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Security and resilience – Emergency management – Guidelines for colour-coded alert

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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 292, *Security and resilience*.

This second edition cancels and replaces the first edition (ISO 22324:2015), of which it constitutes a minor revision.

The changes are as follows:

— the title has been updated;

— references to guidance in other relevant standards have been added;

— the Bibliography has been updated.

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

People can be faced in their daily lives with various kinds of risks. People at risk should be able to take appropriate safety actions when faced with hazards even if they do not have a full understanding of them.

Public warnings, through a combination of prior notifications and alerts, enable people at risk to take appropriate and timely actions to protect their safety. ISO 22322 provides further guidance on public warning.

Colour-coded alerts are used to notify people at risk of status changes on a safety or danger continuum in allowing them to take appropriate actions.

This document will lead to better understanding of colour-coded alerts by reducing confusion and prompting more appropriate responses in an emergency situation.

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Security and resilience – Emergency management – Guidelines for colour-coded alert

1 Scope

This document gives guidance on the use of colour codes to inform people at risk as well as first response personnel about danger and to express the severity of a situation.

This document is applicable to all types of hazard in any location.

This document does not apply to the method for displaying colour codes, detailed ergonomic considerations related to viewing displays or safety signs covered by ISO 3864-1.

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 22300, *Security and resilience — Vocabulary*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in ISO 22300 apply.

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

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

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

4 Guidance for use of colour codes

4.1 General

Red, yellow and green (and the spectrum in between in terms of hue) should be used to express the status of a hazard. Black, purple, blue and grey should be used to give supplementary information about the hazard. ISO 22322 provides further guidance on public warning.

4.2 Colour codes to express the status of hazard

4.2.1 General

The colour codes to express the status of hazard are as follows:

— Red is associated with danger and should be used to notify people at risk to take appropriate safety actions immediately.

— Yellow is associated with caution and should be used to notify people at risk to prepare to take appropriate safety actions.

— Green is associated with a safe status and should be used to notify people at risk that no action is required.

This document does not define danger, caution or safety other than the suggested meaning given in Table 1.

Experts should classify the status of hazard into danger, caution or safe.

Table 1 — Colour codes

Colour	Associated meaning	Proposed action
Red	Danger	Take appropriate safety action immediately
Yellow	Caution	Prepare to take appropriate safety action
Green	Safe	No action required

4.2.2 Typical colours for colour-coding system

If more than three colours are needed to express the level of hazard, the colours and supporting information should be based on the following:

— the number of the level of hazard should be minimized in order to limit the number of colours being used;

— hues between the red and green spectrum should be chosen;

— no more than seven colours should be used to avoid confusion;

— supporting information, which is understandable by users, should be added, including:

— supplemental information (e.g. text, numbers, shape, symbol, size);

— positional coding.

Figure 1 illustrates the different colours which can be used in colour-coding systems.

The colours in Figure 1 are indicative and should not be used for colour matching.

Annex B gives recommendations on colour specifications based on Munsell, CMYK and RGB systems.

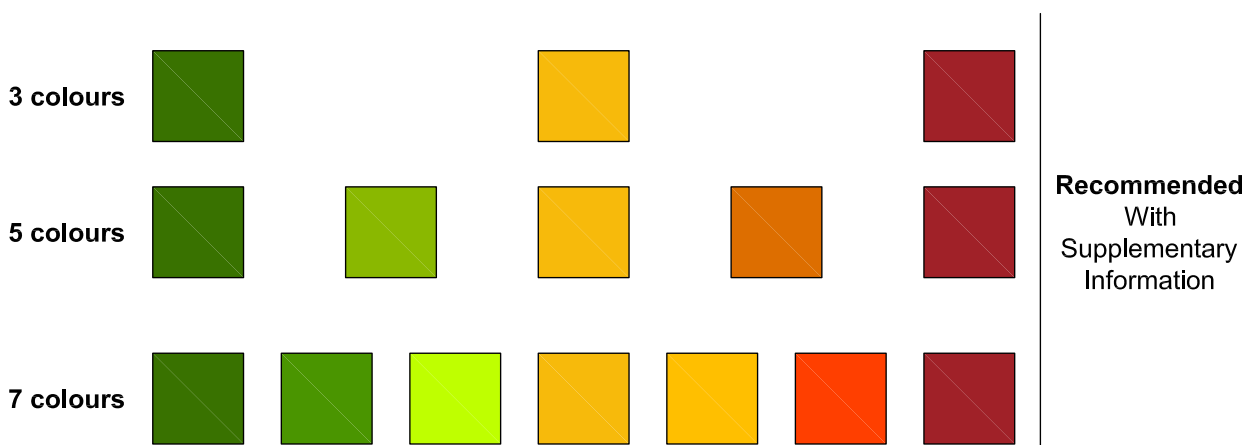**Figure 1 — Guideline for use of basic colours**

4.2.3 Order and position for the red, yellow and green spectrum

The order of colours can provide positional cues so that people can easily recognize the meaning of the alert.

There are several ways to show and use the spectrum of red, yellow and green (see Figure 2). However, these colours should always be placed in a certain order where the increasing level of hazard is presented:
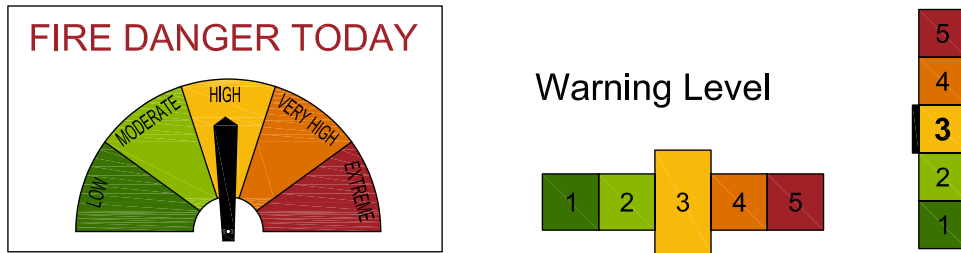
— from left to right, or

— from bottom to top.

Figure 2 — Example of the order and position of colour-coding

4.3   Colour codes to give supplementary information

4.3.1   General

In addition to the red, yellow, green spectrum, the colours black, purple, blue and grey may be used to provide additional information, see Table 2.

Annex B gives recommendations on colour specifications based on Munsell, CMYK and RGB systems.

Applications using colour codes consistent with this document are demonstrated in Annex A.

Table 2 — Supplementary colour codes

Colour	Associated meaning	Additional information
Black	Fatal danger	Can be used in addition to red to give supplementary information about fatal danger.
Purple	Fatal danger	Can be used in addition to red to give supplementary information about fatal danger.
Blue	Informational purposes	Can be used to give supplementary information. However, blue should not be used to indicate any level of hazard.
Grey	No information available	Should be used to explicitly indicate that no information is available.

4.3.2   Black and purple

Black or purple should be used for fatal danger. Users may choose black or purple depending on cultural significance.

Black can be replaced with black and white checkerboard.

When expressing fatal danger on computer screens or LED displays, black can be a problem since black is a non-luminescent colour. In such cases, using black and white checkerboard is recommended. See Figure 3 for a checkerboard example.
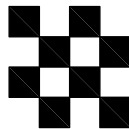
Figure 3 — Example of checkerboard

4.3.3   Blue

Blue should not be used to indicate a safe condition or any other level of hazard. Blue should be used for purely informational purposes that do not indicate levels of hazard.

4.3.4   Grey

Grey should be used to explicitly indicate no information is available.

4.4   Consideration for human factors and colour blindness

4.4.1   General

It is essential that colour-coded alerts are visible, and that appropriate attention is paid to the performance of the display device and its associated ergonomic requirements.

Special consideration should be given to human limitations for distinguishing colours one at a time. Judgements about safety, relying only on colour-coding, should take account of human abilities to discriminate between different colours.

Whenever human judgement based solely on colour-coding is required, only red, yellow and green should be used. Supplementary information to the used colour should be provided whenever people at risk can be expected to include those with limited colour discrimination. Supplementary information should follow ergonomic advice for all kinds of colour blindness (see ISO/TR 22411 and ISO 9241-300).

NOTE   Inability to distinguish between red and green is the most common form of colour blindness (more information can be found in ISO/IEC Guide 71).

4.4.2   Colour names

When appropriate, the colour name should be used as a supplementary way to warn people at risk.

EXAMPLE   An audible "red alert" over a public address system can be used to warn people.

NOTE   Some languages do not include words for all existing colours. Generally, names for black, purple, red, yellow and green are common in most languages, while names of orange and amber are not found in many languages.

4.4.3   Text colours

When appropriate, text should be used to clarify the colour that is used. Such text can be placed separately or superimposed over the colour. When superimposing text over a colour-coded alert, the text colours shown in Table 3 are recommended in order to maintain satisfactory levels of contrast.

The selection of appropriate text font should take account of ergonomic requirements.

NOTE   The choice of font has a significant impact on legibility. The appropriate font depends on conditions such as, but not limited to, viewing distances, levels of illumination and colour contrasts.