
**Graphic technology — Process control
for the production of half-tone colour
separations, proofs and production
prints —**

Part 3:

Coldset offset lithography on newsprint

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*Technologie graphique — Contrôle du processus de confection de
sélections couleurs tramées, d'épreuves et de tirages —*

Partie 3: Impression offset sans sécheur sur papier journal

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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.

International Standards are drafted in accordance with the rules given in the ISO/IEC Directives, Part 2.

The main task of technical committees is to prepare International Standards. 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.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. ISO shall not be held responsible for identifying any or all such patent rights.

ISO 12647-3 was prepared by Technical Committee ISO/TC 130, *Graphic technology*.

This second edition cancels and replaces the first edition (ISO 12647-3:1998) which has been technically revised, in particular the tone value increase values specified, as borne out by the print characteristic curves of Figure 3. Parameters of all process steps have to be adjusted to achieve these curves; they apply irrespective of whether a positive or a negative acting plate making process is used. The reference to letterpress has been removed completely. Some solid colour CIELAB values have been changed slightly in response to demands from the field.

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ISO 12647 consists of the following parts, under the general title *Graphic technology — Process control for the production of half-tone colour separations, proofs and production prints*:

- *Part 1: Parameters and measurement methods*
- *Part 2: Offset lithographic processes*
- *Part 3: Coldset offset lithography on newsprint*
- *Part 4: Publication gravure printing*
- *Part 5: Screen printing*
- *Part 6: Flexographic printing*

Introduction

When producing a half-tone colour reproduction it is important that the colour separator, proofer and printer have previously specified a minimum set of parameters that uniquely define the visual characteristics and other technical properties of the planned print product. Such an agreement enables the correct production of suitable separations (without recourse to "trial-and-error") and subsequent production of off-press or on-press proof prints from these separations whose purpose is to simulate the visual characteristics of the finished print product as closely as possible.

For more information on the technical background refer to ISO 12647-1.

It is the purpose of this part of ISO 12647 to list and explain the minimum set of process parameters required to uniquely define the visual characteristics and related technical properties of a half-tone proof or production print produced by coldset offset lithography on newsprint, or half-tone proof designed to simulate this, from a set of half-tone separation films.

It is a further purpose of this part of ISO 12647 to list values or sets of values of the primary parameters specified in ISO 12647-1 and related technical properties of a half-tone newspaper print or proof produced from a set of half-tone colour separation films. Where deemed useful, secondary parameters are also recommended for specification.

Since non-periodic screening and direct-to-plate techniques are common practice within newspaper printing, information on some of the pertinent parameters has been included.

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Graphic technology — Process control for the production of half-tone colour separations, proofs and production prints —

Part 3: Coldset offset lithography on newsprint

1 Scope

This part of ISO 12647 specifies a number of process parameters and their values to be applied when preparing colour separations for newspaper single or four-colour printing and proofing. The parameters and values are chosen in consideration of the complete process, covering the process stages: “colour separation”, “film setting”, “making of the printing forme”, “proof production” and “production printing”.

This part of ISO 12647 is applicable:

- to coldset offset and production printing and off-press proof printing processes on newsprint that use colour separation films rather than digital data;
- by analogy to press printing from printing surfaces produced by direct imaging methods and the corresponding proof printing processes
- It is not applicable:
- to line screens and non-periodic screens although certain parameters given can be applied by analogy. In particular, the tone value increases specified, apply directly because they refer to control patches that contain periodic screen half-tones;
- to flexo and letterpress production printing although a number of parameters can be applied by analogy.

2 Normative references

The following referenced documents are indispensable for the application 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 5-3, *Photography — Density measurements — Part 3: Spectral conditions*

ISO 8254-1, *Paper and board — Measurement of specular gloss — Part 1: 75 degree gloss with a converging beam, TAPPI method*

ISO 12647-1:2004, *Graphic technology — Process control for the production of half-tone colour separations, proof and production prints — Part 1: Parameters and measurement methods*

ISO 15930-4, *Graphic technology — Prepress digital data exchange using PDF — Part 4: Complete exchange of CMYK and spot colour printing data using PDF 1.4 (PDF/X-1a)*

ISO 15930-6, *Graphic technology — Prepress digital data exchange using PDF — Part 6: Complete exchange of printing data suitable for colour-managed workflows using PDF 1.4 (PDF/X-3)*

3 Terms and definitions

For the purposes of this document the definitions given in ISO 12647-1 and the following apply.

3.1 coldset offset lithography
method of offset lithographic printing where the inks set ("dry") primarily by absorption into the print substrate

4 Requirements

4.1 General

The following subclauses are arranged according to the order set out in ISO 12647-1. They also depend on it for the definition of the parameters and test methods.

If data files or colour separation film sets are supplied for printing they should be accompanied by a proof print that simulates the intended production printing condition to a sufficient degree. This fact shall be verifiable by measuring a well-known control strip or a similar control device that is printed on the proof print along with the subject.

4.2 Data file, colour separation films and printing formes

4.2.1 General

Electronic data should be delivered as PDF/X-1 or PDF/X-3 data files as defined in ISO 15930-4 or ISO 15930-6. Where film is supplied, the intended receiver of the film shall specify the tone value curve for which the film shall be prepared.

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4.2.2 Film or printing forme quality

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The tone values for film and printing formes shall be adjusted such that, for all primary colours, the tone value increase from data to paper conforms to one of the two curves specified in 4.3.4.1. Within an ink set, the printed characteristics of all the primary printing ink colours shall conform to the same tone value curve.

NOTE 1 Data sender and receiver need to agree on which of the two curves specified in Table 5 and shown in Figure 3 will be used. The choice of the appropriate curve for common use is generally made by national or international trade associations.

NOTE 2 Methods for tone value adjustments include setting of the RIP look-up table, choosing a suitable blanket type, suitable setting of the plate to blanket pressure and adjustment of the ink rheology.

EXAMPLE 1 Conventional plate making with negative film produces a tone value increase of 33 % in the mid tone. In order to achieve 26 %, the RIP look-up table was adjusted by - 4 % and the choice of a different ink generated a 3 % lower tone value increase. These two adjustments lowered the tone value increase to 26 %. If 30 % is to be achieved, less adjustments are necessary to reach the correct tone value increase.

EXAMPLE 2 With a given CTP system the tone value increase was found to be 22 %. An increased blanket to plate pressure yielded + 2 %, the remaining + 2 % were introduced at the RIP look-up table; 26 % tone value increase was achieved.

The resolution of the film or plate setter should be set to 500 cm⁻¹ and shall not be set to a lower value than 472 cm⁻¹ in order to assure a sufficient number of generated tone value steps.

The deviation of tone values over the complete printing forme shall not exceed ± 2 %. The deviation range of the measuring device (densitometer or camera-based device) shall be added to this value.

Unless otherwise specified, the core density of a colour separation film shall be at least 2,5 above the transmission density of the clear film (film base plus fog). The transmission density in the centre of a clear half-tone dot shall not be more than 0,1 above the corresponding value of a large clear area. The transmission density of the clear film shall not be higher than 0,15.

The fringe width of a colour separation film shall not be greater than 6 μm .

The colour separation film quality should be evaluated according to Annex B of ISO 12647-1:2004. Measurements shall be made with a (UV) transmission densitometer whose spectral products conform to ISO type 1 printing density as defined in ISO 5-3; for the evaluation of core properties, type 2 printing density may be used.

The clear film density requirement is based on the understanding that the density range of the clear areas of all films that are to be exposed on to an offset plate, for consistent work, should not exceed 0,10.

NOTE 3 As a practical guide, a core density of 2,5 above the clear film density will normally be achieved if the density of large solid areas is more than 3,5 above the clear film density.

NOTE 4 With non-periodic screens, a fringe width of not more than 4 μm is reported to give reliable results.

4.2.3 Screen frequency

For four-colour work, the screen frequency should be $(40 \pm 2) \text{ cm}^{-1}$. Within the same copy of a newspaper, the screen ruling shall be the same for colour and black-and-white printing. If, as an exception, other screen rulings are used, the tone value increase shall be adjusted such that it agrees with Table 5 and Figure 3.

NOTE 1 With computer-generated screening, the parameters screen ruling and screen angle can be varied slightly in conjunction, from one process colour to another, in order to minimize moiré patterns.

NOTE 2 With non-periodic screens, reliable results are obtained if the minimum dimension of the image elements is 40 μm .

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4.2.4 Screen angle

For half-tone dots without a principal axis, the nominal difference between the screen angles for cyan (C), magenta (M) and black (K) shall be 30° , with the screen angle of yellow separated at 15° from any other colour. The screen angle of the dominant colour should be 45° .

For half-tone dots with a principal axis, the nominal difference between screen angles for cyan, magenta and black shall be 60° , with the screen angle of yellow at 0° and 15° off from the next screen angle. The screen angle of the dominant colour should be 135° .

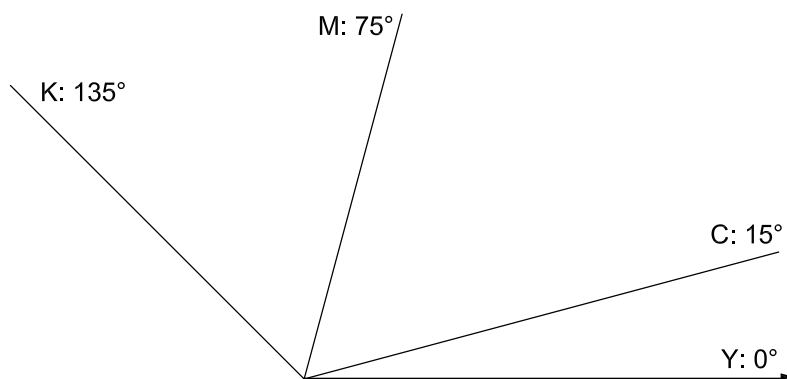


Figure 1 — Example of a screen angle combination for a screen with a principal axis and with black as the dominant colour

NOTE The dominant colour is defined as that which contains most of the image information compared to the others. For colour separations with high amount of GCR the dominant colour will be black, otherwise it will be magenta or, in some cases, cyan.

4.2.5 Dot shape and its relationship to tone value (film or printing forme)

An elliptical half-tone dot shape should be used where the first link-up occurs between the tone values (on film) of 35 % and 45 % – ideally 40 %. The tone value where the second link-up occurs shall be not more than 20 % above that of the first.

4.2.6 Image size tolerance (film or printing forme only)

For a set of colour separations in common environmental equilibrium, the lengths of the diagonals shall not differ by more than 0,02 %, measured from common image elements.

NOTE This tolerance includes image or plate setter repeatability and film or printing forme stability.

4.2.7 Tone value sum

Unless otherwise specified, the tone value sum should not exceed 240 % and shall not exceed 260 %. Where the maximum tone value sum approaches this limit, the tone value of black should be at least 85 %.

NOTE Any colour that is reproduced using all three chromatic process inks, can be thought of as having a neutral component. This is defined by the lowest tone value and its grey balance equivalents of the other two inks. It is possible to replace all or some of the neutral component by black ink. Under colour removal (UCR) limits the tone value sum by replacing chromatic-colour ink with black ink in the neutral shadows. Grey component replacement (GCR) replaces chromatic-colour ink with black ink in the entire colour space. GCR is recommended for newspaper colour separations, because it reduces colour variations during the print run.

4.2.8 Grey balance

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No grey balance is specified.

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4.3 Proof or production print

4.3.1 Visual characteristics of image components

4.3.1.1 Print substrate colour

The production print substrate shall conform to the L^* , a^* , b^* values specified in Table 1 within the tolerances specified in Table 2.

The print substrate used for proofing should be identical to that used for production with respect to the defined values. When the production substrate cannot be used for proofing, the values of Table 1 shall be taken as the reference. The deviations of the L^* , a^* , b^* values of the proofing print substrate from those of the actual production or reference print substrate shall not exceed the tolerances specified in Table 2.

Table 1 — CIELAB L^* , a^* , b^* values of typical newsprint

	L^*	a^*	b^*
Unit	1	1	1
Standard newsprint	82,0	0,0	3,0
	(3,2)	(0,9)	(2,2)

Measurement of upper line values in accordance with ISO 12647-1: black backing, D50 illuminant, 2° observer, 0/45 or 45/0 geometry.

Informative values for white backing are obtained if lower line values (in parentheses) are added to those of the upper line. White backing measurements according to ANSI CGATS.5 [4].

Table 2 — Tolerances for the colour of the print substrate

Unit: 1

	ΔL^*	Δa^*	Δb^*
Proofing shall be within	3	2	2
Production should be within	3	1	1
Production shall be within	4	2	2
Variation tolerance in one production run shall be within	2	2	2

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4.3.1.2 Print substrate gloss

The print substrate gloss shall be less than 5% in accordance with ISO 8254-1.

4.3.1.3 Ink set colours

The CIELAB colour co-ordinates L^* , a^* , b^* of the process colour solids CMYK on the proof shall agree with the target values specified in Table 3 within the appropriate deviation tolerances specified in Table 4.

The deviation of the process colour solids CMYK of the production print is restricted by the condition that the colour differences between proof and OK print shall not exceed the appropriate deviation tolerances specified in Table 4.

The variability of the process colour solids CMYK during the production run is restricted by the following condition. For at least 68 % of the prints, the colour differences from the OK print shall not exceed the appropriate variation tolerances specified in Table 4.

The information about deviation and variation for two colour overprints is given in Annex A.