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ISO

INTERNATIONAL ORGANIZATION FOR STANDARDIZATION

ISO RECOMMENDATION
R 508

IDENTIFICATION COLOURS FOR PIPES CONVEYING FLUIDS IN LIQUID OR GASEOUS CONDITION IN LAND INSTALLATIONS AND ON BOARD SHIPS

1st EDITION
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BRIEF HISTORY

The ISO Recommendation R 508, *Identification Colours for Pipes Conveying Fluids in Liquid or Gaseous Condition in Land Installations and on Board Ships*, was drawn up by Technical Committee ISO/TC 8, *Shipbuilding Details*, the Secretariat of which is held by the Nederlands Normalisatie-instituut (NNI) in collaboration with Technical Committee ISO/TC 5, *Pipes and Fittings*, the Secretariat of which is held by the Association Suisse de Normalisation (SNV).

Technical Committee ISO/TC 8 began work on this question in 1956 and, together with ISO/TC 5, adopted a Draft ISO Recommendation in 1962.

In December 1963, this Draft ISO Recommendation (No. 638) was circulated to all the ISO Member Bodies for enquiry. It was approved, subject to a few modifications of an editorial nature, by the following Member Bodies:

Argentina	Germany	Republic
Austria	Greece	of South Africa
Belgium	India	Spain
Canada	Israel	Sweden
Chile	Italy	Switzerland
Colombia	Japan	Turkey
Czechoslovakia	Korea, Rep. of	United Kingdom
Denmark	Netherlands	U.S.S.R.
Finland	Norway	
France	Poland *	

One Member Body opposed the approval of the Draft:

Brazil

The Draft ISO Recommendation was then submitted by correspondence to the ISO Council, which decided, in October 1966, to accept it as an ISO RECOMMENDATION.

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* for installations on board ships only.

ISO Recommendation R 508 October 1966

IDENTIFICATION COLOURS FOR PIPES CONVEYING FLUIDS IN LIQUID OR GASEOUS CONDITION IN LAND INSTALLATIONS AND ON BOARD SHIPS

1. PURPOSE

The purpose of this ISO Recommendation is to define the meaning and application of a limited number of colours which should be used for the identification of pipes conveying fluids in liquid or gaseous condition in land installations and on board ships.

2. SCOPE

This ISO Recommendation applies to land installations and to installations on board ships.

According to the importance of the installations and to the variety of fluids conveyed, the pipes should be identified by

(*a*) *basic identification colours only*,

for installations where the determination of merely the basic nature of the fluid is sufficient;

(*b*) *basic identification colours and code indications*,

for installations where the precise determination of the fluid is of great importance.

3. BASIC IDENTIFICATION COLOURS

3.1 Basic identification colours and their meanings

Green	— water in liquid state
Silver-grey	— steam
Brown	— mineral, vegetable and animal oils; combustible liquids
Yellow-ochre	— gases in either gaseous or liquefied condition (except air)
Violet	— acids and alkalis
Light blue	— air
Black	— other liquids

3.2 Physical definition of the basic identification colours

The basic identification colours are defined by means of the CIE Standard Colorimetric System of colour specification, as accepted at the 8th session of the International Commission on Illumination, held at Cambridge (United Kingdom), in 1931.

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The specifications are expressed in CIE chromaticity co-ordinates x and y and luminance factor β determined under CIE conditions, i.e. source C, direction of illumination normal, direction of viewing 45°.

TABLE 1. — **Definition of the basic identification colours**

Basic colour name	CIE chromaticity co-ordinates x and y, luminance factor β	Example
Green	$y > -0.1\,x + 0.412$ $y > 2.8\,x - 0.552$ $y < 0.474 - 0.1\,x$ $x > 0.357 - 0.15\,y$ $0.09 < \beta < 0.17$	
Silver-grey	$\beta > 0.50$	
Brown	$x > 0.545 - 0.35\,y$ $y > 0.19\,x + 0.257$ $x < 0.588 - 0.25\,y$ $y < 0.39\,x + 0.195$ $0.09 < \beta < 0.17$	
Yellow-ochre	$y > 0.840 - 1.07\,x$ $y > 0.77\,x + 0.075$ $y < 0.823 - 0.94\,x$ $y < x + 0.006$ $0.30 < \beta < 0.45$	
Violet	$y < 0.17\,x + 0.223$ $y < 2.6\,x - 0.49$ $y > 0.25\,x + 0.185$ $y > 7\,x - 1.854$ $0.36 < \beta < 0.50$	
Light blue	$y < 0.550 - x$ $y < 0.64\,x + 0.118$ $y > 0.994 - 3\,x$ $y > 0.94\,x + 0.024$ $0.36 < \beta < 0.50$	

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3.3 Method of application

At the user's choice the basic identification colour should be

(*a*) painted on the pipe over the whole length;

(*b*) painted on the pipe as a band over a length of about 150 mm, depending on the diameter of the pipe;

(*c*) applied by wrapping around the pipe an adhesive band of the basic identification colour.

This basic identification colour should be placed at all junctions, at both sides of valves, service appliances, bulkheads, wall penetrations and at any other places where identification of the fluid is necessary.

Valves may be painted with the identification colour with the following exception: if the pipeline has been provided with the safety colour for fire fighting, the valves should be painted red (see clause 4.1 (*a*)).

For example. — Valves in fire-extinguishing steam or water pipelines or in water flooding pipelines should be painted red.

4. CODE INDICATIONS

The application of code indications should be determined by the user. Code indications should be placed at all junctions, at both sides of valves, service appliances, bulkheads, wall penetrations, etc.

4.1 Code indications

Code indications are

(*a*) The safety colours

— *red*, for fire fighting;
— *yellow*, with black diagonal stripes, for warning of danger;
— *auxiliary blue* in conjunction with the green basic colour, to denote pipes carrying fresh water, either potable or non-potable.

(*b*) Information regarding the nature of fluid for which the following systems may be used:

— name in full in national language, for example: fresh water;
— abbreviation in national language, for example: *FW*;
— chemical symbol, for example: H_2O.

4.2 Definition of the safety colours

The safety colours are defined in ISO Recommendation R 408, *Safety Colours* (see also clause 3.2).

TABLE 2. — **Definition of the safety colours**

Colour name	CIE chromaticity co-ordinates x and y, luminance factor β	Example
Safety red	$y < 0.290 + 0.080\ x$ $y > 0.920 - x$ $y > 0.559 - 0.394\ x$ $y > 0.316$ $0.07 < \beta < 0.15$	
Safety yellow *	$x > 0.048 + 0.827\ y$ $y > 0.887 - x$ $y > 0.120 + 0.632\ x$ $\beta > 0.45$	
Auxiliary blue	$x < 0.433 - 0.95\ y$ $y < 0.64\ x + 0.12$ $x > 0.342 - 0.95\ y$ $y > 1.26\ x - 0.074$ $0.08 < \beta < 0.16$	

* "Safety yellow" is a yellow colour with an orange cast.

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4.3 Method of application

If a safety coulour is applied, this colour should be

(*a*) painted on the basic identification colour, in the case of a pipe painted over the whole length;

(*b*) painted between two basic identification colour bands, each of a length of about 150 mm, depending on the diameter of the pipe (see Fig. 1);

(*c*) applied by wrapping around the pipe an adhesive safety colour band between two basic identification colour bands, each of a length of about 150 mm, depending on the diameter of the pipe (see Fig. 1).

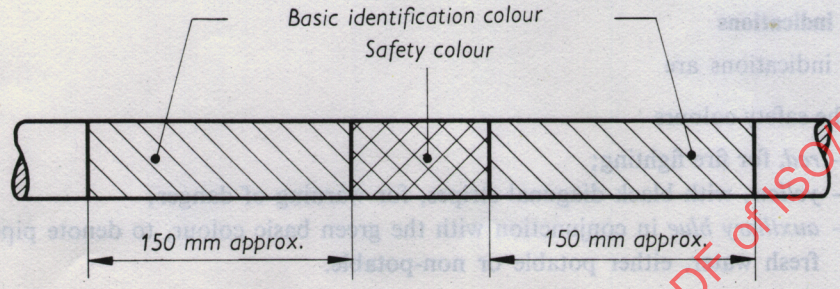

FIG. 1. — **Application of safety colours**

Further possible code indications, such as information regarding the fluid, should be placed on the basic identification colour or next to the basic identification colour band. This information should be either in white or in black in order to contrast clearly with the colour of the pipe or with the basic identification colour and should be placed directly on the pipe or on a label, plate or sign, fixed to the pipe near the basic identification colour. The label, plate or sign should be of the same colour as the safety colour, if this colour is applied.

5. DIRECTION OF FLOW

When it is necessary to know the direction of flow of the fluid, this should be indicated by an arrow situated in the proximity of the basic identification colour and painted white or black in order to contrast clearly with the basic identification colour. If a label, plate or sign, with a codified indication, is attached to the pipe, the direction of flow may be shown by the pointed end of this label, plate or sign.

TABLE 3. — **Captions corresponding to the French terms shown in Fig. 2,** *Examples of identification by colours and code indications*

French	English
Eau ou	Water or
Eau extinctrice d'incendie ou	Fire extinguishing water or
Eau potable	Drinking water
Cloison ou mur	Bulkhead or wall
Vapeur 80 à 510 °C	Steam 80 to 510 °C
Vapeur extinctrice d'incendie	Fire extinguishing steam
Huile pour moteur diesel	Diesel oil
Huile lubrifiante (HL)	Lubricating oil (LO)
Ammoniaque (NH_4OH)	Acqueous ammonia (NH_4OH)
Vin	Wine

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