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Materion Barr Precision Optics & Thin Film Coatings provides a broad array of technologies including complex optical filters, filter arrays, lens coatings and optical thin film component assemblies. Diverse markets are composed of: commercial, defense, life sciences & medical, thermal imaging, and space, science & astronomy industries.

LightGate™

The Challenge

The LightGate™, the Total Internal Reflection (TIR) Prism from Materion Barr Precision Optics & Thin Film Coatings, is characterized by state of the art AR coatings, superior quality of blackening and a tightly controlled air gap. It is used to separate the illumination and imaging path in Digital Light Processing (DLP™) based light engines particularly for rear projection TVs.

The LightGate™ is a key component for maximum contrast, high light throughout and high uniform images. It enables on-axis illumination, and compact designs.

Benefits

- High performance AR allows higher acceptance angles which maximize light throughout
- Highest contrast by excellent surface quality and superior blackening of nonactive surfaces and chamfers
- Customized masking on any surface offers even higher contrast
- Lowest image distortion by tightly controlled air gap
- Tight color control by neutral spectral characteristics
- High environmental durability and mechanical stability
- Further integration of lenses and additional mechanical fixtures
- Fast prototyping and customized designs

Applications

Our LightGate™ is designed to meet the demanding needs of Projection Displays based on the DLP technology. LightGate™ can be employed in all DLP based 1-chip and 3-chip designs. The advantages offered by the LightGate™ compared to other designs are especially beneficial for RPTV applications, particularly the on-axis illumination and a compact engine design.

Technical Data

Dimensions

- Customized, tolerances typically ± 0.1 mm

Material

- Typically N-BK7 or equivalent; and Nd tolerance ≤0.0005

Flatness

- Typically 3 fringes per inch at λ 633nm

Scratch/dig

- Typically 60/40

Transmission

- Optimized AR coating – see figure below
- Other AR coatings on request

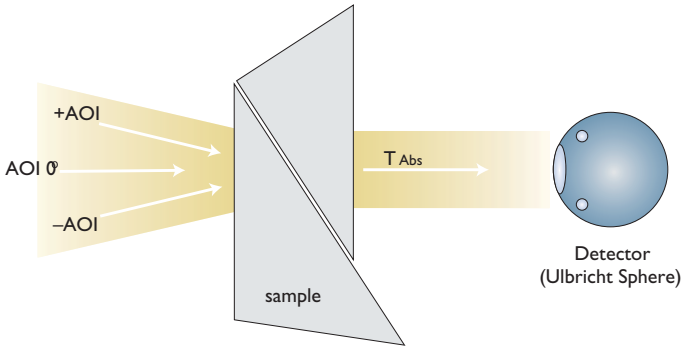
Assembly

- Per customer requirement, including lens or complete subassemblies

Blackening

- Per customer requirement, including special masking on any surface
- Good performance at high temperature

Description of Measurement Method (Absolute transmission measurement)



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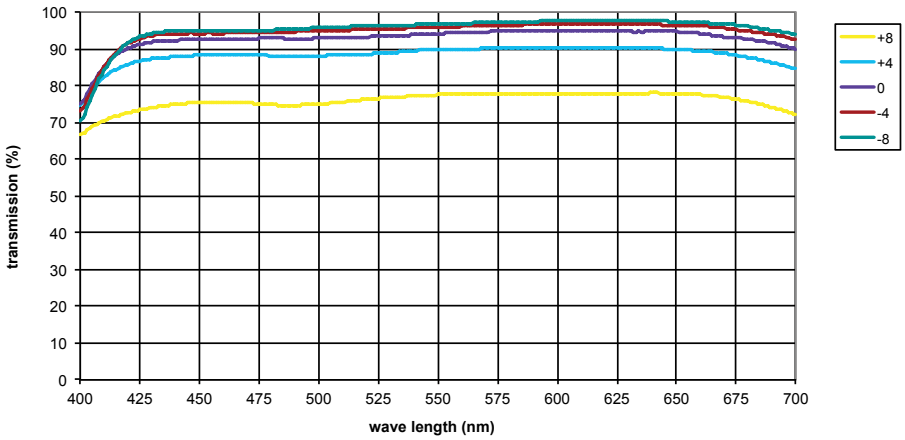
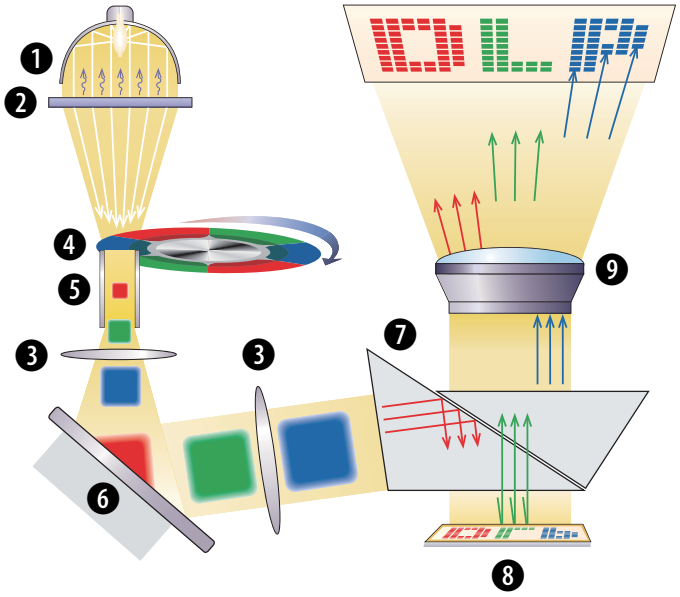
Absolute transmission of imaging path for AOI = ±8, ±4 and 0 degrees



Schematic of DLP® RPTV light engine



1. Lamp with Cold Light Reflector
2. UV-Guard™ Filter
3. Illumination Optics
4. ColorWheel™
5. LightTunnel™
6. Silflex™/Deflex™ Mirror
7. LightGate™
8. DMD™ (Digital Micromirror Device™)
9. Projection Lens

Materion is a global advanced materials company, dedicated to providing solutions that enable our customers' technologies and drive their growth. Our products include precious and non-precious specialty metals, precision optical filters, inorganic chemicals and powders, specialty coatings, specialty-engineered beryllium alloys, beryllium and beryllium composites, and engineered clad and plated metal systems. The Materion business is structured to enhance our ability to provide customers with innovative, best total-cost solutions.

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