

ESKOM SPECIFICATION

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TITLE: **SPECIFICATION FOR THE IDENTIFICATION
OF THE CONTENTS OF PIPELINES AND
VESSELS**

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Annexes

Introduction

This specification represents a revision of NWS 1059 Rev. 3 to simplify the nomenclature and to harmonize it to some extent with SABS 0140-3:1992 (first revision).

This revision also entails some expansion of the definitions and nomenclature of SABS 0140-3:1992.

Annex A is a listing of fluids that are conveyed by pipe or stored in vessels and for which contents identification is required. This listing is not exhaustive and can be expanded during future revisions.

It is recommended that a display board be erected that indicates the contents identification in use. It is imperative that only one scheme is in force at a station.

This specification does not provide for the identification of the contents of pipelines and storage vessels containing fluids for medical use or nuclear power products.

1 Scope

The objective of this specification is to identify the contents of pipelines and vessels firstly by group and secondly by identifying the specific fluid in the group. Some groups of fluids are further broken down to identify potential safety risks such as high and low temperature fluids and drinkable and non-drinkable fluids. Some changes in format have been introduced in an endeavour to remove conflicts and ambiguities.

This specification describes Eskom's requirements for the identification of the contents of pipelines and vessels. It specifies:

- a) the colours and other methods used for the identification of the contents of pipelines and vessels installed above ground or in trenches;
- b) the application of the contents identification system; and
- c) the contents identification materials to be used.

2 References

The following documents are read in conjunction with this specification. However, in case of conflict this specification shall take precedence.

SABS 630:1972, *Decorative high gloss enamel paint for interior and exterior use.*

SABS 1091:1975, *National colour standards of paint.*

SABS 1186:1993, *Symbolic safety signs.*

SABS 0140-3:1992, *Identification colour markings. Part 3 — Contents of pipelines.*

SABS CKS 279:1971, *Colours for paints (for Government purchasing).*

3 Definitions and abbreviation

3.1 basic colour: A colour that indicates the group of fluids to which the contents of a pipeline or vessel belongs.

3.2 clad/cladding: The external protective metal sheath of the insulation of a pipeline or vessel.

3.3 colour code indicator(s): One or two colours that are applied in addition to the basic colour to indicate the specific contents.

3.4 descriptive code indicator: A legend applied to indicate the specific contents (and hazards) involved either in the form of a formula or symbol, words or pictograms.

3.5 hot: Hot means that the temperature of the contents exceeds 60 °C.

3.6 lagged: Indicates an insulated pipe or vessel that has no external protective sheath.

3.7 outside diameter (OD): The outside diameter means the outside diameter of a pipe/vessel or where lagged/clad, the diameter over the lagging/cladding.

3.8 rectangular area: An expression used for the display area of the contents identification on a pipeline or vessel.

4 Requirements

4.1 Contents identification

4.1.1 General

The contents of pipelines and vessels shall be identified by a basic colour that indicates the group of fluids in accordance with annex A of table A.1 and table A.2.

The specific content is defined by the colour code indicators as well as the warning signs and the descriptive indicators in accordance with annex C and annex D.

The colour references and codes shall be in accordance with SABS 1091 and is summarized in annex B.

4.1.2 Colour code indicators

a) First colour indicator

i) In the case of a pipe/vessel painted over its entire length/surface with the basic colour or is clad, the first colour code indicator is in the form of a band ON the basic colour, see annex D figure D.3.

ii) Where the pipe/vessel is not painted in the basic colour, the first colour code indicator is in the form of a band applied BETWEEN two basic colour bands, see annex D figure D.4.

b) Second colour indicator

Where a second colour code indicator is specified, it is repeated in bands on each side of the first colour code indicator band, see annex D figure D.5 and figure D.6.

4.1.3 Identification materials, width of bands and arrangement

a) Materials

- i) paint (see annex B table B.1);
- ii) retro-reflective adhesive bands; and
- iii) labels.

Adhesive bands shall not be applied to surfaces with temperatures above 115 °C.

b) Width of bands

The width of band is equal to 30 % of the pipe OD with a minimum width of 25 mm and a maximum width of 150 mm.

c) Arrangement of bands

The bands are applied adjacent to each other, see annex A table A.1, and table A.2.

4.1.4 Direction of flow arrow

The direction of flow arrows are of white colour with dimensions in accordance with annex C table C.1 and annex D figure D.10.

4.1.5 Descriptive indicator

Positions of the symbols and materials are in accordance with annex C table C.1 and figure C.2.

4.1.6 Legend size

The height of the letters used for identification of the specific contents of the pipeline or vessel (e.g. hydrogen, fuel oil, sewage) is superimposed on a 'rectangular area' in the basic colour in accordance with annex C, table C.1, figure C.2 and annex D, figure D.8.

4.1.7 Plate labels

For pipelines smaller than 35 mm OD the descriptive indicators are placed on labels or plates secured to the pipeline as annex C figure C.1.

4.1.8 Chemical hazards

The name of the hazardous chemical is displayed in the English language on any vessel containing a chemical, e.g. sulfuric acid, annex C figure C.1 and annex D figure D.8.

4.1.9 Radioactive hazard symbol

The radioactive hazard symbol is black on a yellow background in accordance with annex D figure D.11. The size of the symbol shall be such that it can be readily observed. If needed, plate labels shall be fitted.

4.1.10 Low level pipe hazards

Where a pipe crosses a pedestrian walkway such that it creates an obstruction, this pipe is marked in the method shown in annex D figure D.9.

4.2 Application categories for identification of pipeline and vessel contents

Details of the application of contents identification to pipelines and vessels are as follows:

4.2.1 Small diameter pipes

Pipelines of 35 mm OD and below are painted in the basic colour over their full length. Colour code indicator bands are superimposed and spaced at 10 m intervals.

4.2.2 Large diameter pipes

In cases of long exposed sections of large diameter pipes, due consideration shall be given to the costs incurred with regard to the use of a basic colour over the full length. The spacing of the identification information (bands and descriptive) may be more than 10 m.

4.2.3 Short pipe runs

Short pipes, i.e. less than 600 mm long are painted the basic colour over their full length in accordance with annex D, figure D.1.

4.2.4 Long pipe runs

Identification bands are spaced at intervals of 10 m nominally along the length of the pipe and adjacent to valves, wall and floor penetrations, bends and tees in accordance with annex D figure D.7.1, figure D.7.2, and figure D.7.3.

4.2.5 Fire fighting services

Pipelines used for fire fighting services are painted in the basic colour over their full extent in accordance with annex D, figure D.1.

4.2.6 Semi-concealed pipework

In cases of hydro power stations or other installations where most pipework is carried in covered trenches, the pipelines are painted the basic colour over their entire length subject to clause 4.2.2. Colour code indicator bands if specified are only applied at access positions such as manholes.

4.2.7 Stainless steel and galvanizing

Stainless steel and galvanized pipework is not to be painted, except for identification bands, unless required for additional corrosion protection.

4.2.8 Corrosion resistant materials

Corrosion resistant materials such as plastics are not painted except for identification bands unless required for protection from ultraviolet radiation. In such cases the basic colour is applied.

4.2.9 Insulated pipes and vessels for steam and chemicals

4.2.9.1 Insulated pipes and vessels protected by cladding do not require painting except for colour code indicator bands, see annex A table A.2.

4.2.9.2 Insulated pipes and vessels without cladding are painted along their full length in the basic colour with colour code indicator bands.

4.2.10 Multi-pipeline runs

Colour identification and descriptive identification are positioned on multi-pipeline runs such that the identification of all pipes in the run is clearly visible from an observation position, see annex C figure C.4.

4.2.11 Vessels

In special cases where vessels are not required to be painted entirely in their basic colour, a protective paint scheme, (including aluminium colour) can be used, provided due consideration is given to the costs incurred. Where any colour other than the basic colour is used to paint the vessel, the basic colour is represented as bands in accordance with annex C figure C.2 and figure C.3.

4.2.12 Aesthetics

Pipelines and vessels located in areas of aesthetic importance are painted in a suitable colour in accordance with the architect's colour scheme provided that contents identification is applied at suitable places and intervals.

4.2.13 Aluminium colour

Where the contents of a pipeline or vessel requires protection from heat or cold of its surrounds, consideration is given to the use of an aluminium colour subject to the application and positioning of identification bands.

5 Records

This specification has been registered in the INDABA database system.

A master copy is retained in the Technology Standardization Department. Hard copies can be obtained by contacting: RAPHAEL KHONZA, Tel. (011) 800-4684, Fax (011) 800-2072.

6 Distribution

This specification will be distributed to all departments and Divisional Managers.

7 Annexes

7.1 Annex A

Identification colours of liquids and gasses in Eskom excluding fluids for medical use and nuclear power products.

7.2 Annex B

Colour references and code numbers to SABS 1091:1975.

7.3 Annex C

Dimensions and arrangement of descriptive identification legends for pipelines and vessels.

7.4 Annex D

Application of the contents identification to pipelines and vessels.

Annex A
(normative)

**Identification colours of liquids and gases in Eskom excluding fluids
for medical use and nuclear power products**

Table A.1 — Non-clad pipes and vessels

Contents	Basic colour	Colour code indicators			Basic colour
AIR					
Service/plant air	Arctic blue				Arctic blue
Electrical service air	Arctic blue	Maroon			Arctic blue
Instrument/control air	Arctic blue	Salmon pink			Arctic blue
Atmospheric relief	Arctic blue	Crimson			Arctic blue
ACIDS and ALKALIS					
Acids	Jacaranda				Jacaranda
Alkalis	Dove grey				Dove grey
GAS					
Acetylene	Light stone	Maroon			Light stone
Argon	Light stone	Peacock blue			Light stone
Carbon dioxide	Light stone	Light grey	Lt bruns green	Light grey	Light stone
Chlorine	Light stone	Canary yellow			Light stone
Freon R11, R12, R22	Light stone	Strong blue			Light stone
Helium	Light stone	Middle brown			Light stone
Hydrogen	Light stone	Poppy red			Light stone
Nitrous oxide	Light stone	Ultramarine			Light stone
Nitrous oxide & oxygen mixture	Light stone	Ultramarine	White	Ultramarine	Light stone
Nitrogen	Light stone	Black	Light grey	Black	Light stone
Oxygen	Light stone	White			Light stone
Butane - propane	Light stone	LPG (superimposed)			Light stone
Sulfur hexafluoride	Light stone	SF6 (superimposed)			Light stone
OILS					
Diesel fuel	Golden brown	White			Golden brown
Hydraulic power	Golden brown	Salmon pink			Golden brown
Lubricating oil	Golden brown	Verdigris green			Golden brown
Transformer oil	Golden brown	Crimson			Golden brown
Seal oil	Golden brown	Canary yellow			Golden brown
Fuel oil	Golden brown	Black			Golden brown
Turbine oil	Golden brown	Light grey			Golden brown
Industrial gear oil	Golden brown	Maize			Golden brown
Air compressor oil	Golden brown	Jacaranda			Golden brown
Open gear oil	Golden brown	Dark grey			Golden brown

Annex A
(continued)

Contents	Basic colour	Colour code indicators	Basic colour
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**FIRE RESISTANT
FLUIDS**

Fire resistant fluids	Golden brown	Dark violet	Golden brown
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**DRINKABLE
WATERS**

Drinkable water - cold	Brilliant Green	Cornflower			Brilliant Green
Drinkable water - hot	Brilliant Green	Cornflower	Crimson	Cornflower	Brilliant Green

**NON-DRINKABLE
WATER**

Condensate < 60 °C	Strong blue		Strong blue
Softened water	Strong blue		Strong blue
Storm water	Strong blue		Strong blue
Dimineralized water	Strong blue	White	Strong blue
Chilled water	Strong blue	Cornflower	Strong blue
Hydraulic power	Strong blue	Salmon pink	Strong blue
Industrial service water	Strong blue	Golden yellow	Strong blue
Sealing water	Strong blue	Verdigris green	Strong blue
Main cooling water	Grass green		
Auxiliary cooling - Open circuit	Grass green	Light stone	Grass green
Auxiliary cooling - Closed circuit	Grass green	Canary yellow	Grass green
Raw water	Grass green	Salmon pink	Grass green
Fire fighting	Signal red		Signal red

DRAINS

Sewage	Black	Black
Non-recoverable waters	Black	Black
Recoverable waters	As pipework	

VACUUM CLEANING

Insitu vacuum cleaning systems	Arctic blue	Primrose	Arctic blue
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Annex A
(concluded)

Table A.2 — Clad pipes and vessels

Contents	Basic colour	Colour code indicators			Basic colour
STEAM					
Main steam	Cladding	Pastel grey			Cladding
Hot reheat	Cladding	Crimson			Cladding
Cold reheat	Cladding	Maroon	Crimson	Maroon	Cladding
Auxiliary steam	Cladding	Canary yellow			Cladding
HP Bled	Cladding	Light brunswick green			Cladding
LP Bled	Cladding	Peacock blue	Lt Bruns green	Peacock blue	Cladding
Saturated steam	Cladding	Verdigris green			Cladding
Gland steam	Cladding	Signal red			Cladding
WATER >60 °C					
Condensate	Cladding	Strong blue	Crimson	Strong blue	Cladding
Boiler feed	Cladding	White	Crimson	White	Cladding
Distillate	Cladding	White	Crimson	White	Cladding
CHEMICALS					
Acids	Cladding	Jacaranda			Cladding
Alkalis	Cladding	Dove grey			Cladding
DRAINS					
Non-recoverable waters	Cladding	Black			Cladding
Recoverable waters	Cladding	As pipework			Cladding

Annex B
(normative)

Colour references and code numbers to SABS 1091:1975

Arctic blue	F28	Light stone	C37
Brilliant green	H10	Maize	B32
Canary yellow	C61	Maroon	A01
Crimson	A03	Middle brown	B07
Cornflower	F29	Peacock blue	F08
Dark grey	G13	Poppy red	A14
Dark violet	F06	Salmon pink	A40
Dove grey	G22	Strong blue	F11
Golden brown	B13	Ultramarine	F09
Grass green	D14	Verdigris green	E22
Jacaranda	F18		
Light brunswick green	H07	White	No number
Light grey	G29	Black	No number

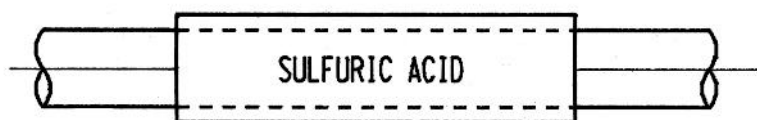
Annex C
(normative)

**Dimensions and arrangement of descriptive identification legends
for pipelines and vessels**

Table C.1 — Dimensions of legends for pipelines and vessels

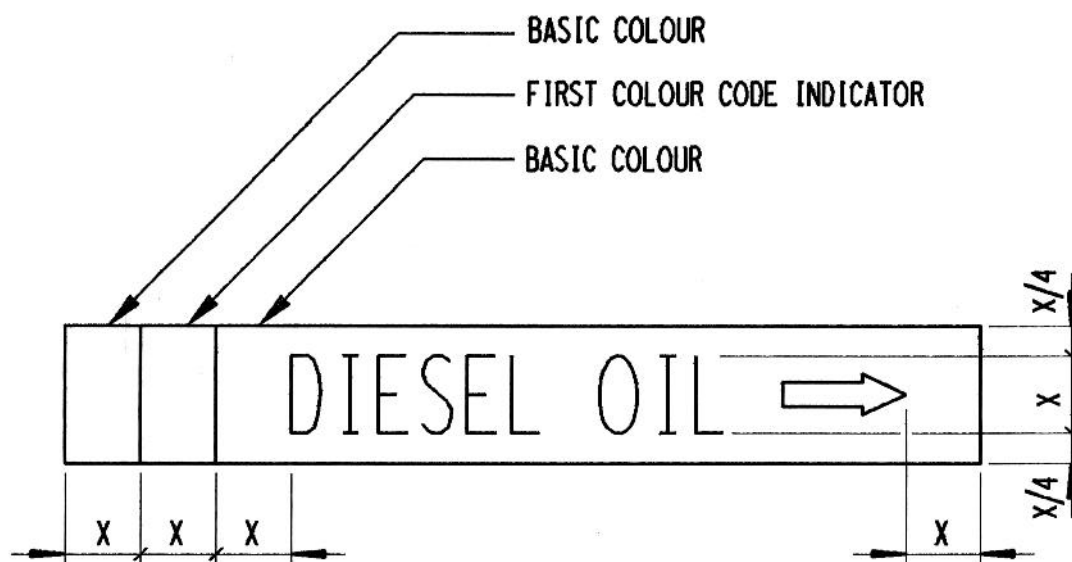
Outside diameter mm	Legend height mm	Chemical hazard legend height mm	Direction of flow arrow
			Length mm
Up to 50	20	20	75
51 to 100	25	25	100
101 to 150	38	50	150
151 to 225	50	100	200
226 to 300	75	150	300
301 to 600	100	150	300
Above 600	150	150	300

Annex C
(continued)



Rectangular descriptive label fixed securely to the pipeline and painted in the basic colour.

Figure C.1 — Plate labels for small diameter pipelines



Descriptive identification including symbols and signs. Colour identification in accordance with annex A. X is the legend height in accordance with table C.1. The length is determined by description and symbols.

Figure C.2 — Example of labels and rectangular areas

Annex C
(concluded)

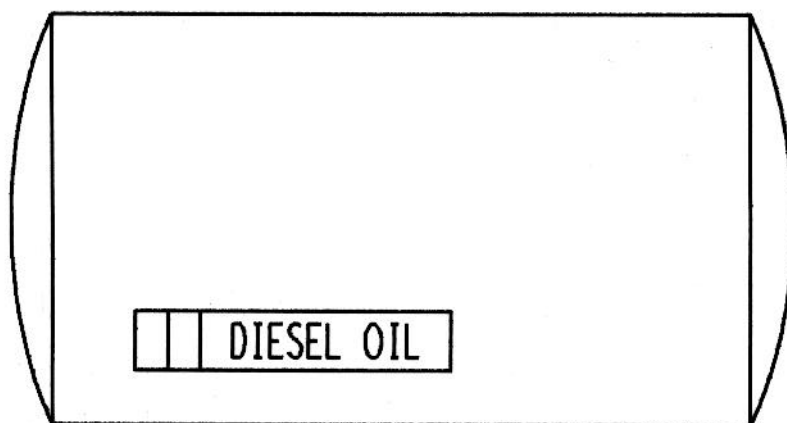
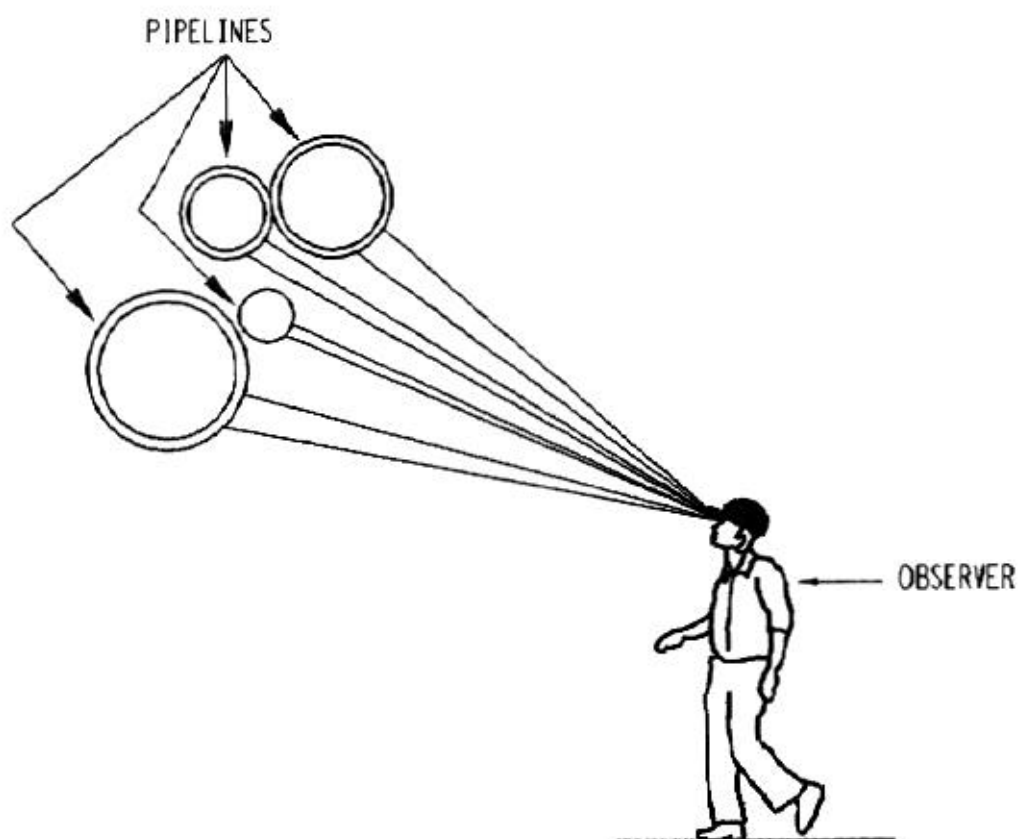


Figure C.3 — Application of contents identification to vessels



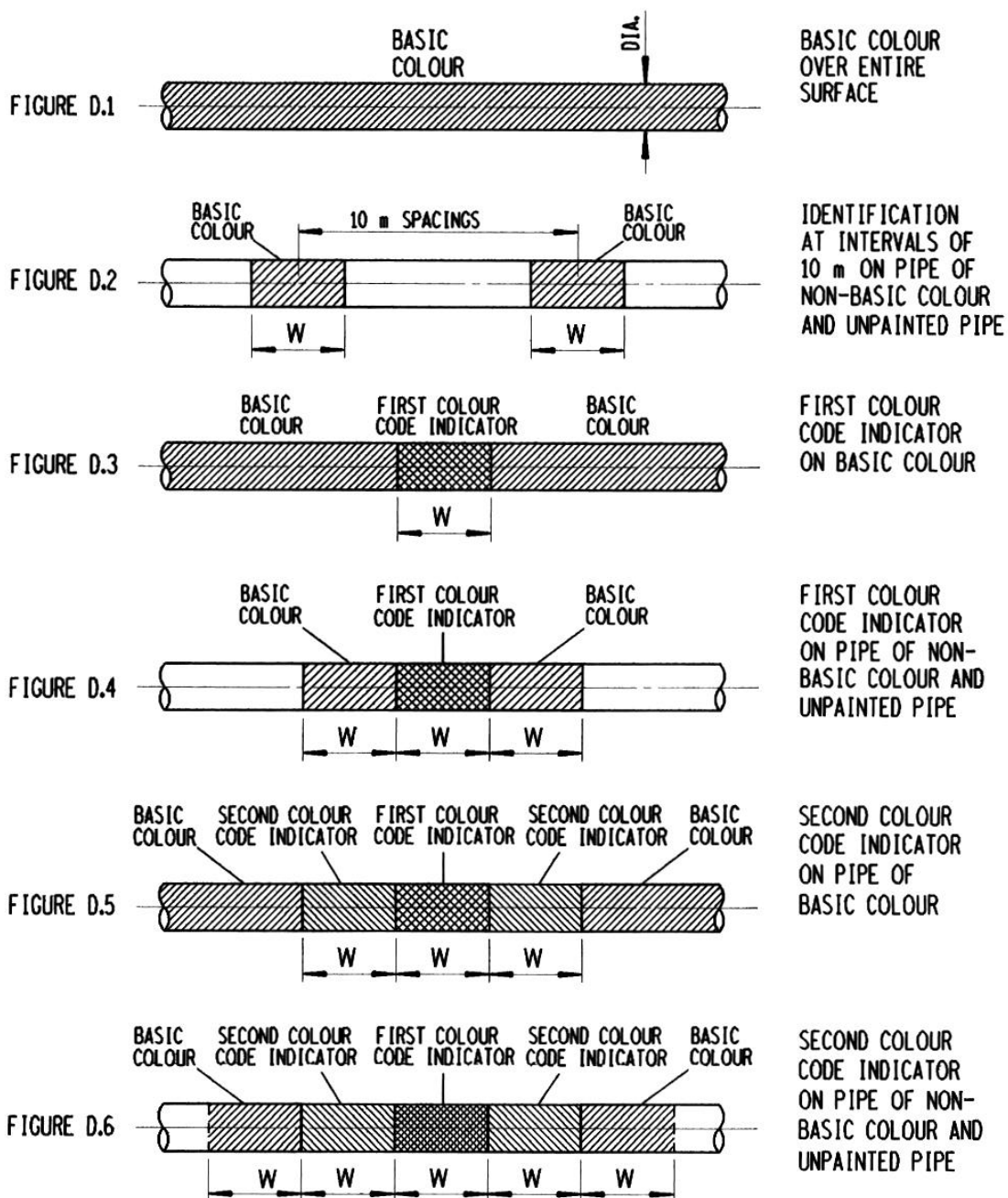
NOTE — Extract from SABS 0140-3:1992.

Figure C.4 — Visibility of identification on multi-pipeline runs

Annex D (normative)

Application of the contents identification to pipelines and vessels

NOT TO SCALE
 $W = 0,3 \times \text{PIPE DIAMETER}$. WITH:
25 mm MIN. AND 150 mm MAX.



Annex D
(continued)

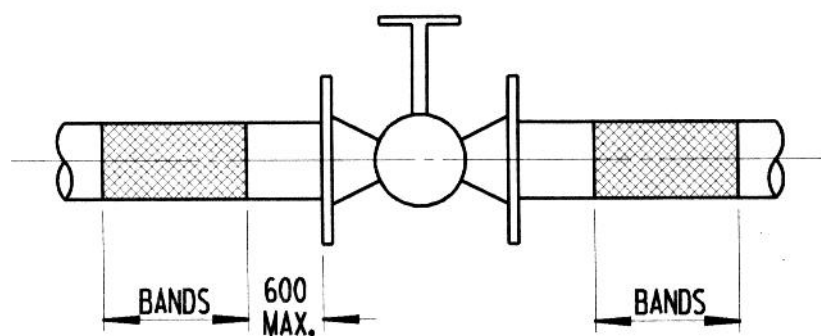


Figure D.7.1 — Colour identification around in-line equipment

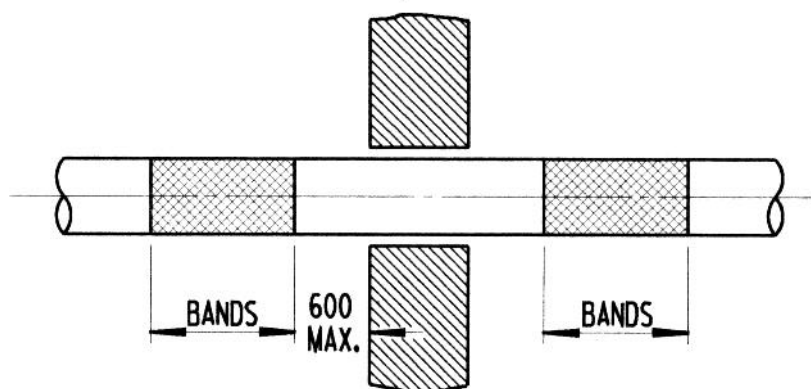


Figure D.7.2 — Colour identification at bulkheads, wall penetrations and floors

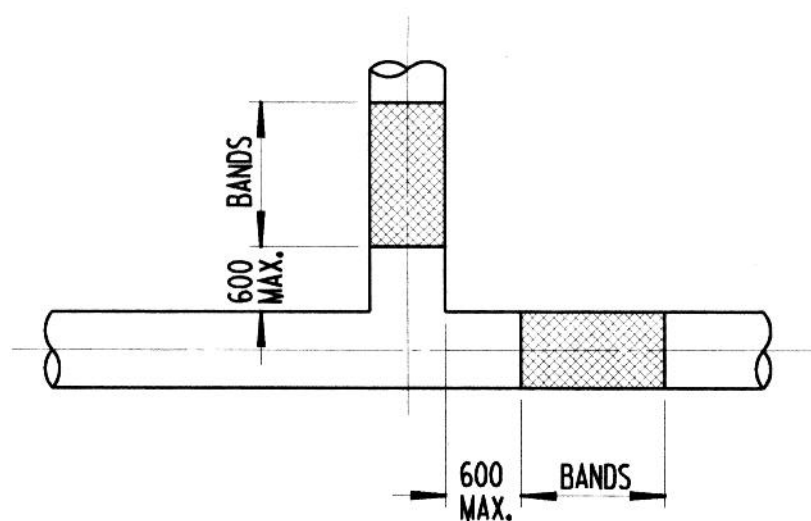


Figure D.7.3 — Colour identification at piping junctions or connections

Annex D
(continued)

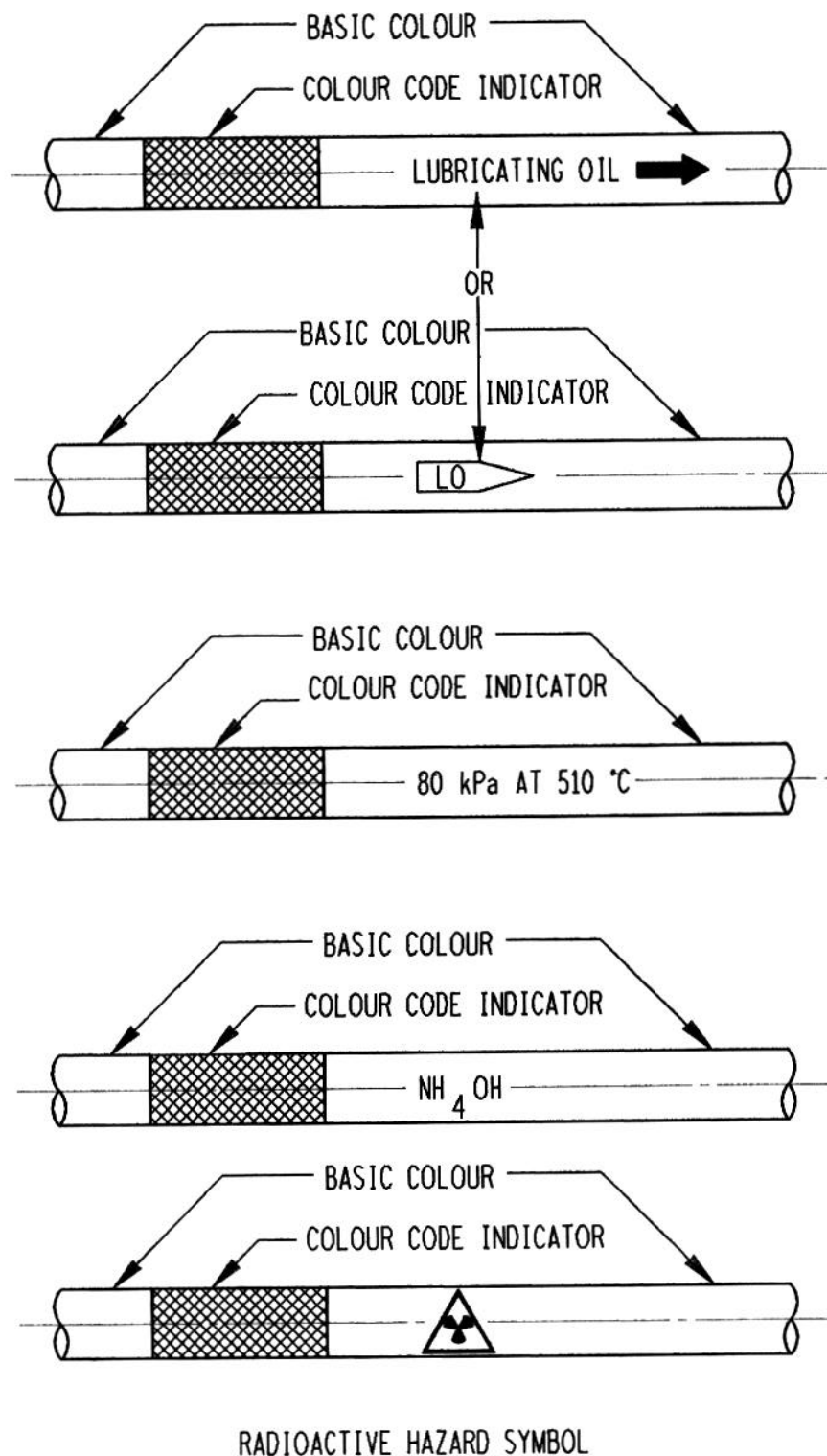


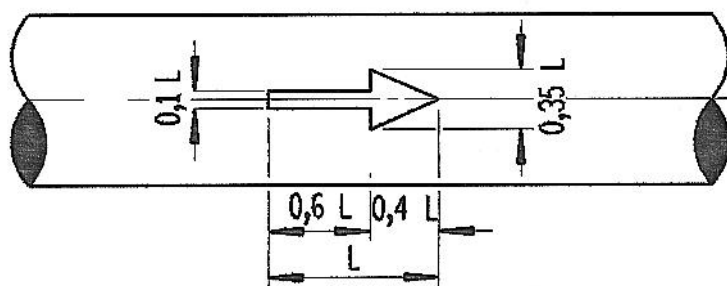
Figure D.8 — Examples of location of descriptive identification

Annex D
(concluded)



Golden yellow bands with superimposed black diagonal strips.

Figure D.9 — Identification of hazardous pipe



See annex C table C.1 for L.

Figure D.10 — Direction of flow symbol

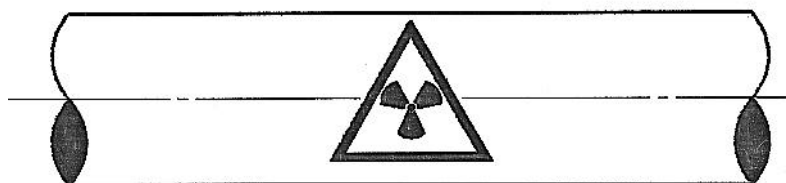


Figure D.11 — Ionizing radiation hazard symbol