

INTERNATIONAL STANDARD

ISO 12647-2

Second edition
2004-11-15

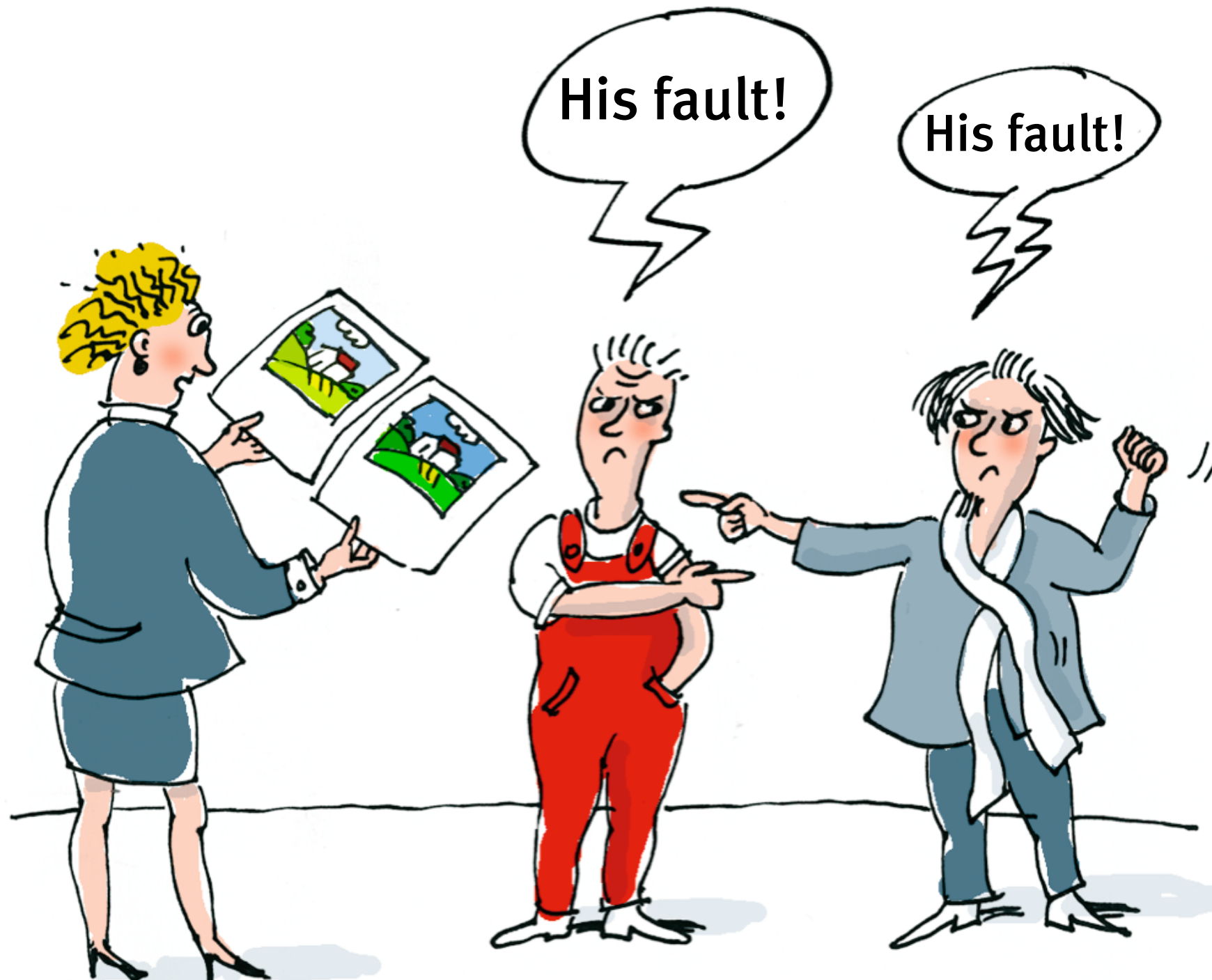
**Graphic technology — Process control
for the production of half-tone colour
separations, proof and production
prints —**

**Part 2:
Offset lithographic processes**

International printing standards – why?



International printing standards to avoid this ...



International printing standard ISO 12647

- History and primary parameters
- Implementation for offset printing
- Acceptance and experiences

History of the international standard ISO 12647

- **ISO 12647**
 - Multi-part standard
 - Part 1: parameters and measurement methods
 - Part 2: offset processes (sheet-fed, web, forms)
 - Further parts for newsprint (3), gravure (4), screen (5), flexo (6)
- **Part 2 – offset: First edition: 1996**
- **Second edition: 2004**
- **Aim values and tolerances unchanged since 2003 DIS!**

Offset lithographic processes – ISO 12647-2 *primary parameters*

- Aim values and tolerances focused on ink solids (CIELAB) and tone value increase (reference: 60/cm)
- Five paper type classes
 - Paper type 1: Gloss-coated
 - Paper type 2: Matt-coated
 - Paper type 3: Lightweight gloss-coated (LWC), web
 - Paper type 4: Uncoated, white
 - Paper type 5: Uncoated, yellowish

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Standardized offset printing



Three primary parameters

- **CIELAB coordinates of ink solids**
- **Tone-value increase**
- **CMY mid-tone spread**

Offset ink – Two standards for two purposes

- ISO 2846 – standard for *ink manufacturers*
 - CIELAB aim values and tolerances for cmyk-solids
 - *Laboratory*-printing device, *Special* paper (APCO II)
- ISO 12647-2:2004 – *production* standard
 - CIELAB aim values and tolerances for cmyk-solids
 - Printed on *production* paper, five paper-types

CIELAB coordinates of ink solids

Table 2 — CIELAB coordinates of colours for the printing sequence cyan-magenta-yellow

unit: 1

Colour	Paper type ^{a,b}											
	1, 2			3			4			5		
	Coordinates			Coordinates			Coordinates			Coordinates		
	$L^*_{b,c}$	$a^*_{b,c}$	$b^*_{b,c}$	$L^*_{b,c}$	$a^*_{b,c}$	$b^*_{b,c}$	$L^*_{b,c}$	$a^*_{b,c}$	$b^*_{b,c}$	$L^*_{b,c}$	$a^*_{b,c}$	$b^*_{b,c}$
Black	16	0	0	20	0	0	31	1	1	31	1	2
	(16)	(0)	(0)	(20)	(0)	(0)	(31)	(1)	(1)	(31)	(1)	(3)
Cyan	54	−36	−49	55	−36	−44	58	−25	−43	59	−27	−36
	(55)	(−37)	(−50)	(58)	(−38)	(−44)	(60)	(−26)	(−44)	(60)	(−28)	(−36)
Magenta	46	72	−5	46	70	−3	54	58	−2	52	57	2
	(48)	(74)	(−3)	(49)	(75)	(0)	(56)	(61)	(−1)	(54)	(60)	(4)
Yellow	88	−6	90	84	−5	88	86	−4	75	86	−3	77
	(91)	(−5)	(93)	(89)	(−4)	(94)	(89)	(−4)	(78)	(89)	(−3)	(81)
Red, M+Y	47	66	50	45	65	46	52	55	30	51	55	34
	(49)	(69)	(52)	(49)	(70)	(51)	(54)	(58)	(32)	(53)	(58)	(37)
Green, C+Y	49	−66	33	48	−64	31	52	−46	16	49	−44	16
	(50)	(−68)	(33)	(51)	(−67)	(33)	(53)	(−47)	(17)	(50)	(−46)	(17)
Blue, C+M	20	25	−48	21	22	−46	36	12	−32	33	12	−29
	(20)	(25)	(−49)	(22)	(23)	(−47)	(37)	(13)	(−33)	(34)	(12)	(−29)
Overprint of C+M+Y	18	3	0	18	8	6	33	1	3	32	3	1
	(18)	(3)	(0)	(19)	(9)	(7)	(33)	(2)	(3)	(32)	(3)	(2)

^a Paper types according to 4.3.2.1.

^b The values without brackets are measurements in accordance with ISO 12647-1: D50 illuminant, 2° observer, 0/45 or 45/0 geometry, black backing. Values in brackets pertain to measurement on the white backing specified by CGATS.5^[5] and are

Tone-value increase (TVI) – paper-type specific

Table 4 — Tone-value increase for the 50 % control patch of a control strip with circular half-tone dots for a number of important printing conditions

Printing characteristics	Tone-value increase % for screen rulings:		
	52 cm ⁻¹	60 cm ⁻¹	70 cm ⁻¹
Four-colour continuous forms printing, chromatic colours ^b			
positive-acting ^c plates, paper types ^a 1 and 2	17	20	22
positive-acting ^c plates, paper type ^a 4	22	26	—
negative-acting ^c plates, paper types ^a 1 and 2	22	26	29
negative-acting ^c plates, paper type ^a 4	28	30	—
Heat-set web and commercial/speciality printing, chromatic colours ^b			
positive-acting ^c plates, paper types ^a 1 and 2	12	14 (A) ^d	16
positive-acting ^c plates, paper type ^a 3	15	17 (B) ^d	19
positive-acting ^c plates, paper types ^a 4 and 5	18	20 (C) ^d	22 (D) ^d
negative-acting ^c plates, paper types ^a 1 and 2	18	20 (C) ^d	22 (D) ^d
negative-acting ^c plates, paper type ^a 3	20 % (C) ^d	22 (D) ^d	24
negative-acting ^c plates, paper types ^a 4 and 5	22 % (D) ^d	25 % (E) ^d	28 % (F) ^d

^a Paper types as defined in 4.3.2.1.

^b Black may be equal or up to 3 % higher

^c With computer-to-plate, the choice of the tone value category is independent of plate type but should, for compatibility reasons, follow legacy industrial practice which may be positive-acting for some geographical areas and negative-acting for others.

Tone-value increase curves



Key

A film or data tone value

ΔA tone-value increase

NOTE Curves labelled A to F correspond to printing conditions listed in Table 4.

TVI tolerances and mid-tone spread

**Table 5 — Tone-value increase tolerances and maximum mid-tone spread
for proof and production printing**

unit: %

Tone value of control patch	Deviation tolerance		Variation tolerance
	Proof print	OK print	Production print
40 or 50	3	4	4
75 or 80	2	3	3
Maximum mid-tone spread	4	5	5

NOTE 1 It has to be recognized that in the worst case these tolerances produce a difference between proof and OK print of 7 % in the mid-tone.

NOTE 2 The values in Table 5 refer to measurements by densitometer or colorimeter and to control strips with a screen ruling of 50 cm⁻¹ to 70 cm⁻¹.

NOTE 3 Percentage tolerances are calculated by subtracting the aim value from the measured value.

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Implementation of ISO 12647-2



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Basis: Altona Test Suite application kit (ATS) – Reference prints for 7 ISO offset printing conditions!



Tools to implement predictable and consistent color from pre-press to press

- **General**
 - “bvdM Media Standard Print” for free
(pre-press concepts, aim values, e.g. TVI in 5% steps)
 - Affordable measurement devices and ISO compatible quality assurance software for proof and print
 - Visual and colorimetric reference: Altona Test Suite application kit

Tools to implement predictable and consistent color from pre-press to press

- **Pre-press:**
 - FOGRA characterization data based on ATS prints
 - ECI offset profiles for separation and simulation (softproof and digital proof print) based on FOGRA data
 - Automized Proofing systems (PDF/X and ICC-profiles)
 - “Ugra/Fogra media wedge CMYK” (colorimetric proof evaluation)
- **Press:**
 - Sophisticated press control (MAN Roland, Heidelberg, ...)

Benefits of the printing standard ...



The print plant of the future ... by Dan Everard

- ... will be staffed by only a man and a dog:
 - The man is there to feed the dog
 - The dog is there to bite the man if he touches the equipment