DSI • DEPOSITION SCIENCES, INC.

A LOCKHEED MARTIN COMPANY

PATTERNED THIN FILM OPTICAL FILTERS

Technical Data Sheet

PROCESS/PRODUCT DESCRIPTION

DSI's photolithography capability produces patterned thin film coatings (including bandpass filters, absorption coatings, and metals) on substrates up to 6 inches.

DSI's processes enable high placement accuracy, the ability to accurately maintain coating spectral properties at the smallest geometries, and two-sided patterning capabilities (for flat windows and filters). DSI utilizes both wet and dry film resist processes to support the development and production of challenging patterned coating geometries for our customers.

PATTERNED FUNCTIONALITY

- Multispectral Filtering
- Light Absorbing Apertures/Picture Frames
- Optical Alignment Fiducials

APPLICATIONS

- Multispectral Sensing/Imaging
- Intelligence, Surveillance, and Reconnaissance (ISR)
- Remote Sensing
- Aerospace Intelligence
- Space Imaging

TECHNICAL SPECIFICATIONS

When developing a patterned filter, several variables must be considered including:

- Spectral requirements for the coating(s) being deposited
- Feature sizes
- Alignment requirements of the features
- Substrate size
- Substrate material
- Number of different filters/coatings being deposited and patterned

Spectral requirements of the filter(s) can affect the size and positional accuracy of the features. More challenging optical filters require more layers to achieve the required spectral performance. These layers result in coatings with significant physical thickness and can result in high film stress. As a result, thicker coatings are more challenging to pattern.

General characteristics of DSI's patterned filters are summarized in the table below:

Parameter	Typical Specifications*
Minimum Line Width	50 µm
Dimensional Accuracy	± 5 µm
Feature Placement	± 5 µm
Front to Back Alignment	± 10 µm
Largest Substrate Size	200 mm Diameter, 127 mm Square
Substrate Thickness	0.0762 mm to 8 mm
Common Substrates	Fused Silica, BK7 & Glasses, Gallium Arsenide, Germanium, Indium Phosphide, Sapphire, Silicon, Zinc Sulfide
Maximum Coating Thickness	20 µm
Resist Types	Wet and Dry Film Processing

*The above specifications are to be used as nominal values only. Filter complexity, physical thickness, and uniformity requirements need to be considered before actual values can be determined.

All patterns and optical thin films are designed for specific applications. DSI engineers work closely with customers to design the optimal combination of performance, delivery, and cost. Let us engineer a solution for you.

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