Color Specification for Electric Signal Lighting Devices—SAE J578d

SAE Standard
Last Revised September 1978

THIS IS A PREPRINT WHICH IS SUBJECT TO REVISIONS AND CORRECTIONS. THE FINAL VERSION WILL APPEAR IN THE 1980 EDITION OF THE SAE HANDBOOK.

Society of Automotive Engineers, Inc.
400 COMMONWEALTH DRIVE, WARRENDALE, PA. 15096

LAND SEA AIR SPACE

PREPRINT

COLOR SPECIFICATION FOR ELECTRIC SIGNAL LIGHTING DEVICES—SAE J578d

SAE Standard

Report of Lighting Committee approved January 1942 and last revised September 1978. Rationale statement available.

1. Scope—The purpose of this standard is to define and provide for the control of colors employed in motor vehicle external lighting equipment. The specification applies to the overall effective color of light emitted by the device and not to the color of the light from a small area of the lens. It does not apply to any pilot, indicator, or tell-tale lights.

2. Definitions—Fundamental definitions of color are expressed by Chromaticity Coordinates according to the CIE (1931) standard colorimetric system. (See Fig. 1.)

2.1 Red—The color of light emitted from the device shall fall within the following boundaries:

$$y = 0.33 \text{ (yellow boundary)}$$
$$y = 0.98 - x \text{ (purple boundary)}$$

2.2 Yellow (Amber)—The color of light emitted from the device shall fall within the following boundaries:

$$y = 0.39 \text{ (red boundary)}$$
$$y = 0.79 - 0.67x \text{ (white boundary)}$$
$$y = x - 0.12 \text{ (green boundary)}$$

φ **2.2.1 Selective Yellow**[1]—The color of light emitted from the device shall fall within the following boundaries:

$$y = 0.58x + 0.14 \text{ (red boundary)}$$
$$y = 1.29x - 0.10 \text{ (green boundary)}$$
$$y = 0.97 - x \text{ (white boundary)}$$

2.3 White (Achromatic)—The color of light emitted from the device shall fall within the following boundaries:

$x = 0.31$ (blue boundary) $\quad y = 0.44$ (green boundary)
$x = 0.50$ (yellow boundary) $\quad y = 0.38$ (red boundary)
$y = 0.15 + 0.64x$ (green boundary) $\quad y = 0.05 + 0.75x$ (purple boundary)

φ **2.3.1 White to Yellow**—The color of light emitted from the device shall fall within one of the following areas:

(a) That defined in paragraph 2.2 Yellow.
(b) That defined in paragraph 2.2.1 Selective Yellow.
(c) That defined in paragraph 2.3 White.
(d) The area between Yellow, Selective Yellow, and White as shown by the dashed lines in Fig. 1.

2.4 Green—The color of light emitted from the device shall fall within the following boundaries:

$$y = 0.73 - 0.73x \text{ (yellow boundary)}$$
$$x = 0.63y - 0.04 \text{ (white boundary)}$$
$$y = 0.50 - 0.50x \text{ (blue boundary)}$$

2.5 Blue—The color of light emitted from the device shall fall within the following boundaries:

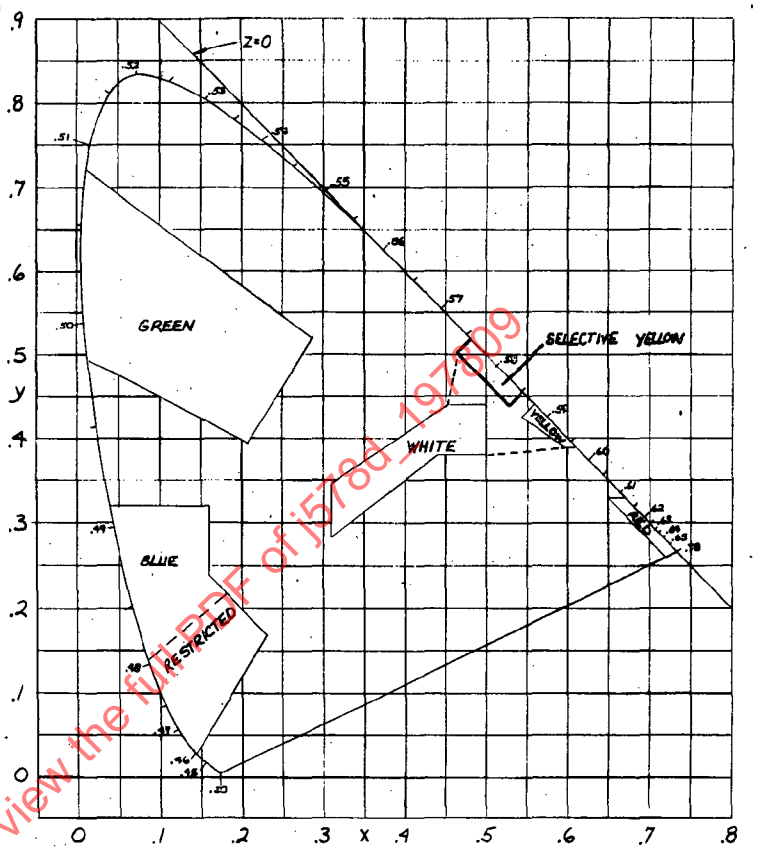
2.5.1 RESTRICTED BLUE—This color should be elected when recognition of blue as such is necessary.

$$y = 0.07 + 0.81x \text{ (green boundary)}$$
$$x = 0.40 - y \text{ (white boundary)}$$
$$x = 0.13 + 0.60y \text{ (violet boundary)}$$

2.5.2 SIGNAL BLUE—This color may be elected when, due to other factors, it is not always necessary to identify blue as such.

$$y = 0.32 \text{ (green boundary)}$$
$$x = 0.16 \text{ (white boundary)}$$
$$x = 0.40 - y \text{ (white boundary)}$$
$$x = 0.13 + 0.60y \text{ (violet boundary)}$$

3. Method of Color Measurement—One of the methods listed in the following paragraphs shall be used to check the color of the light from the device for compliance with the color specifications. The device shall be operated at design voltage. Components (bulbs, caps, lenses, and the like) shall be tested in a fixture or manner simulating the intended application.



φ FIG. 1—CHROMATICITY DIAGRAM

3.1 Visual Method—In this method, the color of the light from the device undergoing the inspection is compared visually with the color of the light from a standard. The standard may consist of a filter or limit glass. In the case of white, CIE Source A is used only as a color reference. The chromaticity coordinates of the color standards shall be as close as possible to the limits listed in the definitions. The color of the standard filters is determined spectrophotometrically.

RED—Red shall not be acceptable if it is less saturated (paler), yellower, or bluer than the limit standards.

YELLOW (AMBER)—Yellow shall not be acceptable if it is less saturated (paler), greener, or redder than the limit standards.

WHITE—White shall not be acceptable if its color differs materially from that of CIE Source A.

GREEN—Green shall not be acceptable if it is less saturated (paler), yellower, or bluer than the limit standards.

BLUE—Blue shall not be acceptable if it is less saturated (paler), greener, or redder than the limit standards.

In making visual appraisals, the light from the device illuminates a portion of the comparator field. The standard illuminates an immediately adjacent field portion of approximately equal area. It is preferable that the standard field should surround the comparator field, or vice versa. The locations of the standard and test sample shall be adjusted so the comparison fields have equal and uniform luminance (brightness). The test equipment shall be so arranged that light is brought into the comparator field from the full aperture of the device or component.

3.2 Tristimulus Method—In this method, photoelectric receivers, with spectral responses that approximate the CIE standard spectral tristimulus valves, are used to make color measurements. In making these measurements,

φ [1]Not for use in Turn Signal, Parking, Identification, Clearance, Side-marker, and School Bus Warning Lamps, as well as yellow reflex reflector applications as required by FMVSS 108.

The φ symbol is for the convenience of the user in locating areas where technical revisions have been made to the previous issue of the report. If the symbol is next to the report title, it indicates a complete revision of the report.