



Designation: **D7189—05 D7189 – 12**

Standard Test Method for Relative Mileage of News Ink on Newsprint¹

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1. Scope

1.1 This test method covers the laboratory procedure for determining the relative mileage of news inks on newsprint. The test method utilizes a proofing press, analytical balance and a reflection densitometer.

1.2 This test method is intended for black oil-based news inks that dry by penetration (that is, letterpress or web offset) and for which a suitable reference standard is available. With appropriate optical instrumentation, it is also applicable to colored news inks.

1.3 This test method may also be used to determine the relative ink receptivity of test newsprints versus a reference standard.

1.4 The values stated in SI units are to be regarded as the standard. The values given in parentheses are for information only.

1.5 *This test method 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 to determine the applicability of regulatory limitations prior to use.*

2. Referenced Documents

2.1 *ASTM Standards:*²

[D528 Test Method for Machine Direction of Paper and Paperboard](#) (Withdrawn 2010)³

[D685 Practice for Conditioning Paper and Paper Products for Testing](#) (Withdrawn 2010)³

[D5039 Test Methods for Identification of Wire Side of Paper](#) (Withdrawn 2009)³

[D7305 Test Method for Reflection Density of Printed Matter](#)

3. Terminology

3.1 *Definitions:*

3.1.1 *ink mileage, n*—weight per unit area of ink required to achieve a given optical reflection density, laboratory units are g/m^2 .

3.1.2 *ink receptivity, n*—weight per unit area of ink required to achieve a target optical reflection density when comparing different paper/newsprint stocks, laboratory units are g/m^2 .

3.1.3 *news ink, n*—a pigmented paste composition that is applied to newsprint by printing machinery.

3.1.4 *newsprint, n*—paper substrate made from wood pulp used chiefly for printing newspapers.

3.1.5 *optical reflection density, n*—the light absorbing ability of a material, expressed as the logarithm of the reciprocal of the reflectance factor (that is, higher optical reflection density indicates more light is absorbed).

3.2 *Symbols:*

A = weight of inked plate after printing, g

B = weight of inked plate before printing, g

C = coverage (weight of ink) on the print, g

C_T = C required to achieve the target optical density, g

C_T = C required to achieve the target reflection density, g

D = optical density

¹ This test method is under the jurisdiction of ASTM Committee D01 on Paint and Related Coatings, Materials, and Applications and is the direct responsibility of Subcommittee D01.56 on Printing Inks.

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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 The last approved version of this historical standard is referenced on www.astm.org.

- D = reflection density
- M = mileage of an ink, or ink receptivity of a paper, g/m²
- S = printed area on the paper specimen, cm²

4. Summary of Test Method

4.1 Laboratory prints of the test news ink on the designated newsprint are made at various ink film weights giving optical reflection densities that span the target value.

4.2 The weight of ink on the print corresponding to the target density is determined graphically or by regression analysis. The resulting value for mileage, expressed as g/m², is compared to that obtained with the reference news ink tested in the identical fashion.

4.3 When the test method is used to compare different newsprint stocks with a reference newsprint, the relationship is called ink receptivity.

5. Significance and Use

5.1 Ink mileage on a production press is of economic importance of the user of printing inks, the lower the mileage figure, the less ink is required to produce a job. This test method provides a procedure by which news inks can be assessed for mileage or newsprint stocks for ink receptivity in the laboratory.

5.2 Because of the many variables that exist among laboratory and production presses, this test method is apt to yield more meaningful information when results are expressed on a relative rather than an absolute basis.

6. Apparatus

6.1 *Laboratory print maker—Print Maker*—preferably a motor driven printability tester capable of setting print pressure and having a readily removable printing plate that can be accommodated on an analytical balance.

6.2 *Printing plate—Plate*—typically a solid-faced disk composed of aluminum, rubber-covered aluminum, or rubber-covered nylon. Resulting prints are about 43.5 to 5 cm wide and 20 cm long (1½ by 8 in. long).

6.3 *Analytical Balance*—accurate to 0.0001 g with ~~150~~ minimum 160 g capacity to accommodate the typical disc in 6.2.

6.4 *Reflection Densitometer*—conforming to Test Method D7305.

NOTE 1—The filter systems in typical densitometers are suitable only for use with black, white, and the three process colors (yellow, magenta and cyan).

6.5 *Tongs—Tongs or Rubber Gloves (without powder)*—for handling the printing plate.

6.6 *Ink spatula—Spatula*—small.

7. Materials

7.1 For measuring mileage of news inks.

7.1.1 *Reference news ink*—having a known mileage, to be used as the basis for rating the test news ink.

7.1.2 *Newsprint*—cut to appropriate size appropriate to the print maker and consistent for printing side (felt or wire) and grain cut in machine direction.

7.1.3 *Target optical reflection density specificationspecification.*

7.1.4 *Backing material*—for use while making optical density measurements. ~~A black matte material or several sheets of unprinted newsprint stock reflection density measurements.~~ Unprinted newsprint stock in sufficient thickness to guarantee 99 % opacity is the standard. Typically, six or more sheets are required to achieve the opacity requirement. Other backing materials such as a matte black may be used by agreement between supplier and customer.customer but this must be clearly noted in the report.

7.1.5 *Clean-up materials*—such as mineral spirits and lint-free rags or tissues.

8. Hazards

8.1 **Warning**—Since solvents may be hazardous to the skin and eyes, wear rubber gloves and safety glasses during cleanup to avoid solvent contact with skin and eyes. See suppliers Material Safety Data Sheets for further information on each solvent used.

TABLE 1 Guidelines for Test Materials

Printability Tester	Size of newsprint mm cm	Size of print mm cm	Surface area of distribution mm ² cm ²	Initial ink added to rollers g g
Prufbau	4.5 × 28	4 × 20	570	0.10 – 0.15
IGT C-Type	4 × 25	3.5 × 20	720	0.16–0.25
IGT	5.5 × 28	5 × 20.8	1320	0.20–0.35
IGT A-Type	5.5 × 30	5 × 20	1200	0.20 – 0.35