



Standard Practice for Determining Page Yield of Ink Jet Printer Cartridges— Continuous Printing Method¹

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1. Scope

1.1 This practice describes a continuous printing procedure to determine the page yield of an ink jet printer cartridge containing either a monochrome or a multi-color reservoir. Printing done continuously may result in a different page yield than that of intermittent printing.

1.2 This practice can be used to evaluate the page yield of an ink jet printer cartridge or a comparison between several ink jet printer cartridges when evaluated on the same ink jet printer model. This practice can also be used for a comparison between different printer models using the same cartridge number.

1.3 *This standard does not purport to address all of the safety concerns, if any, associated with its use. It is the responsibility of the user of this standard to establish appropriate safety and health practices and determine the applicability of regulatory limitations prior to use.*

2. Referenced Documents

2.1 *ASTM Standards:*²

[F909 Terminology Relating to Printers](#)

[F1174 Practice for Using a Personal Computer Printer as a Test Instrument](#)

[F1856 Practice for Determining Toner Usage for Printer Cartridges](#)

[F1857 Terminology Relating to Ink Jet Printers and Images Made Therefrom](#)

[F1942 Practice for Creating Test Targets for Determining the Ink Yield of the Imaging Supplies Used in Ink Jet Printers](#)

3. Terminology

3.1 *Definitions:*

3.1.1 See Terminology [F909](#) for terms relating to printers.

¹ This practice is under the jurisdiction of ASTM Committee [F05](#) on Business Imaging Products and is the direct responsibility of Subcommittee [F05.07](#) on Ink Jet Imaging Products.

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² For referenced ASTM standards, visit the ASTM website, www.astm.org, or contact ASTM Customer Service at service@astm.org. For *Annual Book of ASTM Standards* volume information, refer to the standard's Document Summary page on the ASTM website.

3.1.2 See Terminology [F1857](#) for terms relating to ink jet printers and images made therefrom.

3.1.3 *end-of-life*—status of ink jet cartridge when print shows severe banding, void areas, or light print. Some printers stop printing when employing low ink detection systems.

4. Summary of Practice

4.1 This practice describes a method to determine the page yield of an ink jet printer cartridge based on the number of pages printed using predetermined page area coverage. This practice can be used to evaluate an ink jet printer cartridge or a comparison between several ink jet printer cartridges. This practice can also be used for a comparison between different printer models using the same cartridge number.

5. Significance and Use

5.1 This practice can be used to determine the number of pages an ink jet printer cartridge can print until it reaches its end-of-life by continuously printing predetermined page area coverage.

5.2 This practice can be used for the evaluation of an OEM (Original Equipment Manufacturer) cartridge compared to a refilled, remanufactured, or compatible ink jet printer cartridge when this practice is performed on the same printer.

5.3 This practice is applicable to all ink jet cartridges, whether single or multi-color.

5.4 This practice may be used for comparison between different ink jet printers that use the same cartridge(s) providing that print quality and media/paper settings are comparable. Comparable settings could typically be described as the printer's default settings.

5.5 This practice can be used to assess design goals of manufacturers of ink jet printer cartridges for ink capability, ink filling effectiveness, and the manufacturing process.

5.6 This practice may be used for research and development, and for quality acceptance evaluation.

5.7 The results produced by this practice can be used for competitive comparisons or the determination of cost per page analysis.

6. Interferences

6.1 Printer related controls such as print quality settings and media/paper settings, as well as printer drivers for different operating systems, will produce different yield results. In a comparative test the same printer, printer settings and the same operating system should be used. Different printers describe print quality settings using different terms. This practice will use the print quality setting of “normal” or “standard” and the media/paper setting for plain paper. These are typically the default settings for the printer. If the printer driver has a color adjustment choice of “graphic” or “photo,” choose the “graphic” setting.

6.2 An ink jet cartridge designed for use on more than one printer model can result in different page yields.

6.3 The printable area should be 8 by 10 in., making this test usable for standard letter and A4 size papers in accordance with Practice **F1856**. This test cannot be conducted using a printer that does not accept standard letter or A4 size paper.

6.4 The test should be performed at a controlled temperature and humidity within the operating range of the printer. All equipment and materials should be conditioned in the test atmosphere for at least 24 h prior to testing.

6.5 Different percent page coverage of the test targets will produce different results. In a comparative test, the same test target should be used.

6.6 Test printers should be in good mechanical and electrical condition. Any printer failures can invalidate the test.

6.7 Test cartridges must function properly without any defects in the print.

6.8 When printing black, some printers with all-in-one cartridges will underprint the black print with cyan, magenta, and yellow even if “black only” print is specified. Therefore, because the color cartridge used during black print testing is actually printing, a different unused color cartridge should be used when conducting a yield test for the color cartridge. In all cases, make sure that the color being tested is the only color being printed—true black, true cyan, true magenta, and true yellow.

6.9 Some printers perform an ink-charging procedure when used for the first time and ink is used from the first cartridge(s) installed. Therefore, a different cartridge should be used to conduct this test.

7. Equipment and Materials

7.1 *Ink jet test printer(s)* suitable for testing purposes, following the guidelines as stated in Practice **F1174**.

7.2 *Test target and digital printing system* complying with Practice **F1942**.

7.3 *Reference cartridge* (OEM printer specified) for a comparative test.

7.4 *Test cartridge* designed for use in the test printer.

7.5 *Conditioned paper* meeting the requirements of the printer. The same paper type and manufacturer should be used for all comparative tests.

8. Test Procedure

8.1 Select the ink jet cartridge to be tested. Remove the seal or clip, or both, according to printer-specific manual.

8.2 Before beginning test, install a reference cartridge (OEM printer specified) in accordance with the instructions of the printer user’s manual. Print a test page, either self-test or PC-controlled, to ensure the test printer is working properly. (This is especially important if the test printer has never been used and uses an ink-charging process.) Remove cartridge.

8.3 Install the test cartridge in a properly working test printer and perform the same routine as **8.2**, to ensure the test cartridge is working properly. If the test cartridge is not working properly, perform the cartridge cleaning function of the printer. If the test cartridge is still not printing properly, replace with another cartridge and repeat this step.

8.4 Program the test printer with desired test target utilizing the digital printing system as stated in **7.2**. To compare yield to the original equipment manufacturer’s page yield results, a 5 % coverage test target should be used. (For a less time-consuming test for other purposes such as research and development, a test target with a higher percent coverage can be used and extrapolated to 5 % coverage).

8.5 Begin printing test pattern and continue printing until cartridge reaches end-of-life as defined in **3.1.3**.

8.6 Determine number of pages printed.

8.7 For multi-color cartridges, follow steps **8.1** to **8.6**, printing 5 % coverage for each color. Test is complete when one color exhibits characteristics of end-of-life or low ink detection system stops printing.

9. Report

9.1 Test date and location.

9.2 Identification of printer used and setup conditions.

9.3 Identification of reference ink jet cartridge (OEM printer specified).

9.4 Identification of evaluated ink jet cartridge. This may include variables such as ink design, manufacturing process, and so forth.

9.5 Test target name stating percent coverage.

9.6 Start and end printed pages of reference cartridge.

9.7 Start and end printed pages of test cartridge or comparison cartridge.

10. Keywords

10.1 ink jet; ink jet printer; page yield

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