ประกาศกระทรวงอุตสาหกรรม

ฉบับที่ ๓๕๔๕ (พ.ศ. ๒๕๔๙)

ออกตามความในพระราชบัญญัติมาตรฐานผลิตภัณฑ์อุตสาหกรรม

พ.ศ. ๒๕๑๑

เรื่อง กำหนดมาตรฐานผลิตภัณฑ์อุตสาหกรรม

เทคโนโลยีการพิมพ์ - การควบคุมกระบวนการ

การผลิตในงานแยกสีฮาล์ฟโทน ปรู๊ฟ และพิมพ์

เล่ม ๓ : การพิมพ์หนังสือพิมพ์ด้วยระบบออฟเซตแบบโคลด์เซต

อาศัยอำนาจตามความในมาตรา ๑๕ แห่งพระราชบัญญัติมาตรฐานผลิตภัณฑ์อุตสาหกรรม พ.ศ. ๒๕๑๑ รัฐมนตรีว่าการกระทรวงอุตสาหกรรมออกประกาศกำหนดมาตรฐานผลิตภัณฑ์อุตสาหกรรม เทคโนโลยีการพิมพ์ - การควบคุมกระบวนการการผลิตในงานแยกสีฮาล์ฟโทน ปรู๊ฟ และพิมพ์ เล่ม ๓ : การพิมพ์หนังสือพิมพ์ด้วยระบบออฟเซตแบบโคลด์เซต มาตรฐานเลขที่ มอก. 2260 เล่ม 3-2549 ไว้ ดังมีรายการละเอียดต่อท้ายประกาศนี้

ประกาศ ณ วันที่ ๑๐ สิงหาคม พ.ศ. ๒๕๔๙

สุริยะ จึงรุ่งเรืองกิจ

รัฐมนตรีว่าการกระทรวงอุตสาหกรรม

มาตรฐานผลิตภัณฑ์อุตสาหกรรม
เทคโนโลยีการพิมพ์ - การควบคุมกระบวนการการผลิตในงานแยกสีฮาล์ฟโทน ปรู๊ฟ และพิมพ์
เล่ม 3 : การพิมพ์หนังสือพิมพ์ด้วยระบบออฟเซตแบบโคลด์เซต

บทนำ

มาตรฐานผลิตภัณฑ์อุตสาหกรรมนี้ มีวัตถุประสงค์เพื่อกำหนดค่าพารามิเตอร์และเกณฑ์กำหนดทางเทคนิคที่เกี่ยวข้องกับคุณภาพสิ่งพิมพ์หนังสือพิมพ์ด้วยระบบออฟเซตแบบโคลด์เซต

ขอบข่าย

มาตรฐานผลิตภัณฑ์อุตสาหกรรมนี้ นำเสนอพารามิเตอร์ต่าง ๆ ทางการพิมพ์และค่าเกณฑ์กำหนดเพื่อใช้ควบคุมกระบวนการผลิต ตั้งแต่ขั้นตอนการแยกสีและปรู๊ฟสำหรับพิมพ์หนังสือพิมพ์สีเดียวหรือสี่สี จนถึงขั้นตอนพิมพ์
รายละเอียดให้เป็นไปตามมาตรฐาน ISO 12647-3 : 2005 ข้อ 1

เอกสารอ้างอิง

รายละเอียดให้เป็นไปตามมาตรฐาน ISO 12647-3 : 2005 ข้อ 2

บทนิยาม

ความหมายของคำที่ใช้ในมาตรฐานผลิตภัณฑ์อุตสาหกรรมนี้ ให้เป็นไปตามมาตรฐาน ISO 12647-3 : 2005 ข้อ 3

ข้อกำหนด

ไฟล์ข้อมูลนำเข้า-ส่งออก ฟิล์มแยกสี แม่พิมพ์ ปรู๊ฟ มาตรฐานกระดาษพิมพ์ หมึกพิมพ์ และการควบคุมงานพิมพ์บนแท่น
รายละเอียดให้เป็นไปตามมาตรฐาน ISO 12647-3 : 2005 ข้อ 4

วิธีทดสอบ

การทดสอบหาค่าน้ำหนักสีและการเกิดเม็ดสกรีนบวมบนสิ่งพิมพ์
รายละเอียดให้เป็นไปตามมาตรฐาน ISO 12647-3 : 2005 ข้อ 5

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 12467-3:1998) 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.

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.

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 proof 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.

4.2.2 Film or printing forme quality

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 $(40 \pm 2)\ cm^{-1}$. 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.

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°.

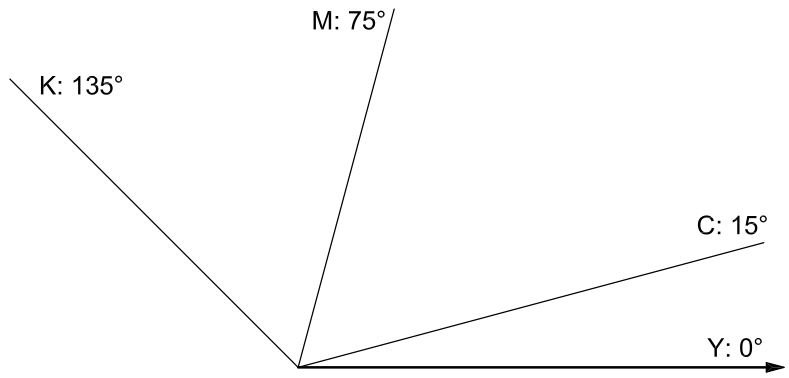


Figure 1 — Example of a screen angle combination for a screen with a principal axis and with black as the dominant colour

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

No grey balance is specified.

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

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.

Table 3 — CIELAB L^*, a^*, b^* aim values of ink colours on newsprint or on equivalent proofing print substrates

Unit:1

	L^*	a^*	b^*
Cyan	57,0	– 23,0	– 27,0
	(2,1)	(– 0,9)	(– 0,1)
Magenta	54,0	44,0	– 2,0
	(1,5)	(3,6)	(2,7)
Yellow	78,0	– 3,0	58,0
	(2,4)	(1,6)	(3,6)
Black	36,0	1,0	4,0
	(0,8)	(0,5)	(0,5)
Cyan + yellow	53,0	– 34,0	17,0
	(1,9)	(– 0,3)	(0,5)
Cyan + magenta	41,0	7,0	– 22,0
	(1,4)	(0,0)	(– 0,7)
Magenta + yellow	52,0	41,0	25,0
	(1,8)	(3,8)	(1,0)
Cyan + magenta + yellow	40,0	0,0	1,0
	(0,4)	(0,1)	(– 0,6)
Four colour black (K = 100 %, C = 52 %, M = 44 %, Y = 44 %)	34,0	1,0	2,0
	(0,5)	(– 0,6)	(– 0,2)
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].			

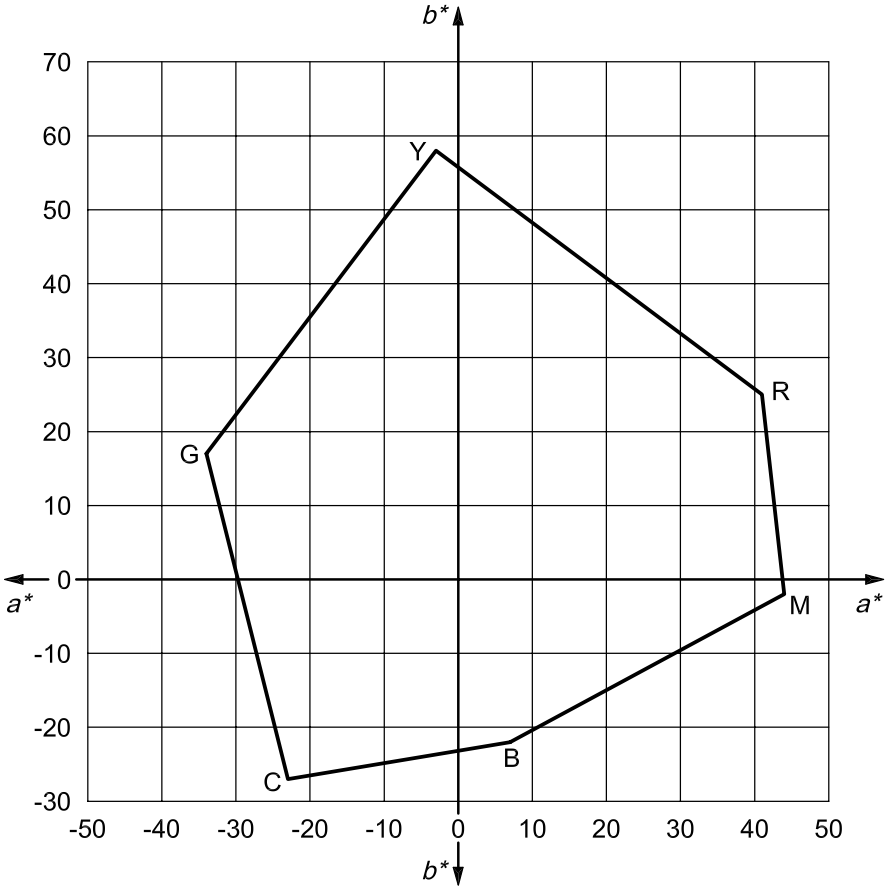
NOTE 1 The secondary colours red, green, blue can vary depending on conditions that include the mechanics of the press, the surface characteristics of the print substrate and the rheological and transparency properties of the inks. Thus, conformance of the primaries C, M, Y to specifications is not sufficient for the conformance of the secondaries to the values given in Table 3.

NOTE 2 The values in Table 3 relate to printing with ink sets in accordance with ISO 2846-2; they were derived from press runs in the field.

NOTE 3 The distribution of CIELAB values is not gaussian but skewed. For reasons of consistency, the variation tolerance is defined here as the upper limit for 68 % of the production copies. This is in analogy with a gaussian distribution where 68 % are within plus or minus one standard deviation from the mean.

NOTE 4 As a secondary reference, reflection densities for the process colours as measured with two different densitometer types are provided in Table B.1. In Annex C a reference to a complete list of X,Y,Z and CIELAB values of a complete ISO 12642 target is given.

NOTE 5 Recommended colour printing sequences are CMYK and KCMY.



NOTE See Table 3 for values of a^* and b^*.

Figure 2 — CIELAB L^*, a^*, b^* aim values of ink colours on newsprint or on equivalent proofing print substrates

Table 4 — CIELAB ΔE^*_{ab} tolerances for the primary process colour solids

Unit:1

	K	C	M	Y
Deviation tolerance	5	5	5	5
Variation tolerance	4	4	4	5
Deviation and variation tolerances are defined in ISO 12647-1.				

4.3.1.4 Ink set gloss

There is no requirement.

4.3.2 Tone value reproduction limits

Half-tone dot patterns within the following tone value limits (on the film or printing forme) shall transfer on to the print in a consistent and uniform manner:

— 3 % to 90 % for offset printing formes (negative-acting contact-exposed plate, positive-acting contact-exposed plate, directly exposed (CTP) plates).

No significant image parts shall rely on tone values outside of the above ranges on the colour separation film or the directly exposed printing forme.

NOTE The range 3 % to 50 % (on the printing formes) is reported to be achievable by non-periodic screens if the minimum dimension of the image elements is 40 µm.

4.3.3 Tolerance for image positioning

The maximum deviation between the image centres of any two separations shall be less than 0,3 mm and should be less than 0,15 mm.

4.3.4 Tone value increase

4.3.4.1 Aim values

The tone value increase for the production run shall be as specified in Table 5 and Figure 3 within the tolerances specified in Table 6. The tone value increase for proofing should be identical to that used for production. The test method shall be as specified in Clause 5.

NOTE 1 For non-periodic screens, the values in Tables 5 and 6 also apply since they refer to measurements in a control strip with a periodic half-tone screen, see clause 5. For the purpose of colour separation however, it is important to use tone value increase data that refer to measurements in non-periodic half-tones. For non-periodic screens with a spot diameter of 40 µm it is reported that a tone value increase of 43 % at 50 % tone value on film is typical for the offset process with negative-acting plates.

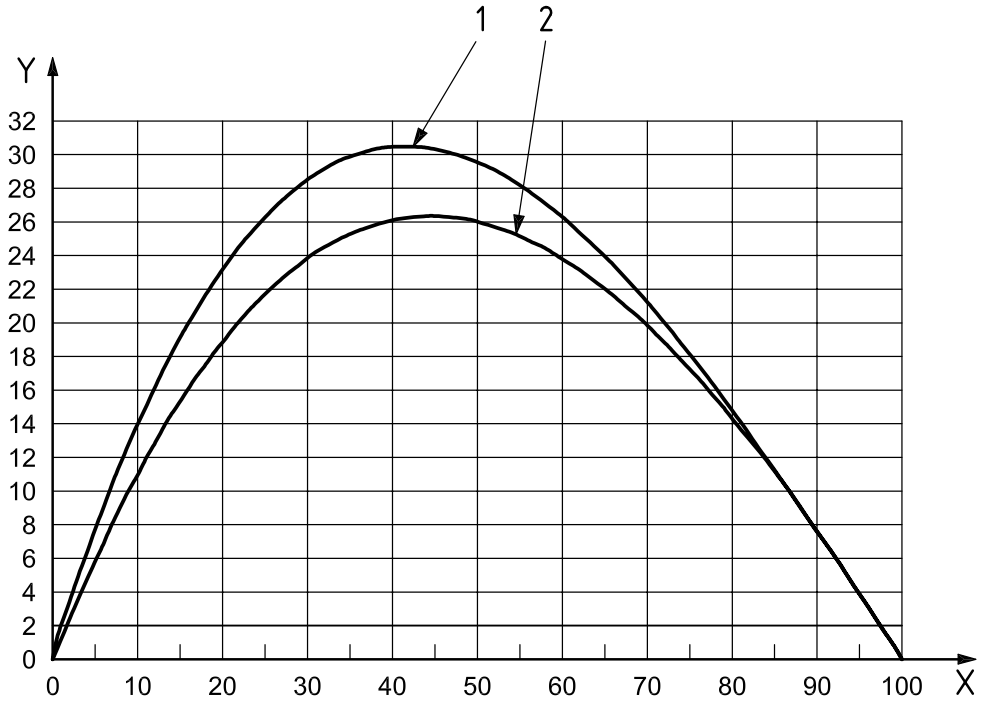
NOTE 2 The tone value increase on the developed negative-acting contact-exposed printing forme at a tone value of 40 % or 50 % is generally between 3 % and 5 %. The tone value on the developed positive-acting contact-exposed printing forme at a tone value of 40 % or 50 % is generally reduced by 3 % (e.g. a tone of 40 % will be decreased to 37 %).

NOTE 3 Due to the specifics of common newspaper direct exposing technologies (e.g. computer-to-plate with photopolymer plates, negative exposed; silver halide plates, positive exposed; thermal plates; etc.) a common target tone value increase on the plate cannot be specified in general. In fact, the tone value increase on a directly imaged printing form can vary between 0 % and 9 % at a tone value of 40 % or 50 %. In addition, the tone value increase in printing with these printing formes varies considerably. It is recommended to set-up a newspaper CTP system (RIP, plate setter and processor) in such a way that the target tone value increase of Table 5 and Figure 3 can be achieved.

Table 5 — Tone value increase values for production printing

Unit: %

Reference tone value (data)	Tone value increase measured on paper for 26 % curve	Tone value increase measured on paper for 30 % curve
10	11,1	14,1
20	19,0	23,4
30	24,0	28,5
40	26,1	30,5
50	26,0	29,5
60	23,9	26,1
70	19,8	21,0
80	14,3	15,2
90	7,6	7,8



Key

X reference tone value in percent
Y tone value increase in percent
1 30 % curve
2 26 % curve

Figure 3 — Print characteristic curves according to Table 5

4.3.4.2 Tolerances and mid-tone spread

The deviation of the tone value increase of a proof or an OK print from the pertinent aim value specified in 4.3.4.1 shall not exceed the deviation tolerance specified in Table 6. The mid-tone spread (variation of tone values/dot gains between chromatic colours) of proof or production prints shall not exceed the values given in Table 6. The test method shall be as specified in Clause 5.

During production printing, the tone value increase shall agree with that of the OK print within the pertinent variation tolerance specified in Table 6.

Table 6 — Tone value tolerances and maximum mid-tone spread for proof and production printing

Unit: %

	Proofing deviation	**Production**	
		Deviation	Variation
Control patch 40 or 50	4	5	5
Control patch 75 or 80	3	4	3
Mid-tone spread	Proofing	Production	
	5	6	
The values refer to control strips with 40 cm^{-1} screen ruling.			

4.4 Additional requirements for single-colour reproduction and printing

The minimum tone value on halftone reflection copy used for producing films or plates shall be 5 %.

5 Test method: tone value and tone value increase of a print

Refer to ISO 12647-1 test methods and note the following additional requirements.

A multi-colour control strip or a digital control strip shall be printed along with the subject. It shall contain well-defined control patches with accurate tone value designations. Aim tone values for grey balance control patches are given in Annex D. A screen ruling of 40 cm^{-1} should be used.

Annex A
(informative)

Tolerances for the secondary colour solids

The recommended deviation tolerances for the colour differences of the two-colour overprints without black ink between proof and OK print and the recommended variation tolerances for the colour differences of the two-colour overprints without black ink during the production run are shown in Table A.1.

The variation tolerance is defined here as the upper limit for 68 % of the production copies.

Table A.1 — CIELAB ΔE_{ab}^* tolerances for the secondary colour solids

Unit:1

	M+Y	C+Y	C+M
Deviation tolerance [a]	8	8	8
Variation tolerance [a]	7	7	7
It is recommended that ΔL^* or ΔH^* not account for more than 60 % of the total deviation or variation.			
[a] Deviation and variation tolerances are defined in ISO 12647-1.			

Annex B
(informative)

Densities of ink set colours

Table B.1 — Typical reflection densities of the process colour solids on newsprint meeting the requirements of Table 3

Unit:1

Reflection densities [a]	ISO Status E [b, c] relative density polarized	ISO Status T [c] (absolute) density unpolarized
Cyan	0,90	0,90
Magenta	0,90	0,90
Yellow	0,90	0,85
Black	1,10	1,05
Newsprint [d]	0,0	C: 0,23; M: 0,24; Y: 0,27; K:0,22

[a] All densities were measured with the sample placed on a black backing as specified in ISO 5-4 [5].

[b] ISO 14981 [6].

[c] ISO 5-3.

[d] As measured under the same conditions.

Only Status T, unpolarized, absolute and Status E polarized, relative, are reported here, as they represent the two most common measurement modes.

Annex C
(informative)

Characterization data for 26 % and 30 % tone value increase

A pointer (short name) to the two characterization data sets for the two different tone value increase curves, from the data to the print, can be found on the ICC web site, www.color.org. The pointer for the 26 % tone value increase curve is “IFRA26” and for the 30 % tone value increase curve is “IFRA30”.

These files contain X, Y, Z and L^*, a^*, b^* values for an ISO12642 [7] target with 928 patches.

Annex D
(informative)

Grey balance

Useful tone values for grey balance control patches are shown in Table D.1. These values should be used for control patches and do not represent separation aims. Many newspapers commonly use the single combination of cyan 30 %, magenta 24 % and yellow 24 %. A black half-tone control patch of about 30 % may be used as a visual reference of nearly equal lightness (see 3.14 of ISO 12647-1:2004).

Table D.1 — Cyan, magenta and yellow tone values combination for grey balance

Unit: %

Cyan	Magenta	Yellow
10	8	8
20	16	16
30	24	24
40	33	33
50	42	42
60	53	53

Bibliography

[1] ISO 2846-2, *Graphic technology — Colour and transparency of printing ink sets for four-colour-printing Part 2: Coldset offset lithographic printing*

[2] ISO 13656, *Graphic technology — Application of reflection densitometry and colorimetric to process control or evaluation of prints and proofs*

[3] ISO 13655, *Graphic technology — Spectral measurement and colorimetric computation for graphic arts images*

[4] ANSI CGATS.5:2003, *Graphic Technology — Spectral Measurement and Colorimetric Computation for Graphic Arts Images*

[5] ISO 5-4, *Photography — Density measurements — Part 4: Geometric conditions for reflection density*

[6] ISO 14981, *Graphic technology — Process control — Optical, geometrical and metrological requirements for reflection densitometers for graphic arts use*

[7] ISO 12642, *Graphic technology — Prepress digital data exchange — Input data for characterization of 4-colour process printing*