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AMERICAN NATIONAL STANDARD



ANSI Z535.4-1998

AMERICAN NATIONAL STANDARD

PRODUCT SAFETY SIGNS AND LABELS

NATIONAL ELECTRICAL MANUFACTURERS ASSOCIATION
1300 NORTH 17TH STREET, SUITE 1847, ROSSLYN, VA 22209
(703) 841-3200 FAX: (703) 841-3300

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ANSI Z535.4-1998

AMERICAN NATIONAL STANDARD

PRODUCT SAFETY SIGNS AND LABELS

Secretariat
National Electrical Manufacturers Association

Approved April 28, 1998
American National Standards Institute

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Foreword (This foreword is not part of American National Standard Z535.4-1998.)

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 two new standards. The five standards include:

- ANSI Z535.1, Safety Color Code [ANSI Z53.1-1979 was updated and combined into this standard in 1991.]
- ANSI Z535.2, Environmental and Facility Safety Signs [ANSI Z35.1-1972 and Z35.4-1972 were updated and combined into this standard in 1991.]
- ANSI Z535.3, Criteria for Safety Symbols [new in 1991]
- ANSI Z535.4, Product Safety Signs and Labels [new in 1991]
- ANSI Z535.5, Accident Prevention Tags (For Temporary Hazards) [ANSI Z35.2-1974 was updated and combined into this standard in 1991.]

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

There are two annexes in this standard. Both Annex A and Annex B are considered to be informative and not considered part of this standard.

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

This Standard provides guidelines for the design of safety signs and labels for application to products. These guidelines have been in use since 1991, when this Standard was first published. There are only minor modifications to these guidelines in this revision, mostly editorial changes to provide clarity. The major revision in this document is in the revision of Annex A and Annex B, which are not an official part of this Standard. Annex A promotes the explanation of the use of the safety label components in collateral material used with the product. Annex B provides principles and guidelines for the design of product safety signs. The subcommittee hopes that Annex A and Annex B are of value to the reader of this standard.

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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Anthony L. Martino, Vice Chairman
Ronald R. Runkles, Secretary

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American Society of Safety Engineers	J. Paul Frantz
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International Business Machines	Diane B. Britton
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International Staple, Nail and Tool Association	John Kurtz
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UARCO, Incorporated	Will M. Garth
	James Moore (Alt.)
Underwriters Laboratories, Incorporated	Richard Olesen
W.H. Brady Company	Lori Aeschbacher
	Thomas J. Felmer (Alt.)

Subcommittee Z535-4 on Product Safety Signs and Labels, which developed the standard, had the following members:

L. Dale Baker, Chairperson
Ronald R. Runkles, Secretary

D. Baker	A. Martino
G. Bartolett	W. Mathers
G. Bell	L. Mills
T. Bresnahan	M. Mingoia
J. Carr	K. Novak
R. Cunitz	R. Olesen
S. Deppa	G. Peckham
A. Dorris	R. Patten
G. Ferris	D. Scarbrough
R. Fisk	T. Standard
C. Di Giovanni	S. White
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R. Marhelfka	

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American National Standard

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. In this regard, the Accredited Standards Committee Z535 has recognized and affirmed the need for these two standards.

2 Scope and purpose

2.1 Scope

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

2.2 Purpose

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

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

3 Application and exceptions

3.1 Application

This standard provides guidance for manufacturers, employers, distributors, and others who have a desire to alert persons to potential personal injury hazards inherent with products. For chemical products and chemical mixtures follow ANSI Z129.1-1994.

3.2 Exceptions

3.2.1 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.

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

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3.2.2 Should it be necessary to use the same graphic system for product safety signs and for environmental and facility safety signs, the graphic system as defined in this standard (see section 6 and 7.1 through 7.5) or as defined in ANSI Z535.2-1998, *Environmental and Facility Safety Signs* (see sections 5.1.2, 5.2.2, 5.3.2) may be used.

4 Definitions

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

4.2 colors: Colors specified in this standard shall conform to American National Standard *Safety Color Code*, ANSI Z535.1-1998.

4.3 decal: (See safety sign.)

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

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.

4.6 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 margin. There may be up to three (3) panels per sign: signal word, message, and symbol.

4.7.1 signal word panel: Area of the safety sign that contains the signal word. For personal injury hazards, the signal word panel also contains the safety alert symbol.

4.7.2 message panel: Area of the safety sign that contains the word messages which identify the hazard, indicate how to avoid the hazard, and advise of the probable consequence of not avoiding the hazard. [1,2]

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

4.8 pictorial: (See symbol/pictorial.)

4.9 placard: (See safety sign.)

4.10 safety alert symbol: (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 should not be used to alert persons to property-damage-only accidents.

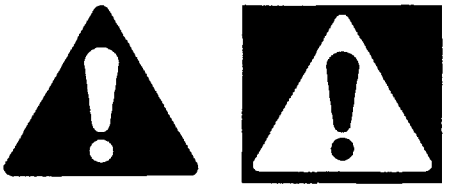

Figure 1 — Safety alert symbol

4.11 safety sign: A visual alerting device in the form of a decal, label, placard, or other marking such as an embossing, stamping, etching, or other process which advises the observer of the nature and degree of the potential hazard(s). It can 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, or decal affixed to a product that provides hazard and safety information about that product.

4.11.2.1 permanent safety sign or label: Information affixed to a product to warn against potential exposure to hazards inherent in the normal use associated with the product, or which might be created during other reasonably anticipated product

[1] 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.

[2] 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.

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use. The sign or label is to be permanently affixed to the product so that it cannot be easily removed.

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

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

4.13 signal word: The word or words that call attention to the safety sign and designate a degree or level of hazard seriousness. The signal words for product safety signs are DANGER, WARNING and CAUTION.

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

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

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

Note—DANGER or WARNING should not be considered for property damage accidents unless personal injury risk appropriate to these levels is also involved. CAUTION is permitted for property-damage-only accidents. The safety alert symbol should not be used to alert persons to property-damage-only accidents.

4.14 symbol/pictorial: A graphic representation intended to convey a message without the use of words. It may represent a hazard, a hazardous situation, a precaution to avoid a hazard, a result of not avoiding a hazard, or any combination of these messages. (See ANSI Z535.3-1998, *Criteria for Safety Symbols*).

5 Sign classifications

5.1 Hazard classification

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

5.2 Signal word selection

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

5.3 Multiple hazard identification

5.3.1 One sign or label

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

5.3.2 Levels of seriousness

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

6 Sign or label format

6.1 Panels

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

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6.2 Panel arrangement

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

6.3 Safety alert symbol

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

6.4 Border

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

6.5 Word message

The word message should be concise and readily understood.

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

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

6.6 Pictorial

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

7 Safety sign and label colors

7.1 Standard colors

Safety colors shall conform to ANSI Z535.1-1998, Safety Color Code.

7.2 Signal word panels

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

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

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

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

7.3 Message panel

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

7.4 Symbol/pictorial panel

The symbol/pictorial panel should normally have a black pictorial on a white background. Other colors may be used for pictorial 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 standards. Other colors may be used for compliance with other standards (see 3.2 Exceptions).

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

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

8 Letter style and size

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

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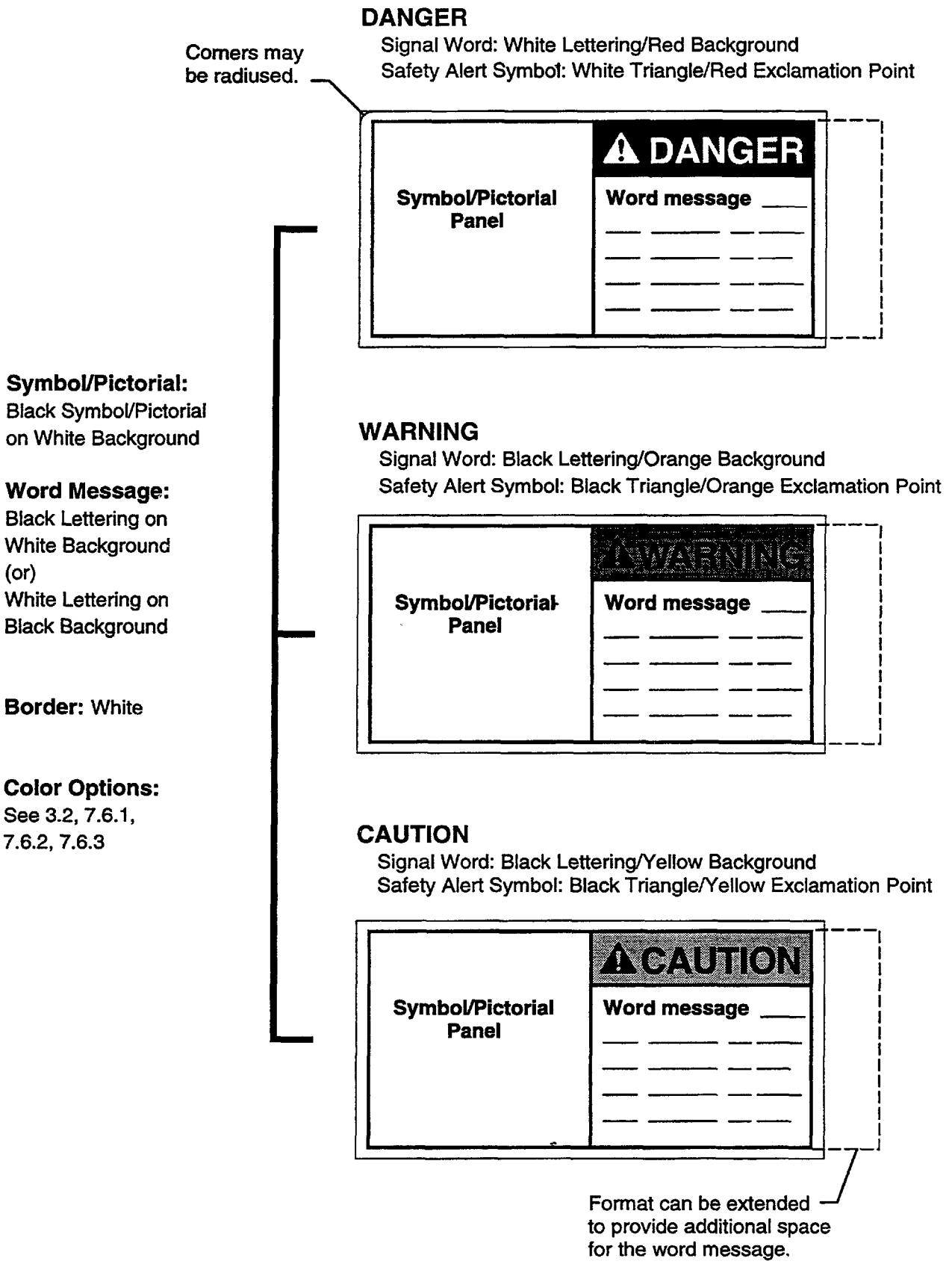

Figure 2 — Three-panel sign – horizontal format

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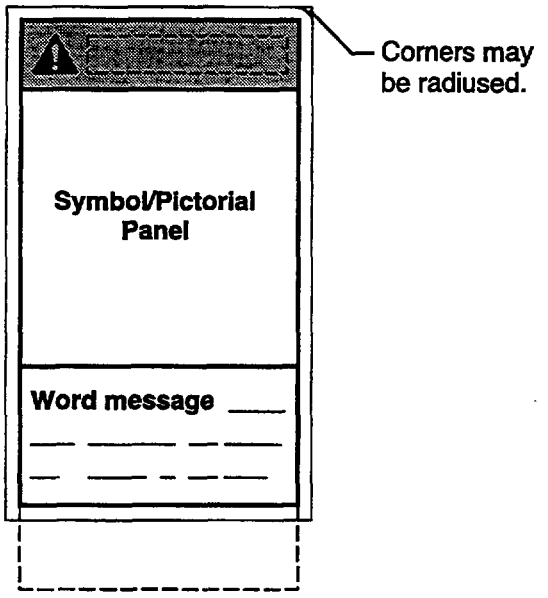

Figure 3 — Three-panel sign – vertical format

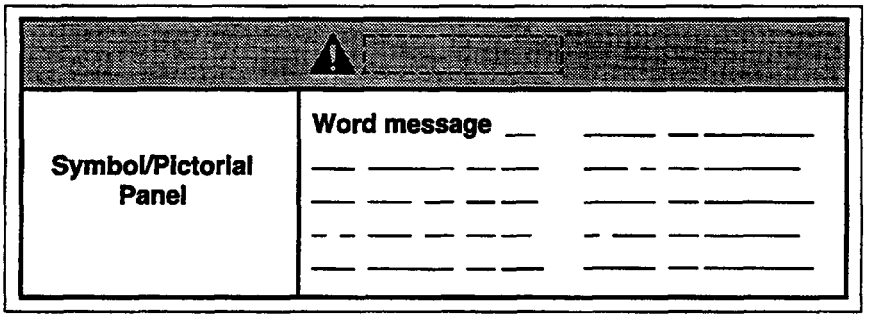

Figure 4 — Three-panel sign – horizontal format

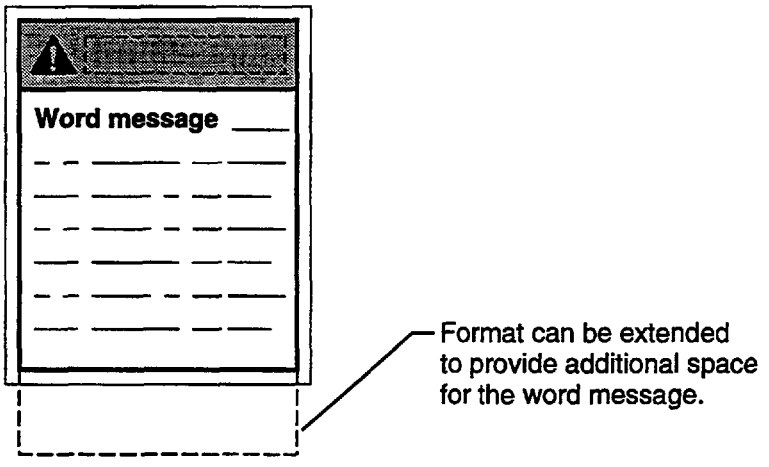

Figure 5 — Two-panel sign – vertical format

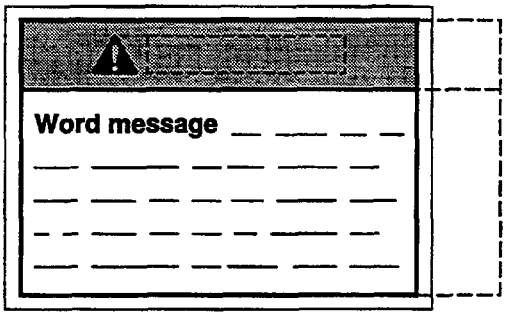

Figure 6 — Two-panel sign – horizontal format

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8.1 Letter style

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

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

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

8.2 Letter size

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

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

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

8.2.4 Signal word letter height should be at least 50 percent greater than the selected height of the 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 potential hazard in time to take appropriate action.

9.2 Protection

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

10 Expected life and maintenance

10.1 Expected life

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

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

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.

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.

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11 Symbols/pictorials

11.1 General

11.1.1 Symbols and pictorials are graphic representations chosen to clearly convey a specific alerting message.

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

11.2 Symbol/pictorial use

Symbols and pictorials may be used to clarify, supplement or substitute for a portion of the word message found in the message panel of product safety signs. Only symbols validated for recognition should be used. Symbols/pictorials that have not been validated for recognition may only be used to supplement or clarify the word message on the product safety sign.

12 References

12.1 General

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

12.2 American National Standards

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

1. American National Standards Institute (ANSI). *Safety Color Code,* ANSI Z535.1-1998.

2. American National Standards Institute (ANSI). *Environmental and Facility Safety Signs,* ANSI Z535.2-1998.

3. American National Standards Institute (ANSI). *Criteria for Safety Symbols/Pictorials,* ANSI Z535.3-1998.

4. American National Standards Institute (ANSI). *Accident Prevention Tags for Temporary Hazards,* ANSI Z535.5-1998.

12.3 Other standards

1. American National Standards Institute (ANSI). *Precautionary Labeling of Hazardous Industrial Chemicals.* New York: ANSI Z129.1-1994.

2. American Society for Testing and Materials (ASTM). *Standard Practice for Operating Light-Exposure Apparatus (Carbon-Arc Type) With and Without Water for Exposure of Nonmetallic Materials.* ASTM Section 14, Volume 14.02, Designation G23-95. Philadelphia, PA: 1997 Annual Book of ASTM Standards.

3. American Society for Testing and Materials (ASTM). *Practice for Operating Light -Exposure Apparatus (Xenon-Arc Type) With and Without Water for Exposure of Nonmetallic Materials.* ASTM Section 14, Volume 14.02, Designation G26-95. Philadelphia, PA: 1997 Annual Book of ASTM Standards.

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

12.4 Other publications

1. 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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Annex A

(Informative)

Guidelines for increasing recognition of safety label components

A1 Scope

It is important that the meaning of a product safety label is clearly understood by those who use or service the product. To increase the understanding of a safety label's components, the ANSI Z535 committee strongly encourages product manufacturers to incorporate the following information in their products' collateral material (e.g., operation manuals, instructions, safety literature, service manuals, etc.). Doing so will assist in the objective of achieving a national uniform system for the recognition of potential personal injury hazards. In addition, reproducing your products' safety labels in accompanying collateral material is recommended.

A1.2 The signal words

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.

Explain the meaning of the different signal words as defined by the ANSI Z535.4 standard. Such training is necessary to increase understanding of the multi-tier hazard classification system. The following artwork may be used for this purpose. (Note: The use of the appropriate color for each signal word panel is desirable. See the ANSI Z535 color chart at the front of this standard).



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.

A1.3 The symbols/pictorials

Explain the meaning of the symbols and pictorials used on your safety labels. This enables the viewer to better understand the meaning of the graphics and makes future recognition of the symbols/pictorials more instantaneous. Additional information may be added in your literature to further explain the meaning of each symbol/pictorial. See ANSI Z535.3 *Criteria for Safety Symbols* for more information about symbol/pictorial selection, design and testing.

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Annex B

(Informative)

Principles and guidelines for the design of product safety signs and labels

B1 Scope

Good consistent visual design helps to effectively communicate hazard information. The purpose of 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. For property-damage-only safety signs, the signal word CAUTION is used without the safety alert symbol (see Annex A).



Figure 1 — Examples of Correct Safety Alert Symbol and Signal Word Placement



Figure 2 — Examples of Incorrect Safety Alert Symbol 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/pictorial, 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.

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 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.

Moving parts can crush and cut.

Keep hands clear while operating.

Lockout power before servicing.

Figure 3

[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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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 to prevent interaction with the hazard.

Keep out.
Hazardous voltage inside.
440 Volts.

Figure 4

B3.2 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.

B3.2.1 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	*Non-Headline Style Message*
Moving parts can crush and cut. Keep guard in place. Lock out power before servicing.	**This machine has moving parts that can crush and cut. Keep the guard in place while operating this machine. Before servicing is performed, lock out the power.**

B3.2.2 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.**
Lock out power before servicing equipment.	**Power must be locked out before servicing equipment.**
Immediately replace guards after repair or adjustment.	**After repair or adjustment, immediately replace guards.**

B3.2.3. 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.**

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B3.2.4 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, operating procedures and safety bulletins.

B3.2.5 Separation of word message content

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

Outline Format

Moving parts can crush and cut.

Keep hands clear while operating.

Lockout power before servicing.

Outline With Bullet Format

Moving parts can crush and cut.

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

Continuous Format

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

B3.2.6 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 Right 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.

B3.2.7 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.

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B3.2.8 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 stoke "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).

Arial/Helvetica	**Futura**
Arial/Helvetica Bold	**News Gothic Bold**
Folio Medium	**Meta Bold**
Franklin Gothic	**Univers**

Figure 5 — Examples of Sans Serif Typestyles

B3.2.9 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 can be added to separate portions of a word message, as shown in the outline format illustrated in A4.2.5. The space between words and between letters is called tracking. For purposes of legibility, it is important to use proper word and letter spacing when typesetting the word message.

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

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

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

Figure 6 — Examples of Correct and Incorrect Type Spacing

B3.2.10 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.

Moving parts can crush and cut.

Keep hands clear while operating.

Lockout power before servicing.

Black type on a white background

Moving parts can crush and cut.

Keep hands clear while operating.

Lockout power before servicing.

White type on a black background

Figure 7 — Examples of Type Color Choice

B3.2.11 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.

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B3.2.12 Letter size

Legibility of the word message at the minimum safe viewing distance[3] determines the proper letter size for the word message. The letter size/safe viewing distance guidelines in Table 1 define the type size required to achieve legibility at the given viewing distance. The height of the capital letter "H" is used to determine the proper measurement. Note that the type sizes shown indicate the minimum or recommended word message letter size. A word message's type size may need to be larger in order to obtain conspicuousness from other information presented on the product. A larger type size may also be desired in order to warn persons at distances greater than the minimum safe viewing distance. Portions of a word message may appear in a larger type size for special emphasis. Final determination of letter height should be based on a visual examination of the formatted word message in light conditions similar to the reasonably expected environment of use. It is advisable to test different type size versions of the safety label to determine the optimum size for readability at the desired viewing distance. The designer should also consider the age-level of the intended audience when testing the word message for legibility.

B3.2.13 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 — 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*	.08 Inches	.08 Inches	.084 Inches
2 Feet	.10 Inches	.16 Inches	.168 Inches
3 Feet	.12 Inches	.19 Inches	.252 Inches
4 Feet	.14 Inches	.22 Inches	.336 Inches
5 Feet	.16 Inches	.25 Inches	.420 Inches
6 Feet	.18 Inches	.28 Inches	.504 Inches
7 Feet	.20 Inches	.31 Inches	.588 Inches
8 Feet	.22 Inches	.34 Inches	.672 Inches

*.08 inch type is the suggested minimum type size for use on product safety signs.

B4 The use of symbols/pictorials

Well designed symbols and pictorials can often communicate hazard information quickly and across language barriers. Although the ANSI Z535.4 standard allows word-message-only formats for safety labels, the use of symbols and pictorials is encouraged whenever practical. See ANSI Z535.3 *Criteria For Safety Symbols* for additional information concerning symbol/pictorial selection, design and testing.

B5 Multi-lingual formats

The selection of additional languages for product safety signs is an extremely complex issue. Experts suggest that nearly 150 foreign languages are spoken in the United States and over 23 million Americans speak

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

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a language other than English in their homes. If it is determined that additional languages are desired on a safety sign, the following formats may be considered. In all examples, the use of symbols/pictorials 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/pictorial and word message panels.

B5.1 Vertical formats

The vertical bilingual format shown in Figure 8 can be modified to include a longer word message by lengthening the word message panels.

B5.2 Horizontal Formats

Figures 9 and 10 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.

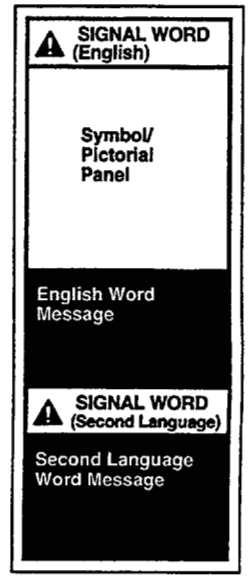

Figure 8

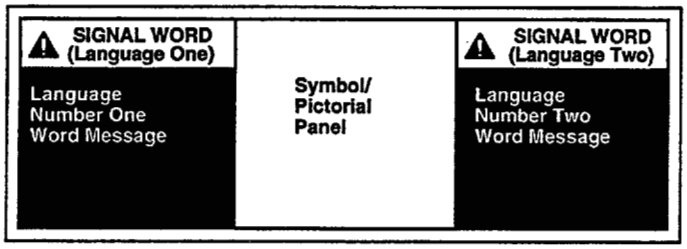

Figure 9

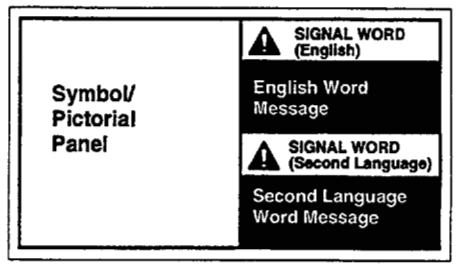

Figure 10

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.

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 symbols/pictorials in multi-hazard formats is optional but encouraged. Additional symbols/pictorials 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 pictorial 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 1, 2 and 3 of the ANSI Z535.4 standard and use a single symbol/pictorial to communicate the most important hazard. Use the outline format to separate the various hazard word messages (see B3.2.5).

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B6.2 Two-panel Formats

Use the two-panel signal word/word message formats shown in Figures 4 and 5 of the ANSI Z535.4 standard. Use the outline format to separate the various hazard word messages (see B3.2.5).

B6.3 Multi-pictorial Formats

Use one of the multi-symbol/pictorial formats shown in Figures 11 through 13. In formats 11 and 12, place the most important hazard symbol/pictorial 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/pictorials ("reading" the symbols/pictorials from left to right or top to bottom). If the format shown in Figure 12 is used, arrange the word message segments so they line up opposite the appropriate symbol/pictorial panel.

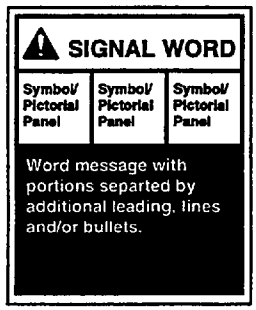

Figure 11

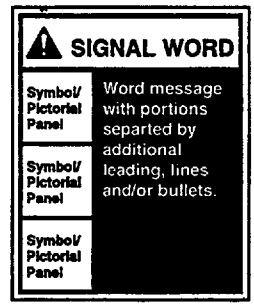

Figure 12

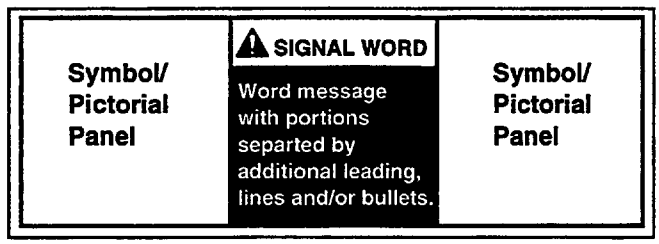

Figure 13

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Revisions 2001

The ANSI Accredited Standards Committee Z535 plans to issue the next revisions of the Z535 Standards (.1 through .5) in December 2001. In order to meet that deadline, the committee developed the following tentative timetable:

All proposed changes are due:	June 30, 1999
Revisions will be finalized for letter balloting:	April 11, 2000
Letter balloting will be completed by:	July 18, 2000
Public reviews will be completed by:	March 1, 2001
Drafts will be ready to submit to the publisher:	May 21, 2001
Published:	December 15, 2001

All proposed changes must be submitted by June 30, 1999. 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:

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National Electrical Manufacturers Association
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ANSI Accredited Standards Committee Z535
On Safety Signs and Colors

FORM FOR PROPOSALS

Return to: Secretary, ANSI ASC Z535
National Electrical Manufacturers Association
1300 North 17th Street, Suite 1847
Rosslyn, VA 22209

Date_____ Name_____ Telephone #_____

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Representing_____
(Please indicate organization or self.)

1. a. Standard Title_____

   b. Section/Paragraph_____

2. Proposal recommends (check one): New Text
   Revised Text
   Deleted Text

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

4. Statement of the Problem or Substantiation for the Proposal

5. Check one. This proposal is original material.
   This proposal is not original material; its source is as follows:

   _____

   _____

(This original material is the submitter's own idea based upon his own experience, thought, or research, and to the best of his/her knowledge, is not copied from another source.

I agree to give NEMA all and full rights, including rights of copyright, in this proposal, and I understand that I acquire no rights in any standards publication in which this proposal in this or another similar or analogous form is used.

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Signature

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