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# Camera

# BUYER'S

# GUIDE



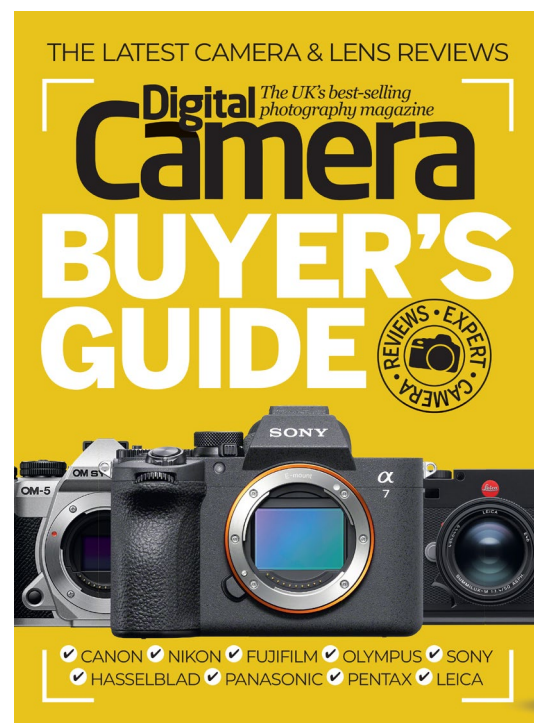
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# Digital Camera BUYER'S GUIDE

REVIEWS • EXPERT  
CAMERA

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**1** The 850D's battery is good for taking 800 shots using the viewfinder; this drops to just 370 shots in Live View.

**2** The built-in pop-up flash has a guide number of 12 at ISO 100, which isn't bad by today's standards.

**3** The 850D is available body-only, or with Canon's decent EF-S 18-55mm f/4-5.6 IS STM kit lens, which gives you a versatile focal range.

# Canon EOS 850D/Rebel T8i

£799/\$749

Can this affordable DSLR fend off competition from mirrorless rivals?

[www.canon.co.uk](http://www.canon.co.uk)

## Specifications

**Sensor:** 24.1MP APS-C CMOS (22.3 x 14.9mm)  
**Image processor:** Digic 8  
**AF points:** 45 cross-type (viewfinder), Dual Pixel CMOS AF (Live View)  
**ISO range:** 100-25,600  
**Max image size:** 6,000 x 4,000px  
**Metering zones:** 384  
**Video:** 4K UHD at 25p, 24p; 1080p (Full HD) at 60p, 50p, 30p, 25p, 24p  
**Viewfinder:** Pentamirror, 95% coverage, 0.82x magnification  
**Memory card:** SD, SDHC, SDXC (UHS-I)  
**LCD:** 3-inch vari-angle touchscreen, 1,040k dots  
**Max burst:** 7.5fps (Live View), 7fps (viewfinder)  
**Connectivity:** Wi-Fi 2.4GHz, Bluetooth 4.1, USB 2.0, mini HDMI, 3.5mm microphone jack  
**Size:** 131 x 103 x 76mm  
**Weight:** 515g body only (with card and battery)

**W**e've been waiting to test the Canon EOS 850D since it was first announced in February 2020. The global pandemic meant worldwide supplies came to a grinding halt; however, while we still wrestle with weekly challenges and evolving restrictions, Canon has been able to finally release the EOS 850D.

The EOS 850D (sold as the Rebel T8i in some countries) is positioned as more of an all-rounder camera for enthusiasts than a true beginner DSLR, though it's equally tempting for existing Canon users stepping up from cameras like the entry-level EOS 1300D/Rebel T6 or 2000D/Rebel T7.

## Key features

Canon is keen to offer photographers easier ways to share images online: the EOS 850D includes 2.4GHz Wi-Fi and Bluetooth Low Energy so you can

connect to your iOS or Android device through the Canon Camera Connect app to edit and share images. From there, content can be downloaded to a smart device, reviewed and posted on social media or shared with friends and family.

Powered by Canon's fast Digic 8 processor, the Canon EOS 850D is a light, versatile and connected DSLR, and is capable of 7fps continuous shooting. It has Canon's tried-and-tested 24.1-megapixel Dual Pixel CMOS APS-C sensor, but what sets the EOS 850D apart from the old 800D/T7i are its Intelligent Tracking (iTR) autofocus technology and, of course, its new 4K movie capability. However, while 4K may be new to Canon DSLRs at this price point, mirrorless cameras in this sector have been 4K-capable for at least one camera generation.

iTR AF aims to improve focusing when you use Face Tracking AF





4

The viewfinder uses a pentamirror design with 95% coverage, which is a little disappointing.

5

The 850D gets a dedicated AF-On button that's long been a favourite on higher-spec Canon DSLRs.

6

The Canon has a control dial on the top, but the 'second' dial is the small multi-controller on the back.



We didn't find the 850D's images to be quite as sharp as those of rival 24-megapixel cameras.



The EOS 850D offers good noise control at higher ISO settings, matching the Fujifilm X-T200 closely.



6

or the new Eye Detection AF in Live View, to help you take better portraits with sharper eyes.

While shooting 'traditionally' using the optical viewfinder (that shows 95% coverage) the autofocus tracking on the EOS 850D benefits from 45-point all cross-type AF, as well as Canon's Dual Pixel CMOS AF.

Naturally, the 850D can shoot raw files, but there's also a C-Raw format that'll produce smaller file sizes, which almost doubles the continuous shooting buffer from 40 to 75 images.

The 850D can record video in Full HD at up to 60 fps, or 4K UHD resolution at up to 25 fps. There's also a detailed set-up for time-lapse movies and automatic scene selection. To counteract the 'jittery shake' associated with handheld movie shooting, the EOS 850D features five-axis Movie Digital IS, for smooth, controlled video capture.

### Build and handling

At 515g body-only, the EOS 850D feels light for a DSLR. Even with the larger EF-S 18-135mm lens attached, it's easy to hold and shoot.

The EOS 850D also comes set up with an easy-to-use Guided menu interface, which explains features like how Aperture Priority mode can be used to blur a background behind your subject or keep a whole landscape in focus.

The 850D's small Quick Control dial is better than the basic four buttons surrounding the Set button on the 800D's rear panel. However, the dial is thinner than on the old EOS 77D or the more upmarket EOS 90D. We found it tricky to use accurately while dialling in exposure compensation in Aperture and Shutter Priority modes. But as you can access all the settings you need via the touchscreen, we'd generally just tap the screen and press the Q button, then tap and adjust specific settings that way.

Focusing using the touchscreen in Live View offers far greater focus control and accuracy: →



Canon cameras don't always score highly in our dynamic range tests, but this one is very good.

“What sets the EOS 850D apart from the old 800D are its Intelligent Tracking autofocus technology and its new 4K movie capability”



## DSLR Canon EOS 850D/Rebel T8i



The 850D's iTR AF system offers fast and effective face and eye tracking in Live View mode.

you have 143 points in automatic mode or 3,975 points in manual selection, thanks to the Dual Pixel CMOS AF system.

### Performance

Shooting action using the 7fps burst rate, Auto Selection AF point selection and AI Servo AF, the EOS 850D did a good job of focusing on children running quickly towards us – one of the trickiest shots to capture, as the focusing distance is rapidly changing. Out of a seven-shot sequence, only one image didn't have our fast-running subject in sharp focus, which is impressive for this level of camera.

Using the optical viewfinder, the EOS 850D's iTR autofocus did a decent job of finding a face in the frame to focus on when using the Auto Selection AF settings. But it's while shooting with Live View that iTR really comes alive. Portraits can be captured with ease,

as you get a Face Tracking target box that tracks and locks around faces, wherever that face is in your frame. For even greater focusing precision, a smaller target box locks on to one of the eyes; you can even choose which eye to focus on.

While the EOS 850D is posited as a 4K camera, its 4K shooting is very compromised. The video quality itself is good, with lots of fine detail resolved. However, filming in 4K means suffering a 1.5x crop and losing Dual Pixel AF – you're reduced instead to a nervous, pulsing, contrast-detect autofocus system. In anything but good lighting conditions it struggles to register subjects, with face and eye detection quite shaky. Employing either digital stabilisation mode invokes further cropping, reducing your frame to about a third of its size with the strongest stabilisation turned on – and it isn't even that stable! **Peter Travers**

## Rival cameras



**Fujifilm X-T200**  
£549/\$799

The mirrorless X-T200's 4K video and much lower price makes the Canon EOS 850D look dated and expensive.  
**Reviewed: issue 233**



**Nikon D5600**  
£579/\$699

The D5600 is older than the Canon EOS 850D and doesn't offer 4K video, but it's a lot cheaper to buy.  
**Reviewed: issue 190**

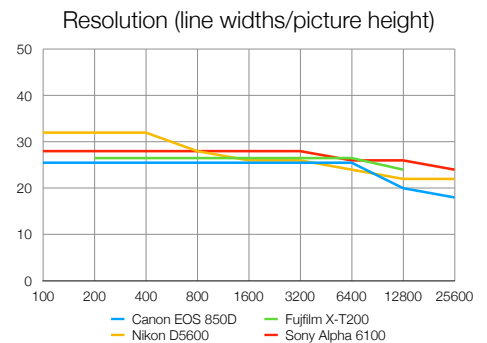


**Sony Alpha 6100**  
£749/\$849

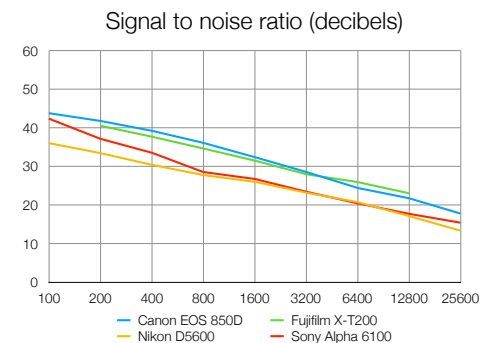
The 6100's styling won't suit everyone, but its speed, AF and video capabilities will.  
**Reviewed: issue bit.ly/dca6100**



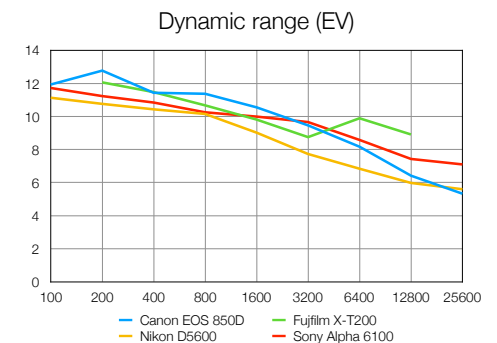
## Lab tests



Even fitting the 850D with a super-sharp Sigma 50mm f/1.4 test lens, we couldn't get the 850D to produce images quite as crisp as those from the Nikon D5600 or the Sony Alpha 6100.



A happy by-product of the 850D's slightly soft images is that image noise is also softened, which makes it look less grainy and distracting. As such, the 850D produces the cleanest images of the bunch here.



The EOS 850D scores well in this test. However, at ISO 3200 and above, the A6100 is the camera to beat. The X-T200's boost at ISO 6,400 only makes sense if background processing is boosting its results.

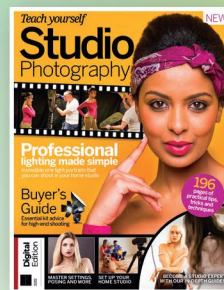
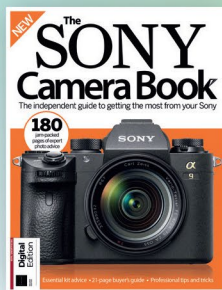
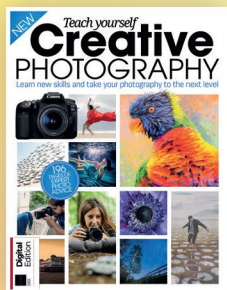
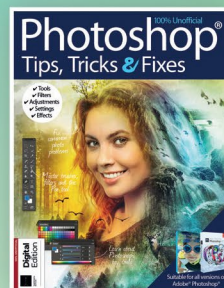
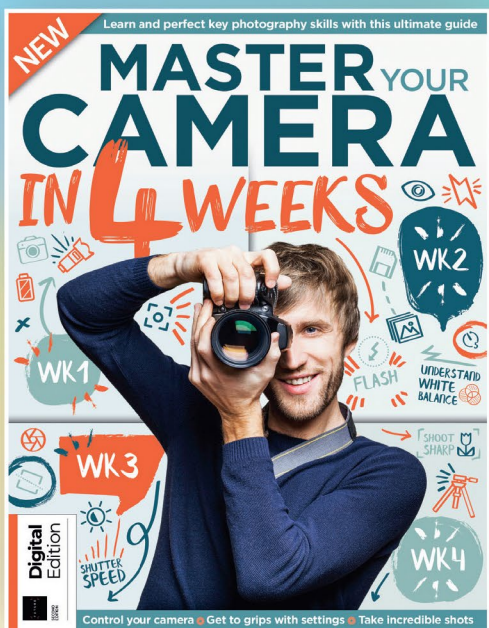
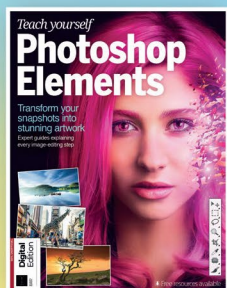
## Digital Camera verdict

**3.0** ★★★★★ Good



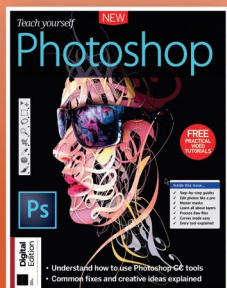
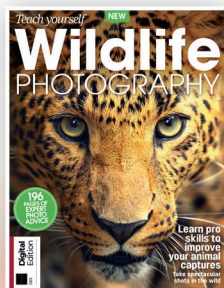
The Canon EOS 850D/Rebel T8i is a decent camera, but a pretty modest update of the EOS 800D/T7i. The addition of 4K video sounds great, but the 4K video crop factor and the lack of Dual Pixel CMOS AF in 4K mode are disappointing. Worse, the 850D has to fight off many cheaper, better rivals.





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**1** Inside the grip is a battery that can capture 1,300 shots in a single charge.

**2** The EOS 90D has an APS-C sensor, but more megapixels than most of Canon's full-frame models.

**3** There's a pop-up flash in the pentaprism housing, with a GN of 12 at ISO 100.

**4** The mode dial has a locking button and underneath is a big but slightly awkward power lever.

# Canon EOS 90D

£1,200/\$1,471 (body only)

In a world of mirrorless cameras, why do they still make DSLRs? Well, when you pick up the EOS 90D and use it, you'll know why...

[www.canon.com](http://www.canon.com)

## Specifications

**Sensor:** 32.5MP APS-C CMOS, 22.3 x 14.8mm

**Image processor:** DIGIC 8

**AF points:** 45 cross-type, Dual Pixel CMOS AF in Live View

**AF modes:** Auto, single point, spot, zone, large zone

**ISO range:** 100 to 25,600 (exp 51,200)

**Max image size:** 6,960 x 4,640

**Metering modes:** Evaluative, centre-weighted, partial, spot

**Video:** 4K UHD at 30p, 25p

**Viewfinder:** Optical pentaprism, 100% coverage, 0.95x magnification

**Memory card:** 1x SD/SDHC/SDXC (UHS II)

**LCD:** 3-inch vari-angle touchscreen, 1.04m dots

**Max burst:** 10fps

**Connectivity:** Wi-Fi, Bluetooth

**Size:** 140.7 x 104.8 x 76.8mm

**Weight:** 701g (body only, with batteries and SD card)

**T**he Canon EOS 90D's 32.5-megapixel sensor has the highest resolution of any APS-C camera you can buy.

That bald fact is likely to dominate any story about Canon's new DSLR, but could actually prove its downfall. More pixels don't always mean better image quality – we'll have more to say about this shortly – but thankfully the EOS 90D has plenty more to shout about.

For a start, this is Canon's first camera to follow a new and exciting development in digital cameras – combining high resolution with high frame rates. Not only does the EOS

90D beat any APS-C Canon before it for megapixels, it can do this at ten frames per second. Before, the only APS-C Canon capable of this was the EOS 7D Mark II, an out-and-out sports model whose future now looks uncertain to say the least.

In fact, it looks likely that the EOS 90D represents a merging of two previously separate Canon DSLR lines – the EOS 80D and the EOS 7D Mark II. The EOS 90D is most like the EOS 80D in its design and construction – and pricing – but pretty much thrashes the EOS 7D Mark II in all but autofocus specifications. But it's not just about the frame rate. The EOS



5

The rear screen is touch sensitive and on a vari-angle pivot for maximum versatility.

6

The joystick controller is new, and inherited from Canon's higher-end DSLRs.

7

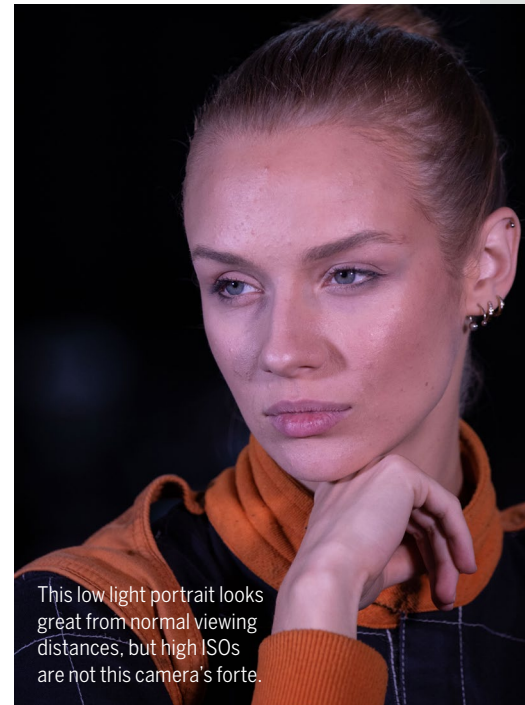
The rear control dial spins around the D-pad not on it, so there's no danger of pressing buttons accidentally.

8

This row of four buttons controls the AF mode, drive mode, ISO and metering mode.

9

The top status panel displays shooting data clearly, and has a small backlight button.



This low light portrait looks great from normal viewing distances, but high ISOs are not this camera's forte.

movie live-view lever, playback and trash buttons and a control lock lever to prevent accidental changes. That's a lot of buttons, and yet the EOS 90D still doesn't feel crowded.

The rear touchscreen is fully articulating with a side pivot, so that does mean the screen is off to the side of the camera for angled shots and not on the optical axis, but it gives a lot more flexibility for vertical shooting. The touch-responsiveness is very good, and if you enable the touch shutter mode there's almost no delay between tapping the screen and the camera focusing and firing the shutter.

Everything about the EOS 90D's operation feels honed to perfection. There are a couple of minor niggles, such as what feels like an over-large power lever awkwardly placed under the main mode dial, and the mode dial itself looks and feels like it belongs on a cheaper camera, but neither is a deal-breaker.

## Performance

The design and operation of the EOS 90D might be nigh-on perfect, but things take a slightly different turn with its performance. Our lab tests show very good resolution for an APS-C camera, but it's matched or nearly matched by a number of rival cameras with 24 megapixels. Canon's new sensor does not provide

90D also shoots 4K video – and not in the irritating crop mode previously seen on Canon cameras, but using the full sensor width at last. Now, you don't get an instant crop factor when you switch to 4K video, and your wide lenses stay 'wide'!

There's something else worth pointing out, too. The EOS 90D uses Canon's Dual Pixel CMOS AF system, as used to great effect on its mirrorless cameras, so when you switch the EOS 90D to live view mode, it's at no autofocus disadvantage at all compared to a mirrorless camera. In fact you could say that the EOS 90D is the equal of any mirrorless camera, but with the advantage of an optical viewfinder.

## Build and handling

The EOS 90D has an unashamedly meaty feel. We're constantly being told how mirrorless cameras are lighter, smaller and more comfortable to carry around than a DSLR, but the Canon counteracts that with its own qualities. The EOS 90D is thick and chunky, but with plenty of space for

plenty of controls. Its smoothly contoured profiles and grippy textured surfaces give your hands and fingers more surface area and leverage: paradoxically, this larger and heavier camera is more comfortable to carry around one-handed than many mirrorless cameras half its size.

Canon has been designing DSLR controls for a long time, and it shows. The twin-dial setup has a narrow knurled wheel on the top of the grip and a second dial on the back of the camera around the four-way D-pad. Both work well. Four buttons in front of the top LCD panel control the AF mode, drive mode, ISO and metering pattern, while another button the other side of the top control dial adjusts the AF area. There is another AF area button on the back, alongside buttons for AE/AF lock and an AF-ON function.

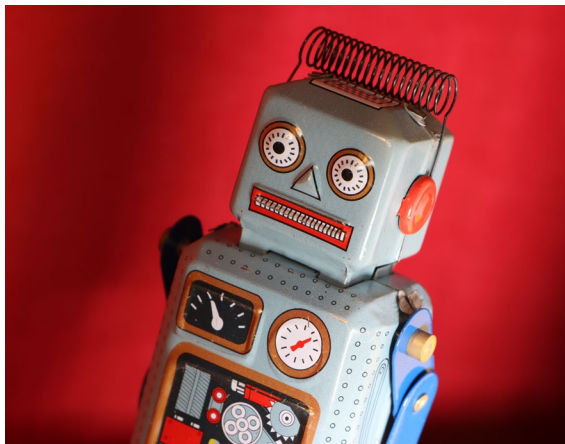
Canon has added a joystick controller from its higher-end DSLR models, and the back of the camera also has Menu and Info buttons, a Q menu button, a combined stills/



## DSLR Canon EOS 90D



Fast movement towards the camera proved challenging for the AF system, but static subjects (below) are no problem.



the definitive step up in resolution that the figures left us hoping for.

Worse, the increased pixel density does appear to have had an effect on the EOS 90D's high ISO performance. Images look good – at a distance – right up to ISO 6,400 or even 12,800 (ISO 25,600 is a bit of a push).

But if you take a closer look it's apparent that fine-textured detail is starting to smooth over as early as ISO 1,600. The EOS 90D can take great-looking images right across its ISO range, but if detail is important in low light, you'll be better off with a

tripod and a lower ISO setting. These factors make the EOS 90D's headline-grabbing 32.5MP feel a little bit hollow. The results are great, but no breakthrough, and there's a price to be paid in sensitivity.

The lab tests (opposite) suggest the EOS 90D matches the older EOS 80D for noise levels across the ISO range, but this test does not measure textural resolution, which is one of the reasons why we do real-world tests, too.

Does the EOS 90D produce better-quality images than the EOS 80D? Possibly, depending on the circumstances. What it can do, though, is capture content that the EOS 80D can't, thanks to its 10fps continuous shooting and 4K video capability.

10fps continuous shooting is quite an achievement, especially in a camera with such a high-resolution sensor and priced for the enthusiast market, not for professionals.

But for high-speed shooting a high frame rate is not enough on its own. You also need a good AF system and a good buffer capacity.

The EOS 90D uses Canon's mid-range 45-point AF system. It's good, but it's not the same as the top-tier 65-point AF system on the EOS 7D Mark II. It proved pretty good in our tests, though struggled somewhat with a dog playing fetch,

## Rival cameras



**Fujifilm X-T3**  
£1,199/\$1,499

Fujifilm's current APS-C flagship costs more than the EOS 90D, but its 4K video capabilities are far more advanced. It's also smaller and lighter and uses Fujifilm's trademark 'classic' controls. Reviewed: issue 210



**Nikon D7500**  
£949/897

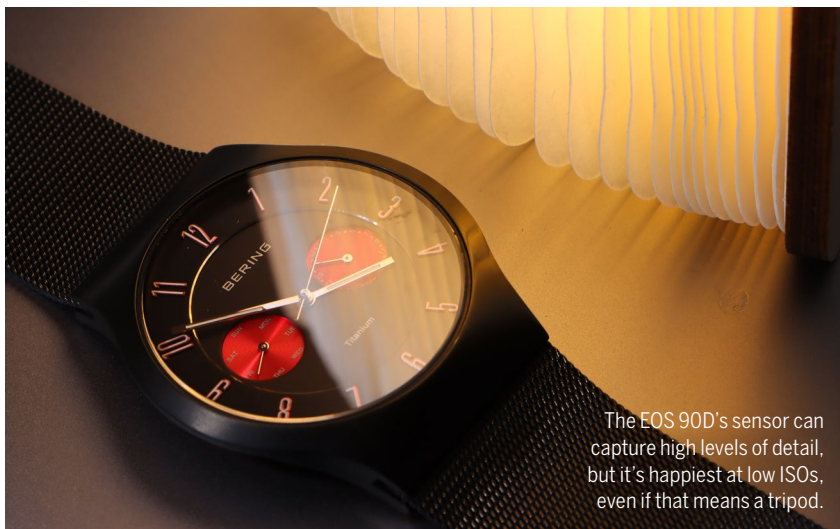
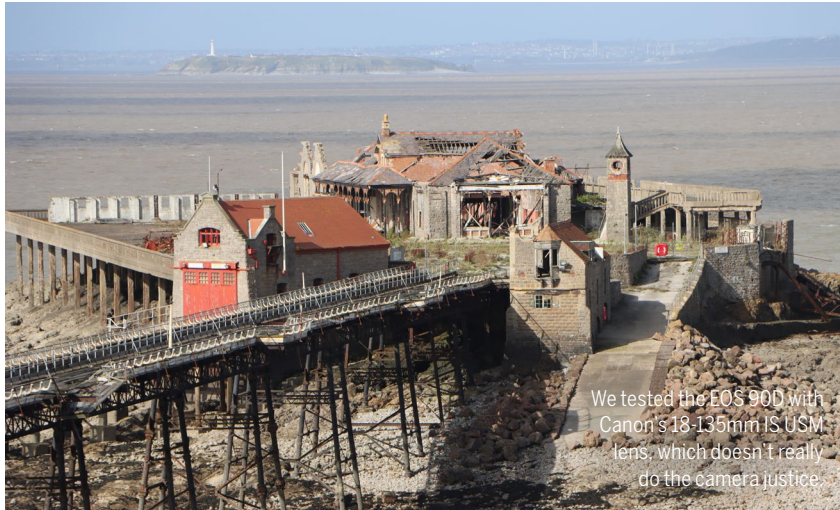
The D7500 looks distinctly underpowered next to the EOS 90D, with 'just' 20 million pixels and 8fps continuous shooting. But it's a strong, wieldy camera and it is cheaper. Reviewed: issue 193



**Sony A6400**  
£929/\$898

The A6400 is a vlogging specialist that offers the same kind of 4K video features as the EOS 90D, but in a smaller package. It's also pretty handy for stills photography, too. Reviewed: issue 215





especially running towards the camera – a faster lens (we were using the bundled 18-135mm STM kit lens supplied with the camera) might help, plus a bit more practice (and a slower, less agile dog)!

The other issue is the buffer capacity. 25 RAW files or 68 JPEGs is not much. At a frame rate of 10fps, the camera hits slow-down after just 2.5 seconds or 7 seconds respectively. You don't have much of a window to time your bursts, especially if you want to shoot RAW files. This is why specialist sports cameras like the Nikon D500 and its 200-shot RAW buffer capacity cost more.

The fact that the EOS 90D can shoot continuously at 10 frames per second is brilliant, but it would be unfair to expect it to match proper sports-focused cameras just because the frame rate is the same.

The biggest step forward for the EOS 90D is uncropped 4K video. It's not the first Canon camera to shoot 4K video, but previous models have

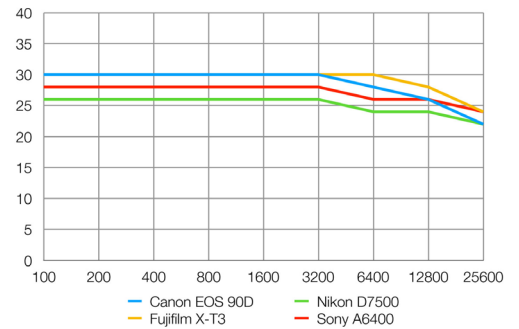
used hefty crop factors when switching to shooting in 4K, so that your lenses effectively become 'longer' and your wideangle lenses aren't wide any more.

The EOS 90D, however, uses the full width of the sensor for 4K video capture. The wider 16:9 aspect ratio means you inevitably lose a little image height, but the horizontal angle of view remains the same.

These days there's an assumption that to shoot video you should get a mirrorless camera, but the EOS 90D's Dual Pixel CMOS AF means that it's at no disadvantage to a mirrorless camera at all in live view/video mode. What's more, the 90D doesn't just have an external mic socket but a headphone socket, too. Video isn't an afterthought for this camera – it's designed specifically for serious videography. There's one other thing, though: Canon says the EOS 90D can shoot HD video at up to 120fps (or 4x slow motion speed). It can, but not with continuous AF. **Rod Lawton**

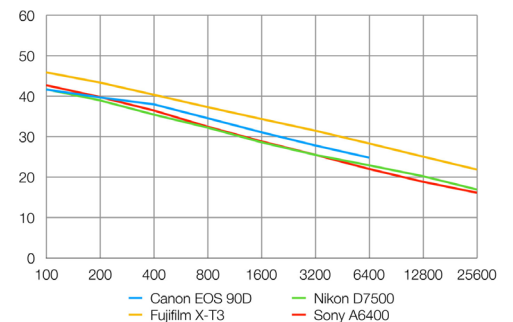
## Lab tests

Resolution (line widths/picture height)



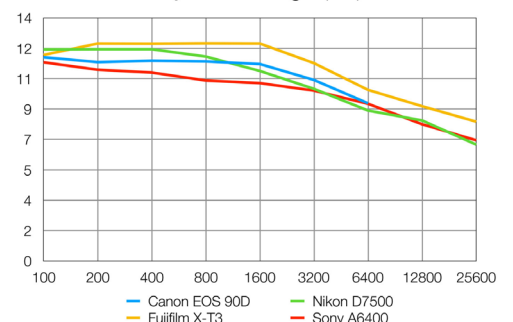
The EOS 90D shows a clear resolution advantage over its nearest rival in the Nikon DSLR camp, the D7500, but it was matched by the 26MP Fujifilm X-T3.

Signal to noise ratio (decibels)



The EOS 90D does pretty well for noise control in our lab tests, beating the Nikon and the Sony, though not the Fujifilm X-T3.

Dynamic range (EV)



The Fujifilm X-T3 shows a small advantage here. The Nikon D7500 does better than the EOS 90D at low to medium ISOs, but swings the other way at ISO 800.

## Digital Camera verdict

**4.5** ★★★★★ Outstanding



The real-world resolution gain isn't great and there's an impact on high ISO detail rendition, but the EOS 90D's build, handling, features and price are perfect.



## Mirrorless Canon EOS R100



**1**  
Designed to tempt upgraders from smartphones, the R100 has a comfortable grip.

**2**  
Its RF-S lens mount accepts RF-S lenses natively, but full-size RF variants will also fit.

**3**  
Images are captured by a 24.1MP CMOS APS-C sensor, paired with a Digic 8 processor.

# Canon EOS R100

£670/\$600 (with RF-S 18-45mm F4.5-6.3 IS STM lens)

A step up from a smartphone in terms of image quality

[www.canon.co.uk](http://www.canon.co.uk)

### Specifications

**Lens mount:** Canon RF-S  
**Sensor:** 24.1MP APS-C CMOS  
**Image processor:** Digic 8  
**AF points:** Dual Pixel CMOS AF (88% coverage)  
**ISO range:** 100 to 12,800 (exp to 25,600)  
**Stabilisation:** Electronic (Movie Digital IS)  
**Video:** 4K up to 25p (1.55x crop), 1080p up to 60p (uncropped), 720p up to 120p • Vertical video  
**Viewfinder:** 2.36m dots, up to 60fps refresh rate, 0.95x magnification  
**Memory card:** 1x SD/SDHC/SDXC UHS-I  
**LCD:** Fixed 3-inch (non-touch) screen, 1.04m dots  
**Max burst:** 6.5fps (3.5fps with AF)  
**Connectivity:** Wi-Fi, Bluetooth, Micro HDMI, microphone jack  
**Dimensions:** 116.3 x 88.1 x 58.7mm  
**Weight:** 356g (with battery and memory card)



The Canon EOS R100 is a camera we've been waiting for since the R system first launched – an affordable, entry-level model that's simple enough for families to capture treasured shots as easily as on their phone, yet advanced enough to grow with someone as their photography skills develop.

The Canon EOS R100 is simple enough for a first-timer to shoot great images in Auto, but it reveals its real strengths in semi-automatic and manual modes, where you can start getting creative in ways that aren't possible on a smartphone. The R100 replaces the best-selling Canon Rebel SL2/Canon EOS 200D as well as the Canon Rebel T7/Canon EOS 2000D and is the most affordable entry point into the company's EOS R camera system – along with its impressive range of Canon RF lenses.

### Key features

Staking its claim as one of the best cameras for beginners, the Canon EOS R100 eschews many advanced camera features in favour of streamlined simplicity. Aimed at newcomers to cameras or those who primarily take photographs on a phone, the R100 boasts a guided user interface with friendly and helpful menus to make it easy to get the camera do what you want it to.

If you're unfamiliar with camera settings, you needn't worry. The menus offer descriptions of the various modes as well as on-screen examples of what you can expect – making it a breeze to get shooting right away. Features such as Creative Assist allow you to make adjustments to contrast, background blur and brightness without needing to know about settings. When you're ready to delve into semi-automatic or manual



## Canon EOS R100 Mirrorless



4

As befits a camera at this price point, there's no AF-On button where you'd expect to find it.

7

The R100 is fitted with a universal flash shoe, which widens the choice of accessories.

5

The rear LCD is a fixed 3-inch unit (no tilt or swivel) with a display that can be customised.

8

Press the rear pad to switch the top plate control wheel between different modes.

6

Use this rear pad to dial in ISO, drive mode, exposure compensation and adjust flash power.

9

Selecting different modes is simple, with options for beginners alongside PASM.



James Artalus

Features such as Creative Assist allow you to make adjustments to contrast, background blur and brightness without needing to know about settings.

mode, the exposure dial puts control at your fingertips. But don't view the streamlined features and single dial as signs of an underpowered camera – the R100 is highly capable.

Its 24.1MP APS-C image sensor is an optimised version of the one found in the Canon EOS M50 Mark II, with which the R100 shares a few similarities. It packs plenty of data and detail into your shots while enabling you to achieve shallow depth of field. If you're shooting faraway subjects, like wildlife or sports, the sensor's 1.6x crop factor will magnify the focal length of your lenses for greater reach.

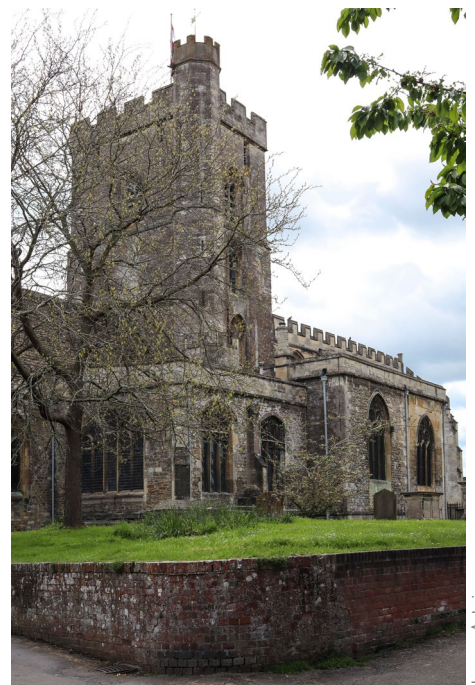
Despite being surpassed by the latest EOS R cameras, the R100's Dual Pixel Autofocus is the same hybrid AF system that powers professional DSLRs like the Canon EOS 5D Mark IV, so it's rock-solid and reliable. While it's aimed primarily at stills shooters, the R100 captures both Full HD and 4K video – both in a vertical orientation as well as horizontal, for quick and easy sharing and uploading.

However, it should be noted that 4K invokes an additional crop factor (of 1.55x) on top of the existing APS-C crop (of 1.6x), meaning that your footage will look 'zoomed in' and you will need to use an ultra-wide lens like the Canon RF 16mm f/2.8 STM to maintain a wide field of view. In addition, Dual Pixel AF is available when shooting in Full HD but not in 4K, when it uses a more choppy contrast-detect autofocus system.

### Build and handling

The camera is similar in size, shape and layout to the Canon EOS R50, which sits between the Canon EOS R100 and the more advanced Canon EOS R10 in the product hierarchy.

It is a compact camera, even by mirrorless standards, complemented by a range of suitably sized compact lenses – including the Canon RF 28mm f/2.8 STM pancake lens, which was released at the same time as the R100. The camera is at its most portable and effective when



James Artalus

Exert some degree of manual control and you can really start experimenting with things like depth of field and freezing or blurring fast-moving images.



## Mirrorless Canon EOS R100



James Artaius

With a 24.1MP sensor, the R100 can pack plenty of data and detail into your shots. If you're shooting fast-moving and faraway subjects, such as wildlife or sports, then the sensor's 1.6x crop factor will magnify the focal length of your lenses, giving you greater reach.

paired with these lightweight prime lenses, as well as the Canon RF-S 18-45mm f/4.5-6.3 IS STM kit lens with which it is bundled.

The controls are simple and sensibly laid out. We like the On/Off switch being anchored to the mode dial on the right-hand side of the camera, making it easy to quickly power up the camera with one hand,

ready to start firing frames, so you don't miss a moment. A pop-up flash is built into the top of the camera body, making it possible to keep taking shots at night or when shooting indoors with poor illumination. On top of the flash is a hot shoe, allowing you to mount accessories such as flashguns or vlogging microphones if you want.

Our only reservations about the R100's handling are that the rear LCD screen has no touch functionality. While this is fairly standard on entry-level cameras, the R100 is marketed at people who take pictures on their phone and will expect to be able to tap the screen to take a photo or change a menu setting. We also occasionally nudged the mode dial when adjusting the exposure – not a huge problem, but something worth being aware of.

## Rival cameras



**Fujifilm X-T30 II**  
**£769/\$899**

Old-school shutter speed and aperture dials and terrific images, but the lack of in-body image stabilisation is a shame. Reviewed, issue 251



**Nikon Z 30**  
**£699/\$707**

A capable offering at an attractive price, the Z 30 is a dedicated point-and-shoot video camera that won't break the bank. Reviewed, issue 260



**Sony A6100**  
**£749/\$748**

Packs a host of improvements over the A6000 – but at nearly twice the price, they don't come cheap. Review: [bit.ly/dcw\\_a6100](https://bit.ly/dcw_a6100)



## Performance

When it comes to imagery, it's hard to fault the Canon EOS R100. Whether shooting in Auto, semi-auto or full manual mode, it takes a cracking shot. The automatic modes behave much as a phone does, choosing the optimum settings to ensure a well-exposed image with minimal camera shake and the benefit of a shallow depth of field.

Exert some degree of manual control and you can really start experimenting with things like depth of field and freezing or blurring fast-moving images. Either way, you get pristine images packed with rich



## Canon EOS R100 Mirrorless



James Artaius

Touch Shutter shooting on the rear screen could have been useful here – it's surprising that a camera aiming to attract smartphone users lacks the functionality of a touchscreen LCD.



James Artaius

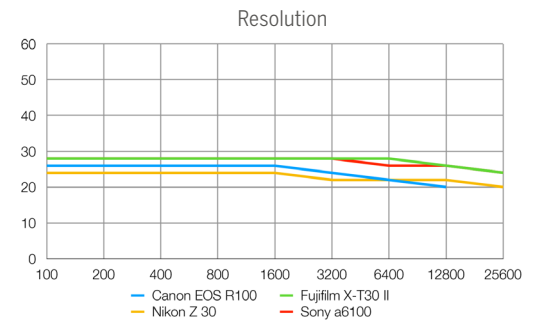
Like its Canon stablemates, the R100 captures images with punchy colours – and with the ability to capture raw files, newcomers to photography can get even more creative in editing.

colour and plenty of detail, thanks to the 24.1MP image sensor. And with the ability to capture raw files, you can get more creative with editing.

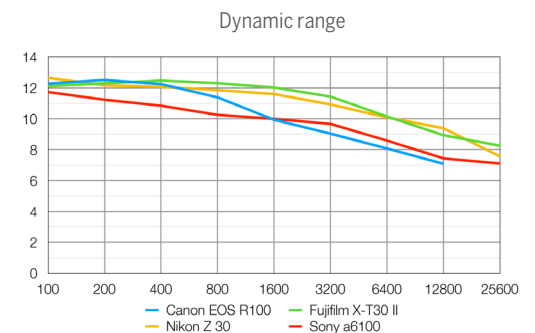
The only real limitation is its ISO range. The top end of ISO 12,800 (expandable to ISO 25,600) is fairly conservative, meaning grain will be introduced much sooner if you're shooting in low-light conditions and relying on the ISO setting alone to expose your images. The autofocus is robust and reliable, as we'd expect

from Canon's Dual Pixel AF, especially with its Face+ Tracking with Eye Detection. It's unfortunate that Dual Pixel isn't available when shooting 4K – with the additional crop factor, 4K video feels less than optimum. Two unheralded features of the R100 are the 4K Frame Grab, which lets you extract a still frame from your 4K footage, and Hybrid Auto, which takes two to four seconds of video when you take a pic and compiles clips of your day out. **James Artaius**

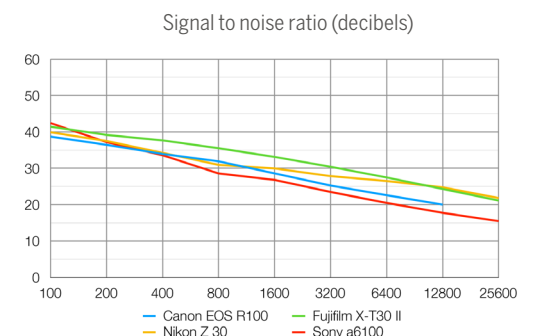
### Lab tests



The 24.1MP EOS R100 largely falls into line between the 20.9MP Z 30 and 26.1MP X-T30 II when resolving fine detail. The 24.2MP A6100 does well to match the slightly more pixel-packed X-T30 II in this test.



The R100 captures excellent dynamic range at lower sensitivities. At ISO 800 and above it can't compete with the Nikon or Fujifilm cameras, capturing around 2EV less dynamic range at higher sensitivities.



The R100's images exhibit similar noise levels to the Nikon Z 30 at lower sensitivities, but the Z 30's high-ISO shots are cleaner than those of the Canon.

### Digital Camera verdict

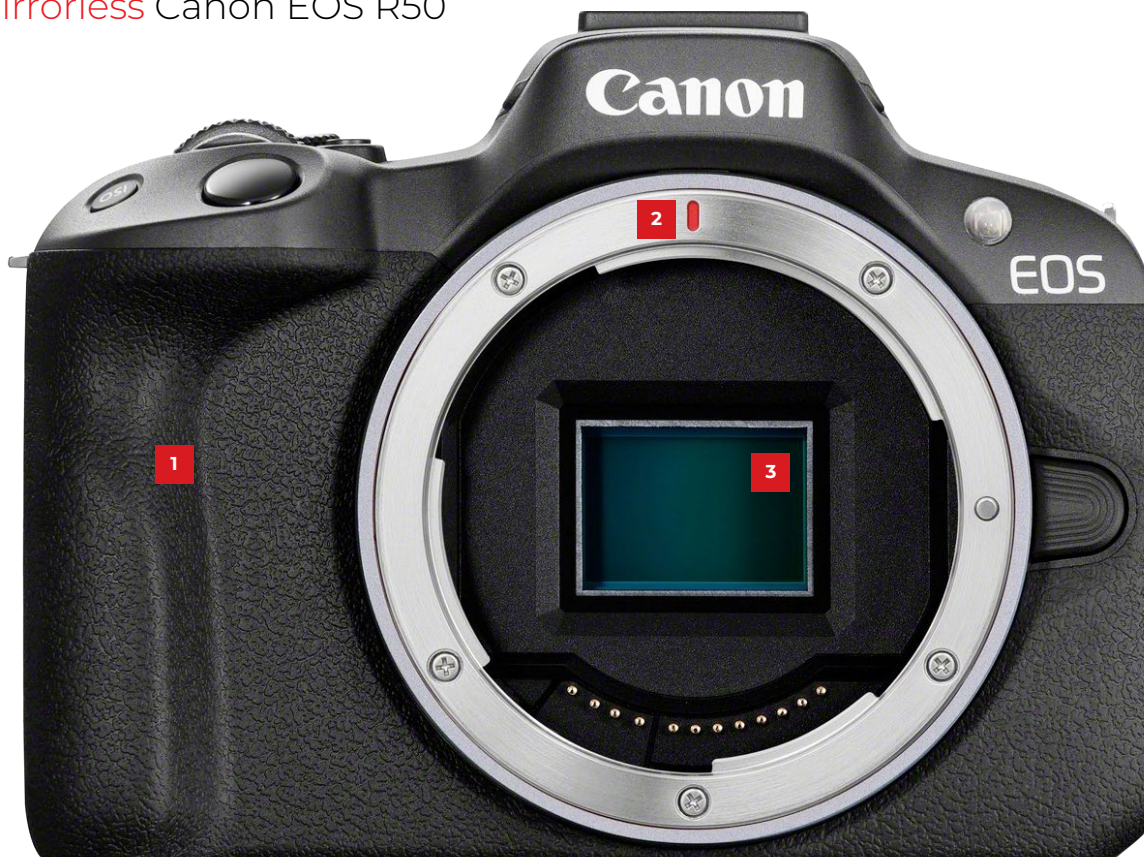
4.5 ★★★★★ Outstanding



The Canon EOS R100 is a capable mirrorless camera that's great for beginners, with simple controls and useful features, but also allows you to unlock new abilities. Aimed at anyone who wants to take better pictures than they can on a smartphone, its launch price makes the EOS R100 the most compelling entry-level APS-C camera on the market right now.

“When it comes to imagery, it's hard to fault the EOS R100. Whatever mode you choose, it takes a cracking shot”





**1** The EOS R50 has a compact form factor, and the hand grip is correspondingly small.

**2** Three RF-S mount lenses are available, but RF mount optics are also compatible.

**3** A 24.2MP APS-C sensor (the same as the EOS R10's) takes care of stills and video capture.

# Canon EOS R50

£789/\$679 (body only)

An M50 ported to the RF-S mount – with big improvements

[www.canon.co.uk](http://www.canon.co.uk)

## Specifications

**Sensor:** 24.2MP APS-C (1.6x crop)

**Lens mount:** Canon RF, RF-S

**Image processor:** Digic X

**Autofocus:** Dual Pixel CMOS AF II

**AF points:** 4,503 AF positions (3,713 for video)

**ISO range:** 100-32,000 (exp to 51,200)

**In-body image stabilisation:** None

**Max image size:** 6,000 x 4,000px

**Metering modes:** Real-time with image sensor, 384-zone metering; 4 modes incl Evaluative & Spot

**Video:** 1080p up to 120p, 4K up to 30p (uncropped)

**Viewfinder:** 0.39 OLED EVF, 2.36 million dots

**Memory card:** 1x UHS-I SD

**LCD:** 2.95-inch fully articulating touchscreen, 1.62 million dots

**Max burst:** 15fps electronic shutter, 12fps mechanical

**Connectivity:** Wi-Fi, Bluetooth (4.2), Canon Camera Connect, Multifunction Shoe, micro HDMI, USB-C, microphone

**Size:** 116.3 x 85.5 x 68.8mm

**Weight:** Black: 328g body only (375g with card and battery). White: 329g (376g)



anon might not be willing to admit it, but the EOS R50 seems to indicate that the EOS M experiment is over. If nothing else, it's pretty inarguable that the R50 is the spiritual replacement for the EOS M50 Mark II.

The EOS M range of cameras sold exceptionally well, being the favourite tool of many a vlogger and travel photographer who wanted a small social media-oriented camera.

Whether Canon ever took the EOS M seriously is up for debate, releasing more camera bodies than it ever made lenses – and a new lens for the EF-M mount has not been released since 2018.

However, Canon has avoided repeating the same mistakes with its second attempt at mirrorless cameras; in only five years it has released 13 EOS R bodies and

33 RF-mount lenses, and there are no signs of this slowing down.

Still, while the Canon EOS M50 will continue to be sold, the EOS R50 manages to supersede its spiritual predecessor in almost every way.

## Key features

The EOS R50 produces 24.2MP still images using its APS-C-sized sensor – which is the same one featured in the EOS R10. It is also capable of 15 frames per second continuous shooting speeds using the electronic shutter, which is incredibly quick and would have been unthinkable for a camera of this size and cost just a few years ago.

The EOS R50 uses the Canon RF mount, which supports RF-S lenses designed for its APS-C lineup of cameras – so it goes without saying that EF-M mount lenses for EOS M cameras will not work with this



## Canon EOS R50 Mirrorless



- 4** Shoot from many different angles with the rear touchscreen.
- 5** Fully articulating, it offers 1.62 million dots of resolution.
- 6** There's an AF point selector and AE lock, but no AF start button.
- 7** Content creators will love the dedicated video recording button.
- 8** The PASM mode dial keeps things simple, with just nine positions.
- 9** Accessories can be charged through the Multifunction Shoe.



Subject Blur Guide is a new feature on the EOS R50. Track the horizontal green line with the camera and the R50 optimises settings for better panning shots.

one, meaning that those hoping for a quick upgrade from the M50 or M50 Mk II might be disappointed.

Canon's APS-C sensors have a crop factor of 1.6x (unlike the standard 1.5x crop of APS-C sensors from other manufacturers), meaning that the same focal length displayed on your lens is narrower than on a full-frame camera, so this is something to bear in mind if you like to shoot very wide.

Video can be captured in 4K 30p, which has been oversampled from 6K, or in Full HD (1080p) up to 120p. The R50 uses the entire width of the sensor, so there is no forced video crop, though there is the aforementioned 1.6x APS-C crop.

The R50 has no in-body stabilisation, but can use Canon's digital stabilisation system, or employ the optical stabilisation present in most of Canon's lens lineup. The camera possesses Canon's insanely

good Dual Pixel Autofocus, but it is a pared-down AF and does not have the latest subject-tracking additions from Canon's higher-spec cameras, including horses or aeroplanes. It does have face and eye detection, though it lacks Canon's automatic eye priority (which switches between a subject's closest eye during video recording).

The R50 comes with the new Multifunction Shoe, and the usual selection of ports, including a micro HDMI, USB-C connector and a 3.5mm mic jack. There are several wireless connectivity options, with

“The EOS R50 supersedes the M50 Mark II in almost every way”



Taken on an R50 with a Canon EF 50mm f/1.8 STM, used via an EF-EOS R mount adapter, the camera's sensor has captured a pleasing fall-off in focus.



## Mirrorless Canon EOS R50



Handheld Night Scene



Full Auto

To provide smartphone-esque ease of use, the EOS R50 offers new or enhanced automatic modes, including Handheld Night Scene. The final result when using this mode (left), which captures multiple frames and merges them automatically, is usable straight from the camera – a capture using full Auto is shown on the right.



Single frame



Final image

built-in Wi-Fi, Bluetooth 4.2 and the image.canon cloud service.

There are specific features for content creation, such as a selectable aspect ratio for social media (like natively shooting in 16:9). The R50 can also shoot in vertical orientation and save the end result in a vertical orientation, for immediate use in mobile apps like TikTok.

There are new creative options in Scene Intelligent Auto. Creative bracketing is one new example, enabling you to automatically apply different creative filters to your images, giving a choice of effects. The camera also has a Panoramic mode, which will automatically stitch several images into one panoramic photo.

Focus bracketing is another feature found within the new Advanced A+ mode, accessed via Scene Intelligent Auto. It takes multiple frames, using different focus positions, and merges them automatically.

### Build and handling

If you didn't think the EOS R10 could shrink down any further, then think again. The EOS R50 is an even more miniature version of that camera, and it sits very much in the EOS R family of styling, dropping the more boxy hard edges from the M50 for smooth curves. A few buttons from the R10 have fallen by the wayside, with the R50 more closely resembling its EOS M brethren. On the top there is just one control wheel, a mode select dial, an ISO button, and a record button. On the rear of the camera there is no joystick, but the usual selection of buttons is there, matching the M50. The inclusion of an articulating touchscreen will make vlogging and shooting at awkward angles much easier.

Looks-wise, Canon has stuck to its guns with the R50; it looks very much like a Canon camera. For a camera that has a big focus on vlogging, it is notable that Canon has not tried to make this look a little more on-trend with today's image-conscious influencers, who tend to covet classic-looking camera bodies.

## Rival cameras



Canon EOS M50 Mk II  
£599/\$599

Compact and capable, takes great stills and 1080p video, although its 4K mode is too compromised.  
Reviewed: issue 242



Nikon Z 30  
£678/\$706

A dedicated point-and-shoot video camera, the 20.9MP Z 30 is well built and is a capable offering at an attractive price.  
Reviewed: issue 260



Sony A6100  
£679/\$748

Upgrade to the A6000 entry level APS-C CSC, with new 24.2MP sensor, image processor and hybrid AF system.  
[www.bit.ly/dca6100](http://www.bit.ly/dca6100)



### Performance

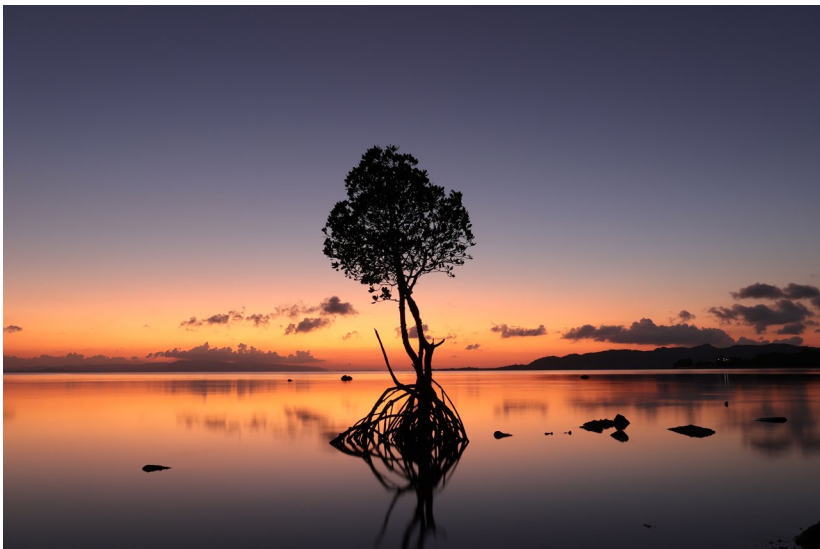
The R50 shares the same 24.2MP APS-C sensor and Digic X processor as the R10. With a focus on vlogging and hybrid content creation, it is great to see that the R50 uses the full width of its sensor to capture oversampled 4K footage. Gone is the frustrating video crop that has plagued previous Canon cameras like the M50, although you still need to deal with the 1.6x crop from using an APS-C sensor.

That 1.6x crop can come in handy, though, and with fast 15fps burst shooting you can even use this camera for some wildlife and sports

## Canon EOS R50 Mirrorless



The EOS R50 is available in a bundle with an RF-S 18-45mm IS STM kit lens, but this image shows what it can produce when using a prime lens (the RF 50mm F1.8 STM) for portraiture.



A 3.2-second exposure at f/11, ISO 100, using an RF-S 18-45mm F4.5-6.3 IS STM lens at 18mm, showcases the capabilities of Canon's famed colour science.

photography, with more affordable optics like Canon's RF 600mm f/11 IS STM and RF 800mm f/11 IS STM being more appropriate-sized telephoto lenses for such a miniature camera. This actually puts it as a faster readout than the EOS R5, which just shows how fast camera technology is

“Faster and more seamless content creation cement the purpose of the EOS R50”

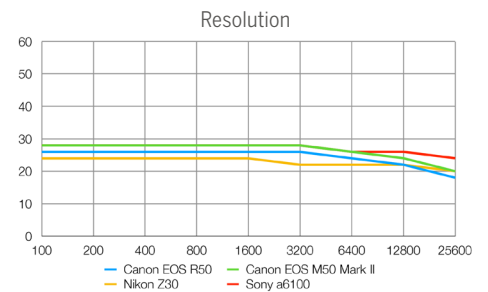
moving, and how quickly new developments trickle down to the lower end of the market.

Social media-focused additions such as vertical video shooting and creative filters are very welcome additions that should make content creation even faster and more seamless and cement this camera's purpose.

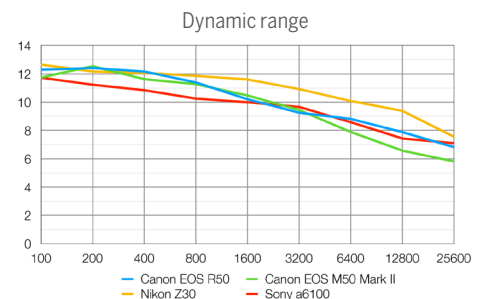
One thing you won't find on this video-focused camera is in-body stabilisation, which is a shame, but that is not unexpected at this price point. However, the camera does make use of Canon's in-built digital stabilisation at the expense of a tighter crop, or you can rely on the optical image stabilisation to be found in the latest Canon RF and RF-S lenses.

**Gareth Bevan**

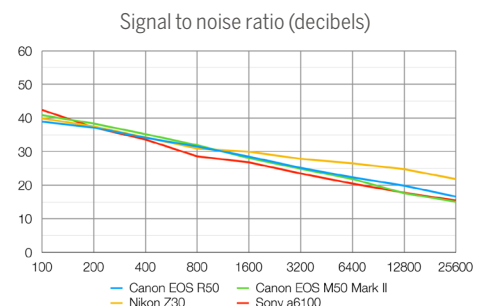
### Lab tests



Both Canon cameras and the Sony have sensors with a pixel count of approximately 24MP. Consequently these three models resolve very similar amounts of fine detail, and narrowly outperform the 20.2MP Z



Against the M50 Mk II, the R50 captures around 1EV extra dynamic range at ISO 6400 and beyond. Both Canons can't match the Nikon here; its lower MP count results in larger, more light-sensitive pixels.



The two Canons are virtually inseparable throughout the tested sensitivity range. Again, the Z 30 makes use of its lower MP count to produce images that are less noisy than those from the R50 at higher

### Digital Camera verdict

4.5 ★★★★★ Outstanding



The Canon EOS R50 is the perfect companion for content creators and travellers who want a small and simple-to-use camera. With a solid spec sheet, including 24.2MP still images and 4K video, you can get a lot of quality from this tiny camera. And with the guided user interface and the straightforward menu system, the R50 couldn't be simpler to use.





**1** The EOS R6 Mark II boasts a maximum burst rate of 40fps (electronic shutter).

**2** It is built around a new 24.2MP full-frame sensor – a step up from 20.1MP on the R6.

**3** The handgrip houses an LP-E6NH battery, which is CIPA rated for at least 580 shots.

# Canon EOS R6 Mark II

£2,779/\$2,499 (body only)

This 40fps speed demon makes mincemeat of other hybrids

[www.canon.co.uk](http://www.canon.co.uk)

## Specifications

**Sensor:** 24.2MP full-frame CMOS  
**Mount:** Canon RF  
**Image processor:** Digic X  
**AF points:** Dual Pixel CMOS AF II  
**Image stabilisation:** 5-axis IBIS, up to 8 stops  
**ISO range:** 100-102,400 (exp 50-204,800)  
**Max image size:** 6000 x 4000 pixels  
**Max video resolution:** 4K HQ 60p, 1080p 180p  
**Viewfinder:** 3.69m dot OLED, 0.5 inch, 100% coverage, 120fps refresh  
**Memory card:** 2x SD UHS-II  
**LCD:** 3-inch, 1.62m dot, vari-angle touchscreen  
**Shutter speeds:** 1/16,000-30s  
**Max burst:** 12fps mechanical shutter, 40fps electronic  
**Connectivity:** USB-C, wireless LAN, Bluetooth, HDMI micro out (Type D)  
**Size:** 138.4 x 98.4 x 88.4mm  
**Weight:** 670g (incl battery and memory card)

If the Canon EOS R6 Mark II was an animal, it would pack teeth like switchblades, razor-sharp talons, a venom sac and the footspeed to chase down anything foolish enough to draw its attention.

Indeed, while the Canon EOS R6 Mark II is almost a top-to-bottom specs improvement over the original Canon EOS R6, in terms of that last point it manages to outpace even the mighty Canon EOS R3 – boasting an amazing 40fps continuous shooting speed. This actually outguns both the Sony A1 and Nikon Z 9, too, unless you count the Z 9 cheating by shooting 11MP images.

Still, the Canon EOS R6 Mark II is about more than just sheer speed. From its full-width, 6K-oversampled video to the brand-new 24.2MP sensor to the ability to pre-record both stills

and video, so you don't miss a microsecond of the action, this is the most fully loaded mid-range camera on the market.

## Key features

As noted, the Canon EOS R6 Mark II is a step up from the R6 in a great many ways. Chief among these is in terms of resolution, with a brand-new image sensor boasting 24.2MP (compared to the 20.1MP of the original).

The maximum continuous shooting speed has doubled, from 20fps to 40fps (when using the electronic shutter; mechanically it still sits at 12fps), which records both JPG and RAW images.

The new sensor enables the camera to capture full-width 4K 60p video (including 4K 60p HQ, downsampled from 6K), as well as 1080p footage at up to 180p – an increase from its predecessor's 120p recording. If

## Canon EOS R6 Mark II Mirrorless



4

The viewfinder is a 0.5-inch 3.69m dot OLED with 100% coverage.

7

This new dual selector switch flips the camera between stills and video modes.

5

The fully articulating touchscreen enables a wide range of different shooting scenarios.

8

The R6 Mark II is the latest model to receive Canon's new Multi Function Shoe.

6

Stills and video are captured to a UHS-II SD/SDHC/SDXC card; two slots are provided.

9

Unlike its predecessor, the camera's power switch is on the right of the top plate.



Shot on a pre-production Canon EOS R6 Mark II and Canon RF 28-70mm f/2L lens: 1/1000 sec at f/2, ISO 2000.

you want to use the R6 Mark II as a webcam for livestreaming and video conferencing, you can now simply plug and play via USB – no need for additional drivers or software.

Both stills and video possess a pre-recording feature, which enable the camera to start capturing photos or footage even before you depress the shutter (0.5 seconds for stills, three or five seconds for video), ensuring that you don't miss a moment even if you're slow with your trigger finger.

The ferocious autofocus is now even better than before, too, taking the Dual Pixel AF II algorithms from the R3 and combining it with even more deep learning. The net result is that tracking now extends to two subject types: horses and aircraft (in addition to birds, dogs, cats, cars, motorcycles and trains).

Like other recent EOS R system bodies, such as the R7 and R10, the R6 Mark II takes the Multi Function Shoe from the R3. It also imports the Panoramic photo mode from its APS-C siblings and introduces

a new (and very welcome!) focus breathing correction function.

### Build and handling

The Mark II is almost identical in size, weight and proportion to the original – and it retains the same degree of weather-sealing, too. However, some key changes are worth noting.

Firstly, the power switch: it's gone. Well, not completely – it's just gone from its old position on the left shoulder, replaced instead by a dedicated stills/video switch that's a big nod towards this camera's overt focus on hybrid shooters. The power switch now sits instead on the right shoulder, beneath the rear exposure dial – which should please street shooters who like to arm their cameras one-handed.

The other change is to the joystick, where the familiar R5 and R6 input has been replaced with a newly designed one (which is also customisable). It lacks the knurled edges at the top-left, top-right and centre-bottom of the stick, so if you're familiar with the previous design, you —→

“The Canon EOS R6 Mark II is the most fully loaded mid-range camera on the market”



## Mirrorless Canon EOS R6 Mark II



Taken on a pre-production Canon EOS R6 Mark II and Canon RF 28-70mm f/2L lens: 1/1000 sec at f/2, ISO 2000.

might find your thumb sliding off without the tactile notification that you're at the edge of the disc.

Canon has also made some useful tweaks to the menus. For us, the coolest is having a set of hotkey-like shortcuts to three ISO settings, so you can quickly tap the ISO menu and jump between them without having to scroll the wheel or swipe the screen.

The new Q2 menu is also much appreciated; operating much like the original Q menu, this gives you

a dedicated quick-menu to adjust your video settings (the Q1 menu remains dedicated to photo settings). Again, this camera really is geared up to cater for hybrid shooters, rather than feeling like a photography-first device that just happens to record video as well.

### Performance

While we didn't get to test out the new AF subject tracking modes, since there were no horses or planes available while we had the camera,



The EOS R6 Mark II is also available in a kit with an RF 24-105mm f/4L IS USM lens, which nudges the price up to £3,999/\$3,599.

## Rival cameras



**Nikon Z 6 II**

**£1,999/\$1,999**

This light refresh of the Z 6 is a very capable camera; twin image processors boost the shooting burst rates. Reviewed: issue 237



**Panasonic Lumix S1**

**£1,999/\$2,499**

The S1 has higher resolution and better video, but its AF isn't as advanced and its max burst is much slower. Reviewed: issue 218



**Sony Alpha 7 IV**

**£2,399/\$2,498**

A stills and video powerhouse – like a mini-Sony A1 that's good at everything but is less than half the price. Reviewed: issue 249



it does an incredible job finding and locking onto human subjects.

We were photographing a troupe of dancers, and no matter how they turned, twirled, leapt or pirouetted, the EOS R6 Mark II never failed to keep them in focus. Once again, like the original R6, this delivers the best AF performance that money can buy.

That extends to video shooting, along with a new Face Only AF mode that comes direct from the Cinema EOS line. With this selected, if a face is tracked and exits the frame, the AF

# Canon EOS R6 Mark II Mirrorless



Top: Photographed on a pre-production Canon EOS R6 Mark II and Canon RF 15-35mm f/2.8L lens – 1/30 sec at f/2.8, ISO 1000. Above: Same camera and lens: 1/30 sec at f/2.8, ISO 800.

will not shift focus to the background; it will maintain focus where it is, until the face re-enters the frame, upon which it resumes tracking as before.

Speaking of video, everything has been upped on the Mark II. Not only do you get full-width 4K, you can also record 6K 60p ProRes RAW via HDMI (3.7K ProRes RAW in crop), the 29:59 recording limit is no more, and the circuitry has been redesigned to enable the capture of 40 minutes of oversampled 4K 60p or six hours of 4K 30p. There are also new exposure tools, such as false colour to ensure your footage is the correct brightness.

The magic performance isn't limited to video. That 40fps burst is absolutely ridiculous, with a buffer depth of 190 JPEG/ 75 RAW images. When not shooting at the top speed, the buffer seem limitless; we held down the shutter for 10, 20 and 30 seconds, and it didn't even take a breath.

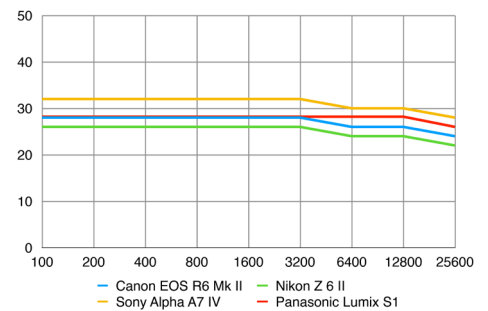
There are other welcome creative additions, too, such as in-camera focus bracketing – which, unlike other Canon cameras, actually does the compositing in-camera rather than requiring you to do it manually in external software. Thanks to the improved stabilisation, which is good for up to eight stops depending on your lens choice, you can do it without a tripod. We did a 100-shot stack, handheld, and the results were perfect.

**James Artaius**

“The camera never failed to keep our troupe of dancers in focus”

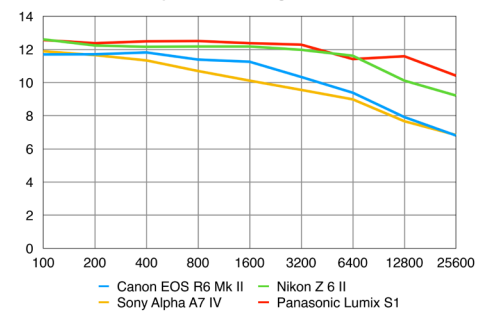
## Lab tests

### Resolution (line widths/picture height)



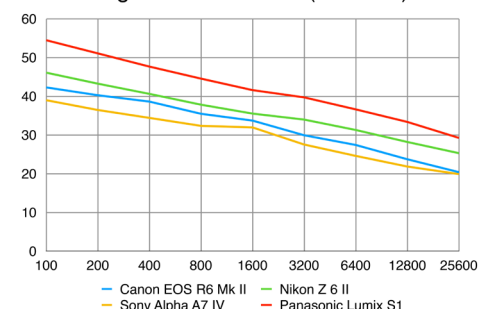
There's little to separate the three 24MP cameras when it comes to resolving fine detail. The 33MP Sony has a small advantage over the competition.

### Dynamic range (EV)



At lower sensitivities, the R6 II captures comparable dynamic range to its rivals. However, at ISO 800, the Canon can't quite match Nikon and Panasonic.

### Signal to noise ratio (decibels)



Though Nikon and Panasonic produce the cleanest images, the EOS R6 II isn't far behind, generating only marginally more noise than the class leaders.

## Digital Camera verdict

**4.5** ★★★★★ Outstanding



This hybrid packs an obscene amount of firepower, with 6K video and 24.2MP stills at 40 frames per second. Flitting between the two mediums has seldom been easier. This is Canon's finest 6-series camera, and a brilliant younger brother to the EOS R5 for those who don't need ultimate resolution but demand premium performance.



## Mirrorless Canon EOS R5 Mark II



# Canon EOS R5 Mark II

£4,499/\$3,999 (body only)

The brand's most important – and most powerful – camera

[www.canon.co.uk](http://www.canon.co.uk)

### Specifications

**Sensor:** 45MP back-illuminated full-frame stacked CMOS sensor

**Lens mount:** Canon RF

**Autofocus:** Dual Pixel Intelligent AF cross-type, 5850 AF points stills / 4500 AF points movies

**Image stabilisation:** 8.5 stops centre, 7.5 stops corners

**ISO range:** 100 to 51,200 (exp 50 to 102,400)

**Video:** 8K 60p, 4K 120p, 2K 240p, FullHD 240p

**Viewfinder:** 0.5-inch OLED, 5.76 million dots, 120 / 60fps, 0.76x magnification, Eye Control AF

**LCD:** 3.2-inch TFT, 2.1 million dots

**Memory:** 1x CFexpress Type B (up to 2TB), 1x SD UHS-II card

**Max burst:** 30fps electronic (200 JPEG or 93 RAW CFexpress / 86 RAW SD), 12fps mechanical (760 JPEG or 230 RAW CFexpress / 95 RAW SD)

**Connectivity:** Wi-Fi (6G / 5G / 2.4G), Bluetooth, USB-C, HDMI, ethernet, microphone, headphone, N3 remote terminal, PC Sync output, GPS, Multi-function Shoe

**Size:** 138.5 x 101.2 x 93.5mm

**Weight:** 656g (body only); 746g incl memory card and battery

The Canon EOS R5 Mark II has one huge act to follow. The original R5 was the best camera Canon has ever made – so good that, despite being launched in 2020, it's still better than almost any camera on the market today.

However, the Canon EOS R5 Mark II is more than just an obligatory update: this is a transformative camera that shifts the goalposts and proceeds to score thunderous goals. Neural net-powered in-camera upscaling and denoising, monster resolution for stills and video, better-than-ever image stabilisation, never-before-seen autofocus tech that is light years ahead of the competition... the measuring stick just changed here.

### Build and features

The basics are all in the specs (left), but there's much more to this camera than meets the eye. For example, its Neural Network Image Processing feature uses AI algorithms and deep learning to

enable features such as In-Camera Upscaling, which turns standard 45MP images into 180MP files, and High ISO Noise Reduction, which denoises images by two stops. These computational features often sound like gimmicks, but they aren't. The AI autofocus system has the usual improvements, with horses and aeroplanes now added to subject detection, but it's way better than that.

First up is Action Priority mode, which works with any sport featuring a ball that's constantly in play and includes dedicated modes for basketball, soccer and volleyball. Canon has trained this with deep learning AF to recognise body movements, so it tracks not just the player in possession of the ball, but it can also predict where the ball is going next and focus on the right person.

The camera recognises a spike in volleyball and understands that the ball is likely to catapult across the court. Likewise, it recognises an alley oop in basketball, where a player receives a lob before throwing down a jam.

## Canon EOS R5 Mark II **Mirrorless**



4

Another addition to the EOS R5 Mark II is Eye Control AF, hence the oversized viewfinder.

7

Switch between stills and video with this dedicated switch on the left of the top plate.

5

Fully articulating, the rear LCD enables stills from tricky angles and monitoring video.

8

Canon's Multi-Function Shoe allows for the charging of accessories, including microphones.

6

The R5 Mk II continues with the rear control wheel and a joystick for moving AF points.

9

To power up the camera, a lever has been added to the exposure mode dial.



James Artaius

Take a photograph of your subject (or shoot an image of them) and add it to Registered People...



James Artaius

...and the camera will automatically detect it. You can register and prioritise up to ten different faces.

In the Registered People Priority mode, you can save the faces of up to 10 people, either by taking a photo or lifting an image from the internet. The camera will then recognise the face and automatically jump to it when in frame. You can rank the 10 faces in order of priority, so that if more than one of your Registered People are in the frame, the camera will prioritise the highest ranked one. For example, at a wedding, the bride and groom could be one and two, followed by close family or guests.

This is all made possible by Canon's new dedicated Digic Accelerator chip – a secondary processor that works with the latest Digic X processor to deliver the evolved Dual Pixel Intelligent AF system, offering AF and tracking computation at up to 60fps with the electronic shutter. This not only allows Action Priority and Registered People Priority, it also provides unprecedented stickiness to the subjects it tracks. While all camera systems claim to follow subjects even with obstructed views, the EOS R5 Mark II actually does it.

The advanced AF subroutines are complemented by an upgraded version of the Eye Control AF system that debuted on the Canon EOS R3. The technology is better than ever, enabling you to move your focus point around the viewfinder by moving your eyes.

As you'd expect of the first consumer camera series to boast 8K video, the Canon EOS R5 Mark II doubles down on high-resolution video. It captures 8K DCI Lite RAW at up to 60p, 8K DCI and UHD at up to 30p, 4K DCI SRAW at up to 60p, 4K DCI and UHD at up to 120p, and 2K DCI and Full HD at up to 240p. There are also 35mm crops for 4K DCI and UHD up to 60p, and 2K DCI and Full HD up to 240p. The camera is more integrated into the Cinema EOS system than ever, offering Canon Log 2 and 3 with Canon 709/BT.709 Std, PQ/HLG and HDR movie mode, along with custom picture, proxy recording, LPCM/24-bit/4-channel audio and a full-size HDMI port and tally lamp.

How about the overheating woes that blighted the launch of →

“The EOS R5 Mark II is more than just an update: this camera shifts the goalposts”





James Artaius

Eye Control AF allows focus points to be moved around the frame – the camera tracks the movement of the photographer's eye using clever tech in the viewfinder.

the R5? The internals have been designed with individual graphite sheets for the sensor and card slot boards to dissipate heat, with the boards for the card and the sensor and engine separated by an aluminium plate.

In addition, a passive cooling system incorporates exhausts on the body and vents that run through the camera to allow air to move through and heat to escape. There is also an external cooling fan grip that turns the passive cooling system into an active one by blowing air through the vents and cooling the camera.

## Performance

Shooting 45MP images at 30fps is nothing new in the current camera market, but shooting 45MP images at a consistent 30fps

with consistent autofocus is like manna from heaven. I've praised the Dual Pixel AF II as the best autofocus system in the world before, but that's left in the rear view mirror: Dual Pixel Intelligent AF is simply the standard by which all autofocus systems will now be judged.

I've seen predictive AF algorithms before in the Sony A9 III, and though the system is clever, it was too easily duped by twitch movements. With Action Priority, the camera simply sticks to your player. I was expecting the system to have blind spots, so I did my best to find them. Canon's video, showing the camera capturing an alley oop with player-perfect focus, looked too good to be true. So when I heard two ballers call

for an oop during their game, I made sure my camera was pointing in the right direction. Sure enough, the EOS R5 Mark II tracked and kept focus during every frame. Most AF systems get fooled by plays like this, as it's the exact type of twitching movement I was talking about earlier. But not here.

Apart from the Registered Person Priority, the other AF input is Eye Detect AF. This is an evolved version of the technology in the Canon EOS R3, which features an oversized electronic viewfinder packed with infrared blasters that can track the movement of your eyeball. Once calibrated, simply look around the viewfinder and it hovers an AF point over whatever you're looking

## Rival cameras



Fujifilm GFX 100S II  
£4,999/\$4,999

Produces pin-sharp photos – a compelling option for professionals debating between full-frame and the medium-format GFX series. Reviewed: issue 286



Nikon Z 8  
£3,999/\$3,999

Inherits the vast majority of the Nikon Z 9's specs, including its blisteringly fast electronic shutter and EXPEED 7 processor. Reviewed: issue 270

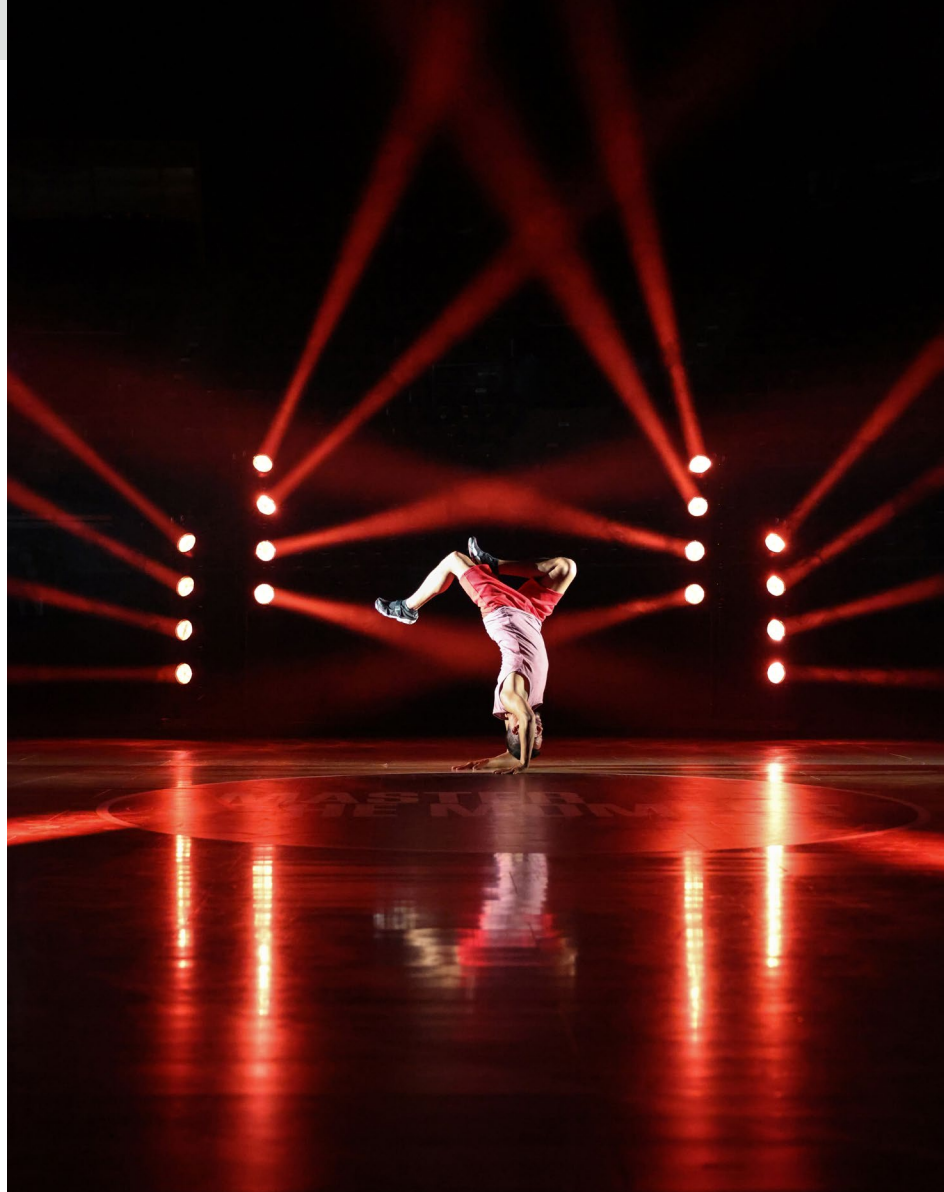


Sony A7R V  
£3,999/\$3,898

Pitched as the resolution specialist, the A7R V also blurs all the video and sports boundaries. It's an amazing technological achievement. Reviewed: issue 264



The camera can be charged over USB-C, and there's a full-size HDMI port for video output.



Some minor banding occurred when shooting with the electronic shutter in low light, when the scene and subjects were lit with pulsating disco lights, but we were using a prototype camera running beta firmware.

at; simply half-press the shutter and you have a 'hotkey' to snap focus wherever you want it, as fast as you can look at it. I was impressed by this tech on the R3, but here it's much more responsive to granular movement and has a much longer detection range, so you no longer have to position your face as close to the 'finder as possible. These two functions are ridiculously good and will transform the way we think about resolution and ISO sensitivity from now on.

The only criticism I have of the camera is that I experienced some minor banding when shooting with the electronic shutter in low light, when the scene and subjects were lit with pulsating nightclub spotlights – you can see the result in the breakdancing images here. Bear in mind that I was using a prototype camera running beta firmware; this may well be a sync/flicker issue, as I didn't have time to do much setup before the performance.

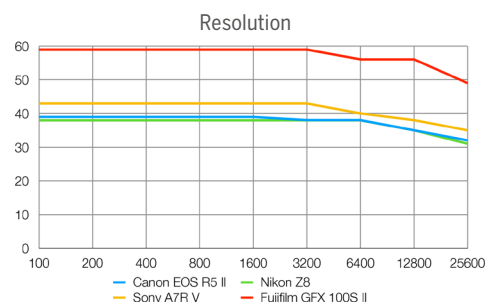
It's hardly a problem, but I'll be keen to see if I can replicate the phenomenon in the real world with a finished production model. **James Artaius**



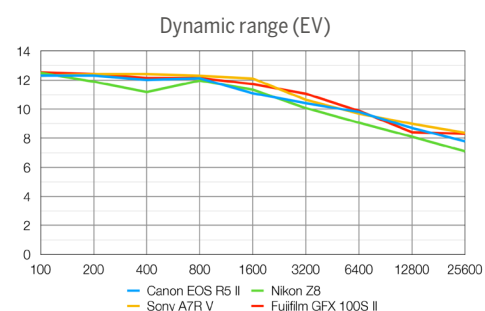
Most AF systems can be fooled by 'twitch' or fast sport movements – but not the EOS R5 Mark II.

## Mirrorless

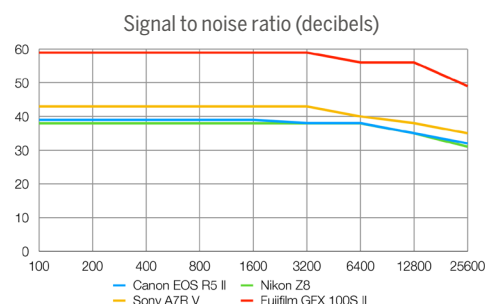
### Lab tests



The R5 Mark II performs as you would expect for its 45MP resolving power, tying with the Nikon Z 8, but capturing a little less detail than the 61MP A7R V. The 102MP Fujifilm is in a class of its own, though.



The four cameras are closely matched for dynamic range. The R5 Mk II is a little less impressive than the Sony and Fujifilm cameras at low to mid sensitivities, but at ISO 6400 and above, there's not much in it.



The R5 Mk II narrowly beats its full-frame rivals for image clarity, producing images with the least obtrusive noise. Stepping up to medium format is an advantage: the GFX 100S II generates less noise at all sensitivities.

### Digital Camera verdict

**5.0** ★★★★★  
A best-in-class product



I use a lot of cameras in my job but this is the best I've ever tried. Those are bold words indeed, but the Canon EOS R5 Mark II does exactly what I want it to do. Which is everything the original EOS R5 did – just bigger, better, more. In-camera 180MP upscaling and 2-stop denoising, faster 30fps burst speed, 8K 60p RAW, C-Log2, killer AI-powered predictive autofocus, reduced rolling shutter, Eye Control AF, 8.5 stops of image stabilisation, pre-capture for stills and video, Smart Controller, Multi-Function Shoe, full-size HDMI port... quite simply, this is Canon's ultimate camera.



## Mirrorless Canon EOS R1



- 1** Built like a tank, the R1 has a magnesium alloy body and polycarbonate with glass fibre.
- 2** Controls are mirrored so the buttons fall in the same place when used in different orientations.
- 3** The 24.2MP full-frame sensor outputs stills and video at file sizes for easy transmission.

# Canon EOS R1

£6,549/\$6,799 (body only)

This could be the most formidable sports camera on the market

[www.canon.co.uk](http://www.canon.co.uk)

### Specifications

**Sensor:** 24.2MP back-side illuminated full-frame stacked CMOS sensor  
**Lens mount:** Canon RF  
**Autofocus:** Dual Pixel Intelligent AF cross-type, 4368 AF points stills / 3354 AF points movies  
**Image stabilisation:** 8.5 stops centre, 7.5 stops corners  
**ISO range:** 100 to 102,400 (exp 50 to 409,600)  
**Video:** 6K 60p, 4K 120p, 2K 240p, FullHD 240p  
**Viewfinder:** 0.64-inch OLED, 9.44 million dots, 120 / 60fps, 0.9x / 0.8x / 0.7x magnification, Eye Control AF  
**LCD:** 3.2-inch TFT, 2.1 million dots  
**Memory:** 2x CFexpress Type B (up to 2TB)  
**Max burst:** 40fps electronic (500 jpeg or 230 raw), 12fps mechanical (1,000+ jpeg or 1,000+ raw)  
**Connectivity:** Wi-Fi (6G / 5G / 2.4G), Bluetooth, USB-C, HDMI, ethernet, microphone, headphone, N3 remote terminal, PC Sync output, GPS, Multi-function Shoe  
**Size:** 157.6 x 149.5 x 87.3mm  
**Weight:** 920g (body only)/1115g (with card and battery)

The Canon EOS R1 is the camera I've been waiting for since the entire R system was launched back in 2018. What is a camera system without a flagship camera – a standard-bearer to showcase the system and provide all the trickle-down goodness for the next half-decade? Well, I've reviewed every top-tier sports camera from every manufacturer – literally the A to Z of flagship cameras. And after countless hours, tens of thousands of photographs and endless seconds-turned-minutes of 240p video, I think I can safely say that the EOS R1 is the best flagship sports camera out there.

### Key features

The R1 has a lot of tech in common with the Canon EOS R5 Mark II – so much so, in fact, that the two cameras are essentially siblings. However, the R1 has plenty of USPs that make it the obvious and indispensable choice for professional shooters. The Neural network Image Processing features in this camera are arguably even more

important here than they are in the R5 Mark II. A combination of deep learning and algorithmic AI is used to power In-Camera Upscaling, which transforms the pedestrian-resolution 24.2MP images into pixel-packed 96MP photos – immediately outclassing every full-frame camera on the market and effectively hitting medium-format territory.

On top of that is High ISO Noise Reduction, which uses AI to denoise images by two stops. It works wonders when you're pushing those higher ISOs, which are already way cleaner than you'd expect thanks to the flagship image sensor and modest pixel count. It's easy to dismiss these features as a gimmick, but trust me: they're not. All of a sudden, your 24MP sports camera packs all the resolution of a massive medium format sensor with raised ISO ceilings to boot.

I didn't think that Dual Pixel CMOS AF could get any better, but Canon has upped the ante by adding a dedicated Digic Accelerator processor that fires in tandem with its newest Digic X image processor. The result is Dual Pixel

# Canon EOS R1 Mirrorless



4

Unlike former flagship the 1D X Mark III, the R1's rear LCD screen is fully articulating.

6

The rear dial works in tandem with the dial on the top plate, to change settings quickly.

8

A small LCD display on the top of the camera is another borrow from EOS R bodies.

5

The Smart Controller allows focus points to be moved in any direction – and quickly.

7

The Multi-Function Shoe provides communication and power to mounted devices.

9

White Balance gets a dedicated button – it's a key setting for working pros.

Intelligent AF, the levelled-up evolution of Dual Pixel that can make AF and tracking computations at up to 60fps when you use the electronic shutter.

This makes all manner of magic possible, including the new Action Priority mode for sports with a circular ball (the camera is pre-programmed with modes for basketball, football and volleyball). This mode has been schooled with deep-learning autofocus to recognise, detect and track the body mechanics of players when it spots that there is a ball in the frame.

This means that the camera can recognise when a footballer jumps to make a header, but it also calculates where the ball is likely to go next. It understands when a volleyball player leaps in the air and throws their arm back for a crosscourt spike.

The clever autofocus functions don't stop there. Next up is Registered People Priority, a mode that detects faces. Simply take a photo of your subject – or even take a photo of a photo on their social media profile, if they're not in front of you – and the camera will register that person's face (in fact, it will somehow even register their profile as well). You can register up to 10 separate faces, and the R1 will automatically focus on one of them as soon as they enter the frame.

But what happens if two, three or even all 10 of your Registered People appear in the frame at the same time?

This is where the Priority comes into play. When you've registered your faces, you assign them a number and the camera will prioritise them accordingly.

## Shooting speeds

Obviously, we need to talk about shooting speeds. Ever since the Nikon Z 9 and Sony A9 III pulled the 120fps card, expectations have been raised for Canon to keep up with the Joneses and offer the same furious frame-rate for its own flagship camera. And yet, the R1 doesn't fire 120 frames, and it doesn't have a fancy global shutter sensor.

While it has a shiny new stacked sensor – one whose readout speed is just 2ms, resulting in 40 per cent less rolling shutter than the Canon EOS R3, and with the first cross-type AF points in any full-frame camera for superior horizontal line detection – it's nowhere near the top speed of its rivals. In fact, it maxes out at 40fps, which is the same speed as the entry-level Canon EOS R8.

So is this an admission of defeat? Hardly. Canon makes full-frame global shutter sensors – it's not like it couldn't use one if it wanted to. But instead of going faster, Canon has done the opposite and has actually gone slower. If you go mechanical, then the top speed is 12fps, but with the electronic shutter, you can customise the speed down from 40 to either 30, 20, 15, 12, 10, 7.5, five, three, two or even one frame per second. —>

James Artaius



Photograph a person's face or social media profile and confirm to register them for priority tracking.

James Artaius



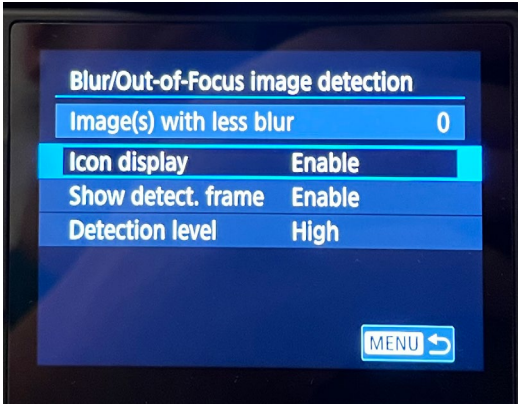
The R1 recognises when two players connect on offensive play in basketball and focuses accordingly.

James Artaius



You can make the star player in a game the most important and the bench warmer the least.

James Artaius



Zero images with blur? Maybe the R1 thought James's intentional camera blur images were somehow artistic...



## Mirrorless Canon EOS R1



This sequence shows that the camera knows to focus on the ball handler, and doesn't get fooled when he lobs it over the head of the defence and above the rim. The focus then follows and shifts to his teammate, who leaps in from out of frame to catch the ball in midair and jam it through the basket.



Pre-continuous shooting mode means you'll never miss a key moment again.

Reading between the lines, Canon's message is pretty clear. Professional sports photographers don't need 120fps. On the contrary, beginners and enthusiasts are the ones who need 120fps, because they don't know what they're doing and they need all the assistance they can get. Pros are so good at what they do that even 40fps is probably overkill – all it's doing is filling their cards, cloud storage and press agency servers with thousands of near-identical frames. What pros really need is the ability to choose fewer frames per second.

### Other key features

Far more useful than additional frames after the fact are additional frames before it, which is why the EOS R1 now has a Pre-continuous shooting mode that starts capturing 20 frames when you half-press the shutter – so even if you don't fully press it until after the moment has already happened, you still get the perfect shot, even if you technically missed the moment.

The sensor also features a high-detail low-pass filter to improve resolution while reducing brightness moiré and colour moiré. It achieves this with the same specialised, quad-layer, 16-point subsampling with Gaussian distribution that was launched on the Canon EOS-1D X Mark III, rather than the traditional dual-layer, four-point subsampling.

Elsewhere, as expected, the R1 inherits an improved version of the Eye Control AF system from the R3. An extra-large electronic viewfinder tracks the movement of your eye with infrared LEDs and a control sensor, enabling you to move your focus point around simply by looking at your subject – then half-pressing the shutter to lock. The new system boasts double the detection frame rate and a hugely increased detection range – and even as someone who wears glasses, I found it fantastic to use.

### Video

And finally, let's talk about the video performance. The Canon EOS R1 boasts internal 6K DCI RAW up to 60p, 4K DCI and UHD up to 120p, 2K DCI and Full HD up to 240p, and 35mm/APS-C crops for 4K DCI and UHD 120p, and 2K DCI and Full HD up to 120p. And best of all, the high frame rates now capture audio as well.

A slew of Cinema EOS-friendly features are present, including ProRes RAW with Atomos devices, Canon Log 2 and 3/HLG support, LUT support, Custom Picture support, 4-channel/24-bit audio and a host of other goodies, including a full-size HDMI port and tally lamp on the front of the body.

Like the R5 Mark II, the R1 has a heat-dissipating design to draw heat away from the interior, with an aluminium sheet separating the memory card slot and CMOS sensor and engine, each of which has a graphite sheet to dispel heat to the exterior of the body. Combined with the inherently better heat management due to the overall bigger body, this produces pretty robust recording limits before overheating kicks in.

## Rival cameras



**Canon EOS-1D X Mark III**  
£6,999/\$6,499

Superb low-light performance, plus Deep Learning AF and 5.5K Raw video make it the ultimate hybrid DSLR/mirrorless. Captures up to 20fps in Live View.

Reviewed: Issue 227



**Nikon Z 9**  
£5,299/\$5,497

The flagship Z 9 camera uses an electronic shutter to blow the D6 DSLR out of the water for speed, resolution and all-round performance. Also boasts Nikon's best video specs.

Reviewed: Issue 250



**Sony A9 III**  
£6,099/\$5,998

A 24.6MP full-frame powerhouse for sports photographers, offering 120fps raw + jpeg bursts. The global shutter era is here, and photography will never be the same again.

Reviewed: Issue 289



James Artaius



While designed and optimised for professional sports photographers, the R1 is no slouch for still subjects. Its 24.2MP images can be transformed into pixel-packed 96MP photos by using In-Camera Upscaling.

## Performance

While there were four years between the launch of the original Canon EOS R5 and the R5 Mark II, it has now been over five years since the launch of the last 1-series camera – that being 2020’s Canon EOS-1D X Mark III. I guess it doesn’t feel that long because we also got the EOS R3 at the end of 2021, which was the de facto flagship in the EOS R lineup, and to many people, it was close enough to a 1-series camera that they were happy with it. But while R3 is a ferocious camera, it’s not the R1.

From the improved image stabilisation and Eye Control AF to auto-network switching and the anti-fog eyepiece, and from the new joystick and button layout, the remote rebooting and ProRes RAW recording all the way through to the fact that there’s no plastic in the packaging, this is a more capable camera than the R3 in every way. The R1 has just solved the classic dilemma of having the 24MP sweet spot for sports shooting while also having the flexibility to photograph in medium-format resolution – do you really need a second body for hi-res imaging now?

If you hadn’t guessed, the new autofocus systems and functions are out of this world. During the time I tested it, this camera simply didn’t miss a beat – not a single incident of focus hunting, no focus drifting onto random patterns in the background or suddenly jumping to a knee instead of a face or another subject entirely. This is as trustworthy as a personal focus puller.

I only have two minor criticisms. The first one is something I also experienced on the R5 Mark II, though it should be noted that I haven’t experienced the same issue on production cameras. But I did get some minor banding issues while shooting

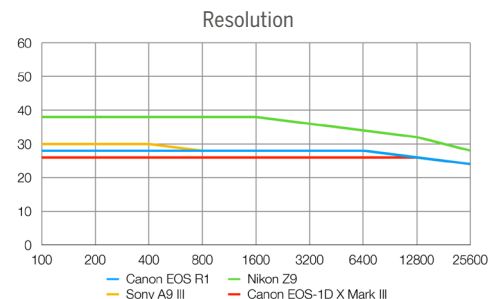
breakdancers at the R1’s launch event, using the electronic shutter at high speed as they performed their routines lit only by pulsing FX lights. It was hardly a major issue, and may simply be due to the fact that I didn’t turn on the anti-flicker option or check that my camera frequency was synced to the right Hz.

The other quibble may also be a case of user error, but a great feature on the R1 – and another nod to the AI-infused capabilities of the camera – is Blur/ Out-of-Focus image detection. I simply couldn’t get it to detect any blurry images. Now, what I will say with absolute hand-on-heart honesty is that not a single one of the first 3,525 images on my memory card was out of focus, which speaks to the brilliance of the AF system.

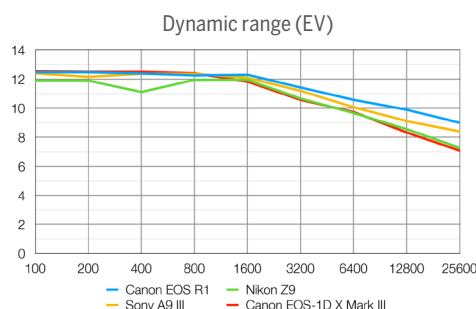
So I took three more images of my face, making sure that I selected a slow shutter speed and then shaking my head from side to side to create artificially blurred shots – and still, the blur detection didn’t flag them up. I’d love to see this feature tightened up (or explained to me) as anything that helps crop the non-keepers has got to be good – even if there aren’t many naturally occurring ones.

**James Artaius**

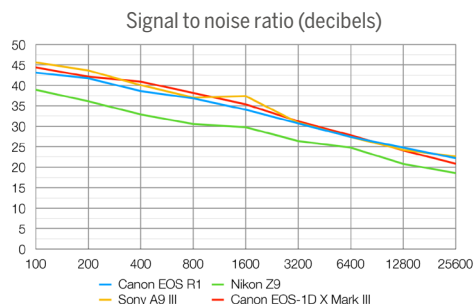
“Canon’s message is clear. Pro sports shooters don’t need 120fps. Beginners and enthusiasts do”



Naturally, the Z 9 was always going to excel for outright detail capture, with its 45.7MP sensor easily resolving more fine detail than the other cameras in the 20-24MP range in this comparison.



The EOS R1 and old EOS-1D X III are tied for dynamic range capture at lower sensitivities, but in dim light, the newer camera captures as much as 2EV more than its DSLR sibling once you reach ISO 25,600.



DSLRs may be a dying breed, but despite being launched in early 2020, the EOS-1D X III produces cleaner images than the EOS R1 at lower sensitivities, and there’s little difference right up to ISO 25,600.

## Digital Camera verdict

4.5 ★★★★★ Outstanding



For all its high-tech bells and whistles, the amazing algorithms and clever computations, the Canon EOS R1 just works. You point it at your subject, it makes sure everything is in focus and you can just get on with taking images. That’s probably the best possible endorsement for a camera. The Canon EOS R1 is a cheat code for sports photography, making life easier for elite agency photographers and aspiring amateurs alike. Canon’s latest flagship has been worth the wait, and while other brands worked harder, Canon worked smarter – and the EOS R1 is all the better for it.



## Medium-format Fujifilm GFX 100S II



**1**  
Fujifilm's Bishamon-  
Tex material isn't the  
best-looking, but its  
grip qualities in the  
field are excellent.

**2**  
The image sensor  
measures 43.8 x  
32.9mm, approx 1.7x  
larger than full-frame.

**3**  
Currently, 18 Fujifilm  
GF lenses are available  
for its G lens mount.

# Fujifilm GFX 100S II

£4,999/\$4,999 (body only)

A lighter, more refined GFX camera for the masses

[www.fujifilm.eu](http://www.fujifilm.eu)

### Specifications

**Sensor:** 102MP BSI CMOS II

**Processor:** X-Processor 5

**Continuous shooting:** 7fps

**Video:** 4K 30p, 4:2:2 10-bit internal,  
ProRes via HDMI

**IBIS:** Up to 8.0 stops

**EVF:** 5.76m dot OLED, 0.84x mag

**Screen:** 3.2in, 2.36m-dot,  
three-way tilt touch LCD

**Storage:** Dual UHS-II SD card slots

**Ports:** 3.5mm mic, headphone,  
Micro HDMI, PC Sync, USB-C PD

**Battery:** NP-W235

**Dimensions (W x H x D):** 150 x 104 x 87mm

**Weight:** 802g (excl battery  
and memory card)



With the release of the Fujifilm GFX 100S II, it appears that Fujifilm might have found its rhythm with its medium-format GFX line-up. You might find it hard to believe that it was only in 2017 that the Fujifilm GFX series burst onto the scene. Since then we have been treated to a few different shapes and sizes, but each new addition has pushed medium-format cameras, bringing more resolution, IBIS and professional video – all with prices that have been competitive with the best full-frame cameras.

With this latest model, Fujifilm has simplified its GFX lineup, ditching the GFX 50S II – the last of its 50MP GFX cameras – and is now focusing on two 102MP cameras instead. On one hand, you have the GFX 100 II, a do-it-all camera for the top pros who need stunning image quality

and cutting-edge video – and which also has a price tag only suitable for professionals.

On the other hand is the new GFX 100S II, a refinement of the GFX 100S. Like the prior model, the 100S II is an attempt to balance affordability with some of the best aspects of medium-format cameras, to be the camera that brings medium-format to more people. With some big shoes to fill, can the GFX 100S II continue the good work of its predecessor?

The GFX range has always offered notably good value compared with other medium-format cameras, and it's great to see that continue here. The closest Hasselblad, the X2D 100C, currently costs £7,369/\$8,199, but the much cheaper GFX 100S II goes head to head with it on key specs. However, with the even more affordable GFX 50S II and GFX 100S gone from the range, the 100S II is now



4

The GFX 100S II's electronic viewfinder is generously sized, with a resolution of 5.76 million dots.

7

Pressing the Q button brings up a quick menu of favourite settings, which you can customise.

5

The rear touchscreen features a three-way tilting mechanism for extra flexibility.

8

The mode dial has four standard P/A/S/M shooting modes, plus six custom positions.

6

The focus stick makes it easy to select an autofocus point, and is large enough to find without looking.

9

The top plate's 1.8in screen offers instant feedback on settings, and the display can be customised.



The GFX 100S II is able to combine accurate colour, sumptuous detail and exquisite blur in the same shot.

the cheaper GFX option – but is less competitive on price than megapixel-packed full-frame rivals like a 61MP Sony A7R V (£3,999/\$3,899).

## Build & handling

At first glance, you might not even notice this is a new camera, save for the 'II' marking added to the product name. The GFX 100S II seems to have the same body as its predecessor, although one giveaway is the addition of Fujifilm's new Bishamon-Text material, with its signature Y-shaped pattern. Fujifilm likes to refer to this as fake leather in its marketing, but it is unlikely to convince anyone that it is actually leather.

I tend to prefer the look of traditional faux leather-wrapped cameras, but Bishamon-Text is a lot grippier, which really helps on not-so-light GFX cameras and lenses – although this is the lightest GFX camera yet at just 883g, which is impressive when you consider a full-frame Nikon Z 8 weighs 910g.

The GFX 100S II itself isn't much larger than a DSLR, although GFX

lenses can be monsters, so the idea of one-handed shooting is mostly going to go out of the window. I tested the GFX 100S II alongside the new GF 500mm lens: this is far from a light combination to carry around, but I was pleasantly surprised by how easily I was able to cling onto the camera with the grip and new texture.

Apart from the new material, all ports, buttons and switches remain the same as on the GFX 100S, making the 100S II an easy transition for any upgraders. It also follows the general cross-range Fujifilm pro camera layout, so anyone familiar with a Fujifilm X-H2 can get up and running pretty quickly.

For the most part, I found the controls easy and intuitive enough to use, with the usual front and rear wheels. The eight-way autofocus joystick on the rear is chunky enough to easily find when you're in a hurry. As with other Fujifilm cameras, the controls are incredibly customisable, so even if you aren't happy with them out of the box, it's quick and easy to set the camera up the way →

"As with other Fujifilm models, the GFX 100S II controls are incredibly customisable"



## Medium-format Fujifilm GFX 100S II



The GFX 100S II's artificial intelligence enables the camera to easily lock on to animal eyes, keeping the focus sharpest where it matters. Shot with the GFX 100S II and a GF 500mm f/5.6 R LM OIS WR lens: 1/400 sec at f/5.6, ISO 320.

you like, and there are two custom function buttons on the top plate to assist with this.

One button I struggled with a little was the exposure button: its location, next to the shutter button, is perfect, but it was just a little too small for my clumsy finger to find quickly. Hopefully, this would improve with enough practice, but a larger or more raised button would be preferable.

And there's one request from my personal wishlist as a regular Fujifilm X-Series shooter: I wish there was a directional pad on the back. This would add a few more customisable buttons, which is always appreciated, but I also prefer navigating menus with a D-pad rather than the sometimes overzealous joystick.

As with the previous model, the GFX 100S II provides dual UHS-II SD card slots, with the availability of CFexpress reserved as a key point of difference for the more expensive GFX 100 II. Your experience might vary depending on the SD card you have but, while testing the camera using a ProGrade V90 card, I didn't have any issues with the camera slowing down to process images during high-speed bursts or when recording 4K video. There is also

the ability to record to external storage like an SSD via USB-C if you prefer.

The 5.76m-dot OLED viewfinder is lovely to use: it is large, bright and clear for composing shots. I was testing the GFX 100S II alongside the new Fujifilm X-T50 (see our hands-on test in issue 284), and taking the same shot through each viewfinder kept reminding me how much of a joy medium-format GFX cameras are for composing images. The viewfinder is not removable or tiltable, however.

### Performance

The headline feature is still the sublime 102MP sensor that impressed so much in the previous model, although it has been redesigned slightly from the GFX 100S. There are new microlenses for better autofocus, and a new pixel structure that allows the sensor to adopt a new low ISO of 80. For photography that requires the ultimate image quality, like art reproduction or product photography, you really can't do much better than this sensor.

However, if you still aren't impressed by 102MP, the GFX 100S II can also perform the Pixel Shift trickery of other GFX models, to create massive 400MP images. The camera is also

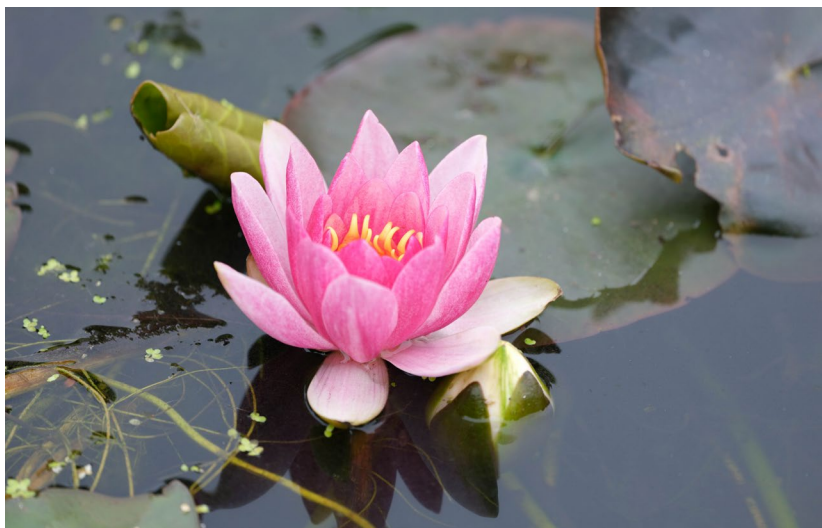


The pairing of the Fujifilm GFX 100S II camera and the new GF 500mm super-telephoto lens makes for a hefty package.

capable of using Pixel Shift to merge four shots for True Colour (which is a full 24-bit RGB image).

Yes, 102MP can seem like overkill for other types of photography, but the benefits of cropping capabilities mean that you can digitally zoom further into your subject without losing quality. I spent a weekend with the 100S II in a wildlife park, and even though I was using the new GFX 500mm zoom – the longest large-frame lens ever – the ability to crop in even further on animals just beyond the reach of the lens was really useful.

Autofocus is improved from the last model, particularly around its AI capability. The camera can now recognise vehicles, drones,



Advantages of the GFX 100S II include the ability to crop heavily and still retain a decent image resolution (top) and the ease of handheld shooting thanks to IBIS (above).

birds, insects and, as I have thoroughly tested, animals.

The autofocus was very good at recognising a huge range of animals during my safari testing, locking on to shapes with ease and – more often than not when given an unobstructed view – finding the animals' eyes. The AF isn't quite as quick as it is on rival full-frame cameras from Canon and Sony, and it could get a little thrown off by any fences or branches that slightly obscured my animal subjects. The autofocus also was a bit skittish when there were multiple subjects in the frame: in a herd of deer, the camera changed its mind several times in just a few seconds about which deer it fancied focusing on.

Autofocus speed, as seen in the prior model, is still fantastic: the camera can pull from near to far very quickly (although this will be somewhat dependent on the lens). Tracking was very good on the whole, especially when my subject meandered slowly around the frame in a predictable manner; when subjects started to move around

a little quicker, there were a few more missed focus shots, with the autofocus not as sticky as in other systems.

The in-body image stabilisation system has also been upped from six to eight stops of shake correction (when used with a compatible lens). Shooting handheld with the GF 500mm was absolutely outstanding. Shooting at a slow speed in the fading light at the end of the day while also on a slowly moving vehicle, I still managed to get sharp shots.

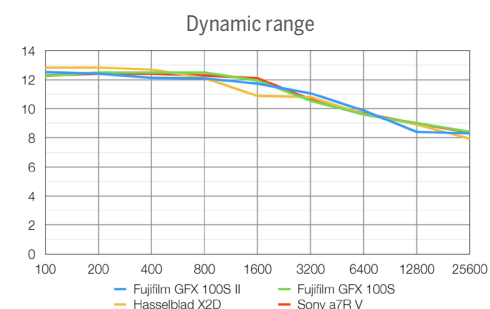
My only real frustration with the GFX 100S II was its mediocre battery life. I managed to easily churn through a battery in just a few hours of shooting – so making sure you charge and carry spares is a necessity. **Gareth Bevan**

“Shooting handheld was absolutely outstanding”

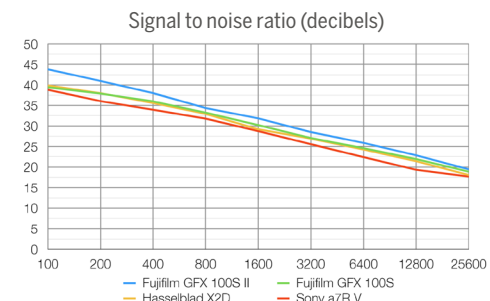
## Medium-format



It's small wonder these medium-format cameras max out our test scale. The original 100S resolves slightly more fine detail at higher sensitivities than the 100S II, potentially due to a change in image



All four cameras are closely matched when it comes to capturing dynamic range, with the two GFX cameras delivering a comparable performance across the entire tested sensitivity range.



While the 100S II may lose out slightly to the original 100S in high-ISO resolving power, the tables turn when it comes to noise control, where the 100S II produces the cleanest images of our test group.

## Digital Camera verdict

5.0 ★★★★★ A best-in-class product



If you have been longing for the GFX 100 II since its release last year but find it beyond your budget, the GFX 100S II might be the perfect alternative. It is actually cheaper than the previous 100S, making it a compelling option for professionals who are debating between full-frame and the GFX series.

Photos are pin-sharp and the ability to crop into the smallest details is unreal. Any pro photographers about to click the 'Buy' button on a new full-frame camera should seriously consider the GFX 100S II as an alternative.



## Compact Fujifilm X100VI



**1**  
The body (in a silver or black finish) and the 23mm lens are identical to the X100V.

**2**  
The lens has a control ring, which by default controls the camera's digital zoom.

**3**  
One minor quibble is with the grip, as there isn't really a huge amount to cling onto.

# Fujifilm X100VI

£1,599/\$1,599

Looks like its predecessor but packs in some stealth upgrades

[www.fujifilm.com](http://www.fujifilm.com)

### Specifications

**Sensor:** 40.2MP X-Trans CMOS 5 HR Sensor  
**Processor:** X-Processor 5  
**Lens:** Fixed Fujinon 23mm F/2.0 II (35mm equivalent)  
**Viewfinder:** 3.69m-dot OLED EVF / OVFL Hybrid  
**Screen:** 3.0-in 1.62M-dot 2-way tilt touch LCD  
**Max burst:** 11fps (manual shutter), 20fps (electronic shutter)  
**Image stabilisation:** In-body only, 6.0 stops  
**Video:** 6.2K 30p, 4K 60p, HD240p, 4:2:2 10-bit, F-Log, F-Log2  
**Memory:** 1x SD/SDHC/SDXC, UHS-I  
**Size (L x H x D):** 128 x 75 x 55mm  
**Weight:** 521g (including battery and memory card)

**T**he overnight success of the X100V took everyone by surprise, but none more so than Fujifilm. Launched in 2020 as

the fifth iteration of Fujifilm's premium compact camera, its sudden popularity among TikTok influencers caused a six-month waiting list to purchase one.

Fujifilm is back with the Fujifilm X100VI, a compact camera with a fixed lens design. The premium vintage aesthetic is made for street and travel photographers who want a pocket-friendly camera. The X100 range is also one of the few true rangefinder designs still being made, with the pricier manual focus only Leica M11 the only other option with an optical viewfinder.

### Key features

Externally, little has changed from the previous model, but when you have a viral success on your hands, you don't want to rock the boat. The body and 23mm lens are identical to the X100V, with all the major improvements hidden

inside the camera. The X100VI sees a bump in resolution from the X-Trans 5 sensor from 24MP to 40MP, with video now topping out at 6K. The new X-Processor 5 also powers better autofocus with subject recognition and tracking for faces, eyes, animals, birds and vehicles. For those who own the Fujifilm X100V, the question is whether the Fujifilm X100VI is worth the upgrade.

### Build and handling

The design is near-identical to the X100V but that repetition is no bad thing. The X100 series harks back to rangefinder film cameras from the film era and the X100VI is built to a premium standard that feels amazing in the hand.

Fujifilm remains committed to dials on its cameras and there are two on top, one handling exposure compensation and the other shutter speed. This shutter speed dial also has a clever trick where you can lift and twist it to change the camera ISO. The aperture is handled by the ring on the lens, which has two raised textured handles and is easy enough to

## Fujifilm X100VI Compact



4

One of the X100VI's highlights is the hybrid optical viewfinder: in use, it's a great experience.

7

There are two dials on the top, one handles exposure compensation, and the other shutter speed.

5

If you prefer an electronic viewfinder, a flick of a switch turns the screen to a 3.69m dot OLED EVF.

8

The shutter speed dial has a clever trick where you just lift and twist to set the ISO value.

6

The screen only has a 90° horizontal tilt, limiting its usefulness for filming as you can't flip the screen.

9

Aperture is changed via a ring with two raised handles, which is easy to turn with one finger.



Although our lab tests showed increased noise from the X100VI, many of our test shots were taken at night, and even at ISO 6400 or 12,800, the images were usable.



The lens is compatible with wide and tele lens converters released with the X100V – however, if you want to use filters, you need to purchase a filter adapter ring.

turn with one finger. The lens clicks at each aperture stop are audible if you don't want to take your eye off the viewfinder. But if you just want to point and shoot, you don't have to worry about these – all the dials have an auto setting or you can mix manual with auto to shoot in aperture priority or shutter priority modes. And like other Fujifilm cameras, if you'd prefer some manual control, you can delve into the menu and set the camera up to cycle through aperture and shutter speed using the thumb and finger wheels.

The lens is unchanged from the X100V – although that was an outstanding revision with incredible sharpness. The 23mm focal length is spot on for a compact camera, as it works for travel, street and environmental portraiture, I would have liked a wider aperture to expand low-light performance and creativity with shallow focus. There

is also a control ring on the lens – while you can set this to several different functions in the settings, by default it controls the camera's digital zoom. That's digital zoom, not optical, so the camera will crop the image for a smaller pixel count. Where the X100V's 24.1MP sensor limited the digital cropping's effectiveness, the 40MP sensor in the X100VI seems made for this feature – with 50mm (20MP) and 70mm (10MP) crops still holding a lot of resolution.

The lens is compatible with the existing wide and tele lens converters released alongside the X100V. One frustration for anyone who wants to put a filter on the front of their lens is the additional purchase of a filter adapter ring (AR-X100) – it's also the only way to make the lens water-resistant.

One of the highlights of the X100 series is the hybrid optical viewfinder – one of the last remaining →

“Externally, little has changed from the previous model, but when you have a viral success, you don't rock the boat”





Garreth Bevan

optical viewfinders in a world full of EVFs. Due to the rangefinder design, the viewfinder doesn't perfectly line up with the sensor, but there is a digital box projected in the optical viewfinder that shifts depending on shooting distance so you know what is in your shot. It takes some getting used to initially, but after a while becomes second nature. If you prefer to use an electronic viewfinder, a flick of the front level switches it to a 3.69-million-dot OLED EVF.

The screen is a 1.62 million dot LCD panel. Vloggers might be disappointed to hear that the screen still doesn't flip around so that you can see yourself while you record. However, it does tilt by 90 degrees and still sits beautifully flush with the camera body.

One minor quibble with the build is the grip. Though it's more substantial than the X-E4, there isn't a huge amount to cling onto, and your little finger will be lost with what to do with itself.

## Performance

The X100V set some lofty expectations with its outstanding image quality, but the X100VI exceeds them. Edge to edge, images are sharp and detailed, with excellent contrast. Fujifilm's colour science is among my favourites and in the standard Provia simulation, colours are pleasing with a good balance of natural colour and saturation. If you don't like that, there are always another 20 simulations to try.

In our lab tests, noise at higher ISOs takes a hit over the X100V due to smaller photosites on this higher megapixel sensor – in reality, this is far less of a noticeable effect. I shot the neon lights of Tokyo at night with this camera and, even at ISO 6400 or 12,800, images from the newer model were usable and didn't look any noisier to the naked eye than from the X100V. Peeping in the corners, there doesn't seem to be any obvious softness or vignetting in jpegs, even when stopped down to f/2.

Autofocus is improved and makes the older model feel significantly slower. On the X100VI, AF is quick and silent and in continuous focus, the camera had no issue holding a focal point as my subject wandered about the frame.

## Rival cameras



**Fujifilm X100V**  
**£1,199/\$1,399**

A new, sharper lens does justice to the latest sensor, and the tilting touchscreen on the rear makes the X100V much easier to use.  
Reviewed: issue 229



**Nikon Z fc**  
**£899/\$957**

A pleasure to operate and it captures quality images to boot. Matching 'SE' lenses complement its good looks.  
Reviewed: issue 247



**Ricoh GR III**  
**£799/\$899**

The fixed-lens GR III scores top marks for neatness and small size, but loses out for value, performance and handling.  
Reviewed: issue 216







Gareth Bevan

Video footage is good and at 6K, there was a sharpness to the footage. The IBIS held shots steady, but some jerky movements managed to slip in so you may want to invest in a gimbal.



Gareth Bevan

Images from the X100VI are sharp and detailed, with excellent contrast. Fujifilm's colour science is renowned and the standard Provia simulation colours are pleasing, with a good balance of natural colour and saturation – and there are a further 20 simulations to try.

As well as human faces and eyes, the X100VI's autofocus also now recognises subjects including animals, birds, cars and vehicles. Some of these feel less essential on a 23mm fixed lens camera, but they are good to have. Vehicle tracking worked well in testing.

Battery life continues to be a weak point for the X100 series. It was my main gripe about the X100V, and although the processor is meant to improve efficiency, it hasn't moved the needle that much. In a few intensive days of shooting, I was easily burning through a battery or two, so it's advisable to invest in a few spares.

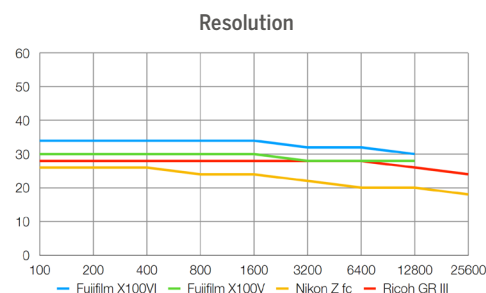
Film simulations are one of the top selling points for Fuji cameras and Fujifilm has taken the number of film simulations up to 20 – adding the Reala Ace simulation to an X-Series camera for the first time. Film simulations are lots of fun on their own but also a quick and easy way to stylise a photo right out of the camera. For the more creative, they're also a great building block for film recipes to make even more complex and accurate film looks.

Video performance gets a boost from the new sensor and processor. The X100VI tops out at 6K 30p footage, although this has a 1.23x crop, which makes the 23mm lens a 28mm lens (or a 42mm full frame equivalent). The X100VI is also capable of 4K 60p footage without a crop, or 1080p footage up to 240p. Video recording is good – filming at 6K, there is a real sharpness to the footage. The IBIS also managed to hold my static shots steady, and panning was definitely improved, but if video is your priority, there are more suitable cameras. Overall, the X100VI is a great photography camera that also shoots good video when needed. **Gareth Bevan**

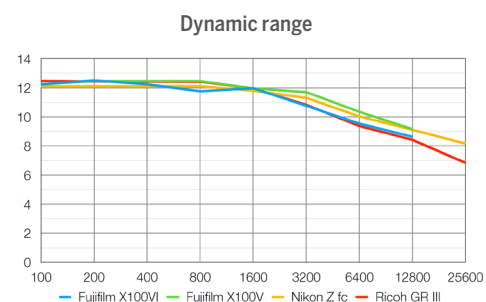
“The X100V set some lofty expectations for its image quality; the X100VI exceeds them”

## Fujifilm X100VI Compact

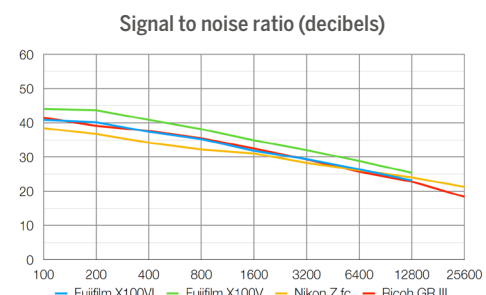
### Lab tests



Fujifilm's switch from a 26.1MP to 40.2MP sensor pays dividends when it comes to resolving fine detail. The X100VI leads the pack at all sensitivities and captures noticeably more detail than the X100V.



At higher sensitivities, the X100VI falls short of the X100V, capturing around 1EV less dynamic range between ISO 3200 and 12,800. Pixel-packed sensors benefit resolution but impact the dynamic range.



The X100VI can't match the X100V for image noise levels. Cramping extra pixels onto the same-sized APS-C sensor means each photosite (pixel) is smaller, making it more likely to generate noise.

### Digital Camera verdict

**4.5** ★★★★★ Outstanding



Fujifilm's uber-popular compact returns and while not much has changed externally, inside it's a different story. The new sensor takes the renowned quality of the previous model and pushes it further. Image quality is excellent, autofocus is faster and video has been greatly improved. One sore point is the battery life, which hasn't really improved from the previous model. It's also more expensive than the X100V, and might be more than some are willing to pay for a fixed-lens compact – you'd have to value this design over cheaper but similarly specced cameras.





**1** There's only a small bump for your fingers to grip, but it's key to the design aesthetic.

**2** Use this front wheel to adjust functions such as aperture or exposure compensation.

**3** The X-M5 is available in silver or black. A kit with the XC 15-45mm lens costs £899/\$899.

# Fujifilm X-M5

£799/\$799 (body only)

Powerful, stylish and incredibly compact – content creators and casual shooters look no further

[www.fujifilm.eu](http://www.fujifilm.eu)

## Specifications

**Lens mount:** Fujifilm X  
**Sensor:** 26.1 MP X-Trans CMOS 4 (APS-C)  
**Image processor:** X-Processor 5  
**Autofocus:** Intelligent Hybrid AF  
**ISO sensitivity:** ISO 160-12800 (exp to 80, 100, 125, 25600 & 51200)  
**Image stabilisation:** None  
**Max burst:** 5fps manual shutter / 30fps (1.25x crop) 20fps (no crop) electronic shutter  
**Video:** 6.2K 30p, 4K 60p (1.18x crop), HD 240p, 4:2:2 10-bit, F-Log, F-Log2  
**Viewfinder:** None  
**LCD:** 3.0-in 1.04m-dot vari-angle touchscreen  
**Memory cards:** 1 x UHS-I SD slot  
**Dimensions:** 112 x 67 x 38mm  
**Weight:** 355g (incl battery and memory card)



When the Fujifilm X-T50 turned out to not quite be the X-T30 II replacement many had expected, some speculated Fujifilm might be turning its attention away from the entry-level camera market and towards more premium models. However, just months later, Fujifilm has unveiled an affordable new camera that not only embraces the 'entry level' label, but might even reinvent it.

The X-M5 is nominally the sequel to the X-M1, released in 2013 – the numbering jump reflects its place in Fujifilm's current fifth generation of camera bodies. In a pocket-sized rangefinder-style body – although without the viewfinder to formally qualify it as such – the X-M5 is compatible with Fujifilm's range of XF lenses. With the market in content-creation cameras exploding, the X-M5 is directly aimed at vloggers and video makers, offering a combination of

easy-to-use video modes, a rotatable screen, updated microphones and powerful video capabilities.

The headline spec is 6.2K open-gate video – which, for a lot of content creators out there, is a huge deal that sets the X-M5 a step above similar models from the likes of Sony and Nikon. Yet, with Fujifilm's beloved film simulations and recipes, improved autofocus and a solid 26.1MP sensor, stills photographers might find a lot to love here as well.

## Build and handling

Stylistically, the X-M5 isn't a huge departure from the X-M1. Available in either black or silver, it emulates other classically styled Fujifilms like the X-T5 or the X100VI, with a faux-leather-wrapped metal body and dials up top.

I was fully prepared for the X-M5 to feel a lot cheaper than the X100VI I use day to day, but the body feels solid and hefty in a premium sort



**4** This is a camera pitched at content creators, so don't go looking for a physical viewfinder...

**7** This control dial offers instant access to Fujifilm's fabulous film simulation looks.

**5** ... instead, you'll have to compose your shots and monitor recordings on the touch-sensitive tilting rear screen.

**8** The other main dial covers exposure modes and the user-definable custom modes.

**6** There's no four-way controller on the rear, but this small joystick fulfils that function.

**9** A button for video recording and a custom function dial sit on the right-hand edge of the top plate.

and minimal, with the general button layout in keeping with the rest of the Fujifilm family, for easy switching between models. There is also a welcome directional joystick.

The X-M5 is the second camera in the Fujifilm lineup (after the X-T50) to get a dedicated film simulation dial. I have mixed thoughts on this, but on a camera like this, where manual controls are not the focus and you don't have to sacrifice a dial, it completely makes sense. It certainly made me change my film simulations more than I would if they were just in the menus.

On the other side of the camera, you have a mode dial, which has four options for custom settings (perfect for film recipe enthusiasts); this is also how you can jump between photo modes, or between vlogging or standard video modes.

There is also an unmarked dial that can be customised to a range of functions, including aperture, shutter speed, exposure compensation or – curiously, given the new dial – film simulations. On the front is a wheel that can control the same functions, but you can switch between each one by pressing the dial in.

## Performance

When the X-M5 shares a sensor with so many beloved Fujifilm cameras, like the Fujifilm X-T4 and the X-S20, it should really come as no surprise that the camera's image quality is excellent. It doesn't have →

“It should come as no surprise that the camera's image quality is excellent”

of way – although it only weighs 355g. I tried hard to find some flaws with the build, but all the dials feel solid, the flaps and battery door are secure, and the buttons – while a little bit too tiny for my clumsy fingers – have a decent click.

One of the reasons that the X-M5 is so compact and affordable clearly stems from the lack of an electronic or hybrid-optical viewfinder. While this will be a huge disappointment to the contingent of Fujifilm fans holding out for an 'X-E5' to update the X-E4, the X-M5 does sport a flip-out rotating screen that is perfect for composing vlogs and other pieces to camera. If you are used to shooting mostly on a phone, the X-M5 provides much the same kind of experience.

There is also no built-in flash – another signal that this is more a video camera than a stills one. With tiny hotshoe flashes or LEDs increasingly affordable, though, there are quick and easy ways to work around this.

The camera has a very slight raised grip on the front and a thumb grip on the rear, which is just about enough to cling onto, but I did find holding the

camera a little awkward. Those with smaller hands might cope better, but the X-M5 is not as comfortable as, say, the Sony ZV-E10 II.

I mostly used the camera with Fujifilm's 35mm f/1.4 and XC 15-45mm lenses, which are the perfect size on this X-M5, but the camera should also fare well with Fujifilm's dinky f/2 prime lenses, and would be an ideal match for the XF 27mm f/2.8 pancake lens (if you can find one).

Unfortunately, the kit lens the X-M5 is sold with – the XC 15-45mm – is such a mediocre optic that I find it really disappointing that Fujifilm didn't offer some other kits. The 15-45mm is fine for just an extra \$100 (the X-M5 kit costs £899/\$899) but, with its annoying extension when the camera is on, its irritating zoom sound and its average quality, you will likely be itching to upgrade it before long.

Focusing on the X-M5's controls, the rear panel is the biggest departure from the X-M1, as the traditional collection of buttons around the D-pad has been largely phased out in the last generation of Fujifilm cameras. The back is sleek





Gareth Bevan

The X-M5 follows in the Fujifilm tradition of delivering accurate colour rendition, with 20 film simulations for in-camera processing options.

the resolution of Fujifilm's newer 40MP sensor, but the 26.1MP sensor has more than enough resolution for the camera's intended purposes of casual shooting and social media. A higher pixel count would only make images larger and more cumbersome to work with.

Images straight from the camera are key to the X-M5's appeal, and Fujifilm's processing is excellent, with fantastic colour science and a great dynamic range in standard Provia mode. The real fun comes with tweaking your images, though. There are plenty of options with Fujifilm's film simulations, but also through adding film-like grain to your images, boosting the dynamic range, or playing with the colour chrome effects to change the saturation in skies.

Panasonic and Sony are gunning for Fujifilm here by adding photo LUTs to their cameras for still images. I still find Fujifilm's system far more simple and intuitive, although also more limiting to get in-depth with grading colour.

Fujifilm has brought its latest autofocus algorithms to the X-M5 with the inclusion of the X-Processor 5. The X-M5 is capable of recognising subjects including human faces and eyes, as well as animals, birds, insects, cars and other vehicles. The AF performs really well here: I had no issue picking up birds on the lake in my local park. Sony chose to leave its AI co-processor out of the ZV-E10 II, which limits the subjects it can recognise to

just humans and some animals – a decision Sony might now regret from a competitive standpoint.

The biggest omission in the X-M5 is in-body image stabilisation – which will limit how low you can drop your shutter speed before the effects of hand shake start to creep into your images. In recent models, Fujifilm has offered around seven stops of compensation. Whether this matters to you likely depends on both how steady your hands are and how much you shoot in low-light situations, but it certainly isn't a deal-breaker. Until a few years ago, it was rare to even have IBIS in a camera, and no other cameras around this price have IBIS, including Sony's ZV-E10 II. You can use optical image-stabilised lenses like the XC 15-45mm, which will help, but a few other manufacturers offer more image-stabilised lenses than are in the XF lineup.

The bigger question is: does the lack of a viewfinder make this any less of a photography camera? As someone who

## Rival cameras



**Canon EOS R50**  
**£789/\$679**

A great beginner camera, with a 24.2MP APS-C sensor, 4K video, intelligent AF modes, and 15/12fps burst. Reviewed: issue 267



**Nikon Z 30**  
**£699/\$707**

Aimed at vloggers, for which the vari-angle touchscreen works much better than the tilting screen of the Z 50. Reviewed: issue 260



**Sony ZV-E10 II**  
**£925/\$999**

Not the perfect all-rounder, but comes remarkably close to achieving vlogging camera perfection. [bit.ly/dcm290\\_ZV-E10\\_II](https://bit.ly/dcm290_ZV-E10_II)



The X-M5 easily fits in the palm of the hand, but punches above its weight.





Gareth Bevan

Both these images show how well the Fujifilm X-M5 is able to capture a high dynamic range, with darks and lights that deliver detail rather than clipping out.

usually composes every photo through a viewfinder, I did find its absence somewhat limiting – I just find it far more satisfying to shut out the world around me and focus on only what's in my frame. It's a criticism I have also levelled at Sony's ZV cameras and the Lumix S9. Maybe fewer of Fujifilm's target market now use viewfinders and this is the future, but I find that hard to believe when film cameras have had an explosion in popularity among the youngest generations.

Fujifilm is banking on the X-M5's appeal to video makers. Thankfully the camera excels in this area. Following the blueprint of the X-S20, the newer processor paired with the older sensor (with its fewer megapixels) gives the X-M5 the necessary processing power and speed to produce up to 6.2K 10-bit open-gate video up to 30p.

For anyone unfamiliar with the term open-gate, it refers to the ability to use the entire sensor area; while this gives a more uncommon 3:2 ratio in footage rather than the traditional 16:9, it offers you far more flexibility later, when it comes to cropping. This is incredibly useful if you want to shoot one video that will be used in more than one place, such as YouTube (horizontal 16:9), TikTok (vertical 9:16), and Instagram (4:5), with 6.2K affording some cropping without losing too much detail.

The options don't stop there. You can also record in F-Log2 if you want to get in deep with colour grading or max out the dynamic range. Other recording options include oversampled 4K up to 30p with no crop, or 4K 60p with a 1.18x crop factor. Image quality in video looks great in all of these, and you can also slap on a film simulation to your video to give it an instant look – although, like photos, this isn't quite as in-depth

as the downloadable LUTs available on other systems.

Fujifilm has upped the audio capabilities of the X-M5 in an effort to take the fight to Sony's ZV cameras, which have three capsule microphones that capture far better sound than you usually get from a built-in mic. There are not only more microphones, but you can also change the directional pick-up pattern from omnidirectional (all around) to isolate noise from behind the camera, in front of it, or both.

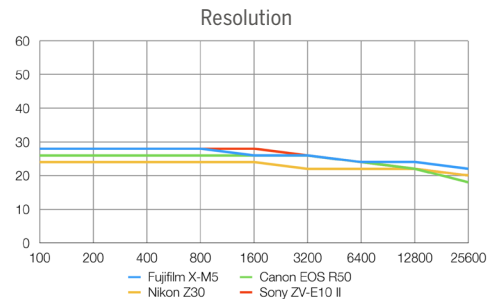
I found this to be quite effective, but still nowhere near the quality you would get from a good external mic. Outside, with road noise, birds chirping and some wind, the internal mics didn't isolate my voice in my tests as clearly as I would have hoped – although the directional pickup made my voice much clearer than the omnidirectional pattern. If you are really serious about your audio quality, my advice is still to pick up an external mic.

As with stills, the biggest issue with the X-M5's video is a lack of IBIS. This is obviously fine if you intend to keep the camera static; it wouldn't even be a consideration for, say, beauty vlogging. But outside, moving about with the camera, there is some very noticeable camera shake. Fujifilm's new digital image stabilisation algorithm works pretty well, although I found it overcompensated and made the footage look a bit too rigid.

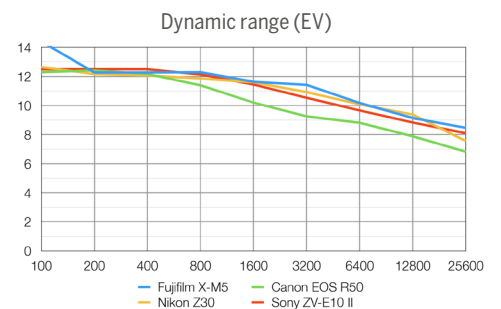
There is also the downside of your footage being penalised with a 1.32x crop. The 23mm lens I was using is effectively a 35mm lens thanks to the APS-C sensor crop, but it becomes a 46mm lens with digital image stabilisation applied – far beyond the focal length I had in mind when I bought the lens. **Gareth Bevan**

## Fujifilm X-M5 Mirrorless

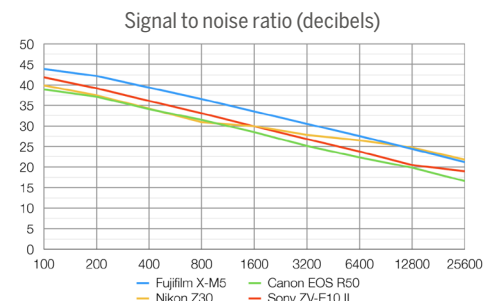
### Lab tests



The Fujifilm X-M5 and Sony ZV-E10 II both use 26MP sensors, so it makes sense that they resolve the most fine detail. The 24MP EOS R50 follows close behind, while the 20.9MP Z30 can't match



Fujifilm's X-Trans sensors usually perform well in our dynamic range test, and the X-M5 is no exception. Its sky-high ISO 100 score is a little suspicious, but it delivers consistently broad



The X-M5 delivers the cleanest images of this group, and by a wide margin. The Z30 is just about able to match the X-M5, but only at very high sensitivities, and only by having a lower-resolution

### Digital Camera verdict

5.0 ★★★★★ A best-in-class product



I was surprised by how much of a good time I had shooting with the X-M5. It's compact, stylish, feels great in the hand, and adds more powerful specs than the direct competition – all while being more affordable than its closest Sony rivals. I think this is currently the best-value camera you can buy today.

If you especially lean towards vlogging or making videos, then this is the camera that should be top of your list for consideration. Autofocus is a breeze, thanks to the latest processor giving access to all of Fujifilm's latest algorithms.



## Mirrorless Fujifilm X-H2



1

The deep grip gives a secure hold, even with longer and heavier lenses.

2

The X-H2 uses the same X Mount as all previous models, with a wide range of lenses.

3

Fujifilm's brand new 40MP X-Trans sensor delivers the highest APS-C resolution yet.

# Fujifilm X-H2

£1,899/\$1,999 (body only)

Setting a new standard for APS-C cameras

[www.fujifilm-x.com](http://www.fujifilm-x.com)

### Specifications

**Sensor:** 40MP APS-C X-Trans 5 HR BSI  
**Image processor:** X-Processor 5  
**Mount:** Fujifilm X Mount  
**ISO range:** 64-51,200  
**Shutter speeds:** 15 minutes-1/180,000sec  
**Image stabilisation:** 5-axis IBIS  
**Max image size:** 7,728 x 5,152 pixels  
**Max video resolution:** 8K 30p, 6.2K 30p, 4K 60p, 1080 120p  
**Viewfinder:** 5.76-million-dot OLED  
**Memory cards:** 2 slots: 1 x CFexpress Type B, 1 x SD UHS-II cards  
**LCD:** Vari-angle touchscreen, 1.62m dots  
**Max burst:** 20fps electronic, 15fps mechanical  
**Connectivity:** Wi-Fi, Bluetooth, HDMI, USB-C, 3.5mm mic, 3.5mm headphone, 2.5mm remote  
**Size:** 136.3 x 92.9 x 84.6mm  
**Weight:** 660g (including battery)



Fujifilm sold us a dummy in 2022. Rumours abounded of a new 40MP APS-C flagship, which was later confirmed by Fujifilm as being 'in development', then talk shifted to an ultra-fast camera with a stacked sensor. It then became apparent that Fujifilm was launching two flagship cameras, and not one. The first of these to arrive was the high-speed Fujifilm X-H2S, proving to be spectacular in its own right, but for many observers the precursor to the main event, the Fujifilm X-H2.

This camera has the highest resolution yet in an APS-C camera, its 40-megapixel sensor surpassing that of all but a handful of full-frame cameras. It can also shoot 8K video, which has never before been achieved with the APS-C format, and matched by a pretty small set of full-frame

cameras. Moreover, it does this at a price that's far, far below that of any of these full-frame models.

The Fujifilm X-H2 and X-H2S are a very strong double-act. The 26MP X-H2S has blinding professional speed, while the 40MP X-H2, fast in its own right, offers professional levels of resolution both for stills photography and video.

Physically, they are all but identical. Yet in terms of what they do and how they do it, they are somewhat different. The X-H2 targets users for whom resolution is everything.

### Key features

The X-H2 has a new 40MP APS-C X-Trans sensor, which is a high enough resolution in itself, but this is supplemented by a 160MP multi-shot pixel-shift mode, which merges 20 separate images into one. It has 20 shots rather than the usual

## Fujifilm X-H2 Mirrorless



4

The 5.76 million-dot EVF is near enough identical to the one on the X-H2S.

7

The screen folds against the back for protection if you want to use the viewfinder.

5

The vari-angle LCD touchscreen contains 1.62 million dots.

8

The two card slots accept either UHS-II SD or CFexpress Type B memory cards.

6

As is the case with the X-H2S, the X-H2 sports a conventional PASM mode dial.



7

8

16 because of the unique colour filter array of the X-Trans sensor design, and the multi-shot merging happens later on a computer – it's not done in-camera.

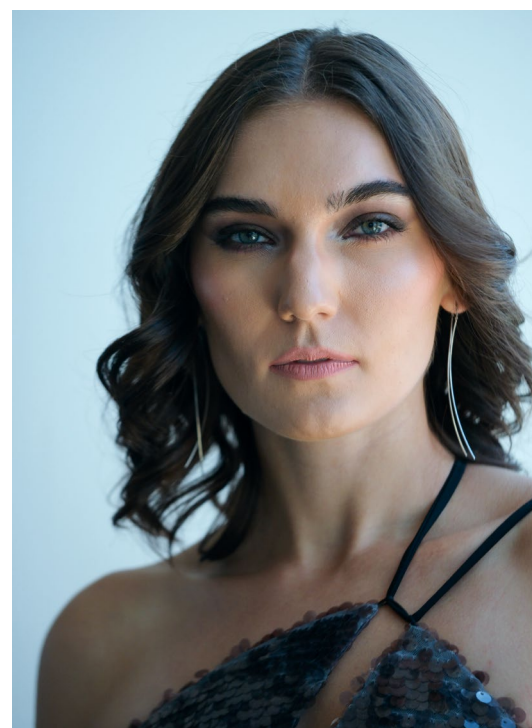
Normally, high-resolution sensors sacrifice speed, but while the sensor in the X-H2 does have a slower readout speed than the one in the X-H2S (it doesn't use the same stacked design), it is no slouch.

With a maximum burst speed of 15fps with the mechanical shutter, the X-H2 can successfully keep up with most sports cameras for sheer speed. What Fujifilm calls the 'rolling shutter' time, ie the scan time, of the X-H2 sensor is 1/88sec versus the 1/180sec of the X-H2S.

The company also acknowledges that the focus tracking performance will not be the same as the X-H2S's because it can't match the faster camera's readout speed. However, the X-H2 will be bought primarily for its resolution, and that brings its real headline features.

The 40MP stills (and 160MP multi-shot) resolution are only half the story. The other half is the 8K video capability. Some were hoping for 8K 60p capture, but the X-H2's 30p capture will be fine for most, and while it can't match the 4K 120p capture of the X-H2S, it can still do 4K 60p.

Of course, with 8K capture comes that new video bugbear – heat – and its effect on maximum —→



Chris George

Fujifilm cameras are well regarded for their film simulations and portrait rendering: Fujifilm X-H2 with Fujinon XF 80mm f/2.8 LM OIS WR Macro, 1/900 sec at f/2.8, ISO 800.

“The X-H2's 40MP sensor surpasses that of all but a handful of full-frame cameras”



## Mirrorless Fujifilm X-H2



Chris George

We were able to test the X-H2 on the New York skyline during Fujifilm's X-Summit event in September when the new camera was officially launched: Fujifilm X-H2 with Fujinon XF 16-55mm f/2.8 R LM WR, 1/420sec at f/5.6, ISO 400.

recording times. Well, here Fujifilm has come up trumps. The X-H2 has cooling vents behind the rear screen which allow a claimed recording time of 160 minutes at 25C without any additional cooling, increasing to 240 minutes with Fujifilm's optional FAN-001 cooling fan (as offered for the X-H2S, too). In our book, that's as good as unlimited recording – a remarkable achievement.

Elsewhere, the X-H2 appears to be pretty much identical to the X-H2S, with a very good 5.76m-dot EVF, 1.62m dot vari-angle touchscreen and both CFexpress Type B and UHS-II memory cards. Naturally, it takes the full range of Fujifilm X Mount lenses, many of which are being updated to meet the speed and resolution of Fujifilm's latest cameras.

“It feels like a very snappy performer, with fast and accurate AF”

One of these, the new Fujinon XF 56mm f/1.2, is being launched at the same time as this camera.

### Build and handling

The Fujifilm X-H2 is not a large camera but it has a deep grip for a secure hold and there is a decent amount of space around the controls. These do not follow the traditional external controls of the Fujifilm X-T4, but instead this camera swaps to a conventional mode dial (like the X-H2S). This has no fewer than seven custom settings (C1-C7) – Fujifilm has opted for in-depth customisation rather than a body covered in buttons.

We have so far tried the X-H2 with a variety of lenses, including the Fujinon XF 16-55mm f/2.8 and the newly announced Fujinon XF 56mm f/1.2 R WR – this camera will be sold body-only and with the XF 16-80mm f/4 – and while it feels best balanced with Fujifilm's smaller lenses, it's not too unwieldy with the 16-55mm, which is a likely pro choice for X-H2 buyers.

The 5.76m-dot electronic viewfinder is very crisp and clear, as you would expect from that resolution, and the rear screen is very good, too – it's

great to have a fully vari-angle screen rather than a simple tilting screen.

The status display panel on the top of the X-H2 is especially good and worth giving up shutter speed and ISO dials for. The numerals are big and clear and the white-on-black display has bags of contrast.

### Performance

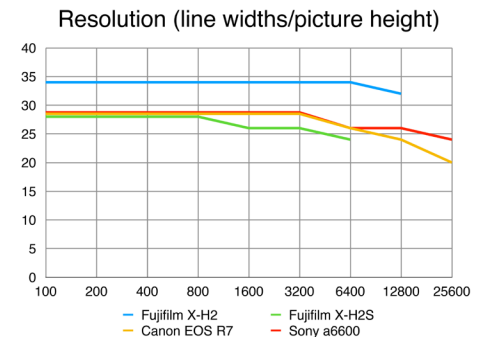
Theoretically, the Fujifilm X-H2's responses will be slower than those



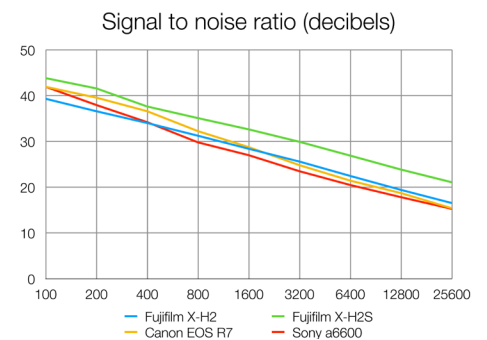
The X-H2 has dual memory card slots, one of which takes SD UHS-II compatible cards and the other CFexpress Type B.

# Fujifilm X-H2 Mirrorless

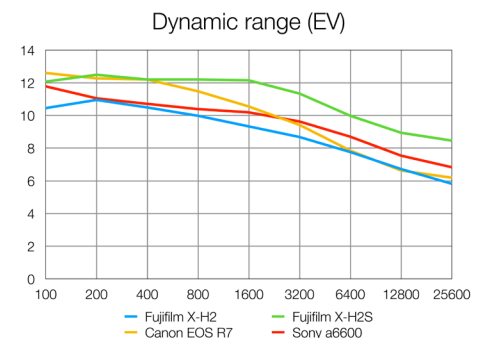
## Lab tests



With 40.2MP on tap, it's no surprise that the X-H2 is in a league of its own in this test, resolving significantly more fine detail than the competition.



The clarity of the X-H2's images is closely matched to Canon and Sony's, though the X-H2 produces less noise and therefore higher signal-to-noise scores.



The X-H2 captures a respectable amount of dynamic range, though its pixel-packed sensor leaves it a bit compromised compared to the 26.1MP X-H2S.

## Digital Camera verdict

5.0 ★★★★★ A best-in-class product



The Fujifilm X-H2 is an extremely compelling camera at an equally compelling price. With its 40MP resolution and 8K video, it takes on some full-frame big guns at half the price – while being made to the same exacting, professional standards. The X-H2 has effectively redefined what can be expected from an APS-C camera system.

Chris George



Chris George



The X-H2's 40MP sensor breaks new ground for detail rendition in an APS-C sensor, and Fujifilm is upgrading many of its lenses to match this new resolution standard.

of the X-H2S, but it still feels like a very snappy performer, with fast and accurate autofocus (now with Animal, Bird, Automobile, Bike, Airplane and Train recognition, not just Face and Eye AF). When in use, we didn't notice a whole lot of difference in terms of responsiveness.

On paper at least, Fujifilm has not put a foot wrong with the X-H2. The design and handling follow that of the X-H2S (physically they are all but identical) and the X-H1 before it, a camera we admired greatly, so we're very happy to see its successor.

The X-H2 handles very well, its specification is spellbinding and its price point is just as impressive.

Yes, it has a smaller sensor, but it matches the specs of full-frame cameras at two or three times the price. The image quality is every bit as good as we would expect, and the resolution doesn't disappoint. The Fujifilm X-H2 genuinely sets new standards for APS-C cameras.

Rod Lawton

"On paper at least, Fujifilm has not put a foot wrong with the X-H2"





**1**  
The most obvious feature of the camera is its jaw-dropping design – a perfectly sculpted square body.

**2**  
The CFV 100C instantly transforms an old 200 or 500 camera into a 100MP mirrorless powerhouse.

**3**  
From the tactility of the exposure dial to the shutter button, the whole system is a marvel of precision.

# Hasselblad 907X & CFV 100C

£6,729/\$8,199

Not just a beautiful camera system but versatile, too

[www.hasselblad.com](http://www.hasselblad.com)

## Specifications

**Sensor:** 100MP back-side illuminated CMOS medium-format

**Lens mount:** Hasselblad X System

**Autofocus:** Hybrid phase detect with 294 PDAF zones

**Image stabilisation:** No

**ISO range:** 64 to 25,600

**Video:** No

**Viewfinder:** No

**LCD:** 3.2-inch, 2.36 million-dot tilting (40°, 90°) touchscreen

**Memory:** Internal 1TB SSD, 1x CFexpress Type B (up to 512GB)

**Max burst:** 3.3fps (14-bit colour)

**Connectivity:** Wi-Fi 6, Bluetooth, USB-C 3.1 Gen2, shutter control port, flash sync input, flash sync output, ELX output, optional hot shoe

**Size:** 102 x 92 x 84mm

**Weight:** 620g (907X & CFV 100C; excluding battery and memory card)

**T**he Hasselblad 907X and CFV 100C is the most beautiful camera system I've seen. I'm a sucker for vintage cameras and SLR-styled modern mirrorless models, but I've never been quite as smitten with the design of a camera like this one.

But this beauty is also a beast. A truly unique modular system, the Hasselblad 907X & CFV 100C comprises a 'camera' (the 907X, reviewed in issue 235) and the all-new 100MP medium-format back (the CFV 100C). Combined, they become a modern mirrorless camera, but the CFV 100C can also be attached to a vintage Hasselblad body, such as the iconic 500C, adding 100MP horsepower to these similar systems.

The camera is a huge step up in performance from the previous Hasselblad 907X & CFV 50C (the older 50MP digital back). That's because, inside, there's a lot in common with the Hasselblad X2D 100C – namely the 100MP sensor and phase detect autofocus system with face detection.

However, the X2D is a conventional SLR-style camera, so the 907X & CFV 100C have as many differences as similarities. So who is this combo for, and does an old-fashioned box-style camera still have a place in the modern world?

## Features

The most obvious feature of the camera is its jaw-dropping design – a palm-sized, perfectly sculpted square body that eschews a viewfinder and ergonomics in favour of a tilting screen and touch-oriented inputs. However, this is more than just an aesthetic affectation. This is a modular camera system that consists of two parts: the wafer-thin 907X 'camera' (a mount adaptor to attach XCD lenses to the camera back) and the CFV 100C digital back, which contains the 100MP image sensor, processor, rear screen, controls, battery and memory.

Inside the CFV 100C is the same 100MP sensor and phase-detect-powered autofocus system as the Hasselblad X2D. The new 907X combo delivers the same performance as the



## Hasselblad 907X & CFV 100C Medium-format

4

An optional optical viewfinder can be attached, though the system is intended to be used via the screen.

6

The 3.2-inch rear screen's 2.36 million dot and 24-bit colour shows off the glorious colour depth and tonality of its images.

5

The shutter is located in the bottom corner, where your finger sits as you hold the camera in hand.

7

There are five buttons at the bottom of the screen, but the system is designed to be driven by touch.



The 100MP resolution offers so much flexibility in terms of editorial framing, shooting in different aspect ratios and the ability to artificially extend the focal length.



The 907X/100C has no stabilisation, however, if your work demands a more measured approach, such as product photography, then it's less of a disadvantage.



The incredible 100MP sensor produces pin-sharp images, but this resolution will instantly betray even the merest hint of laxness in your camera discipline.

X2D but with additional versatility due to the modularity of the system. With the CFV 100C and 907X, you can mount the modern mirrorless X System Hasselblad lenses (along with HC/HCD, V and XPan glass via adapters). However, you can also attach the CFV 100C to technical cameras and Hasselblad's legacy V System film medium-format cameras – including the 500 and 200 series.

Like the X2D, this system has a single CFexpress Type B slot (which supports cards up to 512GB) along with a built-in 1TB SSD, good for around 4,700 raws, 4,000 raw + jpeg sets, 28,000 jpegs, 4,300 raw + HEIF sets, or 53,000 HEIFs. Thanks to their leaf shutter design, Hasselblad XCD lenses support flash

synchronisation at all shutter speeds, which is handy for the studio shooting that this system caters for. A feature you won't find, however, is video. No one buys a Hasselblad because they want to shoot a vlog, but it's worth mentioning.

### Build and handling

The build quality of the 907X/100C is as premium as the design. From the locking mechanism that connects the body and the back to the irresistible tactility of the exposure dial and shutter button, the system is a marvel of precision. While there are five buttons at the bottom of the rear screen, the camera is designed to be driven by touch – and Hasselblad's menu system and touch



“The camera's most obvious feature is its jaw-dropping design – a palm-sized, perfectly sculpted square body”



## Medium-format Hasselblad 907X & CFV 100C



James Artalus

interface are unparalleled. Like a minimalist, upmarket version of Apple's UX, this is the most luxurious way of changing ISO or adjusting your screen brightness. The rear screen is a 3.2-inch affair with 2.36 million dots and 24-bit colour to display the glorious colour depth and tonality of images.

Given that the combo is designed to be used like a classic top-down camera with a waist-level 'finder', such as the Hasselblad 500C, the touchscreen tilts with hard stops at 40° and 90°. An optional optical viewfinder can be attached, though the system is intended to be used via the screen.

The ergonomics are modelled after classic medium format 'box' cameras – which is to say, this isn't a camera designed for handheld shooting, though it fits in the palm. The shutter is located in the bottom corner, where your trigger finger sits as you hold the camera in your hand and is surrounded by the knurled exposure dial. These are the only direct controls on the camera itself, though XCD lenses have a customisable control ring to add an extra exposure function.

A beautiful-looking grip is available for dedicated handheld shooting. But while the grip feels great and works well, this camera is to be used on a tripod rather than handheld – particularly since it lacks any in-body image stabilisation. Besides, that 100MP resolution will instantly betray even the merest hint of laxness in your camera discipline.

### Performance

The 907X with CFV 100C delivers genuinely incredible image quality, with unrivalled tonality and colour depth. Hasselblad's Natural Colour Solution

## Rival cameras



**Fujifilm GFX 100 II**  
**£6,999/\$7,499**

This is a revelation: it should be the catalyst for every full-frame pro wavering over jumping to medium-format. Reviewed: issue 277



**Hasselblad 907X & 50C**  
**£5,990/\$6,400**

Not designed to compete with regular cameras, this is a pro tool that's part of a flexible modular system. Reviewed: issue 235



**Sony A7R V**  
**£3,999/\$3,898**

A stunning camera: remarkable autofocus acquisition and tracking, and the image quality is as good as the A7R IV. Reviewed: issue 264







The images are sublime, as always from Hasselblad. As well as tonality and colour, there is so much richness and depth packed into the files and the highlights and shadows sing.



The 907X & 100C demands a considered approach rather than rapid-fire SLR-style shooting. As such, it's tailor-made for landscapes, still life, product photography and studio portraiture.

technology means that hues and tones 'pop' in a way that adds greater dimension to your subjects. Of course, this being the same sensor found in the Hasselblad X2D, you can expect the same 16-bit colour and 15 stops of dynamic range – along with the same phase detect autofocus system that finds focus fast and reliably.

While the sensor and AF system are carried over from the X2D, something that hasn't been transplanted is the seven-stop image stabilisation system. The modern Hasselblad demands a deliberate, considered approach rather than rapid-fire SLR-style shooting. As such, the 907X / 100C is tailor-made for landscapes, still life, product photography, studio portraiture, and anywhere the camera can be set up stationary for measured, precise work. That said, it's also a formidable street shooter when paired with a monopod.

The images are, as always from Hasselblad, sublime. In addition to the tonality and colour, there is so much richness and depth packed into the files that highlights and shadows simply sing – there is also latitude in the dynamic range to work with. Then there's the resolution – it's easy to forget how much flexibility 100MP gives you. Not just in terms of framing, or being able to shoot in aspect ratios like XPan (65:24), but also in the ability to artificially extend your focal length. **James Artaius**

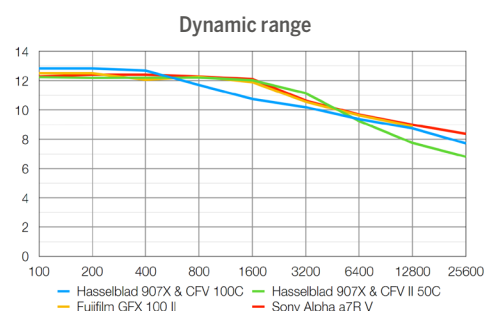
“Hues and tones ‘pop’ in a way that adds greater dimension to your subjects”

## Hasselblad 907X Medium-format

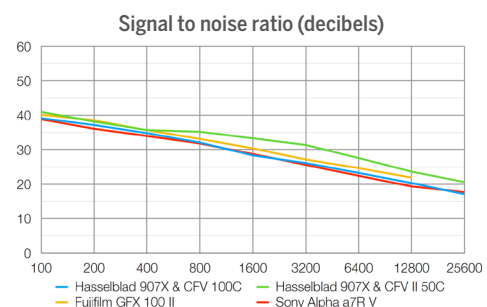
### Lab tests



The two 100MP cameras unsurprisingly resolve almost identical detail levels, though the GFX 100 II produces clearer results at higher ISOs, thanks to its slightly better image noise control.



The CFV 100C leads the pack for dynamic range at low ISOs, but can't quite match the comparison cameras once sensitivities exceed ISO 400.



The camera to beat here is the CFV II 50C, as its relatively modest pixel count for such a large sensor area means it has larger individual pixels, which are, therefore, less susceptible to generating image noise.

### Digital Camera verdict

4.5 ★★★★★ Outstanding



The Hasselblad 907X & CFV 100C is a truly unique camera system with a miraculous 100MP sensor but, given its various limitations – lack of viewfinder, ergonomics or stabilisation – why would anyone pick the 907X & CFV 100C over the Hasselblad X2D? If your work requires the use of a tripod, then these limitations don't matter so much. It can't be escaped that this product costs an incredible amount of money – however, the Hasselblad 907X & CFV 100C is the ultimate medium-format camera. If your work is studio or tripod-based, this is the system for you.



## Mirrorless Leica M EV1



**1** If required, an optional grip can be bought from Leica, for an additional price of £340 (\$460).

**2** The iconic red dot is front and centre on the M EV1, as it is with other M series cameras.

**3** Over 80 Leica M-mount lenses are available, including 28mm and 35mm 'street' primes.

# Leica M EV1

£6,840/\$8,895 (body only)

An alternative – and controversial – take on a classic

[www.leica-camera.com](http://www.leica-camera.com)

### Specifications

**Sensor:** 60.3MP full-frame, CMOS  
**Image processor:** Maestro III  
**Lens mount:** M-mount  
**ISO range:** 64-50,000  
**Stabilisation:** No  
**Max burst:** 4fps  
**Viewfinder:** 5.76m dot EVF, 60Hz, 0.76x  
**LCD:** 2.95in TFT, 2.33m dot  
**Max image size:** 9528 x 6328px  
**Video:** No  
**Storage:** 64GB internal SSD, 1 x UHS-II SD  
**Connectivity:** Wi-Fi, Bluetooth, USB-C  
**Battery/ shots:** BP-SCL7, 244 shots (approx)  
**Dimensions (W x H x D):** 140 x 80 x 38mm  
**Weight:** 484g (incl battery)

The Leica M series has featured some of the most esteemed cameras in the industry, which have been used to take some of the world's most recognised images, winning it a cult-like following. With such dedicated and impassioned users, the pace of change has been slow and measured, with the switch from film to digital being the most significant change to the series in around half a century of incremental refinement.

With the introduction of the Leica M EV1, the M series faces another momentous milestone – it's the first one not to feature an optical viewfinder. Instead, the M EV1 uses an electronic viewfinder (EVF). As hallowed ground for street photographers, any change to the M series is going to be divisive, but this is an alternative to the Leica M11, not a replacement. And it's far from the first Leica camera to use an EVF; the Leica Q series is a popular rangefinder-style option that has never featured an optical viewfinder.

With a range of over 80 M-mount lenses, the Leica M EV1 will most likely

be used with either a 28mm or 35mm lens stuck permanently to the front. With the OVF gone, I'd question whether the better buy is a Leica Q3 or Leica Q3 43 – both of which offer a fixed lens but the same EVF and sensor, while adding autofocus, video and image stabilisation to the package – and for a lower price.

However, for frequent lens changers, or those who like the stripped-back simplicity and shooting experience of an M camera over the more complex Q, how does the Leica M EV1 compete with the other M11 cohort?

### Build and handling

The elephant in the room with the Leica M EV1 is the new EVF. While dedicated fans may bemoan Leica for betraying the soul of its M rangefinders, others simply won't care. If you want a pure M experience, there are four rangefinder M-series cameras you can buy, so the existence of the M EV1 shouldn't be something to get worked up about.

The EVF itself is excellent. It's slightly slower than the one used in the Q3, topping out at 60fps instead of 120fps – but it matches the 5.76m-dot

## Leica M EV1 **Mirrorless**



The body covering is the same diamond pattern that features on the Leica Q compact camera.



Gareth Bevan

When using the digital cropping modes, a box in the EVF or rear screen will indicate the cropped area.



Gareth Bevan

Battery performance is rated at 244 shots via the rear LCD, or 237 shots when using the EVF.



Gareth Bevan

During testing, the ISO performance of the M EV1 was excellent. We were happy to shoot up to ISO 3200 without being concerned about image noise.



4

Thanks to an EVF, exposure flaws can be corrected in real time rather than in editing.

6

A single card slot is housed in the battery cavity; there's also an internal 64GB SSD.

8

The tactile controls have a reassuring feel, as you'd expect from a Leica camera.

5

The rear LCD screen has no tilting mechanism so it isn't the easiest one to use.

7

With no hood, the EVF is prone to picking up face and finger grease, says our tester.

9

The M EV1 weighs 82g less than the M11 camera on which it's based.

resolution, and it's easy to use. The only issue is that the lack of a hood around the EVF means that it tends to pick up grease from your face or fingers.

The main benefit of an optical viewfinder is the ability to frame a shot while still seeing what's happening around the frame. With an EVF, you lose that as it only shows the area that will be captured in the image – for many street photographers, this is invaluable to their process. But if that is your preferred way of shooting, Leica's optical M rangefinders aren't going anywhere.

The EVF has some significant benefits that probably outweigh the arguments for a traditional OVF. Having a clear screen for focusing is a godsend for manual-focus cameras – especially

for anyone with poor eyesight. The EVF allows you to magnify the screen by either 1.3 or 1.8 times, getting in close to nail the focus. You can also adjust the screen by -4 and +2 dioptres to aid different visual impairments. The EVF (and rear screen) also support Leica's focus peaking, which highlights the in-focus area with a particular colour.

The other benefit of an EVF is that you can see exactly how your image will look, live in the viewfinder – and correct flaws in exposure on the fly rather than through trial and error or in editing.

Finally, on the EVF, I wish Leica had moved the logo to the gap where the viewfinder used to be. The Leica dot sits in the middle of the M series cameras – and that's where it is on the EV1 →



## Mirrorless Leica M EV1



Gareth Bevan

The Queen Anne statue outside St Paul's Cathedral in London. Captured on a 35mm Summicron M ASPH lens, with settings of 1/640 sec at f/5.6, ISO 400.

– but the open space draws attention to the fact that there's nothing else there.

Apart from the missing viewfinder, it's hard to tell the Leica M EV1 apart from the rest of the M11 cameras. It features the same beautifully designed magnesium and aluminium body with a leatherette cover – it's one of the most luxurious cameras I've used (although to be expected at the price). It comes in regular black only, with no

silver brass version so far. The Leica M EV1 is also slightly lighter than the M11, weighing 484g compared with 530g.

As beautiful as the camera is, handling could be an issue. There is a small nub of a thumb grip on the rear of the camera, but the camera has no front grip, so it's not the most comfortable to hold for long periods one-handed. You can buy an optional grip from Leica for an additional £340 (\$460).

Like previous models, the battery is accessed via a switch on the bottom, which pops the cell out but requires a further press to unlock the mechanism. It's a clever way of doing it without having a battery cover or door, and it's quick to get used to. However, the USB-C charging port is on the base of the camera, which means it can't sit flat when being charged, which is a bit awkward and means you either have to lay the camera down on its screen or leave it balancing on the end of the charging cable. The single SD card slot is also behind the battery, meaning that you have to take the battery out to remove the SD card. It's a minor annoyance, but it allows the M EV1 to keep its clean lines without needing a separate SD slot door.

The Leica M EV1 comes with 64GB of built-in SSD storage, which is accessible via the Leica Fotos app or USB-C, so you might not need to take the SD out as often.

## Rival cameras



**Fujifilm X100VI**  
**£1,599/\$1,599**

A new sensor improves the image quality over the X100V, autofocus is faster and video has been greatly improved.

Reviewed: Issue 280



**Sigma BF**  
**£1,969/\$1,999**

Made from a single block of aluminium, the 24.6MP BF offers a friction-free touchscreen-driven experience.

Reviewed: Issue 296



**Sony A7C R**  
**£2,799/\$3,398**

A 61MP full-frame mirrorless with a powerful image processor, amazing resolution and workable low-light performance.

[www.bit.ly/dcm303\\_a7cr](http://www.bit.ly/dcm303_a7cr)



## Performance

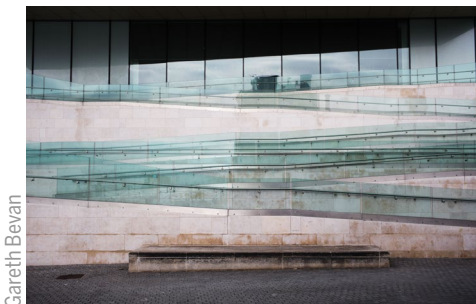
The Leica M EV1 packs in a 60.3MP sensor, but employs the company's Triple Resolution tech to shoot either 36.5MP or 18.4MP images using the whole sensor area for smaller raw (DNG) or jpeg files. The DNG files range from 70 to 120MB, depending on the size, and jpegs at around 15 to 30MB.



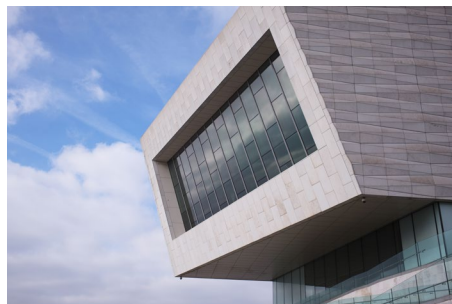
## Leica M EV1 **Mirrorless**



Impressive dynamic range means there's plenty of scope for pulling out the detail captured in raw files.



Photos from the M EV1 are distinctly 'Leica' – contrast-heavy and leaning into cooler tones.



Paired with the M EV1, the 35mm Summicron lens rendered photos with distinct subject separation.

The camera can also make use of digital cropping modes during capture, which crop in either 1.3x or 1.8x, saving the cropped image as a jpeg, but the DNG as the full uncropped file, with the crop data accessible in editing software such as Lightroom. When using the crop mode, the camera displays a box in the EVF or on the screen to show the cropped area.

Photo performance is excellent, with the sharpness being particularly good. Large images have a lot of cropping potential and the dynamic range is impressive, with a good amount of scope in raw files to pull detail out of the shadows or highlights. ISO performance is also good; I was comfortable shooting up to ISO 3200 without being concerned about grain, with it only starting to become visible from 6400 onwards.

There is no mistaking the photos from the M EV1 as distinctly 'Leica'. They are fairly contrast-heavy, leaning more into cooler tones with accurate but bold colours. The Summicron-M 35mm f/2 ASPH lens I used renders photos with a distinct subject separation, with the kind of unique bokeh these lenses are renowned for. This is due to the lens, but vignetting was an issue wide-open – though these were easily

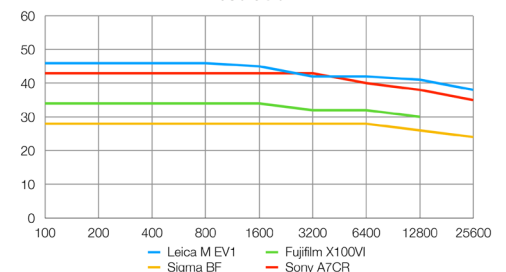
cleaned up in Lightroom – and many would argue that it adds character to the images.

I shot most of my photos in either the natural profile of the camera, which I found the most balanced for colour, or Leica's high-contrast monochrome setting for punchier black and whites. There are other profiles and looks for different tastes, including a colourful Leica Vibrant and a more neutral Leica Monochrome.

Battery performance is acceptable, but longevity isn't its strongest suit, being rated at 244 shots using the LCD or 237 via the EVF. However, the nature of the Leica M EV1 and its manual-focus lens made me more careful about how I was shooting, which actually meant the battery easily lasted for a whole day of wandering around London shooting, though heavier shooters might want to carry a spare. **Gareth Bevan**

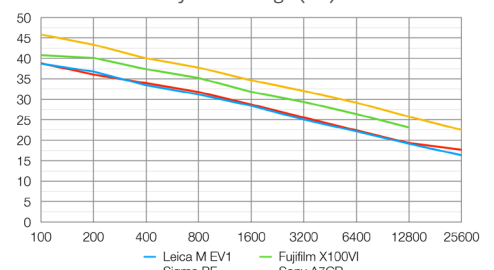
“There is no mistaking photos from the M EV1 as distinctly ‘Leica’”

Resolution



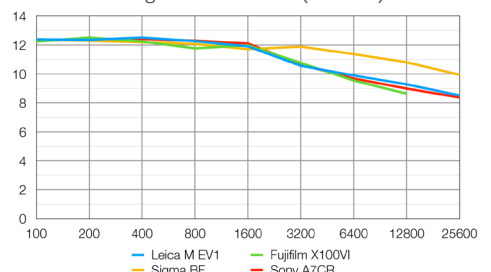
With megapixel counts in excess of 60MP, the Leica and Sony cameras were always going to come out on top when it comes to resolving fine detail.

Dynamic range (EV)



The more pixels on a sensor, the more susceptible it is to generating image noise, so the 60.3MP Leica produces noticeably noisier images at all sensitivities than the 24.6MP Sigma BF.

Signal to noise ratio (decibels)



The M EV1 matches the Sony and Fujifilm cameras for dynamic range. The Sigma BF is in a class of its own for low-light dynamic range, though – a payoff from a lower megapixel count and more light-

### Digital Camera verdict

4.0 ★★★★★ Excellent



For diehard fans, the Leica M EV1 is controversial. Optical viewfinders may be favoured by street photographers, but the benefits of an EVF outweigh those concerns. Images are every bit as good as Leica's other M cameras, with excellent sharpness, accurate colours, great dynamic range and Leica's distinct look. The camera is as beautifully designed as ever, although the grip is fairly minimal. How much the Leica M EV1 appeals to you depends on whether you want to switch out lenses or you value the simplicity of the stripped-back shooting experience.



## Compact Leica Q3



**1** There's no grip so Q3 users will require the reassurance of a strap when shooting.

**2** The fixed focal length Summilux 28mm f/1.7 offers autofocus and image stabilisation.

**3** With a black finish, the Q3 is subtle enough for street shooting – and it includes the red badge.

# Leica Q3

£5,300/\$5,995

Beautiful, simple to use and takes incredible photos

[www.leica-camera.com](http://www.leica-camera.com)

### Specifications

**Lens:** Leica Summilux 28mm f/1.7 ASPH  
**Sensor:** 60.3MP CMOS  
**Image processor:** Leica Maestro IV  
**Autofocus:** Hybrid AF (contrast metering, depth mapping, and phase comparison)  
**ISO range:** ISO100-100,000  
**Max image size:** 9520 x 6336px  
**Metering modes:** Spot, centre-weighted, highlight-weighted, multi-field  
**Video:** 8K 29.97p 4:2:2/10 bit, max 29 minutes; 4K 59.94p 4:2:2/10 bit; FullHD 119.88p 4:2:2/10 bit  
**Video formats:** H.265, H.264, ProRes  
**Viewfinder:** EVF, 5.76m dots  
**LCD:** 3-inch TFT LCD, approx. 1,843,200 dots, 384ppi, aspect ratio 3:2, touch panel  
**Max burst:** 15fps (electronic shutter)  
**Memory card:** 1x UHS-II, UHS-I, SD/SDHC/SDXC  
**Connectivity:** Bluetooth, Wi-Fi, HDMI, USB Type-C 10Gbps  
**Size (W x H x D):** 130 x 92.6 x 80.3mm  
**Weight:** 743g/658g (with/without battery)

There are not many new full-frame fixed-lens cameras around nowadays, especially premium cameras.

Since Sony binned off its RX range, this has effectively left Leica with an open goal for its Q series of cameras. However, Leica being Leica, it is still going to showboat around for a while before kicking the ball into the net.

The Leica Q series began in 2015, with the idea of a full-frame compact camera that balanced exceptional image quality and intuitive controls. The Leica Q's 28mm f/1.7 lens also garnered significant praise, with many commentators likening it to Leica's finest M series lenses.

Building on this success, Leica introduced the Leica Q2 in 2019, featuring a higher-resolution sensor, weather-sealing and all-round improved usability.

Leica is now back with the third iteration of the Q series, the aptly named Leica Q3. The Q3 aims to take everything that was loved about the previous two versions, including the same renowned fixed 28mm lens, but build upon its strengths with new cutting-edge technology. However, as the Q3 forges ahead into the future, can Leica still maintain the magic of the past versions?

### Key features

The camera incorporates Leica's new back-illuminated CMOS sensor with Triple-Resolution-Technology, providing users with three resolution options: 60, 36, or 18 megapixels, all using the full sensor width. The 60-megapixel setting captures the finest details, while the lower resolution options offer faster operation, longer image sequences, smaller file sizes and a slight increase



4

Unlike its Leica Q2 forebears, the Q3 brings the many benefits of a folding LCD screen.

7

Old-school features such as an aperture ring and a distance scale hark back to more tactile times.

5

The rear display is a 3-inch TFT unit which offers approximately 1.84m dots of resolution.

8

The flash hot shoe cover keeps the top plate profile sleek and protects the electrical contacts.

6

Button placement favours right-handers, with Play and Menu top and tailing the control wheel.

9

Many of the controls are unlabelled, but you'll soon learn and remember what they all do.



Gareth Bevan

The Leica Q3 features an integrated macro mode for close-up shots and an extended digital zoom.

dust and water. Connecting to the Leica Photos app is now easier with Bluetooth, Wi-Fi, or the dedicated certified cable for iPhone and iPad. Transfer speeds have been significantly improved, enabling seamless mobile workflow and easy video transfers to smartphones. The app also allows users to apply special Leica 'looks' directly to photos for a distinctive style.

## Build and handling

For anyone familiar with Leica cameras, especially the Q2, it will come as no surprise that the build quality of the Leica Q3 is outstanding. The body is metal with a textured grip on the front, which feels premium to hold, and the familiar red dot logo sits prominently in the top right corner. The body is also dust and water-resistant, although we were having a rare spell of sunshine in London during our testing, so we didn't get to try this.

The rear of the camera has had a welcome upgrade from the previous version. There are now three custom function buttons; by default these are set up for ISO on the top dial,

in dynamic range. Powering the camera is the latest Maestro Series processor with L2 Technology.

In addition to photography, the Leica Q3 caters for content creators by offering 8K video recording capabilities and support for codecs such as H.265 and Apple's ProRes. The camera can be connected to external devices including gimbals, power banks and display recorders via its USB-C and HDMI ports. Tethered shooting is also supported using the USB-C cable connection.

The Leica Q3 boasts a fixed Leica Summilux 28 mm f/1.7 ASPH lens, which provides a natural wide and versatile perspective. The lens's wide f/1.7 aperture allows for excellent low-light performance and attractive background blur. It also features an integrated macro mode for close-up shots. The camera introduces an extended digital zoom enabled by

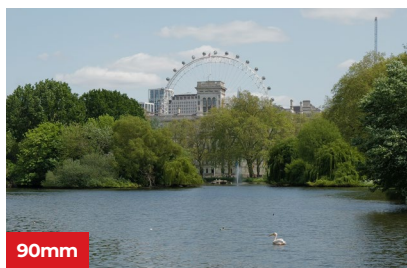
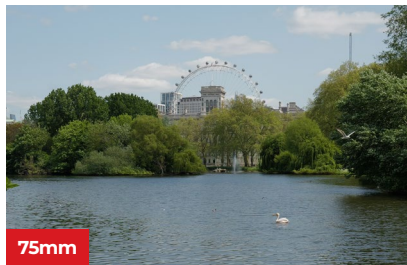
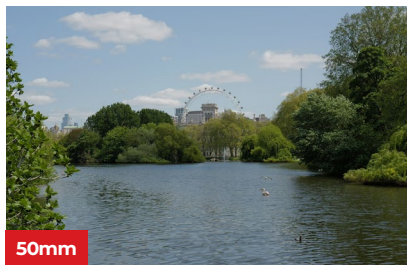
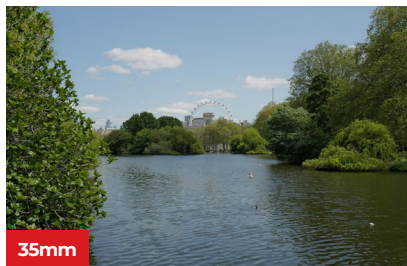
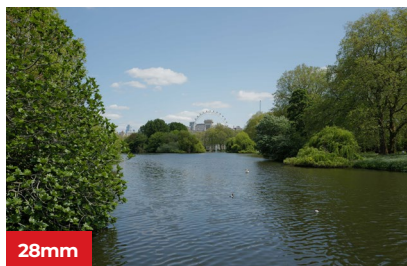
the 60MP sensor, allowing users to capture cropped images at various focal lengths. The Q3 offers additional features like Leica Perspective Control (LPC) for straightening perspective anomalies and Leica Dynamic Range (LDR) for producing high dynamic range JPEG images without post-processing.

Improvements to the autofocus system include a hybrid autofocus system with phase detection for precise focus and fast object tracking. The Q3's intelligent subject recognition can now recognise human bodies, faces and eyes, as well as animals for subject tracking.

The camera features a 5.76MP OLED viewfinder and a tilting 3-inch high-resolution touchscreen on the rear that offers unique viewing angles and expanded creative possibilities. It maintains its durability with IP52 certification, safeguarding against



## Compact Leica Q3



The in-camera crop feature: the digital zoom enabled by the 60MP sensor allows users to shoot cropped images at various focal lengths.

“The rear screen is sharp and clear, giving me a happy buzz each time I reviewed images”



Gareth Bevan

The Leica Q3's dynamic range is impressive. Even when shooting in bright sunshine, the detail the camera is able to capture in both the highlights and shadows was incredible. Clipping in both areas was well controlled, too.

and on the rear, one for switching between photo and video quickly, and the other for changing the digital focal length of the camera, though I didn't even think about changing them. Leica has nailed the key features most shooters want from this camera. If you want to change them, though, this is easily done by holding down the button until the menu pops up.

The screen on the rear of the camera is sharp and clear, and my photos looked amazing on it – giving me a happy little buzz each time I reviewed my images and saw how they pop. The screen also tilts now, so you can shoot at more tricky angles, which is quick and easy to do, and the mechanism feels robust. Using the OLED electronic viewfinder is a pleasant experience: it is large and clear and I enjoyed composing images through it. There is a minor note, where it seems to change resolution once the focus is locked, which is not an issue per se, just an odd quirk.

The lens remains the tried and tested 28mm optic from previous versions of the Q series, and when a lens is this good, why would you change it? The lens feels as premium as the camera body. The lens has a reassuringly tight aperture ring that is smooth to turn but also stays put, which pleased me as I'm not a fan of loose controls.

There is a ring at the base of the camera for switching between macro mode and regular shooting; when

doing this, the whole focal distance scale slides up and down and looks so cool, I found myself doing this just for the enjoyment of watching it.

Finally, there is a manual focus ring. Manual focus can be locked and unlocked with a small button on the base of the ring to prevent accidental switches. I didn't find this button intuitive to use, though – it was difficult to find the button naturally with my finger and so I had to spend a few seconds hunting for it. As a long-term user, this might get easier over time but, luckily, I don't frequently use manual focus anyway.

The only major issue I had with the Leica Q3 build is that it did get a little jarring to carry for long periods. There is no prominent grip on the camera as standard, and the camera is relatively compact; I was out shooting for several hours and found that my fingers were aching from gripping the camera, as well as my dangling little finger taking the brunt of a deep indent from the camera corner. There is an optional grip for the Q3, which I didn't have the opportunity to try out, but I'm assuming that it would make for a far more comfortable experience if you plan to shoot for long periods with the Q3.

### Performance

The photo performance on the Leica Q3 is very good indeed. The processing that Leica applies to its images is pleasing, with beautiful



Gareth Bevan

Autofocus is snappy and accurate across the board and, if you are shooting in any of the zone or area focusing modes, we found that the Q3 rarely had to hunt for its target.

colours that pop but are still natural. The dynamic range the camera is able to capture is impressive, too – even shooting in bright sunshine, the clipping in the highlights and shadows was incredibly controlled.

The Q3 has a fixed 28mm lens, although using the new 60MP sensor, the lens can crop in-camera for 35mm, 50mm, 75mm, and 90mm focal lengths, with photo sizes varying down to 8MP at 90mm, which sounds tiny by today's standards, but is way more than necessary for apps such as Instagram. And, I know, you could just crop your photos later in editing, but there is something more pleasing in framing your subject at the moment of taking the photo with the right crop and having it all automatically applied. If you mess up your crop in-camera but you are shooting in raw and jpeg, the full 28mm image will still be recorded as a raw dng file without any crop for later editing.

Autofocus is snappy and accurate across the board if used in any of the zone or area focusing modes, and the Q3 rarely had to hunt for its target. The human subject detection was good, easily picking up faces and eyes and having a high hit rate for nailing focus on one eye, even at lower apertures.

However, where the autofocus completely falls apart is in its human+animal detection autofocus mode. Let's start with the good: the Leica Q3 picked up an impressive amount of animals. I put it through its paces at a zoo, where it managed to focus on large birds, zebras, alpacas and other horse-shaped animals, as well as a few species of monkeys and lemurs. For more realistic use cases, the Q3 also had no issue recognising domestic cats and dogs.

However, at the time of writing, there is no official list of what animals the Leica is officially capable of recognising, so I am not sure whether the autofocus was actually recognising specific animals or just focusing on prominent moving objects.

And now for the frustrating news. The Leica Q3 sees subjects everywhere – every tree, fence and patterned surface (the list goes on) seemed to attract a yellow subject recognition box. Sometimes when actually trying to photograph an animal in the frame, the camera would ignore the animal and choose a random inanimate target to focus

on instead. It is by far from the only camera system to do this, but this is one of the most extreme cases of false positives I have encountered.

In video mode, the Leica Q3 is capable of stunning 8K recording, with excellent video processed in-camera, and there are also codecs including Apple ProRes for those who want to get in-depth editing of their footage. As with images, the dynamic range for video is outstanding; shooting in full sunlight, especially bright subjects, the detail captured is excellent. Again, Leica's colour processing is a standout.

Autofocus in video is a little on the slow side. Sometimes the focus just would not pick up new focal points as the camera moved or would hunt for a few seconds before locking focus – essentially, it isn't as snappy as the video focus from other systems. In subject and tracking modes, the autofocus can be just a little too eager; the focus is too keen to shift at the slightest detection of movement, which sometimes causes noticeable refocusing that can be distracting on the final footage.

Built-in stabilisation is effective at helping to keep panning footage smooth, but when walking or adding more varied movement, the footage was often too shaky handheld to use for a lot of purposes, although this is not uncommon. If you are planning on doing a lot of video on the Q3 then a separate gimbal is probably required to get silky smooth footage. **Gareth Bevan**

## Digital Camera early verdict

The Leica Q3 surpassed my expectations for a fixed-lens compact. Its 60MP sensor produces breathtaking images, enhanced by the digital crop feature that adds a fun element of experimentation to the 28mm fixed lens. Shots exhibit remarkable Leica processing, with beautifully rendered colours as well as exceptional dynamic range. The autofocus performs admirably, delivering swift and precise results, particularly in subject focusing, thanks to its efficient human and eye detection capabilities.

Nevertheless, the animal detection feature leaves much to be desired, as it often misidentified inanimate objects as living creatures, focusing on the object and ignoring a moving animal – it's not alone in this, but the frequency of false positives was high. As for its video capabilities, the Leica Q3 excels in delivering high-quality 8K footage in a variety of professional codecs, which is great, but I'd question whether this camera's target audience needs that. Image stabilisation also struggled with handheld shake more than many systems.

Nonetheless, the Leica Q3 stands as a remarkable camera for day-to-day use, and it effortlessly earns its place as one of the best walking-around photography cameras available today. Though alas, it is a Leica, and the lofty price tag renders it inaccessible to many photographers.



The tilting screen offers new angles to shoot from and its mechanism feels very robust in use.





- 1** The D3500 has a slightly larger grip than the older D3400 and handles well for a small camera.
- 2** With a Guide Number of just 7m at ISO 100, the pop-up flash is best kept for emergencies only.
- 3** The retracting 18-55mm AF-P lens is compact, smooth and silent – and it's pretty sharp too.
- 4** The rear screen is fixed and not touch-sensitive, but it's sharp and clear.
- 5** The control layout on the back has been designed to give plenty of thumb space when you hold the camera.

# Nikon D3500

£479/\$497 with 18-55mm AF-P kit lens

Nikon's new entry-level DSLR ticks all the boxes

[www.nikon.com](http://www.nikon.com)

## Specifications

**Sensor:** 24.2MP APS-C CMOS 4, 23.5 x 15.6mm  
**Image processor:** Expeed 4  
**AF points:** 11-point AF, 1 cross-type  
**ISO range:** 100 to 25,600  
**Max image size:** 6,000 x 4,000px  
**Metering zones:** 420 pixel RGB sensor  
**Video:** 1920 x 1080 at 60p, 50p, 30p, 25p, 24p  
**Viewfinder:** Optical pentamirror, 95% coverage  
**Memory card:** SD/SDHC/SDXC UHS I  
**LCD:** 3.0-inch fixed, 921K dots  
**Max burst:** 5fps  
**Connectivity:** Bluetooth  
**Size:** 124 x 97 x 69.5mm (body only)  
**Weight:** 415g (body only, with battery and memory card)

**T**he D3500 is the latest version of Nikon's entry-level DSLR. It's effectively an update to the evergreen D3400, a starter DSLR that's been a long-term favourite. The D3500 will usually come with a lightweight 18-55mm AF-P kit lens, which has a retracting mechanism to make it more portable.

This camera is designed specifically for beginners, with simplified controls and a built-in Guide Mode to help new users learn the basics. But it's also compatible with a wide range of lenses from Nikon and third-party makers, and has a good enough

specification to please enthusiasts as well as beginners.

Inside, the D3500 has a decent 24.2-megapixel APS-C sensor. It also has an unusually good 5fps continuous shooting speed; and while you don't get 4K video, it can shoot Full HD 1,920 x 1,080 video at up to 60/50fps.

## Build and handling

The D3500 is pretty fat and chunky compared to a mirrorless camera, but this gives you a good grip on the camera, and it's very light. The rear screen is fixed and not touch-sensitive, but it is bright and sharp.



The viewfinder might only be a cheaper 'pentamirror' design rather than the pentaprism found in more expensive DSLRs, but it's very clear, and you can see right into the corners of the frame without shifting your eye.

For an inexpensive, beginner-orientated camera, the D3500 feels well-made and is very nice to use.

## Performance

Autofocus performance is very good, both for viewfinder shooting and in Live View mode. Nikon does not use on-sensor phase-detection autofocus in its DSLRs, relying on slower contrast-based autofocus instead,

but the fast, silent autofocus in the AF-P 18-55mm kit lens transforms its performance.

Our lab tests show that the D3500's image quality is very much on a par with its rivals. There are slight differences here and there in resolution, noise and dynamic range, but these show up more in lab tests than they do in real-world shooting. In practice, the D3500 delivers sharp, vibrant and well-exposed images. The 18-55mm AF-P lens performs really well for an inexpensive kit lens, with consistent sharpness exhibited across the focal range and right to the edges of the frame. **Rod Lawton**

## Rival cameras



**Canon EOS 750D/Rebel T6s**  
£499/\$539

It's one of Canon's previous-generation DSLRs, but this means you get good specifications for the money, and a fully articulating screen. Reviewed: issue 166



**Panasonic GX80**  
£399/\$598

A very different camera to the Nikon D3500, but also pitched at cost-conscious beginners. It uses a smaller Micro Four Thirds sensor, but this means it's practically pocket-sized. Reviewed: issue 197



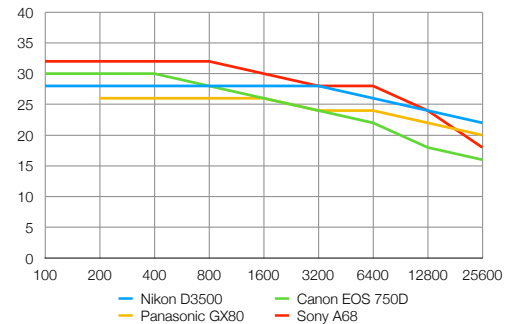
**Sony Alpha 68**  
£499/\$698

Sony's old SLT cameras are still around, and at pretty competitive prices too. The Alpha 68 gives you a lot of camera for your money, though support for additional lenses is patchy. Reviewed: issue 180



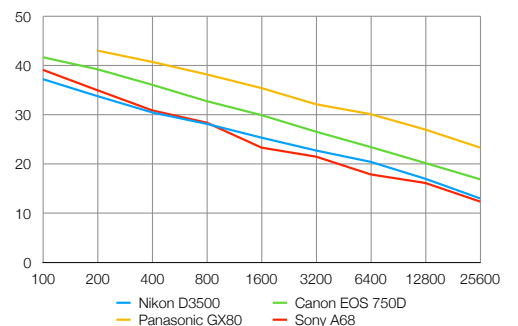
## Lab tests

Resolution (line widths/picture height)



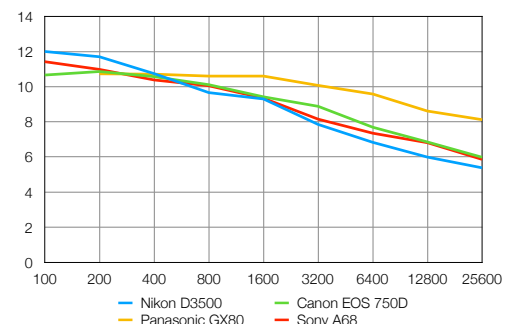
We checked the D3500's lab results against three key rivals. In our resolution test, the D3500 came out roughly in the middle of the pack.

Signal to noise ratio (decibels)



Interestingly, the Panasonic GX80 is a clear winner here. It has fewer megapixels but a smaller Micro Four Thirds sensor. The D3500 trails behind.

Dynamic range (EV)



The Nikon, Canon and Sony produce very similar dynamic range scores, with the D3500 having a slight advantage at low ISO settings.

## Digital Camera verdict

**4.0** ★★★★★ Excellent



Nikon has rejuvenated a classic design to keep it appealing to first-time DSLR buyers. Perhaps mirrorless cameras aren't the future after all...



## Mirrorless Nikon Z fc



**1** The Z fc has twin recessed control dials: one on the front, and another on the back.

**2** The flat-fronted body looks wonderful, but it doesn't give your hand much of a grip.

**3** Even now, Nikon only makes two native DX Nikkor Z lenses. This is the 16-50mm kit lens.

# Nikon Z fc

£899/\$959

Nikon's first retro-themed Z-mount camera

[www.nikon.co.uk](http://www.nikon.co.uk)

### Specifications

**Sensor:** 20.9MP APS-C CMOS

**AF points:** 209

**ISO range:** 100-51,200 (expandable to ISO 204,800)

**Stabilisation:** Electronic Vibration Reduction, video only

**Max image size:** 5,568 x 3,712px

**Video:** 4K UHD up to 30p

**Viewfinder:** 0.39-in 2.36-million-dot OLED EVF

**Memory card:** SD/SDHC/SDXC (UHS-I)

**LCD:** Vari-angle touchscreen

**Max burst:** 11fps

**Size:** 135 x 94 x 44mm

**Weight:** 390g body only, 445g with battery and memory card



With the likes of Fujifilm, Olympus and Leica cashing in on the retro camera style for years, the time has come (again) for Nikon to follow suit, this time in the form of the Nikon Z fc.

We say 'again' because it wasn't so long ago when Nikon tried the same thing, with the Df in 2013. However, while the Df was was a full-frame DSLR camera, the new Z fc is an APS-C Z-mount mirrorless model. The Z fc is also specced to be a better all-round camera than the Df ever was, in an effort to make it just as versatile as its conventionally styled rivals, only with more visual appeal.

Anyone who remembers the Df will spot similar styling cues on the new Z fc. It takes the iconic and achingly handsome looks of the Nikon FM series of 1980s 35mm film SLRs, and wraps them around its latest APS-C

mirrorless camera technologies. That's not to say the Z fc's tech is all new, though. This is more of a re-skin of Nikon's existing Z 50 – although that isn't necessarily a bad thing: the Z 50 is a great camera in its own right.

### Key features

The result of sharing the Z 50's tech is that the Z fc packs the same 20.9MP APS-C CMOS sensor with low-pass filter, and the same Expeed 6 image processor. That's around 3MP less than the 24MP sensors in most APS-C rival cameras, while the likes of Fujifilm and Canon offer even higher megapixel counts in some of their mirrorless models. Even so, 20.9MP is still more than enough resolution, while the larger sensor photosites should, in theory, improve the Z fc's low-light performance and dynamic range.

The Z fc also gets the Z 50's excellent 209-point hybrid AF



4

The rear screen is on a pull-out vari-angle hinge, unlike the tilt-only screen on the Nikon Z 50.

7

It's from the top that the Z fc's retro design stands out – the ISO dial looks really smart.

5

The 2.36m dot EVF is not the highest-resolution by any means, but it's perfectly adequate.

8

Additional retro-style controls include a shutter speed dial and a dial for exposure compensation.

6

The four-way circular controller on the back is quite small, but is mostly for navigation not settings.

9

This mini-screen indicates the currently set lens aperture, although there are no aperture dials on the lenses themselves.



The Z fc has only 20.9MP, compared to the 24+ megapixels of rival cameras, but in reality its detail rendition still looks pin-sharp, and you'll rarely notice the difference.

system, equipped with eye-detection for humans and animals. Nikon has slightly boosted its low-light performance relative to the Z 50: the Z fc can now focus down to -4.5EV, while the Z 50 was sensitive to -4EV.

Both cameras share the same respectable 11fps max continuous shooting speed, along with identical 4K video recording capabilities. That means the Z fc can record UHD 3,840 x 2,160 footage at a max 30 fps, and does so using the full width of the sensor, so your 4K footage isn't cropped to a narrower field of view.

While the Z fc inherits the Z 50's 0.39-inch 2.36-million-dot OLED electronic viewfinder, it does offer something extra when it comes to the rear screen. The Z fc is equipped with a fully articulating touchscreen display – it's a tad smaller than the screen on the Z 50 (3in vs 3.2in) but massively more practical, especially for selfies and vlogging. This marks the first time Nikon has put a vari-angle screen on one of its Nikon Z mirrorless cameras, and you have to wonder why it's taken the company so long.

There's one area where the Z fc is radically different to the Z 50: its controls. Most modern cameras are controlled with a mode dial, with shutter speed and ISO settings set via a digital interface. The Z fc relegates the mode dial options to a small lever under a big external ISO dial on the top plate. On the other side of the viewfinder is an equally big shutter speed dial. The only external control you don't get is an aperture ring, but as Nikon's Z lenses aren't equipped with this feature, that's a compromise you'll have to make.

### Build and handling

As you'd hope for a Nikon camera designed to be a thing of beauty, the Z fc feels like a high-quality product. The silver top plate is indeed metal, though the matching bottom plate is painted plastic. Twisting and turning each retro-themed dial on the top plate is satisfyingly clunky, and those who experienced the film cameras that inspired the Z fc's controls will no doubt wallow in the nostalgia. What's more, the front

“This is the first time Nikon has put a vari-angle screen on one of its Nikon Z cameras”



## Mirrorless Nikon Z fc



Focusing is fast and efficient, and the vari-angle screen makes it much easier to get down low and close to your subjects in confined spaces. This is equally relevant for video, where a vari-angle screen is much better than a simple tilting screen.

and rear control dials are comfortably large and have good feedback with none of the sponginess of many a Fujifilm X-mount camera.

The exposure compensation dial is far enough in from the edge of the camera to prevent accidental rotation, and alongside it sits an unusual mini-screen. Its function is to display the lens aperture f-stop, which gives you a quick reference point and does a good job of compensating for the lack of an aperture ring on Z lenses.

Moving to the rear of the camera, we see a feature not present on any other Z camera: an articulating screen. Out in the field it really becomes apparent how useful this is beyond just vlogging. The ability to flip out the camera while shooting at awkward angles can't be understated, especially when you're using a camera that's eminently suited to street photography.

However, while the articulating screen and direct-access dials are ergonomic highlights, the Z fc's flat



The APS-C format Z fc uses the same Z lens mount as full-frame Nikon Z cameras.

body makes no concession to grippiness. It lacks the protruding grip present on the Z 50, making the Z fc more liable to slip out of your hands. The black leather-look texture around the body of the camera is also much less grippy than it looks. We resorted to holding the camera via the lens while carrying the camera around, but would recommend using the supplied strap. It's also worth noting that the Nikon GR-1 extension grip is available, and is designed to provide a more ergonomic experience.

Alongside the Z fc, there's the Nikkor Z DX 16-50mm f/3.5-6.3 VR Silver Edition lens. This is essentially the same kit lens you get with a Z 50, with a cosmetic makeover, featuring a silver exterior design to match the Z fc.

## Rival cameras



Fujifilm X-T30  
£849/\$799

Less of a retro look, but with external shutter speed and aperture controls, and a proper choice of lenses.  
Reviewed: issue 215



Olympus OM-D  
E-M10 Mk IV  
£649/\$699

With a smaller sensor but the same resolution, the Olympus has a lower price and more lenses.  
Reviewed: issue 235



Sony Alpha 6400  
£899/\$899

Less retro, more state-of-the-art vlogging tool, the A6400 is a serious alternative, although it looks pricey now.  
Reviewed: issue 215





The Z fc's snappy autofocus and vari-angle screen are great for street photography, but with no in-body stabilisation, you may need a tripod for slower shutter speeds.

The lens is compact and light, with a total length of 32mm and weighing in at just 135g. It offers a 24-75mm full-frame-equivalent zoom range.

The other retro lens available at launch is the Nikkor Z 28mm f/2.8 SE. This isn't as versatile as the Z DX 16-50mm, but it certainly feels at home attached to the Z fc. Using a prime lens on a camera that's suited to photo walks and trips away is always a joy, because it forces you to move in search of interesting compositions. The 42mm effective focal length (in 35mm terms) isn't as familiar as a 35mm or a 'nifty fifty', but it's still a very versatile focal length, and will serve you well if you leave your other lenses at home.

## Performance

There are no surprises with the Z fc's performance: its image quality is identical to the Z 50 on which it's based. While this means you 'only' get 20.9MP, the payoff is enhanced dynamic range and low-light performance thanks to the marginally larger photosites spread across the

same APS-C sensor size, versus a more conventional 24MP sensor.

Even so, don't expect perfectly clean shots at sky-high ISO settings. Crank the sensitivity up past ISO 3,200 and noise is clearly visible when viewing at 100% image size. Dynamic range is excellent, especially with Nikon's Active D-Lighting dynamic range enhancement enabled, and the Z fc's default matrix metering mode does a fine job of accurately exposing shots in tricky lighting scenarios.

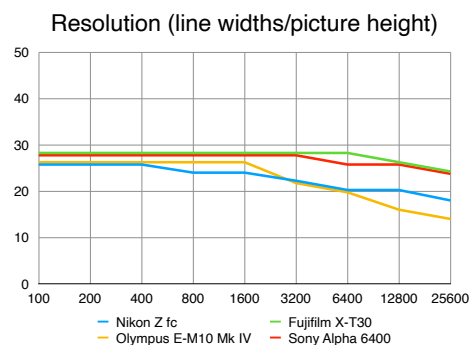
We found the AF to be fast and reliable when shooting with the bundled DX 16-50mm kit zoom lens, whether that was shooting in low light or capturing fast-moving subjects.

**Mike Harris & Ben Andrews**

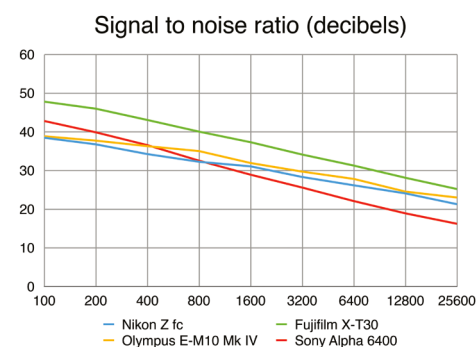
“Dynamic range is excellent, especially with Active D-Lighting”

## Nikon Z fc Mirrorless

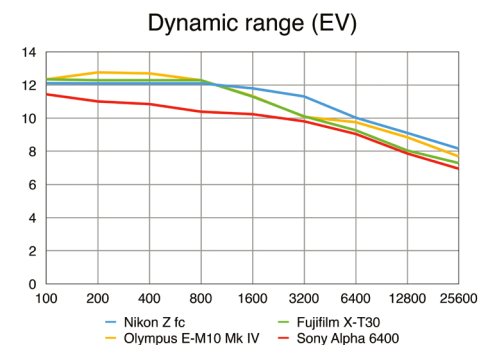
### Lab tests



The relatively low 20.9MP pixel count of the Z fc means that in spite of its APS-C sensor size, it roughly matches the Micro Four Thirds Olympus E-M10 IV.

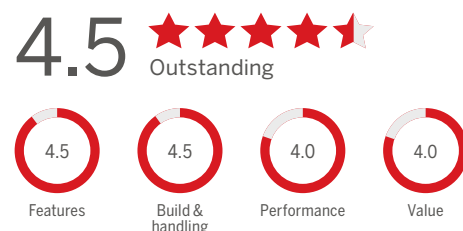


Nikon's 20.9MP sensor is a relatively old design now, so the Z fc generates more image noise than the X-Trans 4 sensor in the Fujifilm X-T30.



The Z fc, E-M10 IV and Alpha 6400 are all closely matched in terms of dynamic range, although the Z fc performs strongly at higher ISOs.

### Digital Camera verdict



The Nikon Z fc is an unabashedly retro camera with all the mod cons you'd expect from a current mirrorless model, and its aluminium dials are a joy to operate. But the Z fc isn't all style and no substance. Thanks to sharing the Z 50's internals, performance and image quality are excellent, so there are few compromises to be made for the extra style.



## Mirrorless Nikon Z 5



**1** The camera can be powered by USB-C, rather than just charged by it – useful for movie shooting or time-lapse photography.

**2** The battery life is rated at 470 shots – a decent 25% improvement over the Z 6's 380 shots.

**3** In some countries, the Z 5 is bundled with the new 24-50mm kit lens.

# Nikon Z 5

£1,719/\$1,699 with 24-50mm lens

Is this entry-level full-frame camera enough to persuade you to make the move to mirrorless?

[www.nikon.co.uk](http://www.nikon.co.uk)

### Specifications

**Sensor:** 24.3MP full-frame CMOS sensor  
**Image processor:** Expeed 6  
**AF points:** 273-point hybrid phase/contrast AF  
**ISO range:** 100-52,200 (exp. 50-102,400)  
**Metering modes:** Matrix, centre-weighted, spot, highlight-weighted  
**Video:** 4K UHD, 30/25/24p  
**Viewfinder:** EVF, 3,690k dots, 100% coverage, 0.8x magnification  
**Memory card:** Two SD/SDHC/SDXC, UHS-II  
**LCD:** 3.2-inch tilting touchscreen, 1,040k dots  
**Max burst:** 4.5fps  
**Connectivity:** Wi-Fi, Bluetooth  
**Size:** 134 x 101 x 70mm  
**Weight:** 675g (body only, including battery and memory card)

**F**or what's supposed to be an entry-level full-frame mirrorless camera, the Nikon Z 5 is surprisingly well-specified. It's fully weather-sealed, featuring five-stop in-body image stabilisation, a 24.3MP sensor that goes up to ISO 51,200 in native settings, and a class-leading electronic viewfinder. It seemingly matches the more upmarket Nikon Z 6 feature for feature in all the important places.

Even the control layout is almost exactly the same as in the Z 6, offering a near-identical handling experience. There's a thumbstick, a D-pad and an array of buttons to access vital controls at the back, along with a touchscreen rear LCD and finger- and thumb-operated control dials in easy reach, and a pair of

well-positioned programmable Function buttons on the front.

For those making the move from a DSLR, though, the lack of direct access buttons can take some getting used to. While Nikon DSLRs typically allow you to change between single, continuous and self-timer shooting modes by turning a dial, or between AF-S, AF-C and manual focus with a dedicated button, here you'll need to select these options from on-screen menus.

### Key features

While the Z 5's 24.3MP sensor is practically the same size as the Z 6's 24.5MP component, it's not exactly the same. The 0.2MP difference translates to a 6,016 x 4,016-pixel resolution on the Z 5, versus a 6,048 x 4,024 pixel-count on the Z 6. This

## Nikon Z 5 Mirrorless



4

The crisp electronic viewfinder has a resolution of 3,690k dots, and has an impressive 0.8x magnification.

7

This area of the top plate is clear because on the Z 5 the main mode dial is now on the right side.

5

You can tap the screen to simultaneously focus and take the shot, which can be much quicker than using the thumbstick to get the focus point on the desired area.

8

The 24-50mm retracting kit lens launched alongside the Z 5 is certainly compact, but its zoom range and maximum aperture are poor.

9

Unlike higher-end Z-series cameras, the mode dial doesn't have a centre button lock, which makes it easier to switch exposure mode by accident.

6

The four-way controller on the back is quite small, but there are also two control dials and a joystick.

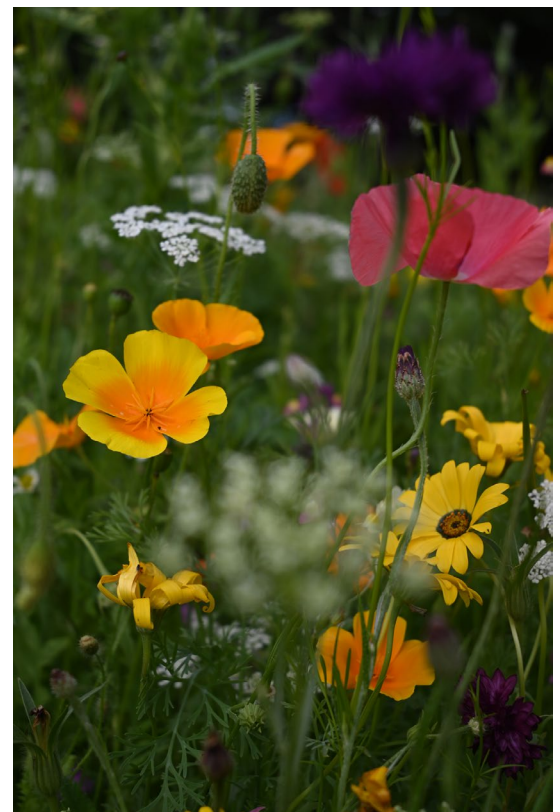
handful of pixels is certainly not enough to lose any sleep over, and images from either can be printed to the same resolution or cropped to the same degree without any noticeable difference – but it does indicate some differences in the sensor.

The Z 6 has a more expensive back-side illuminated sensor, while the Z 5's is based on more established (and therefore cheaper) CMOS technology. The chief distinction here is that BSI sensors put all the wiring at the back, while with CMOS this is at the front, sitting between the individual photodiodes, and potentially blocking some light from reaching them. In a nutshell, BSI sensors have better low-light performance. That said, both cameras have an ISO range of ISO 100-51,200, but the Z 6's expanded range goes one stop better, topping out at ISO 204,800 rather than ISO 102,400.

Another physical difference is that the door that houses the memory card

slots is deeper; this is due to the Z 5 housing two memory card slots, rather than the single slot of the cameras higher up the range. This initially might seem like it gives the Z 5 the upper hand, especially to those concerned about the potential for card failure, but there are important considerations to take into account.

When Nikon adopted the XQD memory card format for the Z 6 and Z 7 (and has since enabled compatibility with CFexpress), it reasoned that this was due to XQD being the fastest, most reliable and future-proof format available. This came at a price, with the Sony-owned format being eye-wateringly expensive compared to same-capacity SD cards. Even the fastest UHS-II SD cards are left in the dust compared to the read/write speeds of XQD/CFexpress, and while we've certainly had SD cards corrupt on us, XQD/CFexpress cards are often quoted as having a failure rate that's close to zero. —>



The kit lens' widest available f/6.3 aperture when zoomed in limits the shallow depth of field, but at least the Z 5's colour reproduction is fabulous.



## Mirrorless Nikon Z 5



The Nikon Z 5 is the first Nikon to feature Animal AF out of the box – earlier models need a firmware update. It works best if your furry subjects are relatively static.

In addition to backing up your images on the fly, the Z 5's dual-card design also gives the option of recording raw files to one card and JPEGs to the other – useful for quickly sharing images from one card while having the full-fat files for those you might wish to work on more extensively on the other – or simply increasing the number of shots you can take without physically changing cards.

Every entry-level camera needs a kit lens, and the Z 24-50mm f/4-6.3 is the Z 5's. In some markets, including the UK, the camera is available as a bundle with the lens, while in

other territories, such as the USA, it can be bought body-only.

The lens is pretty compact, though not quite as compact as the pancake design of the Z 16-50mm that accompanies the APS-C sensor Z 50. Like many other Nikon Z zooms, it features a retractable design, so the lens is a fair bit longer in use than in the stowed position.

The lens proved to be pretty sharp throughout its albeit limited focal length range, and it focused swiftly on moving subjects, such as our skateboarders, enabling a high hit rate of action shots.



Like the Z 6 and the Z 7, the screen tilts up and down for low and high-level shooting, though it doesn't flip all the way around for selfies.

However, that focal length range really isn't very big at all, stretching barely over 2x. While the 24mm length is pretty much what you'd expect, topping out at 50mm comes up short when it comes to telephoto reach. (The Z 50's Z 16-50mm has a 3.1x zoom range by way of comparison, with a 24-75mm effective focal length.)

The aperture shrinks from f/4 at the wide end to f/6.3 when zoomed in – which is pretty slow, particularly considering the limited zoom range, and limits shallow-depth-of-field effects for portraits and the like.

In addition to the zoom ring, there's also a control ring, which is normally used for manual focusing but can be assigned other functions when autofocus is engaged.

One glaring omission is that there's no on-barrel switch to turn autofocus on and off. As there's no manual AF/M switch on Z cameras either, this means delving into the menus to disable autofocus. There's also no VR switch, as the lens relies on the in-body stabilisation of the Z 5.

Nikon has made compromises in both the zoom range and the maximum aperture to produce such a compact kit lens, and for many that will be a compromise too far. We much prefer the Z 24-70mm f/4 that's the kit lens option for the Z 6 and Z 7. Not only does it address both those concerns, but as an S-line lens, its image quality is simply stellar.

The Z 24-50mm f/4-6.3's image quality is good but not great. We think many photographers will outgrow its limited range pretty quickly.

### Build and handling

The Z 5 uses the same stunning electronic viewfinder as the Z 6 and the Z 7, with a 3.69-million-dot display, for a crystal-clear, near-lag-free image that is as close as you can get to a 'proper' optical viewfinder. Thanks

## Rival cameras



**Canon EOS RP**  
**£1,399/\$1,299 with 24-105mm lens**  
Even with its 24-105mm kit lens, the EOS RP easily undercuts the Nikon Z 5 on price.  
Reviewed: issue 214



**Panasonic Lumix S1**  
**£2,399/\$3,399 with 24-105mm lens**  
With its 24-105mm kit lens, the Lumix S1 is a more expensive, more substantial camera.  
Reviewed: issue 218



**Sony Alpha 7 III**  
**£2,649/\$3,099 with 24-105mm lens**  
The A7 III costs more, but this figure includes a 24-105mm lens that's far better than the Nikon's.  
Reviewed: issue 203





The 24-50mm kit lens launched alongside the Z 5 produces sharp images, though you do have to get in quite close for portraits such as this.

to the use of top-quality Nikon optics in the display, it's still one of the the best EVFs around. Once you get used to it, you may well find you prefer it to an optical viewfinder.

The rear LCD, on the other hand, has only around half the resolution, at 1.04 million dots rather than the 2.1 million of the cameras higher up the range. While you can just about see the difference when you view the displays side by side, in isolation most people won't notice the lower pixel count. It takes an additional press of the zoom button to see image detail at 100%.

## Performance

We tested the Z 5 directly alongside a Z 6. We took both cameras on a field trip, taking as near-identical shots as we could manage of the same scene on a tripod with both the Z 5 and the Z 6, swapping the 24-50mm kit lens between them. Viewed at a 100% pixel-peeping level, the Z 6 shots showed perhaps a touch more contrast and depth in the shadows, but in most regular shooting circumstances, you'd be hard-pressed

to tell the difference between shots taken on either camera.

While this is a new sensor, it still packs the same number of 273 AF points. Autofocus appears to be just as responsive as in the Z 6, and with points covering 90 per cent of the frame arranged in a 21 x 13 array, it covers a far bigger area than the autofocus modules built into Nikon's DSLRs, which are clustered around the frame centre. While it's zippy, it doesn't quite match the speed and accuracy of autofocus that Nikon's most advanced DSLR systems are capable of.

While the Z 5 can shoot 4K video at 30fps, it is cropped by a factor of 1.7x, rather than using the full sensor width like the Z 6. This means that shooting at the wide end of the 24-50mm kit lens would give an effective focal length of 41mm, which is not really wide angle at all. On the other hand, the standard 50mm end becomes a moderate-telephoto 85mm. It's perfectly capable at shooting video, but your lenses don't behave in the way you might expect.

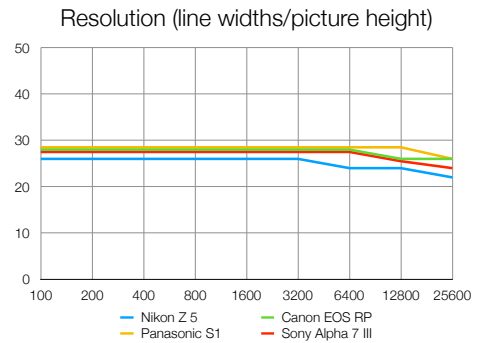
**Adam Waring & Mike Harris**



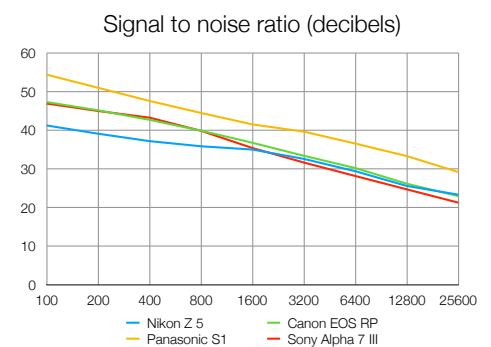
Using continuous focus and the Area AF mode, the Nikon Z 5 had no trouble keeping up with these skateboarders during our real-world shooting sessions.

# Nikon Z 5 Mirrorless

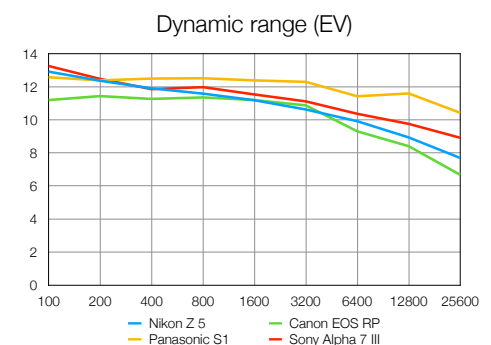
## Lab tests



The resolution of the Z 5 proved slightly lower than that of its rivals, but the difference won't really be apparent in real-world shooting. The 25-50mm kit lens might have something to do with this.



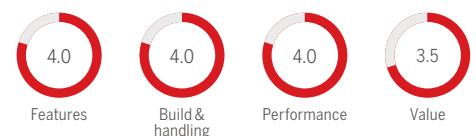
The Z 5's signal-to-noise ratio proved worse than the rival cameras we selected at low ISO settings, where noise tends to be less apparent anyway, but about the same at high ISO settings.



The Z 5's dynamic range is good at low to medium ISO settings but drops away from the A7 III and the S1 at higher ISOs. It does comfortably beat the much cheaper EOS RP across the ISO range, though.

## Digital Camera verdict

**4.0** ★★★★★ Excellent



The Z 5 is a very good entry-level full-frame camera, but its relatively high price may persuade you that it's worth forking out the relatively little extra for the Z 6. The Z 5 is competent and attractive, but a host of cameras can boast exactly the same thing.



## Mirrorless Nikon Z 6II



1

There's a pair of user-definable Fn buttons on the front; but most people will be happy with the defaults of selecting white balance and focus mode/area.

2

The Z 6II's 24.5MP image resolution is unchanged from the Z 6, although twin processors boost the shooting burst rates.

# Nikon Z 6II

£1,999/\$1,999

Evolution not revolution in this full-frame update

[www.nikon.co.uk](http://www.nikon.co.uk)

### Specifications

**Sensor:** 24.5MP CMOS BSI  
**Image processor:** Dual Expeed 6  
**AF points:** 273 hybrid AF points  
**ISO range:** 100-51,200 (exp 50-204,800)  
**Max image size:** 6,048 x 4,024px  
**Video:** 4K UHD at 30/25/24p; 1080p (Full HD) at 120/100/60/50/30/25/24p  
**Viewfinder:** 3,690k-dot OLED EVF, 100% coverage, 0.8x magnification  
**Memory card:** SD UHS-II, CFexpress (Type B) / XQD  
**LCD:** 3.2-inch tilting touchscreen, 2,100k dots  
**Max burst:** 14fps  
**Connectivity:** Wi-Fi 2.4GHz and 5GHz, Bluetooth 4.2, USB-C, mini HDMI, GPS, microphone, headphone  
**Size:** 134 x 101 x 70mm  
**Weight:** 615g, body only (705g with battery)

The Z 6II replaces the original Z 6 from 2018 as Nikon's enthusiast-level full-frame mirrorless camera. With a 24MP sensor, it hits the sweet spot between resolution and processing power, and for many users is a preferable option to the professional-grade Nikon Z 7II, which comes with approximately double the megapixel count.

The Z 6 ticked many of the right boxes, so what we see here is very much a refinement rather than anything radically new. It receives incremental improvements to speed and functionality, after Nikon listened to user feedback on the Z 6.

Externally there is little difference between this new camera and its predecessor. The only giveaways are the 'II' nomenclature next to the Z 6 logo, and a marginally deeper battery door. To accommodate some of the internal changes, it's a couple of millimetres deeper and weighs in at 20 grammes heavier.

### Key features

The Nikon Z 6II comes with two card slots, rather than the single XQD of the original. Here we have a dual XQD/CFexpress slot, along with the more commonplace SD format, able to take the fastest UHS-II variety. This is undoubtedly due to criticism levelled at the original camera.

The other major change under the hood is that there are now not one but two Expeed 6 processors, providing double the processing grunt. Creating images from the raw data captured by the image sensor is a processor-intensive task, turning a series of static images into smooth video even more so. This extra processing power translates to faster shooting frame rates and improved low-light performance, as well as better video.

As such, the Z 6II receives an increased continuous shooting speed of 14fps, up from 12fps on its predecessor – and the extra horsepower means that it can buffer 124 12-bit raw files or 200 JPEGs.



3

The 3,690k-dot EVF is clear enough, but its 60Hz refresh rate feels creaky next to the 120Hz offered by rival bodies.

4

The choice of a tilting rear LCD, rather than a fully articulating screen, will disappoint vloggers.

5

There's a joystick for precise autofocus, although you can obviously still select your focus point by tapping the touchscreen.

For video, the camera currently maxes out at full-readout 4K 30p, but will be receiving 4K 60p (albeit with a 1.5x crop) with a firmware update in February. Everything else here is exactly as it was with the original Z 6, from the 24.5MP sensor to the resolution of the electronic viewfinder and rear screen.

## Build & handling

The camera control layout is identical to the original Z 6. The deep grip makes the body comfortable to hold, and the scrolling front and rear dials are in easy reach of the forefinger and thumb, as are all the other essential controls such as the shutter, ISO and exposure compensation buttons.

The rear LCD and electronic viewfinder are unchanged, which is a bit of a missed opportunity. Likewise it is curious that Nikon has decided to stick with a tilting rear LCD, rather than taking the opportunity to add a fully articulating screen – something that hobbles portrait and video shooting. Like the original, the Nikon Z 6II possesses weather sealing for all-purpose shooting.

## Performance

A fast frame rate is nothing without snappy autofocus – and the hybrid AF system, which spreads 273 AF points across the entirety of the image sensor, locks onto subjects with unerring accuracy. It's still a half-step behind the phase-detect systems employed by other cameras, but it's not far off.

The face and eye detect modes are impressive, locking onto two- and four-legged subjects even against the busiest of backgrounds, and switching automatically between faces or individual eyes depending on their proximity. Again, it's a hair behind Canon and Sony's AF systems, but it's still remarkably good.

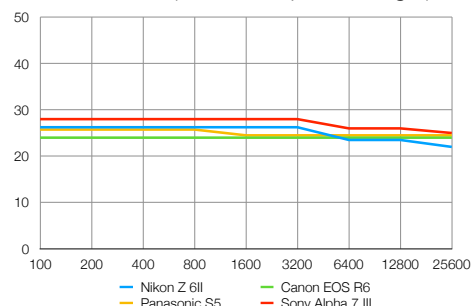
Although the performance of the in-body image stabilisation system feels largely unchanged, Nikon's system is right up there with Canon and Panasonic, leaving Sony in the rear-view mirror.

We'll have to reserve judgement on the promised 4K 60p shooting until it arrives, but it's disappointing that this will invoke a 1.5x crop.

**Adam Waring & James Artaius**

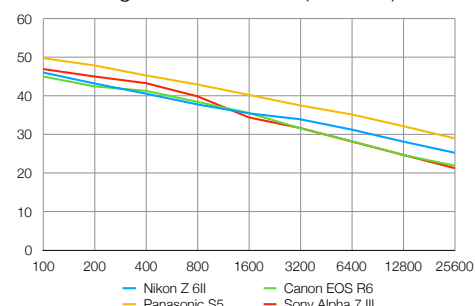
## Nikon Z 6II Mirrorless

Resolution (line widths/picture height)



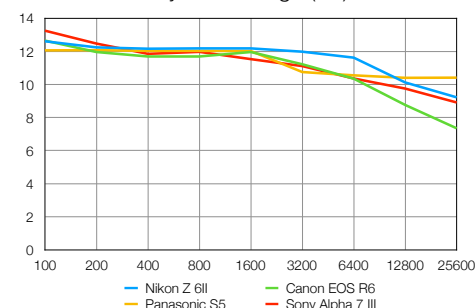
Despite having almost the same megapixel count, the Z 6II isn't quite able to resolve the same amount of fine detail as the A7 III. For reference, the original Z 6 was able to equal the Sony in this test.

Signal to noise ratio (decibels)



All four comparison cameras are closely matched in this test. The Panasonic S5 maintains a consistent lead, but it's at the higher ISOs where the Z 6II moves into a clear second place.

Dynamic range (EV)



The Z 6II beats its main competitors at all but our lowest and highest tested ISO sensitivities. Also worth noting is how consistently high its dynamic range is from ISO 100 right through to ISO 6,400.

## Rival cameras



**Canon EOS R6**

£2,499/\$2,499

The EOS R6 is a versatile camera that can shoot pretty much anything, as long as you're content with fewer megapixels.

Reviewed: issue 234



**Panasonic S5**

£1,919/\$2,299

With a strong AF system and up to 6.5 stops of image stabilisation, the S5 is tough to beat in this category.

Reviewed: issue 235



**Sony Alpha 7 III**

£1,749/\$1,999

The A7 III has the same resolution as the Z 6II. Its video specs lag behind, but its autofocus is good in movie mode.

Reviewed: issue 203



## Digital Camera verdict

4.0 ★★★★★

Excellent



Features



Build & handling



Performance



Value

The Nikon Z 6II is a light refresh of the original Z 6, with a second memory card and processor bringing a bump to burst shooting and the promise of 4K 60p video. It's a very capable camera, although some of its specs are outperformed by rival systems.



## DSLR Nikon D780



1

Unlike most mirrorless cameras, which are all angles and edges, the D780 has a smoothly contoured body, with soft-feel materials and a comfortable grip.

2

Nikon claims an amazing 2,260-shot battery life, though we'd expect this to drop with a lot of Live View use.

# Nikon D780

£2,199/\$2,299

The last hurrah for the DSLR, or a sign of things to come?

[www.nikon.co.uk](http://www.nikon.co.uk)

### Specifications

**Sensor:** 24.4MP back-illuminated full-frame CMOS

**Image processor:** Expeed 6

**Autofocus:** 51-point phase detect (viewfinder),  
273-point hybrid phase detect (Live View)

**ISO range:** 100-51,200 (exp 50-204,800)

**Max image size:** 6,048 x 4,024

**Metering modes:** 180k RGB sensor, Matrix,  
center weighted, spot, highlight weighted

**Video:** 4K UHD, 30/25/24p

**Viewfinder:** Optical pentaprism,  
0.7x magnification, 100% coverage

**Screen:** 3.2-inch, 2,359k-dot tilting touchscreen

**Memory card:** 2 x SD/SDHC/SDXC (UHS II)

**Max burst:** Up to 7fps (viewfinder), 12fps (live view)

**Size:** 144 x 116 x 76mm

**Weight:** 840g (including battery and memory card)

**T**he launch of the Nikon D780 will reignite a long-running debate about mirrorless versus DSLR cameras. It might even blur the boundaries.

Like last year's Canon EOS 90D, the Nikon D780 is staging a counter-attack against the advancing hordes of mirrorless cameras. It takes crucial mirrorless technology from Nikon's Z 6 to produce a kind of hybrid camera that offers the best of both worlds: an optical through-the-lens viewfinder, but the high-performance Live View AF and video features of a mirrorless.

Traditionally, DSLRs offer optical viewing but compromised (slow) Live View autofocus. Mirrorless cameras

offer fast, hybrid on-sensor phase-detection AF but compromise with an electronic viewfinder (although many see it as an advantage, not a compromise).

However, there's been no technical reason why DSLRs shouldn't have the same on-sensor Live View AF features as mirrorless cameras, and now it's happening. Canon has been using its phase-detection on-sensor Dual Pixel CMOS AF system in its DSLRs for some time, and Nikon has now done the same with the D780.

The D780 is the first Nikon DSLR to adopt this approach, but it seems unlikely to be the last. It's a more upmarket alternative to Nikon's popular D750, sharing the same



3

The D780's control layout will be instantly familiar to existing Nikon DSLR owners.

5

The D780's twin-dial control setup (there's another dial on the front) is fast and efficient in use.

7

The mode dial has a central locking button and a release mode dial directly underneath.

4

The D780 combines an optical viewfinder with mirrorless-style on-sensor phase detection AF in Live View.

6

The touchscreen display is very sharp and clear, with an impressive 2,359k-dot resolution.

8

You can buy the D780 body only, or with the Nikkor AF-S 24-120mm f/4 VR – a great match.



The D780 delivers pleasing colour rendition in its JPEGs; for those who shoot raw, Adobe has already updated its Creative Cloud software to support the new camera.

24-megapixel resolution, but now with fast Live View autofocus, 4K video, continuous shooting up to 12fps and improved processing.

We understand the D750 will continue at a much lower price point for stills photographers who don't need 4K video or fast live view AF. So the D750 becomes Nikon's cheapest full-frame DSLR; the D780 can be seen as a more advanced enthusiast/semi-pro camera; and the only two cameras above it are the high-resolution Nikon D850 and the super-fast Nikon D6.

## Key features

The Nikon D780 is designed for both stills and movies. By today's standards, its 24-megapixel resolution is baseline spec for a full-frame

camera, but it does promise a good level of detail rendition combined with better high-ISO performance than you'd expect from a higher-resolution camera. It also keeps the cost down for enthusiast photographers.

The D780 has the same 180k RGB metering and scene recognition system as the more expensive D850. It also uses Nikon's tried-and-tested 51-point phase-detection AF sensor; when you use the Live View mode, it swaps to the 273-point on-sensor phase detect AF system of the Nikon Z 6. This is more sophisticated – and a lot faster – than the simple contrast AF system in the D750.

The Live View experience is made even better with the high-resolution tilting 2,359k-dot LCD monitor, with touch shutter release and AF point selection. This also offers wider 90% horizontal and vertical coverage than the viewfinder AF system, which uses a separate, dedicated sensor.

The D780 is unexpectedly good at continuous shooting. It can hit a good, though unremarkable, 7fps

in viewfinder shooting, but this leaps to 12fps in Live View – which also has a silent shooting option.

The video capabilities are impressive too, including uncropped 4K UHD at 30/25/24fps, 60/50fps in DX mode and up to 120fps for Full HD; but while the D780 does offer eye AF for stills, this doesn't extend to video. You get Nikon's N-Log option with up to 12-stop dynamic range and →



## DSLR Nikon D780



The D780 captures 4K video and has both microphone and headphone connection sockets.

We used the D780's auto white balance throughout our tests, and it handled different conditions really well.

10-bit capture, and you can capture HLG HDR footage to an external recorder via the HDMI port. There's an external mic socket, as you'd expect, and a headphone socket.

Other features include a focus shifting mode for macro shots with extended depth of field, and the ability to 'scan' 35mm film via Nikon's EX-2 digitising adapter and a Micro-Nikkor lens (both sold separately).

The ISO range is 100-51,200, expandable to ISO 50-204,800, and the D780 has an extended shutter speed range from 1/8,000 sec to

900 sec (excellent for long exposure fans). The D780 has dual UHS-II SD/SDHC/SDXC memory card slots, which is a nice surprise, and an extremely impressive 2,260-shot battery life, though we expect this would drop substantially with extensive use of Live View.

### Build and handling

DSLRs are bigger and bulkier than mirrorless cameras, and full-frame DSLRs are the biggest of the lot. That sounds like a disadvantage, but actually it can be refreshing to

use a camera body built to the same scale as today's full-frame zoom lenses. We tested the D780 with the Nikkor AF-S 24-120mm f/4 VR and the AF-S 16-35mm f/4 VR. These are both lenses that enthusiasts and pros will want to use, and both are weighty, medium-sized lenses that feel a good match for the D780 body.

We were also lucky enough to test the camera for several days in Iceland, where its size and heft were welcome while shooting and making adjustments in the extreme cold, wearing gloves.

That's not to say the D780 is quite perfect. The four-way D-pad on the back could do with being bigger, and while it works faultlessly, it has a slightly imprecise action. It's surrounded by a useful lock lever designed to prevent accidental adjustments, but which is itself flicked a little too easily by accident.

Also, although it has the on-sensor AF system of a mirrorless camera and the same Live View performance, the D780 does not offer the seamless, automatic transition between viewfinder and rear screen shooting that a mirrorless camera does. On a mirrorless camera, an eye sensor detects when you put the camera to your eye or take it away again, and switches displays instantly. On the D780, you have to press the Live View button, and the camera's 'ker-chunk' as it locks up the mirror is a reminder that it's making a mechanical internal adjustment.

Users of other camera brands sometimes remark that Nikon control layouts are different to others and take a little learning. That's true to an extent, but the D780's buttons and dials will be instantly familiar to anyone who's used Nikon DSLRs in the past. While the camera may look a little fussy at first, you very quickly

## Rival cameras



Nikon D750  
£1,179/\$1,499

The D750 is showing its age compared with the D780, but for regular stills photography, there's not that much between them.

Reviewed: issue 158



Canon EOS 6D Mk II  
£1,479/\$1,599

The Canon 6D Mark II is cheaper than the D780 and has a vari-angle screen, but the D780 has a classier feel and 4K video.

Reviewed: issue 194



Sony Alpha 7 Mk III  
£1,999/\$1,999

The Alpha 7 III is still the most accessible, versatile and affordable of all of Sony's full-frame mirrorless camera models.

Reviewed: issue 203





The exposure system does seem to favour highlights: this shot needed a little brightening.

adapt to its layout, and it does offer fast and efficient external controls.

The rear screen has a tilting mechanism rather than a vari-angle pivot, but that's fine for horizontal shots and keeps the screen on the same optical axis as the lens. The screen is larger than usual at 3.2 inches across the diagonal, with a high 2,359k-dot resolution, and the Touch AF and Touch Shutter modes work well: you tap to select the focus point, or to focus and shoot in a single action.

## Performance

Most of our test shots were outdoor landscapes or close-ups, and both of the D780's AF systems proved fast and efficient. This is an important difference – with a mirrorless camera, the AF system is the same for both viewfinder and Live View shooting. With the D780 you need to adjust to two different AF systems with two different sets of characteristics.

Our Iceland expedition offered up some amazing subject matter, but it also provided some serious exposure headaches, thanks to the extremes of ice and snow and near-black lava beaches. Most shots taken with the default Matrix metering needed some kind of editing later, but that was mostly a reflection of the very difficult subject matter.

Even taking that into account, it does seem as if the D780's Matrix metering is biased towards highlights rather than midtones. You're less likely to get highlight blowout, but more likely to have to make tonal adjustments in software later. We also had a few shots that were underexposed for no obvious reason.

The D780 might have the Z 6's sensor technology, but it doesn't have its in-body stabilisation. The



We got to try out the D780 for a *Game of Thrones*-style photo shoot.

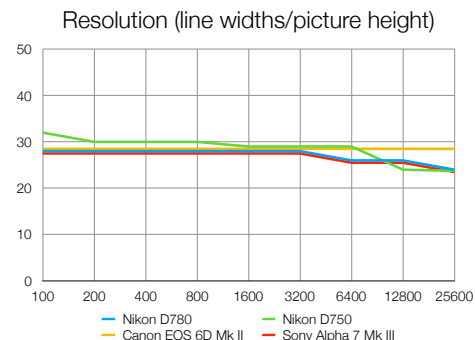
lens-based VR in many Nikkor F mount lenses is effective for stills photography, but did not do much to stabilise the footage in our handheld video tests. For video we think this is a camera best used with a tripod or a stabilising gimbal, when the video quality becomes very good.

The 7fps continuous viewfinder shooting and 12fps in Live View is pretty impressive, but the buffer capacity of 68 lossless compressed 14-bit raw files or 100 JPEGs is more impressive still. It's not billed as a camera for shooting sports, but the D780 is pretty well equipped for a camera in this class.

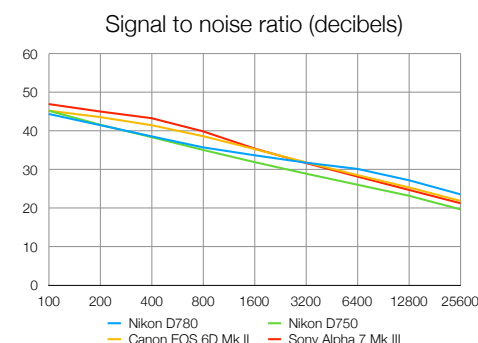
It also has an impressive 2,260-shot battery life, although we assume this figure is based around viewfinder shooting, and that continuous Live View shooting would drain the batteries a lot faster. The Nikon Z 6, for example, has a battery life of just 380 shots. **Rod Lawton**

# Nikon D780 DSLR

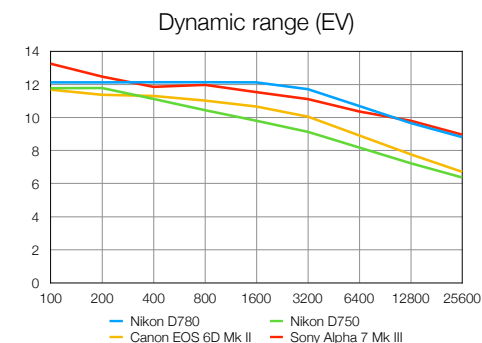
## Lab tests



With peak resolution of 2,800 line widths/picture height, the Nikon D780's resolving power is exactly as we'd expect for a full-frame 24-megapixel camera.



The D780 is slightly noisier than the Canon and Sony cameras at low to medium ISO settings, but it offers the best high-ISO performance of this group.



The Nikon D780 shows a marked improvement over the older D750, and narrowly beats the Sony A7 III, a camera with particularly good dynamic range.

## Digital Camera verdict

5.0 ★★★★★ A best-in-class product



There are no fireworks with the Nikon D780, no radical new technologies. It's simply an excellent evolution of a great camera design.



## Mirrorless Nikon Z 7II



**1**  
A new EN-EL15c battery delivers 420 shots per charge with the LCD, and 360 shots with the EVF.

**2**  
The 45.7MP full-frame sensor is unchanged from the original Z 7, as is the 493-point hybrid AF system.

**3**  
The Nikkor Z lens mount can take regular Nikon DSLR lenses via the Nikon FTZ mount adaptor.

# Nikon Z 7II

£2,999/\$2,997

Is this update enough to keep up with the competition?

[www.nikon.co.uk](http://www.nikon.co.uk)

### Specifications

**Sensor:** 45.7MP full frame CMOS, 35.9 x 23.9mm  
**Image processor:** Dual-core Expeed 6  
**AF points:** 493-point hybrid phase/contrast AF  
**ISO range:** 64 to 25,600 (exp. 32-102,400)  
**Video:** Uncropped 4K UHD up to 30p, cropped 4K UHD up to 60p  
**Viewfinder:** 3690k-dot OLED EVF, 100% coverage, 0.8x magnification  
**Memory card:** SD UHS-II, CFexpress (Type B) / XQD  
**LCD:** 3.2-inch tilting touchscreen, 2,100K dots  
**Max burst:** 10fps mechanical shutter  
**Connectivity:** Wi-Fi 2.4GHz and 5GHz, Bluetooth 4.2, USB-C, mini HDMI, GPS, microphone, headphone  
**Size:** 134 x 101 x 70mm  
**Weight:** 615g body only (705g with battery)

**T**he Z 7II is the follow-up to Nikon's first full-frame mirrorless camera: the Z 7, launched in 2018. With a 45.7-megapixel full-frame sensor at its heart, the Z 7II is Nikon's new flagship mirrorless camera, created to take on the likes of Canon's EOS R5 and the Sony Alpha 7R IV, while also designed to tempt DSLR owners to make the switch.

Sitting alongside the Z 7II is Nikon's more enthusiast-orientated full-frame mirrorless camera, the 24.5-megapixel Z 6II (reviewed in *Digital Camera* 237). Costing significantly less than the pro-orientated Z 7II, the Z 6II is marketed as more of an all-rounder.

We're big fans of the original Z 7 and, as the name suggests, Nikon hasn't started from the ground up with the Z 7II. Instead, the company has listened to feedback and looked

to iron out the weaknesses of the original, tweaking and refining to arrive at the Z 7II. Externally at least, the only giveaway that you're dealing with the newer camera is the Z 7II badge. But with the mirrorless landscape changing dramatically in the last two years through a selection of new rivals, do the changes made to the Z 7II offer enough to put it ahead of the competition?

### Key features

Nikon has opted to use the same 45.7-megapixel full-frame back-illuminated sensor that was seen in the Z 7, but rather than the single Expeed 6 processor that was featured in the older model, the Z 7II now has the luxury of dual Expeed 6 processors. Doubling the processing power brings with it a number of improvements, including the burst shooting speed increasing from 9fps to 10fps.



4

The 3,690k-dot OLED EVF offers 100% coverage and 0.8x magnification; it's good, but not the best.

7

In a change from the Z 7, the Z 7II now has twin card slots: one for SD UHS-II cards, one for CFexpress Type B/XQD.

5

The tilting rear screen is useful for waist-level shooting and video, but is not much help for vertical shots.

8

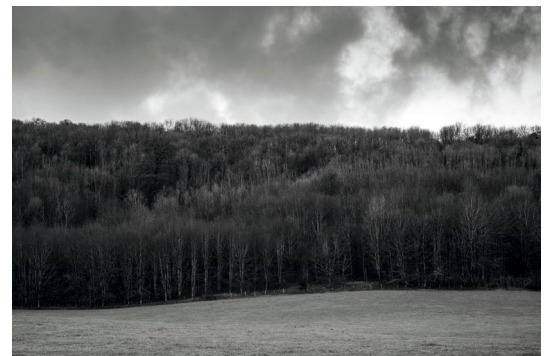
Compact as it is, the Z 7II still has space on the top plate for a status panel.

6

Round the back, there is both a focus lever and a four-way controller, plus an AF-On button.

9

This rear control dial is complemented by another at the front, inset into the top of the grip.



The Z 7II's image quality and dynamic range make it great for black-and-white photography as well as colour. There is a monochrome in-camera mode, but raw files are better.



The autofocus is fast and precise and the rear focus lever makes it easy to choose the focus point. For fast-moving subjects, though, Nikon's D6 or D850 DSLRs have an edge.

You do need to read the small print, though, as this speed is achievable only if you're shooting 12-bit raw files and using a single AF point. The extra processing power delivers a much deeper shooting buffer, with the Z 7II now having up to 3.3 times the buffer capacity of the original model.

The Z 7II's video offering has also been enhanced, with the new camera now capable of shooting 60p 4K footage. This is up from 30p on the Z 7, but this higher frame rate sees a slight 1.08x crop applied to the footage to achieve it, with the Z 7II using 93% of the width of the sensor. If you're planning to send footage to an external recorder, the Z 7II can output ready-to-view Hybrid Log Gamma (HLG) footage for viewing on HDR TV sets, while the Z 7II's 'hot charging' USB-C support means you'll be able to power the camera while it's in use, enabling you to shoot for as long as you want.

Speaking of power, the Z 7II gets a new, uprated battery. While the Z 7's battery life was officially rated at an underwhelming 330 shots, the Z 7II uses a higher-capacity version of the battery, with the new EN-EL15c now able to deliver 420 shots per charge with the LCD, and 360 shots through the viewfinder. It's a welcome improvement, but it still lags behind rivals like Sony's A7R IV, which can muster up to 670 shots on a charge.

One area that was often singled out on the original Z 7 was

"Nikon has looked to iron out the weaknesses of the original"



## Mirrorless Nikon Z 7II



Nikon's Matrix metering system does a good job of preserving highlights, but for extra-high-contrast scenes, the Z 7II's raw files offer useful additional dynamic range.

its reliance on a single XQD card slot, but the Z 7II now benefits from dual card slots with the welcome addition of a UHS-II SD card slot alongside the XQD/CFexpress Type B socket.

Rather than developing a new autofocus system, the Z 7II employs the same 493-point AF system that was enjoyed by the Z 7, but the extra Expeed 6 processor has allowed Nikon to make some improvements here as well. In addition to sharpening up the overall performance of autofocus, the Z 7II now includes human or animal eye/face detection in Wide Area AF mode and improved focusing in low light, which sees the Z 7II

now able to focus down to -3EV (compared with the Z 7's -2EV).

### Build and handling

Despite the extra card slot, the design of the Z 7II is identical to the Z 7 – and to the Z 6 and Z 6II for that matter. (The more affordable Nikon Z 5 is very similar, too. Apart from the Z 7II badge, the only other difference is that it's a couple of millimetres thicker and a gramme or two heavier.

While sticking with an unchanged design might appear to be playing it incredibly safe, the original Z 7 was a pretty well-sorted camera when it came to handling, so it's perhaps



Like its predecessor, the Z 7II is a well-sorted camera that's compact in design, but with a good 'grip' and well laid-out controls.

no bad thing that Nikon has felt no need to tinker here. The deep grip makes the Z 7II incredibly comfortable to hold, and the control layout makes it one of the most satisfying mirrorless cameras to shoot with. Key controls fall to the hand easily, and it's great to see that face/eye detection is now accessed along with all the other area AF modes. A dedicated drive mode would be good to have on the Z 7II (perhaps around the collar of the mode dial), but this is relatively straightforward to get to via the menu.

Just like the Z 7, the Nikon Z 7II enjoys magnesium alloy top, front and back covers to deliver ample rigidity, and the body is weather-sealed to Nikon's professional specifications. This all combines to deliver a camera that's very well-made and that can happily be used in a number of environments.

One area we'd liked to have seen Nikon overhaul is the electronic viewfinder (EVF) and rear display. While the 3.69m-dot EVF in the original Z 7 impressed at the time, it's since been overshadowed by 5.76m-dot EVFs in key rivals, and it's disappointing not to see Nikon equip the Z 7II with something similar. As it is, it uses the same 3.69m-dot EVF as its predecessor; while it's very good, it's not a match for the higher-resolution EVFs on the competition like the Canon EOS R5 and the Sony Alpha 7R IV.

Another curiosity is Nikon sticking with the Z 7's tilting rear touchscreen LCD in the Z 7II. While this method has a range of uses and applications, a vari-angle mechanism would have made it a more appealing proposition for videographers and portrait shooters.

## Rival cameras



Canon EOS R5  
£4,199/\$3,899

The EOS R5 is technically more advanced than the Z 7II, but it's much more expensive, too. Reviewed: issue 233



Panasonic Lumix S1R  
£2,799/\$3,698

The Lumix S1R is built like a tank and has some beautiful lenses in a growing selection, but it's pricey and heavy. Reviewed: issue 216



Sony Alpha 7R IV  
£3,199/\$3,498

The Alpha 7R IV still leads the full-frame mirrorless field for resolution and autofocus performance. Reviewed: issue 223





The Z 7II now includes human or animal eye/face detection in Wide Area AF mode, which proves to be very accurate in real-world shooting, and improved focusing in low light.

## Performance

Even though the Z 7II is now able to max out at 10 frames per second, that still leaves it lagging behind the likes of the Canon EOS R5, which can shoot at up to 12fps with its mechanical shutter and 20fps if you choose the electronic shutter. That said, it's identical in speed to the Alpha 7R IV, although that camera is handling large 60MP files. While it could be argued that this puts it behind its rivals (especially when it's limited to Single Point AF), 10fps might still be enough for most disciplines.

The 493-point hybrid AF system inside the Z 7II is a solid performer. Using both phase and contrast-detect AF, the Z 7II finds focus very quickly, and human/animal face and eye detect modes work very well. Train the Z 7II on your subject, even against a busy background, and it'll lock on and automatically switch between faces or individual eyes. Predictive focus tracking is also good on the Z 7II, enabling you to maintain focus on your subject as it moves round the frame. Viewed in isolation, the AF system on the Z 7II is very impressive, but against the likes of the EOS R5's incredibly sophisticated AF, it's not quite there. Nikon aficionados photographing action are probably still best served by the company's D850 and D6 DSLRs – while they can't match the 90% coverage of the Z II, their advanced tracking AF certainly has the edge.

There are no nasty surprises when it comes to image quality, having seen

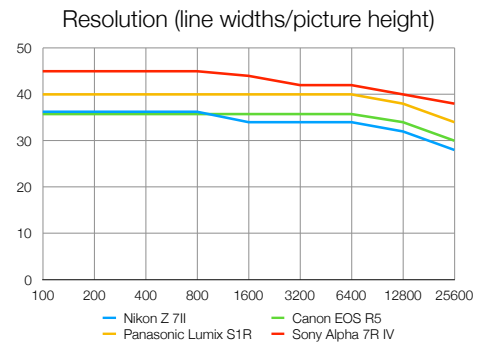
variations of this sensor used in both the Z 7 and D850. The level of detail achievable is impressive, while the wide dynamic range means there's plenty of flexibility in the raw files. It's possible to recover good amounts of shadow detail, while the Z 7II's Matrix metering does a good job of preserving the highlights.

The lab results weren't quite what we were expecting, as the Z 7II appears slightly down against some older rivals in noise and dynamic range. Real-world results were very impressive, however.

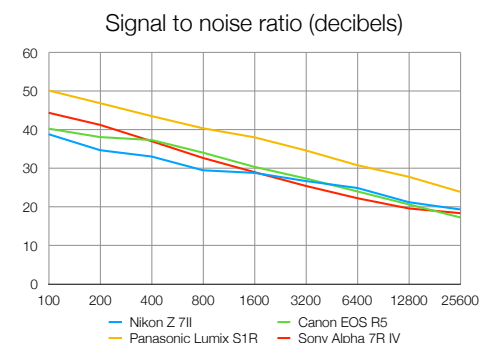
The Z 7II's in-body image stabilisation system is a strong performer, delivering five stops of compensation. This means that shooting at slow shutter speeds and still coming away with a sharp shot is very much a reality when shooting with the Z 7II. IBIS is not just a benefit for stills, though, as it can be harnessed when shooting video, too. Provided you keep movement down to a minimum where possible, you can come away with some incredibly smooth 4K footage. **Phil Hall**

“The Z 7II’s IBIS system is a strong performer”

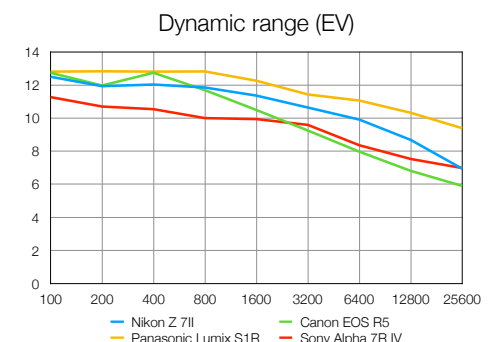
## Lab tests



Not surprisingly, the 60MP Sony Alpha 7R wins for resolution, with a clear advantage over the rest. The Lumix S1R is in second place, despite having a similar sensor resolution to the EOS R5 and the Z 7II.



The winner here is the S1R, with the Alpha 7R IV and the EOS R5 close together in second place. The Z 7II trails a disappointing fourth here, although it gains a slim advantage at higher ISO settings.



The S1R is out in front, producing measurably higher dynamic range across the ISO range. The Z 7II and the EOS R5 are close together in second place, although the Z 7II establishes a gap at higher ISO settings.

## Digital Camera verdict

4.5 ★★★★★ Outstanding



The Z 7II feels a little like a stopgap before we see Nikon introduce an all-new model. However, it still has a lot going for it – and at a more affordable price than key rivals, it shouldn't be ignored.



## Mirrorless Nikon Z50 II



**1** While the Z50 II looks fairly similar to the Z50, it is bigger and has a deeper, more comfortable grip.

**2** The downsized APS-C (or DX) sensor allows the Z50 II to be used with an equally compact range of lenses.

**3** While the Z50 II has the same 20.9MP sensor as the Z50, it features a newer-generation Expeed 7 processor.

# Nikon Z50 II

£849/\$910 (body only)

Brand's original DX-format Z-series mirrorless gets turbocharged with Expeed 7 processor

[www.nikon.co.uk](http://www.nikon.co.uk)

### Specifications

**Lens mount:** Nikon Z  
**Sensor:** 20.9MP CMOS (APS-C)  
**Image processor:** Nikon Expeed 7  
**Autofocus:** 209 points, hybrid phase-detection/contrast AF  
**ISO:** 100-51,200 (204,800 extended)  
**Image stabilisation:** None  
**Max burst:** 11fps (mechanical shutter), 30fps (High speed capture +)  
**Video:** 4K UHD 60p, Full HD 120p  
**Viewfinder:** 0.39in 2.36m-dot OLED  
**LCD:** 3.2in 1.04m-dot vari-angle touchscreen LCD  
**Memory cards:** 1xSDXC UHS-II  
**Connectivity:** USB-C, HDMI (Type D), 3.5mm audio in/out, Wi-Fi, Bluetooth  
**Battery:** EN-EL25a  
**Dimensions:** 127 x 96.8 x 66.5mm  
**Weight:** 495g (body only)

The Nikon Z50 II is the follow-up to Nikon's first crop-sensor mirrorless and comes just over five years after the original Nikon Z50 launched back in 2019. Smaller and lighter than the full-frame Z-series cameras further up the range, its downsized APS-C (or DX, in Nikon parlance) sensor enables it to be used with an equally more compact range of lenses.

There are plenty of similarities between the Z50 II and its predecessor, with the same 20.9MP sensor, 3.2in 1.04 million-dot rear screen and 2.36 million-dot viewfinder. The ISO range remains at 100-51,200 (204,800 expanded) as does the 11fps shooting rate when the mechanical shutter is used. However, it does have a newer-generation Expeed 7 processor – the same as used in the newer full-frame Z-series cameras from the Nikon Z f through to the Nikon Z 9, and this chip

offers a vast improvement in autofocus performance, cleaner images compared to those from a Z50 at the same ISO settings, and increases the frame rate to up to 30fps when using an electronic shutter.

### Build and handling

While the Z50 II looks similar to the Z50 at a glance, it is a little bigger and has a deeper, more comfortable grip. The control layout has more in common with cameras like the Nikon Z 6III, with a dedicated button for drive mode, which was absent on the Z50 and had to be accessed via the menu system. It also gains physical buttons to zoom in and out, and a 'Disp' button to toggle between various on-screen information overlays. On the Z50, these were 'soft' buttons built into the rear LCD.

There's also a new dedicated button to access Picture Controls, which is exclusive to the Z50 II and not found on any other Nikon camera. This gives fast

## Nikon Z50 II Mirrorless



4

The EVF is the same 2.36 million-dot display as on the Z50, but it is now twice as bright.

7

There are buttons to zoom in and out, plus a 'Disp' button to toggle on-screen info overlays.

5

The rear touchscreen has the same 1.04 million-dot resolution as the previous model.

8

There's also a new button for exclusively accessing the Z50 II's Picture Controls.

6

The layout of controls on the Z50 II's back panel has similarities to the Nikon Z 6III.

9

The rear touchscreen is mounted on a vari-angle mechanism that rotates up, down and to the side.



Nikon is pitching this camera to videographers and photographers – and it's a stellar video performer.

access to the various 'looks' that are applied with jpegs processed in-camera. Of course, if you prefer to shoot in raw format, then this won't be much use to you, but it can be reprogrammed for a variety of other functions instead – as can many of the other controls.

While the rear touchscreen has the same 1.04 million-dot resolution as the Z50, this time it's mounted on a proper vari-angle mechanism that flips out to the side and can be rotated up and down – and all the way around to the front for selfies and vlogging. By contrast, the screen on the Z50 could only flip up or down, and while it could be twisted all the way around to be forward-facing, with the screen below the camera, if you were using a tripod then most of the display would be obscured by the tripod column.

Those hoping for an ultra-high-res electronic viewfinder, such as the EVF featured on the Z6 III, will be disappointed, as it's the same 2.36 million-dot display as found in the

original Z50. However, it is twice as bright, making it more natural to use when shooting in bright conditions.

### Performance

The Expeed 7 processor is Nikon's latest-gen chip, first found in the range-topping Z 9 and, having since appeared in the Nikon Z 8, Z f and Z 6III, is now in an APS-C body for the first time. This chip endows the Z50 II with the same levels of intelligent subject-detection autofocus that's found in the Z 9 and I found it to be super-responsive, locking onto multiple subjects snappily.

The camera has subject detection modes specifically for people, animals, birds, vehicles and aeroplanes, and an auto mode that recognises them all simultaneously. Nikon claims that this new feature doesn't throttle the AF performance in any way, and it works, for all intents and purposes, just as well as it does on cameras such as the Z 9.

The headline maximum shooting rate is 11fps when using the



Nikon's Wireless Remote Controller allows you to control key camera functions from a distance.

"The new Expeed 7 chip offers better autofocus and cleaner images"





Nikon

Pre-release capture mode saves up to a second's worth of shots before the shutter button is fully depressed and is handy for ensuring you don't miss the moment.

mechanical shutter, the same as the Z50. For most photographers, this should easily be fast enough, but Nikon has added even faster 15fps and 30fps 'High-speed frame capture +' modes that forgo the mechanical shutter for an electronic one. This does come with some rolling shutter issues, where the image shears slightly when capturing fast-moving objects due to limitations in the electronic shutter's scan rate. This mode is also limited to jpeg or HEIC file formats only, so you won't have the full editing latitude that you would have with a raw file.

There's also an option to capture images before you take them. Essentially, the 'Pre-release capture' mode starts recording images in the background when you half-press the shutter button to achieve focus

and an exposure reading. This saves up to a second's worth of shots leading up to the shutter being fully depressed and keeps saving them until the button is fully released. This function is only available when used in conjunction with High-speed frame capture +, so once again there are no raw files. It's handy for ensuring that you don't miss the moment, but is best used sparingly as it fills memory cards pretty quickly and you end up with dozens of ever-so-slightly different variations of the same shot to select from in the editing stage.

But features such as this make it an absolutely storming camera for capturing action and, while the Z50 II is pitched as an entry-level camera,

it's also ideal for those who like to photograph subjects such as sports and wildlife on a budget, with the bonus of the 1.5x telephoto boost that the smaller APS-C sensor gives. In fact, it comfortably outguns older pre-Expeed 7 full-frame cameras, including the Nikon Z 5, Z 6II and Z 7II when it comes to reliably capturing fast subjects.

Nikon is pitching this camera as much to videographers as photographers, and it's a stellar video performer, with uncropped 4K 30p oversampled from 5.6K. There's also a 4K 60p slo-mo mode, but this does have a 1.5x crop applied. You can shoot in Full HD 120p for quarter-speed footage and there's a 2x digital zoom (with no loss of image quality), which can be set to zoom smoothly at 11 different speeds for a pro-quality feel. There's also electronic video stabilisation, for less-shaky footage, when shooting Full HD.

Videographers will also be delighted to see that the camera offers N-Log

## Rival cameras



**Canon EOS R10**  
**£899/\$979**

Budget, beginner camera with pro-level autofocus and 15fps speed, 4K 60p imaging and 120p slow motion at 1080p.  
Reviewed: Issue 259



**Fujifilm X-T30 II**  
**£769/\$899**

Looks cool but works well, too, with old-school shutter speed and aperture dials. But the lack of in-body stabilisation is a shame.  
Reviewed: Issue 251



**Sony A6400**  
**£949/\$899**

A dream camera for bloggers, but for stills photographers, it is held back by a five-year-old design and limited external controls.  
Reviewed: Issue 215







While the sensitivity range is the same as the Z50's, topping out at ISO 51,200, Nikon says Z50 II images are crisper and exhibit fewer signs of noise, improving the quality of images taken in low-light conditions.

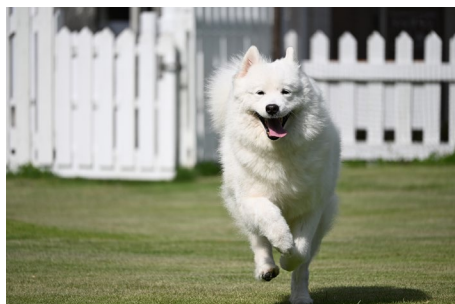
recording with a full 10-bit codec, which gives a huge amount of flexibility when colour grading video – in a similar way that you get the greater flexibility of raw files compared with jpeg still images.

Nikon also has vloggers firmly in its sights, with a new Product Review mode that automatically switches focus between people and objects. The camera uses AI-based face and eye tracking to keep the focus on the person but automatically switches focus to any objects that are introduced into the frame and brought closer to the camera, making it ideal for creating slick 'review' videos. The camera is automatically recognised by cameras and phones as a video device, cutting out the need for using Nikon's Webcam Utility software, as is the case with other Nikon cameras.

Videographers will also welcome the addition of a headphone socket for monitoring recording, but this also doubles as a socket for the new MC-DC3 remote cord that works exclusively with the camera. **Adam Waring**

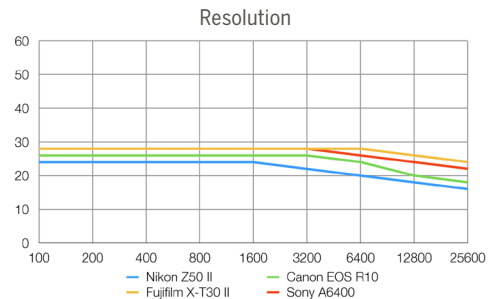


With excellent dynamic range performance, the camera can resolve detail in high-contrast scenes.

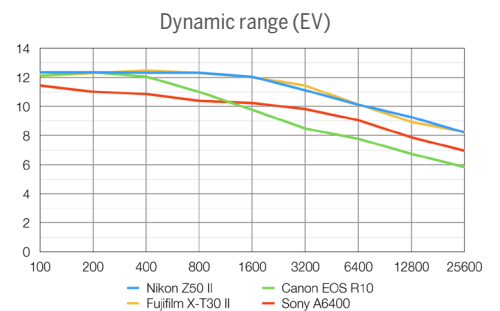


## Nikon Z50 II Mirrorless

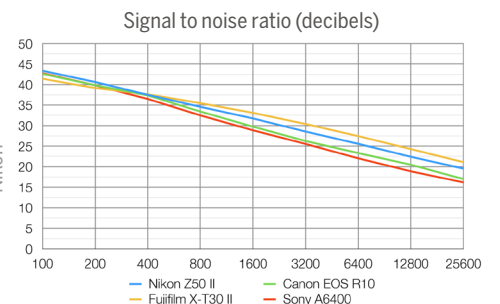
### Lab tests



With its 20.9MP sensor, it's hardly surprising that the Z50 II trails behind its competitors, all of which offer resolutions of 24MP or greater.



It's neck-and-neck with the Fujifilm X-T30 II in terms of dynamic range, but the Z50 II produces beautifully detailed images, rich in detail from the



Signal-to-noise results are superb, thanks to the processing power of the Expeed 7, although the Fujifilm X-T30 II outperforms it slightly at higher ISOs.

### Digital Camera verdict

4.5 ★★★★★ Outstanding



It's disappointing that, five years on, the Nikon Z50 II still uses the same 20.9MP sensor as its predecessor, but this is by far the most advanced camera in the company's DX range. Though pitched at beginners and enthusiasts, it packs the pro-level performance of more expensive Nikon cameras in a smaller body. It is superbly versatile and should be a hit for those who like shooting sports and wildlife, with zippy autofocus and advanced subject recognition locking onto fast-moving subjects. It's great for video, too, offering decent touches for filmmakers on a budget.



## Mirrorless Nikon Z 30



**1** This is the only Z-series mirrorless not to sport an electronic viewfinder, helping to reduce the cost of the camera.

**2** The best kit options include the svelte retracting 16-50mm lens, which includes built-in VR – helpful for smooth video recording.

**3** A red LED 'tally light' illuminates while the Z 30 is recording video, or is in self-timer mode.

# Nikon Z 30

£699/\$707 (body only)

New APS-C body with vloggers in its sights

[www.nikon.co.uk](http://www.nikon.co.uk)

### Specifications

**Sensor:** 20.9MP APS-C CMOS  
**Image processor:** EXPEED 6  
**AF points:** 209-point hybrid AF system  
**ISO range:** 100-51,200  
(expandable to ISO 204,800)  
**Video:** Uncropped 4K UHD up to 30p,  
1080p Full HD up to 120p  
**Viewfinder:** None  
**Memory card:** SD/SDHC/SDXC, UHS-I  
**LCD:** 3-inch vari-angle  
touchscreen, 1040k dots  
**Max burst:** 11fps  
**Stabilisation:** Electronic Vibration  
Reduction (video only)  
**Connectivity:** Wi-Fi, Bluetooth,  
SnapBridge, USB-C,  
micro HDMI, microphone  
**Size:** 128 x 73.5 x 59.5mm  
**Weight:** 350g body only (405g  
with battery and memory card)

Nikon's third mirrorless Z-series camera with a DX (APS-C) sensor has arrived in the guise of the Z 30. It joins the original Nikon Z 50 – launched over two years ago – and the more recent Nikon Z fc, which is essentially the same camera with retro-themed, direct-access controls. The Z 30 feels very much like the same camera again, this time sans-viewfinder to appeal to vloggers, and perhaps a generation brought up on smartphones.

This plucky little Z camera's target audience and price range places it squarely alongside the Sony ZV-E10 and could be considered a more affordable alternative to the range-topping Sony A6600.

The Z 30 is also Nikon's most affordable Z-series mirrorless to date, largely made possible due to hardware hand-me-downs and an absent

viewfinder. Electronic viewfinders are complex and expensive components. They typically squeeze many more pixels than a rear LCD into a very high-resolution screen that's the size of a thumbnail, with precision optics to make for a comfortable viewing experience. But vloggers don't need any of that: they turn the camera on themselves as they express their views of the world around them.

The Z 30 is available body-only or in a couple of kit options. Our review sample included the tried-and-tested Z DX 16-50mm f/3.5-6.3 VR standard zoom, which equates to a very usable 24-75mm in full-frame terms. This is a wise buy for anyone new to the Nikon ecosystem, with the lens adding just £140 to the base price. It's amazingly compact for a kit lens, barely protruding beyond the camera grip and very much in keeping with the compact aesthetic. Other kit

## Nikon Z 30 Mirrorless



4

The rear screen has a vari-angle pivot, which is ideal for video.

5

The 3-inch rear screen's 1.04m dots provide plenty of detail.

6

Whether it's stills or video, this lever makes the mode clear.



Nikon

The Z 30's 20.9MP APS-C sensor can shoot down to -4.5 EV, making it a great performer in low light.



7

The Z 30 has microphones built into its top plate, though keen vloggers are likely to connect an external one.

8

The record button is of a decent size and has been positioned to make shooting video easier.



Adam Waring

A frame taken from a Full HD video shot at 120fps to capture a 4x slo-mo of our somersaulting subject. The kit lens's in-built VR will help with image stabilisation.

options are a double-zoom kit, which adds the DX 50-250mm f/4.5-6.3 VR zoom to the 16-50mm for £1,069, and a Vlogger Kit for £879.

One of the key benefits of the Z 30 over other cameras in its class is that it provides access to Nikon's range of Z-mount lenses, which has delivered astounding optical quality time and again. With the addition of the FTZ adapter, many of Nikon's F-mount lenses are compatible too. However, so far there are only a small number of DX-format Nikkor Z lenses designed for this camera, though an ultra-wide DX zoom is on the Nikon Z roadmap.

### Key features

Unsurprisingly, the Z 30's spec sheet is very similar to the Nikon Z 50 and Z fc: the guts of the three cameras are all but identical. The Z 30 has the same 20.9MP APS-C CMOS sensor, powered by the EXPEED 6 image processor. There's the now-familiar 209-point hybrid AF system, and an 11fps maximum shooting rate with full autofocus. The camera boasts Eye- and Animal-Detection AF for both stills and video. It can record

4K UHD uncropped video at 30fps, or Full HD at up to 120fps – perfect for smooth slow-motion footage.

While the hardware is the same, tweaks have been made to the firmware. Nikon says there have been improvements to the AF system, in particular with face/eye tracking for both people and animals.

The camera can now record lengthy 125-minute clips. However, it should be pointed out that this feature is only available in Full HD (up to 25p), with 4K maxing out at around 35 minutes. The EN-EL25 battery is rated for 75 minutes of video, so the camera has to be tethered to take full advantage of the two-hour recording length.

Accordingly, the camera can be powered while recording via the included (albeit rather short) USB-C to USB-A cable. This is the only way to charge the battery from the box, as there's no charger included. This might seem a little unfair for a camera aimed at Nikon or Z-camera newbies, but with an increasing number of tech giants omitting chargers on environmental grounds, it certainly isn't surprising. →



The Z 30's vari-angle screen flips out to the side, then can be tilted up or down or faced forwards for selfie/vlogging mode.

"A key benefit of the Z30 is that it provides access to Nikon's range of Z-mount lenses"



## Mirrorless Nikon Z 30



While it's primarily aimed at videographers, the Z 30 is also a very capable stills camera, with access to the entire range of Z-mount lenses (and most F-mount ones, via the FTZ adapter).

### Performance

The results were interesting. The autofocus works very well. The human and animal eye AF is very effective. What you need to be aware of, though, is that the Z 30 has its own specific AF-F ('F' for full-time AF) for video use. You could spend ages wondering why the C-AF mode doesn't work.

The stabilisation is poor to middling. The Z 30 has no IBIS, so it's dependent on lens-based VR and the body's own electronic VR. Used together, they can keep static shots looking steady, but if you attempt any kind of camera movement, such as a steady pan or walking and shooting, the VR is out of its depth. It smooths things to a degree, but produces jumps instead of jitters.

The electronic VR can also produce pronounced edge wobble when you're walking forward and filming. When there are small changes in camera position between frames, there are parallax changes between near and far objects, too, and we suspect that when the electronic VR keeps the centre object steady, it exaggerates the movement of those near the edges.

You can use the Z 30 handheld from a static position and get very steady shots, but if you're going to attempt any camera movements we would recommend that you use a tripod or a gimbal and switch both VR options off.

Considering the similarities beneath the hood of Nikon's three DX-format mirrorless cameras, it's no surprise that the Z 30's still image quality is on a par with the Z 50 and the Z fc. At 5568 x 3712 pixels, the 20.9MP sensor doesn't quite match the 6000x4000 resolution of the 24MP sensors found in some of Nikon's DX-format DSLRs, but you get increased dynamic range and improved

low-light performance in return. Besides, high megapixel counts aren't as important when it comes to video – 20.9MP is more than enough to provide the 3840 x 2160 pixels that make up 4K video. On that note, the Z 30 is capable of outputting 4K uncropped, taking advantage of the full width of the image sensor. This is a crucial upgrade on the Z fc; the Z 50 also outputs 4K uncropped.

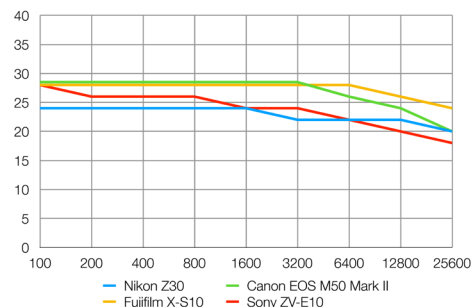
It is a shame 4K 60p isn't available – especially as it's featured on the iPhone 13 Pro – but for an entry-level video camera, this would have been a big ask.

Like other DX-format Z-series cameras, the Z 30 doesn't have in-body image stabilisation (IBIS). However, it does feature Electronic Vibration Reduction. This works by discarding pixels via a 1.3x crop to maintain stability. If you want maximum image quality, the 16-50mm kit lens boasts in-lens VR, which is at least as effective.

Purists may shy away from Active D-Lighting, but it's worth highlighting this function's ability to automatically balance exposures – ideal for vloggers who want to shoot and upload with minimum hassle. If that's your bag, Auto mode might be a tempting prospect, but videographers rely on maintaining a constant shutter speed that's double the frame rate (1/100 sec at 50p for example), so you're better off using Shutter Priority or Manual mode.

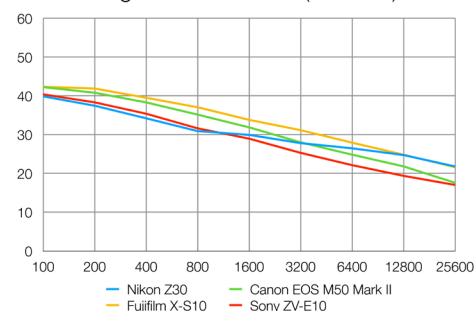
And that's ultimately the biggest hurdle the uninitiated will face. The Z 30 is undeniably a very capable vlogging device, but there's a definite learning curve for those used to smartphone shooting. It's a shame then, the camera doesn't bridge the gap with a dedicated, automatic video mode. **Mike Harris**

Resolution (line widths/picture height)



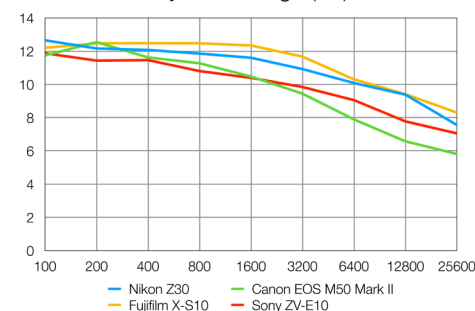
With 'only' 20.9MP available, the Z 30 resolves noticeably less fine detail than the 26MP Fujifilm X-S10 and 24MP Canon M50 MkII. It does get close to the performance of the ZV-E10, however.

Signal to noise ratio (decibels)



The Z 30 is in last place at lower sensitivities, but comes good where it matters; at higher ISOs, where noise is most visible. By ISO 12,800, the Nikon produces the joint-cleanest images of the group.

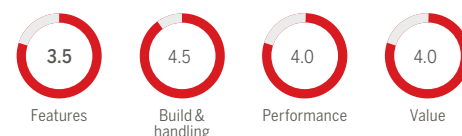
Dynamic range (EV)



Dynamic range is excellent, with the Z 30 getting close to the class-leading X-S10, and capturing significantly more highlight and shadow detail than its Canon and Sony competitors.

### Digital Camera verdict

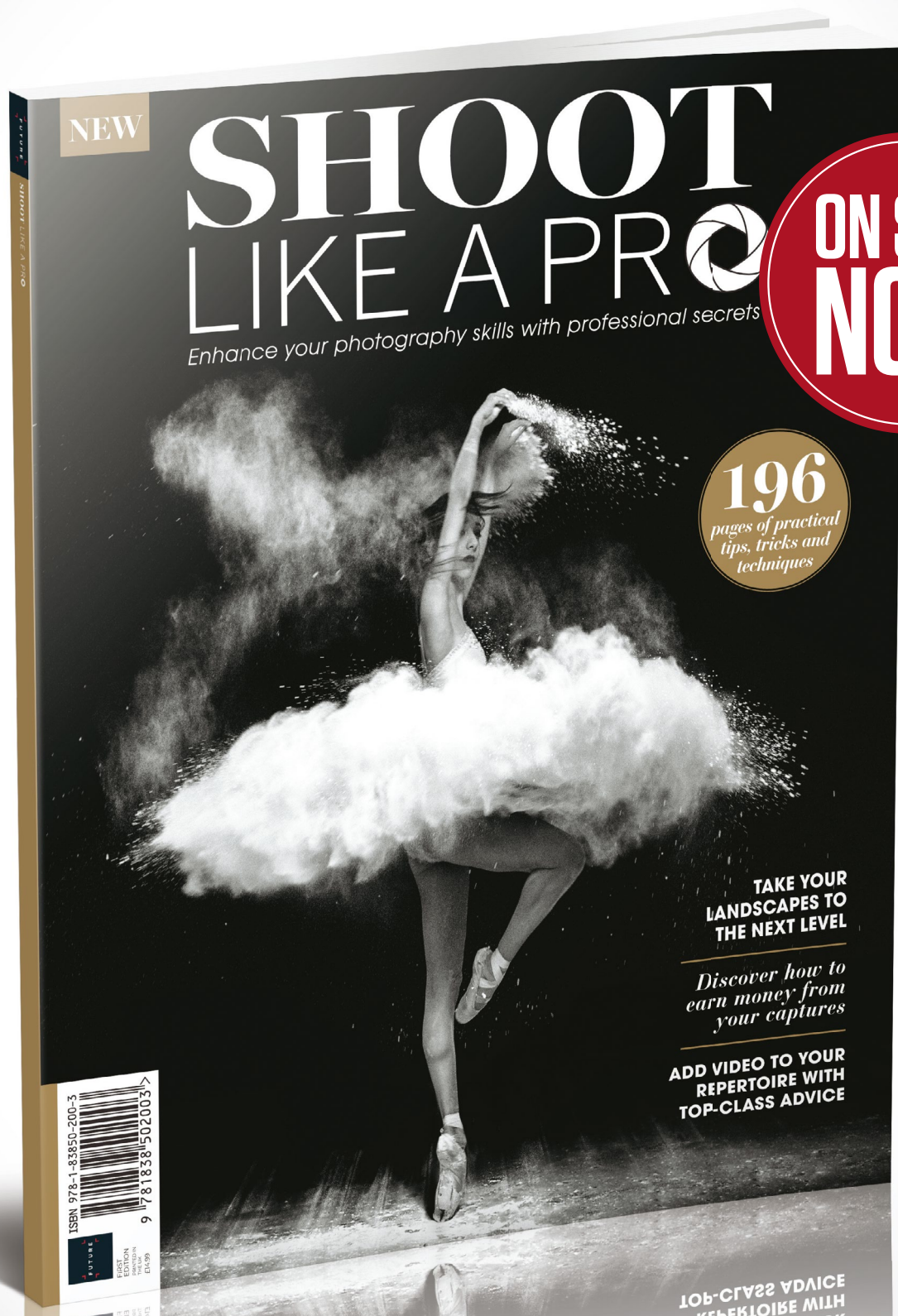
4.0 ★★★★★ Excellent



If you're looking for a dedicated point-and-shoot video camera that won't break the bank, the Z 30 offers arguably the best build quality in its price range. But if you can't live without an EVF or predominantly shoot stills, you could always plump for the Nikon Z 50 or Nikon Z fc. All in all, though, the Z 30 is a capable offering at an attractive price.

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## Mirrorless Nikon Z f



**1** The camera body has a leather-like textured finish that adds to the overall retro charm.

**2** The 24.5MP full-frame sensor has a total of 299 autofocus points spread over the entire image frame.

**3** The grip is a shallow bump and not nearly as deep as those on a traditional DSLR.

# Nikon Z f

£2,299/\$1999 (body only)

Nikon's latest attempt to revive the days of film doubles down on retro charm, but it has the quality to back it up

[www.nikon.co.uk](http://www.nikon.co.uk)

### Specifications

**Sensor:** 24.5MP CMOS full-frame Nikon FX  
**AF points:** 299, 89% x 96% coverage, -10EV  
**ISO range:** 50-64,000 (204,800)  
**Max image size:** 6048 x 4032px  
**Image stabilisation:** Up to 8 stops  
**Max burst:** 7.8fps RAW/JPEG, 30fps JPEG  
**Video:** 4K 60p, 4K 30p, FHD 120p  
**Viewfinder:** 3690k-dot (Quad VGA) OLED  
**Rear LCD:** 3.2-in 2100k-dot vari-angle TFT touch-sensitive LCD  
**Memory card:** 1 x UHS-II SD, 1 x microSD  
**Connectivity:** USB-C, Micro HDMI, mic, headphone, Wi-Fi, Bluetooth  
**Power:** EN-EL15c rechargeable Li-ion  
**Size (W x H x D):** 144 x 103 x 49mm  
**Weight:** 710g (incl battery and memory card)

**T**he Nikon Z f isn't the manufacturer's first attempt at reviving the style of film cameras for the digital age. The Nikon D f arrived in 2013 but failed to garner any sequels. Nikon dipped its toe in the water again in 2021, with the Nikon Z fc and got a different reaction. Nikon claimed that demand for the Z fc far exceeded its expectations, showing that there was a serious appetite for cameras with a vintage aesthetic.

The Nikon Z fc was universally well received; we gave it a near-perfect score, enamoured with its vintage looks but criticising its build quality and ergonomics. However, after the release of the Z fc, users demanded a full-frame version with the same classic styling, so it was inevitable that Nikon would deliver just that.

With the release of the Nikon Z f, it appears that Nikon is fully on board the vintage-inspired camera train – the Z f is a full-frame version of

the Z fc that is the true digital successor to the classic Nikon FM2 film camera. Nikon is hoping to answer the criticisms levelled at the Z fc with the considerably more expensive and larger Nikon Z f, but has it done enough to make this the perfect camera for vintage enthusiasts?

### Key features

Despite its retro exterior, the Nikon Z f features the latest advancements from the company's flagship models, the Nikon Z 8 and Z 9. Core features include a 24.5MP full-frame sensor, powered by the Expeed 7 processor, which boosts autofocus performance, expands file format options, improves in-camera stabilisation and provides exceptional low-light capabilities with an ISO range of up to 64,000.

The Nikon Z f boasts the same impressive autofocus system as the Z 8 and Z 9, equipped with 299 focus points that cover a substantial part of the sensor area. This system is adept



4

The viewfinder on the Nikon Z f is a joy to use – big and clear with a sharp resolution.

7

The Z f offers 4K video recording capabilities, and records continuously for up to 125 minutes.

5

The body is exceptional quality with a solid magnesium alloy body and brass dials.

8

Along the top, there are dials for setting shutter speed, ISO and exposure compensation.

6

The rear LCD is fully articulating rather than tilting as seen on cameras such as the Z 6II.

9

The LCD screen on the top plate is limited to showing the aperture, set on the front command dial.



Gareth Bevan

With its respectable specifications, the Z f is a decent video camera for anyone creating content for YouTube.

at subject tracking, including human faces and eyes, animals, birds and vehicles, ensuring precision even in shooting conditions as dark as -10EV.

Unique to the Nikon Z f is the introduction of subject detection algorithms that function seamlessly in manual focus mode or when using adapted manual-focus lenses, enhancing exposure accuracy based on recognising the subject.

The Nikon Z f is capable of up to eight stops of image stabilisation with compatible lenses and offers pixel shift imaging, which combines multiple shots to create higher-resolution images. It also introduces the Focus Point VR system, employing the camera's focus point to enhance in-body image stabilisation.

For videographers, the Nikon Z f offers versatile video recording capabilities, supporting 4K video at various frame rates (60p, 30p, 24p) and Full HD up to 120p. Video enthusiasts will appreciate features

such as focus peaking, zebra stripes, waveform display in Live View, fine ISO control and an enhanced video information display. The camera can record continuously for up to 125 minutes, making it a viable choice for extended video projects.

## Build and handling

If you're a fan of vintage-style cameras like the Nikon FM2, you will like the Nikon Z f. The body is exceptional quality with a solid magnesium alloy body and brass dials that not only feel much more secure than the Z fc but will also wear with use the same as vintage cameras from the past.

Some may dismiss it as a 'hipster' camera, but if you are the type of photographer who cares about your gear, why wouldn't you want it to look this good? The downside of those stunning looks is that the camera is heavy and has practically no grip, making it uncomfortable to hold. The camera was launched alongside

an optional grip from Smallrig – an admission by Nikon, perhaps, that ergonomics were compromised to get the classic look.

For a full vintage effect, the camera has dials and switches galore, with dials for shutter speed, ISO, and exposure. The aperture is controlled using the front wheel and is displayed on the small display up top, which is thankfully larger and easier to read than the dial on the Z fc. There is also a switch to flick from stills to video and from colour to monochrome as well as through the different shooting modes. The shutter button on the Z f is frustratingly sensitive, so you may end up taking shots of the ground or before the camera has focused.

The Nikon Z f isn't all vintage; there are a few modern twists as well. It has a fully articulated screen on the rear, so you can vlog or shoot from awkward angles, however, the hinge sticks out awkwardly and the screen does not fold flush against the back of the camera. There are all the modern ports present for charging the battery in-camera via USB-C or connecting headphones or microphones. —→



## Mirrorless Nikon Z f



With its 25MP sensor, the images from the Z f are pleasing, reliably solid and large enough to produce images for most purposes, including professional work for weddings or portraits.

The viewfinder on the Nikon Z f is a joy to use – big and clear with a sharp resolution. I tended to flip the screen and compose images using the viewfinder for the full film camera effect. There is a small rubber ring around the eyepiece which makes it more comfortable to use, but also attracts a lot of lint.

An odd addition to the Nikon Z f is its microSD card slot, which sits alongside the SD UHS-II slot. MicroSD isn't fast enough for many of the camera's applications, like 4K video or fast burst rates, so two SD card slots would have been better. One downside to Nikon's vintage-inspired cameras is that there are few lenses designed to match. Unlike Fujifilm or Olympus rivals, where lenses work on all body styles, most Nikon Z lenses are styled to match the modern Z system cameras.

Currently, there are only three lenses that complete the look of your Nikon Z f and while you can, of course, use any Nikon lens on the Z f via the FTZ adapter, some may struggle to buy into a vintage design without the lenses to match. This split has led to issues like the retro-inspired Nikon lenses bafflingly not having aperture rings. When such careful consideration has been taken to offer the most film-camera-like experience possible in the Z f body, that seems like an odd choice.

### Performance

With likely the same sensor as the Nikon Z 6 II, images from the Z f are reliably solid and 25MP is large enough to produce pleasing images for almost any purpose, including professional work for weddings or portraits. Image resolution is great; I was limited to the



Gareth Bevan

The dynamic range is impressive, with backlit scenes producing lots of detail in the shadows without blowing out the highlights.

Nikon 40mm lens for my testing but more premium lenses will likely produce even more impressive results.

The Expeed 7 processor inside the Nikon Z f means this camera is the closest you can get to a Nikon Z 6 III or Z 7 III right now. The Z f inherits the autofocus powers from the Nikon Z 8 and Z 9, which means it is much better at tracking subjects. In my experience, it's not up to the level of Sony or Canon.

The processor handled noise well, with camera noise well controlled and unnoticeable until upwards of 6400, and usable until around 12800. The dynamic range is also impressive, with strongly backlit scenes still producing lots of detail in the shadows without completely blowing out the highlights.

One quirk I noticed occasionally when shooting on full Auto settings, was that the camera would make some surprising choices – either a much faster shutter speed than necessary, therefore cranking the ISO high to compensate or, at the opposite end of the scale, not pumping the ISO which meant the shutter speed was low.

Image stabilisation in the Z f is excellent. I could comfortably get handheld shots down to around 1/15 sec in low light with no blur from my hands shaking, although your success will depend on your own stability.

Having black and white as a dedicated position on the mode switch wasn't initially something I thought I would need; however, I found myself flicking the camera into monochrome mode much more than I anticipated. Having the mode on the dial removed the inertia of having to dig into a menu, and resulted in me shooting more in both colour and black and white.

The black-and-white conversion in-camera is well handled. I find the contrast is spot on in the default mode,

## Rival cameras



**Canon EOS R6 Mark II**  
**£2,779/\$3,599**

A hybrid camera that packs some firepower, with 24.2MP stills at 40fps and up to 6K video, plus AF detection for trains, planes and horses. Reviewed: issue 264



**Fujifilm X-T5**  
**£1,699/\$1,699**

Takes the X-T4 further in terms of resolution but is ideal for those who want a lightweight camera with traditional controls and a 40.2MP resolution. Reviewed: issue 263



**Nikon Z fc**  
**£899/\$957**

This DX-format Z camera is a pleasure to operate and captures quality images to boot. Matching 'SE' lenses complement its good looks. Reviewed: issue 247





In keeping with the Nikon Z f's retro film credentials, a dedicated B&W switch sits below the shutter speed dial and allows you to quickly switch over to monochrome shooting.



The image processor handles noise well – we found noise well controlled and virtually unnoticeable until upwards of ISO 6400, and usable until we reached around 12,800.

but there are also hard and soft contrast options depending on your style. As this is just a conversion, you can also go into the raw file and restore the monochrome NEF file to its full-colour glory, making the decision to swap into B&W mode less final for scenes you aren't sure about.

The Nikon Z f also makes a decent video camera. While it isn't being positioned as a true filmmaker's camera, it has respectable video specs and it looks like a capable camera for anyone creating video content for YouTube or social media. With a fully articulating screen, the camera is also a great choice for vloggers.

The camera can shoot in 4K up to 60p, although if you drop down to 30p, the Z f oversamples 6K footage for better quality. The Z f also packs in up to eight stops of in-body image stabilisation with compatible lenses, and I was able to produce some pretty smooth footage while panning. For walking movement, the stabilisation

struggled, so you may want to invest in a gimbal for action shots.

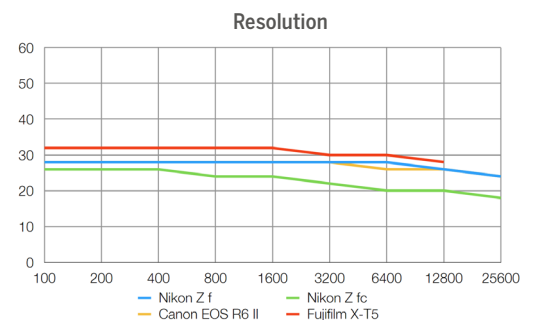
Left to its own devices the focus can be a little slow to adjust to changes, and sometimes the camera just wouldn't refocus automatically despite a change in subject. A quick tap on the screen rectified this, but other camera systems seem a little faster and more willing to swap focus. **Gareth Bevan**



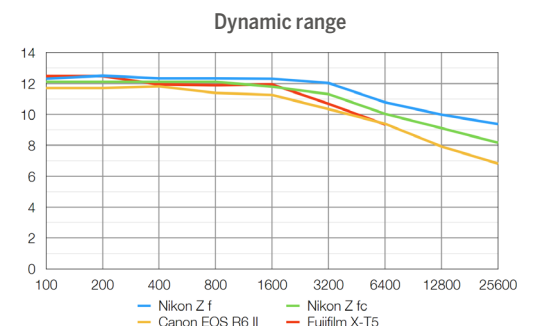
The Nikon Z f has a fully articulated screen to allow you to vlog or shoot from awkward angles. But for a more realistic film experience, you can use the viewfinder.

## Nikon Z f Mirrorless

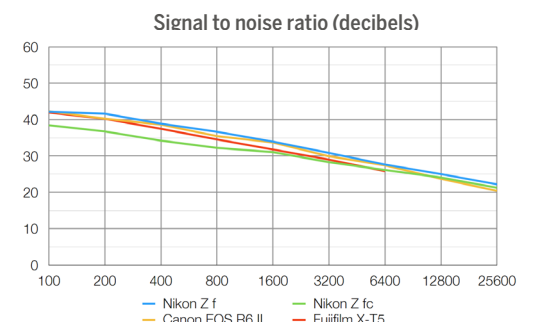
### Lab tests



The Z f ties with the Canon EOS R6 II for detail, as both share a near-identical megapixel count. Despite its smaller sensor size, the 40MP Fujifilm X-T5 beats the full-frame cameras here for capturing fine detail.



The Z f captures excellent dynamic range. At low to mid sensitivities it's better than the Z fc and X-T5, but increase the ISO and the full-frame Z f pulls ahead, capturing up to 2 EV more than the EOS R6 II.



The Z f produces a similar degree of image noise to the EOS R6 II and X-T5, and shows this all the way through the tested ISO range.

### Digital Camera verdict

**4.5** ★★★★★ Outstanding



The Nikon Z f is sure to stir a wave of nostalgia for film but its beauty comes at the cost of ergonomics and a lack of vintage-style lenses for the Z mount spoils the aesthetic. However, the Z f is the closest thing to a Z 6 III right now, offering better AF and subject tracking, as well as solid video performance. This is the vintage-inspired Nikon we've waited for.



## Mirrorless Olympus PEN E-PL10



1

The E-PL10 is a premium product, with beautiful leatherette finish and a sturdy feel.

2

The screen flips down so that it points back to you from underneath the camera, meaning that you can't see it if the body is mounted on a tripod.

3

While there's only one control dial, you can still control shutter and aperture independently by pressing the D-pad to toggle between the two inputs.

# Olympus PEN E-PL10

£649/\$599

A compelling travel, street and vlogging camera

[www.olympus.co.uk](http://www.olympus.co.uk)

### Specifications

**Sensor:** 16.1MP Four Thirds Live MOS

**Image processor:** TruePic VIII

**AF points:** Contrast-detect, 121 points

**ISO range:** 200 to 25,600 (expandable to 100)

**Max image size:** 4,608 x 3,456

**Metering modes:** Digital ESP, centre-weighted, spot, spot with highlight control, spot with shadow control

**Video:** 4K UHD up to 30fps, 1080p Full HD up to 60fps

**Memory card:** SD/SDHC/SDXC (UHS-I)

**LCD:** 3-inch 180° tilting touchscreen, 1040k dots

**Max burst:** 14.1fps; silent mode/e-shutter, 8.6fps mechanical

**Connectivity:** Wi-Fi, Bluetooth, USB Micro, Micro HDMI

**Size:** 117 x 68 x 39 mm

**Weight:** 332g (body only); 380g with battery and SD card

Taken on its own merits, the Olympus PEN E-PL10 is, just like its predecessors, a great camera for travellers, vloggers and fashionistas. However, the problem is exactly that: the E-PL10 is just like its predecessors.

That makes it increasingly difficult to take the Olympus PEN E-PL10 on its own merits, because those merits come with a 2020 price tag – and almost the exact same merits are available on the 2019 model, which comes with a 2019 price tag.

Still, we've been big fans of the E-PL ('PEN Lite') line since the E-PL7 – and this latest iteration is undoubtedly one of the best travel cameras as well as one of the best vlogging cameras.

At the heart of the Olympus PEN E-PL10 is a 16.1-megapixel image sensor – that's on the low side by 2020 standards, but it's still a very competent sensor that produces crisp, punchy, vibrant images.

What really sets the E-PL10 apart from the competition, though, is the

three-axis in-body image stabilisation that offers 3.5 stops of stability. In layman's terms, that means you can handhold the camera at slower shutter speeds (while shooting in low light, for example) or while using longer lenses, without worrying about camera shake spoiling your images.

IBIS is still a rarity among cameras in this category, and really makes a huge difference to your shots – especially when using lenses with narrower apertures, such as the M.Zuiko 14-42mm EZ kit lens that is often bundled with PENs.

The E-PL10 features a 180° flipping touchscreen that makes it perfect for vlogging as well as taking selfies and videos on your travels.

### Build & handling

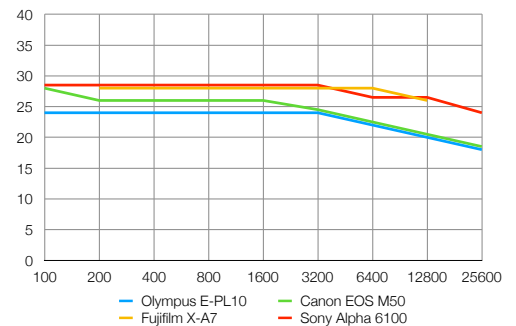
The size really is the strength of this camera, and is where the Micro Four Thirds format has a distinct edge on its rivals. Unlike bodies with larger sensors, Micro Four Thirds lenses are as compact as they come – such as the 14-42mm EZ lens, which makes

# Olympus PEN E-PL10 Mirrorless



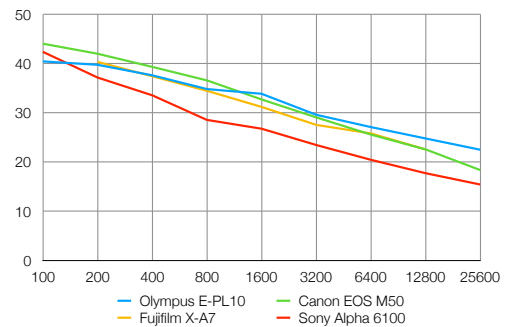
## Lab tests

Resolution (line widths/picture height)



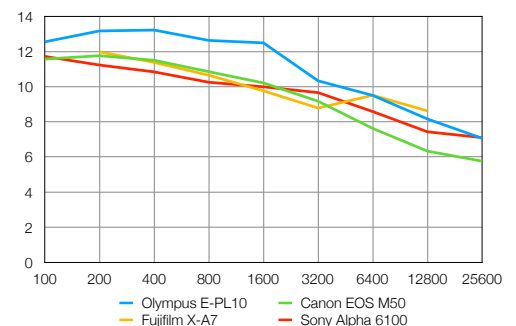
With the PEN E-PL10 only having 16.1MP at its disposal, it simply can't resolve the same level of fine detail compared with rivals packing 24MP.

Signal to noise ratio (decibels)



The PEN E-PL10 gets off to a slightly mediocre start at ISO 100, but by ISO 200 it's already producing images that are as clean as those from the Fujifilm X-A7.

Dynamic range (EV)



At sensitivities up to ISO 3,200, the PEN E-PL10 is capable of class-leading dynamic range. Above ISO 3,200 the performance gap narrows.

## Digital Camera verdict

4.0 ★★★★★ Excellent



Its core tech is getting long in the tooth now, but with three-axis image stabilisation and 4K video, it's still a great body for shooting on the go.

a perfect combo with the E-PL10 – and bestow you with a powerful picture-taking setup in an incredibly small package.

Build quality is good and solid; while this may be Olympus' entry-level body, it doesn't feel at all cheap and plasticky the way some other manufacturers' smaller bodies do.

The camera features Face Priority and Eye Priority autofocus, which is helpful for stills photography, but the contrast-detect AF system means that it will sometimes struggle to follow faces in video mode, particularly if you have a busy background. Generally, though, it's great for run-and-gun video.

Silent shooting has at last been added to the drive modes, giving you full manual control while shooting with the electronic shutter (previously with the E-PL9 and E-M10 Mark III, Olympus only offered silent shooting in a semi-automatic AP mode).

Perhaps we didn't notice it for the E-PL9, but the suite of Art Filters has now been limited somewhat. While you still get the all the standard Instagram-esque overlays (some more tasteful than others, from Grainy Film and Pop Art to Diorama and Instant Film), you don't get the full raft of options. One of our favorites, for example, is Vintage, but here you only get a single option whereas on the OM-D bodies you can choose from Vintage I, II or III.

For instant sharing or remote shooting, the camera connects to your smartphone via Wi-Fi or Bluetooth. From here, the free OI.Share app enables you to transfer photos and movies, or use your phone as a remote control to fire the camera – great for getting group shots, taking self-portraits without your arm sticking out, or even for shooting back-garden wildlife.

**James Artaius**

## Rival cameras



**Canon EOS M50**  
£499/\$599

Canon's most popular mirrorless model, this APS-C body boasts a viewfinder and a 24.1MP image sensor, but there's no IBIS. Reviewed: issue 204



**Fujifilm X-A7**  
£599/\$699 with 15-45mm lens

The X-A5 replacement has a higher price tag, hobbled 4K and fiddly controls, and didn't excel in our lab tests. Reviewed: bit.ly/dcxa7



**Sony Alpha 6100**  
£699/\$749

The A6100 features big performance boosts but a big price tag, and like all APS-C bodies has bigger lenses. Reviewed: bit.ly/dca6100







**1**  
The PEN E-P7 ditches the single exposure dial for dual control dials, making it a much more comprehensive manual photographic tool.

**2**  
The E-P7's Profile Control summons colour and mono shooting modes; a menu button on the top enables you to pick profiles on the fly.

# Olympus PEN E-P7

£749/€799 (body only)

The first camera to come from Olympus' new owner

[www.olympus.co.uk](http://www.olympus.co.uk)

## Specifications

**Sensor:** 20.3MP 4/3-inch Live MOS  
**Lens type:** Micro Four Thirds  
**Image processor:** TruePic VIII  
**AF points:** 121-point contrast-detect  
**ISO range:** 200-25,600 (expandable to Low – approx 100)  
**Stabilisation:** 5-axis in-body image stabilisation, 4.5 stops  
**Max image size:** 5184 x 3888px  
**Video:** 4K at 30/25/24p; 1080p at 60/50/30/25/24p; 720p at 120fps (no audio)  
**Viewfinder:** N/A  
**LCD:** 3-inch tilting touchscreen (80° up, 180° down), 1.037k dots  
**Memory card:** SD/SDHC/SDXC, UHS-II compatible  
**Shutter speeds:** Mech 1/4,000-60 sec, elec 1/16,000-60 sec, bulb up to 30 mins  
**Max burst:** Mech 8.7fps (up to card capacity), elec 15fps (42 RAW/49 JPG)  
**Connectivity:** Wi-Fi, Bluetooth, Micro HDMI, Micro USB 2.0  
**Size:** 118 x 69 x 38mm  
**Weight:** 337g body only, including battery and memory card

**T**he Olympus PEN E-P7 is a surprising camera. While the world was waiting to see what OM Digital Solutions, new steward of the Olympus brand, would do with its first-ever product, nobody predicted that it would resurrect the E-P series of PEN cameras. In doing so, however, it has not only breathed new life into the pedestrian PEN line, it has also shown that it isn't afraid to shake things up.

There hasn't been an entry in this series since 2013's Olympus PEN E-P5, a cult classic among Micro Four Thirds users. The PEN E-P7 combines the finesse and form factor of its predecessor, a Profile Control switch inspired by the fan-favourite PEN-F, and the functionality of the new OM-D E-M10 Mark IV.

The result is the best non-OM-D Olympus camera we've seen since the PEN-F, as well as one of the best cameras around for travel and street photography, as well as vlogging.

## Key features

While the PEN E-P series has been dormant since 2013, the PEN E-PL ("PEN Lite") line has undergone a disappointing rinse-and-refresh for the past few years. Indeed, the PEN E-PL10 and E-PL9 were both lumbered with an outdated 16MP image sensor and three-axis in-body image stabilisation that were holdovers from the original, seven-year-old OM-D E-M10.

By contrast, the E-P7 takes its technological cues from the latest E-M10 Mark IV. It packs the same 20.3MP sensor with improved AF performance (though it is still contrast-detect), the same five-axis IBIS that's good for 4.5 stops of stabilisation, and the same 4K 30p video – which benefits from the silky smooth IBIS in a way that larger APS-C and full-frame sensors can only dream of.

It takes cues from the venerable PEN-F, too, namely in the form of the Profile Control switch. Like the Creative Dial on the PEN-F, this

## Olympus PEN E-P7 Mirrorless



3

The 180° tilting selfie screen will be a welcome feature for bloggers and vloggers.

4

The E-P7 doesn't come with a battery charger: instead it features a USB pass-through connection to recharge the battery in-camera.

enables you to summon a host of bespoke mono and colour profiles – including the much-loved Mono 2, which is unofficially a Tri-X film simulation, along with other profiles that give a similar feel to classic film stocks like Ektachrome and Portra.

Also returning is Advanced Photo mode, selectable from the mode dial, which helps beginners take more ambitious images. From long exposures and keystone compensation to HDR and focus bracketing, this puts powerful photography at the fingertips of even complete newcomers.

### Build and handling

The E-P7 eschews the E-PL series' more modern look and two-tone grip for a vintage-inspired design and textured leatherette finish. The traditional recessed 'pinhole' style power button of the E-PL cameras is also gone, replaced by a separate new power dial on the right-hand side.

In one respect, it's great to have a proper power switch instead of a fiddly button; on the other, that means there are four dials crammed onto the top panel – and the power one is so close to the mode dial that switching

between modes often leads to inadvertently knocking the power off.

### Performance

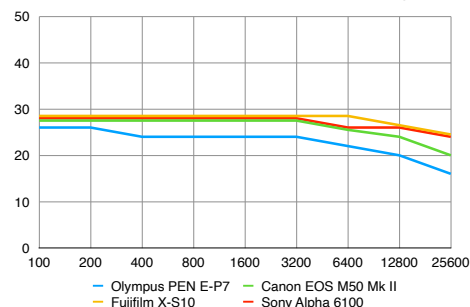
Purely in terms of the images it produces, the E-P7 delivers results on par with the PEN-F or the E-M10 Mark IV. Photographs are rich, detailed and defined no matter what lenses you're using. The body is obviously tailor-made for the M.Zuiko 14-42mm EZ Pancake lens, and it squeezes every last ounce of resolution out of that overperforming slice of wonderglass.

The E-P7 features the same new autofocus system as the E-M10 Mark IV – it's still a contrast-based AF system, but is night and day better than any of the preceding E-PL cameras. The improved AF is particularly noticeable when recording video: gone is the hunting and pulsing of Olympus' older contrast AF system.

If you want to start shooting video, but don't know your bitrate from your B-roll, the E-P7 is a fantastic point-and-shoot 4K camera that delivers crisp footage with sublime stabilisation.

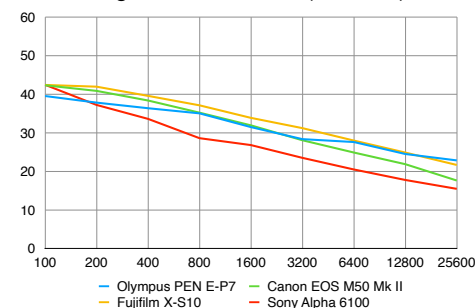
Our only real complaint with the E-P7 is the LCD screen, which displays certain hues – especially skintones – far too hot. **James Artaius**

Resolution (line widths/picture height)



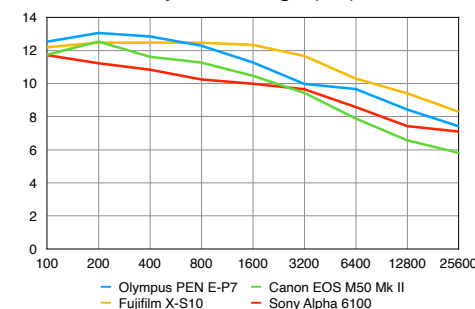
Inevitably, with 'only' 20.3MP on tap, the E-P7 can't match the 24MP+ competition when it comes to resolving fine detail. The real-world difference isn't vast, but it is noticeable under close scrutiny.

Signal to noise ratio (decibels)



The E-P7, X-S10 and EOS M50 Mark II are all closely matched in this test, generating similarly clean images with low noise levels. The ageing sensor design in the A6100 produces noticeably noisier images.

Dynamic range (EV)



Recent Olympus cameras have traditionally been strong for dynamic range, and the E-P7 is no exception to this. The Fujifilm X-S10 is still the benchmark in this sector at higher ISOs, however.

## Rival cameras



**Canon EOS M50 Mk II**  
£589/\$599

Canon's mid-range mirrorless camera has a bigger sensor than the Olympus, but no IBIS and weaker video. Reviewed: issue 242



**Fujifilm X-S10**  
£949/\$999

The new standard for APS-C enthusiast cameras that ticks every box, although it's bulkier than the E-P7. Reviewed: issue 238



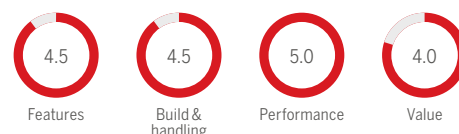
**Sony Alpha 6100**  
£679/\$749

Sony's entry-level A6100 has terrific autofocus but old sensor tech and no in-body stabilisation, and seems pricey, too. [www.bit.ly/dca6100](http://www.bit.ly/dca6100)



## Digital Camera verdict

4.5 ★★★★★ Outstanding



The PEN E-P7 is a fantastic return to form for the PEN series, and a triumph for OM Digital Solutions' first product – so stylish that you can take it anywhere, so simple that beginners can use it, and so capable that experts can get sensational results from it.





**1**  
The OM-3 sports an external design inspired by the looks of classic Olympus cameras.

**2**  
Use the Creative Dial to access four film-like colour profiles and four monochrome profiles.

**3**  
The Micro Four Thirds stacked back-side illuminated sensor has a 20.4MP resolution.

# OM System OM-3

£1,699/\$1,999 (body only)

A camera that makes you fall in love with photography again

[explore.omsystem.com](https://explore.omsystem.com)

## Specifications

**Sensor:** 20.4MP Micro Four Thirds, stacked, BSI, Live MOS (2x crop)

**Processor:** TruePic X

**Lens mount:** Micro Four Thirds

**ISO range:** 200-25,600 (exp 80 to 102,400)

**Autofocus:** Quad Pixel, 1,053 cross-type hybrid phase detect

**Max image size:** 5184 x 3888px

**Video:** Up to 4K 60p (High-Speed Full HD 240p)

**Max burst speed:** 120fps with S-AF, 50fps with C-AF

**Viewfinder:** 2.36 million dot OLED, 100% coverage

**LCD:** 3-inch, 1.62 million dot, vari-angle touchscreen

**Memory card:** 1x SD UHS-II

**Connectivity:** USB-C, Micro HDMI, mic jack, headphone jack, remote shutter, Wi-Fi, Bluetooth

**Battery:** BLX-1

**Dimensions (W x H x D):** 139.3 x 88.9 x 45.8mm



here's a lot to say about the OM System OM-3, but the two most pertinent things are that it's the PEN-F successor

Olympus fans have been waiting nearly a decade for, and also that this camera out-Fujifilms Fujifilm. The OM-3 has the flagship firepower of the OM-1 Mark II, with its cutting-edge computational photography. It has the handcrafted creativity of the Olympus PEN-F, with the ahead-of-its-time Creative Dial. And it has the iconic shape and silhouette of its namesake, the Olympus OM-3, with its timeless design by Yoshihisa Maitani.

It's the PEN-F sequel we've been waiting for since 2016, and a camera that gives Fujifilm's finest a run for their money. Film simulations, computational photography, algorithmic autofocus... the OM-3 is a potent creative tool. Naysayers will decry the Micro Four Thirds sensor, but the OM-3 does things that no other camera is capable of.

## Build and handling

The OM System OM-3 is a beautiful camera. The brand's other models, such as the OM System OM-5, have traditionally taken their design aesthetic from classic Olympus SLRs, but no camera has duplicated the lines and silhouette quite as faithfully as the OM-3.

Of course, adhering to the original Olympus OM-3 design means that there is no grip on the front, though there is a thumbrest on the back. However, I used the OM-3 without any discomfort and it never once came close to slipping out of my hands. I'd rather keep the flat face of the camera to maintain the aesthetics – as was the case with the PEN-F.

The timeless design has had some modern mirrorless embellishments. Crucially, the Creative Dial from the PEN-F has been resurrected. Sitting on the front of the camera, it offers fingertip access to a wealth of creative tools, from colour and mono film profiles to Art Filters and the custom colour creator.

## OM System OM-3 Mirrorless



**4** The OM-3's body boasts metal construction and is weather-sealed, rated to IP53 certification.

**5** The OM-3's EVF is an OLED unit with 2.36 million dots and a max magnification of 1.37x.

**6** Use this button to select Computational Photography modes like focus stacking.

**7** Toggle between stills and video modes with this dial, which has a Slow & Quick position.

**8** Five custom settings can be defined by the user and stored on the exposure mode dial.

**9** The 3-inch vari-angle LCD screen has a resolution of 1.62 million dots.



The top of the camera sees a first for OM: the addition of a dedicated dial to flick between photo, video and S&Q (Slow & Quick) modes. Here, the OM-3 arms you with creative potential and invites you to unleash it, in whatever form takes your fancy at any given time.

Another first is a dedicated CP button on the rear, giving quick access to the camera's Computational Photography modes. A quick stab unlocks things like Live ND and Live GND (software-powered neutral density and grad filters), High Res Shot (50MP handheld and 80MP on a tripod), focus stacking and multiple exposure shooting.

Unlike recent generations of SLR-styled OM/Olympus bodies, the OM-3 boasts metal construction for a reassuringly solid, substantial feel. It's weather-sealed, too, rated to IP53 certification – and having used this extensively in the rain, I trust this brand more than any other in bad weather. One quibble is that the doors covering the ports and connections can be knocked open a little too easily.

What might surprise some is the size of the OM-3. It's notably bigger than both the E-M5/OM-5 and PEN-F, and is comparable in size to the SLRs after

which it takes its shape. Still, OM/Olympus has always made some of the smallest camera bodies on the market – so this is by no means a big camera, just slightly bigger than I expected. It accepts the larger, higher-capacity, BLX-1 batteries of the OM-1 family – presumably to power all the computational processing and the Quad Pixel autofocus system.

### Performance

As you might expect, the core photographic performance is identical to the OM-1 Mark II with which the OM-3 shares its technology. Everything here behaves exactly as it does on the flagship – although I found the autofocus performance to be even better. Perhaps it's because the OM-3 is running more recent algorithms, but the AF was much quicker and stickier at identifying and staying with subjects – even when using a rather old and clunky Olympus M.Zuiko 75-300mm lens. Either way, OM's Quad Pixel AF tech is coming on leaps and bounds. It's not quite at Canon and Sony levels yet, but it's catching up.

Elsewhere, you'll find the blistering burst modes, offering up to 50fps with

continuous autofocus and 120fps with fixed focus – along with Pro Capture, the pre-shooting mode that enables you to record the frames that took place before you have even fully clicked the shutter button. OM debuted this technology on the Olympus E100 RS back in 2000 and still does it better than anyone else.

You also get the Live ND and Live GND modes – the coolest camera features I've seen – enabling you to shoot with software-powered neutral density and grad filters, and leave the bulky physical glass at home. Pixel shift-powered High Res Shot mode enables you to shoot 14-bit raw files up to 80MP, with two stops of noise reduction for beautiful fidelity if you shoot static subjects.

Image stabilisation is rated at 6.5 stops (or 7.5 with a Sync IS lens), which you might notice is a stop lower than the →

“Beyond the flagship tech, the real fun is a Creative Dial, which unlocks an arsenal of film profile presets”





James Artaius

**Above:** The OM-3's Image stabilisation is rock-solid, with the smaller Micro Four Thirds sensor making shooting even more sturdy.

**Left:** The Creative Dial features eight film profile presets, four colour and four black and white, all of which are customisable.

options. At the fore are the eight film profile presets, four colour and four black and white. For the former, there is Natural, Chrome Film Vivid, Chrome Film Rich Color and Chrome Film Soft Tone. For monochrome, there's Monotone, Classic Film B&W, Classic Film IR and Classic Film Low Contrast.

These can be fine-tuned for saturation, highlight and shadow, vignetting, sharpness, contrast, tone effect and even film grain. While everyone from Nikon to Panasonic has jumped on the custom recipes bandwagon, it's great to see this mode back in an OM camera for the first time since 2016. The dial is also your shortcut to the Color Creator, which enables you to amplify the existing hues in your scene or dial out any unwanted colours – the sort of colour balancing you might usually do in Photoshop, only here you can do it in-camera, as you take the image, empowering you to capture the scene the way you're experiencing it.

A good example is a sunset, where you might want to punch up the pinks and golds. Or if you're shooting somewhere like Death Valley, which is surprisingly desaturated, you can embellish the existing colours and make it look as punchy as it does in postcards. Of course, there are the trusty OM Art Filters, some of which are tacky, but others, such as the Vintage, Bleach Bypass and Instant Film options, are genuinely great pre-production tools.

Something worth mentioning is that I tested the OM-3 side-by-side with the Leica SL3-S (reviewed, issue 293), a capable full-frame camera. But two interesting things happened; first of all, a byproduct of the OM-3's nimble size

maximum 7.5 (8.5 with Sync IS) boasted by the OM-1 Mark II. It's rock-solid – even when photographing birds at 600mm handheld, or shooting a handheld 15-image focus stack. Almost every camera these days has good IS, but the smaller sensor in Micro Four

Thirds cameras just makes them so much easier to stabilise – and shooting feels a lot more sturdy as a result.

Beyond all the clever flagship tech, though, the real fun – and the heart of the OM System OM-3's shooting experience – is the Creative Dial, which unlocks an arsenal of customisable

## Rival cameras



**Fujifilm X-T5**  
**£1,699/\$1,699**

Takes the X-T4 further in terms of resolution and is ideal for those wanting a lightweight camera with a 40.2MP resolution. Reviewed: Issue 263



**Nikon Z fc**  
**£899/\$957**

No style over substance, this DX-format Z camera captures quality images. The matching 'SE' lenses complement its good looks. Reviewed: Issue 247



**Nikon Z f**  
**£2,299/\$1,999**

Rides a wave of nostalgia for film but at the cost of ergonomics and a lack of lenses. Good autofocus and solid video quality. Reviewed: Issue 276







The OM-3's small and agile nature means you can whip it out of a sling bag in seconds. It's also discrete, so ideal for taking street shots.

and tiny lenses was that I took way more in-the-moment, blink-and-you'll-miss-it, 'decisive moment'-type shots with this camera than the SL3-S. Which is ironic, given that Leica built its reputation on being the ultimate street camera. The SL3-S is a bulky full-frame camera with bulky lenses; just wrestling it out of a bag might make you miss 'the shot'. However, the OM-3 is so small and agile that I could whip it out of a sling bag in seconds and it's so discrete that I could snap street shots quickly and quietly.

The second thing is that I used both cameras to photograph clients – and despite the prevailing myths that “Micro Four Thirds cameras aren't proper cameras” and that “You need to shoot full frame”, the clients both liked the Leica shots, but loved the OM ones.

As with the photographic capabilities, the OM System OM-3 shares the same tech as the OM-1 Mark II – so you can expect the exact same performance from this camera. I feel I was a little harsh on the OM-1 Mark II's video specs when I reviewed it, largely because it arrived in the wake of the Panasonic Lumix G9 II – which is a superior system for pure videography. However, I don't think the person looking at the OM-3 is weighing it up against the specs of the G9 II (or vice versa).

Still, the OM-3 offers a lot for the content creation crowd – including its two video modes that, like the Color Profiles, offer a degree of pre-production that makes it easier for storytellers to share their footage without having to master LUTs and grading. Both modes echo OM-Log400 for dynamic range, with OM Cinema 1 offering a more contrasty and golden starting point while OM Cinema 2 provides a softer look with a cyan bias.

The new shooting dial, with its fast



This image was captured using the Vintage I Art Filter, which is Taylor Swift's favourite. OM System OM-3 and M.Zuiko 17mm f/1.8 II: 1.5 sec at f/1.8, ISO 200.

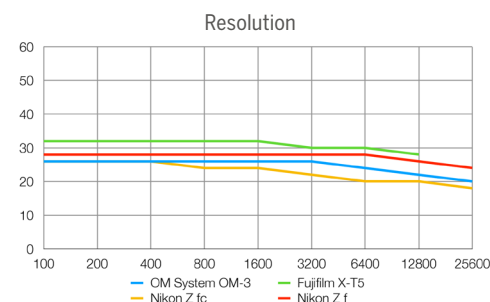
access to Slow & Quick mode, really is an invitation to dive in and have fun with your video footage. Whether you want to snag a hyperlapse at 1fps or a stunning slow-mo at 240fps, you can quickly snap into S&Q and shoot it with minimal fuss.

While few people will choose OM cameras for their movie-making chops, I feel that the video capabilities of the OM-3 are more important than other models. I'm guessing that the crowd that will be attracted to this camera is the same crowd that's attracted to the Fujifilm X100VI – the style-conscious shooter who's primarily interested in stills, but still wants a capable 4K camera with which to create content.

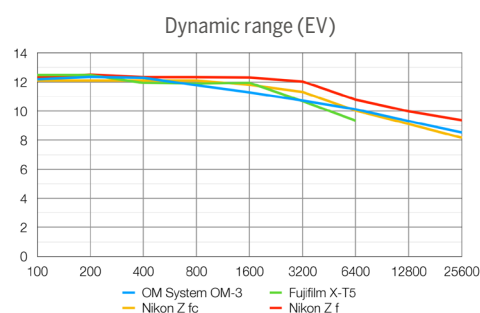
And the OM-3 definitely scores here. Nobody will accuse it of being the best camera for vlogging, but it's still a capable one that will find an eager audience thanks to its cinema profiles, film presets and Art Filters that make it easy to crank out compelling content

## Mirrorless

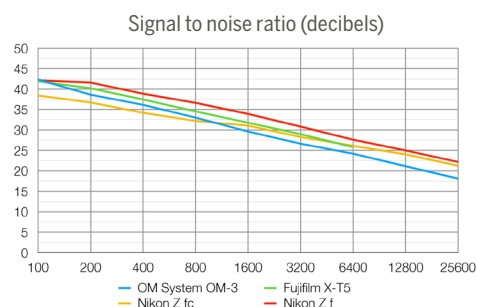
### Lab tests



Despite the same 20MP count as the APS-C Nikon Z fc, packed onto a smaller MFT sensor, the OM-3 manages to resolve more fine detail at higher ISOs. The 40.2MP X-T5 was always going to win this test.



OM System cameras (and Olympus predecessors) do well for capturing dynamic range at lower ISOs. The OM-3 gives the APS-C cameras a run for their money, but the full-frame Z f is in a league of its



The OM-3 starts off well at low sensitivities, but as ISOs rise, its sensor struggles compared with the APS-C Fujifilm and Nikon. With its larger individual pixels, the full-frame Z f is the camera to beat here.

### Digital Camera verdict

5.0 ★★★★★ A best-in-class product



The OM System OM-3 rekindles the magic of the Olympus glory days, celebrating the brand's heritage with a body that inspires you to shoot. It's a playful camera that places signature features like the Creative Dial, Computational Photography button and S&Q dial at your fingertips and challenges you to see what you can do. Whether the OM-3 is the camera for you will depend on your thoughts on Micro Four Thirds sensors. Aside from shallow depth of field being more challenging to achieve and only having one memory card slot, there's nothing to dislike about the OM-3.



## Mirrorless Olympus OM-D E-M1 Mark III



**1** The E-M1 Mk III is rated to 400,000 shutter actuations, doubling the Mk II's shutter life.

**2** Brought over from the E-M1X, an improved Supersonic Wave Filter reduces sensor dust by a factor of 10.



# Olympus OM-D E-M1 Mark III

£1,599/\$1,799

The ultimate pro camera for general photography

[www.olympus.co.uk](http://www.olympus.co.uk)

### Specifications

**Sensor:** 20.4MP Four Thirds Live MOS

**Image processor:** TruePic IX

**AF points:** 121 cross-type on-chip phase detection

**ISO range:** Low to 25,600 (ISO 200 base)

**Max image size:** 7,776 x 10,368

**Metering modes:** ESP, spot, centre-weighted, highlight, shadow

**Video:** C4K at 24fps, 4K at 30fps, 1080p at 120fps

**Viewfinder:** EVF, 2.36m dots, 0.84x mag

**Memory card:** 1 UHS-II SD, 1 UHS-I SD

**LCD:** 3-inch fully articulating touchscreen, 1,037k dots

**Max burst:** 60fps

**Connectivity:** Wi-Fi, Bluetooth, USB-C

**Size:** 134 x 91 x 69mm

**Weight:** 504g (body only; 580g with battery and SD card)

The Olympus OM-D E-M1 Mark III is a distillation of the company's greatest technology, and the apex of its professional camera aspirations. The smallest and lightest pro system in the world, it offers an unparalleled 7.5 stops of image stabilisation (6.5 as a base), unmatched 60fps shooting bursts (18 with AF/AE), and advanced features that simply aren't possible on any of its rivals.

However, when its rivals include the just-launched Canon EOS-1D X Mark III and the brand-new Sony Alpha 9 II, does the Olympus OM-D E-M1 Mark III have what it takes to topple the best professional cameras on the market?

And why has Olympus given us a pro body when it only released the Olympus OM-D E-M1X just over a year ago? If you're feeling a little confused about the manufacturer's current top-tier product line, you're not alone.

### Key features

Last year saw the release of the E-M1X, a mirrorless camera the size of a pro DSLR, with a built-in vertical grip, dual batteries and twin TruePic XIII processors. All of this amounted to a monstrously powerful camera – but also a monstrously sized camera by Micro Four Thirds standards (which are supposed to be about offering much smaller form factors than full-frame systems).

## Olympus OM-D E-M1 Mark III Mirrorless



**3** To accommodate the new joystick, which helps so much in selecting autofocus points, some controls have moved around compared with the E-M1 Mark II. The Info button now sits where Menu used to be, and Menu now resides at the far left of the camera's rear.

**4** The camera supports charging via USB cable, and also supports the USB PD standard to enable the camera to be used while charging. This means that you can plug in a power bank and keep on shooting (provided you attach the optional HLD-9 battery holder).

**5** As with the E-M1X, the Bulb function has been added to the mode dial, giving direct access to Olympus' brilliant Live Composite, Live Bulb and Live Time modes – it's a nod towards astrophotographers, whom it seems the company is keen to attract.



While the E-M1X isn't without its place, we're very pleased to see Olympus return to convention with the Mark III, which combines the raw power of the E-M1X with the smaller, familiar form factor of the E-M1 Mark II.

While we're disappointed that Olympus is trotting out the same 20.4MP image sensor yet again (it is a great sensor, but come on, guys – it came out in 2016!), along with the same old EVF and same old screen, this time we do get a brand-new processor: TruePic IX. To illustrate how powerful this new processor is, the E-M1X required two TruePic VIIIs to perform its more advanced features – such as Live ND filters, Intelligent Subject Detect AF, and the handheld

50MP High Res Shot. The fact that the TruePic IX can perform all these tricks, and more, tells you just how much more beastly it is than its predecessor.

Indeed, among its new party pieces are an improved Face Priority / Eye Priority AF algorithm, which keeps a better lock on subjects, even side-on; and the new Starry Sky AF algorithm, which comprises accurate astro autofocus, a fine-tuned scan option for telephoto lenses, as well as a special image stabilisation-powered mode for handheld astrophotography shots.

The E-M1 Mark III carries over other signature features from the E-M1X, such as 80MP High Res Shot for tripod-based photography; seven stops of image stabilisation (7.5 with Olympus Sync-IS lenses); custom AF targeting to create bespoke focus clusters (such as a straight, vertical, person-shaped line rather than a clump of squares); new AF target modes for stills and video; and 4K / C4K capture up to 30fps, with OM Log400 and movie stabilisation good enough to retire your gimbal.



We tested the E-M1 Mk III head-to-head with the Canon EOS-1D X Mk III. It kept right up with both its full-frame counterpart, and the players on the court.

It also boasts all the familiar flagship features, such as 60fps burst shooting (with focus locked, and 18fps with full AF/AE tracking), 1080p video at up to 120fps, in-body Focus Stacking and Focus Bracketing, and world-class weather-sealing.

### Build & handling

The Olympus OM-D E-M1 Mark III is identical in size to the Mark II, —————>



## Mirrorless Olympus OM-D E-M1 Mark III



Last year's E-M1X featured a pro DSLR-sized frame, but the E-M1 Mk III goes back to the ultra-compact form of the Mk II.

menu for changing critical shooting settings, the E-M1 Mark III now offers the choice of an alternative, pro-oriented control panel. This abolishes less crucial options (such as aspect ratio, IBIS modes and shadow and highlight settings) for a cleaner, friendlier interface.

### Performance

As you'd expect, the Olympus OM-D E-M1 Mark III confidently outperforms the Mark II. Everything here feels superior, from the faster and more robust autofocus to a significant improvement in ISO performance, and of course in the video capabilities. If you're an existing Mark II owner and you're wondering if this is worth the upgrade, you'll notice a dramatic boost in its core performance – and that's before factoring in the new features.

The camera performs at least on par with the E-M1X (unsurprising, given that many of the same algorithms are running under the hood), and meaningfully outpunches it in a number of areas. In particular, handheld 50MP pixel-shift images are far more consistent (previously it was prone to more errors when rendering), while focus-stacking autofocus and accuracy feels far improved.

The in-body image stabilisation is truly otherworldly. The E-M1 Mark III delivers seven stops of stabilisation as standard; but when it's paired with a Sync IS Pro lens (the 12-100mm f/4, the 300mm f/4 and the upcoming 150-400mm f/4.5), that becomes an astonishing 7.5 stops. Bearing in mind the 2x crop factor, we've shot rock-steady handheld images at the equivalent of 1,200mm – something that makes this camera a powerhouse for wildlife shooting. The IBIS system provides enormous advantages for shooting handheld in general, especially in low light.

With up to 7.5 stops of in-body stabilisation, we shot handheld exposures that were 10 seconds long!

and is only heavier by six grammes. While the ergonomics are likewise almost the same, there is one key difference: like the E-M1X, the camera now possesses a Multi Selector (that's a joystick, to you and us).

Up until the E-M1X, Olympus bodies relied on either the D-pad or Touch and Drag using the rear LCD screen to manoeuvre focus points around. However, D-pads are too finicky for fast movement – and if you've ever used a camera in cold weather or with gloves on, you'll know that Touch and Drag is only good until it isn't. So the

addition of a joystick is a very welcome one, especially if you're shooting fast action or sports.

Another useful addition ported over from the E-M1X is the dedicated ISO button, which resides on the camera's right shoulder above the rear thumb grip (displacing the Fn1 button). It was only an extra click or two to change ISO settings using the Super Control Panel before, but having a specific button is undoubtedly useful in the heat of the moment.

Speaking of the Super Control Panel, Olympus' brilliant one-stop

## Rival cameras



Canon 1D-X Mk III  
£6,499/\$6,499

While a DSLR dinosaur in some respects, the 1D-X Mark III is a technological terror that beats the E-M1 Mk III for high-ISO shooting.  
Reviewed: Issue 227



Nikon D5  
£5,199/\$5,499

The ageing Nikon D5 is imminently being replaced by the D6. If you want a DSLR, right now the Canon EOS-1D X Mark III is the way to go.  
Reviewed: Issue 179



Sony Alpha 9 Mk II  
£4,699/\$4,499

Sony's flagship offers superior ISO and fast sports AF, but lacks the articulating screen and 80MP imaging, and has inferior stabilisation.  
Reviewed: [bit.ly/dcwa9ii](http://bit.ly/dcwa9ii)





Even with frantic action like basketball, the E-M1 Mark III's autofocus system is highly reliable.

Pro Capture mode remains one of our favourite features in the camera industry – and it's something that not even the Sony A9 II or the Canon EOS-1D X Mark III are capable of. If you're not familiar with it, Pro Capture records 35 frames when you half-press the shutter and up to 120 frames (a new improvement) after you've pressed it – so even if you're half a second slow on the draw, you never miss the critical moment, whether it's a bird of prey taking off or a runner bolting from the starting blocks.

The face detect AF and tracking feels decidedly more 'sticky': even when your subjects turn to the side, the AF is able to keep track of and focus on the sides of faces. There is also the handy ability, if the camera detects more than one face in the frame, to select which one to track – definitely a boon for social, event and wedding photographers!

The E-M1 Mark III is a very capable camera for sports and action photography. Its subject acquisition and tracking is both quick and accurate; we found it to be highly capable and reliable in this arena, which is dominated by the sports shooting specialists, the Canon EOS-1D X Mark III and the Sony A9 II.

In terms of video, the Olympus again performed exceptionally. In a shooting scenario as hostile as the basketball court we tried it out in, with such erratically fast-moving subjects, it does require quite vigilant focus point movement (made much easier with the joystick) to make



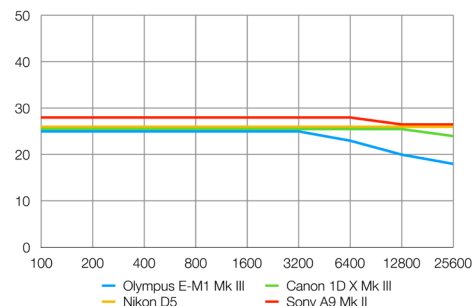
With its 50MP High Res Shot mode, the E-M1 Mark III is ideal for portraiture.

sure the camera knows what and where to target.

It's in video mode that you appreciate just how formidable the seven-stop image stabilisation really is. Our footage was shot with the camera held out at arms' length, frantically panning and trying to follow the action while zooming the lens in and out – but despite all of that, it came out pretty darn stable. While a gimbal or full rig would no doubt improve stabilisation, our footage testing demonstrates that you can absolutely shoot steady video without needing such things. It's part of what makes the E-M1 Mark III a winning package. **James Artaius**

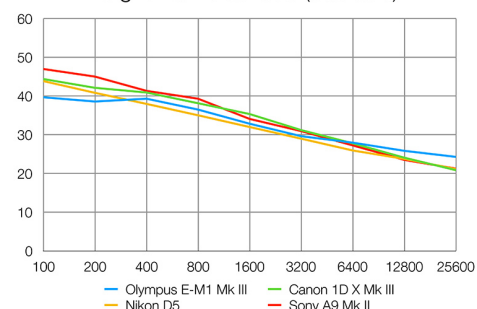
## Lab tests

Resolution (line widths/picture height)



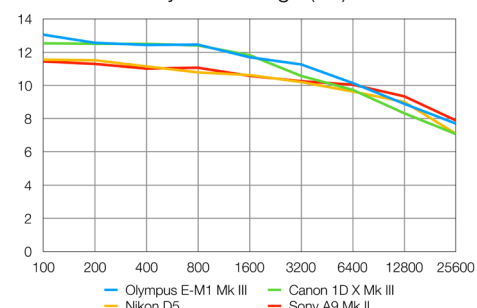
At ISO 6,400 and above, the smaller photosites on the Olympus' MFT sensor are more susceptible to generating image noise than the big full-frame sensors in the Canon and Nikon.

Signal to noise ratio (decibels)



The OM-D E-M1 III gets off to a mediocre start, but at ISO 400 it's catching up nicely, and at higher sensitivities it's producing the cleanest images.

Dynamic range (EV)



Olympus's 20MP Micro Four Thirds sensor has always been strong on dynamic range, and it still performs superbly in this respect.

## Digital Camera verdict

**5.0** ★★★★★ A best-in-class product



Its unique combination of features and superb performance makes the E-M1 Mark III the most versatile all-purpose camera for professionals.



## Mirrorless OM System OM-1 Mark II



**1** Externally, the OM-1 Mark II looks and feels virtually identical to its predecessor.

**2** Turn on the camera and the sensor vibrates rapidly to shake loose any particulates.

**3** For the Mark II version, the OM System logo replaces the old Olympus one.

# OM System OM-1 Mark II

£2,199/\$2,399 (body only)

Has all the features that you wish your camera had

[explore.omsystem.com](https://explore.omsystem.com)

### Specifications

**Sensor:** 20.4MP Micro Four Thirds stacked BSI Live MOS

**Image processor:** TruePic X

**AF points:** 1,053 cross-type phase/contrast detect

**ISO range:** 200 to 102,400

**Image stabilisation:** 5-axis IBIS, up to 8.5 stops (w/ Sync IS lenses)

**Max image size:** 5,184 x 3,888 (standard 20.4MP), 8,160 x 6,120 (50MP Handheld High Res Shot), 10,368 x 7,776 (80MP Tripod High Res Shot)

**Metering modes:** Multi-pattern, center-weighted, spot

**Max video resolution:** Up to 4K 30p (High-Speed FullHD 240p)

**Viewfinder:** 5.76m dot OLED, max 1.65x magnification

**Memory cards:** 2 x SD/SDHC/SDXC, UHS-II

**LCD:** 3-inch vari-angle touchscreen, 1.62m dots

**Max burst:** 120fps (213 raw/buffer 92 raw + 92 jpeg)

**Connectivity:** Wi-Fi, Bluetooth, USB-C, headphone jack, microphone jack, sync socket

**Dimensions (L x H x D):** 139 x 92 x 73mm

**Weight:** 511g (body only) 599g (with 1x battery and 1x memory card)

The OM System OM-1 Mark II has a lot to live up to. The original OM-1 was universally considered a home run – a rare example of the industry giving love not only to a Micro Four Thirds camera but also to OM Digital Solutions as a company in its first true post-Olympus product. While the OM System OM-1 Mark II is similar to its predecessor in many ways, it also has some significant improvements – and there is no other camera that can do what it does. For instance, its signature feature, the Live GND filter, a brilliant software-powered graduated ND filter, is single-handedly enough to transform the way you shoot landscapes. Added to that are the improvements to the autofocus, over double the buffer depth (top speed 120fps) and an industry-best 8.5 stops of in-body image stabilisation.

### Key features

If this review convinces you of just one thing, it should be to dispel the myth that this camera is 'just an OM-1 with a firmware upgrade'. If you're a photographer who works outdoors, it may be the best camera you'll ever use.

The OM-1 Mark II is priced £2,199/\$2,399 – a reasonable price for such a powerful camera, but many people have a prejudice against this kind of price for a Micro Four Thirds body. If you only equate value to sensor size, you might feel that the OM-1 Mark II is overpriced. But if you look at the features on offer, this is an appropriately priced camera.

### Build and handling

Not only is the OM-1 Mark II itself compact – crucially, so are the lenses. Externally, the OM System OM-1 Mark II looks and feels virtually identical to its predecessor. I love that it keeps the



## OM System OM-1 Mark II Mirrorless



4

The 3-inch vari-angle LCD screen has a resolution of 1.62 million dots.

5

The EVF now boasts 5.76 million dots resolution and a 12-fps refresh rate.

6

The body is IP53-certified, making it one of the most weather-sealed cameras you can currently buy.

7

There's a good chunky grip, instinctive control layout and a responsive joystick.

8

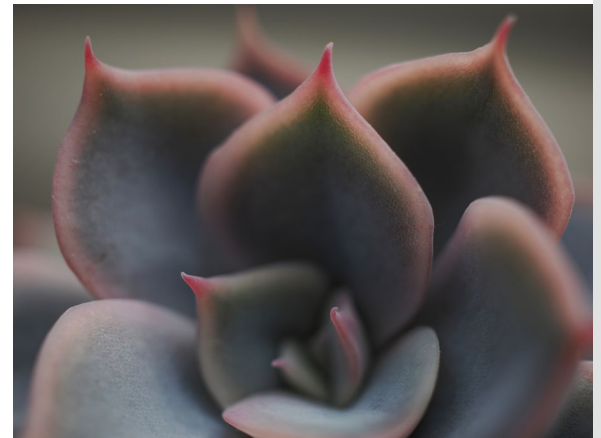
The OM-1 Mark II can shoot at up to 120fps with no AF, or up to 50fps with AF/AE.

9

Some 'reaction shooters' prefer the power switch on the right side but here, it's located on the top left.



OM System has a series of Art Filters, which if used sensitively, can be used for beautiful pre-production on your images.



Micro Four Thirds sensors have a greater depth of field, which can be an advantage for wide-aperture work such as macro.

silhouette and handling from the old Olympus OM-D E-M1 series, so you get a nice chunky grip, instinctive control layout and a responsive joystick.

The only noticeable changes on the outside of the camera are the newly rubberised control dials that replace the plastic ones on the previous version that many felt didn't offer enough grip and the OM System logo replacing the old Olympus one, which may have been the main reason to release a Mark II if you subscribe to the theory that OM System was only allowed to use the Olympus branding for two years following the sale.

Despite being lightweight, the build quality is super robust. The body is IP53-certified, making it one of the most weather-sealed cameras you can buy when paired with an appropriate weather-sealed lens – perfect for challenging conditions such as rain, dust and snow.

Something that isn't talked about enough is OM's Super Sonic Wave Filter, which is a crucial complement to weather-sealing. I've often used Sony cameras and ended up with dust on the sensor, simply from changing lenses; the Filter on the OM vibrates the sensor 30,000 times per second when you power on the camera, shaking loose any particulates.

The fully articulated rear screen is perfectly serviceable, with 1.62 million dots of resolution, but the 5.76 million-dot electronic viewfinder really shines. It offers all the detail you need during shooting and enables you to punch into your images to check them out and examine fine detail and focus.

Some 'reaction shooters' prefer the power switch on the right-hand side of the body for quicker, one-handed activation when the action starts. Here the switch is on the top left, so that's something to consider. →

"If you're an outdoors photographer, this may be the best camera you'll ever use"



## Mirrorless OM System OM-1 Mark II



James Artaius

There is no subject detection mode specifically for squirrels – however, the OM-1 Mark II camera's 'dog and cat mode' is able to track them pretty well.

### Performance

Let's start with what's new here, namely the headline feature: Live GND, which is the coolest camera feature I've ever used. Live GND is the next evolution of Olympus/OM System's Live ND filter: a software-driven feature that gives you an in-camera neutral

density filter (up to a 7-stop on the OM-1 Mark II) without the need for a physical filter on your lens. As you might have guessed, Live GND is a software-powered ND grad filter – and again, it gives you an in-camera grad without needing one on your lens.

Powering Live GND is increased onboard RAM in the OM-1 Mark II, which also provides the muscle for any number of new features – another reason why this camera is more than 'just a firmware update'. The in-body image stabilisation, for example, now delivers an industry-best 8.5 stops of compensation – all thanks to the increased algorithmic power made available by the increased memory.

And while it's hard to discern the half-stop difference between the 8 stops offered by the OM-1 (using Sync-IS lenses), I shot extensively at 1200mm with the new M.Zuiko 150-600mm lens – and it was rock-solid for stills and video alike.

The autofocus is improved, too. Not only is subject tracking significantly better, enabling me to keep up with birds in flight at a much-improved rate, but AI Detection AF for humans has also been introduced (and added to the main subject detection submenu, rather than being separate) – again, a result of the increased RAM.

Birding is one of the trickiest challenges for any AF system and one

### Rival cameras



Canon EOS R6 Mark II  
**£2,779/\$3,599**

Packs an obscene amount of firepower, with 24.2MP stills at a startling 40fps and up to 6K video, plus updated AF detection. Reviewed: issue 264



Nikon Z 7II  
**£3,099/\$2,997**

Matches Nikon's similarly priced D850 for megapixels but can yield even better results, especially when shooting handheld. Reviewed: issue 239



Sony A7 IV  
**£2,399/\$2,499**

Not an 'entry level' full-frame mirrorless – more like a mini-Sony A1 that's extremely good at everything but less than half the price. Reviewed: issue 249





With 8.5 stops of stabilisation, it's not only possible but also practical to shoot handheld video at 1200mm. However, overall, the camera's video performance is one of its few weak spots.

that Olympus/OM has occasionally struggled with. I was amazed when photographing birds – and humans, too – that subject detection is stickier than ever, even when foreground objects threaten to trick the autofocus.

What else has been improved on the OM-1 Mark II that can't be achieved via firmware? The buffer depth has more than doubled, topping out at 213 raw files when shooting blackout-free 120fps bursts, though it should be noted that 120fps is only offered with locked focus, but full AF is offered at up to 50fps shooting.

While 120fps is amazing, a feature I'm personally grateful for is the addition of slower burst rates. The OM-1 Mark II can now shoot at 12.5 or 16fps – which is ideal for situations where 25, 50 or 120fps are overkill.

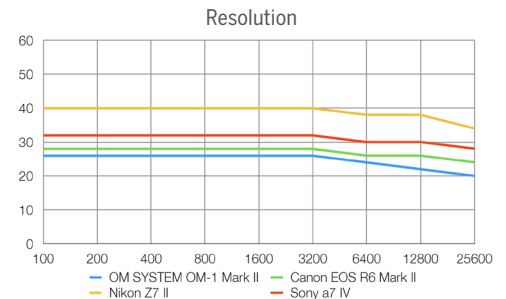
The Hi-Res Shot has been improved, too, now offering 14-bit depth when shooting 50MP handheld or 80MP tripod shots. I don't use this mode often, but since I treat it as 'ultimate image quality mode' I appreciate that it now delivers raw files with even better detail. And of course, there are still all the 'standard' features, including Live Composite (for easy

light painting, lightning shots and star trails), IP53-certified weather sealing, and in-camera focus stacking. This, as I learned from the fashion photographer Chris Nicholls, is a feature exclusive to OM System, because it owns the patent. Other cameras can bracket photos, but only OM can stack them in-camera.

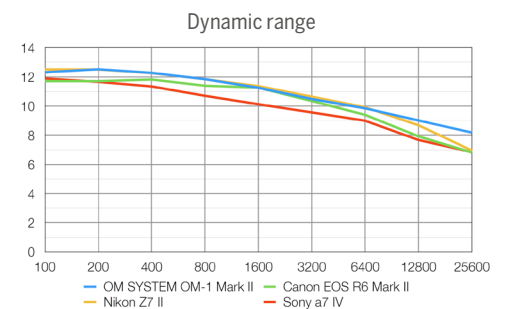
So what are the OM-1 Mark II's weak spots? Unsurprisingly, they are related to the camera's video performance. That's not to say that the video is bad, because it isn't; it's just not a patch on a more video-conscious body like the Panasonic G9 II. The Full HD and 4K footage I shot looks great. The 8.5 stops of stabilisation makes it not only possible but practical to shoot handheld at 1200mm. And the AF is brilliant at picking up and staying with subjects. But 8-bit video is merely average and 10-bit still has the baffling issue of hiding the histogram so you can't monitor your exposure.

The video modes here are perfectly fine, and OM has always been a photography-oriented brand, but if you're a video-first or hybrid shooter, then something like the G9 would be a better bet. **James Artaius**

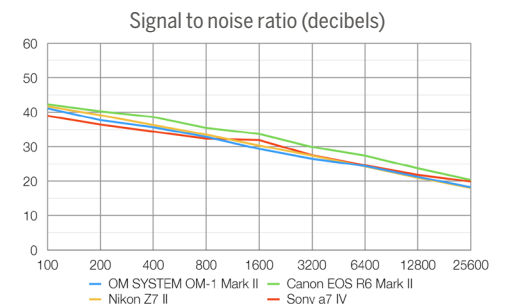
“New features confirm that this camera is more than ‘just a firmware update’”



With only 20.4MP, the OM-1 Mark II was never going to beat the Nikon Z 7II for outright resolving power. Even so, it's impressive that it gets so close to the Canon EOS R6 Mark II, despite a smaller sensor.



Not only does the OM-1 Mark II match its full-frame rivals for dynamic range, it actually comes out on top in our tests – a stellar performance.



More proof that a smaller sensor doesn't need to compromise image quality: while the OM-1 Mark II doesn't produce the cleanest images of the group, it matches the Z 7II and A7 IV over the tested ISO range.

## Digital Camera verdict

**5.0** ★★★★★ A best-in-class product



OM System has repositioned itself as an outdoor and adventure camera specialist. And, if you shoot landscapes, in particular, there's no better camera to take out with you. It's a supremely capable camera that is fantastic for many more genres, including macro, where the shallow depth of field and in-camera focus stacking and bracketing make the process simple. The OM System OM-1 Mark II is the cleverest camera on the market – its computational photography is nothing short of wizardry – and so much more than a glorified firmware update.





**1**  
The OM-5 Mark II's grip is slightly thicker than the original OM-5's and offers more purchase.

**2**  
The Micro Four Thirds sensor gives a 2x crop when compared with full-frame lenses.

**3**  
The OM-5 Mark II boasts IP53 weather sealing, but your lenses need to be weather-sealed, too.

# OM System OM-5 Mark II

£1,099/\$1,199 (body only)

Looks familiar, but is it still the choice for outdoor photographers?

[explore.omsystem.com](https://explore.omsystem.com)

## Specifications

**Sensor:** 20.4MP Micro Four Thirds, Live MOS (2x crop)  
**Processor:** TruePic IX  
**Lens mount:** Micro Four Thirds  
**ISO range:** 200-25,600 (exp to 64)  
**Autofocus:** Hybrid phase/contrast detect, 121 cross-type points  
**Image stabilisation:** 5-axis IBIS, up to 6.5 stops centre/5.5 stops corner (7.5 / 6.5 stops with Sync-IS lenses)  
**Max image size:** 5184 x 3888px  
**Video:** 4K 30p, C4K 24p, 1080p 120p  
**Max burst speed:** 30fps with fixed AF, 10fps with continuous AF  
**Buffer:** 21 jpeg/19 raw  
**Viewfinder:** 2.36m dot OLED, 100% coverage  
**LCD:** 3-inch, 1.04m dot, vari-angle touchscreen  
**Memory card:** 1x SD UHS-II  
**Connectivity:** USB-C, Micro HDMI, mic jack, remote shutter, WiFi, Bluetooth  
**Battery/ shots per charge:** BLS-50, 310  
**Dimensions:** 125.3 x 85.2 x 52mm  
**Weight:** 370g (body only)

**T**he OM System OM-5 Mark II knows what it does, and it does it incredibly well. Built on fundamentals, it is highly effective, even against flashy rivals. The OM-5 Mark II is everything you'd expect: it's packed with clever computational features, it's rugged and lightweight enough to be your adventure buddy... and it's similar to the original OM System OM-5 and, indeed, the Olympus OM-D E-M5 Mk III before it.

OM has made some significant changes, though. The camera adopts the new and much-improved menu system of the OM-3 and OM-1 Mark II. It also inherits the OM-3's CP button, putting computational photography at your fingertips. The grip is slightly thicker, providing more purchase in outdoor environments. And for the first time, it is available in a third colour, called 'sand beige', which is the version we have on test here.

As someone who has been using OM's 5-series cameras ever since the trailblazing Olympus OM-D E-M5 in 2012, this is the Swiss Army knife camera I would spend my money on today if I didn't own one. Here is why...

When the OM System OM-5 Mark II shipped this summer, it carried a price tag of £1,099 (\$1,199). For comparison, the original OM-5 has an RRP of £1,199 (\$1,199), but is currently available for £809 (\$899) at some retailers. The more advanced OM System OM-3 is priced at £1,699 (\$1,999).

The OM-5 Mark II comes in the usual silver and black options, along with the third colourway, 'sand beige'. Availability of this option varies by territory; it is a limited edition in the US and a Wex Photo Video exclusive in the UK.

## Build and handling

As is a bit of a theme, the OM System OM-5 Mark II is similar to the original OM-5 when it comes to handling



## OM System OM-5 Mark II **Mirrorless**



James Artaius



OM System OM-5 Mark II and M.Zuiko 30mm F3.5 Macro: 1/320 sec at f/3.5, ISO 200.



James Artaius



OM-5 Mark II and M.Zuiko 12-40mm F2.8 Pro: 1/800 sec at f/2.8, ISO 500, using a custom mono picture mode.

**4**  
The USB-C port on the side allows the OM-5 Mark II to be charged when powered down.

**6**  
The four-button cluster and menu selection dial is carried over from the OM-5.

**8**  
Access the OM-5 Mark II's secret sauce – computational photography – via this button.

**5**  
The camera adopts the new menu system from the OM-3 and OM-1 Mark II.

**7**  
Use these buttons for sequential/self-timer mode and switching to Live View.

**9**  
A single SD card slot (SDHC, SDXC, UHS-I and UHS-II) for capturing stills and video.

and build quality. But, as is also a bit of a theme, this is no bad thing. The OM-5 Mark II boasts flagship-level IP53 weather-sealing, for peace of mind when shooting in wet or dusty conditions (bear in mind, of course, that your system is only properly weather-sealed if the lens has sealing as well).

The main change to the camera's ergonomics is the new, beefier grip. The Mark II is just over 3mm deeper than the original OM-5, which is thanks to the slightly more protruding grip – something that I was actually wary of at first. To me, the whole point of the OM-5 is that the grip is discreet, whereas the OM-1 has a chunky grip, for example.

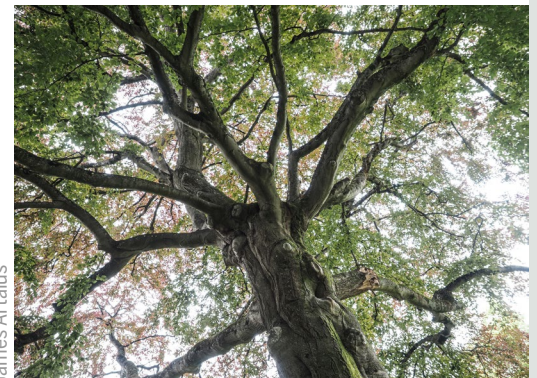
Thankfully, OM has managed to give the OM-5 Mark II a noticeable amount of additional purchase without feeling like the grip has become any bigger – sleight of hand in the most literal way. I'm pleased with the way the camera handles and even more pleased that

it doesn't impede the svelte body. It should be noted that OM is not producing an official grip attachment for the OM-5 Mark II – though third parties will doubtless fill this gap.

While all other properties are virtually identical, there are two more key physical differences. Firstly, the exposure compensation button (above the record button on the camera's right shoulder) has been replaced by a CP button, providing quick access to the computational photography features. Introduced on the OM-3 →

“The OM-5 Mk II is packed with clever features and rugged enough to be your adventure buddy”

James Artaius



OM-5 Mark II and M.Zuiko 12-40mm F2.8 Pro: 1/100 sec at f/2.8, ISO 200.



A third body finish is available for the OM-5 Mk II. Called 'sand beige', it is exclusive to Wex Photo Video in the UK and is a limited edition in the USA.



## Mirrorless OM System OM-5 Mark II

James Artaius



The image stabilisation in Olympus – and now OM System – cameras has always been class-leading. That means tiny subjects can be captured when shooting handheld and still rendered sharp and in focus. OM System OM-5 Mark II and M.Zuiko 30mm F3.5 Macro: 1/250 sec at f/3.5, ISO 200.

(see review, issue 297, August), this is a brilliant way to bring to the surface advanced functions that were previously buried in menus.

The final difference is a third colour option: the OM System OM-5 Mark II is available in silver, black and sand beige variations. Though availability varies by region, this is the first time a 5-series camera has been launched in a third colour, apart from a limited edition Titanium colour under the Olympus banner.

### Performance

It doesn't take a tarot reader to guess what I'm going to say next: the OM System OM-5 Mark II performs a whole lot like the previous model. There are inherent advantages and disadvantages of the Micro Four Thirds sensor at the heart of this camera, some of which will better suit some shooters than others. Resolution, for example, is a limitation of the format. While Panasonic has managed to achieve 25.2MP in the Lumix GH7, the

ceiling for OM System remains at 20.4MP.

Which, in my experience, is perfect for everyday photography and most of the work I shoot, although DJI did squeeze 100MP out of an MFT sensor for the Mavic Pro 4.

For whenever you might need more resolution, there's the High Res Shot mode, which uses pixel shift multi-shot technology to produce 50MP images handheld or 80MP images on a tripod. The caveat is that you really need a statue-still subject, otherwise movement artifacts will be rendered – but for things like still life and architecture or cityscapes, it works great.

Depth of field is another interesting one. The physically smaller nature of the MFT sensor means that it renders a greater depth of field than a full-frame or APS-C sensor at an equivalent focal length. That can be tough if you want blurry backgrounds, but if you shoot macro or you don't want depth of field to be razor-thin when shooting with wide apertures, it can actually be an advantage.

For this review, I spent quite a bit of time shooting macro photographs with the OM System OM-5 Mark II and it's some of the best fun I've had with a camera in ages. The depth of field combined with the ridiculously solid image stabilisation (where Olympus has always led the field) means that I can shoot tiny subjects handheld and still get things sharp and in focus. Throw in the

## Rival cameras



**Fujifilm X-T30 II**  
**£769/\$899**

Doesn't just look cool, with shutter speed and aperture dials, but works well, too. Shame about no in-body stabilisation. Reviewed: issue 251



**Nikon Z50 II**  
**£849/\$910**

Nikon's most advanced DX camera packs pro performance in a compact body. Ideal for sports and wildlife. Reviewed: issue 291



**OM-System OM-3**  
**£1,699/\$1,999**

The OM-3 offers the most advanced computational photography on the market, with a range of versatile creative options. Reviewed: issue 297





The svelte form of the OM-5 Mark II makes it a good choice for subtly shooting street photography. OM-5 Mark II and M.Zuiko 12-40mm F2.8 Pro: 1/60 sec at f/2.8, ISO 200, with custom mono picture mode.

in-camera focus stacking, which is handily available through the computational photography button, and this is a dream, especially if you love taking close-ups while you're out hiking or exploring.

The smaller sizes also imbue MFT sensors with a 2x crop factor, which doubles the effective focal length of your lenses – and also means that Micro Four Thirds lenses can be dramatically smaller and lighter than cameras with larger sensors.

So while I set out to shoot close-ups, using the palm-sized Olympus M.Zuiko 30mm Macro lens, I had plenty of room in my bag for the Olympus M.Zuiko 75-300mm, which gives me an incredible 600mm of reach, thanks to that 2x crop factor. This meant I was able to snag some shots of an adorable family of ducklings I spotted on my ramble, along with a squirrel playing hide-and-seek in a rubbish bin.

Of course, as someone at your local camera club will no doubt tell you, the smaller MFT sensor also means smaller photosites, which affects the low-light performance. However, as you'll see in our lab tests, the OM-5 Mark II actually

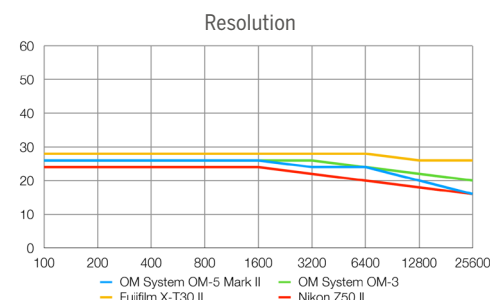
performs better at high ISOs than the recent Nikon Z50 II with its APS-C sensor – so don't believe all the hype about the limitations of Micro Four Thirds sensors.

The OM System OM-5 Mark II is a joy to shoot with. It's a nimble and responsive camera, fast to focus and quick to react to your surroundings at a moment's notice, whether that's jumping into the suite of computational photography tricks to shoot with a virtual ND filter or flicking into movie mode to record footage in OM-Log.

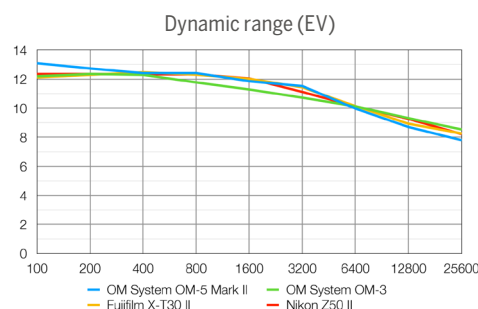
The only limitation I can find with this camera is the lack of subject detection autofocus. It has a great algorithm for finding eyes and faces when shooting portraits, and the Starry Sky AF mode is remarkable at focusing on the night sky, but the lack of animal AF made it tricky to photograph the squirrel and ducklings.

In fairness, the OM-5 Mark II doesn't market itself as a wildlife camera, and photographing animals is still way easier than it was on a DSLR. But when competing cameras like the Z50 II offer numerous AF modes as standard, it's a shame not to have the same here. **James Artaius**

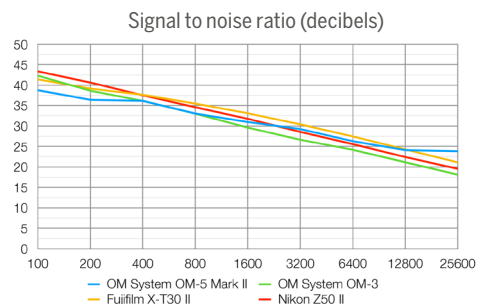
## Mirrorless



With the same 20MP pixel count, the two OM System cameras resolve almost identical levels of fine detail, even outperforming the 20.9MP Z50 II. The 26.1MP X-T30 II was always going to be the



All cameras are closely matched, but the OM-5 Mark II captures the most dynamic range at low-to-medium sensitivities, before it starts to slightly trail the pack at ISO 6400 and above.



The OM-5 Mark II's images have more noise at low and mid sensitivities, but it performs well with high ISO shots. At ISO 3200 and above, the OM-5 II produces cleaner images than both the OM-3 and

## Digital Camera verdict

4.5 ★★★★★ Outstanding



The OM System OM-5 Mark II follows a tough act in the original OM-3. It's a formidable camera, but too similar to the previous generations to warrant an upgrade. If you aren't an existing OM-5 or E-M5 user, this is a fantastic everyday camera, capable of incredible handheld macro photos, slow shutter speed waterfall photos without an ND filter or 80MP fine-art prints. If you're currently using an entry-level camera like a Canon EOS R100 or a Nikon Z30, and you want something small with an impressive array of features, the OM-5 Mark II is a great upgrade.



## Mirrorless Panasonic Lumix G100D



**1** There is a decent-sized grip on the right side that makes it feel quite secure to hold.

**2** The 20MP MFT sensor is no disadvantage compared with APS-C rivals, except perhaps beyond ISO 3200.

**3** The G100D is so small that it doesn't wedge into the palm of your hand, even with your fingers on the grip.

# Panasonic Lumix G100D

£619/\$750 (kit with 12-32mm F3.5-5.6 lens)

Small, affordable, has an EVF and it shoots 4K, too

[www.panasonic.com](http://www.panasonic.com)

### Specifications

**Sensor:** 20.3MP Live MOS, Micro Four Thirds

**Lens mount:** MFT

**ISO range:** 200-25,600  
(ISO 100 extended mode)

**Viewfinder:** 2.36M-dot OLED EVF,  
0.74x magnification

**LCD:** 3.0-in 1.84M-dot vari-angle

**Max burst:** 6fps, 5fps with AF

**Image stabilisation:** Digital EIS,  
lens IS where available, no IBIS

**Video:** 4K 30p, FHD 60p, S&Q mode up to  
4x slow motion, 8x quick motion

**Memory card:** Single UHS-I SD slot

**Battery life:** 280/270 shots (EVF/rear screen)

**Dimensions (L x H x D):** 115.6 x 83.1 x 54.2  
mm



The original Panasonic Lumix G100 was launched in 2020 as an entry point to the Lumix mirrorless camera

range and with an emphasis on vlogging features, notably a vari-angle screen and an advanced mic array for recording in different situations.

The Lumix G100D is a newer variant that is more of a maintenance release than a new camera. The fundamental features and design haven't changed and there are just two differences; the EVF has dropped in resolution from 3.68 million dots to 2.36 million, but has swapped from TFT technology to OLED – so the screen is better.

The second change is the provision of a USB-C port (though this still runs at USB 2 speeds). This was probably in response to changing camera legislation and does at least allow easy USB charging from power banks.

### Key features

You get a 20MP MFT Live MOS sensor in a baby-SLR design with an electronic viewfinder housing on the top and a good quality flip-out vari-angle screen on the back. The Micro Four Thirds format offers a lightweight and affordable camera with professional capabilities.

The Lumix G100D brings this to the beginner market, though it's a shadow of cameras such as the Lumix GH5 II and GH6. The lack of in-built image stabilisation is the most serious limitation and while it has an OZO Audio system by Nokia, you will also need an external microphone. But the Lumix G100D is also a pretty good stills camera. The 20MP sensor captures lots of detail, the EVF is good and the vari-angle screen adds more flexibility. More than a vlogging camera that can shoot stills, it's also a good hybrid travel and fashion camera.

## Panasonic Lumix G100D Mirrorless



4

The rear screen has a higher resolution than is usual for a camera at this price point.

5

The EVF is pretty good, too – it's sharp and clear and the colours are good.

6

A control dial on the back doubles as the camera's four-way controller.

7

The buttons are tightly clustered on the back as the space is taken up by the rear screen and thumbrest.

8

The power switch is located under the main mode dial, but you will get used to it.

9

There's a control dial and a red 'record' button next to the shutter release.



Multi Metering seems to be underexposing here, probably due to the white lighthouse – some EV compensation might be needed.



The autofocus is fast and has a choice of patterns for different subjects. This isn't a camera for fast-paced action, though.

### Build and handling

The Lumix G100D is a small camera but keeps a DSLR-style shape that gives it a certain appeal. There is a decent-sized grip on the right side that makes it quite secure to hold, though it may feel unbalanced with larger lenses.

The EVF is pretty good. You don't notice the drop in resolution compared to the original model – it's sharp and clear and the colours are good. The same goes for the rear screen, which has a higher-than-usual resolution for a camera at this price point.

There's a control dial around the shutter release and a prominent red 'record' button to the right. A second control dial on the back doubles as the camera's four-way controller. The buttons are tightly clustered on the back because the space is taken up by the rear screen and the thumbrest. They work well enough but are flush to the camera body so you need to check

what you're pressing. The G100D is a nicely designed camera that handles well. But it's so small that it doesn't wedge into the palm of your hand, even with your fingers on the front grip.

### Performance

The Lumix G100D's 20MP MFT sensor delivers lots of detail and it's no disadvantage compared to larger-sensor APS-C rivals, except perhaps at higher sensitivity settings beyond ISO 3200. Probably the biggest difference is its native 4:3 aspect ratio, which is a little 'square' compared with the 3:2 ratio of APS-C and full-frame cameras.

The G100D might use contrast AF rather than phase detect AF, but you'd never know it. It's fast and positive, and you have a choice of AF patterns for different subjects and scenarios. It's not a camera for fast-paced action, though. A maximum 6fps burst speed is low by current standards →

"The Lumix G100D is a great choice for novices and budget-conscious buyers"



## Mirrorless Panasonic Lumix G100D



Rod Lawton

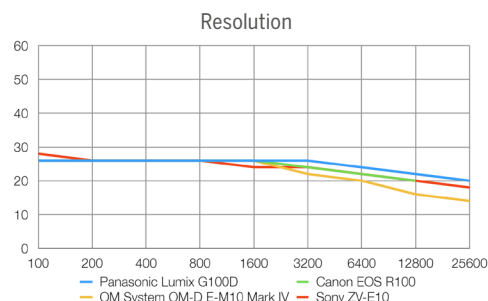
Panasonic's DFD autofocus has a pretty poor reputation, but for stills photography (and much video) it's actually really good. It's also easy to set the focus point with the rear touchscreen.

and drops to 5fps with continuous AF. The lack of in-body image stabilisation is a drawback too, limiting the G100D for low-light shots. Action photography aside, the quality is as good as any other Micro Four Thirds camera when using the same lenses. However, the 12-32mm f/3.5-5.6 retracting kit lens isn't the best, though good enough for snapshots and casual use.

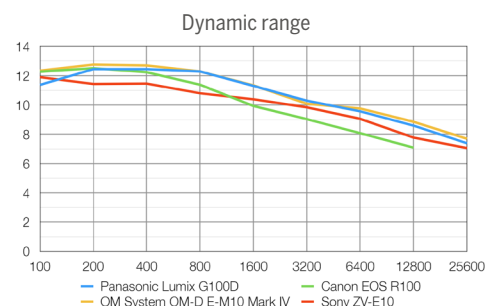
The Lumix G100D might be a great choice for novices and budget-conscious buyers but its limitations soon become apparent. Novice videographers may start by shooting handheld and the G100D is no good at it. With electronic IS switched on, you can get reasonably steady shots of

static subjects, but you need real skill for smooth panning movements. The G100D needs to be on a tripod or a gimbal – without support, it's pretty shaky. The AF didn't always respond quickly to changing subject distances in our tests, but this could be deliberate – focus shifts should be progressive and smooth, not 'snappy'.

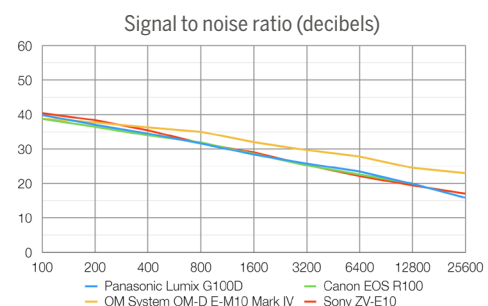
The G100D's OZO audio system is cleverer than the average built-in mic but has limitations. It has different pickup patterns from front to front-side, rear or omnidirectional but in practice, is susceptible to wind noise outdoors and room echo inside. The actual 4K video quality is good, but the G100D is hamstrung by its poor stabilisation and the limitations of



The 20.3MP G100D does well to hold its own against the 24MP Canon and Sony cameras when it comes to resolving fine detail.



The relatively small MFT sensor in the G100D doesn't hold it back when capturing dynamic range, as it can record more highlight and shadow detail than the APS-C Canon and Sony cameras at most



There's little to separate the G100D from the EOS R100 and ZV-E10 for image clarity. The OM-D E-M10 IV has excellent high ISO noise control, which pays dividends in low light and gives it an edge in this

## Rival cameras



Canon EOS R100

£670/\$600

Simple controls and useful features including Dual Pixel AF will help smartphone shooters looking to step up to a mirrorless camera. Reviewed: issue 271



OM System OM-D E-M10 Mark IV

£799/\$799

With a 20MP MFT sensor, improved IBIS and a flip-down and tiltable screen, it offers plenty of new features. Reviewed: issue 235



Sony ZV-E10

£679/\$699

4K video, Sony's excellent autofocus system, a vari-angle screen and a clip-on muffler to cut wind noise. Good value, too. Reviewed: issue 246



## Digital Camera verdict

4.0 ★★★★★

Excellent



Features



Build & handling



Performance



Value

The Lumix G100D is affordable, versatile and a great stills camera, but while its video features are also good, its limitations soon become obvious. If you're happy to use a tripod for most of your shots and prepared to invest in an external mic, it's a great camera to kickstart your vlogging career, but for anything more, it's out of its depth. The G100D isn't the only mirrorless camera that might leave smartphone upgraders disappointed and while it will give you better video quality than your phone, you're going to have to work harder to achieve it.

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**1** The Lumix GH7 recycles the robust and ergonomic design of its predecessor, the GH6.

**2** Despite its MFT sensor, the GH7 isn't a small camera. It feels much more like a DSLR than a mirrorless model.

**3** The 25.2MP Live MOS sensor and Venus Engine processor help to improve noise reduction.

# Lumix GH7

£1,999/\$2,199 (body only)

New and improved AF make this one of the best hybrids around

[www.panasonic.com](http://www.panasonic.com)

## Specifications

**Lens mount:** Micro Four Thirds  
**Sensor:** 25.2MP BSI CMOS  
**Image processor:** Venus Engine  
**Autofocus:** Hybrid Phase Detect AF  
**ISO sensitivity:** ISO 200-25600 (exp to ISO 100)  
**Stabilisation:** Up to 6.5 stops  
**Continuous shooting speed:** Up to 14 fps (MS), 75 fps (ES)  
**Video recording:** 5.8K/30p 4:2:0, C4K/60p 4:2:2  
**Viewfinder:** OLED EVF, 3,680k-dot  
**LCD:** 3.0-inch free-angle touchscreen, 1,840k-dot  
**Memory cards:** 1x CFexpress Type B, 1x SD/SDHC/SDXC (UHS-II)  
**Battery:** 2200mAh  
**Dimensions (W x H x D):** 138.4 x 100.3 x 99.6mm  
**Weight:** 805g (incl battery, SD card, hotshoe cover)

**F**or many people, when they think of Panasonic cameras, the GH line might be the first model that pops into their heads. The GH lineup of hybrid cameras has long been renowned for its video pedigree, with the Lumix GH6 especially being a fan-favourite for independent filmmakers.

However, despite the GH6's brilliance, there was one glaring omission – phase detect autofocus. The GH6 was released just a few months prior to the Lumix S5 II, which debuted Panasonic's modern autofocus system and finally brought Lumix AF into competition with the likes of Sony and Canon. But this left many observers and potential buyers, wondering why Panasonic didn't delay the GH6 release to include this feature.

Panasonic is finally on course to correct this misstep with the GH7,

which features a brand new sensor, processing engine and, yes, phase-detect autofocus. With the GH6 basically getting everything else right though, then surely this is an open goal for Panasonic?

## Design & handling

If you don't spot the logo, you might not even notice this is a new model. The Panasonic Lumix GH7 recycles the previous model's design, although there is nothing wrong with that, as the GH6 made some strides with robust and ergonomic design.

Panasonic's GH cameras are not my favourite for their style, I find them unexciting to look at, but it doesn't take away from the fact that the camera's ergonomics are well-thought-out. The layout of buttons and dials is intuitive, there is a button for practically every setting I could think of changing, which meant I didn't have

## Lumix GH7 Mirrorless



4

The EVF has a resolution of 3.68m dots and offers a sharp and clear view of the scene.

7

Connectivity includes Wi-Fi, Bluetooth and remote control through the Lumix Lab app.

5

The camera is easy to carry around and the grip is comfortable for long shooting sessions.

8

The GH7 has a 3.2-inch articulated LCD. It is bright and sharp and easy to compose on.

6

The GH7 features dual card slots, with both SDXC and CFexpress Type-B slots:

9

The layout of buttons and dials is intuitive, there is a button for almost every setting.

video without an on-camera monitor. This display is bright and sharp and is easy to compose on, and the touchscreen also supports touch-to-focus and touch shutter.

Connectivity options in the GH7 are comprehensive; built-in Wi-Fi and Bluetooth allow for easy sharing of images and remote control through the Panasonic Lumix Lab app, where you can also load LUTs onto the camera (more on that later). There are also ports for USB-C accessories, a full-size HDMI port for connecting to monitors, and a headphones and microphone jack.

The GH7 also features dual card slots, with one SDXC slot and one CFexpress Type-B card slot. You can delve into the menus for a range of options for recording to each card simultaneously, in sequence, or use one as a backup. The GH7 also can record directly to an external SSD if that is your preferred setup.

### Performance

At the heart of the GH7 is a new 25.2MP Live MOS sensor and an enhanced Venus Engine image processor. Compared with its predecessor, this processor boosts overall performance, enabling faster processing speeds and improved noise reduction, but the big talking point here is the GH7 finally getting upgraded to Panasonic's latest phase detect autofocus (PDAF).

“The dynamic range is impressive given the supposed limits of the MFT sensor”

to go diving into the menu every few minutes. Thankfully, when you do use the menu, Panasonic's user interface is one of the most user-friendly and accessible to both novices and experienced photographers.

Despite its MFT sensor, the GH7 isn't a small camera; it feels much more like a DSLR than a mirrorless. But with an internal fan enabling some incredible internal recording options, as well as a rotating screen and an EVF, there is a lot to squeeze in. Saying that, though, the GH7 is easy enough to carry around and I found the grip comfortable to use during my shooting sessions marching around central London capturing content.

The GH7 is also not too heavy, although it does weigh a few more grams than the full-frame Lumix S5 II. The camera's body is constructed from durable magnesium alloy and weather sealing ensures it can

withstand use in various environments where dust and moisture can creep in, which is reassuring as I stare into the big vents for the rear fan.

Whilst the GH7 might be marketed towards video makers, the electronic viewfinder (EVF) is another highlight of the GH7 versus similar video-centric cameras you might be considering, such as the Sony FX series. If you are just as serious about video as you are about your photography, then this is one of the best hybrid cameras you can get, and I would say this is a better choice over the Lumix G9 II.

The EVF has a resolution of 3.68 million dots with a quick refresh rate and provides a sharp and clear view of the scene. It's not the best EVF I have used, but I found it perfectly pleasant to shoot through. Also as mentioned, the GH7's design includes a 3.2-inch articulated touchscreen, which is pretty much essential for shooting





Gareth Bevan

When it comes to photos, the Lumix GH7 excels. It offers a hybrid camera experience as good as the Lumix G9 II and shouldn't be pigeonholed for filmmakers only.

The autofocus system in the GH7 is now a hybrid AF, which employs a combination of phase detection, contrast-detection (CDAF), and depth-from-defocus (DFD) technology – that's a lot of buzzwords to say that is much faster and more precise than ever before. The autofocus still is some way from knocking Canon or Sony off the podium in the autofocus race (Canon's latest AF is mindblowing), but it's a huge leap forward for Panasonic cameras.

The improved face and eye detection is particularly useful for filming human subjects, with the tracking being much more accurate and sticky ensuring that subjects are always in sharp focus. The AF system also does so much better at reliably tracking subjects in complex scenes with

multiple moving elements. There is also now support for the tracking of animals, cars, motorcycles, trains and aeroplanes.

The GH7 also features in-body image stabilisation (IBIS), which provides up to 6.5 stops of stabilisation when used with Panasonic's combination Dual IS, which combines optical stabilisation in the lens and sensor-based stabilisation.

I have consistently rated Panasonic's stabilisation as the best in the industry and it is still true here. The camera also has a few additional options for video IBIS, with modes especially suited to panning, static, or shots with heavy unpredictable movement. I found the panning and static modes to be a huge

help, although heavy movement did still produce some jelly-like effects on the footage, despite the heavy crop, although it is the most gimbal-like IBIS I have used to date.

Battery life isn't a weak point, but it's just not as fantastic as the rest of the camera, offering respectable but middling performance. Your results will very much depend on how you use the camera, as high-intensity video modes using the screen and other connected devices will drain the tank much faster than just shooting stills using the EVF. But I have squeezed more battery out of many similar-sized cameras. If you are going to need a lot of battery power, an optional battery grip is available that doubles the battery life.

The GH7 is first and foremost a video machine, so unsurprisingly, video performance is where the GH7 truly shines. The GH7 has a frankly ridiculous amount of video options. At the top end, the camera can record

## Rival cameras



**Fujifilm X-S20**  
**£1,249/\$1,299**

The perfect camera for most people, with its straightforward controls, excellent fully automatic modes and its small and compact size.

Reviewed: issue 271



**Lumix S5 II X**  
**£2,299/\$2,198**

Extra features over the S5 II, including SSD recording, HDMI raw output, Apple ProRes, ALL-I compression and streaming functionality.

Reviewed: issue 272



**Sony ZV-E1**  
**£2,350/\$2,199**

Small and light, the ZV-E1 packs in an image-stabilised full-frame sensor, subject recognition and auto-tracking.

Reviewed: issue 270



While some users may be put off by the MFT sensor size, it doesn't hold the GH7 back.



Gareth Bevan

The hybrid AF system uses a combination of phase detection, contrast-detection (CDAF) and depth-from-defocus (DFD) technology. It's faster and more precise than ever before.

in ProRes RAW HQ at 5.7K 30p or 4K 60p, there is also open-gate 10-bit 4:2:0 recording in 5.8K 30p or 5.7K 60p, C4K 120p 10-bit 4:2:0, C4K 60p 10-bit 4:2:2, and 240p in Full HD. If it's a format and frame rate that is possible, it's probably on the GH7.

Even more impressive is that the GH7 can record for an unlimited time, (or at least until your CFExpress/SSD is full). This is all made possible by the inclusion of the fan in the rear of the GH7 that works tirelessly to expel the heat created. At no point in my testing did the camera get too hot and have to stop recording, nor was the fan noise troublesome whatsoever for those concerned about their audio.

The 4K footage produced straight out of the camera is crisp and detailed, with rich colours and excellent dynamic range, although the GH7 benefits from internal LUTs which can be added to the camera via the Lumix Lab app, making it easier than ever to get colour-graded footage ready for social media instantly. I love shooting but detest editing, so anything to take some of the work out is appreciated – I can see every manufacturer following Panasonic's lead on this.

If you still prefer to get full creative control in the editing suite, then ProRes RAW or 10-bit 4:2:2 internal recording offers significant advantages in post-production and the inclusion of V-Log further enhances the dynamic range, which is outstanding for this camera. The GH7 has an additional mode for HDR recording and supports Hybrid Log Gamma (HLG) for wider compatibility. There is also an anamorphic mode that supports cinematic anamorphic de-squeezing in a range of magnifications.

As well as the built-in stereo microphone, 3.5mm microphone

input and headphone jack, the GH7 also has new audio capabilities with an optional XLR microphone adapter allowing recording of 32-bit floating audio tracks, though I didn't have this mic for testing with the GH7. The GH7 does allow for quick and easy audio monitoring, with a dedicated button for quickly jumping into audio settings.

When it comes to photos, the Panasonic Lumix GH7 excels. I mentioned before how this camera shouldn't be pigeonholed as just for filmmakers, and it offers a hybrid camera experience that is every bit as good as the Lumix G9 II. With the same sensor and lens options, the GH7 can shoot the same 14 fps with the mechanical shutter and up to 75 fps with the electronic shutter. There isn't much to separate the two when it comes to stills, except the price.

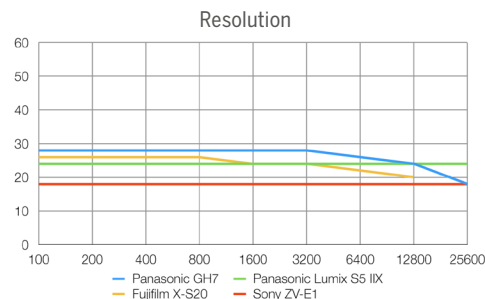
The camera produces images with excellent detail and vibrant colours, but the dynamic range is especially impressive given the supposed limits of the smaller Micro Four Thirds sensor size. Low-light performance is good, the camera has a native ISO range of 100-25600, and I didn't find noise bothersome until around the 8000+ ISO range.

A hallmark of Panasonic cameras, the GH7 also supports high-resolution photo mode, which allows you to shoot and combine multiple exposures into a megapixel-packed ultra-high-resolution image. The camera's stabilisation system ensures that the exposures are precisely aligned. Yes, lots of cameras do a pixel shift mode, but Panasonic is the only manufacturer that can do it directly in-camera. This mode works wonderfully and is ideal for landscape and architectural photography, where capturing fine details is essential.

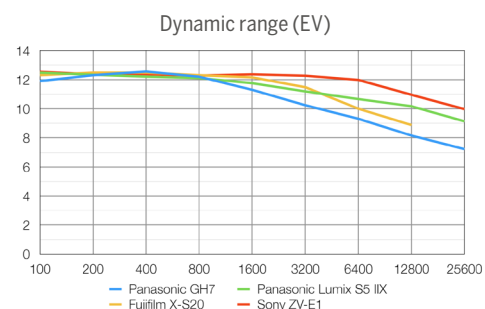
**Gareth Bevan**

## Lumix GH7 Mirrorless

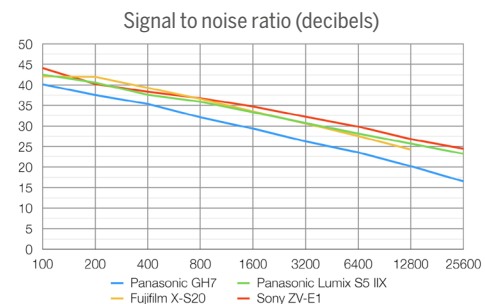
### Lab tests



Despite having a smaller sensor, the 25MP GH7 resolves more fine detail than the 26MP X-S20 and outperforms the full-frame S5 IIX. With only 12.2MP



The GH7 puts in an excellent performance at lower sensitivities. However, at ISO 1600 the small sensor and relatively high megapixel count work against it, and the dynamic range is noticeably more



The GH7's relatively small individual sensor photosites (pixels) reduce their light sensitivity and make them more susceptible to image noise. Its images are noisier than the three rivals, especially

### Digital Camera verdict

**5.0** ★★★★★ A best-in-class product



The Panasonic Lumix GH7 has many improvements over its predecessor, but top of the bill is the latest phase detect autofocus. An improved sensor and processor combine to offer the most advanced video capabilities, with outstanding image quality and dynamic range. Add class-leading image stabilisation, sticky and reliable autofocus and unlimited recording, and this is a formidable filmmaking powerhouse. But it isn't all about video; the GH7 delivers on its promise to fix complaints about the previous model, making it one of the best hybrid cameras on the market.



## Mirrorless Panasonic Lumix G9 II



**1**  
The G9 II takes its design cues from the recent S5 II more than the original G9.

**2**  
The G9 II uses an MFT image sensor that captures 25MP shots.

**3**  
It might have a small sensor, but it's not a small camera: the G9 II has the heft you'd expect from a pro-oriented model.

# Panasonic Lumix G9 II

£1,699/\$1,899 (body only)

Proof we should still care about the Micro Four Thirds format

[www.panasonic.com](http://www.panasonic.com)

### Specifications

**Sensor:** 25.2MP Micro Four Thirds Live MOS

**AF points:** 779-point Phase Detection AF / Contrast AF

**ISO range:** 100-25,600

**Max image size:** 5,776 x 4,336px

**Image stabilisation:** Dual IS 2 (7.5-stop)

**Max burst:** 14fps AF-S or 10fps AF-C (mechanical shutter), 75fps AF-S or 60fps AF-C (electronic shutter)

**Video:** 5.8K 30p, 4.4K 60p, 4K 120p, FHD 240p

**Viewfinder:** 3.68m dot OLED, 60/120fps

**Rear LCD:** 3.0in, 1.84m dot

**Memory card:** 2 x UHS-I/UHS-II SD/SDHC/SDXC

**Connectivity:** USB-C, HDMI, mic, headphone, Wi-Fi, Bluetooth

**Power:** Li-ion battery, USB power supply and charging

**Size (W x H x D):** 134 x 102 x 90mm

**Weight:** 658g (including battery and SD card)

It has been almost six years since Panasonic released the original G9. It's been a long wait, but the Lumix G9 II is a fully-fledged upgrade that you can honestly get excited about.

With Panasonic's recent focus on its full-frame cameras (such as the well-received S5 II) and the growing number of L-Mount Alliance members, many were speculating that Panasonic might phase out its Micro Four Thirds lineup. Panasonic and Olympus were the pioneers of the MFT sensor and mount, pushing it as a solution to achieve high-quality images with smaller cameras, such as the technical marvel of the Panasonic GM1. But as market forces moved toward full-frame cameras, it looked like Panasonic's MFT ambitions might have been put on ice.

With this release, Panasonic is certainly not letting up with the format, nor the advantages it brings

to video as well as some genres of photography, including sports and wildlife. But the camera landscape is different now compared with when the original G9 was released. Is there still a place for a stills-centric MFT camera?

### Key features

The standout feature of the G9 II is its enhanced autofocus system: it not only facilitates quicker and more precise focusing through an expanded 779-point phase detection autofocus system but also introduces more advanced subject recognition.

These improvements enable effective tracking of subjects like humans and animals, including their eyes, as well as cars and motorcycles. While it may not match the extensive subject recognition capabilities of some other brands, it certainly covers the essential areas most photographers require.

Under the hood, the camera boasts a newly designed 25.2MP Live MOS

## Panasonic Lumix G9 II Mirrorless



4

The electronic viewfinder has an impressive 3.68 million dots and high refresh rates.

7

A rich set of controls (with comfortable spacing) includes an eight-way navigation pad.

5

The rear screen has touchscreen controls and a fully articulated tilt-and-swivel system.

8

G9 owners looking to upgrade may rue the loss of the top info screen in favour of a second dial.

6

The built-in joystick helps you select your focus point or area while you look through the EVF.

9

The 2x crop factor of the G9 II's MFT image sensor means that compatible lenses are small and light.



Gareth Bevan

The G9 II captures satisfying images, with well-balanced colour and good dynamic range.

them to both photos and videos. The G9 II has 19 pre-made LUTs, including the new Leica Monochrome option.

### Build and handling

The G9 II undeniably feels solid and well put together, and there is weatherproof sealing. In the tradition of the G9, Panasonic has put every button and dial most photographers are ever going to need on the G9 II. There are three command dials, a directional pad and an upgraded eight-way joystick, as well as buttons to change ISO, exposure, autofocus and white balance quickly.

The G9 II is a proper old-school photographer's camera, with tactile controls and not much hidden behind touchscreen menus. However, there are a few notable changes from the previous model – the biggest being the removal of the top screen, which has been replaced by a mode dial. Some photographers become attached to their top screens but, thanks to modern cameras with information-laden EVFs, other people almost never actually use them.

Sensor, paired with a new processing engine. By employing a high-resolution Pixel Shift mode, the G9 II can now generate 100MP images handheld.

The G9 II boasts a top burst speed of 60fps with continuous autofocus, which can be pushed to 75fps without autofocus while using the electronic shutter. With the mechanical shutter, the G9 II achieves a more modest 14fps (AF-S) or 10fps (AF-C).

Panasonic has also significantly enhanced its image stabilisation system to offer up to eight stops of in-body stabilisation. (This is slightly reduced to 7.5 stops for lenses longer than 60mm.) The camera also incorporates advanced Active IS

to provide additional stabilisation during more pronounced movements, such as walking or panning.

In the realm of video, the G9 II offers resolutions of 5.7K 60p, 4K 120p or Full HD 240p. The camera can record in 4:2:0 10-bit, delivering up to 13 stops of dynamic range while shooting in V-Log. It also supports recording in Apple ProRes and enables direct recording to an external SSD.

Additionally, you can create or install real-time LUTs in-camera, and apply



## Mirrorless Panasonic Lumix G9 II



Gareth Bevan

You can capture 25MP stills with the G9 II – or switch to Pixel Shift mode, which cleverly combines multiple frames to generate 100MP images. The image stabilisation system means you can get sharp results even while handholding the camera. In-body processing of the 100MP image takes around 30 seconds.

The only unimpressive thing about the build I could find was the doors that cover the side ports. I found that they opened far too easily and wouldn't stay closed unless firmly pressed in, which was a minor inconvenience and an occasional hindrance.

The design of the body itself has been refined a little since the last

model: the top of the camera has been flattened down from the more rounded design of the G9. The G9 II now looks identical to the S5 II; with a lens on, you won't even notice the difference.

One point to note is that the G9 II is not a small camera despite its smaller sensor, which was originally one of the big selling points of the MFT format.

Panasonic has made a professional camera with great ergonomics, like a good grip and uncluttered button design. But if you were hoping to make a size saving by buying MFT, this camera won't help with that.

### Performance

The G9 II takes very good photos, with a fantastic amount of detail. At 25MP there is some room to play with during cropping, although I found the stills gave up some of the finer details when cropped. However, this only becomes an issue when you print large images. For use on the web and social media, you should be able to crop images a fair amount and retain quality.

Colour and dynamic range on JPEGs out of the camera was excellent, and the automatic white balance was accurate and consistent throughout my shoots, despite the changing lighting conditions.

To put some misguided assumptions around MFT cameras to bed, image quality is not automatically weaker than from larger sensors. The image quality from the G9 II in good light

## Rival cameras



**Fujifilm X-H2**  
**£1,899/\$1,999**

With its 40MP resolution and 8K video, the Fujifilm X-H2 has effectively redefined what can be expected from an APS-C camera. Reviewed: issue 261



**Panasonic Lumix S5 II**  
**£2,299/\$2,198**

The addition of phase detection autofocus brings the 24.2MP S5 II right in line with some of the best hybrid cameras that money can buy. Reviewed: issue 267



**Sony ZV-E1**  
**£2,350/\$2,199**

Small and light, the ZV-E1 packs in an image-stabilised full-frame sensor, subject recognition and auto-tracking. Reviewed: issue 270





Gareth Bevan

The MFT-based image sensor in the G9 II provides a 2x crop factor compared with a full-frame camera; this means you can zoom in from a distance with a relatively short-focal-length lens.

is right up there with the best from larger systems. However, low-light performance did not fare as well as my Canon full-frame camera, for example. In darker environments, shot at the same settings, the full-frame images just had more detail.

There is a mess of maths around focal lengths and subject distances, but there is plenty of debate over whether MFT can achieve the same background blur versus larger sensors at the same distance, which can give images a flatter look in some situations. I find this to be less obvious in practice: depending on what I was shooting, I could use longer lenses to create more blur (although this does change the compression). The foreground and background falloff from the G9 II gives natural and professional-looking images and will satisfy anyone who isn't insistent on the creamiest of artistic blur.

The major bonus of a Micro Four Thirds sensor is the extended reach it gives you. MFT sensors have a 2x crop factor, which means that the 100-400mm lens I used for testing is equivalent to a 200-800mm lens on a full-frame camera. If I wanted the equivalent lens for my Canon full-frame camera, then not only is anything Canon or a third party offer absolutely enormous and heavy, but also much more expensive.

The image stabilisation between the camera and the lens was exceptional, with the in-body image stabilisation working wonders. Even at 400mm (800mm equivalent), the combination of the 7.5-stop IBIS and the optical stabilisation in the lens gave me not only a steady view through the EVF, but also sharp, shake-free images while moving in a jeep on a rough road. Admittedly it was a bright day, so the shutter speed was high. However, even

in much dimmer conditions, I found that I could get shake-free images at the wider end of the 12-60mm lens – down to around 1/5 sec, although this will depend on your own personal steadiness, of course.

The handheld high-megapixel mode continues to offer one of the best implementations in any camera: the G9 II can process the 100MP image in-camera and save you from having to use external software for processing. The camera handles the processing quickly, taking around 30 seconds to create the high-res file.

The 100MP photos themselves are impressive when you want to crop or print larger images, although there is not as much of a dramatic step up from a 25MP image as some people might hope for. It does give you far more freedom to crop in and preserve detail, but it also creates files that are four to five times larger than normal.

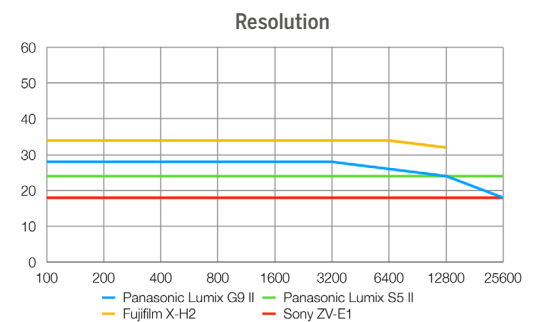
It is in its video performance that the G9 II really shines. The S5 IIX is probably the best mirrorless camera for video right now, and the G9 II inherits so much of what makes that camera great. Even in my short time testing the camera, I was immediately impressed with not only the video quality, but also Panasonic's huge improvements in image stabilisation and focusing.

The video straight out of the camera is sharp, with great colours and very good dynamic range. There are also on-board LUTs to get colour-graded footage straight from the camera without the added step of editing.

Despite a new active stabilisation mode, footage is still a little jerky in movement like panning and walking, and you can achieve better results with a gimbal. But the stabilisation comes into its own for holding a static shot steady. **Gareth Bevan**

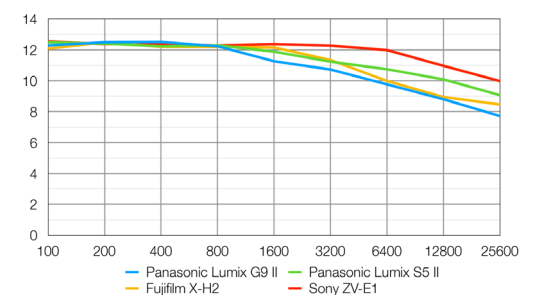
## Panasonic Lumix G9 II Mirrorless

### Lab tests



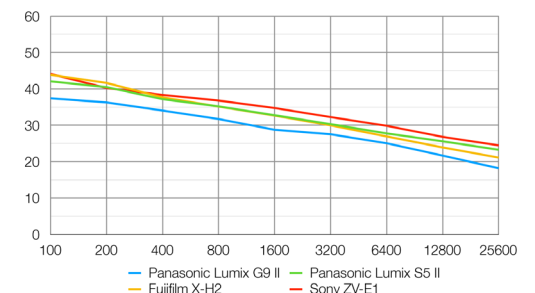
The Lumix G9 II's 25.2MP sensor is excellent at capturing fine detail, providing a marked improvement over the 24MP S5 II, even though the latter has much larger individual pixels.

### Dynamic range



There's little to separate all four cameras at low sensitivities, proving that sensor size alone really doesn't make much difference for capturing maximum dynamic range in good lighting conditions.

### Signal to noise ratio (decibels)



Given the variety of sensor sizes on test here, all four cameras are quite closely matched, but the G9 II is playing catch-up to the APS-C and full-frame cameras in this test group.

### Digital Camera verdict

**4.5** ★★★★★ Outstanding



The Lumix G9 II delivers a true hybrid camera experience, with comprehensive specs that cater to both photographers and videographers. Video performance in particular is outstanding. A worthy follow-up to the original, the G9 II shows why Panasonic is right not to give up on the MFT mount just yet – and why you might not want to either.



## Compact Lumix S9



**1** While the plastic construction feels solid, it doesn't have quite the same quality feel as other Lumix cameras.

**2** Attach a lens to the S9, and it gets rather front-heavy and only has minimal grip.

**3** The Lumix S9 is an impressively small camera, especially when you consider it has a full-frame sensor.

# Lumix S9

£999/\$1,498 (body only)

A compact powerhouse, but is it aimed at content creators?

[www.panasonic.com](http://www.panasonic.com)

### Specifications

**Sensor:** 24.2MP full-frame CMOS  
**Lens mount:** L-Mount  
**ISO range:** 100-51,200 (extended to 20,4800)  
**Autofocus:** Phase Detection AF system / Contrast AF system, 772  
**Image stabilisation:** B.I.S. (5-stops), Dual I.S. 2 (6.5-stops)  
**Max image size:** 6,000 x 4,000px  
**Max burst:** Electronic only, 30fps burst, 8fps AF-C  
**Video:** 6K30p, 4:2:0 10-bit, C4K 4K60p 4:2:2 10-bit  
**LCD:** 3.0in vari-angle LCD touch panel, 1.84m dot  
**Memory card:** 1 x SD UHS-II  
**Connectivity:** USB-C, Micro HDMI, mic jack, Wi-Fi, Bluetooth  
**Battery/shots per charge:** S-R2060, 470  
**Dimensions (W x H x D):** 126 x 73.9 x 46.7mm  
**Weight:** 486g (with battery and memory card)



anasonic is no stranger to small interchangeable lens cameras, such as the Lumix LX100 II or Lumix GX85/80.

However, with the Lumix GX9 the last of that type to be released in 2019, they appeared to have fallen out of favour. But as small, well-specified compact interchangeable lens cameras, such as the Ricoh GR III, Fujifilm X100VI and Sony A6700, make a return, the brand has launched the Lumix S9 to compete.

This is no sequel to one of its previous Lumix cameras; Panasonic has made a few changes. The Lumix S9 swaps the MFT sensor for a full-frame one and gets rid of the viewfinder. No longer a rangefinder, yet not a full compact, there's nothing else like the S9 on the market. Panasonic is aiming this camera at the social media crowd, pushing its in-camera LUTs in its 'shoot to share in 30 seconds' marketing. LUTs ('lookup tables') are a set of

parameters that affect the look of a photo or video. They have featured in previous Lumix cameras, but the S9 is the first to feature a dedicated LUT button. The Lumix Lab app will help create and transfer these LUTs.

Panasonic has always been a master of balanced hybrid cameras, but the Lumix S9 is something new. Can it serve photographers and videographers equally? Or is it one for Instagram?

### Build and handling

The Lumix S9 is an impressively small camera, especially when you consider that it packs a full-frame sensor. It isn't the smallest full-frame camera around, with the Sigma fp taking that honour. It's marginally wider and taller than the Sony A7C or ZV-E1, but not as deep.

However, the Lumix S9 comes up against some of the same criticisms levelled at the Sony A7C II. Attach a lens to the S9, and it becomes front-heavy, and with minimal grip, I found my hand



## Lumix S9 Compact



4

The new LUT button on the rear opens the camera's library of preloaded LUTs.

5

Panasonic has decided to omit an EVF; instead, you use the fully articulating screen.

6

Settings like focus mode, ISO, white balance and drive modes are on the rear control wheel.

7

On top, there's a mode dial, plus record and exposure compensation buttons.

8

A collar surrounding the shutter button acts as an additional control dial.

9

On the side of the camera are Micro HDMI and USB-C ports for peripherals and charging.

aching when using it one-handed. Panasonic has launched a Lumix S 26mm manual-focus fixed f/8 aperture pancake lens for the camera, but the additional size of a Lumix S 35mm or Lumix S 20-60mm lens (the latter is sold in a kit with the S9) undermines the positives of such a small camera.

The Lumix S9 is an attractive camera that will catch the eye when out and about, especially in its funky colours. Taking after previous Lumix cameras, the S9 incorporates some rangefinder touches, like a strip of faux leather across the front of the camera, but doesn't go in for the full vintage look in the same way as Fujifilm or OM System. Overall, it's a pleasing Lumix design, though it doesn't push any boundaries.

There are some optional colours for the front strip of faux leather – Night Blue, Crimson Red and Dark Olive. I'm not a fan of coloured cameras, but while others might be more enthused about them, it does also come in Jet Black.

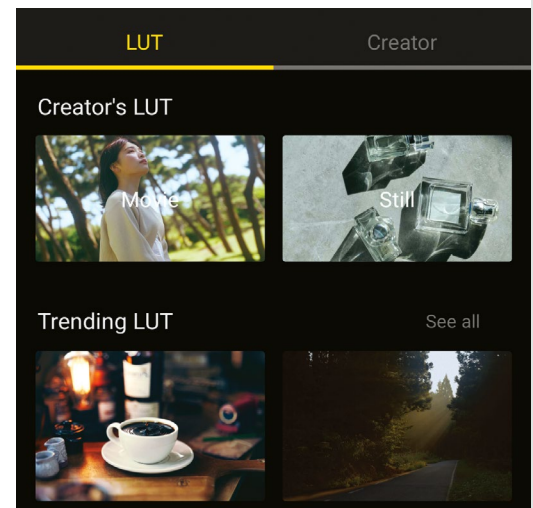
The Lumix S9's build quality is good, but while the plastic construction feels solid, buttons and dials don't have quite the same quality feel as other Lumix cameras. Some of the buttons are a little flat and mushy, whereas on the S5 II, they had a decent bounce. It's a minor complaint, but it makes the camera feel slightly less premium. The Lumix S9 isn't weather-sealed for dust and moisture resistance, which is a shame for a camera that could be used for travel. The most notable addition to the rear of the camera is the →

“Panasonic is aiming this camera at the social media crowd, pushing in-camera LUTs in its marketing”

Gareth Bevan



In-camera LUTs eliminate the need to import files into editing software, apply a filter and export them again.



The Lumix Lab app is where you can view LUTs made by other creators, which you can then add to your Lumix S9.

Gareth Bevan



The Crop Zoom/Hybrid Zoom feature applies a digital crop to the jpeg, giving the impression of a longer lens.



Panasonic's decision to omit an electronic viewfinder (EVF) is a curious one. It's less of an issue with video, but a lack of EVF may exclude serious photographers.



## Compact Lumix S9



Gareth Bevan

With the same sensor as in the excellent Lumix S5 II, you won't be disappointed by the performance. However, the Lumix S9 is positioned as a camera that bridges the gap between traditional photography and modern content creation. While it doesn't quite achieve that, it does a wonderful job at the latter.

new LUT button, which opens the camera's library of preloaded LUTs. Otherwise, the S9 features the usual staple controls, with key settings like focus mode, ISO, white balance and drive modes on the rear control wheel. The mode dial is on the top plate, along with the record button, exposure compensation button and the shutter surrounded by a second control dial. It's not too dissimilar to many other brands, so most people should feel at home using the S9.

Panasonic's decision to omit an EVF is a curious one. Marketing states that the S9 can be an extension of your phone for social media and encourages you to use the screen. Dropping the EVF may have helped Panasonic set a competitive price, but while this is fine for video, where you rely on the fully articulating screen, not having an EVF may exclude serious photographers.

Testing the camera in bright sunlight and having to rely on the screen was a challenge, when the instinct is to put

the camera to your eye to get a clearer picture of what you're shooting. It's worse for using LUTs, where an accurate reference is essential. Outdoors, I struggled to see differences between them on the screen.

### Performance

With essentially the same sensor as the one in the excellent Lumix S5 II, I was expecting the same great performance, and was not disappointed. The S9 looks set to continue Panasonic's domination of hybrid video cameras, with impressive video stats, such as open gate 6K30p, Cinema 4K, and 14+ stops of dynamic range in V-Log. The S9 features Panasonic's latest Phase Hybrid AF with 779 AF points, which was quick and accurate in testing, especially locking onto human faces and eyes. The S9 is capable of tracking animals, birds, cars and motorbikes.

Panasonic's stabilisation tech is consistently impressive and its algorithms produce the most gimbal-like performance yet. The S9 boasts 6.5 stops of 5-axis Dual I.S. 2, and in initial tests, the S9 footage looks as steady as its other cameras.

For stills, the S9's 24MP isn't quite as headline-grabbing as some rival cameras, but it's sufficient, especially when the S9 is geared towards sharing images on social media, where ultimate image resolution is not paramount. If you need larger images,

## Rival cameras



Canon EOS R8  
£1,699/\$1,499

Same processor as the EOS R6 Mk II, AF subject recognition, 24.2MP images and rapid 40fps shooting, but no IBIS. Reviewed: issue 266



Fujifilm X-S20  
£1,249/\$1,299

With straightforward controls, fully automatic modes and its compact size, the X-S20 is the hybrid camera to beat. Reviewed: issue 271



Sony ZV-E1  
£2,350/\$2,199

A compact and lightweight vlogging camera, with an image-stabilised full-frame sensor, subject recognition and auto-tracking. Reviewed: issue 270







The S9 has a maximum image size of 6,000 x 4,000px. Need larger images? Then Panasonic's Handheld High-Res combines several shots in-camera to output a 96MP image without requiring tripod use.

the S9 can perform Panasonic's trick of Handheld High-Res, combining several shots in-camera for a 96MP image without a tripod. However, it produces hefty file sizes and isn't suitable for moving subjects.

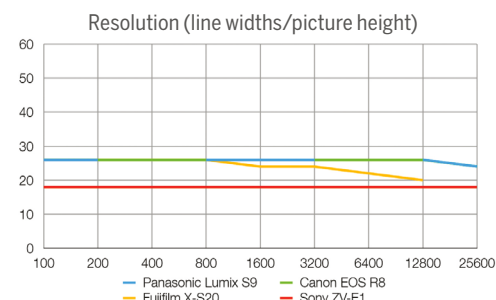
Panasonic also introduces a new feature called Crop Zoom/Hybrid Zoom, which might be my favourite S9 feature. Crop Zoom applies a digital crop to the jpeg image, giving the impression that a longer lens was used. I tested the camera with a 24mm prime lens, which I could digitally 'zoom' to around 75mm, giving me a 1920 x 1080 (~2.7MP) pixel image. This doesn't sound like much, but it is perfectly fine for social media. If you shoot in raw + jpeg mode, you also have the uncropped raw image if you decide you don't like the crop. Hybrid Zoom functions in a similar way, but combines the optical zoom of a lens with a digital crop as you manually twist the lens. For example, the Lumix S 20-60mm lens becomes a 20-187mm lens.

But the feature everyone will be talking about on the S9 is the Real Time LUTs. Is this prominence of LUTs a response to the popularity of Fujifilm's film simulations and

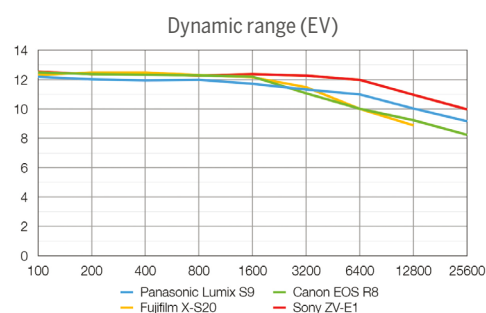
recipes? Maybe, but LUTs are a different beast. While Fujifilm's simulations are based on accurately recreating film stock in a digital way, LUTs have a more wide-ranging scope to be creative with colour. It just depends on how you want your images to look. The LUT button cycles through the LUTs on the camera so you see how they affect the Live View image in real time. In the companion Lumix Lab app, there are 39 slots for loading LUTs, offering plenty of scope for playing with different styles. The Lumix Lab app is well designed and it was easy to find LUTs to load onto the camera.

However, your enjoyment of LUTs comes down to how you like to edit. If you already have a library of Lightroom or Premiere Pro presets, or an app like VSCO, you can apply image presets and LUTs in post-production. Having this functionality in-camera is hard to beat for speed and simplicity – essential things for content creators. LUTs can cut out the tedious process of importing files into editing software to apply a filter before exporting them again. Social media is only going to keep growing, and LUTs are the future of photography. **Gareth Bevan**

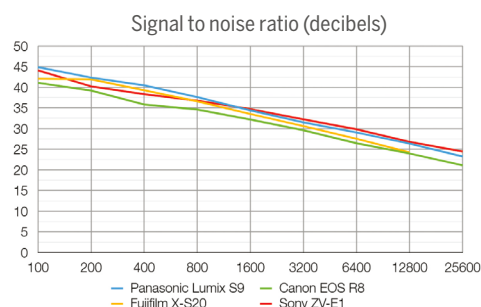
## Lumix S9 Compact



With 24.2MP, the Lumix S9 and Canon EOS R8 resolve identical levels of fine detail. The APS-C sensor X-S20 struggles to match the full-frame cameras at higher ISOs, while the 12MP ZV-E1 was



The S9's dynamic range isn't quite class-leading at lower sensitivities, but outperforms the Canon and Fujifilm cameras at high ISOs. A large sensor and low pixel count make the ZV-E1 unbeatable in low



The S9 manages low noise levels throughout the range and almost matches the ZV-E1 at high ISOs. This in spite of the S9 having smaller individual pixels, which could have made it more prone to

### Digital Camera verdict

4.0 ★★★★★ Excellent



Despite its large full-frame sensor, the Lumix S9 is an impressively small camera, foregoing an EVF to maintain those dimensions – a decision that detracts from the traditional photography experience. Is the S9 a photographer's tool or is it for content creators? The built-in LUTs will appeal to creators who need to quickly and easily post polished photos to social media. While the compact size, video features and full-frame sensor set it apart, the S9's most compelling aspect is its aggressive pricing. For content creators, it's definitely worth checking out.



## Mirrorless Panasonic Lumix S1 II



**1** The grip is deep and comfortable, and offers a secure hold with larger full-frame lenses.

**2** Take your pick from a wide range of L-mount lenses from Panasonic, Sigma and Leica.

**3** One of two dedicated buttons for recording video is conveniently sited on the front panel.

# Panasonic Lumix S1 II

£2,899/\$3,199 (body only)

Panasonic's most convincing, and expensive, all-rounder

[www.panasonic.com](http://www.panasonic.com)

### Specifications

**Sensor:** 24.1MP full-frame partially-stacked BSI CMOS sensor

**Processor:** Venus Engine

**Lens mount:** L-Mount

**ISO range:** 100-51,200 (expandable 50-204,800)

**Autofocus:** 779-pt Phase Hybrid with subject detection (people, eyes, animals, vehicles)

**Stabilisation:** 5-axis, up to eight stops

**Max image size:** 6,000 x 4,000px

**Max burst speed:** 70fps (electronic), 10 fps (mechanical), 1.5 sec pre-burst

**High-Res mode:** 96MP jpeg/raw

**Video:** 6K 30p 3:2 open-gate, 5.1K 60p 17:9 / 4:3, DCI/UHD 4K 120p; 10-bit 4:2:2 internal, ProRes RAW/Blackmagic RAW via HDMI

**Viewfinder:** 5.76m-dot OLED, 0.78x, 60/120Hz

**LCD:** 3.0in 1.84m-dot articulating touchscreen

**Memory cards:** CFexpress Type-B/ UHS-II SD

**Connectivity:** Wi-Fi, Bluetooth, USB-C, HDMI, mic jack, headphone jack, remote shutter

**Battery:** DMW-BLJ31, 370 shots (CIPA)

**Dimensions (W x H x D):** 134 x 102 x 92mm

**Weight:** 800g (incl battery & card)

The original Lumix S1 was launched in 2019 as Panasonic's do-it-all full-frame mirrorless, alongside more specialist siblings, the high-resolution S1R and the video-centric S1H. Now Panasonic is revitalising its flagship S1 line, with the arrival of its second-generation Lumix S1R II and now the Lumix S1 II.

The Lumix S1 II looks almost identical to its 47MP S1R II sibling, sharing the same durable magnesium alloy body, deep grip and control layout, but under the hood, it's a different beast. With specs including a newly developed 24.1MP full-frame partially stacked BSI CMOS sensor enabling 70fps bursts, 779-point Phase Hybrid AF with AI subject detection, 5.1K/6K video up to 60p and eight-stop in-body stabilisation, it is tailored for speed.

Panasonic's camera strategy is all about hybrid performance. The Lumix S5 II and Lumix S5 IIX showed the

benefits of combining strong stills and video capabilities in affordable bodies. Now, the Lumix S1 II arrives as a flagship hybrid that attempts to merge the best of the S1, S1R and S1H into one top-end camera – while still allowing those cameras to shine on their own merits.

But with so many cameras in Panasonic's lineup, is the S1 II still the best of the best or just one of many?

### Build and handling

The Lumix S1 II is another pro-calibre body. It inherits the design of the S1R II, which has slimmed down significantly from the original S1. Panasonic managed to make the body only marginally larger than the smaller Lumix S5 IIX, which is an achievement. Weighing in at around 798g (with card and battery), the S1 II is about 20 per cent lighter than its predecessor, yet feels solid as a brick. Looks-wise, Lumix cameras aren't exactly sexy, but the S1 II looks like it means business.

## Panasonic Lumix S1 II Mirrorless



4

Switch the camera between stills, video and Slow and Quick modes using this collar.

6

Controls for the autofocus mode and the AF area cluster around the AF ON button.

8

The exposure mode dial has moved from the opposite side – the S1's top LCD gives way.

5

The rear LCD tilts and rotates for monitoring video, and will rotate with cables plugged in.

7

A drive mode dial on the top left of the camera is lockable, as is the exposure mode dial.

9

A UHS-II SD slot, plus a CFexpress Type B slot, caters for card storage.



Lumix S1 II and Lumix S 25-105mm F4 Macro OIS lens: 1/125 sec at f/4, ISO 1250.



Lumix S1 II and Lumix S 25-105mm F4 Macro OIS lens: 1/80 sec at f/4, ISO 400.



Lumix S1 II and Lumix S 25-105mm F4 Macro OIS lens: 1/60 sec at f/4, ISO 400.

I found the grip deep and comfortable, offering a secure hold even with larger full-frame zoom lenses like the Lumix S 24-105mm F4 I used for testing. I spent some long days shooting handheld with this combo and found the overall weight substantial, but it's well distributed and not straining on the wrists. The grip and balance helped with handheld stability, especially for video.

The control layout will be familiar to any Lumix shooter, as it is shared throughout most of the range. Panasonic S-line cameras usually have extensive physical controls, and the S1 II continues that tradition – almost every function has a dedicated button

or switch. There are front and rear command dials, an eight-way AF joystick, and AF-ON and AE-L buttons under your thumb, as well as buttons for quickly accessing white balance, ISO and exposure compensation.

All the buttons and dials feel high quality and are weather-sealed with the rest of the camera, giving confidence when shooting outdoors. There are also lots of other little touches, like the locking mode dials alongside the customisable lock switch, which you can program to lock specific controls of your choosing. The S1 II is a deep camera in terms of customisation – practically every button can

“The Lumix S1 II is a flagship hybrid that merges the best of the S1, S1R and S1H into one camera”



## Mirrorless Panasonic Lumix S1 II



Colours are pleasing, with Lumix's usual accurate and neutral colour science being great as a baseline for editing. Lumix S1 II and Lumix S 25-105mm F4 Macro OIS lens: 1/640 sec at f/4, ISO 100. Custom LUTs can be easily created, and there are many available in the Lumix companion app to get you started.

be remapped, and there are dozens of options for video resolutions, autofocus and other settings. Despite this, Panasonic's menus and interface remain logical and its UI is one of the slickest.

One big pro is that the photo/video menus are separate, with the camera remembering a whole set of unique settings for each mode, so thankfully, you don't have to dive into menus when switching from capturing photos to recording footage.

The 5.76m-dot EVF is large and sharp, while the rear LCD with its tilt-and-articulate mechanism gives a range of angles for videographers. I could quickly tilt it up for waist-level stills, or flip it out to the side for video and vlogging. The downside is that the 3in screen is smaller than some rivals (which often use 3.2in), but it's bright and usable outdoors.

The S1 II also has all the ports and connectivity for pros. The full-size HDMI port is robust for external

monitors and recorders. The USB-C supports both charging and direct tethering or streaming, as well as direct to SSD recording, or you can use the dual card slots – with UHS-II SD and CFexpress for faster writing. The camera's built-in Wi-Fi also makes wireless transfer and remote control pretty seamless via the Lumix app.

### Performance

The Lumix S1 II's performance is all about speed – both autofocus and burst shooting – and it largely delivers on that promise. Having used pre-S1 II Lumix cameras, which relied on contrast-based DFD autofocus, the S1 II's Phase Hybrid AF is much better. Autofocus is now fast, confident and competitive with other brands.

In everyday shooting – portraits, street, travel – the S1 II locks focus almost instantly. Face and eye detection work well; the camera reliably identifying and holding focus on subjects' eyes, even in backlit conditions. In AF-C continuous mode, I tracked moving people and cars with a high rate of success. Low-light AF is also excellent. However, for fast action, such as sports and wildlife, the S1 II is good but not class-leading. I took the camera to a skate park to push its AF tracking. Panasonic has introduced a new 'Urban Sports' AF mode designed for erratically moving subjects, such as

### Rival cameras



Canon EOS R6 Mark II  
£2,779/\$3,599

Packs huge firepower, with 24.2MP stills at 40fps and up to 6K video, plus updated AF detection.  
Reviewed: Issue 264



Nikon Z 6III

£2,699/\$2,499

With subject recognition and tracking abilities, the autofocus system is superb, and the camera's image quality is stellar.  
Reviewed: Issue 285



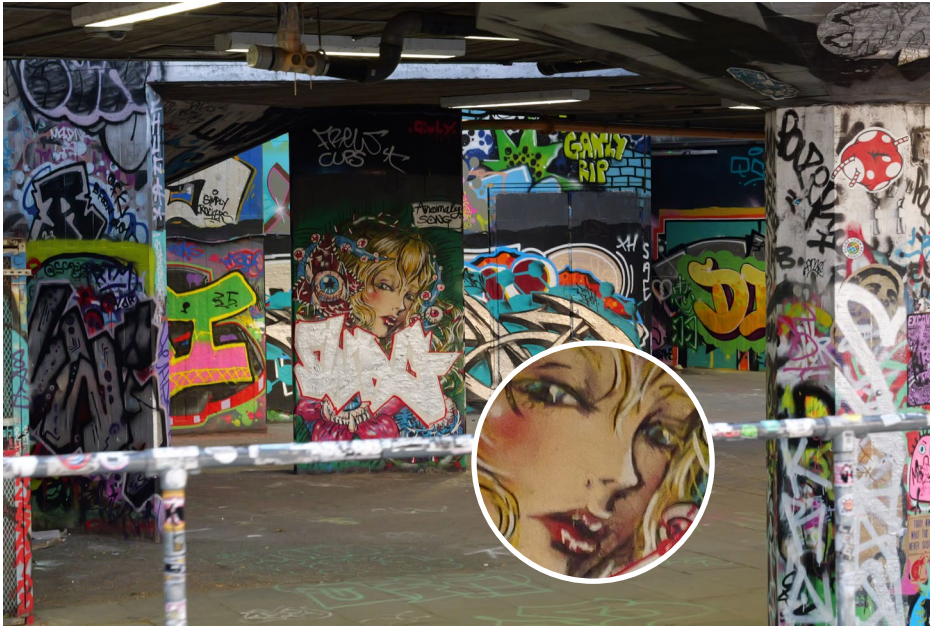
Sony A7 IV

£2,399/\$2,499

Too powerful and too expensive for an entry level camera. It's more like a mini-A1 but at less than half the price.  
Reviewed: Issue 249







Details from the 24MP sensor are sharp and the ISO performance is fantastic, with clean images up to ISO 6400, like this one. Lumix S1 II and Lumix S 25-105mm F4 Macro OIS lens: 1/80 sec at f/9, ISO 6400.

breakdancers, skateboarders and parkour athletes. Using this mode, the S1 II did a decent job detecting the skaters and predicting their movement, but it wasn't flawless. It's just not quite as sticky as the phenomenal autofocus in the Sony A9 III or Canon EOS R5 II. Thankfully, the S1 II's sheer burst speed means you get a lot of options to find that fleeting moment – and the fast readout of the half-stacked sensor meant I couldn't see any effects on my subjects.

For pro sports photographers, 70fps will be ideal, but for the majority of users, it's overkill. In testing, 70fps generated so many near-identical images that culling became such a chore. More realistically, I would choose a slower fps, which the camera allows. We are often bamboozled by the big numbers associated with new gear, but would you ever really use this burst speed?

Stills from the S1 II are excellent. Panasonic claims 14 stops of dynamic range, despite the move to a half-stacked sensor, which in theory should restrain dynamic range. I pushed my photos to the limits in bright sunlight without any negative effects, and lab tests found it outperformed its non-stacked Canon and Sony rivals. Details from the 24MP sensor are sharp and ISO performance is fantastic. Images are clean up to ISO 6400, where fine noise starts to appear, but it doesn't really become an issue until after ISO 12,800.

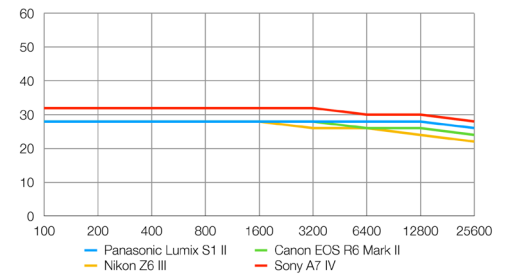
The moderate resolution can't quite offer the same resolving power as the S1 IIR – although there is a 96MP High Resolution multi-shot mode if you need to capture a static scene with huge detail. This works exceptionally well, even handheld, thanks to Panasonic's outstanding in-body image stabilisation, which deserves some praise. The eight-stop IBIS in the Lumix S1 II is the best around. For stills, I was easily getting super-slow shutter speeds in low light, even with the mediocre f/4 aperture of my lens.

Colours are pleasing, with Lumix's usual accurate and neutral colour science being great as a baseline for editing. If you want some more unique colours for your jpegs, the S1 II offers a selection of pre-made Photo Styles, including Leica Monochrome. You can add custom LUTs to the camera, with lots available in the Lumix companion app.

Lumix cameras are some of the best hybrid video cameras around, and the Lumix S1 II is no exception. With its oversampled 4K and 6K capabilities, the camera produces some of the best 4K footage I've seen from a hybrid. Recording in 4K 60p (downsampled from 6K), the footage is exceptionally crisp. Colours are neutral and accurate, although video can be captured using Panasonic's built-in LUTs feature for some bespoke colour in the file. You can also use Panasonic's V-Log, which offers 14+ stops of dynamic range. **Gareth Bevan**

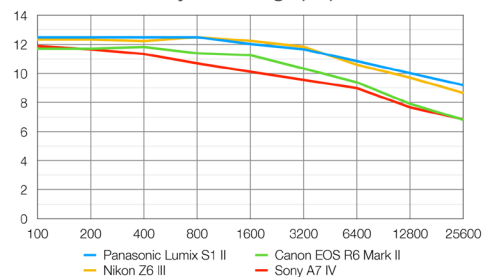
“The Lumix S1 II's performance is all about speed – both autofocus and burst shooting – and it largely delivers on that promise”

Resolution



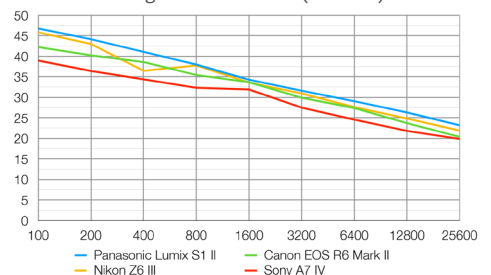
The 24MP cameras resolve similar fine detail at lower sensitivities. However, as ISOs increase, the S1 II's images are more detailed than those from the Canon and Nikon, thanks to Panasonic's lower

Dynamic range (EV)



The S1 II captures excellent dynamic range across the range. It matches the previous class leader, the Nikon Z6 III, at lower sensitivities and even manages to beat it at higher ISOs – an impressive

Signal to noise ratio (decibels)



As with dynamic range, the S1 II beats its rivals for low image noise levels. Throughout our tested sensitivity range it consistently produces cleaner images than the competition.

## Digital Camera verdict

4.5 ★★★★★ Outstanding



Panasonic's Lumix S1 II is built for those who need speed, with the half-stacked sensor providing 70fps burst speeds. The 24MP sensor produces clean, sharp images with reliable colour and class-leading stabilisation. Autofocus is dependable, with improved algorithms and new modes for urban sports. However, the S1 II is more expensive than half-stacked sensor cameras such as the Nikon Z6 III, as well as non-stacked rivals like the EOS R6 II and Alpha A7 IV. If you won't use every spec this camera offers, you might be better off saving some money.



## Mirrorless Lumix S1 IIE



**1**  
The S1 IIE features a 24.2MP full-frame BSI (back side illuminated) CMOS sensor.

**2**  
The main mode dials all feature locking buttons to avoid accidental nudging.

**3**  
The original Lumix S1 was chunky and hefty, but the S1 IIE is much slimmer and lighter.

# Lumix S1 IIE

£2,399/\$2,498 (body only)

Everything you get from the S1 II, apart from the top speeds

[www.panasonic.com](http://www.panasonic.com)

### Specifications

**Sensor:** 24.2MP full-frame BSI CMOS  
**Lens mount:** L-Mount  
**Image processor:** Venus Engine  
**ISO range:** 100-51,200 (expandable 50 – 204,800)  
**Autofocus:** 779-pt Phase Hybrid with subject detection (people, eyes, animals, vehicles)  
**Stabilisation:** 5-axis, up to 8-stops  
**Max image size:** 6,000 x 4,000px  
**Max burst:** 30 fps (ES), 10 fps (MS), 1s pre-burst  
**High-Res mode:** 96MP JPEG/RAW  
**Video:** 6K 30p 3:2 open gate, 5.9K 30p 17:9 / 4:3, DCI/UHD 4K 30p, 1080 120p; 10-bit 4:2:2 internal, ProRes RAW/Blackmagic RAW via HDMI  
**Viewfinder:** 5.76m-dot OLED, 0.78x, 60/120Hz  
**LCD:** 3.0in 1.84m-dot articulating touchscreen  
**Memory card:** 1x CFexpress Type-B / 1x UHS-II SD  
**Connectivity:** Wi-Fi, Bluetooth, USB-C, HDMI, microphone and headphone jacks  
**Battery/ shots per charge:** DMW-BLJ31, 380 / 340 shots (LCD / EVF, SD, CIPA)  
**Dimensions (W x H x D):** 134 x 102 x 92mm  
**Weight:** 795g (with battery and memory card)

**J**ump in your time machine and nip back to late 2018. It seemed the whole world was going full-frame mirrorless, with the original Canon EOS R, Nikon Z 6 and Nikon Z 7 following a precedent that the Sony A7 had set about five years earlier. Panasonic followed suit in February 2019, with the launch of the original 24.2MP Lumix S1 and 47MP Lumix S1R. The former was superseded in May 2025 by two new models, the Lumix S1 II and the Lumix S1 IIE, which we're reviewing here.

Both have a similar megapixel count of approximately 24MP, the crucial difference being that the S1 II has a partially stacked image sensor, whereas the S1 IIE doesn't. As featured in the Nikon Z 6III, the advantage of the S1 II's partially stacked sensor equates to fast readout speed, in Panasonic's case, with a stills burst rate of up to 70fps, and super-high frame rates for high-resolution video with minimal rolling shutter effect.

Even so, the S1 IIE is certainly no slouch, with a burst rate of up to 30fps

and 6K video on demand, with a significantly lower purchase price. To my mind, Panasonic has always been particularly focused on hybrid cameras for shooting both stills and video, and the S1 IIE certainly aims to be a top all-rounder that's one of the best hybrid cameras on the market.

### Build and handling

Full-frame 'all-rounder' cameras with about 24MP under the hood hit the sweet spot, as far as I'm concerned. I enjoy the typically excellent dynamic range and signal-to-noise performance, while also appreciating impressive levels of fine detail without going massive on data sizes for image files.

The S1 IIE very much typifies all of these plus points, although, as I've alluded to, it features a 'slower' 24.2MP full-frame BSI (back side illuminated) CMOS sensor compared with the lightspeed 24.1MP full-frame partially-stacked BSI CMOS sensor of its sibling S1 II. There are a couple of knock-on differences due to the different type of sensor, and if you want to check the details, have a read of our full Panasonic

## Lumix S1 IIE Mirrorless



4

There's a 3in 1.84 million-dot touchscreen with tilting and full vari-angle articulation.

6

All of the dials, switches and buttons have a high-quality look and response.

8

Dual memory card slots cater for both CFexpress Type B and SD/HC/XC UHS-II.

5

The 0.78x OLED viewfinder has a 5.76m-dot display and fast 60/120Hz refresh rate.

7

The control layout is mostly inherited from the original and has a pro-grade feel.

9

The DMW-BLJ31 Li-ion rechargeable battery is rated at 380/340 shots (LCD/EVF).

Lumix S1 II review (issue 298) or take a peek at the article on our website comparing the Lumix S1 II and S1 IIE ([www.bit.ly/dcm302\\_lumix](http://www.bit.ly/dcm302_lumix)).

The original Lumix S1 was a decidedly chunky and hefty affair, but both of the Mark II cameras are much slimmer and more lightweight, more akin to the Lumix S5 IIX. The S1 II and S1 IIE have identical dimensions of 134 x 102 x 92mm, although the IIE is marginally lighter at 795g vs 800g, both including battery and memory cards.

Speaking of batteries, both cameras also take the same DMW-BLJ31 Li-ion rechargeable battery, although it has slightly more stamina in the IIE, rated at 380/340 shots (LCD/EVF) compared with 360/320 shots in the S1 II. And for memory, both cameras also have dual card slots, catering to CFexpress Type B and SD/HC/XC UHS-II. Use the CFexpress slot and you'll get slightly less battery life in both cameras.

I'm glad that the control layout of the camera is mostly inherited from the original models. As such, it has a pro-grade feel with direct access to all the important settings that you might need for creative shooting. I also like that the main mode dials have locking buttons to avoid accidental nudging. Moreover, all of the dials, switches and buttons have a high-quality look and feel. Build quality is further enhanced by a solid magnesium alloy shell with comprehensive weather seals and a freeze-resistant design.

The feature set is certainly expansive, with the camera catering equally well to stills and videography. Indeed, the video specifications run to a few pages on their own. Either way, for sharp-shooting, two of the features I depend on most are autofocus and image stabilisation. The IIE boasts impressive credentials on both counts.

Panasonic's 'Next-level' autofocus technology is based on a phase/contrast-detection hybrid system (and about time, too) with 779 phase-detection points. It also features the now common AI-based attractions for effectively recognising and tracking people, animals, cars, motorcycles, bikes, trains, planes and even 'urban sports'. The 5-axis image stabilisation system is also high-end, offering up to 8-stop performance at the centre of the frame and as much as 7-stop effectiveness at the periphery.

For autofocus and image stabilisation, the S1 IIE is identical to the pricier S1 II, and the same applies to the EVF (electronic viewfinder) and rear screen. That's more good news, as both are of high quality. Shooting and playback are made easy on the eye by the large, 0.78x OLED viewfinder, with its 5.76 million-dot display and fast 60/120Hz refresh rate. The same goes for the 3in 1.84 million-dot touchscreen at the rear of the camera, which boasts both tilting and full vari-angle articulation, to suit every need and preference.



Matthew Richards

The S1 IIE recognised the helicopter in this scene as an aircraft and autofocused on it in double-quick time.



Matthew Richards

For shots taken in low, indoor lighting, the S1 IIE retains fine detail and also manages to suppress image noise.



Matthew Richards

The physical ports on the S1 IIE include USB-C (10Gbps), HDMI, microphone and headphones.



Matthew Richards

Taken under fairly low, indoor lighting levels, this frame is the mid-point between ISO 200 and ISO 51,200.



## Mirrorless Lumix S1 IIE

Matthew Richards



Naturally, the bottom line in terms of photo performance is always image quality – and, in this respect, the results from the S1 IIE are an absolute delight.

Well connected, the S1 IIE features 2.4GHz and 5GHz Wi-Fi, plus Bluetooth V5, and supports a wide range of apps and cloud-based services. Connectivity is further enhanced in V1.1 of the camera's firmware. As you might expect in this class of camera, physical ports include USB-C (10Gbps), HDMI, microphone and headphones. XLR and 4-channel microphones are

compatible via Panasonic's DMW-XLR2 adapter, which is sold separately.

### Performance

Compared with the S1 II, the S1 IIE's main drawback in terms of stills performance is that it simply can't match the pricier camera's 70fps maximum burst rate. As it turns out, the quickest burst rate is less than half

as fast, at a comparatively pedestrian 30fps. But consider that the 24MP Nikon Z 6II can only muster 14fps, maybe it's not that pedestrian after all. And it's also about twice as fast as some of the quickest DSLRs in the business, including the Canon EOS-1D X Mark III (in viewfinder mode) and the Nikon D6 – cameras that have served some of the world's top sports and wildlife photographers well over the years.

Besides, in real-life usage, 30fps is more than fast enough for the vast majority of shooting scenarios. I'm impressed that the S1 IIE achieves this speed in electronic shutter mode while maintaining continuous autofocus and metering, along with a blackout-free viewfinder image. And like the S1 II, the buffer depth is sufficient for up to 200 raw quality shots or 300 jpegs in continuous shooting.

Autofocus and image stabilisation are also every bit as impressive in the S1 IIE, with autofocus speed and tracking abilities being streets ahead of the original S1 and stabilisation being pretty much as good as anything else out there at the moment. AF tracking isn't quite on a par with some of the most tenacious cameras in this respect, like the Canon EOS R5 Mark II or Sony A9 III, but it's still highly capable.

## Rival cameras



**Canon EOS R6 Mark II**  
**£2,779/\$3,599**

Packs huge firepower, with 24.2MP stills at 40fps and up to 6K video, plus updated AF detection.  
Reviewed: Issue 264



**Nikon Z 6III**  
**£2,699/\$2,499**

With subject recognition and tracking abilities, the autofocus system is superb, and the camera's image quality is stellar.  
Reviewed: Issue 285



**Sony A7 IV**  
**£2,399/\$2,499**

Too powerful and too expensive for an entry level camera. It's more like a mini-A1 but at less than half the price.  
Reviewed: Issue 249





Dynamic range is excellent, with the S1 IIE retaining detail in dark shadows and bright highlights. It also preserves plenty of fine detail and texture, even at high ISO settings, and effectively stifles image noise.

Naturally, the bottom line in terms of photo performance is always image quality. In this respect, the S1 IIE is an absolute delight. Colour rendition is beautifully natural, with plenty of in-camera style options, and the same goes for dramatic and moody monochrome. Dynamic range is excellent, retaining detail in everything from extremely dark shadows to super-bright highlights. There's plenty of fine detail and texture preserved in images, which is maintained even at high ISO settings, along with an effective stifling of image noise. All in all, stills image quality is every bit as good as from the more upmarket S1 II.

The images that I took while reviewing the S1 IIE contain a sequence of shots taken under fairly low, indoor lighting levels. I started at ISO 200 and worked my way up to ISO 51,200. See the photo on page 111 for an example of how the camera trades retention of fine detail against suppression of image noise throughout the sensitivity range, when shooting in jpeg quality mode.

## Video performance

Just as with stills, the impact in terms of reduced video performance compared with the S1 II is due to the image sensor. Without a partially stacked architecture and therefore a slower readout speed, the S1 IIE can't manage some of the exotic frame rates delivered by the S1 II. For example, while both cameras can shoot at 6K 30p (open gate) and 6K 60p (2:4:1), the S1 II can capture 5.9K at 60p and 4K at 120p. The S1 IIE drops to a maximum of 5.9K 30p and can only manage 120p at Full HD (1080p) rather than 4K.

Even so, I like the inclusion of open gate, which uses the 3:2 aspect ratio of the whole image sensor and makes it more efficient to

crop for horizontal or vertical orientation in post-production. Again, the video options for both internal and external recording are so comprehensive in both cameras that, if I were to list them all, you'd probably still be reading this review tomorrow.

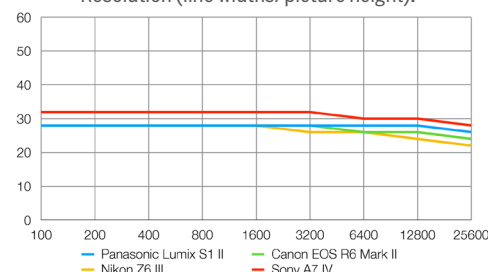
I found that in-body image stabilisation worked really well for handheld shooting of video as well as stills, so that's another positive attribute that's shared with the S1 II. The only real downside, fan-cooled resolutions and high-end frame rates aside, is that the slower data readout of the S1 IIE's more conventional sensor gives a greater risk of the dreaded 'rolling shutter', which is commonly referred to as the 'jello effect'.

This is a phenomenon caused by the length of time it takes for data to be outputted line by line from the image sensor. If you're shooting a fast-moving object, such as the blades of a propeller or a truck speeding from one side of the frame to the other, their shape will be deformed due to the change of position from the start of each frame to the end. Sure enough, the S1 IIE can't compete with the performance of the S1 II, but it's still pretty good. For more on how the S1 IIE performed in testing, view our sample video clip [[www.bit.ly/dcm302\\_lumixvid](http://www.bit.ly/dcm302_lumixvid)], shot at Bristol docks in the UK.

**Matthew Richards**

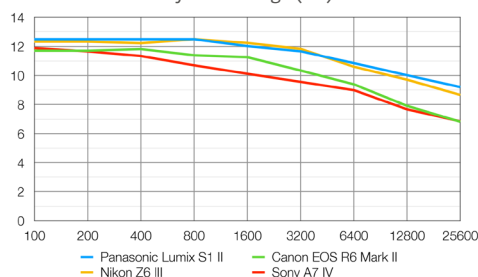
"The S1 IIE's stills image quality is every bit as good as from the more upmarket S1 II"

Resolution (line widths/picture height):



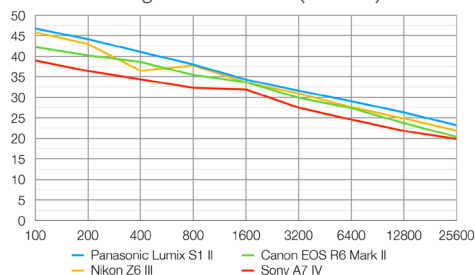
The three 24MP cameras resolve similar levels of fine detail at lower sensitivities. As ISOs increase, the S1 II's images are more detailed than those of the Canon and Nikon cameras, thanks to lower

Dynamic range (EV)



The S1 II captures excellent dynamic range throughout our tested sensitivity range. It matches the previous class leader, the Nikon Z6 III, at lower sensitivities and even beats it at higher ISOs.

Signal to noise ratio (decibels)



As with dynamic range, the S1 II beats its rivals for low image noise levels. Throughout our tested sensitivity range, it consistently produces cleaner images than the competition.

## Digital Camera verdict

**4.5** ★★★★★ Outstanding



Nobody wants to spend money for nothing, or at least on something they don't need. The partially stacked image sensor of the Panasonic S1 II makes it a real speed demon, but to use an analogy, do you need a Ferrari when going to the supermarket? The 70fps burst rate of the S1 II is more than I'd ever need and the super-fast readout speeds only pay dividends for the highest-resolution video capture at the highest frame rates. Forced to choose, I'd take the S1 IIE for its excellent image quality and superb video and stills performance at a 20 per cent discount, any day.





**1**  
The K-3 Mark III Monochrome feels robust and its grip gives a decent hold.

**2**  
There is 12fps continuous shooting and the AF system has 101 focus points.

**3**  
The colour filter array in front of its 24MP APS-C sensor has been removed.

# Pentax K-3 III Monochrome

£1,949/\$2,197 (body only)

Now you don't have to buy a Leica to get a monochrome sensor

[www.ricoh.eu](http://www.ricoh.eu)

## Specifications

**Lens mount:** Pentax KAF2  
**Sensor:** 25.7MP APS-C CMOS, monochrome  
**Autofocus:** 105-point phase detect incl 21 cross-type (OVF), contrast AF (Live View)  
**ISO:** 100-1,600,000  
**Image stabilisation:** 5-axis Pentax SR, 5.5 stops  
**Max shooting speed:** 12fps, 37 jpeg, 32 raw  
**Video:** 4K UHD 30p, Full HD 60p  
**Exposure range:** -3EV to +20EV  
**Viewfinder:** Optical pentaprism, 100% coverage, 1.05x magnification  
**LCD:** 3.2in 1.62m-dot fixed touchscreen  
**Memory cards:** 1 x SD UHS-II, 1 x SD UHS-I  
**Connectivity:** USB-C, HDMI (Type D), 2.5mm accessory, 3.5mm audio in, 3.5mm audio out, Wi-Fi, Bluetooth  
**Battery:** D-LI90, 800 shots  
**Dimensions:** 134.5 x 103.5 x 73.5mm  
**Weight:** 820g (body only, incl card and battery)



What is the point of a monochrome sensor, you may ask? While any regular digital camera can produce black and white images either in camera or in a photo editor, they come with technical compromises. The photosites on the sensor are sensitive only to light, not colour, so to make sensors capture colour images, a colour filter array (CFA) is overlaid on the photosites so that each one is sensitive to red, green or blue light only. That's no good on its own, so it needs an interpolation process to work out a full-colour value for each pixel. The result of interpolation is a slight softening of fine detail and some noise and artifacts in the red, green and blue colour channels that make up the colour image.

This extra processing undermines the image quality and as it's unnecessary for black and white photography, Pentax has taken the regular K-3 III

design and removed the colour filter array from in front of the sensor. Each photosite is now sensitive to all light, not just one particular colour, so its light-gathering capabilities are improved and the fine detail is crisper and sharper.

There are some downsides, not least that you have a camera that is incapable of shooting in colour. There is also no way to adjust the tonal balance between the different colours in the scene in the way that you can when converting colour images. With a monochrome camera like the Pentax K-3 III Monochrome, you have to go back to old-school black and white shooting using 'contrast' filters on the lens to adjust the tones. For example, you need a red filter to darken blue skies or a yellow filter to lighten foliage.

The K-3 III Monochrome is a 24MP APS-C DSLR of a type we've seen from Pentax before, but this one is at the top of the APS-C range with a rugged, strong-feeling body, 12fps continuous

## Pentax K-3 III Monochrome DSLR



4

The optical pentaprism gives 100 per cent coverage and 1.05x magnification.

7

The K-3 III Monochrome does have some modern advances, such as USB-C charging.

5

The rear screen is clear and bright but it is fixed to the body and has no tilting mechanism.

8

Five user-definable settings are available on the PASM mode exposure dial.

6

With no need for White Balance control, an 'Fx' button has been added to the four-way array.

9

Switch between stills, movie and Live View shooting modes with this dedicated dial.



It doesn't follow the Pentax KF in having hybrid on-sensor phase-detect AF. Instead, it follows the classic Pentax DSLR route of a phase-detect sensor for viewfinder shooting and slow-but-sure contrast AF in Live View. The viewfinder uses a pentaprism design, rather than the cheaper pentamirror, and is rather good. It offers 100 per cent coverage and 1.05x magnification with a 50mm lens set to infinity – though it's an APS-C camera, so that viewfinder magnification compares to around 0.75x on a full-frame DSLR.

One unavoidable aspect of the optical viewfinder is that you see the world in colour – here, mirrorless monochrome cameras with EVFs have an advantage. You can switch between the OVF and Live View via a dial on top of the camera. The Live View is fed by the sensor, so it's in black and white. The display quality is good, and the status display (when you're using the viewfinder) is both clear and highly detailed – and there's a second status display on the top panel for key shooting settings. The rear screen is fixed, so it doesn't have a tilt mechanism. That might be a deal-breaker for some but it's how DSLRs used to be and it shouldn't be hard to adapt.

The mode dial on this Pentax, as with other models, has a couple of interesting extras. As well as the usual P, Av, Tv and M modes, there's a TAv mode and an Sv mode. These effectively bring the ISO setting into

shooting and advanced SAFOX 13 AF system with 101 focus points. This is for viewfinder shooting; if you use the Live View mode, the camera reverts to the slower, but still effective, contrast AF.

Is it one of the best DSLRs right now? Perhaps not. The regular Pentax K-3 III is a bit niche, combining last-generation DSLR tech with a hefty price tag. Like previous Pentax DSLRs, this one has Pentax's in-built sensor-shift Shake Reduction system. Pentax is still the only DSLR to offer in-body stabilisation. The five-axis anti-shake mechanism offers up to 5.5 stops of compensation and an 'Anti-aliasing Filter Simulator'. The sensor does not have a physical anti-aliasing (low pass) filter so this uses the sensor-shift tech to achieve an anti-aliasing effect and reduce moiré effects in fine patterns and textures.

While Pentax might appear to be stuck at a certain point in camera history, the K-3 III Monochrome has

some modern advances, such as USB-C charging. It can also shoot 4K video, though the contrast AF is unlikely to keep up well with moving subjects.

There are some notable changes for the Monochrome model. The minimum ISO has been increased to 200 to reflect the greater sensitivity of the photosites and, with no need for White Balance control, this button has been replaced with an 'Fx' button. Here, Pentax is aiming for a particular kind of audience. "Returning to the starting point of photography: capture images with light and shadow," says its website.

### Build and handling

The Pentax K-3 III Monochrome has typical Pentax DSLR handling. It feels strong, rugged and solid. And while the DSLR design may be out of date, this one has kept up with some modern trends. It has USB-C charging, as mentioned, and 4K 30p video.

"By removing the colour filter array, the Pentax K-3 III Mono has sharper images with less noise"





Above and below: These images were captured handheld during a night-time photo walk with the camera set to ISO 25,600 to allow for an aperture of f/4 and reasonable depth of field. The results are noisy, naturally, but it's perfectly acceptable noise and the overall results are unexpectedly good.



## Rival cameras



**Leica M11 Monochrom**  
**£8,300/\$9,195**

It's expensive, it doesn't do video and is manual focus-only, but this is still a unique and desirable camera.  
Reviewed: issue 269



**Leica Q2 Monochrom**  
**£4,995/\$5,995**

Produces a much higher level of image quality than a regular 'colour' camera can deliver – even the regular Q2.  
Reviewed: issue 238



**Pentax K-3 Mark III**  
**£1,899/\$1,999**

Fast, powerful and packed with clever features, but with no on-sensor phase detect autofocus, the K-3 III also feels oddly dated.  
Reviewed: issue 247



the exposure triangle. In TAv mode, you can set both the shutter speed and the lens aperture manually, and the camera will adjust the ISO setting to give the correct exposure. In Sv mode, you set the ISO and the camera adjusts the shutter speed and aperture. This is no different, of course, from using Auto ISO or setting the ISO manually, but by adding these to the mode dial, Pentax makes the ISO a central part of the exposure modes, not a separate setting.

The K-3 III body has magnesium alloy top, bottom, front and rear panels and is both dust- and weather-resistant. Pentax says it's designed to operate in temperatures of down to -10C. The Monochrome model also offers a black and white interface and silver for the icons on buttons and switches.

## Performance

Physically, the Pentax K-3 III Monochrome performs much as you would expect for a recent DSLR design. The 101-point phase-detect viewfinder AF is positive and reasonably fast, though this depends on the lens you're using, as some older Pentax lenses are neither quick nor quiet. The 12fps continuous shooting speed is impressive on paper, but the limited buffer capacity will restrict you to short bursts only, which seems like a serious failing on a flagship camera.

In terms of image quality, it's mostly positive. Pentax says the removal of the





Rod Lawton



Rod Lawton

Above: These images were taken on a day with hazy sun. The tonality is nice and the detail is excellent, but the bright skies really showed up the sensor's lack of highlight latitude – and that's even when shooting raw.

colour filter array gives sharper images with less noise, and that appears to be true. At a pixel level, the definition is extremely crisp, though this will depend on the quality of the lenses you're shooting with. I took the Pentax on a night-time photo walk with the ISO set to 25,600 and the images show good contrast and a hard but tight grain pattern that's actually quite attractive.

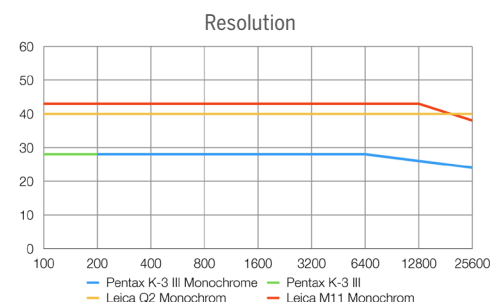
There's also the question of tonality, another theoretical advantage of the monochrome sensor. Without the colour interpolation of regular cameras, tonal gradations should be smoother. That may be true, but there are both technical and practical drawbacks. Because you're shooting in mono only, you cannot vary the colour channel strengths to simulate the effects of black and white filters. You have to use the real thing to darken blue skies or lighten foliage in landscapes, which sounds fine until you actually have to go out and purchase them. The other issue I had was poor

highlight recovery in raw files. I'm used to relying on 1-1.5EV of highlight recovery with regular cameras, but with the K-3 III Monochrome, at best I got around 0.6EV. That's a much lower margin of error than I'm used to, and probably many other photographers, too. When shooting outdoors, you need to pay attention to the exposure of bright skies if you want to retain any detail.

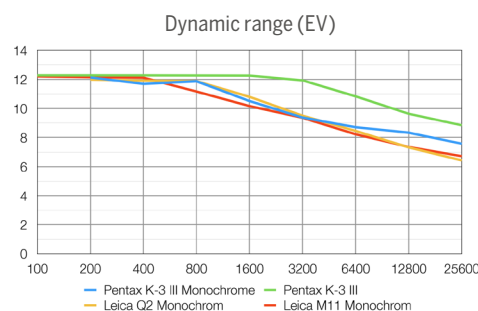
Shooting at night also gave me a chance to test the camera's shake-reduction system. Pentax claims it offers up to 5.5 stops of compensation, but I'd probably only rely on two or three stops. It's definitely worth having, though it's worth noting that a sensor-shift system like this has no effect on the optical viewfinder image. You'll only get much sense of the stabilisation effect if you are using Live View, which proved surprisingly effective. It's naturally a lot slower than a modern mirrorless camera's hybrid AF, but still perfectly usable, even handheld. **Rod Lawton**

## DSLR

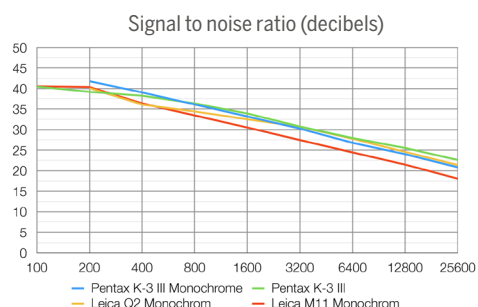
### Lab tests



The Pentax cameras resolve near-identical amounts of fine detail throughout the sensitivity range. Both Leicas are full-frame with larger megapixel counts,



The K-3 III Monochrome rivals the full-frame Leica mono cameras for dynamic range, beating them by around a stop at the highest ISOs. However, go past ISO 800 and the K-3 III is in a league of its own.



Both Pentax cameras generate low grain and noise, which we'd expect given their identical sensor size and megapixel count. Even the full-frame Leicas cannot beat the image clarity of the K-3 III Mono.

### Digital Camera verdict

4.0 ★★★★★ Excellent



The K-3 III Monochrome's sensor can't be written off as a hipster novelty – it has clear advantages over a regular sensor for B&W capture – but it is incapable of colour photography and you will have to use real filters to modify the black and white rendition. It's a classic DSLR design, which may not suit a generation raised on mirrorless, and on a practical level, its poor highlight recovery doesn't suit Pentax's monochrome aspirations. However, this is the cheapest dedicated mono camera by far and, for that reason alone, the Pentax K-3 III Monochrome deserves praise.





**1** While one of Pentax's smaller DSLR designs, the KF's body is still pretty chunky.

**2** The mirror box and pentaprism/flash housing really add to the bulk at the front.

**3** The KF is based around a 24MP APS-C CMOS sensor and a PRIME MII Image processor.

# Pentax KF

£849/\$847 (body only)

A new camera or an old friend in disguise?

[ricoh-imaging.eu](http://ricoh-imaging.eu)

## Specifications

**Sensor:** 24MP APS-C CMOS  
**Lens mount:** Pentax KAF2  
**Image processor:** PRIME MII  
**AF points:** 11-point Phase-matching AF  
**ISO range:** 100 to 102,400  
**Max image size:** 6,000 x 4,000px  
**Metering modes:** TTL open aperture, 77 segmented metering, centre-weighted and spot metering  
**Max video resolution:** 1920 x 1080 30p/60i  
**Viewfinder:** Optical pentaprism, 100% coverage, 0.95x magnification with 50mm lens  
**LCD:** 3-inch 1,037k dot vari-angle  
**Max burst:** 6fps JPG (L: \*\*\* at Continuous H, up to approximately 40 frames)  
**Memory card:** SD/SDHC/SDXC UHS-I  
**Connectivity:** Wi-Fi, USB 2.0, Micro HDMI  
**Size:** 125.5 x 93.0 x 74.0mm  
**Weight:** 684g (with battery and memory card)



anon and Nikon may dominate the DSLR market, but we mustn't forget that there is a third contender,

Pentax. The company has been making DSLRs for the same time as the other two and, after an early dalliance with mirrorless, has fully committed to the digital SLR design. It is mainly aiming for a small but passionate band of enthusiasts who appreciate the brand's traditional values, heritage and rugged design.

The Pentax KF is the latest of Pentax's many, and sometimes almost indistinguishable, APS-C format DSLRs, all of which seem to share the same 24MP CMOS sensor, but have varying combinations of body design, burst speeds and other features.

Pentax also makes a full-frame DSLR, the hefty but rather good Pentax K-1 Mark II, and it also makes

the medium format Pentax 645Z, a camera that brought medium format to the masses long before Fujifilm. It may not lead the field, but Pentax cameras certainly deserve to be considered alongside the best DSLRs and best medium-format cameras.

Pentax might be a brand with real depth and history, but it isn't known for pushing back the frontiers of imaging technology. We should also explain that we did not have access to the regular 18-55mm kit lens for this review and only had one lens (55mm f/1.4 SDM) with its own AF motor.

## Key features

The Pentax KF's digital SLR design means it has an optical viewfinder with one focusing system (an 11-point SAFOX AF system) and a rear screen with a different one. In live view, you get hybrid phase/contrast AF which should give much faster and more



4

The controls are good and sturdy, but the dials themselves are possibly a little too stiff.

7

In a clever touch, a long press of the pad's central button controls the AF point position.

5

When not in use for Live View, the rear screen acts as a clear information display.

8

There is a 6fps burst mode, but the buffer capacity is limited to 10 raw frames.

6

A four-way control pad accesses ISO, drive mode, WB and flash control options.

9

The mode dial has two extra modes: Sv and TAv – different routes to manual and Auto ISO.



8

Wi-Fi/Fx2

Wi-Fi/Fx2



Rod Lawton

Auto White Balance does a good job of balancing daylight and artificial light without losing atmosphere (shot with a 10-17mm fisheye zoom).



Rod Lawton

The KF seems particularly prone to losing detail in bright skies, though if you shoot raw files it's a fairly simple task to recover it during editing.

And now, the lenses. Pentax makes some modern lenses with integrated DC or SDM AF motors, though these can be pretty expensive. But many more Pentax AF lenses are controlled by a screw drive from the camera body, including the neat-looking 'Limited Edition' primes. This is a different user experience, and not necessarily in a good way, either. Nevertheless, the best Pentax lenses do contain a mix of both types.

effective autofocus than the contrast-only AF on other Pentax DSLR bodies, though this will depend on the lens.

The only other Pentax DSLR to offer hybrid AF is the Pentax K70, launched in 2016. That also has a 24MP sensor, flip-out screen, 1080 video and an identical body design. As far as we can tell, the KF has a different rear display, slightly different battery life, a new badge and a choice of white or blue special editions.

The flip-out rear screen gives the KF a more modern feel than other Pentax DSLRs, but it isn't touch-sensitive, though, and the KF's video capabilities are stuck in the dark ages at a maximum resolution of 1920 x 1080. It can shoot 1080 video at 30p, but while it can do 60fps, it's interlaced. Interlaced video – in 2023!

Inside, the KF uses Pentax's long-running and effective SR Shake Reduction system – Pentax is still the only manufacturer to build IBIS into a DSLR. The SR system doesn't just cut out camera shake, it also offers 'anti-aliasing simulation' to help combat moiré in fine patterns and textures – though that's not a particularly common issue.

There is a 6fps burst mode, but the buffer capacity is limited to 10 raw frames or 40 jpegs, so this camera will be no good for sports photography. It has a single UHS-I card slot.

You get a proper pentaprism viewfinder, unlike the cheaper and smaller pentamirror designs on rival cameras and the KF even offers interchangeable focusing screens, which is a real blast from the past.





Rod Lawton

Colours captured by the Pentax KF are rich and natural-looking and you don't often need to make any adjustments to the auto-exposure.

## Build and handling

The Pentax KF is one of the company's smallest DSLR designs, but by most people's standards, it's still a pretty chunky camera body. Although it's a similar width and height to many mirrorless cameras, the mirror box and pentaprism/flash housing really add significantly to the bulk at the front.

Many users won't mind the extra heft and 'grippability' and might even prefer it to the feel of a mirrorless camera, though it will take up more space in your camera bag.

The controls are good and sturdy, though the control dials may even be a little too stiff. Round the back is a four-way control pad which accesses ISO, drive mode, WB and

flash options or, with a long press, the position of the AF point. That's clever.

The main mode dial has the usual Program AE, Shutter Priority, Aperture Priority and Manual modes – and two extra. Sv (sensitivity value) mode lets you set the ISO and leaves the camera to work out the best aperture and shutter speed. It's hard to see how that's different to setting the ISO and using P mode. Tv mode lets you set the shutter speed and aperture and jiggles the ISO to get the exposure right, which sounds a lot like using Auto ISO in manual mode.

The viewfinder is pretty good, too – it's big and clear, and displays all your shooting information equally clearly underneath. You can view this info and more on the rear screen (if you aren't currently using it for Live View), which is an excellent display.

The Live View is both unusual and useful in the context of a DSLR, but the shunting and clanking as the mirror is moved out of the way remind you that this is not a DSLR's natural environment. The Live View AF is adequate but not the fastest when

## Rival cameras



Canon EOS 850D  
£799/\$749

Sold as the Rebel T8i in the US, the 24.1MP 850D is a decent camera but its 4K video capture comes with a crop. Reviewed: issue 236



Nikon D7500  
£1,300/\$1,500

Low-light performance and overall image quality are first-rate, although its resolution is 20MP lower than its forebear. Reviewed: issue 193



Fujifilm X-T30 II  
£769/\$899

Looks good and works well, too, with old-school shutter speed and aperture dials, but there's no IBIS. Reviewed: issue 251





Rod Lawton

Pentax seems to have nailed the colour rendition produced by its cameras, at least when you're taking outdoor, blue-sky photographs like this.



Rod Lawton

The autofocus is accurate enough if you take your time, but it's less reliable with Pentax's older or 'Limited' lenses which are driven by the body and don't have their own AF motors.

tested with Pentax's 55mm f/1.4 SDM lens. It's pretty painful with screw-driven lenses, as is the viewfinder AF.

The autofocus with these screw-drive lenses is noisy, choppy and hesitant. It works, in its own time, but it messes with your shot timing and, if you reframe and the lens makes no noise, you start to wonder whether it has actually refocused.

## Performance

The Pentax KF produces rich, natural-looking jpegs, as we've come to expect from Pentax DSLRs. The multi-pattern exposure system works well, with only an occasional need to dial in some exposure compensation with unusually dark- or light-toned subjects, as we'd expect. We found that bright skies often lost some highlight detail in the clouds, despite Pentax's extended dynamic range option, but it's easy enough to recover highlights from the raw files.

There were no issues with the Auto White Balance either, which gave natural-looking colours both outside and indoors. This is

something we almost seem to take for granted with modern cameras.

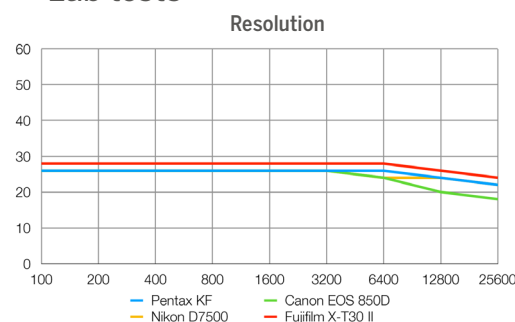
Other aspects of the KF's performance are less impressive. We've already explained the AF issues with older or cheaper Pentax lenses, and while the camera will focus accurately with whatever lens you use, it won't always do it quickly or at the first attempt. If Pentax is going to persist with its body-driven AF, it needs to find a way to improve it.

We tested four different lenses with this camera and, as a batch, they showed varying degrees of optical quality. An older 18-55mm f/3.5-5.6 kit lens showed much more chromatic aberration at the edges of the frame than we would expect today, the Pentax DA\* 55mm F1.4 SDM lens was good and adequately refined during focusing but no more, while the HD Pentax-DA 70mm F2.4 Limited lens is sharp enough but again relies on body-driven AF, as does the HD Pentax-DA Fisheye 10-17mm F3.5-4.5 ED fisheye zoom. We've reviewed these last three lenses separately.

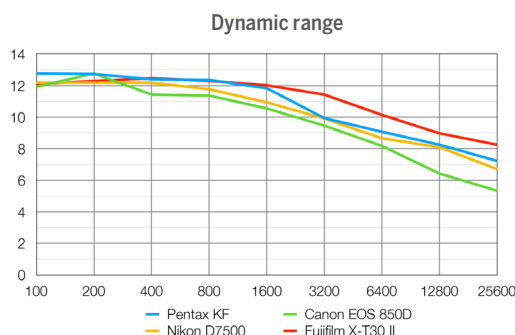
**Rod Lawton**

## Pentax KF DSLR

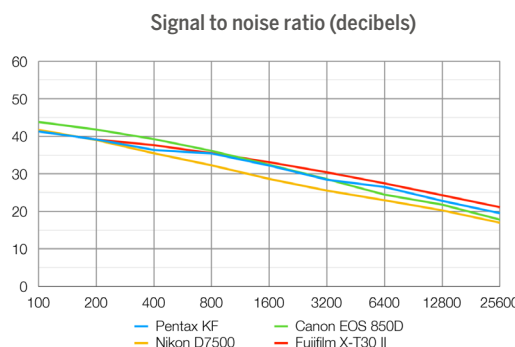
### Lab tests



The KF resolves the amount of fine detail we'd expect from a 24MP camera, equalling the EOS 850D, and outperforming it from ISO 6400. The extra resolving power of the 26.1MP X-T30 II gives it an advantage.



The KF performs well, capturing more dynamic range than its DSLR rivals throughout the sensitivity range, and equalling the X-T30 II – a camera with a modern image sensor at its heart – at lower sensitivities.



The KF images are impressively clean, with low image noise levels that rival both the Canon and Fujifilm cameras throughout the tested ISO range.

### Digital Camera verdict

**3.5** ★★★★★ Good



The Pentax KF is a well-made DSLR but it is essentially a relaunch of the Pentax K70. The merits of this camera's autofocus system will be lost unless you are using a newer Pentax lens with an SDM, DC or PLM AF motor. Otherwise, you're restricted to the body-based AF drive, which makes this camera seem more primitive than it actually is.





**1**  
The camera is machined out of a single ingot of aluminium.

**2**  
Some users have said that the lack of a front grip makes the camera difficult to hold.

**3**  
Key features of the BF include its 24.6MP BSI full-frame sensor and hybrid autofocus.

# Sigma BF

£1,969/\$1,999 (body only)

Stylish mirrorless takes on both Leica and your phone camera

[www.sigmauk.com](http://www.sigmauk.com)

## Specifications

**Lens mount:** L-Mount  
**Sensor:** 24.6MP back side illuminated full-frame CMOS  
**Image processor:** Not specified  
**Autofocus:** Hybrid phase and contrast-detection  
**ISO range:** 100-102,400 (exp 6, 12, 25, 50)  
**Image stabilisation:** Video stabilisation only (electronic)  
**Max burst rate:** 8fps  
**Max image size:** 6016 x 4012px  
**Shutter speed:** 1/25,600-30 secs. Up to 5 minutes (Bulb)  
**Max video resolution:** 6K 30p, 4K 30p, Full HD 120p  
**Viewfinder:** None  
**Rear screen:** 3.15-inch TFT touchscreen, 2.1 million dots  
**Memory:** 320GB internal only (no card storage)  
**Connectivity:** USB-C  
**Battery:** BP-81 Li-ion  
**Dimensions (W x H x D):** 130.1 x 72.8 x 36.8mm  
**Weight:** 388g (body only). 446g (with battery)

**P**erhaps it's an L-Mount Alliance in-joke, but the Sigma BF just out-Leica'd Leica. Maybe the two companies placed a wager on whether Sigma would be first to outdo Leica's cameras or Leica would be first to outdo Sigma's lenses.

Either way, the Sigma BF is a clever little camera for some familiar reasons. It's so beautiful that it makes your heart skip a beat. It's made from a single block of aluminium. It boasts a bountiful internal memory. It strips physical controls and an EVF in favour of a friction-free touchscreen-driven experience. And it uses the L-Mount.

What has that got to do with Leica? Because back in 2014, it launched the Leica T – a camera that was also achingly beautiful, made from a single block of aluminium, had loads of internal memory, ditched the controls and EVF, and used the L-Mount (back then it was called the T mount).

But the Sigma BF is bigger, better, more in every way. And it's hands-down the most gorgeous camera I've ever seen, let alone used – not since the Hasselblad X1D has a modern camera had the chutzpah to be so daringly different in how it looks. It's truly a masterclass in industrial design.

The same ethos behind the way the camera looks – 'radical simplicity' – lies behind the way it operates. Not only does it ditch almost every physical control, but it also banishes every single icon from the rear screen. The idea is that the Sigma BF becomes the everyday camera that can replace your phone, for all those moments when we reach for our pocket instead of our camera bag. So the Sigma BF beats Leica at its own game. But does it beat today's cameras?

## Build and handling

The minimalism extends to the camera's controls; the Sigma BF



**4**  
The camera's 'radical simplicity' means that by default, there are no icons on the rear screen.

**7**  
A pair of microphones, for recording video, is located on the top plate of the camera.

**5**  
Three buttons (power, playback, menu) and a dial pad comprise the controls on the rear.

**8**  
With its streamlined shutter button, the BF aims to be as simple to use as a smartphone.

**6**  
There's no card slot but the BF's internal memory can hold more than 14,000 jpegs.

**9**  
Sigma's silver I-series lenses maintain the aesthetic, but the BF is also available in black.



(32-104F) though be aware that using it in conditions beyond this range will have an impact on battery life, which is rated at 260 images or 60 minutes of video.

## Performance

How does the 'radical simplicity' work in practice? Pretty well, actually. It took a short while to get used to the grammar of the Sigma BF's interface, which is unlike anything I've ever used before. However, after a little adjustment of muscle memory, I was flying. By default, the screen has no information on it whatsoever; all that's displayed is the Live View of your scene. A quick press of the OK button will discreetly display your settings around the edges of the frame, after which you highlight and click the one you want to assign to the wheel – which you can then rotate →

“The idea is that the Sigma BF replaces your phone for those moments when we reach for our pocket”

presents you with a shutter, four buttons (power, play, menu and OK) and a clickable wheel on the back. This might come as a shock if you're used to a DSLR or a pro sports body, but remember, this camera isn't trying to be those things, it's trying to be as streamlined as a smartphone.

We've established that the Sigma BF is a traffic-stoppingly pretty camera. Though, it should be said, that has a lot to do with the fact that I used it mainly with Sigma's new silver 35mm and 90mm I-series primes. With regular black L-Mount lenses, it looks a lot less attractive – though you could, of course, go for the black version of the BF, even if it is a real fingerprint magnet.

Anyway, the camera is machined out of a single ingot of aluminium – a process that takes seven painstaking hours on gigantic machines in the Sigma factory in Aizu, Japan, which I was lucky enough to visit to see the camera being assembled. This gives it an astonishingly robust feel and reassuring degree of heft, while somehow still being incredibly light at just 446g. It evokes the same feeling of tangible quality as other cameras machined from a single piece of metal, like the Olympus PEN-F and the Leica TL. The result is a body with an elegant finish without a single visible screw hole.

However, unlike the PEN-F, which featured a leatherette finish, and the TL with its soft, sexy curves, the Sigma BF is an unapologetically angular camera. While it has no sharp corners, it has hard lines and harsh edges – meaning that its ergonomics are far from friendly to your hands, with the possible exception of the palm notch on the bottom-right of the body, which reminds me of the Sigma SD Quattro. In fact, almost everybody I spoke to felt that the camera was uncomfortable to hold for extended periods. And a few also pointed out that the lack of a front grip also made it hard to keep hold of.

All I can tell you is that I used the camera without any discomfort at all – although I did grow up using a Nintendo NES controller, which is similarly pointy, so maybe my hands are just immune to it. I've also never had a problem keeping hold of a camera without a grip (I don't wear a strap, either) and had no issue holding the BF out over bridges or out of windows.

The camera boasts a 'dust and splash resistant structure', with Sigma explaining that “although this construction allows the lens to be used in light rain, it is not the same as being waterproof”. As with many cameras, the Sigma BF is rated for use in temperatures from zero to 40C





**Above:** The Sigma BF's colour presets are on par with the quality of Fujifilm's Film Simulations. There are 13 in all and allow you to capture scenes as you saw them.  
**Below:** By default, all that's displayed on the LCD is the Live View of your scene. Use the OK button to discreetly display your settings around the edges of the frame.



to manipulate exposure values, scroll through colour presets and so on.

People often criticise cameras with only one control dial, but a lot of photographers shoot in a priority mode anyway, which I dare say is how the Sigma BF is intended to be used – it is aiming to replace the way you use your phone, after all. And if you mount a lens with an aperture ring, you don't really lose any control anyway.

Shooting entirely via the rear screen is something you either vibe with or you don't. Certainly, if you live in a bright environment, where there's a lot of sun or snow, it can be hard at times to see the screen. But again, this is a device that has been designed to replace your smartphone – so shooting on the rear screen is part of the proposition. I shot a travel photography assignment in India using a camera with no EVF and it wasn't such a big deal.

However, since it's the only screen on the camera, I would have preferred one that could tilt. Fixed rear screens should have died out along with DSLRs and, while I appreciate that a tilting screen would have messed with the single piece of aluminium aesthetic, it also restricts your ability to take street photography shots. But this is the same issue you have with a smartphone... so again, perhaps we have to accept that it's simply part of the deal.

I was hugely impressed by the camera's autofocus. Sigma's AF tech

## Rival cameras



**Lumix S9**

**£1,499/\$1,499**

Aimed at creators who want a smaller camera, the S9 lacks a viewfinder. Built-in LUTs will please its target audience.  
 Reviewed: Issue 297



**Nikon Z f**

**£2,299/\$1,999**

Rides a wave of nostalgia for film but at the cost of ergonomics and a lack of lenses. Good autofocus and solid video quality.  
 Reviewed: Issue 276



**Sony A7C II**

**£2,100/\$2,299**

Top-notch video skills but a rangefinder-style EVF. For content creators who want a compact camera packed with pro features.  
 Reviewed: Issue 281







Captured at the maximum sensitivity of ISO 102,400 – our lab testing revealed that the BF bettered its three rivals at higher ISO values.

has improved massively over the years, and I almost forgot that I could move my focus manually because the BF focused exactly where I wanted it to for about 90 per cent of my shots without any guidance. It has head, face and eye subject detection for humans and animals, and I was extremely pleased with its tracking performance, too. It occasionally locked onto a fence or a billboard while shooting a busy street scene, but all it needed was a tap on the screen to place a focus point.

Another big positive came in the form of the colour presets, some of which are on par with the Film Simulations in Fujifilm cameras. There are 13 in all (including the brand new Rich, a punchy oversaturated affair, and Calm, a soft, cyan-heavy number) and some of them are truly sensational straight out of camera. I especially like how they enable you to pre-produce your shots, capturing the scene as you experienced it, rather than post-producing your images until they lose all meaning.

I was concerned about the lack of in-body image stabilisation in the Sigma BF, mainly because I've owned cameras with IBIS for over a decade and my ability to handhold is probably pretty shocking these days. But it was no problem at all and, amazingly, not one of the thousand or so shots I took has even a trace of camera shake.

Unfortunately, the battery life is a bit of a pain point. I was averaging about 180 shots per charge, far short of the quoted 260 images. The situation was even worse in cold conditions, where the aluminium body acted like a refrigerator for the battery, making it even harder to pump out power.

It was perfectly fine for an afternoon or evening of casual shooting, which is arguably its intended use, but if you're



The BF's autofocus system offers head, face and eye subject detection for humans and animals and we found its subject tracking performance to be impressive.

planning on using it for sustained studio work, then you might want to grab a couple of extra batteries.

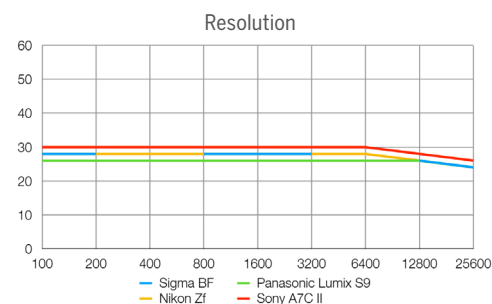
As for video, the 6K 30p (or the 4K 30p to which it can be downsampled) footage is very good. You get 10-bit capture and you get Leica L-Log... but again, you don't get a microphone jack, headphone jack, any kind of shoe or any mounting points for a rig or cage.

And of course, there's no IBIS.

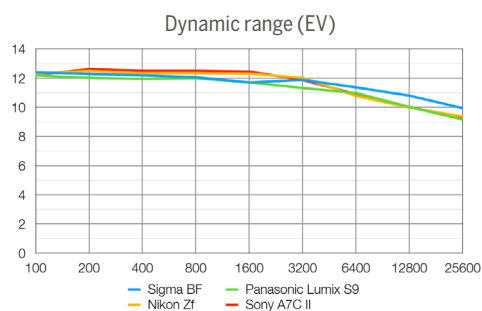
So despite that 6K 30p headline, I would not use this camera to shoot video. Why is it there, then? Because sometimes, being able to snap footage for Reels, Stories and TikToks is incredibly useful – and that's how I think you should consider the BF's video. It's a more than useful bonus, but not a major selling point. **James Artaius**

## Sigma BF **Mirrorless**

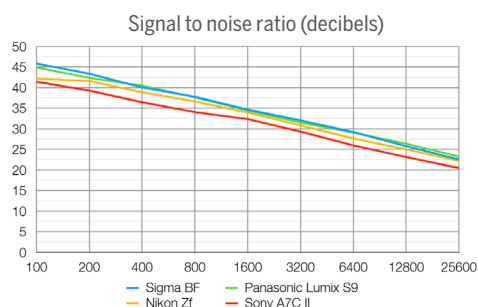
### Lab tests



The BF resolves an equal amount of fine detail to the Nikon Z f throughout our tested sensitivity range and does well to almost match the resolving power of the 33MP Sony A7C II.



All cameras are closely matched at lower ISOs when it comes to capturing dynamic range, but push past ISO 3200 and the BF starts to shine, pulling out a one-stop advantage over the other cameras.



The Sigma BF handles noise well, essentially matching the low noise levels of the Lumix S9 at all tested sensitivities.

### Digital Camera verdict

4.0 ★★★★★ Excellent



Whether snapping shots of a mountain, ambling around a castle or stealing street scenes in the city, the Sigma BF is the perfect camera to stow in a sling bag and whip out to catch those spontaneous moments. There are compromises, of course, but where most other cameras try to be all things to all people, the Sigma BF carves out its own niche. If you're the sort of person who compares the specs against other models, it isn't for you; this is a camera you want because you want it. So could the Sigma BF become your everyday camera? Yes, I think it could.



## Vlogging camera Sony ZV-1 II



# Sony ZV-1 II

£869/\$898

This sequel does little to separate itself from the original

[www.sony.co.uk](http://www.sony.co.uk)

**T**he Sony ZV range has been around for a while, having first been introduced for the rapidly growing segment of vlogging and social content creation. The ZV range offers small and compact systems that aim to produce better content than the smartphone in your pocket. Sony kicked off the range with the original Sony ZV-1, and in just a few years we now have five unique cameras in the lineup. Sony has now released a sequel, the Sony ZV-1 II, although looking at the specs sheet, it's more of a revision than a revolution.

### Key features

The main new feature is the ZV-1 II's wide-angle zoom lens, an 18mm lens designed for vlogging and selfies, while the 50mm focal length at the other end of the range is ideal for portraits and product shots. The lens keeps its maximum aperture of f/1.8 at the wide end but drops to f/4 when zooming in. While the ZV-1 is not image stabilised, it offers Sony's Active digital stabilisation for smoother footage with a slight crop. Behind the lens, the camera has auto-tracking, including Eye AF, for both humans and animals.

The ZV-1 II has a built-in 3-capsule microphone for better sound recording, which can intelligently switch the direction of recording from 'all directions' to 'front' when the camera recognises a human face in the frame. The camera also has digital noise reduction as well as a windscreen included in the box. The ZV-1 II has plenty of features to make vlogging faster and easier, including the option to select from five 'Looks' and four 'Moods' to change the overall style of your video without any complex editing. The ZV-1 II also has a Cinematic Vlog setting that sets the camera to Cinemascope and 24fps for professional-looking video at the touch of a button. These can all be controlled with new touchscreen menus, which Sony claims are more intuitive than ever before.

Other key features of the ZV-1 II include a Product Showcase setting, which automatically switches the focus when it detects a product. The Bokeh Switch changes to a wider aperture and uses

**1** The key new feature on the ZV-1 II is an 18mm wide-angle zoom lens designed for vlogging and selfies. At the other end of the range it is ideal for portraits and product shots.

**2** The ZV1 II comes supplied with a wind defuser that slots into the camera hotshoe. It reduces wind noise in the microphones.

**3** The touch screen is much-improved from the older version and is now more user-friendly for anyone stepping up from a smartphone.

digital blurring for a soft background, similar to professional camera footage. The ZV-1 connects to the Creators' App via Bluetooth, so you can upload photos or use the app to control the camera from afar.

### Build & handling

The ZV-1 II is tiny, but that's one of its main selling points. It's a compact camera that can slide into a pocket or a small bag and go anywhere with you. It has the smallest of grips, which is just about enough to catch a finger on. Otherwise, the build and button layout is the same as the ZV-1, which is no bad thing, as it offers a decent amount of buttons as well as a control wheel.

The camera comes with a wind defuser, which slots into the camera hotshoe and gives good wind suppression to the microphones. The tally light on the front of the camera is a useful feature for letting you know when you are recording, especially if you can't see the screen easily.

The lens extends a surprising way out from the body but retains its balance even when extended. The lens is zoomed in and out using a zoom toggle on the top which has a retro feel to it, but the zoom is smooth and quick enough that you won't miss much action. The other big change from the previous version is the much-improved touch screen. While the older version had limited touch control in menus, you can now control the whole camera, making it more

# Sony ZV-1 II Vlogging camera



Sony's ZV range was designed for vloggers and social media content creators and that's where the ZV-1 II's strengths lie. Its video performance blows even the latest smartphone cinematic modes out of the water.

user-friendly and bringing it more in line with what anyone stepping up from a smartphone will be expecting.

## Performance

In terms of photo performance, Sony's 1-inch sensor produces good photos, but they aren't noticeably better than a phone with decent processing. The bigger sensor gives a slight advantage in low light and sharpness, but there was little difference in image quality between photos from the ZV-1 II and the same images on my Pixel 7 Pro.

Few will notice the difference, as the phone and the ZV-1 II process their images differently. Images from the ZV-1 II are less processed-looking, especially when it comes to HDR, although the purpose of the ZV-1 II is for ready-to-share images, so more aggressive processing could be beneficial – bright areas lost detail in the ZV-1 II's shots compared with HDR phone images.

At the wide end, photos have a slight softness, especially near the edges, and in bright light, occasionally have a glowing ethereal quality. As you go through the zoom range, this sharpens up and, at 50mm, the image quality is good and you can achieve some decent background blur if you are close to your subject. You can push the camera into digital zoom up to 2x (100mm), which produces photos with no perceptible difference in image quality.

The ZV-1 II serves as a perfectly good stills camera, but there are much more compelling and more affordable options. Compared with cameras with larger APS-C sensors, the ZV-1 II sensor size limitations become more apparent.

Gareth Bevan



Sony's 1-inch sensor produces decent photos, but apart from better sharpness and low-light images, they aren't noticeably better than from a phone.

## Video performance

In almost all cases, video performance on the ZV-1 II surpasses that of a phone. The 1-inch sensor offers a more natural depth of field and, while the footage isn't quite a Hollywood production, it blows the latest cinematic video modes out of the water.

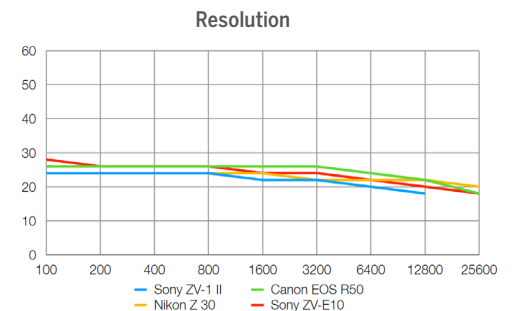
The 4K video from the Sony ZV-1 II is sharp and clear, and performance in low light is good, although better at wider angles, with the top end of the zoom range having a narrower aperture which pushes the ISO and noise a little higher. The camera's shutter speed is fun to play with and I enjoyed creating super slow-motion footage, which is just about passable for social media use. But even with Sony's Active digital stabilisation, the footage was a little jerky and, at times, you can clearly see the digital image stabilisation at work.

The camera shines in its sound quality; the three-microphone array is excellent at picking up voices and does a much better job than other cameras. **Gareth Bevan**

## Specifications

**Mount:** 20MP 1-in BSI CMOS  
**Lens construction:** 18-50mm f/1.8-4.0  
**ISO:** 125-12800 (expandable 80 - 25600)  
**Screen:** 3-in fully articulated touchscreen  
**Shooting speed:** 24fps continuous shooting  
**Video:** 4K (3840x2160), 1080p FHD, FHD 720p 960fps high-speed video  
**Connectivity:** Bluetooth, WiFi  
**Dimensions:** 106 x 60 x 47 mm  
**Weight:** 292g

## Lab tests



The closest competitor in terms of megapixels to the ZV-1 II is the 20.2MP Nikon Z 30, but thanks to its larger APS-C sensor size, fine detail is slightly better defined. The 24MP Canon EOS R50 and Sony ZV-E10 resolve noticeably more detail than the ZV-1 II, though the difference isn't night and day.

## Dynamic range

Despite its smaller sensor size, the ZV-1 II is a solid performer in our dynamic range test, equalling its APS-C rivals at lower sensitivities. Only the Z 30 clearly beats it and, even then, only at higher sensitivities.

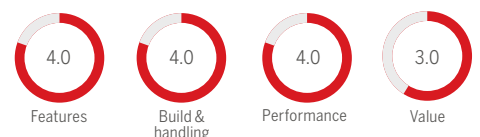
## Signal to noise ratio (decibels)

The ZV-1 II manages to equal the EOS R50 and ZV-E10 when it comes to image clarity and noise. Even though a 1.0-type sensor is significantly smaller than an APS-C sensor, it doesn't put the ZV-1 II at an obvious disadvantage in any of our lab tests.

View the lab charts at: [www.bit.ly/dcm\\_zv1\\_ii](http://www.bit.ly/dcm_zv1_ii)

## Verdict

3.5 ★★★★★ Very good



The ZV-1 II is a strange release for Sony and doesn't do enough to separate itself from the previous model. The ZV-1 II is more of an alternative model to the ZV-1 than an outright upgrade. Some people will prefer the wider zoom, now starting at 18mm, while others will prefer the extra focal length on the original, which also has a wider aperture throughout the range. Sony's decision to up the price by around \$150 from the ZV-1 release makes it a little too expensive for what this camera is capable of.



## Mirrorless Sony A7 V



**1**  
The grip has been redesigned: it is marginally deeper and has more of a lip.

**2**  
The A7 V sports a new partially stacked sensor, which is faster than the one used in the A7 IV.

**3**  
A refreshed Bionz XR2 image processor enables an evolution in AF performance.

# Sony A7 V

£2,799/\$2,899 (body only)

A smarter, faster all-rounder, but with a few compromises

[www.sony.co.uk](http://www.sony.co.uk)

### Specifications

**Lens mount:** Sony E-mount  
**Resolution:** 33MP  
**Processor:** Bionz XR2  
**ISO:** 100-51,200  
**Autofocus:** 759-point phase detect, 94% coverage, -4.0EV  
**Stabilisation:** 7.5 stops (centre), 6.5 stops (periphery)  
**Max burst:** 30fps with AE/AF (electronic) for 185 jpegs / 85 raw  
**Video:** 4K60p 4:2:2 10-bit, 4K120p (Super35),  
**Viewfinder:** 0.5-inch, 3.68m-dot, 0.78x magnification, 60/120fps  
**Screen:** 3.2-in, 2095k-dot LCD  
**Memory cards:** 1 x CFexpress Type A / SD UHS-II, 1 x SD UHS II  
**Battery/shots:** NP-FZ100, rated for 630 shots (EVF), 750 shots (LCD)  
**Dimensions (W x H x D):** 130.3 x 96.4 x 82.4mm  
**Weight:** 695g (incl battery and memory card)

**T**he A7 series has always been Sony's dependable full-frame workhorse, the jack-of-all-trades, and the camera most general photographers should probably buy, whether they shoot portraits, sport, landscapes, weddings or video. The new A7 V doesn't change this; it's still the everyman's camera, but it represents the biggest generational shift this range has seen since the A7 III.

The A7 V has many improvements that trickle down from other recent models, but Sony has also introduced a few firsts. There is a new partially stacked sensor, which improves readout times for faster burst speed and writing video. This is joined by a refreshed Bionz XR2 processor, which integrates the separate AI unit we have seen in most of Sony's recent range into the processor, enabling an evolution in autofocus performance over the prior model.

It's still recognisably an A7-series body, but it's faster, more intelligent and more refined than the A7 IV. However, since the A7 III came along and changed the mirrorless camera game, the

competition has arrived at the party. The latest mid-range bodies from the big players, including the Canon EOS R6 Mk III, Nikon Z 6III and Lumix S1 II, challenge Sony's once-dominant position in this market segment. So does the A7 V do enough to get back out in front?

### Build and handling

If not for the camera name printed along the top plate, you might not spot the difference between the A7 V and the previous model. Sony hasn't radically changed the design, which is fine. Sony cameras are some of the best-looking cameras around, so as the saying goes, if it ain't broke, don't fix it.

Tweaks include a redesigned grip that is marginally deeper and has more of a lip than the previous model. Though the A7 V is compact, it still feels comfortable and well-balanced in the hand, even with the huge array of Sony E-mount glass. However, it could use a little more support at the bottom for larger hands, as my little finger was left dangling.

The A7 V still has controls everywhere, including a button for almost every function you'd want during everyday



## Sony A7 V Mirrorless



4

The electronic viewfinder offers 100 per cent coverage, with a 3.68m dots resolution.

5

A collar on the main mode dial offers fast switching between Still/Video/S&Q.

6

There are twin UHS-II SD card slots; the top one also takes CFexpress Type A cards.

7

The layout of controls on the rear panel has been retained and is intuitive to use.

8

A pair of USB-C ports offers one for charging, and one for transferring data.

9

Battery life has been improved, and it betters most of the A7 V's mirrorless rivals.

shooting. Most can be remapped to taste, making the camera feel more personalised the longer you use it.

The EVF is identical to the one on the A7 IV. It's a 0.5-inch, 3.68m-dot screen with a 0.78x magnification, and it is switchable between 60 and 120 fps, for power conservation or smoother subject tracking. It's not class-leading, but it's a fine EVF that you won't struggle to use. The LCD screen has received a more significant improvement, with a bump in size from 3 inches to 3.2 inches, and a long-overdue leap in resolution from a 1.03m-dot screen on the A7 IV to a 2.1m-dot screen on the A7 V.

Sony's menus are well-designed and relatively easy to navigate around, although some newer users might find them overwhelming due to the number of options. Fortunately, Sony has brief in-camera explanations for settings, should you be confused about what something does. But I still had to Google a couple of times where a specific setting was, after trawling through the menus had me pulling my hair out. Thankfully, there is a simplified

touch interface that is the fastest way to change key settings without diving through layers of menus.

The A7 V has also inherited the 4-axis multi-angle screen we've seen on recent Sony models. It's a big upgrade over earlier A7 bodies, and with the added tilt, it makes low-angle photography easier and more subtle, as you no longer have to flip out and rotate the entire screen. It can also avoid cable congestion, with the additional axis providing enough space for the screen to clear any HDMI or USB-C cables connected to the camera during filming.

I am a little torn on the unmarked port doors. On one hand, it looks clean and minimalist, but the unmarked flaps are confusing and I opened the wrong flap in search of the USB-C ports on a few occasions. Underneath those ports, Sony has included a full-size HDMI for connecting to an external monitor, a headphone jack for monitoring sound, a mic jack with plug-in power, and a new addition that's slightly surprising: two USB-C ports – one for mains power and one for connecting accessories. Perhaps Sony knows differently, —>



The 3.2-inch flip-out LCD rear screen assembly features Sony's latest fully articulating design.

Gareth Bevan



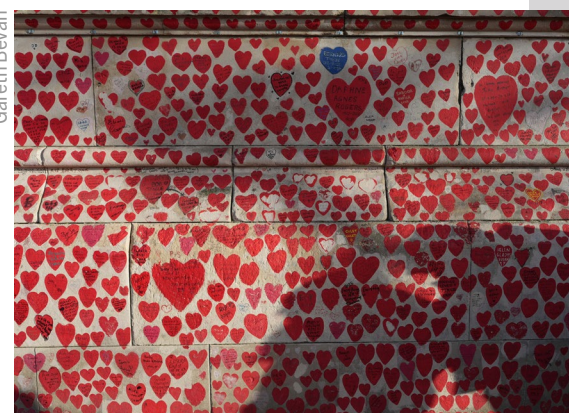
The 4-axis multi-angle screen is a big upgrade over earlier A7 bodies. It makes low-angle shots easier, as you no longer have to fully flip out the screen.

Gareth Bevan



The A7 V is compact and feels well-balanced and comfortable in the hand. However, it could use a little more support at the bottom for larger hands.

Gareth Bevan



Even in harsh, low winter sun, jpegs on the A7 V retained a surprising amount of detail in the highlights without brightening the shadows, too.





The amount of detail I was able to salvage from underexposed images was particularly impressive. There's plenty of scope to manipulate colours, too.

but it feels a little unnecessary, and not a scenario that will trouble many users.

Finally, the two SD card slots from the previous model remain, with one doubling as CFexpress Type A. This is useful if you shoot a lot of high-bitrate video or long bursts, but Type A cards are still prohibitively expensive and not widely used outside Sony's camera ecosystem. Of course, Sony is going to support its own format, but CFexpress Type B would be more affordable and more useful for any frequent system switchers.

### Performance

Sony has kept the resolution at a respectable 33MP, making it the highest-resolution partially stacked sensor yet, albeit from a limited field. It remains the sweet spot of file size, detail and overall usability, and if you do need more resolution, the Sony A7R V has you covered. In terms of image quality, the A7 V doesn't spring any surprises – it just refines what Sony already did well. Using

the excellent Sony FE 24-50mm F2.8 G lens, my images were packed with plenty of detail and a decent amount of scope for cropping, but you'd struggle to see any difference over the previous model.

Sony promises 16 stops of dynamic range, and there is a good amount of scope to push and pull shadows and highlights. Both jpeg and HEIF files are good; the highs and lows are nicely balanced without looking overly processed. I shot in harsh, low winter sun lighting conditions, but the jpegs retained a surprising amount of detail in the highlights without brightening the shadows too aggressively. And shooting in 4:2:2 10-bit HEIF, I was especially impressed by the amount of detail I was able to salvage from underexposed images, and the scope to manipulate colours.

Noise performance has so far been strong throughout the 100-6,400 range, but it becomes an unavoidable issue at higher ISOs. You can go up to 51,200, although

I wouldn't recommend these extreme values unless you really need that shot.

Sony also claims that white balance will look more consistent thanks to AI-assisted AWB, and I have been impressed by the accuracy from the A7 V; even in challenging light, it has avoided the slightly greenish cast Sony has been known for.

Colours are accurate and true to life, but don't have a signature look. Sony offers some control over jpeg images, with several different pre-programmed styles, including a few non-specific film emulations and black and white profiles, and you can also tweak your own. These profiles are great for adding a quick bit of style to an otherwise mundane image, but they don't have the flexibility of Fujifilm's recipes or Lumix's LUTs to consider the A7 V jpegs as being social-media-ready.

Autofocus on the A7 V is the biggest improvement Sony has made over the prior generation. The A7 V doesn't see anything new that hasn't already been on other Sony models, but the new AI unit (now integrated into the main processor) brings the latest subject recognition across all subject types, not just human faces, but also to animals, birds, insects and vehicles. There are also a whopping 759 PDAF points covering 94 per cent of the sensor.

“Autofocus is lightning-quick. It's also one of the most confident and accurate subject recognition AF systems I've used”



Gareth Bevan

Noise performance is strong throughout the ISO 100 to 6,400 range, but becomes an issue at higher ISOs.



Gareth Bevan

AI-assisted AWB is impressive on the A7 V. It avoids the greenish cast that Sony had become known for.



Sony offers several styles, including film emulations and black and white profiles.

The A7 V also benefits from the latest auto subject recognition mode, which means you no longer have to pick the specific type of subject you are shooting, as the camera can recognise all subjects in one unified mode. However, you can still pick a specific subject type, should you wish to focus on a pet and not the owner, or a driver and not the car, for example.

In practice, the autofocus was lightning-quick. It's also one of the most confident and accurate subject recognition autofocus systems I have used. Tracking is incredibly sticky and easy to use; just tap on your subject on the touchscreen, and the autofocus glues itself to it.

Though I didn't really push it to its limits, one of the benefits of the partially stacked sensor is the A7 V's blistering 30fps blackout-free shooting with autofocus and auto exposure, while the buffer can handle up to 185 jpeg or 85 raw images when using CFexpress Type A cards. You also get pre-capture, which is programmable from 0.03 to 1 sec before you press the shutter, giving you a safety net for moments that happen just before you can react.

The battery life is good, too. Official ratings of 630 shots with the EVF or 750

with the LCD represent an improvement – and are much better than most mirrorless rivals. In practice, I didn't quite get those numbers, but there was a noticeable improvement, and I would be confident shooting a full-day event such as a wedding on just a couple of NP-FZ100 batteries.

For video, it's another big leap from the previous generation, adding 4K/120P, and the new partially stacked sensor improves readout speeds for less rolling shutter. But while video has improved, some limitations feel more noticeable, given what other brands are offering. Where rivals are pushing 6, 7 or even 8K open-gate video, the video from the A7 V tops out at 4K. The 4K is oversampled from the 7K readout of the sensor, and video quality is excellent as you'd expect from Sony. But missing out on open gate limits a creative tool that is increasingly useful to video editors trying to edit for multiple platforms, while restricting the resolution limits in post-production cropping.

Using the full sensor, the A7 V can record in 4K up to 60p. 4K/120P, on the other hand, requires a more significant Super35 (roughly APS-C) crop. This is to be expected and does allow better control over rolling shutter speed and colour dynamic range. The

Canon EOS R6 Mark III is the only hybrid camera at a similar price point that offers full frame readout 4K/120p – but we have yet to see how that performs.

The rolling shutter is well controlled, and high-speed trains remained firmly upright rather than skewed. This is not just a huge improvement on the last generation, but it embarrasses recent video cameras like the Sony FX2 and its lousy rolling shutter. Unfortunately, Sony also continues to avoid raw video. This is another Sony camera with no internal raw, including industry standards like Apple ProRes, which again sets it behind similarly priced rivals. You get 4:2:2 10-bit footage in S-Log or S-Log2, which gives scope for changing colours and lighting in post-production, but also makes it more challenging to use with footage shot using other systems.

The A7 V has an improved 7.5 stops of in-body stabilisation in the centre and 6.5 stops on the peripheries. The A7 V is impressively stable for handheld video in subtle movements like panning, but IBIS alone won't counter heavier movements like walking. However, the A7 V now benefits from improved digital stabilisation, with Active and Dynamic stabilisation modes. These add a slight crop to the footage, but they are effective and make handheld footage look smoother than before. It isn't quite Lumix/OM level, but the A7 V remains one of the better stabilised full-frame cameras for general use. **Gareth Bevan**

## Digital Camera early verdict

4.5 ★★★★★ Outstanding



While the autofocus leap alone might have been enough to make this a compelling upgrade over the previous model, Sony has also improved the handling, stabilisation and burst speed, and with the new partially stacked sensor, video gets a big boost with 4K/120P and tighter rolling shutter. However, the A7 V is not flawless. Despite the improvements to video, the specs still feel a little held back compared with some rivals, with no open gate, a max resolution of 4K and limited codecs with no internal raw. CFexpress Type A also remains a pricey investment to get the best out of the latest power features.

The bottom line is that the A7 V is faster and smarter than the A7 IV and is a worthy upgrade. Although it has strayed even further out of enthusiast territory and more into professional territory – and for many photographers, this might be overkill – for serious enthusiasts, pros and hybrid creators, this could be the best Sony camera that has been released for quite some time.





**1**  
The improved moulded grip shape is more rounded and can accept four fingers.

**2**  
The A1 II's resolution is bettered by the A9 III, but a 50MP sensor is none too shabby.

**3**  
Plenty of E-mount lenses are available from Sony and third-party makers.

# Sony A1 II

£6,299/\$6,499 (body only)

Powerful new autofocus boosts an otherwise predictable sequel

[www.sony.co.uk](http://www.sony.co.uk)

## Specifications

**Lens mount:** Sony E  
**Sensor:** 50.1MP full-frame Exmor RS CMOS  
**Image processor:** Bionz XR  
**Autofocus:** 759 phase-detect, 425 contrast-detect  
**ISO range:** 100-32,000 (expandable to 50-102,400)  
**Image stabilisation:** Five-axis, up to 8.5 stops  
**Max burst:** 10fps mechanical shutter, 30fps electronic shutter  
**Max image size:** 8,640 x 5,760px (199MP with Multi Shot mode)  
**Max shutter speed:** 1/32,000 sec (electronic); 1/800 (mechanical)  
**Video recording:** 4 8K 30p (XAVC HS 8K), 4K (XAVC HS 4K or XAVC S 4K) up to 120p, 10-bit 4:2:0 internal, 16-bit raw via HDMI  
**Viewfinder:** 9.44m dots, 100% coverage, 0.9x magnification, 240fps refresh rate  
**LCD:** 3-inch tilting touchscreen, 2.1m dots  
**Memory cards:** 2x CFexpress Type A/ SD UHS-II/SDHC/SDXC  
**Connectivity:** Wi-Fi 5GHz and 2.4GHz, Bluetooth  
**Dimensions (W x H x D):** 136 x 97 x 83mm  
**Weight:** 743g body only, incl battery and memory card

**T**he A1 II is the latest flagship camera from Sony, succeeding the original A1 released three years previously – and the first Alpha camera released in over a year. While a hugely impressive camera if you take a look at its spec sheet – continuing the A1 brand of being a camera that is just really good at absolutely everything. I also find it, on the whole, an all too predictable update.

The A1 II maintains many killer features from its predecessor, including the excellent 50.1MP sensor and adds a few new ones, but it lacks a little pizzazz with showstopping new features. The majority of its most significant updates, while undeniably amazing technologies have already been seen in other Sony models – most notably last year's A9 III.

Except for one biggie that is. There is one standout feature that I am incredibly excited by, and is set to be a game-changer for Sony autofocus going forward – and that is the world's first

full-frame auto-subject detection. While this tech debuted on the APS-C Fujifilm X-S20, for the first time this enables simultaneous identification of multiple subjects on a full-frame camera without manual selection.

The A1 II is still inexplicably expensive, launching at £6,300 (\$6,500) – the same price as the first generation in the US, although slightly lower in price than the A1 was in the UK. If you are interested in the A1 II, it's likely you're already locked in with a lot of pricey Sony G Master lenses, so the cost is something you'll have to adjust to.

## Build and handling

Sony has long homogenised the style and layout of its Alpha series cameras, and whether you use the A7 IV, the A9 III or the A1 II, your experience will be largely the same – which makes bouncing between different models incredibly easy if you often need to carry a second body. And at around 792g (with a battery, two SD cards, and a strap),



## Sony A1 II Mirrorless



4

With 9.44 million dots, the A1 II's high-resolution EVF is still class-leading.

7

The layout of external ports has been revised, to make simultaneous use a better experience.

5

Use this 'thumbstick' controller for setting the focus point or navigating menus.

8

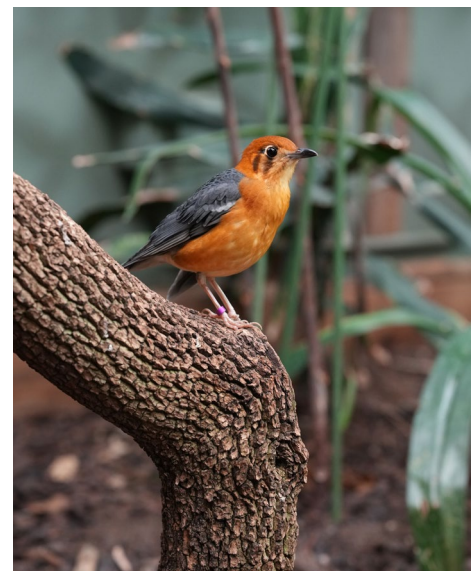
The movie and S&Q modes have been moved to a switch under the mode dial.

6

The A1 II gets the four-axis multi-angle LCD from the A9 III. The screen now rotates fully.

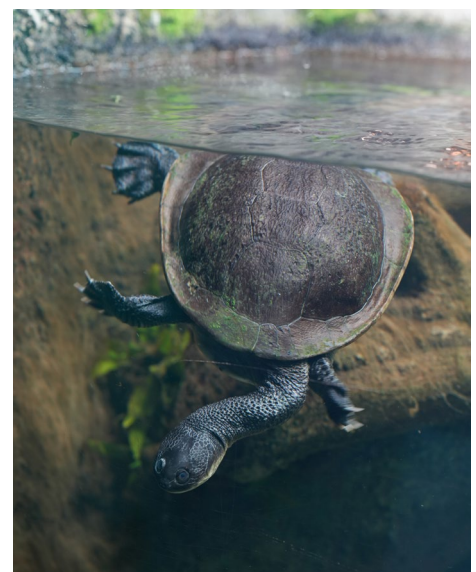
9

Although set for exposure compensation, this dial's function can be customised.



Gareth Bevan

Auto subject detection is the A1 II's game-changing feature – no need to select the subject beforehand.



Gareth Bevan

Colour rendition is accurate though it lacks punch. But Sony's image profiles can give them a boost.

carrying the A1 II isn't much of a chore. The improved moulded grip shape is more rounded and I could actually get all four fingers on the grip, which is a rarity with most mirrorless cameras. I found the A1 II comfortable to hold one-handed – even when I had Sony's monster new 28-70mm lens attached, although I did have to take some breaks.

All-in-all there is an incredible, almost overwhelming amount of control over the A1 II. The camera follows the same button and dials layout as last year's A9 III and is only a minor departure from how things are laid out on the A1.

The most significant changes are that the movie and S&Q modes have been moved from the mode dial to a three-way switch underneath the mode dial – this is protected with a lock so you don't accidentally nudge yourself between modes, but makes switching between modes much faster. And the dial in the rear left has dropped its exposure compensation markings as the dial can be customised to other

functions if desired – although is still set by default for exposure compensation.

The other controls on the A1 II include a second customisable dial on the top plate, one on the rear of the camera that also functions as a D-pad, and a dial on the front grip. Alongside the mode dial are two more (lockable) dials to control burst speeds as well as focus mode.

### Performance

Autofocus has seen the biggest leap forward over the previous iteration. The A1 II finally catches up to other Sony cameras with the latest algorithms that not only speed up focusing but now can recognise human bodies, faces and eyes, as well as animals, birds, insects, and several types of vehicles. There is nothing really new here, but the A1 II brings one game-changing new feature for Sony – auto subject detection.

The Sony A1 II becomes the first camera in Sony's lineup to be able to recognise all the different subjects listed above, but in one mode →





Gareth Bevan

The in-body image stabilisation is outstanding. Even when snatching quick shots in low-light conditions on a busy shopping street, the A1 II's captures were sharp.

– no more flicking between different subjects in the settings (unless you want to limit the recognition to one particular subject). Just spotted an elusive creature? No need to waste valuable seconds changing to animal autofocus; just point and shoot.

The auto setting works really well, with the camera easily jumping between different subjects with the same accuracy I would get in each specific recognition mode. The auto mode sometimes got a little tripped up when it came to multiple subjects in one frame. On one occasion, I tried to take a full-length portrait of a person, but the camera was insistent on focusing on a bouncy dog that was next to them rather than their face. And in a wide group shot the camera also kept jumping focus to passing

cars rather than the smaller static human subjects. But these were rare and fairly minor inconveniences, likely to be fine-tuned in time by Sony.

The photo quality from the Sony A1 II is just exceptional – paired with the new Sony FE 28-70mm F2 GM lens, photos were crystal clear and pin sharp. Shooting the London Eye from nearly half a mile away on Westminster Bridge, I could almost have identified the people in the pods. With the same sensor as the previous model, you won't notice a difference if upgrading – and if image quality is really essential, then the Sony A7R V has an even higher resolution.

The colours out of the A1 II are good. I don't like Sony's standard colour

science as much as other brands but images are very accurate, if lacking a little punch. However, Sony does offer several set image profiles to change up the look of your jpegs or you can fine-tune your own.

The A1 II offers up to 8.5 stops of in-body image stabilisation, besting the A9 III by another half-stop. For still images, the IBIS is outstanding – I found that I could comfortably use the camera in low light without real concern. I photographed the Christmas lights in London's busy Oxford Street at night and, despite the jostling and bumps from other shoppers and the fast pace I was working at, the shots were still incredibly sharp.

## Rival cameras



Canon EOS R5 Mark II  
£4,499/\$3,999

All the speed you need, all the resolution you could want and an autofocus system you've only dreamed of. The new sheriff in town. Reviewed: issue 295



Nikon Z 8  
£3,999/\$3,999

Inherits the vast majority of the Nikon Z 9's specs, including its blisteringly fast electronic shutter and EXPEED 7 processor. Reviewed: issue 270



Sony A7R V  
£3,999/\$3,898

Pitched as the resolution specialist, the A7R V also blurs all the video and sports boundaries. It's an amazing technological achievement. Reviewed: issue 264



Gareth Bevan

Gareth got to test the A1 II with Sony's monster new FE 28-70mm F2 GM lens.





Paired with the new Sony FE 28-70mm F2 GM (due to be reviewed in issue 295), the A1 II did a great job in changeable lighting, with the focus fall-off pleasingly smooth here. Exposure: 1/250 sec at f/4, ISO 100.

Video quality is excellent. The camera can record in up to 8K, although how many people really need 8K video? The files are monstrous to store and work with; I filled my 128GB card in around 19 minutes and struggled to edit the files even on a brand-new M4 MacBook Pro.

As a jack-of-all-trades camera, the Sony A1 II is a phenomenal all-rounder, and if you cover several different and varied areas, then perhaps it will be the perfect camera for your needs. Yet there are other models in Sony's lineup, many of which do a better or similar job at specific photography types, for considerably less money.

Landscape or product photographers seeking the absolute best image quality could consider the 64MP Sony A7R V, which can also record 8K video (most recent Sony models can provide equal quality 4K). If you can afford the price of the A1 II, the global sensor and ludicrous shutter speeds of the Sony A9 III might be better for fast action. So if you are considering the A1 II, ask yourself whether you really need everything it has to offer. **Gareth Bevan**

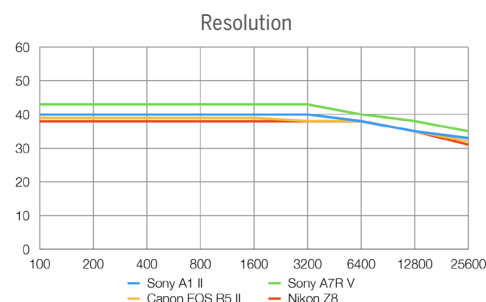


Gareth Bevan

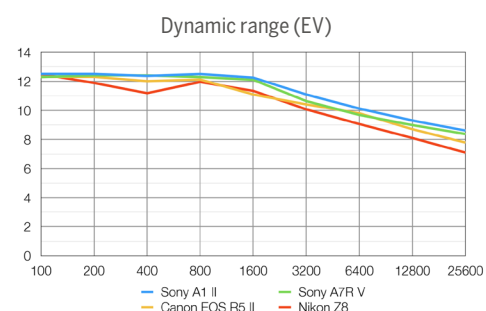
A good example of the A1 II's 50.1MP resolution – shot at 70mm, there is a lot of detail to play with.

## Sony A1 II **Mirrorless**

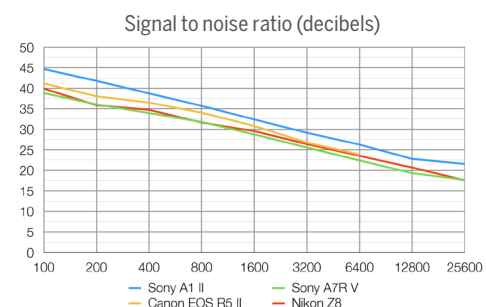
### Lab tests



Unsurprisingly, the 61MP A7R V does best in our resolution test, but the 50.1MP A1 II isn't that far behind and it narrowly beats the Canon and Nikon competition at most sensitivity settings.



The A1 II captures excellent dynamic range throughout the tested sensitivity range, decisively beating the Canon EOS R5 II and Nikon Z8, and coming out just ahead of the Sony A7R V.



The A1 II produces the cleanest, least noisy images, by some margin. The gap between it and the A7R V is especially noticeable, proving that extra megapixels don't always improve image quality.

### Digital Camera verdict

4.5 ★★★★★ Outstanding



Though it's a fairly predictable sequel, the A1 II keeps Sony's flagship fresh and up-to-date. It's a testament to how cutting-edge the original Sony A1 was that it only needs minor tweaks to stay with the pack. Image quality is exceptional, alongside Sony's best-ever IBIS, but the major improvement is to the autofocus, with its game-changing auto subject recognition. Not only is it faster than ever, but Sony's AF is now easier and more intuitive for focusing in a range of situations. It's a shame the A1 II still costs so much, as its rivals are catching up – and they're less pricey.





**1**  
A larger front grip makes the A7R IV a little easier to handle, but the body still lacks height for a good 'grip'.

**2**  
Inside is an NP-FZ100 lithium-ion cell which gives a battery life of 530 (viewfinder) or 670 shots (rear screen).

**3**  
The Sony FE lens mount is now very well-supported both with Sony optics and third-party lenses.

# Sony Alpha 7R IV

£3,499/\$3,499

As a technical achievement, the A7R Mark IV is remarkable.  
As a camera, its handling foibles are starting to grate

[www.sony.co.uk](http://www.sony.co.uk)

## Specifications

**Sensor:** 61MP full-frame Exmor R CMOS sensor

**Image processor:** Bionz X

**AF points:** Hybrid AF;

567 phase-detection, 325 contrast AF points

**ISO range:** 100 to 32,000 (exp 50-102,400)

**Max image size:** 9,504 x 6,336

**Metering modes:** Multi-segment, centre-weighted, spot, average, highlight

**Video:** 4K UHD at 30p, 24p

**Viewfinder:** EVF, 5.76m dots

**Memory card:** Two SD/SDHC/SDXC (UHS II)

**LCD:** 3-inch tilting touchscreen, 1.44m dots

**Max burst:** 10fps

**Connectivity:** Wi-Fi, Bluetooth, NFC

**Size:** 129 x 96 x 78mm

**Weight:** 655g (body only, with battery and SD card)

Sony doesn't want the Alpha 7R IV to be thought of solely in terms of resolution, but a 61MP sensor is bound to grab the headlines. It beats its full-frame rivals by some margin, and re-establishes Sony as a front-runner in a full-frame mirrorless camera market that's become very busy.

But the A7R IV is not just about resolution. It has a very rounded balance of overall image quality and versatility, combining its ultra-high-resolution with 10fps continuous shooting capability and a buffer that can sustain this for up to 7 seconds.

Sony's epic hybrid AF technology takes another step forward too, with 567 phase-detection AF points spread across 74% of the image area and 325 contrast AF points. It now offers Real-Time AF tracking in its movie mode, too.

And just to drive home the resolution point once more, the Alpha 7R IV has a Pixel Shift Multi Shooting mode that can combine four images for full-colour data for each pixel (avoiding the demosaicing interpolation process cameras normally use) or 16 images with sub-pixel movements to create 240-megapixel photographs.

## Sony Alpha 7R IV Mirrorless



**4** The EVF has a high resolution at 5.76m dots, but manages to look a little oversharpened.

**6** The focus joystick is a good size and proves very useful for positioning the AF point quickly.

**8** On the Sony A7R IV, customisable C1, C2, C3 and C4 buttons replace dedicated WB and other controls.

**5** The rear touchscreen is smaller than some (3-in, not 3.2-in), can't flip forwards and has no sideways action.

**7** Unlike the Nikon Z 7 and the Lumix S1R, the A7R IV does not have a status screen on the top plate.

**9** The EV compensation dial is handy, and has a locking button to prevent it being turned accidentally.



### Key features

61 million pixels is a ground-breaking resolution for full-frame cameras, but it's worth pointing out that this increase is spread across both the image width and height, so the A7R IV's images are not that much larger than those of the Nikon Z 7, say, measuring 9,504 x 6,336 pixels (Sony) versus 8,256 x 5,504 pixels (Nikon). That's an increase in image width and height of 15%.

What's truly impressive, though, is how Sony has managed to maintain a 10fps continuous shooting speed, despite the massive increase in the data that's being captured and processed. True, the buffer capacity is restricted to 68 raw files/JPEGs, but it's also possible to shoot in an APS-C mode that captures 26-megapixel images and with three times the buffer capacity (claimed).

Sony's latest autofocus system brings 567 phase-detection AF points to the A7R IV, covering 74% of the image area (or the entire area in APS-C mode), and supporting both human and animal eye tracking.

Video performance gets a boost with the addition of Real-Time AF, but otherwise it does feel as if Sony is resting on its laurels somewhat. There's still no 50/60p 4K video capability, nor 10-bit capture; and if you want the best 'oversampled' quality, you need to use the cropped Super 35 mode. You can capture Full HD at up to 120fps. Arguably, the A7R IV is hardly a video specialist. Nevertheless, it does feel as if the video capabilities have not really advanced significantly.

The A7R Mark IV does bring wireless tethered shooting capability, though the large files and limited wireless data bandwidth means you're still likely to be better off with an old-fashioned cable connection.

Sony says its five-axis in-body stabilisation system has been tuned for this new camera to offer up to 5.5EV compensation, and the A7R IV's Pixel Shift Multi Shooting mode can merge 16 shots made with tiny pixel-shifts between each to produce 240MP images – if you have static subjects, sufficient



This portrait shot from an official Sony hands-on session really highlights the value of Sony's Eye AF system, especially with fast prime lenses at wide apertures.

storage capacity and the required Sony Imaging Edge 2.0 software.

### Build and handling

Sony's A7 series was the first full-frame mirrorless camera design, and it's still the smallest. That's great in principle, but when you match up these bodies with Sony's bigger, high-performance lenses (especially the premium



## Mirrorless Sony Alpha 7R IV



The A7R IV produces excellent JPEG images with rich, saturated but natural-looking colours.



The new focus joystick made it much easier to select the rearmost statue to focus on.



The A7R Mark IV's body is nice and small, but Sony's G Master lenses are not!

G Masters, like the 24-70mm f/2.8 lens used for most of our testing, the combination quickly starts to feel front-heavy.

This has been addressed in the A7R IV with a larger grip on the camera body. It doesn't sound much of a change, but it makes a considerable difference. It's immediately obvious when you pick up and handle these cameras side by side.

There's a bigger AF-On button too, and the EV compensation dial now has a lock to prevent accidental adjustments (easily done when

your thumb is reaching quickly for the rear control dial).

The electronic viewfinder now has 5.76 million dots, which ought to make it super-clear. It still has a 'digital' look – you can't see the dots, of course, but object edges have a distinctly oversharpened look. It's a reminder that EVFs are simply tiny digital screens that offer no more guarantee of accuracy than a computer monitor.

The three-inch rear screen is starting to feel a little small on a camera of this class too, especially while you're shooting video, where you lose the top and bottom edges to the narrower 16:9 ratio.

What shows up the ageing A7 design more than anything else, though, is what rival camera makers have done. The Nikon Z 6 and Z 7 are slightly larger cameras that handle rather better – and have lenses that feel as if they are designed to balance properly with the body. They also have a top-mounted status panel, as does the Panasonic Lumix S1R: an even larger and heavier camera, but one that has the heft you need when you're shooting with big and heavy professional lenses.

The A7R also relies heavily on its customisable function buttons instead of buttons specifically for functions like white balance, AF mode/area, image size/quality and so on. It also has a tiresome menu system made up of six tabs and no fewer than 40 individual screens.

The A7R IV isn't a camera you can just pick up and use. You have to learn how it's set up, where to find the functions you need and how to get it to work the way you like. If you like tinkering and personalising, you'll probably love it. If you like

## Rival cameras



**Fujifilm GFX 50R**  
£3,449/\$3,999

The GFX 50R is built purely for quality, not all-round handling and speed, but it costs no more than the A7R IV and has a larger sensor. Reviewed: issue 212



**Nikon Z 7**  
£2,519/\$2,697

The Z 7 can't match the A7R IV's outright resolution, but it's a lot cheaper, handles extremely well and has very good IBIS. Reviewed: issue 208

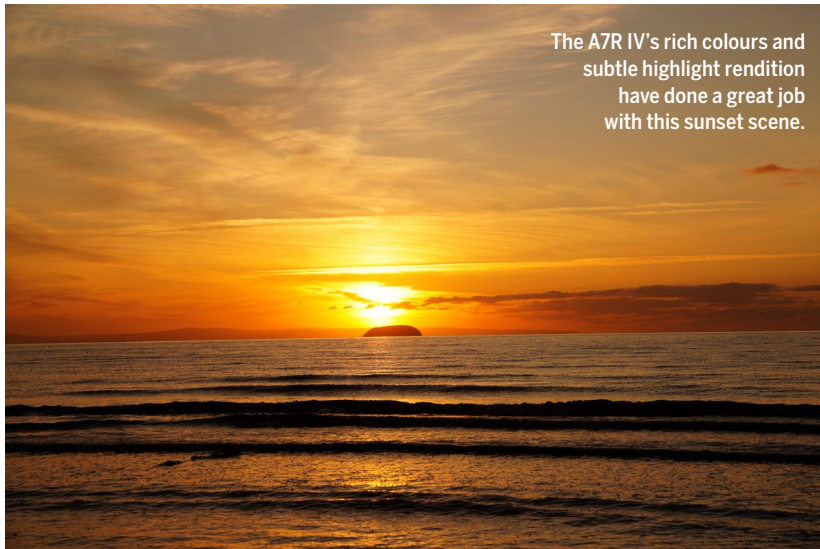


**Panasonic Lumix S1R**  
£2,999/\$3,698

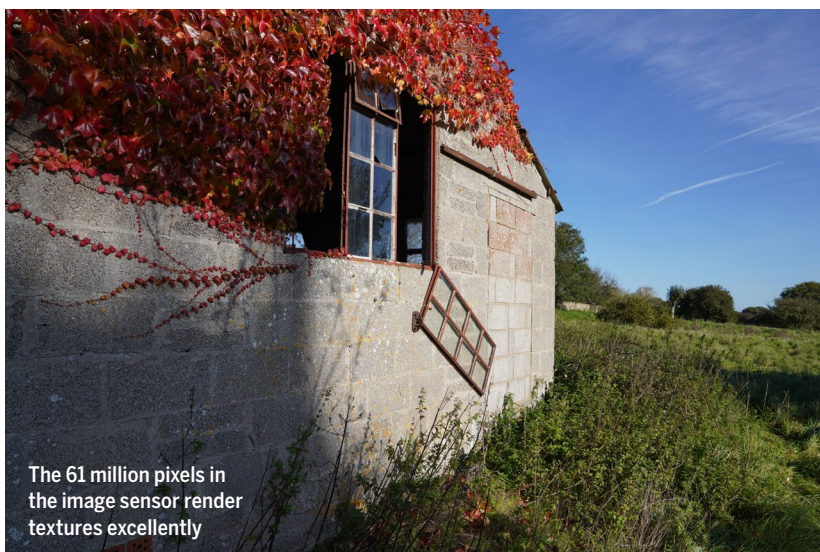
The Lumix S1R doesn't match the A7R IV's resolution, but it has more advanced 4K video and a bigger body better suited to pro lenses. Reviewed: issue 216







The A7R IV's rich colours and subtle highlight rendition have done a great job with this sunset scene.



The 61 million pixels in the image sensor render textures excellently

your cameras to be logical and obvious, it's a different story.

## Performance

On paper, the Sony A7R Mark IV looks spectacular; in practice, the advantage of its 61MP resolution over 40-50 megapixel rivals is more subtle.

You have to be particularly careful with the shutter speeds and focusing to get the full benefit of the 61MP sensor, and although Sony claims a 5.5-stop shutter speed advantage from the five-axis in-body-stabilisation, you'd be unwise to rely on it. We tried some handheld shots with the new Sony 35mm lens at slow shutter speeds between 1/8 and 1/2 sec, which should be in its safety zone, and got a pretty poor success rate.

Despite disappointing lab results, the real-world dynamic range is very good. Our outdoor shots under a tricky overcast sky came out really well, with subtle sky detail, and no blow-out or

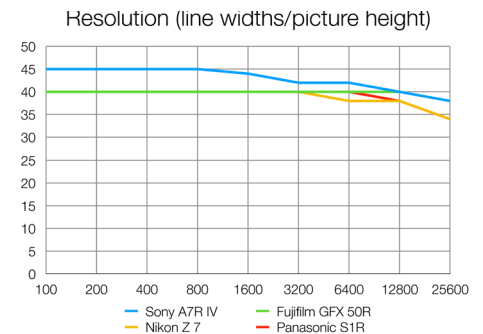
colour shifts. Sony says it's tweaked the processing to produce subtler highlight gradations, so perhaps that's the explanation.

The colour rendition is especially good, and the A7R IV produces very natural-looking JPEGs. Most of our sample shots were taken using Auto white balance, and none looked as if they needed colour correction.

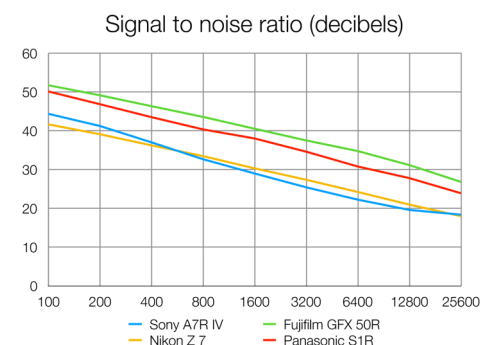
The Eye AF works almost uncannily well as long as your subject is not moving about too quickly. It started to lose contact with very rapid subject movements in continuous shooting/continuous AF mode, but only under pretty extreme provocation.

The A7R IV's 10fps continuous shooting mode is amazing in a camera with this kind of resolution, but the size of its buffer shows it's not really a sports specialist. Once the buffer is full, it takes some time to clear while the data is written to the memory card. **Rod Lawton**

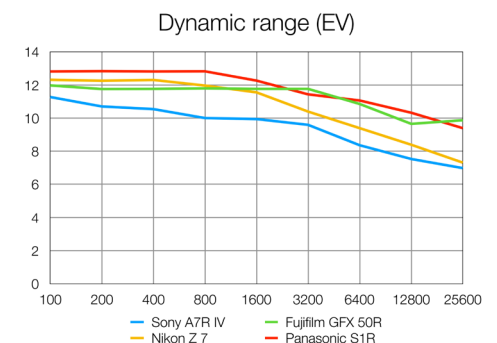
## Lab tests



The Sony A7R Mark IV's resolution advantage is due in part to our new test method, so its rivals may be closer than they appear here. We show this comparison chart for information purposes.



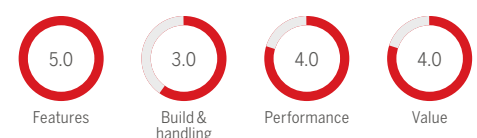
The Fujifilm GFX 50R wins in this test by virtue of its larger sensor, and the Lumix S1R is close behind – Panasonic cameras tend to be good at noise control.



Sony claims 15 stops of dynamic range for this camera, but in our lab tests the A7R IV was slightly disappointing compared to its rivals.

## Digital Camera verdict

4.0 ★★★★★ Excellent



The Sony A7R Mark IV raises the resolution bar for full-frame sensors, but it's a subtle, incremental improvement rather than a giant leap forward.





**1** Impressive specs include a global shutter image sensor, 120fps shooting and a shutter speed of 1/80,000 sec.

**2** A new addition is a fifth custom button, C5. By default, this acts as a modifier to engage the 120fps bursts on HQ+.

**3** The ergonomics of the camera's grip have been refined – at the request of A9 II users, according to Sony.

# Sony A9 III

£6,099/\$5,998 (body only)

This camera's global shutter could change photography forever

[www.sony.co.uk](http://www.sony.co.uk)

## Specifications

**Lens mount:** Sony E  
**Sensor:** 24.6MP full-frame global shutter Exmor RS CMOS  
**Image processor:** Bionz XR  
**Autofocus:** Phase detection, 759 points (stills), 627 points (video), AI-based Real-time Recognition AF  
**ISO sensitivity:** 250-25,600 (exp to 125-51,200 for stills)  
**Image stabilisation:** Up to 8 stops  
**Continuous shooting:** 120fps raw + jpeg, full res, blackout-free, with AF/AE  
**Max shutter speed:** 1/80,000 sec (1/16,000 sec for continuous)  
**Video recording:** 4K 60p (oversampled 6K), 4K 120p  
**Viewfinder:** 9437k-dot Quad XGA OLED  
**LCD:** 3.2-in 2095k-dot 4-axis monitor  
**Memory cards:** 2x SD UHS-II / CFexpress A hybrid

**T**he Sony A9 III is easily the most advanced camera ever made. While not yet referred to as the company's flagship, the A9 series has traditionally occupied that position. As mighty as the Sony A1 is, its specs look quaint compared with those of the A9 III.

The top sports cameras have long been a launchpad for manufacturers' cutting-edge technology, but I have never seen a camera with as much futuristic tech as the Sony A9 III – this is a camera that will transform the way we use cameras.

With headlines including the world's first full-frame global shutter image sensor, 120fps continuous shooting at full resolution (24.5MP) jpeg and raw, and the ability to shoot with a shutter speed of 1/80,000 sec, this is a camera made of pure photographic muscle.

## Features

The Sony A9 III is so loaded with killer specs that it may be easier to say what isn't a key feature. The biggest and most game-changing one is the full-frame global shutter – the first in the world and transformative in terms of how it enables us to capture both photographs and video.

Essentially, a global shutter exposes every frame on the sensor at the same time, rather than line-by-line, scanning left-to-right from top-to-bottom, the way traditional sensors do. The result is that 'rolling shutter', where straight lines (whether they are moving vehicles, telegraph poles or buildings) appear warped and distorted when shot at high electronic speed, is made extinct. So whether you're a stills shooter or a videographer, distortion is now gone, as are flicker and banding. Essentially, you can wave goodbye to a whole bunch of technical headaches.



## Sony A9 III Mirrorless



4

It has a tiny mirrorless body, rather than the 'pro DSLR' form used by Canon and Nikon.

7

The back of the camera is identical to the A9 II, except for a new symbol on the record button.

5

On the top plate, photo, video and S&Q have moved from the mode dial to a collar switch...

8

The A9 III has Sony's four-axis tilt screen – a hybrid screen that also flips out to rotate.

6

... which now requires some dexterity to depress the lock button on top of the dial.

9

Sony has upgraded the A9 III to dual UHS-II SD and CFexpress Type A hybrid card slots.

The camera is less advanced when it comes to video (though this is possibly a deliberate decision to leave room for the Sony A7S IV) but, nonetheless, it delivers 4K 60p that's oversampled from 6K, as well as 4K 120p with no crop for the first time on an Alpha camera.

### Build and handling

It's a running gag that all Alphas look and feel the same, so it's no surprise to discover that the A9 III looks and feels much like the A9 II before. It feels great in the hands, but with slightly refined ergonomics, mainly in the form of the grip, which Sony says has been integrated at the request of many users during the A9 II's lifespan. It offers more purchase and a better handhold, especially when using big lenses – and particularly if you're not pairing the camera with the additional vertical battery grip.

Sony seems confident that pros really want a tiny mirrorless body on the A9, rather than the traditional 'pro DSLR' form favoured by Canon and Nikon. At the same time, we've never seen a pro in the field using one without the additional grip and while it is nice to have the option, it is an extra expense. The back of the camera is virtually identical apart from a different graphic on the record button. The top plate sees the most changes, with photo, video and S&Q now removed from the mode dial and placed on a collar switch →

"The Sony A9 III is a product that will transform the way we use cameras"

That dovetails with the A9 III's second-most amazing feat – a maximum shutter speed of 1/80,000 sec that makes flash sync speeds extinct. It is so fast that it syncs with flash at all speeds, making not just standard speeds, such as 1/250 sec, redundant but rendering high-speed sync technology superfluous, too.

The global shutter also offers the ability to shoot continuous bursts of stills at 120fps. And while the Nikon Z 8 and Z 9 already do that, they do it in a compromised state. If you shoot at 120fps on a Z 8 or Z 9, you only get 11MP jpegs, because the sensor – even though it's stacked – simply isn't fast enough to deliver full-resolution jpegs, let alone raw files.

That's not a problem for the A9 III, which can rattle off 120fps images at full 24.6MP resolution, in 14-bit jpeg and raw, blackout-free, with full autofocus and auto exposure.

Of note, 14-bit stills are standard for every shooting mode – courtesy of the twin Bionz XR processors. These also facilitate another technological feat, Composite RAW Shooting. This captures up to 32 raw images that can then be stacked in Sony Imaging Edge to minimise noise and false colour even when shooting at high ISO or in low light conditions. This is intended to compensate for the more limited ISO performance of the global shutter sensor – a trade-off of the technology – with its higher base of ISO 250.

Sony is also pushing its Real-time Recognition AF, powered by a dedicated AI processing unit. This employs 'human pose estimation technology' that recognises not just the eyes but also the position of the body and the head, making it possible to lock onto and track a subject that is facing away from the camera or whose face is covered.





James Artaius

The A9 III's autofocus system was less consistent with kickboxing than its predecessor, the A9 II, as unpredictable feinting movements often tricked the camera.

surrounding it. I found this cumbersome when I wanted to flick between stills and video, not helped by the slightly awkward dexterity required to simultaneously depress the lock button on top of the dial.

A new addition to the front of the camera is a fifth custom button, C5. By default, this acts as a modifier to engage the 120fps bursts on HQ+, meaning you can set the speed of your bursts to something like 20fps, if that's all you need for most shots, but you can then hold down C5 at any point while bursting to kick in 120fps.

I love the principle; changing the burst rate is traditionally a painful menu process, not something you can quickly do on the fly. That means that you're stuck shooting at whatever speed you've chosen, often

ending up with hundreds of duplicates and an empty battery and card. This way, you can simply use C5 like the shift key on your keyboard and turn on 'turbo shooting mode' for the few seconds that you actually need it.

In practice, though, it was fiddly to use; simply remembering to hold down a button is hard enough during frantic moments of action. Then, holding it down using your middle finger is an unnatural bit of camera handling. I'm sure it'd become second nature but it takes a bit of getting used to initially.

An unsurprising upgrade is that Sony has shifted to dual UHS-II SD / CFexpress Type A hybrid card slots. Sony's continued support of the

format is an isolationist one, given that everyone else in the industry uses CFexpress Type B – potentially making it unappealing for those using rival systems to switch and have to reinvest in another expensive memory type. Particularly when Type A is the slowest of the CFexpress formats – somewhat at odds with the A9 III's otherwise blistering speed. The final change from the A9 II is the addition of Sony's four-axis tilt screen – a hybrid tilting screen that also flips out to rotate for the best of both worlds.

## Performance

The only way to test an elite-level sports camera is to shoot elite-level sports – so I tested the A9 III at a training facility, photographing teams in various disciplines as they prepared for the 2024 Olympic Games.

Manufacturers make all sorts of claims about autofocus, from the focusing speed itself to the tenacity of the subject tracking. But it's one thing

## Rival cameras



Canon EOS R3  
£5,659/\$5,999

A top-tier tool of choice for working professionals that offers blackout-free 30fps stills and 6K raw video. Reviewed: issue 248



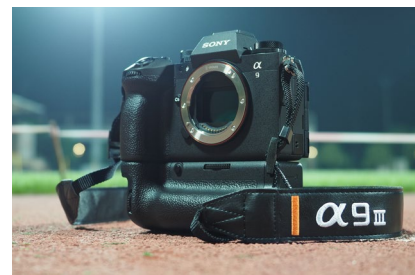
Nikon Z 9  
£5,299/\$5,497

The flagship Z series camera uses an electronic shutter to blow the D 6 DSLR away for resolution, speed and performance. Reviewed: issue 250



Panasonic Lumix S1H  
£3,599/\$3,999

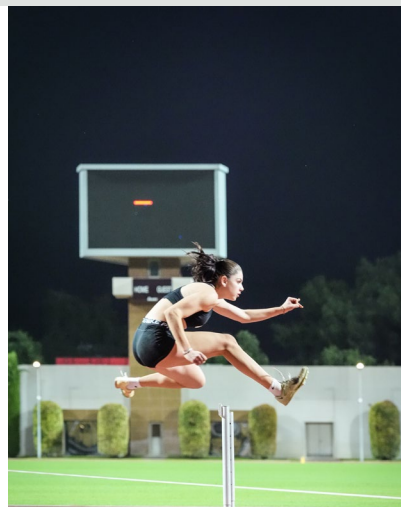
Though it has the power for pro video productions, vloggers might not appreciate its size, weight and patchy video AF. Reviewed: Issue 232



Whether you shoot stills or video, the global shutter ends distortion, flicker and banding.



With a lone subject in an empty space, AF acquisition and tracking was flawless. But with hurdles, the only occasional issue I had was side-on, where autofocus took a fraction longer.



James Artaius

to shoot a landscape or even a wedding; virtually every camera falls on its face if you shoot sports with it – let alone at the elite level.

Sony has made a bold claim about its new AI processing unit that powers Real-time Recognition AF, promising 'human pose estimation technology' that recognises and tracks subjects' bodies and heads, even when they're facing away or in a small area of the screen. In other words, it doesn't matter if the camera can't see the subject's eyes or face; the AI sees a human body and locks onto it.

Mostly, that's exactly what it does. I shot a range of sports from track events, such as hurdles and high jump, to fast-moving solo exhibition events like rhythmic gymnastics and erratic, competitive events like kickboxing. The discipline it handled most capably was gymnastics, though, sadly, this was a closed-team practice, so we cannot publish the shots I took. With a lone subject in an empty space, the acquisition and tracking were flawless, keeping the athlete in focus whether they were facing the camera or fully contorting in the middle of a move.

With hurdles, the camera had little problem, given that the subject's face was always in the frame. The only occasional issue I had was side-on, where acquisition took a fraction longer and caused a few missed shots. Surprisingly, the A9 III was less consistent with kickboxing and Muay Thai than the A9 II. Multi-limb combat sports are the best way to test a sports camera; not only are you dealing with unpredictable twitch movements and two combatants constantly moving and forcing the tracking to work overtime, they are constantly faking and feinting – offering moves to trick their opponent, and also a camera's AF system.

Perhaps this is where the A9 III with its 'human pose estimation technology' designed to use subject form data to accurately recognise and predict movement is actually too clever for its own good. In mapping a database of human skeletal positions to predict movement, it sets itself up to be tricked in the same way a boxer's opponent is when a feint or fake is thrown. This could account for the AF system occasionally getting confused in a way that the A9 II didn't.

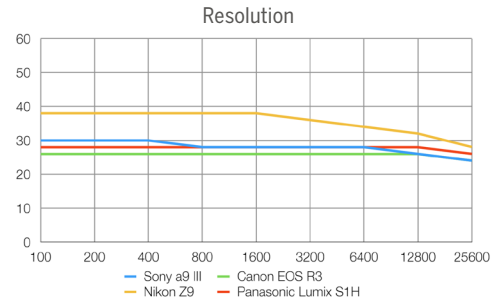
This was particularly noticeable when shooting video, as the focus would dart to shoulders and backs and occasionally logos, looking for something to stick to when a face disappeared for a moment or an unusual tumbling strike was thrown. The focus was maintained 90 per cent of the time, which is still outstanding, but it feels like for this particular sport, other AF systems perform better.

The only other event that caused occasional problems was the high jump. Here, the camera kept up with the athlete as she made her approach and launch, but consistently got confused when she reached the horizontal 'Fosbury flop' position and I ended up with shots focused on the bar or the trees behind her – it felt like the AF didn't recognise the human body in such an unusual position.

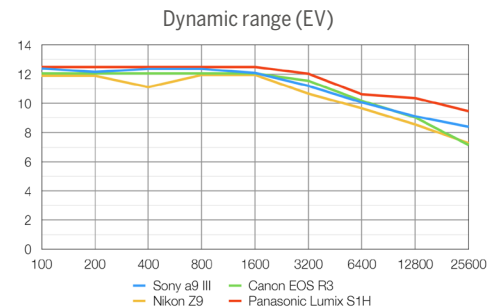
Despite this, overall, the A9 III's autofocus system is incredible. Bearing in mind that I was blasting away at up to 120fps, and up to 120p in 4K, for the AF to keep up at all is remarkable enough. For it to be as resoundingly robust and subject-sticky as it actually is, it's mind-blowing. Specifically for shooting high jump, however, I'm hoping that future firmware updates help iron out some kinks in what is, let's not forget, still a pre-production camera. **James Artaius**

## Sony A9 III Mirrorless

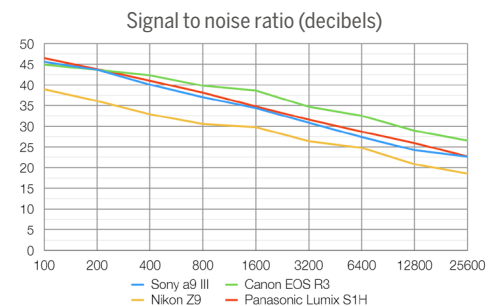
### Lab tests



The Sony, Canon and Nikon cameras all have sensors around 24MP in resolution, so their ability to resolve fine detail is similar. The 45.7MP Nikon Z9 is out in front, but that extra pixel density has its



All four cameras capture similar dynamic range at lower sensitivities. As sensitivities rise past ISO 800, the A9 III starts to fall behind the Panasonic, but its dynamic range matches that captured by



The A9 III and Lumix S1H produce low levels of image noise throughout the range. The EOS R3 outputs exceptionally clean images at higher ISOs, while the

### Digital Camera verdict

4.5 ★★★★★ Outstanding



I am blown away by the Sony A9 III. In terms of sheer technological firepower, there's no camera on the market that can touch it. And in terms of what it does with that firepower, it's in a league of its own – the global shutter era is here, and photography will never be the same again. My only misgiving is the AF system – at times, it felt slower than the A9 II – but occasional AF wobbles happen, even under ideal circumstances. For now, the Sony A9 III is the most incredible sports camera I've used. And with future firmware updates, no doubt it will get even better.





**1** The grip is surprisingly deep and moulded for a compact camera and comfortable enough to hold one-handed.

**2** The APS-C crop sensor format combines Sony's E-Mount lenses with a light and compact camera body.

**3** Sony's crop-frame sensor applies an approximate 1.5x magnification to the effective focal length.

# Sony A6700

£1,449/\$1,399 (body only)

Taking on all challengers, Sony is back with a new crop frame champion to try to reclaim the APS-C throne

[www.sony.co.uk](http://www.sony.co.uk)

## Specifications

**Sensor:** 26MP BSI Exmor R  
**Image processor:** Bionz XR + AI Processor  
**AF points:** 759 points (phase-detection AF)  
**ISO range:** 100-32,000 (80-102,400 extended)  
**Max image size:** 6192 x 4128px (L)  
**Image stabilisation:** 5-stop in-body  
**Max burst:** 11 frames per second (buffer of 1000 JPGs or 59 RAW)  
**Video:** 4K 120p/60p, HD 240p (S-Log3, LUT, S-Cine)  
**EVF:** 2359k XGA electronic viewfinder  
**LCD:** 3-inch side-flip touchscreen  
**Memory card:** 1x UHS-II SD card slot  
**Connectivity:** Headphone/microphone jack, HDMI, USB-C, Bluetooth and WiFi  
**Power:** NP-FZ100 battery  
**Size (W x H x D):** 122 x 69 x 75.1mm  
**Weight:** 409g (approx)



hen Sony released its first APS-C crop sensor mirrorless camera back in 2013, the company hit on something good.

Combining the new Sony E-Mount for smaller and lighter mirrorless lenses with a light and compact camera body, Sony's A6x00 range became successful with travellers, weekend photographers and content creators as the compact hybrid camera to beat.

The Sony A6600 has sat at the top of the range since 2019, however, over the past few years, Sony has made a lot of technical developments that it is rapidly rolling out to new camera models. Fans of Sony's A6x00 range have been clamouring for Sony to update its lineup, and the company has finally answered those calls with the Sony A6700.

However, since the Sony A6600's release, Sony just can't seem to stop launching similar cameras – in the past few months, we have already had

the Sony ZV-E1 and the Sony ZV-1 II. Sony's ZV cameras are aimed at video-focused content creators, although they are capable of taking quality stills. Apart from lacking an electronic viewfinder, ZV cameras share much of the same design and technology as the A6x00 range. For example, the ZV-E10 is a compact interchangeable lens APS-C camera with a 24.1MP sensor and great 4K video for much less than an A6600.

With ZV cameras closing ground, does the A6x00 range still have a future? Sony still believes there is space in the market for both. However, the A6600 is a tough act to follow, and with plenty of new competition out there, how does the A6700 hold up?

## Key features

The Sony A6700 features a 26MP APS-C back-side illuminated (BSI) CMOS sensor from Sony's Exmor R range, capable of ISO 100-32,000 (80-102,400 extended) and supported



## Sony A6700 Mirrorless



by five-axis in-body image stabilisation (IBIS) that offers up to five stops of shake correction.

Trickling down from Sony's high-end Sony A7R V, the A6700 also uses the combination of Sony's latest Bionz XR processor and separate AI chip for autofocus and image processing, allowing for speeds of 11 frames per second with a buffer of 1,000 jpegs or 59 raw photos at full resolution with continuous autofocus.

Autofocus now includes all of the latest subject recognition and tracking categories from the latest Sony cameras, including the ability to track human bodies, heads, faces and eyes, as well as vehicles, animals, birds and insects. Sony claims autofocus performance is now 20 percent more reliable than the previous generation. The A6700 has almost twice the number of phase detection autofocus points, clocking in at 759 points

that cover 93 percent of the frame and it can focus in up to -3 EV.

Being a hybrid camera, the video specs are equally improved from the previous generation. The Sony A6700 offers Super 35 6K oversampled video and can record in 4K up to 120fps or 240fps in Full HD, which is 10x slowed footage. Video can be recorded internally with 14+ stops of range in 10-bit 4:2:2 in S-Log and S-Cinetone, and LUTs can be applied in-camera. However, the camera can't record in raw or ProRes via HDMI output.

There is still a 2.36m dot electronic viewfinder (EVF) with a 1.07x magnification and up to 120fps. Sony claims it has made the EVF brighter and more pleasant to use than the last generation. The A6700 now also benefits from a side flip touchscreen, rather than the flip-up screen that was on the previous generation, which will suit videographers much better.

4

The viewfinder is one negative. It feels dated and has a low resolution by today's standards.

7

The A6700 uses the same rechargeable battery pack as the A6600 and has a 550-shot capacity.

5

The LCD is a fully articulated vari-angle, useful for shooting at awkward angles.

8

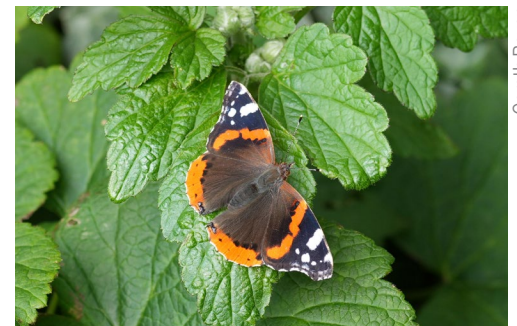
Sony's latest Bionz XR processor with a separate AI chip allows for speeds of 11 frames per second.

6

A dial under the main mode selection dial has been added for switching between modes.

9

Three doors on the left side reveal headphone sockets, USB-C, mini-HDMI and an SD card slot.



Gareth Bevan

Autofocus now includes all of the latest subject recognition and tracking categories, including insects.

### Build and handling

The Sony A6700 keeps the compact build that is a hallmark of the series. The A6700's viewfinder is still in the left corner in a rangefinder design, which isn't to everyone's tastes but means the camera can be short and boxy without the usual viewfinder hump. The A6700 has a chunky appearance but, overall, it looks and feels as though it means business.

The grip on the A6700 is surprisingly deep and moulded for a compact camera. It's comfortable enough to use the back buttons with my thumb one-handed without feeling like the camera was going to slip from my grip.

The A6700 has microphone and headphone sockets, USB-C, mini-HDMI and an SD card slot, all hidden behind three separate doors on the left side of the camera. These doors look more aesthetically pleasing than rubber flaps but are trickier and more delicate to open. The SD card slot isn't in the battery compartment, which is a relief for someone who uses tripods and gimbals much of the time.

Though the buttons and layout will be familiar to Sony shooters,



## Mirrorless Sony A6700



The amount of detail captured by the A6700 is excellent. Sony's cameras exhibit some of the most clinically sharp images available, and the A6700 is no exception. And while some may prefer a little more softness to their images than Sony's default profile, that's down to your preference and the type of work you create.

there are some new additions. Sony has added a secondary dial under the main mode selection dial for switching between photo, video, and S&Q modes. This is easier to use without looking than the switches on Sony's ZV lineup as you can flick it with your thumb without adjusting your grip.

There is now a larger dedicated video record button on the top of the camera rather than on the side, to switch to video at any time, which is much easier and more natural to use. The AF-MF/AEL switch from the A6600 has also been replaced with an AF-ON button. How big a deal this is will depend on

how you shoot. Possibly my favourite improvement from the previous generation is the screen. The A6700 now has a fully articulated vari-angle screen instead of the flip-up one on the A6600. This is much easier for shooting awkward angles or recording selfies or vlogs. Some street photographers like a flip-up screen so they can shoot from the hip, but the vari-angle screen is more versatile.

The only real negative with the Sony A6700's build is its viewfinder. For a new camera at this price, it feels dated. The viewfinder's resolution is poor by modern standards – even after playing with the settings, it is quite dark and there is considerable flickering in highlights. Though usable, it isn't a particularly pleasant experience, and I found myself defaulting to the screen for shooting.

The viewfinder has always felt like an afterthought on the A6x00 range, especially as it starts to feel more indistinguishable from Sony's ZV lineup. Without a good viewfinder, it is harder to pinpoint the reason for the A6700 to exist outside the ZV range.

## Rival cameras



Canon EOS R7  
£1,349/\$1,499

With pro-level speed and autofocus, and big-time image resolution, the EOS R7 is a fantastic addition to the EOS R ecosystem and a worthy successor to the 90D and 7D DSLRs. Reviewed, issue 258



Fujifilm X-S20  
£1,249/\$1,299

The perfect camera for most people, with its straightforward controls, excellent fully automatic modes and a small and compact size. Content creators and vloggers will find a lot to love here. Reviewed, issue 271



Nikon Z 5  
£1,719/\$1,699

Competent and attractive, the Z 5 is a good entry-level full-frame camera, but its relatively high price may persuade you that it's worth forking out the comparatively little extra for the Z 6. Reviewed, issue 234





Gareth Bevan

For static subjects, the A6700 locks onto them at a 'blink and you'll miss it' speed. In fact, it's difficult to see how standard point autofocus could get perceptively faster.

## Performance

The A6700's 26MP sensor might look tame compared with the 40MP sensor in the Fujifilm X-T5 or the 64MP sensor in Sony's own A7R V, but it is more than enough resolution to use across the web, social media or medium-sized prints, and still competes with rival cameras at this price point.

Image detail from the A6700 is excellent. Sony's cameras exhibit some of the most clinically sharp photos available, and the A6700 is no exception. I prefer a little more softness to my images than Sony's default profile, but that is down to your preference and the work you create.

Colours are accurate but have a richness and vibrancy that makes them pop without looking unnatural. The A6700 managed to produce an accurate, and importantly, consistent white balance between photos, even in changeable weather and lighting. I also like the skin tones that Sony cameras reproduce, which veer towards slightly warmer tones and an increased saturation that makes subjects look healthy and vibrant.

As the A6700 now uses the already acclaimed Bionz XR and AI Chip, you can expect the autofocus to be incredibly fast and accurate. For static subjects, the A6700 locked onto subjects at a 'blink and you'll miss it' speed – at this point it is hard to see how standard point autofocus can get perceptively faster. Where the A6700 now shines is in its AI recognition and tracking capabilities for humans as well as various animals, birds, vehicles, and now insects. I couldn't find an abundance of insects, but the animal- and bird-tracking worked to perfection on the limited domestic animals I could find in London. The camera even tracked some foxes skulking around my garden in near darkness.

Sony's human and face tracking is some of the best available. The A6700 can recognise human bodies and heads, as well as faces and eyes. The camera had no issues tracking my subject around the frame, keeping eyes in focus in every shot – even deliberate erratic movements couldn't throw the focus off. I got a good hit rate for burst shooting for full subjects, and although it couldn't nail the focus on small details in every shot, the number of usable shots was impressive.

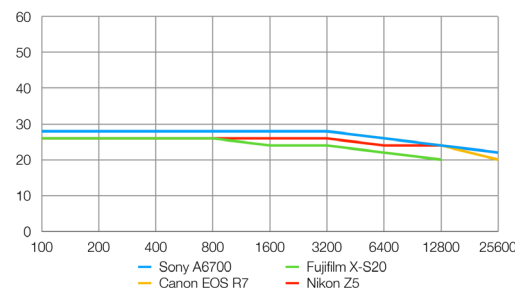
## Video

With Sony's focus on video, it comes as no surprise that the A6700's video performance is excellent. The 4K video is impressively sharp, rich and detailed in standard outputs. If you have no intention of digging into codecs or LUTs then you don't need to as the standard footage from the A6700 is good enough until you want to get creative. The A6700 has several pre-built-in styles to choose from – if you don't want to spend an age in editing software, these are pleasing enough but can soon veer into cheesy.

Sony's image stabilisation continues to be the best around, with solid performance in steady movements like panning, although the IBIS struggled with heavier movements. Walking is softened by the IBIS, but don't expect iPhone-like smoothness straight out of the camera.

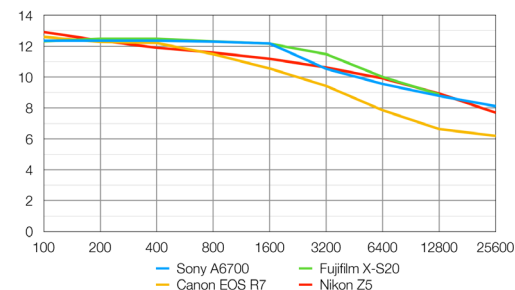
Autofocus on the Sony A6700 for video is awesome. Sony has led the pack for some time and while other brands have caught up, Sony seems to still be a whisker ahead. Tracking subjects turning away for moving in and out of frame is solid, and the camera rarely insists on finding subjects in random inanimate objects, a common complaint with other systems. **Gareth Bevan**

## Sony A6700 Mirrorless



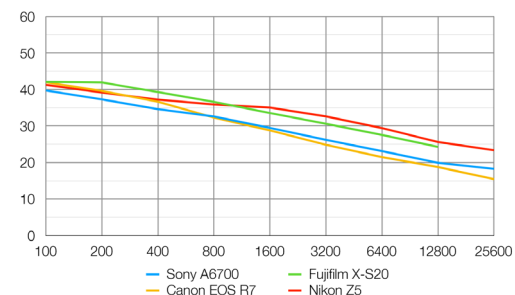
The 26MP Sony A6700 does well to resolve a comparable level of fine detail to the 32.5MP Canon EOS R7 throughout the tested sensitivity range.

### Dynamic range



There's little to separate the A6700 from the Fujifilm X-S20 and Nikon Z5 when it comes to dynamic range.

### Signal to noise ratio (decibels)



The A6700 doesn't score highly here, producing noisier images than the X-S20. It's not surprising that the Nikon Z 5 outperforms the A6700 in this test. Its full-frame sensor allows for relatively large individual photosites ('pixels'), which in turn can be more light-sensitive and less likely to generate noise.

## Digital Camera verdict

4.5 ★★★★★ Outstanding



The Sony A6700's design and tech refinements make it a compelling upgrade from the A6600. It's now the best Sony APS-C camera to buy for stills, while improved 4K video and AI autofocus make it an alternative to Sony's ZV line-up. Overall, it's an ideal option for travel photographers or content creators who want professional features in a small package.





# Crop-sensor wide-angles

Wide-angle zooms can give you a whole new perspective on life. Matthew Richards reveals the best buys for non-full-frame cameras

M

ost standard zoom lenses give decent coverage, but wide-angle zooms go a whole lot further. With viewing angles of more than 100 degrees, you can

shoehorn much bigger areas into the image frame. They're ideal for the great outdoors, especially when you want to capture big skies and epic vistas in landscape photography. Extra-wide viewing angles can be vital for indoor photography, when you can't get as far back from your subject as you might like.

Wide-angle photography isn't just about cramming more into the image

frame. A key creative advantage is that you can really exaggerate perspective and inject some real wow-factor into your photos. Get in really close to the main subject in a scene, and it can take on a giant-like stature, with the middle distance and background dramatically shrinking away from it.

Thanks to the inherently large depth of field that you get at very short focal lengths, another bonus is that you can retain excellent sharpness in the foreground and background, keeping scenes well focused from front to back. Let's choose some winners.

**Matthew Richards**

## The contenders

<b>1 Canon</b> EF-S 10-18mm f/4.5-5.6 IS STM	£239/\$279
<b>2 Fujinon</b> XF10-24mm f/4 R OIS	£849/\$999
<b>3 Nikkor</b> AF-P DX 10-20mm f/4.5-5.6G VR	£329/\$307
<b>4 Olympus</b> 7-14mm f/2.8 Pro M.Zuiko Digital ED	£949/\$1,299
<b>5 Sigma</b> 8-16mm f/4.5-5.6 DC HSM	£599/\$799
<b>6 Sigma</b> 10-20mm f/3.5 EX DC HSM	£319/\$399
<b>7 Sony</b> E 10-18mm f/4 OSS	£659/\$849
<b>8 Tamron</b> 10-24mm f/3.5-4.5 Di II VC HLD	£449/\$499





Wide-angle lenses **Group Test**





## Group Test Wide-angle lenses



Digital  
Camera  
VALUE  
AWARD

### Canon EF-S 10-18mm f/4.5-5.6 IS STM £239/\$279

Light in build, light on the wallet

**Lens mount** Canon EF-S

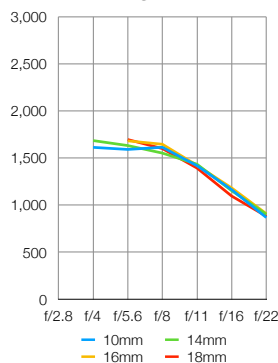
Carrying around additional lenses is no fun when they're big and heavy. This relatively new offering from Canon is refreshingly small for a DSLR-style wide-angle zoom, and is less than half the weight of either of the two competing Sigma lenses on test. Part of the weight loss is thanks to a plastic rather than metal mounting plate, but overall build quality feels reasonably robust nonetheless.

Typical of many recent Canon lenses, it features an STM (Stepping Motor) autofocus system which, in this case, is fast for stills, smooth for video capture and near-silent in operation.

No lightweight in terms of performance, this lens matched or beat Canon's pricier 10-22mm lens for sharpness in our tests, throughout its zoom and aperture ranges. Colour fringing is also less noticeable and barrel distortion is well-controlled at the short end of the range.

#### Sharpness

Sharpness through the zoom range is pretty good, but lags behind of the Sigma 10-20mm.



#### Fringing 1.71

Colour fringing is quite minimal, even in the extreme corners of the image frame.

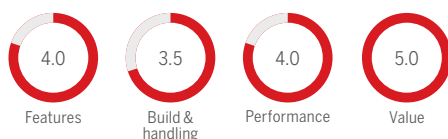
#### Distortion -1.86

At 10mm, barrel distortion is quite restrained; pincushion is minimal at the long end.

#### Digital Camera verdict

Less than half the price of Canon's older 10-22mm wide zoom for APS-C cameras, this lens adds image stabilisation. It's the more attractive buy for an own-brand Canon.

4.0 ★★★★★ Excellent



Digital  
Camera  
EDITOR'S  
CHOICE

Digital  
Camera  
BEST  
ON TEST

Digital  
Camera  
GOLD  
AWARD

Digital  
Camera  
BEST FOR  
FUJIFILM

### Fujinon XF10-24mm f/4 R OIS £849/\$999

Pricy, but worth every penny

**Lens mount** Fujifilm X

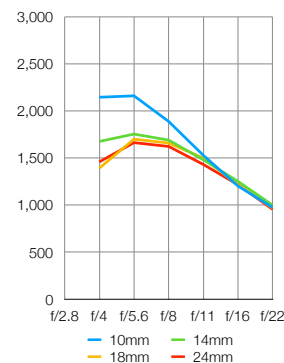
There's no denying that this Fujifilm lens is considerably pricier than some of the other own-brand offerings from camera manufacturers – but in this case, you get what you pay for. As an 'R' series optic, it has a physical aperture ring for intuitive manual adjustments. Four aspherical elements and four ED (Extra-low Dispersion) elements are included in the optical path. Zoom and focus mechanisms are both fully internal, so the front element neither extends nor rotates.

The autofocus system is based on a stepping motor, which also enables precise manual adjustments via the electronically coupled focus ring. An optical image stabiliser is included.

Contrast and sharpness are spectacular throughout the short half of the zoom range, even wide-open at f/4, although it pays to stop down to f/5.6 towards the long end. Autofocus is both quick and accurate.

#### Sharpness

Not limited to the central area of the image frame, sharpness is excellent into the corners.



#### Fringing 0.36

Colour fringing is entirely negligible at any combination of focal length and aperture.

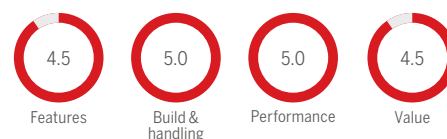
#### Distortion -0.14

Helped by in-camera tweaks, distortions go unnoticed even in architectural photography.

#### Digital Camera verdict

A constant-aperture zoom with a tough metal barrel, the Fujinon XF10-24mm feels every inch a professional-grade choice. It's simply a fabulous lens.

5.0 ★★★★★ A best-in-class product





## Nikkor

### AF-P DX 10-20mm f/4.5-5.6G VR

£329/\$307

A smart Nikon newcomer

**Lens mount** Nikon DX

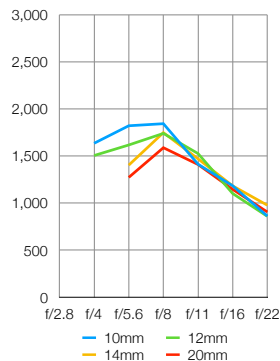
**T**his relatively recent launch is considerably smaller, lighter and cheaper than Nikon's more established 10-24mm and 12-24mm zooms. Similarities to the Canon include a plastic mounting plate, a stepping-motor autofocus system and the addition of an optical stabiliser.

The VR (Vibration Reduction) stabiliser is very much worth having, with a 3.5-stop effectiveness. The AF-P (Pulse motor) autofocus system is quick for stills, enables smooth AF transitions in movie capture, and is virtually silent in operation. However, it's incompatible with a number of older DSLRs, with which neither auto nor manual focusing is available.

Sharpness is pretty respectable at the centre of the frame but drops off noticeably towards the edges and corners. Performance could also be better in terms of distortion and colour fringing.

#### Sharpness

Sharpness could be better at longer zoom settings, and towards the edges.



#### Fringing 3.39

Colour fringing is worse than average, but some DSLRs can make in-camera corrections.

#### Distortion -1.47

Barrel distortion is quite sharp at 10mm, but drops off at mid to long zoom settings.

#### Digital Camera verdict

The AF-P DX 10-20mm f/4.5-5.6G VR is an attractive lightweight zoom that's ideal for travel – and it's much better value than Nikon's older 10-24mm and 12-24mm zooms.

**4.0** ★★★★★ Excellent



Digital Camera  
**BEST FOR MFT**

## Olympus

### 7-14mm f/2.8 Pro M.Zuiko Digital ED

£949/\$1,299

High-spec but high-priced

**Lens mount** Micro Four Thirds

**T**he 2.0x crop factor of the Micro Four Thirds format poses a significant technical challenge when designing ultra-wide-angle lenses. This zoom lens from Olympus literally makes light of the situation, coming in at half the weight of an equivalent full-frame lens despite its weather-sealed, metal-jacketed enclosure.

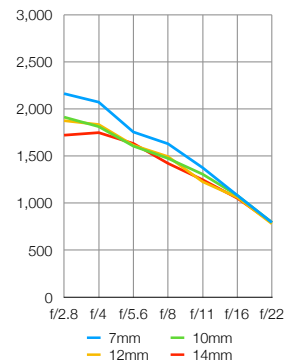
An impressive optical layout includes an ED (Extra-low Dispersion) element, three Super ED elements and two HR (High Refractive index) elements.

There's a handy push-pull mechanism in the focus ring for quick-shifting between autofocus and manual focus modes. There's no optical stabiliser, but Olympus bodies tend to feature sensor-shift stabilisation anyway.

Scores from our lab tests are exemplary – although, as with the Fujifilm lens, they're somewhat flattered by in-camera corrections which are applied even to raw files.

#### Sharpness

Centre-sharpness is superb, but it's best to stop down a little for corner-sharpness.



#### Fringing 0.43

There's virtually no sign of any colour fringing, even at the extreme corners of the frame.

#### Distortion -1.1

There's some barrel distortion at short to mid zoom settings, but you won't usually notice it.

#### Digital Camera verdict

This lens combines an effective 14-28mm zoom range with a wide f/2.8 constant-aperture rating – and it's only about half the weight of equivalent full-frame lenses.

**4.5** ★★★★★ Outstanding





## Group Test Wide-angle lenses



### Sigma 8-16mm f/4.5-5.6 DC HSM £599/\$799

It's like an optical black hole

**Lens mounts** Canon EF-S, Nikon DX, Pentax K, Sony A, Sigma

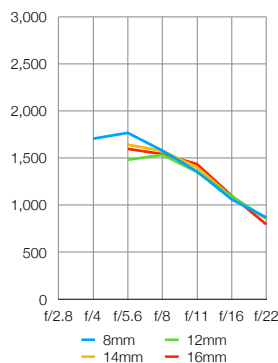
**S**ucking much more into the image frame, this Sigma lens shaves 2mm off the shortest focal length of most APS-C format zoom lenses, boosting the viewing angle from around 109 degrees to a monstrous 121 degrees.

The optical path includes four top-quality FLD (Fluorite-grade Low Dispersion) elements and Sigma's usual Super Multi-Layer Coatings to guard against ghosting and flare. As with the Olympus lens on test, this Sigma has a built-in hood to protect the bulbous front element, so there's no attachment thread for filters. At least the two-part lens cap enables 72mm filters to be used at the long end of the zoom range.

Even when combining the widest available aperture with the shortest zoom setting, sharpness remains impressive across the entire image frame – no mean feat.

#### Sharpness

It's a sharp lens right out to the corners, despite its ultra-wide viewing angle.



#### Fringing 1.42

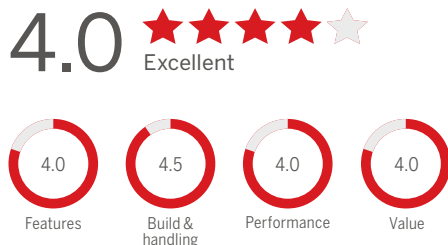
There's a similarly low amount of fringing as from the Tamron lens at both ends of the range.

#### Distortion 0.31

Distortions are sometimes less than lenses with more modest viewing angles.

#### Digital Camera verdict

This lens is the ideal choice if you want to really maximise your viewing angle potential: the difference is somewhat eye-popping as you look through the viewfinder.



### Sigma 10-20mm f/3.5 EX DC HSM £849/\$999

A lens with 'constant' attraction

**Lens mounts** Canon EF-S, Nikon DX, Pentax K, Sony A, Sigma

**N**early 10 years old, this 10-20mm zoom predates Sigma's 'Global Vision' line-up of Contemporary, Art and Sport lenses. A revamp of the company's original 10-20mm lens for APS-C cameras, it swaps from a variable to a 'constant' aperture rating.

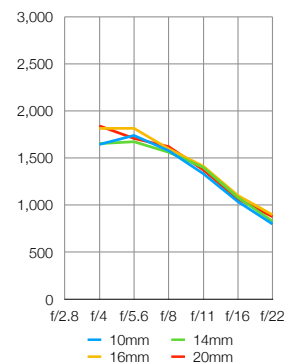
Up-market glass includes two ELD (Extraordinary Low Dispersion) and an SLD (Special Low Dispersion) element. Construction is sturdier than in the Canon and Nikon lenses, and the Sigma features a more conventional ring-type ultrasonic autofocus system.

Compared with Sigma's 8-16mm lens, the more modest maximum viewing width enables a detachable petal-shaped hood and a filter thread.

Centre-sharpness is impressive throughout the zoom range, but corner-sharpness isn't quite as good as from the Sigma 8-16mm. Barrel distortion at the short end and colour fringing throughout are controlled well.

#### Sharpness

It beats the Canon and Nikon lenses on test for sharpness in the longer half of the range.



#### Fringing 2.45

Fringing is well-controlled, dying out almost completely at longer zoom settings.

#### Distortion -2.0

Barrel and pincushion distortions are of a similarly low order to the Canon lens.

#### Digital Camera verdict

This veteran Sigma is a solid performer with high-grade handling and image quality, and its 'constant' aperture rating is unmatched by competing lenses at a similar selling price.





Digital  
Camera  
**BEST FOR  
SONY E**

## Sony

### E 10-18mm f/4 OSS

£659/\$849

Premium features, compact build

**Lens mount** Sony E

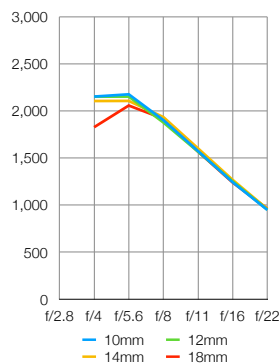
**S**ony's full-frame mirrorless cameras have been hogging the limelight recently – but there's still plenty of life in the APS-C line-up, for which this lens is designed. Typical of the breed, it's relatively small and light. It's actually only slightly lighter than the Canon and Nikon lenses but feels a little more robust, and has a metal rather than plastic mounting plate.

Features include a constant f/4 aperture rating and an OSS (Optical SteadyShot) stabiliser with three-stop performance. The optical path is simple compared with most other lenses on test, with only about two thirds of the total number of elements, but there's some high-tech Super ED glass in the mix, aiming to boost sharpness and reduce colour fringing.

Centre-sharpness is excellent across the zoom range, but corner sharpness is relatively poor at 10mm, even when stopping down the aperture.

#### Sharpness

It's mostly great, but corner sharpness at the short end of the range is disappointing.



#### Fringing 0.61

Colour fringing is entirely negligible at any combination of focal length and aperture.

#### Distortion 1.06

Barrel distortion is minor at 10mm; pincushion is similarly low in the 14-16mm sector.

#### Digital Camera verdict

Performance and image quality are broadly good, although the outright zoom range is relatively small, and the price feels steep compared with some competitors.

**4.0** ★★★★★

Excellent



Digital  
Camera  
**VALUE  
AWARD**

Digital  
Camera  
**BEST FOR  
CANON**

Digital  
Camera  
**GOLD  
AWARD**

Digital  
Camera  
**BEST FOR  
NIKON**

## Tamron

### 10-24mm f/3.5 -4.5 Di II VC HLD

£449/\$499

New, improved, smarter and better

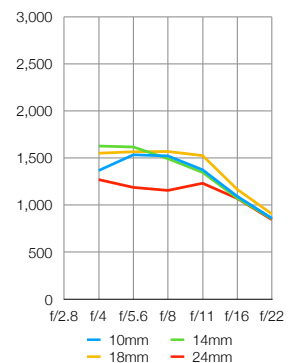
**Lens mounts** Canon EF-S, Nikon DX

**O**riginally launched back in 2008, Tamron's 10-24mm zoom got a major revamp last year. The new optical path includes enhanced aspherical and LD (Low Dispersion) elements. There's also a new HLD (High/Low torque-modulated Drive) autofocus system and VC (Vibration Compensation) stabilization, both of which were lacking in the original lens. Electromagnetic aperture control previously included in the Canon-fit edition has migrated to the Nikon-fit version, although this makes the new lens incompatible with some older Nikon DSLRs.

Not just faster and quieter, the HLD autofocus improves handling as the focus ring no longer rotates during autofocus, while also adding full-time manual override. Build quality is excellent and includes a full set of weather-seals, plus a keep-clean fluorine coating on the front element.

#### Sharpness

In 'real-world' shooting, sharpness proved excellent at all zoom settings.



#### Fringing 3.23

Fringing is noticeable at 14 and 18mm, but less so at the extremes of the focal range.

#### Distortion 0.7

Distortion at typical shooting distances is less than close-range lab results would imply.

#### Digital Camera verdict

Shooting at very close range, the Tamron delivered mediocre results in our lab tests. It was a different story in our real-world tests, where sharpness was excellent throughout.

**5.0** ★★★★★

A best-in-class product





# The fab Fuji rules the roost

The Fujinon XF10-24mm f/4 R OIS is an optical treat



Digital Camera  
EDITOR'S CHOICE

Digital Camera  
BEST ON TEST

Digital Camera  
GOLD AWARD

Digital Camera  
BEST FOR FUJIFILM

Fujifilm's X-series camera bodies and lenses have rightly won high praise for their clever design, robust build construction and high-end performance. All of these facets are typified by the XF10-24mm lens, which combines flawless handling with neat styling and top-drawer image quality.

The Olympus 7-14mm is a beautifully made lens that delivers pro-grade handling and performance, but its built-in hood

precludes the attachment of screw-in filters or filter holders. The same goes for the Sigma 8-16mm, but at least a specialist Lee Filters adaptor is available for the Olympus. Even so, the Sigma is a clear winner for maximising viewing angles, and is available for a wide range of camera types.

The recently launched Canon and Nikkor lenses are relatively compact and light, with plastic mounting plates, and they both feature optical stabilisers. They make good

travel lenses, and we prefer them to the companies' older wide-angle zooms.

Even so, the similarly priced Sigma 10-20mm has better build quality and overall performance, if you can live without optical stabilisation. The Sony 10-18mm comes up a bit short in overall zoom range but offers good features and performance – but it's more than twice the price of the Sigma 10-20mm, although the Sigma is only available for Sony A rather than E.

## How the lenses compare



Canon  
EF-S 10-18mm  
f/4.5-5.6 IS STM



Fujinon  
XF10-24mm  
f/4 R OIS



Nikkor  
AF-P DX  
10-20mm  
f/4.5-5.6G VR



Olympus  
7-14mm f/2.8 Pro  
M.Zuiko Digital  
ED



Sigma  
8-16mm  
f/4.5-5.6 DC  
HSM



Sigma  
10-20mm f/3.5  
EX DC HSM



Sony  
E 10-18mm f/4  
OSS



Tamron  
10-24mm  
f/3.5-4.5 Di II  
VC HLD

Contact	www.canon.co.uk	www.fujifilm.co.uk	www.nikon.co.uk	www.olympus.co.uk	www.sigma-imaging-uk.com	www.sony.co.uk	www.tamron.co.uk	
Street price	£239/\$279	£849/\$999	£329/\$307	£949/\$1,299	£599/\$799	£319/\$399	£659/\$849	£449/\$499
Mount options	C	F	N	MFT	C N P S-A Sg	C N P S-A Sg	S-E	C N
Elements/groups	14/11	14/10	14/11	14/11	15/11	13/10	10/8	16/11
Diaphragm blades	7 blades	7 blades	7 blades	7 blades	7 blades	7 blades	7 blades	7 blades
Minimum aperture	f/22-29	f/22	f/22-29	f/22	f/22	f/22	f/22	f/22-29
Optical stabiliser	Yes	Yes	Yes	No	No	No	Yes	Yes
Autofocus motor type	Stepping motor	Stepping motor	Stepping motor	Stepping motor	Ultrasonic (ring)	Ultrasonic (ring)	Stepping motor	Modulated drive
AF manual override	Electronic	Electronic	Electronic	Electronic	Full-time	Full-time	Electronic	Full-time
Max angle of view (diagonal)	107.5 degrees	110 degrees	109 degrees	114 degrees	121 degrees	110 degrees	109 degrees	108 degrees
Min focus distance	0.22m	0.24m	0.22m	0.20m	0.24m	0.24m	0.25m	0.24m
Max magnification	0.15x	0.16x	0.17x	0.12x	0.13x	0.15x	0.1x	0.19x
Focus distance scale	No	No	No	No	Yes	Yes	No	Yes
Filter size	67mm	72mm	72mm	None	None	82mm	62mm	77mm
Hood	Optional	Supplied	Supplied	Built-in	Built-in	Supplied	Supplied	Supplied
Dimensions (dia x length)	75 x 72mm	78 x 87mm	77 x 73mm	79 x 106mm	75 x 106mm	87 x 88mm	70 x 64mm	84 x 85mm
Weight	240g	410g	230g	534g	555g	520g	225g	440g

Features	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★
Build & handling	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★
Performance	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★
Value	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★
Overall	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★



# Fujinon XF8-16mm f/2.8 R LM WR

£1,769/\$1,799

The widest zoom yet for Fujifilm cameras

[www.fujifilm.co.uk](http://www.fujifilm.co.uk)

If you are a Fujifilm X-series camera user, you simply can't get a zoom that offers you a wider view than the Fujinon XF8-16mm f/2.8 R LM WR. So you can understand why people could fall in love with a lens that is quite so big, and so expensive.

The main competition for this lens comes from the more affordable Fujinon XF10-24mm f/4 R OIS, which is about half the weight, and has built-in stabilisation (unlike the XF 8-16mm). The difference between 8mm and 10mm sounds slight, but in practice the XF8-16mm's coverage is noticeably greater. This makes this lens a stronger option for subjects such as interiors and architecture.

Another wide (and more affordable) option is the Laowa 9mm f/2.8 Zero D. However, this lens lacks autofocus.

Thanks to the 1.5x crop factor provided by the APS-C sensor used in the Fujifilm's X-mount mirrorless cameras, the effective focal length of this lens is 12-24mm, which has been a favourite focal length range on full-frame DSLRs for years.

The lens gives a constant f/2.8 maximum aperture that helps explain the weight and girth of the lens. There is a lot of glass inside this lens casing!

## Performance

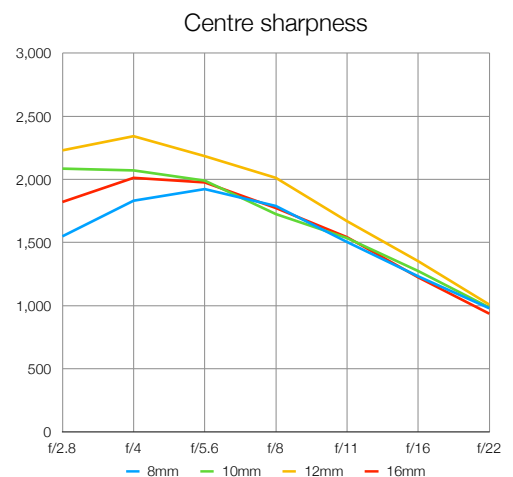
We tested the XF8-16mm on the Fujifilm X-Pro3 and the Fujifilm X-A7. The lens dwarfed both of these cameras in a way that you don't usually expect from a wide-angle lens. But when you put the zoom to the use it was made for, it performs wonderfully – thanks to a well-thought out design – and you soon forget about the size and weight. It is probably a better match of a camera like the X-T3 with a grip, but it is equally usable on the smallest of Fujifilm mirrorless bodies. The images it shoots are impressive, too, making this a lens that you can easily fall in love with. **Chris George**

**1** The fixed lens hood does an excellent job of eliminating flare.

**2** The front element is a bulbous affair, which means that screw-in front filters are out of the question.

**3** This zoom gives you beautifully engineered zoom, focus and aperture rings to get a grip on.

**Mount:** Fujifilm X  
**Lens construction:** 20 elements in 13 groups  
**Angle of view:** 83-121° degrees  
**Effective focal length:** 12-24mm  
**Diaphragm blades:** 9  
**Maximum aperture:** f/2.8  
**Minimum aperture:** f/22  
**Minimum focusing distance:** 0.25m  
**Maximum magnification ratio:** 0.1x  
**Filter size:** n/a  
**Image stabilisation:** No  
**Dimensions:** 88 x 122mm  
**Weight:** 805g



## Sharpness

Centre-frame sharpness is excellent throughout the zoom range, from wide open through to f/11.

## Fringing **Short 0.76 Long 0.56**

Chromatic aberration is minimal at all focal lengths and apertures – it's barely noticeable in photos.

## Distortion **Short -0.09 Long -0.01**

Shots display little to no visible distortion, because Fujifilm cameras automatically apply corrections.

## Verdict

**4.5** ★★★★★ Outstanding



This lens offers a range of ultra-wide focal lengths no other X-mount zoom can offer. For interiors, or for city architecture, this lens is unparalleled. The price is high... but for the focal length range, and for the wide maximum aperture, the cost is justified.





# Standard zoom lenses

Stick or twist? Here's how basic standard zoom lenses from Canon and Nikon compare with exotic upgrade options

S

tandard zoom lenses cover most eventualities for day-to-day shooting, so it pays to have a good one. You can buy most Canon and Nikon SLRs as complete kits with a standard zoom. In the APS-C format camp, the most popular option is a light and fairly unassuming 18-55mm lens. The main full-frame kit zooms are the Canon EF 24-105mm IS STM and the Nikkor AF-S 24-120mm f/4 ED VR. They're all solid performers, so why would you need to upgrade?

Some kit zooms feel like they're built down to a price. Only the Nikkor 24-120mm features a nano-structure coating, weather-seals and a focus distance scale, while both of the Canon and Nikkor 18-55mm lenses have plastic rather than metal mounting plates.

If you decide to shift up to a more exotic standard zoom, you can expect premium or fully pro-grade build quality, faster aperture ratings and, hopefully, better overall performance. Let's see how they stack up. **Matthew Richards**

## The contenders

<b>1 Canon</b> EF-S 18-55mm f/3.5-5.6 IS STM	£214/\$106
<b>2 Canon</b> EF-S 15-85mm f/3.5-5.6 IS USM	£690/\$799
<b>3 Canon</b> EF 24-105mm f3.5-5.6 IS STM	£579/\$599
<b>4 Canon</b> EF 24-70mm f/2.8L II USM	£1,740/\$1,599
<b>5 Nikkor</b> AF-P DX 18-55mm f/3.5-5.6G VR	£209/\$247
<b>6 Nikkor</b> AF-S DX 16-80mm f/2.8-4E ED VR	£989/\$1,067
<b>7 Nikkor</b> AF-S 24-120mm f/4 ED VR	£1,045/\$1,097
<b>8 Nikkor</b> AF-S 24-70mm f/2.8E ED VR	£1,799/\$2,399









## Group Test Standard zooms



### Canon EF-S 18-55mm f/3.5-5.6 IS STM £214/\$106

#### The best Canon 18-55mm yet

**M**arginally larger and heavier than Canon's previous EF-S 18-55mm IS II kit lens, the latest IS STM boasts some

key advantages. Previous editions relied on a basic electric autofocus motor that was noisy and sluggish. Worse still, the manual focus ring and the front element both rotated during autofocus, impairing handling and making it tricky to use lens filters.

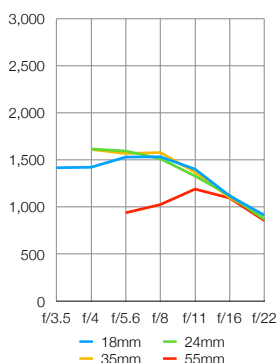
The stepping motor in this lens addresses all of these issues and delivers fast yet virtually silent autofocus. The STM lens inherits the four-stop image stabiliser from its predecessor, while adding two extra optical elements and a more well-rounded seven-blade diaphragm.

#### Performance

Centre-sharpness is pretty good on the whole, but drops off quite noticeably at the long end of the zoom range, while corner-sharpness is merely mediocre.

#### Sharpness

Levels of sharpness drop off towards the edges and at the long end of the zoom range.



#### Fringing

Short **3.09** Long **1.39**  
Colour fringing can be noticeable when uncorrected.

#### Distortion

Short **-3.03** Long **0.22**  
Short-zoom barrel distortion is worse than in the 15-85mm.

#### Digital Camera verdict

Image quality is good rather than great, but it's a big improvement over its 18-55mm predecessor from Canon, with much better handling and quieter operation.

**4.0** ★★★★★ Excellent



### Canon EF-S 15-85mm f/3.5-5.6 IS USM £690/\$799

#### Altogether more zoom range

**T**his lens offers a wider maximum viewing angle than any other Canon standard zoom for APS-C SLRs. It also boosts telephoto reach, compared with the 18-55mm kit lens, with an effective range of 24-136mm.

The design is comparatively old-school, which isn't surprising as the lens was launched 10 years ago. Autofocus is driven by a ring-type ultrasonic autofocus system with mechanically coupled full-time override. It's quick, but not as quiet as most of the lenses that use stepping motors. The focus distance scale is a plus point.

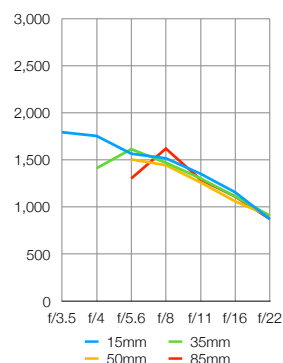
The design is comparatively old-school, which isn't surprising as the lens was launched 10 years ago. Autofocus is driven by a ring-type ultrasonic autofocus system with mechanically coupled full-time override. It's quick, but not as quiet as most of the lenses that use stepping motors. The focus distance scale is a plus point.

#### Performance

There's good performance from the autofocus system and four-stop stabiliser but sharpness is a little disappointing. Our review sample delivered its best sharpness when shooting wide-open.

#### Sharpness

It's a little sharper than the Canon 18-55mm at the longest zoom setting.



#### Fringing

Short **3.12** Long **2.55**  
Colour fringing is a little worse than from the 18-55mm.

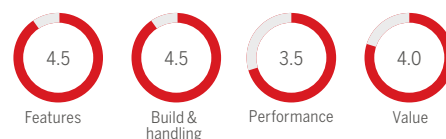
#### Distortion

Short **-2.58** Long **0.78**  
There's more pincushion than the 18-55mm at the long end.

#### Digital Camera verdict

Build quality is better than in the Canon 18-55mm, and the wider coverage and telephoto reach are nice, but there's no real improvement in image quality.

**4.0** ★★★★★ Excellent





## Canon

### EF 24-105mm f/3.5-5.6 IS STM

£579/\$599

Digital Camera  
VALUE  
AWARD

#### A straightforward bargain buy

**C**ompared with Nikon's 24-120mm VR kit lens, this model (often bundled with the EOS 6D Mark II) is little more than half the price. It lacks some of the Nikkor's finery, though: it's not a constant-aperture lens, it has neither weather-seals nor a focus distance scale, and you have to buy a hood.

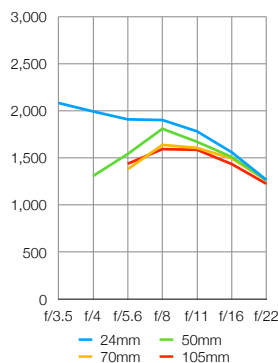
On the plus side, the Canon lens has a refreshingly lightweight build, a fast and near-silent stepping motor-based autofocus system and a more effective four-stop stabiliser. Build quality feels rather better than in Canon's 18-55mm kit lens, with a sturdy barrel and a metal mounting plate.

#### Performance

This full-frame kit lens punches above its weight in terms of image quality. There's plenty of sharpness on tap, even when shooting wide-open. Distortions, colour fringing and vignetting are well-controlled.

#### Sharpness

Short-range lab-test scores aren't great, but real-world sharpness is impressive.



#### Fringing

Short **2.38** Long **2.1**  
Colour fringing is reasonably well-controlled.

#### Distortion

Short **-2.8** Long **1.52**  
Barrel and pincushion distortions are pretty average.

#### Digital Camera verdict

For image quality, this lens pretty much matches Canon's constant-aperture EF 24-105mm f/4L IS II USM, which is almost twice the price. It's standout value.

**4.0** ★★★★★ Excellent



## Canon

### EF 24-70mm f/2.8L II USM

£1,740/\$1,599

Digital Camera  
BEST FOR  
CANON

#### Pretty compact but lacks stabilisation

**E**asily manageable for an f/2.8 standard zoom, this lens is little more than two thirds the physical length of the competing Nikon, and shaves nearly 25 per cent off the weight. The Mark II represents a major revamp over the original lens, with an upgraded optical design that aims for greater sharpness.

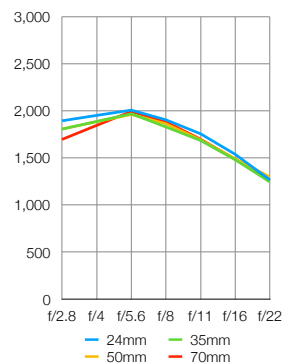
The Mark II is sturdier, better weather-sealed and has a more well-rounded nine-blade diaphragm, which helps to maintain the lens's attractive bokeh. However, given that Sigma, Tamron and Nikon have built optical image stabilisers into their latest 24-70mm f/2.8 lenses for SLRs, it's a disappointing omission here.

#### Performance

Sharpness is excellent, although it's eclipsed by the competing Nikon lens, as well as Canon's new RF 24-70mm f/2.8 lens for its mirrorless bodies.

#### Sharpness

Sharpness is very good and impressively consistent throughout the zoom range.



#### Fringing

Short **2.47** Long **1.61**  
Fringing is well-controlled throughout the zoom range.

#### Distortion

Short **-2.34** Long **0.13**  
Barrel and pincushion are impressively low.

#### Digital Camera verdict

This is Canon's best standard zoom for SLRs, but the lack of stabilisation can be frustrating and it's pricey compared with high-performance alternatives.

**4.5** ★★★★★ Outstanding





## Group Test Standard zooms



### Nikkor AF-P DX 18-55mm f/3.5-5.6G VR

£209/\$247



#### Cleverly compact and retractable

**A**vailable as a kit lens with or without VR, the stabilised version is definitely the one to go for. Both have a retractable design that enables a small carrying size. Unlike the previous AF-S editions, the AF-P models use a quiet stepping motor to drive autofocus, like the competing Canon 18-55mm.

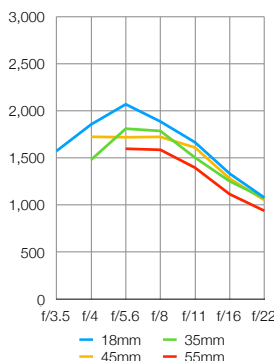
Unlike in previous designs, the focus ring remains stationary during autofocus. However, neither autofocus nor manual focusing works with older Nikon SLRs. There's also no VR on/off switch: you can only switch it off via the camera menu.

#### Performance

Nikon's smallest kit zoom for SLRs boasts fast autofocus speed as well as four-stop VR. Outright image quality is very good in most respects, although colour fringing and barrel distortion are quite severe at the short end of the zoom range.

#### Sharpness

There's a relative lack of sharpness when shooting wide-open at 18mm.



#### Fringing

Short **4.66** Long **1.06**  
Uncorrected fringing is only apparent at the short end.

#### Distortion

Short **-4.01** Long **0.27**  
There's very little distortion at mid to long zoom settings.

#### Digital Camera verdict

Great for travel and general shooting, it's a good performer and terrific value. Fringing and distortion can be easily corrected. Nikon's 16-80mm lens costs a lot more.

**4.0** ★★★★★ Excellent



Features



Build & handling



Performance



Value



### Nikkor AF-S DX 16-80mm f/2.8-4E ED VR

£989/\$1,067

#### Nikon's top-flight DX option

**N**ew meets old in this lens: it combines an effective yet conventional ring-type ultrasonic autofocus system with a new-generation, electromagnetically controlled diaphragm. This helps to maintain consistently accurate exposures in rapid continuous drive mode.

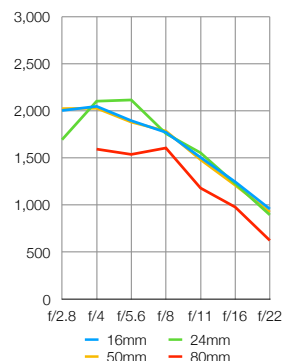
The zoom range is an 'effective' 24-120mm, which works out the same in practical terms as Nikon's full-frame kit lens for the D750. However, while that one has a constant-aperture rating of f/4, the DX lens is up to a full f/stop faster at short zoom settings. Like current kit lenses for DX-format SLRs, it has a seven-blade diaphragm and a four-stop stabiliser.

#### Performance

Sharpness is exceptional at all but the longest zoom setting. However, lateral chromatic aberration can be visible when uncorrected at the short end.

#### Sharpness

The lens is super-sharp at most zoom settings but drops off at the long end.



#### Fringing

Short **3.29** Long **1.78**  
There's noticeable fringing at 16mm, but it mostly dies away.

#### Distortion

Short **-4.59** Long **2.26**  
Short-zoom barrel distortion can be very noticeable.

#### Digital Camera verdict

For performance and versatility, this is the best DX-format standard zoom on the market for Nikon SLRs. It beats alternatives from independent manufacturers.

**4.5** ★★★★★ Outstanding



Features



Build & handling



Performance



Value



## Nikkor

### AF-S 24-120mm f/4 ED VR

£1,045/\$1,097

A high-quality kit lens for the D750

**B**uilding on the success of Nikon's original AF-S 24-120mm VR, this second edition has a constant rather than variable aperture rating and an upgraded stabiliser. It's been on sale for a decade now, though, and the 3.5-stop stabiliser is less effective than in most newer Nikon lenses. At least VR comes complete with Normal and Active modes.

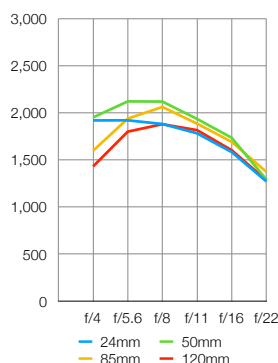
Build quality is very good for a kit lens and includes weather-seals. Conventional internals include mechanical control for the diaphragm and a ring-type ultrasonic AF system.

#### Performance

Sharpness holds up pretty well throughout the zoom range, right out to the edges and corners of the frame. If uncorrected, however, colour fringing and distortions are rather noticeable, especially in comparison with new-generation Z-mount lenses.

#### Sharpness

It's not far behind the Nikkor 24-70mm, but drops off at its longer maximum focal length.



#### Fringing

Short **4.06** Long **1.33**  
Poor at 24mm, colour fringing gradually decreases.

#### Distortion

Short **-4.19** Long **2.9**  
Distortions are on a par with the AF-S 24-70mm f/2.8.

#### Digital Camera verdict

This lens is well suited to the Nikon D750 and older full-frame SLRs, with which it's fully compatible, but it won't make the most of the high-resolution D850, for example.

**4.0** ★★★★★  
Excellent



## Nikkor

### AF-S 24-70mm f/2.8E ED VR

£1,799/\$2,396

A big brute of a standard zoom

**M**easuring 155mm in length, this is one of the biggest standard zoom lenses on the market. You'd be forgiven for assuming it had an internal zoom mechanism, but it extends even further as you near either end of the zoom range.

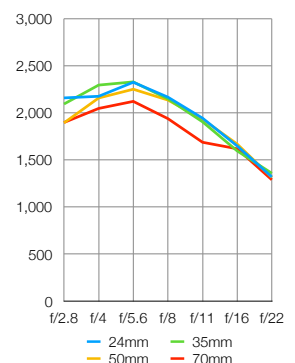
Redesigned a few years ago, this edition adds four-stop stabilisation; the previous incarnation had none. It also gains an entirely new optical design, incorporating four ED elements. The nine-blade diaphragm is also upgraded with electromagnetic control.

#### Performance

The lens is capable of magnificent results, and delivered the best scores for sharpness in our lab tests. Even so, it is somewhat eclipsed in this aspect of its image quality by Nikon's new full-frame Z-mount standard zooms, and its colour fringing, distortions and vignetting are much more noticeable.

#### Sharpness

It beats the AF-S 24-105mm, especially in the longer half of the zoom range.



#### Fringing

Short **5.55** Long **0.71**  
At the short end, it's the poorest Nikkor here.

#### Distortion

Short **-3.94** Long **2.12**  
Barrel and pincushion are no worse than the 24-120mm.

#### Digital Camera verdict

It's built like a tank and has become more affordable in the UK, since the price dropped a while ago. It's a superb lens, and a great choice for any full-frame Nikon SLR.

**4.5** ★★★★★  
Outstanding





# Swings and roundabouts

The Nikkor AF-S 24-70mm f/2.8E ED VR claims top spot



Digital  
Camera  
BEST  
ON TEST

**W**hen you trade up from a standard kit lens to a more sophisticated zoom, there's often little or no improvement in autofocus speed, nor in facets of image quality like sharpness, colour fringing and distortion. The biggest difference you'll usually find is that top-flight lenses typically have a faster aperture rating, delivering a tighter depth of field and giving you more

creative freedom. Premium lenses are generally more adept at keeping ghosting and flare to a minimum. Build quality also tends to be much better, catering to the demands of professional photographers.

The Nikkor 24-70mm is the most impressive lens in this test. Even so, if you're got the excellent Nikkor 24-120mm kit lens, there's little need to upgrade unless you really feel the need for that extra f/stop.

Trading up from the Canon 24-105mm f/3.5-5.6 to the 24-70mm f/2.8 is a trickier decision, as you'll lose image stabilisation as well as extra telephoto reach in the process. That said, the Canon 24-105mm lens is rather basic compared with the Nikkor 24-120mm, whereas the Canon 24-70mm is a fully pro-grade lens with particularly strong build quality.

## How the lenses compare



Canon EF-S  
18-55mm  
f/3.5-5.6 IS STM



Canon EF-S  
15-85mm  
f/3.5-5.6 IS USM



Canon EF  
24-105mm  
f/3.5-5.6 IS STM



Canon EF  
24-70mm f/2.8L  
II USM



Nikkor AF-P DX  
18-55mm  
f/3.5-5.6G VR



Nikkor AF-S DX  
16-80mm  
f/2.8-4E ED VR



Nikkor AF-S  
24-120mm f/4  
ED VR



Nikkor AF-S  
24-70mm f/2.8E  
ED VR

Contact	www.canon.co.uk	www.canon.co.uk	www.canon.co.uk	www.canon.co.uk	www.nikon.com	www.nikon.com	www.nikon.com	www.nikon.com
Street price	£214/\$106	£690/\$799	£579/\$599	£1,740/\$1,599	£209/\$247	£989/\$1,067	£1,045/\$1,097	£1,799/\$2,399
Full-frame compatible	No	No	Yes	Yes	No	No	Yes	Yes
Equiv focal length	29-88mm	24-136mm	36-168mm	38-112mm	27-82.5mm	24-120mm	36-180mm	36-105mm
Elements/groups	13/11	17/12	17/13	18/13	12/9	17/13	17/13	20/16
Diaphragm	7 blades	7 blades	7 blades	9 blades	7 blades	7 blades	9 blades	9 blades
Optical stabiliser	4-stop	4-stop	4-stop	None	4-stop	4-stop	3.5-stop	4-stop
Autofocus type	Stepping motor	Ultrasonic (ring-type)	Stepping motor	Ultrasonic (ring-type)	Stepping motor	Ultrasonic (ring-type)	Ultrasonic (ring-type)	Ultrasonic (ring-type)
Manual focus override	Electronic	Full-time	Electronic	Full-time	Electronic	Full-time	Full-time	Full-time
Min focus distance	0.25m	0.35m	0.4m	0.38m	0.25m	0.35m	0.45m	0.38m (35-50mm)
Max reproduction ratio	0.36x	0.21x	0.3x	0.21x	0.38x	0.22x	0.24x	0.28x
Focus distance scale	No	Yes	No	Yes	No	Yes	Yes	Yes
Mounting plate	Plastic	Metal	Metal	Metal	Plastic	Metal	Metal	Metal
Weather-sealed mount	No	No	No	Yes	No	Yes	Yes	Yes
Filter size	58mm	72mm	77mm	82mm	55mm	72mm	77mm	82mm
Hood	EW-63C, £15/\$23	EW-78E, £38/\$30	EW-83M, £29/\$27	EW-88C, included	HB-N106, £20/\$25	HB-75, included	HB-53, included	HB-74, included
Dimensions (dia x length)	69 x 75mm	82 x 88mm	83 x 104mm	89 x 113mm	65 x 63mm (retracted)	80 x 86mm	84 x 104mm	88 x 155mm
Weight	205g	575g	525g	805g	205g	480g	710g	1,070g
Features	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★
Build & handling	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★
Performance	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★
Value	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★
Overall	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★



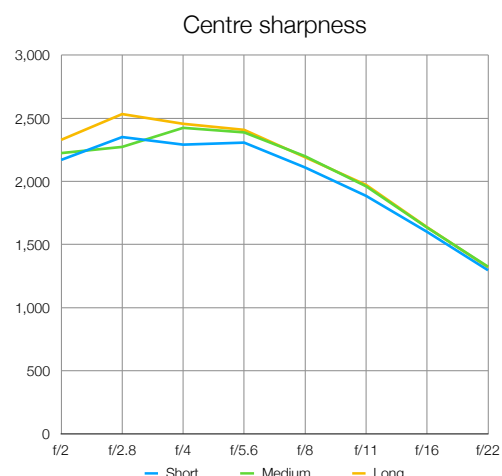
# Canon RF 28-70mm f/2L USM

£3,049/\$2,999

A monster of a standard zoom lens

[www.canon.co.uk](http://www.canon.co.uk)

**Full-frame compatible:** Yes  
**Elements/groups:** 19/13  
**Image stabiliser:** No  
**Minimum focus distance:** 0.39m  
**Max magnification factor:** 0.18x  
**Manual focus override:** Yes  
**Focus limit switches:** No  
**Internal zoom:** No  
**Internal focus:** Yes  
**Filter size:** 95mm  
**Iris blades:** 9  
**Weather seals:** Yes  
**Supplied accessories:** Cap, rear cap, hood, case  
**Dimensions (dia x length):** 104 x 140mm  
**Weight:** 1,430g



## Sharpness

Sharpness is mostly scintillating, but images are soft around the edges at short zoom settings.

## Fringing Short 1.67 Long 1.6

There's very little colour fringing at any focal length throughout the entire zoom range.

## Distortion Short -1.43 Long 1.21

A benefit of the relatively modest zoom range is that distortions are low throughout.

## Verdict

4.5 ★★★★★ Outstanding



It's a fabulous lens that really can rival three or four separate prime lenses. However, the sheer bulk and weight of the lens make it feel a mismatch for a mirrorless body, leaving somewhat of an f/2.8-shaped gap in Canon's RF lens line-up.

One of the main attractions of Canon's EOS R and RP bodies is their comparatively compact and light build, compared with full-frame SLRs. By contrast, the RF 28-70mm is a monster, measuring 104 x 140mm and weighing in at 1,430g. It's nearly twice the weight and twice the price of Canon's top-spec EF 24-70mm f/2.8 lens, weighing about the same as a 70-200mm f/2.8 zoom.

The RF lens's upscaled build is mainly due to it being a full f/stop faster than most premium standard zooms. The optical elements need a larger diameter to let in more light; this lens has an oversized 95mm filter thread, despite its more limited zoom range with less wide-angle potential. Instead, the design goes all out for premium image quality, with minimal distortions.

You could argue that with its f/2 aperture and premium optical design, this zoom lens performs more like four prime lenses with 28mm, 35mm, 50mm and (nearly) 85mm focal lengths. The zoom lens might therefore represent a saving in size and weight, while also reducing the need to swap the lens mounted on the camera. Even so, a prime lens with a similar aperture rating would equate to a much less bulky shooting package hanging around your neck, even if it meant popping a couple of extra lenses in your bag.

## Performance

Autofocus is very fast but not completely silent, based on a ring-type ultrasonic system, rather than a stepping motor or Nano USM. Centre sharpness is spectacular throughout the entire zoom range, even when you shoot wide-open at f/2, although corner sharpness at the short end is disappointing. Contrast and colour rendition are superb, while lateral chromatic aberrations and distortions are minimal. At f/2, bokeh is beautiful with negligible longitudinal fringing, and wonderfully smooth transitions. **Matthew Richards**

**1** A tell-tale sign of the lens's extra-large build is its 95mm filter thread.

**2** You can adjust ISO, aperture, shutter speed and exposure compensation via the forward control ring.

**3** The focus ring operates smoothly, but the lens lacks a mechanical focus distance scale.

**4** The lens physically extends at longer zoom settings and features a zoom lock switch.









# Standard zooms for mirrorless

Is your 'kit' lens good enough, or should you go for something more fancy?



Last issue, we tested the most popular standard zoom lenses for Canon and Nikon DSLRs, which are bundled with DSLR bodies to form complete camera kits. We

compared them with more exotic options, which are available if you buy your standard zoom separately.

This month, it's round two, as we compare kit and upgrade zooms for Fujifilm, Olympus and Panasonic crop-sensor cameras, as well as for Sony full-frame E-mount models.

Kit lenses for crop-sensor mirrorless cameras often have a retractable design, making them particularly compact for stowing away, adding to the svelte attraction of this type of camera. Upgrade zooms tend to be larger and heavier, but usually have a constant aperture rating that's generally about two f/stops faster at the long end of the zoom range. That's great for gaining a tighter depth of field, as well as fast shutter speeds under dull lighting. They also tend to have better build quality and classier glass. **Matthew Richards**

## The contenders

<b>1 Fujifilm</b> Fujinon XC15-45mm f/3.5-5.6 OIS PZ	£229/\$299
<b>2 Fujifilm</b> Fujinon XF16-55mm f/2.8 R LM WR	£949/\$1,199
<b>3 Olympus</b> M.Zuiko Digital ED 14-42mm f/3.5-5.6 EZ Pancake	£255/\$224
<b>4 Olympus</b> M.Zuiko Digital ED 12-40mm f/2.8 Pro	£699/\$849
<b>5 Panasonic</b> Lumix G Vario 12-32mm f/3.5-5.6 Asph Mega OIS	£259/\$317
<b>6 Panasonic</b> Lumix G Leica DG 12-60mm f/2.8-4 Asph Power OIS	£799/\$898
<b>7 Sony</b> FE 28-70mm f/3.5-5.6 OSS	£395/\$398
<b>8 Sony</b> FE 24-70mm f/2.8 G Master	£1,799/\$2,198



## Group Test Standard zooms



Digital  
Camera  
VALUE  
AWARD

### Fujinon XC15-45mm f/3.5-5.6 OIS PZ £229/\$299

#### Power to the people

**A**vailable in black or silver, this Fujifilm kit lens isn't as tiny or featherweight as its Micro Four Thirds counterparts on test, but still boasts a space-saving retractable design.

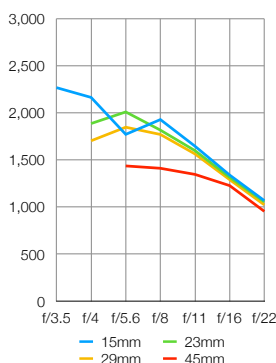
Like the competing Olympus EZ kit lens, the Fujinon has a motorised zoom mechanism. The lens automatically extends and retracts when you switch the camera on and off. Fast and slow zoom speeds are available, depending on how much you twist the zoom ring. It's useful for video capture, but less than ideal for very precise adjustments while you're shooting stills.

#### Performance

The minimum focus distance is unusually short at the wide-angle end of the zoom range. The electronically coupled focus ring works smoothly, and the stepping motor autofocus system is quick and quiet. Image quality is very good overall.

#### Sharpness

Centre-sharpness is strong in the short half of the zoom range, but drops off.



#### Fringing

Short **2.11** Long **1.39**  
Colour fringing can be slightly noticeable at the short end.

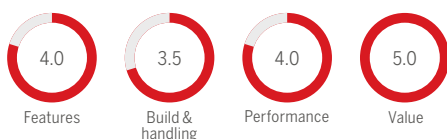
#### Distortion

Short **-0.75** Long **-0.41**  
After in-camera corrections, there's only minimal barreling.

#### Digital Camera verdict

Remarkably small and light for an APS-C format standard zoom, this kit lens delivers pleasing images. The motorised 'power zoom' is a mixed blessing, though.

**4.0** ★★★★★ Excellent



Digital  
Camera  
BEST FOR  
FUJIFILM

### Fujinon XF16-55mm f/2.8 R LM WR £949/\$1,199

#### A couple of steps up the ladder

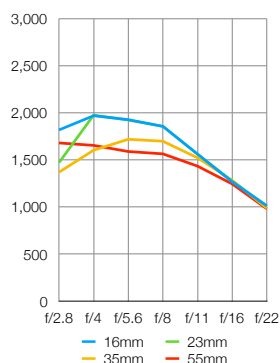
**A**t four times the price of the 15-45mm, the constant-aperture 16-55mm f/2.8 zoom is the pick of the crop for anyone upgrading from their kit lens. Sure, it doesn't feature optical stabilisation, but it does have a tough weather-sealed build, a rapid 'linear motor' autofocus system, a constant f/2.8 aperture and a control ring. It also gives a significantly wider maximum viewing angle than Fujifilm's 18-55mm lens (another upgrade possibility), equivalent to 24mm rather than 27mm in full-frame terms.

#### Performance

Three aspherical and three ED elements help to boost image quality, while dual HT-EBC and Nano-GI coatings do a great job of minimising ghosting and flare. Two f-stops faster than the 15-45mm kit lens at the long end of the zoom range, it gives a tighter depth of field.

#### Sharpness

There's a dip in wide-open sharpness at mid-zoom settings, but overall it's good.



#### Fringing

Short **2.37** Long **1.09**  
Fringing is slightly lower than in the Fujinon 15-45mm.

#### Distortion

Short **-0.66** Long **0.31**  
There's almost no distortion; vignetting is also minimal.

#### Digital Camera verdict

It's fairly big and heavy for an APS-C format lens but build quality, handling and image quality are all epic, as you'd expect from one of Fujifilm's 'red badge' best-of-breed lenses.

**4.5** ★★★★★ Outstanding





# Olympus

## M.Zuiko Digital ED 14-42mm f/3.5-5.6 EZ Pancake

£255/\$224

A pancake that doesn't fall flat

**T**his 'pancake' zoom from Olympus follows the same basic script as the Fujinon 15-45mm kit lens on test.

It's available in black or silver and has a retractable design with a motorised zoom mechanism. However, it's even smaller and lighter than the Fujinon.

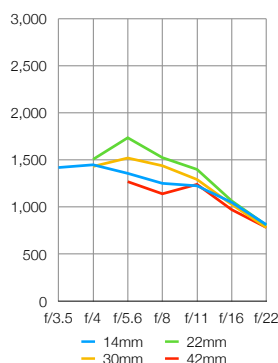
The speed of the zoom motor increases if you twist the zoom ring further, but precise adjustments for stills capture can be tricky. Build quality is good: surprisingly for such a lightweight kit lens, the mounting plate is made from metal rather than plastic.

### Performance

Upmarket optics include three aspherical elements, one aspherical ED element and a Super HR (High Refractive index) element, along with Olympus's A Zero coating. Outright sharpness is a little mediocre, but image quality on the whole is good for a lens this small.

### Sharpness

Sharpness drops off towards the edges when you use wide apertures in the short half.



### Fringing

Short **1.41** Long **0.52**  
Minimal fringing at the short end vanishes at the long end.

### Distortion

Short **-1.67** Long **-0.21**  
After in-camera corrections, it's a distortion-free lens.

### Digital Camera verdict

Adding to the slimline, travel-friendly credentials of Olympus Micro Four Thirds cameras, this is a neat lens that takes up next to no room at all when it's retracted.

**3.5** ★★★★★ Very good



## Standard zooms **Group Test**



Digital  
Camera  
**BEST FOR  
OLYMPUS**

# Olympus

## M.Zuiko Digital ED 12-40mm f/2.8 Pro

£699/\$849

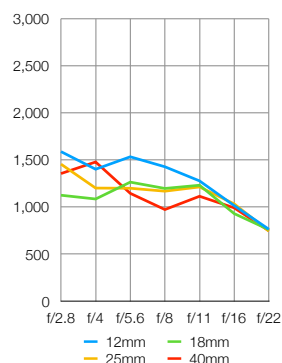
Boasts a constant aperture

**C**oming in at three times the price of the Olympus pancake zoom and four times the weight, this is very much the pro-grade big brother for Micro Four Thirds cameras. Indeed, the constant f/2.8 aperture rating makes this lens two f-stops faster than the Olympus pancake zoom at the long end of the zoom range.

The weather-sealed build quality is excellent, while handling luxuries include a physical focus distance scale and a neat customisable Lens-Function button.

### Sharpness

Results for sharpness don't look particularly good, but the lens performs beautifully.



### Performance

Optical highlights include two aspherical, one dual-surface aspherical, one ED aspherical, two ED and two HR elements, along with A Zero coating. Sharpness and contrast proved excellent in our real-world testing, although lab results weren't overly inspiring.

### Fringing

Short **0.3** Long **0.53**  
There's no fringing to be seen after in-camera corrections.

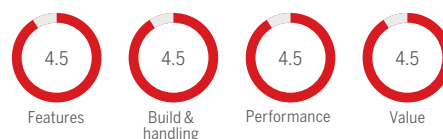
### Distortion

Short **0.04** Long **0.2**  
Distortions are kept firmly at bay with auto corrections.

### Digital Camera verdict

Lab test results don't tell the full story: this lens was an excellent performer throughout all of our 'real-world' procedures, and delivers pictorially gorgeous results.

**4.5** ★★★★★ Outstanding





## Group Test Standard zooms



### Panasonic Lumix G Vario 12-32mm f/3.5-5.6 Asph Mega OIS £259/\$317

#### A variation on a kit theme

**L**ike the Fujifilm and Olympus kit lenses on test, this one comes in silver or black and has a retractable design. It collapses to pretty much the same diminutive size as the Olympus. It's even lighter, at an unfeasible 70g in weight, yet adding a three-stop optical stabiliser that's lacking in the Olympus.

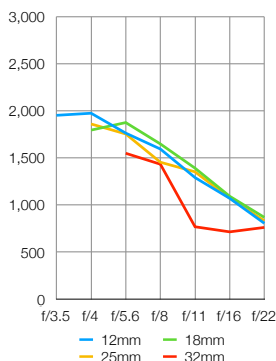
The Panasonic has a manual rather than motorised zoom mechanism. You have to manually extend the lens for use when you switch on the camera and it's not so convenient for movie capture, but offers greater zooming precision for stills.

#### Performance

There's no manual focus ring, but autofocus is quick, ultra-quiet and very reliable. Image quality is good for such a tiny lens but, as usual, the widest available aperture of f/5.6 at the long end of the zoom range can be a challenge.

#### Sharpness

It's very good across most of the zoom range, only dropping off at the longest setting.



#### Fringing

Short **0.4** Long **0.73**  
There's virtually no colour fringing to be seen.

#### Distortion

Short **-2.01** Long **-0.12**  
There's only a little barrel distortion at 12mm.

#### Digital Camera verdict

Incredibly small and light, yet with optical stabilisation and generous wide-angle coverage, this is a great lens for travel and everyday shooting on MFT cameras.

**4.0** ★★★★★ Excellent



Digital  
Camera  
**BEST FOR  
PANASONIC**

### Panasonic Lumix G Leica DG Vario-Elmarit 12-60mm f/2.8-4 Asph Power OIS £799/\$898

#### No constant aperture, more zoom

**C**ompared with Panasonic's retractable kit lens on test, this one costs about three times the price and is a much more hands-on affair. Whereas the smaller lens lacks any control switches or even a manual focus ring, this one has AF/MF and stabiliser on/off switches for instant control, plus a smooth-action, electronically coupled focus ring. It doesn't have a retractable design, and is somewhat larger and heavier, at 68 x 86mm and 320g, but still entirely manageable.

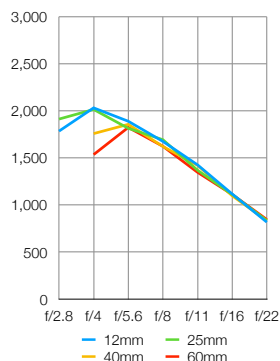
Unlike all the other upgrade zooms on test, this lens doesn't have a constant-aperture design that enables the widest aperture of f/2.8 throughout the zoom range.

#### Performance

Thanks to the inclusion of four aspherical and two ED elements, plus a three-stop stabiliser, image quality is highly impressive in all respects.

#### Sharpness

It's sharper than Panasonic's 12-32mm and delivers a much greater zoom range.



#### Fringing

Short **1.12** Long **0.43**  
Short fringing is slightly higher than in the 12-32mm lens.

#### Distortion

Short **-1.79** Long **0.04**  
Auto corrections means you get very little distortion.

#### Digital Camera verdict

The jumbo zoom range and effective optical stabiliser are two of the biggest attractions in this lens, making up for the aperture shrinking from f/2.8 to f/4 at the long end.

**4.5** ★★★★★ Outstanding





## Sony

### FE 28-70mm f/3.5-5.6 OSS

£395/\$398

#### A modest FE standard zoom

**T**his lens is a popular kit lens option with A7-series bodies. It's pretty compact and light for a full-frame compatible standard zoom lens, at 73 x 83mm and 295g, despite lacking a retractable design. It also includes a three-stop optical stabiliser, which comes in very useful on older-generation A7 bodies that lack in-camera stabilisation.

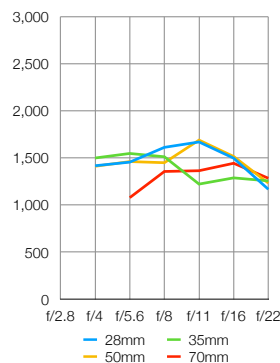
Build quality feels good overall, and it has a dust/moisture resistant design, although without a rubber ring around the metal mounting plate.

#### Performance

Three aspherical elements and one ED element help to boost image quality and the seven-blade diaphragm is fairly well-rounded. Outright sharpness is disappointing, though, making it a bit of a mismatch with any of Sony's full-frame cameras that bump up the megapixel count.

#### Sharpness

Sharpness isn't too bad at the centre, but disappointing towards the edges.



#### Fringing

Short **0.48** Long **2.71**  
Fringing is well-controlled across most of the range.

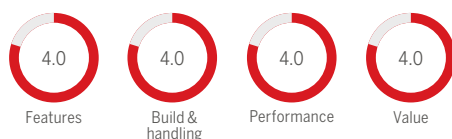
#### Distortion

Short **-2.35** Long **3.46**  
Barreling at the short end gives way to pincushion.

#### Digital Camera verdict

This lens is fairly small, light and inexpensive for a full-frame compatible standard zoom, but it lacks the quality to make the most of Sony's recent mirrorless cameras.

**4.0** ★★★★★  
Excellent



## Sony

### FE 24-70mm f/2.8 G Master

£1,799/\$2,198

Digital Camera  
**BEST ON TEST**

Digital Camera  
**GOLD AWARD**

Digital Camera  
**BEST FOR SONY**

#### A big lens in every way

**T**his G Master lens is as good as it gets for an own-brand Sony standard zoom. And so it should be, costing about five times the price of the 28-70mm kit lens. It's not massively bigger or heavier than the Fujifilm f/2.8 lens on test, despite the Sony being designed for full-frame rather than APS-C format cameras.

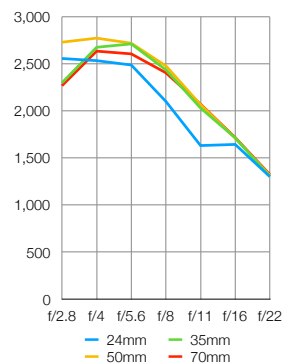
The weather-sealed construction feels sturdy, and switches are featured for AF/MF and a focus hold. There's no optical stabiliser, but newer Sony full-frame cameras have in-body stabilisation instead.

#### Performance

Sharpness and contrast are fabulous, aided by the inclusion of one extreme aspherical, two regular aspherical, one Super ED, and one regular ED element in the optical path. Nano AR coating is also on hand to fend off ghosting and flare.

#### Sharpness

Even wide-open, sharpness is simply phenomenal throughout the zoom range.



#### Fringing

Short **1.6** Long **0.29**  
Very little fringing at 24mm; less at mid to long settings.

#### Distortion

Short **-1.83** Long **2.31**  
Uncorrected, there's modest barreling at 24mm.

#### Digital Camera verdict

A stellar performer, this lens is much more expensive than any other standard zoom on test, but you get what you pay for. It's the best own-brand Sony standard zoom.

**5.0** ★★★★★  
Outstanding





## Group Test Standard zooms

# Sony is the master of all

The quality of its FE 24-70mm f/2.8 G Master gives it top billing



Digital Camera  
**BEST ON TEST**

Digital Camera  
**GOLD AWARD**

**S**ony has served up some scintillating full-frame mirrorless cameras over the last few years, but the 28-70mm kit lens fails to get the most out of them. By contrast, the 24-70mm G Master lens delivers superb sharpness, along with particularly beautiful bokeh for a standard zoom. The flipside is that the G Master is very pricey. (Now launching in

Sony E-mount fit, the Sigma 24-70mm f/2.8 DG DN Art promises to be a real money-saver at around half the price.)

The kit lenses from Fujifilm and Olympus both feature a retractable design with a motorised zoom mechanism. They also both deliver decent performance but the more upmarket Fujifilm XF16-55mm f/2.8 and Olympus 12-40mm f/2.8 Pro represent significant upgrades in handling and

image quality, as well as a desirable constant f/2.8 aperture rating. The same goes for the Panasonic 12-60mm f/2.8-4 OIS over the 12-32mm kit lens: you get upgraded to a massive zoom range complete with the retention of optical stabilisation and superb image quality. In a nutshell, the upgrade lenses are well worth the extra outlay.

### How the lenses compare



Fujinon  
XC15-45mm  
f/3.5-5.6 OIS PZ

Fujinon  
XF16-55mm  
f/2.8 R LM WR

M.Zuiko Digital  
ED 14-42mm  
f/3.5-5.6 EZ

M.Zuiko Digital  
ED 12-40mm  
f/2.8 Pro

Panasonic  
12-32mm  
f/3.5-5.6 Asph  
Mega OIS

Panasonic Leica  
G 12-60mm  
f/2.8-4 Asph  
Power OIS

Sony FE  
28-70mm  
f/3.5-5.6 OSS

Sony FE  
24-70mm f/2.8  
G Master

Contact	www.fujifilm.co.uk	www.fujifilm.co.uk	www.olympus.co.uk	www.olympus.co.uk	www.panasonic.com/uk	www.panasonic.com/uk	www.sony.co.uk	www.sony.co.uk
Street price (UK, USA)	£229/\$299	£949/\$1,199	£255/\$224	£699/\$849	£259/\$317	£799/\$898	£395/\$398	£1,799/\$2,198
Full-frame compatible	No	No	No	No	No	No	Yes	Yes
Equivalent focal length	22.5-67.5mm	24-82.5mm	28-84mm	24-80mm	24-64mm	24-120mm	42-105mm	36-105mm
Elements/groups	10 / 9	17 / 12	8 / 7	14 / 9	8 / 7	14 / 12	9 / 8	18 / 13
Diaphragm	7 blades	9 blades	5 blades	7 blades	7 blades	9 blades	7 blades	9 blades
Optical stabiliser	3-stop	None	None	None	3-stop	3-stop	3-stop	None
Zoom type	Powered	Manual	Powered	Manual	Manual	Manual	Manual	Manual
Autofocus type	Stepping motor	Stepping motor	Stepping motor	Stepping motor	Stepping motor	Stepping motor	Stepping motor	Stepping motor
Focus ring coupling	Electronic	Electronic	Electronic	Electronic	None (AF only)	Electronic	Electronic	Electronic
Min focus distance	0.13-0.35m	0.3-0.4m	0.2m	0.2m	0.2-0.3m	0.2-0.24m	0.3-0.45m	0.38m
Max reproduction ratio	0.24x	0.16x	0.23x	0.3x	0.13x	0.3x	0.19x	0.24x
Focus distance scale	No	No	No	No	No	No	No	No
Retractable	Yes	No	Yes	No	Yes	No	No	No
Filter size	52mm	77mm	37mm	62mm	37mm	62mm	55mm	82mm
Supplied accessories	None	Hood, wrap	None	Hood, pouch	None	Hood, pouch	Hood	Hood, pouch
Dimensions (dia x length)	63 x 44mm	84 x 106mm	61 x 23mm	70 x 84mm	56 x 24mm	68 x 86mm	73 x 83mm	88 x 136mm
Weight	135g	655g	93g	382g	70g	320g	295g	886g

Features	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★
Build & handling	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★
Performance	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★
Value	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★
Overall	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★



**Mount:** Sony E (APS-C)  
**Lens construction:** 17 elements, 12 groups  
**Angle of view:** 83-29 degrees  
**Diaphragm blades:** 9  
**Minimum aperture:** f/22  
**Minimum focusing distance:** 0.33m  
**Maximum magnification ratio:** 0.2x  
**Filter size:** 67mm  
**Dimensions:** 73 x 100mm  
**Weight:** 494g

# Sony E 16-55mm f/2.8 G

£1,199/\$1,299

The new standard for APS-C Sony cameras

[www.sony.co.uk](http://www.sony.co.uk)

**D**iscerning full-frame shooters generally opt for a 24-70mm f/2.8 lens as their go-to zoom for general shooting. That's great for Sony A7 and A9 cameras, but what if you have an APS-C format A6000 series body? The new Sony E 16-55mm f/2.8 G is an almost exact equivalent, with an effective 24-82.5mm zoom range and the same f/2.8 constant aperture rating.

It's designed to give owners of one of the Sony A6000-series of mirrorless cameras a high-quality kit lens option. Just like the Sony E 70-350mm f/4.5-6.3 G OSS, which was released at the same time, the Sony E 16-55mm f/2.8 G helps to fill out a lens range that had lacked any real choice for those who don't want unnecessarily bulky lenses that are designed for use with full-frame cameras.

## Performance

Autofocus performance is excellent in terms of both speed and accuracy. Sharpness across the whole image frame is epic, even when shooting wide-open at f/2.8, throughout the shorter half of the zoom range. It remains excellent at longer zoom settings, although corner-sharpness drops off a little.

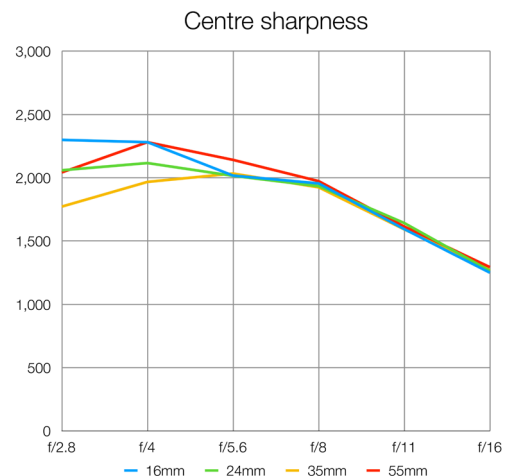
Contrast and colour rendition are superb, while resistance to ghosting and flare is very good indeed. The quality of bokeh is very pleasant when shooting wide-open.

The lens lacks optical stabilisation, which can be an issue for handheld shooting on all current A6000-series cameras apart from the top-end A6600, the only one to feature in-body stabilisation. Our only other criticism is that barrel distortion is very heavy at the short end of the zoom range. It's automatically corrected in the latest cameras, where distortion correction can't actually be switched off for this lens. **Matthew Richards**

**1** Contrast is enhanced by Nano AR Coating, which is effective in combating ghosting and flare.

**2** There are 17 elements arranged in 12 groups, including two AA (Advanced Aspherical) elements, two further aspherical elements and three ED (Extra-low Dispersion) elements.

**3** Although fairly light, the lens feels solid, and has a good scattering of weather seals.



## Sharpness

Centre-frame sharpness is excellent at all focal lengths, even when shooting at f/2.8. Only at f/16 and narrower does sharpness fall off.

**Fringing** Short 0.1 Long 0.33

Fringing is only noticeable at 16mm and at larger apertures – and this is with in-camera correction switched off.

**Distortion** Short -8.54 Long 1.97

There's significant and very obvious barrel distortion at 16mm, though by 24mm it's already reduced to an acceptable degree.

## Verdict

**5.0** ★★★★★ A best-in-class product



A top-quality, fast standard zoom for APS-C format Sony cameras has been a long time coming. This new 16-55mm f/2.8 G ticks all the right boxes.





# Street lenses

It's time to get back to shooting life in motion, so here are eight of the most streetwise buys

M

any of us easing out of lockdown recently have rediscovered the simple joys of ambling around city streets, feasting on the sights and sounds of bustling life. It's only natural to want to capture this 'new' normality on camera. And if you've never been into street photography before, it's a chance to try something new. But what is street photography, and how do you shoot it?

Classic street photography is all about reacting to your environment,

anticipating events as they unfold and capturing definitive moments. More often than not, classic street images include people set against urban surroundings, photographed candidly as they go about their lives.

You'll therefore need a camera and lens combination that you can use fairly discreetly, and that enables you to shoot with next to no setup time. Traditionally, a full-frame camera with a 35mm prime lens is the ideal tool of choice. Let's look at the best options for DSLRs and mirrorless cameras. **Matthew Richards**

## The contenders

1	<b>Canon</b> EF 35mm f/2 IS USM	£539/\$599
2	<b>Canon</b> RF 35mm f/1.8 IS Macro STM	£529/\$499
3	<b>Nikkor</b> AF-S 35mm f/1.8G ED	£455/\$527
4	<b>Nikkor</b> Z 35mm f/1.8 S	£799/\$847
5	<b>Samyang</b> 35mm f/1.4 AS UMC	£487/\$499
6	<b>Sigma</b> 35mm f/1.4 DG HSM   A	£699/\$799
7	<b>Sigma</b> 35mm f/2 DG DN   C	£549/\$639
8	<b>Tamron</b> 35mm f/2.8 Di III OSD Macro	£239/\$199





Street lenses Group Test







## Canon EF 35mm f/2 IS USM

£539/\$599



Get it while you can...

**Lens mount Canon EF**

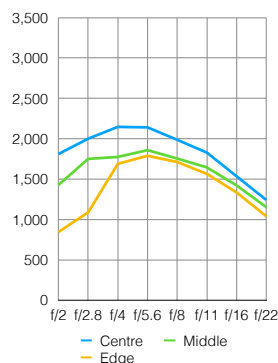
**R**umours are rife that Canon will discontinue this lens sometime this year. That's a shame, because it works really well for street photography. It bridges the gap between the EF 40mm f/2.8 pancake lens, which is super-small, but has a focal length that's a touch on the long side; and the EF 35mm f/1.4L II USM, which is massive in both size and cost. This 35mm f/2 IS USM is quite compact and light, yet has a fairly fast aperture rating, ring-type ultrasonic autofocus, plus four-stop stabilisation. The manual focus ring operates with precision and enables fine adjustments.

### Performance

Performance is impressive, with quick and whisper-quiet autofocus, stabilisation that lives up to its 4-stop billing and excellent image quality in all respects. There's certainly no lack of sharpness and contrast.

### Sharpness

There's little to choose between this and Canon's RF 35mm for centre-sharpness.



### Fringing

f/2.8 **0.75** f/16 **0.75**  
Lateral chromatic aberrations are very well-controlled.

### Distortion

**-1.28**  
Barrel distortion is quite minimal, and less than in the newer Canon RF lens.

### Digital Camera verdict

This is a terrific lens for street photography with full-frame Canon DSLRs. It's not as fast as the Sigma f/1.4 lens, but image stabilisation is a significant bonus.

**4.5** ★★★★★ Outstanding



## Canon RF 35mm f/1.8 IS Macro STM

£529/\$499



Perfect for EOS R-series cameras

**Lens mount Canon RF**

**O**ne of the attractions of mirrorless cameras is that they're generally fairly slim and light. The same can't be said of Canon's companion RF lenses, many of which are weighty beasts, but this 35mm prime bucks the trend. It's actually smaller and lighter than the EF 35mm on test, despite its faster aperture rating.

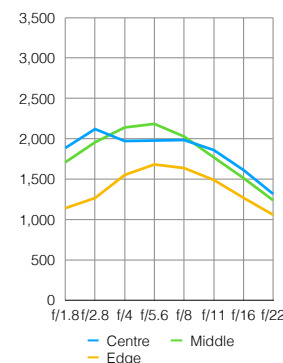
As usual for lenses with stepping motor autofocus systems, there's no focus distance scale or depth of field markings, which are often preferred for 'zone focusing' in street photography. However, a distance scale, focus peaking and focus guide options are available in Canon's EOS R-series bodies.

### Performance

Image quality is outstanding, while handheld shooting benefits from a five-stop image stabiliser, further boosted on newer R-series bodies.

### Sharpness

Sharpness is mostly excellent, but drops off towards the corners at wide apertures.



### Fringing

f/2.8 **1.28** f/16 **1.43**  
Colour fringing is minimal and tends to go unnoticed.

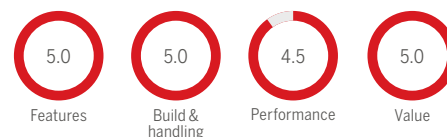
### Distortion

**-1.35**  
There's a touch of barrel distortion, but it's easily fixed with in-camera corrections.

### Digital Camera verdict

Compact and light, it's perfectly matched to slimline EOS R-series mirrorless bodies. The 5-stop stabiliser, 0.5x macro facility and control ring add to the attraction.

**5.0** ★★★★★ A best-in-class product





## Nikkor AF-S 35mm f/1.8G ED

£455/\$527

Compact and keenly priced

**Lens mount Nikon F**

**C**ompared with Nikon's new Z-series 35mm lens for its mirrorless cameras, this F-mount option is smaller, lighter and much less expensive. Both lenses have an f/1.8 aperture rating.

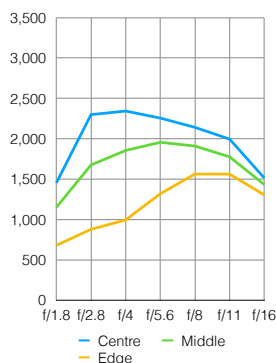
The ring-type ultrasonic system is typically quick and quiet, as well as enabling full-time manual override. There's a focus distance scale but it's of limited benefit for manual focusing, as there are no markings between 0.7m and infinity, and only rudimentary depth of field markers for f/16. Optical highlights include one aspherical element, one ED (Extra-low Dispersion) element and Super Integrated Coating.

### Performance

Bearing in mind that this lens is less than half the weight of the competing Sigma, it packs plenty of punch. Sharpness is mostly very good, and contrast is excellent, even when shooting wide-open.

### Sharpness

Sharpness is excellent at the centre, but there's a big drop-off towards the corners.



### Fringing

f/2.8 **0.99** f/16 **0.99**  
Lateral chromatic aberrations are very negligible.

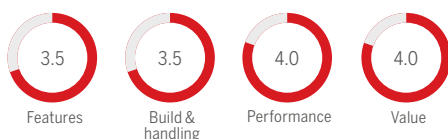
### Distortion

**-1.34**  
The amount of barrel distortion is average, but easy to correct.

### Digital Camera verdict

For build quality and optical prowess, it's no match for the Sigma 35mm Art lens, but the Nikkor is a lot smaller and lighter, which is preferable for street photography.

**4.0** ★★★★★ Excellent



## Nikkor Z 35mm f/1.8 S

£799/\$847

A smart piece of Z-mount design

**Lens mount Nikon Z**

**L**ike most of Nikon's Z-mount prime lenses, this one has an f/1.8 aperture rating – and, like its stablemates, it's pricey for an f/1.8 prime. More exotic than Nikon's F-mount lens on test, it takes the count of aspherical elements from one to three and doubles up on ED elements.

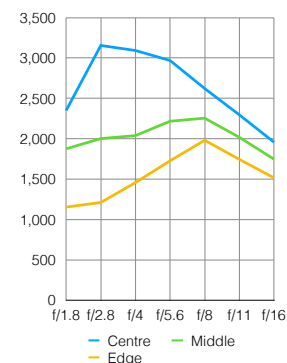
Autofocus is driven by a stepping motor, and there's no focus distance scale. However, directional focus assist lamps and a focus peaking option are available in Z-series cameras.

### Performance

Sharpness is spectacular in the central region of the frame, less so towards the edges and corners. As with the Canon RF lens, the relatively large-diameter mounting plate enables excellent all-round image quality, although the Nikkor lens relies purely on in-camera stabilisation, and lacks the bonus of a macro ability.

### Sharpness

It beats every lens here for centre-sharpness, but is more average towards the corners.



### Fringing

f/2.8 **0.3** f/16 **0.18**  
Even in the corners, lateral aberration is negligible.

### Distortion

**0.22**  
Unusually for a 35mm lens, the Nikkor produced slight pincushion distortion.

### Digital Camera verdict

Larger, heavier and pricier than the Canon RF lens, the Nikkor nevertheless has an upmarket build with performance to match, bringing out the best of Z-series cameras.

**4.5** ★★★★★ Excellent







## Samyang 35mm f/1.4 AS UMC

£487/\$499

Digital  
Camera  
BEST FOR  
PENTAX

A manual lens in varying degrees

**Lens mounts** See table

**T**his manual-focus Samyang lens (badged as Rokinon in the US) is available in a wide variety of mount options. Most have no built-in electronics, so you can't control the aperture from the camera. Instead, you need to use the lens's own aperture ring, and the viewfinder image gets progressively darker with narrower aperture settings. Exceptions are the AE versions in Canon and Nikon mounts, which enable camera-driven aperture control as well as illumination of focus-assist lamps in the viewfinder.

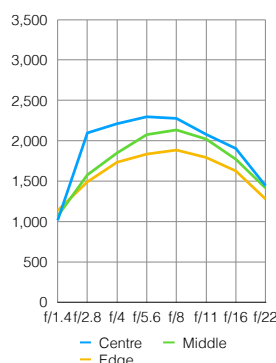
Typical of manual-focus lenses, the focus ring has a long rotational travel and operates with smooth precision.

### Performance

The Samyang is comparatively big and heavy, but sharpness and contrast are disappointing at apertures wider than f/2. Stop down to f/2.8, though, and image quality becomes excellent.

### Sharpness

It's lacklustre wide-open, but sharpness is excellent at apertures of f/2.8 to f/16.



### Fringing

f/2.8 **1.03** f/16 **0.81**  
Axial aberration can be noticeable at wide apertures.

### Distortion

**-1.91**  
Barrel distortion isn't bad but, technically, it's a little worse than in other lenses here.

### Digital Camera verdict

For traditionalists who prefer to focus manually and use zone focusing for street photography, this lens is a top option, and it's available in a wide variety of mounts.

**4.0** ★★★★★  
Excellent



Features



Build & handling



Performance



Value



## Sigma 35mm f/1.4 DG HSM | A

£699/\$799

Digital  
Camera  
BEST FOR  
NIKON F

Quite compact for a Sigma Art

**Lens mounts** See table

**M**any of Sigma's Art lenses for DSLRs are bulky propositions, but this 35mm lens is fairly compact. It's smaller and lighter than the competing Samyang f/1.4 lens, but still about twice the weight of the Canon and Nikkor f/1.8 lenses on test. It features a fast and whisper-quiet ring-type ultrasonic autofocus system. The generous rotational travel of the focus ring enables fine and precise adjustments, although depth-of-field markers are only available for f/16, which is impractical for zone focusing.

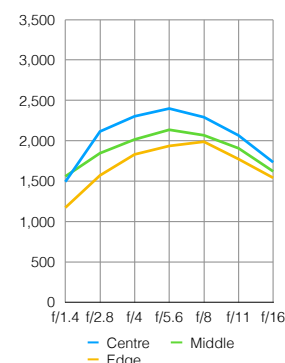
The optical path includes two aspherical elements, one top-grade FLD (Fluorite-grade Low Dispersion) element and four SLD (Special Low Dispersion) elements.

### Performance

Image quality is pretty epic, and the Sigma retains fabulous sharpness for an f/1.4 lens when shooting wide-open.

### Sharpness

It loses out slightly to the Nikkor Z for centre-sharpness but beats it in the corners.



### Fringing

f/2.8 **1.33** f/16 **0.64**  
Fringing all but disappears as you stop down a little.

### Distortion

**-0.52**  
There's less distortion than in any of the other lenses on test for Canon and Nikon SLRs.

### Digital Camera verdict

Available in a growing range of mount options, it's a fabulous lens for Sony A & E series and Panasonic S mirrorless cameras, as well as for Canon and Nikon DSLRs.

**4.5** ★★★★★  
Outstanding



Features



Build & handling



Performance



Value



## Sigma

### 35mm f/2 DG DN | C

£549/\$639

Digital  
Camera  
BEST FOR  
PANASONIC

Made for mirrorless

**Lens mounts** Sony E, L-Mount

**A**lthough Sigma's trusty 35mm Art lens is available in Sony E and Leica L-Mount, it was primarily designed for Canon and Nikon DSLRs. By contrast, this new lens has been designed from the ground up for mirrorless full-frame cameras: it has a slower f/2 aperture rating but is only half the weight.

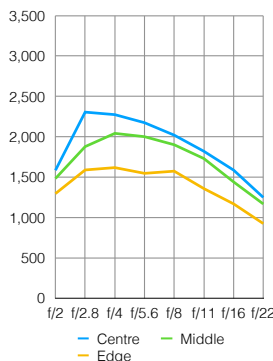
The optical design incorporates one SLD (Special Low Dispersion) element and three aspherical elements. Handling is enhanced by a physical aperture ring, although there's no de-click option.

#### Performance

For an f/2 lens, sharpness is very good wide-open, becoming excellent between f/2.8 and f/11, while autofocus is fast, virtually silent and consistently accurate. Vignetting is very noticeable at f/2 but much reduced at f/2.8.

#### Sharpness

There's a bit of a drop-off wide-open, but sharpness is generally excellent.



#### Fringing

f/2.8 **0.3** f/16 **0.42**  
Lateral chromatic aberration is very minimal.

#### Distortion

**-1.46**  
Barrel distortion can be noticeable, but in-camera corrections are available.

#### Digital Camera verdict

This Sigma works superbly as a light street lens for L-Mount mirrorless cameras but, for Sony E-mount bodies, the Tamron has the edge – and is much less expensive.

**4.5** ★★★★★ Outstanding



Digital  
Camera  
GOLD  
AWARD

Digital  
Camera  
VALUE  
AWARD

Digital  
Camera  
BEST  
ON TEST

Digital  
Camera  
BEST FOR  
SONY

## Tamron

### 35mm f/2.8 Di III OSD Macro

£239/\$199

Both fabulous and inexpensive

**Lens mount** Sony E

**W**ith its f/2.8 aperture rating, this Tamron is the 'slowest' lens in the group, but the upsides are that it's very compact and weighs just 210g. Despite that, the build quality feels sturdy and solid, complete with weather seals. The lens feels well-balanced on the Sony full-frame mirrorless cameras for which it's designed. The stepping motor-based autofocus system is near-silent but not massively fast, while the electronically coupled focus ring works with precision. Like the Canon RF 35mm lens on test, the Tamron can double up as a macro lens, delivering 0.5x magnification at its shortest focus distance of 0.15m.

#### Performance

Sharpness is exceptional even when shooting wide-open, although the f/2.8 aperture rating is modest. Other aspects of image quality are similarly impressive.

#### Sharpness

Scintillating corner-to-corner sharpness is maintained, even when shooting wide-open.



#### Fringing

f/2.8 **0.25** f/16 **0.16**  
There's very little colour fringing, even at the corners.

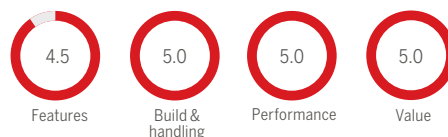
#### Distortion

**-1.08**  
You might spot slight barrel distortion in the regular shapes of buildings.

#### Digital Camera verdict

The build quality and performance of this compact and light lens are excellent, making it incredible value for money. It's a little cracker for Sony mirrorless cameras.

**5.0** ★★★★★ A best-in-class product





# Tamron comes up trumps

The Tamron 35mm f2.8 Di III OSD Macro has real street cred



Digital  
Camera  
GOLD  
AWARD

Digital  
Camera  
VALUE  
AWARD

Digital  
Camera  
BEST  
ON TEST

Digital  
Camera  
BEST FOR  
SONY

Wouldn't it be great if you could get top-end performance and fabulous image quality from a lens that's compact and light yet robustly built, all at a really low price? That's exactly what the Tamron 35mm delivers – and more besides, with refined handling and a bonus 0.5x macro facility. Sure, it only has a modest f/2.8 aperture rating, but that should prove perfectly sufficient for street photography. The only real downside is that this lens is only available

for Sony E-mount cameras. Sigma's 35mm Contemporary lens is a little heavier and much more expensive, but is a great buy for L-Mount as well as Sony cameras.

The Canon RF 35mm is another standout lens for street photography. It's faster than the Tamron with an f/1.8 aperture, adds a highly effective five-stop stabiliser, and again boasts 0.5x macro magnification, for added versatility with extreme close-ups. Image quality is superb, and the lens is keenly priced. The competing Nikkor Z 35mm f/1.8 S is

another fabulous lens with high-end design and incredible centre-sharpness, but it's comparatively pricey. Both lenses are obvious choices for street photography on the respective companies' full-frame mirrorless cameras, though.

For full-frame Canon DSLRs, our top choice is the Canon EF 35mm f/2 IS USM. For Nikon, we prefer the Sigma 35mm f/1.4 DG HSM Art to the own-brand option. For a more traditional manual-focus lens, look no further than the Samyang 35mm f/1.4 AS UMC. ●

## How the lenses compare



Name	Canon EF 35mm f/2 IS USM	Canon RF 35mm f/1.8 IS Macro STM	Nikkor AF-S 35mm f/1.8G ED	Nikkor Z 35mm f/1.8 S	Samyang 35mm f/1.4 AS UMC	Sigma 35mm f/1.4 DG HSM   A	Sigma 35mm f/2 DG DN   C	Tamron 35mm f/2.8 Di III OSD Macro
Contact	www.canon.co.uk		www.nikon.co.uk		samyanglensglobal.com	www.sigma-imaging-uk.com		www.tamron.co.uk
Street price	£539/\$599	£529/\$499	£455/\$527	£799/\$847	£487/\$499	£699/\$799	£549/\$639	£239/\$199
Mount options	Canon EF	Canon RF	Nikon F	Nikon Z	Canon EF, Nikon F, Pentax K, Sony A, Sony E	Canon EF, Nikon F, Sony A, Sony E, L-Mount, Sigma	Sony E, L-Mount	Sony E
Elements/Groups	10/8	11/9	11/8	11/9	12/10	13/11	10/11	9/8
Diaphragm blades	8 blades	9 blades	7 blades	9 blades	8 blades	9 blades	9 blades	7 blades
Autofocus type	Ultrasonic (ring-type)	Stepping motor	Ultrasonic (ring-type)	Stepping motor	None	Ultrasonic (ring-type)	Stepping motor	Stepping motor
Manual AF override	Mechanical	Electronic	Mechanical	Electronic	N/A	Mechanical	Electronic	Electronic
Min focus distance	0.24m	0.17m	0.25m	0.25m	0.3m	0.3m	0.27m	0.15m
Max magnification factor	0.24x	0.5x	0.24x	0.19x	Unspecified	0.19x	0.18x	0.5x
Minimum aperture	f/22	f/22	f/16	f/16	f/16	f/16	f/22	f/22
Optical stabiliser	Four-stop	Five-stop hybrid	No	No	No	No	No	No
Filter size	67mm	52mm	58mm	62mm	77mm	67mm	58mm	67mm
Included accessories	None	None	Hood, pouch	Hood, pouch	Hood, pouch	Hood, soft case	Hood	Hood
Dimensions (D x L)	78 x 63mm	74 x 63mm	72 x 72mm	73 x 86mm	83 x 109-138mm	77 x 94mm	70 x 65mm	73 x 64mm
Weight	335g	305g	305g	370g	690-735g	665g	325g	210g

Features	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★
Build & handling	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★
Performance	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★
Value	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★
Overall	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★



# Laowa Argus 35mm f/0.95 FFII

£899/\$899

Beautiful bokeh and incredible depth of field

[www.ukdigital.co.uk](http://www.ukdigital.co.uk)



Laowa's 35mm f/0.95 is the fastest-available 35mm lens for full-frame cameras. It's not the cheapest or the lightest lens on the market, but it certainly produces images you'll want to share. It might not have autofocus, but its slick design and smooth focusing could make you fall in love with manual focus again.

The selling point of this lens is its incredibly wide f/0.95 aperture which creates images where the out-of-focus areas are beautifully smooth and the in-focus areas are pin sharp. The lens doesn't have any electronics so you can't change aperture settings using the camera. Instead, there's an aperture wheel on the lens that enables you to manually select the aperture.

The focus ring rotates almost three-quarters of the way around the lens which makes it hard to change focus distance in one swift movement. If you're out using it to shoot street photography, you'll have a hard time quickly changing between focus points close to you and focus points far away. The aperture ring and focus ring have deep grooves that make it really easy to hold and adjust, even on a hot day when your hands are a bit sweaty.

## Performance

Shooting wide open, the in-focus areas were impressively sharp and the out-of-focus areas were smooth, and the focus fade was gradual. Stopping down to f/1.2 makes the lens slightly more useful, especially if you're shooting portraits: at f/0.95 you can't even have the eye and eyelashes in focus.

The obvious downside to this lens is that it doesn't have autofocus. This meant that on occasions I missed the shot I wanted, as I wasn't able to focus fast enough. This was especially true for moving objects or when I was massively changing my focus distance, as I had to rotate the focus ring so much.

**Hannah Rooke**

1

The lens feels well-built with a full metal body and hood.

2

The focus dial is smooth, with the perfect amount of torque.

3

The aperture ring feels solid. It comes with grooves to make gripping it easier, and has an option to hear clicks at each full f-stop.

## Specifications

**Mount:** Canon RF, Nikon Z, Sony FE

**Full-frame:** Yes

**Lens construction:** 14 elements in nine groups

**Angle of view:** 63°

**Autofocus:** No

**Image stabilisation:** No

**Min aperture:** f/16

**Diaphragm blades:** 15

**Min focus distance:** 0.5m

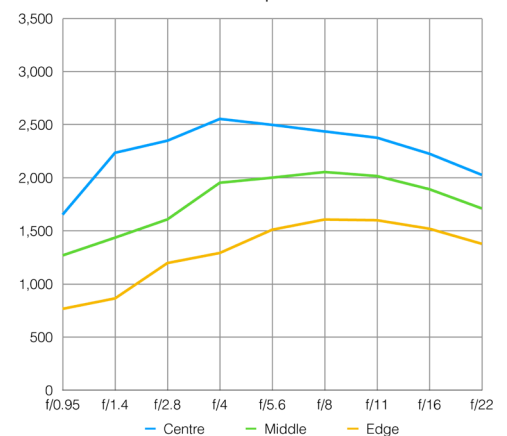
**Max magnification ratio:** 2.0x

**Filter size:** 67mm

**Dimensions (L x D):** 103 x 77mm

**Weight:** 755g

## Sharpness



## Sharpness

Centre sharpness is excellent, even at f/1.2, although it's noticeably softer wide-open at f/0.95. The lens is consistently sharp in the centre through to f/16.

## Fringing

0.45

Fringing is visible in the corners of the frame at all apertures, although it's most apparent at f/4 and narrower apertures.

## Distortion

1.08

There's mild pincushion distortion, but you're only likely to notice it if you're shooting an especially geometric scene.

## Verdict

3.5 ★★★★★ Very good



Features



Build & handling



Performance



Value

Laowa is certainly standing its ground as a company that makes very good lenses, and the Argus 35mm f/0.95 is no different. This super-fast prime is sharp where it needs to be, but the out-of-focus areas are dreamy and smooth. If you don't mind the extra weight in your bag and the lack of autofocus, this would be a welcome addition, whether you're a portrait, landscape or product photographer.





# Nifty fifties

50mm prime lenses are perennially popular optics. Here are our best buys

S

tandard zooms like a 24-70mm offer great convenience for everyday shooting, but a standard prime lens brings something extra to the table. On a

full-frame camera, you get an entirely natural viewing angle that equates to a lifelike perspective; on a crop-sensor body, it makes a great short telephoto for portraiture and the like.

Standard primes also typically have a faster aperture rating. Compared with, say, an f/3.5-5.6 standard zoom,

an f/1.8 prime is around three f-stops faster. This enables faster shutter speeds for freezing action under dull lighting, and delivers a much tighter depth of field for blurring the background, so you can really isolate the subject.

This class of lens has a fixed focal length, so it lacks the versatility of a zoom lens, but there's a lot to be said for 'zooming with your feet' to attain the optimum shooting position.

50mm is the classic focal length for a standard prime, so let's check out the best buys. **Matthew Richards**

## The contenders

1	<b>Artisans</b> 50mm f/1.05	£450/\$486
2	<b>Canon</b> RF 50mm F1.8 STM	£219/\$200
3	<b>Fujinon</b> XF 50mm f/2 R WR	£429/\$499
4	<b>Nikkor</b> AF-S 50mm f/1.4G	£389/\$447
5	<b>Nikkor</b> Z 50mm f/1.8 S	£529/\$597
6	<b>Samyang</b> AF 50mm f/1.4 FE	£499/\$519
7	<b>Sigma</b> 50mm f/1.4 DG HSM   A	£649/\$949
8	<b>Tamron</b> SP 45mm f/1.8 Di VC USD	£415/\$549



50mm lenses Group Test





## Group Test 50mm lenses



### 7Artisans 50mm f/1.05 £450/\$486

Feel the need for speed?

**Lens mounts** See table, page 130

**U**ltra-fast primes generally equate to big, heavy glass and preposterous prices. This lens from 7Artisans rewrites the rule book: it has an astonishingly fast aperture, but weighs in at just 606g and costs less than some f/1.8 lenses, which are about 1.5 f-stops slower. It's available in a wide range of mirrorless camera mounts.

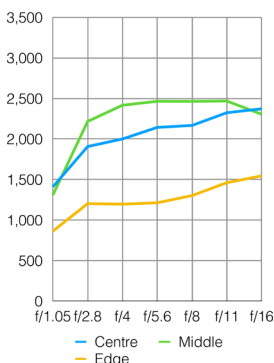
There are no built-in electronics, so aperture adjustment is via the onboard, stepless control ring. The focus ring operates with smooth precision, and the build is generally robust.

#### Performance

Considering its super-fast aperture rating, the lens retains impressive sharpness wide-open, while bokeh is deliciously dreamy. Fast lenses often suffer from axial chromatic aberration at their widest apertures, but this one keeps it to a minimum.

#### Sharpness

Sharpness is impressive wide-open, considering the f/1.05 aperture.



#### Fringing

f/2.8 **1.35** f/16 **1.7**  
Lateral and axial chromatic aberrations are minimal.

#### Distortion

**-0.65**  
There's a hint of barrel distortion, but you'll usually have a job spotting it.

#### Digital Camera verdict

The 7Artisans 50mm combines impressive sharpness with luscious bokeh, while minimising unwanted aberrations. It lacks autofocus, but the handling is refined.

**4.5** ★★★★★ Outstanding



### Canon RF 50mm f/1.8 STM £219/\$200

Simple, small and very affordable

**Lens mount** Canon RF

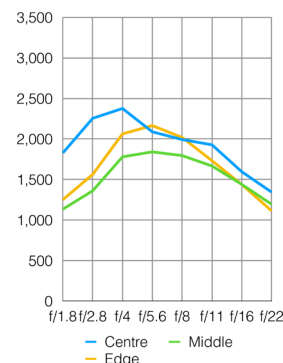
**C**anon's EF-mount equivalent of this lens has always been a massively popular buy for DSLR owners. The new RF edition fills a small hole, as it were, in Canon's full-frame mirrorless line-up. There certainly aren't many compact and affordable Canon RF lenses, but this one is a no-brainer for prime time. Canon's upmarket RF 50mm f/1.2 lens costs around 10 times as much.

#### Performance

This little lens delivers images that combine good wide-open sharpness with pleasant bokeh. It beats the older EF lens in both respects although, like its forerunner, it lacks optical stabilisation, which can be an issue with first-generation EOS R-series cameras. The stepping motor-driven autofocus system is quick and quiet, fast enough for sporty stills and smooth enough for video.

#### Sharpness

Apart from the middle region at f/1.8 to f/2.8, it's sharper than the older EF lens.



#### Fringing

f/2.8 **1.95** f/16 **1.15**  
Fringing can be noticeable towards the corners.

#### Distortion

**-0.36**  
A reduction in barrel distortion is another win over the older EF 50mm lens.

#### Digital Camera verdict

Small, simple and light compared with the other lenses on test, it only features six elements in its optical design, but delivers great results and is excellent value.

**4.5** ★★★★★ Outstanding





## Fujinon

### XF 50mm f/2 R WR

£429/\$499

Digital  
Camera  
**BEST FOR  
FUJIFILM**

More a telephoto than a standard

**Lens mount Fujifilm X**

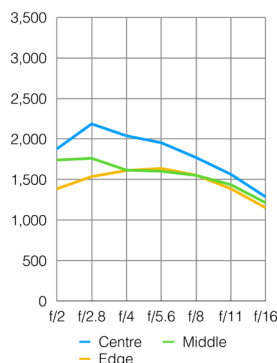
**T**here's no denying that the Fujifilm XF 50mm looks a bit pricey for an f/2 lens. Indeed, it has the slowest aperture rating in this test group. However, it's impeccably built, with comprehensive weather seals, an aperture control ring for refined semi-automatic and manual shooting, and a high-grade optical path that includes an aspherical ED (Extra-low Dispersion) element. The nine-blade diaphragm is very well-rounded. Autofocus is virtually silent, quick for stills and smooth for movie capture.

#### Performance

Thanks to the 1.5x crop factor of Fujifilm X-series cameras, the lens has an effective focal length of 75mm and delivers a sufficiently tight depth of field at f/2 to make it a useful portrait lens. Bokeh remains smooth when stopping down a little, while 'in-focus' areas have immense sharpness.

#### Sharpness

Wide-open sharpness is excellent across the entire frame.



#### Fringing

f/2.8 **0.66** f/16 **1.21**  
Colour fringing is practically impossible to spot at f/2.8.

#### Distortion

**0.52**  
There's a very slight hint of pincushion distortion, but it'll generally go unnoticed.

#### Digital Camera verdict

The 1.5x crop factor of Fujifilm's X-series cameras makes this smartly turned-out lens work like a short telephoto, making it useful for portraiture or general shooting.

**4.5** ★★★★★  
Outstanding



## Nikkor

### AF-S 50mm f/1.4G

£389/\$447

Compact and light for an f/1.4 lens

**Lens mount Nikon F**

**C**ompared with the Nikon F-mount Sigma 50mm f/1.4 lens on test, Nikon's own-brand lens is only half the physical length and about a third of the weight. It's simpler than the Sigma, with eight rather than 13 optical elements, but feels rather less robust.

The straightforward optical path doesn't contain any aspherical or ED (Extra-low Dispersion) elements, as featured in Nikon's newer Z-mount 50mm lens. Similarly, there's no high-tech Nano Crystal Coat for minimising ghosting and flare.

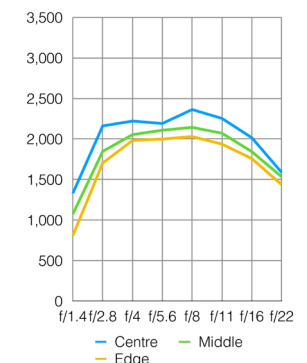
More than 20 years old, the lens is showing its age.

#### Performance

Autofocus accuracy is more critical in very wide-aperture lenses, and the Nikkor does well in this respect. Centre-sharpness is good even at f/1.4, although it loses out to its Sigma competitor.

#### Sharpness

Stop down to f/1.8, and this lens delivers excellent sharpness across the frame.



#### Fringing

f/2.8 **0.69** f/16 **0.82**  
Lateral chromatic aberrations are minimal.

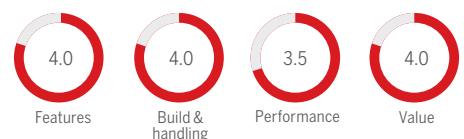
#### Distortion

**-1.71**  
It's not overly bad, but barrel distortion can be clearly visible when uncorrected.

#### Digital Camera verdict

If you're after a relatively small and light 50mm prime for your Nikon DSLR, this lens is much easier to live with than Sigma's f/1.4 offering, and rather more affordable.

**4.0** ★★★★★  
Excellent





## Group Test 50mm lenses



Digital Camera  
GOLD AWARD

Digital Camera  
BEST FOR NIKON Z

Digital Camera  
BEST ON TEST

# Nikkor Z 50mm f/1.8 S

£529/\$597

Setting a new 'standard'

**Lens mount Nikon Z**

**N**ikon's 50mm f/1.8 standard prime has been reinvented for mirrorless full-frame cameras, taking full advantage of the Z mount's larger diameter and its closer proximity to the image sensor. Despite 'only' having an f/1.8 rather than f/1.4 aperture rating, it's considerably longer than Nikon's F-mount 50mm f/1.4.

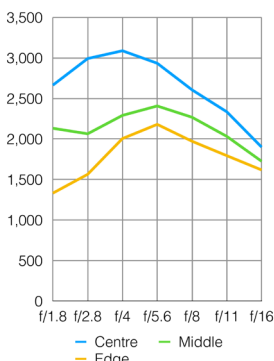
The optical path has 12 optical elements, and also includes two aspherical and two ED elements. The addition of Nano Crystal Coat helps to minimise ghosting and flare. Autofocus is courtesy of a stepping motor, ideally suited to shooting stills and movies.

### Performance

The sharpness from this lens is scintillating, blowing the Nikon AF-S 50mm out of the water at wide apertures. The minimum depth of field isn't quite as tight, but defocused areas look a little smoother nonetheless.

### Sharpness

Sharpness across the entire frame is fabulous, even when shooting wide-open at f/1.8.



### Fringing

f/2.8 **0.32** f/16 **0.29**  
Both lateral and axial colour fringing are entirely negligible.

### Distortion

**0.01**  
With its virtually perfect lab score, the Z 50mm is very much a zero-distortion lens.

### Digital Camera verdict

Nikon's Z 50mm lens is stunningly sharp even wide-open, where the f/1.8 aperture also delivers silky-smooth bokeh. It's not cheap for a 50mm f/1.8 lens – but it's worth it.

**5.0** ★★★★★  
A best-in-class product



Digital Camera  
BEST FOR SONY

# Samyang AF 50mm f/1.4 FE

£499/\$519

An untypically automatic Samyang

**Lens mount Sony E**

**R**enowned for its high-quality yet reasonably priced manual-focus prime lenses, Samyang has recently started making autofocus lenses. This 50mm offering is only available in Sony E-mount, where it gives a traditionally 'standard' perspective on Sony's full-frame mirrorless bodies.

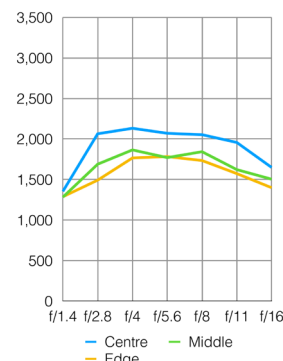
Physically, it's quite long for a 50mm f/1.4 lens. The solid construction features mostly metal barrel parts and, at 585g, the Samyang is more than double the weight of the Nikon f/1.4.

### Performance

Centre-sharpness is very respectable at f/1.4, and the Samyang does well to maintain similar levels of sharpness into the edges and corners of the frame at this aperture. From f/2 and onwards, sharpness and contrast are excellent, but vignetting is quite severe until you hit f/2.8.

### Sharpness

Sharpness is very uniform across the frame at f/1.4, and becomes excellent at f/2.



### Fringing

f/2.8 **0.44** f/16 **0.55**  
Colour fringing is particularly negligible with this lens.

### Distortion

**-0.47**  
There's very little barrel distortion, but it's not as distortion-free as the Sigma.

### Digital Camera verdict

Keenly priced, this lens is solidly built, has a fast aperture rating and delivers excellent all-round performance, proving that Samyang isn't just a one-trick, manual-focus pony.

**4.5** ★★★★★  
Outstanding





Digital Camera  
BEST FOR  
NIKON F

Digital Camera  
BEST FOR  
CANON EF

## Sigma

### 50mm f/1.4 DG HSM | A

£649/\$949

An 'Art' line heavyweight

**Lens mounts** See table, page 130

**S**igma's previous 50mm lens was renowned as being a heavyweight, but the replacement 'Art' edition really piles on the pounds. It's the outright largest and heaviest lens in the group, weighing almost three times as much as the directly competing Nikon f/1.4.

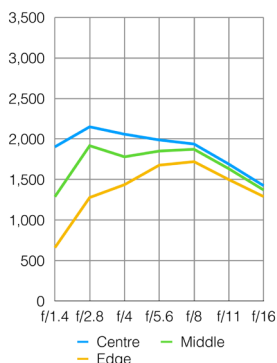
The main reason for the Art lens's weight gain is that it has a much more complex and sophisticated optical path than its predecessor, based on 13 rather than eight elements. And when speed is of the essence, you can count on the Sigma's autofocus system being very fast and consistently accurate.

#### Performance

The Sigma is amazingly sharp, even at f/1.4, along with soft and creamy bokeh. It's virtually a distortion-free lens, and both colour fringing and vignetting are minimal. Overall performance is simply superb.

#### Sharpness

Sharpness only drops off at f/1.4 in the extreme corners of the image frame.



#### Fringing

f/2.8 **1.02** f/16 **1.05**  
Colour fringing is very minimal at any aperture.

#### Distortion

**-0.05**  
Almost matching the Nikkor Z 50mm, the Sigma's barrel distortion is negligible.

#### Digital Camera verdict

Big really is beautiful when it comes to this Sigma 'Art' lens. It's designed with all of the emphasis on image quality rather than weight-saving, and it shows in the results.

**4.5** ★★★★★ Outstanding



## 50mm lenses Group Test



## Tamron

### SP 45mm f/1.8 Di VC USD

£415/\$549

Steady as she goes

**Lens mount** Canon EF, Nikon F

**A**vailable in Canon EF and Nikon F editions, geared towards DSLRs, this Tamron isn't quite a 50mm lens, giving a slightly more generous viewing angle of 51 degrees rather than the more usual 46 degrees on a full-frame body. Unlike competing Canon and Nikon 50mm lenses, it features a four-stop optical stabiliser.

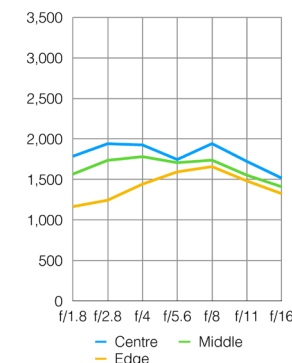
The lens features extensive weather seals and a fluorine coating on its front element, to repel water and greasy fingerprints. The ring-type ultrasonic autofocus system enables the usual mechanically coupled manual override.

#### Performance

Sharpness is very good even at wider apertures, while defocused areas look very soft, and the crossover between sharp and blurred areas in images has a pleasantly smooth transition. Bokeh continues to impress when stopping down a bit from wide-open shooting.

#### Sharpness

Wide-open, the Tamron acquits itself very well, aided by optical stabilisation.



#### Fringing

f/2.8 **0.91** f/16 **0.97**  
Lateral and longitudinal aberrations are quite minimal.

#### Distortion

**-0.65**  
Barrel distortion can be noticeable, but it's less severe than in the Nikkor AF-S 50mm.

#### Digital Camera verdict

If you're after an optically stabilised 50mm prime to use on a Canon or Nikon DSLR, this Tamron fits the bill perfectly. It's ideal for handheld shooting in low-lit scenarios.

**4.5** ★★★★★ Outstanding





## Group Test 50mm lenses

# The Nikkor Z tops the A-list

The Nikkor Z 50mm f/1.8 S is simply superb



Digital  
Camera  
GOLD  
AWARD

Digital  
Camera  
BEST FOR  
NIKON Z

Digital  
Camera  
BEST  
ON TEST

**T**ypical of most primes in Nikon's enviable Z-mount range, the Z 50mm has a modest f/1.8 aperture rating, which enables a reasonably compact build to suit sleek mirrorless camera bodies. It's scary-sharp even wide-open, while the quality of bokeh matches or beats most faster-aperture competitors. It's simply spectacular, and puts Nikon's AF-S 50mm f/1.4G for DSLRs firmly in the shade for handling, all-round performance and image quality.

For Canon and Nikon DSLRs, the Sigma 50mm f/1.4 DG HSM Art is the best standard

prime on the market. It's big and hefty, but the oversized build pays dividends when it comes to image quality, which is thoroughly excellent. However, if you feel at a bit of a loss without image stabilisation, the Tamron SP 45mm f/1.8 Di VC USD comes to the rescue, and still delivers beautifully smooth bokeh despite its slower aperture rating.

Getting back to lenses for mirrorless cameras, the Canon RF 50mm F1.8 STM is a fabulous little lens that punches well above its weight, and it's terrific value at the price. If you'd rather take aperture width to the max and don't mind focusing manually,

the 7Artisans 50mm f/1.05 is a beautifully crafted, high-performance lens that's amazingly affordable for such a fast prime, and is available in a wide range of mirrorless lens mount options.

For Sony mirrorless cameras in particular, the Samyang AF 50mm f/1.4 FE is an excellent choice, whereas the Fujifilm XF50mm f/2 R WR is a smart buy for X-series bodies. The latter naturally has an 'effective' focal length of 75mm, making it more of a short telephoto prime, but the same can be said of other lenses on test if you use them with an APS-C format body.

## How the lenses compare



Name	7Artisans 50mm f/1.05	Canon RF 50mm f/1.8 STM	Fujinon XF 50mm f/2 R WR	Nikkor AF-S 50mm f/1.4G	Nikkor Z 50mm f/1.8 S	Samyang AF 50mm f/1.4 FE	Sigma 50mm f/1.4 DG HSM   A	Tamron SP 45mm f/1.8 Di VC USD
Contact	<a href="http://www.7artisans.co.uk">www.7artisans.co.uk</a>	<a href="http://www.canon.co.uk">www.canon.co.uk</a>	<a href="http://www.fujifilm.co.uk">www.fujifilm.co.uk</a>	<a href="http://www.nikon.co.uk">www.nikon.co.uk</a>		<a href="http://www.samyanglensglobal.com">www.samyanglensglobal.com</a>	<a href="http://www.sigma-imaging-uk.com">www.sigma-imaging-uk.com</a>	<a href="http://www.tamron.co.uk">www.tamron.co.uk</a>
Street price (UK, USA)	£450/\$486	£219/\$200	£429/\$499	£389/\$447	£529/\$597	£499/\$519	£649/\$949	£415/\$549
Mount options	C-RF, L, N-Z, S-E	C-RF	F-X	N-F	N-Z	S-E	C-EF, L, N-F, S-A, S-E, Sg	C-EF, N-F
Full-frame compatible	Yes	Yes	No	Yes	Yes	Yes	Yes	Yes
Elements/groups	10/7	6/5	9/7	8/7	12/9	9/8	13/8	10/8
Diaphragm	13 blades	7 blades	9 blades	9 blades	9 blades	9 blades	9 blades	9 blades
Optical stabiliser	No	No	No	No	No	No	No	Yes
Autofocus type	None, manual only	Stepping motor	Stepping motor	Ultrasonic (ring-type)	Stepping motor	Stepping motor	Ultrasonic (ring-type)	Ultrasonic (ring-type)
Min focus distance	0.57m	0.3m	0.39m	0.45m	0.4m	0.45m	0.4m	0.29m
Max reproduction ratio	0.13x	0.25x	0.15x	0.15x	0.15x	0.15x	0.18x	0.29x
Filter size	58mm	43mm	46mm	58mm	62mm	67mm	77mm	67mm
Accessories inc	Soft case	None	Hood, cloth	Hood, pouch	Hood, pouch	Hood	Hood, soft case	Hood
Diameter x min length	61 x 86mm	69 x 41mm	60 x 59mm	74 x 54mm	76 x 87mm	74 x 98mm	85 x 100mm	80 x 92mm
Weight	606g	160g	200g	280g	415g	585g	815g	540g
Features	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★
Build & handling	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★
Performance	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★
Value	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★
Overall	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★



# Nikkor Z MC 50mm f/2.8

£649/\$649

This compact macro lens also makes a great standard prime

[www.nikon.co.uk](http://www.nikon.co.uk)

It's been a long wait for an own-brand Nikon Z-mount macro lens – and then, like buses, two come along at once. This one is less than half the physical length and weight of the more pro-grade Nikkor Z MC 105mm f/2.8 VR S, and

a shade under two thirds of the price.

With a 50mm focal length and f/2.8 aperture rating, it makes a convenient standard prime for general shooting. But, unlike many 50mm macro lenses down the years, this lens delivers full 1.0x macro magnification rather than just a 0.5x magnification factor, therefore reproducing small objects at life size on the image sensor. Pop the lens on a DX-format Nikon Z-series camera like the Z 50 or the new Z fc, and the 1.5x crop factor gives you an even larger 'effective' magnification factor.

Many modern macro lenses have a fully internal focus mechanism, but this one has a more traditional extending inner barrel. This keeps the physical length to a minimum in general shooting, and enables the lens to feature a rudimentary focus distance scale and magnification factor markings on the inner barrel. But with a short minimum focus distance of 0.16m, the extending inner barrel results in the front of the lens coming to just 5cm from what you're shooting. This can be a bit awkward when you're trying to shoot bugs and other small creatures, as well as potentially casting a shadow over what you're shooting.

## Performance

The autofocus system is fast and consistently accurate, even for extreme close-ups, where focus accuracy is critical due to the typically tiny depth of field. Centre-sharpness is outstanding, even wide-open at f/2.8, and gets even better between f/4 and f/8. Compared with the Z MC 105mm f/2.8 VR S, however, levels of sharpness drop off a little more towards the extreme edges and corners of the frame. **Matthew Richards**

**1** The lens features 10 elements in seven groups, including one ED element and one aspherical element. The front element features a fluorine coating to repel grease and moisture.

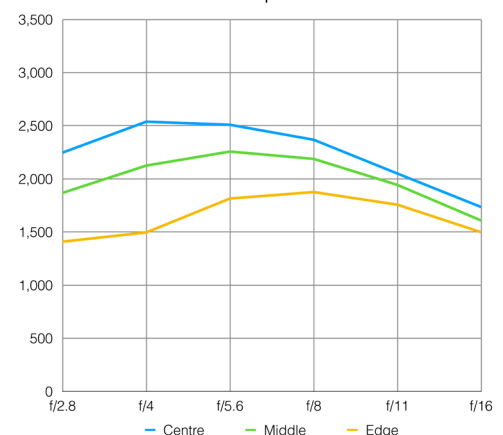
**2** The electronically coupled manual focus ring works with smooth precision, enabling fine adjustments.

**3** The lens has a metal mounting plate, but lacks comprehensive weather-seals.

## Specifications

**Mount:** Nikon Z  
**Full-frame:** Yes  
**Lens construction:** 10 elements in seven groups  
**Angle of view:** 47 degrees  
**Autofocus:** Yes  
**Image stabilisation:** No  
**Diaphragm blades:** Nine  
**Minimum aperture:** f/22-32  
**Min focus distance:** 0.16m  
**Maximum magnification ratio:** 1.0x  
**Filter size:** 46mm  
**Dimensions (L x D):** 75 x 66mm  
**Weight:** 260g

## Sharpness



## Sharpness

Centre-sharpness is epic from wide-open, through pretty much the entire aperture range. It remains excellent at the very narrowest aperture.

## Fringing

Lateral chromatic aberration is entirely negligible, even in the extreme edges and corners of the frame, while axial chromatic aberration is equally well-controlled.

## Distortion

There's just the merest hint of pincushion distortion, but this will generally go completely unnoticed, even when shooting straight-sided objects.

## Verdict

**4.5** ★★★★★ Outstanding



This 50mm f/2.8 standard prime is great for general shooting. It's conveniently compact, and a full f-stop faster than Nikon's Z 24-70mm f/4 S zoom, which is supplied as a kit lens with full-frame Z-series bodies. Its main claim to fame, however, is that it delivers full 1.0x macro magnification at its shortest focus distance, although that distance might be closer than you like.



## Spotlight 50mm lenses



# Sony FE 50mm F1.4 GM

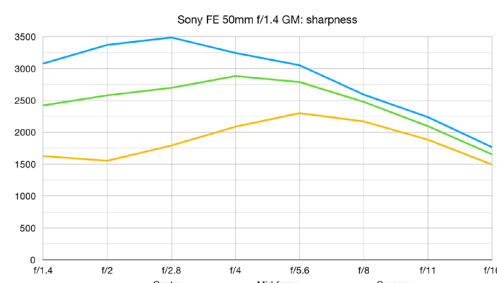
£1,499/\$1,298

Can it match up to its Zeiss predecessor?

[www.sony.co.uk](http://www.sony.co.uk)

## Specifications

**Mount:** Sony FE  
**Full-frame:** Yes  
**Lens construction:** 14 elements in 11 groups  
**Angle of view:** 47°  
**Autofocus:** Yes  
**Image stabilisation:** No  
**Diaphragm blades:** 11  
**Max aperture:** f/1.4  
**Min aperture:** f/16  
**Min focusing distance:** 0.45m  
**Max magnification ratio:** 0.15x  
**Filter size:** 67mm  
**Dimensions (L x D):** 96 x 81mm  
**Weight:** 516g



## Sharpness

This is one of the sharpest lenses we have tested, even wide open at f/1.4. The weak(ish) link is corner sharpness, which is average until you stop down to f/4.

## Fringing

Lateral chromatic aberration is well controlled. It's hard to spot any unless you scrutinise the corners of a high-contrast image shot with a narrow aperture.

0.57

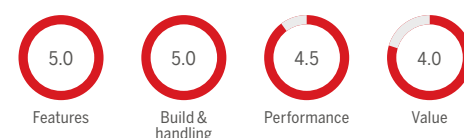
## Distortion

Disabling in-camera distortion correction reveals a touch of pincushion distortion, but it's minor enough to go unnoticed in almost all photos.

1.06

## Digital Camera verdict

4.5 ★★★★★  
Outstanding



The Sony FE 50mm F1.4 GM is an exceptional lens with excellent sharpness and fantastic bokeh for anyone who enjoys the 50mm perspective. There is some vignetting wide open that let down the otherwise glowing report card. Unfortunately, this is an expensive lens and there are much cheaper options out there that will achieve similar results.

In the world of prime lenses, no focal length is more talked about than 50mm, which is wide enough and long enough for many different areas of photography. A 'nifty fifty' is often one of the first lenses in a photographer's kit bag.

Sony has introduced the FE 50mm F1.4 as a replacement for the ageing Zeiss Planar T\* FE 50mm F1.4 ZA lens in its medium distance prime lens lineup. Launched in 2016, the Zeiss is known for its clinical sharpness, bokeh abilities and its quality build but it was a heavy lens with a big price tag.

The new Sony FE 50mm F1.4 GM lens joins a growing family of fast f/1.4 prime G Master lenses, including the FE 24mm F1.4 GM and the FE 85mm F1.4 GM. With the 50mm, Sony offers a choice of primes for all standard focal lengths.

## Performance

Autofocus is exceptional and, paired with the Sony A7R V, it was instantaneous. It is completely silent, so is the perfect companion for event photographers and videographers. Image quality is spectacular and the sharpness in the centre of the image is perfect, using all 61MP of the A7R V's sensor. Sharpness falls off slightly toward the edges, but not enough to be an issue. The detail captured in faces was really good, although not overly clinical, which is key for portrait work.

Bokeh and falloff are both beautiful for smooth creamy backgrounds, this lens would make an exceptional portrait lens. Chromatic aberrations are nearly nonexistent, even in challenging situations. The biggest issue was the significant vignetting with the lens wide open. This was reduced as the lens was stopped down but was still visible even at around f/4. It is a common issue with wide-aperture lenses and is not significantly worse than its rivals. **Gareth Bevan**

**1**  
The lens is one of the sharpest we have tested and would be ideally suited to portrait work.

**2**  
The Sony's AF function is exceptional. It's silent, making it perfect for videographers.

**3**  
This E-mount lens replaces the ageing Zeiss Planar equivalent.



With perfect centre sharpness and smooth backgrounds, this Sony lens is great for portraits.

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# Portrait lenses

Been missing people recently? Shoot the ones you love and keep them close, with a portrait prime...

W

e've all been missing friends and family, on and off over the last year. But with lockdown restrictions easing up, we can look forward to getting reacquainted,

and even capturing some quality portrait images as a keepsake. With that in mind, this month's group test focuses on lenses that are perfect for portraiture.

For full-frame shooters, an 85mm prime with a fast aperture is generally the best choice. The focal length gives a flattering perspective and enables a comfortable working distance, so

you're not crowding your subject and invading their personal space, but are still close enough to engage and give direction. A shorter focal length is preferable for APS-C-format or Micro Four Thirds systems, due to their crop factors. Either way, a 'fast' aperture rating on a portrait lens enables a tight depth of field for blurring the background, literally focusing all the attention on the main subject.

We've picked out some of the most desirable portrait lenses on the market today, while keeping an eye on affordability – not least because many of us are feeling the pinch right now. Let's dive in... **Matthew Richards**

## The contenders

1	<b>Canon</b> EF 85mm f/1.8 USM	£379/\$419
2	<b>Canon</b> RF 85mm f/2 Macro IS STM	£669/\$599
3	<b>Fujinon</b> XF 56mm f/1.2 R APD	£1,099/\$1,499
4	<b>Nikkor</b> AF-S 85mm f/1.8 G	£427/\$477
5	<b>Nikkor</b> Z 85mm f/1.8 S	£709/\$797
6	<b>Olympus</b> M.Zuiko Digital 45mm f/1.8	£249/\$299
7	<b>Sigma</b> 85mm f/1.4 DG HSM   Art	£929/\$1,099
8	<b>Sigma</b> 85mm f/1.4 DG DN   Art	£999/\$1,199





## Group Test Portrait lenses



Digital  
Camera  
VALUE  
AWARD

### Canon EF 85mm f/1.8 USM

£379/\$419

An old-school lens with charm

#### Lens mount Canon EF

**L**aunched almost 30 years ago for 35mm film SLRs, the EF 85mm remains perfectly viable for the digital SLRs of today. It's attractively priced, reasonably compact and light, and ideal for popping in a spare corner of your gadget bag.

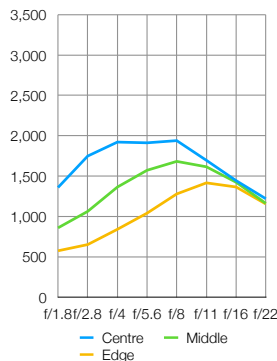
The optical path is fairly simple, based on nine elements in seven groups, but includes Super Spectra coatings to reduce ghosting and flare. The ring-type ultrasonic autofocus system is fast, whisper-quiet and has full-time manual override with a purely mechanical linkage. Handling is good.

#### Performance

Despite the modest aperture rating, sharpness isn't that impressive wide-open but is still sufficient for plenty of detail in the eyes. The quality of bokeh is pleasing at f/1.8, but the diaphragm isn't quite as well-rounded as in some competing lenses.

#### Sharpness

Shoot wide-open and images can look slightly soft, reducing the signs of premature ageing.



#### Fringing 0.25

There's negligible fringing at wide apertures, and even less at medium to narrow settings.

#### Distortion -0.4

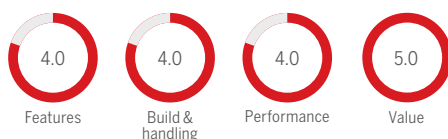
The small barrel distortion isn't an issue, but it's not as 'distortion-free' as some.

#### Digital Camera verdict

Remarkably inexpensive for an 85mm prime lens, the Canon is perfectly capable of delivering gorgeous quality for portraiture, and it handles well, too.

4.0 ★★★★★

Excellent



Digital  
Camera  
BEST FOR  
CANON RF

### Canon RF 85mm f/2 Macro IS STM

£669/\$599

An immensely versatile prime

#### Lens mount Canon RF

**T**he RF 85mm f/1.2 lens and its DS (Defocus Smoothing) edition are Canon's top dogs for portraiture, but the prices are way out of range for most of us. The f/2 lens is much smaller and is less than a quarter of the price.

Smart features include a five-stop hybrid image stabiliser, a customisable control ring and an autofocus range limiter that can lock out the range either side of 0.5m – useful given the lens's 0.5x macro magnification factor at its closest focus distance of 0.35m.

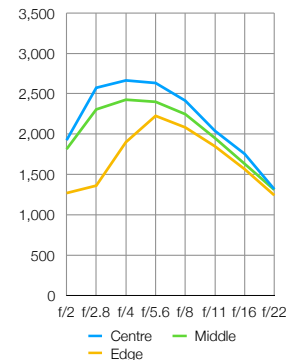
Build quality feels robust and the lens features weather-seals but, as usual for non-L-series Canon lenses, the hood is sold separately.

#### Performance

As we've come to expect from STM lenses, autofocus is quick and virtually silent. The image stabiliser lives up to its claims and handling is a dream.

#### Sharpness

Centre-sharpness is excellent, but corner-sharpness lags behind that of the competing Nikon Z lens.



#### Fringing 0.5

Colour fringing is entirely negligible both for lateral and axial chromatic aberrations.

#### Distortion 1.17

Pincushion distortion is slightly higher than usual for this class of lens.

#### Digital Camera verdict

For an 85mm prime, this is surprisingly versatile, with a short minimum focus distance and 0.5x macro magnification. And it works really well for portraiture.

4.5 ★★★★★

Outstanding





Digital  
Camera  
**BEST FOR  
FUJIFILM**

## Fujinon XF 56mm f/1.2 R APD

£1,099/\$1,499

Comes with a trick up its sleeve

### Lens mount Fujifilm X

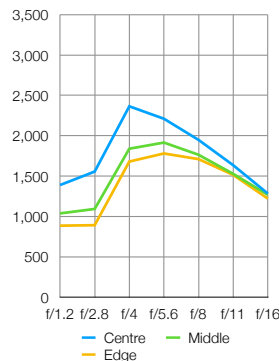
**W**ith an effective focal length of 84mm, this lens enables a natural working distance for portraiture on Fujifilm's APS-C format X-series cameras. Even so, gaining a tight depth of field is more of a challenge. The basic edition of the lens (£849/\$999) aims to solve the problem with an extra-wide f/1.2 aperture rating. This up-market APD edition adds an 'apodisation filter' – essentially a radial neutral-density filter that gets darker towards the circumference of the image circle. This helps to smooth 'bokeh discs' generated by defocused bright objects.

### Performance

Sharpness is pretty good wide-open, where the apodisation filter is at its most effective. Bokeh is smooth for a 56mm lens, but the quality of in-focus and defocused areas isn't any better than from most 85mm f/1.8 lenses on a full-frame camera.

### Sharpness

Good for an f/1.2 lens, although light transmittance only equates to f/1.7.



### Fringing 0.11

It's pretty average from f/1.2 to f/2.8, but virtually eliminated beyond that.

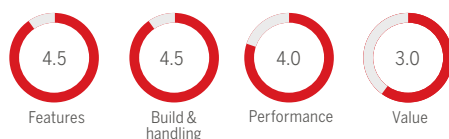
### Distortion -0.02

Essentially a distortion-free lens, it recorded only the merest trace of barrel.

### Digital Camera verdict

This is the number-one choice for portraiture on a Fujifilm X-series camera, but you have to pay out to get similar results to using a more basic lens on a full-frame body.

**4.0** ★★★★★ Excellent



Digital  
Camera  
**VALUE  
AWARD**

## Nikkor AF-S 85mm f/1.8G

£427/\$477

Compact, light and affordable

### Lens mount Nikon F

**E**ven Nikon's upmarket 85mm f/1.4 lens is reasonably compact, but this f/1.8 is particularly light for a full-frame compatible lens, at just 305g. It's also refreshingly inexpensive for an own-brand Nikon.

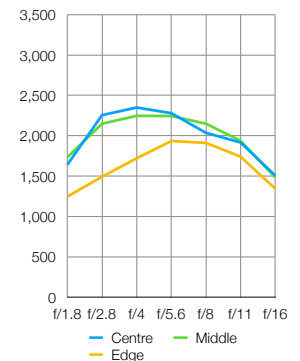
There are no aspherical or ED (Extra-low Dispersion) elements, but build quality is good and there's a rubber weather-seal on the mounting plate. The ring-type ultrasonic autofocus system is fast, whisper-quiet and has full-time manual override. There are only seven diaphragm blades to control the aperture, rather than the eight or nine more usually featured in full-frame compatible 85mm primes.

### Performance

Sharpness is very good, apart from in extreme corners at wide apertures. Bokeh is impressively smooth; points of light remain fairly well-rounded when stopping down a little.

### Sharpness

The little Nikon really punches above its weight for sharpness.



### Fringing 0.99

Lateral and axial aberrations are minimal, the latter helped by the modest aperture rating.

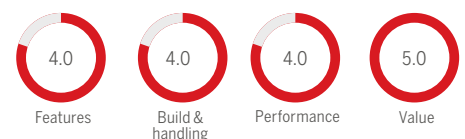
### Distortion 0.43

There's a slight touch of pincushion distortion, but it's hardly an issue in portraiture.

### Digital Camera verdict

Like the competing Canon, this light and affordable Nikon lens is an excellent choice for DSLR portraiture, although it loses out to the much bigger Sigma for image quality.

**4.0** ★★★★★ Excellent





## Group Test Portrait lenses



### Nikkor Z 85mm f/1.8 S

£709/\$797

A fabulous portrait lens

#### Lens mount Nikon Z

**N**ikon's Z-mount lenses have repeatedly won gold awards in our reviews and group tests, and with good reason. As with most other primes in Nikon's line-up, this one has an f/1.8 aperture rating that enables great quality with a compact and light construction. In the 85mm sector, however, a slightly faster aperture is often preferred.

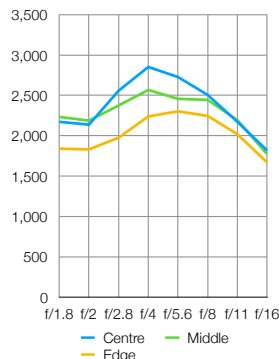
Quality optics include two ED (Extra-low Dispersion) elements and Nano Crystal Coat. Upmarket build quality includes weather seals, while rapid autofocus is driven by a virtually silent stepping motor.

#### Performance

Contrast and sharpness across the entire frame are simply spectacular, even shooting wide-open. Despite 'only' being an f/1.8 lens, bokeh is noticeably smoother than from Nikon's pricier f/1.4 F-mount lens.

#### Sharpness

It's unlikely you'll need such razor-sharpness across the whole frame, but it's available.



#### Fringing 0.35

There's virtually no chromatic aberration of any kind, right across the whole frame.

#### Distortion -0.1

As with some of the other lenses on test, this Nikon is virtually distortion-free.



### Olympus M.Zuiko Digital 45mm f/1.8

£249/\$299

A light, budget-friendly lens

#### Lens mount Micro Four Thirds

**T**hanks to the 2x crop factor of the Micro Four Thirds system, this 45mm lens has an effective focal length of 90mm. It also has a fast aperture rating of f/1.8, bringing some much-needed help in getting a tight depth of field, which is generally a struggle with MFT cameras.

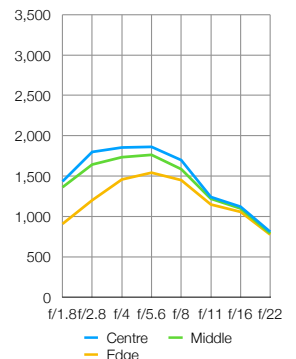
The Olympus is far and away the smallest and lightest lens in the group. Autofocus is driven by an ultra-quiet stepping motor, while high-precision manual focusing is available via a 'fly by wire' focus ring.

#### Performance

Sharpness remains good across the frame, even wide-open, where it only drops off towards the extreme edges and corners. However, bokeh isn't as smooth as with any of the other lenses on test; when stopping down a little, points of defocused light take on a heptagonal shape.

#### Sharpness

Sharpness at wide apertures is easily good enough to give real pop to portraiture.



#### Fringing 0.59

There's next to no fringing at wide apertures and only a little at medium to narrow settings.

#### Distortion 0.3

We're used to seeing very little distortion from MFT lenses; this one has a little pincushion.

#### Digital Camera verdict

It might lack f/1.4 snob value, but this Nikkor delivers astonishing sharpness across the whole frame, with outstandingly smooth and creamy bokeh. It's stellar for portraiture.

5.0 ★★★★★ A best-in-class product



#### Digital Camera verdict

A compact build makes this lens well-balanced on svelte MFT bodies, but bokeh is fidgety. The Olympus 45mm f/1.2 Pro does better, but can cost nearly four times as much.

3.5 ★★★★★ Very good





Digital Camera  
BEST FOR  
NIKON F

Digital Camera  
BEST FOR  
CANON EF

## Sigma 85mm f/1.4 DG HSM | A

£929/\$1,099

A heavyweight contender

**Lens mounts** See table

**T**his Sigma is a weighty proposition for an 85mm f/1.4 lens. It's designed for image quality, without any concessions to compactness.

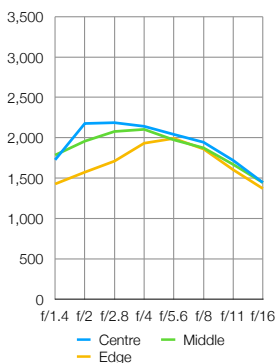
The complex optical path is based on 14 elements, including an aspherical element at the rear and two SLD (Special Low Dispersion) elements, placed at the centre and towards the front. Autofocus is based on a ring-type ultrasonic system. Sigma's Art lenses are immaculately well-built but, unlike some of them, this one adds the extra bonus of weather seals.

### Performance

Autofocus is both fast and accurate. Sharpness across the entire frame is hugely impressive, even when shooting wide-open, which is a real challenge for an f/1.4 lens. We've noticed a little 'onion ring' effect in the bokeh of some Sigma Art lenses, but it's negligible in this one. Bokeh is super-smooth.

### Sharpness

f/1.4 lenses are often soft wide-open, but this Sigma retains superb sharpness.



### Fringing 0.36

The minimal amount of colour fringing is almost as negligible as from the Nikon Z 85mm.

### Distortion 0.03

The Sigma is essentially distortion-free, with a practically perfect lab score.

### Digital Camera verdict

It's a big bruiser of a portrait lens but, size and weight aside, there's no beating it for image quality, and it's great value for a full-frame compatible 85mm f/1.4.

4.5 ★★★★★ Outstanding

4.5  
Features

5.0  
Build & handling

5.0  
Performance

4.5  
Value



Digital Camera

BEST FOR  
SONY

Digital Camera  
BEST FOR  
PANASONIC  
S1

Digital Camera  
BEST FOR  
L-MOUNT

Digital Camera  
GOLD  
AWARD

Digital Camera  
EDITOR'S  
CHOICE

Digital Camera  
BEST  
ON TEST

## Sigma 85mm f/1.4 DG DN | A

£999/\$1,199

Newer, smaller and even better

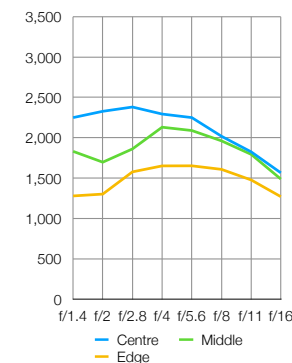
**Lens mounts** Sony E, L-Mount

**T**he Sigma DG HSM Art lens (left) was originally built for DSLRs and subsequently made available in Sony E and L-Mount options. This new DN lens has been designed from the ground up for mirrorless cameras with the latter two mounts.

The new lens is much smaller than the older version. Even so, Sigma has found space for tricked-up handling extras, including an aperture control ring. Optical highlights include five SLD (Low Dispersion Elements) and four HR (High Refractive index) elements.

### Sharpness

Sharpness is scintillating across most of the frame, even shooting wide-open.



### Performance

Wide-open sharpness at f/1.4 is exceptional across most of the frame; although it drops off towards the corners, that's no real problem for portraiture. Bokeh is deliciously smooth and remains so when stopping down a little, thanks to the extremely well-rounded 11-blade diaphragm.

### Fringing 0.5

Both lateral and axial chromatic aberrations are entirely negligible.

### Distortion 3.54

As with many new mirrorless lenses, in-camera corrections control distortion.

### Digital Camera verdict

This is a beautifully crafted lens that boasts robust build quality, excellent handling and gorgeous image quality. It's Sigma's best 85mm lens yet.

5.0 ★★★★★ A best-in-class product

5.0  
Features

5.0  
Build & handling

5.0  
Performance

4.5  
Value



# Sigma takes the top spot



The Sigma 85mm f/1.4 DG DN | A is a stunning portrait lens

**T**he newest kid on the block, Sigma's 85mm DN Art lens for Sony E and Leica L-Mount mirrorless cameras faces some stiff competition. It wins out in style, with terrific build quality and refined handling, as well as spectacular image quality. It's lighter and more compact than Sigma's original 85mm Art lens, which was also adapted to include Sony E and Leica L-Mount options.

Meanwhile, the Nikkor Z 85mm f/1.8 S and Canon RF 85mm f/2 Macro IS STM prove once and for all that 'slower' primes can deliver stellar portrait quality. The Nikon lens's corner-to-corner sharpness and its bokeh quality are impressive, while the Canon lens is amazingly versatile. For Fujifilm X and Micro Four Thirds cameras, look no further than the respective Fujinon and Olympus lenses on test.

DSLRs still have a loyal following, though. For optimum image quality, all-round performance and premium construction, the Sigma 85mm f/1.4 DG HSM Art lens comes up trumps for Canon and Nikon shooters, while the own-brand Canon and Nikkor 85mm f/1.8 lenses are much more compact, lightweight and affordable. Unusually, it's the own-brand lenses that are the best budget buys.

## How the lenses compare



Contact	www.canon.co.uk		www.fujifilm.co.uk	www.nikon.co.uk		www.olympus.co.uk	www.sigma-imaging-uk.com	
Street price	£379/\$419	£669/\$599	£1,099/\$1,499	£427/\$477	£709/\$797	£249/\$299	£929/\$1,099	£999/\$1,199
Mount options	Canon EF	Canon RF	Fujifilm X	Nikon F	Nikon Z	Micro Four Thirds	Canon EF, Nikon F, Sigma, Sony E, L-Mount	Sony E, L-Mount
Elements/Groups	9/7	12/11	11/8	9/9	12/8	9/8	14/12	15/11
Diaphragm blades	8 blades	9 blades	7 blades	7 blades	9 blades	7 blades	9 blades	11 blades
Autofocus type	Ultrasonic (ring-type)	Stepping motor	Stepping motor	Ultrasonic (ring-type)	Stepping motor	Stepping motor	Ultrasonic (ring-type)	Stepping motor
Manual AF override	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Min focus distance	0.85m	0.35m	0.7m	0.8m	0.8m	0.5m	0.85m	0.85m
Max magnification factor	0.13x	0.5x	0.09x	0.12x	0.14x	0.11x	0.12x	0.12x
Optical stabiliser	No	Yes	No	No	No	No	No	No
Filter size	58mm	67mm	62mm	67mm	67mm	37mm	86mm	77mm
Weather seals	No	Yes	No	Yes	Yes	No	Yes	Yes
Included accessories	None	None	Hood, cloth, ND8 filter	Hood, pouch	Hood, pouch	Decoration ring	Hood, soft case	Hood, soft case
Dimensions (D x L)	75 x 72mm	78 x 91mm	73 x 70mm	80 x 73mm	75 x 99mm	56 x 46mm	95 x 126mm	83 x 94mm
Weight	425g	500g	405g	350g	470g	116g	1,130g	630g
Features	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★
Build & handling	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★
Performance	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★
Value	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★
Overall	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★



# Fujinon GF 80mm f/1.7 R WR

£2,099/\$2,299

Shallow-focus heaven from this GFX lens

[www.fujifilm.co.uk](http://www.fujifilm.co.uk)

**M**edium-format lenses are always going to seem oversized when compared with an APS-C or even a full-frame lens. This is unavoidable: the image circle of a medium-format system needs to be that much bigger, to cover the sensor area. This means more glass, a larger diameter and, in turn, more weight. This naturally drives up the price – and with it the certain expectations that premium product buyers will have.

Fujifilm lenses rarely disappoint when it comes to build quality and user experience. There is no doubt that this medium-format lens does carry some bulk, but when the GF 80mm f/1.7 is attached to the front of a Fujifilm GFX camera, it is perfectly balanced.

## Performance

When you are building lenses for use with cameras equipped with north of 100 megapixels, like Fujifilm's GFX 100 and GFX 100S, you have to be confident that the optics are up to the challenge. There's no point having all those pixels if the lens in use doesn't have the resolving power to ever realise the maximum potential of the sensor.

Thankfully, the GF 80mm f/1.7 ticks that box perfectly. Sharpness is superb across the frame, only softening slightly at the edges at f/1.7. This does improve markedly towards f/4, which still produces a significantly reduced depth of field on a medium-format sensor. We also didn't notice a huge difference between crispness in the centre wide-open and at around f/8, which is impressive.

Contrast is gorgeous, and there is basically no chromatic aberration to speak of. There is noticeable vignetting at the widest aperture, but we actually think this adds depth to many shots, and it can be easily removed in software if you don't like it.

The autofocus system is slower than in some of Fujifilm's XF-series lenses, but as the motor is moving a lot of glass, the performance is still more than adequate. **Peter Fenech**

**1** f/1.7 is hardly a spectacular aperture for a full-frame camera – but in the world of medium-format, it's massive!

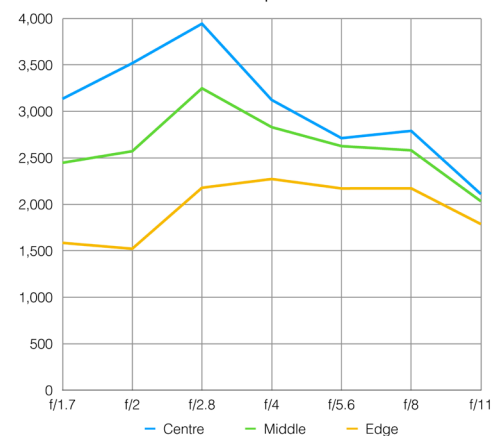
**2** We love the aperture ring and tactile focus ring, which hark back to an earlier decade of photography.

**3** The barrel is solid, and the metal lens mount adds to a very professional feel.

## Specifications

**Mount:** Fujifilm GFX  
**Medium-format:** Yes  
**Focal length:** 80mm (64mm in full-frame terms)  
**Lens construction:** 12 elements in nine groups  
**Angle of view:** 37.7 degrees  
**Autofocus:** Yes  
**Image stabilisation:** Only with camera IBIS  
**Diaphragm blades:** 9  
**Minimum aperture:** f/22  
**Min focus distance:** 0.7m  
**Filter size:** 77mm  
**Dimensions (L x D):** 99 x 95mm  
**Weight:** 795g

## Sharpness



## Sharpness

Centre sharpness is spectacular across the aperture range. While the edge sharpness never quite catches up, from f/2.8 through to f/11 you might not notice.

## Fringing

Fringing levels are practically non-existent; if you do see any, it's so easy to remove in Lightroom and other software now that it's not going to be an issue.

0.15

## Distortion

Distortion is very well-controlled, with only mild pincushioning being discernible. It's far from intrusive, and can be effectively corrected in post-production.

0.52

## Verdict

**4.5** ★★★★★  
Outstanding



You really can't fault the optical performance of this lens – it's superb. The build is up to the rigours of professional use, outdoors and in the studio. This isn't an action lens, but nor are the GFX cameras action models, so you could argue this is irrelevant. The lens delivers where it truly matters – sharpness and detail. The Fujinon GF 80mm f/1.7 R WR is a must-have for GFX camera owners.





# Macro prime lenses

Mount a macro lens on your camera and you'll see the world in almost microscopic detail. Here are our 10 best-buy options



Most macro prime lenses have a maximum magnification ratio of 1.0x or 1:1. This means that, at their shortest focus distance, they can reproduce objects at

full life-size on the camera's image sensor. Something measuring just 36 x 24mm would completely fill the image sensor of a full-frame camera, and it's just around 22 x 15mm or 17 x 13mm if you're

shooting with an APS-C body or an Micro Four Thirds body respectively.

Bear in mind how much larger an image is when you view it on-screen or in print, compared with the size of the camera's sensor, and the scope for enlargement is incredible. Tiny garden bugs can look like giant creatures, and you can see levels of detail that are invisible to the naked eye. Let's take a closer look at what the leading contenders have to offer.

**Matthew Richards**

## The contenders

<b>1 Canon</b> EF 100mm f/2.8L Macro IS USM	£999/\$1,299
<b>2 Canon</b> RF 100mm f/2.8L Macro IS USM	£1,479/\$1,399
<b>3 Irix</b> 150mm f/2.8 Macro 1:1	£489/\$525
<b>4 Laowa</b> 100mm f/2.8 2:1 Ultra Macro APO	£469/\$399
<b>5 Nikon</b> Z MC 105mm f/2.8 VR S	£999/\$997
<b>6 Olympus</b> M.Zuiko Digital ED 60mm f/2.8 Macro	£399/\$499
<b>7 Samyang</b> 100mm f/2.8 ED UMC Macro	£409/\$549
<b>8 Sigma</b> 105mm f/2.8 DG DN Macro   A	£699/\$799
<b>9 Sigma</b> Macro 105mm f/2.8 EX DG OS HSM	£359/\$619
<b>10 Tamron</b> SP 90mm f/2.8 Di VC USD Macro	£649/\$649









## Group Test Macro lenses



### Canon EF 100mm f/2.8L Macro IS USM £999/\$1,299

Canon's top macro for DSLRs

**Lens mount Canon EF**

**A**lthough Canon's hybrid image stabiliser has been inherited by the company's newer macro lenses, it was this lens that hit the headlines. With enhanced performance for close-up shooting, the stabiliser counteracts x-y shift (movement in the horizontal and vertical planes) as well as the more usual angular vibrations. Even so, its effectiveness shrinks from four stops to two at shorter focus distances.

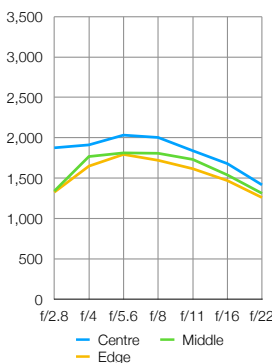
Weather-sealed build quality is typically robust for an L-series lens. The ring-type ultrasonic autofocus system is rapid and whisper-quiet, while focusing is smooth and precise.

#### Performance

Sharpness is excellent at medium to narrow apertures, and remains highly impressive wide-open at f/2.8. Colour fringing is minimal, but barrel distortion can be slightly noticeable if uncorrected in-camera.

#### Sharpness

Excellent sharpness is present at narrow apertures, often preferred for macro shooting.



#### Fringing 0.74

There's a little fringing at f/2.8, but it becomes minimal at medium to narrow apertures.

#### Distortion -0.74

Barrel distortion is minor but, technically, it's the worst lens in the group in this respect.

#### Digital Camera verdict

It lacks the built-in LED Macro Lite of its recent EF-S and EF-M siblings, but this lens is by far the best own-brand option for serious macro shooting with a Canon DSLR.

**4.5** ★★★★★ Outstanding



Digital Camera  
GOLD AWARD

Digital Camera  
BEST FOR CANON RF

### Canon RF 100mm f/2.8L Macro IS USM £1,479/\$1,399

Canon's new flagship macro lens

**Lens mount Canon RF**

**B**reaking new ground, Canon's RF 100mm is a 1.4x macro lens that features autofocus, and it's a fast AF system as well, based on a Dual Nano USM system. It's not only super-speedy for stills, but enables smooth and virtually silent autofocus transitions when you shoot video.

The hybrid optical image stabiliser delivers five-stop performance in general shooting, boosted to eight stops if used with later EOS R-series cameras that feature in-body stabilisation. Another key feature is the Spherical Aberration control ring, which enables you to adjust the quality of defocused areas for better bokeh.

#### Performance

Levels of sharpness are scintillating, although not quite as astonishing as from the Nikkor Z-mount lens on test, while control over colour fringing isn't quite as outstanding.

#### Sharpness

It's superb at wide apertures, but drops off a bit at medium to narrow apertures.



#### Fringing 1.14

Colour fringing is minimal, but not quite as negligible as in some other lenses on test.

#### Distortion 0.48

There's a small amount of pincushion, but in-camera correction is available.

#### Digital Camera verdict

With its extra-large 1.4x magnification factor and novel Spherical Aberration control ring, this is a feature packed lens that delivers superb performance.

**5.0** ★★★★★ A best-in-class product





## Irix

### 150mm f/2.8 Macro 1:1

£489/\$525

It really goes the distance

**Lens mounts** See table

**S**igma's 150mm macro lens was a good performer but has been discontinued, clearing the stage for this Irix full-frame-compatible newcomer. It's an imposing lens that weighs in at 840g, and comes with a tripod collar. The build quality and finish are impeccable, based on high-quality optical elements and a weather-sealed magnesium alloy barrel. The 1.0x macro working distance is longer than with any other lens on test, at 17.5cm.

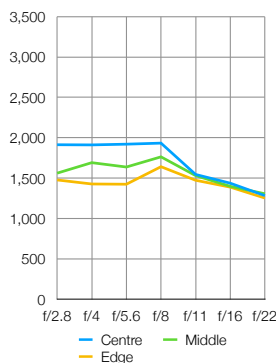
Like the Samyang macro lens, the Irix is a strictly manual-focus affair, but includes all the necessary electronics for camera-driven aperture control and viewfinder focus indicator lamps.

#### Performance

The long-travel focus ring operates smoothly. However, ultra-fine adjustments for macro shooting are more fiddly than with the Samyang lens. Image quality is excellent.

#### Sharpness

Unusually, sharpness across the whole frame barely drops off when shooting wide-open.



#### Fringing 0.63

Colour fringing is consistently minimal throughout the entire aperture range.

#### Distortion 0.13

The amount of pincushion distortion is so slight that it's generally impossible to spot.

#### Digital Camera verdict

The finish is top-notch, and image quality is fabulous. Manual focusing is often preferred for macro shooting, so the lack of autofocus certainly isn't a deal-breaker.

**4.5** ★★★★★ Outstanding



## Laowa

### 100mm f/2.8 2:1 Ultra Macro APO

£469/\$399

Double the magnification

**Lens mounts** See table

**T**here are two very similar editions of this full-frame-compatible Laowa lens, catering to DSLRs and mirrorless cameras. Both give twice the maximum macro magnification of most macro primes, at 2.0x. The mirrorless version is 30mm longer and has a more well-rounded aperture, based on 13 diaphragm blades rather than seven.

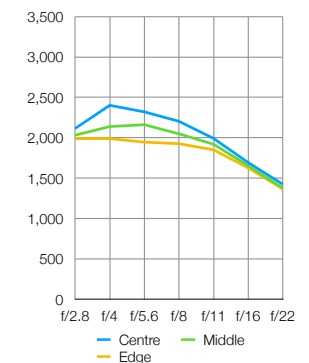
The Laowa is a manual-focus lens, but only the Canon EF mount version has any electronics. In other cases, you need to set the aperture manually via the onboard control ring, and no lens-based metadata is recorded in image files.

#### Performance

The manual effort required pays dividends, with superb sharpness and a minimum of colour fringing. There's a little pincushion distortion, but not enough to cause any concern.

#### Sharpness

Sharpness is excellent and highly consistent across the whole frame.



#### Fringing 0.35

Colour fringing is minimal at f/2.8 and negligible at medium to narrow apertures.

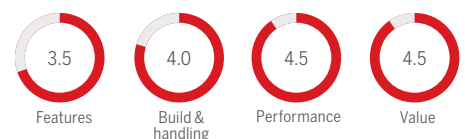
#### Distortion 0.89

There's a hint of pincushion, but it's hard to spot even when you shoot straight objects.

#### Digital Camera verdict

The DSLR model can be tricky for viewfinder-based shooting, but it works well on mirrorless cameras. The 2.0x magnification takes macro to a different level.

**4.5** ★★★★★ Outstanding





## Group Test Macro lenses



### Nikkor Z MC 105mm f/2.8 VR S £999/\$997

Nikon raises its 'micro' game

**Lens mount Nikon Z**

**N**ikon's F-mount 105mm macro lens has been completely reinvented for mirrorless cameras. Handling extras include a customisable control ring and lens-function button, plus a multi-function OLED display. The autofocus system is virtually silent, powered by a Dual-Motor Multi-Focus STM system. The optical Vibration Reduction system is rated at 4.5 stops compared with the three of the older F-mount 105mm lens; that effectiveness is boosted by any Z-series cameras with in-body stabilisation.

#### Performance

The lens puts its mighty feature list and handling prowess to good use, delivering stellar performance in all respects. The autofocus system is super-fast and deadly accurate, while manual focusing is ultra-precise. Image quality is simply spectacular.

#### Digital Camera verdict

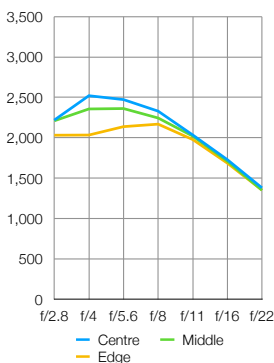
This Z-mount lens is a standout performer, with spectacular image quality, handling and all-round performance. It's only about two thirds the cost of Canon's RF contender.

**5.0** ★★★★★  
A best-in-class product



#### Sharpness

Sharpness is epic from the centre of the frame right out to the extreme corners.



#### Fringing 0.23

There's virtually no sign of any colour fringing, even at the edges and corners.

#### Distortion -0.6

There's a hint of barrel distortion when uncorrected, but it's difficult to spot.



### Olympus M.Zuiko Digital ED 60mm f/2.8 Macro £399/\$499

You'll be seeing double

**Lens mount Micro Four Thirds**

**T**he Micro Four Thirds system is sometimes criticised for its relatively small image sensor.

However, the crop factor not only boosts telephoto reach but gives you double the effective magnification of a full-frame camera. As such, this Olympus lens gives you an effective 2.0x maximum magnification.

The lens is beautifully engineered and features a set of weather seals. Although the comparatively short 60mm focal length knocks about 10cm off the minimum focus distance, the macro working distance from the front of the lens to the subject only shrinks from about 14cm to 10cm, compared with most 90-105mm macro optics.

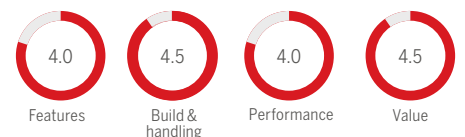
#### Performance

High-precision manual focusing is enabled by the electronically coupled focus ring. Image quality is very good in all respects.

#### Digital Camera verdict

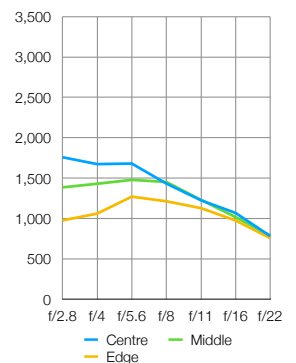
A joy to use, this is our favourite macro lens for Micro Four Thirds cameras. It has refined handling and delivers excellent image quality, effectively up to twice life-size.

**4.0** ★★★★★  
Excellent



#### Sharpness

The Olympus resolves more fine detail than medium-range lab tests would suggest.



#### Fringing 0.7

Colour fringing is minimal, and practically non-existent at wide apertures.

#### Distortion 0.07

There's virtually no distortion when this lens is coupled with an MFT camera body.



## Samyang

### 100mm f/2.8 ED UMC Macro

£409/\$549

It's a mostly manual macro

**Lens mounts** See table

**M**any of us prefer to focus manually for macro shooting. The depth of field tends to be so tiny that you'll often need to be very selective. However, this Samyang lens isn't just a manual-focus optic, but generally lacks any electronics at all. The exception is the Nikon-fit version, which enables aperture adjustment from the camera.

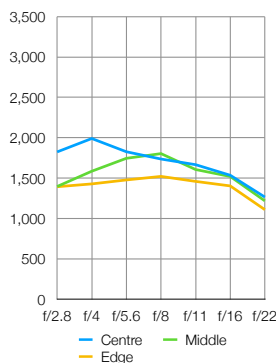
A problem when you use the lens on a DSLR (apart from Nikon) is that the viewfinder image becomes dark with narrow apertures, the preferred option for macro shooting. However, the lens works a treat in Live View mode, or with mirrorless cameras.

#### Performance

Typical of manual-focus lenses, the focus ring has long rotational travel and operates with silky smoothness. It's ideal for making precise adjustments in macro shooting. Image quality is very good as well.

#### Sharpness

Levels of sharpness are pretty good overall, and are quite consistent across the image.



#### Fringing 1.74

There's practically no fringing at wide apertures; it creeps up at medium to narrow settings.

#### Distortion 0.36

There's slight pincushion distortion, but it generally goes unnoticed.

#### Digital Camera verdict

A particularly good choice for Fujifilm mirrorless cameras, the Samyang is a high-quality yet budget-friendly manual lens that works a treat for macro shooting.

**4.0** ★★★★★ Excellent



## Sigma

### 105mm f/2.8 DG DN Macro | A

£699/\$799

Sigma's first 'Global Vision' macro

**Lens mounts** L-Mount, Sony E

**U**nlike some of Sigma's DG HSM lenses that have been repurposed to fit L-Mount and Sony E mirrorless

bodies, this DG DN lens is all-new. The build quality is excellent and features extensive weather seals, as well as a fluorine coating on the front element.

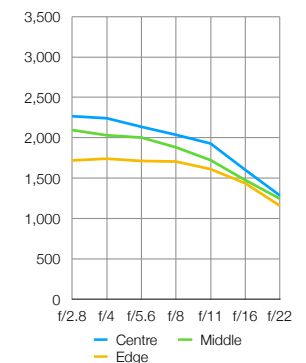
Handling finery includes a customisable function button. There's also an aperture control ring, complete with a 'click on/off' switch. This enables precise aperture adjustments for stills in one-third f/stop increments. There's no optical image stabiliser, but the lens can take advantage of the in-body stabilisation of recent Sony and Panasonic mirrorless cameras.

#### Performance

Autofocus is fast, accurate and near-silent, while manual focusing is precise. Image quality is fabulous and, for levels of sharpness, it eases ahead of the older Sigma 105mm lens.

#### Sharpness

Excellent sharpness drops off a little less than in the Canon RF lens at around f/8 to f/11.



#### Fringing 0.68

Colour fringing is extremely negligible throughout the entire aperture range.

#### Distortion 0.9

There's a touch of pincushion distortion, but not enough to be generally noticeable.

#### Digital Camera verdict

Feature-packed, strongly built and with refined handling, this is our top choice of macro lens for L-Mount and L-Mount cameras. It's also great value at the price.

**5.0** ★★★★★ A best-in-class product





## Group Test Macro lenses



Digital  
Camera  
VALUE  
AWARD

### Sigma

Macro 105mm f/2.8  
EX DG OS HSM

£359/\$619

A bargain lens for big-brand DSLRs

**Lens mounts** Canon EF, Nikon F, Sigma

**L** launched in 2011, this optically stabilised full-frame-compatible macro lens predates Sigma's 'Global Vision' Art, Sports and Contemporary line-up by a year.

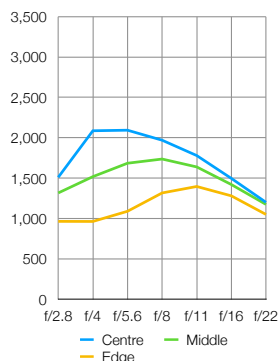
With fast ring-type ultrasonic autofocus and a fully internal focusing arrangement, complete with a range limiter switch that can lock out near or far focusing, the lens works well as a fast telephoto prime. It's also good for shooting sports and wildlife, with a four-stop stabilizer that has switchable static and panning modes.

#### Performance

Corner-sharpness is merely mediocre at wide aperture settings, but that's no real problem in macro photography, where you'll generally use narrow apertures to gain even a little depth of field in your shot. Handling is excellent, and the lens delivers superb all-round image quality.

#### Sharpness

Sharpness is excellent in the central region, but less impressive towards the edges.



#### Fringing 0.79

Levels of colour fringing are minimal and remain consistent throughout the aperture range.

#### Distortion -0.12

There's only the merest hint of barrel distortion, which is generally impossible to spot.

#### Digital Camera verdict

Sigma's 105mm has a sturdy construction and is equally adept as a fast telephoto prime and a full macro optic. It's great value in most world regions, but pricier in the USA.

4.5 ★★★★★ Outstanding



Features



Build & handling



Performance



Value



Digital  
Camera  
BEST FOR  
CANON EF

Digital  
Camera  
BEST FOR  
NIKON F

### Tamron

SP 90mm f/2.8 Di  
VC USD Macro

£649/\$649

A top choice for DSLRs

**Lens mounts** Canon EF, Nikon F

**T** amron's highly popular line of 90mm macro lenses stretches back to 1979. The latest edition comes with a host of updates, including a revised and refined optical layout that features two top-grade XLD (eXtra Low Dispersion) elements. The updated lens also gains weather seals and a fluorine coating on the front element.

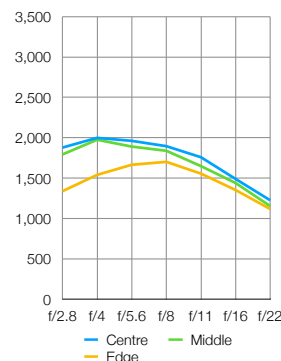
Another notable upgrade is that Tamron has also added a 'hybrid' Vibration Compensation system. This corrects for x-y shift as well as the more usual angular vibration, making it more effective for close-up shooting. Performance drops from four stops to about two at fairly close range, though.

#### Performance

Lab scores for sharpness are good, based on our medium-range charts. However, the Tamron proved excellent at short range, down to the minimum distance for full magnification.

#### Sharpness

Close-range sharpness is even better than medium-range lab tests would imply.



#### Fringing 1.36

Levels of colour fringing creep up a bit at narrower apertures, but are still quite minimal.

#### Distortion 0.09

Distortion is negligible. It's one of the very best lenses in the group in this respect.

#### Digital Camera verdict

It's a superb macro lens for both Canon and Nikon DSLRs, but needs new firmware for an EOS R or RP, and is currently incompatible with later R-series and Nikon Z cameras.

4.5 ★★★★★ Outstanding



Features



Build & handling



Performance



Value

# The results in close-up

It's tight – but the Nikkor Z MC 105mm f/2.8 VR S wins out



**T**he three standout lenses in this group are the new Nikkor Z MC 105mm f/2.8 VR S, Canon's RF 100mm f/2.8L Macro IS USM and Sigma's 105mm f/2.8 DG DN Macro Art. They're all feature-rich in different ways, and deliver spectacular image quality and

all-round performance. The Nikkor Z 105mm edges ahead for sharpness, especially in the all-important medium to narrow aperture range for macro shooting. The Sigma is a great buy for L-Mount and Sony E cameras.

The Tamron 90mm is a cracking macro lens for Canon and Nikon DSLRs. For our

money, it edges ahead of the own-brand Canon EF and Nikon F mount macro lenses for DSLRs. The Sigma Macro 105mm f/2.8 EX DG OS HSM is a better value buy in the UK and Europe, but pricier in the USA. In the Micro Four Thirds camp, the Olympus 60mm is the macro lens to go for.

## How the lenses compare



**Canon**  
EF 100mm  
f/2.8L Macro  
IS USM

**Canon**  
RF 100mm  
f/2.8L Macro  
IS USM

**Irix**  
150mm f/2.8  
Macro 1:1

**Laowa**  
100mm f/2.8  
2:1 Ultra  
Macro APO

**Nikkor**  
Z MC 105mm  
f/2.8 VR S

**Olympus**  
M.Zuiko  
Digital ED  
60mm f/2.8  
Macro

**Samyang**  
100mm f/2.8  
ED UMC  
Macro

**Sigma**  
105mm  
f/2.8 DG DN  
Macro | A

**Sigma**  
Macro  
105mm f/2.8  
EX DG OS  
HSM

**Tamron**  
SP 90mm  
f/2.8 Di VC  
USD Macro

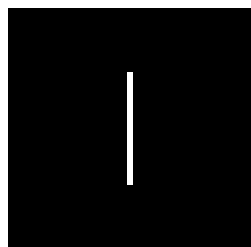
Contact	www.canon.co.uk		www.photo24.co.uk	www.ukdigital.co.uk	www.nikon.co.uk	www.olympus.co.uk	www.samyanglensglobal.com	www.sigma-imaging-uk.com		www.tamron.co.uk
Street price	£999/\$1,299	£1,479/\$1,399	£489/\$525	£469/\$399	£999/\$997	£399/\$499	£409/\$549	£699/\$799	£359/\$619	£649/\$649
Mount options	C-EF	C-RF	C-EF N-F P-K	C-EF C-RF L N-F N-Z P-K S-E	N-Z	MFT	C-EF F-X N-F P-K SNX S-A S-E FT MFT	L S-E	C-EF N-F Sg	C-EF N-F
Full-frame compatible	Yes	Yes	Yes	Yes	Yes	No	Yes	Yes	Yes	Yes
Elements/Groups	15/12	17/13	12/9	12/10	16/11	13/10	15/12	17/12	16/11	14/11
Diaphragm blades	9 blades	9 blades	11 blades	7-13 blades	9 blades	7 blades	9 blades	9 blades	9 blades	9 blades
Autofocus type	Ultrasonic (ring-type)	Dual Nano Ultrasonic	None	None	Stepping motor	Stepping motor	None	Stepping motor	Ultrasonic (ring-type)	Ultrasonic (ring-type)
Manual AF override	Full-time	Electronic	N/A	N/A	Electronic	Electronic	N/A	Electronic	Full-time	Full-time
Max magnification	1.0x	1.4x	1.0x	2.0x	1.0x	1.0x	1.0x	1.0x	1.0x	1.0x
Min focus distance	0.3m	0.26m (1.4x)	0.35m	0.25m (2x)	0.29m	0.19m	0.31m	0.3m	0.31m	0.3m
Internal focusing	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Minimum aperture	f/32	f/32	f/32	f/22	f/32	f/22	f/32	f/22	f/22	f/32
Optical stabiliser	Yes	Yes	No	No	Yes	No	No	No	Yes	Yes
Filter size	67mm	67mm	77mm	67mm	62mm	46mm	67mm	62mm	62mm	62mm
Included accessories	Hood, pouch	Hood, pouch	Hood, tripod collar, case	Hood	Hood, pouch	None	Hood	Hood, soft case	Hood, hood adapter, soft case	Hood
Dimensions (D x L)	78 x 123mm	82 x 148mm	87 x 128mm	72 x 125-155mm	85 x 140mm	56 x 82mm	73 x 121mm	74 x 134mm	78 x 126mm	79 x 117mm
Weight	625g	730g	840g	638-650g	630g	185g	705g	715g	725g	610g
Features	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★
Build & handling	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★
Performance	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★
Value	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★
Overall	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★





# Fast telephoto zoom lenses

We put the latest and greatest fast 70-200mm zooms to the test – so which one is the best?



It's no surprise that the 70-200mm f/2.8 lens takes its place as a 'trinity' zoom. Favoured by both professional and enthusiast photographers all over

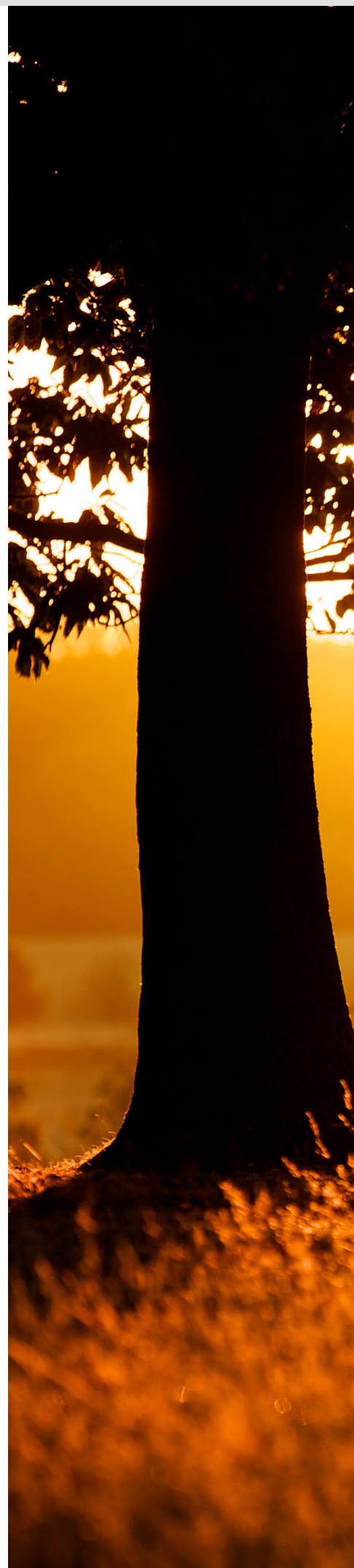
the world, it's fabulous for shooting action sports, wildlife, weddings and other events, and even portraits. The availability of short, medium and fairly long telephoto focal lengths, combined with a fast and constant aperture, enables a tight depth of field and rapid shutter speeds.

It's no surprise, then, that every full-frame camera manufacturer who wants to be taken seriously creates its own 70-200mm f/2.8 lens. There's a rich history of this type of zoom for Canon and Nikon DSLRs; current models are the result of numerous refinements over the years. That goes for Sigma and Tamron competitors as well as own-brand lenses. For Canon, Nikon, Panasonic and Sony mirrorless cameras, most of the lenses on offer are even newer, based on the latest cutting-edge designs.

**Matthew Richards**

## The contenders

1	<b>Canon</b> EF 70-200mm f/2.8L IS III USM	£2,149/\$2,099
2	<b>Canon</b> RF 70-200mm F2.8L IS USM	£2,659/\$2,699
3	<b>Nikkor</b> AF-S 70-200mm f/2.8E FL ED VR	£1,999/\$2,347
4	<b>Nikkor</b> Z 70-200mm f/2.8 VR S	£2,399/\$2,597
5	<b>Panasonic</b> Lumix S Pro 70-200mm f/2.8 OIS	£2,599/\$2,598
6	<b>Sigma</b> 70-200mm f/2.8 DG OS HSM   S	£1,179/\$1,379
7	<b>Sony</b> FE 70-200mm f/2.8 GM OSS	£2,149/\$2,398
8	<b>Tamron</b> SP 70-200mm f/2.8 Di VC USD G2	£1,249/\$1,299









## Group Test Fast telephoto zooms



### Canon EF 70-200mm f/2.8L IS III USM £2,149/\$2,099

The more things change...

**Lens mount Canon EF**

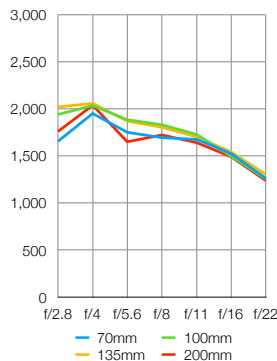
**C**anon has stuck firmly with its popular formula in updating its top-flight 70-200mm zoom. The barrel is a slightly different shade of grey, but the only notable upgrades boil down to coatings. An ASC (Air Sphere Coating) has been added to the 19th element in the optical path, to further reduce ghosting and flare, and fluorine coatings are applied to the front and rear elements, to repel moisture and grease.

#### Performance

Compared with the previous edition of the lens, Canon has downrated the claimed effectiveness of the image stabilisation system from four to 3.5 stops. That puts it more in line with the results of our own lab testing. The new lens is equally impressive as its predecessor for sharpness and contrast, along with offering super-fast autofocus.

#### Sharpness

The Canon EF closely matches the Tamron G2, but lags behind the Sigma Sports.



#### Fringing

Short **1.38** Long **1.12**  
Minimal fringing drops away in the middle of the zoom range.

#### Distortion

Short **-1.02** Long **1.38**  
Slight barrel moves to slight pincushion distortion.

#### Digital Camera verdict

Canon's new lens is very good but it doesn't outperform the equivalent Sigma and Tamron f/2.8 zooms. At nearly twice the price, it's relatively poor value for money.

**4.0** ★★★★★

Excellent



Features



Build & handling



Performance



Value



### Canon RF 70-200mm f/2.8L IS USM £2,659/\$2,699

Digital  
Camera  
**BEST FOR  
CANON RF**

It's compact, but with a catch

**Lens mount Canon RF**

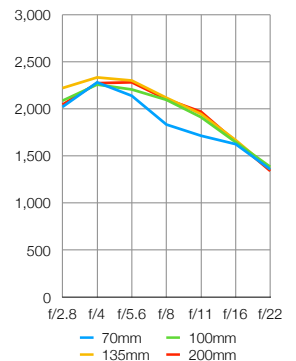
**U**niquely for a 70-200mm f/2.8 zoom, the Canon RF lens has a similar telescoping design to relatively low-budget 70-300mm telephoto zooms, with an inner barrel that extends at longer zoom settings. It's remarkably short at the 70mm zoom setting, making it easy to stow away, and it's fairly light, but the design makes the lens incompatible with Canon's 1.4x or 2.0x teleconverters.

#### Performance

There are certainly no minus points in terms of performance. The floating autofocus system, based on dual Nano USM motors, is amazingly fast and virtually silent. The five-stop image stabiliser works brilliantly well, helping to make the most of the lens's inherent sharpness. And sharpness itself really is excellent, even when shooting wide-open and throughout the entire zoom range.

#### Sharpness

It's much sharper than the Canon EF, boosted by a more effective image stabiliser.



#### Fringing

Short **1.32** Long **0.5**  
There's little fringing at 70mm, and it gets even better.

#### Distortion

Short **1.44** Long **1.32**  
Pincushion is slight at most at mid to long focal lengths.

#### Digital Camera verdict

Its build is up to Canon L-series standards, and it's compact and light. Performance is excellent, but the incompatibility with teleconverters can be an issue.

**4.5** ★★★★★

Outstanding



Features



Build & handling



Performance



Value



## Nikkor

### AF-S 70-200mm f/2.8E FL ED VR

£1,999/\$2,347

The latest own-brand option

**Lens mount Nikon F**

**N**ikon's latest 70-200mm f/2.8 lens for DSLRs has an excellent reputation for premium performance.

Compared with the previous edition, it has an uprated optical design that features a fluorite glass element, six ED elements, one HRI element and the bonus of Nano Crystal Coat.

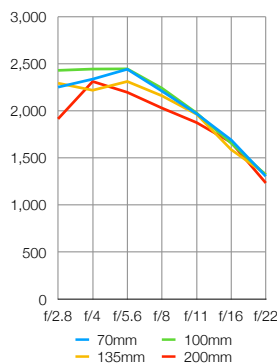
The revised dual-mode VR system has automatic panning detection plus a Sport mode that doesn't interfere with the viewfinder image and avoids a slowdown in continuous shooting. A dual-mode autofocus system gives priority to either automatic focusing or manual override.

#### Performance

Sharpness and contrast are excellent, throughout the zoom range, but the Sigma Sports lens goes toe to toe with the Nikkor for sharpness in real-world shooting, while matching other aspects of image quality and autofocus speed.

#### Sharpness

In the lab and in real-world shooting, the Nikkor delivers superb sharpness.



#### Fringing

Short **2.15** Long **1.12**  
It's worse than average at 70mm, but good at 200mm.

#### Distortion

Short **0.05** Long **1.92**  
There's basically no distortion at 70mm.



## Nikkor

### Z 70-200mm f/2.8 VR S

£2,399/\$2,597

It outshines its F-mount counterpart

**Lens mount Nikon Z**

**T**his Z-mount 70-200mm zoom has a stellar optical design that includes two aspherical elements, six ED (Extra-low Dispersion) elements, a fluorite element and an SR (Short-wavelength Refractive) element. Dual coatings include both Arneo and Nano Crystal Coat.

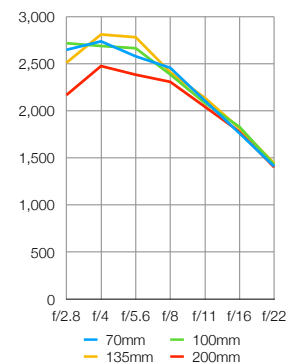
The lens isn't just a feast of fine glass. Autofocus is incredibly rapid yet virtually silent, based on two synchronized stepping motors. There's highly effective five-stop optical VR, based on voice coil motors. Trick features include an OLED display for viewing various shooting parameters.

#### Performance

It's simply the sharpest lens in the entire group, by quite a margin, not only in the central region of the frame but right into the edges and corners. Vignetting is minimal and there's excellent resistance to ghosting.

#### Sharpness

There's incredible sharpness on tap, throughout the whole zoom range.



#### Fringing

Short **0.8** Long **0.74**  
Colour fringing is entirely negligible at all focal lengths.

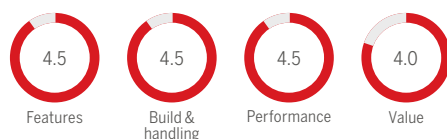
#### Distortion

Short **-0.09** Long **0.05**  
Stellar results, aided by in-camera corrections.

#### Digital Camera verdict

Money no object, it's a winning lens for Nikon DSLRs, with rock-solid build quality, advanced features and excellent performance, but the Sigma Sports is much less expensive to buy.

**4.5** ★★★★★ Outstanding



#### Digital Camera verdict

This Nikon Z-mount lens is destined to become a classic. Impeccable handling combines with superlative performance to make it highly desirable.

**5.0** ★★★★★ A best-in-class product





## Group Test Fast telephoto



# Panasonic Lumix S Pro 70-200mm f/2.8 OIS

£2,599/\$2,598

Digital Camera  
BEST FOR  
L-MOUNT

Panasonic's larger 70-200mm

**Lens mounts** L-Mount

**W**e're big fans of Panasonic's 70-200mm f/4 zoom, which delivers superb image quality and all-round performance in a comparatively compact, light and affordable package. This f/2.8 lens is about 50 per cent heavier and more expensive, as you'd expect from faster glass.

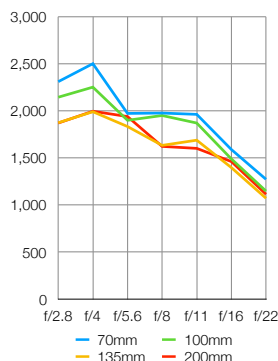
Upgrades include a more advanced optical stabiliser with switchable static and panning modes, which combines with Panasonic in-body stabilisers to give up to seven-stop performance.

## Performance

Autofocus is very fast and virtually silent, and image quality is mostly very good with highly attractive bokeh. However, while centre-sharpness is impressive, especially at shorter zoom settings, edge- and corner-sharpness is comparatively lacklustre, especially in comparison with Panasonic's 70-200mm f/4 lens.

## Sharpness

Centre sharpness is very good, but there's a big drop-off towards the edges.



## Fringing

Short **0.11** Long **0.35**  
There's virtually no visible colour fringing.

## Distortion

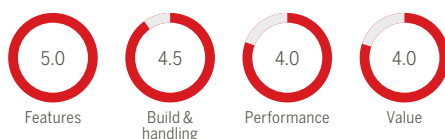
Short **-0.29** Long **-0.16**  
Distortions are practically eliminated after corrections.

## Digital Camera verdict

The S Pro 70-200mm f/4 lens is so good that the f/2.8 struggles to beat it, although it does have handling enhancements and that all-important extra f-stop.

**4.0** ★★★★★

Excellent



# Sigma 70-200mm f/2.8 DG OS HSM | S

£1,179/\$1,379

Digital Camera  
BEST ON TEST  
BEST FOR CANON EF  
BEST FOR NIKON F  
GOLD AWARD  
VALUE AWARD

A simply fabulous 'Sports' edition

**Lens mounts** Canon EF, Nikon F, Sigma

**S**igma's long-running 70-200mm f/2.8 DG OS HSM lens was a popular, budget-friendly option for Canon and Nikon shooters. The replacement Sports edition is completely redesigned, with a new optical path that features 24 elements in 22 groups, incorporating nine FLD elements and one SLD element. There's also a well-rounded aperture based on 11 diaphragm blades.

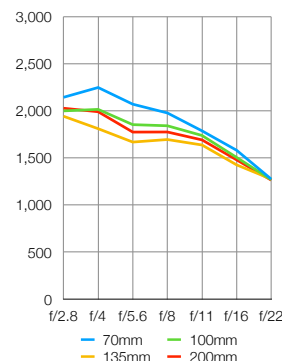
The new optical stabiliser has switchable static and panning modes, the latter working in landscape, portrait and even diagonal orientation.

## Performance

Sharpness and contrast are spectacular, even when shooting wide-open. Autofocus is rapid and accurate and, while stabilisation isn't quite as effective as in the Tamron G2 lens for static shots, it proved better for panning during our tests.

## Sharpness

Close-range lab results don't look overly impressive, but real-world shooting is superb.



## Fringing

Short **1.31** Long **1.63**  
Levels are similar to those of the competing DSLR lenses.

## Distortion

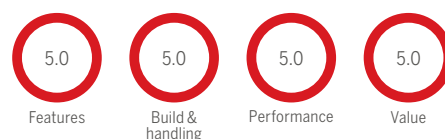
Short **-0.55** Long **1.64**  
Barrel and pincushion distortions are typically low.

## Digital Camera verdict

It's bigger and heavier than competing lenses, but goes extra-large on performance, matching the Nikon F-mount lens and edging ahead of the Canon EF lens. It's also outstanding value.

**5.0** ★★★★★

A best-in-class product





## Sony

### FE 70-200mm f/2.8 GM OSS

£2,149/\$2,398

Digital  
Camera  
BEST FOR  
SONY

A feature-rich G Master zoom

**Lens mounts** Sony FE

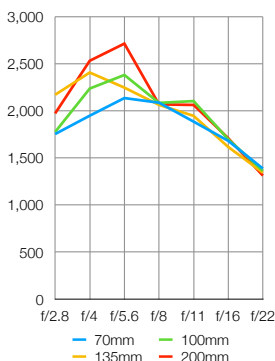
**S**ony's FE 70-200mm f/4 lens is an impressive performer, but the newer f/2.8 G Master really aims for glory, adding an ultra-high tolerance XA (eXtreme Aspherical) element for greater control of colour fringing and enhanced bokeh. Like the Sigma Sports lens, it features 11 diaphragm blades to maintain a very well-rounded aperture. The autofocus system features both ring-type ultrasonic and dual linear motors.

#### Performance

The Sony combines excellent sharpness and contrast with soft and dreamy bokeh. However, despite the advanced autofocus system, focusing speed proved slower in our tests than with competing lenses. The stabiliser gave a disappointing two-stop effectiveness, although it's boosted when used in conjunction with sensor-shift stabilisation.

#### Sharpness

Centre sharpness is largely excellent, but corner sharpness is pretty average.



#### Fringing

Short **1.0** Long **0.43**  
It's the best here for tackling lateral chromatic aberrations.

#### Distortion

Short **-1.41** Long **2.2**  
Distortion is worse than with most other lenses on test.

#### Digital Camera verdict

It's twice the price of the 70-200mm f/4 G OSS. It's not a leader for autofocus speed or the effectiveness of stabilisation, but it delivers sumptuous image quality.

**4.5** ★★★★★ Outstanding



## Fast telephoto zooms **Group Test**



Digital  
Camera  
VALUE  
AWARD

## Tamron

### SP 70-200mm f/2.8 Di VC USD G2

£1,249/\$1,299

A significant upgrade from Tamron

**Lens mounts** Canon EF, Nikon F

**T**his Tamron G2 (Generation 2) lens feels every inch a pro-grade offering. Its optical design has been refined to increase sharpness and contrast, while reducing colour fringing, ghosting and flare.

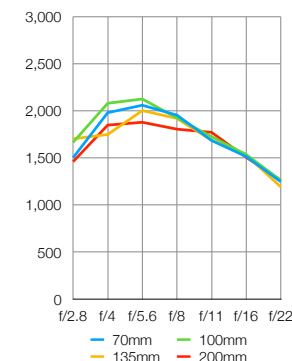
The autofocus system is uprated for faster, more accurate performance, and the Vibration Compensation system boasts five-stop effectiveness with three switchable modes. A key update over the previous edition is that the G2 is compatible with Tamron's 1.4x and 2.0x tele-converters.

#### Performance

As advertised, the autofocus system is very fast and operates with excellent precision. Image quality is gorgeous, although shots are marginally less sharp than with the Nikon and Sigma f/2.8 lenses. Stabilisation is great for static photos, but less impressive for panning shots.

#### Sharpness

It's not quite as sharp as the Nikon and Sigma contenders, especially wide-open.



#### Fringing

Short **1.93** Long **0.64**  
Minor fringing at 70mm becomes negligible.

#### Distortion

Short **-0.7** Long **1.32**  
There's very little distortion at short to medium settings.

#### Digital Camera verdict

It's a superb lens with high-end features, great handling and tough weather-sealed build quality, along with superb image quality and all-round performance.

**4.5** ★★★★★ Outstanding





## Group Test Fast telephoto zooms

# Sporty Sigma is our winner

You can't beat the Sigma 70-200mm f/2.8 DG OS HSM | Sports for quality and value



**F**or Canon, Nikon, Panasonic and Sony mirrorless full-frame cameras, there's no beating the own-brand 70-200mm f/2.8 lenses on test. The Nikkor Z 70-200mm is the pick of the crop, and delivers the best image quality and performance of any lens in the group. But all of the lenses for mirrorless cameras are currently very expensive

and, now more than ever, value for money is a major consideration for potential buyers.

For DSLRs, the Sigma Sports lens matches the competing Nikon F-mount zoom in pretty much every aspect of handling, performance and image quality, and edges ahead of the Canon EF lens. That's no mean feat considering that the Sigma is little more than half the price to buy. All things

considered, it's our overall winner for quality, performance and value for money.

The Tamron 70-200mm f/2.8 G2 is another great-value lens, and is a little more compact and light than the Sigma Sports. In our tests, however, the Sigma was noticeably sharper throughout the zoom range, especially at wide apertures, and its optical stabilisation was more effective when panning.

## How the lenses compare



Name	Canon EF 70-200mm f/2.8L IS III USM	Canon RF 70-200mm f/2.8L IS USM	Nikkor AF-S 70-200mm f/2.8E FL ED VR	Nikkor Z 70-200mm f/2.8 VR S	Panasonic Lumix S Pro 70-200mm f/2.8 OIS	Sigma 70-200mm f/2.8 DG OS HSM   S	Sony FE 70-200mm f/2.8 GM OSS	Tamron SP 70-200mm f/2.8 Di VC USD G2
Contact	<a href="http://www.canon.co.uk">www.canon.co.uk</a>	<a href="http://www.canon.co.uk">www.canon.co.uk</a>	<a href="http://www.nikon.co.uk">www.nikon.co.uk</a>	<a href="http://www.nikon.co.uk">www.nikon.co.uk</a>	<a href="http://www.panasonic.com">www.panasonic.com</a>	<a href="http://www.sigma-imaging-uk.com">www.sigma-imaging-uk.com</a>	<a href="http://www.sony.co.uk">www.sony.co.uk</a>	<a href="http://www.tamron.co.uk">www.tamron.co.uk</a>
Street price	£2,149/\$2,099	£2,659/\$2,699	£1,999/\$2,347	£2,399/\$2,597	£2,599/\$2,598	£1,179/\$1,379	£2,149/\$2,398	£1,249/\$1,299
Mount options	Canon EF	Canon RF	Nikon F	Nikon Z	L-Mount	Canon EF, Nikon F, Sigma	Sony FE	Canon EF, Nikon F
Elements/Groups	23/19	17/13	22/18	21/18	22/17	24/22	23/18	23/17
Diaphragm blades	8 blades	9 blades	9 blades	9 blades	11 blades	11 blades	11 blades	9 blades
Optical stabiliser	2 modes, 3.5 stops	3 modes, 5 stops	2 modes, 4 stops	2 modes, 5.5 stops	2 modes, 4 stops	2 modes, 4 stops	2 modes, 2 stops	3 modes, 5 stops
Autofocus type	Ultrasonic (ring-type)	Dual Nano USM	Ultrasonic (ring-type)	Stepping motor	Dual linear/stepping motor	Ultrasonic (ring-type)	Ultrasonic (ring) + Linear	Ultrasonic (ring-type)
Internal zoom/focus	Yes/Yes	No/Yes	Yes/Yes	Yes/Yes	Yes/Yes	Yes/Yes	Yes/Yes	Yes/Yes
AF limit/hold switches	Yes/No	No/No	Yes/Yes	Yes/Yes	Yes/Yes	Yes/Yes	Yes/Yes	Yes/No
Min focus distance	1.2m	0.7m	1.1m	0.5-1.0m	0.95m	1.2m	0.96m	0.95m
Max magnification	0.21x	0.23x	0.21x	0.2x	0.21x	0.21x	0.25x	0.16x
Filter size	77mm	77mm	77mm	77mm	82mm	82mm	77mm	77mm
Weather seals	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Supplied accessories	Hood, soft case, tripod mount	Hood, soft case, tripod mount	Hood, soft case, tripod mount	Hood, soft case, tripod mount	Hood, soft case, tripod mount	Hood, soft case, tripod mount	Hood, soft case, tripod mount	Hood, tripod mount
Dimensions (dia x length)	89 x 199mm	90 x 146mm	89 x 203mm	89 x 220mm	94 x 209mm	94 x 203mm	88 x 200mm	88 x 194mm
Weight	1,480g	1,070g	1,430g	1,440g	1,570g	1,805g	1,480g	1,500g

Features	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★
Build & handling	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★
Performance	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★
Value	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★
Overall	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★

**Mounts:** L-mount**Full frame:** Yes**Autofocus:** Yes**Lens construction:** 23 elements in 17 groups**Angle of view:** 34-12 degrees**Diaphragm blades:** 9**Minimum aperture:** f/22**Minimum focusing distance:** 0.92m**Maximum magnification ratio:** 0.25x**Filter size:** 77mm**Dimensions:** 84 x 179mm**Weight:** 985g

# Panasonic Lumix S Pro 70-200mm f/4 OIS

£1,749/\$1,699

A balanced telephoto for S-series cameras

[www.panasonic.co.uk](http://www.panasonic.co.uk)

The 70-200mm f/2.8 zoom is often regarded as one of the 'holy trinity' of lenses for full-frame cameras, along with similarly 'fast' wide-angle and standard zooms. However, there's a lot to be said for getting an f/4 zoom instead. Not only are they cheaper, they're also smaller and lighter. The Panasonic Lumix S Pro 70-200mm f/4 OIS is a case in point, with a manageable weight of 985g compared with 1,570g for Panasonic's bigger f/2.8 zoom.

Although it has a modest f/4 aperture rating, this S Pro zoom lens is certainly feature-rich. It's based on a high-tech optical path that includes one aspherical element, one UED (Ultra Extra-low Dispersion) element and three further ED elements, plus a UHR (Ultra High Refractive index) element.

Further attractions include a dual autofocus drive that features both linear and stepping motors. This aims to deliver fast, accurate autofocus performance in virtual silence, ideal for shooting sporting action and even more perfect for tracking wildlife on the move.

Sharpness in real terms isn't just about optical quality: stillness and steadiness are also paramount while shooting, especially with telephoto lenses. As such, the lens has a built-in optical image stabiliser which works in conjunction with the five-axis, sensor-shift stabilization of S-series camera bodies. They team up to deliver as much as a six-stop benefit in beating camera-shake.

## Performance

Impressively, the 70-200mm f/4 maintains excellent sharpness and contrast throughout its entire zoom range, even when shooting wide-open. Sharpness does drop off a bit towards the extreme edges and corners of the frame, but still remains excellent for a telephoto zoom.

Other areas of image quality are similarly impressive, with negligible colour fringing, effectively no distortion and very good control over ghosting and flare. Autofocus is super-speedy and image stabilisation is highly effective. All in all, this lens is a great performer. **Matthew Richards**

1

The focus ring's clutch mechanism enables swapping between autofocus and manual focus with a simple push-pull action.

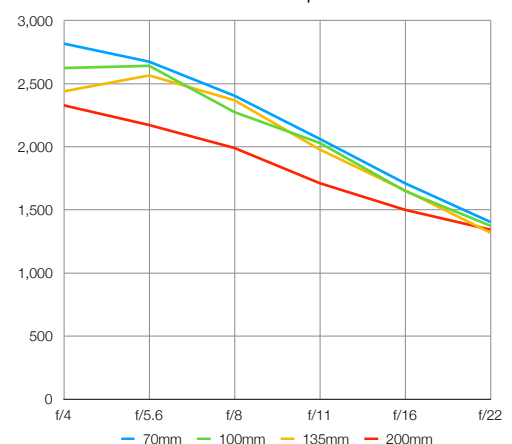
2

Pulling the focus ring back for manual focus reveals a focus distance scale, which is highly unusual for a lens with this type of autofocus system.

3

Weather-seals are employed to ensure dust- and splash-resistance, and the lens is freezeproof down to -10°C.

Centre sharpness



## Sharpness

Wide-open sharpness is pretty amazing and, for a telephoto zoom, there's not very much drop-off towards the corners of the image frame.

## Fringing

Short **0.36** Long **0.2**

There's only a little colour fringing when shooting at 200mm, f/4 and even less at other settings.

## Distortion

Short **0.01** Long **-0.02**

Helped by automatic in-camera corrections, there's essentially no distortion at any focal length.

## Verdict

**5.0** ★★★★★ A best-in-class product



This Panasonic S Pro lens is pretty pricey for a 70-200mm f/4 zoom, but you get what you pay for. The performance of the autofocus and stabilisation systems is excellent, and image quality is superb in all respects. Unless you really need the faster aperture rating of Panasonic's 70-200mm f/2.8 zoom, this less expensive and more lightweight lens is the more sensible choice.





# Superzooms for travelling

There's no beating a 'superzoom' when it comes to versatility. Here are our best buys

W

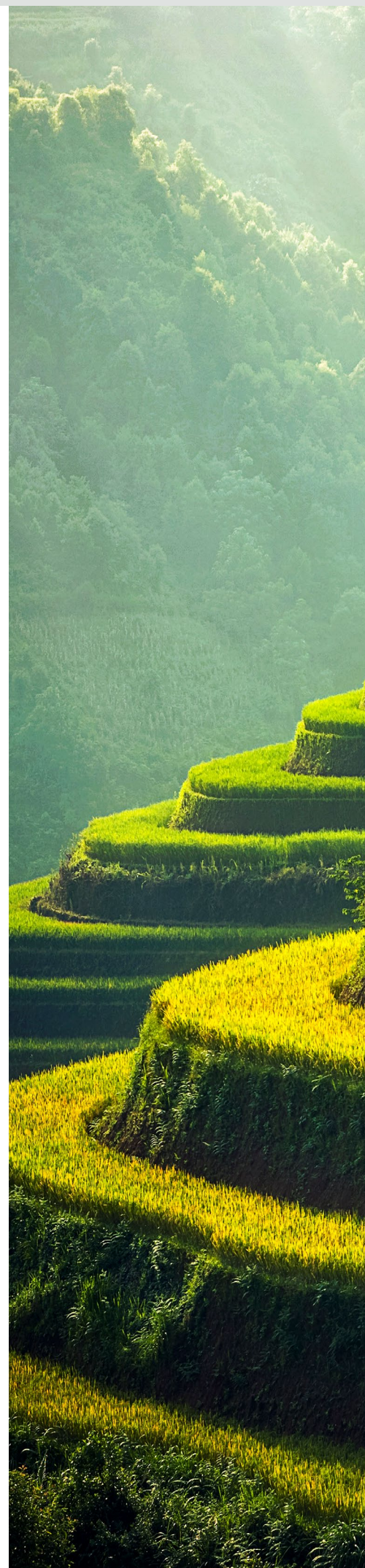
hether you're taking casual shots on walkabout or travelling to the ends of the earth, nobody really wants to be weighed down by a big bag of lenses. A so-called 'superzoom'

lens offers an all-in-one solution, typically covering everything from useful wide-angle coverage to powerful telephoto reach, at the twist of a zoom ring. As well as enabling you to adapt to pretty much any shooting scenario, it also ensures that you won't miss any definitive moments because you were changing the lens on your camera at the time.

Sticking to just one lens might seem counter-intuitive if you've bought a system camera that takes interchangeable lens. Historically, superzooms were notorious for being a poor substitute for using the right tool for the job, the oversized zoom ranges tending to compromise image quality. However, with advances in high-tech optical design and the increasing availability of in-camera corrections for aberrations like lateral chromatic aberration, peripheral illumination and distortion, the latest superzoom lenses are capable of very pleasing results. Here are the best options to suit a wide range of cameras. **Matthew Richards**

## The contenders

1	<b>Canon</b> RF 24-240mm F4-6.3 IS USM	£959/\$899
2	<b>Fujinon</b> 18-135mm f/3.5-5.6 WR LM R OIS	£699/\$899
3	<b>Nikkor</b> Z DX 18-140mm f/3.5-6.3 VR	£629/\$597
4	<b>Nikkor</b> Z 24-200mm f/4-6.3 VR	£949/\$897
5	<b>Panasonic</b> Lumix G 14-140mm f/3.5-5.6 II ASPH Power OIS	£619/\$498
6	<b>Sigma</b> 18-300mm f/3.5-6.3 DC Macro OS HSM   C	£369/\$579
7	<b>Tamron</b> 18-400mm f/3.5-6.3 Di II VC HLD	£599/\$649
8	<b>Tamron</b> 28-200mm f/2.8-5.6 Di III RXD	£799/\$729









## Group Test Superzoom lenses



Digital  
Camera  
BEST FOR  
CANON R

### Canon

RF 24-240mm  
F4-6.3 IS USM

£959/\$899

Full-featured Canon RF superzoom

**Lens mount Canon RF**

**C**anon has long made an EF 28-300mm superzoom for its full-frame DSLRs, but it's enormous at 1,670g, and pricey. By contrast, this RF-mount lens is under half the weight at 750g.

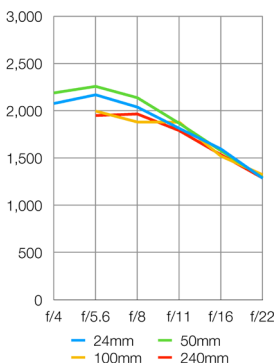
The 10x zoom range kicks off with a wide-angle 24mm focal length. Attractions include a fast and virtually silent Nano USM autofocus system, 5-stop optical stabilisation and an electronically coupled control ring, switchable for manual focus.

#### Performance

Although the autofocus and stabilisation systems work well, optical performance could be better. Sharpness is good, but colour fringing and distortions are dire at some focal lengths. Arguably, that's a moot point, as many mirrorless lenses rely on automatic in-camera corrections. Taking these into the equation, this lens's image quality is very good.

#### Sharpness

Sharpness is excellent apart from towards the corners of the frame.



#### Fringing

Short **0.13** Long **0.23**  
Lateral chromatic aberration is noticeable when uncorrected.

#### Distortion

Short **-8.32** Long **3.42**  
Distortion bad at 24mm, pin-cushion severe at 100-240mm.

#### Digital Camera verdict

Relying heavily on in-camera corrections, Canon's RF superzoom is capable of excellent image quality. It is pricey, though, doesn't have weather seals and the hood isn't included.

4.5 ★★★★★ Outstanding



Features



Build & handling



Performance



Value



Digital  
Camera  
BEST FOR  
FUJIFILM

### Fujinon

18-135mm f/3.5-5.6  
WR LM R OIS

£699/\$899

An ideal X-mount travel lens

**Lens mount Fujifilm X**

**T**he Fujifilm 18-135mm is lightweight but sturdily built, with a comprehensive set of weather-seals. Build quality feels excellent and, as an 'R' lens, it features a physical aperture ring. The 7.5x zoom range is small, equating to 27-206mm in full-frame terms, so the reach isn't generous.

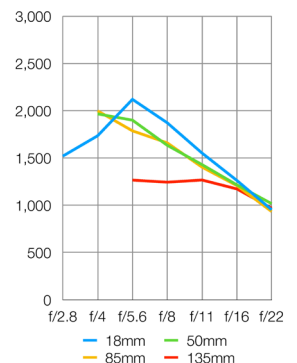
The linear stepping motor autofocus system is fast for stills and delivers smooth focus transitions. Another bonus is a highly effective 5-stop optical stabiliser.

#### Performance

Despite the limited zoom range, sharpness is only good in the central region of the frame, and even here it drops off at the long end. Sharpness towards the edges and corners of the frame are lacklustre at all zoom settings. Colour fringing and distortions are relatively low, thanks to in-camera firmware corrections.

#### Sharpness

Centre-sharpness drops off at long zoom settings and edge/corner-sharpness is mediocre.



#### Fringing

Short **0.21** Long **0.12**  
The firmware automatically corrects fringing.

#### Distortion

Short **-1.03** Long **0.05**  
There's very little distortion at any focal length.

#### Digital Camera verdict

This Fujifilm X-mount superzoom has excellent build quality and refined handling characteristics, but it's pricey, has a limited zoom range and is lacking in sharpness.

4.0 ★★★★★ Excellent



Features



Build & handling



Performance



Value



## Nikkor

### Z DX 18-140mm f/3.5-6.3 VR

£629/\$597

A superzoom for the Z 50 and Z fc

**Lens mount Nikon Z (DX)**

**T**his doesn't have the extravagant zoom range of most superzooms, but still delivers a useful 'effective' 27-210mm in full-frame terms. It's a mirrorless makeover of Nikon's popular AF-S DX 18-140mm VR kit lens for DSLRs, but with a more lightweight build, though quality feels good overall.

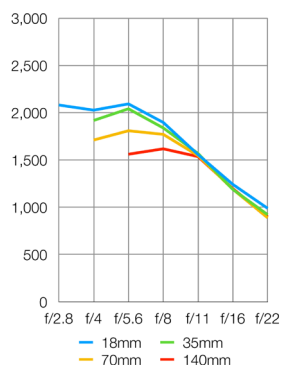
Handling is refined, and alternative functions can be assigned to the manual focus ring in autofocus mode. However, there are no physical auto/manual focus or VR on/off switches, requiring settings to be changed via in-camera menus.

#### Performance

The stepping motor-based autofocus is fast and virtually silent, and enables smooth transitions during video capture. Like many recent lenses designed for mirrorless cameras, however, this relies on in-camera correction for distortions.

#### Sharpness

Sharpness drops off in the 70-140mm sector of the zoom range, but it's good overall.



#### Fringing

Short 0.13 Long 0.06  
Colour fringing is flattened by in-camera correction.

#### Distortion

Short -0.68 Long -0.01  
Minimal distortions due to in-camera correction.

#### Digital Camera verdict

It's a versatile lens for Z DX format mirrorless cameras, but the zoom range is rather limited compared with 18-200mm and 18-300mm superzooms.

4.0 ★★★★★

Excellent



Digital Camera  
GOLD AWARD

Digital Camera  
BEST ON TEST

Digital Camera  
BEST FOR NIKON Z

## Nikkor

### Z 24-200mm f/4-6.3 VR

£949/\$897

An epic superzoom for Z-mount

**Lens mount Nikon Z (FX)**

**T**he Z 24-200mm naturally gives you a greater maximum viewing angle, but loses out for telephoto reach.

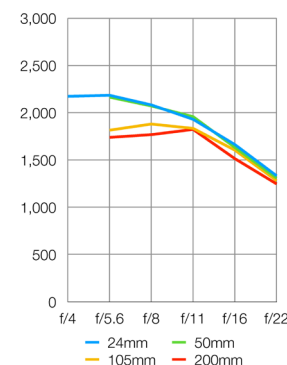
Although it's not from Nikon's acclaimed S-line stable, build quality is good. Premium glass includes two ED elements, one aspherical ED element, and two further aspherical elements. Top-quality ARNEO Coat is applied to minimise ghosting and flare. Performance of the 4.5-stop optical VR system is enhanced when used with the in-body stabilisation of FX Z-mount cameras, and even more essential when mounted on the Z 50 or Z fc.

#### Performance

Along with fast, quiet autofocus and excellent handling, the lens delivers superb image quality. Sharpness remains impressive throughout the entire zoom range and across the whole image frame.

#### Sharpness

It's the pick of the crop for retaining excellent sharpness across the whole image frame.



#### Fringing

Short 0.07 Long 0.87  
There's only negligible colour fringing at 24mm.

#### Distortion

Short -0.18 Long 0.11  
Relies on auto-corrections for distortion.

#### Digital Camera verdict

The Nikon Z 24-200mm proves that superzooms don't have to compromise on quality. It's compact, but a great performer, working well on DX and FX mirrorless bodies.

5.0 ★★★★★

A best-in-class product





## Group Test Superzoom lenses



### Panasonic Lumix G 14-140mm f/3.5-5.6 II ASPH Power OIS

£619/\$498

Digital Camera  
BEST FOR  
MICRO FOUR  
THIRDS

A little lens with big reach

**Lens mount** Micro Four Thirds

**T**he two main choices of superzooms for Micro Four Thirds cameras are this lens and the Olympus 14-150mm. We prefer the Panasonic – it doesn't give such powerful telephoto reach, but there's little in it, the 2x crop factor giving a zoom range of 28-280mm. It's smaller and lighter than the Olympus lens, and compact for a superzoom at 265g.

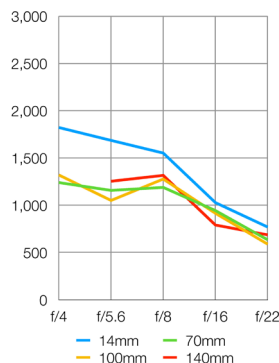
Ideal for stills and movie capture, the lens features an autofocus system based on a stepping motor. As with all but the Sigma 18-300mm and Tamron 18-400mm lenses on test, the focus ring is stationary during autofocus, but enables manual override.

#### Performance

Sharpness is good at both ends of the zoom range, but less impressive in the middle sector. Good dust- and splash-resistance boosts confidence for travel shooting.

#### Sharpness

Mid-sector zoom settings don't deliver great sharpness, but it's good at both ends.



#### Fringing

Short 0.34 Long 0.23  
Colour fringing is negligible, even in image corners.

#### Distortion

Short -1.71 Long 0.44  
Minor barrel distortion at 14mm and minimal pincushion.

#### Digital Camera verdict

It's pretty pricey but as a holiday or travel lens, it beats everything else in this test group for compactness and lightweight build, yet feels a quality item that delivers good results.

4.0 ★★★★★

Excellent



Features



Build & handling



Performance



Value



Digital Camera  
VALUE  
AWARD

Digital Camera  
BEST FOR  
CANON  
EF-S

Digital Camera  
BEST FOR  
NIKON F  
DX

Digital Camera  
BEST FOR  
PENTAX K

Digital Camera  
BEST FOR  
SONY A

### Sigma 18-300mm f/3.5-6.3 DC Macro OS HSM | C

£369/\$579

Big zoom range and performance

**Lens mounts** See table on page 118

**U**ntil recently, Sigma marketed both this 18-300mm and a 18-200mm superzoom.

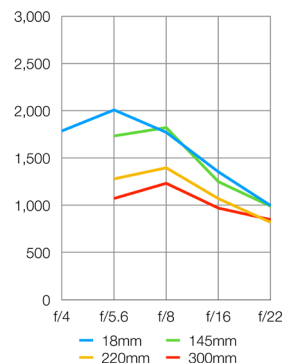
The 18-300mm is only 16mm longer at its minimum zoom setting, but its focal length stretches 50 per cent further.

It employs Sigma's TSC (Thermally Stable Composite) material, and the mounting plate is solid metal, but doesn't have a weather-seal ring. As with other Global Vision lenses, it's compatible with Sigma's USB Dock. Speciality glass includes four top-grade FLD ('Fluorite' Low Dispersion) elements and one SLD.

Typical of motor-based ultrasonic systems, the one in this lens isn't speedy and is clearly audible, as well as lacking manual override. The optical stabiliser gives a 4-stop effectiveness, complete with auto panning detection, boosting handheld performance.

#### Sharpness

Sharpness is excellent through most of the range, dropping off at the long end.



#### Fringing

Short 0.19 Long 0.5  
Colour fringing is generally minimal throughout.

#### Distortion

Short -2.76 Long 1.27  
Lens controls pincushion distortion at mid to long zoom.

#### Digital Camera verdict

Handling is slightly impaired by the focus ring rotating in autofocus, but it delivers a mighty zoom range, with the minimum compromise in image quality.

4.5 ★★★★★

Outstanding



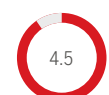
Features



Build & handling



Performance



Value



## Tamron

### 18-400mm f/3.5-6.3 Di II VC HLD

£599/\$649

It rules the roost for reach

**Lens mounts** Canon EF-S, Nikon F (DX)

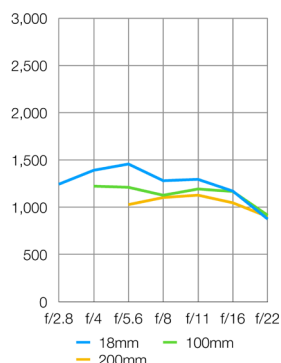
**A**vailable in Nikon F DX and Canon EF-S mount options, this gives an effective zoom range of 27-600mm and 28.9-640mm respectively, stretching into full super-telephoto territory.

The optical design includes two moulded glass aspherical elements and one hybrid aspherical element, plus three low-dispersion elements. Autofocus is driven by an HLD (High/Low torque-modulated Drive) motor. However, the focus ring rotates during autofocus, and there's no full-time manual override. Build quality is good and features weather-seals.

Long-end sharpness is less impressive than with any other lens on test, and colour fringing is noticeable as well. Optical stabilisation is only worth about 2.5 stops, which is less than in most recent and current Tamron 'VC' lenses.

#### Sharpness

Long-zoom sharpness is lacking throughout the zoom range towards the corners.



#### Fringing

Short **0.39** Long **0.52**  
There's little fringing at short to medium zoom settings.

#### Distortion

Short **-3.01** Long **1.22**  
Distortions are controlled, apart from barrel at 18mm.

#### Digital Camera verdict

If extra-long telephoto reach is on your wish list, and it's worth a sacrifice in image quality, this is a top superzoom lens with Canon and Nikon APS-C format DSLRs.

**4.0** ★★★★★

Excellent



Features



Build & handling



Performance



Value

## Group Test Superzoom lenses



## Tamron

### 28-200mm f/2.8-5.6 Di III RXD

£799/\$729

Superzoom for Sony E-mount

**Lens mount** Sony E

**F**or close-ups, the minimum focus distance is impressive for a superzoom lens, ranging from 0.19m to 0.8m.

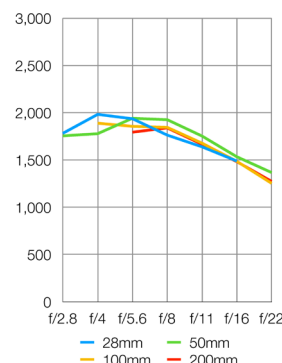
Optical highlights include GM (Glass Moulded Aspherical), hybrid aspherical, LD (Low Dispersion) and XLD (eXtra Low Dispersion) elements. Tamron's BBAR (Broad-Band Anti-Reflective) coating is applied to minimise ghosting and flare.

The RXD (Rapid eXtra-silent Drive) autofocus system is based on a stepping motor and is compatible with Sony's Fast Hybrid AF, Eye AF and DMF (Direct Manual Focus) modes.

The speed and accuracy of the autofocus system is very good, and near-silent in operation. Image quality is decent, but the zoom range is modest compared with the competing Canon and Nikon lenses.

#### Sharpness

Levels of sharpness are very good and consistent, throughout the zoom range.



#### Fringing

Short **0.05** Long **0.36**  
Colour fringing is pretty negligible at 28mm.

#### Distortion

Short **-0.89** Long **1.89**  
There's slight barrel distortion at 28mm.

#### Digital Camera verdict

An appealing lens that delivers impressive performance, but the lack of optical image stabilisation is an issue when using early Sony mirrorless cameras that lack IBIS.

**4.5** ★★★★★

Outstanding



Features



Build & handling



Performance



Value



# Nikon puts the 'super' into superzoom

The Nikon Z 24-200mm f/4-6.3 VR wins out



**S**ome of the latest lenses for mirrorless full-frame cameras that we've seen over the last three years have been significantly better than the older DSLR-based siblings. Superzooms are no exception, the Nikon Z 24-200mm, Canon RF 24-240mm and Tamron 28-200mm all delivering excellent image quality and all-round performance, albeit with quite a lot of help from in-camera corrections. Either way, they're superb and

enormously versatile lenses for Nikon Z, Canon EOS R and Sony Alpha E-mount cameras respectively.

The Nikon Z DX 18-140mm, Fujifilm 18-135mm and Panasonic 14-140mm lenses for crop-sensor cameras aren't quite as impressive in terms of outright image quality. On the plus side, however, they're nicely compact and lightweight, making them particularly appealing for travel and walkabout lenses. Again,

they're the best choices for Nikon Z DX, Fujifilm X and Micro Four Thirds cameras.

Back in DSLR territory, two superzooms on the market stand out. The Sigma 18-300mm Contemporary makes the best job of shoehorning a very generous zoom range into a fairly compact construction, and delivers very pleasing image quality. The bigger and heavier Tamron 18-400mm is also a good option, if you really feel the need for supersized telephoto reach.



Name	Canon RF 24-240mm F4-6.3 IS USM	Fujifilm 18-135mm f/3.5-5.6 WR LMR OIS	Nikon Z DX 18-140mm f/3.5-6.3 VR	Nikon Z 24-200mm f/4-6.3 VR	Panasonic Lumix G 14-140mm f/3.5-5.6 II ASPH Power OIS	Sigma 18-300mm f/3.5-6.3 DC Macro OS HSM   C	Tamron 18-400mm f/3.5-6.3 Di II VC HLD	Tamron 28-200mm f/2.8-5.6 Di III RXD
Contact	www.canon.co.uk	www.fujifilm.co.uk	www.nikon.co.uk		www.panasonic.co.uk	www.sigma-imaging-uk.com	www.tamron.co.uk	
Street price	£959/\$899	£699/\$899	£629/\$597	£949/\$897	£619/\$498	£369/\$579	£599/\$649	£799/\$729
Mount options	Canon RF	Fujifilm X	Nikon Z (DX)	Nikon Z (FX)	Micro Four Thirds	C EF-S, N F (DX), P K, S A, Sg	C EF-S, N F (DX)	Sony E (FE)
Elements/groups	21/15	16/12	17/13	19/15	14/12	17/13	16/11	18/14
Diaphragm blades	7	7	7	7	7	7	7	7
Optical stabiliser	Yes	Yes	Yes	Yes	Yes	Yes (not P or S mount)	Yes	No
Autofocus motor type	Ultrasonic (Nano)	Stepping motor	Stepping motor	Stepping motor	Stepping motor	Ultrasonic (motor)	HLD	Stepping motor
Focus ring during AF	Stationary/manual override	Stationary/manual override	Stationary/manual override	Stationary/manual override	Stationary/manual override	Rotates	Rotates	Stationary/manual override
Front element during focusing	Fixed	Fixed	Fixed	Fixed	Fixed	Fixed	Fixed	Fixed
Min focus distance	0.5m	0.45m	0.2-0.4m	0.5-0.7m	0.3-0.5m	0.39m	0.45m	0.19-0.8m
Max magnification	0.26x	0.27x	0.33x	0.28x	0.25x	0.33x	0.34x	0.32x
Filter size	72mm	67mm	62mm	67mm	58mm	72mm	72mm	67mm
Weather-sealed mount	No	Yes	No	Yes	No	No	Yes	Yes
Included accessories	None	Hood	None	Hood, pouch	Hood, pouch	Hood	Hood	Hood
Dimensions (diameter x length)	80x123mm	76x98mm	73x90mm	77x114mm	67x75mm	79x102mm	79x124mm	74x117mm
Weight	750g	490g	315g	570g	265g	585g	710g	575g
Features	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★
Build & handling	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★
Performance	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★
Value	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★
Overall	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★

# TAKE CHARGE OF THE YEAR WITH PHOTOGRAPHIC FLARE

Whether you have just picked up your first DSLR or feel like you're stuck in a photography rut and are looking for some new projects to take you through the next year, this bookazine has something for you.



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# Super-tele zooms

Here are the best-buy super-telephoto zooms for shooting action, sport, wildlife and more

T

here are often times when we can't get as close as we'd like to. If you're shooting anything from small timid birds to planes at an air show,

from athletes to motor sports, or wildlife on safari, you'll need a lens that really covers the distance. A super-telephoto lens will get you there, and a zoom beats a prime for flexibility when your movements are limited. That's especially true if you're confined to a hide for

shooting wildlife, or in a spectators' area at a sporting event.

A super-telephoto zoom can also come in handy for shooting candid portraits at events, so you can be unobtrusive and pick people out from a distance, while also blurring the background with a fairly tight depth of field. They can even give a creative alternative for landscape photography, giving a different look by compressing perspective. All in all, it's an extremely versatile bit of kit.

**Matthew Richards**

RF 100-400mm F5.6-8 IS USM	£669/\$649
XF100-400mm f/4.5-5.6 R LM OIS WR	£1,549/\$1,899
Z 100-400mm f/4.5-5.6 VR S	£2,699/\$2,697
DG 100-400mm f/4-6.3	£1,149/\$1,598
150-450mm f/4.5-5.6 ED DC AW HD	£1,979/\$1,897
150-600mm f/5-6.3 DG OS HSM   S	£1,329/\$1,999
FE 200-600mm F5.6-6.3 G OSS	£1,599/\$1,998
SP 150-600mm f/5-6.3 Di VC USD G2	£1,249/\$1,399







## Group Test Super-tele zooms



# Canon

## RF 100-400mm F5.6-8 IS USM

£669/\$649

Compact and affordable RF zoom

**L**ess than a quarter of the price of Canon's non L-series lenses, the RF 100-400mm F4.5-7.1L IS USM zoom and much more compact, this is a tempting proposition. Typical of Canon's non L-series lenses, the RF 100-400mm doesn't have any weather-seals, but there are plenty of enticing features. Autofocus is driven by a Nano USM motor that is super-fast for stills and delivers smooth focus transitions. There's a 5.5-stop optical stabiliser, boosted to 6-stop effectiveness with R system cameras that feature IBIS, and an additional control ring. Upmarket glass includes one UD element and one precision-moulded aspherical element.

Autofocus speed and stabilisation lived up to their claims, while image quality is impressive. Sharpness is good across most of the frame throughout the zoom range, while colour fringing and pincushion distortion are minimal, even when uncorrected in-camera.

### Digital Camera verdict

The RF 100-400mm is a real bargain buy for an own-brand Canon RF lens, packing good features and solid performance into a refreshingly compact and lightweight build.

4.5 ★★★★★ Outstanding



Features



Build & handling



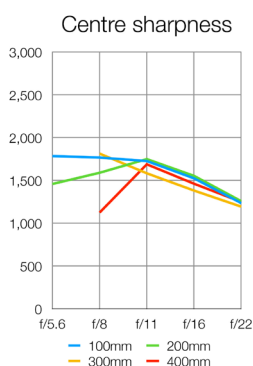
Performance



Value

### Sharpness

Sharpness drops off towards the corners of the image frame but is mostly very good.



### Fringing

Short 0.67 Long 1.66  
Colour fringing can be noticeable towards the edges of the frame at 200-400mm.

### Distortion

Short 1.58 Long 1.45  
Uncorrected pincushion distortion is quite slight, and very consistent throughout.



# Fujinon

## XF100-400mm f/4.5-5.6 R LM OIS WR

£1,549/\$1,899

X-mount cameras boost its reach

**T**he only lens in the group designed exclusively for APS-C format cameras, on which it gives an 'effective'

maximum focal length of just over 600mm. It has a linear motor AF system, optical image stabilisation and weather-resistant construction – pretty much everything on a Fujifilm X Series photographer's wish list.

Given that the lens only has to produce a small image circle, it's no lightweight. However, it is beautifully engineered with a high-precision feel and no hint of zoom creep. The optical path includes no less than five ED (Extra-low Dispersion) elements, plus a Super ED element.

The autofocus system's dual linear stepping motors enable very fast performance and the five-stop stabiliser is effective, complete with automatic panning detection. Sharpness proves best in the short to mid-range sector of the zoom range.

### Digital Camera verdict

This high-performance zoom delivers excellent performance in a tough, strong build. The APS-C format boosts the maximum telephoto reach of the lens.

4.5 ★★★★★ Outstanding



Features



Build & handling



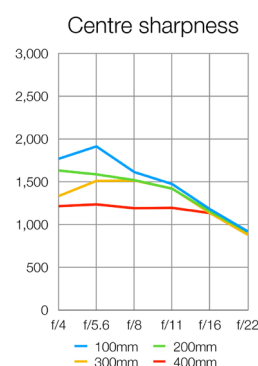
Performance



Value

### Sharpness

Sharpness is best at the short end of the zoom range, dropping off near the long end.



### Fringing

Short 0.24 Long 0.41  
Colour fringing is practically impossible to spot, at any zoom position.

### Distortion

Short -0.01 Long 0.07  
It's a non-issue, with the lens delivering essentially distortion-free images.



## Nikkor

### Z 100-400mm f/4.5-5.6 VR S

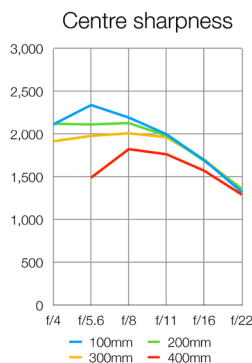
£2,699/\$2,697

Nikon's first super-tele Z zoom

**T**he Z 100-400mm features high-tech attractions and handling exotica aplenty. The autofocus system is driven by two linear stepping motors. Unlike the other lenses, this gives smooth autofocus transitions. The VR system is equally impressive, based on voice coil motors that deliver 5.5-stop effectiveness. There's no holding back in optical quality either, with no less than six ED elements, two Super-ED elements and both ARNEO and Nano Crystal coatings, plus a fluorine coating on the front. There's a multi-function OLED display, one primary L-fn (Lens-function) button and four secondary L-fn2 buttons.

Autofocus speed and accuracy coupled with the effectiveness of VR guarantee an excellent hit rate, even when shooting tricky subjects like birds. Sharpness itself is impressively consistent from the centre of the frame to the extreme edges and corners.

**Sharpness**  
There's a drop-off at 400mm in our lab-tests, but real-world results proved impressive.



**Fringing**  
Short 0.24 Long 0.41  
Colour fringing is negligible at the short end and still minimal at medium to long settings.

**Distortion**  
Short -0.01 Long 0.07  
There's pincushion distortion at mid to long zoom, but auto correction is available.

#### Digital Camera verdict

The lab-test results don't look too special, and it's very pricey, but in real-world shooting everything comes together to deliver superb handling and performance.

4.5 ★★★★★ Outstanding



## Panasonic

### Leica DG 100-400mm f/4-6.3

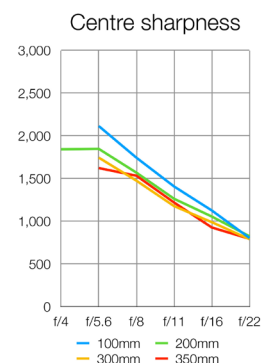
£1,149/\$1,598

Telephoto super-powers for MFT

**L**ike the Fujifilm 100-400mm lens, this is designed for crop-sensor cameras, but this time of the Micro Four Thirds variety. As such, the size of the image sensor enables a more lightweight construction, and a 2x focal length multiplier that boosts the effective zoom range to 200-800mm. The Panasonic Leica DG Vario-Elmar 100-400mm f/4-6.3 Asph. Power O.I.S. to give this its full title, boasts Leica backing, aspherical elements and optical image stabilisation, which can work with the in-body stabilisers of various MFTs. The optical path includes two ED elements, one aspherical ED element and one Ultra ED element. A locking ring lets you lock the zoom ring at any position.

Autofocus is fast and accurate and image stabilisation works well, although it lacks a switchable panning mode. Optical performance is highly impressive all-round.

**Sharpness**  
Sharpness tends to be most impressive when shooting wide-open.



**Fringing**  
Short 0.79 Long 1.01  
There's virtually no lateral chromatic aberration, even in extreme corners of the frame.

**Distortion**  
Short 0 Long 0.08  
Helped by firmware, it is an essentially distortion-free lens throughout the zoom range.

#### Digital Camera verdict

The Panasonic is well balanced on MFT bodies and enables prolonged periods of handheld shooting. Performance and image quality are strong in all respects.

4.5 ★★★★★ Outstanding





## Group Test Super-tele zooms



### Pentax 150-450mm f/4.5-5.6 ED DC AW HD £1,979/\$1,897

A powerful Pentax super-tele

**P**entax designed this full-frame compatible lens when they only made APS-C format DSLRs.

The decision has come good with the launch of Pentax's full-frame DSLRs.

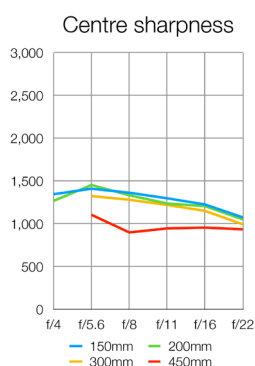
There are both auto and manual priority 'Quick Shift' modes, plus an AF preset facility and four customisable buttons. These can act as AF-on or AF-hold buttons, or select a previously stored focus distance.

Other attractions include a weather-sealed construction, HD coatings and a 'super protect' coating on the front element. One SLD (Super Low Dispersion) element is fitted, along with three ED elements.

Based on a built-in DC motor, autofocus speed is a little pedestrian compared with other lenses on test. Sharpness drops off rather noticeably at the long end of the zoom range – a situation that isn't helped by the lens's reliance on in-camera stabilisation.

#### Sharpness

Levels of sharpness are a little lacklustre towards the long end of the zoom range.



#### Fringing

Short 1.47 Long 2.34

At the maximum zoom length, colour fringing can become noticeable in image corners.

#### Distortion

Short 1.45 Long 1.13

Pincushion actually decreases slightly as you extend through the zoom range.



### Sigma 150-600mm f/5-6.3 DG OS HSM | S £1,329/\$1,999

Hefty but worth the weight

**T**his Sigma Sports lens is around 1.5x to 2x the weight of most contenders on test, tipping the scales

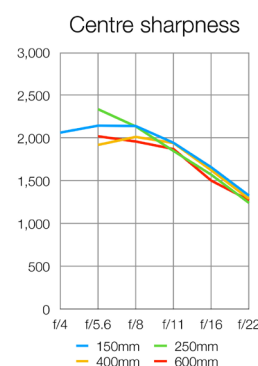
at nearly 3kg. Sigma also makes a smaller and lighter Contemporary edition of its 150-600mm lens, but this one is better built. The barrel and hood are metal rather than plastic, and features a full set of weather-seals.

Optical highlights include two FLD (Fluorite Low Dispersion) elements and fluorine coatings on the front and rear. Advanced features include dual autofocus modes, dual-mode stabilisation, and two switchable custom modes. The zoom lock can be engaged at any marked focal length.

All aspects of image quality are excellent, throughout the entire zoom range. Autofocus is very fast and the stabiliser works very well in both static and panning modes. It's a fabulous super-tele zoom with suitably 'sporty' performance.

#### Sharpness

Even at the extra-long 600mm mark, sharpness remains very impressive.



#### Fringing

Short 1.99 Long 1.01

There's little colour fringing at the short end, and even less in the mid to long zoom sector.

#### Distortion

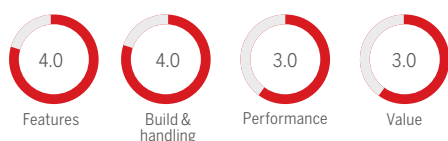
Short 0.64 Long 0.95

Pincushion remains quite minimal throughout the entire zoom range.

#### Digital Camera verdict

A high-tech lens that's ideal for both APS-C and full-frame Pentax DSLRs, but it's pricey and sharpness could be better, especially towards the long end of the zoom range.

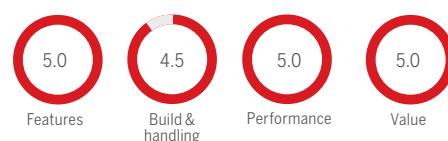
3.5 ★★★★★ Very good



#### Digital Camera verdict

It's a relatively heavyweight lens, especially compared with Tamron's 150-600mm zoom, but the Sigma wins with superb performance and image quality.

5.0 ★★★★★ A best-in-class product





## Sony

### FE 200-600mm F5.6-6.3 G OSS

£1,599/\$1,998

A spectacular Sony super-tele

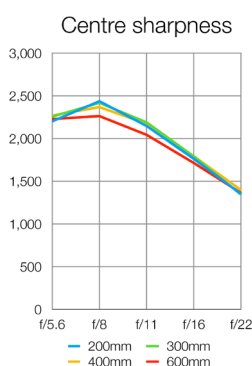
**W**e've been impressed by the Sony FE 100-400mm f/4.5-5.6 G Master OSS super-tele zoom for

E-mount mirrorless cameras, but the newer 200-600mm boosts telephoto reach, and with only a minimal narrowing of the aperture rating.

Handling is excellent with a switchable triple-mode optical stabiliser, autofocus range limiter and customisable AF-on/AF-lock buttons. Unusually, the physical length remains fixed throughout the zoom range. Nano AR coating reduces ghosting and flare, and there's a fluorine coating on the front, along with weather-seals.

The DDSSM (Direct Drive Super Sonic Motor) autofocus system is fast, accurate and ultra-quiet. The optical stabiliser works best in conjunction with in-body stabilisers featured in recent Sony cameras, and sharpness is both scintillating and impressively consistent throughout the zoom range.

**Sharpness**  
Sharpness is impressively consistent throughout the entire zoom range.



**Fringing**  
Short 1.19 Long 1.38  
Chromatic aberrations are minimal at all zoom settings, even in the extreme corners.

**Distortion**  
Short 1.56 Long 1.87  
There's minimal pincushion distortion, which remains consistent at all focal lengths.

#### Digital Camera verdict

Picking up the baton from the FE 100-400mm G Master, this has similarly refined handling and delivers scintillating performance and image quality.

5.0 ★★★★★ A best-in-class product



## Super-tele zooms Group Test



## Tamron

### SP 150-600mm f/5-6.3 Di VC USD G2

£1,249/\$1,399

The G2 is a worthy upgrade

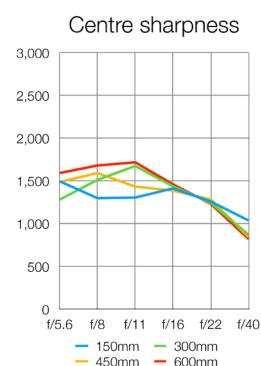
**T**he original Tamron 150-600mm was good, but the G2 edition is a major upgrade. Two LD (Low

Dispersion) elements and secondary nano-structure coatings are present, along with better weather-seals and a fluorine coating on the front.

New and improved VC (Vibration Compensation) is rated at 4.5-stops, with three operating modes. These include static and panning options, plus a tracking mode. The autofocus system is faster, and a 'flex zoom lock' can be engaged. The G2 also gains compatibility with Tamron's TAP-in Console for customisation and firmware upgrades, and the company's new 1.4x and 2.0x tele-converters.

Everything works well, especially the revamped autofocus and stabilisation systems, and handling is refined. Sharpness is a little lacking in the short to medium zoom sector, but comes on strong between 400mm and 600mm.

**Sharpness**  
Unusually for this class of lens, sharpness is best at the long end of the zoom range.



**Fringing**  
Short 1.61 Long 1.91  
It's fairly minimal at either end, and absolutely negligible in the mid-zoom sector.

**Distortion**  
Short 1.59 Long 1.57  
Mild pincushion remains at a constant level throughout the entire zoom range.

#### Digital Camera verdict

Nearly a kilogram lighter than the Sigma 150-600mm lens, the Tamron is more comfortable for prolonged periods of handheld shooting. The G2 is a worthy upgrade.

4.5 ★★★★★ Outstanding





# Sony wins for price and performance

The Sony FE 200-600mm F5.6-6.3 G OSS really delivers



**S**ony has come up trumps with its FE 200-600mm. Building on the success of the FE 100-400mm G Master, the newer, bigger lens adds a third stabilisation mode and a more effective autofocus range limiter switch that can lock out both the short and long sectors. Image quality and all-round performance are superb, as are handling and build quality.

For Canon and Nikon DSLRs, as well as for full-frame mirrorless cameras via adapters, the Sigma 150-600mm Sports is our top

choice for performance at a reasonable price. However, the Canon RF 100-400mm is a much more compact and lightweight option for EOS R system mirrorless cameras, and relatively inexpensive. The Nikon Z 100-400mm is an excellent but comparatively pricey lens for Nikon's mirrorless Z system cameras.

The Tamron G2 is an appealing alternative if you want maximum telephoto reach in a smaller, more lightweight package than the Sigma Sports lens. Taking downsizing to the

extreme, the Panasonic 100-400mm is the most compact and lightweight lens in the group, but delivers a mighty effective telephoto reach for MFT cameras, equating to 200-800mm. The Fujifilm 100-400mm for APS-C format X-mount cameras is larger and heavier but a great buy at the price. Finally, the Pentax 150-400mm has some seriously advanced features and great handling, but lacks optical stabilisation and comes up a bit short on telephoto reach for full-frame K-mount bodies.

## How the lenses compare

								
Name	Canon RF 100-400mm F5.6-8 IS USM	Fujinon XF 100-400mm f/4.5-5.6 R LM OIS WR	Nikkor Z 100-400mm f/4.5-5.6 VR S	Panasonic Leica DG 100-400mm f/4-6.3	Pentax 150-450mm f/4.5-5.6 ED DC AW HD	Sigma 150-600mm f/5-6.3 DG OS HSM   S	Sony FE 200-600mm F5.6-6.3 G OSS	Tamron SP 150-600mm f/5-6.3 Di VC USD G2
Contact	<a href="http://www.canon.co.uk">www.canon.co.uk</a>	<a href="http://www.fujifilm.co.uk">www.fujifilm.co.uk</a>	<a href="http://www.nikon.co.uk">www.nikon.co.uk</a>	<a href="http://www.panasonic.com">www.panasonic.com</a>	<a href="http://www.pentax.co.uk">www.pentax.co.uk</a>	<a href="http://www.sigma-imaging-uk.com">www.sigma-imaging-uk.com</a>	<a href="http://www.sony.co.uk">www.sony.co.uk</a>	<a href="http://www.tamron.co.uk">www.tamron.co.uk</a>
Street price	£669/\$649	£1,549/\$1,899	£2,699/\$2,697	£1,149/\$1,598	£1,979/\$1,897	£1,329/\$1,999	£1,599/\$1,998	£1,249/\$1,399
Mount options	CRF	F X	N Z	MFT	P K	C E F, N F, Sg	S E	C E F, N F
Elements/Groups	12/9	21/14	25/20	20/13	18/14	24/16	24/17	21/13
Diaphragm blades	9 blades	9 blades	9 blades	9 blades	9 blades	9 blades	11 blades	9 blades
Min aperture	f/32-45	f/22	f/32-40	f/22	f/22-27	f/22	f/32-36	f/32-40
Optical stabiliser	5.5 stops	5 stops	5.5 stops	Yes (unspecified)	None	4 stops	Yes (unspecified)	4.5 stops
Autofocus motor type	Nano USM	Dual linear stepping motors	Dual linear stepping motors	Stepping motor	DC motor	Ultrasonic (ring-type)	Direct Drive Supersonic Wave	Ultrasonic (ring-type)
Internal zoom/focus	No/Yes	No/Yes	No/Yes	No/Yes	No/Yes	No/Yes	Yes/Yes	No/Yes
Angle of view (diagonal)	24-6 degrees	16-4 degrees	24-6 degrees	12-3 degrees	17-6 degrees	16-4 degrees	12-4 degrees	16-4 degrees
Min focus distance	0.88m	1.75m	0.75-0.98m	1.3m	2.0m	2.6m	2.4m	2.2m
Max magnification	0.41x	0.19x	0.38x	0.25x	0.22x	0.2x	0.2x	0.26x
Filter size	67mm	77mm	77mm	72mm	86mm	105mm	95mm	95mm
Weather seals	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Included accessories	None	Hood, tripod collar	Hood, tripod collar	Hood, tripod collar, soft case	Hood, tripod collar, soft case	Hood, tripod collar	Hood, tripod collar, soft case	Hood, tripod collar, pouch
Dimensions (dia x length)	80x165mm	95x211mm	98x222mm	83x172mm	95x242mm	121x290mm	112x318mm	108x260mm
Weight	635g	1,375g	1,435g	985g	2,000g	2,860g	2,115g	2,010g
Features	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★
Build & handling	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★
Performance	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★
Value	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★
Overall	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★	★★★★★



# Sigma 150-600mm f/5-6.3 DG DN OS Sports

£1,199/\$1,499

A mirrorless makeover makes a master lens

[www.sigma-imaging.co.uk](http://www.sigma-imaging.co.uk)

We're big fans of Sigma's existing 150-600mm f/5-6.3 DG OS HSM lens, but since it has only been available for Canon, Nikon and Sigma DSLRs, mirrorless users have been out of luck... until now! The 150-600mm f/5-6.3 DG DN OS Sports is a refreshed version of the old DSLR lens; available in E-mount or L-mount options, it's compatible with full-frame Sony, Panasonic, Leica and Sigma camera bodies. Like the exceptional DSLR version, this super-telephoto zoom is ideal for wildlife, sports, motorsports and other action photography.

The 150-600mm Sports inherits most of its signature features from its DSLR counterpart, though the optical path does differ slightly, with 25 elements arranged in 15 groups, including four FLD Elements and two SLD elements to reduce aberrations. Sigma's Super Multi-Layer Coating is employed to reduce flare and ghosting, and a water and oil-repellent coating is applied to the front element to bead away rain droplets and minimise fingerprints. The lens also boasts optical stabilisation – essential for a lens with a focal length this long – giving an effective shutter speed reduction of four stops, ensuring rock-solid stability even at maximum zoom.

## Performance

We tested the E-mount version of the lens on a Sony A7R III body. The lens was impressively sharp through its entire zoom range, especially in the centre of the frame. Inevitably corner sharpness is a little softer, but this will rarely be an issue when your subject is likely to be set against a blurred background due to a shallow depth of field. Thankfully, bokeh is pleasingly smooth.

As with any super-telephoto lens, you'll need to take some time to set up your camera's autofocus to ensure consistently sharp, in-focus shots. But get the set-up right and the 150-600mm Sports will deliver a satisfying hit rate of sharp shots. **Ben Andrews**

**1** Both the zoom and focus rings are tactile and smooth to operate. You can adjust the degree of resistance on the zoom ring.

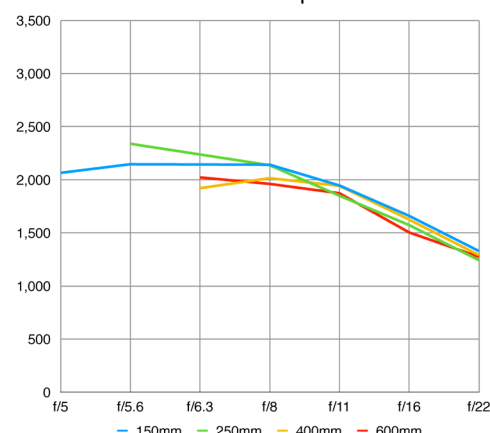
**2** The metal lens barrel features strap lugs – useful given the lens's hefty weight of 2.1kg.

**3** This edition of the lens carries over controls from the DSLR version, including dual autofocus modes, dual stabilisation modes, an autofocus range limiter switch and two custom modes.

## Specifications

**Mounts:** E-mount, L-mount  
**Full-frame:** Yes  
**Lens construction:** 25 elements in 15 groups  
**Angle of view:** 16.4-4.1°  
**Autofocus:** Yes  
**Image stabilisation:** Yes  
**Diaphragm blades:** Nine  
**Min aperture:** f/22-29  
**Min focus distance:** 58-280cm  
**Max magnification ratio:** 1:2.9  
**Filter size:** 95mm  
**Dimensions (L x D):** 109 x 266mm  
**Weight:** 2,100g

## Centre sharpness



## Sharpness

Centre sharpness is excellent at all focal lengths. Corner sharpness takes an inevitable dip, but you still wouldn't call the image quality 'soft'.

## Fringing Short 0.08 Long 0.39

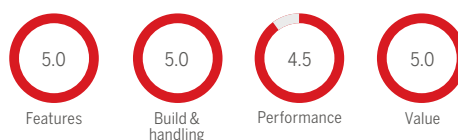
Fringing becomes more noticeable as the focal length increases, but it never reaches worrying levels and could easily be minimised with in-camera correction.

## Distortion Short 1.4 Long 1.53

There's slight pincushion distortion at all focal lengths (with in-camera correction disabled), but it's consistently minimal.

## Verdict

**5.0** ★★★★★ A best-in-class product



The Sigma 150-600mm f/5-6.3 DG DN OS Sports is hard to beat. It's superbly well-engineered with weather seals, has a wealth of features and delivers excellent image quality. If you're an E-mount or L-mount user and are after a super-telephoto for sports or wildlife photography, this is an excellent choice. It offers a flexible focal range and pro-spec features at a very fair price.