# ANSI Z535.1 – SAFETY COLORS IN FOCUS

By Erin Earley

In our "On Your Mark" columns, we often discuss the importance of American National Standards Institute (ANSI) Z535. This family of standards is critical for manufacturers and workplaces across the U.S. in their focus on accident prevention and risk reduction. That's because they form a guide for the design, application, and use of signs, colors, and symbols intended to identify and warn against hazards and for other accident prevention purposes. This month's column explores one of these standards in depth: ANSI Z535.1 – Safety Colors.

## WHY COLORS USED IN SAFETY SYMBOLS AND LABELS MATTER

Color is often used in warnings and instructions to supplement a word message or safety symbol. The idea is that the use of these so-called "safety colors" can help to increase a worker's recognition of the hazard and increase the necessary reaction time to hazardous situations or emergencies. When color is used in a standardized way, or in a color-coding system, it can help to create a unified look for safety symbols or labels used to warn about hazards on equipment or in a workplace.

"Effectively communicating hazards is vital for safety. The use of color can help with comprehension and understanding of safety messages, but it has to be very specifically defined," says Angela Lambert, head of standards compliance at Clarion Safety Systems, with a focus on ANSI and ISO, and the chair of the ANSI Z535.1 subcommittee that works to keep the standard up to date. "The orange used in a warning label's signal word panel has to look like orange. It can't look like 'yellowish orange' or 'reddish orange'. It's important to avoid, at a glance, having that color be confused with yellow (which is used in signal word panels for caution situations) or red (which is used in a signal word panel for danger situations)."

## WHAT IS ANSI Z535.1?

ANSI Z535.1 – Safety Colors establishes safety color codes intended to alert and inform people to take precautionary actions in the presence of hazards. This color coding is used across safety labels, signs, and tags and for the identification and location of fire equipment, first aid equipment, obstacles, and other hazards.

Using ANSI Z535.1 color codes helps to create a unified look for hazards in workplaces and on equipment, which can help increase a worker's recognition and increase the reaction time in an urgent situation. The standard defines, in scientific terms using charts and diagrams, the technical definitions, color standards, and color tolerances for these colors: safety red, safety orange, safety yellow, safety green, safety blue, safety purple, safety black, and safety white.

Per the standard, its intention is to provide, "a system for specifying safety colors, in terms of Munsell notations, CIE colorimetric data, defined chromaticity regions, and color formulas for each ANSI and ISO safety color used on safety signs, labels, and tags."



At left, signal word panels and their color-coding, per ANSI Z535.4. At right, examples of color-coding for the three types of symbols used in product safety labels.

As outlined in the standard itself, its purpose is to:

- Implement a uniform system for specifying safety colors
- Include safety color formulas for a variety of applications and media for specifying ANSI and ISO Safety Colors (in Annex C)
- Harmonize with safety colors specified in the Code of Federal Regulations
- Harmonize with ISO 3864-4, Graphical symbols— Safety colours and safety signs

## THE STANDARDS ORIGIN – AND LATEST UPDATES

ANSI Z535.1 is the oldest of the family of ANSI Z535 standards. It originated as the American War Standard in 1945, which contained a "Safety Color Code." It was developed at the request of the War Department and approved by the American Standards Association (ANSI's original name) – and has evolved since then.

ANSI Z535 is reviewed and updated on a periodic basis, and 2022 and 2023 are revision cycle years. In its most recent update, ANSI Z535.1 was republished in 2022, revising the previous version which was published in 2017. The 2022 edition – the tenth revision of the standard since its origin – incorporated minor updates to how it relates to and can be combined with other applicable standards and regulations.

## USING COLOR STANDARDS AND BEST PRACTICES IN YOUR SYMBOLS, LABELS, AND SIGNS

When it comes to using standardized and best practice colors in your safety symbols, labels, or signs, it is key to understand and use the specifications outlined in ANSI Z535.1. "ANSI Z535.1 safety colors are tightly defined and should be adhered to for proper color discrimination or color coding," Lambert says.

For how to use or apply color, ANSI Z535.1 only defines the colors themselves, not their uses. One of the major revisions of the ANSI Z535.1 Safety Color Code in 2002 was to delete information concerning the application of the safety colors. Per the standard, "*The intention of making this change was to maintain Z535.1 as the standard that defines the safety colors in terms of their color tolerances. The application of the colors (i.e., how they are to be used) properly belongs to the other standards in the ANSI Z535 series as well as to other standards that include uses for safety colors.*"

As an example, for information on how to apply color to your labels and signs, you can turn to ANSI Z535.4's section 7 on safety signs and label colors. It states:

*7.1 Standard colors: Safety colors shall conform to ANSI Z535.1.*

*7.2 Signal word panels*

*7.2.1 DANGER: The word DANGER shall be in safety white letters on a safety red background.*

*7.2.2 WARNING: The word WARNING shall be in safety black letters on a safety orange background.*

*7.2.3 CAUTION: The word CAUTION shall be in safety black letters on a safety yellow background.*

*7.2.4 NOTICE: The word NOTICE shall be in italicized safety white letters on a safety blue background.*

*7.2.5 SAFETY INSTRUCTIONS or similar words: The signal words used for a SAFETY INSTRUCTIONS sign or panel shall be in safety white letters on a safety green background.*

As another example, for information on how to apply color to the symbols used in safety labels, you can turn to ISO 3864-2 as well as ISO 3864-1. In its section 4.3 on "Use of Colour," ISO 3864-2 states:

*"When a geometric shape is used around a graphical symbol, the shape's corresponding safety colour shall identify the type of safety information to be conveyed by the graphical symbol (e.g. warning, prohibition or mandatory action, see ISO 3864-1)."* ℹ

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