

The fine print

If you're after laser-quality reproduction from your printer but worry about the expense, then look no further as we put 10 entry-level offerings through their paces

Laser printers are very much the unsung heroes of computing. Without them, the usefulness of PCs diminishes rapidly, while the paperless office remains a far-off dream as we print ever more, not fewer, pages. Laser printing is still the dominant technology and the speed and quality advantages it enjoys over inkjet technology are well known. Unfortunately, size and price have, so far, deterred the home and small-office user from buying laser printers, but that's about to change – the latest generation of entry-level lasers have shrunk, in both respects.

If you print a lot of colour documents or photos, and not a lot of text, you probably won't want to part with your inkjet as it is more than capable of producing high-quality text anyway. But if you've ever stood in front of an inkjet waiting for a 20-page document to emerge or taken a close look at the letters on the page, you'll understand why laser is better. If you print lots of text-heavy documents and you want razor-sharp output, you need a laser.

Lasers have other benefits as well, such as cheaper consumables. A toner cartridge may cost double that of an inkjet refill but it lasts longer. This translates to a cost per page of between 1 to 2p for the laser and up to 6p for the inkjet.

So this month our second group test is devoted to this class of laser printer. It covers 10 entry-level laser printers, the sort that would be purchased by home or small-office users, but are still capable of being shared by a handful of users. We set a price ceiling of £500, a target that all the models achieved easily.

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• *Laser printers tested and reviewed by Roger Gann*

Brother HL-1250



its heavy-duty cycle promises trouble-free day-to-day operation.

For its speed, the HL-1250 is relatively compact, comes with a big paper tray as standard and offers a better than average resolution of 600 x 1,200dpi. It has low running costs of about 1.2p per page but the printer lies at the dearer end of our price spectrum.

The HL-1250 comes with 4MB of RAM, expandable to 36MB.

ALTHOUGH BROTHER markets the HL-1250 as a 'family device' its specification makes it even more suitable for small offices that require an inexpensive, reliable workhorse. It can, for example, take an optional 250-sheet second paper tray, which is a boon for business users but less helpful at home. A replacement for the popular HL-1000, the HL-1250 connects to parallel or USB ports and will work on PCs and Macs. It lacks any internal network capability but

This high spec didn't translate into noticeably better-looking output – it was pretty good, with well-formed type, while our greyscale image had good contrast and definition, though with a hint of banding. It's a 12ppm printer and produced the first page of text in 15 seconds.

Its output speed was pretty much as promised both on text and graphics, though it was a trifle weak when it came to printing out the PowerPoint

slideshow. In use, it was noisier than other printers.

The HL-1250 is easy enough to get up and running – as is the norm these days, you get a 'quick-start' poster to walk you through the basics of setting it up and the more detailed stuff is supplied in the form of an online manual in pdf format on the CD-ROM. Ergonomically, the HL-1250 is a mixed bag – it has slightly awkwardly located status LEDs and a push button mounted on the front panel, rather than on the top of the printer, where they are more easily accessible. Conversely, the manual/envelope feed is located on the front edge, which is more convenient.

The HL-1250 comes with DOS, Mac and Windows drivers, plus manual duplexing, which is rare for this price.

DETAILS



PRICE £316.08 (£269 ex VAT)

CONTACT Brother 0845 606 0626

www.brother.co.uk

PROS Fast; reasonably priced; cheap to run
CONS Rag-bag printer software clutters your desktop

OVERALL The HL-1250 is yet another decent printer offering from Brother – for a 12ppm printer it's pretty cheap

Canon LBP 800



identical specification too and, bar a few notches on the toner cartridges, you could swap them without much trouble. But the similarities end there – the LBP 800 lacks any external controls and apart from a status LED, it's a plain looking device.

Another big difference relates to cost – the LBP 800 is half the price of the LaserJet 1100, while its toner and running costs are two-thirds the price. Speed-wise it bettered the

NOT AS CHEAP AS

the QMS Minolta or the Samsung printers in this group test, this 8ppm printer still offers very good value for money. It's a compact 600dpi unit, with a vertical paper tray to the rear and a similar vertical output tray at the front. As far as I/O goes, the LBP 800 only has a bi-directional parallel port.

Externally, the LBP 800 looks like it was separated at birth from the near-identical HP LaserJet 1100. It has a near-

LaserJet 1100 on graphics, which is a tribute to the CAPT driver software as the LBP 800 has a meagre 512KB of RAM, compared to the LaserJet 1100's 2MB. This didn't prevent it from delivering print speeds close to its claimed 8ppm – 7.81ppm and 7.52ppm on the Acrobat and Word tests respectively.

Setting up the LBP 800 took just a few minutes, installing the drivers and the online user's guide. The Windows driver is sound-enabled, which means

you're 'told' when printing has started (as if you didn't know) and when it has stopped. You either love or hate this sort of thing and if you fall into the latter camp, you can switch the feature off. Status feedback is provided, which is useful on long print runs – you can actually see the progress of each page through the printer as an animated graphic.

Another potentially useful utility is the troubleshooting functionality. Feature-wise, the Canon driver is a little simpler than its rivals, with slightly fewer options. You'll still find the most important ones here, though, such as overlays, multiple page printing and graphics control.

DETAILS



PRICE £209 (£177.87 ex VAT)

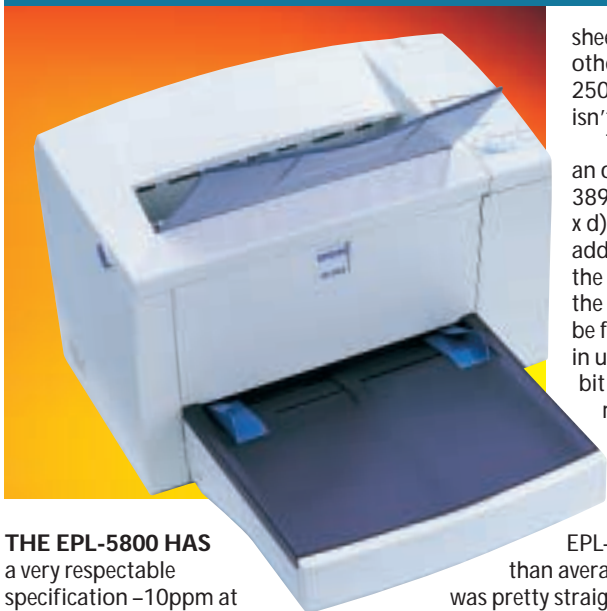
CONTACT Canon 0500 246 246

www.canon.co.uk

PROS Attractive price; low running costs; easy-to-use driver
CONS Limited expansion options; modest paper handling

OVERALL Given a choice between this and the LaserJet 1100 there's no competition – the LBP 800 is essentially the same and yet is much cheaper

Epson EPL-5800



THE EPL-5800 HAS

a very respectable specification – 10ppm at 1,200dpi with both parallel and USB and no less than 16MB of RAM, but it is a little pricey. Windows and Macintosh drivers come as standard, as does PCL 5e and PCL6, while PostScript Level 3 is available as an optional extra.

However, the paper handling isn't exceptional; the EPL-5800 has a 150-

sheet tray while several other printers boasted 250sheets. Networking isn't an option either.

The machine itself has an odd form factor, at 389 x 310 x 240mm (w x h x d), but the paper tray adds another 170mm to the depth and, as it's of the cassette variety, can't be folded away when not in use, so it takes up a fair bit of desk-space. It has a rather 'traditional' look, following Epson's conservative house style.

In use the EPL-5800 proved quieter than average. Installation was pretty straightforward and Epson's excellent manual means that this process shouldn't take longer than a few minutes.

The driver itself also has full online help and is relatively easy to use with a good range of features. In particular the status monitor usefully indicates paper and toner life, something no other printer did.

The EPL-5800 is a bit unusual in offering true 1,200dpi and 1,200dpi 'class' printing. However, the former resolution imposes a severe hit on performance and for text printing it's hard to justify using this setting.

Even at 600dpi it was possible to discern every single character printed at 1pt, which is pretty damn sharp – none of the other printers in this group test were able to match that. Graphics didn't seem to benefit much from this – the default was a trifle dark with a hint of thin banding.

The EPL-5800 didn't disappoint on the text printing test, returning times over the stated 10ppm but, despite having a fast 133MHz RISC processor, its graphics printing speed was less stellar, returning about 6ppm, which is a little less than we would have hoped or expected.

DETAILS

★★★★



PRICE £374.83 (£319 ex VAT)

CONTACT Epson 01442 611 144

www.epson.co.uk

PROS Great text quality; well specified; fast

CONS Weak graphics performance

OVERALL The EPL-5800 is a better than average printer with a higher than average price

HP LaserJet 1100



HP'S ENTRY-LEVEL LaserJet, the 8ppm 1100 seems like a welcome addition to small- and home-office users who want speed, reliability and a small footprint. Its Resolution Enhancement technology produces sharp, black, clean text and bears comparison with true 1,200dpi output but its graphics capabilities are less impressive. Unique among the printers in this round-up is the 1100's optional JetPath scanning attachment, which adds sheet-fed

scanning and copying capabilities using a 'pod' that clips on to the front.

Setup didn't take long. It may be pricey but at least HP includes a proper printed manual along with the obligatory online user guide. The driver setup was as slick as ever. The 1100 has an odd-ball high-density Centronics socket so you have to use the special printer lead that comes with it. Ergonomically, it's well thought out – like Canon's LBP 800, there's a rear vertical-mounted

paper tray plus a corresponding output tray at the front. The printer has minimal controls – just one illuminated button (it lights up when you have to press it) and a couple of status LEDs. It's also easy to add extra RAM: all you have to do is lift up a hinged flap at the rear to access the non-standard 100pin SIMM socket.

The Windows driver is of a high standard and users have a variety of options and settings in the interface,

including printing multiple sheets on one page, manual duplexing and watermarking. Status feedback is conspicuous by its absence, though.

Paper handling is modest and the paper tray holds only 125 sheets, which is hardly enough for a typical office. With a duty cycle of 7,000 pages a month, the 1100 should, however, meet the demands of most small offices. Its £60 toner cartridge is good for about 2,500 pages and, with an average cost of 2.4p per page, it's the most expensive of all the laser printers we tested.

On our performance tests, the 1100 was a mixed bag, delivering the goods on text printing but doing fairly poorly when it came to graphics tasks – in fact, it was the runt of the litter in this respect.

DETAILS

★★

PRICE £386.58 (£329 ex VAT)

CONTACT HP 0990 47 47 47

www.hp.com/uk

PROS Simple to use and run; scanner option is a novelty

CONS Expensive to run; slow on graphics

OVERALL The LaserJet 1100 is distinctly average among its peers – it's slow, expensive to buy and expensive to run. Check out Canon's LBP 800 instead



IBM Infoprint 12



THE LAUNCH of the Infoprint range marks a return to form for Big Blue, which has been out of the printer market for quite some time. The Infoprint 12 is very different to all the other printers in this test – it's jet black rather than the ubiquitous beige so beloved of the PC world. Its RRP is only a fiver more than HP's LaserJet 1100 but the two printers are miles apart.

The Infoprint 12 is a 12ppm unit

that supports both 600 and 1,200dpi printing, in PCL5e and PCL 6.

PostScript Level 3 is an optional extra. The Infoprint is well served on the I/O front, with both parallel and USB ports as standard.

In many ways the Infoprint 12 is a little version of a 'proper' laser printer, with stackable paper trays and big printer specification. It is, as a result, a bit bigger and heavier, too.

The Infoprint comes with excellent driver support – as well as the usual Windows drivers, you'll find OS/2 and Linux. The Windows driver is well featured, with a tabbed dialog offering comprehensive controls over resolution and good graphics quality controls. You also get a wide range of layout options such as booklet printing, face up/down printing, and watermarks.

Driver installation could have been

better – it's not easy to track down the online Reference Guide. Also the very useful Remote Control Panel is listed as 'RCP' in the Setup menu – so initially we didn't install it because we didn't know what it was.

At first we were disappointed with the output quality, which looked very faint, a situation we couldn't alter from within the driver. However, once we'd installed the 'RCP', we discovered why it was so – toner-saving Econo Mode had been turned on. Turning it off improved matters considerably.

Graphics printing was particularly smooth and free from artefacts and banding. In contrast, its 1,200dpi text output was distinctly disappointing and easily eclipsed by the Epson EPL-5800.

DETAILS



PRICE £392.45 (£334 ex VAT)

CONTACT IBM Printing Systems

020 7202 3000

www-5.ibm.com/uk/printers/

PROS Very well specified printer; good driver support; good expansion potential

CONS Expensive; disappointing 1,200dpi performance

OVERALL Comes close, but doesn't quite win

Kyocera FS-1000



ALL KYOCERA PRINTERS enjoy broad specifications and the FS-1000 is no different – it's a 10ppm, 600dpi printer, with a choice of no fewer than four print emulations including PCL6. PostScript Level 2 is an optional extra. Additional paper trays can be fitted beneath the main 250-sheet tray and you can fit an optional internal Ethernet card, so this is a little printer with big pretensions, but sadly has no USB port.

Setting up the printer took longer

than expected. Installing the software was the first hurdle. There's no simple front-end installation

program to guide you through all the software on the CD-ROM – and there's quite a lot of it, so it's difficult to know what's relevant and what's not. In fact, while there were drivers for every

other Kyocera printer, there were no specific drivers for the FS-1000 on the CD-ROM so we got

the 390KB download from the Kyocera website. Also, when the printer is first powered up, it takes 15 minutes to initialise, a process not found in any of the other printers we looked at.

Although the FS-1000 has a range of diagnostic status LEDs, it can also be managed using Kyocera's Remote Operation Panel (ROP). This useful software utility communicates with the printer and allows you to check on and configure it from the desktop.

Another feature of the ROP is a 3D display of the device, to aid troubleshooting, locating paper jams and any open panels.

Kyocera's range of printers is among the most ecologically friendly around, with most of the parts you'd expect to throw away being fully recyclable.

The FS-1000 was a bit of a disappointment when it came to performance, returning 8.38ppm on the text test and dropping dramatically when it came to graphics, managing 2.36ppm on the Acrobat test and 2.64ppm on the PowerPoint test. Print quality wasn't bad, though graphics looked a little grainy. However, there is some compensation in that its running costs only amount to 0.9p per page.

DETAILS



PRICE £351.33 (£299 ex VAT)

CONTACT Kyocera 0118 923 0789

www.kyocera.co.uk

PROS Low running costs; good specification; good expansion capabilities

CONS Poor/slow graphics performance; high initial cost

OVERALL The FS-1000 is fine as a cheap to run, heavy-duty text workhorse but is otherwise a fairly average printer

Lexmark Optra E-312L



THE OPTRA E-312L

is the budget version of the 312, with fewer options and a commensurately lower price. It's a 10ppm, 600dpi printer that retails for £211 – it also offers a '1200 Image Quality' resolution as well. The E-312L comes with only 2MB of RAM, but at least it takes dirt-cheap standard SIMMs. It is also blessed with both parallel and USB ports. Like many of the printers in this group test, it has a familiar form factor, with 150-sheet

vertical paper input and 100-sheet output trays, which is fine for light use but is inadequate for a busy office.

Getting the Optra E-312L up and running caused no problems.

It's supplied with two CD-ROMs, one containing the online user manual and the other containing all Lexmark printer

drivers and MarkVision, Lexmark's printer management software.

The printer is software

controlled – the unit only has a couple of status LEDs and a multifunction button. The driver offers options for multi-page printing on a single sheet, overlays, print density and contrast adjustments, so no complaints here.

The E-312L enjoys wide driver support, ensuring compatibility with pretty much every system going. It's easy to install with both USB and parallel interfaces, the drivers are compatible with everything from Windows 3.1 to

2000, including NT 3.51 and NT4. You also get drivers for DOS, OS/2 2.1 plus various flavours of Linux, Unix and Sun Solaris. You also get compatibility with both PCL5 and PCL6 emulations.

Image quality itself is above average, which considering the price is a bonus. However, the meagre amount of memory the E-312L comes with exacts a toll when it comes to performance – it was painfully slow when printing the 50-page pdf file, managing a mere 2.55ppm. On text, it could manage a more respectable 8.65ppm, which is still short of its claimed 10ppm. Running costs are on a par with other printers in this test, at around 1.6p per page.

DETAILS



PRICE £249 (£211.91 ex VAT)

CONTACT Lexmark 01628 481 500, www.lexmark.co.uk

PROS Excellent driver support; easy to use; good print quality

CONS Lacks RAM, which explains slow graphics output

OVERALL The Optra E-312L is another example of a 'big' little printer and enjoys many of the features found on the more expensive Optras, but without the price tag. Print quality is good, but it's slow when printing graphics

Minolta-QMS PagePro 1100L



ONCE AGAIN A

LOW price doesn't necessarily mean a low spec – the PagePro 1100L is a 600dpi printer that can deliver pages at 10ppm. The 1100L is in fact a reduced feature version of the 1100, which sells for slightly more. That model offers PCL6 emulation – the 1100L uses QuickPage instead.

The 1100L is cleverly designed to minimise costs – the curved translucent

cover doubles as the output tray, while the 150-sheet input tray is the pull-down front panel. The 1100L is a GDI (graphics device interface) printer so is limited to the Windows OS (not NT3.51 or Windows 3.1). It has a 4MB buffer that can't be expanded.

There are no frills on the PagePro 1100L, it's a very basic laser printer – it has just two status LEDs and everything is controlled onscreen.

Driver installation was a mixed bag. The setup program had an unnecessarily flash front end and yet the installer asks basic questions that it really should have been able to work out for itself.

The 1100L is a true GDI printer which essentially means that it is dependent on the host PC to provide much of the crunching power while it rasterises an image and so on.

The drivers had a distinct Windows 3.1 feel to them – even on a 1GHz Pentium III machine, whenever it was given a long print job, the driver would soak up 100 per cent of CPU cycles and every now and again the PC would momentarily freeze up during a print job.

Nevertheless, when it came to performance, the PagePro 1100L didn't disappoint and more or less delivered what it promised, print speeds of just over 9ppm for Word and Acrobat and almost 7ppm for PowerPoint – speeds that put many dearer printers to shame. Running costs are good but not exceptional at about 1.4p per page, which is about par for the course.

DETAILS



PRICE £170.37 (£145 ex VAT)

CONTACT Minolta-QMS 01784 442 255 www.minolta-qms.co.uk

PROS Fast; cheap; decent print quality

CONS Those GDI processor hiccups

OVERALL It's hard to go wrong with a laser printer at this price – it's fast, compact, works well and doesn't cost the earth to run. If you don't mind the occasional hiccup on your processor, the PagePro 1100L is well worth considering



Oki OKIpage 14ex



with a status panel. This may appear 'old fashioned' but the OKIpage 14ex is bang up to date: it has a USB port as well as parallel.

It should have been easy to install the drivers but we found it a trifle long-winded, particularly if you wanted to use the parallel port.

Once installed, though, the driver is fully-featured and supports such desirable features as

multi-page printing, binding margins, graphics quality controls and watermarks. Installing the toner cartridge can be a relatively dirty affair compared to the 'clean hands' toner cartridges originally pioneered by HP and Canon. With the OKIpage you insert a tube of toner in to the top of the print mechanism and rotate a tab at one end of it. Though messy, this is simpler than it sounds.

At a claimed 14ppm, the OKIpage

ALTHOUGH IT'S

referred to as a laser printer, none of the printers Oki produces employ lasers – they use an array of finely pitched LEDs to place an electrostatic charge on the photo-sensitive drum.

The OKIpage 14ex follows the traditional Oki house style of a low-slung form factor with a 'proper' control panel at the top rear edge of the printer – this comprises an eight-key keypad

14ex was the fastest rated printer in this group test and while it never actually hit that speed it did manage over 12ppm on both the Word and Acrobat printing tests, though it didn't do so well on the PowerPoint test. However, the graphics quality was rather uninspiring and cheaper lasers were easily better than the OKIpage14ex in this regard. Nevertheless, over 12ppm for a £272 printer is still pretty good going. It was also the quickest at delivering the first page at 12 seconds, though this was slower than the 7.5 seconds claimed. The upside of all this is that running costs are commendably low, at about 1.1p per page.

DETAILS



PRICE £319.60 (£272 ex VAT)

CONTACT Oki 01753 819 819

<http://europe.oki.com/>

PROS A fast, good quality text printer that's cheap to run

CONS Graphics quality is relatively poor

OVERALL The OKIpage 14ex is undoubtedly fast and its print quality is fine for text work, but less so for graphics. It's also the second cheapest printer to run so it's a good choice for a busy office that churns out plenty of correspondence

Samsung ML4500



ML-4500, although a parallel cable is included.

The ML-4500 has a fairly small footprint and won't occupy too much desk space. Its form factor is similar to other lasers in this class – it has a vertical paper bin at the rear with an integral tray to the front, thus presenting a U-shaped paper path, though if you want to print on thicker paper

stock, a flick switch lets paper emerge horizontally at the front. As with most printers, the front panel pulls forward to give you access to the one-piece toner cartridge.

The 4500 is simple to operate – there are no controls *per se* on the unit itself bar the toner saving button, and it has a trio of status LEDs for data, out of paper and error.

Once again, this printer was easy to commission. There's no printed manual – full documentation is provided online

SAMSUNG'S

LATEST entry-level offering sells for less than £150, which makes it the cheapest laser printer on the market, and cheaper than plenty of inkjets. It has a respectable specification, too: 8ppm with 600dpi resolution. However, you wouldn't expect to find frills on a printer at this price point so you won't be too surprised to learn that luxuries like a USB port aren't present on the

in pdf format – the supplied 'get you started' poster should be enough for most users. The Windows driver was simple to install. This is fairly basic compared to its peers – you can choose between 600 or 300dpi resolutions, opt for toner saving or to use either vector or raster graphics, but that's about it.

Despite being built to a price, this £150 printer outperformed others costing twice as much in our tests, returning a print speed of 6.98ppm when printing the 50-page Acrobat file, which was a pleasant surprise. At 1.7p per page, its running costs were slightly higher than average, though.

DETAILS



PRICE £149.99 (£127.66 ex VAT)

CONTACT Samsung Electronics
020 8391 0168

www.samsungelectronics.co.uk

PROS Unbeatable price; reasonable performance

CONS Basic facilities; slightly higher running costs

OVERALL A cheap and cheerful entry to the world of laser printing, the ML4500 puts many more expensive printers to shame. It's basic but at the end of the day, it prints text very well, given its price tag

How we did the tests

We connected each printer to the EPP parallel port of a 1GHz AMD Athlon II Windows 98SE system with 128MB of RAM. Some printers did come with USB ports but in order to make all the tests strictly comparable, we used only the parallel port for our testing. All performance tests were done with each printer set to its 600dpi setting. A few printers did offer higher print resolutions than this but these were typically interpolated resolutions and not true resolutions. Most of the time these printers will be used for printing documents, reports and spreadsheets and the difference between 600dpi and 1,200dpi on 12pt text is hard to detect without the aid of a magnifying glass.

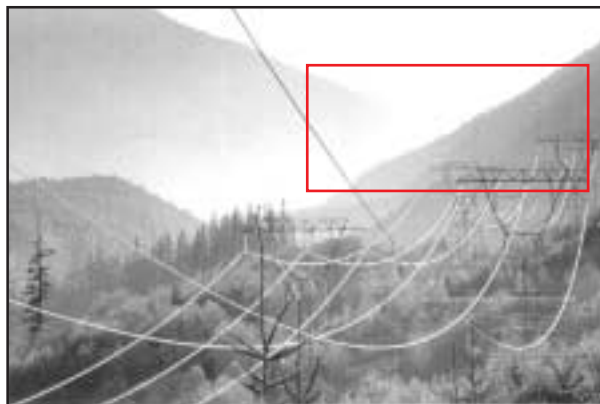
The PCW suite of printer tests comprises six documents. Four are used in printer speed tests, the other two are used to establish overall print quality. They are as follows.

Graduated text test

This is a short formatted Word document consisting of a one-line sentence printed three times in normal, italic and bold, repeated in various point sizes from 1pt to 12pt. The font used is Times Roman and the page is printed once, using Word 2000. So, this is a test of the ability to print text legibly



The sample text used in the graduated text test



The complete image used in the greyscale image test

at small point sizes plus a test of overall text quality (see p184). Interestingly, most laser printers are, thanks to their 600dpi resolutions, able to print legible text down to 2pt, though you need a linen tester or magnifying glass to actually read it.

Greyscale image test

This is a black and white photo of a misty mountain panorama – the image has 256 levels of grey. It was printed out in landscape mode, at 100 per cent size, using Paint Shop Pro 5. Subtle graduated fills are difficult for any printer to realistically produce, such as the light greys of this test image. Many typically produced banding across these fills, making the image look uneven. This is a hard test, given that most laser printers are destined to produce only

text documents. Still, thanks to their typical, high resolution of 600dpi, most were able to make a decent fist of the image (see p185).

Printing pdf files

This is a 50-page Acrobat pdf file, consisting largely of text with some simple graphics thrown in. It was printed using Adobe Acrobat Reader v4.05 using its default settings. While a pdf file may resemble pages of text, as far as the printer is concerned, this is one huge graphics file with 50 pages and so is particularly demanding. Factors such as installed memory and processor power would affect print speed here – greater RAM allows more of the image to be buffered, meaning that the printer does not have to be drip-fed data by the PC, while a faster processor in the printer accelerates the rasterisation process, a particularly computer-intensive task. This was reflected in the wide range of print times achieved (see opposite) – some printers found printing out pdfs particularly hard going.

Printing an rtf file

This is another Word file, this time in Rich Text Format rather than the native Word format. It's a simple, mainly unformatted, document that's 50 pages in length. Word 2000 is used to print it out. This is the test where most printers turn in

their best performance – after all, printing text isn't particularly demanding. Again, as these printers will be confined to mundane letter printing for most of their lives, in some ways, this is arguably the most important test of all (see opposite).

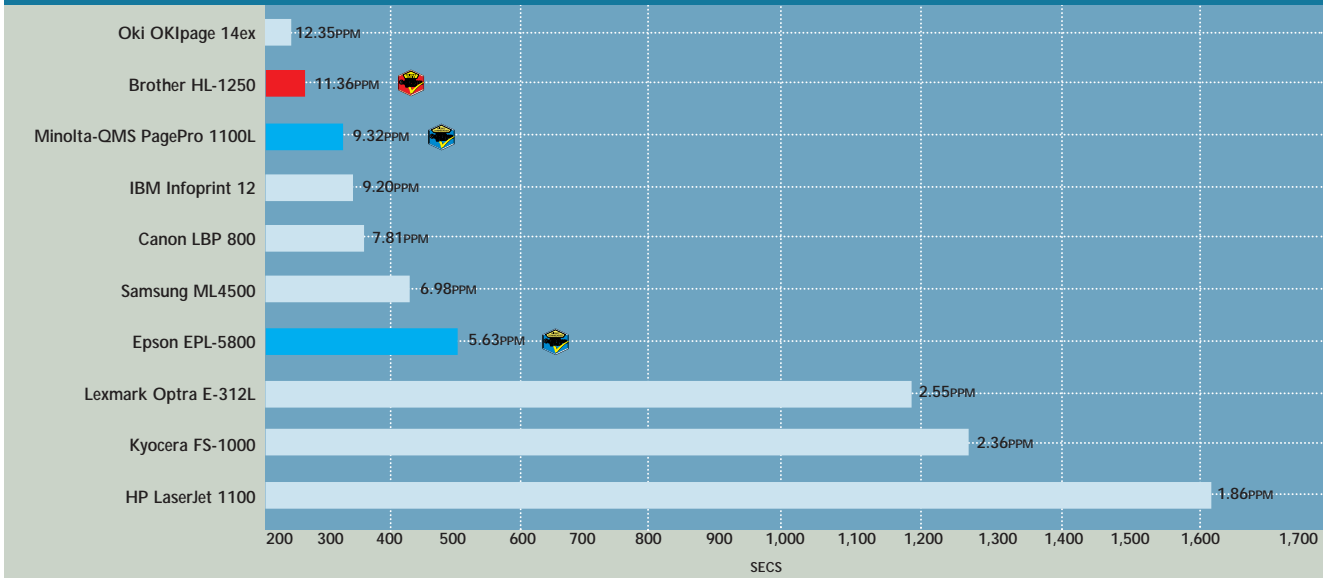
The PowerPoint test

This is a 12-slide PowerPoint presentation comprising a plain background, basic clipart and a few bullet-pointed text lines per page. It is a speed test. This was printed, using PowerPoint 2000, with the print dialog set for handouts, three to a page. This is a speed test, with the stopwatch started when the Print dialog OK button was clicked and stopped when the final page completely emerged from the printer into the output tray. Again, like the Acrobat test, this is quite demanding and some printers fared better than others when put to this particular test (see opposite).

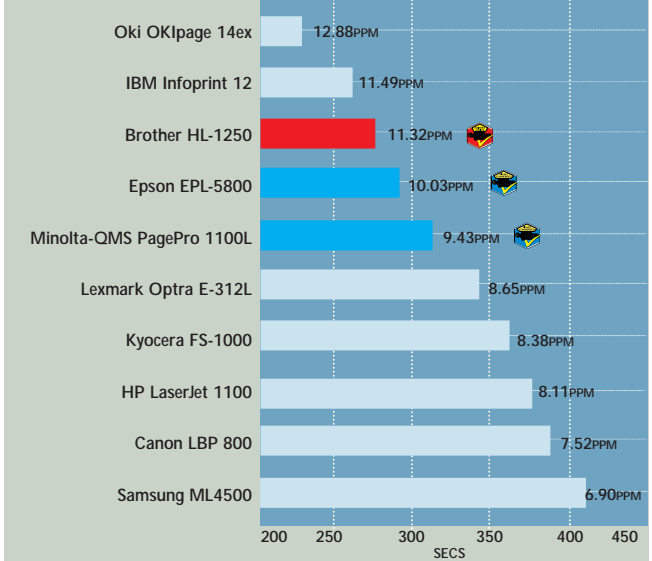
Coverage test

This uses a standard Word document calculated to have five per cent of the page covered with text. The test times how long the printer takes to produce a single-page – this is typically longer than it takes to print the second and third pages. We waited until the printer entered power-saving standby mode and then print the same single-page document again. The difference between the two times (see opposite) tells us how long the printer takes to warm up (elements such as the fusion roller need to be sufficiently hot to melt the toner onto the page to make it permanent). Some printers, such as the Canon LBP 800 and HP LaserJet 1100, had such short warm-up times that they entered standby mode almost immediately, thus saving power almost continuously.

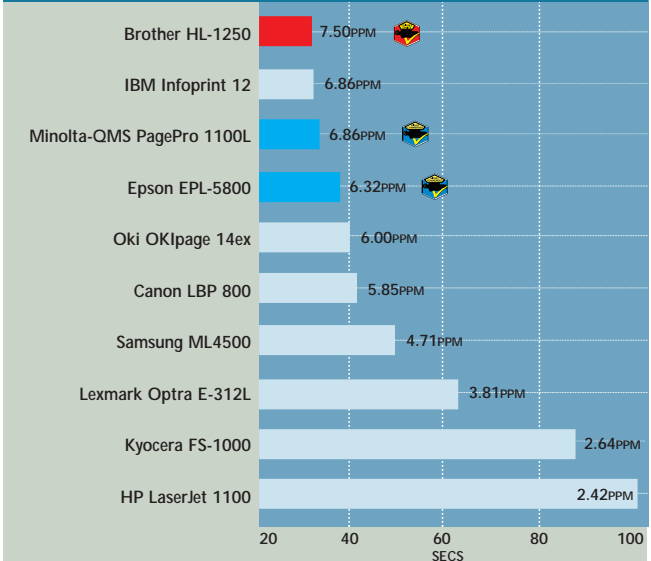
Printing a pdf document



Printing a Word rtf document

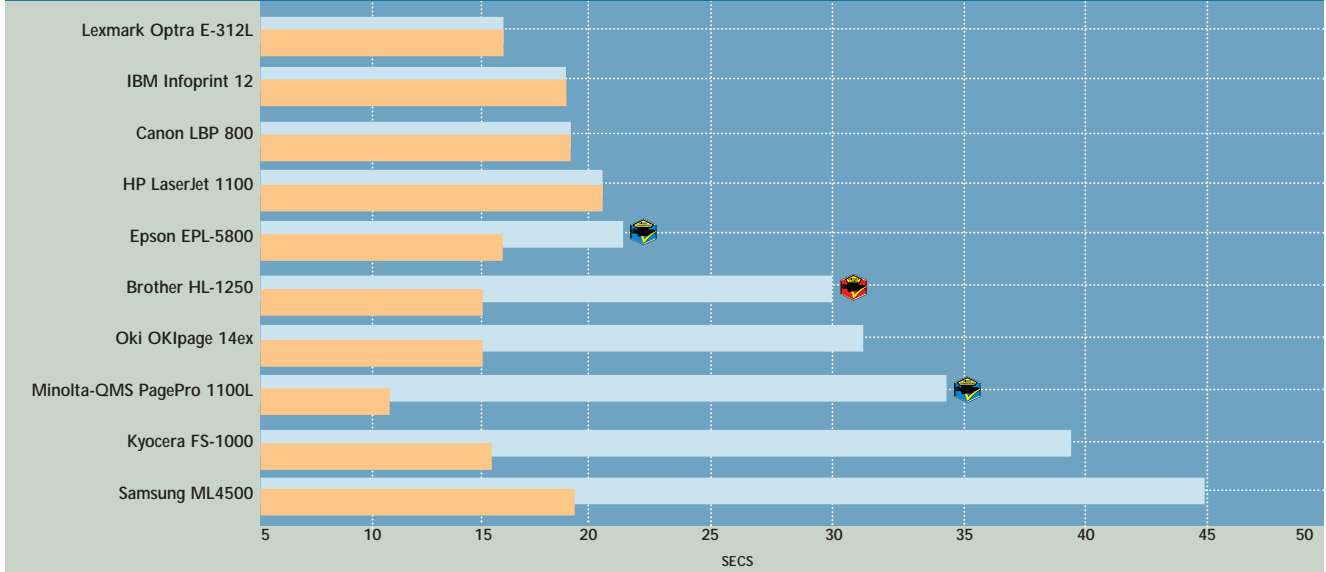


Printing a PowerPoint document



Printer performance was measured in the number of seconds taken to complete a job. In all of the graphs, shorter bars indicate better performance. The figures at the the end of the bars in the three graphs above indicate the relative speed in pages per minute (ppm), calculated by dividing the number of pages printed into the time taken to complete.

Five per cent coverage – sleep ■ Five per cent coverage – awoken ■



Greyscale image test results

Brother HL-1250



Canon LBP 800



Epson EPL-5800



HP LaserJet 1100



IBM Infoprint 12



Kyocera FS-1000



Lexmark Optra E-312L



Minolta-QMS PagePro 1100L



Oki OKIpage 14ex



Samsung ML4500

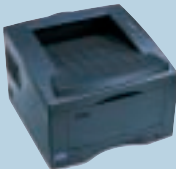







Table of features



MANUFACTURER	BROTHER	CANON	EPSON	HP
MODEL	HL-1250	LBP 800	EPL-5800	LASERJET 1100
Price inc VAT (ex VAT)	£316.08 (€269)	£209 (€177.87)	£374.83 (€319)	£386.58 (€329)
Phone	0845 606 0626	0500 246 246	01442 611 144	0990 474 747
URL	www.brother.co.uk	www.canon.co.uk	www.epson.co.uk	www.hp.com/uk
Price per page (five per cent coverage)	1.2p	1.6p	1.5p	2.4p
Supplied memory	4MB	512KB	16MB	2MB
Maximum memory	36MB	512KB	256MB	18MB
Ports	Parallel/USB	Parallel	Parallel/USB	Parallel
Processor	66MHz MB86832	See note below	133MHz RISC	35MHz M5202
Resolution (dpi)	600 x 1,200	600	1,200	600
CONSUMABLES				
Toner cartridge (price ex VAT)	£47	£40	£73.34	£60.31
Image drum (price ex VAT)	£87	N/A	£51.85	N/A
Combined unit (price ex VAT)	N/A	N/A	N/A	N/A
OPERATION				
Pages per minute	12	8	10	8
Time to first page (in seconds)	15	18	16	18
Maximum pages per month	15,000	See note below	15,000	7,000
Toner life (pages)	6,000	2,500	6,000	2,500
Drum life (pages)	20,000	See note below	20,000	N/A
Engine life (pages)	200,000	See note below	N/A	N/A
LANGUAGES				
PCL level	6	See note below	6/5e	5e
PostScript level	N/A	See note below	Optional	N/A
Other	Epson FX/ProPrinter	Canon Advanced Printing Technology	Esc P2/FX	N/A
PAPER				
Paper tray capacity (pages)	250	125	150	125
Output tray capacity (pages)	150	100	100	100
Separate manual feeder?	✓	✓	✓	✓
SOFTWARE SUPPORT				
Windows 95/98	✓	✓	✓	✓
Windows Me	✓	✓	✓	✓
Windows NT	✓	✓	✓	✓
Windows 2000	✓	✓	✓	✓
Windows 3.1	✓	✓	✓	✓
Other	Mac	N/A	Mac	OS/2/DOS/Unix
Number of additional fonts	61	See note below	31	26
DRIVER OPTIONS				
Media selection	✓	✓	✓	✓
Realtime status display	✗	✓	✗	✗
Smoothing/resolution enhancement	✓	✓	✓	✓
Multiple pages per sheet	✓	✓	✓	✓

Note: Canon declined to supply this information

					
IBM	KYOCERA	LEXMARK	MINOLTA-QMS	OKI	SAMSUNG
INFOPRINT 12	FS-1000	OPTRA E-312L	PAGEPRO 1100L	OKIPAGE 14EX	ML4500
£392.45 (£334)	£351.33 (£299)	£249 (£211.91)	£170.37 (£145)	£319.60 (£272)	£149.99 (£127.66)
020 7202 3000	0118 923 0789	01628 481500	01784 442 255	01753 819 819	020 8391 0168
www-5.ibm.com/uk/printers/	www.kyocera.co.uk	www.lexmark.co.uk	www.minolta-qms.co.uk	http://europe.oki.com/	www.samsungelectronics.co.uk
2p	0.9p	1.6p	1.4p	1.1p	1.7p
4MB	4MB	2MB	4MB	4MB	4MB
68MB	132MB	66MB	4MB	36MB	68MB
Parallel/USB/Ethernet option	Parallel	Parallel/USB	Parallel	Parallel/USB	Parallel/USB
66MHz RISC	75MHz PowerPC	67MHz Toshiba	Mitsubishi M3807	50MHz RISC	35MHz RISC
1,200	600	1,200	600 x 1,200	600 x 1,200	600
£120	£54	£97.03	£68	£24	£42.55
N/A	N/A	N/A	£45	£105	N/A
N/A	N/A	N/A	N/A	N/A	N/A
12	10	10	10	14	8
14	15	15	15	7.5	15
20,000	8,000	10,000	15,000	15,000	2,000
6,000	6,000	6,000	6,000	4,000	2,500
N/A	100,000	120,000	20,000	20,000	N/A
N/A	100,000	120,000	N/A	180,000	50,000
6/5e	6	6	N/A	6	6
Optional	Optional	2	N/A	N/A	N/A
N/A	Epson LQ/Diablo630/ Proprinter	PPDS	QuickPage	IBM Pro Printer III XL/ Epson FX SIDM	N/A
250	250	150	150	250	150
250	150	100	100	200	100
✓	✓	✓	✓	✓	✓
✓	✓	✓	✓	✓	✓
✓	✓	✓	✓	✓	✓
✓	✓	✓	✓	✓	✓
x	✓	x	✓	✓	✓
OS/2/Mac/Linux	DOS	OS/2 2.1/DOS/Linux/ Unix/Mac/Sun Solaris	N/A	Mac	Mac/Linux
45	45	77	N/A	45	45
✓	✓	✓	✓	✓	✓
x	x	✓	✓	x	x
✓	✓	✓	x	x	✓
✓	✓	✓	✓	✓	x



Editor's Choice

Although we subjected these printers to quite stringent graphics testing, let's be realistic here – few users would want to output graphics to a laser printer on a regular basis, not when photo-realistic inkjet printers are available that can make a much better job of it. True, some of them did acquit themselves – the Lexmark Optra E-312L and the IBM Infoprint 12 delivered the most pleasing greyscale images. Nevertheless, given the choice, most users would probably prefer to see colour rather than greyscale images. So for this reason, at this end of the laser printer market, the ability to print accurate greyscale images, while important, isn't critical.

No, while many users will use them to print charts and presentation handouts, by far the biggest use of these printers will be for text printing: letters, reports and spreadsheets. Here, it becomes difficult to differentiate between the print qualities of these printers, certainly with the naked eye. These were all 600dpi, or better, models and this sort of resolution produces very clean-cut text at all standard point sizes. On this basis all of the printers we looked at were more than suitable for text printing.

Differences in text print quality did exist between them but you had to use a linen tester or magnifying glass to be able to detect them. There were one or two surprises here. First, 1,200dpi printing doesn't noticeably improve text quality and imposes a significant performance hit. For example, the IBM Infoprint 12's 1,200dpi text was almost indecipherable at tiny point sizes. This was in stark contrast to the Epson EPL 5800, which

could deliver crystal-clear text at 1pt while printing at 'only' 600dpi, which is a remarkable feat. If you're looking for the ultimate in text quality in an entry-level printer then you should give the Epson serious consideration.

We now turn to the other major differentiator – print speed. There may not have been much between the printers when it came to printing text but they sure took differing amounts of time to do the job.

When the first personal lasers appeared several years ago, they were 4ppm and 6ppm printers – today we have nothing slower than 8ppm and some as high as 14ppm. These are manufacturers' claimed speeds and as far as text printing is concerned these claims are more or less in the right ball-park. The OKIpage 14ex was the fastest, at 12.88ppm, closely followed by the IBM Infoprint 12 and the Brother HL-1250 at 11.49ppm and 11.32ppm respectively.

The picture was less rosy when it came to printing graphics and here, limitations in memory and processing power threw into stark relief the real differences between the printers. The HP LaserJet 1100 fared the worst when it came to graphics while others that 'could do better' included the Kyocera FS-1000, Lexmark Optra E312L and the Epson EPL 5800 which were all pretty slow at outputting graphics.

Running costs are an important issue and those pennies soon mount up if you do a lot of printing. Kyocera prides itself on offering the lowest running costs of any manufacturer and so it is with the FS-1000 – 0.9p per page was the lowest per page cost. The OKIpage 14ex was

close behind at 1.1p, followed by the Brother HL-1250 at 1.2p. Bringing up the rear was the HP LaserJet 1100 at 2.4p.

All the printers offered good value for money, even the dearer ones, which typically offered a better specification and greater expansion potential. But of course some offered more value for money than others, in particular the Samsung ML4500, the Minolta-QMS PagePro 1100L and the Canon LBP 800.

The winners

Now comes the hard part – deciding on the Editor's Choice. It was a close-run thing, essentially a photo-finish but there can only be one winner. Taking all these factors into account, the **Editor's Choice** in this laser printers group test goes to the **Brother HL-1250**. While by no means a perfect printer, it offered the best overall combination of print quality, print speed and price. Its running costs were low and it enjoys wide driver support.

On to the **Highly Commended** printers. One of these has to be one of the bargain-basement printers simply because they offer tremendous value and still deliver the goods. While the Samsung ML4500 was the absolute cheapest, the £20 premium you pay for the **Minolta-QMS PagePro 1100L** is probably worth it as it's faster and cheaper to run.

The final **Highly Commended** award goes to the **Epson EPL-5800** for the simple reason that it delivered the best quality text printing we've seen in this price bracket. Since high-quality text printing is very important in a business environment, the Epson is an attractive SoHo option.



Brother HL-1250: the best combination of speed, quality and price



Minolta-QMS PagePro 1100L: fast and cheap to run



Epson EPL-5800: delivered the best quality text printing in the group test