SAE Aerospace
An SAE International Group

AEROSPACE RECOMMENDED PRACTICE

SAE ARP577 REV. D

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Superseding ARP577C

(R) Emergency Placarding - Internal and External

1. SCOPE:

This SAE Aerospace Recommended Practice (ARP) provides criteria for the development and standardization of placards containing signs, symbols and/or instructions for locating and operating exits and emergency equipment that might be used or operated by cabin occupants and rescue personnel under emergency conditions. In addition, this ARP gives guidance in the selection and development of warning placards. The placards are intended to be seen and understood by occupants within and, in the case of external exit placards, by persons outside of the airplane.

1.1 Purpose:

The purpose of this ARP is to assist manufacturers as well as commercial, corporate and private operators to produce standardized emergency placarding.

2. REFERENCES:

2.1 Applicable Documents:

The following publications form a part of this document to the extent specified herein. The latest issue of SAE publications shall apply. The applicable issue of other publications shall be the issue in effect on the date of the publication of this document. In the event of conflict between the text of this document and references cited herein, the text of this document takes precedence. Nothing in this document, however, supersedes applicable laws and regulations unless a specific exemption has been obtained.

2.1.1 SAE Publications: Available from SAE, 400 Commonwealth Drive, Warrendale, PA 15096.

2.1.2 U.S. Government Publications: Available from Superintendent of Documents, U.S. Government Printing Office, Washington, DC 20402, U.S. Code of Federal Regulations, Title 14, Part 25.812 Exit Signs.

TO PLACE A DOCUMENT ORDER: **Tel: 877-606-7323 (inside USA and Canada)**
Tel: 724-776-4970 (outside USA)
Fax: 724-776-0790
Email: custsvc@sae.org
SAE WEB ADDRESS: **http://www.sae.org**

2.2 Applicable References:

Reference 1. ARP503, Emergency Evacuation Illumination.

Reference 2. Sanders, M. S. and McCormick, E. J.: Human Factors in Engineering and Design, 7th ed. McGraw-Hill Book Company, New York, NY, 1993.

Reference 3. Panero, J. & Zelnik, M.: Human Dimension and Interior Space, Watson-Guptill Publications, New York, 1979.

Reference 4. ANSI Z535: American National Standard: Product Safety Signs and Labels, Published by National Electrical Manufacturers Association, 1300 North 17th Street, Suite 1847, Rosslyn, VA 22209, available through Global Engineering Documents, 15 Inverness Way East, Englewood, CO 80112.

Reference 5. Miller, J., Frantz, J., and Rhoades, T.: A Model for Designing and Evaluating product Information, published in the 1991 Proceedings of the Human Factors Society, pp. 1063-1067, P.O. Box 1369, Santa Monica, CA 90406.

2.3 Definitions:

2.3.1 EMERGENCY PLACARD: Any durable visual signage that provides instructions for locating emergency equipment, operating that equipment, or warning users about potential hazards. Emergency equipment includes slides and other escape devices, life rafts, fire extinguishers, life jackets, oxygen masks, and such other items as might be used or operated under emergency conditions.

2.3.1.1 Locational Placard: Signage that identifies the placement of emergency equipment.

2.3.1.2 Instructional Placard: Signage that provides information on how to operate emergency equipment.

2.3.1.3 Warning Placard: Signage that alerts a person to the presence of a hazard, thereby triggering the processing of additional information regarding the nature, probability, and magnitude of the hazard. This additional information may be within the user's memory or may be provided by other sources, such as written or pictorial instructions or instructions from a crew member.

2.3.2 FAVORABLE VIEWING CONDITIONS: Conditions in which there is sufficient illumination, high contrast between the words or pictures and their background, and sufficient time for seeing. Viewing conditions are degraded if any of these factors are compromised.

2.3.3 PICTORIAL PRESENTATION: When information is presented either by photograph or illustration. May be either realistic or abstract.

2.3.3.1 Realistic Pictorial Presentation: One that is easily understandable without prior learning, e.g., most photographs and "life-like" illustrations. Usually considered culture-free and language-free.

2.3.3.2 Abstract Pictorial Presentation: A picture, such as a symbol, that is understandable only with prior learning.

3. GENERAL GUIDANCE FOR ALL PLACARDS:

3.1 Realistic pictorial presentations should be used whenever possible to convey information on equipment location and operation. An abstract pictorial presentation (e.g., the picture of a cigarette overlaid with a red circle and slash to symbolize "no smoking") may be used if it is well understood by the intended users.

3.2 A written word or phrase shall be used if the pictorial presentation alone is inadequate to provide the information or if the word(s) increases the understanding of the placard. Unnecessary words should be avoided.

3.3 Emergency placards shall be made conspicuous by using any of several techniques, including:

a. making the color of the placards different from the background;
b. lighting the placard;
c. placing a border around the placard.

Letters, characters, and pictures shall appear upright to the intended user.

3.4 Illumination of placards shall be in accordance with Reference 1.

4. WRITTEN INSTRUCTIONS:

4.1 Written instructions shall be aligned such that they are read in the correct order. When phrases are separated, some method (such as the use of numbers or arrows) shall be used to indicate reading order.

4.2 Abbreviations should be avoided. Abbreviations may be used if they are understood by the intended users.

4.3 Letters or numerals shall comply with the following recommendations (see Reference 2):

a. no flourishes shall be used;
b. critical details shall be simple and prominent;
c. character features such as openings and breaks shall be readily apparent;
d. stroke width-to-height for black letters on white background shall be between 1:6 and 1:8;
e. when white letters on a black background are used the stroke width-to-height shall be between 1:7 and 1:10;
f. letter width-to-height shall be between 1:1 and 1:5;
g. numeral width-to-height shall be 3:5;
h. the letter "I" and the numeral "1" shall be consistent with the stroke width-to-height ratio of the characters selected.

4.4 Suggested styles include Gothic, Spartan, Futura, and Helvetica Medium. Use sans serif type styles for short word messages. Limit serif type styles to emergency placards having a large amount of text.

4.5 Text shall be written in 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 written messages with numerous words shall not be used because it is more difficult to read quickly as compared to lower case type. A single word or short phrase may be set in upper case type to provide emphasis.

4.6 Short sentences with short, easily understandable words shall be used.

4.7 An outline format shall be used whenever possible because a "continuous format" layout is less readable than an "outline format." Examples of each type of format follow:

Continuous Format:
This hatch may be opened by lifting the cover, grabbing the handle and pulling it toward you.

Outline Format:
To open this hatch
Lift cover
Grab handle
Pull it toward you

5. PICTORIAL INSTRUCTIONS:

5.1 When instructional placards show two or more operations then some means may be required to indicate the order of operation. Numbers, arrows, letters, etc., should be used to indicate the order in which pictorial instructions are to be followed. Letters ("A", "B", "C", etc.) or numbers shall be avoided, however, if the instructions are meant for users who may not understand the alphabetical or the numerical system.

5.2 Pictorial instructions should display the intended information in a realistic rather than an abstract manner. An abstract presentation may be used if the intended users understand it.

5.3 Distortion of pictorial displays may be used to increase understanding of the message. For example, color or size of an important element, such as a door handle, may be altered in order to draw a person's attention.

5.4 If distortion of pictorial displays is necessary the distortion shall not degrade understanding of the message.

6. MINIMUM-SIZED PICTURES AND WORDS:

The minimum letter height and size of, or distance between, elements of a picture shall subtend at least 20 minutes of arc under favorable viewing conditions, at least 37 minutes of arc under moderate viewing conditions, and at least 50 minutes of arc under poor viewing conditions (see Table 1).

TABLE 1

Letter Height	Viewing Condition Favorable	Viewing Condition Moderate	Viewing Condition Poor
0.40 in (10 mm)			X
0.30 in (8 mm)		X	
0.16 in (4 mm)	X		
MINIUTES OF ARC	20	37	50

NOTE: For other viewing distances, letter heights (and distances between elements) can be calculated for the various viewing conditions using Equation 1:

$$\text{Visual Angle (minutes of arc)} = \frac{(3438)(\text{Letter Size})}{\text{Viewing Distance}} \qquad \text{(Eq. 1)}$$

Minimum letter height and stroke width, placard illumination, and figure-to-background contrast are established in Reference 2.

7. COLOR OF PLACARD AND BACKGROUND:

To be legible the pictures or words must be of a different color than the background. Some color combinations are more legible than are others. It is generally recommended that the picture or word be of a darker color than the background since this combination is more legible than the reverse. However, a light figure (or word) on a dark background (e.g., white on black) may be used if other factors are considered more important than a minor loss in legibility. Table 2 lists a few common colors which have been rated for legibility when used with other colors.

TABLE 2

Legibility Rating	Color Combination
Good	Black on White (Best) Black on Yellow White on Black Dark Blue on White Grass Green on White
Fair	Red on White Red on Yellow
Poor	Green on Red Red on Green Orange on Black Orange on White

Different shades of colors, color saturation, and intensity and color of illumination will affect legibility of some combinations.

8. PLACARD PLACEMENT:

8.1 Locational Placards Placement:

8.1.1 Locational placards shall be placed so as to attract the attention of those required to use them.

8.1.2 Locational placards shall be placed on any enclosure housing the equipment. The placards shall be visible from all normal directions of approach.

8.1.3 Placement of the internal placards should be such that the placards are visible and readable to adults ranging in height from the 5th percentile female to the 95th percentile male. (For the U.S. Population, the 5th percentile female height is 59 inches [150 cm] and the 95th percentile male height is 73 inches [183 cm], Reference 3.)

Placement of external placards should be such that the placards are visible and readable to those ranging in size from the 5th percentile female to the 95th percentile male from positions either on the ground, or on ramp equipment, as appropriate.

8.1.4 Locational placards situated away from equipment shall indicate the direction to the equipment.

8.1.5 Locational placards referring to two or more different pieces of equipment should not be placed close together. If such placards must be placed close together, the format of the placards should be somewhat different in order for a person to easily understand there are two or more pieces of equipment located there.

8.2 Instructional Placard Placement:

8.2.1 Instructional placards shall be placed on, or as close as is practical to, the equipment for which they are intended.

8.2.2 Instructional placards shall indicate the emergency position(s) to which a control on a piece of emergency equipment can be moved. The description or location of each emergency position shall be obvious regardless of the position of the control.

8.3 Warning Placard Placement:

8.3.1 When a hazardous condition exists and the hazard cannot be eliminated, and when an effective barrier cannot be erected to prevent unintended contact with it, then a warning shall be provided. The warning shall conform to U.S. national standards for safety signs as presented in Reference 4.

8.3.2 Warnings shall be developed systematically to insure they are adequate (Reference 5). A multilevel approach shall be followed when a potential hazard is identified with the use or misuse of a piece of equipment or with some possible behavior on the part of passengers or crew that could result in injury or damage.