

Counting the cost of printing

Is the high cost of ink putting you off printing at home? Our tests reveal whether you can save money by using generic ink cartridges



How we test

We print more than 21,000 pages during testing. Standard paper is recycled and photo paper's donated to a local school for craftwork

Quality prints

We compare the printed photos, text, charts and tables produced by each ink cartridge and rate them for quality.

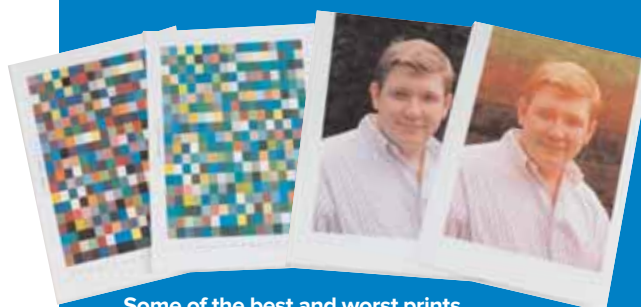
Cost per print

We also count how many documents are produced by each cartridge until it is drained, and repeat the process with a new set of cartridges to ensure results are consistent.

If there are significant differences between

the two results, we print a third, fourth and sometimes even a fifth set of documents to ensure that we are able to provide you with accurate information about print costs.

We search for high street and online prices for all the ink cartridges we've tested. Then it's just a case of dividing this by the average number of pages you get from a cartridge to reach the average cost per print.



Some of the best and worst prints produced by the cartridges featured in our test

Ink cartridges made by your printer's manufacturer can be very expensive, so it's not surprising that 46 per cent of Which? members with inkjet printers have tried alternative cartridges in an attempt to save some cash.

Known as generic or third-party cartridges, there are many different brands around and they're widely available – you can buy them over the internet or in your local stationers or supermarket. You can also go to refill centres, such as Cartridge World, to get your empty cartridges topped up.

The advantage with generic cartridges is that they cost less upfront. But do they really save you money when you work out the cost per page, and will they produce the same quality of documents as original cartridges? To answer these key questions, we spent 12 weeks putting 19 cartridges to the test.

Our results explained

If you already own a Canon, Epson, HP or Lexmark printer, turn to p74 to see whether you can cut the cost of printing. The results from our tests will give you an indication of the quality and cost of third-party cartridges compared with that of the original cartridges made by your printer's manufacturer. This should help you decide whether it's worth switching to generic cartridges to save money.

Our test results are a good starting point for helping you to choose a cartridge that gives the right balance

between cost and quality, but the results produced on your printer at home will vary, depending on the exact printer model you have and the type of cartridge that it takes. If you do opt for generics, you may have to try a few brands before finding one you're completely happy with.

Generic inquiry

We also wanted to find out whether Which? members have had any problems with using generic cartridges (see 'Our research', below, for more details about the research). You can find the results of our survey in the pie chart opposite – you might even be surprised by the number of people who have had no problems when using generics.

OUR RESEARCH

When selecting ink cartridges to test, we consult manufacturers, market intelligence reports and industry experts to choose popular cartridges that are available for current printers. We also check availability on the high street and online. We test cartridges from the leading manufacturers as well as models from some lesser-known brands.

We also surveyed 3,696 Which? panel members in July 2007: 1,492 members provided details about their experiences with generic ink cartridges. Thank you to everyone who took part.

Insider information

We reveal the results of our survey and answer your generic cartridge queries

At Which? we've heard a lot of rumours about generic ink cartridges causing damage to printers, so we decided to find out how many of you had actually experienced this sort of problem.

The results (see the pie chart, below) show that 63 per cent of respondents who used generic cartridges in their inkjet printers have experienced no problems at all. The most common issue for those who did experience problems was that they just wouldn't print – read on to find out your rights if you have problems with generics.

Q I bought a compatible ink cartridge and it didn't print. What are my consumer rights?

A Under the Sale of Goods Act 1979, the retailer must sell ink cartridges that are of a satisfactory quality and fit for purpose. If the problems you're having are because of a faulty cartridge, rather than your printer, you should return to the shop and ask it to supply another cartridge that works, or request a refund.

Q I took my old ink cartridge to be refilled and it's now producing streaky prints. What should I do?

A In this situation, the Supply of Goods and Services Act 1982 applies. You could return to the store and ask for a replacement cartridge – as it may stock ready-filled cartridges – or ask for a refund.

But before you rush back to the shops, try running a print-head clean – your printer's instruction manual will show you how to do this. If you can't find the manual, visit the manufacturer's website.



Q Will using a generic ink cartridge invalidate my printer's warranty?

A We contacted the major printer manufacturers and they all said that simply using a generic cartridge will

not invalidate the warranty. But do read the terms of your own printer's warranty carefully to see whether it says that failure to use the manufacturer's parts will invalidate the warranty.

However, any damage caused to your printer by a generic cartridge is unlikely to be covered by the warranty. If you're worried about this, avoid using generic cartridges until the warranty has expired – this is usually one year.

Q What's a continuous ink system and can it save me money?

A Continuous ink systems are made up of several bottles of ink – one for each colour cartridge – that sit outside your printer. Ink is fed continuously into each cartridge via a small tube.

These systems are almost certainly cheaper than using the manufacturer's own brand of ink cartridges, but, based on our own experience, continuous ink systems can be very messy and difficult to use. This is why we don't recommend that you use them.



COMPATIBLE CARTRIDGE COMPLICATIONS

John Russell 39,
independent financial advisor

Switching to generic cartridges can save you money, but it won't always save you time, as John Russell found out.

John decided to use generic cartridges to reduce the printing costs for his Canon Pixma MP500. 'My issue with generic cartridges for this printer is the need to gently pry away the tiny electronic chip from the Canon cartridge, apply it to the generic replacement and then go through combinations of button pressing to get the darned thing to be "recognised" by the printer – a fiddly task!

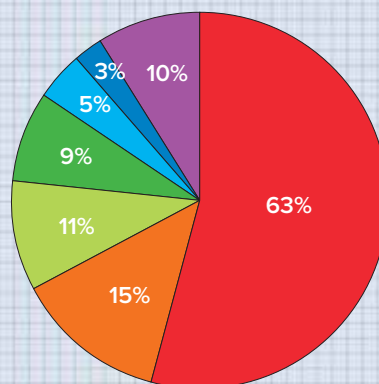
'I've gone back to buying original cartridges and surf the net for the best deals, even if it means buying two or three cartridges rather than just one.'

When a new ink cartridge is developed by a printer manufacturer, it takes time to come up with a generic alternative, and even then it might require you to fiddle in the way described by John. If this is the case with cartridges for your printer, it may prove to be more trouble than it's worth.

YOUR EXPERIENCES WITH USING COMPATIBLE INK CARTRIDGES

KEY

- I have had no problems using generic/third-party ink cartridges
- The cartridge would not print
- The cartridge produced streaks and random dotting when it printed
- The colours on the printouts looked washed out
- The printouts were grainy
- The ink spilt inside my printer
- Other



Total sample: 1,492. Some respondents reported more than one problem

EPSON

BRAND	PRICE	WHICH? TEST PERFORMANCE					SCORE %
EPSON D88+ Cartridge set-up: CMYK ^a	£	PRINT QUALITY		PRINT COSTS			
		DOCUMENTS	PHOTOS	BLACK TEXT (p)	PHOTO (£)	OVER THREE YEARS (£)	
EPSON T0611, T0612/3/4 ^b	31	★★★★	★★★★	3	1.44	282	74
TESCO E242, E252	17	★★★	★★★	2	0.77	153	64
JET TEC E106B, E106C/M/Y ^b	24	★★★★	★★★	2	1.08	217	63
WHSMITH 061M	20	★★★	★★★	2	0.91	182	63
INK2U T0611, T0612/3/4 ^b	28	★★★	★★	2	1.29	255	42

^a Cyan, magenta, yellow, black ^b Coloured cartridges are also available to buy singly



Epson's original cartridges produced good-quality results on our printer, but running costs were a little high. The cheapest generic cartridges for the Epson D88+ were from Tesco. Although print quality wasn't on a par with Epson's own cartridges, it was satisfactory. It's probably not worth using the Tesco generic cartridges for important photographs, but they'd be fine for everyday printing.

Epson printers use cartridges with a chip on them that tells your printer when you've run out of ink. Sometimes you can get several more prints from original cartridges if you buy a chip re-setter – available online for £5 to £10.

BEST FOR QUALITY Epson T0611, T0612/3/4

BEST VALUE Tesco E242, E252

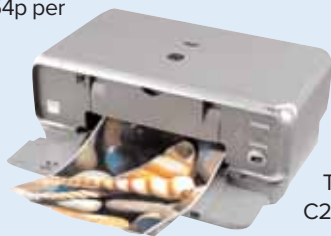
CANON

The Canon original cartridges we tested produced good-quality prints at lower prices than the other originals from HP, Epson and Lexmark.

If you want to cut your printing costs even further, opt for compatible generic cartridges from Jet Tec. We achieved good results with them and you will save yourself 54p per A4 photo if you use Jet Tec cartridges rather than original ones from Canon. However, do bear in mind that print quality isn't quite as good as using Canon's own-brand

cartridges, particularly for plain black text documents, but you're likely to be happy with the results.

The Canon cartridges refilled at Cartridge World produced poor results, with heavy colour casts in green and orange visible on several printed documents.



BEST FOR QUALITY Canon BCI-3e, BCI-6C/M/Y

BEST VALUE Jet Tec C21B and C22C/M/Y

BRAND	PRICE	WHICH? TEST PERFORMANCE					SCORE %
CANON PIXMA IP3000 Cartridge set-up: CMYK ^a	£	PRINT QUALITY		PRINT COSTS			
		DOCUMENTS	PHOTOS	BLACK TEXT (P)	PHOTO (£)	OVER THREE YEARS (£)	
CANON BCI-3e, BCI-6C/M/Y ^b	42	★★★★	★★★★★	3	0.93	198	66
JET TEC C21B, C22C/M/Y ^b	20	★★★★	★★★★★	1	0.39	80	64
INK2U BCI-3e, BCI-6C/M/Y ^b	17	★★★	★★★★★	1	0.70	137	44
CARTRIDGE WORLD (refill)	14	★	★	1	0.47	93	27

^a Cyan, magenta, yellow, black ^b Coloured cartridges are also available to buy singly

USING THE TABLES

We tested sets of generic cartridges and compared them with each manufacturer's own cartridges. Only complete sets of black and colour cartridges were used. Each printer manufacturer uses a different cartridge design, so you can't compare, say, HP cartridges with Lexmark's. All Cartridge World cartridges are refills (see 'Jargon buster', opposite).

Price

We give a guide to the price you can expect to pay for a set of black and coloured cartridges. Some coloured cartridges are also available to buy individually – we show

this in the tables. Online prices are in *italics*.

Test performance

Print quality documents

Quality of text, graphs and spreadsheets. **Print quality photos** Quality of photos using recommended paper and Kodak paper.

Print costs black text

Ink cost of a page of black text. **Print costs photo** Ink cost of an A4 colour photo. **Print costs over three years** Cost of printing one photo, three text and two colour graphic documents a week for three years.

Score

This ignores price.

Print quality **60%**

Number of pages **40%**

Contacts

Canon 0870 514 3723; www.canon.co.uk

Cartridge World 0800 183 3800; www.cartridgeworld.org

Epson 0870 241 6900; www.epson.co.uk

Hewlett Packard 0870 010 4320; www.hp.co.uk

INK2U 01823 601060; www.ink2u.co.uk

Jet Tec 01205 360033; www.jettec.com

Lexmark 0870 444 0044; www.lexmark.co.uk

Tesco 0800 505555; www.tesco.com

WH Smith 0870 444 6444; www.whsmith.co.uk

HP

Some HP cartridges, including the type we tested, have a built-in print head. This can make it difficult for generic manufacturers to produce matching cartridges, which means that generics for this type of cartridge are often refilled original ones.

Original cartridges from HP produced the best-quality results, although they were a little on the pricey side. However, it's possible to cut costs dramatically if you're prepared to accept a slight compromise in quality. Ink2U cartridges (available from the website www.ink2u.co.uk) produced results that

were good enough for everyday printing, and even photos were almost as good as those produced by the original cartridges from HP.

BEST FOR QUALITY HP21, HP22
BEST VALUE Ink2U HP21, HP22



BRAND	PRICE	WHICH? TEST PERFORMANCE					SCORE %
HP PHOTOSMART D2360 Cartridge set-up: black/colour	£	PRINT QUALITY		PRINT COSTS			
		DOCUMENTS	PHOTOS	BLACK TEXT (p)			
				PHOTO (£)	OVER THREE YEARS (£)		
HP21, HP22	30	★★★★	★★★★	9	2.14	548	64
INK2U HP21, HP22	15	★★★	★★★★	2	0.99	209	62
WHSMITH H21B, H22A	37	★★★★	★★	5	2.74	548	59
CARTRIDGE WORLD (refill)	16	★★★	★	3	1.68	355	48
JET TEC M21, M22	22	★★	★	2	1.27	241	36



LEXMARK

In our tests on a Lexmark Z640 printer, all the cartridges produced below-average-quality prints – even those from Lexmark. If you own a Lexmark Z640, you can save money by switching from original cartridges. If you want to save money but don't want to use generics, opt for high-capacity Lexmark 16 and 26 cartridges (not featured in the table, they cost about £45).

In general, we've found that Lexmark printers are quite expensive to run. So if you plan to print lots of documents, Lexmark may not be the brand for you.

BEST FOR QUALITY We can't recommend a cartridge – all of those tested on our printer were below average.

BEST VALUE To save money in the long run, buy a different brand of printer. As a short-term measure, switch to Ink2U compatible cartridges.

BRAND	PRICE	WHICH? TEST PERFORMANCE					SCORE %
LEXMARK Z640 Cartridge set-up: black/colour	£	PRINT QUALITY		PRINT COSTS			
		DOCUMENTS	PHOTOS	BLACK TEXT (p)	PHOTO (£)	OVER THREE YEARS (£)	
INK2U 17, 27	19	★★	★★	5	2.52	460	52
WHSMITH L17B, 26A ^a	46	★★	★★	11	5.11	965	50
JET TEC Remanufactured Lexmark 16, 26 ^a	35	★★	★★	5	3.33	617	49
CARTRIDGE WORLD (refill)	23	★★	★★★★	6	3.29	610	43
LEXMARK 17, 27	33	★★	★★	11	8.25	1,494	41

^a High-capacity cartridge – standard-capacity cartridge unavailable

Jargon buster

Our guide to printer-related technical terms



Transferring chips can be fiddly

■ **CHIPS** Some cartridges have a computer chip that tells your printer when the ink is low and the cartridge needs to be replaced. These chips can be difficult to copy, so generics may not be available. Some generic versions require the user to remove the chip from an original unit and stick it to the new one.

■ **COMPATIBLE CARTRIDGES** A type of generic cartridge which is manufactured from scratch to work with your printer.

■ **ORIGINAL CARTRIDGES** Cartridges made by the same manufacturer as your printer.

■ **PRINT HEAD** Ink passes through the print head – which is

like a very fine sieve – before hitting the page. Some manufacturers build print heads into their cartridges; others put them directly into the printer.

■ **REFILL CENTRES** Shops that put new ink into drained cartridges.

■ **REMANUFACTURED CARTRIDGES** Empty original cartridges that have been collected, cleaned and refilled.

■ **THIRD-PARTY CARTRIDGES** Another name for generic ink cartridges.