

Printer and Multifunction Toner Yields



Table of Contents

Consumable Yield Testing and Reporting Overview.....	1
ISO/IEC Standardization Efforts	1
The ISO/IEC Consumable Yield Standard	1
Stated Yield versus Actual Yield	2
Other Consumable Testing.....	2
Questions and Answers.....	3

As part of our commitment to quality, reliability, and customer satisfaction, we support industry standards such as those set by the International Organization for Standardization (ISO) and the International Electrotechnical Commission (IEC).

This document details methodologies for testing and reporting estimated yields for toner cartridges.

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CONSUMABLE YIELD TESTING AND REPORTING OVERVIEW

Customers are becoming increasingly aware of the cost of owning and operating their printers. The cost of consumable supplies such as toner cartridges is a major component of the Total Cost of Ownership (TCO) for a printer. The per-page cost of printing is driving many printer purchase decisions today, as these costs are combined with print volume and print coverage assumptions to give companies a reasonable estimate of the monthly and annual TCO for a specific printer.



ISO/IEC STANDARDIZATION EFFORTS

The International Organization for Standardization (ISO), based in Geneva, Switzerland, is composed of national standards bodies that formulate and issue technical standards. These play a key role in the development, manufacturing, and supply of products and services.

The ISO collaborates on all matters of electrotechnical standardization with the International Electrotechnical Commission (IEC), the leading global organization that prepares and publishes international standards for all electrical, electronic, and related technologies.

Further information about the ISO organization and its standards can be found at www.iso.org. More information on the IEC can be found at www.iec.ch.



THE ISO/IEC CONSUMABLE YIELD STANDARD

The ISO and IEC have adopted a standard for black-and-white devices—ISO/IEC 19752—which is described as “a method for the determination of toner cartridge yield for monochromatic electrophotographic printers and multifunction devices that contain printer components.” Black-and-white printers reporting toner yields under ISO/IEC 19752 use the following explanation:

Toner Cartridge Yield:

- Average XX,XXX standard pages¹

¹ Declared yield in accordance with ISO/IEC 19752. Yield will vary based on image, area coverage, and print mode.

ISO/IEC 19798 is a similar standard that has been adopted for color laser devices. ISO/IEC 19798 is described as “a method for the determination of toner cartridge yield for color printers and multifunction devices that contain printer components.”



Reporting format is as follows:

- Average Continuous CMYK Yield: XX,XXX pages

or

- Average Continuous CMY Yield: XX,XXX pages
- Average Continuous Black Yield: XX,XXX pages (if the Black Yield is different than Color)

Different implementations of color tables and color balance optimization among manufacturers can lead to yield variations between color cartridges, even if they have the same toner weight. To account for this, ISO supports a second reporting method called “composite yield,” allowing a single average reporting yield for Cyan, Magenta, and Yellow toner cartridges. Black is reported separately as an individual yield.

- Average Continuous Composite CMY Yield: XX,XXX pages
- Average Black Continuous Yield: XX,XXX pages

ISO/IEC 19752, and ISO/IEC CD 19798 specify the use of a standard test page for black and white, multiple test pages for color products, explicit testing procedures, statistical sampling, environmental controls, and well-defined cartridge end-of-life status. More information on these specifications is available under the Test Parameters and Conditions section of this document.

At Xerox, we have adopted ISO/IEC 19752 for testing and reporting toner cartridge yields for our black-and-white printers. Likewise, we have also adopted ISO/IEC 19798 for testing and reporting color toner cartridge yields, for our color printers. Adopting ISO/IEC yield reporting standards benefits manufacturers and customers by enabling consumable yield comparisons across product lines and manufacturers.

STATED YIELD VERSUS ACTUAL YIELD

The ISO/IEC standard allows for objective comparisons of stated toner yields for different printers, regardless of OEM. Many prospective customers use consumable yield information to estimate the toner life they can expect to experience with their particular applications, and adherence to the ISO/IEC standard enables this analysis.

It is important to note that the ISO/IEC yield is a comparative statistic and not a predictive tool. The number of pages that customers will get for their own applications will depend on a variety of factors, with page coverage having the highest impact. Research has shown that the industry average for black-and-white page coverage is between 4% and 5%. There is an inverse relationship between page coverage and toner yield—the lower the page coverage, the more pages the toner will yield. Conversely, pages with higher coverage result in lower toner yields.

Customers utilizing heavy page coverage applications will achieve lower toner yields. Many Xerox® Printers contain an important feature called Usage Profile, giving customers access to page coverage data on a job-by-job basis, or an average for all jobs printed by a specific printer. This data can be downloaded to a Microsoft® Excel® file or viewed online via Xerox® CentreWare® Internet Services and Xerox® Embedded Web Server. Using this information, customers can estimate if they will achieve higher or lower toner yields compared to the declared ISO/IEC standard yields.

OTHER CONSUMABLE TESTING

Currently, only toner cartridges are subject to ISO/IEC yield standards. Drums (or imaging units), fuser units, and maintenance kits are not covered. Yields are published based on the OEM’s own testing methodology. Users should be aware of the factors that can impact drum and fuser yields, as these are longer-life consumables that can be significantly impacted by usage patterns and certain types of media.

QUESTIONS AND ANSWERS

Our Compliance with ISO/IEC Standards

Q: Will you provide “ISO/IEC certificates” for supplies that have been ISO/IEC yield tested?

A: The ISO/IEC certification process does not result in the issuance of certificates. By declaring a yield according to ISO/IEC standards, we warrant that we have done the testing according to ISO/IEC standards and guidelines. This declaration will be found in data sheets or collaterals that list consumable supplies yields.

Q: Do we publish our ISO test results?

A: Yes. They can be found online at www.office.xerox.com/iso/.

Stated Yield versus Actual Yield

Q: Can I get the ISO/IEC yield for my specific printing application?

A: No. The ISO/IEC standard ensures that the stated consumable yields of different printer OEMs are comparable by specifying a set of common testing parameters and conditions. It is not guaranteed that users will get the declared yields in their own applications, as page coverage varies by application, and page coverage has the highest impact on actual yields. User applications running at approximately 5% page coverage under normal office operating conditions can expect, on average, to experience yields that are similar to the ISO declared yields.

Q: What are the factors that will impact the yields users get from toner cartridges?

A: The most important factor affecting yield is page coverage. Coverage analysis has consistently shown that in office environments, the average black-and-white page coverage is in the range of 4% to 5%. However, it is not unusual for office applications to run above or below that average. In general, pages with significant dark or shaded areas (logos or pictures) or a large amount of fine print will generate area coverage higher than 5%. Other factors that can reduce toner cartridge yield include higher temperature, higher humidity levels, and using a higher print resolution setting.

Color coverage varies by product class, but is generally much higher than black-and-white products. Letter/A4-size color printers can have average page coverage in the 7-15% range (depending on the application and mix between color and black-and-white documents). Tabloid/A3-size color printers tend to drive higher color page coverage, in the range of 10-30%, in office environments. In graphic arts environments, average color page coverage can increase to the 40-60% range. The ISO/IEC color standard is based on an overall page coverage in the range of 20%. Users whose average color coverage is under 20% are likely to experience greater yields than reported, while those running higher coverage applications will experience lower yields than reported.



Q: How is color page coverage calculated?

A: Color page coverage is the sum of the individual coverage for cyan, yellow, magenta, and black toners. Color applications tend to be more elaborate (often including charts and images), so the area coverage tends to be much higher than monochrome pages on average. It is not unusual to find color pages (like pictures) with total coverage in the range of 40-60%, or even in excess of 100% if “process black” is used (where cyan, yellow, and magenta are combined to create black). The color test suite for ISO/IEC CD 19798 and ISO/IEC 24711 is composed of five representative samples of office color printing (see the Appendix).

For more information, please contact your Xerox sales representative, local reseller, or visit www.office.xerox.com.