SEMI D56-0310
MEASUREMENT METHOD FOR AMBIENT CONTRAST OF LIQUID CRYSTAL DISPLAYS

This Standard was technically approved by the Flat Panel Display – Metrology Global Technical Committee. This edition was approved for publication by the global Audits and Reviews Subcommittee on January 20, 2010. Available at www.semiviews.org and www.semi.org in March 2010.

1 Purpose

1.1 Customers usually use liquid crystal displays (LCDs) in a bright environment; such as office, living room, etc. To evaluate the contrast of display devices under ambient light is more practical than in a dark environment. The results of ambient contrast measurements are affected by different illuminance, view angles, etc. Therefore, it is necessary to standardize the measurement method of ambient contrast in LCDs.

2 Scope

2.1 This Standard is applicable to ambient contrast measurement for LCDs.

NOTICE: SEMI Standards and Safety Guidelines do not purport to address all safety issues associated with their use. It is the responsibility of the users of the Documents to establish appropriate safety and health practices, and determine the applicability of regulatory or other limitations prior to use.

3 Limitations

3.1 This Standard is applicable to ambient contrast measurement for LCDs under diffuse lighting. The ambient contrast measurement under direct lighting is not included in this Standard.

3.2 This Standard is applicable to LCDs for indoor use.

4 Referenced Standards and Documents

4.1 None.

NOTICE: Unless otherwise indicated, all documents cited shall be the latest published versions.

5 Terminology

5.1 *Abbreviations and Acronyms*

5.1.1 *LCD* — liquid crystal display

5.1.2 *LMD* — light measurement device

5.1.3 *DUT* — display under test

5.2 *Definitions*

5.2.1 *ambient contrast* — the contrast of the display measured under ambient lighting conditions.

5.2.2 *measurement port* — the port on the integrating sphere which the beam of the LMD is aligned through it to focus on the surface of DUT.

5.2.3 *sampling port* — the port on the integrating sphere which light exits from and hits on the DUT, it confines the sampling area of the DUT.

5.2.4 *specular port* — the port on the integrating sphere which is in the opposite side and symmetrical to the measurement port.

6 Summary of Method

6.1 *Environment Conditions*

- Temperature: 25 ± 3°C.

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- Humidity: 40% to 60% RH.
- Illumination of surrounding: dark room ≤2 lux.
- No reflection or low reflection objects of surroundings.

6.2 *Measurement Setup*

6.2.1 A uniform diffuse-ambient light is provided by a light source with an integrating sphere to illuminate the screen of the display (see Figures 1 and 2). The integrating sphere has plural ports. The display under test (DUT) is placed against the sampling port of the integrating sphere. The light measurement display (LMD) is arranged to view the screen through the measurement port.

6.2.2 Only one measurement port is in use during the measurement. Measurement ports not in use have covers on them. The inner surfaces of covers are coated with standard white that should have the same reflection properties with the inner surface of the sphere.

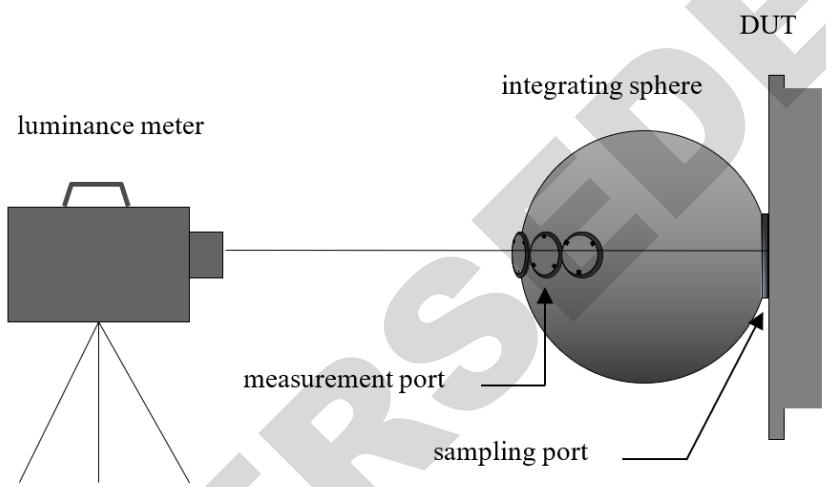

Figure 1
The Measurement Configurations

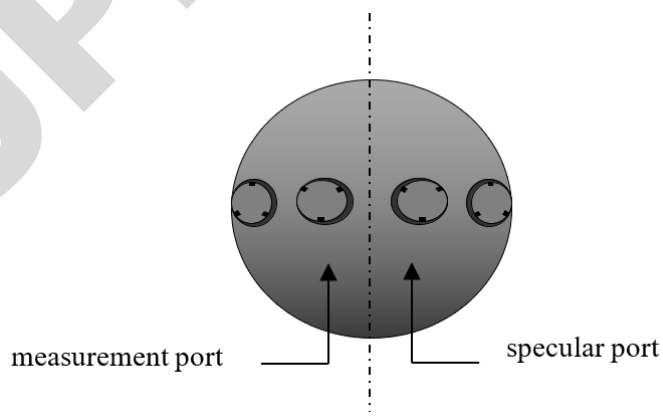

Figure 2
Side View of the Integration Sphere

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