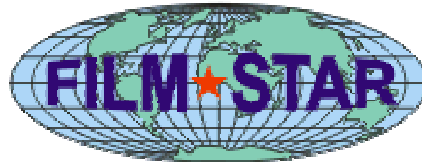


Technology • Process • Design • Outsourcing • Training

Design Software

Thin Film Solutions can supply various software packages that aid designers in the production of precision and efficient coatings.

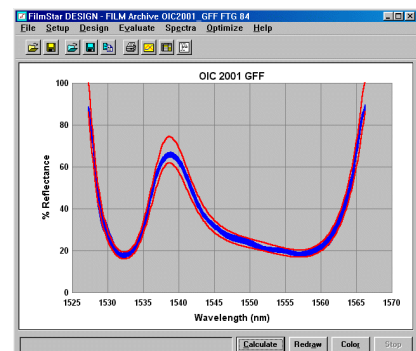


Optical Thin Films

FilmStar Optical Thin Film Software is a suite of Windows programs for designing, manufacturing, and measuring optical thin film coatings. Optical coatings are applied to glass and other surfaces by high vacuum deposition. Applications range from decorative coatings in the Swarovski crystal collection to DWDM filters used in telecommunications.

Key features:

- Superior Multilayer Design and Optimisation Routines
- Extensive Indices and Dispersion Database
- General Merit Functions and Constraints Algorithm
- Inverse Synthesis for Reverse Engineering
- Links into Inficon IC/4+ & IC/5 Deposition Controllers *
- Uses Industry-Standard File Formats
- Optical Monitor Control Interface *
- Substrate Compensation Capability
- Interfaces with Popular Spectrophotometers *
- Numerous Additional Modules Available



IC/4+ Extended Materials Editor

| | Material Name | Density | Z-Ratio | Source | PID Control | Process Gain |
|---|---------------|---------|---------|--------|-------------|--------------|
| 1 | BaF2 | 4.886 | 0.793 | 1 | NO | 10.00 |
| 2 | CaF2 | 3.180 | 0.775 | 1 | NO | 10.00 |
| 3 | CdTe | 6.200 | 0.980 | 1 | NO | 10.00 |
| 4 | CeF3 | 2.700 | 1.080 | 1 | NO | 10.00 |
| 5 | Cs | 1.870 | 1.000 | 1 | NO | 10.00 |
| 6 | Cu | 8.930 | 0.437 | 3 | NO | 10.00 |

Download 6 from IC/4+ Material Directory 1 (1-24)
Upload 6 to

Transfer Material Table 255 (0-255) to Material Directory 1 before downloading

Scan Parameters 1B - Lambda 900 Settings

Signal | Detector | Beam | Accessories

Scan Mode
 Continuous Discrete Delay Factor 0 (0-10)

UV/VIS Slit Width
 Fix 240 nm (.05-5) Servo 2 (0-255)

UV/VIS Signal Averaging
 Time 2 sec (0.04-10) Scan Speed = 30.0 nm/min

MIR Slit Width
 Fix 10 nm (.2-20) Servo 2 (0-9)

MIR Signal Averaging
 Time 3 sec (0.04-10) Scan Speed = 20.0 nm/min

Slit Width Program... Signal Program... Expert Mode

DESIGN Workbook - [Bbar.xls]

| | A | B | C | D | E | F | G |
|----|------------|-------|-------|-----------------------|------------------|--------|------------|
| 1 | DataType | 0 | Macro | LAYERSCOPY;CALCULATE; | | | |
| 2 | | | | | | | |
| 3 | | | | | | | |
| 4 | DataMarker | | | | Objective | | Constraint |
| 5 | 45.000 | 0.017 | 0.983 | Average= | 0.53088 | | -0.080 |
| 6 | 46.000 | 0.010 | 0.990 | Max= | 2.45529 | | 0.000 |
| 7 | 47.000 | 0.006 | 0.994 | | | | 0.000 |
| 8 | 48.000 | 0.003 | 0.997 | | Passed | | |
| 9 | 49.000 | 0.001 | 0.999 | | FALSE | | |
| 10 | 50.000 | 0.001 | 0.999 | | Design | | |
| 11 | 51.000 | 0.001 | 0.999 | | | | |
| 12 | 52.000 | 0.001 | 0.999 | | 18.4H | 18.40 | |
| 13 | 53.000 | 0.001 | 0.999 | | 18.4L | 18.40 | |
| 14 | 54.000 | 0.002 | 0.998 | | 94.06H | 94.06 | |
| 15 | 55.000 | 0.002 | 0.998 | | 94.06L | 94.06 | |
| 16 | 56.000 | 0.002 | 0.998 | | | | |
| 17 | 57.000 | 0.002 | 0.998 | | Total Thickness= | 224.92 | |

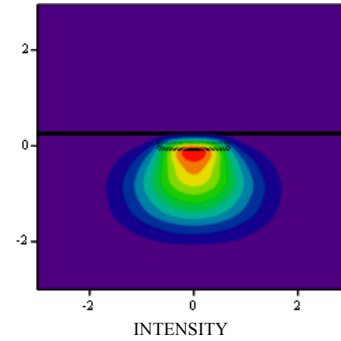
* Optional extra

Coatings & Waveguides

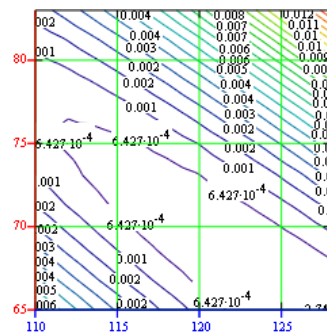
TFS software for coatings and waveguides is a design environment to enable the design of both the coating and aspects of the waveguide, such as a laser diode. It permits the user to achieve good results even when he has limited knowledge of the properties of the waveguide. It also permits tolerancing of the coating.

Key features:

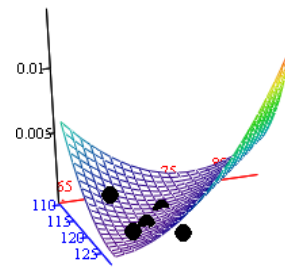
- Coating Design Algorithm
- Facet Reflectivity
- Materials Database
- Near and Far Field Calculations
- Tolerancing and Optimisation Routines
- Waveguide Structure Definition



Intensity distribution plot



Thickness-thickness facet reflectance contour diagram for a particular non-angled facet case



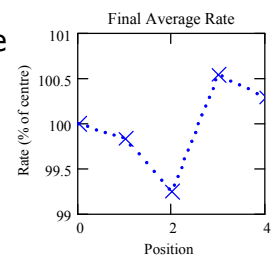
Experimental results (●) can be compared with theory

PVD Uniformity Optimisation

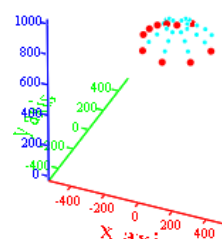
Thin Film Solutions offers software to calculate and optimise uniformity over the substrate and from substrate to substrate within a single axis or double axis jig. This includes optimisation of deposition and ion/ plasma source positions together with uniformity mask shape calculation and deposition source positional optimisation.

Key features:

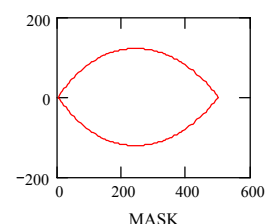
- Calculates for Dome, Planetary or Flat substrate holders
- Ion Current Flux Density Optimisation
- Sample Point Pattern Generation
- Uniformity Mask Algorithms



Uniformity map



Radial sample point map



Mask generation