

FINAL
DRAFT

INTERNATIONAL
STANDARD

ISO/FDIS
22934

ISO/TC 130

Secretariat: SAC

Voting begins on:
2021-03-02

Voting terminates on:
2021-04-27

Graphic technology — Communication of offset ink properties

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ISO/FDIS 22934

<https://standards.iteh.ai/catalog/standards/sist/1e0f8455-7041-4f1f-832d-45fbec67bc33/iso-fdis-22934>

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Reference number
ISO/FDIS 22934:2021(E)

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Published in Switzerland

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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.

The procedures used to develop this document and those intended for its further maintenance are described in the ISO/IEC Directives, Part 1. In particular, the different approval criteria needed for the different types of ISO documents should be noted. This document was drafted in accordance with the editorial rules of the ISO/IEC Directives, Part 2 (see www.iso.org/directives).

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Any trade name used in this document is information given for the convenience of users and does not constitute an endorsement.

For an explanation of the voluntary nature of standards, the meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the World Trade Organization (WTO) principles in the Technical Barriers to Trade (TBT), see www.iso.org/iso/foreword.html.

This document was prepared by Technical Committee ISO/TC 130, *Graphic technology*.

Any feedback or questions on this document should be directed to the user's national standards body. A complete listing of these bodies can be found at www.iso.org/members.html.

Introduction

Offset printing inks are special purpose, complex mixtures of chemicals intended to be applied on a substrate by offset printing. They have customized properties and defined drying mechanisms resulting in ink films with standard or customized properties. This document establishes requirements on the communication of offset ink properties, aiming to the optimized planning of printing and to ensure the inks have the appropriate properties for the intended use of the printed products. Examples are the use of alkali resistant inks for combined use with dispersion varnishes to avoid colour changes after printing or the use of higher light fast inks for outdoor applications.

For the printing of food packaging, additional requirements are in continuing development. Often, these are related to the usability of particular substances within the inks. Printers of food packaging are recommended to stay in close contact to their ink suppliers and industry federations and to follow actual developments in this area. Aspects of food safety for food packaging and children toy safety are outside the scope of this document.

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Graphic technology — Communication of offset ink properties

1 Scope

This document specifies offset ink related properties which are intended to be communicated between ink supplier and the printer, and which are essential for the optimized print production planning and the intended use of the final product.

NOTE The final product is not necessarily the finished print product.

Aspects related to food safety and other safety requirements like children's toys safety are not part of the scope of this document.

2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

ISO 2836, *Graphic technology — Prints and printing inks — Assessment of resistance of prints to various agents*

ISO 12040, *Graphic technology — Prints and printing inks — Assessment of light fastness using filtered xenon arc light*

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3 Terms and definitions

For the purposes of this document, the following terms and definitions apply.

ISO and IEC maintain terminological databases for use in standardization at the following addresses:

- ISO Online browsing platform: available at <https://www.iso.org/obp>
- IEC Electropedia: available at <http://www.electropedia.org/>

3.1

corona treatment

application of an electric discharge on a low surface tension surface in order to increase the surface tension to improve ink wetting and ink adhesion

3.2

ink

composite material containing colourants, functional components, vehicle and additives

Note 1 to entry: The ink is applied as a fluid to a substrate in the offset printing process and setting or drying by either physical (evaporation) and/or chemical (polymerisations e.g. oxidation, radiation induced, or other) processes to form an image for decorative, informative or technical purposes.

3.3

light fastness

resistance of the print to the effects of a specified light source (such as filtered xenon arc light)

**3.4
safety data sheet**

compilation of health, safety, and environmental data along with precaution measures for the safe handling of chemicals and chemical compositions

**3.5
transparency**
ability of an ink film to transmit light

Note 1 to entry: It is generally expressed as some measure of the unwanted scattering.

4 General requirements

Communication of ink properties shall be performed by the ink supplier in an official language of the local market.

Safety data sheets shall be available and shall be delivered for hazardous ink formulations without special request. These can be delivered physically or by electronic means.

The name of the product, its use, its colour and the contact data of the supplier of the ink shall be given. This information shall be provided on the container using a label.

NOTE Additional communication requirements can result from national laws. In particular, hazard symbols according to Reference [1] and labels according to Reference [2] might be necessary.

5 List of ink properties to be communicated

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5.1 General

Data communicated according to 5.2, 5.3, 5.4, 5.5, and 5.6 are data representative for typical qualities of offset inks. No batch specific data is required. Information can be given on a label on the container and shall be given in a technical data sheet.

5.2 Intended usage

The intended usage of the ink shall be specified. Typical substrates printable with the ink should be identified together with preprint requirements, for example, corona treatment of polyethylene or polyethylene terephthalate. Additional functionalities should also be addressed. It shall also be clearly identified where it is not intended to be used.

NOTE Additional functionalities can, for example, be the suitability for food packaging (if additional requirements were met). The not intended use can, for example, be the use for food packaging.

5.3 Light fastness

Light fastness shall be given for sheet fed offset inks and should be given for heat-set offset inks in one of the light fastness levels 1 to 8 or as an intermediate in the format "x-y" where x and y are neighbour digits between 1 and 8. Light fastness shall be determined according to ISO 12040.

5.4 Transparency

Transparency should be given in one of the categories "opaque", "semi opaque" or "transparent".

NOTE The terms "opaque", "semi opaque" and "transparent" typically are already used for the ink pigments. [3] The categorization is open to the manufacturer. A method to determine transparency is given in ISO 2846-1 [4] together with acceptance levels for the four-colour ink set inks cyan, magenta and yellow.

5.5 Drying mechanism

The drying mechanism shall be given in one of the main categories "oxidative", "setting", "radiation curing", or "other". More than one main category may be given if appropriate, e.g. "oxidative + setting". For "radiation curing", the use for one of the subcategories "mercury medium pressure lamps", "iron doted mercury medium pressure lamps", "UV-LED", or "electron beam" shall be specified. For "other" drying processes, specific requirements shall be given in detail.

NOTE Radiation doses for energy curing inks are typically not given since the exact amount of the ink film thickness is not available during the print and different dosimeters requiring different calibrations are used in the market.

5.6 Resistance to solvents and alkali

Particular solvents or alkaline environment affects some pigments in inks. To avoid bleeding or colour changes of inks in contact with wet varnish or glue it was recognized that fastness to the following agents is very beneficial.

5.6.1 Ethanol

The resistance to ethanol shall be given for sheet fed offset inks and should be given for heat-set offset inks in one of the categories "fast", "unstable" and "conditional". Fastness to ethanol shall be tested according to ISO 2836.

5.6.2 Solvent mixture

The resistance to the solvent mixture consisting from denatured ethanol — ethyl acetate — 1-methoxypropanol-2 mixture, 60 % by volume; 30 % by volume; 10 % by volume shall be given for sheet fed offset inks and should be given for heat-set offset inks in one of the categories "fast", "unstable" and "conditional". Fastness to the solvent mixture shall be tested according to ISO 2836.

5.6.3 Alkali

The resistance to alkali shall be given for sheet fed offset inks and should be given for heat-set offset inks in one of the categories "fast" and "unstable". Fastness to alkali shall be tested according to ISO 2836. If the ink film needs to be durable to even more rigorous conditions, testing according to ISO 12632^[5] should be performed.

5.7 Fresh conditioning

For oxidative drying sheet fed offset inks the presence of skin-avoiding properties shall be given.

5.8 Additional information

Parties may agree on further information, such as special resistances, ink film properties (gloss, slippage, etc.).

Bibliography

- [1] *United Nations Globally Harmonized System of Classification, Labelling and Packaging of Chemicals (GHS)*
- [2] *United Nations Recommendations on the Transport of Dangerous Goods (UN Rec. Tr.)^l*
- [3] HERBST W., HUNGER K., *Industrial Organic Pigments: Production, Properties, Application.* Wiley-VCH, 2004
- [4] ISO 2846-1, *Graphic technology — Colour and transparency of printing ink sets for four-colour printing — Part 1: Sheet-fed and heat-set web offset lithographic printing*
- [5] ISO 12632, *Graphic technology — Ink, paper and labels — Requirements on hot alkali penetration and resistance*

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