

DIN 2403 Identification of pipelines according to the fluid conveyed. Marking of pipes according to fluid transported

1 Field of application

This standard specifies the colours for the identification of pipelines in above ground installations according to the fluid conveyed.

2 Scope

A clear identification of the pipelines according to the fluid conveyed serves the interests of safety, correct repair and effective fire fighting. It is intended to point out hazards, in order to avoid accidents and damage to health.

3 Identification

The pipelines shall be clearly identified by labels specifying the nature of the fluid conveyed. If a colour identification is used, then

- either labels or adhesive labels in the colour identifying the group of fluids conveyed shown in table 1 shall be used or
- colour bands in the colour identifying the group of fluids conveyed shall be fitted or
- the pipeline shall be painted over the whole length in the colour identifying the group of fluids conveyed or
- labels, adhesive labels or colour bands shall be placed at important points, e.g. at both sides of each valve, at junctions, wall penetration.

For technical reasons, the original colours have not been reproduced. They are only shown in the original English version of DIN 2403.

4 Allocation of colours to the pipe contents

The fluids conveyed through pipelines are divided into 10 groups in accordance with their general properties, and their colours are given in table 1.

Table 1.

Pipe contents	Group	Colour name	Colour reference (as specified in DIN 6164 Part 1)	Nearest colour sample in accordance with RAL 840 HR
Water	1	Green	23 : 7 : 3	RAL 6018
Steam	2	Red	7 : 8 : 3	RAL 3000
Air	3	Grey	18 : 1 : 3	RAL7001
Combustible gases	4	Yellow	2 : 6 : 1	RAL 1021
		or yellow	2 : 6 : 1	RAL 1021
		with auxiliary red	7 : 8 : 3	RAL 3000

Non-combustible gases	5	Yellow with auxiliary black	2 : 6 : 1 N : 0 : 9.5	RAL 1021 RAL 9005
		or black	N : 0 : 9.5	RAL 9005
Acids	6	Orange	5 : 5 : 1	RAL 2003
Alkalis	7	Violet	11 : 2 : 4	RAL 4001
Combustible liquids	8	Brown	3 : 5 : 4	RAL 8001
		or brown with auxiliary red	3 : 5 : 4 7 : 8 : 3	RAL 8001 RAL 3000
Non-combustible liquids	9	Brown with auxiliary black	3 : 5 : 4 N : 0 : 9.5	RAL 8001 RAL 9005
		or black	N : 0 : 9.5	RAL 9005
Oxygen	0	Blue	17 : 5 : 2	RAL 5015

5 Shape and arrangement of labels

The shape of the labels with border shall be as shown in figures 1 to 6. The size a×b shall be selected from DIN 825 Part 1, e.g. 74mm×210mm.

The pointed end of the label shown the direction of flow of the fluid conveyed. If the direction of flow alternates, labels with pointed ends at both sides shall be used, as shown in figure 4.

The labels shall be durable and sufficiently strong (adhesive labels, labels made from laminated plastics, enameled labels, adhesive tape etc.)

6 Identification on the label

The fluid shall be identified by words, a chemical symbol, code or abbreviation, and possibly by the colour in accordance with clause 4.

If an auxiliary colour is to be applied to the pipeline by colour banding, then the basic identification colour shall be pre-dominant.

6.1 Green, red, blue, violet, brown and black labels shall have white lettering. White, yellow, orange and grey labels shall have black lettering. The edges shall be in the same colour as the lettering.

6.2 If a code is used, the number before the dot shows the number identifying the group of fluids, to which the fluid conveyed belongs. The number after the dot shows the family of fluids (see table). Other types of fluid can be indicated by appending further digits.

It is recommended that an explanation of the code system used be displayed in a suitable place on the premises.

6.3 The following sizes of lettering are recommended, depending on the outside diameter of the pipes, including thermal insulation.

Table 2.

Outside diameter	up to 30	50	80	130	160	240	over 240
Size of lettering	12.5	20	25	40	50	63	80 or 100

7 Additional identification

7.1 Additions can be made to the above identification code, e.g. by stating the pressure, temperature or other characteristics using symbols in accordance with DIN 1304. In addition, all pipelines conveying radioactive fluids shall be marked with the warning symbol for ionizing radiation in accordance with DIN 25 400.

7.2 Pipelines conveying fluids the incorrect handling of which could incur particular dangers may additionally be marked by an orange band surrounded by a black edge intersecting the pointed end of the label.

7.3 If fire extinguishing pipelines are marked red (RAL 3000), then care shall be taken to ensure that they cannot be confused with steam pipelines. If any confusion is possible, the fire extinguishing pipelines shall be identified by an additional white band. The white area shall cover 50% of the total area and each red border 25% of the total area. The letter F (fire extinguishing pipeline) in the colour of the fire extinguishing agent used, e.g. green for water, red for steam, shall be placed in the white area.

7.4 In water supply systems which are subject to the Verordnung über Brauchwasser für Lebensmittelbetriebe (Trinkwasserverordnung) (Regulation on drinking water and service water for food processing companies) pipelines for different supply systems shall, in accordance with article 15(1) of this regulation, be identified by different colours, unless the pipelines are laid under ground, e.g. drinking water pipes with white bands or bands on a green background.

8 Examples for identification on plates or labels

In the following examples of designation

pointing to right means direction of flow to the right (R);

pointing to left means direction of flow to the left (L);

pointing both ways means alternating directions of flow (W);

A means name of fluid given;

B means chemical symbol given;

C means colour white given additionally.

Designation of identification on label indicating flow to the right (R), giving the code for raw water ¹⁾ (1.1):

Identification DIN 2403 - R 1.1

giving the name (A) of fluid 1.1 (raw water ¹⁾)

Identification DIN 2403 - R 1.1 A

Designation of identification on label indicating flow to the right (R), giving the code for steam (2.4):

Identification DIN 2403 - R 2.4

Designation of identification on label indicating alternating flow (W), giving the name (A) of fluid 2.4 (steam):

Identification DIN 2403 - W 2.4 A

Designation of identification on label indicating flow to the left (L), giving the code for sulfuric acid (6.0):

Identification DIN 2403 - L 6.0

giving the chemical symbol (B) for fluid 6.0 (sulfuric acid):

Identification DIN 2403 - L 6.0 B

giving the chemical symbol (B) for fluid 6.0 (sulfuric acid), specifying white as the auxiliary colour (C):

Identification DIN 2403 - L 6.0 B C

¹⁾ See subclause 7.4

Table 3. Summary

Colour group of fluids	Code identifying ²⁾ type of fluid	Type of fluid
Identification colour green	Group 1	Water
	1.0	Drinking water (see subclause 7.4)
	1.1	Raw water
	1.2	Service water, clean water
	1.3	Treated water
	1.4	Distilled water, condensate
	1.5	Pressurized water, impounded water
	1.6	Circulating water
	1.7	Heavy water
	1.8	
	1.9	Waste water
Identification colour red	Group 2	Steam

	2.c	LP steam up to 1.5 bar gauge pressure	stating pressure or temperature
	2.1	HP saturated steam	
	2.2	HP superheated steam	
	2.3	Reduced, tapped, back pressure steam	
	2.4	Vapour	
	2.5	Vacuum steam (at absolute pressure)	
	2.6	Circulating steam	
	2.7		
	2.8		
	2.9	Waste steam	
Identification colour grey	Group 3	Air	
	3.0	Fresh air, outside air	
	3.1	Compressed air (stating the pressure)	
	3.2	Hot air	
	3.3	Clean air (conditioned)	
	3.4		
	3.5		
	3.6	Recalculation air, flushing air	
	3.7	Delivery air	
	3.9	Exhaust air	
Identification colour yellow or yellow with auxiliary red	Group 4	Combustible gases, including liquefied gases	

	4.0	Public gas supply
	4.1	Acetylene
	4.2	Hydrogen and gases containing hydrogen
	4.3	Hydrocarbons and their derivatives
	4.4	Carbon monoxide and gases containing CO
	4.5	Mixed gases (technical gases)
	4.6	Inorganic gases NH ₃ , H ₂ S
	4.7	Hot fuel gases
	4.8	
	4.9	Combustible waste gases
	Group 5	Non-combustible gases, including liquefied gases
Identification colour yellow with auxiliary black or black	5.0	Nitrogen and gases containing nitrogen
	5.1	
	5.2	Carbon dioxide and gases containing CO ₂
	5.3	Sulfur dioxide and gases containing SO ₂
	5.4	Chlorine and gases containing chlorine
	5.5	Other inorganic gases
	5.6	Gas mixtures
	5.7	Derivatives of hydrocarbons
	5.8	Non-combustible heating gases
	5.9	Non-combustible waste gases
Identification colour orange	Group 6	Acids

	6.0	Sulfuric acid
	6.1	Hydrochloric acid
	6.2	Nitric acid
	6.3	Inorganic mixed acids
	6.4	Organic acids
	6.5	Acid salt solutions
	6.6	Oxidizing solutions
	6.7	Etching acid
	6.8	
	6.9	Acid waste
	Group 7	Alkalis
Identification colour violet	7.0	Sodium hydroxide solution
	7.1	Aqueous ammonia
	7.2	Potassium hydroxide solution
	7.3	Calcium hydroxide solution
	7.4	Other alkaline inorganic liquids
	7.5	Alkaline organic liquids
	7.6	
	7.7	
	7.8	
	7.9	Alkaline waste
Identification colour brown or brown	Group 8	Combustible liquids

with auxiliary red	8.0	Danger class A I (flash point below 21)
	8.1	Danger class A II (flash point above 21 up to 55)
	8.2	Danger class A III (flash point above 55 up to 100)
	8.3	Danger class B (soluble in water, flash point below 21)
	8.4	Technical greases and heavy oils
	8.5	Other organic liquids and pastes
	8.6	Nitroglycerin
	8.7	Other liquids, including liquid metals
	8.8	
	8.9	Combustible waste
Identification colour brown with auxiliary black or black	Group 9	Non-combustible liquids
	9.0	Liquid foods
	9.1	Aqueous solutions
	9.2	Other solutions
	9.3	Aqueous slurries (mash)
	9.4	Other slurries
	9.5	Jelly (glue)
	9.6	Emulsions and pastes
	9.7	Other liquids, including liquid metals
	9.8	
9.9	Non-combustible waste	
Identification colour blue	Group 0	Oxygen

	0.0	
	0.1	
	0.2	
	0.3	
	0.4	
	0.5	
	0.6	
	0.7	
	0.8	
	0.9	
²⁾ Codes to which no type of fluid is allocated are spares for possible additions.		

Standards and other documents referred to

- DIN 825 Part 1 Dimensions of nameplates; square and rectangular nameplates
- DIN 1304 Symbols for formulae
- DIN 6164 Part 1 DIN colour chart; DIN colour chart system for 2 standard observer
- DIN 25 400 Warning symbol for ionizing radiation
- RAL 840 HR Colour register