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Standard Test Method for Determining Luminance of a Membrane Switch Backlit with Diffuse Light Source¹

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1. Scope

1.1 This test method covers procedures for determining the luminance of a backlit membrane switch. As written, it applies to a fully assembled switch. For specific purposes, it can be applied to partially assembled switches with the understanding that the results pertain only to the partial assembly and will be modified as the further assembly proceeds.

1.2 The values stated in SI units are to be regarded as standard. No other units of measurement are included in this standard.

1.3 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 *graphic overlay*—a graphically illustrated layer often attached to the topside (or first surface) of the switch assembly for protection, cosmetic purposes, or to indicate the location and function of the switch keys.

2.1.2 *illumination layer*—a layer in the construction of a membrane switch, which may or may not be a physically distinct layer which contains or supports the source of illumination for the membrane switch. Examples are a flexible layer containing light emitting diodes (LEDs), often either the top or bottom layer of the switch, or a flexible layer of electroluminescent (EL) material, often a distinct and separate layer added at assembly.

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

2.1.4 *UUT*—unit under test.

3. Significance and Use

3.1 Illumination of a switch or of certain features of a switch often has a functional purpose and must meet specification to satisfy the functional requirements of the switch.

3.2 Illumination of the switch can be affected by variations in the quality and design of the overlay and its application.

3.3 This test method addresses only the optical and visual appearance of the switch and not its electrical function.

3.4 This test method is non-destructive.

3.5 If this test method is applied to the entire switch assembly, the results can be applied to the whole device. However, it may be sufficient and practical to apply the test either to a subassembly only, or to the illumination layer only, in which case the results apply to that layer only and the net effect on the fully assembled device must be calculated, extrapolated, or otherwise inferred.

4. Interferences

4.1 Tests on incomplete assemblies give results appropriate to that state of assembly. Specifically, later application of a graphic overlay may alter the results.

4.2 Failure to fill the sampling aperture of the photometer will bias the results in a way which is not necessarily predictable.

4.3 Since every system of illumination changes characteristics as it ages, it must be recognized that the results apply to a particular interval in the lifetime of the system. Characterization of the aging properties may be addressed in a separate test method.

4.4 *Perpendicularity*—Since the angular distribution of emitted light can be altered by any material through which it passes, it is important that the photometer be held perpendicular to the area to be sampled.

4.5 *Temperature*—Since the performance of many light sources can vary with temperature, it is important to allow the UUT to thermally stabilize, if necessary, and then record the ambient temperature at which the measurements are made.

4.6 *Ambient Light*—Stray light sources will be detected by the photometer and will affect the UUT luminance measurement.

¹ This test method is under the jurisdiction of ASTM Committee F01 on Electronics and is the direct responsibility of Subcommittee F01.18 on Membrane Switches .
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