SAE INTERNATIONAL

AEROSPACE RECOMMENDED PRACTICE

ARP577™ REV. F

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Superseding ARP577E

Emergency, Instruction, and Information Placards - Internal and External

RATIONALE

This document is being revised to update formatting and references.

1. SCOPE

This SAE Aerospace Recommended Practice (ARP) specifies criteria for the design, development, standardization, and comprehension testing of placards containing pictures, drawings, symbols, and/or written instructions for locating and operating aircraft emergency equipment. This ARP also provides guidance in the selection and implementation of warning placards intended to instruct occupants inside, and rescue personnel outside, the aircraft.

1.1 Purpose

The purpose of this ARP is to assist manufacturers, operators, placard designers, and OEMs in producing and installing standardized, well-comprehended 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 purchase order. 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 International, 400 Commonwealth Drive, Warrendale, PA 15096-0001, Tel: 877-606-7323 (inside USA and Canada) or +1 724-776-4970 (outside USA), www.sae.org.

ARP503	Emergency Evacuation Illumination
ARP8996	Comprehensibility Testing for Pictogram-Based Aircraft Signs and Placards
CAESAR 3-D	Anthropometric Database

TO PLACE A DOCUMENT ORDER: **Tel: 877-606-7323 (inside USA and Canada)**
Tel: +1 724-776-4970 (outside USA)
Fax: 724-776-0790
Email: CustomerService@sae.org
SAE WEB ADDRESS: **http://www.sae.org**

For more information on this standard, visit
https://www.sae.org/standards/content/ARP577F/

2.1.2 ANSI Accredited Publications

Copies of these documents are available online at http://webstore.ansi.org/.

ANSI Z535 American National Standard: Safety Alerting Standards

2.1.3 ISO Publications

Copies of these documents are available online at http://webstore.ansi.org/.

ISO 9186 Graphical Symbols - Test Methods

2.1.4 Other Publications

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

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.

2.2 Related Publications

The following publications are provided for information purposes only and are not a required part of this SAE Technical Report.

2.2.1 Code of Federal Regulations (CFR) Publications

Available from the United States Government Printing Office, 732 North Capitol Street, NW, Washington, DC 20401, Tel: 202-512-1800, www.gpo.gov.

14 CFR 25 Airworthiness Standards: Transport Category Airplanes

2.2.2 EASA Publications

Available from European Union Aviation Safety Agency, Konrad-Adenauer-Ufer 3, D-50668 Cologne, Germany, Tel: +49 221 8999 000, www.easa.europa.eu.

CS-25 Certification Specification for Large Aeroplanes

2.2.3 FAA Publications

Available from Federal Aviation Administration, 800 Independence Avenue, SW, Washington, DC 20591, Tel: 866-835-5322, www.faa.gov.

AC 25-17A Transport Airplane Cabin Interiors Crashworthiness Handbook

2.2.4 GAMA Publications

Available from General Aviation Manufacturers Association, Suite 801, 1400 K Street, N.W., Washington, DC 20005-2485, Tel: 202-393-1500, https://gama.aero/.

Publication No. 15 Symbolic Messages

2.2.5 ICAO Publications

Available from International Civil Aviation Organization, 999 University Street, Montreal, Quebec H3C 5H7, Canada, Tel: +1 514-954-8219, http://www.icao.int/.

Annex 6, Part I	Operation of Aircraft - International Commercial Air Transport - Aeroplanes
Annex 8	Airworthiness of Aircraft
Doc 10086	Manual on Information and Instructions for Passenger Safety

2.3 Definitions

ABSTRACT PICTORIAL PRESENTATION: An illustration, such as a symbol, that is comprehensible only with prior instruction.

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

FAVORABLE VIEWING CONDITIONS: Conditions in which placard foreground elements (words, pictures, drawings, symbols, etc.) are presented clearly and in high contrast to the background, with sufficient illumination and viewing time for recognition and comprehension. Viewing conditions are degraded if any of these factors is compromised.

INFORMATION PLACARD: Any durable visual signage that provides information to either the crew, maintenance personnel, cleaning personnel, or passengers (for example: life vest under your seat).

INSTRUCTION PLACARD: Any durable visual signage that requires an action from either the crew, maintenance personnel, cleaning personnel, or passengers (for example: fasten seat belt while seated, how to operate emergency equipment).

LOCATION PLACARD: Signage that identifies the place of equipment stowage.

PICTORIAL PRESENTATION: Information presented either by photograph or illustration. May be realistic or abstract.

REALISTIC PICTORIAL PRESENTATION: A pictographic illustration that is comprehensible without prior instruction (e.g., most photographs and “life-like” illustrations), and usually considered culture- and language-free.

WARNING PLACARD: Signage that alerts a person to the potential for or presence of a hazard, indicating the need for additional evaluation of its nature, probability, and magnitude, as well as the potential need for additional information.

2.4 Mandating and Recommending Words

SHALL indicates a mandatory criterion.

SHOULD indicates a criterion for which an alternative, including non-compliance, may be applied if it is documented and justified.

3. GENERAL GUIDANCE

3.1 A realistic pictorial presentation should be used whenever possible to convey information on equipment location and operation.

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

3.3 An abstract pictorial presentation (e.g., the picture of a red circle and slash to indicate “prohibition”) may be used if it is widely understood by the intended users.

3.4 Placard letters, characters, pictures, and symbols shall appear upright to the intended user.

3.5 Design, comprehension testing, and implementation of placards should be conducted in accordance with ARP8996 and ANSI Z535 or ISO 9186. A success criterion of 85% correct responses is considered successful comprehension. However, standardized placards identified in ANSI Z535 may be implemented without further comprehension testing.

4. WRITTEN INSTRUCTIONS

Disclaimer: This section is for English language only. For placards in other languages, the content of this section should be considered as much as possible.

4.1 Text shall be rendered in mixed upper- and lower-case type. Only the first letter of the first word in a sentence should be capitalized, since sentences with all upper-case letters take longer to read. A single word or short phrase may be rendered in upper case type to provide emphasis (ANSI Z535.2).

4.2 Instructions shall be arranged so as to be followed in the correct order. Separated words and phrases shall be delimited, using numbers, arrows, bullets, etc., to indicate procedural order.

4.3 Short sentences with short, easily comprehensible words should be used.

4.4 Abbreviations should be avoided, except where shown via testing to be effective.

4.5 For clarity, fonts of a simple form like Arial, Calibri, Times New Roman, Helvetica Medium, etc., shall be used. Sans serif type fonts may be used for short words. Serif type fonts should be limited to placards having a large amount of text.

4.6 An outline format should be used whenever possible for text, because of its generally improved readability over a continuous format. Examples of each type of format follow:

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

b. Outline format:

To open hatch
Lift cover
Grab handle
Pull it toward you

4.7 Letters or numerals shall be rendered as follows (ANSI Z535.2):

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. Letter width-to-height shall be between 1:1 and 1:5;

f. Numeral width-to-height shall be 3:5;

g. Stroke width-to-height for white letters on a black background shall be between 1:7 and 1:10.

5. PICTORIAL INSTRUCTIONS

5.1 Instructions should display the intended information in a realistic, rather than an abstract, manner, except where an abstract representation (e.g., symbol) has been shown via testing to be comprehended by the range of intended users. Comprehension testing of candidate pictorials and symbols should be conducted in accordance with ANSI Z535.3.

5.2 An instructional placard showing two or more operations shall indicate the procedural order. Numbers, arrows, letters, etc., should be used to indicate the order in which pictorial instructions are to be followed.

5.3 Distortion of pictorial displays may be used to increase comprehension of the message. For example, the color or size of an important element, such as a door handle, may be emphasized to draw a person's attention. Such distortion shall not degrade comprehension of the message.

6. MINIMUM PICTURE AND WORD SIZE

6.1 The minimum letter height and size of, or distance between, elements of a picture shall subtend at least 20 minutes of arc in favorable viewing conditions, at least 40 minutes of arc in moderate viewing conditions, and at least 50 minutes of arc in poor viewing conditions (Table 1; refer to ANSI Z535.2 for more detailed information).

Table 1 - Minimum letter height by viewing condition

Letter Height	Favorable	Moderate	Poor
0.40 inch (10 mm)			X
0.30 inch (8 mm)		X	
0.16 inch (4 mm)	X		
Minutes of arc	20	40	50

NOTE: The viewing distance for Table 1 is up to 27 inch (0.7 m). For other viewing distances, letter heights (and distances between elements) can be calculated for the various viewing conditions using Equation 1:

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

7. PLACARD AND BACKGROUND COLOR COMBINATIONS

7.1 Foreground pictures, words, or symbols should be of a different color than the background. Some color combinations provide greater clarity than others, depending on shade, saturation, and intensity (see Table 2), as well as the color and brightness of illumination. Backgrounds with high reflectivity such as metallic silver should be avoided but if chosen it should be assured that the contrast between background and foreground color is equivalent to a non-high-reflecting background. Generally, foreground figures should be of a darker color than the background; however, a light-colored figure on a dark background (e.g., white on black) may be used where ambient background conditions favor such use or where standardized signage outside the aircraft environment has provided general prior knowledge of the message (refer to ANSI Z535.4).