

SEMI D66-0519

TERMINOLOGY FOR PLASTIC SUBSTRATES OF FLEXIBLE DISPLAY

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1 Purpose

1.1 In this Standard, definition and interpretation of each term provides characteristics of materials used for flexible display manufacturing. This Standard benefits unification of terminology generally used for plastic substrates of flexible display manufacturing.

2 Scope

2.1 This Standard is applicable for plastic substrates of flexible display manufacturing. It covers terminology related to plastic substrates of flexible display, used in the area of material, structure, inspection, and measurement.

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 does not include thin glass substrate and metal foil.

4 Referenced Standards and Documents

4.1 ISO Standards¹

ISO 15105-1:2007 — Plastics – Film and Sheeting – Determination of Gas-Transmission Rate – Part 1: Differential-Pressure Methods

ISO 15105-2:2003 — Plastics – Film and Sheeting – Determination of Gas-Transmission Rate – Part 2: Equal-Pressure Method

ISO 15106-1:2003 — Plastics – Film and Sheeting – Determination of Water Vapour Transmission Rate – Part 1: Humidity Detection Sensor Method

ISO 15106-2:2003 — Plastics – Film and Sheeting – Determination of Water Vapor Transmission Rate – Part 2: Infrared Detection Sensor Method

ISO 15106-3:2003 — Plastics – Film and Sheeting – Determination of Water Vapor Transmission Rate – Part 3: Electrolytic Detection Sensor Method

ISO 15106-4:2008 — Plastics – Film and Sheeting – Determination of Water Vapor Transmission Rate – Part 4: Gas-Chromatographic Detection Sensor Method

ISO 15106-5:2015 — Plastics – Film and Sheeting – Determination of Water Vapor Transmission Rate – Part 5: Pressure Sensor Method

ISO 15106-6:2015 — Plastics – Film and Sheeting – Determination of Water Vapor Transmission Rate – Part 6: Atmospheric Pressure Ionization Mass Spectrometer Method

ISO 15106-7:2015 — Plastics – Film and Sheeting – Determination of Water Vapor Transmission Rate – Part 7: Calcium Corrosion Method Text: Info of Book or Publication

ISO 75-1:2004 — Plastics – Determination of Temperature of Deflection Under Load – Part 1: General Test Method

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ISO 75-2:2004 — Plastics – Determination of Temperature of Deflection Under Load – Part 2: Plastics and Ebonite

ISO 75-3:2004 — Plastics – Determination of Temperature of Deflection Under Load – Part 3: High-Strength Thermosetting Laminates and Long-Fiber-Reinforced Plastics

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

5 Definitions

5.1 *base film* — the base film that defines shape of flexible display. It generally provides the thermal properties and mechanical properties of the display.

5.2 *coating layer* — the layers that are deposited on base film by wet process and/or dry process. They generally provide high gas/water barrier, good adhesion between base film and other layer, a smooth surface, a hard surface, and a resistance against chemicals respectively. The layer may have several properties above.

5.3 *electrical conductive layer (option)* — the layer that is deposited by wet process and/or dry process. It generally supplies electric voltage or electric current to an active layer such as liquid crystal layer or light emitter layer or electrophoretic layer. Generally, a transparent conductive film is used.

5.4 *elements of plastic substrate of flexible display* — See Figure 1. Plastic substrate of flexible display is composed of base film and, if need arises, coating layer that implements and/or complements the requirements for specification. Several layers may be coated on base film.

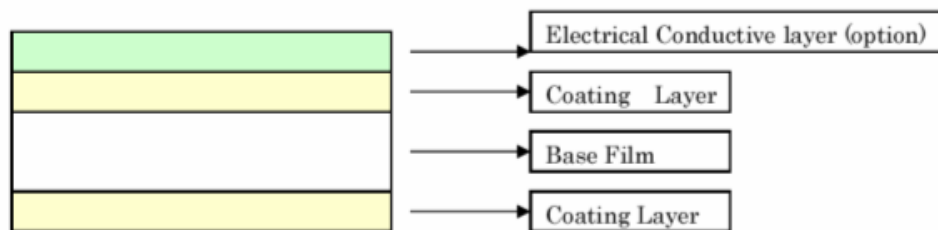


Figure 1
Plastic Substrates of Flexible Display

5.5 Optical Properties

5.5.1 *chromaticity* — quantitative representation of the color. For example, commonly used in the plastic substrate in $L^*a^*b^*$ color system, 'Lightness index' represented by the L^* , 'Hue' and 'saturation' value of a^*b^* represented.

5.5.2 *reflectance* — the ratio of reflected light intensity to the incident wave intensity, when the light reflected at the boundary of the plastic substrate. At the substrate surface, the light beam incident on the surface ' Φ ', the light beam reflected from the surface ' Φ_r ', reflectance R is represented by the formula below.

$$R = \Phi_r / \Phi \times 100 (\%) \quad (1)$$

Reflectance is affected by the composition, temperature, thickness of the material, and wavelength of light.

5.5.3 *retardation* — a representation of the optical path difference caused by the difference between the fast axis (axis of lower refractive index) and the slow axis (axis of higher refractive index). Its value is expressed as follows.

$$(\text{retardation}) = (\text{refractive index difference } \Delta n) \times (\text{pathlength}) \quad (2)$$

Retardation is affected by the composition, temperature, thickness of the material, and wavelength of light.

5.5.4 *transmittance* — The ratio of the light intensity passes through the plastic substrate to the incident. The incident intensity I_0 , and the transmission intensity I , transmittance T is represented by the formula below.

$$T = I/I_0 \times 100 (\%) \quad (3)$$

Transmittance is affected by the composition, temperature, thickness of the material, and wavelength of light.