



Designation: **F 1595 – 9500**

Standard Practice for Viewing Conditions for Visual Inspection of Membrane Switches¹

This standard is issued under the fixed designation F 1595; the number immediately following the designation indicates the year of original adoption or, in the case of revision, the year of last revision. A number in parentheses indicates the year of last reapproval. A superscript epsilon (ϵ) indicates an editorial change since the last revision or reapproval.

1. Scope

1.1 This practice covers procedures for performing visual inspection of membrane switches. This includes visual inspection of overlays and circuitry.

1.2 This practice defines lighting parameters, distance from eye to specimen, viewing angle, and the viewing time allowed for a specific size specimen.

1.3 This practice is only designed for visual inspection of aesthetic qualities of membrane switches. It is not intended for color matching or gloss measurement.

1.4 *This standard does not purport to address all of the safety concerns, if any, associated with its use. It is the responsibility of the user of this standard to establish appropriate safety and health practices and determine the applicability of regulatory limitations prior to use.*

2. Terminology

2.1 Definitions:

2.1.1 *aesthetic qualities*—these relate to the cosmetic appearance of the membrane switch and include such characteristics as printing quality, uniformity of finish, material attributes, and mechanical integrity.

2.1.1.1 *Discussion*—These are often described by such terms as scratches, bubbles, dents, dings, bumps, blurs, smears, voids, pinholes, etc. These are highly subjective terms that defy precise definition but which are nonetheless identifiable and measurable.

2.1.2 *color matching*—procedure by which a color is compared to a standard to determine if the two are visually indistinguishable under specified lighting conditions.

2.1.3 *continuous scanning motion*—viewing technique whereby the inspector views the whole specimen, in the time allowed, without stopping in any one area of the panel.

2.1.4 *cosmetic flaws (or defects)*— see *aesthetic qualities*.

2.1.5 *foot-candles*—unit of illuminance equal to one lumen per square foot.

2.1.6 *membrane switch*—a momentary switching device in which at least one contact is on ~~(, or made of)~~ of, a flexible substrate.

2.1.7 *overlay*—outer layer of a membrane switch on which the graphics are printed.

2.1.7.1 *Discussion*—Not all membrane switches have an overlay.

2.1.8 *viewing angle*—the angle between the line of sight of the observer and the surface of the specimen.

2.1.9 *window areas*—any area of a membrane switch through which a display, light, lamp, or other graphics, are viewed.

3. Significance and Use

3.1 This practice is designed to enable all manufacturers and users of membrane switches to perform visual inspections under uniform conditions. The aim is to eliminate key variables in the inspection procedures so specimens can be viewed more objectively.

3.2 Viewing specimens under these conditions could reveal cosmetic defects in the specimen. Many of these defects or flaws are due to variables in the raw materials or the manufacturing process. These cosmetic flaws or defects do not necessarily mean that the specimen is defective. The determination of whether a specimen is acceptable or defective varies with the application and the needs of the user. Therefore, customer and vendor must agree on acceptable quality standards prior to manufacturing.

3.3 This practice does not establish standards for acceptability of specimens, only how they must be viewed (inspected).

3.4 This practice is not intended to be used for color matching purposes. Color matching must be performed under more precise lighting conditions outside the scope of this practice.

¹ This practice is under the jurisdiction of ASTM Committee F1 on Electronics and is the direct responsibility of Subcommittee F01.18 on Membrane Switches. Current edition approved April 15, 1995; Dec. 10, 2000. Published February 2001. Originally published as F 1595-95. Last previous edition F 1595-95.

4. Procedure

- 4.1 Specimen shall be clean and dry.
- 4.2 Specimen shall be viewed by a person with normal vision (1× power) or corrected to normal vision (1× power).
- 4.2.1 Corrective lenses must be un-tinted. Do not use non-prescription or magnifying devices.
- 4.3 Lighting source shall be cool white fluorescent tubes producing 75 to 100 foot-candles at any point on the specimen.
- 4.4 The inspection area shall have a neutral gray background. Take care to keep the viewing area free from distractions.
- 4.5 View the specimen no closer than 18 in. from eye to surface of the specimen.
- 4.6 The viewing angle shall be perpendicular (plus or minus 15°) to the surface of the specimen.
- 4.7 View the specimen in a continuous scanning motion to ensure that the whole specimen is inspected.
- 4.8 The maximum viewing time is dependent on the size of the specimen (see Table 1).

TABLE 1 Specimen Size and Maximum Viewing Time

Specimen Size, in. ²	Maximum Viewing Time, s
Up to 12	3
13 to 20	6
21 to 30	9
31 to 40	12
41 to 50	15
51 to 60	18
over 60	3 s for each additional 10 in. ²

4.9 View window areas against a diffused lighted background at an intensity of 75 to 100 foot-candles on the surface of the specimen. Include the viewing time for window areas in the viewing time for the whole specimen.

5. Keywords

- 5.1 continuous scanning motion; foot-candles; membrane switches; overlays; window areas

ASTM International takes no position respecting the validity of any patent rights asserted in connection with any item mentioned in this standard. Users of this standard are expressly advised that determination of the validity of any such patent rights, and the risk of infringement of such rights, are entirely their own responsibility.

This standard is subject to revision at any time by the responsible technical committee and must be reviewed every five years and if not revised, either reapproved or withdrawn. Your comments are invited either for revision of this standard or for additional standards and should be addressed to ASTM International Headquarters. Your comments will receive careful consideration at a meeting of the responsible technical committee, which you may attend. If you feel that your comments have not received a fair hearing you should make your views known to the ASTM Committee on Standards, at the address shown below.

This standard is copyrighted by ASTM International, 100 Barr Harbor Drive, PO Box C700, West Conshohocken, PA 19428-2959, United States. Individual reprints (single or multiple copies) of this standard may be obtained by contacting ASTM at the above address or at 610-832-9585 (phone), 610-832-9555 (fax), or service@astm.org (e-mail); or through the ASTM website (www.astm.org).