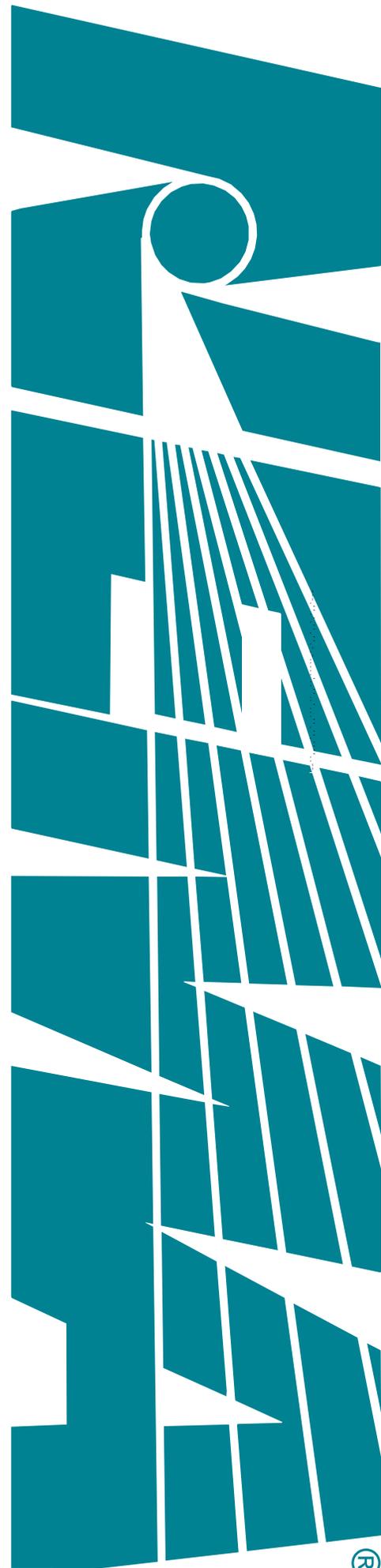


ANSI Z535.4-2011

Product Safety Signs and Labels





ANSI Z535.4-2011

Revision of ANSI Z535.4-2007

American National Standard

**Product Safety
Signs and Labels**



ANSI Z535.4-2011
Revision of
ANSI Z535.4-2007

American National Standard
Product Safety Signs and Labels

Secretariat:

National Electrical Manufacturers Association

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Foreword

In 1979, the ANSI Z53 Committee on Safety Colors was combined with the ANSI Z35 Committee on Safety Signs to form the ANSI 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.

While the basic mission and fundamental purpose of the ANSI Z535 Committee is to develop, refine, and promote a single, uniform graphic system used for communicating safety and accident prevention information, the Z535 Committee recognizes that this information can also be effectively communicated using other graphic systems.

The Z535 Committee created subcommittees to update the Z53 and Z35 standards and to write new standards. To date, the following six standards comprise the ANSI Z535 series:

- ANSI Z535.1 *Safety Colors* [ANSI Z53.1-1979 was updated and combined into this standard in 1991]
- ANSI Z535.2 *Environmental and Facility Safety Signs* [ANSI Z35.1-1972 and Z35.4-1972 were updated and combined into this standard in 1991]
- ANSI Z535.3 *Criteria for Safety Symbols* [new in 1991]
- ANSI Z535.4 *Product Safety Signs and Labels* [new in 1991]
- ANSI Z535.5 *Safety Tags and Barricade Tapes (for Temporary Hazards)* [ANSI Z35.2-1974 was updated and combined into this standard in 1991]
- ANSI Z535.6 *Product Safety Information in Product Manuals, Instructions, and Other Collateral Materials* [new in 2006]

Together, these six standards contain the information needed to specify formats, colors, and symbols for safety signs used in environmental and facility applications, in product and product literature applications, and in temporary safety tag and barricade tape applications.

Published separately is the ANSI Z535 Safety Color Chart. This chart gives the user a sample of each of the safety colors: red, orange, yellow, green, blue, purple, brown, grey, white, and black. It also describes each color's ink formulation and closest PANTONE® color.

This ANSI Z535.4 standard was prepared by Subcommittee Z535.4 on Product Safety Signs and Labels. The foreword and all of the annexes are considered to be informative and are not an official part of this standard. In the vocabulary of writing standards, the word "informative" is meant to convey that the information presented is for informational purposes only and is not considered to be mandatory in nature. The body of this standard is "normative," meaning that this information is considered to be mandatory.

This standard provides guidelines for the design of safety signs and labels for application to products. The core guidelines contained in this standard were initially published in the first edition of this standard. This first edition became available in 1992. In the 1998 revision, Annex A was added to explain the use of safety label components in collateral material used with the product, and Annex B was added to provide helpful principles and guidelines for the design of product safety signs.

In the 2002 revision, Annex C was added to describe the use of ISO formats for product safety signs and labels and Annex D was added to provide translations for signal words.

In the 2007 revision, Annex E was added to provide assistance in selecting a signal word and Annex F was created to separate the normative references from the informative references.

The 2011 edition of this standard was revised to better harmonize with the ANSI Z535.2, Z535.5, and Z535.6 standards. A new type of product safety sign, the "safety instruction sign", was added to the standard joining the existing types of signs, hazard alerting signs, and safety notice signs which were also more clearly defined and named in this edition. In tandem with these changes, the definitions for

“accident,” “harm,” and “incident” were refined to more clearly delineate a separation between physical injury and other safety-related issues (e.g., property damage).

Due to differences in color printing technologies and color monitors, the appearance of colors in this standard may not be accurate. See the ANSI Z535-2011 Safety Color Chart for the purpose of viewing accurate colors.

Proposals for improvement of this standard are welcome. Information concerning submittal of proposals to the Z535 Committee for consideration can be found at the back of this standard.

This standard was processed and approved for submittal to ANSI by the Accredited Standards Committee Z535 on Safety Signs and Colors. Committee approval of this 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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Greg Winchester, Secretary

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| Clarion Safety Systems, LLC | Geoffrey Peckham |
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| International Safety Equipment Association | Janice Comer Bradley Christine Fargo (Alt.) |
| Institute of Electrical and Electronics Engineers | Sue Vogel |
| International Staple, Nail, and Tool Association | John W. Kurtz |
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At the time it prepared this edition of ANSI Z535.4 for Z535 Committee vote, Subcommittee Z535.4 on Product Safety Signs and Labels had the following members:

Steve Hall, Chair
Paul Orr, Secretary

| | |
|--------------------|--|
| L. Dale Baker | L. Baker & Associates |
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| Carl Wong | Applied Materials |
| John Young | National Electrical Manufacturers Association |

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Product Safety Signs and Labels

1 Introduction

This standard sets forth a system for presenting safety and accident prevention information through product safety signs and labels. It consolidates a number of previous graphic approaches into a common design direction selected to present product hazard information in an orderly and visually consistent manner.

The basic mission and fundamental purpose of the ANSI Z535 Committee is to develop, refine, and promote a single, uniform graphic system used for presenting safety and accident prevention information. Such an approach assists standard users in the efficient development of product safety signs and labels, and assists sign viewers in recognizing signs as being related to safety.

This standard sets forth a hazard communication system that is designed to complement the ANSI Z535.2-2011, ANSI Z535.5-2011, and ANSI Z535.6-2011 standards. While these standards are similar in many respects, they each address different physical and visual requirements. As a result, the Accredited Standards Committee Z535 has recognized and affirmed the need for these separate standards.

2 Scope and Purpose

2.1 Scope

This standard sets forth requirements for the design, application, use, and placement of safety signs and labels on a wide variety of products.

2.2 Purpose

The purposes of this standard are to:

- a. establish a uniform and consistent visual layout for safety signs and labels applied to a wide variety of products,
- b. minimize the proliferation of designs for product safety signs and labels, and
- c. establish a national uniform system for signs that communicate safety information.

2.2.1 Existing American National Standards

There are a number of existing American National Standards that 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 that 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 communicate safety information via product safety signs or labels.

3.1.1 ISO-formatted safety signs

Product safety information may be conveyed by ISO formatted safety labels in compliance with ISO 3864-2 (see Annex C).

3.2 Exceptions

Should any of the requirements of this standard conflict with federal, state, or municipal regulations, such conflict shall not invalidate other requirements of this standard.

4 Definitions

4.1 accident: An incident that results in harm, property damage, or both.

4.1.1 harm: Any degree of physical injury, including death.

4.1.2 incident: An unintended and undesired event.

4.2 colors: Colors specified in this standard shall conform to ANSI Z535.1.

4.3 decal: (See safety sign, Section 4.12.)

4.4 hazard: A potential source of harm.

4.5 Intent

4.5.1 may: This word is understood to be permissive.

4.5.2 shall: This word is understood to be mandatory.

4.5.3 should: This word is understood to be advisory.

4.5.4 informative: Refers to those portions of this standard provided only for purposes of clarification, illustration, and general information. Those portions of the standard considered informative do not contain mandatory requirements. The Foreword and all of the annexes are considered informative.

4.5.5 normative: Refers to those portions of the standard containing the mandatory requirements (shall), as well as the recommended practices (should). The body of this standard is considered normative.

4.6 label: (See safety sign, Section 4.12.)

4.7 minimum safe viewing distance: The closest distance a person can be to a safety sign and still have time to follow the safety sign's message to avoid the hazard.

4.8 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 white space. There are three (3) types of panels a safety sign may use: signal word, message, safety symbol (see Figures 2 through 11).

4.8.1 signal word panel: Area of the safety sign that contains the signal word or words, and, when used, the safety alert symbol.

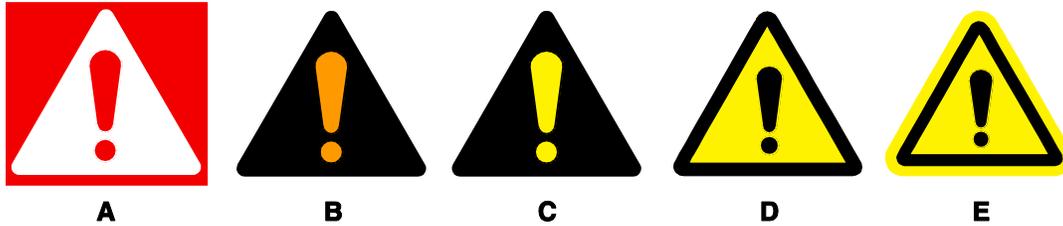
4.8.2 message panel: Area of the safety sign that contains the word message.

4.8.3 safety symbol panel: Area of the safety sign that contains the safety symbol.

4.9 pictorial: (See safety symbol, Section 4.13.)

4.10 placard: (See safety sign, Section 4.12.)

4.11 safety alert symbol: A symbol that indicates a hazard. It is composed of an equilateral triangle surrounding an exclamation mark. The safety alert symbol is only used on hazard alerting signs. It is not used on safety notice and safety instruction signs (see Figure 1 and Annex A1.2).



(A) for use with **DANGER** signal word; (safety white triangle, safety red exclamation mark, safety red background)

(B) for use with **WARNING** signal word; (safety black triangle, safety orange exclamation mark)

(C) for use with **CAUTION** signal word; (safety black triangle, safety yellow exclamation mark)

(D) and (E) for use with **DANGER, WARNING, or CAUTION** signal words; ([D] is a safety yellow triangle with a safety black border and safety black exclamation mark; [E] is a safety yellow triangle with a safety black exclamation mark and a safety yellow border around a safety black band)

NOTE—(D) and (E) are provided to allow for consistency with certain ISO standards such as ISO 3864-1 and ISO 3864-2.

Figure 1
The Safety Alert Symbol

4.12 safety sign: A visual alerting device in the form of a decal, label, placard, cord tag, or other marking such as an embossing, stamping, etching, or other process that provides safety information.

4.12.1 environmental/facility safety sign: Sign or placard in a work or public area that provides safety information.

4.12.2 product safety sign or label: Sign, label, cord tag, or decal affixed to a product that provides safety information about that product.

4.12.2.1 permanent safety sign or label: A sign that is to be permanently affixed to the product so that it cannot be easily removed. Permanent safety signs typically provide information about potential exposure to hazards inherent in the normal use associated with the product, or which might be created during other reasonably anticipated product use or misuse.

4.12.2.2 temporary safety sign or tag: A sign affixed to a product or its container that is intended to be removed. Temporary safety signs and tags typically provide information about a temporary hazard created by situations such as shipment, setup, service or repair.

4.12.3 Types of product safety signs

4.12.3.1 hazard alerting sign: Sign directly related to a hazard that identifies the hazard, the level of hazard seriousness, the probable consequence of involvement with the hazard, and how the hazard can be avoided. When information on consequence, avoidance, or type of hazard is readily inferred, this information may be omitted from the message panel (see Annex B3.1).

4.12.3.2 safety notice sign: Sign that gives notice of safety practices not directly related to physical injury.

4.12.3.3 safety instruction sign: Sign that identifies specific safety-related instructions or procedures. This type of sign may be used to supplement a hazard alerting sign by providing a place to convey lengthy safety-related instructional information.

4.13 safety symbol: A graphic representation intended to convey a safety message without the use of words. (See ANSI Z535.3)

4.14 signal words: The words used in the signal word panel. The signal words for hazard alerting signs are “DANGER,” “WARNING,” and “CAUTION.” Safety notice signs use the signal word “NOTICE.” Safety instruction signs use signal words that are specific to the situation. See Annex E for guidance in selecting a signal word.

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

4.14.2 WARNING: Indicates a hazardous situation that, if not avoided, could result in death or serious injury.

4.14.3 CAUTION: Indicates a hazardous situation that, if not avoided, could result in minor or moderate injury.

4.14.4 NOTICE: Indicates information considered important, but not hazard-related (e.g., messages relating to property damage). The safety alert symbol shall not be used with this signal word.

4.14.5 SAFETY INSTRUCTIONS or similar words: Indicates a type of safety sign, or a separate panel on a safety sign, where specific safety-related instructions or procedures are described. More definitive signal words are encouraged, where practical (e.g., SAFE SHUTDOWN PROCEDURE, SAFE OPERATING PROCEDURES, BOILER SHUTDOWN PROCEDURE, LOCKOUT PROCEDURE, SAFE INSTALLATION INSTRUCTIONS, EMERGENCY SHUTDOWN INSTRUCTIONS). The safety alert symbol shall not be used with this classification of signal word. This signal word may also be used as a heading for a safety instruction panel incorporated into a hazard alerting sign to convey lengthy instructional information (see Annex B7).

5 Use of signal words

5.1 Hazard classification

Hazard alerting signs are classified according to the relative seriousness of the hazardous situation. The classification is based on the probability of being injured if the hazard is not avoided, and on the severity of the resulting injury. For hazard alerting signs, there are three hazard classifications that are denoted by the signal words “DANGER,” “WARNING,” and “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 shall be made in accordance with the definitions provided in Section 4.

5.3 Multiple hazard signs

5.3.1 One sign or label

When more than one hazard exists on a product, either in close proximity to each other, or which might be preventable from a common location, one hazard alerting sign may be used, provided that the information addresses each hazard.

5.3.2 Signal word for multiple hazard signs

When multiple hazardous situations are addressed on one hazard alerting sign, and the hazards are classified at different levels of seriousness, the signal word corresponding to the greatest level of seriousness (i.e., DANGER, WARNING, or CAUTION) 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. On hazard alerting signs, in addition to a word message, a safety instruction panel may be incorporated as a place to convey lengthy instructional information (see Figure 13). A safety symbol panel may be used to communicate a part or all of the elements of a message panel (see Annex B3.1).

6.2 Panel arrangement

6.2.1 Panel format

The sign or label panels may be in a horizontal or vertical format. See Figures 2 through 13 for examples.

6.2.2 Panel placement

The relative placement of the signal word and message panels should be such that the signal word panel precedes all text in the message panel, as shown in Figures 2 through 6 and in Figure 10. When space is

limited, a panel arrangement such as that shown in Figures 7, 8, and 11 may be used to increase the size of the message panel. When vertical space, in particular, is limited, the panel arrangement shown in Figure 8 may be used. An option for a larger symbol panel is shown in Figure 9. When no word message panel is used, the panel arrangement shown in Figure 12 may be used. Figure 13 is an example of how a safety instructions panel may be incorporated into a hazard alerting sign.

6.2.3 Panel shape

Panels may be non-rectangular to make good use of the available space.

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 Distinctiveness

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

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

6.5.2 Longer word messages and space limitations

When detailed instructions, precautions, or consequences require a longer word message, or when space is limited, a sign may refer the user to the proper instruction manual or other relevant information. A hazard alerting sign may refer the user to a safety instructions sign for specific hazard-related instructions or procedures.

7 Safety sign and label colors

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.

7.2.6 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. As an alternative, the safety alert symbol may consist of a safety black triangle band and safety black exclamation mark on a safety yellow triangle. See Figures 1 and 2.

7.3 Message panel

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

7.4 Safety symbol panel

The safety symbol panel should have a safety black symbol on a safety white background. Other colors may be used for safety symbol emphasis, such as safety red for fire, etc., or if surround shapes are used (see ANSI Z535.3 for recommended surround shapes and colors).

7.5 Border

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

7.6 Color options

7.6.1 Other colors

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

7.6.2 When special circumstances limit the use of sign colors

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 safety symbol panels provided that the panel colors contrast with the background color of the product.

7.6.3 When special circumstances preclude the use of safety colors

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

NOTE—For additional reference on letter style and size, see Annex B.

8.1 Letter style

8.1.1 Signal words

Signal words shall appear in sans serif letters in upper case only. The signal word NOTICE shall appear in italicized sans serif letters in upper case only.

8.1.2 Message panel lettering

Message panel lettering should be a combination of upper and lower case letters. Upper case only lettering may be used for short messages or emphasis of individual words.

8.2 Letter size

8.2.1 Lettering

For hazard alerting signs, lettering shall be of a size that enables a person with normal vision, including corrected vision, to read the message panel at a safe viewing distance from the hazard. For safety notice and safety instruction signs, lettering shall be of a size that enables a person with normal vision, including corrected vision, to read the message panel from the expected viewing distance.

8.2.2 Determination of minimum safe viewing distance

Determination of safe viewing distance for the message panel text shall take into consideration a reasonable hazard avoidance reaction time.

8.2.3 Signal word letter height

Signal word letter height should be at least 50 percent greater than the height of a capital H in the majority of the message panel wording. When space is limited, signal word letter height may be the same as the majority of the message panel wording.

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), for hazard alerting signs, alert the viewer to the hazard in time to take appropriate action.

NOTE—Sections 8.2.1 thru 8.2.3, Section 9.1, and Annex B provide guidance for determining “legibility” and “safe viewing distance.”

9.1.1 Safety instruction signs

When a hazard alerting sign refers to a separate safety instruction sign for hazard avoidance procedures, the safety instruction sign may be in a different location. For example, the safety sign may be located near the hazard, and the safety instruction sign may be located near where the procedures for hazard avoidance are performed. Multiple hazard alerting signs may refer to one safety instruction sign, and a single hazard alerting sign may refer to multiple safety instruction signs.

9.2 Protection

When feasible, placement of the sign or label should provide protection from foreseeable damage, fading, or visual obstruction caused by abrasion, ultraviolet radiation, 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, symbol legibility, and word message legibility as described in Section 8.2. Reasonable expected life shall take into consideration whether the safety sign is permanent or temporary, the expected life of the product, and the foreseeable environment of use.

10.2 Product user instructions

The manufacturer should include information on maintenance or replacement of safety signs or labels as detailed in 10.2.1 through 10.2.3. This information should be included in collateral material, if provided with the product.

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 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 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 another 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 Safety symbols

11.1 Conveyed message

Safety symbols should be readily understood and should effectively communicate the message. See ANSI Z535.3.

11.2 Use with and without corresponding word messages

Safety symbols may be used to clarify, supplement, or substitute for a portion or all of a word message found in the message panel. When used with a word message, safety symbols shall be compatible with the word message. A symbol may only be used to substitute for a portion or all of a word message if it has been demonstrated to be satisfactorily comprehended (e.g., Annex B of ANSI Z535.3) or there is a means (e.g., instructions, training materials, manuals, etc.) to inform people of the symbol's meaning.

12 References

12.1 General

This standard shall be used in conjunction with the American National Standards listed in 12.2. Other standards listed in 12.3 and other publications listed in Annex F contain additional information that can 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, the revision shall apply.

1. ANSI Z535.1-2006 (R2011), *American National Standard Safety Colors* (American National Standards Institute, 2006).
2. ANSI Z535.2-2011, *American National Standard Environmental and Facility Safety Signs* (American National Standards Institute, 2011).
3. ANSI Z535.3-2011, *American National Standard for Criteria Safety Symbols* (American National Standards Institute, 2011).
4. ANSI Z535.5-2011, *American National Standard Safety Tags and Barricade Tapes (for Temporary Hazards)* (American National Standards Institute, 2011).
5. ANSI Z535.6-2011, *American National Standard Product Safety Information in Product Manuals, Instructions, and Other Collateral Materials* (American National Standards Institute, 2011).

12.3 Other standards

1. ISO 3864-1:2011, *Graphical symbols—Safety colours and safety signs—Part 1: Design principles for safety signs in workplaces and public areas* (International Organization for Standardization, 2011).
2. ISO 3864-2:2004, *Graphical symbols—Safety colours and safety signs—Part 2: Design principles for product safety labels* (International Organization for Standardization, 2004).



NOTE—See Figures 3 through 13 for various panel arrangement options.

Figure 2
Examples of Color Description

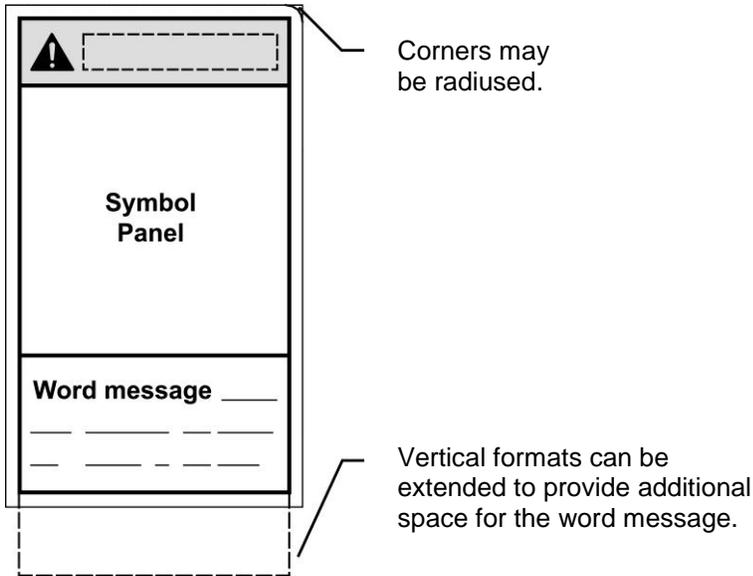


Figure 3
Three-Panel Sign in Vertical Format



Figure 4
Two-Panel Sign in Vertical Format

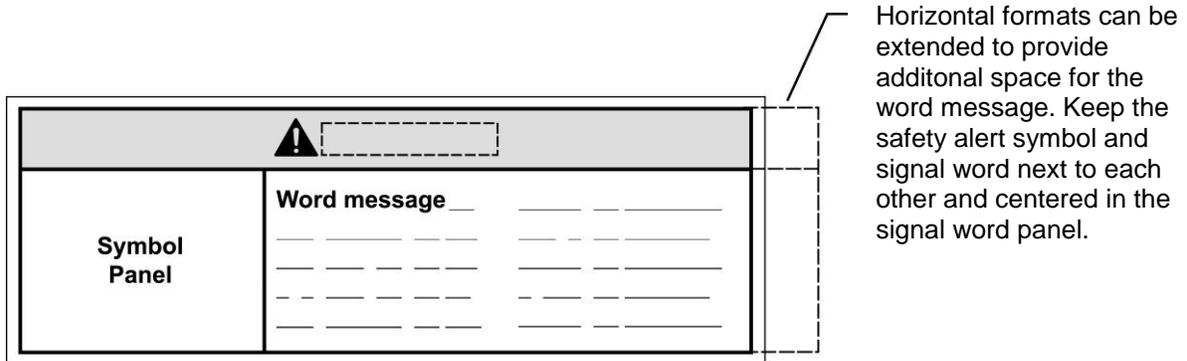


Figure 5
Three-Panel Sign in Horizontal Format

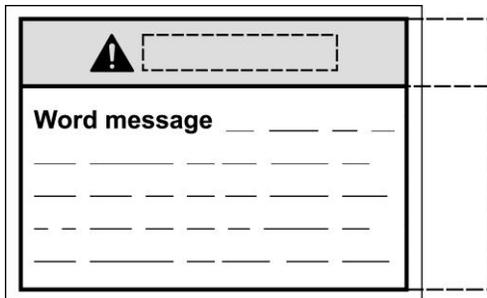


Figure 6
Two-Panel Sign in Horizontal Format

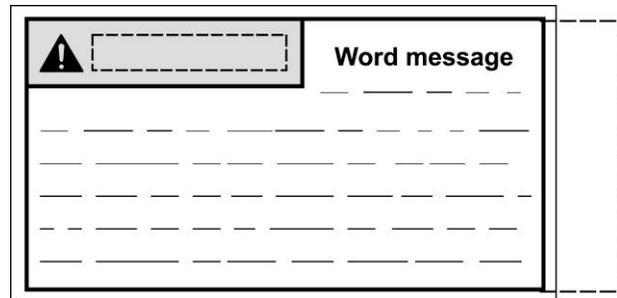


Figure 7
Two-Panel Sign in Shortened Signal Word Panel Format



Figure 8
Two-Panel Sign in Side-by-Side Format

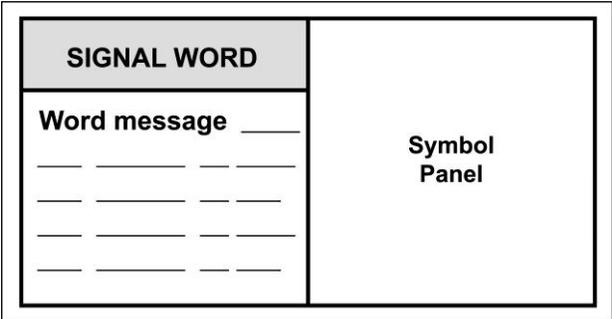


Figure 9
Three-Panel Sign in Horizontal Format with
Symbol Panel on Right

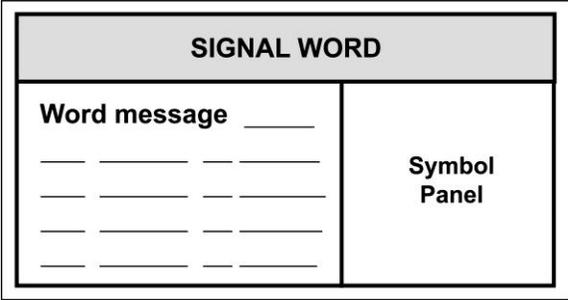


Figure 10
Three-Panel Sign in Horizontal Format
with Message Panel and Symbol Panel
Separated by Line

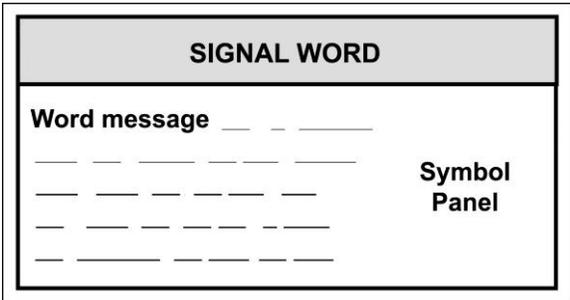


Figure 11
Three-Panel Sign in Horizontal Format with
Message Panel and Symbol Panel Separated by
White Space

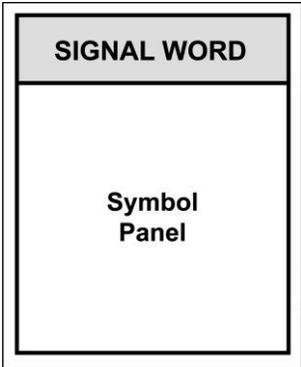


Figure 12
Two-Panel Sign in Horizontal Format with Word
Panel and Symbol Panel

| | |
|--|--|
| Symbol Panel | SIGNAL WORD |
| | Word message _____ _____ _____ _____ |
| SAFETY INSTRUCTIONS SIGNAL WORD | |
| Instructional Word Message _____ _____ _____ _____ | |

**Figure 13
Hazard Alerting Sign Incorporating a Safety Instruction Panel**

NOTE—In all of the examples in Figures 3 through 13, any of the signal word and safety alert symbol combinations can be used.

Annex A

Providing Information About Safety Messages in Collateral Materials and Product Safety Signs and Labels (informative)

A1 Explanation of signal words and symbols

Those signal words and safety symbols that are used in a product's collateral materials or on the product may be defined in collateral materials if space is available.

A1.1 Safety alert symbol

The meaning of the safety alert symbol may be provided in collateral materials. The following artwork may be used for this purpose.



This is the safety alert symbol. It is used to alert you to potential physical injury hazards. Obey all safety messages that follow this symbol to avoid possible injury or death.

A1.2 Signal words

The meaning of the different signal words as defined in this standard may be explained in collateral materials. The following artwork may be used for this purpose.



DANGER indicates a hazardous situation which, if not avoided, will result in death or serious injury



WARNING indicates a hazardous situation which, if not avoided, could result in death or serious injury



CAUTION indicates a hazardous situation which, if not avoided, could result in minor or moderate injury



NOTICE is used to address practices not related to physical injury



Safety instruction (or equivalent) signs indicate specific safety-related instructions or procedures

A1.3 Other highlighting conventions

The meaning of any other highlighting conventions used to differentiate safety messages (e.g., text manipulations, indentation, etc.) may be explained in collateral materials.

A1.4 Safety symbols

The meaning of any safety symbols used on safety labels or collateral materials may be explained in collateral materials.

A2 Product safety signs and labels

A2.1 Presence, location, and content

Information identifying the presence, location, and content of product safety signs or labels may be provided in collateral materials. Product safety signs may be reproduced in collateral materials. The purpose and expected life of the document, as well as the location and expected life of the labels, should be considered when deciding whether to provide this information. Space considerations in the document may also be considered when deciding whether to include such information.

A2.2 Maintenance or replacement

Information on maintenance and/or replacement of product safety signs and labels may be provided in collateral materials. The expected life of the product, the labels, and the document should be considered when deciding whether to provide this information. Space considerations in the document may also be considered when deciding whether to include such information.

A2.3 References to collateral materials

If product safety signs or labels refer readers to collateral material(s) for additional safety information, relevant information should be provided in the referenced material(s) (see ANSI Z535.6-2011).

Annex B

Principles and Guidelines for the Design of Product Safety Signs and Labels (informative)

B1 Scope

Good, consistent visual design helps to effectively communicate safety information. This annex provides the designer with information on widely recognized principles that can aid in the development of effective product safety signs.

NOTE 1—In this annex, the term “sign” will be used to mean either a product safety sign or label.

NOTE 2—Every safety sign must be considered on its own terms. Limitations on space or other unique conditions may justify variance from these principles. Examples of word messages are provided to illustrate how principles related to grammatical structure, writing style and print layout can enhance the safety sign. These examples are not intended to prescribe standardized word messages for the hazards mentioned in the examples.

B2 Signal word panel arrangement

For those signal words that require the use of the safety alert symbol (i.e., DANGER, WARNING, and CAUTION), the safety alert symbol and signal word should be positioned close together and centered in the signal word panel. See Figures B1 and B2. For those signal words that do not require the safety alert symbol (i.e., NOTICE, SAFETY INSTRUCTIONS), the signal word should be positioned in the center of the signal word panel.



Figure B1
Examples of Correct Safety Alert Symbol
and Sign Word Placement



Figure B2
Examples of Incorrect Safety Alert Symbols and
Signal Word Placement

B3 Developing the word message for hazard alerting signs

B3.1 The content of the word message

The word message on a hazard alerting sign typically communicates information to a viewer on the type of hazard, the consequence of not avoiding the hazard, and how to avoid the hazard. Many factors must be considered when determining whether to omit consequence, avoidance, or type of hazard information in the word message. Factors to consider include whether the message can be inferred from a symbol, other text messages, user training, or the context in which the safety sign is used.

B3.2 Ordering the content of the word message

The order in which the content appears in the message panel is flexible. Factors to consider when determining the order of a word message's content include the target audience's degree of prior knowledge of the hazard, the reaction time required to avoid the hazard, seriousness of the hazard, severity, and probability of injury, and obviousness of the hazard or avoidance procedure.

Generally, the hazard message should come first when there are many feasible action/avoidance alternatives; however, action/avoidance messages should come first when there are few avoidance alternatives. Figure B3 illustrates a word message that explains the type of hazard and consequences of interaction with the hazard before it describes the hazard avoidance information. Placing the information

in this order would be appropriate if it is found that the audience needs to know what the hazard is before they would follow the avoidance information presented on the label. This format assumes that there is time to read the entire word message and still avoid the hazard.

Figure B4 illustrates a word message that places the hazard avoidance information first. Ordering the word message in this way would be appropriate if a person needs to immediately follow the avoidance information in order to prevent interaction with the hazard.

**Moving parts
can crush and
cut.**
**Keep hands
clear while
operating.**
**Lockout power
before
servicing.**

**Figure B3
Word Message with Hazard
Type and Consequence First**

Keep out.
**Hazardous
Voltage inside.**
440 Volts.

**Figure B4
Word Message with Hazard
Avoidance First**

B3.3 Formatting the word message

There are many issues that must be considered when developing a word message, from sentence structure to typesetting specifications. The length of the word message depends on the amount of information that needs to be communicated to a person to allow them to understand and avoid the hazard. Once this information is determined, it should be written and formatted in a manner that is concise and easily understood. The following are several principles that can be applied to the word message to achieve this objective.

B3.3.1 Use headline style

Write in a headline style. Compare the sample word messages shown below. The headline style example eliminates nonessential words and omits pronouns (“this,” “that,” “they”), articles (“a,” “the,” “an”), and forms of the verb “to be” (“is,” “are,” “were”). Avoid hyphenation when at all possible.

Moving parts can crush and cut.
Keep guard in place.
Lockout power before servicing.

**Figure B5
Example of Headline Style Message**

**This machine has moving parts that can
crush and cut. Keep the guard in place
while operating this machine. Before
servicing is performed, lockout power.**

**Figure B6
Example of Non-headline Style Message**

B3.3.2 Use active voice

Write sentences in the active voice rather than the passive voice. This means placing the subject of the sentence first, the action (verb) next, and the object (noun) last. Often the subject “you” or “your” can be inferred from the sentence and is unnecessary.

Keep hands away from rotating blade.

Lockout power before servicing equipment.

Immediately replace guards after repair or adjustment.

Figure B7
Examples of Active Voice Sentences

Your hands must be kept away from rotating blade.

Power must be locked out before servicing equipment.

After repair and adjustment, immediately replace guards.

Figure B8
Examples of Passive Voice Sentences

B3.3.3 Avoid prepositional phrases

Avoid the use of prepositional phrases. Prepositional phrases can often be eliminated or replaced with one word.

Disconnect power to service equipment.

Turn off power if jam occurs.

Figure B9
Examples of Sentences without Prepositional Phrases

Disconnect power in order to service equipment.

Turn off power in the event a jam occurs.

Figure B10
Examples of Sentences with Prepositional Phrases

B3.3.4 Refer to another source

Keep only essential hazard-related information in the product safety sign. If necessary, consideration can be given to refer the viewer to another source for additional safety information. Examples of such sources include safety instruction signs, operation manuals, service manuals, checklists, operating procedures, and safety bulletins.

B3.3.5 Separation of word message content

To enhance readability, the word message arrangement in an outline format should be considered. The addition of bullets may also be considered to help separate portions of the word message.

Moving parts can crush and cut.

Keep hands clear while operating.

Lockout power before servicing.

**Figure B11
Message in Outline Format**

Moving parts can crush and cut.

- **Keep hands clear while operating.**
- **Lockout power before servicing.**

**Figure B12
Message in Outline-with-Bullets Format**

Moving parts can crush and cut. Keep hands clear while operating. Lockout power before servicing.

**Figure B13
Message in Continuous Format**

B3.3.6 Text justification

Left aligned “ragged right” text should be used for all but one-line text messages, which can be either left aligned or centered. Left alignment aids in readability by creating a vertical line that the eye naturally locates when searching for the next line of text. Justified text should be avoided because the added space between words makes it more difficult to read.

Moving parts can crush and cut.

Keep hands clear while operating.

Lockout power before servicing.

**Figure B14
Message with Left-Aligned Ragged Text**

Moving parts can crush and cut.

Keep hands clear while operating.

Lockout power before servicing.

**Figure B15
Message with Centered Text**

Moving parts can crush and cut.

Keep hands clear while operating.

Lockout power before servicing.

**Figure B16
Message with Justified Text**

B3.3.7 Upper and lower case letters

The preferred format for text is the use of mixed upper and lower case letters where only the first letter of the first word in a sentence is capitalized. The use of all upper case letters for the word message is discouraged because it is more difficult to read quickly than lower case type. On occasion, a single word or phrase may be set in upper case letters to provide emphasis.

**Moving parts can crush
and cut.**

Do not remove guard.

**Lockout power before
servicing.**

**Figure B17
Text with Mixed Case Lettering**

**Moving parts can crush and
cut.**

Do NOT remove guard.

**LOCKOUT power before
servicing.**

**Figure B18
Text with Selective Use of
Upper Case Lettering**

**MOVING PARTS CAN
CRUSH AND CUT.**

DO NOT REMOVE GUARD.

**LOCKOUT POWER
BEFORE SERVICING.**

**Figure B19
Text with All Upper Case
Lettering**

B3.3.8 Choice of type style

Sans serif typestyles are preferred for short word messages. Serif typestyles may be used, but should be limited to safety labels which contain large amounts of text. The important specification to look for when choosing a typestyle is the stroke “width-to-height” ratio. This ratio refers to the width of the letter and the strokes used to create the letter and should be between 1:6 -1:8 (see Howett 1983, paragraph 12.4 [Annex F2, Reference 3]).

Arial/Helvetica
Arial/Helvetica Bold
Folio Medium
Franklin Gothic

Futura
News Gothic Bold
Meta Bold
Univers

**Figure B20
Examples of Sans Serif Typestyles**

B3.3.9 Choice of type spacing

The correct spacing between lines of text, between words, and between letters helps to make a word message easier to read. The amount of space between lines of text is called leading. Lines of text should be separated by leading that is approximately 120% of the type point size (e.g., 10 point type should have 12 point leading, 14 point type should have 16.8 point leading, etc.). Additional leading should be added to separate portions of a word message, as shown in the outline format illustrated in B3.3.5. The space between words and between letters is called tracking. For purposes of legibility, it is important to use proper word and letter spacing when typesetting the word message.

**This is an example of a
word message with proper
leading and word/letter
spacing.**

**This is an example of
a word message with
too much leading and
too much word/letter
spacing.**

**This is an example of a word
message with not enough
leading and not enough
word/letter spacing.**

**Figure B21
Examples of Correct and Incorrect Type Spacing**

B3.3.11 Choice of type color

The word message's type can be safety black on a safety white background or safety white on a safety black background. This choice should be based on which is more legible; however, legibility is dependent on more than type color. Factors such as type size, amount of text, reading distance, contrast with the product surface, and lighting conditions must all be considered.

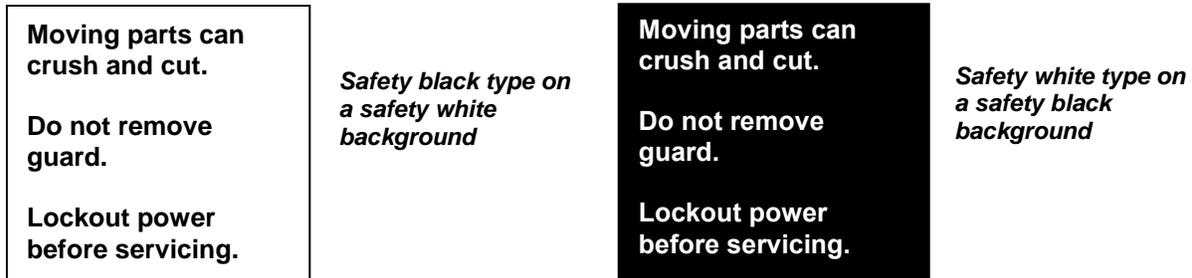


Figure B22
Examples of Type Color Choice

B3.3.12 Comprehension

The word message should be written so that it can be understood by the target audience (i.e., those who are to use and/or service the product). This means choosing words that accurately describe the specific hazard and avoidance information in terms the intended audience will understand.

B3.3.13 Letter size

Legibility of the word message at the minimum safe viewing distance determines the proper letter size for the word messages.

NOTE—The minimum safe viewing distance refers to the closest distance a person can be to the label and still have time to follow the safety sign's message to avoid the hazard.

The letter size / safe viewing distance guidelines in Table B1 define the letter size required for legibility at the given viewing distance. The height of the capital letter "H" identifies the type's letter size. Note that the letter sizes shown indicate the minimum or recommended word message letter size. Letter size may need to be larger for the following reasons:

- a. To be conspicuous from other information presented on the product;
- b. To facilitate legibility under low light, or other unfavorable viewing conditions;
- c. To warn persons at distances greater than the minimum safe viewing distance;
- d. To convey special emphasis for portions of the message; and
- e. To facilitate legibility for populations who have difficulty reading small text (e.g., senior citizens).

A formatted sign with the selected letter size for word messages should be visually examined in the environment expected for actual use (e.g., lighting, background, angle, etc.), and tested for legibility in that environment by persons representative of the expected viewers. Legibility may be improved by increasing letter size, and by other means such as adjusting leading, kerning, tracking, line length, justification and alignment; selecting a different typeface, style or weight; changing sign material or finish to reduce glare; increasing contrast between letters and background; etc.

B3.3.14 Minimum letter height calculations

Type size is defined in "points," a term used to describe the space required for lead type characters. Point sizes measure from the top of the capital letters to the bottom of the lower case letters with descenders (e.g., the bottom of the letter "g" or "j"). One point equals 0.01384 inches, or approximately 1/72 of an

inch. Although typefaces vary slightly, a practical guide for defining type size is based on using the capital letter “H” for measurement purposes. Since the character “H” has no descender, it is possible to use a conversion factor of 0.01 inches = 1 point of type size. Thus, 12-point type yields a capital “H” approximately 0.12 inches high. For metric purposes, use a conversion factor of 3.9 points =1 mm of height for a capital “H.”

Recommended Letter Heights For Favorable Reading Conditions:

2 Feet Or Less: Viewing Distance (in.) / 150

>2 To 20 Feet: Viewing Distance [(ft. - 2) x .03] + .16

Over 20 Feet: Viewing Distance (ft.) / 28.6

Recommended Letter Heights For Unfavorable Reading Conditions (All Distances):

Viewing Distance (ft.) x .084

Table B1
Examples of Word Message Letter Heights and Minimum Safe Viewing Distances

| Minimum Safe Viewing Distance | Minimum Letter Height for FAVORABLE Reading Conditions | | | Recommended Letter Height for FAVORABLE Reading Conditions | | | Recommended Letter Height for UNFAVORABLE Reading Conditions | | |
|-------------------------------|--|------------------|------------------|--|-----|-----|--|------|-------|
| | point size | in | mm | point size | in | mm | point size | in | mm |
| 1 foot or less (30 cm) | 8 ^a | .08 ^a | 2.0 ^a | 8 | .08 | 2.0 | 8.4 | .084 | 2.13 |
| 2 feet (60 cm) | 10 | .10 | 2.5 | 16 | .16 | 4.1 | 16.8 | .168 | 4.26 |
| 3 feet (90 cm) | 12 | .12 | 3.0 | 19 | .19 | 4.8 | 25.2 | .252 | 6.40 |
| 4 feet (120 cm) | 14 | .14 | 3.6 | 22 | .22 | 5.6 | 33.6 | .336 | 8.53 |
| 5 feet (150 cm) | 16 | .16 | 4.1 | 25 | .25 | 6.4 | 42.0 | .420 | 10.67 |
| 6 feet (180 cm) | 18 | .18 | 4.6 | 28 | .28 | 7.1 | 50.4 | .504 | 12.80 |
| 7 feet (210 cm) | 20 | .20 | 5.1 | 31 | .31 | 7.9 | 58.8 | .588 | 14.94 |
| 8 feet (240 cm) | 22 | .22 | 5.6 | 34 | .34 | 8.6 | 67.2 | .672 | 17.07 |

^a 8 point (.08 in, 2.0 mm) type is the suggested minimum type size for use on product safety signs, except for small products where 6 point (.06 in, 1.5 mm) type size may be used.

B4 The use of safety symbols

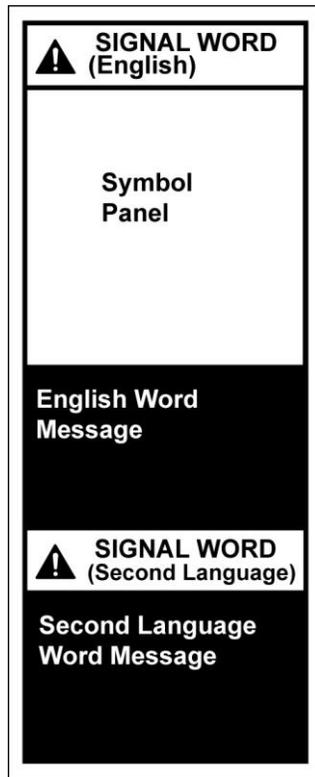
Well-designed safety symbols can often communicate hazard information quickly and across language and literacy barriers. The ANSI Z535.4 standard allows for signs with a word-message-only format, a symbol-only format, or a combination of symbols and text. When deciding whether or not to use safety symbols to complement or replace words, factors to consider include the risk of critical confusion, the clarity and speed of communication, space availability, and translation and literacy issues. (See ANSI Z535.3 for additional information concerning safety symbol selection, design, and testing.)

B5 Multi-lingual formats

The selection of additional languages for product safety signs is an extremely complex issue. Experts suggest that nearly 150 languages are spoken in the United States and millions of Americans speak a language other than English in their homes. If it is determined that additional languages are desired on a safety sign, the following formats should be considered. In all examples, the use of symbols is strongly encouraged in order to better communicate the sign’s hazard information across language barriers. Safety white type on a safety black background is used in these examples to highlight the symbol and word message panels.

B5.1 Vertical formats

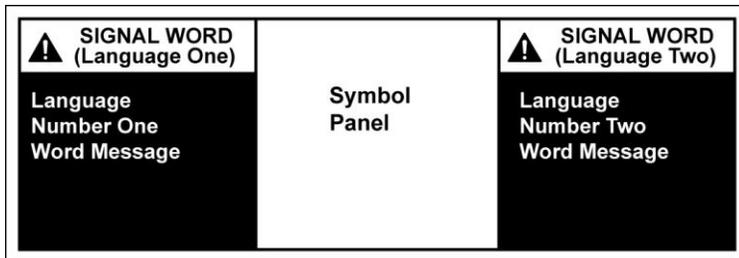
The vertical multilingual format shown in Figure B23 can be modified to include a longer word message by lengthening the word message panels.



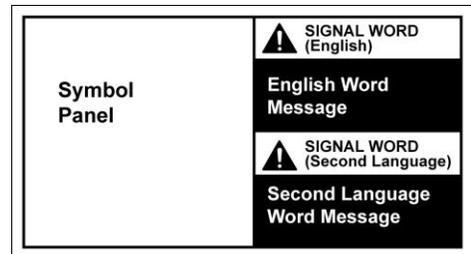
**Figure B23
Vertical Bilingual Format**

B5.2 Horizontal formats

Figures B24 and B25 illustrate horizontal formats for multilingual safety labels. In Figure B24, the English word message and signal word may appear on either the right or left side. The text and signal word panels may be widened to accommodate longer word messages.



**Figure B24
Horizontal Multilingual Format with Symbol Panel in Middle**



**Figure B25
Horizontal Multilingual Format with Symbol Panel on Left Side**

B5.3 Signal word panel arrangement

The safety alert symbol and signal word should be positioned close together and centered in each signal word panel of a multilingual safety sign (see Annex B2).

B5.4 Letter size

A slightly smaller type size may be needed to accommodate the length of a translated signal word or word message.

B6 Multi-hazard formats

If multiple hazards exist at one location or if there is only enough space for a single safety label, a multi-hazard label may need to be considered. The use of safety symbols in multi-hazard formats is optional, but encouraged. Additional safety symbols can be added to these formats as needed. The signal word corresponding to the hazard with the greatest seriousness level should be used. (See Section 5.3.2.) The word message and symbols should be prioritized by greatest importance. Factors to consider include the target audience's degree of prior knowledge of the hazard, the reaction time required to avoid the hazard, seriousness of the hazard, severity and probability of injury, obviousness of the hazard or avoidance procedure, etc. Safety white type on a safety black background is used in these examples to highlight the safety symbol and word message panels. The following options can be considered when designing multi-hazard signs.

B6.1 Three-panel formats

Use one of the standard three-panel formats shown in Figures 2, 3, 5, 9, 10, and 11, and use a single symbol. Use the outline format to separate the various hazard word messages (see Annex B3.3.5).

B6.2 Two-panel formats

Use the two-panel signal word / word message formats shown in Figures 4, 6, 7, and 8. Use the outline format to separate the various hazard word messages (see Annex B3.3.5).

B6.3 Multi-symbol formats

Use one of the multi-symbol formats shown in Figures B26 through B28. In the formats shown in Figures B26 and B27, place one safety symbol in the upper left panel so that it is "read" first and order the word message segments so they correspond to the order of the safety symbol ("reading" the safety symbols from left to right or top to bottom). If the format shown in Figure B27 is used, arrange the word message segments so they line up opposite the appropriate safety symbol panel.

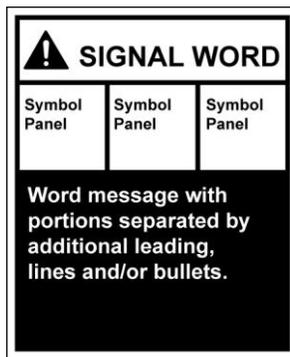


Figure B26
Multi-Symbol Format with Symbol Panels on Top of Word Message

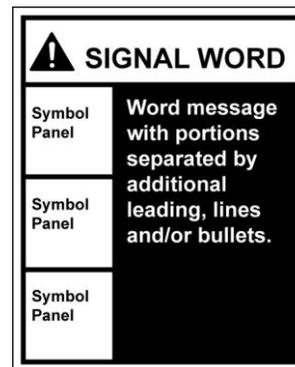


Figure B27
Multi-Symbol Format with Symbol Panels to Side of Word Message

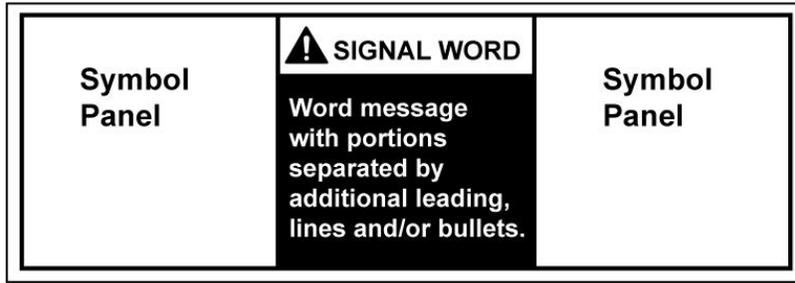


Figure B28
Multi-Symbol Format with Symbols Panels on Each Side of Word Message

B7 Safety instruction sign formats

When designing a hazard alerting sign, there are times when it is desirable to separate lengthy procedures or instructions from essential “need to know quickly” hazard-related safety information. A safety instruction sign is useful for this purpose, thereby allowing the message panel of a safety sign to remain short and concise.

B7.1 Specific wording for the instructional signal word

The signal word classification “SAFETY INSTRUCTIONS” or similar words (see Section 4.14.5) encourages the use of more definitive words where practical. More definitive words are intended to briefly identify the type of information in the safety instruction panel, much like a headline for a news article. Examples of more descriptive word choices include SAFE OPERATING PROCEDURES, BOILER SHUTDOWN PROCEDURE, LOCKOUT PROCEDURE, SAFE INSTALLATION INSTRUCTIONS, and EMERGENCY SHUTDOWN INSTRUCTIONS.

B7.2 Format Options

Separating instructional safety information can be accomplished in one of two ways:

- a. Separate safety instruction sign (see Figure B29);
- b. A safety instruction sign included as part of a hazard alerting sign (see Figure B30).

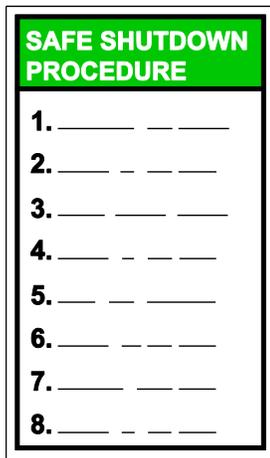


Figure B29
Separate Safety Instructions Sign

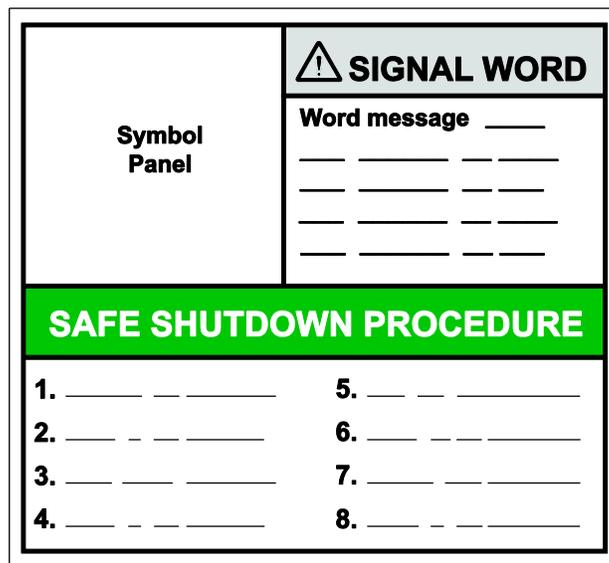


Figure B30
Safety Instructions Sign as Part of Hazard Alerting Sign

Annex C

The Use of ISO Safety Signs for Products

(informative)

ISO standards such as ISO 3864 and other industry-specific ISO standards exist for product safety signs and labels. These ISO-formatted safety signs have been used internationally for many years.

In some instances, it may be possible for a safety sign or label to be in conformance with ANSI Z535.4 and an ISO standard. In other instances, conformance with one standard will not result in conformance with one or more aspects of the other.

A decision to convey all or a portion of a product's safety information in the form of ISO-formatted signs may be based on many factors. Such factors include, but are not limited to the product's anticipated market, the movement of the product from country to country during its expected life, the target audience's characteristics, and space availability on the product.

Annex D

Translations of Signal Words

(informative)

D1 Scope

Translation of the signal words and word message are optional considerations. These translations may vary by region and dialect. It is recommended that translations be checked regarding their appropriateness for the intended audience.

Table D1
Translations of Signal Words

| LANGUAGE | DANGER | WARNING | CAUTION | NOTICE |
|--------------------|-------------------|-----------------|-------------|-------------|
| Arabic | خطر | تحذير | تنبيه | إنذار |
| Chinese Simplified | 危险 | 警告 | 小心 | 注意 |
| Czech | NEBEZPEČÍ | VAROVÁNÍ | UPOZORNĚNÍ | OZNÁMENÍ |
| Danish | FARE | ADVARSEL | FORSIGTIG | BEMÆRK |
| Dutch | GEVAAR | WAARSCHUWING | VOORZICHTIG | LET OP |
| Estonian | OHT | HOIATUS | ETTEVAATUST | TEATIS |
| Farsi | خطر | اخطار | احتياط | توجه |
| Finnish | VAARA | VAROITUS | HUOMIO | HUOMAUTUS |
| French | DANGER | AVERTISSEMENT | ATTENTION | AVIS |
| German | GEFAHR | WARNUNG | VORSICHT | HINWEIS |
| Greek | ΚΙΝΔΥΝΟΣ | ΠΡΟΕΙΔΟΠΟΙΗΣΗ | ΠΡΟΣΟΧΗ | ΕΙΔΟΠΟΙΗΣΗ |
| Hebrew | כּוּנָה | אזהרה | זהירות | הודעה |
| Hungarian | VESZÉLY! | FIGYELMEZTETÉS! | VIGYÁZAT! | ÉRTESÍTÉS |
| Italian | PERICOLO | AVVERTENZA | ATTENZIONE | AVVISO |
| Japanese | 危険 | 警告 | 注意 | 注記 |
| Korean | 위험 | 경고 | 주의 | 주의 사항 |
| Latvian | BĪSTAMI | BRĪDINĀJUMS | UZMANĪBU | IEVĒRĪBAI |
| Lithuanian | PAVOJUS | ĮSPĖJIMAS | PERSPĖJIMAS | PRANEŠIMAS |
| Norwegian | FARE | ADVARSEL | FORSIKTIG | LES DETTE |
| Polish | NIEBEZPIECZEŃSTWO | OSTRZEŻENIE | PRZESTROGA | NOTYFIKACJA |
| Portuguese | PERIGO | ATENÇÃO | CUIDADO | AVISO |
| Russian | ОПАСНО | ОСТОРОЖНО | ВНИМАНИЕ | УВЕДОМЛЕНИЕ |
| Slovak | NEBEZPEČENSTVO | VAROVANIE | UPOZORNENIE | OZNÁMENIE |
| Slovenian | NEVARNOST | OPOZORILO | POZOR | OBVESTILO |
| Spanish | PELIGRO | ADVERTENCIA | ATENCIÓN | AVISO |
| Swedish | FARA | VARNING | OBSERVERA | OBS! |
| Thai | อันตราย | คำเตือน | ข้อควรระวัง | ประกาศ |
| Turkish | TEHLİKE | UYARI | DİKKAT | DUYURU |
| Vietnamese | NGUY HIỂM | CẢNH BÁO | CÂN THẬN | THÔNG BÁO |

Annex E

Risk Estimation and Signal Word Selection

(informative)

E1 Scope

Signal words for hazard alerting signs are selected based on the risk that results from not following the safety message. The level of risk determines signal words and safety colors. This annex provides guidance for estimating risk and selecting signal words.

E2 Definitions

E2.1 accident: An incident that results in harm, property damage or both.

E2.2 harm: Any degree of physical injury, including death.

E2.3 hazard: A potential source of harm.

E2.4 hazardous situation: A condition or act that is contrary to the implicit or explicit instructions of a safety sign and that produces an increased risk of harm. The presence of the condition or performance of the act may be intentional or unintentional. However, conditions or acts that are implemented with the intention of causing harm are not considered hazardous situations within the scope of this standard.

E2.5 incident: An unintentional and undesired event.

E2.6 risk: A combination of the probability of occurrence of harm and the severity of that harm.

E3 Risk Estimation

E3.1 General

Risk estimation involves (a) considering the probability and severity of outcomes that can result from a hazardous situation and (b) combining these estimates to determine the risk. While quantitative risk assessment is possible in certain limited circumstances, only qualitative risk estimates are possible in most cases. For the purpose of hazard alerting sign classification (i.e., assigning a signal word and safety color), qualitative risk estimation is commonplace and generally appropriate.

There are numerous methods for estimating the risk posed by a hazardous situation. This section outlines one method that is specifically designed to assist in assigning signal words according to the definitions in this standard.

E3.2 Hazardous situation

Hazard alerting signs provide instructions, explicit or implicit, regarding how to avoid hazardous situations. In order to select the appropriate signal word, risk must be estimated for the particular hazardous situation or situations.

Note that, for the purposes of signal word selection, it does not matter why a hazard alerting sign might not be followed (e.g., failure to read the sign, conscious decision to ignore the sign); the hazardous situation associated with a sign is the same, regardless of why the sign is not followed.

When a sign addresses more than one hazardous situation, the risk associated with each hazardous situation should be estimated. In these cases, the signal word corresponding to the greatest risk level is used (see Section 5.3.2).

E3.3 Model of events resulting from a hazardous situation

Figure E1 shows the possible results of a hazardous situation.

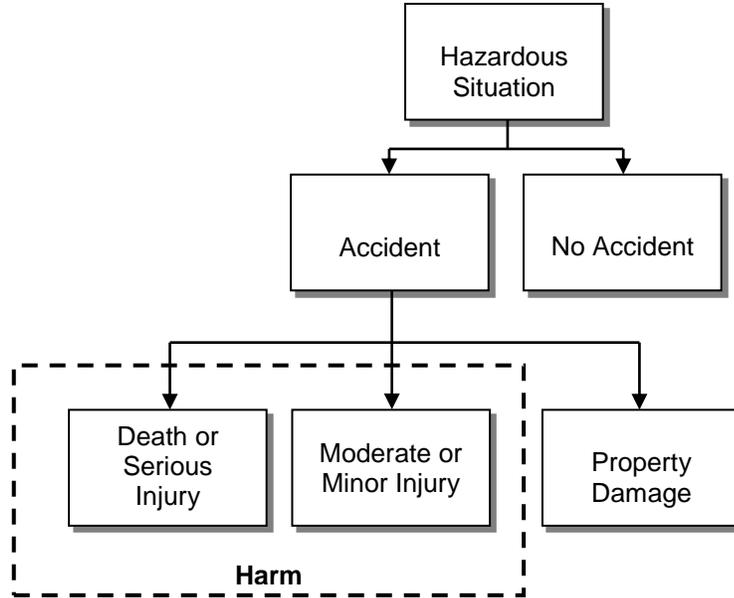


Figure E1
Model of the Possible Results of a Hazardous Situation

A hazardous situation (i.e., the result of not following a sign) may or may not result in an accident. If an accident occurs, it results in harm if some degree of physical injury occurs. The harm can be classified by severity.

E3.4 Severity

E3.4.1 Classification of severity

As shown in Figure E1, there are two classifications for severity of harm: death or serious injury, and moderate or minor injury.

E3.4.1.1 Death or serious injury

Serious injury to humans is more severe than minor or moderate injury, and typically has one or more of the following characteristics:

- a. permanent loss of function or significant disfigurement;
- b. substantial and prolonged medical treatment required;
- c. long periods of disability;
- d. considerable pain and suffering over long periods of time.

Examples of serious injuries include amputations, severe burns, and loss or impairment of vision or hearing.

E3.4.1.2 Moderate or minor injury

Moderate or minor injury to humans does not include death or serious injury, and typically does not result in permanent disability, significant disfigurement, or pain. Examples of minor or moderate injuries include cuts, scratches, and irritation.

E3.4.2 Hazardous situations resulting in multiple severities

When the outcome of an event includes results falling into more than one of the severity classifications, the most severe classification should be used. For example, an event that results in both minor injury to one body part and serious injury to another should be classified as "serious injury or death."

E3.4.3 Worst Credible Severity

A hazardous situation can result in a variety of outcomes, each with varying likelihood. When selecting a signal word, it is necessary to determine the worst credible severity that can result from a hazardous situation. Only outcomes that are credible possibilities should be considered.

E3.5 Probability of Harm

For the purpose of signal word selection, probability of harm includes the probability of an accident and the probability of the worst credible severity occurring if there is an accident.

The probability of the safety sign not being followed should not be included in an estimate of risk for the purpose of signal word selection.

E3.5.1 Probability of Accident

The probability of an accident if a hazardous situation exists (i.e., if the safety sign is not followed) should be estimated. The probability of an accident includes the probability of accidents of any severity.

E3.5.2 Probability of Worst Credible Severity

The probability of the worst credible severity resulting if an accident occurs should be estimated. To estimate the probability of the worst credible severity, it is necessary to include not only the likelihood of the worst credible severity, but also the likelihood of all other outcomes that fall within the worst credible severity category (e.g., if the worst credible severity is death, then include all outcomes that are in the category "serious injury or death").

E3.5.3 Estimating Probability

For the purposes of assigning signal words, probability need not be determined quantitatively or with great precision. Signal words are assigned based on estimates of probability using two qualitative categories: "will" and "could."

E3.5.3.1 Will

"Will" indicates an event that is expected to happen with near certainty.

E3.5.3.2 Could

"Could" indicates an event that is possible but not nearly certain.

E4 Signal word selection

E.4.1 Determination of risk

For hazard alerting signs, the signal word is selected according to the risk presented by the hazardous situation that the safety sign addresses. In other words, signal word selection is based on the risk posed if the safety sign is not followed.

The risk is determined based on:

- a. worst credible severity if an accident occurs;
- b. probability of an accident if the hazardous situation occurs (i.e., if the safety sign is not followed); and
- c. probability of the worst credible severity occurring.

E4.2 Signal word selection matrices

The following matrices show the signal words and colors that are assigned for each combination of accident probability, worst credible severity, and probability of worst credible severity.

If the worst credible severity is death or serious injury:

| | | Probability of Accident if Hazardous Situation is Not Avoided | |
|---|-------|--|---|
| | | Will | Could |
| Probability of Death or Serious Injury if Accident Occurs | Will |  |  |
| | Could |  |  |

If the worst credible severity is minor or moderate injury:

| | |
|-----------------------|---|
| For all Probabilities |  |
|-----------------------|---|

If there is no credible risk of physical injury:

| | |
|-----------------------|---|
| For all Probabilities |  |
|-----------------------|---|

E4.3 Signal word selection process

The signal word selection process is summarized in Figure E2.

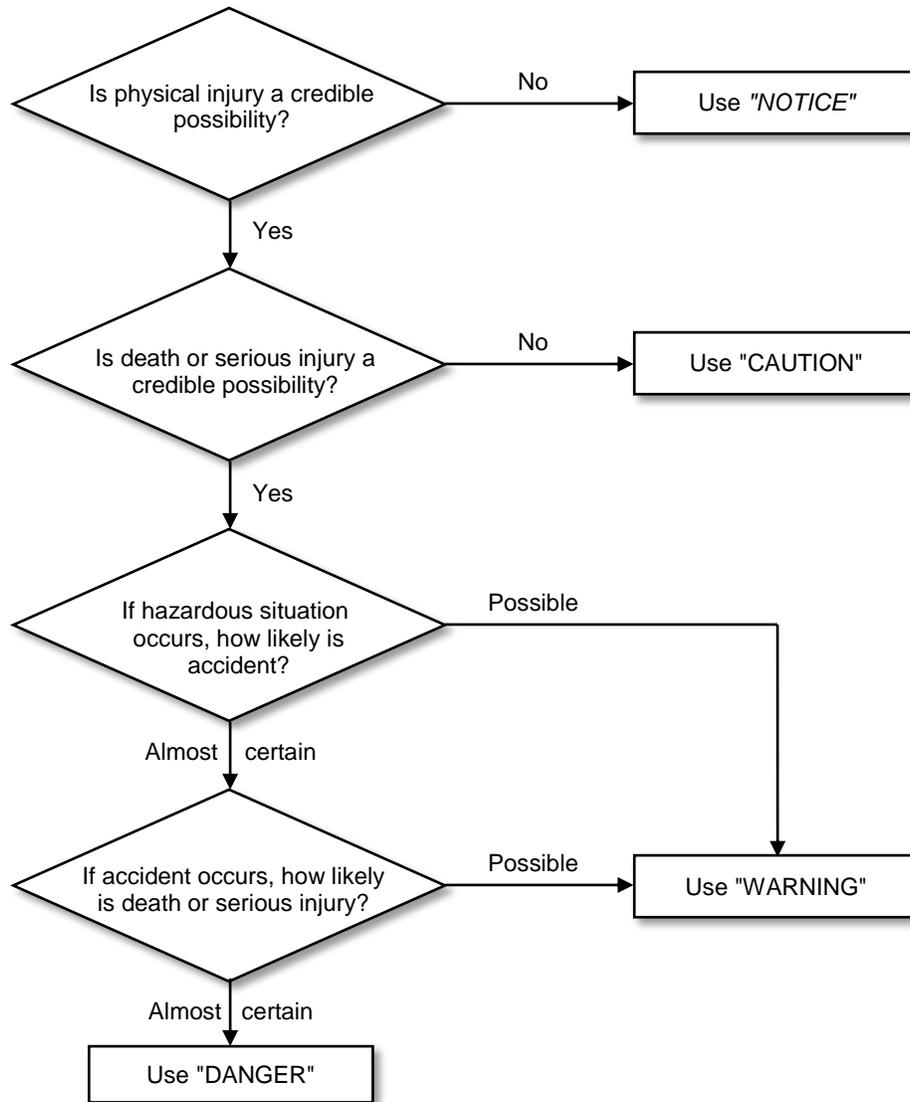


Figure E2
Signal Word Selection Process

Annex F

Informative References

(informative)

F1 Standards

1. ANSI/UL 969, *Standard for Marking and Labeling Systems* (Underwriters Laboratories, Inc., 26 September 2001).

F2 Publications

1. FMC Corporation, *Product Safety Sign and Label System* (FMC, 1985).
2. Smith, Sidney L., "Letter Size and Legibility," *Human Factors*, vol. 21(6) (December 1979), pp 661-670.
3. Howett, Gerald L., *Size of Letters Required for Visibility as a Function of Viewing Distance and Observer Visual Acuity* (National Bureau of Standards, 1983).
4. Westinghouse Electric Corporation, *Westinghouse Product Safety Label Handbook*, (Westinghouse, 1981).

2016 Revisions

The ANSI Accredited Standards Committee Z535 plans to issue the next revisions of the Z535 standards (Z535.1 through Z535.6) in December 2016. In order to meet that deadline, the committee developed the following tentative timetable:

| | |
|---|-------------------|
| All proposed changes are due: | June 30, 2014 |
| Revisions will be finalized for letter balloting: | April 15, 2015 |
| Letter balloting will be completed by: | July 15, 2015 |
| Public reviews will be completed by: | March 1, 2016 |
| Drafts will be ready to submit to the publisher: | May 31, 2016 |
| Published: | December 15, 2016 |

All proposed changes must be submitted by June 30, 2014. Any proposals received after that date will be deferred to subsequent revisions. In order to facilitate the next revision, proposed changes must be submitted on a form for that specific purpose, which is on the next page. Please send this form to:

Secretary, ANSI Committee Z535
 National Electrical Manufacturers Association
 1300 North 17th Street, Suite 1752
 Rosslyn, VA 22209

ANSI Accredited Standards Committee Z535 on Safety Signs and Colors

FORM FOR PROPOSALS

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Name _____ Date _____

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b. Section/Paragraph _____

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 Deleted Text

3. Proposal (Include the proposed new or revised text, or identify the words to be deleted. Underline additions and strikethrough deletions.)

4. Statement of the Problem or Reason for the Proposal

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