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# INTERNATIONAL STANDARD



# 12

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INTERNATIONAL ORGANIZATION FOR STANDARDIZATION • МЕЖДУНАРОДНАЯ ОРГАНИЗАЦИЯ ПО СТАНДАРТИЗАЦИИ • ORGANISATION INTERNATIONALE DE NORMALISATION

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## Aerospace — Pipelines — Identification scheme

*Aéronefs — Tuyauteries — Procédé d'identification*

First edition — 1976-11-01

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**Descriptors** : aircraft, aircraft equipment, pipelines, piping, marking, colour codes.

## FOREWORD

ISO (the International Organization for Standardization) is a worldwide federation of national standards institutes (ISO Member Bodies). The work of developing International Standards is carried out through ISO Technical Committees. Every Member Body interested in a subject for which a Technical Committee has been set up 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.

Draft International Standards adopted by the Technical Committees are circulated to the Member Bodies for approval before their acceptance as International Standards by the ISO Council.

International Standard ISO 12 was drawn up by Technical Committee ISO/TC 20, *Aircraft and space vehicles*, and was circulated to the Member Bodies in September 1975.

It has been approved by the Member Bodies of the following countries :

Australia	Germany	South Africa, Rep. of
Belgium	India	Spain
Brazil	Japan	Turkey
Canada	Mexico	United Kingdom
Czechoslovakia	Netherlands	U.S.S.R.
Egypt, Arab Rep. of	Poland	
France	Romania	

No Member Body expressed disapproval of the document.

*This I S cancels and replaces  
ISO Recommendation ~~12~~ 12 - 1970.*



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**Aerospace — Pipelines — Identification scheme****ERRATUM***Inside front cover*

Add the following paragraph at the end of the Foreword :

"This International Standard cancels and replaces ISO Recommendation R 12-1970."

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# Aerospace – Pipelines – Identification scheme

## 1 SCOPE AND FIELD OF APPLICATION

This International Standard states the requirements for a scheme to indicate, by appropriate marking, the functions or contents of pipe systems in aircraft and spacecraft.

The purpose of the scheme is to provide the minimum identification necessary for normal maintenance purposes.

## 2 THE SCHEME

### 2.1 General

2.1.1 Where ambient temperatures permit, the scheme shall consist of markers fixed to the pipe systems to indicate their functions or contents, to give due warning where the contents are dangerous and, when required, to indicate the direction of flow of the contents. Typical applications of the scheme are shown in figure 1.

Any additional identification required should be separate and distinct from the lettering, symbols and colours specified in this International Standard. It is recommended that such additional identification should be by means of a number code (see figure 1d).

2.1.2 Where ambient temperatures are too high to permit the use of markers, the requirements of this International Standard shall be met as fully as possible. As a minimum requirement, one inscription in black letters, located in accordance with clause 4, shall be applied in such a manner that it remains legible throughout the temperature range imposed on the line.

### 2.2 Basic identification

2.2.1 Each of the pipe systems listed in table 1 shall be identified by a marker bearing the designation of the system, together with the appropriate symbol as described in table 1 and shown in figure 2.

2.2.2 Filler lines, vent lines, pressure transmitter lines, priming lines and drain lines or related functional equipment shall be identified by the same marker as the main line.

TABLE 1 – Pipe systems and symbols

Designation of pipe system	Symbol (see figure 2)	
	Description	No.
Air conditioning	Dot pattern	11
Battery activator	Ellipse with radiating lines	24
Breathing oxygen	Rectangle	10
Compressed gas	Broad diagonal stripe	16
Coolant	Horizontal "S"	9
De-icing	Triangle <sup>1)</sup>	13
Drinking water	"H <sub>2</sub> O"	25
Electrical conduit	Flash of lightning	17
Fire protection	Horizontal diamond	12
Fuel	Four-pointed star	1
Hydraulic	Circle	6
Inerting	Pipe cross <sup>1)</sup>	19
Instrument air	Zig-zag line <sup>2)</sup>	8
Lubrication	Square <sup>1)</sup>	5
Monopropellant	Block T	21
Rain repellent	Falling raindrops	22
Pneumatic	"X" <sup>2)</sup>	7
Rocket catalyst	Three vertical stripes <sup>2)</sup>	15
Rocket fuel	Four-pointed star inside crescent	3
Rocket oxidizer	Crescent	2
Solvent	Horizontal stripes	20
Vacuum	Wavy line <sup>2)</sup>	23
Waste water	Chain <sup>2)</sup>	26
Water injection	Chevron	4

1) Alternate symbols to be staggered.

2) Continuous pattern.

2.2.3 The contents of pipelines other than those listed in table 1 (for example toilet) shall, where necessary, be identified by markers bearing the name of the function or contents only.

## 2.3 Supplementary identification

### 2.3.1 Sub-division of basic identification

Where necessary for the further identification of a pipeline, a sub-division of a basic identification shall be by means of additional words, describing the specific function or contents of the sub-division (for example "Methyl bromide", "Auto-pilot"), which may be on a second, narrower marker adjacent to the basic identification marker or interposed between the words on the latter.

### 2.3.2 Warning symbol

Markers bearing the skull and crossbones symbol, as shown in figure 2 (14), shall be applied adjacent to the basic identification markers on all lines where it is necessary to indicate that the contents of the lines are considered to be dangerous to maintenance personnel.

### 2.3.3 Direction of flow

When required, the direction of flow of the contents of a pipeline shall be indicated by means of additional markers bearing arrows, as shown in figure 2 (18).

## 3 MARKERS

### 3.1 General

Except as provided in 3.2.2, all lettering and symbols shall be printed in black upon a white or equivalent ground.

If desired, alternate lines or, where appropriate, pairs of lines of the lettering may be inverted.

### 3.2 Basic identification marker

**3.2.1** The basic identification marker shall be not less than 25 mm wide and shall bear

- the appropriate symbol, at regular intervals or forming a continuous pattern (see figure 2) in a band approximately 7 mm wide on one margin of the marker;
- the designation of the pipe system, in lettering not less than 3 mm high, repeated at regular intervals such that the gap between the lines is not more than twice the height of the lettering, on the portion of the marker not used for the symbol.

**3.2.2** If desired, the background to the written description may be coloured, in which case the colouring shall be as shown in figure 2. The colours shall have the colorimetric values given in table 2 and shall not be of such density as to obscure the lettering. Where there is more than one colour, the widths of the bands shall be approximately equal.

TABLE 2 — Colorimetric values of colours

Colour	Chromaticity co-ordinates and luminance factor under CIE* Standard Illuminant B		
	Value x	Value y	$\beta$ %
(1) Blue	0,201	0,188	8,8
(2) Green	0,366	0,510	14,3
(3) Yellow	0,483	0,488	62,3
(4) Brown	0,506	0,386	3,3
(5) Orange	0,620	0,356	16,2
(6) Red	0,645	0,316	7,7
(7) Grey	0,342	0,363	29,1

\* Commission Internationale pour l'Eclairage (International Commission on Illumination).

### 3.3 Supplementary identification marker

A marker used for supplementary identification purposes (see 2.3) shall be not less than 12 mm wide and shall bear either

- the appropriate symbol at regular intervals as shown in figure 2 (14) and (18), or
- the desired inscription, in lettering not less than 2 mm high, repeated at regular intervals such that the gap between the lines is not more than twice the height of the lettering.

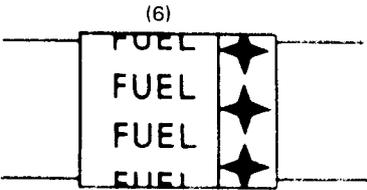
### 3.4 Identification

For purchasing and handling purposes, the markers shall be identified by the number of the relevant national standard together with the appropriate symbol number as shown in table 1.

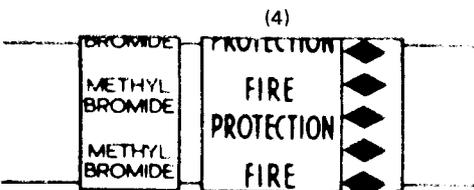
## 4 LOCATION OF MARKERS

Markers shall be located at both ends of a pipeline component and at approximately 600 mm spacing along the line. Identification points shall be selected so that when the pipeline is installed at least one marker is located adjacent to each servicing point and inspection door.

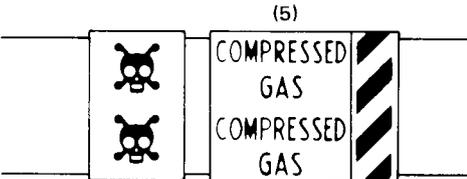
To preclude over-application of markers, discretion may be exercised when implementing these requirements. Where visibility is unrestricted over a one-piece pipeline of considerable length, the markers need only be placed at intervals necessary to ensure that at least one marker is visible and recognisable from any observation point along the line. Similarly, where a length of pipeline is less than 600 mm and the installed pipeline may be readily traced, only one marker need be used.



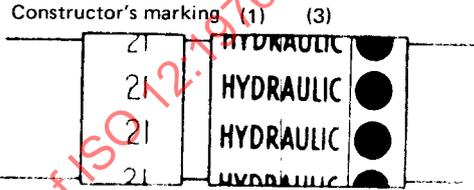
a) Fuel



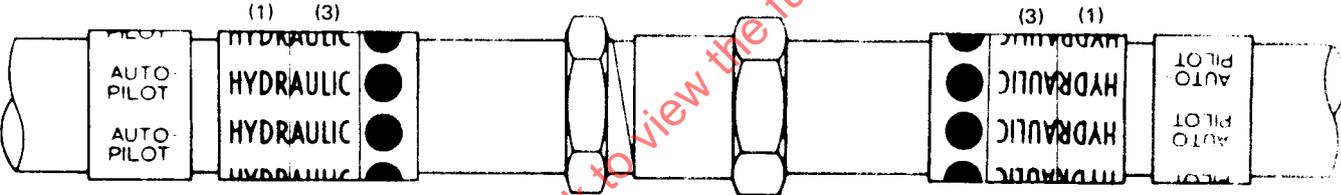
b) Fire protection – methyl bromide



c) Compressed gas-warning



d) Hydraulic – with additional identification



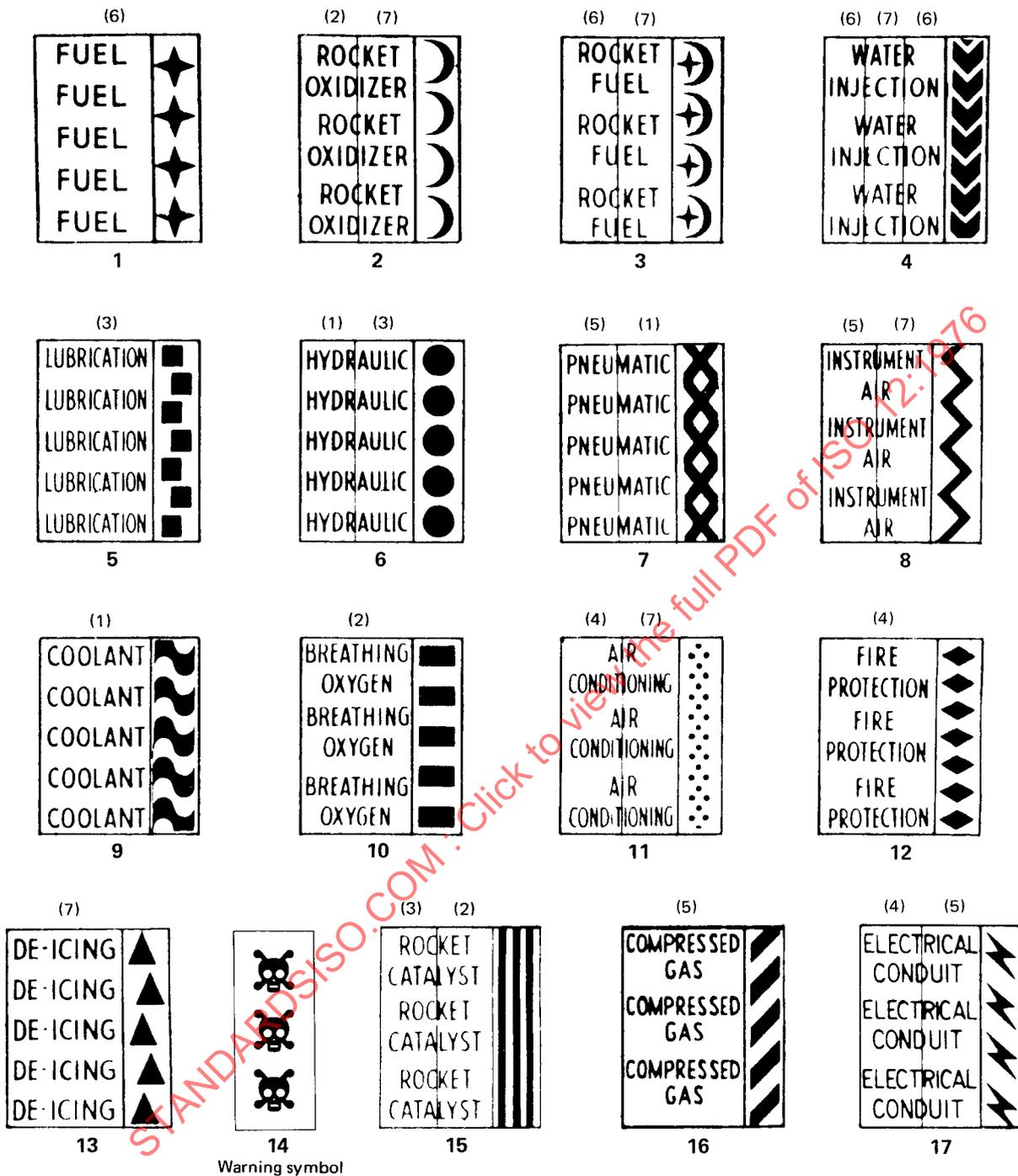
e) Positioning of markers

NOTES

- 1 The numbers above the markers are the serial numbers of the colours as given in table 2.
- 2 The supplementary identification marker may be located on either side of the basic identification marker (see 2.3.1).

FIGURE 1 – Typical applications of markers

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NOTES

- 1 The numbers above the markers are the serial numbers of the colours as given in table 2. The numbers below the markers are the symbol numbers for identification purposes.
- 2 The symbol may be located on either margin of a marker (see 3.2.1a)).

FIGURE 2 – Identification symbols and colours