

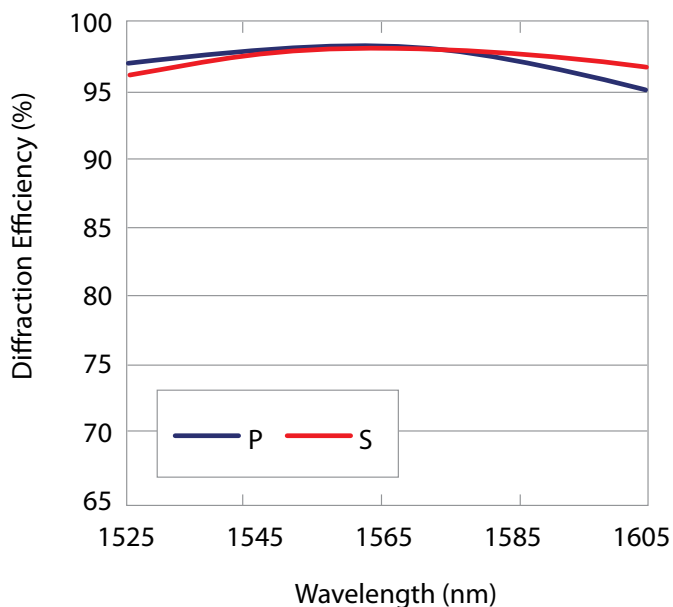
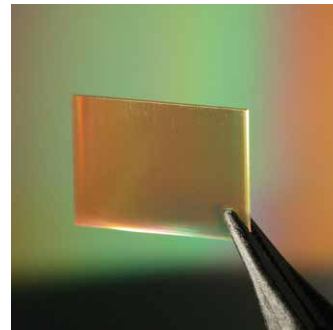
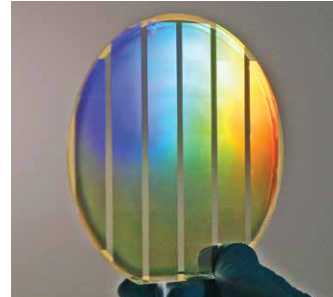
High Efficiency Telecom Transmission Gratings T-940CL Series

Features:

- Ultra-High Diffraction Efficiency.
- Very Low Polarization Sensitivity.
- Excellent Feature Fidelity and Groove Uniformity.
- Only fused Silica and robust dielectrics are used, no polymers.
- Extreme environmental stability. Telcordia qualified.
- Each grating is a master: low light scatter, no ghosting.
- Very competitive pricing.
- Strict quality control. LightSmyth is ISO 9001:2008 certified.

Applications:

- Optical telecommunications (ROADM, WSS, WDM MUX/DEMUX)
- Pulse compression
- Spectral beam combining
- Remote optical sensors and spectroscopy



LightSmyth Technologies' transmission gratings are fabricated on fused silica substrates and robust dielectric films by state-of-the-art projection photolithography and reactive ion etch. These high fidelity semiconductor fabrication methods enable precise realization of sophisticated proprietary grating designs that provide diffraction efficiency close to 100% and line spacing control to 1 part per million.

No other grating technology is capable of achieving this degree of performance combined with the cost effectiveness and reproducibility afforded by semiconductor volume fabrication technology.

Left: Typical absolute diffraction efficiency of 940 grooves/mm Telecom Transmission Grating for C and L band.

High Efficiency Telecom Transmission Gratings

T-940CL Series

| Optical | | |
|--|--------------|----------|
| Description | Value | Units |
| Line Density | 940.07 | Lines/mm |
| Line Density Uniformity | ± 0.001 | Lines/mm |
| Angle of Incidence (AOI) ¹ | 47.5 ± 1 | ° |
| Wavelength Range | 1526 to 1610 | nm |
| Optimal polarization ² | Any | |
| Diffraction Efficiency ^{3,4} | ≥ 92 | % |
| Polarization Dependent Loss ^{3,4} | ≤ 0.25 | dB |
| Spectral Non-Uniformity ^{3,4} | ≤ 0.25 | dB |
| Spatial PDL Non-Uniformity ^{3,4} | ≤ 0.1 | dB |
| Insertion Loss Ripple ^{4,5} | ≤ 0.15 | dB |

Notes: ¹ Optical grating performance will remain substantially similar over a 5° variation in angle of incidence.

² p-polarization: electric field vector is perpendicular to the grating lines; s-polarization is orthogonal to p.

³ Determined from parabolic fit of efficiency as a function of wavelength for s- and p- polarization.

⁴ Worst case in the operational wavelength range.

⁵ Determined by Fast Fourier Transform method.

| Mechanical | |
|--------------------------|--|
| Dimension tolerances | ± 0.2 for grating size and width |
| Substrate Thickness | 0.675 ± 0.050 mm |
| Material | Fused silica, dielectric layers |
| Scratch/Dig ⁶ | 60/40 standard, 40/20 and 20/10 custom |

Note: ⁶ As per MIL-PRF-1380B in the clear aperture; no requirements outside of the clear aperture.

| Substrate dimension options | | | | |
|-----------------------------|--|-----------------------------------|---------------------------------------|--|
| Part Number | Substrate width, mm ⁷ | Substrate height, mm ⁷ | Clear aperture width, mm ⁸ | Clear aperture height, mm ⁸ |
| T-940CL-2710-92 | 27.45 | 10.0 | 26.45 | 9.0 |
| T-940CL-2418-92 | 24.0 | 18.0 | 23.0 | 17.0 |
| Custom dimensions | Any rectangle fitting within 135 mm diameter circle (e.g. 130x20 mm) | | | |

Notes: ⁷ Width is perpendicular to grating grooves, height is along the grating grooves.

⁸ Clear aperture is centered on the substrate.