
International Standard



5737

INTERNATIONAL ORGANIZATION FOR STANDARDIZATION • МЕЖДУНАРОДНАЯ ОРГАНИЗАЦИЯ ПО СТАНДАРТИЗАЦИИ • ORGANISATION INTERNATIONALE DE NORMALISATION

Prints — Preparation of standard prints for optical tests

Impressions — Réalisation d'impressions normalisées destinées aux mesures optiques

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Descriptors : prints, printing inks, test specimen conditioning, test specimen, marking, specifications, test equipment.

Foreword

ISO (the International Organization for Standardization) is a worldwide federation of national standards bodies (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 authorized 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 5737 was developed by Technical Committee ISO/TC 130, *Graphic technology*, and was circulated to the member bodies in May 1982.

It has been approved by the member bodies of the following countries :

Australia	Germany, F. R.	Sweden
Austria	India	Switzerland
Czechoslovakia	Italy	United Kingdom
Egypt, Arab Rep. of	New Zealand	USSR
Finland	Romania	
France	South Africa, Rep. of	

No member body expressed disapproval of the document.

Prints — Preparation of standard prints for optical tests

0 Introduction

This International Standard technically conforms to document CEI 14-74 of the European Committee of Paints, Printing inks and Artists' colours Manufacturers Associations.

1 Scope and field of application

This International Standard specifies a method for the preparation of print specimens for optical tests, such as colorimetric tests, optical density and brightness tests. It also gives the information required for the marking of these specimens.

These specimens, which are known as standard prints and are obtained by the method defined in this International Standard, shall be used for any subsequent optical tests regarding either printing substrates or the ink-support assembly.

This International Standard applies only to prints prepared by the typographic or offset methods.

2 Reference

ISO 2834, *Printing inks — Preparation of standardized prints for determination of resistance to physical and chemical agents*.

3 Definition

standard print for optical tests : A print made with a known mean thickness of ink following the procedure specified in this International Standard.

4 Method

4.1 Principle

Using an appropriate method and taking account of the density of the ink, a known quantity of ink, in grams per square metre, is regularly spread over the substrate in order to obtain a print of a specified thickness.

4.2 Materials

4.2.1 Ink, delivered ready for use by the manufacturer.

4.2.2 Substrate, chosen according to the print required.

4.3 Apparatus

4.3.1 Ink pipette, accurate to 0,01 cm³.

4.3.2 Printing machine or equipment, meeting the following requirements :

- the inking mechanism shall regularly ink the forme;
- the printing unit shall provide a uniform transfer of ink at constant speed and pressure.

The printed surface shall not exceed the development of any circular printing forme. The printing forme shall be easily removable.

NOTE — It is possible, in principle, to use laboratory devices, proof presses or production machines.

Flat/round or round/round equipment may be used. The inking and printing operations may be carried out on one machine or on two separate machines.

4.3.3 Forme, having a polished metallic and non-porous surface, a mass which shall not exceed the maximum load of the analytical balance used and dimensions that ensure that the mass of ink deposited with each printing shall be clearly in excess of the precision of the balance. By the use of the forme a uniform solid shall be obtained.

NOTE — For certain types of paper, it might be necessary to use supple printing formes, taking the necessary precautions required for such a case.

4.3.4 Analytical balance, accurate to 0,1 mg.

4.4 Preparation of materials

Take ink and substrate samples representative of the lots to be tested.

Keep the ink and substrate at $23 \pm 1^\circ\text{C}$ and $50 \pm 2\%$ relative humidity for at least 12 h.

Mark the direction and face to be printed of the substrate cut previously to the required size.

Stir the ink thoroughly with a spatula before taking a sample after having removed the skin.

4.5 Procedure

4.5.1 Inking the forme

Spread uniformly over the distributor roller, the desired quantity of ink, measured by means of the ink pipette (4.3.1).

Choose the distribution and inking times to ensure that the ink distribution shall be the most homogeneous possible.

4.5.2 Printing conditions

4.5.2.1 Pressure

Print under the conditions and with the pressure likely to obtain a homogeneous print within the range of the optical density required.

NOTE — With printing laboratory equipment account has to be taken of the geometry of the apparatus and that of the forme in order to regulate the "linear pressure". To calculate the pressure required multiply the "linear pressure", in newtons, by the width of the forme, in centimetres.

4.5.2.2 Speed of printing

This should be stated as a function of the equipment used and the nature of the materials to be tested.

4.5.3 Implementation

Ink the forme as specified in 4.5.1. Weigh the forme (4.3.3) on the analytical balance (4.3.4) before placing it on the machine (4.3.2) then print under the conditions specified.

Take out the printing forme from the machine and re-weigh. The forme should be handled quickly but with care in order to prevent any heating which could modify the characteristics of the ink.

The quantity ρ_s , expressed in grams per square metre, of printed ink is given by the equation

$$\rho_s = \frac{m_1 - m_2}{S} \times 10^4$$

where

m_1 is the mass, in grams, of the ink forme before printing;

m_2 is the mass, in grams, of the forme after printing;

S is the printed surface, in square centimetres.

From the quantity ρ_s , in grams per square metre, of printed ink and its density ρ , in grams per cubic centimetre, the thickness of the film deposited δ , in micrometres, is given by the formula

$$\delta = \frac{\rho_s}{\rho}$$

Make only one printing after each inking of the printing forme; however to establish the curve of values of the optical density linked with the thickness of the ink film for a determined whole ink-substrate, carry out several trials one after the other from different inking levels. Then carry out measurements in order to determine the couples, optical density value-ink film thickness, necessary for the graph of the curve.

NOTE — To obtain reproducible prints, it is necessary to

- clean the apparatus and printing forme after each printing;
- dry carefully so that there is no trace of cleaning solvent;
- take into account the requirements concerning the distribution and inking times, use inks and substrates prepared in the same way.

4.5.4 Drying

Dry the prints in air, at 23 ± 1 °C and 50 ± 2 % relative humidity.

Carry out optical tests 24 h after the printing.

5 Marking

A standard print for optical tests shall be marked as follows :

- the substrate (supplier, references, printed surface, mass per square metre),
- the ink (supplier, references, density),
- direction of printing compared with the direction of the manufacture of the substrate ("machine direction"),
- thickness, in micrometres, of the layer of ink or quantity of ink applied in grams per square metre,

and, if necessary, a statement of any deviation from the method specified.

6 Test report

The test report shall contain the following particulars :

- a) any operations not specified in this International Standard which might have modified the printing;
- b) the ambient conditions of temperature and relative humidity;
- c) the printing apparatus;
 - its mark and type;
 - type and quality of the forme and of the packing;
 - geometry of surfaces in contact;
 - dimensions of the printing zone;
- d) references of the measurement device for optical density;
- e) the results of measures made for each printing;
 - speed and contact time;
 - “linear pressure”;
 - volume of the distributed ink;
 - mass of printing forme before inking (in case of measurement of the transfer rate);
 - mass of the forme after inking;
 - mass of the printing forme after printing (or “transfer”).

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