



agriculture, land reform & rural development

Department:
Agriculture, Land Reform and Rural Development
REPUBLIC OF SOUTH AFRICA

Chief Directorate:
National Geo-spatial Information

Standard for the Printing of Imagery and Maps

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v4

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SECTION A

Preliminary Informative Elements

Document Control

Acknowledgement


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A 3 Foreword

This standard covers the Printing of Imagery and Maps produced by the Chief Directorate: National Geo-spatial Information (CD: NGI), Department of Agriculture, Land Reform and Rural Development.

The CD: NGI is mandated by the Land Survey Act, Act 8 of 1997 to provide mapping that covers the Republic of South Africa.

It is applicable to all imagery and maps at various scales and describes the printing requirements.

This standard shall be used in conjunction with the international standard, ISO 12647-2 *Graphic technology — Process control for the production proof and production prints*

A 4 Terms and Definitions

[Refer to Glossary](#)

A 5 Symbols and Abbreviations

[Refer to Glossary](#)

A 6 Introduction

A 6.1 General

Name of the Standard

The standard described in this document shall be known as the Standard for the Printing of Imagery and Maps

The shortened name, Printing Standard, may be used.

A 6.2 Scope and Purpose

The Printing Standard comprises of the specifications required for printing of imagery, maps of the national series and other maps as required by the CD: NGI and its status is mandatory. These requirements shall be adhered to by CD: NGI and all outsourced printing.

A 6.3 Audience

The primary audience of this document is the CD: NGI. The secondary audience of this document are contractors and map users.

A 6.4 Applicability

This document is applicable to all role players, activities and processes involved in the printing of imagery and maps.

A 6.5 Assumptions

It is assumed that the provisions of this document may be applied by users outside CD: NGI.

A 6.6 Normative References, other standards and related documents

- The document Recommended Practice for the Structure and Drafting of Standards and Related documents is used to guide the format and structure of this document. Refer to C 1 for document references.

A 6.7 Maintenance Authority

Maintenance of this Printing Standard is the responsibility of the Division: Quality Assurance of CD: NGI. Changes to this Standard will be initiated by CD: NGI as improvements or amendments become necessary, or as required. Any request for amendments to this Standard may be submitted by any institution, body or individual to CD: NGI for consideration. All such requests and any other comments on the Standard must be addressed to:

Chief Directorate: National Geo-spatial Information
Private Bag X 10
Mowbray
7705

and be referenced as: Amendment - Standard for the Printing of Imagery and Maps

The Quality Assurance Division shall maintain the provisions and structure of this document through amendment and revision activities.

A 6.8 Roles and Responsibilities

The roles and responsibilities of the main role players as it pertains to the drafting and maintenance of this document are stated below.

A 6.8.1 Sub-Directorate: Quality Assurance

- To maintain the provisions of this document.
- Keeping track of all amendments to this document
- Providing assistance and guidance to the Standards Development Committees and CD: NGI Management in interpreting the provisions of this document
- Provisionally approving a proposed revision of this standard with respect to its structure and format.
- Ensuring that the use and purpose of this document is communicated effectively.

A 6.8.2 Standards Development Committee – Standard for the Printing of Imagery and Maps

- To draft revised specifications to the provisions of this document
- To make recommendations on the update and amendment of the provisions of this document.
- Refer to the relevant section in the Terms of Reference of the Standards Development Committee for more details in this regard.

A 6.8.3 Manager: Quality Assurance

- Evaluate proposed amendments and revisions of this Standard.
- Provisionally approving proposed amendments to this Standard.
- Refer to the relevant section in the Terms of Reference pertaining to the Geomatics Manager: Quality Assurance for more details in this regard.

A 6.8.4 CD: NGI Senior Management

- To provide inputs into and recommend approval of this Standard.

A 6.8.5 Chief Director: NGI

- To authorise revision of this Standard
- To approve this Standard.

SECTION B
Normative Elements

B 1 General

Printing inks vary in pigment, viscosity and tack and vary from manufacturer to manufacturer. These factors have a strong influence on the appearance of the final printed product and thus these factors need to be taken into consideration when reviewing this document.

B 1.1 Printing input of imagery and maps by CD: NGI

Printing quality shall be at minimum resolution of 300 pixels / dots per inch (ppi/dpi).

B.1.1.1 Imagery:

Monochrome or Colour Tagged Image File Format (Tiff) images shall be either scanned or captured using the Scanning of Film-based Aerial Photography Standard (QLAS.SD. 14), the Standard for the Acquisition of Digital Aerial Imagery (QLAS.SD. 2) or the Ortho-Rectification and Mosaicking of Imagery Standard (QLAS.SD. 15)

B.1.1.2 Maps:

B.1.1.2.1 Orthophoto Maps: Maps shall be printed from the file format as received outputs from the Orthophoto Map Production process.

B.1.1.2.2 Topographical and Ancillary Maps, and Charts, shall be printed from file formats received as outputs from the respective production processes.

B.1.2 Imagery

Printed on demand and consist of high-quality images printed at a scale requested by the client. The inkjet plotters are used with high quality paper (refer to B.2.2).

Parameters analysed in order to determine acceptability of quality:

- Smudging: Shall be no smudging
- Tonal values within histogram: refer to B.5.1
- Colour correctness: refer to B.3.1.2
- Fine lines: refer to B.3.1.1
- Moiré effect: Shall be no moiré pattern
- Size and scale: at time of print, distortion in width and length shall not exceed 0.1% of source
- Ground Detail: Shall be sharp at print quality: refer to B.1.1.3
- Ground Detail: Enlargement to scale shall not cause pixilation

B.1.3 Maps.

Two types of maps are produced by CD: NGI

B.1.3.1 Orthophoto Maps:

B.1.3.1.1 Low quality process: (Inkjet process). Printed on bond paper (refer to B.2.1)

Parameters analysed in order to determine acceptability of quality:

- Smudging: shall be no smudging
- Tonal values within histogram: refer to B.5.1
- Colour correctness: refer to B.3.1.2
- Fine lines: refer to B.3.1.1
- Moiré effect: shall be no moiré pattern
- Size and scale: at time of print, distortion of the map face in width and length shall not exceed 0.1% of source
- Ground Detail: Shall be sharp at print quality refer to B.1

B.1.3.1.2 High quality process: (Inkjet). Printed on coated paper (refer to B.2.2)

Parameters analysed in order to determine acceptability of quality:

- Smudging: shall be no smudging
- Tonal values within histogram: refer to B.5.1
- Colour correctness: refer to B.3.1.2
- Fine lines: refer to B.3.1.1
- Moiré effect: shall be no moiré pattern
- Size and scale: distortion of the map face in width and length shall not exceed 0.1% of source
- Ground Detail: Shall be sharp at print quality refer to B.1

B.1.3.2 Topographic Maps:

B.1.3.2.1 High quality process: (Inkjet and Off site press printing). Printed on coated paper (refer to B.2.2).

Parameters analysed in order to determine acceptability of quality:

- Smudging: shall be no smudging
- Colour correctness: refer to B.3.1.2, B.5.2 and B.5.3
- Fine lines: line accuracy shall not exceed 0.01% of source
- Moiré effect: no moiré pattern in screened fills
- Fonts: using the 1: 50 000 Topographical Map Series (QLAS.SD.10), the 1: 250 000 Topographical Map Series (QLAS.SD.11) and the 1: 500 000 Topographical Map Series (QLAS.SD.12)
- Size and scale: distortion of the map face in width and length shall not exceed 0.1% of source per ½ square metre of paper
- No bleeding of ink

B.2 Print media

B.2.1 Low Quality (Inkjet process)

paper used shall be:

- Paper: Bond - 80 g/m²

B.2.2 High Quality (Inkjet and off site press printing)

Paper used for inkjet plotters:

- Heavyweight coated paper, which is a high volume matt coated inkjet paper, shall not be more than 0.1% stretch over a ½ running metre at time of print– 120 g/m²
- Premium Instant - Dry Satin Photo Paper shall not be more than 0.1% stretch over ½ a running metre. – 280 g/m²
- Off site press printing Heavyweight coated paper, which is a high volume matt coated paper shall not be more than 0.1% stretch over ½ a running metre – minimum 120 g/m²

B.3 Printing accuracy

B.3.1 Low quality Inkjet, High quality InkJet off site press printing

B.3.1.1 Line accuracy in the printing process shall be within 0.1% of the source at time of print

B.3.1.2 Colour correctness in the printing process shall be within 95% confidence of source.

B.3.1.3 Print to Print Repeatability shall be 95% confidence of the source.

B.3.2 Multi Colour Registration for off site press printing

B.3.2.1 Each print colour shall be registered within 0.01mm of the centre of the registration marks.

B.4 Quality of ink

B.4.1 Ink used in the printing of all maps produced for CD: NGI shall display fade resistant characteristics under the following conditions.

- Minimum 1 year when the hardcopy is not laminated.
- Minimum 3 years when the hardcopy is laminated and stored indoors away from direct sunlight exposure.

B.4.2 Colour settings shall be:

- RGB-Adobe RGB (1998) (ISO-12647-2:2004)
- CMYK-coated Fogra27 (ISO-12647-2:2004)

B.5 Requirements for Printing of Imagery and Maps

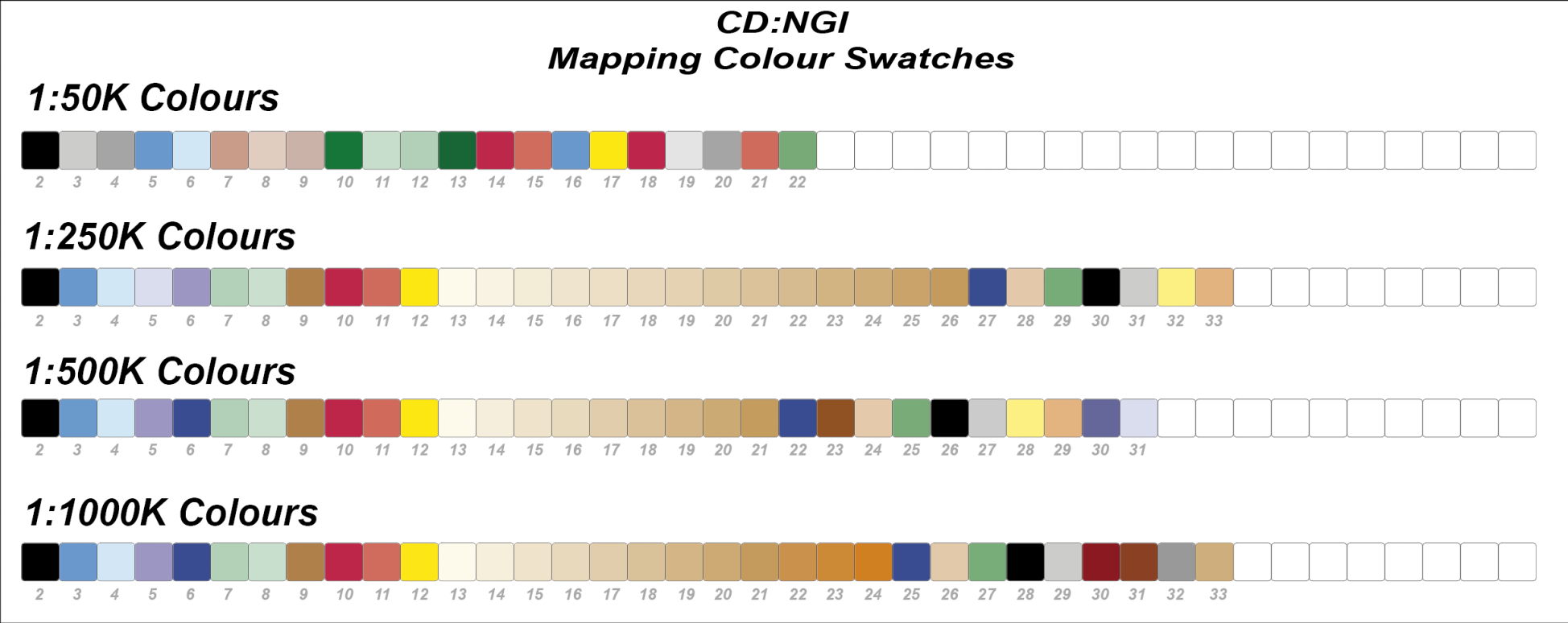
B 5.1 The 1: 10 000 Orthophoto Map Series and Imagery

B.5.1.1 The whole RGB spectrum (1 to 256 colours) shall be used for printing a colour orthophoto map.

B.5.1.2 For the printing of grey scale orthophoto maps the tonal range shall be:

- Highlights (10 % to 15%)
- Midtones (40 % to 60%)
- Shadows (85 % to 90%)

B 5.2 CD: NGI Mapping Colour Swatches



B 5.3 Colour Code Tables

B 5.3.1 The 1: 50 000 Topographic Map Series:

COLOUR	0 - 255			%				C	M	Y	K		L	A	B
	R	G	B	R	G	B									
2	0	0	0	0	0	0		0	0	0	100		0	0	0
3	203	203	203	79	79	79		0	0	0	25		82	0	0
4	165	165	165	64	64	64		0	0	0	42		68	0	0
5	105	152	201	41	59	79		71	15	0	11		60	-13	-34
6	211	229	243	82	89	95		24	1	3	1		90	-7	-10
7	199	155	137	78	61	54		0	39	31	16		70	21	19
8	224	204	192	88	80	75		0	17	14	10		85	8	10
9	202	177	168	79	69	66		0	23	16	20		76	11	10
10	39	119	64	15	46	25		94	0	89	32		42	-57	23
11	200	219	202	78	86	79		25	0	23	4		85	-11	6
12	177	204	180	69	80	70		35	0	32	7		79	-17	8
13	39	103	58	15	40	23		92	0	87	44		37	-48	19
14	189	38	73	74	15	29		0	93	61	4		49	70	29
15	207	110	93	81	43	36		0	71	58	1		62	48	34
16	105	151	200	41	59	78		71	15	0	11		60	-13	-34
17	240	221	29	94	86	11		0	13	99	0		89	-5	93
18	189	38	73	74	15	29		0	93	61	4		49	70	29
19	230	230	230	90	90	90		0	0	0	12		92	0	0
20	165	165	165	64	64	64		0	0	0	42		68	0	0
21	206	108	92	80	42	36		0	71	58	1		61	48	35
22	118	166	117	46	65	46		60	0	63	15		63	-34	19

B 5.3.2 The 1: 250 000 Topographical Map Series

COLOUR	0 - 255			%				C	M	Y	K		L	A	B
	R	G	B	R	G	B									
2	0	0	0	0	0	0		0	0	0	100		0	0	0
3	105	152	201	41	59	79		71	15	0	11		60	-13	-34
4	211	229	243	82	89	95		24	1	3	1		90	-7	-10
5	217	221	235	85	86	92		16	8	0	3		88	0	-8
6	155	152	190	61	59	74		40	34	0	7		65	8	-20
7	177	204	180	69	80	70		33	0	31	10		79	-17	8
8	200	219	202	78	86	79		23	0	21	7		85	-12	5
9	176	129	75	69	50	29		0	46	68	25		60	21	42
10	189	38	73	74	15	29		0	93	61	4		49	70	29
11	206	109	92	80	43	36		0	71	58	1		62	48	35
12	240	221	29	94	86	11		0	13	99	0		89	-5	93
13	251	247	237	98	96	93		1	2	7	1		98	0	6
14	249	244	228	97	95	89		0	3	11	2		96	0	9
15	243	236	215	95	92	84		0	4	15	5		94	1	12
16	239	230	206	93	90	80		0	6	17	6		92	1	13
17	236	224	198	92	88	77		0	9	20	6		90	3	15
18	232	215	187	91	84	73		0	13	23	7		88	5	18
19	228	210	177	89	82	69		0	14	27	9		86	5	20
20	224	203	166	88	79	65		0	16	31	11		84	6	23
21	220	195	155	86	76	61		0	20	35	11		81	8	26
22	214	188	144	84	73	56		0	22	39	13		79	9	28
23	211	180	130	82	70	51		0	26	46	14		77	10	33

COLOUR	0 - 255			%				C	M	Y	K		L	A	B
	R	G	B	R	G	B									
24	207	174	120	81	68	47		0	28	50	15		75	11	36
25	201	163	105	79	64	41		0	33	57	16		71	14	40
26	197	156	93	77	61	36		0	36	64	18		69	16	44
27	60	77	142	23	30	55		93	65	0	11		33	8	-43
28	228	202	170	89	79	66		0	20	29	7		84	9	21
29	119	168	118	46	66	46		61	0	64	14		63	-35	20
30	0	0	0	0	0	0		0	0	0	100		0	0	0
31	203	203	203	79	79	79		0	0	0	25		82	0	0
32	245	234	129	96	91	50		0	6	62	1		93	-5	55
33	224	179	126	88	70	49		0	36	51	3		78	17	38

B 5.3.3 The 1: 500 000 Topographical Map Series / 1: 500 000 Aeronautical Chart Series

COLOUR	0 - 255			%				C	M	Y	K		L	A	B
	R	G	B	R	G	B									
2	0	0	0	0	0	0		0	0	0	100		0	0	0
3	105	152	201	41	59	79		71	15	0	11		60	-13	-34
4	211	229	243	82	89	95		24	1	3	1		90	-7	-10
5	155	152	190	61	59	74		40	34	0	7		65	8	-20
6	60	77	142	23	30	55		92	64	0	14		33	8	-42
7	177	204	180	69	80	70		33	0	31	10		79	-17	8
8	200	219	202	78	86	79		23	0	21	7		85	-12	5
9	176	129	75	69	50	29		0	46	68	25		60	21	42
10	189	38	73	74	15	29		0	93	61	4		49	70	29
11	206	109	92	80	43	36		0	71	58	1		62	48	35
12	240	221	29	94	86	11		0	13	99	0		89	-5	93
13	251	247	237	98	96	93		1	2	7	1		98	0	6
14	245	238	220	96	93	86		0	5	13	4		95	1	10
15	238	227	204	93	89	80		0	8	18	5		91	2	13
16	231	218	188	90	85	73		0	11	23	8		88	3	17
17	226	206	171	88	80	67		0	16	28	10		85	6	22
18	219	194	154	86	76	60		0	20	35	12		81	8	26
19	211	181	135	82	71	53		0	25	43	14		77	10	31
20	204	170	114	80	66	45		0	29	53	16		74	12	38
21	197	156	94	77	61	37		0	36	63	18		69	15	43
22	60	77	142	23	30	55		92	64	0	14		33	8	-42
23	143	83	36	56	32	14		0	66	89	38		44	31	45

COLOUR	0 - 255			%				C	M	Y	K		L	A	B
	R	G	B	R	G	B									
24	229	203	171	89	79	67		0	20	29	7		84	9	22
25	119	168	118	46	66	46		61	0	64	14		63	-35	20
26	0	0	0	0	0	0		0	0	0	100		0	0	0
27	203	203	203	79	79	79		0	0	0	25		82	0	0
28	245	234	129	96	91	50		0	6	62	1		93	-5	55
29	224	179	126	88	70	49		0	36	51	3		78	17	38
30	101	102	147	39	40	57		62	47	0	23		45	9	-27
31	216	220	235	84	86	92		16	8	0	3		88	0	-8

B 5.3.4 The 1: 1 000 000 Aeronautical Chart Series

COLOUR	0 - 255			%				C	M	Y	K		L	A	B
	R	G	B	R	G	B									
2	0	0	0	0	0	0		0	0	0	100		0	0	0
3	105	152	201	41	59	79		71	15	0	11		60	-13	-34
4	211	229	243	82	89	95		24	1	3	1		90	-7	-10
5	155	152	190	61	59	74		40	34	0	7		65	8	-20
6	60	77	142	23	30	55		92	64	0	14		33	8	-42
7	177	204	180	69	80	70		33	0	31	10		79	-17	8
8	200	219	202	78	86	79		23	0	21	7		85	-12	5
9	176	129	75	69	50	29		0	46	68	25		60	21	42
10	189	38	73	74	15	29		0	93	61	4		49	70	29
11	206	109	92	80	43	36		0	71	58	1		62	48	35
12	240	221	29	94	86	11		0	13	99	0		89	-5	93
13	251	247	237	98	96	93		1	2	7	1		98	0	6
14	245	238	220	96	93	86		0	5	13	4		95	1	10
15	238	227	204	93	89	80		0	8	18	5		91	2	13
16	231	218	188	90	85	73		0	11	23	8		88	3	17
17	226	206	171	88	80	67		0	16	28	10		85	6	22
18	219	194	154	86	76	60		0	20	35	12		81	8	26
19	211	181	135	82	71	53		0	25	43	14		77	10	31
20	204	170	114	80	66	45		0	29	53	16		74	12	38
21	197	156	94	77	61	37		0	36	63	18		69	15	43
22	200	145	74	78	57	29		0	47	76	12		67	23	52
23	203	138	54	79	54	21		0	54	89	7		66	28	62

COLOUR	0 - 255			%				C	M	Y	K		L	A	B
	R	G	B	R	G	B									
24	207	132	39	81	52	15		0	59	97	3		65	33	68
25	60	77	142	23	30	55		92	64	0	14		33	8	-42
26	229	203	171	89	79	67		0	20	29	7		84	9	22
27	119	168	118	46	66	46		61	0	64	14		63	-35	20
28	0	0	0	0	0	0		0	0	0	100		0	0	0
29	203	203	203	79	79	79		0	0	0	25		82	0	0
30	139	33	37	54	13	14		0	93	88	35		36	54	36
31	138	66	37	54	26	14		0	76	88	39		40	39	40
32	152	152	152	59	59	59		0	0	0	48		64	0	0
33	208	175	126	81	68	49		0	28	47	15		75	12	33

SECTION C

Supplementary Informative Elements

C 1 References

1. International Organization for Standardization, 2004. [ISO 2004] ISO 12647-2: 2004 *Graphic technology — Process control for the production of half-tone colour separations, proof and production prints — Part 2: Offset lithographic processes*. [ISO].