

ANSI Z535.2-2002
Revision of
ANSI Z535.2-1998

American National Standard

For Environmental and Facility Safety Signs

Secretariat:

National Electrical Manufacturers Association

Approved November 7, 2002

American National Standards Institute, Inc.

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Published by

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Foreword (Neither this foreword nor any of the informative annexes is a part of American National Standard Z535.2-2002.)

This standard is one of five standards maintained and revised by the ANSI Z535 Committee. The five standards are:

Z535.1 – Safety Color Code
Z535.2 – Environmental and Facility Safety Signs
Z535.3 – Criteria for Safety Symbols
Z535.4 – Product Safety Signs and Labels
Z535.5 – Safety Tags and Barricade Tapes (for Temporary Hazards)

This standard was formulated to provide a visual alerting system to aid in identifying potential hazards known to exist in the environment. Together, ANSI Z535.1, Z535.2, and Z535.3 contain information needed to specify formats, colors, and symbols for safety signs used in environmental and facility applications. The ANSI Z535.4 and Z535.5 standards are harmonized with this standard to provide appropriate hazard avoidance information for products that might be encountered in the environment (ANSI Z535.4) or temporary changes to the environment (ANSI Z535.5). It is desirable that new signs, symbols and colors for environmental and facility safety signs specified after the approval of this standard comply with the standard.

The ANSI Z35 Committee on Safety Signs and ANSI Z53 Committee on Safety Colors were combined in 1979 to form the ANSI Z535 Committee on Safety Signs and Colors. The ANSI Z-535.4 Standard addresses the design of safety signs and labels for application to products, and was first published in 1991. In this Standard, the format specified for the signal word panel was a simple rectangle. The rectangle contained the Safety alert symbol, a signal word (Danger, Caution or Warning), and specific safety colors were designated to be used with those signal words (Danger/ Safety Red; Warning/ Safety Orange; Caution/ Safety Yellow.) This contrasted with the longstanding format of the black rectangle with red oval and white letters used for danger signs. The initial impetus for the new ANSI Z535.4 - 1991 header format was that products often had limited space for a sign or label and omitting the older format allowed bigger letters for the signal word. The ANSI Z535.2 - 1991 standard retained the longstanding danger heading format and created a similar format (using a truncated diamond) for the new warning sign head. Each 1991 standard allowed the user to use the format of the other standard if desired.

The ANSI Z535.2 - 1998 standard showed the preferred format for environmental and safety signs to be the simple header style of the ANSI Z535.4 standard for product safety signs and labels; both standards included the older system. As of the 2002 standard, the older format is no longer included; the simple header with larger letters and more referential color is set forth.

The ANSI Z535.2 – 1998 standard also stated a preference to use a white background for the message panel, in order to increase contrast and viewing distance. Like the ANSI Z535.4 standard, the Z535.2 – 1998 standard also required the sign to give information of the consequences of not avoiding the hazard, if the consequence is not obvious.

There are three annexes to this standard. This foreword and all of the Annexes are considered to be informative and 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. The body of this standard is “normative”, meaning that this information is considered to be mandatory.

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:

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AMERICAN NATIONAL STANDARD **ANSI Z535.2-2002**

For Environmental and Facility Safety Signs

1 Introduction

This standard covers requirements for environmental and facility safety signs that are to be used to visually alert and inform observers of potential hazards in the environment or facility. See ANSI Z535.4-2002 for the requirements for product safety signs and labels.

Sometimes the actions required to avoid the hazard or the consequences of not avoiding the hazard are not obvious to the viewer from the context in which the sign is used. In such situations viewer training, additional messages, or the use of safety symbols on the sign should be used to provide this information. To achieve these objectives, it is most important to have an easily recognizable and highly conspicuous hazard alerting system such as is presented in this document.

The diversity of culture and background in the American society increases the need to standardize a visual alerting identification system for safety signage. The great need to eliminate accidents and suffering among individuals who may be exposed to hazards requires the use of standard formats, sizes, colors, shapes, and a firm understanding of the degree of hazard. This document contains the elements that designate a separation between levels of hazard severity.

This standard sets forth a hazard alert system that uses different signal words and colors to distinguish between levels of hazards. Use of this standard will allow observers of environmental and facility safety signs to determine the type and degree of hazards and take appropriate actions to avoid injury.

To promote standardization and increase effectiveness, the formats used in this standard are intentionally similar to those used in ANSI Z535.4-2002 Standard for Product Signs and Labels. While these standards are similar in many respects, they each address different physical and visual requirements. As a result, there are basic differences between environmental/facility safety signs and product safety signs. Environmental and facility safety signs are usually larger and observed at longer distances; they 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. The Z535 Committee on Safety Signs and Colors has recognized and affirmed the need for these two standards.

The ultimate application of the visual alerting messages will be up to those responsible for affixing these messages. This standard is intended to provide specifications for signs to convey a safety alert message that is clearly and rapidly understood regardless of the viewers' background. In certain areas of the country where other languages are used, consideration should be given to providing messages in those languages.

2 Scope and purpose

2.1 Scope

This standard establishes requirements for a uniform visual system of identification related to potential hazards in the environment. It provides for the design, application and use of signs and placards employing this visual alerting system.

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2.2 Purpose

The primary purpose of this standard is to provide an effective means of communicating information concerning environmental hazards to the observer, so that injury resulting from the hazard(s) can be avoided. To this end, this standard establishes a uniform and consistent visual layout intended to limit proliferation of safety sign designs and achieve a national system to promote recognition and avoidance of hazards. In addition, communication of other important information for the safety and well-being of the observer is also included. To do this effectively, it is necessary to minimize the number of layouts and design formats while providing flexibility to meet individual consumer needs and situations.

This standard covers safety signs used at fixed locations in the environment such as industrial facilities, as well as larger, movable signs that may be used on a temporary basis. For the requirements of accident prevention tags, safety alerting tapes, etc., used with temporary hazards, see ANSI Z535.5-2002 Safety Tags and Barricade Tapes (for Temporary Hazards).

There are a number of existing American National Standards which are recognized for particular industries or specific uses. Compliance with these standards may be considered for such particular industry or use. It is not the intent of this ANSI Z535.2 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.

This standard is issued with the objective of minimizing the proliferation of non-standard hazard alerting devices and achieving application of a national uniform system for the recognition of hazards in the environment. Where portions of other standards and regulations can be modified to reflect the concepts of this standard, such modifications should be made.

3 Application and exceptions

3.1 Application

This standard provides guidance for industries, commercial establishments, property owners, employers, and others who have a desire to alert persons to potential personal injury hazards or property damage hazards inherent in the environment or facility under their control.

3.2 Exceptions

3.2.1 Federal, state, or municipal regulations

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

3.2.2 Labels or signs for products

These requirements do not include labels or signs for products, containers of chemicals and chemical mixtures and hazardous substances[1], in-plant vehicular movement and wayfinding signs (except as defined in section 5.8), public streets and highways[2], railroads, air transport, marine operations, exit signs, identification of piping or process valves, or safety bulletins and posters.

[1] Note: For chemical products and chemical mixtures, follow ANSI Z129.1 –2000, and see Reference 14.
[2] American National Standard Manual on Uniform Traffic Control Devices for Streets and Highways.

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4 Definitions

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

4.2 color: Colors specified in this standard shall conform to ANSI Safety Color Code, Z535.1-2002

4.3 decal: See safety sign.

4.4.1 hazard: A source of potential injury to a person or to property.

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 recommended practices (should). The body of this standard is considered normative.

4.6 label: See safety sign.

4.7 panel: Area of a safety sign having a distinctive background color different from adjacent areas of the sign or which is clearly delineated by a line, border, or margin. Three (3) types of panels a safety sign may use are: signal word, message, and safety symbol.

4.7.1 signal word panel: Area of a safety sign that contains the signal word or words. For personal injury hazards, the signal word panel shall contain the safety alert symbol.

4.7.2 message panel: Area of a safety sign that contains those words related to: identification of the hazard, how to avoid the hazard, and/or the probable consequences 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 a safety sign that contains the safety symbol.

4.8 placard: See safety sign.

4.9 safety alert symbol: (See Annex A) 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 Figure 1.

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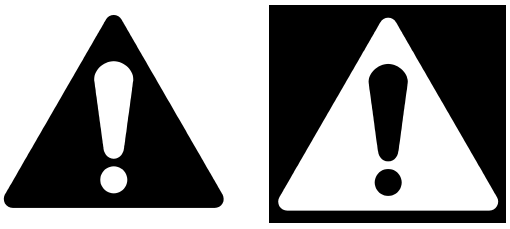

Figure 1—Safety alert symbol

4.10 safety sign: A visual alerting device in the form of a sign, label, decal, placard, or other marking which advises the observer of the potential hazard(s) which can cause an accident and the level of hazard seriousness. It may also provide other directions to eliminate or reduce the hazard and may advise of the probable consequences of not avoiding the hazard.

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

4.10.2 product safety sign: Sign, label, or decal affixed to a product that provides hazard and safety information about that product[3].

4.11 safety signs and signal words, types of: The seven types of safety signs are DANGER, WARNING, CAUTION, NOTICE, safety instructions and safety equipment location, fire safety, and directional arrows. The first five types of safety signs use a signal word or words to designate a level of hazard seriousness. No signal words are used for fire safety or directional arrow signs. Signal words are the word or words that designate a degree or level of safety alerting. Specific signal words are defined here and the definition repeated where they appear in subsequent sections (see section 5 inclusive). The signal word or words shall always be located in a distinctive panel located in the uppermost portion of the safety sign.

4.11.1 DANGER: Indicates an imminently hazardous situation which, if not avoided, will result in death or serious injury. This signal word is to be limited to the most extreme situations. This signal word should not be used for property damage hazards unless personal injury risk appropriate to this level is also involved.

NOTE—The DANGER signal word is appropriate for signs in the area of, or inside of enclosures containing, a Danger-level hazard.

4.11.2 WARNING: Indicates a potentially hazardous situation which, if not avoided, could result in death or serious injury. This signal word should not be used for property damage hazards unless personal injury risk appropriate to this level is also involved.

NOTE—The WARNING signal word is appropriate for signs placed outside of the area of, or on the exterior of the enclosures containing, a Danger-level hazard.

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

4.11.4 NOTICE signs: Signs used to indicate a statement of company policy directly or indirectly related to the safety of personnel or protection of property. This signal word should not be associated directly with a hazard or hazardous situation and shall not be used in place of “DANGER,” “WARNING,” or “CAUTION.”

4.11.5 signs for safety instructions or safety equipment location: Signs used to indicate general instructions relative to safe work practices or indicate the location of safety equipment.

[3] For Chemicals and chemical mixtures, follow ANSI Z129.1 – 2000.

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4.11.6 fire safety: Signs used to indicate the location of emergency fire fighting equipment. (Note: These signs indicate the location of, but not the direction to, equipment, etc.)

4.11.7 directional arrow signs: Signs used to indicate the direction to emergency equipment, safety equipment, and other locations important to safety.

4.12 surround/surround shape: A geometric configuration around the symbol which can convey additional safety information.

4.13 safety symbol: A graphic representation intended to convey a message. It may represent a hazard, hazardous situation or precaution to avoid a hazard, the result of not avoiding the hazard or any combination of these messages.

5 Safety sign colors and formats

5.1 DANGER signs

5.1.1 Signal word panel

Danger signs shall have the signal word “DANGER” in white letters on a rectangular safety red background placed at the top of the sign. The safety alert symbol shall precede the signal word. The base of the 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 be equal to or exceed the signal word letter height. See Figure 2.



Figure 2—Format for the DANGER signal word panel - white letters on safety red background, safety red exclamation mark.

The previous format for the signal word panel of a danger sign shown in Annex C shall not be used for new sign procurement. Existing signs, in use or already manufactured, that use the older format may continue to be used.

5.1.2 Message panel

The message shall be in black or red letters on a white background, or white letters on a black background.

5.1.3 Safety symbol panel

The safety symbol panel, if used, shall be a square or rectangle with a black, safety red, or black and safety red symbol on a white background.

5.2 WARNING signs

5.2.1 Signal word panel

Warning signs should have the signal word “WARNING” in black letters on a rectangular orange background placed at the top of the sign. The safety alert symbol shall precede the signal word. The base of the 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 be equal to or exceed the signal word letter height. See Figure 3.

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Figure 3—Format for the WARNING signal word panel—black letters on safety orange background, safety orange exclamation mark

The previous format for the signal word panel of a warning sign shown in Annex C shall not be used for new sign procurement. Existing signs, in use or already manufactured, that use the older format may continue to be used.

5.2.2 Message panel

The message shall be in black letters on a white background or white letters on a black background.

5.2.3 Safety symbol panel

The safety symbol panel, if used, shall be a square or rectangle with a black symbol on a white background.

5.3 CAUTION signs

5.3.1 Signal word panel—personal injury

Caution signs shall have the signal word “CAUTION” in black letters on a rectangular yellow background placed at the top of the sign. The safety alert symbol shall precede the signal word if the hazard is a potential personal injury hazard. The base of the 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 be equal to or exceed the signal word letter height. See Figure 4.



Figure 4—Format for the personal injury CAUTION signal word panel—black letters on safety yellow background, safety yellow exclamation mark

The previous format for the signal word panel of a caution sign shown in Annex C shall not be used for new sign procurement. Existing signs, in use or already manufactured, that use the older format may continue to be used.

5.3.2 Signal word panel—property damage only

The safety alert symbol shall be omitted on Caution signs used to indicate property damage only accidents. These signs shall have the signal word “CAUTION” in black letters on a rectangular safety yellow background placed near the top of the sign. See Figure 5.

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Figure 5—Format for the property damage only CAUTION signal word panel—black letters on safety yellow background

5.3.3 Message panel

The message shall be in black letters on a white background or white letters on a black background.

5.3.4 Safety symbol panel

The safety symbol panel, if used, shall be a square or rectangle with a black symbol on a white background.

5.4 NOTICE signs

5.4.1 Signal word panel

These signs shall have the signal word “NOTICE” in white italic letters on a safety blue background on a rectangular field, and this distinctive panel shall be located in the uppermost portion of the visual alerting device. No other signal word or symbol shall be used within this distinctive shape and color arrangement.



Figure 6—Format for the NOTICE signal word panel—white italic letters on safety blue background

5.4.2 Message panel

The message shall be in safety blue or black letters on a white background.

5.4.3 Safety symbol panel

The safety symbol panel, if used, shall be a square or rectangle with a safety blue or black symbol on a white background.

5.5 Signs for safety instruction or safety equipment location

5.5.1 Signal words

Signs containing safety instructions or procedures should use the signal words SAFETY INSTRUCTIONS or SAFETY PROCEDURES. More definitive signal words, such as SAFE SHUTDOWN PROCEDURE, are encouraged, where practical. Signs indicating the location of safety equipment (except fire fighting equipment) would use definitive signal words, such as EYEWASH. Where multiple safety items are at the same location, SAFETY EQUIPMENT may be used as the signal words. The signal word or words shall be in white letters on a safety green background on a rectangular field, and this distinctive panel shall appear in the uppermost portion of this sign. Signal words that are not in accordance with the definition

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given in 4.11 shall not be used and these include DANGER, WARNING, and CAUTION. See Figure 7.



Figure 7—Format of signal word panel used for safety instruction and safety equipment location signs—white letters on safety green background

5.5.2 Message panel

The message shall be in safety green or black letters on a white background.

5.5.3 Symbol panel

The symbol panel, if used, shall be a square or rectangle with a safety green or black symbol on a white background.

5.6 Fire safety signs

5.6.1 Signal word panel

These fire safety signs do not have a signal word.

5.6.2 Message panel

The message panel shall be in safety red letters on a white background in either a square or rectangular field.

5.6.3 Safety symbol panel

The safety symbol panel, if used, shall be safety red on white or white on safety red. See Figure 8.



Figure 8—A typical fire extinguisher location safety sign

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5.7 Directional arrow signs

5.7.1 Directional arrow sign panels

This directional arrow symbol shall be in white on a black or colored background on a rectangular field, and this distinctive symbol shall appear in the uppermost portion of the visual alerting device when used by itself or in conjunction with general safety or fire safety signs. When these directional arrows are used in conjunction with DANGER, WARNING, CAUTION, or NOTICE signs, the arrows shall be in a lower sign panel. The color of the arrows shall be in the same color arrangement as the message or symbol as described in the definition section 5.0 inclusive. Directional arrows shall be designed as illustrated in Figure 9.

5.7.2 Illustration

This distinctive shape shall be designed as illustrated below:

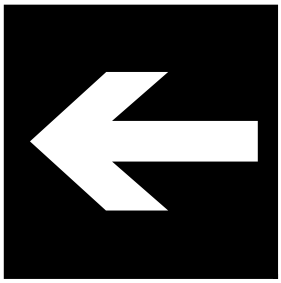

Figure 9—Directional arrow (indicating movement to the left)

5.8 Special signs

5.8.1 Definitions

These signs have been developed for special uses and have been separated from the other categories of hazard alerting devices by special layout. These visual alerting devices are covered by other standards as listed in the Reference section.

5.9 Sign classification selection

5.9.1 Not the intent of this standard

It is not the intent of this standard to define precisely levels of hazard or where the various hazard level signs are to be used.

5.9.2 No required use of a particular hazard alerting signal word

When no federal, state, or local government code, regulation, standard, or guideline specifically requires the use of a particular hazard alerting signal word, it shall be up to those responsible to select the appropriate hazard classification. Each situation requiring the use of a hazard alerting device should be reviewed with regard to the definitions given in section 4 inclusive and 5 inclusive.

6 Sign design/layout

6.1 Three panel signs

Three panel signs shall be as illustrated as in Figure 10.

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6.2 Two panel signs

Two panel signs shall be as illustrated as in Figure 11.

6.3 Application of sign formats by hazard classification

Table 1 and Figures 10 and 11 shall be used to determine which sign panel formats may be used with which signal panel.

Table 1—Application of sign panel formats*

Sign Classification	Permitted	Prohibited or Not Used
DANGER	A Through G	H and I
WARNING	A Through G	H and I
CAUTION	A Through G	H and I
NOTICE	A Through G	H and I
GENERAL SAFETY	All	-----
FIRE SAFETY	H and I	A Through G
DIRECTIONAL	C, D, E, F, G	A, B, H, I
SPECIAL	Not Applicable	-----

***See Figure 10 and Figure 11 for referenced formats**

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7 Sign color specifications

The color of sign finishes shall conform to the ANSI Z535.1-2002 *Safety Color Code*.

8 Safety symbols

8.1 General

8.1.1 Pictorials, pictographs, or other graphic representations

Safety symbols are pictorials, pictographs, or other graphic representations chosen to clearly convey a specific safety alerting message.

8.1.2 Conveyed message

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

8.2 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) or there is a means (e.g., instructions, training materials, manuals, etc.) to inform people of the symbol's meaning.

9 Letter style and size

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

9.1 Letter style

9.1.1 Signal words

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

9.1.2 Message panel lettering

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

9.1.3 Acceptable lettering styles

Examples of acceptable lettering styles include: Arial, Arial Bold, Folio Medium, Franklin Gothic, Helvetica, Helvetica Bold, Meta Bold, News Gothic Bold, Poster Gothic, and Universe.

9.2 Letter size

9.2.1 Legibility of text

Legibility of text is influenced by letter height, the ratio of letter height to width (stroke width), and spacing between letters, words, and lines. Annex B provides guidance on these and other factors that affect text legibility.

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9.2.2 Overall size of the lettering

The overall size of the lettering shall be determined by the distance from which the sign can be safely and easily read. The message should be as concise as practical. Letters shall be adequately spaced and not crowded.

9.2.3 Minimum letter height

Minimum letter height shall be one unit in height for every 150 units of safe viewing distance from the hazard alerting device for signal words and one unit in height for every 300 units viewing distance for the majority of other words contained on the word message panel (see Reference 15). The safe viewing distance must be determined for each specific case where a safety sign is needed. The message panel text shall meet the legibility criteria at the determined safe viewing distance.

10 Sign finish

Sign finish shall be of durable materials with colors in accordance with ANSI Z535.1-2002 *Safety Color Code.*

11 Sign placement

11.1 Placed to alert and inform the viewer

Signs shall be so placed to alert and inform the viewer in sufficient time to take appropriate evasive actions to avoid the potential harm from the hazard.

11.2 Legible, non-distracting, and not hazardous

Safety signs shall be so placed that they are legible, non-distracting, and not hazardous in themselves.

11.3 Motion of the hazardous device

Safety signs shall not be located in areas where they may be removed by the motion of the hazardous device, or rendered ineffective by situational conditions of the hazard. These alerting devices shall not be blocked by moveable panels such as doors, windows, racks, gates, etc.

12 Illumination

12.1 Displayed with illumination or retroreflectorization

All hazard alerting devices shall be displayed with illumination or retroreflectorization as needed for adequate legibility under normal operating conditions. Where illumination is inadequate or colors not recognizable, use supplemental illumination[6] (see Reference 14).

[6]Supplemental illumination includes portable illumination such as flashlights.

12.2 Situations other than normal operating conditions

Consideration should be given for situations other than normal operating conditions, such as emergency conditions, visibility, power failure, etc. Where illumination may be interrupted, the sign should be equipped with emergency lighting or retroreflective materials, or both.

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13 References

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Collins, B.L., Kuo, B.Y., Mayerson, S.E., Worthey, J.A., and Howett, G.L. *Safety Color Appearance Under Selected Light Sources,* NBSIR 86-3493, December 1986.

Howett, Gerald L.*, Size of Letters Required for Visibility as a Function of Viewing Distance and Observer Visual Acuity*, National Bureau of Standards, 1983.

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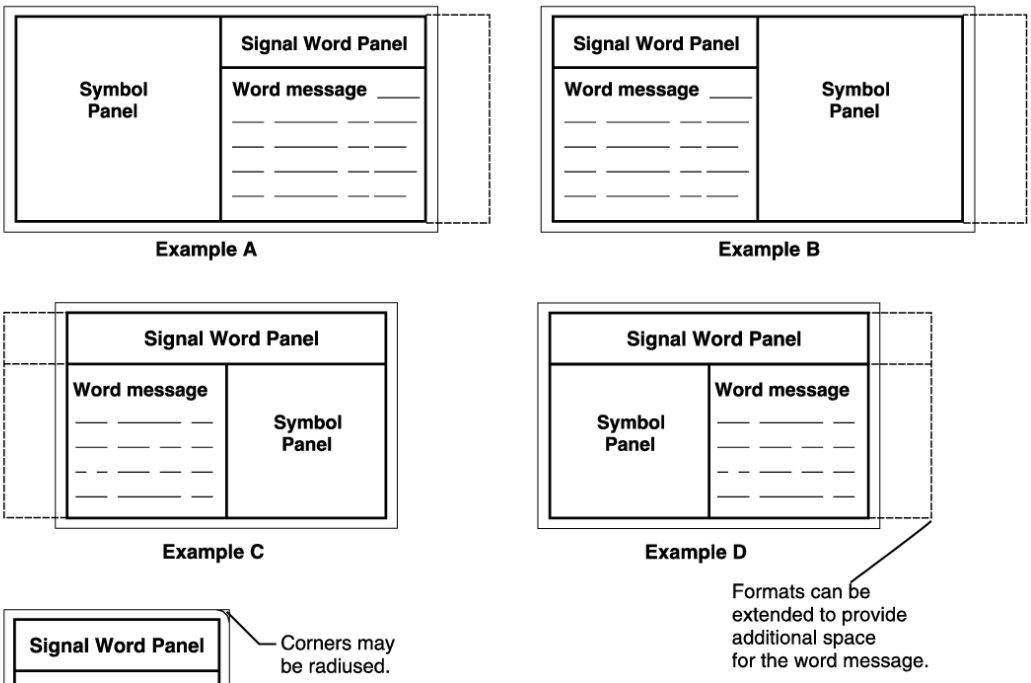

Figure 10—Three-panel sign formats

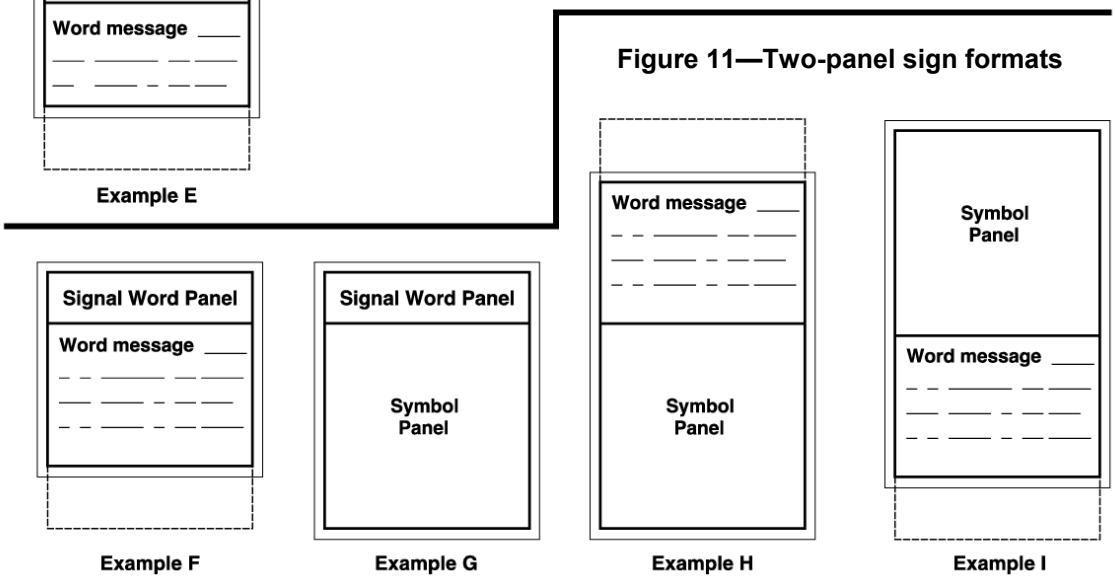

Figure 11—Two-panel sign formats

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Annex A
(Informative)
Guidelines for Increasing Recognition of Safety Sign Components

A1 Scope

It is important that the meaning of a safety sign is clearly understood by those who may come in contact with the hazard. To increase the understanding of a safety sign's components, the ANSI Z535 committee encourages safety sign manufacturers and owners of facilities to publish and exhibit the following information on safety posters, safety bulletins, or the like. Doing so will assist in the objective of achieving a national uniform system for the recognition of potential personal injury hazards and accident prevention.

A1.1 The safety alert symbol

Explain the meaning of the safety alert symbol. Then use this symbol whenever a safety-related message is written that warns of a potential personal injury hazard. In literature that makes note of potential personal injury hazards, the safety alert symbol can be used alone or in combination with the proper signal word to call attention to the hazard information. 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 The signal words

Explain the meaning of the different signal words as defined by the ANSI Z535.2 standard. Such training is necessary to increase understanding of the three-tier personal injury hazard classification system and the meaning of other signal words. The following artwork may be used for this purpose (Note: The use of the appropriate color for each signal word panel is desirable. See ANSI Z535.1.



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



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



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



CAUTION used without the safety alert symbol indicates a potentially hazardous situation which, if not avoided, may result in property damage.

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NOTICE

NOTICE indicates information or a company policy that relates directly or indirectly to the safety of personnel or protection of property.

SAFETY INSTRUCTIONS

Safety instruction or safety equipment location signs indicate general instructions relative to safe work practices, reminders of proper safety procedures, or the location of safety equipment.

A1.3 Safety symbols

Explain the meaning of the safety symbols used on your safety signs. This enables viewers to better understand the meaning of the graphics and makes future recognition of the safety symbols more instantaneous. See *ANSI Z535.3 Criteria for Safety Symbols* for more information about safety symbol selection, design, and testing.

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Annex B
(Informative)
Principles and Guidelines for the Design of Environmental and Facility Safety Signs

B1 Scope

Good consistent visual design helps to effectively communicate hazard information. The purpose of this annex is to provide the designer with information on widely recognized principles that can aid in the development of effective safety signs. [1]

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, CAUTION, EYEWASH, etc.), the signal word should be positioned in the center of the signal word panel. For property-damage-only safety signs, the signal word CAUTION is used without the safety alert symbol (see Annex A).



Figure B1—Examples of correct signal word and safety alert symbol placement



Figure B2—Examples of incorrect signal word and safety alert symbol placement

B3 Developing the Word Message

B3.1 The content of the word message

The word message on a 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.

[1] 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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The information required on a safety sign should be arranged to provide the most important information first. Where reaction time is an issue, the action statement will be the most important portion of the word message and should be placed first. In other cases, the hazard description statement will be the most important information to communicate first. The statement concerning the consequences of interaction with the hazard is generally best understood when placed after the hazard description statement, or used integrally with the hazard description statement. As a general rule, 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 sign. 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.

Type of Hazard and Consequence Statement *Avoidance Statements*	**Moving parts can crush and cut** **Keep out during operation** **Lockout power before entering**

Figure B3—Word message with hazard description first

Keep Out **Hazardous voltage inside** **Can shock, burn or cause death**	*Avoidance Statement* *Type of Hazard Statement* *Consequence Statement*

Figure B4—Word message with hazard avoidance message 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 in Figures B5 and B6. The "headline style" example of Figure B5 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.

Hazardous voltage. **Keep out!** **Keep access door locked.**

Figure B5—Headline style message

Hazardous voltage is very danger-ous and should be avoided at all times. Keep the access door closed at all times and do not enter this area.

Figure B6—Non-headline style message

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B3.3.2 Use succinct statements

Safety signs are intended to communicate appropriate information to the viewer fast enough to allow the viewer to comprehend the information and take the necessary actions to avoid the hazard. Faster reaction times are promoted by using succinct statements.

B3.3.2.1 Action statement

The action statement gives the viewer instructions on how to avoid the hazard. The statement should be simple, direct, and applicable to the hazard. Figure B7 contains examples of action statements.

Keep Out!	**Wear hard hats**	**No smoking**
Keep away	**Call *before* you dig**	**Do not operate!**

Figure B7—Examples of action statements

B3.3.2.2 Hazard description statement

The hazard description statement identifies the specific hazard in clear, simple language. Where the desired action and the consequence of not avoiding the hazard are obvious from the hazard description statement (such as “Slippery when wet”), the action and consequence statements may be omitted. Figure B8 contains examples of concise hazard description statements:

Hazardous voltage inside	**Confined space**	**Biological hazard**
Laser radiation	**Hot pipes above**	**Buried fiber optic cable**

Figure B8—Examples of concise hazard description statements

B3.3.2.3 Consequence statement

The consequence statement tells the viewer in clear, simple language what will happen if the warning is ignored. Figure B9 contains examples of consequence statements:

Will burn	**Can cause serious burns or death**	**Can irritate skin**
Can cause infertility	**Will disrupt electrical service to critical equipment**	
Exposure can cause nausea, dizziness, and a headache		

Figure B9—Examples of consequence statements

B3.3.2.4 Emergency information

Where it is important for viewers or accident responders to know the ownership of the affected facilities, a telephone number or other useful information should be placed after the Action, Hazard Description and Consequence statements.

B3.3.3 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. Figure B10 contrasts active voice with passive voice messages.

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Active Voice Messages	*Passive Voice Messages*
Keep hands away from rotating blade.	**Your hands must be kept away from rotating blade.**
Lock out power before servicing equipment.	**Power must be locked out before servicing equipment.**
Replace guards immediately after repair or adjustment.	**After repair of adjustment, immediately replace guards.**

Figure B10—Examples of active voice vs. passive voice messages

B3.3.4 Avoid prepositional phrases

Avoid the use of prepositional phrases. Prepositional phrases can often be eliminated or replaced with one word. Figure B11 contrasts messages with and without prepositional phrases.

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

Figure B11—Examples of concise prepositional phrases

B3.3.5 Emphasizing desired action or other message

Where room is available and it is desired to emphasize the desired action or other message, key words may be shown in larger letters, in all capital letters, in bolder letters, in a different type face, with an exclamation mark, or with a combination thereof. Figure B12 contains examples of ways to emphasize portions of a word message.

Hazardous voltage inside.	**Hazardous voltage inside.**	**Hazardous voltage inside.**
Keep Out!	**KEEP OUT!**	**KEEP OUT!**
Keep access door locked.	**Keep access door locked.**	**Keep access door locked.**
Example A	*Example B*	*Example C*

Figure B12—Examples of ways to emphasize portions of a word message

B3.3.6 Refer to another source

Keep only essential hazard-related information in the safety sign. If necessary, consideration can be given to referring the viewer to another source for additional safety information or for permission to proceed. Examples of such sources include safety instruction labels, Material Safety Data Sheets (MSDS), operation manuals, service manuals, operating procedures, and safety bulletins.

B3.3.7 Separation of word message content

To enhance readability, arrangements of the word message in an outline format should be considered, as in Figure B13. The addition of bullets may also be considered to help separate portions of the word message, as in Figure B14. The use of continuous format, as in Figure B15, is sometimes necessary for

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product safety labels and temporary tags (see ANSI Z535.4 and Z535.5), but is rarely necessary or appropriate for environmental and facility safety signs.

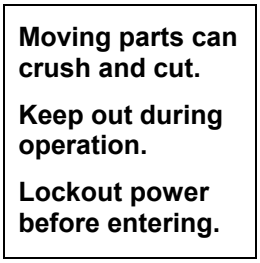

Figure B13—Outline Format

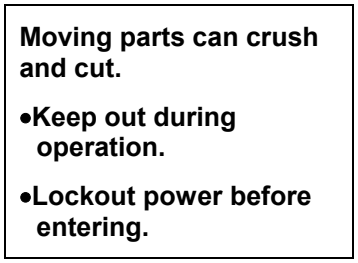

Figure B14—Outline With Bullet Format

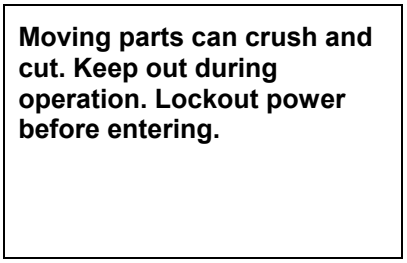

Figure B15—Continuous Format

B3.3.8 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). See Figure B16. Left alignment aids in readability (compared to centered text; see Figure B17) 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. See Figure B18.

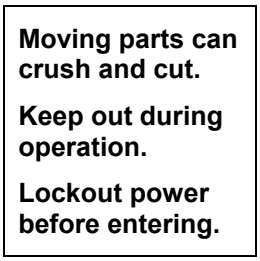

Figure B16—Left Aligned Ragged Right Text

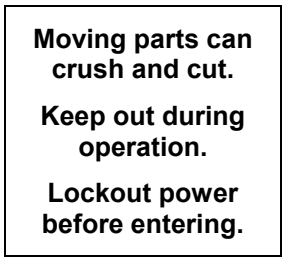

Figure B17—Centered Text

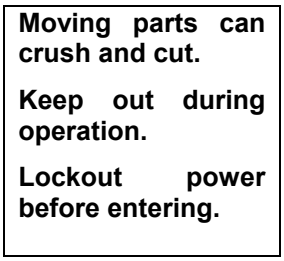

Figure B18—Justified Text

B3.3.9 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. See Figure B19. 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. See Figure B20. On occasion, a single word or phrase may be set in upper case letters to provide emphasis. See Figure B21.

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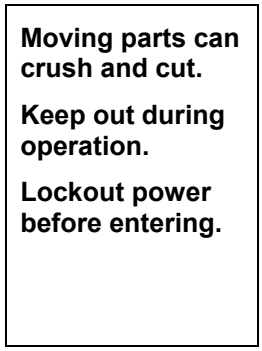

Figure B19—Mixed case lettering

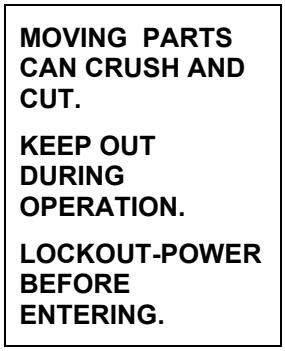

Figure B20—All upper case

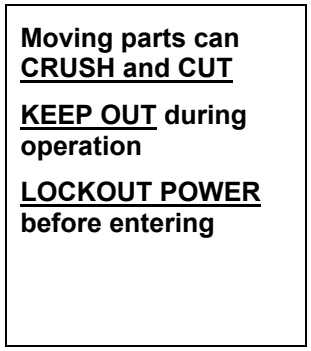

Figure B21—Selective use of upper case

B3.3.10 Choice of type style

Sans serif typestyles are preferred. 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. For black type on a white background the stroke width-to-height ratio should be 1:6 –1:8. For white type on a black background the stroke width-to-height ratio should be 1:8 –1:10 (see reference 15).

B3.3.11 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 can be added to separate portions of a word message, as shown in the outline format illustrated in B3.3.7. 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. See Figure B22.

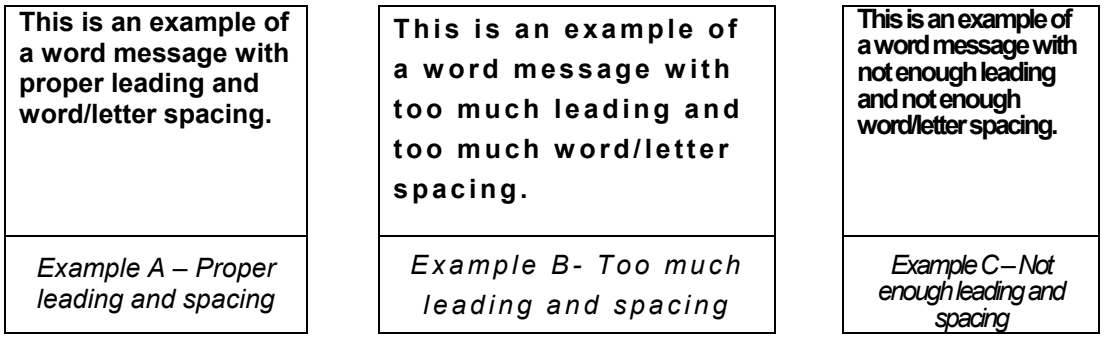

Figure B22—Examples of correct and incorrect type spacing

B3.3.12 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. 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. See Figure B23.

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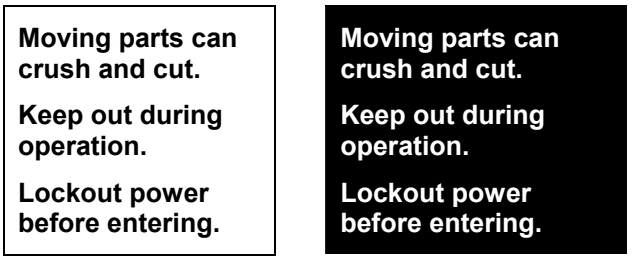
Black type on a white background



White type on a black background

Figure B23—Examples of type color choice

B3.3.13 Letter size

Legibility of the word message at the minimum safe viewing distance[2] determines the proper letter size for the word messages. The letter size/safe viewing distance guidelines in Table B1 define the type size required to achieve legibility at the given viewing distance. The height of the capital letter "H" identifies the type's letter size. Note that the type sizes shown in column two and column three of Table B1 indicate the *minimum* word message letter size for favorable light conditions and the *recommended* letter size for unfavorable reading conditions, respectively. Letter size may need to be larger than the values in column two for various reasons, including the following:

- to obtain conspicuousness from other information displayed in the area,
- 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, and
- 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.

B3.3.14 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."

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

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Table B1—Examples of word message letter heights and minimum safe viewing distances

Minimum Safe Viewing Distance[2]		Minimum Height for FAVORABLE Reading Conditions		Recommended Letter Height for UNFAVORABLE Reading Conditions	
		[viewing distance (ft)/25]	[viewing distance (m)/3]	[viewing distance (ft)/12]	[viewing distance (m)/1.43]
(ft)	(m)	(in)	(cm)	(in)	(cm)
≤4	≤1.2	.16*	0.4*	.33	0.8
6	1.8	.24	0.6	.50	1.3
8	2.4	.32	0.8	.66	1.7
10	3.0	.40	1.0	.83	2.1
15	4.6	.60	1.5	1.27	3.2
20	6.1	.80	2.0	1.68	4.3
30	9.1	1.20	3.0	2.51	6.4
40	12.2	1.60	4.1	3.36	8.5
60	18.3	2.40	6.1	5.04	12.8.
80	24.4	3.20	8.1	6.72	17.1
100	30.5	4.00	10.2	8.40	21.3
125	38.1	5.00	12.7	10.49	26.6
150	45.7	6.00	15.2	12.58	32.0
200	61.0	8.00	20.3	16.79	42.7

*.16 inch (0.4 cm) type is the suggested minimum type size for use on environmental/facility safety signs

B3.3.15 Comprehension

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

B4 Use of safety symbols

Well designed safety symbols can often communicate hazard information quickly and across language and literacy barriers. Although the ANSI Z535.2 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 symbol selection, design and testing.

B5 Multi-lingual formats

The selection of additional languages for safety signs is an extremely complex issue. Experts suggest that nearly 150 foreign 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 only to differentiate the placement of safety symbol and word message panels.

B5.1 Vertical formats

The vertical bilingual format shown in Figure B24 can be modified to include a longer word message by lengthening the word message panels.

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B5.2 Horizontal formats

Figures B25 and B26 illustrate horizontal formats for bilingual safety signs. In Figure B25, 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—Long message, vertical format

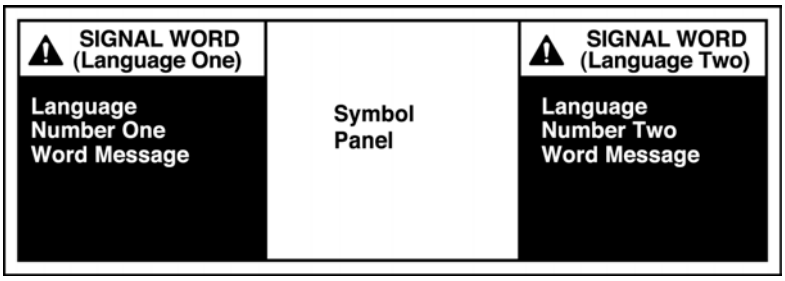

Figure B25—Long message, horizontal format

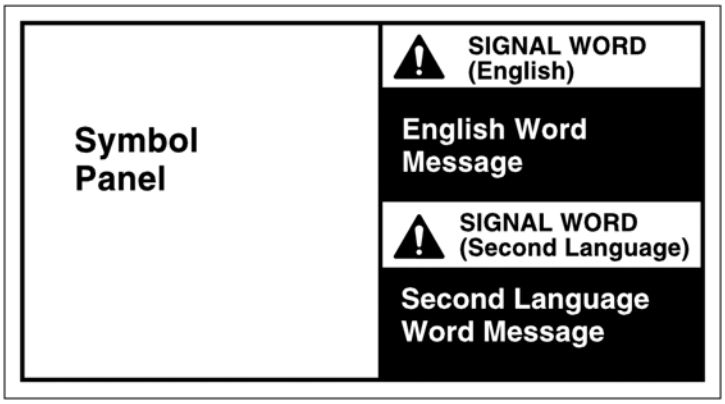

Figure B26—Short message format

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 label (see B2).

B6 Multi-hazard formats

If multiple hazards exist at one location on a product or if there is only enough space for a single safety label, a multi-hazard label may need to be considered. The use of symbols in multi-hazard formats is optional but encouraged. Additional symbols can be added to these formats as needed. The signal word corresponding to the hazard with the greatest seriousness level should be used. 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 only to differentiate the placement of safety symbol and word message panels. The following options can be considered when designing multi-hazard signs.

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B6.1 Three-panel formats

Use one of the standard three-panel formats shown in Figure 13 of the ANSI Z535.2 standard and use a single symbol to communicate the most important hazard. Use the outline format to separate the various hazard word messages (see B3.3.7).

B6.2 Two-panel formats

Use the two-panel signal word/word message formats shown in Figure 14 of the ANSI Z535.2 standard. Use the outline format to separate the various hazard word messages (see B3.3.7).

B6.3 Multi-symbol formats

Use one of the multi-symbol formats shown in Figures B27 through B31. In formats B27 and B28, place the most important hazard 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 symbol ("reading" the symbols from left to right or top to bottom). If the format shown in Figure B28 is used, arrange the word message segments so they line up opposite the appropriate symbol panel.

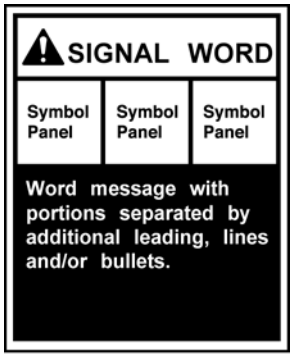

Figure B27—Multiple symbols on top

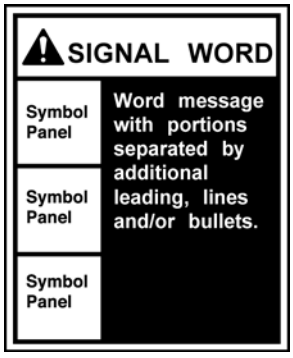

Figure B28—Multiple symbols on left

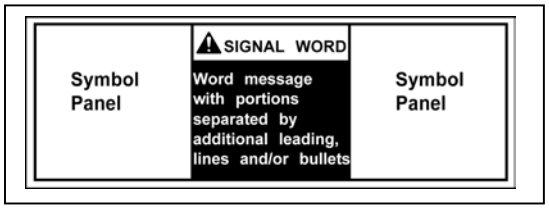

Figure B29—Two-symbol alternative format

Figures B30 and B31 illustrate the multi-hazard/multi-signal word formats. In these formats, each hazard is ordered according to its seriousness level and placed below the appropriate signal word. Additional pictorials or word messages may be located under each signal word as needed. Use the outline format to separate portions of the word message with additional leading, lines or bullets (see B3.3.7).

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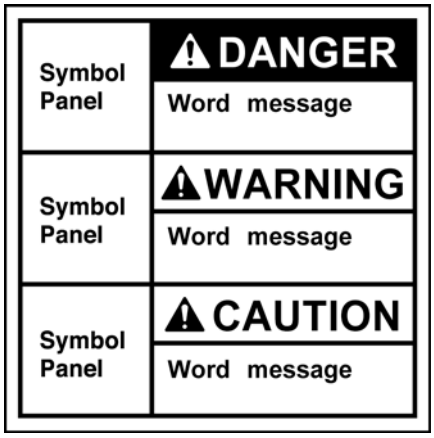

Figure B30—Symbols on left

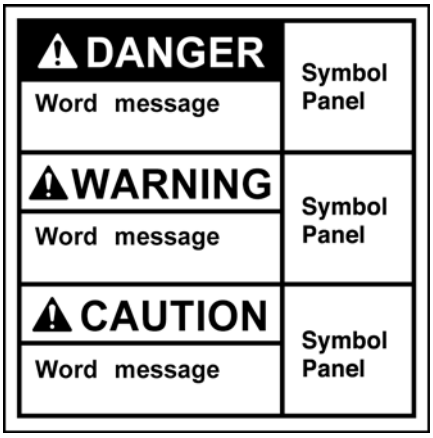

Figure B31—Symbols on right

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Annex C
(Informative)
Previous Formats for Signal Word Panels

The following formats for signal word panels were used in earlier editions of this standard and were included as an alternate to the preferred panel format in the 1998 Edition. They are not included in this edition of the standard. Existing signs, in use or already manufactured that use the older format may continue to be used.







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Revisions 2006

The ANSI Accredited Standards Committee Z535 plans to issue the next revisions of the Z535 Standards (.1 through .5) in December 2006. In order to meet that deadline, the committee developed the following tentative timetable:

All proposed changes are due:	June 30, 2004
Revisions will be finalized for letter balloting:	April 11, 2005
Letter balloting will be completed by:	July 18, 2005
Public reviews will be completed by:	March 1, 2006
Drafts will be ready to submit to the publisher:	May 21, 2006
Published:	December 15, 2006

All proposed changes must be submitted by June 30, 2004. 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 back of this page. Please send this form to:

Secretary, ANSI Committee Z535
National Electrical Manufacturers Association
1300 North 17th Street, Suite 1847
Rosslyn, VA 22209

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ANSI Accredited Standards Committee Z535
On Safety Signs and Colors

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   - ☐ Deleted Text

3. Proposal (Include the proposed new or revised text, or identify the words to be deleted.)

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5. Check one.
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