NEMA Z535.4 91 ■ 6470247 0500623 6 ■

American National Standard

ANSI Z535.4-1991

Product Safety Signs and Labels

National Electrical Manufacturers Association
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American National Standard

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Safety color sheet for use with ANSI Z535.1, Z535.2, Z535.3, Z535.4 and Z535.5-1991

Color Name	Munsell Notation Hue	Value Chroma	Equivalent CIE Data (Y%)	x	y	Approximate PMS Color
Safety Red	7.5R	4.0/14	12.00	0.5959	0.3269	15 parts Warm Red 1 part Rubine Red 1/4 part Black
Safety Orange	5.0YR	6.0/15	30.05	0.5510	0.4214	13 parts Yellow 3 parts Warm Red 1/4 part Black
Safety Brown	5.0YR	2.75/5.0	5.52	0.4766	0.3816	9 parts Yellow 7 parts Warm Red 4-1/2 parts Black
Safety Yellow	5.0Y	8.0/12	59.10	0.4562	0.4788	Pantone 108 C
Safety Green	7.5G	4.0/9.0	12.00	0.2110	0.4121	Pantone 3415 C
Safety Blue	2.5PB	3.5 /10	9.00	0.1691	0.1744	13-1/2 parts Process Blue 2-1/2 parts Reflex Blue
Safety Purple	10.0P	4.5 /10	15.57	0.3307	0.2245	Pantone 253 C
Safety White	N	1.0 (5R-5Y)	78.70	0.3101	0.3163	White
Safety Gray	N	5.0/	19.80	0.3101	0.3163	1-1/2 parts Black 1/2 part Reflex Blue 13 parts Trans. White
Safety Black	N	5.0/	19.80	0.3101	0.3163	Black

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ANSI®
Z535.4-1991

American National Standard

for Product Safety Signs and Labels

Secretariat

National Electrical Manufacturers Association
National Institute of Standards and Technology

Approved June 1991

American National Standards Institute

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Foreword (This foreword is not a part of American National Standard for Product Safety Signs and Labels, ANSI Z535.4-1991.)

This standard, approved by the American National Standards Institute in June 1991, is the first edition of an American National Standard that provides guidelines for the design of safety signs and labels for application to products.

In 1979, the Z53 Committee on Safety Colors was combined with the Z35 Committee on Safety Signs to form the Z535 Committee on Safety Signs and Colors. This committee has the following scope:

> "To develop standards for the design, application, and use of signs, colors, and symbols intended to identify and warn against specific hazards and for other accident prevention purposes."

Five subcommittees were created and assigned the tasks of updating the Z53 and Z35 standards, and writing two new standards. The five standards include:

Z535.1 - Safety Color Code, which updates Z53.1 (1979).

Z535.2 - Environmental and Facility Safety Signs, which updates Z35.1 (1972).

Z535.3 - Criteria for Safety Symbols, a new standard.

Z535.4 - Product Safety Signs and Labels, a new standard.

Z535.5 - Accident Prevention Tags, which updates Z35.2 (1974).

Together, these five standards contain information needed to specify formats, colors, and symbols for safety signs used in environmental and facility applications (Z535.2), product applications (Z535.4), and accident prevention tags (Z535.5).

It is desirable that new signs, labels, symbols and colors specified after the approval of this standard, comply with the standard.

Neither the Foreword, nor the normative Annexes, are to be considered part of this standard.

Suggestions for improvement of this standard are welcome. They should be sent to the American National Standards Institute, 11 W. 42nd Street, New York, New York 10036.

This standard was processed and approved for submittal to ANSI by the Accredited Standards Committee on Safety Signs and Colors, Z535. Committee approval of the standard does not necessarily imply that all committee members voted for its approval. At the time it approved this standard, the Z535 Committee had the following members:

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Carrol E. Burtner, P.E., Secretary
Albert O. Hughes, Z535.4 Subcommittee Chairperson

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American National Standard

for Product Safety Signs and Labels

1 Introduction

The design of safety signs for products has been influenced for many years by standards originally developed for accident prevention signs to be used in the general environment. As product safety signs evolved, some basic differences developed between their characteristics and those of environmental safety signs: Environmental safety signs are usually larger, observed at longer distances, and frequently contain lesser amounts of information for visual clarity at a distance. Product safety signs are likely to contain more information within a smaller format, are usually observed at closer distances, and must physically and visually integrate with a wide range of product size, shape, and color characteristics. Attempts by product manufacturers to address these variable characteristics have produced numerous approaches to the graphic treatment of such signs.

This standard sets forth a hazard communication system developed specifically for product safety signs and labels. It consolidates a number of previous graphic approaches into a common design direction carefully selected to present product hazard information in an orderly and visually consistent manner for effective communication.

This ANSI Z535.4 standard developed for Product Safety Signs and Labels complements the ANSI Z535.2 standard developed for Environmental and Facility Safety Signs. These standards are similar in many respects, however, they each address different physical and visual requirements as noted above. In this regard, the Accredited Standards Committee Z535 has recognized and affirmed the need for these two standards.

2 Scope and purpose

2.1 Scope

This standard sets forth performance requirements for the design, application, use, and placement of permanently affixed safety signs and labels intended to identify potential hazards for persons using, operating, servicing, or in proximity to, a wide variety of products. A product safety sign or label should alert persons to a specific hazard, the degree or level of hazard seriousness, the probable consequence of involvement with the hazard, and how the hazard can be avoided.

2.2 Purpose

The purposes of this standard are: (1) to establish a uniform and consistent visual layout for safety signs and labels applied to a wide variety of products, (2) to minimize the proliferation of design for product safety signs and labels and (3) to achieve application of a national uniform system for the recognition of potential personal injury hazards for those persons using products.

2.2.1 There are a number of existing American National Standards which are recognized for particular industries or specific uses. Compliance with such a standard may be considered for the particular industry or use. It is not the intent of this ANSI Z535.4 standard to replace existing standards or regulations which are uniquely applicable to a specific industry or use. It is the intent to encourage adoption of this standard in subsequent revisions of other standards and regulations.

3 Application and exceptions

3.1 Application

This standard provides guidance for manufacturers, employers, distributors, and others who have a desire to alert persons to potential personal injury hazards inherent with products. For chemical products and chemical mixtures follow ANSI Z129.1-1988.

3.2 Exceptions

3.2.1 Should any of the requirements of this standard conflict with federal, state, or municipal

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At the time of approval, the Z535.4 subcommittee had the following members:

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All subsequent drafts leading to the publication of this standard were based on Z535.4 subcommittee deliberations, Z535 letter ballots and the American National Standards public comment process.

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regulations, such conflict shall not invalidate other sections of this standard.

3.2.2 Should it be necessary to use the same graphic system for product safety signs and for environmental and facility safety signs, the graphic system as defined in this standard (see section 6 and 7.1 through 7.5) or as defined in ANSI Z535.2-1991, Environmental and Facility Safety Signs (see 4.1 through 4.3) may be used.

4 Definitions

4.1 accident: An occurrence in a sequence of events that produces unintended injury, death or property damage.

4.2 colors: Colors specified in this standard shall conform to American National Standard Safety Color Code, ANSI Z535.1-1991.

4.3 decal: (See safety sign.)

4.4 hazard: A source of potential injury to a person.

4.5 label: (See safety sign.)

4.6 may: This word is understood to be permissive.

4.7 panel: Area of the safety sign having a distinctive background color different from adjacent areas of the sign, or which is clearly delineated by a line, border, or margin. There may be up to three (3) panels per sign: signal word, message, and symbol.

4.7.1 signal word panel: Area of the safety sign that contains the signal word and the safety alert symbol.

4.7.2 message panel: Area of the safety sign that contains the word messages which identify the hazard, indicate how to avoid the hazard, and advise of the probable consequence of not avoiding the hazard[1]. When a symbol/pictorial is used to convey any of these messages, the message(s) conveyed by the symbol/pictorial are not required to be repeated in word form in the message panel.

4.7.3 symbol/pictorial panel: Area of the safety sign that contains the symbol/pictorial.

4.8 pictorial: (See symbol/pictorial.)

4.9 placard: (See safety sign.)

4.10 safety alert symbol: A symbol which indicates a potential personal safety hazard. It is composed of an equilateral triangle surrounding an exclamation mark and conforms to ANSI Z535.3-1991, Criteria for Safety Symbols.

4.11 safety sign: A visual alerting device in the form of a decal, label, placard, or other marking such as an embossing, stamping, etching, or other process which advises the observer of the nature and degree of the potential hazard(s) which can cause injury or death. It can also provide safety precautions or evasive actions to take, or provide other directions to eliminate or reduce the hazard.

4.11.1 environmental/facility safety sign: Sign or placard in a work or public area that provides safety information about the immediate environment.

4.11.2 product safety sign or label: Sign, label, or decal affixed to a product that provides hazard and safety information about that product.

4.11.2.1 permanent safety sign or label: Information affixed to a product to warn against potential exposure to hazards inherent in the normal use of or associated with the product, or which might be created during reasonably anticipated product use. The sign or label is to be permanently affixed to the product so that it cannot be easily removed.

4.11.2.2 temporary safety sign or tag: Information affixed to a product or its container to warn of a temporary hazard created by situations such as shipment, setup, service or repair. Temporary safety signs and tags are removed when the hazard no longer exists.

4.12 shall: This word is understood to be mandatory.

4.13 should: This word is understood to be advisory.

4.14 sign classifications: Various categories of signs, each with a distinct signal word and colors, which represent different levels of hazards.

4.15 signal word: The word or words that designate a degree or level of hazard seriousness. The signal words for product safety signs are DANGER, WARNING and CAUTION.

[1] Listed in order of priority. Where avoidance and consequence information is obvious, inclusion of these messages in the message panel is less important.

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4.15.1 DANGER: Indicates an imminently hazardous situation which, if not avoided, will result in death or serious injury. This signal word is to be limited to the most extreme situations.

4.15.2 WARNING: Indicates a potentially hazardous situation which, if not avoided, could result in death or serious injury.

4.15.3 CAUTION: Indicates a potentially hazardous situation which, if not avoided, may result in minor or moderate injury. It may also be used to alert against unsafe practices.

Note: DANGER or WARNING should not be considered for property damage accidents unless personal injury risk appropriate to these levels is also involved. CAUTION is permitted for property-damage-only accidents.

4.16 symbol/pictorial: A graphic representation intended to convey a message without the use of words. It may represent a hazard,a hazardous situation, a precaution to avoid a hazard, a result of not avoiding a hazard, or any combination of these messages. (See ANSI Z535.3-1991, Criteria for Safety Symbols.)

5 Sign classifications

5.1 Hazard classification

Product safety signs and labels are classified according to the relative seriousness of the hazard situation. The determination is based on an estimation of the likelihood of exposure to the hazardous situation and what could happen as a result of exposure to the hazard. For products, there are three hazard classifications which are denoted by the signal words DANGER, WARNING or CAUTION.

5.2 Signal word selection

When no federal, state, or local government code, regulation, standard, or guideline specifies a particular signal word, selection of the signal word should be made in accordance with the definitions provided in Section 4.

5.3 Multiple hazard identification

5.3.1 One sign or label

When more than one hazard situation exists on a product, either in close proximity to each other, or which might be preventable from a common location, it is permissible to use only one safety sign or label provided that the information effectively addresses each hazard.

5.3.2 Levels of seriousness

When multiple hazard situations are addressed on one sign or label, and the hazards are classified at different levels of seriousness, the signal word corresponding to the greatest hazard level shall be used.

6 Sign or label format

6.1 Panels

A product safety sign or label consists of a signal word panel plus a message panel. A pictorial panel may be used to communicate parts, or all, of the elements of a message panel (see 4.7.2 Message Panel).

6.2 Panel arrangement

The sign or label panels can be either in a horizontal or vertical arrangement (see Figures 1 through 5). The figures, as shown, are sample formats. Actual size, layout, and proportion may vary depending on application requirements.

6.3 Safety alert symbol

A safety alert symbol, when used with the signal word, shall precede the signal word. The base of the safety alert symbol shall be on the same horizontal line as the base of the letters of the signal word. The height of the safety alert symbol shall equal or exceed the signal word letter height.

6.4 Border

A safety sign or label shall be distinctive on the product. A contrasting border may be used on the sign to achieve distinctiveness.

6.5 Word message

The word message should be concise and readily understood.

6.5.1 Multiple messages should be provided with sufficient space between them, when feasible, to prevent them from visually blending together.

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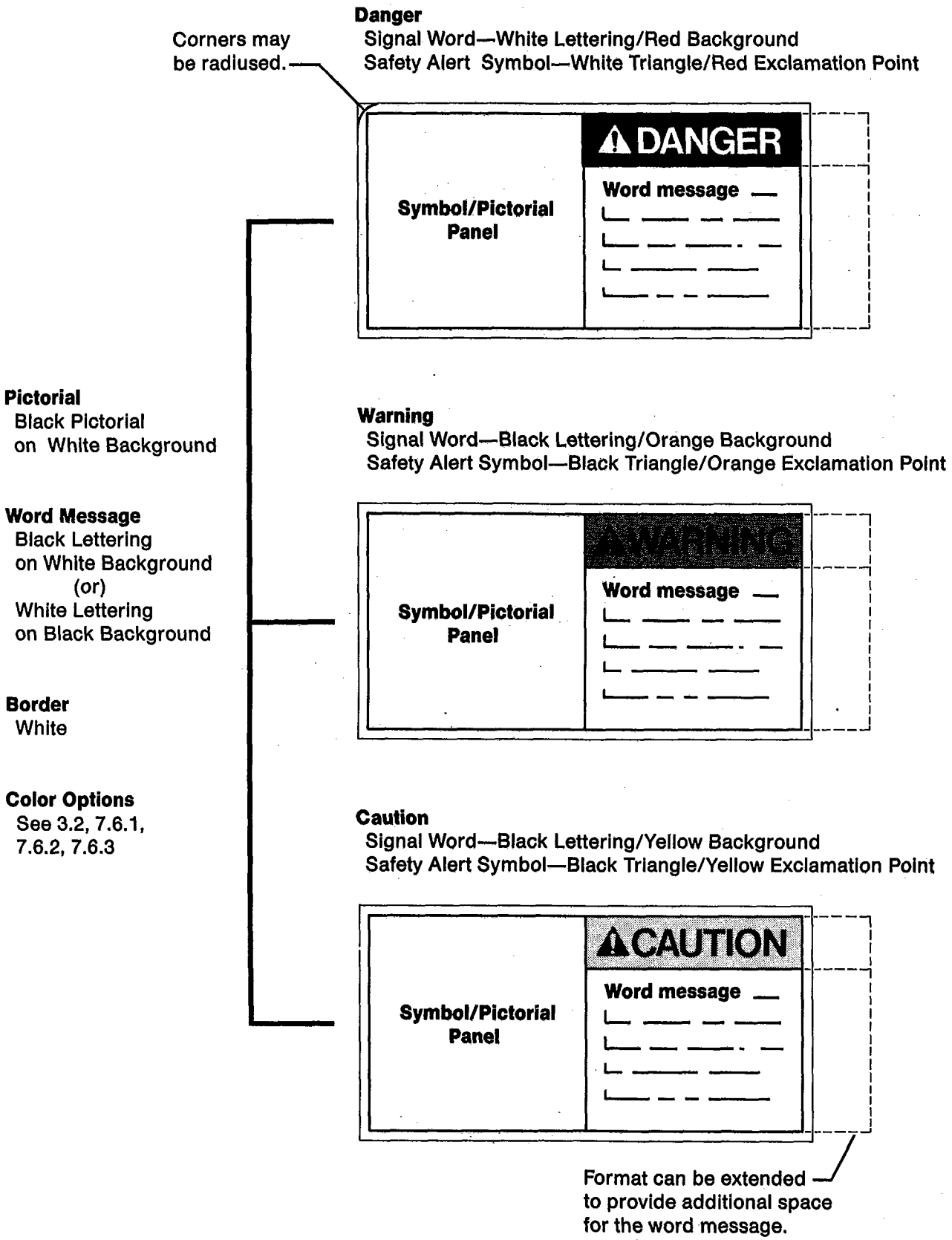

Fig. 1. Three-Panel Sign — Horizontal Format

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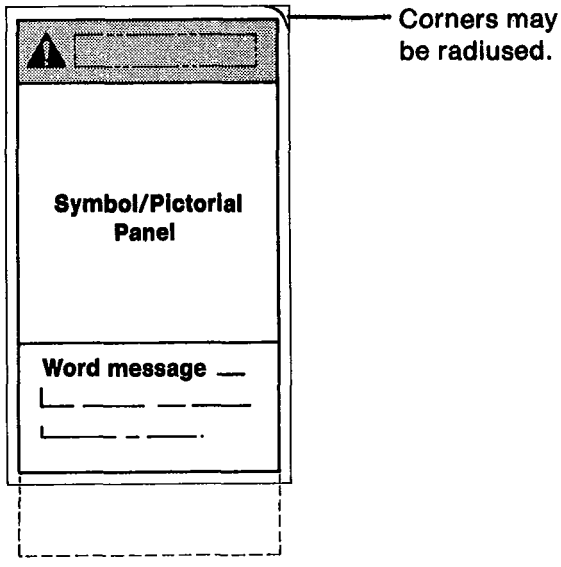

Fig. 2.
Three-Panel Sign
— Vertical Format

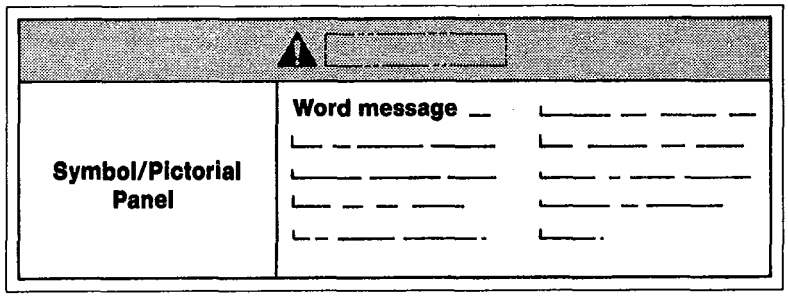

Fig. 3.
Three-Panel Sign
— Horizontal Format

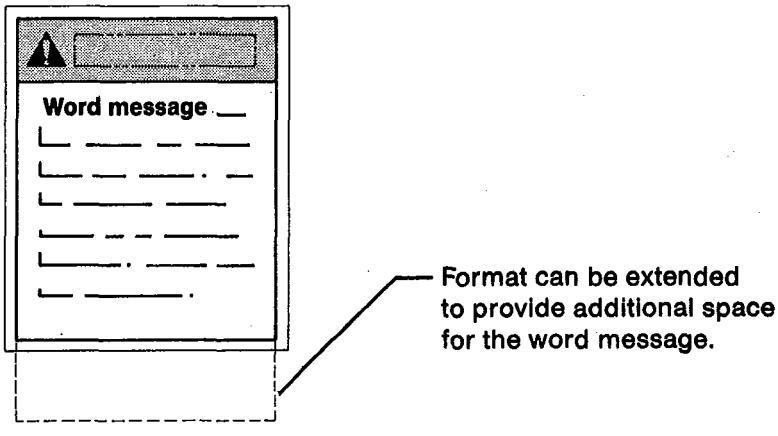

Fig. 4.
Two-Panel Sign
— Vertical Format

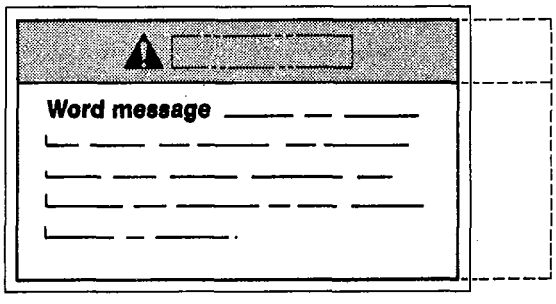

Fig. 5.
Two-Panel Sign
— Horizontal Format

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6.5.2 When detailed instructions, precautions, or consequences require lengthy verbiage it shall be permissible to refer the user to the proper instruction manual.

6.6 Pictorial

The pictorial should be readily understood and should effectively communicate the message.

7 Safety sign and label colors

7.1 Standard colors

Safety colors shall conform to ANSI Z535.1-1991, Safety Color Code.

7.2 Signal word panels

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

7.2.2 WARNING The word WARNING shall be in black letters on an orange background.

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

7.2.4 Safety alert symbol The solid triangle portion shall be the same color as the signal word lettering, and the exclamation mark portion shall be the same color as the signal word panel background.

7.3 Message panel

The message panel should have either black lettering on a white background or white lettering on a black background.

7.4 Pictorial panel

The pictorial panel should normally have a black pictorial on a white background. Other colors may be used for pictorial emphasis, such as red for fire, etc.

7.5 Border

The border should normally be white. If necessary to achieve better contrast, the border may be black.

7.6 Color options

7.6.1 Other standards. Other colors may be used for compliance with other standards (see 3.2 Exceptions).

7.6.2 Message and pictorial panels. When special circumstances limit the use of sign colors to two colors, the colors assigned to the signal word panel may also be used for the message and pictorial panels provided that the panel colors contrast with the background color of the product.

7.6.3 Exceptions. When special circumstances preclude the use of safety colors on base materials such as wood, cardboard, metal, plastic, etc., the marking used should (when feasible) contrast with the background color of the base material.

8 Letter style and size

8.1 Letter style

8.1.1 Signal words shall be in sans serif letters in upper case only.

8.1.2 Message panel lettering shall be in sans serif letters. Letters may be in upper case only, or in combinations of upper case and lower case letters as deemed appropriate.

8.1.3 Examples of acceptable lettering styles are: Medium, Folio Medium, News Gothic Bold, Helvetica Bold, or equivalent.

8.2 Letter size

8.2.1 Lettering shall be of a size that enables a person with normal vision, including corrected vision, to read the safety sign or label at a safe viewing distance from the hazard.

8.2.2 Safe viewing distance for the signal word shall take into consideration a reasonable hazard avoidance reaction time.

8.2.3 Safe viewing distance for the message panel wording may be different from the safe viewing distance for the signal word.

8.2.4 Signal word letter height should be at least 50 percent greater than the selected height of the message panel wording.

Note: For additional reference on letter heights and viewing distances see Annex A.

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9 Sign and label placement

9.1 Location

Product safety signs and labels shall be placed such that they will: (1) be readily visible to the intended viewer and (2) alert the viewer to the potential hazard in time to take appropriate action.

9.2 Protection

When feasible, placement of the sign or label should provide protection from forseeable damage, fading, or visual obstruction caused by abrasion, ultra-violet light, or substances such as lubricants, chemicals and dirt.

10 Expected life and maintenance

10.1 Expected life

Product safety signs or labels shall have a reasonable expected life with good color stability, pictorial legibility, and word message legibility when viewed at a safe viewing distance as described in Section 8.2. Reasonable expected life shall take into consideration the expected life of the product and the foreseeable environment of use.

Note: While there is no definition provided for "legibility" and "safe viewing distance," paragraphs 8.2.1 thru 8.2.3, paragraph 9.1 and Annex A do provide some guidance for interpretation.

10.2 Product user instructions

The manufacturer should make available information on maintenance or replacement of safety signs or labels as detailed in 10.2.1 through 10.2.3. If accompanying collateral material is provided, this information may be included.

10.2.1 Maintenance

Product safety signs or labels should be periodically inspected and cleaned by the product user as necessary to maintain good legibility for safe viewing distance as described in Section 8.2.

10.2.2 Replacement

Product safety signs or labels should be replaced by the product user when they no longer meet the legibility requirements for safe viewing distance as described in Section 8.2. In cases where products have an extensive expected life or where exposed to extreme conditions, the product user should contact either the product manufacturer or some other source to determine a means for obtaining replacement signs or labels.

10.2.3 Installation procedure

Installation of new or replacement safety signs or labels should be in accordance with the sign or label manufacturer's recommended procedure.

11 Pictorials

11.1 Recognition

Pictorials and other symbolic configurations may be used as a supplement to, or in place of, worded messages on a safety sign or label. Their use should provide the viewer with an immediate opportunity to recognize an existing hazard. They should normally be confined to a square and conform to ANSI Z535.3-1991, Criteria for Safety Symbols.

11.2 Testing for understandability

Pictorials and other symbolic configurations shown in ANSI Z535.3-1991, Criteria for Safety Symbols should be incorporated into a safety sign or label where appropriate. Where a new symbol is needed, testing and evaluation criteria are provided in ANSI Z535.3.

12 References

12.1 General

This standard shall be used in conjunction with American National Standards listed in 12.2 Other standards listed in 12.3 and other publications listed in 12.4 contain additional information that may be useful in completing the requirements of this standard.

12.2 American National Standards

When the following American National Standards are superseded by a revision approved by the American National Standards Institute, Inc., the revision shall apply.

1. American National Standards Institute (ANSI). *Safety Color Code,* ANSI Z535.1-1991.

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2. American National Standards Institute (ANSI). *Environmental and Facility Safety Signs*, ANSI Z535.2-1991.

3. American National Standards Institute (ANSI). *Criteria for Safety Symbols*, ANSI Z535.3-1991.

4. American National Standards Institute (ANSI). *Accident Prevention Tags for Temporary Hazards*, ANSI Z535.5-1991.

12.3 Other standards

1. American National Standards Institute (ANSI). *Precautionary Labeling of Hazardous Industrial Chemicals.* New York: ANSI Z129.1-1988.

2. American Society for Testing and Materials (ASTM). *Standard Practice for Operating Light-Exposure Apparatus (Carbon-Arc Type) With and Without Water for Exposure of Nonmetallic Materials.* - ASTM Section 14, Volume 14.02, Designation G23-81. Philadelphia, PA: 1987 Annual Book of ASTM Standards.

3. American Society for Testing and Materials (ASTM). *Practice for Operating Light-Exposure Apparatus (Xenon-Arc Type) With and Without Water for Exposure of Nonmetallic Materials* - ASTM Section 14, Volume 14.02, Designation G26-84. Philadelphia, PA: 1987 Annual Book of ASTM Standards.

4. Underwriters Laboratories, Inc. (UL). *Standard for Marking and Labeling Systems.* Northbrook, IL: UL969-1989.

12.4 Other publications

1. Collins, B.L., Lerner, N.D., Pierman, B.C., *Symbols for Industrial Safety.* National Bureau of Standards, NBSIR 82-2485, April 1982.

2. FMC Corporation, *Product Safety Sign and Label System*, FMC: Santa Clara, CA. 1985.

3. McCormick, E.J., *Alphanumeric and Related Displays, Human Factors in Engineering and Design*, 88-97, McGraw-Hill, Inc., 1976.

4. Westinghouse Electric Corporation, *Westinghouse Product Safety Label Handbook*, Westinghouse: Trafford, PA. 1981.

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Annex A
(normative)

Letter heights and viewing distances

Suggested computations for minimum letter heights for message panel wording over varying viewing distances and lighting conditions.*

Safe viewing distance	MINIMUM letter height for FAVORABLE reading conditions	MINIMUM letter height for UNFAVORABLE reading conditions
Less than 24 inches	Ht. (in.) = $\frac{\text{View Distance (in.)}}{150}$	Ht. (in.) = $\frac{\text{View Distance (in.)}}{75}$
24 to 96 inches	Ht. (in.) = $\frac{\text{View Distance (in.)}}{300}$	Ht. (in.) = $\frac{\text{View Distance (in.)}}{150}$
Greater than 96 inches	Ht. (in.) = $\frac{\text{View Distance (in.)}}{400}$	Ht. (in.) = $\frac{\text{View Distance (in.)}}{300}$

Note:

1. For purposes of computation, use of upper case letter height is acceptable. Final computation of letter height for viewing distances close to 24 inches and 96 inches can be based on either formula as long as readability can be demonstrated.

2. Letter height values derived from the above computations are not absolute due to variables that affect readability such as letter style, letter weight, contrast, and illumination. Final determination of letter height should be based on a visual examination of the composed word message in the reasonably expected environment of use or one very similar to the expected environment of use.

3. Letter height minimums indicated for FAVORABLE reading conditions may, in some instances, be reduced further for application to small products, product containers, or products having limited surface area on which to apply the message. However, a lower case letter height of .05 in. (1.2 mm) or 6-pt. type is approaching the lower limits of legibility and should be considered as the minimum height for safety messages.

* McCormick, E.J., Alphanumeric and Related Displays, Human Factors in Engineering and Design 88-97, McGraw-Hill, Inc., 1976.

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