KEYPOINT INTELLIGENCE
Buyers Lab

Custom Test Report

JULY 2018

Genuine Brother OEM Toner Cartridges for the HL-L8360CDW versus 10 Compatible Brands

Keypoint Intelligence – Buyers Lab was commissioned by Brother UK Limited (Brother) to conduct an independent comparative lab evaluation of the performance of genuine Brother TN-423 toner cartridges in reliability, image quality, and toner yield against that of 10 third-party "compatible" toner brands, with 11 Brother HL-L8360CDW printers used as test devices. Buyers Lab purchased five CMYK cartridge sets of each brand on the open market. The test was considered completed when each brand had exhausted five cartridges of any one colour.

The 10 "compatible" brands tested were selected as representative samples from the range of third-party toners available. These were Aztec, Cartridge Kingdom, Colour Direct, Do it wiser, Eurotone, LCL, MWT, Patronenbob, Perfect Print, and Prestige. For the purposes of this test their results were anonymized as Brand A, Brand B, Brand C, Brand D, Brand E, Brand F, Brand G, Brand H, Brand I, and Brand J. There is no correlation between the order of the brands and the order of anonymized brands in this list.

Each toner brand was tested on a dedicated and brand-new HL-L8360CDW printer to eliminate cross-contamination, with each device printing a heavy-coverage test target suite until each brand had exhausted five cartridges of any one colour. All failures, including misfeeds/paper jams, printer damage, early end-of-life, and out-of-box toner failures were recorded. Proprietary Buyers Lab image quality test targets were also printed every 2,500 impressions to see how the image quality varies over time.

Executive Summary

Although third-party toners may seem reliable and an inexpensive alternative to OEM toner, customers often don't know the potential hidden costs associated with using third-party compatibles in their printers. Toner from the original printer manufacturer is engineered to work reliably with the printer, providing full yield and ideal quality from the first page to the last. The same cannot always be said for many third-party toners, which are designed more generically.

In Buyers Lab's test, the genuine Brother toner demonstrated excellent reliability throughout testing, with no device or toner issues whatsoever. All of the third-party toners tested experienced reliability issues (such as premature failure and toner depletion without notification, which resulted poor quality prints), produced substandard colour quality that couldn't be given to a client, and performed far less consistently overall. For the end user, this translates to additional downtime and increased supplies and maintenance costs, which can easily outweigh the low upfront cost of third-party cartridges.

In Buyers Lab's page yield tests, the genuine Brother toner not only produced among the highest average CYMK yield, delivering more pages than the third-party group average, but also produced more consistent page yields. Some third-party brands' page yields differed widely throughout the test, with compatible cartridges producing up to 47% fewer pages from one cartridge to the next. Technicians also noted that all the compatible toners tested ran out of toner without notification, so the test devices printed very faded and unusable pages. In fact, up to 33 percent of third-party cartridges used in the test expired without warning.

In terms of image quality, the Brother OEM toner delivered an overall superior performance from start to finish, with all pages printed of such high quality that they could be used both internally and externally as customer-facing content. In contrast, most of the output from third-party brands was rated as being acceptable for internal use only.

Based on the results of Buyers Lab's test, genuine Brother TN-423 toner cartridges provided higher yields, excellent reliability, and ideal and consistent image quality from first to last page, making the OEM brand the superior choice compared to the third-party brands tested.

Overall Performance Ratings Summary

Toner	Total CMYK Yield (using heavy-coverage original)	Overall Average Image Quality Score	Number of Reliability Issues
Brother OEM	12,705	3.0	0
Brand A	12,505	2.4	2
Brand B	12,807	2.6	3
Brand C	11,034*	2.4	3
Brand D	7,634*	2.0	15
Brand E	12,726	2.5	2
Brand F	12,226	2.4	4
Brand G	12,712	2.4	1
Brand H	11,152	2.3	3
Brand I	7,965	2.1	14
Brand J	12,488	2.3	2
Average for Third-Party Brands	11,325	2.3	4.9

*Brands C and D each had leaking cartridges (one for C and two for D). The tested yields for these cartridges are included in the final yield; however, many customers would reject them as failures, leading to even lower yields.

Reliability

Every genuine Brother TN-423 toner cartridge tested proved to be reliable out of the box, with the device using the Brother toner cartridges completing testing with no failures, jams, toner leakage, or printer damage. The device performed as expected and signaled for toner replacement when cartridges were running low.

All third-party toner brands experienced at least one issue or failure in testing. For example, the printer running with Brand H toner required the early replacement of a black cartridge, and two brands (Brands C and D) experienced toner leakage right out of the box. Although Buyers Lab technicians were able to use the leaking cartridges in this test, most users would reject them as failures and return them for a refund or replacement, which is not only an inconvenience, but creates additional downtime.

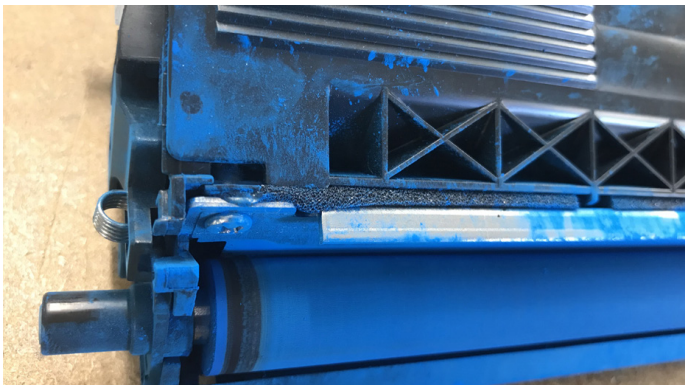
All third-party brands tested experienced at least one instance of toner running out with no notification, with two brands (Brands D and I) both experiencing 13 instances during their respective tests. The printers continued to print despite having an exhausted cartridge, in some cases even two, resulting in wasted time and resources from needing to reprint the unusable pages. Buyers Lab technicians also noted the lack of accurate supplies status on the embedded web server when using the compatible cartridges; the Brother toner provided accurate supplies information throughout testing.

Further, all 10 third-party brands tested left visible toner residue inside their respective printers, which not only creates a messy work environment, but can also lead to reliability issues over time as toner builds up on internal components. In contrast, the inside of the printer using genuine Brother toner was clean, exhibiting only a negligible amount of toner dust at the completion of the test.

Examples of Toner Leakage

A Brand C cartridge leaked toner inside its packaging.

A Brand D cartridge leaked toner inside its packaging.



Brand D toner leaked out of two cyan cartridges and Brand C toner leaked out of one yellow cartridge. While Buyers Lab technicians felt there was no significant contamination of the work area and all cartridges were deemed ok for use in the test, most customers would reject these as failures.

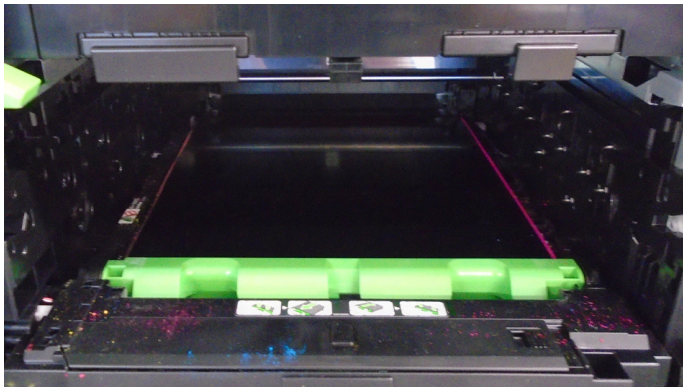
View of internal components at the start of testing.

At the start of testing, all test devices' internal components were pristine, with no sign of toner contamination.

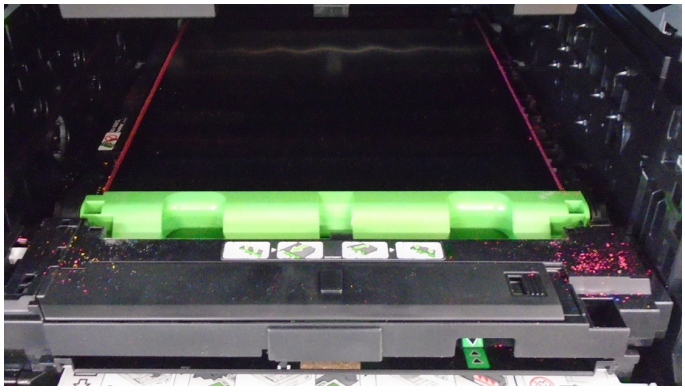
Internal components at the end of Brother OEM test.

The printer dedicated to Brother OEM toner was clean, with only a slight amount of cyan toner dust visible in one area inside the printer.

Internal components at the end of Brand B's test show visible cyan and magenta toner residue.

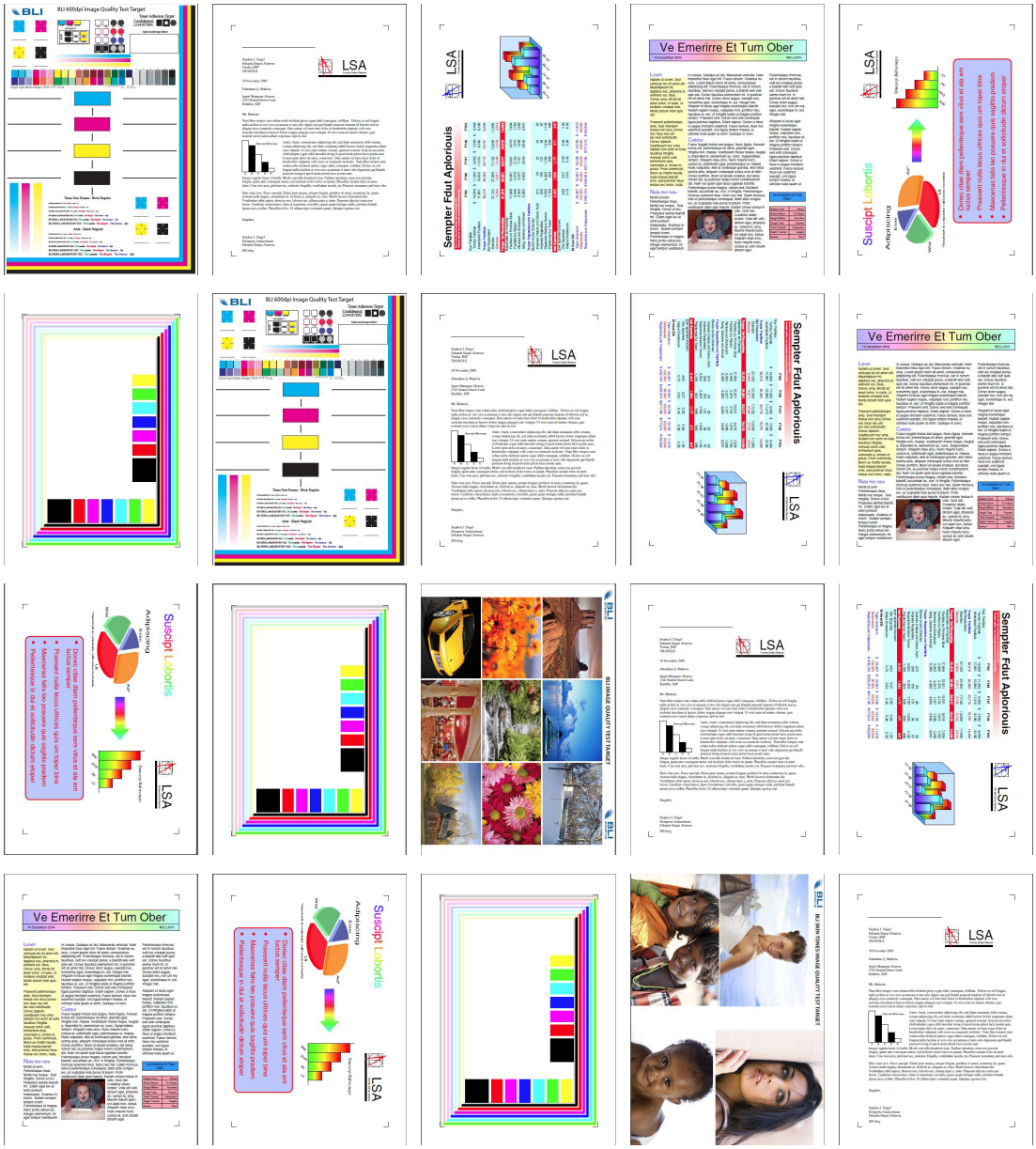


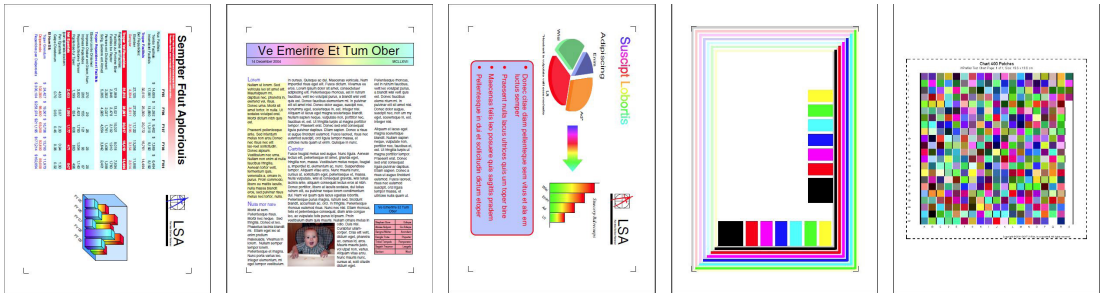
Internal components at the end of Brand I's test show a lot of magenta toner residue on the right-hand side of the device.



At the end of the test, all third-party brands showed some toner residue left inside the respective printers. Leaking toner increases cleaning effort, creates image quality defects, and creates buildup over time which can result in reliability issues such as jamming and premature wear on components, which would incur additional costs for the user.

Tested Page Yields





For this test, Buyers Lab used a mix of heavy-coverage documents (pictured above). Pages in this test suite range from ~1% to 47% page coverage per colour, with an average page coverage of 8.14% per colour over the entire test suite. Rated yields of 4,000 pages (CMY) and 6,500 pages (K) are based on an ISO test target, which has lighter coverage (~5%). As such, tested yields are lower than claimed yields. Yields from this test are for comparative purposes only. Buyers Lab technicians printed this suite in sequence until five cartridges of any one colour were exhausted, at which point testing ceased.

- In Buyers Lab's test using a heavy-coverage original, the Brother OEM toner produced the highest average yields out of five sets of CYMK cartridges.
- The Brother toner cartridges performed consistently, producing yields that varied up to 3% from cartridge to cartridge; on average, the third-party brands' cartridges yielded a far higher percent variance performance, with Brands D and I showing the most inconsistent CMY yield variance that ranged from 12% to 31% from cartridge to cartridge.
- While three brands provided a slightly higher overall tested yield, it's worth noting that their overall image quality is rated lower and all experienced reliability issues with running out of toner with no notification.

Buyers Lab's Tested Yields

	Brother	Average Third-Party*
Total Pages Printed in the Test	12,705	11,325
Average Yield Per Cartridge Set	2,541	2,265
Percent More Pages from Brother OEM Toner		12.19%

*Three cartridges were found to be leaking toner right out of the package, which would likely be considered defective by the average consumer. Though they were deemed usable by the lab for this test, if Buyers Lab had eliminated those cartridges, tested yields would be lower. Tested page yield is based on Buyers Lab's testing in duplex mode using a multi-page heavy-coverage test suite.

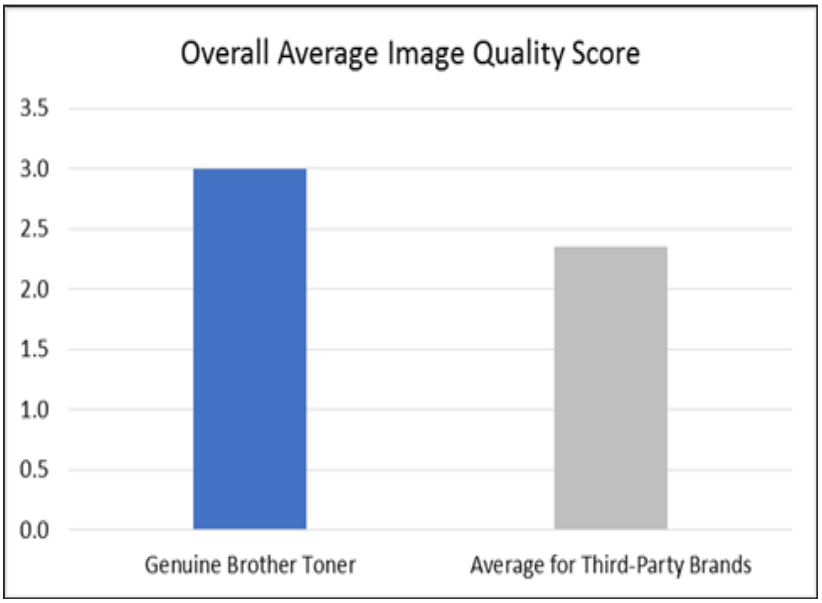
Image Quality

Image quality is assessed in several areas, such as text and fine lines, solid density, colour gamut, and photographic images. Buyers Lab's proprietary image quality test targets were printed at the beginning of testing with the Brother OEM starter toner, and then printed on each device every 2,500 impressions. The image quality samples were subjected to a battery of tests to rate image quality. The results for text, fine line reproduction, and photographic images were then compared and graded on a three-point scale where 3 (best) means output is of a high standard and can be distributed internally or externally to clients; a 2-grade print is output that exhibits a minor defect but is still acceptable for internal company use only; and a 1-grade print has major defects and is unsuitable for use.

Only the Brother genuine toner produced image quality that was consistently rated good enough to be used both internally and externally as customer-facing content. It had by far the best overall image quality, with clean and consistent text and fine lines, vibrant colours, fine detailing in high contrast areas, natural skin tones, and smooth halftones across all its samples.

Despite the majority of third-party brands producing equally good text and fine line quality in black mode, 90% of third-party brands delivered colour photographic image quality that was rated grade 1 and grade 2 only, and showed image defects such as fading, graininess, and banding. In a customer situation, these unacceptable pages would likely be reprinted, reducing the net page yield and increasing cost of ownership. With an overall group average of 2.3%, the third-party toners' image quality is suitable for internal company use at best, while the Brother OEM toner's average of 3 (highest possible score) clearly shows it's best for external professional use.

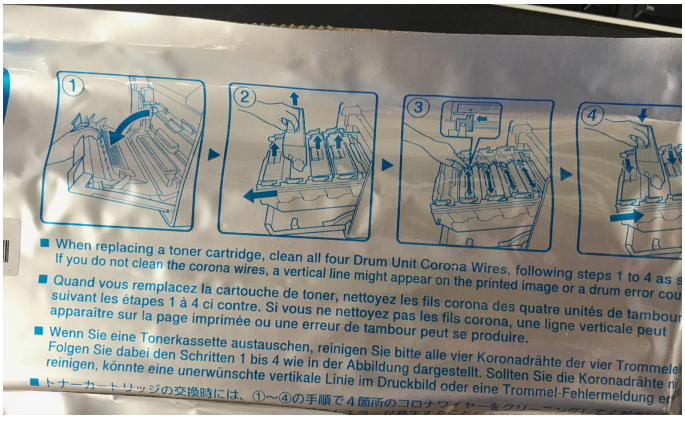
In other areas, the Brother genuine toner was tied for the second highest black density reading, and experienced no image quality defects whatsoever. Moreover, the Brother OEM toner produced the most consistent CIE colour volume over the course of testing, which means users can count on consistent quality from first page to last; other brands showed greater variance, meaning the colours produced at the beginning of a print run might not match those at the end. A professional service provider would expect its printed colour communications to be not only consistently good, but also reflect a positive message of its professional status to external clients. Any deviation in quality could mean a loss of data integrity and potential damage to its reputation.



Text, fine lines, and photographic images are rated on a three-point scale where 3 is best quality, 2 is suitable for internal use only, and 1 is unusable.

- There was very little to distinguish between the quality of the tested toners' text and fine line output, even as testing progressed. When viewed under magnification, most samples showed text that was cleanly produced, fully formed with smooth edges, and had no visible overspray.
- In the subjective photographic image assessment, however, there was much more variation in terms of quality and consistency. The Brother OEM toner delivered top-rated output across the board, while output from the other brands showed defects such as banding, paler colours, and graininess.

Brother OEM toner packaging.

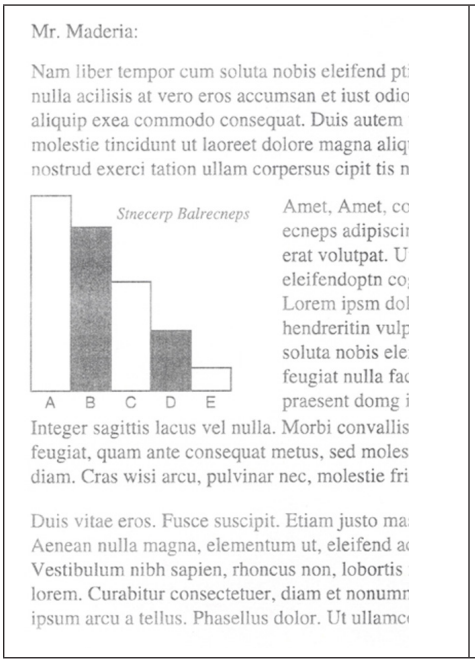


Brother OEM toner packaging instructs users to clean the corona charge wire when replacing cartridges, which helped to avoid at the outset some of the image quality issues encountered with the competing brands.

Brand J toner packaging.

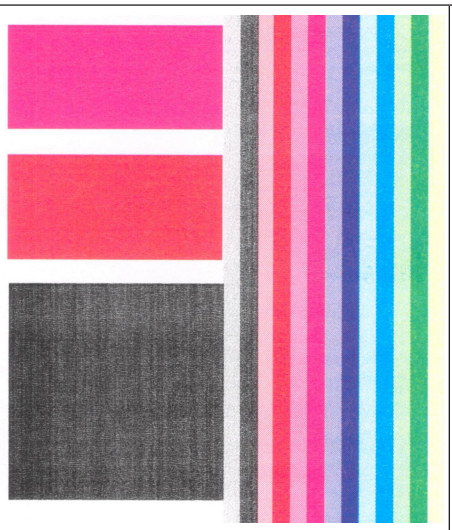
Most of the third-party brands' packaging provided no such instructions, resulting in marks and lines on some toner brands' output. These types of image defects were eliminated once the charge wire was cleaned.

Examples of Defects (some samples magnified to show detail)



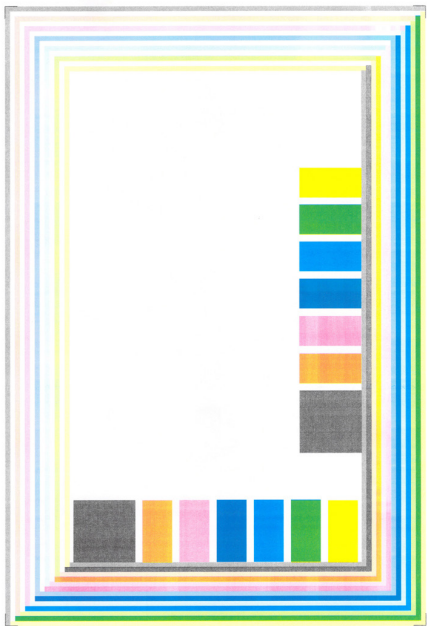
BRAND H TONER

Black cartridges ran out of toner without notification, resulting in faded output.



BRAND I TONER

Unlike the Brother OEM packaging, Brand I packaging didn't instruct users to clean the corona charge wire when replacing cartridges, which resulted in grainy black solid areas.



BRAND D TONER

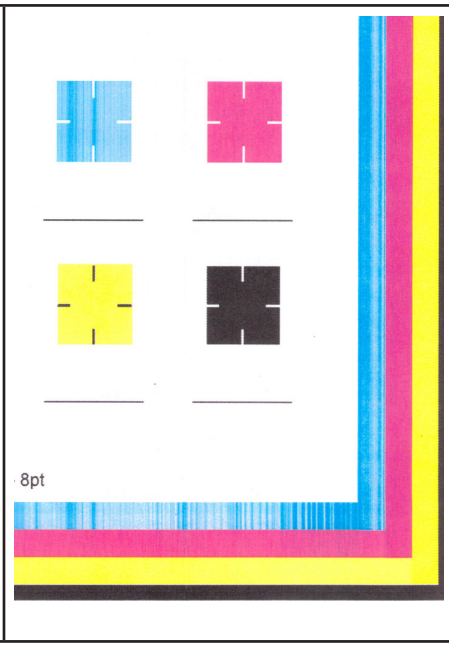
Both the black and magenta toner cartridges ran out of toner without notification, resulting in very faded output.

BRAND E TONER

The second black cartridge ran out of toner without notification, which resulted in very faded output.

BRAND F TONER

Packaging instructions didn't direct users to clean the charge corona wire when replacing cartridges, which resulted in a fine white line running through cyan areas on output.



BRAND A TONER

During testing, a cyan cartridge ran out of toner without triggering a notification, resulting in streaky defects.

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Examples of Subjective Photographic Image Quality (at 5,000 impressions)

The Brother OEM toner delivered consistent quality throughout, with vibrant and natural colours, and sharp detailing.

Brand I's image sample shows a heavy magenta bias and over-saturated colours, which diminish fine detail and contrast.

The Brother OEM toner delivered consistent quality throughout, with vibrant and natural colours, sharp detailing, and smooth tonal transitions.

Brand A's image sample shows some banding and is grainy.

The Brother OEM toner delivered smooth tonal transitions (see sky).

Brand G's image sample shows slight banding, over-saturated colours, and a grainy appearance.

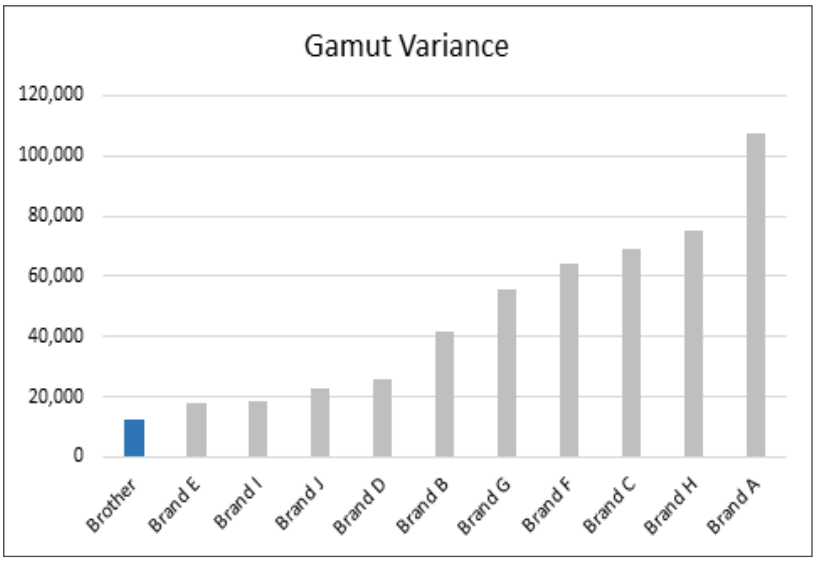
The Brother OEM toner delivered sharp detailing, and smooth tonal gradations.

Brand D's image sample shows banding issues and halftone coverage is grainy, both of which mean output would not be suitable for external nor internal use.

Colour Gamut

The term 'colour gamut' (or colour space) refers to the range of possible colours that a printing device can reproduce. The larger or wider the gamut, the greater the range of producible colours. If, over time, the size and/or shape of the colour gamut changes significantly, there is a greater chance of a perceivable change in colour output produced. CIE is the actual method of measuring colour space. CIE volumes are measured and analysed using ColorThink Pro, and with its Profile Inspector feature, 2D and 3D colour gamut graphs can be generated to compare multiple colour gamut profiles to assess how gamuts produced by different devices stack up. The type of media used can affect the size of a colour gamut, with higher-grade or coated stocks tending to produce larger gamuts than uncoated media (this is especially true when using ink technology).

Output printed with the genuine Brother OEM toner possessed an average CIE volume that was higher than that of 60% of third-party brands tested. More importantly, the variance between the Brother toner's highest and lowest CIE colour volume measurement was the lowest of the test group, which means it had the most consistent colour production over the course of testing. All third-party toners experienced a much larger variance in gamut size—between 30.0% and 88.5% larger than that of the Brother OEM toner.



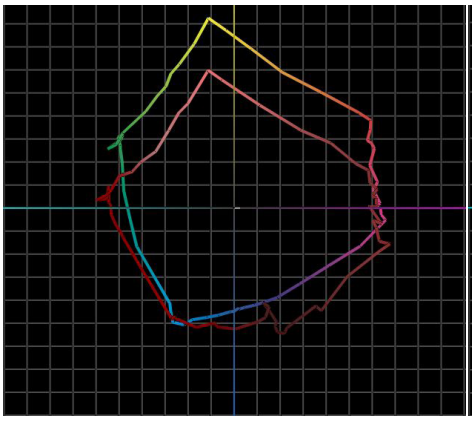
This graph shows the colour gamut variance of each toner brand, ranked in order.
A lower number indicates more consistent colour output over time.

CIE Colour Gamut Volumes											
Toner	Start	2,500	5,000	7,500	10,000	12,5000	Average	*Brother % Larger / Smaller (-) Than Third-Party	Min Volume	Max Volume	Variance
Brother	228,672	231,921	239,204	238,526	236,019	226,861	233,534		226,861	239,204	12,343
Brand A	173,399	213,767	119,433	201,187	211,065	226,713	190,927	22.3%	119,433	226,713	107,280
Brand B	239,909	209,738	221,156	222,363	249,767	251,508	232,407	0.5%	209,738	251,508	41,770
Brand C	170,181	197,131	219,972	151,020	174,852		182,631	27.9%	151,020	219,972	68,952
Brand D	234,092	250,713	234,976	225,091			236,218	-1.1%	225,091	250,713	25,622
Brand E	233,276	237,217	244,957	236,063	227,263		235,755	-0.9%	227,263	244,957	17,694
Brand F	137,874	149,072	181,000	182,688	201,846		170,496	37.0%	137,874	201,846	63,972
Brand G	248,865	193,279	230,133	242,689	234,599	248,415	232,997	0.2%	193,279	248,865	55,586
Brand H	212,741	234,792	224,907	159,590	160,372		198,480	17.7%	159,590	234,792	75,202
Brand I	228,955	247,755	242,759	236,211			238,920	-2.3%	228,955	247,755	18,800
Brand J	232,266	234,792	244,235	244,104	242,718	254,894	242,168	-3.6%	232,266	254,894	22,628
Third-Party Group Average							216,100	8.1%			

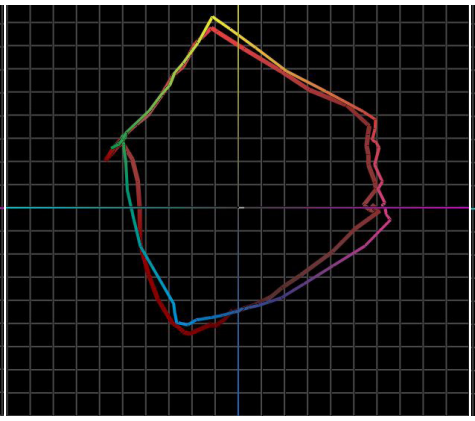
*This compares by what percent Brother OEM toner's average colour gamut is larger (or smaller) vs. third-party toners' average colour gamut. Brands B, D, E, G, I, and J produced gamuts with a similar average volume, while Brands A, C, F and H produced smaller gamuts than the OEM toner.

Colour Gamut Comparisons at 5,000 Impressions

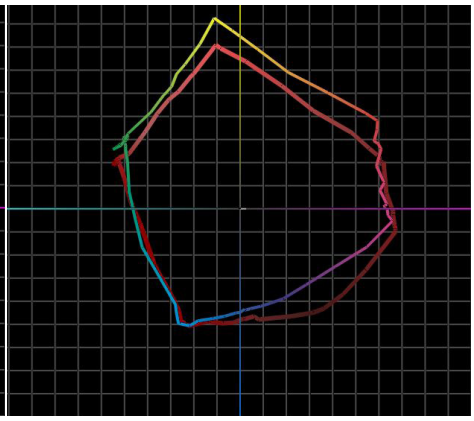
Brother OEM gamut is shown chromatically; competing third-party brands are shown in red.



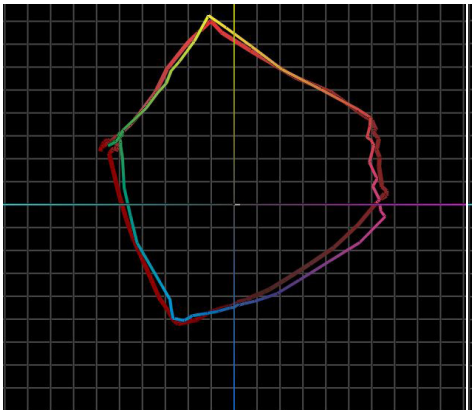
Brother vs. Brand A at 5,000 pages



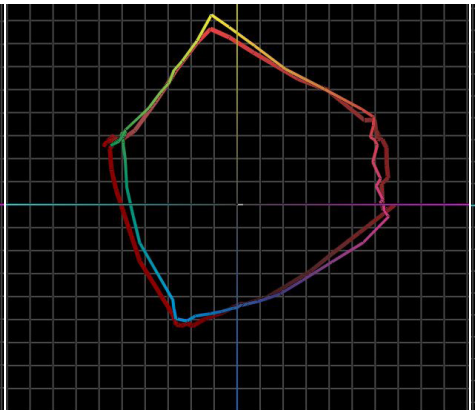
Brother vs. Brand B at 5,000 pages



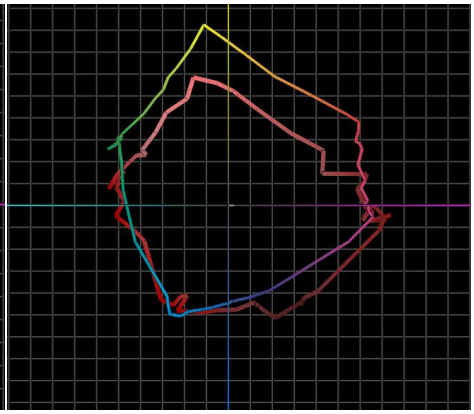
Brother vs. Brand C at 5,000 pages



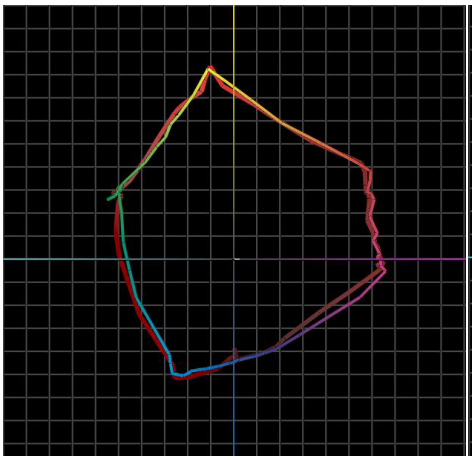
Brother vs. Brand D at 5,000 pages



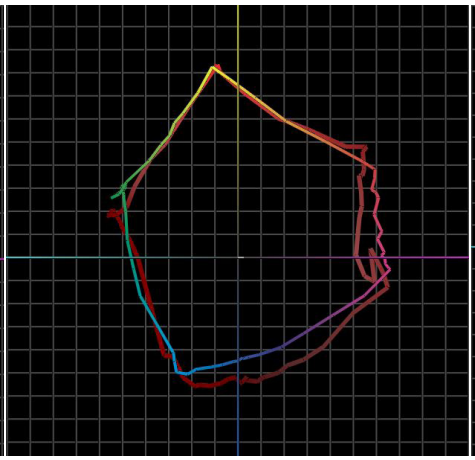
Brother vs. Brand E at 5,000 pages



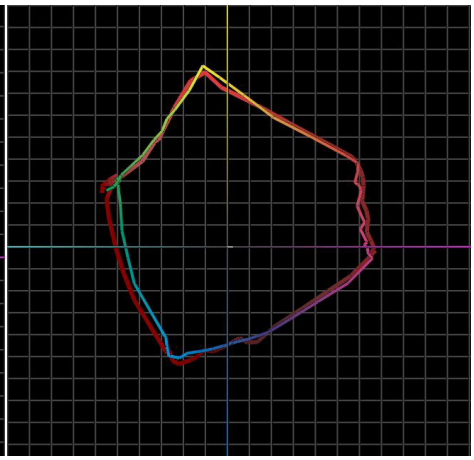
Brother vs. Brand F at 5,000 pages



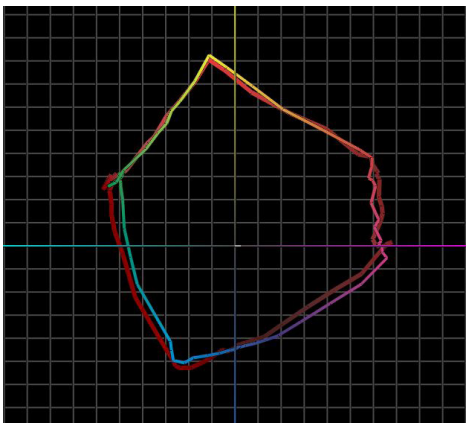
Brother vs. Brand G at 5,000 pages



Brother vs. Brand H at 5,000 pages



Brother vs. Brand I at 5,000 pages

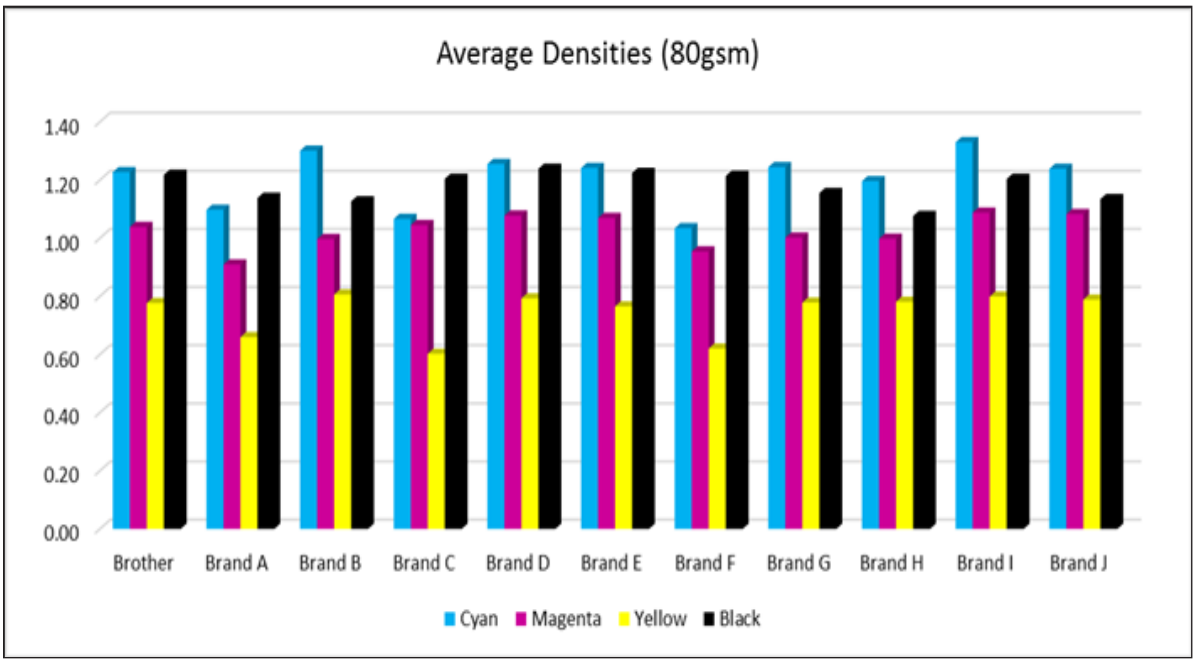


Brother vs. Brand J at 5,000 pages

Average Densities

A higher print density reading for black means that output will be darker and/or richer. However, a higher density isn't always better for cyan, magenta, and yellow as the most desirable density depends on context, and the clarity and accuracy of colour production. The Brother OEM black toner density was tied for second highest.

	Average Densities			
Toner	**Cyan**	**Magenta**	**Yellow**	**Black**
Brother	1.23	1.04	0.78	1.22
Brand A	1.10	0.91	0.66	1.14
Brand B	1.30	1.00	0.81	1.13
Brand C	1.07	1.05	0.60	1.20
Brand D	1.26	1.08	0.79	1.24
Brand E	1.24	1.07	0.77	1.22
Brand F	1.03	0.95	0.62	1.21
Brand G	1.24	1.00	0.78	1.16
Brand H	1.20	1.00	0.78	1.08
Brand I	1.33	1.09	0.80	1.20
Brand J	1.24	1.08	0.79	1.13



This graph shows the average densities of each colour by toner brand

Image Permanence

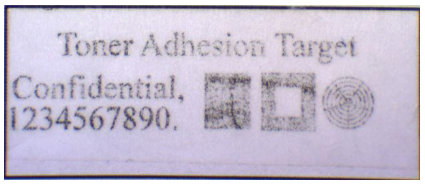
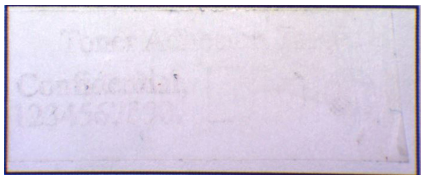
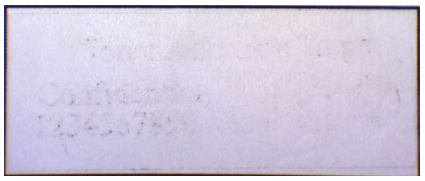
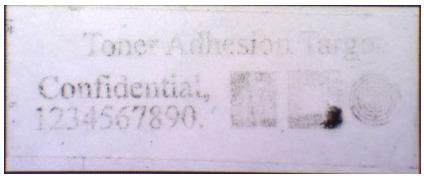
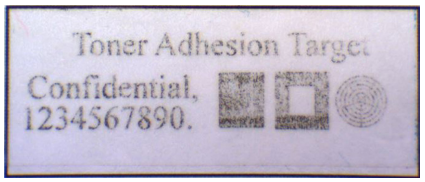
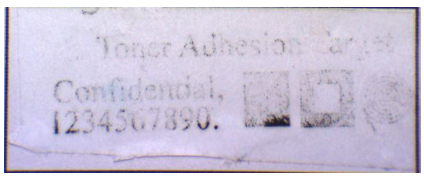
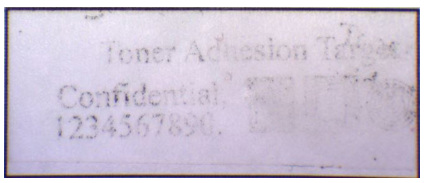
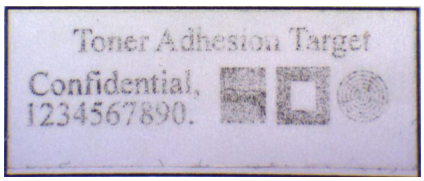
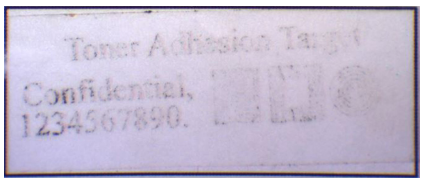
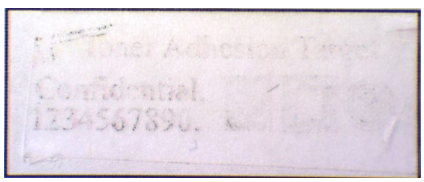
Toner Adhesion

Good toner adhesion is necessary to ensure the longevity and survival of printed documents, and to minimize potential issues with toner rubbing off over time. Such issues can reduce the readability of text and make the purpose of photos, charts, and graphs unclear, which means the potential loss of business intelligence and history.

To test the effectiveness of each brand's toner adhesion, Buyers Lab subjected the output of each brand to a tape test. A lab technician applied a piece of clear tape to a target on printed test document and then pressed the tape onto white space to see how much toner (if any) had been removed from the target.

As can be seen from the results below, the tape has removed hardly any toner from the genuine Brother toner's output, indicating very good toner adhesion and image permanence. However, results for Brands A and G show better toner adhesion than the Brother OEM's result. Overall, 80% of the third-party brands tested showed poor toner adhesion, which means there's increased risk of potential loss of data integrity and content due to toner transfer.

Toner Adhesion Test Results (at 5,000 impressions)

Brother OEM		**Brand F**	
Brand A		**Brand G**	
Brand B		**Brand H**	
Brand C		**Brand I**	
Brand D		**Brand J**	
Brand E			

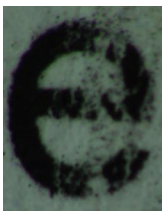
Hard Crease Test

Buyers Lab Hard Crease Test Target

Buyers Lab also subjected the output of each toner brand to a hard crease test, where output was folded so the printed side was on the inside, and then a 2 kg weight was rolled across the page to crease it. The page was unfolded and output was examined for toner cracking/flaking at the fold. Grades assigned were Minimal (best), Non-Excessive, or Excessive (worst). Results of this test can be seen below.

- Only two toner brands' output—the genuine Brother toner and Brand A—were rated Minimal, while 90% of third-party brands had output that suffered significantly more flaking and cracking, and were rated Non-excessive to Excessive.

Hard Crease Test Results (magnified to show detail; images shown are from the 5,000-impression mark for all brands tested)

Brother	Brand A	Brand B	Brand C	Brand D
				
Minimal	Minimal	Excessive	Non-excessive	Non-excessive
Brother	**Brand E**	**Brand F**	**Brand G**	**Brand H**
				
Minimal	Excessive	Excessive	Non-excessive	Excessive

Brother	Brand I	Brand J
		
Minimal	Non-excessive	Excessive

SUPPORTING TEST DATA

Buyers Lab's Tested Yields

	Brother	Brand A	Brand B	Brand C*	Brand D*	Brand E	Brand F	Brand G	Brand H	Brand I	Brand J	Average Third-Party
Total Pages Printed (Five CMYK sets)	12,705	12,505	12,807	11,034	7,634	12,726	12,226	12,712	11,152	7,965	12,488	11,325
Average Yield	2,541	2,501	2,561	2,207	1,527	2,545	2,445	2,542	2,230	1,593	2,498	2,265
Percent More Pages from Brother OEM Toner		1.60	-0.80	15.14	66.43	-0.17	3.92	-0.06	13.93	59.51	1.74	12.19

*Brand C had one leaking cartridge, while Brand D had two, which would likely be considered defective by the average consumer. The Brand C leaking cartridge yielded 2,419 pages, while the two Brand D cartridges yielded a total of 3,950 pages. If Buyers Lab had eliminated those cartridges, tested yields would be lower.

Event Summary Count

Toner brand	Out of toner with no notification (faded print outs)	Out of Box Failure	Early End of Life	Marks on print outs (required charge wire clean)	Total Issues
Brother OEM	0	0	0	0	0
Brand A	2	0	0	0	2
Brand B	3	0	0	0	3
Brand C	2	1*	0	0	3
Brand D	13	2*	0	0	15
Brand E	2	0	0	0	2
Brand F	3	0	0	1	4
Brand G	1	0	0	0	1
Brand H	2	0	1	0	3
Brand I	13	0	0	1	14
Brand J	2	0	0	0	2

* Note that while Buyers Lab was able to use the leaking cartridges in testing, many customers would reject them as failures and return them for a replacement or refund.

Average Image Quality Scores

Toner	Text/Line Art Average	Photographic Images Average	Overall Average
Brother OEM	3.0	3.0	3.0
Brand A	3.0	1.8	2.4
Brand B	3.0	2.2	2.6
Brand C	2.8	2.0	2.4
Brand D	2.8	1.3	2.0
Brand E	3.0	2.0	2.5
Brand F	3.0	1.8	2.4
Brand G	2.8	2.0	2.4
Brand H	3.0	1.6	2.3
Brand I	3.0	1.3	2.1
Brand J	2.8	1.8	2.3
Third-Party Group Average	2.9	1.8	2.3

3 = internal and external use (best); 2 = internal use only (acceptable); 1 = unusable (poor)

Test methodology: Buyers Lab ran each printer for up to seven hours per day with all output printed in duplex mode and with a single printer assigned to each of the cartridge brands. Batches of 200 pages were sent, with the device allowed to cool for a five-minute period before the next submission. Each device was run until no further impressions could be obtained from the five CMYK cartridge sets. Packaging quality, toner leakages, page yield, impact on device reliability (paper jams), and impact on other key components of the device (fuser, drum) and image quality, have been recorded and evaluated per the following:

A) **Page yield:** Page yield was assessed using a mixed suite of documents selected by Keypoint Intelligence – Buyers Lab. The documents included low, medium, and high coverage files. Printer model and serial number, as well as cartridge name and type, were recorded prior to the start of testing. End of cartridge life was deemed to have occurred if the printer displayed a "toner out" message, if image quality had degraded to an unacceptable level, or if the cartridge had caused damage to the printer. A cartridge was considered to have reached the end of its life at first fade if the manufacturer did not specify a shake procedure, or at the third fade occurrence following two shake procedures if the cartridge manufacturer had specified a shake procedure. Any faded pages printed were excluded from the yield count. Throughout testing, each printer was maintained per manufacturer specifications. Once end of life was reached, the cartridge was retired, and a page count was recorded along with a brief description.

B) **Reliability:** Before it started the testing of the full-yield toner cartridges, Buyers Lab exhausted the starter cartridges to ensure all devices were operating correctly. Throughout testing, Keypoint Intelligence – Buyers Lab recorded any packaging and loading issues, cartridge malfunctions (such as mechanical failures, toner leakage), component breakage, background on printed pages, and impact on printer performance (such as damage to fusers). Regular inspections of both drum and fuser surface were carried out to look for wear and tear, with photographs taken as supporting evidence. Cartridges that did not function out of the box, were damaged, or produced 20 or fewer acceptable pages were classified as DOA (dead on arrival) or OOBF (out-of-box failures).

C) **Image quality:** Image quality (IQ) was monitored throughout the day to detect visual IQ drop off events. In addition, a selection of Buyers Lab objective IQ test samples were collected at the start and after every 2,500 impressions. IQ samples were evaluated for clarity and definition of text and line art, optical density, reproduction of halftone images, colour gamut volume, and toner adhesion. Visual evaluations of IQ samples were conducted under a Graphic Lite D5000 Standard Viewer and Edmund Scientific PL-B776U PixeLINK magnifier. Optical density was measured with an X-Rite exactXp densitometer. Toner adhesion was tested using the Scotch tape test.

D) **Image permanence:** Image permanence was evaluated by subjecting the samples to the ASTM F1351 Standard Practice for Determination of the Effect of Hard Creasing Paper on Images Produced by Business Imaging Systems. This test was completed at the start and at the 5,000-impression mark.

Test environment: Testing was conducted under ambient conditions of 22°C (+/-2.7°C) and 50% RH (+/-10%); with daily conditions monitored by an Extech RH520 temperature/humidity digital recorder, in Keypoint - Buyers Lab's test facility located at Unit 11, The Business Centre, Wokingham, RG41 2QZ.

Conditioning: Printers and supplies were acclimated for a minimum of 24 hours prior to testing.

Test equipment: Buyers Lab's dedicated test network, consisting of Windows 2012 servers and Windows 10 Professional workstations, 100/1000BaseTX network switches, and CAT5e/6 cabling

Serial numbers of Brother HL-L8360CDW printer devices

Toner Cartridge Brand	Serial Number
Brother OEM	E77411L7J166569
Brand A	E77411L7J166461
Brand B	E77411L7J166567
Brand C	E77411L7J166561
Brand D	E77411L7J166558
Brand E	E77411L7J166478
Brand F	E77411L7J166464
Brand G	E77411L7J166468
Brand H	E77411L7J166563
Brand I	E77411L7J166469
Brand J	E77411L7J166467

About Keypoint Intelligence – Buyers Lab: Keypoint Intelligence is a one-stop shop for the digital imaging industry. With our unparalleled tools and unmatched depth of knowledge, we cut through the noise of data to offer clients the unbiased insights and responsive tools they need in those mission-critical moments that define their products and empower their sales.

For over 50 years, Buyers Lab has been the global document imaging industry's resource for unbiased and reliable information, test data, and competitive selling tools. What started out as a consumer-based publication about office equipment has become an all-encompassing industry resource. Buyers Lab evolves in tandem with the ever-changing landscape of document imaging solutions, constantly updating our methods, expanding our offerings, and tracking cutting-edge developments.

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