
International Standard



3864

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Safety colours and safety signs

Couleurs et signaux de sécurité

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Descriptors : safety colours, signals, safety requirements, graphic symbols.

Foreword

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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 3864 was developed by Technical Committee ISO/TC 80, *Safety colours and signs*, and was circulated to the member bodies in November 1979.

It has been approved by the member bodies of the following countries :

Australia	Germany, F. R.	Poland
Austria	Hungary	Romania
Brazil	Italy	South Africa, Rep. of
Czechoslovakia	Mexico	Spain
Denmark	Netherlands	Switzerland
France	Norway	United Kingdom

The member bodies of the following countries expressed disapproval of the document on technical grounds :

Belgium
Chile
Sweden
USA

Safety colours and safety signs

0 Introduction

There is a need to standardize a system of giving safety information which eliminates the use of words as much as possible. The need arises because of the increase in international trade and travel, and the growth of work forces lacking a common language.

Education is an essential part of any system for giving safety information. It is desirable to standardize a system for use in all fields of application because lack of standardization may lead to confusion and perhaps accidents.

The use of safety colours and safety signs does not replace proper working instructions and precautionary measures.

1 Scope and field of application

This International Standard prescribes safety colours and safety signs for the purposes of preventing accidents and health hazards and meeting emergencies.

NOTE — It is important to note that, in most countries, safety colours and signs in certain fields (particularly labelling for transport of dangerous goods and traffic signs) are covered by statutory regulations which differ in some respects from those given in this International Standard.

2 Reference

ISO 3461, *Graphic symbols — General principles for presentation*.

3 Definitions

3.1 safety colour : A colour, of special properties¹⁾, to which a safety meaning is attributed.

3.2 safety sign : A sign which gives a general safety message, obtained by a combination of colour and geometric shape and which, by the addition of a graphic symbol or text, gives a particular safety message.

3.3 supplementary sign : A sign with a text only, for use where necessary in conjunction with a safety sign.

4 Purpose of safety colours and safety signs

4.1 The purpose of safety colours and safety signs is to draw attention rapidly to objects and situations affecting safety and health.

4.2 Safety signs shall be used only for instructions which are related to safety and health.

1) Definitions related to the properties of safety colours are given in annex A.

5 Safety colours and contrast colours

5.1 Safety colours

The general meaning assigned to safety colours shall be as given in table 1.

Table 1 — General meaning of safety colours

Safety colour	Meaning or objective	Examples of use
Red	Stop Prohibition	Stop signs Emergency stops Prohibition signs
	This colour is also used for fire-prevention and fire-fighting equipment and its location	
Blue ¹⁾	Mandatory action	Obligation to wear personal protective equipment
Yellow	Caution, risk of danger	Indications of dangers, (fire, explosion, radiation, toxic hazards, etc.) Warning for steps, low passages, obstacles ²⁾
Green	Safe condition	Escape routes Emergency exits Emergency showers First-aid and rescue stations

1) Blue is considered a safety colour only if used in a circular shape.

2) Fluorescent orange-red (see annex A, table 5) may be used in place of safety yellow except on safety signs. This colour is very conspicuous, especially in conditions of poor natural lighting.

5.2 Contrast colours

If a contrast colour is required for a safety colour, it shall be as shown in table 2.

Table 2 — Contrast colours

Safety colour	Corresponding contrast colour
Red	White*
Blue	White
Yellow	Black
Green	White

The contrast colour for white shall be black and for black shall be white.*

5.3 Example of use of safety colours and contrast colours

The following combination of safety yellow and black may be used to indicate temporary or permanent risk locations such as :

- locations where there is a risk of collision, falling, stumbling or of falling objects;
- steps, holes in floors, etc.



Yellow shall cover at least 50 % of the area of the sign.

5.4 Colorimetric and photometric properties of safety colours and contrast colours

Colorimetric and photometric properties of safety colours and contrast colours are given in annex A, which forms an integral part of this International Standard.

6 Geometric form and meaning of safety signs

Table 3 gives the general meaning of geometric forms.

Table 3 — Geometric form and meaning

Geometric form	Meaning
	Prohibition or mandatory action
	Warning
	Information (including instructions)

* In some countries safety yellow, in place of white, is used on prohibition signs.

7 Design of graphic symbols

The design of symbols should be as simple as possible and details not essential to understanding the safety message shall be omitted.

As an illustration of the rules set out in this International Standard, annex B gives some examples of the meaning (referent), the image content and the graphic symbols of some safety signs in common use.

In the future, the design of new graphic symbols shall be in accordance with ISO 3461.

NOTE — The graphic symbols given in annex B are examples only; alternative designs may be used provided the symbol complies with the appropriate image content.

8 Layout of safety signs

The safety colours and contrast colours (see clause 5) and geometric forms (see clause 6) shall be used only in the following combinations to obtain the four basic types of safety signs.

NOTE — Safety signs concerning fire prevention and location of fire-fighting equipment are still under consideration.

8.1 Prohibition signs



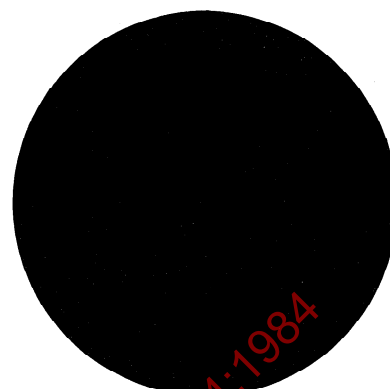
Background colour : white*
Circular band and cross bar : red
Symbol or text : black

The symbol or text shall be placed centrally on the background, and shall not obliterate the cross bar.

It is recommended that the colour red should cover at least 35 % of the area of the sign.

Where a symbol is not available to indicate a particular desired meaning, the meaning shall be obtained preferably by using the prohibition sign without a symbol together with a text on a supplementary sign, or alternatively by using a text in place of a symbol on the prohibition sign.

8.2 Mandatory action signs



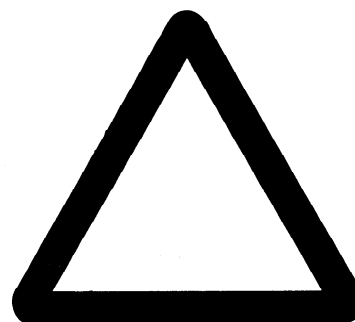
Background colour : blue
Symbol or text : white

The symbol or text shall be placed centrally on the background.

The colour blue shall cover at least 50 % of the area of the sign.

Where a symbol is not available to indicate a particular desired meaning, the meaning shall be obtained preferably by using the general mandatory action sign (see example B.2.1 in annex B) together with a text on a supplementary sign or alternatively by using a text in place of a symbol on the mandatory action sign.

8.3 Warning signs



Background colour : yellow
Triangular band : black
Symbol or text : black

The symbol or text shall be placed centrally on the background.

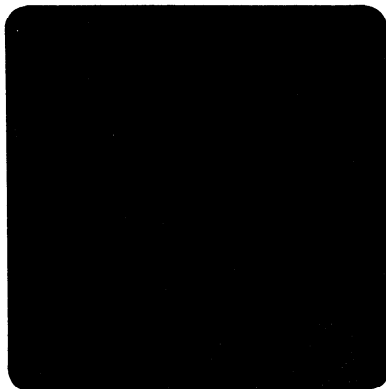
The colour yellow shall cover at least 50 % of the area of the sign.

Where a symbol is not available to indicate a particular desired meaning, the meaning shall be obtained preferably by using the general warning sign (see example B.3.1 in annex B) together with a text on a supplementary sign or alternatively by using a text in place of a symbol on the warning sign.

* In some countries safety yellow, in place of white, is used on prohibition signs.

8.4 Information signs concerning safe conditions

Examples :

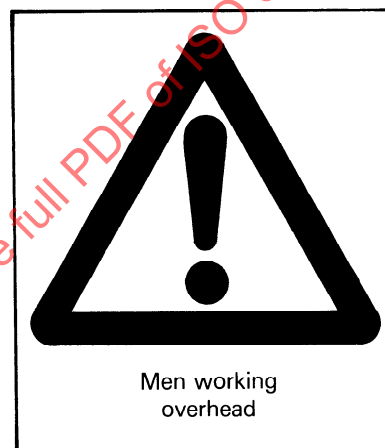


Background colour : green
Symbol or text : white

The symbol or text shall be placed centrally on the background and the shape of the sign shall be square or oblong as necessary to accommodate the symbol or text.

The colour green shall cover at least 50 % of the area of the sign.

Where a symbol is not available to give a particular desired meaning, the meaning shall be obtained by using a text in place of a symbol on the information sign.



9 Supplementary signs

Background colour : white*
Text : black

or

Background colour : colour of the safety sign
Text : relevant contrast colour

The shape of the sign shall be rectangular and shall not comprise any graphic symbol.

The supplementary sign shall be underneath the safety sign or included in its limits.

10 Relationship between dimensions of safety signs and distance of observation (for information only)

The relationship between the greatest distance l from which the safety sign can be understood and the minimum area A of the safety sign is given by the formula

$$A \geq \frac{l^2}{2\,000}$$

where A and l are expressed in square metres and metres respectively.

This formula applies for distances l less than about 50 m.

* In those countries which use safety yellow, in place of white, on prohibition signs, the corresponding supplementary signs also use safety yellow in place of white.

Annex A

Colorimetric and photometric properties of materials

(This annex forms an integral part of the Standard.)

A.1 Definitions

A.1.1 colour boundary : (Straight) line in the CIE chromaticity diagram (CIE 45.15.200*) separating the area of the permitted colours from that of the non-permitted colours.

A.1.2 luminance factor (At a point on the surface of a non-self-radiating body, in a given direction, under specified conditions of illumination) : Ratio of luminance of the material to that of a perfect reflecting diffuser identically illuminated (CIE 45.20.200*).

A.1.3 coefficient of retro-reflection (of a plane retro-reflecting surface) : The quotient obtained from dividing the luminous intensity (I) of the retro-reflecting material in the direction of observation, by the product of the illuminance ($E_{\perp}$) at the retro-reflecting surface on a plane perpendicular to the direction of the incident light and its area (A).

$$\text{Symbol : } R' \quad R' = \frac{I}{E_{\perp} \times A}$$

A.1.4 ordinary materials : Materials which are neither retro-reflecting nor fluorescent.

A.2 Conditions

A.2.1 The physical requirements which safety signs have to meet are primarily related to daytime colour.

A.2.2 Measurements of chromaticity coordinates and luminance factor β shall be made as specified in CIE Publication No. 15 (E.1.3.1).

For the measurement of chromaticity coordinates and luminance factor β , the material is considered to be illuminated by daylight as represented by the Standard Illuminant D_{65} (CIE 45.15.145*) at an angle of 45° with the normal to the surface and the observation made in the direction of the normal ($45/0^{\circ}$ geometry).

A.2.3 The coefficient of retro-reflection shall be measured in accordance with CIE Publication No. 7, Vol. D, 1960 : pp. 566-571, (proceedings 14th session, Brussels), using Standard Illuminant A with the condition that the entrance and observation angles are in the same plane.

A.3 Requirements

The colour areas shall be as shown in figures 1 and 2, as appropriate; the x and y coordinates of the corner points of the colour areas, and the luminance factors required, shall be as given in tables 4 and 5 (see note 2 to table 1).

Table 6 contains the minimum coefficients of retro-reflection for retro-reflecting materials.

NOTES

- 1 The signs (including the colours) shall maintain the same meaning under all relevant lighting conditions.
- 2 Retro-reflecting materials : if, in practice, the photometric values of the retro-reflecting material drop below 50 % of the required minima, or if the chromaticity coordinates fall outside the area boundaries in table 4, the materials are no longer considered suitable for safety use.
- 3 Fluorescent materials : if, in practice, the chromaticity coordinates fall outside the boundaries in table 5, the materials are no longer considered suitable for safety use.

* The numbers refer to CIE (Commission internationale de l'éclairage) Vocabulary Publication No. 17.

Table 4

Colour	Chromaticity coordinates of corner points determining the permitted colour area Illuminant : Standard Illuminant D ₆₅ (45/0° geometry)					ordinary materials	Luminance factor β for retro-reflecting materials	
		1	2	3	4		Type 1	Type 2
Red	x	0,690	0,595	0,569	0,655	$\geq 0,07$	$\geq 0,05$	$\geq 0,03$
	y	0,310	0,315	0,341	0,345			
Blue	x	0,078	0,150	0,210	0,137	$\geq 0,05$	$\geq 0,01$	$\geq 0,01$
	y	0,171	0,220	0,160	0,038			
Yellow	x	0,519	0,468	0,427	0,465	$\geq 0,45$	—	—
	y	0,480	0,442	0,483	0,534			
Retro-reflecting yellow	x	0,545	0,487	0,427	0,465	—	$\geq 0,27$	$\geq 0,16$
	y	0,454	0,423	0,483	0,534			
Green	x	0,230	0,291	0,248	0,007	$\geq 0,12$	—	—
	y	0,754	0,438	0,409	0,703			
Retro-reflecting green	x	0,007	0,248	0,177	0,026	—	$\geq 0,04$	$\geq 0,03$
	y	0,703	0,409	0,362	0,399			
White	x	0,350	0,300	0,290	0,340	$\geq 0,75$	—	—
	y	0,360	0,310	0,320	0,370			
Retro-reflecting white	x	0,350	0,300	0,285	0,335	—	$\geq 0,35$	$\geq 0,27$
	y	0,360	0,310	0,325	0,375			
Black	x	0,385	0,300	0,260	0,345	$\leq 0,03$	—	—
	y	0,355	0,270	0,310	0,395			

Table 5

Colour	Chromaticity coordinates of corner points determining the permitted colour areas Illuminant : Standard Illuminant D ₆₅ (45/0° geometry)					Luminance factor β
		1	2	3	4	
Fluorescent red and orange-red	x	0,690	0,595	0,535	0,610	$\geq 0,25$
	y	0,310	0,315	0,375	0,390	

Table 6

Observation angle α	Entrance angle ϵ	Minimum coefficient of retro-reflection*, in $\text{cd}\cdot\text{lx}^{-1}\cdot\text{m}^{-2}$ Illuminant : Standard Illuminant A									
		Type 1					Type 2				
		White	Yellow	Red	Green	Blue	White	Yellow	Red	Green	Blue
1/3°	5°	50	35	10	7	2	180	122	25	21	14
	30°	24	16	4	3	1	100	67	14	11	7
	40°	9	6	1,8	1,2	0,4	95	64	13	11	7
2°	5°	5	3	0,8	0,6	0,2	5	3	0,8	0,6	0,2
	30°	2,5	1,5	0,4	0,3	0,1	2,5	1,5	0,4	0,3	0,1
	40°	1,5	1,0	0,3	0,2	0,06	1,5	1,0	0,3	0,2	0,06

* For coloured parts of signs which are printed, the coefficient of retro-reflection shall be not less than 70 % of the values in table 6.

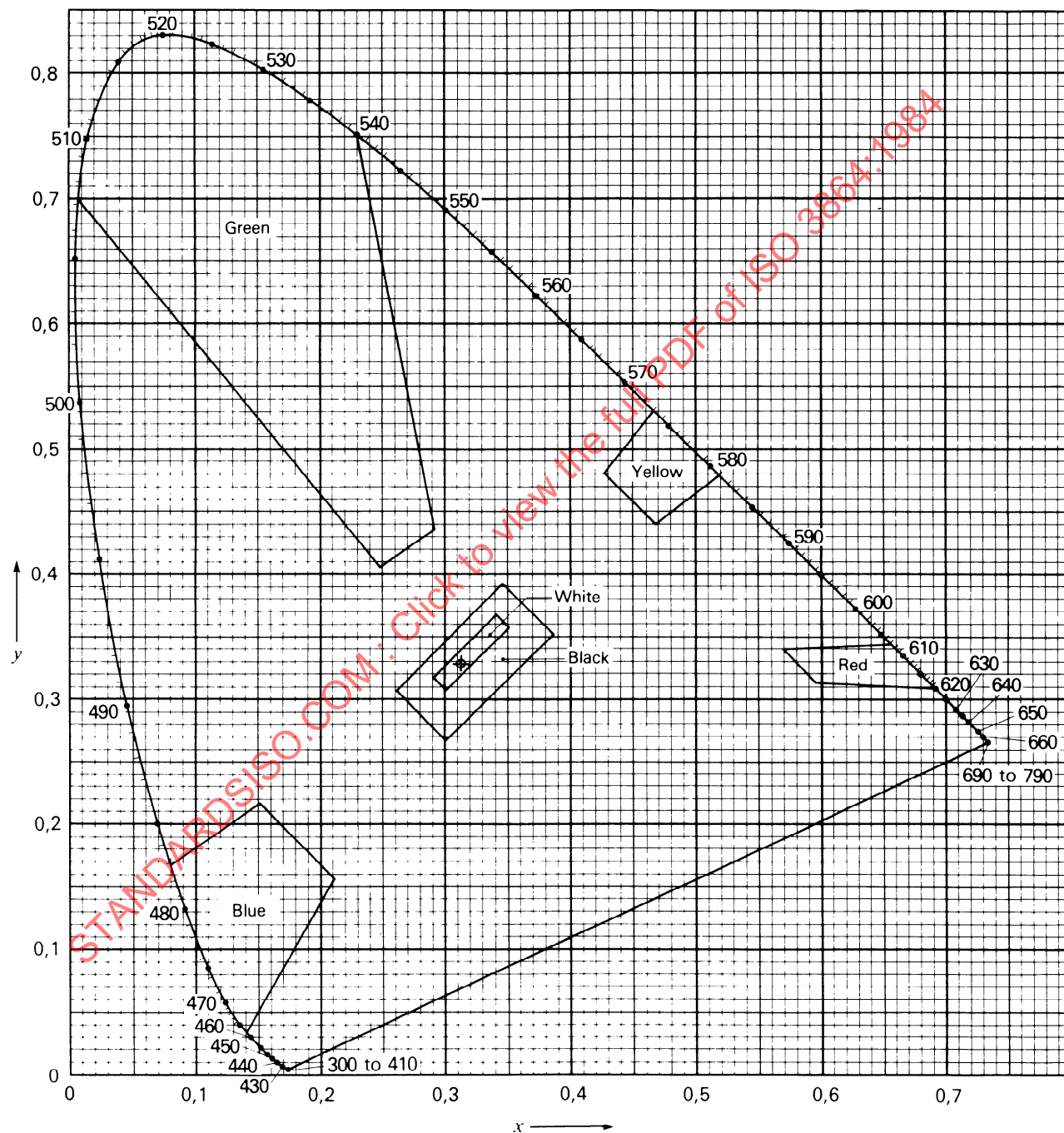


Figure 1 — Boundaries for red, yellow, green, blue, white and black ordinary surface colours

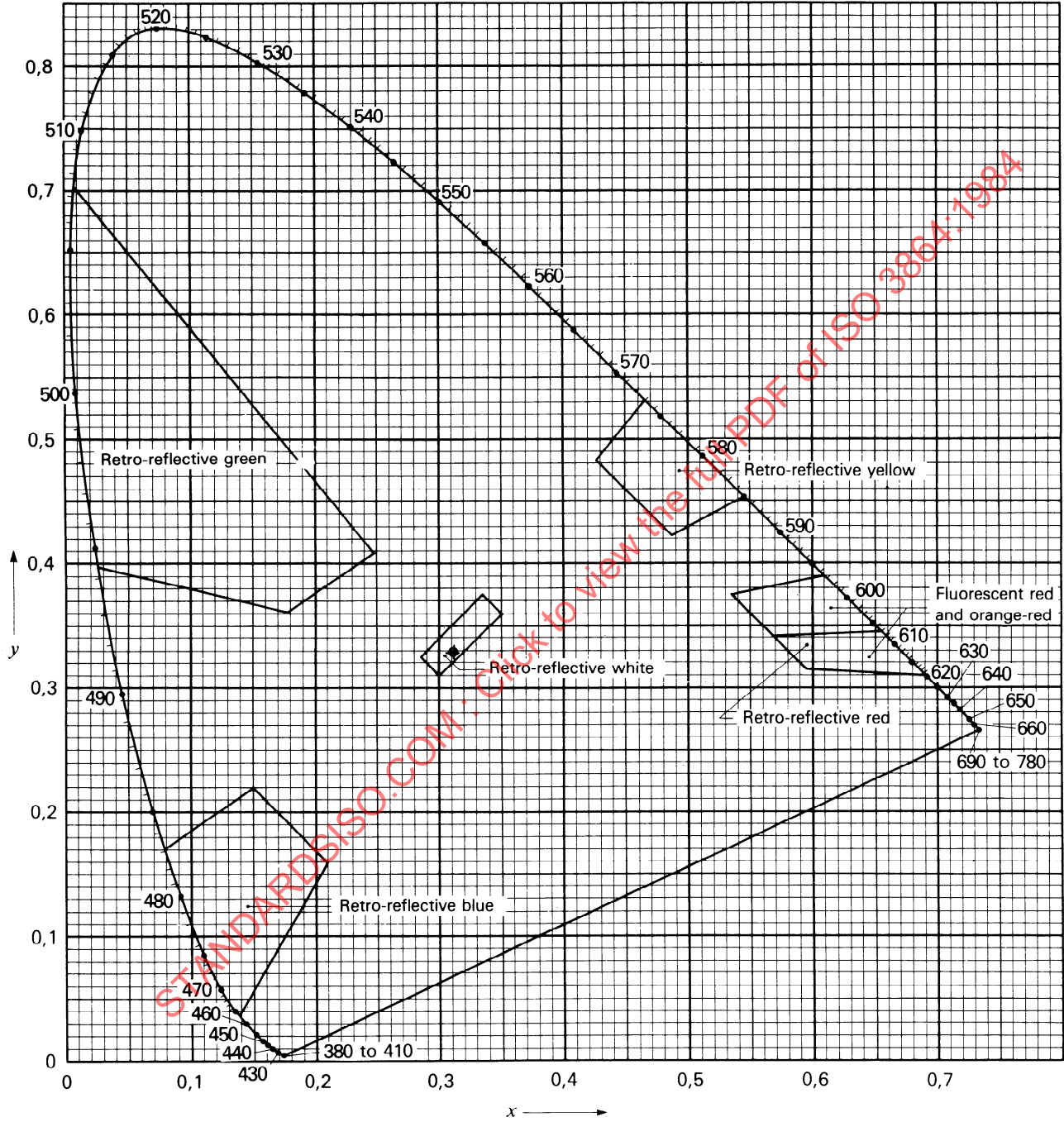


Figure 2 — Boundaries for red, yellow, green, blue and white retro-reflective surface colours and for fluorescent red and orange-red

NOTE — The boundaries for red and blue retro-reflective surface colours are identical to those for ordinary red and blue, as shown in figure 1.

Annex B

Examples of safety signs

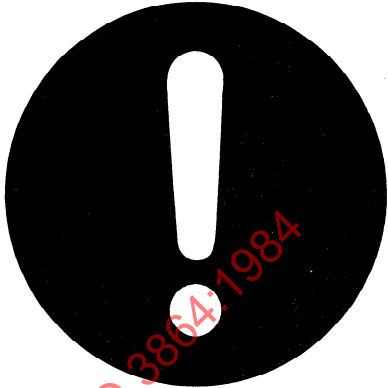
(This annex does not form an integral part of the Standard.)

B.1 Prohibition signs

No.	Referent	Image content	Example
B.1.1	Smoking prohibited	Burning cigarette	
B.1.2	Fire, open light and smoking prohibited	Burning match	
B.1.3	Thoroughfare prohibited for pedestrians	Walking person	See note page 14
B.1.4	Water as extinguishing agent prohibited	Water being poured on fire	

NOTE — This annex will be printed in colour in the final version.

B.2 Mandatory action signs

No.	Referent	Image content	Example
B.2.1	General mandatory action	Exclamation mark	
B.2.2	Eye protection must be worn	Head wearing eye protectors	
B.2.3	Respiratory protection must be worn	Head wearing respiratory protective device	See note on page 14
B.2.4	Head protection must be worn	Head wearing helmet	