

## Genuine Lexmark Brand T65X Fusers vs. Four Brands of Third-Party Fusers

JANUARY 2013

Buyers Laboratory LLC (BLI) was commissioned by Lexmark International Inc. to conduct an independent comparative lab evaluation of the performance of genuine Lexmark brand T65X fusers/maintenance kits against that of third-party brand fusers/maintenance kits in the Lexmark T654dn laser printer. All third-party fusers for the following four brands were purchased by BLI via customary retail channels: Accutec, China Eternal, Liberty and NuPro, which hereafter are referred to as Brand A, B, C and D, though not respectively.

The test was designed to objectively compare the performance of genuine Lexmark fusers to that of the third-party brands, and their claim of having equal performance to that of genuine Lexmark fusers. All testing was conducted in BLI's 10,000-square-foot test lab located in Hackensack, NJ (USA; [www.buyerslab.com](http://www.buyerslab.com)).

Nearly 6,000,000 pages were printed during the test, in which six fusers from each brand were evaluated across 15 printers, with three printers dedicated to each brand. The fusers were run to end of life using the ISO 19752 monochrome test target, during which time reliability, page yield and fuser-related print defects were evaluated. Following test completion of each fuser, each printer was cleaned of all paper dust and serviced with new charge, pick and transfer rollers.

### PERFORMANCE SUMMARY

Throughout BLI's test, the genuine Lexmark fusers provided performance that was consistently superior overall to that of the third-party fusers tested. For reliability, while all of the genuine Lexmark fusers gave a flawless performance, 17 (71%) of the 24 third-party fusers tested failed. The genuine Lexmark fusers also displayed superior page yield performance, with each reaching the 300,000-page specified yield, while the third-party fusers only achieved an overall average yield of 155,578 pages (52% of claimed page yield). Lexmark also had no fuser-related print defects, while of the third-party brands, Brand D had the most.

In commenting on the results of this comprehensive test, Anthony Polifrone, BLI's managing director noted: "Throughout BLI's extensive tests, the genuine Lexmark fusers clearly outperformed the third-party brands in all performance categories, unequivocally demonstrating far superior reliability and page yield, with no fuser-related print defects."

BRAND	TOTAL FAILURES	AVERAGE PAGE YIELD	PERCENT OF YIELD CLAIM
Lexmark	0	300,000	100%
Brand A	4	166,345	55%
Brand B	3	192,700	64%
Brand C	4	222,062	74%
Brand D	6	41,206	14%

## OVERALL PERFORMANCE

### RELIABILITY

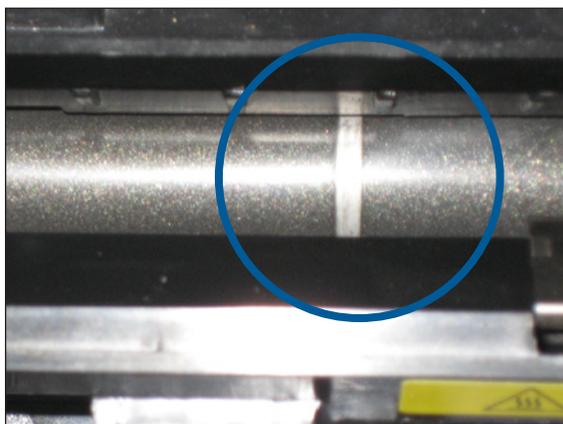
There were no reliability issues of any type with the genuine Lexmark fusers. On the other hand, of the 24 third-party fusers tested, 17 failed (two out-of-box failures, 12 premature expires, three due to service codes that could not be cleared or a roller failure), resulting in a collective failure rate of 71% for the third-party brands. Brand A had one out-of-box failure, two premature expires and one due to an un-clearable error code, for a failure rate of 67%; Brand B had one out-of-box failure and two premature expires, for a failure rate of 50%; Brand C had two premature expires, one failure due to an un-clearable error code and another due to a blistered pressure roller, for a failure rate of 67%; and Brand D had six premature expires, for a failure rate of 100%.

The two third-party fusers that were classified as out-of-box failures could not be installed in the printers due to a warped fuser frame.

In three of the 12 cases of prematurely expired third-party fusers, a service code came up on the display, and the only way to clear the alert was to remove the fuser and install a new one (see Service Code table on page 8 for details). Brands A and C each recorded a premature expire because of fusers that began emitting a loud squeaking sound, which would not go away until a new fuser was installed. The remaining seven premature expires were due to fuser-related print defects: with Brand C, there was a mark on the hot roll (see Exhibit A below) that resulted in extraneous toner marks on pages; and with Brand D, five were due to a hot roll failure that caused toner flaking (see Exhibits D and E on page 5), while with the sixth, fusing problems resulted in excessive background, image breakup, and banding (see Exhibits F and G on page 6).

There were three other third-party fuser failures during the test, all of which happened after 75% of the rated yield had been reached but before the full rated yield had been achieved. At 256,905 pages, one Brand A fuser gave one error code followed by another, and printing could not be continued. One Brand C fuser gave an error code at 290,895 pages, and with another the pressure roller blistered at 290,959 pages, resulting in heavy creases in pages and rendering output unacceptable (see Exhibit B below).

**EXHIBIT A**



**Brand C: Damaged Hot Roll**

**EXHIBIT B**



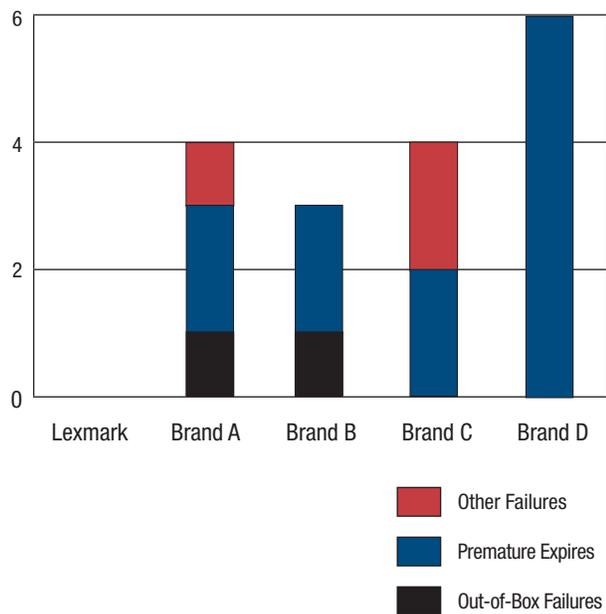
**Brand C: Blistered Pressure Roller**

### Fuser Failures

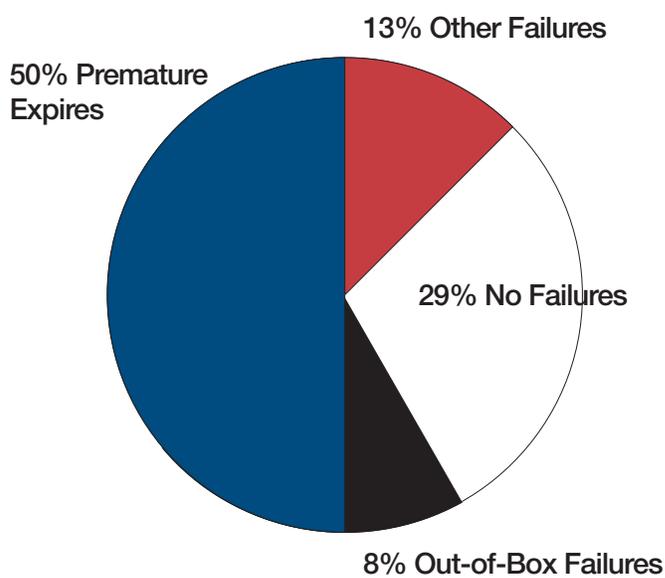
Brand	Out-of-Box Failure	Premature Expire	Other	TOTAL
Lexmark	0	0	0	0 (0%)
Brand A	1	2	1 (Code 920.07, then 924.01)	4 (67%)
Brand B	1	2	0	3 (50%)
Brand C	0	2	2 (Code 201.52; blistered pressure roller)	4 (67%)
Brand D	0	6	0	6 (100%)
<b>TOTAL THIRD-PARTY FAILURES</b>	2	12	3	17 (71%)

Out-of-Box Failure: a fuser that was inoperable upon installation or produced 20 or fewer acceptable pages. Premature Expire: a fuser that produced less than 75% of the rated yield. Other: a fuser that had an issue after it produced more than 75% of, but less than, the rated yield.

**GRAPH 1: Failures per Brand**



**GRAPH 2: Reliability Performance of Third-Party Brands**



## AVERAGE PAGE YIELD PERFORMANCE

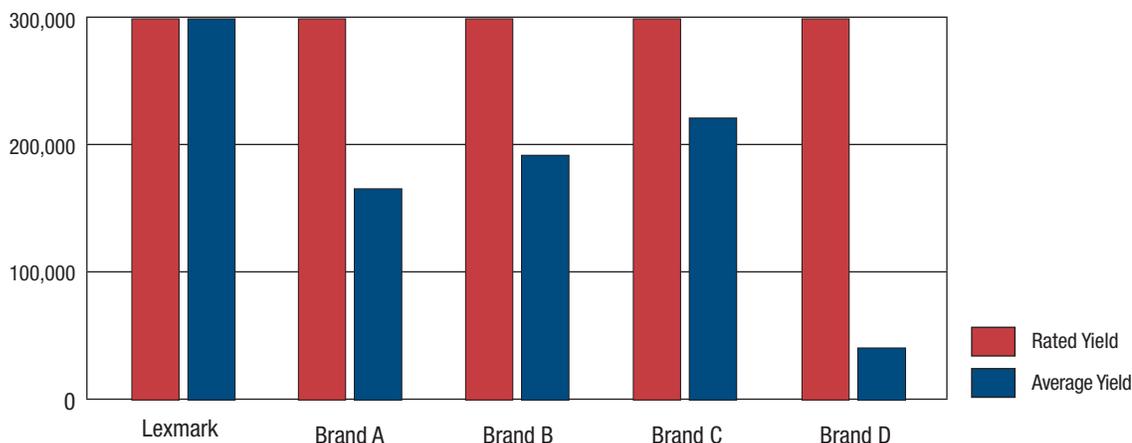
As previously noted, the genuine Lexmark fusers all reached the 300,000-page claimed yield and gave a superior performance to all of the third-party brands. Brand C, with an average of 222,062 pages, had the highest average page yield of the third-party brands, although well short of the Lexmark yield. The average yields for Brands A (166,345 pages), B (192,700 pages) and D (41,206 pages) were also well short of the Lexmark yield. Also noteworthy is that the average page yield for each of the four third-party brands failed to reach 75% of the rated yield (the plateau for premature expires). Third-party fusers collectively produced just 155,578 pages on average—or only 52% of the pages produced with genuine Lexmark fusers.

### Overall Tested Page Yields

Brand	Number of Fusers Tested	Yield Claim (Pages)	Average
Lexmark	6	300,000	300,000
Brand A	6	Equals OEM	166,345
Brand B	6	Equals OEM	192,700
Brand C	6	Equals OEM	222,062
Brand D	6	Equals OEM	41,206
<b>THIRD-PARTY BRANDS</b>	24		155,578

Lexmark’s claimed yield is based on testing using the ISO 19752 monochrome test target.

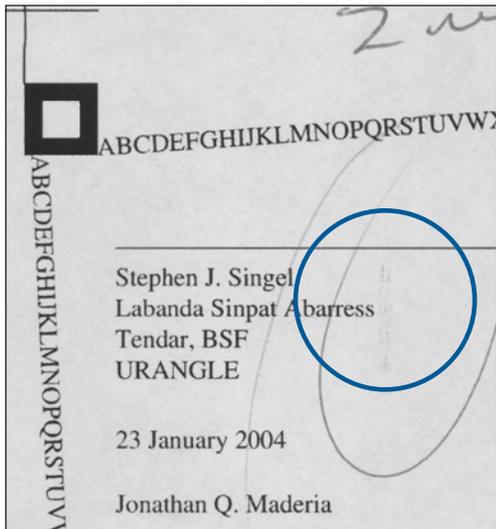
### GRAPH 3: Rated Yield vs. Average Yield



## FUSER-RELATED PRINT DEFECTS

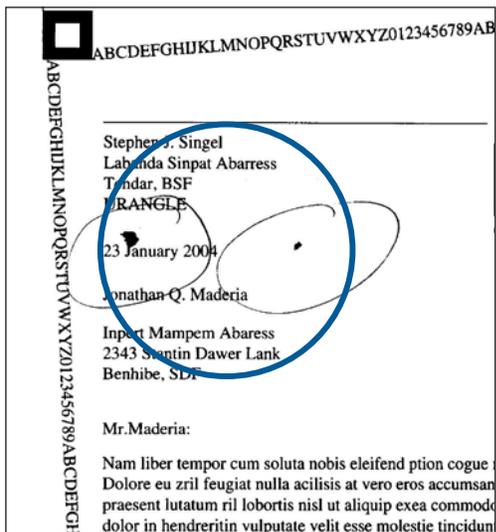
While there were no fuser-related print defects with genuine Lexmark fusers and those from Brands A and B, a total of seven third-party fusers failed due to print defects that were fuser-related. Extraneous toner marks on pages were the result of a mark on one Brand C hot roll (see Exhibit C below). All other fuser-related print defects occurred with Brand D as a result of a hot roll failure that caused toner flaking (see Exhibits D and E below) with five of the six fusers, and excessive background, image breakup, and banding on pages with the sixth (see Exhibits F and G on page 6).

### EXHIBIT C



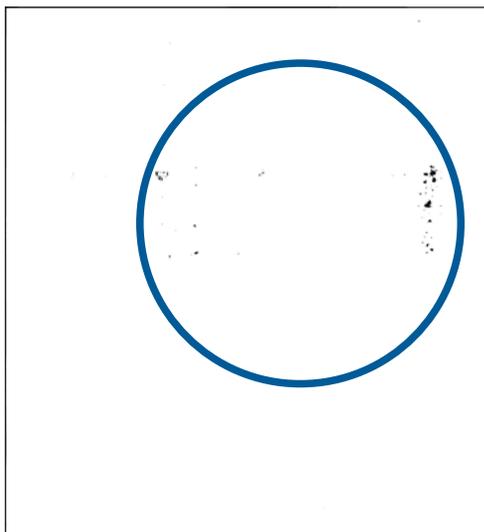
**Brand C: Extraneous Marks on Pages**

### EXHIBIT D



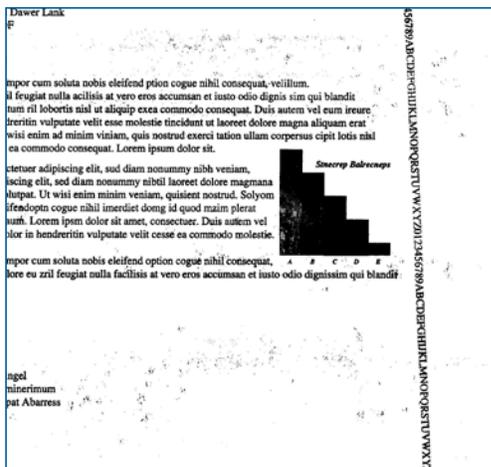
**Brand D: Toner Flaking due to Hot Roll Failure**

### EXHIBIT E



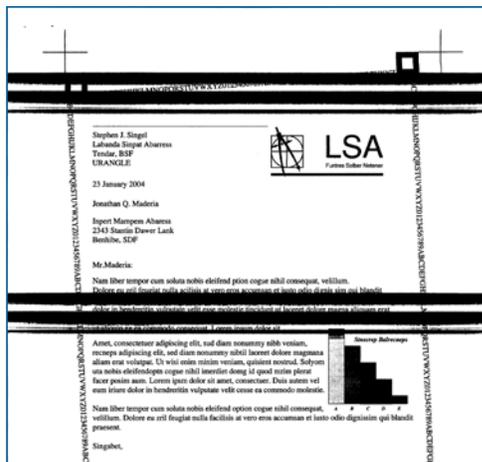
**Brand D: Toner Flaking on back of page due to Hot Roll Failure**

**EXHIBIT F**



**Brand D: Excessive Background due to Fusing Problems**

**EXHIBIT G**



**Brand D: Heavy Banding due to Fusing Problems**

**LAB TEST DATA**

**Yields by Manufacturer**

LEXMARK	PAGES PRINTED	COMMENTS
1	300,000	Met rated life
2	300,000	Met rated life
3	300,000	Met rated life
4	300,000	Met rated life
5	300,000	Met rated life
6	300,000	Met rated life
<b>TOTAL</b>	<b>1,800,000</b>	

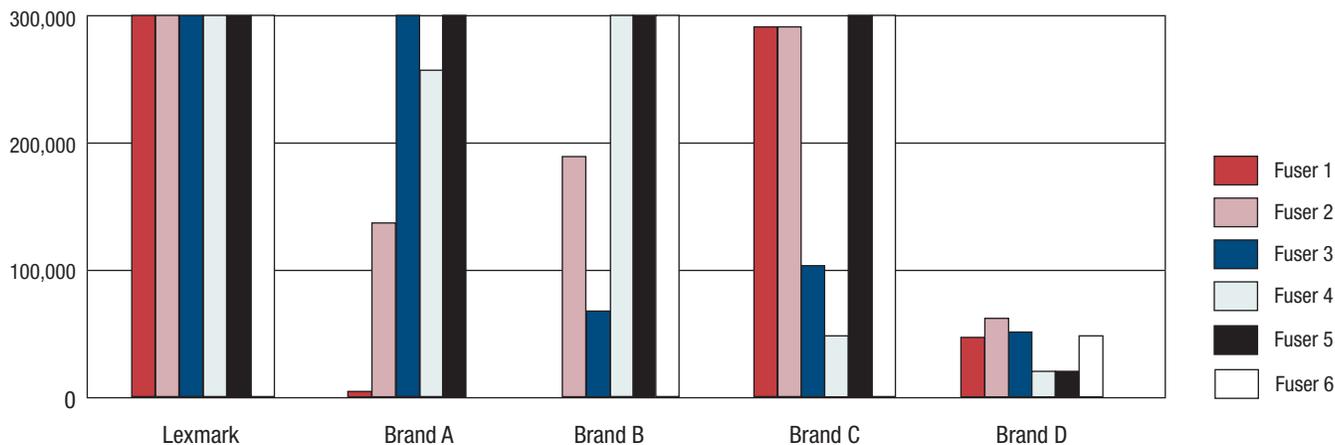
BRAND A	PAGES PRINTED	COMMENTS
1	4,304	Premature expire; Code 202.03
2	136,858	Premature expire; loud squeaking noise
3	300,000	Met rated life
4	256,905	Other failure; Code 920.07, then 924.01
5	300,000	Met rated life
6	0	Out-of-box failure; frame was warped
<b>TOTAL</b>	<b>998,067</b>	

BRAND B	PAGES PRINTED	COMMENTS
1	0	Out-of-box failure; frame was warped
2	188,659	Premature expire; Code 202.51
3	67,542	Premature expire; Code 920.57
4	300,000	Met rated life
5	300,000	Met rated life
6	300,000	Met rated life
<b>TOTAL</b>	<b>1,156,201</b>	

BRAND C	PAGES PRINTED	COMMENTS
1	290,895	Other failure; Code 201.52
2	290,959	Other failure; blistered pressure roller resulting in heavily creased pages
3	103,310	Premature expire; loud squeaking noise
4	47,210	Premature expire; mark on hot roll resulting in print quality issues
5	300,000	Met rated life
6	300,000	Met rated life
<b>TOTAL</b>	<b>1,332,374</b>	

BRAND D	PAGES PRINTED	COMMENTS
1	46,898	Premature expire; toner flaking due to hot roll failure
2	61,887	Premature expire; toner flaking due to hot roll failure
3	50,528	Premature expire; toner flaking due to hot roll failure
4	20,016	Premature expire; toner flaking due to hot roll failure
5	20,015	Premature expire; hot roll failure resulting in excessive fusing issues/print quality failures
6	47,890	Premature expire; toner flaking due to hot roll failure
<b>TOTAL</b>	<b>247,234</b>	

**Graph 4: Fuser Yields by Brand**



### Service Codes

BRAND	FUSER NUMBER	FAILURE TYPE	SERVICE CODE	DEFINITION
A	1	Premature expire	202.03	Media remains on the sensor (narrow media) during the warm up sequence
A	4	Other	920.07	The fuser hot roll temperature is not maintained properly while the media in the fuser nip
A	4	Other	924.01	The fuser thermistor has failed
B	2	Premature expire	202.51	Media reached the sensor (fuser output) but did not clear it in the specified time
B	3	Premature expire	920.57	The fuser hot roll temperature is not maintained properly while the media in the fuser nip
C	1	Other	201.52	The media is late reaching the sensor (fuser output) with the specified time

## TEST METHODOLOGY

### Test Conditions

BLI performed all testing in its 10,000-square-foot U.S. lab located in Hackensack, NJ. All tests were conducted under controlled conditions of temperature and humidity, with conditions monitored 24/7 by an Ex-tech RH S20 Digital RH/Temperature Recorder and Honeywell Model 61 Seven-Day Temperature/Humidity Chart Recorder. Running average temperature was 68°F to 78°F, and running average humidity range was 35% to 65%. All test devices and materials were conditioned for a minimum of eight hours prior to testing. Six of each fuser brand were tested over three dedicated printers, and printers were replaced whenever an individual device showed signs of diminished performance. Following test completion of a fuser, that printer was cleaned of all paper dust and serviced with new charge, pick and transfer rollers. The printers were all run in default mode.

Though the third-party fusers are referred to as Brands A through D in this report, it should not be assumed that the order in which these brands are identified on page 1 directly corresponds to A through D throughout the report.

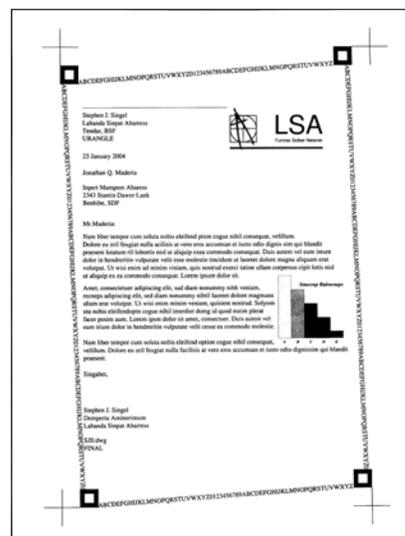
### Reliability

Throughout testing, any fuser malfunctions observed, such as operational/mechanical failure, physical defects and fuser-related print defects, were recorded. Out-of-Box Failure: a fuser that was inoperable upon installation or produced 20 or fewer acceptable pages. Premature Expire: a fuser that produced less than 75% of the rated yield. Other: a fuser that had an issue after it produced more than 75% of, but less than, the rated yield.

## Page Yield

To evaluate page yield, BLI used the ISO 19752 monochrome test target (see Exhibit H at right). A fuser was considered to be at the end of life when it was inoperable after installation or physical damage prevented it from being installed, a malfunction or fuser-related print defects occurred, a service code that could not be cleared was brought up on the display, or a Code 80 prompted the operator to replace the fuser. The total page count per fuser was defined as the number of acceptable pages printed (that is, pages without fuser-related print defects such as excessive streaking, textual imperfections or fading). The overall average page yield was defined as the combined total number of acceptable pages printed by all of the fusers per brand, divided by six.

## EXHIBIT H



ISO 19752 Monochrome Test Target

## ABOUT BUYERS LABORATORY

Since 1961, Buyers Laboratory LLC (BLI) has been the leading global independent office-equipment test lab and business consumer advocate. In addition to publishing the industry's most comprehensive and accurate test reports on office document imaging devices, each representing months of exhaustive hands-on testing in BLI's US and UK laboratories, the company has been the leading source for extensive runnability testing on imaging media and consumables, as well as extensive specifications/pricing databases on MFPs, printers, scanners and fax machines. BLI also has a long-standing reputation for being the industry's most trustworthy and complete source for quality testing services and global competitive intelligence.

In addition to testing over 200 office machines and related consumables annually for its subscribers, BLI provides consulting services to buyers and a range of private testing services that include document imaging device beta and pre-launch testing, performance certification testing, consumables testing (including toner, ink and photoconductors), solutions evaluations, and imaging media runnability testing.

For more information regarding this report or BLI's test services, please call BLI's U.S. lab at 201-488-0404 or BLI's U.K. lab at +44 (0) 118-977-2200; or you may email BLI at [info@buyerslab.com](mailto:info@buyerslab.com) or visit [www.buyerslab.com](http://www.buyerslab.com).