

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 L-band.

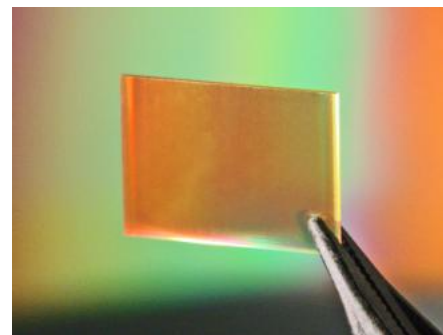
Features:

- 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



Optical		
Description	Value	Units
Line Density	940.07	Lines/mm
Line Density Uniformity	± 0.001	Lines/mm
Angle of Incidence (AOI) ¹	48.4 ± 1	°
Wavelength Range	1570 to 1610	nm
Optimal polarization ²	Any	
Diffraction Efficiency ^{3, 4}	≥ 94	%
Polarization Dependent Loss ^{3, 4}	≤ 0.2	dB
Spectral Non-Uniformity ^{3, 4}	≤ 0.2	dB
Spatial PDL Non-Uniformity ^{3, 4}	≤ 0.1	dB
Insertion Loss Ripple ^{4, 5}	≤ 0.1	dB

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

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-940L-2710-94	27.45	10.0	26.45	9.0
T-940L-2418-94	24.0	18.0	23.0	17.0
Custom dimensions	Any rectangle fitting within 135 mm diameter circle (e.g. 130 x 20 mm)			

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

⁸ Clear aperture is centered on the substrate.