

A Handbook for Effective

SAFETY SIGNAGE

according to the

ANSI Standard
Z535.2-2011



VULCAN
UTILITY SIGNS
Mark It To Protect It

The Role of Safety Signage

Environmental, health and safety professionals know that it's critical to effectively communicate safety. Safety signage plays a key role in achieving this objective. They are the visual tools used to remind people of potential hazards and how to avoid them. Another tool is to reinforce your safety training programs.

Your safety signage is a direct reflection of your company's safety culture. Your safety signage and training demonstrate your care and concern for the health and safety of your employees, guests, visitors, subcontractors and temporary workers.

The New ANSI Standard

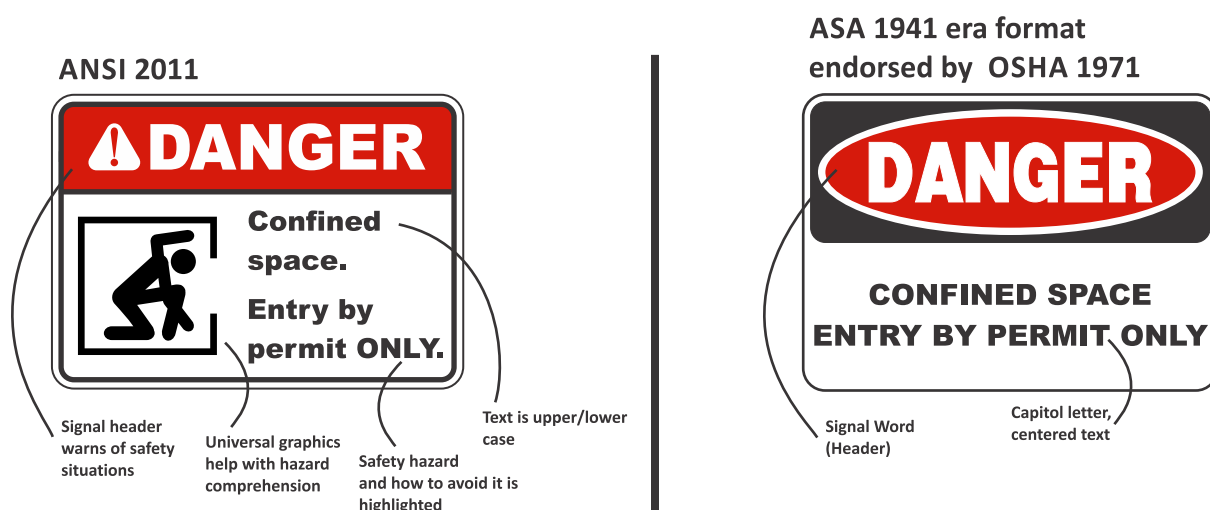
As organizations adopt the latest ANSI standards, the U.S. will increasingly require uniform safety signing. Uniformity leads to more effective communication, with the ultimate objective being fewer accidents in the workplace. These standards truly move the industry forward. With it comes safety and worker protection by:

- Using more effective warnings supported by research and modern risk assessment methodology
- Providing more information on hazards and how to respond to them
- Better accommodating today's diverse workforce with the use of multilingual signs
- Including up-to-date warning standards and technology advancements

OSHA

OSHA has many rules and regulations that companies must follow. There are regulations for machinery to chemical handling and just about everything in between. Under OSHA's Hazard Communication Standard update, companies can now use either the ASA standard from 1967-1968 [Z53.1, Z35.1 & Z35.2] or from 2011 [ANSI Z535.1, Z535.2 & Z535.5] for safety signage.

OSHA adopted the ANSI safety sign standard Z535 in the fall of 2013. **It is also important to know that you will not be fined by OSHA if you do not use the new format.** However, inspectors may document that your facility is not compliant with the new regulation on their report.



Why use the new OSHA approved ANSI standard for Safety Signs?

There are many reasons to adopt the new OSHA/ANSI sign system. Most importantly is that it more effectively communicates safety by:

- Containing more substantive content that explains hazards and how to avoid them
- Using eye-catching symbols to overcome language barriers, drawing attention to the sign and making it stand out from all the other posted signage
- Providing design principles based on risk assessment methods that use carefully defined, severity-ranked color coding
- Establishing guidelines for the viewing distance required to avoid the hazard and relating that distance to the size of the sign components, to determine the proper sign size

About this Handbook

The actual Z535.2 standard and appendix is 35 pages. This handbook boils all this down to what you need to know in order to have the most appropriate sign for every application. Many of the granular details should be known by the manufacturer of the signs. This handbook provides information and details about the main components and ends with a guideline of logical steps to have each sign fabricated.

Components of ANSI Safety Signs

Each of the four components below have a separate section in this handbook containing additional information.

Safety Alert Symbol

Signal Word

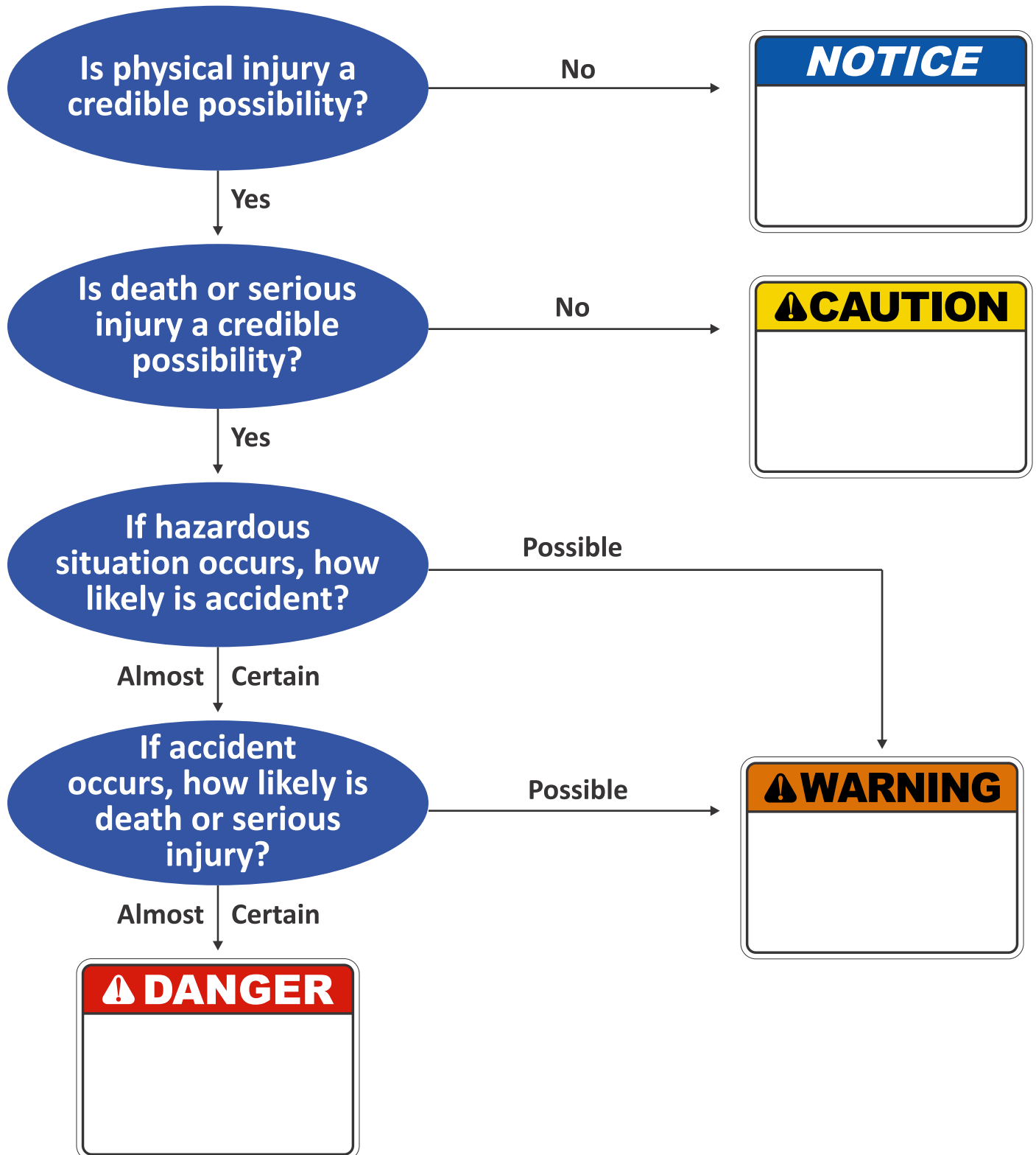


Safety Symbol

Word Message

Signal Words

Signal Words can be broken down into two areas; Hazard Alerting and Informational. The signal words for Hazard Alerting are DANGER, WARNING and CAUTION. The selection of which is based on the risk that results from not following the safety message. The level of risk determines the signal word. The signal word selection process is summarized in the flow chart below and the matrix chart on the opposite page.



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

If the worst credible severity is death or serious injury:

		Probability of Accident if Hazardous Situation is Not Avoided	
		Will	Could
Probability of Death or Serious Injury if Accident Occurs	Will		
	Could		
If the worst credible severity is minor or moderate injury		If there is no credible risk of physical injury	

Safety Alert Symbols

The Safety Alert Symbol is used in conjunction with the signal word. Using a Safety Alert Symbol signifies there is a hazard.

It is composed of an equilateral triangle surrounding an exclamation mark. The Safety Alert Symbol is only used on hazard alerting signs. It is not used on safety notice, safety instruction, safety equipment location and fire equipment location signs. The color of the symbol is the same as the background of the signal word. However, there are certain ISO standards that call for other colors. The pictorial below illustrates the Safety Alert Symbols.



Color Chart

The colors below are to be used with the ANSI Standards Series. A Pantone Matching System [PMS] number is referenced for each color.

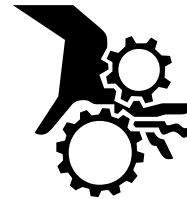
Safety Red	PMS-485C		Safety Orange	PMS-152C	
Safety Yellow	PMS-109C		Safety Green	PMS-3415C	
Safety Blue	PMS-2945C				

Safety Symbols

The U.S. population is multi-ethnic, highly mobile and derived from a multiplicity of social and educational backgrounds, with different reading and word comprehension skills. These factors complicate the effectiveness of word-only signs. Effective safety symbols have demonstrated their ability to provide critical information for accident prevention and for personal protection. Signs with safety symbols can promote greater and more rapid communication of the safety message and therefore greater safety for the general population.

Hazard Alerting

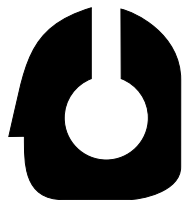
This type of safety symbol conveys the nature of the hazard.



Optional surround shape and color for more emphasis

Mandatory Action

This type of safety symbol conveys actions that should be taken to avoid hazards.



Optional surround shape and color for more emphasis

Prohibition

This type of safety symbol conveys actions that should not be taken.



Information Symbols

Safe Condition

This type of safety symbol is generally used on Safety Equipment Locations and Egress Signs to convey first aid location and means of escape.



Fire Safety

This type of safety symbol is generally used on Fire Equipment Location Signs and can convey the type of fire equipment.

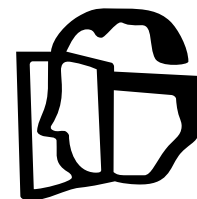


Consistency

“Consistency” refers to the relationship of one symbol to another. For example, in the case of personal protective equipment for the head, consistent head shape emphasizes the important differences in intended meaning, while variation in head shape detracts from differences in user interpretation.



Consistent Head Emphasizes
Differences in Message



Variation in Head Detracts from
Differences in Messages

See page 13 for a listing of symbols

Word Message

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 consequences 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, the target audience's training, or the context in which the safety sign is used.

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

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.

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.

Consequence statement

The consequence statement tells the viewer in clear, simple language what will happen if the warning is ignored.

Will burn **Can cause serious burns or death**

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.

Keep Out!

Do not operate

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.

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.

Hazardous voltage inside

Confined Space

<i>Active Voice</i>	<i>Passive Voice</i>
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.

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 typeface, with an exclamation mark, or with a combination thereof.

Hazardous voltage
inside.

Keep Out!

Hazardous voltage
inside.

KEEP OUT!

Separation of word message content

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

Moving parts can
crush and cut.

Keep out during
operation.

Lockout power
before entering.

Moving parts can
crush and cut.

● Keep out during
operation.

● Lockout power
before entering.

Avoid prepositional phrases

Avoid the use of prepositional phrases.

<i>Without Prepositional Phrases</i>	<i>With Prepositional Phrases</i>
Disconnect power before servicing equipment.	Disconnect power in order to service equipment.

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.

Moving parts can
crush and cut.

Lockout power
before entering.

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. On occasion, a single word or phrase may be set in upper case letters to provide emphasis.

Keep out during
operation.

KEEP OUT during
operation.

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.

Moving parts can
crush and cut.

Keep out during
operation.

Moving parts can
crush and cut.

Keep out during
operation.

Letter Size of Word Message

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

The chart below provides the minimum safe viewing distance and its corresponding letter height of the Word Message. The letter height measurement should be taken using the capital letter "H". The standard further states that the height of the Signal Word should be at least 50% greater than the letter height of the majority of the message of the Word Message.

Minimum Safe Viewing Distance	Minimum letter height of the "H" in the Word Message		Minimum letter height of the Signal Word
feet	points	inches	inches
8	32	0.32	0.48
10	40	0.40	0.60
20	80	0.80	1.20
30	120	1.20	1.80

Letter size may need to be larger than the value in the table above for various reasons including the following:

- To be conspicuous from other information
- To facilitate legibility under low light or other unfavorable viewing conditions
- To warn persons at greater distances
- To convey special emphasis for portions of the message

In Summary

- Letter height of the word message is dependent on the minimum safe viewing distance.
- Signal Word is dependent on the letter height of the word message.
- The size of the sign is dependent on the amount of the word message.



Standard Sizes	7" x 5"	10" x 7"	14" x 10"	20" x 14"
Minimum Safe Viewing Distance	8 ft.	10 ft.	20 ft	30 ft.

Sign Size Determination

Standard sizes of safety signs have been 10" x 7", 14" x 10" and 20" x 14". These standard sizes are still used, but in some cases are restrictive. As summarized on the previous page, there are several items to be considered in the correct size in order to obtain the best size for the sign. It is important to note that specific sign sizes are not stated anywhere in the ANSI standard.

The format of the sign can vary depending on the application. The most common is a horizontal rectangle. The size of the sign is stated as the horizontal dimension first, followed by the vertical dimension.

Horizontal Signs:

10" x 7"

14" x 10"

20" x 14"

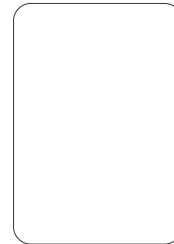


Vertical Signs:

7" x 10"

10" x 14"

14" x 20"



Sign Material

Thus far, this handbook has referred to all signage as having a rigid substrate. Virtually all applications can be made as a decal to be applied to an existing surface. Selection of the right materials in either case is an important consideration. There are many types of rigid substrates. Aluminum is the best choice for outdoor signs due to its durability.

There is a wide variety of films that decals can be fabricated from:

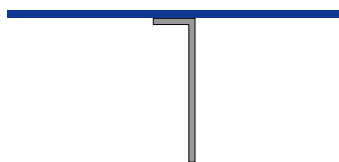
- An outdoor decal should use a "cast" vinyl film which typically has very good durability.
- Decals made from "calendar" vinyls are less in cost and durability.
- Retro-reflective films provide the added benefit of nighttime visibility and can be used on signs as well as decals.
- Photo luminescent films glow for a period of time, should there be a power outage.

Mounting Heights

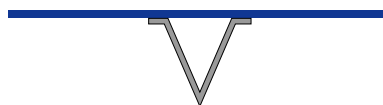
- High Locations - Fire, Safety Equipment and Exit signs should be mounted high for better visibility. 78" above the floor is optimum for these type signs.
- Medium Locations – Typically these signs are intended to be viewed by a standing person. These signs should be placed from 48" to 66" from the floor as measured from the center of the sign.
- Low Locations – These are typically egress path marking signs. The top of the sign should be placed no more than 18" above the floor so the sign can be seen in smoke conditions.

Sign Styles

Most signing is done with flat signs. The viewing angle for flat signs is 45 degrees either side of straight on. Some applications necessitate the viewing angle of 180 degrees. This can be accomplished in a flag fashion with a flange mount or tent formed as depicted below. Three way sign styles can be very effective for a 360 degree viewing angle.



Flange Mount

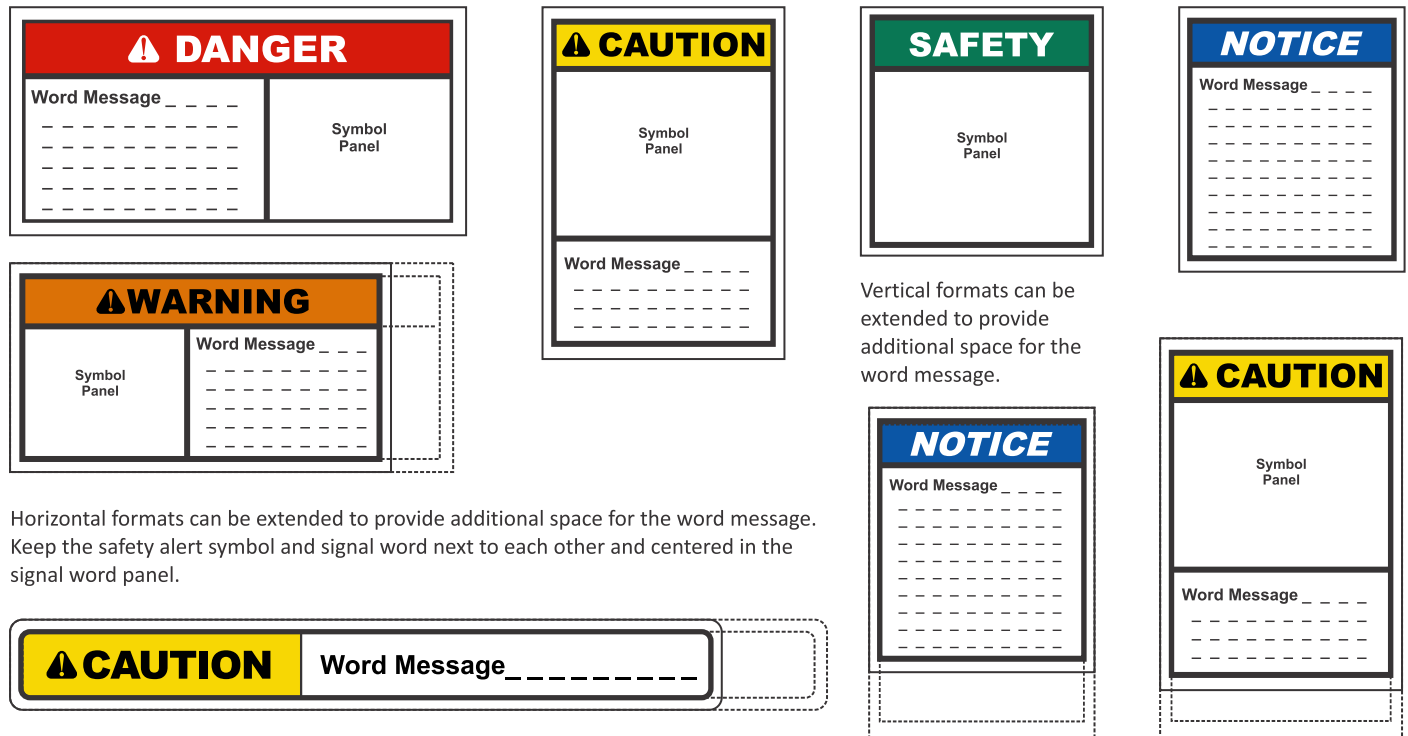


Tent Formed



Orientation and Format

Flexibility in orientation and size is promoted in order to best convey the sign's message, while also taking into consideration the desired placement of the sign. There are few restrictions in this area of the ANSI standard. It is best to remain with a straight sided rectangle. Several examples are below and on the next page that illustrate different orientations.



Horizontal formats can be extended to provide additional space for the word message. Keep the safety alert symbol and signal word next to each other and centered in the signal word panel.

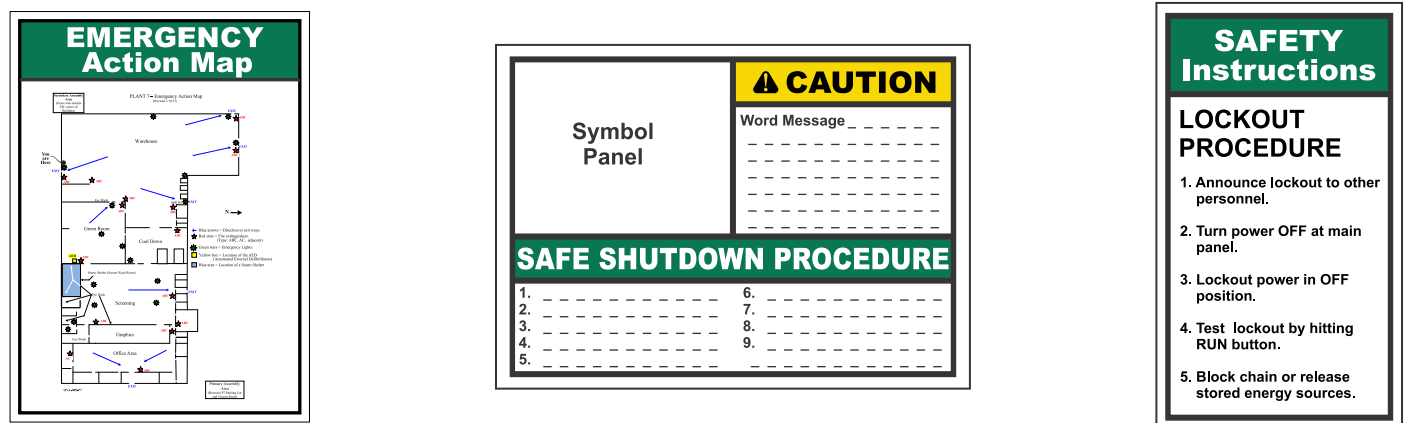
Informational Signs

Instructional Signal Words such as "SAFETY INSTRUCTIONS" or similar words encourage more descriptive words for the application. Examples can be:

Safety Operating Procedures
Safe Installation Instructions

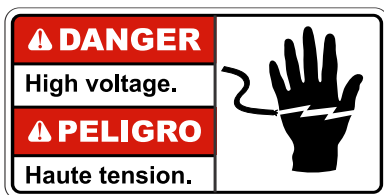
Shutdown Procedure
Lockout Procedure

In these cases the word message may be lengthy, numbered and may be combined as part of a hazard alerting sign.



Multilingual Formats

This selection of additional languages for safety signs is an extremely complex issue. The use of safety symbols is strongly encouraged in order to better communicate the sign's hazard information. The following formats should be considered for multilingual signing.



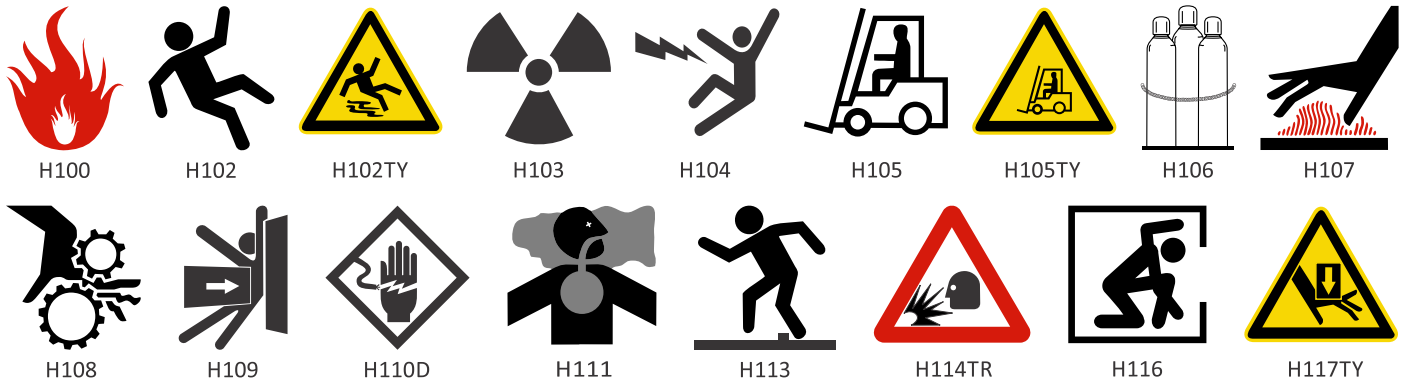
Multi-Hazard Formats

A multi-hazard format may be considered if multiple hazards exist at one location and not enough space for several single signs. Another benefit of multi-hazard formats is the reduction of sign clutter. The hazard with the greatest seriousness level should be arranged first followed by lesser levels.



More Safety Symbols

Hazard



Prohibition Symbols



Mandatory Action



Safe Condition



Fire Safety



How to specify what you need

The following list of questions will provide the information for almost all needs. Notice that a size is not asked for since the sign size depends on the viewing distance and the Word Message.

1. Is there a hazard and if so what is it?
2. What words would you use to convey the hazard avoidance message?
3. Specify the Signal Word.
4. Determine the Safety Symbol.
5. What is the viewing distance?
6. Do you need a decal or rigid sign?
7. Where is the decal/sign going to be - inside or outside?
8. If a sign, how is it going to be mounted? Post, fence, drywall, cement wall, etc.?
9. Additional instructions:

A sign professional that has knowledge in the new ANSI standard will be able to provide a layout for review. The Word Message may be changed to be more succinct. Also, other Safety Symbols may be proposed along with a reason for consideration.

Example

Is there a hazard and if so what is it?	Y	N	Flammable Liquid	
What words would you use to convey the hazard avoidance message?	No smoking, matches, open lighters, metal cutting, welding or brazing			
Specify the Signal Word.	DANGER	WARNING	CAUTION	NOTICE
Determine the Safety Symbol.	Symbol #	H100 (from chart)		
What is the viewing distance?	8'	10'	20'	30'
Do you need a decal or rigid sign?	Decal	Sign		
Where is the decal/sign going to be mounted?	Inside	Outside		
If a sign, how is it going to be mounted? Post, fence, drywall, cement wall, etc.?	Metal Siding			
Additional instructions:	None			



4 holes,
1/4" diameter
in each corner

Vulcan Product Lines

Line Markers

Round



Rectangle



Custom



H41 Bullet Markers



Drivable (DRV) Markers



Aerial Pointer



Facility Identification



Miscellaneous

Aerial Markers



Safety Signs



Temporary Markers



Fleet Marking



Work Zone Products



Traffic Control Signs



Waterway Signs



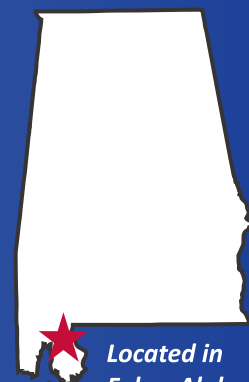
Sign Posts



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