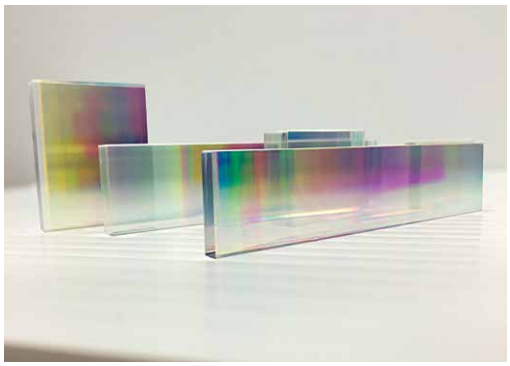
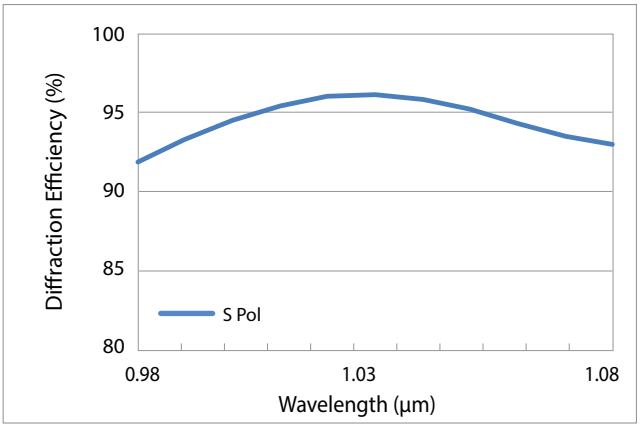
Specification for High Efficiency Transmission Grating, T-1702-1030s series

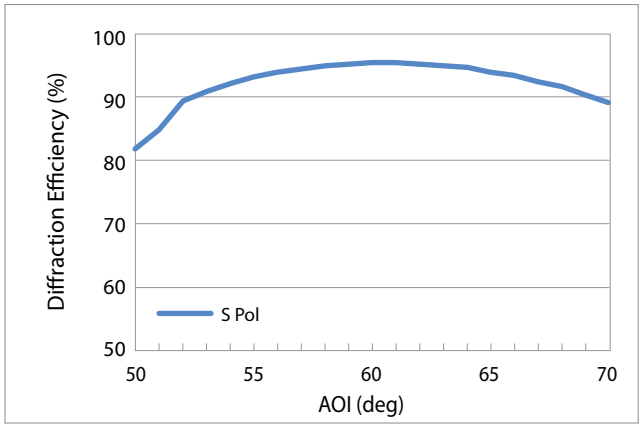
T-1702-1030s series lithographically patterned diffraction transmission grating is designed to be used in demanding industrial applications. It is characterized by high efficiency, excellent long-term stability and high power handling. Gratings produced by LightSmyth undergo extensive quality assurance, have proven reliability track record and competitively priced.



The S-polarization optimized transmission grating has 1702.13 lines/mm and designed to operate near 1030 nm central wavelength at 61.2° angle of incidence (AOI). Extended wavelength range performance and angular sensitivity information is provided below.

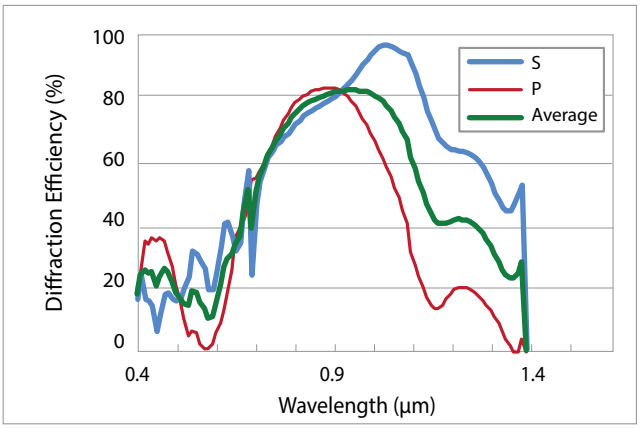


*Typical absolute diffraction efficiency at AOI 61.2° **

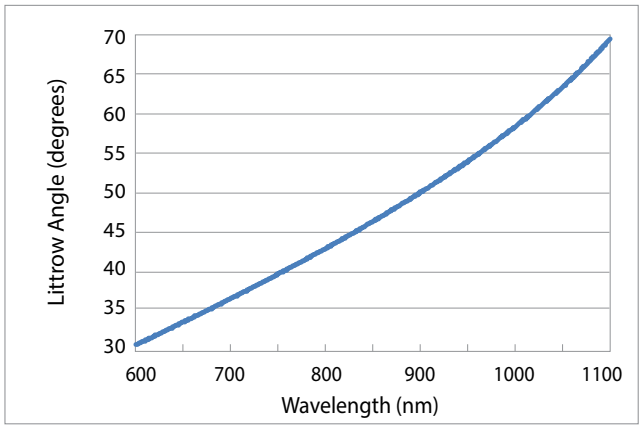


*Diffraction efficiency at 1030 nm as a function of AOI **

Extended operational range: The grating may operate over broader wavelength range provided that suitable anti-reflective coating and angle of incidence is used. The plot below shows simulated performance* over extended range assuming fixed input angle (designed Littrow angle of 61.2°), not accounting for AR coating losses. Optimal input angle for each wavelength is shown on the right.



*Typical absolute diffraction efficiency at AOI 61.2° **



Optimal input angle for each wavelength (Littrow condition)

* simulated performance shown (for guidance only)

Specification for High Efficiency Transmission Grating, T-1702-1030s series

Optical		
Description	Value	Units
Line Density	1702.13	Lines/mm
Line Density Uniformity	0.001	Lines/mm
Angle of Incidence (AOI) [1]	61.2 ± 1	°
Wavelength Range	1030±10	nm
Optimal polarization [2]	S	
Diffraction Efficiency [3,]	>93	%

Notes: [1] Optical grating performance will remain similar over larger variation in angle of incidence. See plot below.
[2] S-polarization: electric field vector is parallel to the grating lines.
[3] Worst case in the operational wavelength range for optimal polarization.

Mechanical	
Dimension tolerances	±0.2 for grating size and width
Substrate Thickness	0.95 ± 0.050 mm
Material	Fused silica, dielectric layers, no polymers
Scratch/Dig [4]	60/40 standard, 40/20 and 20/10 custom

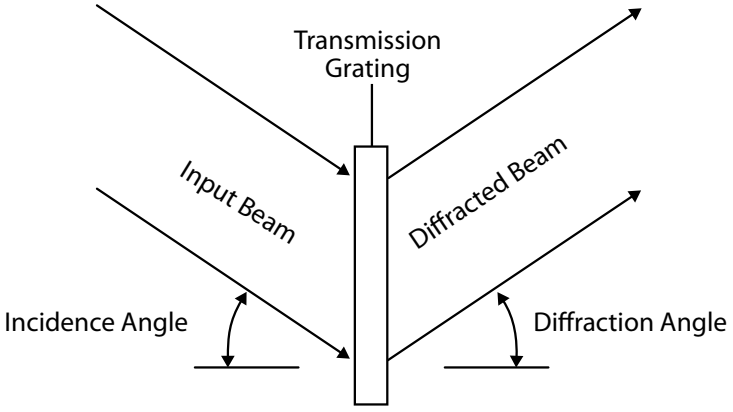
Note: [4] As per MIL-PRF-1380B in the clear aperture; no requirements outside of the clear aperture.

Substrate dimension options				
Part Number	Substrate width, mm[5]	Substrate height, mm[5]	Clear aperture width, mm[6]	Clear aperture height, mm[6]
T-1702-1030s-2515-93	24.7	15	23.7	14
T-1702-1030s-13015-93	130.0	15	125.0	14
Custom dimensions	Any rectangle fitting within 135 mm diameter circle (e.g. 130x20 mm)			

Notes: [5] Width is perpendicular to grating grooves, height is along the grating grooves.
[6] Clear aperture is centered on the substrate.

Typical Optical Layout

The transmission grating is designed to operate in Littrow configuration, where the angle of incidence and diffraction are the same for the central operational wavelength. Light is dispersed in the plane perpendicular to the grooves.



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