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# Safety information for the content of piping systems and tanks —

## Part 1: Piping systems

*Informations de sécurité relatives au contenu des systèmes de tuyauteries et des reservoirs —*

*Partie 1: Systèmes de tuyauteries*



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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.

The procedures used to develop this document and those intended for its further maintenance are described in the ISO/IEC Directives, Part 1. In particular, the different approval criteria needed for the different types of ISO documents should be noted. This document was drafted in accordance with the editorial rules of the ISO/IEC Directives, Part 2 (see www.iso.org/directives).

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. Details of any patent rights identified during the development of the document will be in the Introduction and/or on the ISO list of patent declarations received (see www.iso.org/patents).

Any trade name used in this document is information given for the convenience of users and does not constitute an endorsement.

For an explanation of the voluntary nature of standards, the meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the World Trade Organization (WTO) principles in the Technical Barriers to Trade (TBT), see www.iso.org/iso/foreword.html.

This document was prepared by Technical Committee ISO/TC 145, *Graphical symbols*, Subcommittee SC 2, *Safety identification, signs, shapes, symbols and colours*.

A list of all parts in the ISO 20560 series can be found on the ISO website.

Any feedback or questions on this document should be directed to the user's national standards body. A complete listing of these bodies can be found at www.iso.org/members.html.



# Introduction

Continuous growth in mobility of labour has resulted in a need to standardize safety information and form a coherent system for non-verbal exchange of information that consists of distinct elements to identify hazards related to the content of piping systems and tanks. Every element of the safety information system defined in this document communicates specific information. When combined on a pipe marking, these elements inform the viewer, in a unique and simplified way, of potential hazards so accidents can be prevented and an appropriate response to emergency situations can be efficiently accomplished.

The use of this document is expected to reduce risk by providing a means of improved training and education to reduce possible confusion for people working with and near piping systems in both normal and emergency situations.

The use of a standardized safety information system does not replace proper work methods, instructions or accident prevention training and measures. Education is an essential part of any system that provides safety information.

Many different countries' national pipe marking standards were reviewed during the development of this document. Important design concepts contained in these standards were incorporated into this document.

NOTE Some countries' statutory regulations could differ in some respect from the requirements given in this document.

# Safety information for the content of piping systems and tanks —

# Part 1: Piping systems

**IMPORTANT — The colours represented in the electronic file of this document can be neither viewed on screen nor printed as true representations. For the purposes of colour matching see Table 2 and Table 5, which provide colorimetric and photometric properties, and Annex A, which provides references from colour order systems.**



## 1 Scope

This document specifies safety information for overground piping systems related to the content of the piping system and associated hazards for the purpose of accident prevention, reducing risks to health and providing information for use in case of an emergency.

This document does not cover piping that is buried.

Safety signing of the hazards in an area is not part of this document.

This document can also be used for marine structures and ships.

## 2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements 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 7010, *Graphical symbols — Safety colours and safety signs — Registered safety signs*

UNITED NATIONS, *Globally harmonized system of classification and labelling of chemicals (GHS)*, eighth revised edition, New York and Geneva, 2019, United Nations [viewed 18 May 2020]. Available from: http://www.unece.org/fileadmin/DAM/trans/danger/publi/ghs/ghs_rev08/ST-SG-AC10-30-Rev8e.pdf

## 3 Terms and definitions

For the purposes of this document, the following terms and definitions apply.

ISO and IEC maintain terminological databases for use in standardization at the following addresses:

— ISO Online browsing platform: available at https://www.iso.org/obp

— IEC Electropedia: available at http://www.electropedia.org/

**3.1**
**additional safety information**
information typically presented in the form of text, numbers or both to indicate details related to the *safety information system* (3.8)

EXAMPLE Pressure or temperature.

**3.2**
**additional technical information**
technical information that is additional to the *safety information system* (3.8) to indicate technical details

EXAMPLE Pipe identification codes or from–to information.

**3.3**
**basic identification colour**
colour used to indicate a group of similar media

**3.4**
**content of the pipe**
medium which is transported in the pipe

EXAMPLE Gasses, liquids or solids as powder or granulate.

**3.5**
**flow direction indicator**
arrow to indicate the flow direction of the content of the pipe

**3.6**
**GHS hazard pictogram**
graphical composition defined by the *Globally harmonized system of classification and labelling of chemicals* (GHS) that can include a symbol plus other graphic elements, such as a border, background pattern or colour, intended to convey specific information as given by the GHS

**3.7**
**safety data sheet**
**SDS**
standardized information template for a medium which identifies the medium and contains information about its potential health, physical and chemical hazards, and emergency and firefighting procedures

**3.8**
**safety information system**
series of markings that consistently uses standardized elements to visually communicate information necessary for the reliable recognition, identification and understanding of hazards

**3.9**
**supplementary identification colour**
colour used in combination with the *basic identification colour* (3.3) to indicate a specific purpose

**3.10**
**warning sign**
safety sign that indicates a specific source of potential harm

[SOURCE: ISO 3864-1:2011, 3.16]



## 4 General requirements

A safety information system for piping visually communicates information necessary for the reliable recognition, identification and understanding of any hazard related to the type and character of the content of a pipe. This safety information system shall be installed on site and near any place that might require operation, maintenance or manipulation of a pipe's contents.

This safety information system provides critical information that serves to assist in:

— the correct operation and use of the piping system;

— the safe maintenance of the piping system;

— conveying critical information to trained personnel in emergency situations.

The safety information system shall, in a comprehensive and uniform manner, accurately identify the contents and hazards associated with the content of all piping and material transport systems in conformity with the contents' safety data sheets (SDSs). In some cases the safety information system shall provide, in an integrated, coherent visual manner, specific hazard information related to the pipe contents. Examples of this information include the exact nature of the substance, temperature, toxicity, and the risk of asphyxiation if a release of the pipe contents occurs.

The safety information system shall consistently use multiple visual elements to accurately convey its information, including colours and colour combinations as a coding system, text, safety signs, GHS hazard pictograms and arrows. The information conveyed by the safety information system shall be consistent with the organization's risk assessment and its operation and safety plans.

All elements of a safety information system shall be distinguishable and contrasting from any neighbouring information and shall be visible from the observation distance intended for safe operation, intervention or manipulation. When the contents of pipes include hazardous substances (see GHS), the safety information system shall include distinctive, unambiguous elements and the corresponding warning signs, GHS hazard pictograms or both.

To avoid confusion, the same safety information system elements shall be consistently used and installed throughout an organization's piping system, whether it is a single unit, multiple units on the same site or a multi-plant operation.



# 5 Elements of safety information systems for piping

## 5.1 General

The level of detail required to be displayed in a safety information system for piping will depend on many factors, such as the type of plant, the complexity of the operation, the availability of check lists and manuals and the competence and skills of operators. Organizations shall design safety information systems for piping in accordance with their operational and risk communication needs as identified by their risk assessment process.

A safety information system for piping shall consist of four key elements:

1) colour coding to identify the nature of the content in the piping;

2) content name;

3) flow direction indicators;

4) when applicable, warning signs, GHS pictograms or both.

## 5.2 Colour coding to identify the nature of the content in the piping

Safety information systems for piping shall incorporate colour coding that uses the basic identification colours and the safety colour yellow for hazardous substances.

Where there is no need to further differentiate hazardous substances, the safety colour yellow shall be used alone, without the addition of a basic identification colour. See Table 1.

**Table 1 — Safety colour and basic identification colours**

| | Content of a pipe | Colour | |
|---|---|---|---|
| Safety colour | Hazardous substances | Yellow | |
| Basic identification colour | Gases in either gaseous or liquefied condition | Grey | |
| | Liquids and fixed materials (powder, granulates) | Black | |
| | Acids | Orange | |
| | Alkalis (leaches) | Violet | |
| | Firefighting medium | Red | |
| | Water | Green | |
| | Air | Blue | |



The chromaticity coordinates of a basic identification colour shall fall within the relevant colour region specified in Table 2. The luminance factor for each colour shall be as specified in Table 2. To measure the chromaticity coordinates and luminance factor of pipe markings, the test method for ordinary materials specified in ISO 3864-4:2011, 5.2.1 can be used. The testing shall be carried out on finished markings or samples that are representative, with regard to the colour and surface texture, of the material used in the finished marking.

**Table 2 — Colour regions for safety colour and basic identification colours: chromaticity coordinates and luminance factor for colours externally illuminated by CIE standard illuminant D65**

| Colour | | Corner points of colour region<br>CIE standard illuminant D65<br>CIE 2° standard colorimetric observer | | | | Luminance factor<br>$\beta$ | |
|---|---|---|---|---|---|---|---|
| | | 1 | 2 | 3 | 4 | Minimum | Maximum |
| Yellow | x | 0,467 | 0,514 5 | 0,470 | 0,432 | 0,45 | 0,60 |
| | y | 0,516 | 0,472 5 | 0,440 | 0,478 | | |
| Grey | x | 0,350 | 0,300 | 0,290 | 0,340 | 0,15 | 0,50 |
| | y | 0,360 | 0,310 | 0,320 | 0,370 | | |

NOTE 1 Measurement geometry 45°/0° or 0°/45°.

NOTE 2 All colours except yellow and red are amended from ISO 14726. Yellow and red are safety sign colours from ISO 3864-4.

**Table 2** *(continued)*

| Colour | | Corner points of colour region<br>CIE standard illuminant D65<br>CIE 2° standard colorimetric observer | | | | Luminance factor<br>$\beta$ | |
|---|---|---|---|---|---|---|---|
| | | 1 | 2 | 3 | 4 | Minimum | Maximum |
| Black | x | 0,385 | 0,300 | 0,260 | 0,345 | | 0,03 |
| | y | 0,355 | 0,270 | 0,310 | 0,395 | | |
| Orange | x | 0,590 | 0,538 | 0,508 | 0.550 | 0,25 | 0,4 |
| | y | 0,394 | 0,382 | 0,412 | 0,430 | | |
| Violet | x | 0,320 | 0,319 | 0,329 | 0,340 | 0,1 | 0,2 |
| | y | 0,218 | 0,272 | 0,295 | 0,230 | | |
| Red | x | 0,705 | 0,592 | 0,574 | 0,663 | 0,07 | 0,2 |
| | y | 0,295 | 0,291 | 0,351 | 0,337 | | |
| Green | x | 0,250 | 0,330 | 0,330 | 0,287 | 0,25 | 0,35 |
| | y | 0,580 | 0,580 | 0,458 | 0,439 | | |
| Blue | x | 0,160 | 0,196 | 0,218 | 0,205 | 0,15 | 0,25 |
| | y | 0,225 | 0,250 | 0,192 | 0,169 | | |
| NOTE 1 Measurement geometry 45°/0° or 0°/45°. | | | | | | | |
| NOTE 2 All colours except yellow and red are amended from ISO 14726. Yellow and red are safety sign colours from ISO 3864-4. | | | | | | | |

NOTE Examples of identification colours are given in Annex A.

## 5.3 Content name

The pipe's content name shall be displayed in text elements which can be either the content name or its chemical formula, or by numbers in accordance with national standards.

Longer words may be abbreviated using standard approved abbreviations known by operators as found in the organization's operation safety manuals.

The content name shall be centred and placed within the basic identification colour or in the yellow safety colour using the contrast colours as defined in Table 3. Alternatively, the content name shall be the contrast colour black on a white background.

**Table 3 — Contrast colours for content name to be displayed on the safety colour and basic identification colours**

| | Content of a pipe | Basic identification colour | Contrast colour | |
|---|---|---|---|---|
| Safety colour | Hazardous substances | Yellow | Black | Yellow |
| Basic identification colour | Gases in either gaseous or liquefied condition | Grey | Black | Grey |
| | Liquids and fixed materials (powder, granulates) | Black | White | Black |
| | Acids | Orange | Black | Orange |
| | Alkalis (leaches) | Violet | White | Violet |

**Table 3** *(continued)*

| | Content of a pipe | Basic identification colour | Contrast colour | |
|---|---|---|---|---|
| | Firefighting medium | Red | White | Red |
| | Water | Green | White | Green |
| | Air | Blue | White | Blue |

NOTE Further information on colour systems is given in Annex A.

To increase legibility, a sans serif font in the contrast colour as defined in Table 3 shall be used. To increase readability, upper-case and lower-case letters shall be used. See Figure 1.


**Figure 1 — Example of content name "Air" in the contrast colour white on the basic identification colour blue**

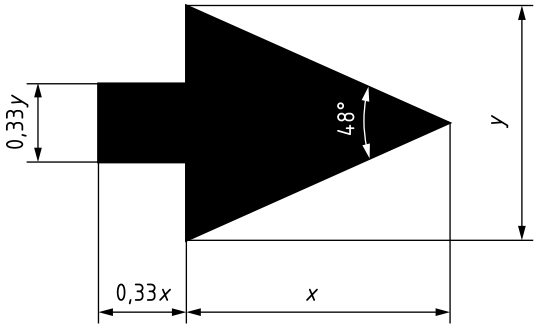


## 5.4 Flow direction indicators

The safety information system uses arrows to indicate the flow direction of the content of the piping system.

The direction of flow shall be indicated with a single headed arrow (see Figure 2) or, where applicable (e.g. ring main), with a double-headed arrow (see Figure 3). The shaft of the arrow may be shortened or lengthened as needed to improve visibility by users at the intended observation distances.

The flow direction indicator shall be black on a white background or the contrast colour on the basic identification colour or on the safety colour as defined in Table 3.




**Key**

*x* length of arrow point

*y* width of arrow point

**Figure 2 — Direction of flow indicator (right)**

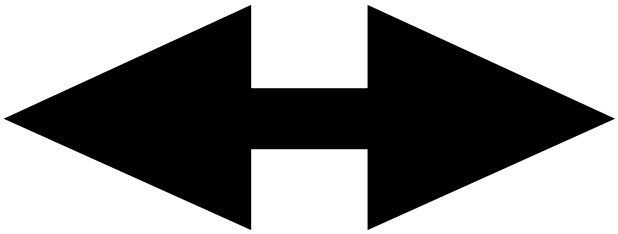


**Figure 3 — Direction of flow indicator to indicate a flow in either direction**

## 5.5 Warning signs and GHS pictograms

Warning signs and graphical symbols are elements of the safety information system used to symbolically communicate specific safety meanings. The SDSs, the organization's risk assessment or both shall identify the specific warning signs according to ISO 7010, GHS pictograms needed to communicate hazards associated with the contents of pipes or both. The safety information system's warning signs and GHS pictograms shall be displayed on a white background or on the yellow safety colour. See Figures 4 and 5 for examples.

**Figure 4 — Examples of display of warning signs and GHS pictograms on a white background**

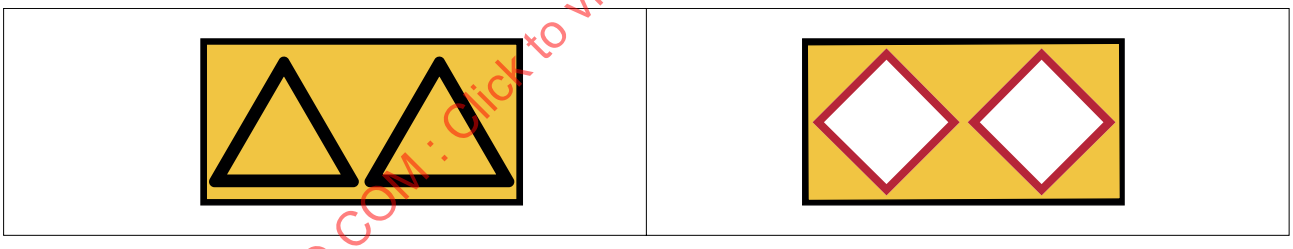


**Figure 5 — Examples of display of warning signs and GHS pictograms on the yellow safety colour background**

NOTE Ranking systems can be used to prioritize and reduce the number of GHS pictograms that need to be displayed.

As a result of an organization's risk assessment, safety information systems on piping may use safety signs, supplementary text or both to communicate potential hazards not defined in SDSs. Such potential hazards include:

— temperature extremes of the contents;

— biohazards;

— radiation;

— asphyxiation by oxygen displacement;

— electrical hazards;

— hazards related to pressurized content.

# 6 Technical and operational information

## 6.1 General

The safety information system for piping may include risk assessment-defined operational information such as:

— additional safety information;

— additional technical information;

— supplementary identification colours.

## 6.2 Additional safety information

If additional safety information is required by the user, this information shall be placed on the coloured background next to the content name in the same contrast colour as the content name as defined in Table 2. Alternatively, the additional safety information shall be the contrast colour black on a white background.

Examples include:

— high pressure;

— high or low temperature;

— speed;

— quantity of flow.

## 6.3 Additional technical information

If additional technical information is required by the user, this information shall be the contrast colour black on a white background.

Examples include:

— pipe identification code according to the piping system;

— from–to information (e.g. "from V09 to P23");

— line number consisting of outside dimension, product code, system number, line sequence;

— number and pipe classification code;

— short description of function or service.

NOTE As a result of risk assessment the height of additional information text could be smaller than the text height of the content name (see Annex B).

## 6.4 Supplementary identification colours

If the content of the piping needs further specification, supplementary identification colours shall be used. The supplementary identification colours shall be placed on both sides of the basic identification colour area. On both sides, the width of the supplementary colour area shall be 10 % of the basic identification colour area.

As a supplementary colour all basic identification colours as defined by Tables 1, 2, 4 and 5 can be used. The supplementary colour shall be different than the relevant basic identification colour associated with the content of the pipe. The safety colour yellow shall not be used as a supplementary colour.

Supplementary colours together with the basic identification colour are used for some special piping systems, such as firefighting systems, water service, medical gas applications and maritime systems. See Annexes C and D for additional information.

Only the combination of the two colours specifies the specific use. If supplementary colours are used, they shall to be used according to Table 2. For the missing supplementary identification colours, see Tables 4 and 5.

**Table 4 — Supplementary identification colours**

| | **Colour** | |
|---|---|---|
| Supplementary identification colour | White | |
| | Maroon | |
| | Brown | |
| | Yellow (brighter than safety colour yellow) | |

**Table 5 — Colour regions for supplementary identification colours: chromaticity coordinates and luminance factor for colours externally illuminated by CIE standard illuminant D65**

| **Colour** | **Corner points of colour region** CIE standard illuminant D65 CIE 2° standard colorimetric observer | | | | | **Luminance factor** $\beta$ | |
|---|---|---|---|---|---|---|---|
| | | 1 | 2 | 3 | 4 | Minimum | Maximum |
| White | x | 0,350 | 0,295 | 0,285 | 0,340 | 0,75 | |
| | y | 0,360 | 0,305 | 0,315 | 0,370 | | |
| Maroon | x | 0,455 | 0,480 | 0,480 | 0,460 | 0,05 | 0,1 |
| | y | 0,359 | 0,364 | 0,330 | 0,330 | | |
| Brown | x | 0,475 | 0,496 | 0,430 | 0,415 | 0,15 | 0,25 |
| | y | 0,435 | 0,415 | 0,385 | 0,395 | | |
| Yellow (supplementary) | x | 0,460 | 0,480 | 0,440 | 0,427 | 0,60 | 0,75 |
| | y | 0,509 | 0,494 | 0,458 | 0,472 | | |
| NOTE Measurement geometry 45°/0° or 0°/45°. | | | | | | | |

NOTE Further information on colour systems is given in Annex A.

## 7 Layout requirements

The following specifications should be considered to determine the correct size and ratio of various elements of a pipe's safety information system:

— The minimum width of the basic identification colour area or, when used alone, the safety colour area on thin pipes should be 85 mm. See Figure B.1.

— If the pipe diameter exceeds 150 mm, the minimum width of the basic identification colour area or, when used alone, the safety colour area should be 120 mm. See Figure B.2.

— If the pipe diameter exceeds 500 mm, the minimum width of the basic identification colour area or, when used alone, the safety colour area should be 200 mm. See Figure B.3.

— For pipes with a diameter up to 500 mm, the minimum colour surface area in $mm^2$ for the basic identification colour area or, when used alone, the safety colour area is 50 times the diameter (in mm) of the pipe. For pipes with a diameter exceeding 500 mm a minimum colour surface area should be 25 000 $mm^2$. See Figure B5 and B.6.

— When a basic identification colour is added on a hazardous substance (yellow) marking, the minimum width of the safety colour yellow should be 50 % of the width of the basic identification colour area.

— A maximum of two lines of text should be used for displaying the content name.

— The minimum text height for a safety information system should be 7 mm.

— The minimum arrow point height (*y* in Figure 2) for a safety information system should be 10 mm.

— The minimum height of warning signs, GHS pictograms or both for a safety information system should be 20 mm.

— To maximize visibility, the safety information system on the pipe should have sufficient contrast with the surface on which it is mounted.

— When a pipe will be seen from two sides, the safety information system should appear on both sides of the pipe.

NOTE For information related to size and observation distances, see Annex B.

## 8 Installation of safety information systems for piping

Safety information systems for piping shall be permanently mounted on pipes at locations where it needs to be observed, specifically considering:

— operational aspects of the installed piping;

— approach paths users will take from the operational positions on the floor;

— working platforms;

— expected access positions.

NOTE Ladders, scaffolding or other temporary equipment do not need to be considered when determining installation locations for the safety information system.

During installation:

— The maximum spacing between two installation points on a pipe should not exceed 10 m. For outdoor locations or in large and highly illuminated areas, a greater distance may be used, taking into consideration all expected observation distances.

— Insulated pipes shall have the safety information system for piping on the outside of the cladding.

— If installation directly on pipes causes poor legibility, then consideration should be given to mounting safety information on backboards or supports that are then attached to pipes with brackets.

— Ventilation pipes that can contain hazardous content shall be considered.

— At places with multiple pipes side by side, the safety information system shall be installed in close proximity and in a consistent manner (see Figure 6).



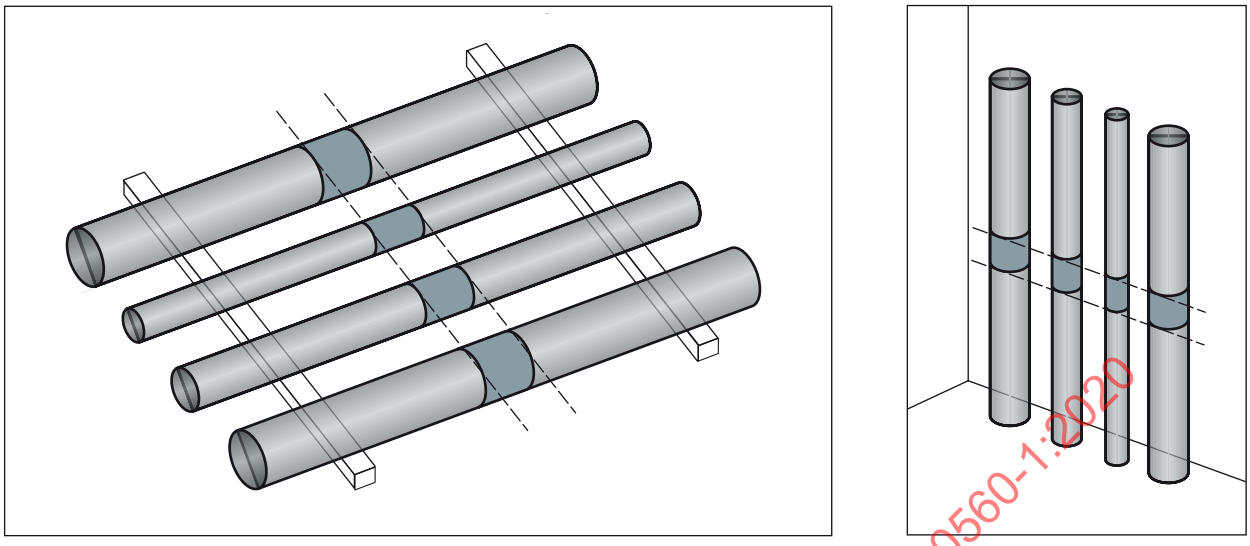


**Figure 6 — Examples of installation at places with multiple pipes**

The safety information system shall be installed at key locations including:

— near valves;

— both sides of connection points of major equipment such as pumps, tanks and vessels;

— at each branching point;

— on either side of walls, floors and other zone separation points;

— adjacent to stairways and platforms on elevated pipes;

— at the start and end of pipe racks;

— at positions with traffic crossings under pipe racks;

— by the inlet and outlet of process train.

## 9 Maintenance, inspection and revision

The safety information system shall be cleaned and maintained on a regular basis.

Inspection of safety information systems shall be carried out at planned intervals to ensure they are legible, conspicuous, clean, comprehensible and up to date. When necessary, the safety information system shall be repaired or replaced.

Any change in the piping system shall result in a review of the safety information system and, if needed, modifications being made.

# Annex A
(informative)

# Standard colours and equivalent colour codes

The chromaticity coordinates and luminance factors for colour regions of ordinary materials are specified in Table 2 and Table 5. However, manufacturers of pipelines might need guidelines concerning what the respective colours look like. For this purpose, and not for colour matching, examples of colour swatches within the colour region are given in Table A.1. Some of the colour references are specified in various national standards.

**Table A.1 — Examples of identification and contrast colours**

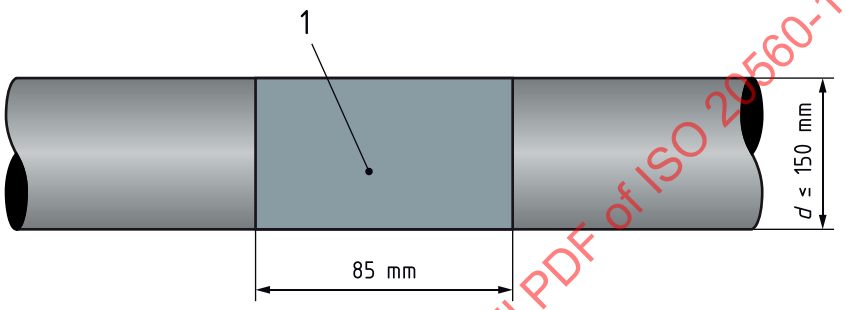
| Colour | Letter code | RAL | Pantone matching system® (PMS) |
|---|---|---|---|
| Yellow (safety colour) | YE | 1003 | 116C |
| Grey | GY | 7001 | 430C |
| Black | BK | 9004 | Black |
| Green | GN | 6018 | 362C |
| Blue | BU | 5015 | 2925C |
| Red | RD | 3001 | 187C |
| Orange | OG | 2003 | 021C |
| Violet | VT | 4001 | 258C |
| White | WH | 9003 | White |
| Maroon | MN | 8015 | 490C |
| Brown | BN | 8001 | 154C |
| Yellow (supplementary identification colour) | YES | 1018 | 106C |
| NOTE The order of the colour listings within the columns of the table is arbitrary and the order of the RAL and Pantone information does not indicate that one colour matching system is closer in matching the designated colour than another. | | | |

# Annex B
(informative)

# Observation distance

The basic identification colour is intended to be the first element of the safety information system for piping that is recognized from the observation distance. Clause 7 specifies the minimum surface area in relation to the diameter of the pipe.

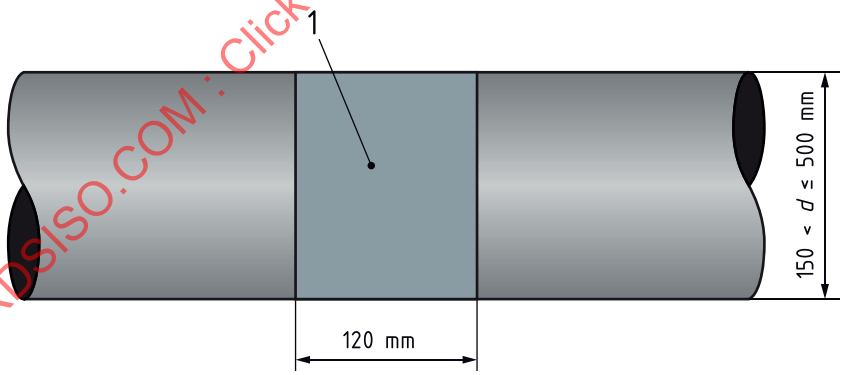
See Figures B.1 to B.5 for the minimum surface area of the basic identification colour on a pipe.




**Key**

1 basic identification colour area or, when used alone, the safety colour area

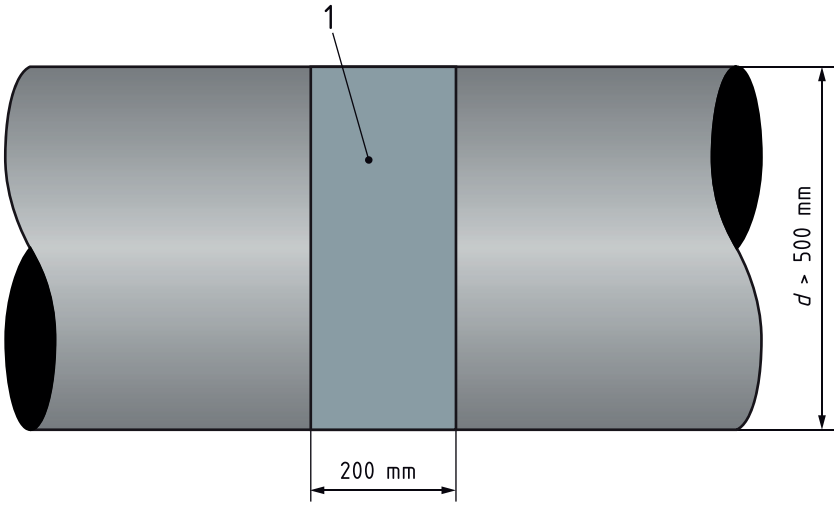
**Figure B.1 — Minimum width of the basic identification colour area or, when used alone, the safety colour area for pipes up to 150 mm wide**




**Key**

1 basic identification colour area or, when used alone, the safety colour area

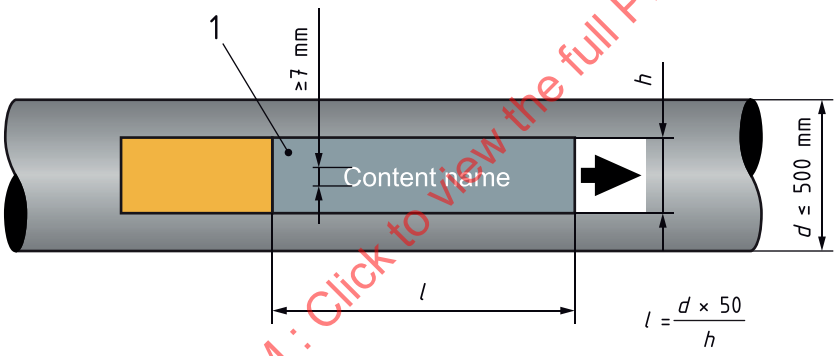
**Figure B.2 — Minimum width of the basic identification colour area or, when used alone, the safety colour area for pipes wider than 150 mm and up to 500 mm wide**




**Key**

1 basic identification colour area or, when used alone, the safety colour area

**Figure B.3 — Minimum width of the basic identification colour area or, when used alone, the safety colour area for pipes wider than 500 mm**




**Key**

1 basic identification colour area or, when used alone, the safety colour area

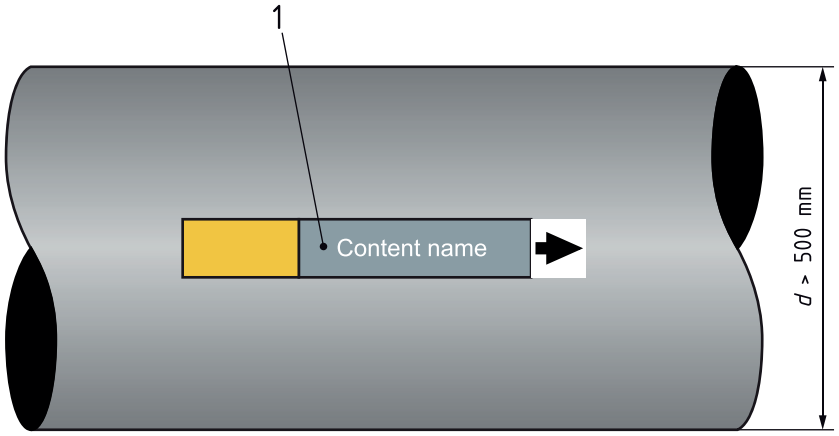
*l* length of the basic identification area

*h* height of the basic identification area

*d* diameter of the pipe

NOTE Key reference 1 is 50 times the diameter (in mm) of the pipe.

**Figure B.4 — Minimum colour surface area of the basic identification colour or, when used alone, the safety colour for pipes up to 500 mm wide**




**Key**

1 basic identification colour area or, when used alone, the safety colour area (min. 25 000 mm$^2$)

**Figure B.5 — Minimum colour surface area of the basic identification colour or, when used alone, the safety colour for pipes wider than 500 mm**

The text used to communicate the name of the pipe's content is intended to be the second-most prominent element of the safety information system. The organization's risk assessment might determine that this text may be readable from a shorter observation distance than the basic identification colour.

The size of the content name text is determined by the required observation distance and the pipe diameter.

The minimum text height, *h*, for the content name (see Figure B.6) can be calculated from the following formula:

$$h = l/Z$$

where

*l* is the observation distance;

*Z* is the relevant distance factor.


**Figure B.6 — Text height**

For text and numbers the distance factor should be 300 under normal lighting conditions of 100 lx, and reduced to 150 when under emergency lighting conditions.

The minimum text height is defined in Clause 7.

Flow direction indicators are the third visual element of safety information systems. The need to recognize flow direction is process related and shorter observation distances than are used for the pipe content name can be used when determining the size of flow direction indicators.

The fourth visual elements of safety information systems are relevant warning signs, GHS pictograms or both. They should be readable at a distance needed for operations or maintenance work of the piping system.

# Annex C
(informative)

# Examples of safety information systems

The elements of safety information systems for piping as described in Clause 5 may be combined in various ways. See Figures C.1 to C.17 for some examples of how to display various visual elements.


**Figure C.1 — Example of a pipe marker with a hazardous content according to an SDS, a GHS pictogram on the yellow safety identification colour and the flow direction indicator in the contrast colour on the basic identification colour**


**Figure C.2 — Example of a pipe marker with a hazardous content according to an SDS, a GHS pictogram on the yellow safety identification colour and the flow direction indicator in black on a white background**


**Figure C.3 — Example of a pipe marker with a hazardous content according to an SDS and risk assessment, the warning signs and GHS pictograms on the yellow safety identification colour and the flow direction indicator in black on a white background**


**Figure C.4 — Example of a pipe marker with a hazardous content according to an SDS, GHS pictograms on a white background and the flow direction indicator in black on a white background**


**Figure C.5 — Example of a pipe marker with a hazardous content according to an SDS and risk assessment, the warning signs and GHS pictograms on the yellow safety identification colour, the flow direction indicator in black on a white background and, as additional safety information, the temperature of the content of the pipe**


**Figure C.6 — Example of a pipe marker with a hazardous content according to an SDS, the GHS pictograms on the yellow safety identification colour, the flow direction in the contrast colour on the basic identification colour and, as additional safety information, the pressure of the content of the pipe and from–to information**

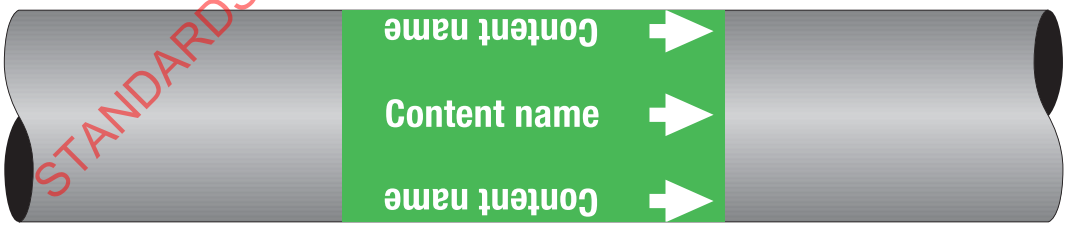



**Figure C.7 — Example of a pipe marker with a non-hazardous content and the flow direction indicator in the contrast colour on the basic identification colour**

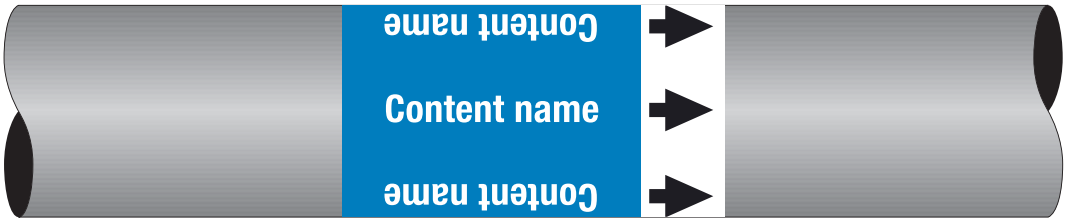



**Figure C.8 — Example of a pipe marker with a non-hazardous content and the flow direction indicator in black on a white background**


**Figure C.9 — Example of a pipe marker with a hazardous content according to an SDS and risk assessment, the warning signs and GHS pictograms on the yellow safety identification colour and the flow direction indicator in black on a white background**


**Figure C.10 — Example of a pipe marker with a hazardous content according to an SDS, the GHS pictogram on the yellow safety identification colour and the flow direction indicator in the contrast colour on the basic identification colour**

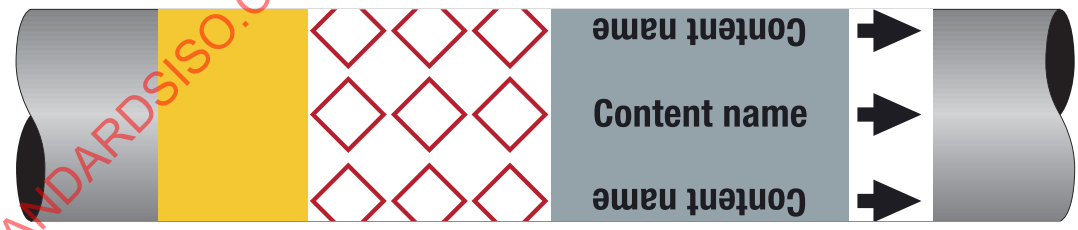



**Figure C.11 — Example of a pipe marker with a hazardous content according to an SDS, the GHS pictograms on a white background and the flow direction indicator in black on a white background**

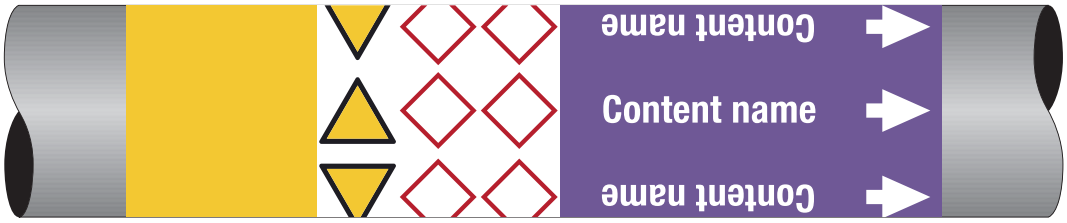



**Figure C.12 — Example of a pipe marker with a hazardous content according to an SDS and risk assessment, the warning sign and GHS pictograms on a white background and the flow direction indicator in the contrast colour on the basic identification colour**


**Figure C.13 — Example of a pipe marker with a hazardous content according to an SDS and risk assessment, the content name, warning sign, GHS pictograms and the flow direction indicator placed in the yellow safety colour**

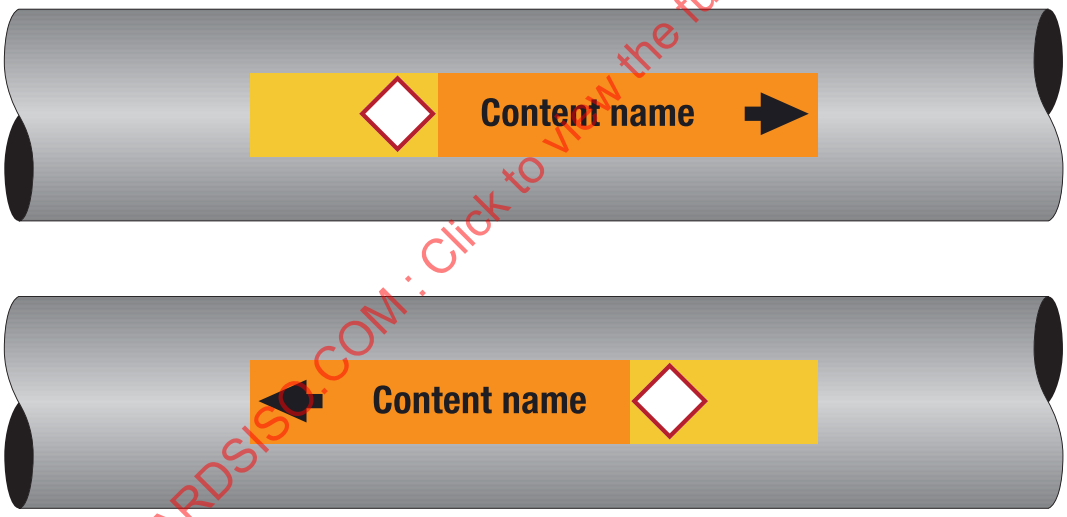



**Figure C.14 — Examples of a single pipe marker with a hazardous content according to an SDS, a GHS pictogram on the yellow safety identification colour and the flow direction indicator in the contrast colour on the basic identification colour**

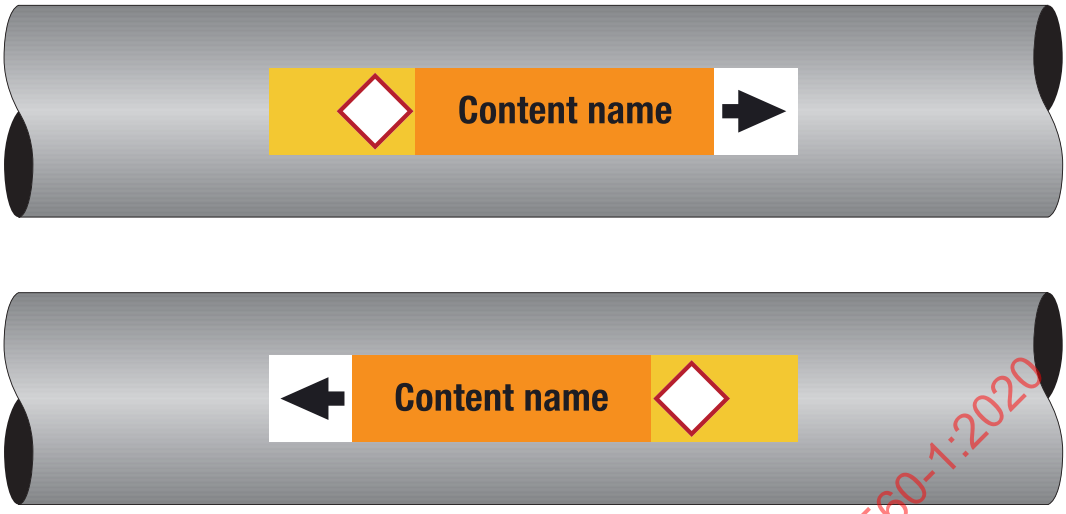



**Figure C.15 — Examples of a single pipe marker with a hazardous content according to an SDS, a GHS pictogram on the yellow safety identification colour and the flow direction indicator in black on a white background**

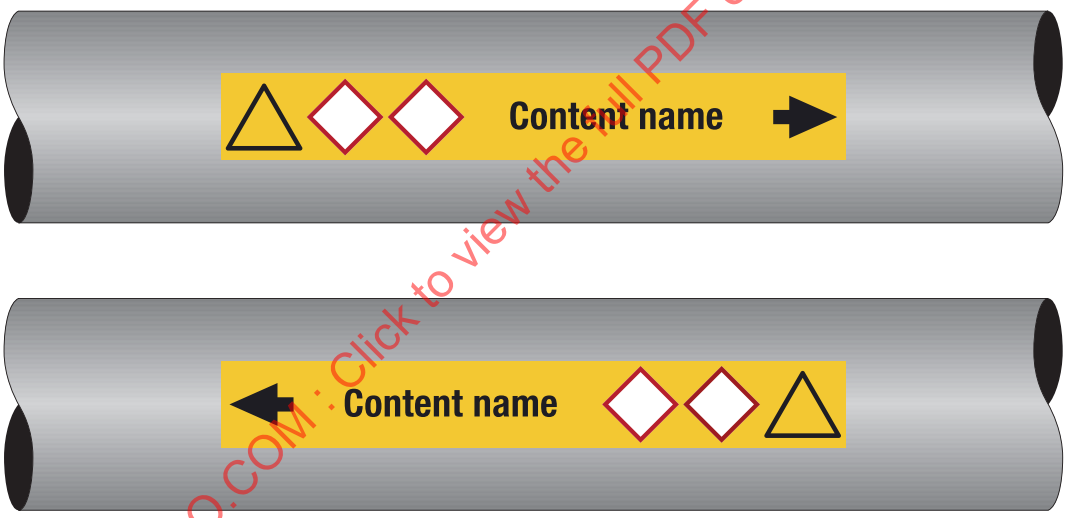



**Figure C.16 — Examples of single pipe markers with a hazardous content according to an SDS and risk assessment, the content name, warning sign, GHS pictograms and the flow direction indicator placed in the yellow safety colour**