

ANSI Z535.4-2007

American National Standard

for Product Safety Signs and Labels

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ANSI Z535.4-2007

American National Standard

For Product Safety Signs and Labels

Secretariat:

National Electrical Manufacturers Association

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Foreword (Neither this foreword nor any of the informative annexes is a part of American National Standard Z535.4-2006.)

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.

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

- ANSI Z535.1, Safety Color Code [ANSI Z54.1-1979 was updated and combined into this standard n 1991.]
- ANSI Z535.2, Environmental and Facility Safety Sign [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, Accident Prevention Tags (For Temporary Hazards) [ANSI Z35.2-1974 was updated and combined into this standard in 1991.]

In 2002 the Z535 Committee changed the title of Z535.5 to:

- ANSI Z535.5, Safety Tags and Barricade Tapes (for Temporary Hazards).

In 2002, the Z535 Committee voted to form a new subcommittee, ANSI Z535.6. The purpose of this new subcommittee is to develop a standard to complement the existing Z535 standards by dealing with various aspects of the provision of safety information in collateral materials. The new standard was published in 2006.

- ANSI Z535.6, Product Safety Information in Product Manuals, Instructions, and Other Collateral Materials [new in 2006]

In 2006, the title of Z535.1 was changed to:

- ANSI Z535.1, Safety Colors.

Together, these six standards contain the information needed to specify formats, colors, and symbols for safety signs that are used in environmental and facility applications (Z535.2), for product applications (Z535.4), for temporary accident prevention tags and barricade tapes (Z535.5) and for safety information in product accompanying literature (Z535.6).

This standard was prepared by Subcommittee Z535.4 on Product Safety Signs and Labels.

This 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.

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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 2006 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.

See the ANSI Z535-2006 Safety Color Chart for the purpose of viewing accurate colors. Due to the differences in color printing technologies and color monitors, the appearance of colors in this document may not be accurate.

This standard was processed and approved for submittal to ANSI by the Accredited Standards Committee on Safety Signs and Colors, ANSI Z535. 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:

Gary M. Bell, Chairperson
Richard Olesen, Vice Chair
Ron Runkles, Acting Secretary

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AMERICAN NATIONAL STANDARD **ANSI Z535.4-2007**

For Product Safety Signs and Labels

1 Introduction

The design of safety signs[1] 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.

The 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. As a result, the Accredited Standards Committee Z535 has recognized and affirmed the need for these two separate standards.

2 Scope and Purpose

2.1 Scope

This standard sets forth performance requirements for the design, application, use, and placement of safety signs and labels intended to identify hazards for persons using, operating, servicing, or in proximity to, a wide variety of products.

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 designs for product safety signs and labels, and (3) to establish a national uniform system for the recognition of potential personal injury hazards for those persons using products.

2.2.1 Existing American National Standards

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.

[1] In this standard, the term “sign” will be used to mean either a product safety sign or label.

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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.

3.1.1 ISO-formatted safety signs

Product safety information may be conveyed by ISO formatted safety labels in compliance with ISO 3864-2, Graphical symbols – Safety colours and safety signs – Part 2: Design principles for product safety labels. 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 unintended harm.

4.1.1 harm: Death, injury, or property damage.

4.1.2 incident: An unintended and undesired event that has the potential to cause harm.

4.2 colors: Colors specified in this standard shall conform to American National Standard For Safety Colors, ANSI Z535.1 – 2006.

4.3 decal: (See safety sign.)

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.)

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

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4.7.1 signal word panel: Area of the safety sign that contains the signal word. For personal injury hazards, the signal word panel shall contain 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. 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 and the reaction time required to avoid the hazard.

When information on consequence, avoidance, or type of hazard is readily inferred, this information may be omitted from the message panel. See Annex B 3.1.

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

4.8 pictorial: (See safety symbol.)

4.9 placard: (See safety sign.)

4.10 safety alert symbol: A symbol which indicates a potential personal injury hazard. It is composed of an equilateral triangle surrounding an exclamation mark. The safety alert symbol shall not be used to alert persons to property-damage-only accidents. (See Annex A.1.1)



Figure 1 — The safety alert symbol:
(A) for use with DANGER signal word (white triangle, red exclamation mark and red background)
(B) for use with WARNING signal word (black triangle, orange exclamation mark)
(C) for use with CAUTION signal word (black triangle, yellow exclamation mark)
(D) and (E)[1] for use with DANGER, WARNING or CAUTION signal words (yellow background, black border and black exclamation mark. (E) has a yellow border around the black border.)

4.11 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 which advises the observer of the nature and degree of the hazard(s). It may also describe 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, cord tag, or decal affixed to a product that provides safety information about that product. The product safety sign should identify the hazard, the degree or level of hazard seriousness, the probable consequence of involvement with the hazard, and how the hazard can be avoided. (See 4.7.2 message panel.)

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 associated with the product, or which might be created during other reasonably anticipated product use or misuse. The sign or label is to be permanently affixed to the product so that it cannot be easily removed.

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[1] D and E are provided to allow for consistency with certain ISO standards, such as ISO 3864-1 and ISO 3864-2.

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 safety symbol: 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 Z535.3-2006, Criteria for Safety Symbols.)

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

4.14 signal word: The word that calls attention to the safety sign and designates a degree or level of hazard seriousness. The signal words for product safety signs are “DANGER”, “WARNING”, “CAUTION”, and “NOTICE”. See Annex E for guidance in selecting a signal word.

4.14.1 DANGER: Indicates a 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.

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

4.14.4 NOTICE: “NOTICE” is the preferred signal word to address practices not related to personal injury. The safety alert symbol shall not be used with this signal word. As an alternative to “NOTICE” the word “CAUTION” without the safety alert symbol may be used to indicate a message not related to personal injury. [1]

5 Sign classification

5.1 Hazard classification

Product safety signs and labels 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 products, there are four hazard classifications which are denoted by the signal words “DANGER”, “WARNING”, “CAUTION” or “NOTICE”.

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 identification

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, it is permissible to use only one safety sign or label, provided that the information effectively addresses each hazard.

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[1] It is the intention of the ANSI Z535 Committee to eliminate the alternative of using the signal word “CAUTION” without the safety alert symbol to indicate a hazardous situation not related to personal injury in the 2011 version of this standard. This will assist in making more of a differentiation between safety messages indicating personal injury and messages not related to personal injury.

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 safety symbol 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

6.2.1 Panel format

The sign or label panels may be in a horizontal or vertical format. See Figures 2 through 11 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. See Figures 2 through 6 and 10 for examples. 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.

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 Lengthy verbiage

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

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6.6 Safety symbol

The safety symbol 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 Z535.1-2006, American National Standard For Safety Colors.

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 white letters on a safety blue background.

7.2.5 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. Or as an alternative, the safety alert symbol may consist of a black triangle band and black exclamation mark on a safety yellow triangle. (See Figure 1 and Figure 2).

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 Safety symbol panel

The safety symbol panel should normally have a black symbol on a white background. Other colors may be used for safety symbol emphasis, such as safety 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 colors

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

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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 be in 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

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

8.2.2 Determination of 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.

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 hazard in time to take appropriate action.
NOTE—Paragraphs 8.2.1 thru 8.2.3, paragraph 9.1 and Annex B provide guidance for determining ‘legibility’ and ‘safe viewing distance’.

9.2 Protection

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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 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.

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. If accompanying collateral material is provided, this information may be included in the collateral material.

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 Safety symbols

11.1.1 Safety symbols

Safety symbols are graphic representations chosen to clearly convey a specific safety alerting message.

11.1.2 Conveyed message

The conveyed message of a safety symbol is to describe the type of hazard, potential consequences of the hazard, or evasive/avoidance actions to be taken. When used, the safety symbol shall be compatible with the word message(s).

11.2 Safety symbol use

Safety symbols may be used to clarify, supplement or substitute for a portion or all of a word message found in the message panel. 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)

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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 American National Standards listed in 12.2. Other standards listed in 12.3 and other publications listed in Annex F 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). *American National Standard For Safety Colors,* ANSI Z535.1-2006.
2. American National Standards Institute (ANSI). *Environmental and Facility Safety Signs,* ANSI Z535.2-2007.
3. American National Standards Institute (ANSI). *Criteria for Safety Symbols,* ANSI Z535.3-2007.
4. American National Standards Institute (ANSI). *Safety Tags and Barricade Tapes (for Temporary Hazards),* ANSI Z535.5-2007.
5. American National Standards Institute (ANSI). *Product Safety Information in Product Manuals, Instructions, and Other Collateral Materials*, ANSI Z535.6-2006

12.3 Other standards

1. ISO 3864-1:2002, *Graphical symbols – Safety colours and safety signs - Part 1: Design principles for safety signs in workplaces and public areas.*
2. ISO 3864-2:2004, *Graphical symbols – Safety colours and safety signs – Part 2: Design principles for product safety labels*.

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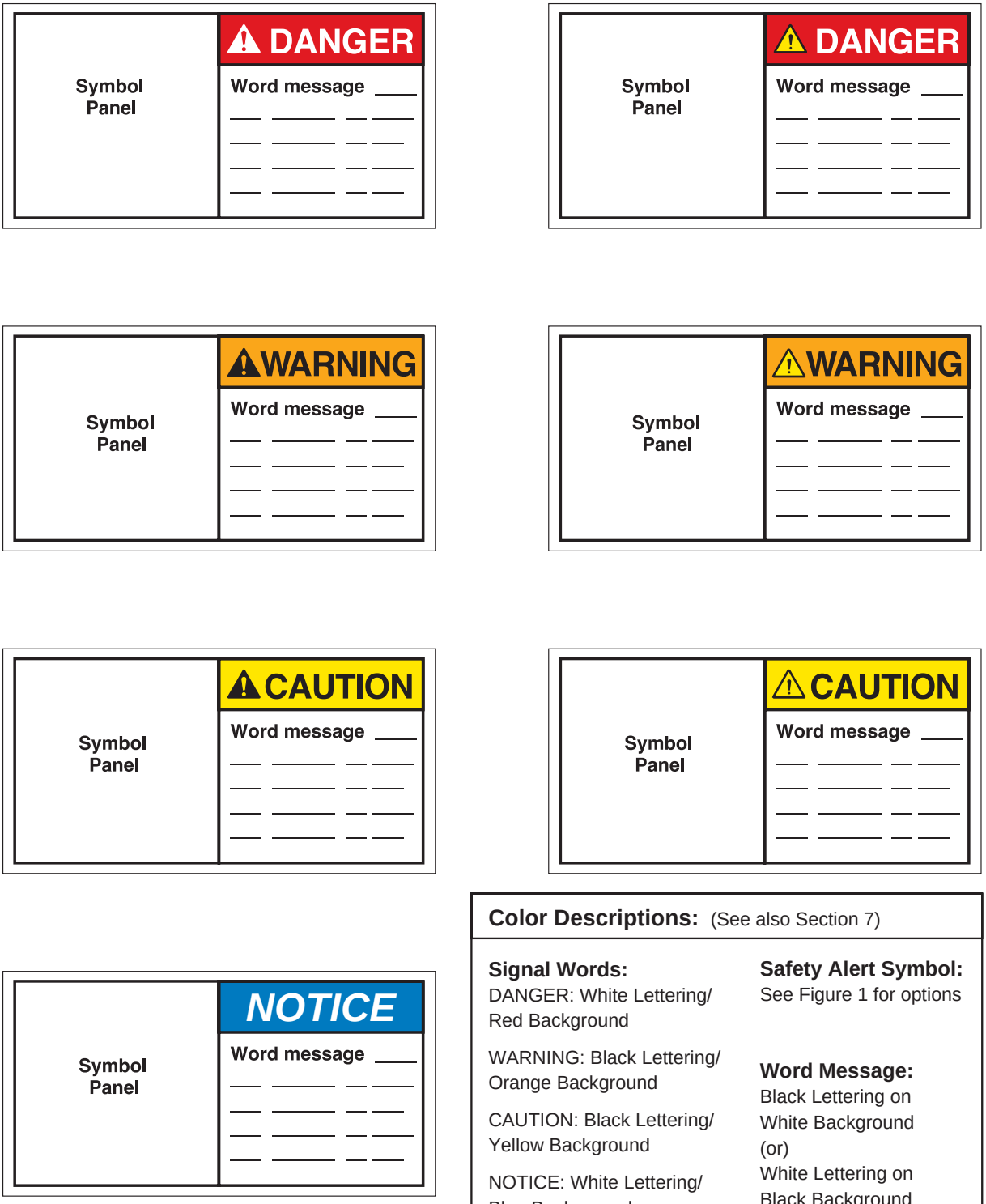

Fig. 2 Examples of Signal Word Panels With Various Safety Alert Symbols - Three-Panel Sign Horizontal Format

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Figure 3 Three Panel Sign - Vertical format

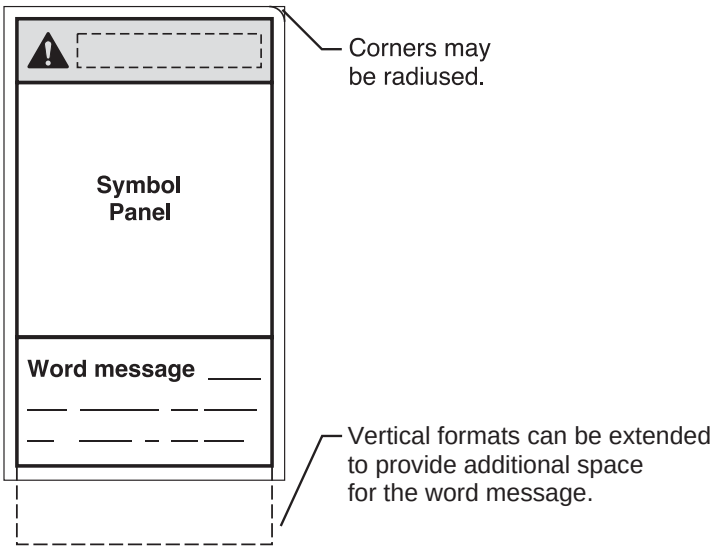


Figure 4 Two Panel Sign - Vertical format

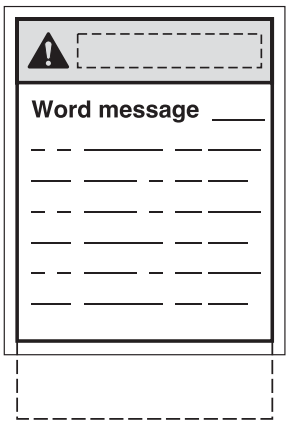


Figure 5 Three Panel Sign - Horizontal format

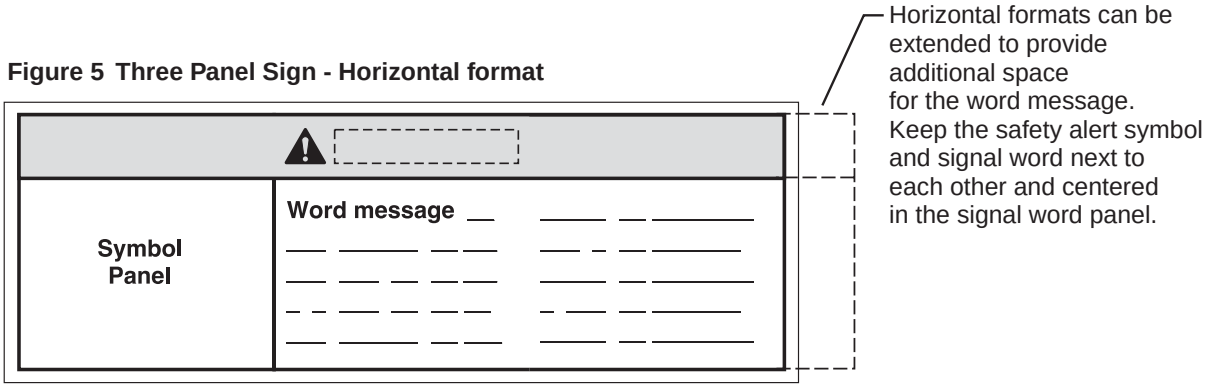


Figure 6 Two Panel Sign - Horizontal format

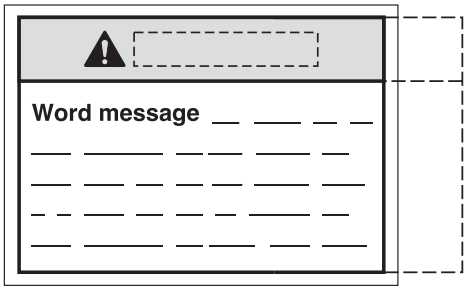


Figure 7 Two Panel Sign - Shortened signal word panel format

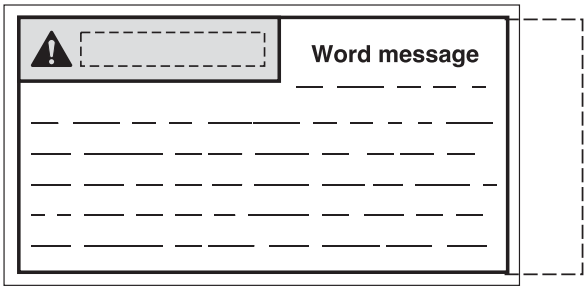
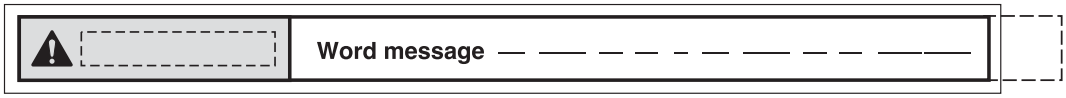


Figure 8 Two Panel Sign - Side-by-side format



Note: In all of the above examples, any of the signal word and safety alert symbol combinations can be used.

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Figure 9 Three Panel Sign - Horizontal format with symbol panel on right

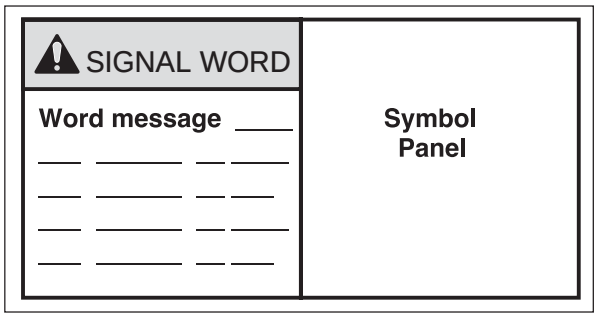


Figure 10 Three Panel Sign - Horizontal format with message panel and symbol panel separated by line

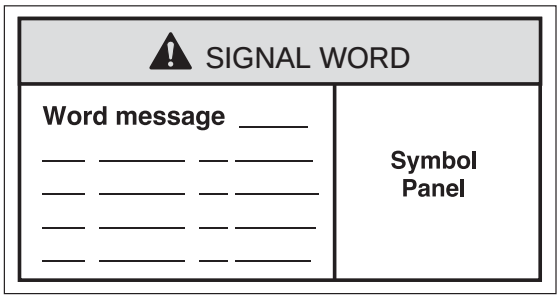
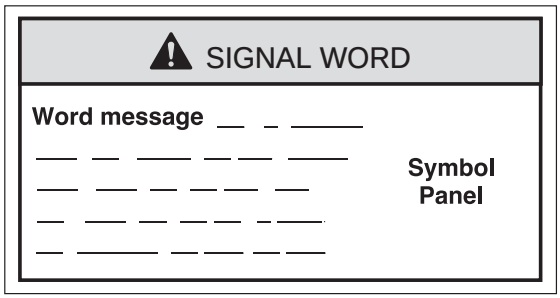


Figure 11 Three Panel Sign - Horizontal format with message panel and symbol panel separated by white space



Note: In all of the above examples, any of the signal word and safety alert symbol combinations can be used.

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Annex A
(informative)

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

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 personal 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 by the ANSI Z535.6 and ANSI Z535.4 standards may be provided 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, used with the safety alert symbol, indicates a hazardous situation which, if not avoided, could result in minor or moderate injury.



NOTICE is used to address practices not related to personal injury.



CAUTION, used without the safety alert symbol, is used to address practices not related to personal injury.

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A1.3 Other Highlighting Conventions

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

A1.4 Safety symbols

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

A2 Product Safety Signs and Labels

A2.1 Identifying the Presence, Location, and Content of Product Safety Signs or Labels

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 Discussing Maintenance or Replacement of Product Safety Signs or Labels

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 Referencing Safety Information in Collateral Materials within Product Safety Signs or Labels

If product safety signs or labels refer readers to collateral materials for additional safety information, relevant information should be provided in the referenced document(s).

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Annex B
(informative)
This annex is not an official part of the body of this standard.
Principles And Guidelines for the Design of Product Safety Signs and Labels

B1 Scope
Good consistent visual design helps to effectively communicate hazard information. This annex provides the designer with information on widely recognized principles that can aid in the development of effective product safety signs.[1], [2]

B2 Signal word panel arrangement
The safety alert symbol and signal word should be positioned close together and centered in the signal word panel. Note that the signal word should always be typeset using all capital letters. (See Annex A.)



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

B3.1 The Content of the word message

The word message on a product safety sign typically communicates information to an observer 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 and the reaction time required to avoid the hazard.
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 3 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

[1] In this Annex, the term "sign" will be used to mean either a product safety sign or label.
[2] NOTE—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.

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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 4 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 prevent interaction with the hazard.

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

Figure B3

Keep out.

Hazardous Voltage inside.

440 Volts.

Figure B4

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.

Headline Style Message

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

Non-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.

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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.

Active Voice Sentences	*Passive Voice Sentences*
Keep hands away from rotating blade.	**Your hands must be kept away from rotating blade.**
Lockout power before servicing equipment.	**Power must be locked out before servicing equipment.**
Immediately replace guards after repair or adjustment.	**After repair and adjustment, immediately replace guards.**

B3.3.3. Avoid prepositional phrases

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

Sentences Without Prepositional Phrases	*Sentences With Prepositional Phrases*
Disconnect power to service equipment.	**Disconnect power in order to service equipment.**
Turn off power if jam occurs.	**Turn off power in the event a jam occurs.**

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 referring the viewer to another source for additional safety information. Examples of such sources include safety instruction labels, 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.

Outline Format	*Outline With Bullet Format*	*Continuous Format*
Moving parts can crush and cut.	**Moving parts can crush and cut.**	**Moving parts can crush and cut. Keep hands clear while operating. Lockout power before servicing.**
Keep hands clear while operating.	• **Keep hands clear while operating.**	
Lockout power before servicing.	• **Lockout power before servicing.**	

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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.

Left Aligned Ragged Text

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

Centered Text

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

Justified Text

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

B3.3.7 Upper and lower case letters

The preferred format for text is the use of mixed upper and lower case 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.

Mixed Case Lettering

Moving parts can crush and cut.

Do not remove guard.

Lockout power before servicing.

Selective Use of Upper Case

Moving parts can crush and cut.

Do NOT remove guard.

LOCKOUT power before servicing.

All Upper Case

MOVING PARTS CAN CRUSH AND CUT.

DO NOT REMOVE GUARD.

LOCKOUT POWER BEFORE SERVICING.

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 reference 3, Paragraph 12.4)*.

Arial/Helvetica
Arial/Helvetica Bold
Folio Medium
Franklin Gothic

Futura
News Gothic Bold
Meta Bold
Univers

Figure B5 — Examples of Sans Serif Typestyles

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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.

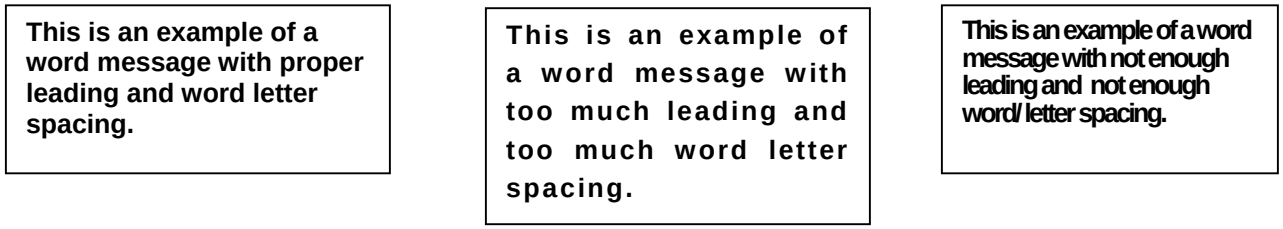

Figure B6 – Examples of correct and incorrect type spacing

B3.3.10 Choice of type color

The word message's type can be black on a white background or white on a black background. This choice should be based on which is more legible. But 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.

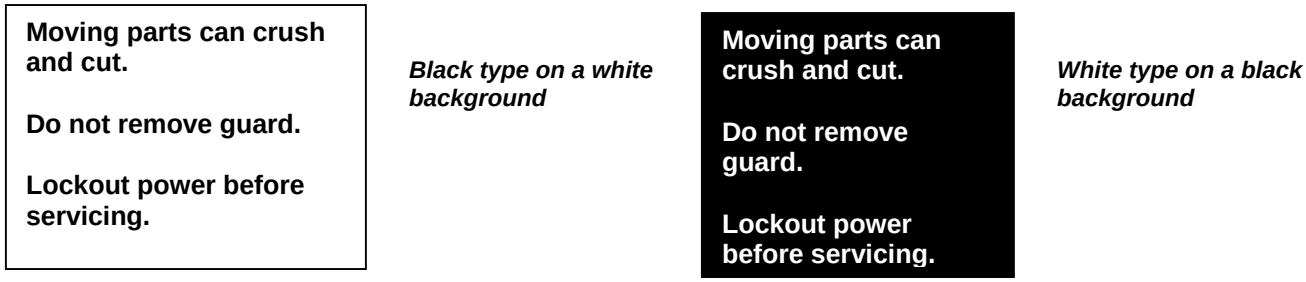

Figure B7 — Examples of type color choice

B3.3.11 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.

B3.3.12 Letter size

Legibility of the word message at the minimum safe viewing distance[3] determines the proper letter size for the word messages. The letter size/safe viewing distance guidelines in Table 1 defines 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:

- To obtain conspicuousness from other information presented on the product,

[3] The minimum safe 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.

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- To facilitate legibility under low light, or other unfavorable viewing conditions,
- To warn persons at distances greater than the minimum safe viewing distance,
- To convey special emphasis for portions of the message,
- To facilitate legibility for populations who have difficulty reading small text (e.g., senior citizens).

A formatted sign with the selected letter size word messages should be visually examined in the environment expected for actual use (lighting, background, angle, etc.), and tested for legibility in that environment by persons representative of the expected viewers. It is advisable to test different letter sizes to determine the optimum size for legibility at the desired viewing distance.

B3.3.13 Minimum letter height calculations

Type size is defined in "points," a term that was 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" etc.). One point equals 0.01384 inches, or approximately 1/72 of an inch. Although type faces 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[3]		Minimum Letter Height for FAVORABLE Reading Conditions		Recommended Letter Height for FAVORABLE Reading Conditions		Recommended Letter Height for UNFAVORABLE Reading Conditions	
1 Foot or less*	(30.5 mm)	.08 inch	(2.03 mm)	.08 inch	(2.03 mm)	.084 inch	(2.13 mm)
2 Feet	(61.0 mm)	.10 inch	(2.54 mm)	.16 inch	(4.06 mm)	.168 inch	(4.26 mm)
3 Feet	(91.4 mm)	.12 inch	(3.05 mm)	.19 inch	(4.83 mm)	.252 inch	(6.40 mm)
4 Feet	(121.9 mm)	.14 inch	(3.56 mm)	.22 inch	(5.59 mm)	.336 inch	(8.53 mm)
5 Feet	(154.4 mm)	.16 inch	(4.06 mm)	.25 inch	(6.35 mm)	.420 inch	(10.67 mm)
6 Feet	(182.9 mm)	.18 inch	(4.57 mm)	.28 inch	(7.11 mm)	.504 inch	(12.80 mm)
7 Feet	(213.4 mm)	.20 inch	(5.08 mm)	.31 inch	(7.87 mm)	.588 inch	(14.94 mm)
8 Feet	(243.8 mm)	.22 inch	(5.59 mm)	.34 inch	(8.64 mm)	.672 inch	(17.07 mm)
*.08-inch (2.03 mm) type is the suggested minimum type size for use on product safety signs, except for small products , .06-inch (1.52 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. Although the ANSI Z535.4 standard allows word-message-only formats for safety labels, the use of safety symbols is encouraged whenever practical. (See *ANSI Z535.3 Criteria For Safety Symbols* for additional information concerning safety symbol selection, design and testing.)

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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 over 23 million 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. White type on a black background is used in these examples to highlight the symbol and word message panels.



Figure B8

B5.1 Vertical formats

The vertical bilingual format shown in Figure B8 can be modified to include a longer word message by lengthening the word message panels.

B5.2 Horizontal formats

Figures B9 and B10 illustrate horizontal formats for bilingual safety labels. In figure 9, 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.

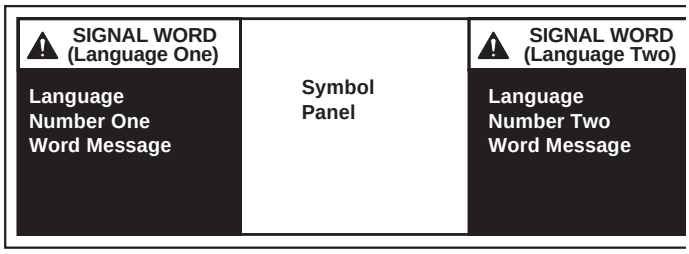

Figure B9

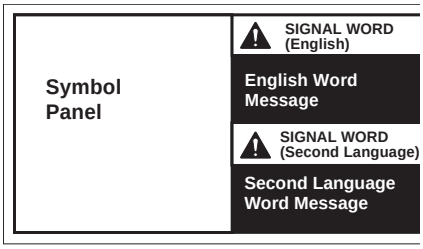

Figure B10

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 bilingual safety sign. (See 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.

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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 ANSI Z535.4, section 5.3.2.) The hazard with the greatest seriousness level should be ordered first in the word message. White type on a 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 of the ANSI Z535.4 standard and use a single symbol to communicate the most important hazard. Use the outline format to separate the various hazard word messages. (See 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 of the ANSI Z535.4 standard. Use the outline format to separate the various hazard word messages (see B3.3.5).

B6.3 Multi-symbol formats

Use one of the multi-symbol formats shown in Figures B11 through B13. In formats B11 and B12, place the most important 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 B12 is used, arrange the word message segments so they line up opposite the appropriate safety symbol panel.

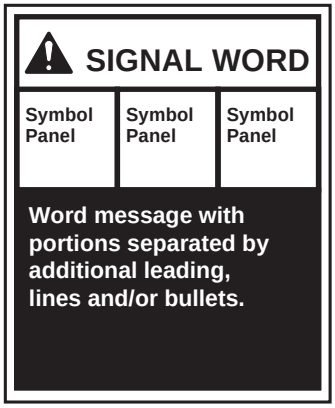

Figure B11

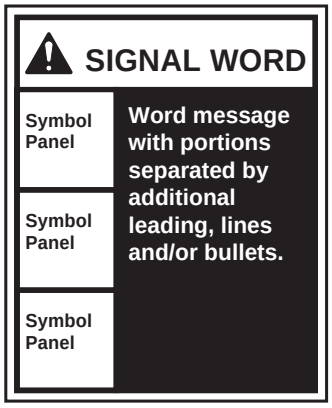

Figure B12

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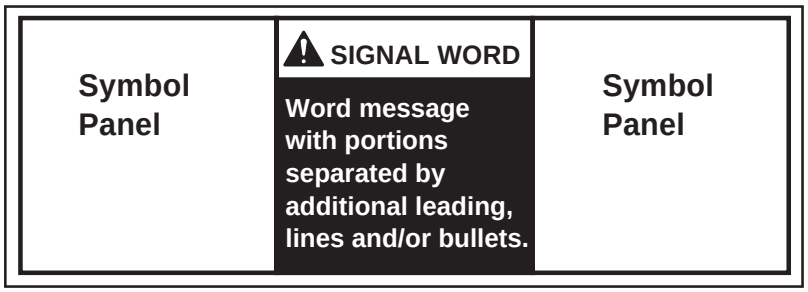

Figure B13

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Annex C
(informative)
The use of ISO safety signs for products

ISO standards such as ISO 3864 and other ISO industry-specific 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.

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Annex D
(informative)
Translations of signal words

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[4]

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 [1]	DANGER	AVERTISSEMENT	ATTENTION	AVIS
German	GEFAHR	WARNUNG	VORSICHT	HINWEIS
Greek	ΚΙΝΔΥΝΟΣ	ΠΡΟΕΙΔΟΠΟΙΗΣΗ	ΠΡΟΣΟΧΗ	ΕΙΔΟΠΟΙΗΣΗ
Hebrew	סכנה	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 [2]	PERIGO	ATENÇÃO	CUIDADO	AVISO
Russian	ОПАСНО	ОСТОРОЖНО	ВНИМАНИЕ	УВЕДОМЛЕНИЕ
Slovak	NEBEZPEČENSTVO	VAROVANIE	UPOZORNENIE	OZNÁMENIE
Slovenian	NEVARNOST	OPOZORILO	POZOR	OBVESTILO
Spanish [3]	PELIGRO	ADVERTENCIA	ATENCIÓN	AVISO
Swedish	FARA	VARNING	OBSERVERA	OBS!
Thai	อันตราย	คำเตือน	ข้อควรระวัง	ประกาศ
Turkish	TEHLİKE	UYARI	DİKKAT	DUYURU
Vietnamese	NGUY HIỂM	CẢNH BÁO	CẨN THẬN	THÔNG BÁO

Translation provided by Parenty Reitmeier Translation Services, Winnipeg, Manitoba Canada

1. The signal words in French are the same for Canada and Europe.
2. The signal words in Portuguese are the same for Brazil and Europe.
3. The signal words in Spanish are the same for Latin America and Europe.
4. An electronic version of this standard is available for enhanced viewing.

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Annex E
(informative)
This annex is not an official part of the body of this standard.
Risk Estimation and Signal Word Selection

E1 Scope

Signal words are selected based on the risk that results from not following the safety message. The level of risk determines signal words, safety colors, and whether or not to use the safety alert symbol. This annex provides guidance for estimating risk and selecting signal words.

E2 Definitions

E2.1 Accident: An incident that results in unintended harm.

E2.2 Harm: Death, injury or property damage.

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 message and that exposes a person or property to 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 that has the potential to cause harm.

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 harm 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 safety messages classification (i.e., assigning a signal word and safety color, and determining whether the safety alert symbol is appropriate), 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. For information about other risk estimation methods or models, see the references at the end of this annex.

E3.2 Hazardous situation

Safety messages 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 safety message might not be followed (e.g., failure to read the message, conscious decision to ignore the message); the hazardous situation associated with a message is the same, regardless of why the message is not followed.

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When a safety message 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 5.1.2).

E3.3 Model of Events Resulting from a Hazardous Situation

Figure C1 shows the possible results of a hazardous situation.

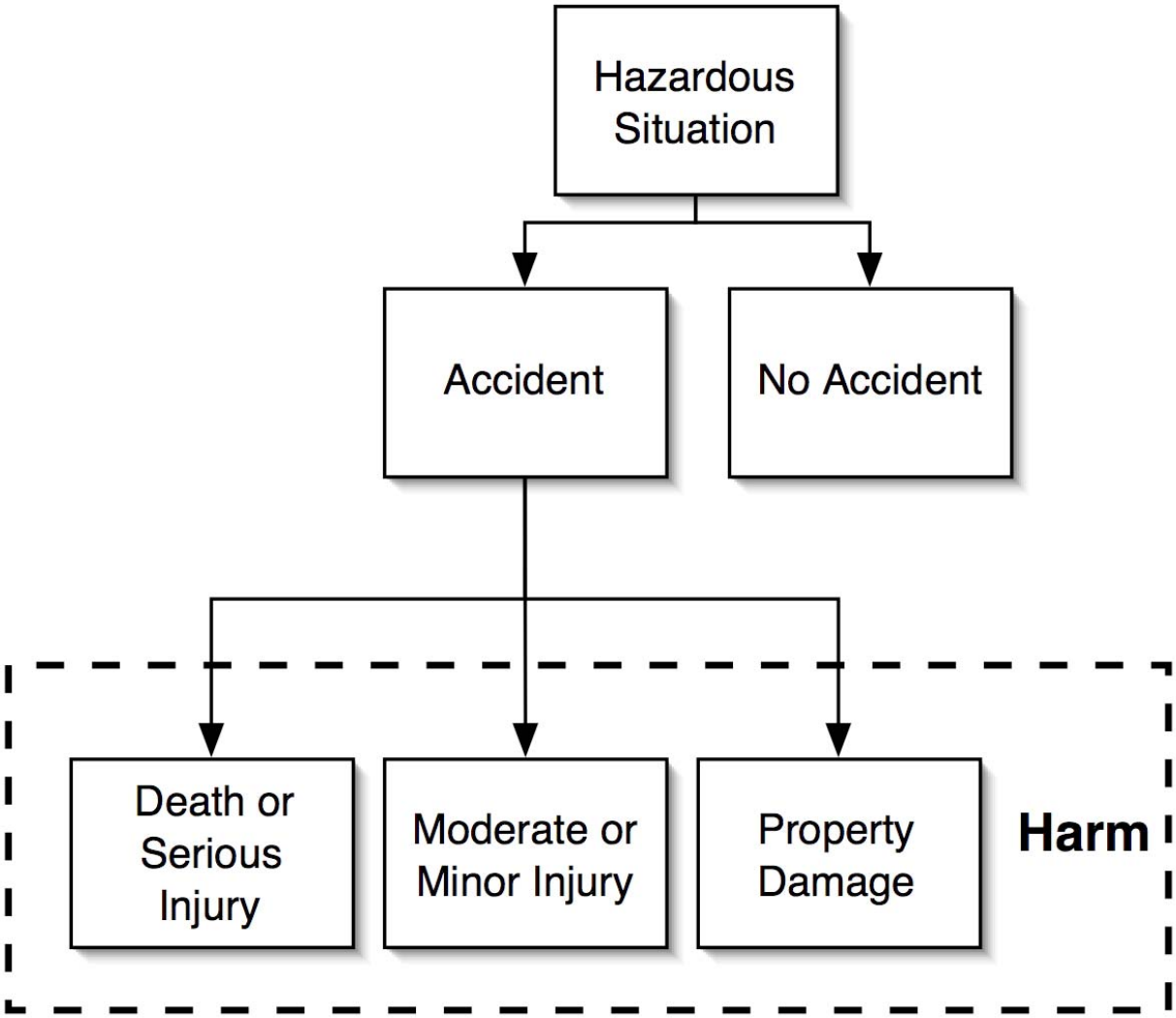

Figure E1 – Model of the possible results of a hazardous situation

The hazardous situation (i.e., the result of not following a safety message) either results in an accident (i.e., harm occurs) or in no accident (i.e., either no incident occurs, or the incident does not result in harm). If an accident occurs, it results in harm. The harm can be classified by severity, from property damage to death or serious injury.

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E3.4 Severity

E3.4.1 Classification of severity of harm

As shown in the model above, there are three classifications for severity of harm that are used in selecting signal words:

E3.4.1.1 Death or serious injury: Injury to humans that is more severe than minor or moderate injury. Harm classified as death or serious injury may also include property damage, or moderate or minor injuries that occur as a result of the same event.

Serious injuries typically have one or more of the following characteristics

- results in permanent loss of function or significant disfigurement
- requires substantial and prolonged medical treatment
- involves long periods of disability
- involves 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: Injury to humans, not including death or serious injury. Harm classified as moderate or minor injury may also include property damage that occurs as a result of the same event.

Minor or moderate injuries do not typically result in permanent disability or significant disfigurement or pain. Examples of minor or moderate injuries include cuts, scratches, and irritation.

E3.4.1.3 Property damage: Damage to property that does not include injury to humans.

E3.4.2 Hazardous situations resulting in multiple harms

When harm resulting from 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 and property damage is classified as “minor or moderate injury”. Similarly, 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 of Harm

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 harm that can result from a hazardous situation. Only outcomes that are credible possibilities should be considered.

Once the worst credible harm has been identified, it should be classified by severity (i.e., property damage only, minor or moderate injury, or death or serious injury). This category is the *worst credible severity of harm* for a particular hazardous situation.

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E3.5 Probability

Risk depends on the 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 of harm occurring if there is an accident.

The probability of the hazardous situation occurring (i.e., the probability of the safety message 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 message is not followed) should be estimated. The probability of an accident includes the probability of accidents that result in any severity of harm.

Circumstances in which a hazardous situation does not result in an incident, or in which it results in an incident that does not cause harm, are not accidents.

E3.5.2 Probability of Worst Credible Severity of Harm

The probability of the worst credible severity of harm occurring *if an accident occurs* should be estimated. To estimate the probability of the worst credible severity of harm, it is necessary to include not only the likelihood of the worst credible harm, but also the likelihood of all other outcomes that fall within the worst credible severity of harm category (e.g., if the worst credible harm 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:

E3.5.3.1 Will: Indicates an event that is expected to happen with near certainty.

E3.5.3.2 Could: Indicates an event that is possible but not nearly certain.

E4 Signal word selection

A signal word is selected according to the risk of harm presented by the hazardous situation that the safety message addresses. That is, signal word selection is based on the risk posed *if the safety message is not followed.*

The risk is determined based on

- worst credible severity of harm if an accident occurs
- probability of an accident if the hazardous situation occurs (i.e., if the safety message is not followed)
- probability of the worst credible severity of harm occurring

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E4.1 Signal Word Selection Matrices

The following matrices show the signal words, colors, and presence or absence of a safety alert symbol that are assigned for each combination of accident probability, worst credible harm, and probability of worst credible harm.

If Worst Credible Severity of Harm 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	DANGER	WARNING
	Could	WARNING	WARNING

If Worst Credible Severity of Harm is Moderate or Minor Injury

For all probabilities:	CAUTION

If Worst Credible Severity of Harm is Property Damage

For all probabilities:	Preferred: NOTICE Alternate: CAUTION

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E4.2 Signal Word Selection Process

The signal word selection process is summarized in Figure E2.

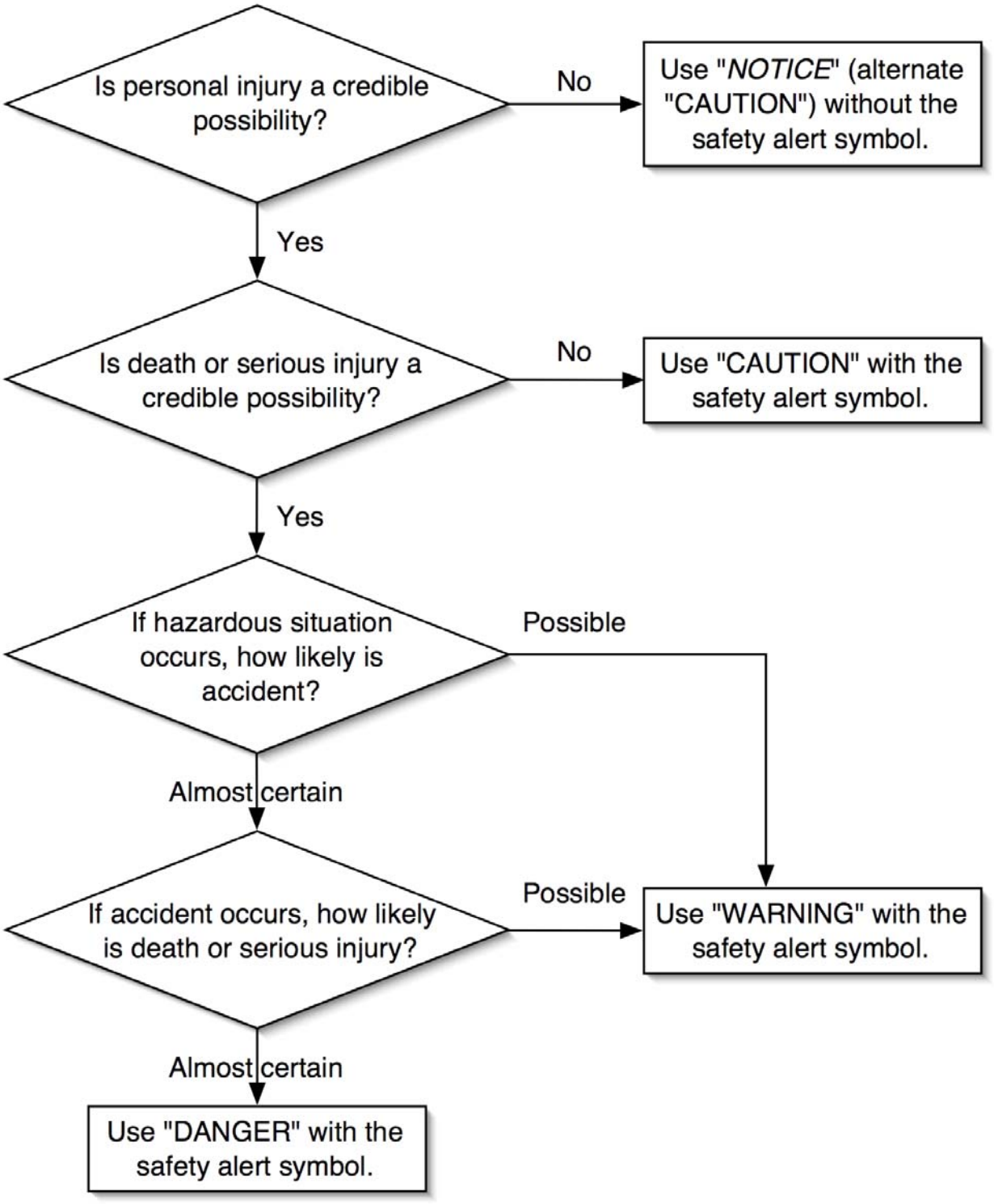

Figure E2 – Signal word selection process

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E5 References

The following publications provide information about risk estimation and assessment:

1. American National Standards Institute (ANSI). *Risk Assessment and Risk Reduction - A Guide to Estimate, Evaluate and Reduce Risks Associated with Machine Tools,* ANSI B11.TR3 – 2000.

2. American National Standards Institute (ANSI) / Robotic Industries Association (RIA). *American National Standard for Industrial Robots and Robot Systems - Safety Requirements,* ANSI/RIA R15.06 – 1999.

3. American National Standards Institute (ANSI) / Association for the Advancement of Medical Instrumentation (AAMI) / International Organization for Standardization (ISO). *Medical devices - Application of risk management to medical devices*, ANSI/AAMI/ISO 14971:2000.

4. American National Standards Institute (ANSI) / Association for the Advancement of Medical Instrumentation (AAMI) / International Organization for Standardization (ISO). *Medical devices - Application of risk management to medical devices - Annex H - Rationale for requirements -- Amendment 1,* ANSI/AAMI/ISO 14971:2000/A1:2003.

5. American National Standards Institute (ANSI) / Packaging Machinery Manufacturing Institute (PMMI). *Safety Requirements for Construction, Care, and Use for Packaging Machinery and Packaging-Related Converting Machinery,* ANSI/PMMI B115.1 – 2000.

6. British Standards. *Safety of Machinery - Principals for Risk Assessment.* BS EN 1050 – 1997.

7. Canadian Standards (CAN) / Canadian Standards Association (CSA). *Risk Management: Guideline for Decision Makers,* CAN/CSA -Q850-97.

8. International Organization for Standardization (ISO). *Safety of Machinery - Principals for Risk Assessment,* ISO 14121 – 1999.

9. U.S. Department of Defense. *Department of Defense Standard Practice for System Safety,* MIL-STD-882D, 1 – February 2000.

10. Semiconductor Equipment and Materials Institute (SEMI). *Safety Guideline for Risk Assessment,* SEMI S10 1103.

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Annex F
(informative)
Informative References

1 Standards

1. Underwriters Laboratories, Inc. (UL). *Standard for Marking and Labeling Systems.* Northbrook IL: UL969-1995.

2 Publications

1. FMC Corporation, *Product Safety Sign and Label System,* FMC: Santa Clara, CA. 1985.
2. Smith, Sidney L., *Letter Size and Legibility,* Human Factors, 1979, 21 (60, 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: Trafford, PA. 1981

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Revisions 2011

The ANSI Accredited Standards Committee Z535 plans to issue the next revisions of the Z535 Standards (Z535.1 through Z535.6) in December 2011. In order to meet that deadline, the Committee developed the following tentative schedule:

All proposed changes are due:	June 30, 2009
Revisions will be finalized for letter balloting:	April 15, 2010
Letter balloting will be completed by:	July 15, 2010
Public reviews will be completed by:	March 1, 2011
Drafts will be ready to submit to the publisher:	May 31, 20011
Published:	December 15, 2011

All proposed changes must be submitted by June 30, 2009. Any and all 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 back of this page. Please send this form to:

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

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ANSI Accredited Standards Committee Z535
On Safety Signs and Colors

Article I. F O R M F O R P R O P O S A L S

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

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