

SEMI D34-0703

TEST METHOD FOR MEASUREMENT OF FPD POLARIZING FILMS

This test method was technically approved by the Global Flat Panel Display Committee and is the direct responsibility of the Japanese FPD Materials and Components Committee. Current edition approved by the Japanese Regional Standards Committee on April 28, 2003. Initially available at www.semi.org May 2003; to be published July 2003.

1 Purpose

1.1 This standard establishes implementation guidelines for the measurement of visual appearance, thickness, and optical characteristics of FPD Polarizing Films. These methods can be applied in manufacturing, quality control, and research and development.

2 Scope

2.1 This document specifies measurement methods.

2.2 Specifies measurement methods for visual appearance (dot defects, line defects, visual exclusion area), thickness, optical characteristics (single transmittance, parallel transmittance, cross transmittance, UV cut performance, polarization efficiency, hue a, b and hue a*, b* and haze) of polarizing films.

NOTICE: This standard does not purport to address safety issues, if any, associated with its use. It is the responsibility of the users of this standard to establish appropriate safety and health practices and determine the applicability of regulatory or other limitations prior to use.

3 Referenced Standards

3.1 *Japan Industry Standards (JIS)*¹

JIS K7105² — Testing methods for optical characteristics of plastics

JIS Z8701³ — Colour specification -- The CIE 1931 standard colorimetric system and the CIE 1964 supplementary standard colorimetric system

JIS Z8720⁴ — Standard Illuminants and sources for colorimetry

JIS Z8723⁵ — Methods for visual comparison of surface colours

JIS Z8729⁶ — Colour specification -- CIE LAB and CIE LUV colour spaces

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

4 Terminology

None.

5 Definitions of Measured Object and Summary of Measurement Methods

5.1 *Visual Appearance of Polarizing Film (Dot Defects)*

5.1.1 *Definition of Defect Size*

5.1.1.1 *Non-White Spot* — Points that can be verified visually during reflection inspection and transmission inspection. Size is defined by measuring the long side and short side of the core section and taking their mean value (Φ).

5.1.1.2 *White Spot* — Points that can be verified visually during Cross-Nicol transmission inspection. Size is defined by measuring the long side and short side of the core section and taking their mean value (Φ).

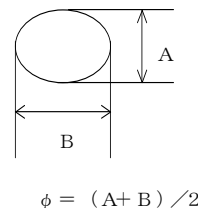


Figure 1
Definition of Defect Size (Dot Defect)

1 Japan Standards Association(JSA) 4-1-24 Akasaka, Minato-ku, Tokyo, 107-8440 Japan. Tel: +81-3-3583-8000, E-mail: webmaster@jsa.or.jp, <http://www.jsa.or.jp>

2 English version available.

3 Related International Standards: CIE 15.2, ISO/CIE 10526: CIE standard colorimetric illuminants, ISO/CIE 10527: CIE standard colorimetric observers; Commission Internationale de l'Eclairage, Kegelgasse 27, A-1030 Vienna, Austria. Tel: +43-1-714-31-87-0; International Organization for Standards(ISO), 1, rue de Varembe, Case, postale 56 CH-1211 Geneva 20, Switzerland. Tel: +41-22-749-01-11, E-mail: central@iso.ch, <http://www.iso.ch>

4 Related International Standards: ISO/CIE 10526: CIE standard colorimetric illuminants

5 Related International Standards: ISO/DIS 3668: Paints and varnishes – Visual comparison of the colour of paints

6 Related International Standards: Not Applicable; English version not available.

5.1.2 Defect Measurement (Inspection) Method — Observe defects under fluorescent light (600–1600 lux), using either reflection, transmission, or Cross-Nicol transmission inspection, or a combination of the above, at approximately 30 cm from the sample.

5.1.2.1 Reflection Inspection: Conduct on a blackboard, using fluorescent light.

5.1.2.2 Transmission Inspection: Conduct on a backlight

5.1.2.3 Cross-Nicol: Place a reference polarizing film on a backlight, and conduct transmission inspection in transmission inspection Cross-Nicol state.

5.2 Polarizing Film Visual Appearance (Line Defects)

5.2.1 Defect Size Definition

5.2.1.1 Line defects visually detected during reflection, transmission, or Cross-Nicol inspection. Size is defined by measuring the length of the long side and short side.

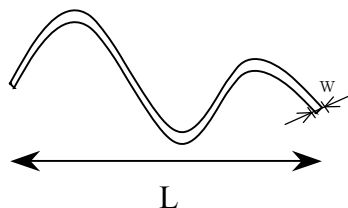


Figure 2
Definition of Defect Size (Line Defect)

5.2.2 Defect Measurement (Inspection) Method — Observe defects under fluorescent light, using either reflection, transmission, or Cross-Nicol transmission inspection, or a combination of the above, at approximately 30 cm from the sample.

5.2.2.1 Reflection Inspection: Conduct on a blackboard, using fluorescent light.

5.2.2.2 Transmission Inspection: Conduct on a backlight

5.2.2.3 Cross-Nicol: Place a reference polarizing film on a backlight, and conduct transmission inspection in transmission inspection Cross-Nicol state.

5.3 Polarizing Film Visual Appearance (Visual Exclusion Area)

5.3.1 Definition

5.3.1.1 L of the Visual Exclusion Area is the measurement of the distance from each side of the polarizing film.

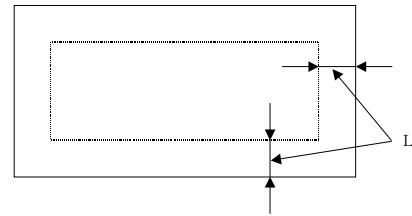


Figure 3
Definition of Visual Exclusion Area

5.4 Polarizing Film Thickness

5.4.1 Thickness Definition

5.4.1.1 Thickness, excluding the thickness of protective film and separate film.

5.4.2 Thickness Measurement Method

5.4.2.1 Measured using a thickness gauge that can measure to 0.001 mm.

5.5 Polarizing Film Optical Characteristics

5.5.1 Definition of Single Transmittance (T_y) and Measurement Method

5.5.1.1 Value of Transmittance of 1 polarizing film, visibility corrected (JIS Z8701) by supplementary standard illuminant C (JIS Z8720)⁷, 2° range of view.

5.5.1.2 Measurement Conditions

5.5.1.2.1 Equipment: Spectrophotometer

5.5.1.2.2 Measurement Wavelength: 400–700 nm (10 nm intervals)

5.5.2 Definition and Measurement Method of Parallel Transmittance ($T_{||}$)

5.5.2.1 Value of Transmittance of 2 polarizing films placed parallel Nicol, visibility corrected (JIS Z8701) by supplementary standard illuminant C (JIS Z8720), 2° range of view.

5.5.2.2 Measurement Conditions

5.5.2.2.1 Equipment: Spectrophotometer

5.5.2.2.2 Measurement Wavelength: 400–700 nm (10 nm intervals)

5.5.3 Definition and Measurement Method for Cross Transmittance ($T_{\perp}$)

5.5.3.1 Value of Transmittance of 2 polarizing films placed crossed Nicol, visually corrected (JIS Z8701) by supplementary standard illuminant C (JIS Z8720), 2° range of view.

⁷ Commonly known as “Light Source C”. Abbreviated to “Ill.C”.