INTERNATIONAL STANDARD ISO 2834

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Printing inks — Preparation of standard prints for determination of resistance to physical and chemical agents

Encres d'imprimerie — Réalisation d'impressions normales pour la détermination de la résistance aux agents physiques et chimiques

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FOREWORD

ISO (the International Organization for Standardization) is a worldwide federation of national standards institutes (ISO Member Bodies). The work of developing International Standards is carried out through ISO Technical Committees. Every Member Body interested in a subject for which a Technical Committee has been set up 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.

Draft International Standards adopted by the Technical Committees are circulated to the Member Bodies for approval before their acceptance as International Standards by the ISO Council.

International Standard ISO 2834 was drawn up by Technical Committee ISO/TC 130, *Graphic technology*, and circulated to the Member Bodies in August 1972.

It has been approved by the Member Bodies of the following countries :

Austria	Germany	Spain
Chile	India	Sweden
Czechoslovakia	Ireland	Switzerland
Denmark	New Zealand	Thailand
Egypt, Arab Rep. of	Poland	Turkey
Finland	Romania	United Kingdom
France	South Africa, Rep. of	

No Member Body expressed disapproval of the document.

Printing inks — Preparation of standard prints for determination of resistance to physical and chemical agents

0 INTRODUCTION

This International Standard is in technical conformity with CEI specification 01-59 of the European Committee of the Paint and Printing Ink Manufacturers' Associations.

A method of test for gravure inks is given in this International Standard although it is not applicable to all instances.

1 SCOPE

This International Standard specifies the conditions for testing the resistance of a printing ink to physical and chemical agents[1)] applied in accordance with clearly defined procedures on a given substrate selected in accordance with the ink used.

All test methods intended to determine the resistance of printing inks shall always be applied to a standard print prepared according to this International Standard unless otherwise indicated.

2 FIELD OF APPLICATION

In principle, the standard print shall be prepared on one of the substrates specified in 4.5 and 5.6 of this International Standard.

If the substrate is not in accordance with these requirements, the results of the test of course will only have a relative value and will have to be related to the specific substrate used for that print.

This International Standard applies to prints obtained from two types of ink, namely :

- letterpress, offset and lithographic inks;
- gravure inks intended for absorbent substrates (paper and board).

This International Standard does not apply to flexographic or silk screen printing.

3 REFERENCE

ISO/R 187, *Method for the conditioning of paper and board test samples.*

4 METHODS OF TESTING LETTERPRESS OFFSET AND LITHOGRAPHIC INKS

4.1 Principle

A known quantity of ink is spread uniformly over a flat known area of reference paper. The ink film thickness is calculated from the volume deposited and the surface area covered.

4.2 Printing process

Any printing process which gives an even uniform ink coating is permissible

4.2.1 on coated paper, according to the provisions of 4.5 with a quantity of ink the equivalent of 1,5 ρ g/m^2, ρ being the density of the ink used, expressed in grams per cubic centimetre.

The maximum tolerance on this value is ± 25 %.[2)]

4.2.2 on uncoated paper, according to the provisions of 4.5 with a quantity of ink the equivalent a 2 ρ g/m^2, ρ being the density of the ink used, expressed in grams per cubic centimetre.

The tolerance on this value is ± 25 %.[2)]

NOTE — Processes which make use of the following apparatus and equipment are considered appropriate :

a) Presses : All roller-presses using the letterpress process

Plates : all metal plates (preferably zinc or copper) engraved according to the dimensions and the distribution of the areas indicated in the figure.

- Plate dimensions : 80 mm × 120 mm
- Screen : 54 lines/cm for coated paper
  48 lines/cm for uncoated paper
- Values of screened areas : 50 to 60 % (70 % in the case of testing for resistance to solvents.)

1) The determination of optical properties of prints will be the subject of a future International Standard.

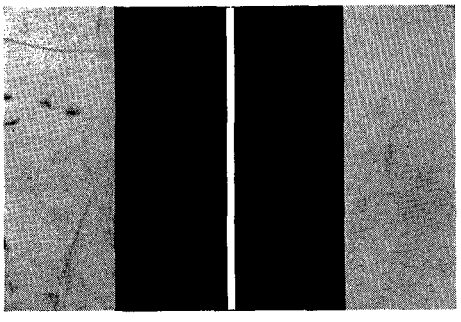
2) If necessary this tolerance may be reduced to ± 10 % (for example for the determination of lightfastness).

Inking of plate : Inking is carried out in the direction indicated by the arrow and with an ink film which will ensure a clean printing of the screen without filling in.

b) It is also permissible to use :

- hand rollers;
- laboratory printability apparatus designed to determine suitability for printing;
- proof presses;
- production machines using letterpress or offset processes.

Scale 1 : 2



Screen Flat Screen

FIGURE – **Metal plate engraving**

4.3 Dimensions of test print

The sections of the forme should have dimensions of at least 20 mm × 50 mm.

4.4 Printing inks

Ink supplied "ready for use" must be used in accordance with the suppliers' instructions.

4.5 Substrates

4.5.1 *For testing light fastness*[1)]

Take a light-fast paper coated on both sides, without optical bleaching agents, containing no mechanical wood pulp and with a minimum grammage of 150 g/m².

4.5.2 *For testing resistance to liquids, solutions, solvents, alkalis etc.*

Take an uncut calendered paper with a high satin finish, without optical bleaching agents, containing no mechanical wood pulp, with a minimum grammage of 100 g/m² and which provides a satisfactory print with a screen of 48 lines/cm.

Both of these papers shall be as chemically neutral as possible.[2)]

4.6 Temperature and humidity conditions

Unless indicated to the contrary the test prints shall be made and left to dry in an atmosphere in accordance with the provisions of ISO/R 187. The length of conditioning time shall be determined by the nature of the product tested.

4.7 Drying of test prints

Test prints are to be dried in free air (i.e. unstacked) in the temperature and humidity conditions given in 4.6.

Unless otherwise indicated the drying time is to be 72 h.

5 METHODS OF TESTING PHOTOGRAVURE INKS INTENDED FOR ABSORBENT SUBSTRATES (PAPER AND BOARD)

5.1 Principle

Using an appropriate method a known quantity of ink is spread uniformly over the surface of a reference paper (complying with the requirements of 5.6). The ink film thickness is calculated from the non-volatile content of the ink and the volume applied. (See the annex.)

5.2 Determination of the dry extract content

By means of a pipette, apply 1 cm³ of the ink to be analysed onto the printing paper specified in 5.6. Rinse the pipette twice with 1 cm³ of thinning solvent recommended by the manufacturer, the product of this rinsing shall be added to the ink on the paper. Take care that the ink is spread evenly over the paper.

Leave the inks to dry in the temperature and humidity conditions specified in 5.7, until constant mass is achieved.

The dry extract content is determined by the difference between the mass of the paper before application of the ink and after the ink has dried.

In each case the sampling shall be duplicated. In order to calculate the quantity of ink applied, take the mean value of the two analyses.

5.3 Application of ink

Spread 10 cm³ of ink per square metre evenly over the entire surface of the reference paper.

Check the quantity of ink in the following manner : weigh the sheet of printing paper, before and after printing, in

1) A method for the determination of resistance to weathering is under consideration by CEI.

2) Reference paper conforming to these requirements may be obtained from Eidg. Materialprüfungsanstalt, Unterstrasse 11, 9001 St. Gall, Switzerland.

normal conditions of temperature and humidity according to 5.7. Before the second weighing the printed paper will have to be dried for at least 24 h in these conditions. The ensuing difference in mass per square metre shall correspond to the non-volatile content analysed according to 5.2 with a tolerance of ± 15 %.[1)]

Any ink-spreading process and any printing method is permissible provided that an even spreading over the entire surface is obtained in a single operation.

NOTE — The distribution of the ink by means of a special scraper and a rubber support is particularly suitable.

5.4 Dimensions of the test print

The dimensions shall be at least 15 mm × 100 mm and adjusted to fit to those of the forme.

5.5 Printing ink

Use inks which are either "ready for use" or prepared "ready for use" according to the supplier's instructions (i.e. brought to printing viscosity).

5.6 Substrate

Use a photogravure paper of 140 g/m² containing no mechanical pulp, light-fast, with a high satin finish, making it possible to obtain, with a distribution of 10 cm³/m² an ink transfer or print which covers well.[2)]

5.7 Temperature and humidity conditions

Unless there is any contrary specification the test prints shall be made and left to dry in an atmosphere meeting the requirements of ISO/R 187. The air humidity shall be the same at the first and second weighing in accordance with the instructions in 5.2 and 5.3 with a tolerance of ± 2 %.

Before and after the ink transfer or printing, the paper must be left for at least 24 h in these temperature and humidity conditions.

5.8 Drying

Drying shall take place in free air in the temperature and humidity conditions specified in 5.7.

1) If necessary the tolerance may be reduced by ± 10 % (for example for the test for light fastness).

2) Reference paper complying with these requirements can be obtained from Eidg. Materialprüfungsanstalt, Unterstrasse 11, 9001 St. Gall, Switzerland.

ANNEX

CALCULATION OF THE FILM THICKNESS OF DRY INK (PHOTOGRAVURE INKS)

The film thickness of dry ink (photogravure ink) is calculated from the volume of wet ink applied, the print area, the mass of the non-volatile content and the density of the dry ink.

$$e = \frac{Va}{\rho S} 10^4$$

where

e is the thickness, in micrometres, of the film of dry ink;

V is the volume, in cubic centimetres, of the ink applied (wet ink);

S is the print area in square centimetres;

a is the mass, in grams per cubic centimetre, of the non-volatile content of the ink;

ρ is the density, in grams per cubic metre, of the dry ink.