INTERNATIONAL STANDARD

ISO 2834

Third edition
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Graphic technology — Test print preparation for offset and letterpress inks

Technologie graphique — Réalisation d'impressions pour encres pour offset et typographie

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International Organization for Standardization
Case postale 56 • CH-1211 Genève 20 • Switzerland
Internet iso@iso.ch

Printed in Switzerland

Foreword

ISO (the International Organization for Standardization) is a worldwide federation of national standards bodies (ISO member bodies). The work of preparing International Standards is normally carried out through ISO technical committees. Each member body interested in a subject for which a technical committee has been established has the right to be represented on that committee. International organizations, governmental and non-governmental, in liaison with ISO, also take part in the work. ISO collaborates closely with the International Electrotechnical Commission (IEC) on all matters of electrotechnical standardization.

International Standards are drafted in accordance with the rules given in the ISO/IEC Directives, Part 3.

Draft International Standards adopted by the technical committees are circulated to the member bodies for voting. Publication as an International Standard requires approval by at least 75 % of the member bodies casting a vote.

International Standard ISO 2834 was prepared by Technical Committee ISO/TC 130, *Graphic technology*.

This third edition cancels and replaces the second edition (ISO 2834:1981), of which it constitutes a technical revision.

Annex A of this International Standard is for information only.

Introduction

This International Standard is a combination of two previous International Standards ISO 2834 describing conditions for testing the resistance of printing inks to physical and chemical attack and ISO 5737 specifying a method for preparation of test prints for optical tests. The necessary revision of these two International Standards resulted in one International Standard exclusively describing the test print preparation for paste inks because for low viscosity gravure or flexo inks no method exists for reproducible preparation of test prints. If tests are done only for mechanical and chemical resistance the user may apply other less accurate methods. The methods described in this International Standard are used in other International Standards, such as ISO 2846-1, ISO 2846-2, ISO 2836, ISO 2837 and ISO 11628.

Graphic technology — Test print preparation for offset and letterpress inks

1 Scope

This International Standard specifies a test method for preparation of test prints and/or test samples produced with paste inks, such as for offset and letterpress printing. The test prints shall serve for optical tests, such as colorimetry, transparency and reflection density. They may also be used for testing the resistance of printing inks to mechanical and chemical attack regarding either printing ink and/or substrate.

2 Normative reference

The following normative document contains provisions which, through reference in this text, constitute provisions of this International Standard. For dated references, subsequent amendments to, or revisions of, any of these publications do not apply. However, parties to agreements based on this International Standard are encouraged to investigate the possibility of applying the most recent edition of the normative document indicated below. For undated references, the latest edition of the normative document referred to applies. Members of ISO and IEC maintain registers of currently valid International Standards.

ISO 13655:1996, *Graphic technology — Spectral measurement and colorimetric computation for graphic arts images.*

3 Test method

3.1 Principle

Using a printability tester, a known quantity of ink is printed uniformly on a known area of the reference paper or any other chosen substrate. The ink coverage is expressed in grams per square metre or, taking into account the mass density of the ink, by the ink layer thickness in micrometres.

For ease of operation, an ink pipette may be used for metering the amount of ink supplied to the inking unit. The actual amount of ink transferred to the substrate is only determined by weighing the printing forme before and after printing.

Additional to printing, test samples for mechanical and chemical resistance tests may be prepared using any technique resulting in a uniform ink film in a desired thickness range.

3.2 Apparatus

3.2.1 Printing

Printability tester with an inking unit allowing to uniformly ink the printing forme and to uniformly transfer the ink onto the substrate at constant speed and pressure.

3.2.2 Printing forme

The printing forme shall have either a polished metallic and non-porous surface or shall be covered by an elastomer or rubber blanket having a Shore A hardness of between 80 and 85. The type of the printing forme shall be mentioned in the report.

3.2.3 Analytical balance

The analytical balance shall be accurate to 0,1 mg.

3.3 Materials

3.3.1 Printing ink

Printing inks for the preparation of test prints shall be ready for use.

3.3.2 Substrate

For the purpose of optical tests, including the assessment of light fastness of an ink, there shall be prior agreement as to the substrate to be used. Whenever possible, a substrate having the characteristics described in annex A is recommended. Where a substrate having the characteristics described in annex A cannot be used, the test will only have relative character and will have to be related to the specific substrate used.

The substrate and properties shall be marked on the print and described in the report.

4 Procedure

4.1 Printing

4.1.1 Inking of the printing forme

An appropriate amount of ink shall be applied to the inking unit. Appropriate time for distribution on the inking unit and inking of the printing forme shall be chosen to ensure a homogeneous distribition of the ink.

NOTE For distribution and inking, 30 s for each, are suitable in most cases. However, for volatile (heat-set) inks, distribution and inking times should not exceed 20 s each (see 4.5).

4.1.2 Prints for optical tests

Test prints shall be prepared according to the following instructions.

— The print shall be made using a printability tester using a printing forme according to 3.2.2.

— In case of applying an ink coverage of more than 1 g/m^2 a metal forme can be used. This is to be mentioned in the report.

— Printing shall be directly from the printing forme to the substrate.

— The temperature of the inking unit shall be (24 ± 1) °C.

— Prints shall be produced with a printing line pressure of (225 ± 25) N/cm at a speed of (1 ± 0,1) m/s.

— The inking unit and the printing forme shall be cleaned after each print.

NOTE Solvent used to clean blanket covered printing formes may penetrate the material. Time must be allowed to ensure full evaporation of the solvent. Using two formes alternately is recommended.

— Separate ink distribution rollers and printing formes, if not metal, shall be used for radiation curing inks.

4.1.3 Evaluation

The amount of ink transferred to the substrate shall be determined by measuring the difference in mass of the printing forme before and after printing. The ink coverage shall be expressed in grams per square metre and is calculated according to the formula:

$$C = \frac{m_1 - m_2}{A}$$

where

C is the ink coverage;

m_1 is the mass of the inked forme before printing;

m_2 is the mass of the forme after printing;

A is the printed area.

Conversion of the ink coverage C to ink film thickness in micrometres shall be made by using the mass density of the ink according to the equation:

$$d = \frac{C}{\rho}$$

where

d is the ink layer thickness;

C is the ink coverage;

ρ is the mass density of the ink.

4.1.4 Ink film thickness

4.1.4.1 Optical tests

For optical tests the ink film thickness shall be reported with two decimal places.

4.1.4.2 Resistance tests

For testing the resistance of printing inks to mechanical or chemical attack the ink film thickness shall be $(1{,}5 \pm 0{,}5)$ µm on coated paper and $(2{,}25 \pm 0{,}75)$ µm on uncoated paper.

4.1.5 Drying

Prior to testing, the prints shall be thoroughly dry. If necessary, appropriate drying equipment should be used.

4.1.6 Provisions for heat-set and waterless inks

If problems in ink transfer arise, a small amount of oil (e.g. linseed oil) may be added to the ink prior to ink distribution. The volume amount of oil added should be kept as low as possible and shall not exceed 5 %. The volume percentage of oil added shall be noted and be used to correct the ink film thickness.

4.2 Other method

Test samples for mechanical and chemical resistance tests may also be prepared using any technique resulting in a uniform ink film in a desired thickness range.

5 Report

The report shall contain the following:

— the printing apparatus;

  — manufacturer and type;

  — type and material of printing forme;

  — distribution and inking times;

  — the ink coverage in grams per square metre or the ink layer thickness in micrometres;

  — the printed area;

— method of ink application if other than printing;

— the substrate (type, supplier, mass per area);

— the ink (designation, supplier, mass density);

— any operations not specified in this International Standard which might have modified the print result.

Annex A
(informative)

Reference substrate for optical tests

For the purpose of optical tests according to this International Standard, a light-fast gloss-coated woodfree paper free of optical brightener should be used, the characteristics of which are as follows.

Colour

CIELAB values: $L^* = 95,5 \pm 2,0$

$a^* = -0,4 \pm 1,0$

$b^* = 4,7 \pm 1,5$

Method: ISO 13655 (except for substrate backing)

Water absorptiveness

Specification: 2 g/m^2 to 5 g/m^2 after 10 s

Method: ISO 535

Gloss

Specification: 70 % to 80 %

Method: ISO 8254-1

Mass per area

Specification: (150 ± 3) g/m^2

Method: ISO 536

Ash content

Specification: 20 % to 30 %

Method: ISO 2144