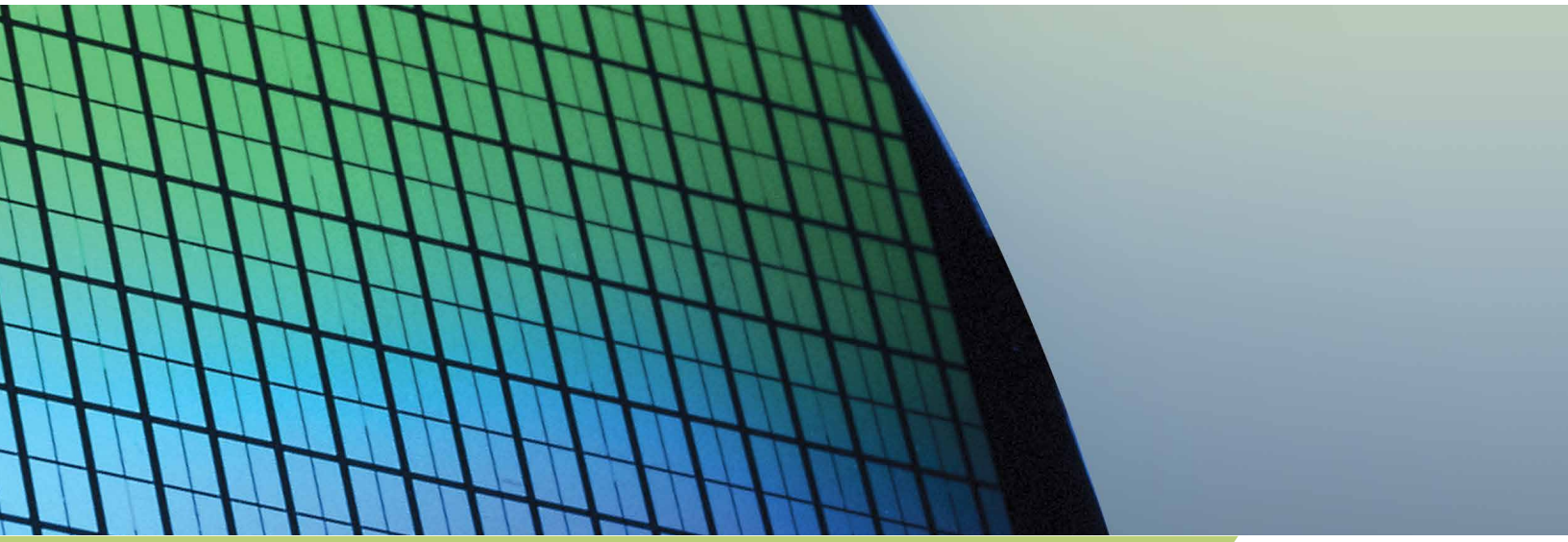
LightSmyth™ Technologies a Finisar Company



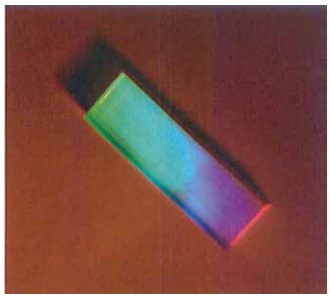
Product Catalog

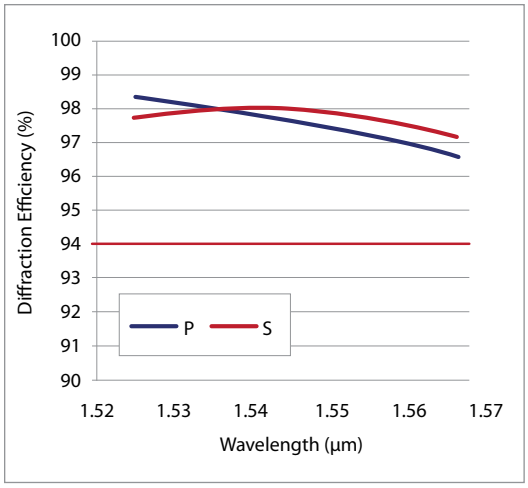
Industry Leader in High-Efficiency
Diffraction Gratings and Diffractive Optics

Table of Contents

Product or Service	Exemplary Application	Page
Optical Components		
Ripple-Free High Efficiency Transmission Gratings	Telecommunications	1
Pulse Compression Transmission Gratings	Pulse Compression	1
High-Power Transmission Beam Combiners	Laser Machining	1
Ultra-High Efficiency Transmission Gratings	Telecommunications	2
Ultra-High Efficiency Reflection Gratings	Telecommunications	4
Standard Reflection Gratings	Remote Sensing	5
Coherent Grating Arrays	Multi-Band Spectrometers	6
Gratings with Embedded Micro-Gratings Arrays	Enhanced Spectrometers	7
Ultrashot Focal Length Focusing Gratings	Laser Locking	8
Nanostructure Substrates		
Nano-Machined Substrates and Stamps	Nano-Imprints, Photonic Crystals	9
Services		
SEM Imaging Services	Conductive & Non-Conductive	11
Precision Dicing Services	Silicon, Quartz & Other Substrates	12
Optical Coating Services	Dielectrics & Metalic	13

Ripple-Free High-Efficiency Transmission Grating





Transmission gratings for wavelength-selective switches and other telecommunication applications often exhibit wavelength dependent insertion loss ripple caused by internal Fresnel reflections. LightSmyth™ has developed a line of Ripple-Free transmission gratings retaining high efficiency, low PDL, and purely inorganic robust construction. LightSmyth Ripple-Free transmission gratings comprise a unique product combining low cost, high volume and lithographic fabrication with a wedged grating substrate. This approach provides epoxy-free monolithic transmission grating with very flat spectral response (ripple reduction from <0.1 dB to <0.01 dB).

Pulse Compression Transmission Gratings

LightSmyth offers a wide range of pulse compression transmission gratings operational in near infrared spectral region. LightSmyth pulse-compression gratings provide best-in-class performance and extremely competitive pricing. The gratings have been deployed in pulse compression systems worldwide.

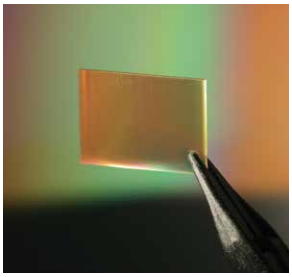


Advantages

- Typical Efficiency >95%
- Very competitive price
- No organics or polymers
- High power handling
- Low wavefront error

High-Power Transmission Beam Combiners

LightSmyth gratings are ideally suited for high power beam combining applications due to extremely low power loss, low material absorption and use of only fused silica and other inorganic dielectric materials in its composition. LightSmyth gratings successfully passed the requirements of the NAVY High Energy Laser program and industrial high power laser systems.



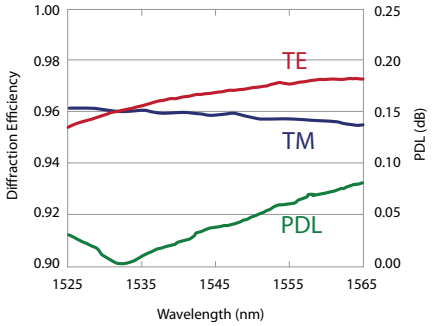
Advantages

- Typical Efficiency >95%
- Very competitive price
- No organics or polymers
- High power handling
- Low wavefront distortion at high power

Ultra-High Efficiency Transmission Gratings

Transmission gratings operate to angularly disperse incident light into a spectrum. LightSmyth's transmission gratings utilize state-of-the-art design and wafer-scale fabrication to deliver record-breaking optical performance combined with low cost providing your optical systems with a powerful competitive edge. Each grating is a master, not a replica, resulting in low scattered light and long lasting performance.

Specifications below are for stock gratings with various line densities and substrate dimensions that are available immediately. Transmission gratings of similar performance with other line densities, operating spectral bands, input/output beam geometries and substrate sizes can be supplied.



Diffraction Efficiency Curves (measured)

Advantages

- Ultra-high efficiency
- Ultra-low polarization-dependent loss
- Robust dielectric materials, no polymers are used
- Each grating is a master; ultra-low scatter
- Highly competitive pricing; Telcordia-qualified

Applications

- Optical telecommunications (WSS, GRISM)
- Remote optical sensors and spectroscopy
- Pulse compression
- High power lasers
- Spectral beam combining

Polarization-Independent Telecom Transmission Gratings

P/N prefix	Line Density (Lines/mm)	Line Density Uniformity (Lines/mm)	Wavelength Range (nm)	Angle of Incidence[1] (°)	Diffraction Efficiency[2] (%)	Insertion Loss Ripple (dB)	Spectral Uniformity[2] (dB)	Polarization-Dependent Loss[2] (dB)	Spatial PDL Uniformity[2] (dB)	Wavefront Error (@1545 nm λ)	Substrate thickness (mm)
T-940C	940.07	0.001	1525-1565	46.5±1	> 94	<0.1	< 0.2	< 0.2	±0.05	<0.1	0.675±0.05
T-940L	940.07	0.001	1570-1610	48.4±1	> 94	<0.1	< 0.2	< 0.2	±0.05	<0.1	0.675±0.05
T-940CL	940.07	0.001	1526-1610	47.5±1	> 92	<0.1	< 0.2	< 0.2	±0.05	<0.1	0.675±0.05
T-966C	966.18	0.001	1525-1565	48.3±1	> 94	<0.1	< 0.2	< 0.2	±0.05	<0.1	0.675±0.05
TRF-940C	940.07	0.001	1525-1565	46.5±1	> 94	<0.01	< 0.2	< 0.2	±0.05	<0.2	5.6±0.2
TRF-966C	966.18	0.001	1525-1565	48.3±1	> 94	<0.01	< 0.2	< 0.2	±0.05	<0.2	5.6±0.2

Notes: [1] Gratings will be highly efficient over larger range of angles – please inquire.
[2] determined from parabolic fit of efficiency as a function of wavelength for s- and p- polarization, worst case in the wavelength range.

High Dispersion Single Polarization Telecom Transmission Gratings

P/N prefix	Line Density (Lines/mm)	Line Density Uniformity (Lines/mm)	Wavelength Range (nm)	Angle of Incidence[1] (°)	Diffraction Efficiency[2] (%)	Insertion Loss Ripple (dB)	Operational Polarization	Spectral Uniformity[2] (dB)	Wavefront Error (@1545 nm λ)	Substrate thickness (mm)
T-1200C	1201.20	0.001	1529-1568	68±0.5	≥90	<0.03	S	<0.25	<0.1	5.6±0.2
T-1166L	1166.18	±0.001	1572-1612	68±0.5	≥90	<0.03	S	<0.25	<0.1	5.6±0.2

Polarization Independent Datacom Transmission Gratings

P/N prefix	Line Density (Lines/mm)	Line Density Uniformity (Lines/mm)	Wavelength Range (nm)	Angle of Incidence AOI[1] (°)	Diffraction Efficiency[2] (%)	Polarization-Dependent Loss[2] (dB)	Wavefront Error (@650 nm λ)
T-1702-895	1702.13	0.001	850-940	49.5±1	≥90	<0.3	<0.25
T-1200-1310	1201.20	0.001	1275-1345	52.0±1	≥85	<0.3	<0.25

Ultra-High Efficiency Transmission Gratings (cont.)

This is an overview table. Refer to http://www.lightsmyth.com to download detailed datasheets

Other High Efficiency Transmission Gratings

Optical

P/N prefix	Line Density (Lines/mm)	Line Density Uniformity (Lines/mm)	Angle of Incidence [1] (°)	Optimal Wavelength Range[1] (nm)	Operational Polarization[2]	Diffraction Efficiency (%)	Wavefront Error
T-1850-800s	1851.85	0.001	47.8±1	800±20	S	>94	<0.2 λ @ operational wavelength over 25 mm aperture
T-1200-850s	1208.46	0.001	30.7±1	850±20	S	> 94	
T-1500-875	1503.76	0.001	41.0±1	875±20	Any	> 94	
T-1850-915s	1851.85	0.001	57.9±1	915±10	S	> 93	
T-1500-930	1500.38	0.001	44.2±1	930±20	Any	> 94	
T-1600-976s	1600.00	0.001	51.3±1	976±10	S	> 94	
T-1850-970s	1851.85	0.001	63.9±1	970±10	S	> 93	
T-1739-1030s	1739.13	0.001	63.6±1	1030±10	S	> 90	
LSFSG-1000	1000.00	0.001	31.0±1	1040±20	Any	> 94	
T-1702-1050s	1702.13	0.001	63.8±1	1054±10	S	> 94	
T-1600-1060s	1600.00	0.001	58.0±1	1060±20	S	> 94	

Notes: [1] Gratings will perform over significantly larger spectral range and range of angles - please inquire.
[2] P-polarization: incident electric field vector perpendicular to grating lines. S-polarization: incident electric field vector parallel to grating lines.

Mechanical[3]

Parameter	Value	Units
Width and Height Tolerance	±0.2	mm
Thickness	0.675±0.050 or 0.95±0.050 (up to 10 mm custom thickness available)	mm
Grating clear aperture (CA)	Centered, 90% of substrate area	
Surface quality in CA	60/40 (up to 20/10 available)	scratch/dig
Surface quality outside of CA	No requirement	
Substrate	Fused silica, dielectric films	
Size	Sizes up to 140 mm diameter are available	

Notes: [3] Better tolerances and surface quality available for custom products.

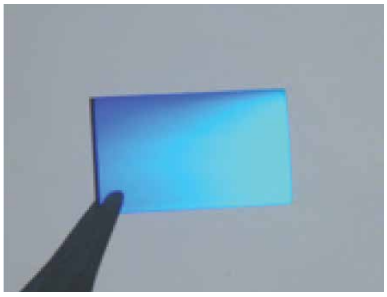
Refer to http://www.lightsmyth.com to review stock sizes and prices.

Custom High-Efficiency Transmission Gratings

LightSmyth offers highly-efficient, ultra-low polarization-dependent-loss transmission gratings with custom line densities, sizes and angles of incidence. Our optical engineers will gladly assist with your custom application.

Ultra-High Efficiency Reflection Grating

LightSmyth's ultra-high efficiency reflection gratings are designed for use in telecom polarization diversity optics as well as for applications in laser frequency stabilization. These gratings are fabricated using projection lithography and reactive-ion-etch on a single-crystal-silicon substrate and metalized (gold for IR) to achieve very high efficiency for a single polarization. Each grating is a master, not a replica, resulting in low scattered light and long lasting performance. Wafer-scale cost-effective fabrication allows us to offer very competitive prices.



Advantages

- Ultra-high efficiency for a single polarization
- Robust dielectric materials, no polymers are used
- Each grating is a master; ultra-low scatter
- Highly competitive pricing; Telcordia-qualified

Applications

- Optical telecommunications (laser sources, polarization diversity systems)
- High power lasers
- Tunable lasers

Telecom Reflection Gratings

Parameter	Value				Units
P/N prefix	SLG-12		SLG-11.7		
Line Density	1200		1169.59		Lines/mm
Line Density Uniformity	0.001		0.001		Lines/mm
Angle of Incidence AOI	68 ± 1		65 ± 1		°
Wavelength Range (in vacuum)	1525 – 1565				nm
Operational Polarization[1]	P-				
Diffraction Efficiency	> 90				%
Wavefront		<0.2		<0.2	λ @1545 nm[2]
Thickness	0.68±0.050	5.7±0.1	0.68±0.050	5.7±0.1	
Substrate Material	Silicon	Fused silica	Silicon	Fused silica	
Coating	Gold				
Technology	Lithographic patterning, reactive ion etch				
Width and Height Tolerance[3]	±0.2				mm
Grating clear aperture (CA)	Centered, 0.5 mm from substrate edges				
Surface quality in CA[3]	60/40				scratch/dig

Notes: [1] P-polarization: E vector is perpendicular to the grating lines.
[2] Over 25x12 mm aperture.
[3] Better tolerances and surface quality available for custom products.

Product Selection

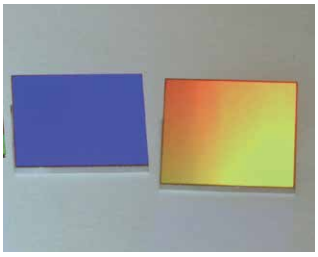
Line Density	Thickness	Part Number Prefix
1200 lines/mm	0.68 mm	SLG-C12
1200 lines/mm	5.7 mm	STG-C12
1169.59 lines/mm	0.68 mm	SLG-C11.7
1169.59 lines/mm	5.7 mm	STG-C11.7

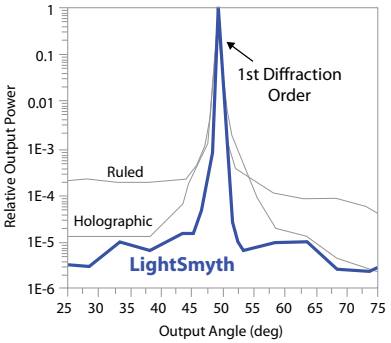
Notes: Custom sizes up to 140 mm diameter are available. Call or visit www.lightsmyth.com for stock sizes.

Standard Reflection Grating

Reflection gratings are used in a variety of optical applications requiring spatial separation of light by wavelength. LightSmyth's ultralow scatter reflection gratings are fabricated using projection lithography and reactive-ion-etch of single-crystal-silicon substrates. Gratings may be coated by a variety of metallic and dielectric materials and optimized for your application using our highly accurate coating simulation software and state-of-the-art coating facility. Each grating is a master, not a replica, resulting in low-scatter and long-lasting performance.

LightSmyth reflection gratings reduce scattered light up to 100X compared to conventional commercial replicated holographic gratings and mechanically ruled gratings (see plot at right).





Advantages

- Each grating is a master, no polymers are used
- Free of replication/ruling flaws, ultra-low scattered light
- Robust single crystal silicon substrate
- Thermal conductivity close to that of copper
- Thermal expansion lower than that of Pyrex glass
- Ultra-high line count (up to 7200 lines/mm) for EUV

Applications

- Remote optical sensors and spectroscopy
- Pulse compression of pico- and femto-second pulses
- High power lasers
- Spectral beam combining
- Astronomy and space exploration

Product Selection

Line Density	Groove Depth	Size [1, 6]	Part number [2]
7200 lines/mm	50 nm	12.5 × 12.5 mm²	SLG-C72-1212A-Al
7200 lines/mm	50 nm	25 × 25 mm²	SLG-C72-2525A-Al

Line Density	λPE (nm) [3, 4, 5]	Size [1, 6]	Part number [2]
3600 lines/mm	240nm(s), 480nm(p)	12.5 × 12.5 mm²	SLG-C36-1212A-Al
2400 lines/mm	300nm(s), 540nm(p)	12.5 × 12.5 mm²	SLG-C24-1212A-Al
1800 lines/mm	390 nm(s); 660nm to 1µm(p)	20 x 9 mm²	SLG-C18-2009A-Al
1740 lines/mm	TBD	22.1 × 9.1 mm	SLG-C17.4-2209-Al
1650 lines/mm	TBD	29.1 × 12.1 mm	SLG-C16.5-2912-Al
1480 lines/mm	TBD	24.1× 10.1 mm	SLG-C14.8-2410-Al
1200 lines/mm	580 nm(s); 1µm,1.55µm(p)	12.5 × 12.5 mm²	SLG-C12-1212A-Al
1200 lines/mm	580 nm(s); 1µm,1.55µm(p)	25 × 25 mm²	SLG-C12-2525A-Al

Notes: [1] Second dimension corresponds to the groove length. [2] The standard reflective coating is Aluminum. Aluminum + MgF_2 protective layer, Aluminum + Al_2O_3 protective layer, and gold coatings are available as an option. [3] The peak efficiency wavelength, λPE, indicates wavelength(s) of highest efficiency for a given polarization state (in parenthesis) [4] P-polarization: Incident electric field vector is perpendicular to grating lines. S-polarization: incident electric field vector is perpendicular to grating lines. [5] Values are given for Littrow mount. For detailed efficiency curves please see www.lightsmyth.com. [6] Typical grating thickness is approximately 0.7 mm. Substrate height and width tolerance is ± 0.3 mm. Grating composition: single crystal silicon, reactive ion etch, reflective metal coating.

Custom Diffration Gratings

LightSmyth offers custom diffraction gratings, fabricated to your specifications with custom metallic or dielectric coatings, line densities, and substrate sizes. The following attributes are offered: up to 12-inch diameter substrates • up to 7200 lines/mm line density • variable line spacing aberration corrected gratings for flat-field spectroscopy • variable duty cycle • line widths as thin as 125 nm.

Standard Reflection Grating

Coherent Grating Arrays are an innovative product exclusive to LightSmyth. They combine multiple diffraction gratings with different properties coherently on a single substrate. This allows for new enhanced optical functionality, such as athermal wavelength referencing, enhanced resolution spectrometers or multichannel spectrometers with a single dispersion element. Grating Arrays used together with 2D sensors to sample multiple spectral stripes eliminate the trade-off between high resolution and wide spectral coverage allowing for compact spectrometers with ultra high-resolution and wide spectral coverage. More details are available in an application note.

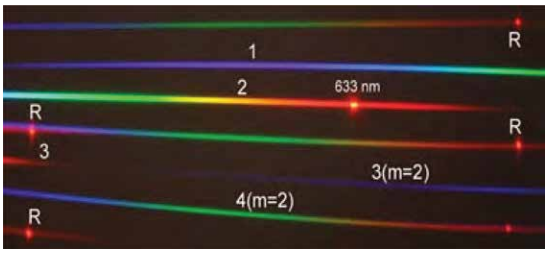


Advantages

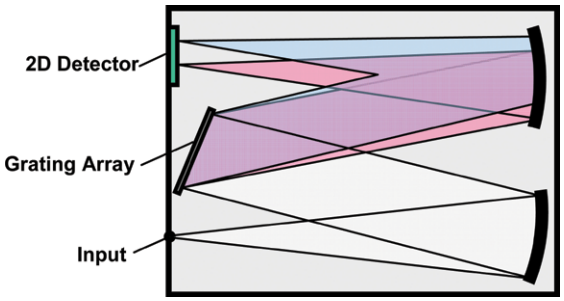
- Sample signal with multiple gratings simulteneously
- Array gratings paint separate regions of 2D detector
- Array gratings may sample non-contiguous wavelength bands
- Enables compact high-resolution multi-channel spectrometers
- Embedded grating markers for self-calibration and alignment

Applications

- Remote optical sensors and spectroscopy
- Single-module LIBS spectrometers
- Simplified echelle-style spectrometers
- Multi-channel spectrometers with a single dispersive element



Actual output spectrum distribution of the Coherent Grating Array



Top view diagram of exemplary multi-band spectrometer layout using Coherent Grating Array.

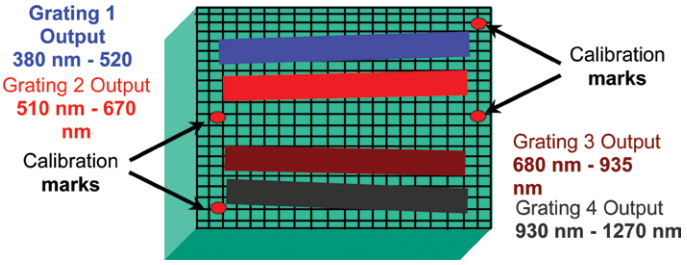


Diagram of exemplary spectral bands on the two dimensional detector. Depending on the calibration source, different spectral bands may be selected.

Product Selection

Primary Grating	Calibration Markers[1]	Line Density	Size[3]	Part Number[2]
1	381, 522 nm	1788 lines/mm	12.5 x 12.5mm	SAG-1212A-Al
2	509, 696 nm	1341 lines/mm		
3	683, 935 nm	998 lines/mm		
4	929, 1271nm	734 lines/mm		

Notes: [1] The calibration markers listed are produced by a HeNe laser incident on the small calibration gratings. Use of a calibration light source having a different wavelength will produce markers coinciding with different values of the dispersed spectra of the four primary gratings. Calibration marks are independent of grating input angle. [2] The standard reflective coating is Aluminum. Aluminum + MgF_2 protective layer, Aluminum + Al_2O_3 protective layer, and gold coatings are available as an option. [3] Typical grating thickness is approximately 0.7 mm. Substrate height and width tolerance is $\pm$ 0.3 mm. Grating composition: single crystal silicon, reactive ion etch, reflective metal coating.

Gratings With Embedded Micro-Grating Arrays

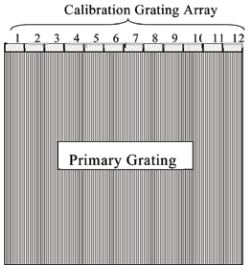
LightSmyth Technologies introduces a new concept in grating design: Gratings with integral calibration features. A schematic representation of such a grating, its photograph, and its far-field output are shown in figures below. The Primary Grating is used in the traditional manner, but the 12 alignment/calibration gratings, when illuminated by a HeNe laser or other reference, provide a family of calibration markers in the detection plane. These markers allow high precision and convenient calibration of the Primary Grating's dispersion line. The markers also allow precise monitoring of the input signal wavefront and the proper detection-plane focus. Significantly, the primary grating wavelengths indicated by the markers are independent of the angle of incidence of the input light. Essentially, one is calibrating the primary grating's output plane through differential comparison of the ratio of line densities of the primary and alignment/calibration gratings. Refer to the relevant application note for more details.

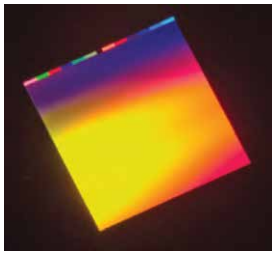
Advantages

- Multi-point wavelength reference provided with a single wavelength source
- Calibration is independent of ambient temperature
- Calibration is independent of optical layout or angle of incidence

Applications

- Remote sensors and spectrometry in wide range of operating temperature or strong vibration environment
- Handheld spectrometers with visual line identification.
- Low cost, robustly calibrated spectrometers







The table below details the properties of both the tilted and non-tilted versions of the product. One inch gratings contain the full set of 12 alignment/calibration gratings. Half-inch gratings contain a subset of 6. The alignment/calibration gratings are designed so that subsets of 6 gratings provide a useful set of markers. Any input angles may be employed without changing the marker wavelengths for a given reference source wavelength.

Grating Properties

Grating	Primary	1	2	3	4	5	6	7	8	9	10	11	12
1st order marker[1], nm	n/a	400	500	600	700	800	900	500	550	600	650	700	750
Lines/mm (non-tilted)	1200	758.6	948.2	1137.7	1327.4	1517.2	1706.7	948.2	1043.0	1137.7	1232.6	1327.4	1422.2
Lines/mm (tilted)	1200	760.6	949.8	1139.1	1328.6	1518.2	1707.6	949.8	1044.4	1139.1	1233.9	1328.6	1423.3
Tilt angle, °	0	4.158	3.329	2.775	2.379	2.082	1.851	3.329	3.025	2.775	2.560	2.379	2.219

Notes: [1] First-order marker wavelength is the wavelength of light diffracted from the primary grating which falls at the same output angle as the HeNe marker signal from the referenced alignment/calibration grating. Note that alignment/calibration gratings produce additional HeNe markers at higher orders and that the marker wavelength is simply multiplied by the order number.

Product Selection

Primary Grating Line Density	Alignment/calibration gratings	Orientation	Size[3]	Part number[2]
1200 lines/mm	1-6 or 7-12	Non-tilt	12.5 x 12.5 mm	CNG-C12-1212A-Al
1200 lines/mm	1-12	Non-tilt	25 x 25 mm	CNG-C12-2525A- Al
1200 lines/mm	1-6 or 7-12	Tilt	12.5 x 12.5 mm	CTG-C12-1212A- Al
1200 lines/mm	1-12	Tilt	25 x 25 mm	CTG-C12-2525A- Al

Notes: [2] The standard reflective coating is Aluminum. Aluminum + MgF_2 protective layer, Aluminum + Al_2O_3 protective layer, and gold coatings are available as an option. [3] Typical grating thickness is approximately 0.73 mm. Substrate height and width tolerance is $\pm$ 0.3 mm. Grating composition: single crystal silicon, reactive ion etch, reflective metal coating.

Ultra-Short Focal Length Focusing Gratings

LightSmyth Technologies' family of flat-substrate focusing gratings are designed for use with externalcavity lasers. The gratings focus optical input signals while simultaneously spectrally dispersing them. The focusing function is incorporated into the gratings via holographic design principles using curved and variably-spaced grating lines. Integrating focus function with spectral dispersion through holography rather than by use of curved substrates or lenses reduces system component count and facilitates miniaturization. Flat-substrate focusing gratings are also relevant to a broad range of applications in spectroscopy and general photonics.



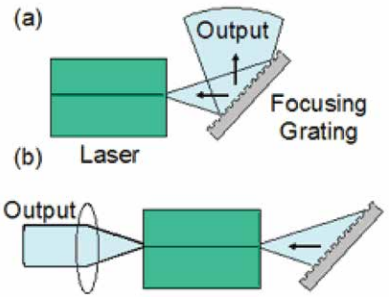
Advantages

- Ultrashot focal length
- Holographic design provides aberration-free focusing
- Focusing and dispersion in a single flat-substrate element

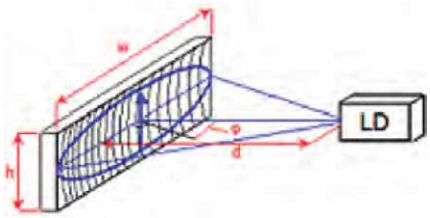
Applications

- Laser diode frequency stabilization/linewidth narrowing
- Wide range laser tuning without mode hopping
- Micro-spectrometers

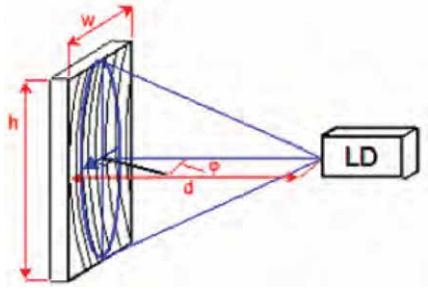
LightSmyth flat-substrate focusing gratings are optimized for implementation in external-cavity diode laser (ECDL) systems where they provide frequency-selective feedback and thus laser frequency stabilization and linewidth narrowing. The gratings are designed for ECDLs employing the Littrow configuration and focus the first-order diffracted beam back toward the laser providing tunable locking feedback. Grating focal lengths are short (3.75 mm) in order to facilitate large longitudinal mode spacing and to enable convenient wide-range single-mode tuning. Grating groove depth and duty cycle are optimized to provide maximal diffraction efficiency.



Use of LightSmyth focusing gratings in external-cavity diode lasers: a, the grating functions as both outcoupler and to provide feedback. b, the grating provides feedback via the diode back facet



Schematic illustrating grating layout for s-input polarization (parallel to the grating lines). d, working distance, h, grating height, w, grating width.



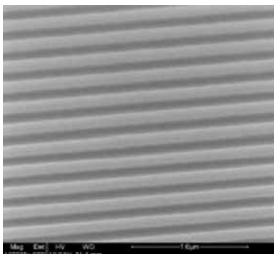
Schematic illustrating grating layout for p-input polarization (perpendicular to grating lines). d, working distance, h, grating height, w, grating width.

Product Selection

Design Wavelength	Design Input Polarization	Incidence Angle φ	Approx. Line Density[1]	Size (w × h)[2, 4, 5]	Part number[3]
405 nm	S	40°	3175 lines/mm	6 × 3 mm²	SCG-405S-0603A-Al
405 nm	P	45°	3640 lines/mm	3 × 6 mm²	SCG-405P-0306A-Al
635 nm	S	40°	2028 lines/mm	6 × 3 mm²	SCG-635S-0603A-Al
635 nm	P	65°	2857 lines/mm	3 × 6 mm²	SCG-635P-0306A-Al
780 nm	P	60°	2222 lines/mm	3 × 6 mm²	SCG-780P-0306A-Al

Notes: [1] At grating midpoint. [2] See figures above for design layout and illustration of parameters. [3] The standard reflective coating is Aluminum. Aluminum + MgF_2 protective layer, Aluminum + Al_2O_3 protective layer, and gold coatings are available as an option. [4] The focal length of all gratings is 3.75 mm. All gratings are designed to provide laser feedback via the first diffraction order. The working distance between grating and laser diode front facet is d = 7.5 mm for all gratings. [5] Silicon substrate has a thickness of 0.73mm. Substrate height and width tolerances are ± 0.3 mm.

Nano-Machined Substrates and Stamps



LightSmyth offers a large variety of nanomachined single crystal silicon substrates providing a low cost entry into nanophotonics research for industry and academic institutions. The substrates may be used in a variety of applications in optics, photonics, biology, chemistry, physics (e.g. neutron scattering), polymer research, nanoimprinting, microfluidics and others. If desired, the substrates can be coated with metallic or dielectric coating. Most of the surface features have slightly trapezoidal cross-section profiles with straight parallel mesas and trenches. Lattice-like (2D photonic crystal) structures are available as well. A number of feature sizes and trench depth is available. SEM images of the substrates may be taken prior to shipment to verify the exact profile.

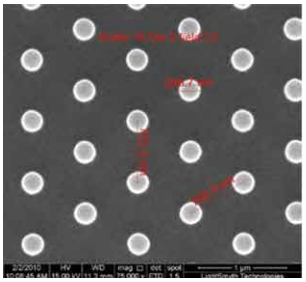
In some cases, two grades are available. Scientific (S) may have cosmetic surface scratches and edge defects. Premium grade (P) has the same surface quality as optical components. Clean-room compatible cleaning and packaging available. New nanostamps are added to our stock frequently. Please contact our application scientists if you cannot find a nanostructure you need in the list.

Advantages

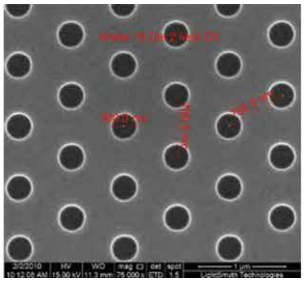
- Low cost entry into nanoscale industry
- Large selection of stock nanostructures
- Custom structures and sizes available
- Enabling for a large variety of applications
- SEM verification of structures cross-section available

Applications

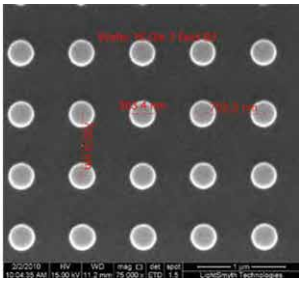
- Nanostamping and nanoimprinting
- Standards for metrology calibration
- Polymer research, nanofluidics
- Advanced solar cells
- Assays for chemical and biological experiments



Hexagonal post lattice type



Hexagonal hole lattice type



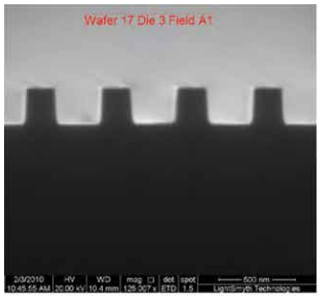
Rectangular post lattice type

Product Selection - 2D Nano Stamps

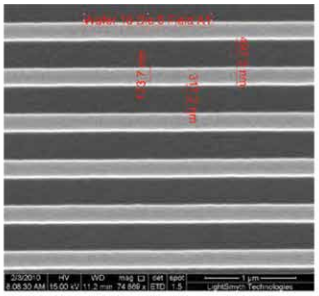
Period	Lattice type	Groove depth	Feature width	Size	Part number
500 nm	rect post	multiple[1]	135 nm	8×8.3×0.7 mm	S2D-24B1-0808-xxx-P
500 nm	rect post	multiple[1]	210 nm	8×8.3×0.7mm	S2D-18B1-0808-xxx-P
600 nm	rect post	multiple[1]	195 nm	8×8.3×0.7mm	S2D-24B2-0808-xxx-P
600 nm	rect post	multiple[1]	275 nm	8×8.3×0.7mm	S2D-18B2-0808-xxx-P
700 nm	rect post	multiple[1]	260 nm	8×8.3×0.7mm	S2D-24B3-0808-xxx-P
700 nm	rect post	multiple[1]	350 nm	8×8.3×0.7mm	S2D-18B3-0808-xxx-P
500 nm	hex post	multiple[1]	165 nm	8×8.3×0.7mm	S2D-18C1-0808-xxx-P
600 nm	hex post	multiple[1]	165 nm	8×8.3×0.7mm	S2D-24C2-0808-xxx-P
600 nm	hex post	multiple[1]	240 nm	8×8.3×0.7mm	S2D-18C2-0808-xxx-P
700 nm	hex post	multiple[1]	220 nm	8×8.3×0.7mm	S2D-24C3-0808-xxx-P
700 nm	hex post	multiple[1]	290 nm	8×8.3×0.7mm	S2D-18C3-0808-xxx-P
600 nm	hex hole	multiple[1]	180 nm	8×8.3×0.7mm	S2D-24D2-0808-xxx-P
700 nm	hex hole	multiple[1]	200 nm	8×8.3×0.7mm	S2D-18D3-0808-xxx-P
700 nm	hex hole	multiple[1]	290 nm	8×8.3×0.7mm	S2D-24D3-0808-xxx-P

Notes: [1] Depth options of 150 and 350 nm available. To order a particular depth, replace "xxx" in the part number with "150" or "350", respectively.

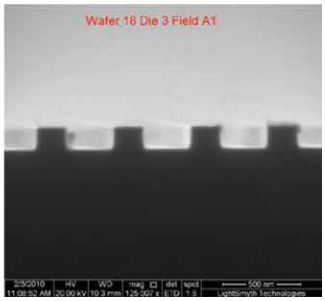
Nano-Machined Substrates and Stamps



Linear nanostamp, cross-section



Linear nanostamp, top view



Linear nanostamp, cross-section

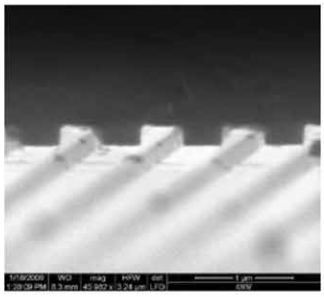
Product Selection - 2D Nano Stamps

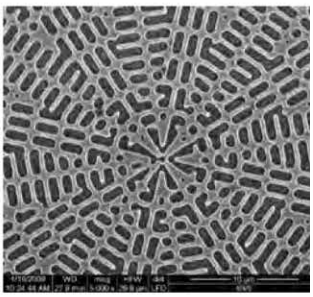
Period	Etch Depth	Duty Cycle[1]	Line width[2]	Size[3]	Part number[4]
139 nm	50 nm	50%	69.5 nm	12.5x12.5x0.7 mm	SNS-C72-1212-50-P
139 nm	50 nm	50%	69.5 nm	25x25x0.7 mm[5]	SNS-C72-2525-50-P
278 nm	110 nm	50%	139 nm	12.5x12.5x0.7 mm	SNS-C36-1212-110-P
278 nm	110 nm	50%	139 nm	12.5x12.5x0.7 mm	SNS-C36-1212-110-S[4]
416.6 nm	110 nm	50%	208 nm	12.5x12.5x0.7 mm	SNS-C24-1212-110-P
416.6 nm	110 nm	50%	208 nm	12.5x2.5x0.7 mm	SNS-C24-1212-110-S[4]
500 nm	multiple[6]	44%	220 nm	8x8.3x0.7 mm	SNS-C20-0808-xxx-D45-P
500 nm	multiple[6]	60%	300 nm	8x8.3x0.7 mm	SNS-C20-0808-xxx-D60-P
555.5 nm	110 nm	50%	278 nm	20x9x0.7 mm	SNS-C18-2009-110-D50-P
555.5 nm	140 nm	50%	278 nm	20x9x0.7 mm	SNS-C18-2009-140-D50-P
555.5 nm	110 nm	29%	158 nm	20x9x0.7 mm	SNS-C18-2009-110-D29-P
555.5 nm	140 nm	29%	158 nm	20x9x0.7 mm	SNS-C18-2009-140-D29-P
600 nm	multiple[6]	43%	260 nm	8x8.3x0.7 mm	SNS-C16.7-0808-xxx-D45-P
600 nm	multiple[6]	55%	330 nm	8x8.3x0.7 mm	SNS-C16.7-0808-xxx-D55-P
606 nm	190 nm	50%	303 nm	29x12x0.7 mm	SNS-C16.5-2912-190-P
606 nm	190 nm	50%	303 nm	29x12x0.7 mm	SNS-C16.5-2912-190-S[4]
606 nm	190 nm	50%	303 nm	29x24.2x0.7 mm[5]	SNS-C16.5-2924-190-P
675 nm	170 nm	32%	218 nm	24x10x0.7 mm	SNS-C14.8-2410-170-P
675 nm	170 nm	32%	218 nm	24x10x0.7 mm	SNS-C14.8-2410-170-S
675 nm	170 nm	32%	218 nm	24x30.4x0.7 mm[5]	SNS-C14.8-2430-170-P
700 nm	multiple[6]	47%	330 nm	8x8.3x0.7 mm	SNS-C14.3-0808-xxx-D45-P
700 nm	multiple[6]	55%	375 nm	8x8.3x0.7 mm	SNS-C14.3-0808-xxx-D55-P
833.3 nm	200 nm	50%	416 nm	12.5x12.5x0.7 mm	SNS-C12-1212-200-P
833.3 nm	200 nm	50%	416 nm	12.5x12.5x0.7 mm	SNS-C12-1212-200-S[4]
833.3 nm	200 nm	50%	416 nm	25x25x0.7 mm[5]	SNS-C12-2525-200-P

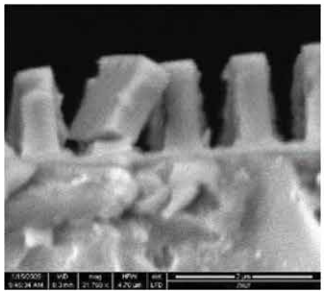
Notes: [1] Duty cycle denotes ratio of line (mesa) width over period.
[2] Indicates width value of mesa.
[3] Second dimension corresponds to the groove length.
[4] P/N ending with "-S" is "scientific" grade offered at a discount. It has at least 80% of usable area. Up to 80/100 scratch/dig/particles and irregular substrate shape may present.
[5] Larger custom sizes availableplease call.
[6] Depth options of 150 and 350 nm available. To order a particular depth, replace "xxx" in the part number with "150" or "350", respectively.

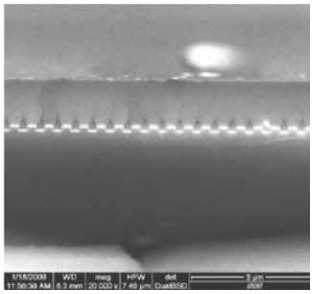
SEM Imaging Service











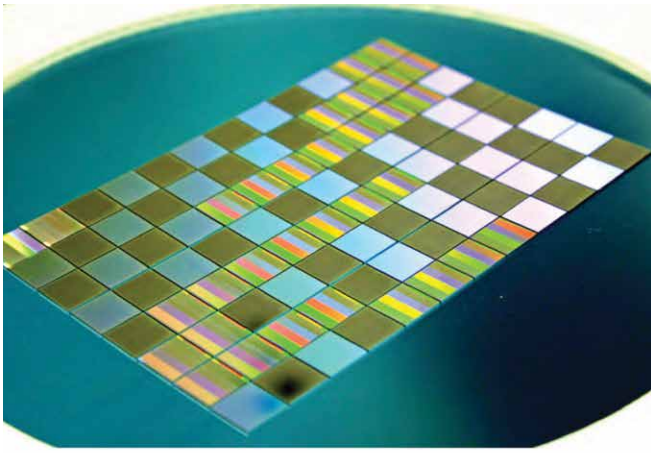
LightSmyth is pleased to offer economical SEM imaging and sample preparation. Working with a state-of-the-art FEI Quanta 400 Scanning Electron microscope, features as small as 3-5 nm can be resolved in high vacuum, low vacuum, and ESEM modes. Sample polishing and coating service is also available.

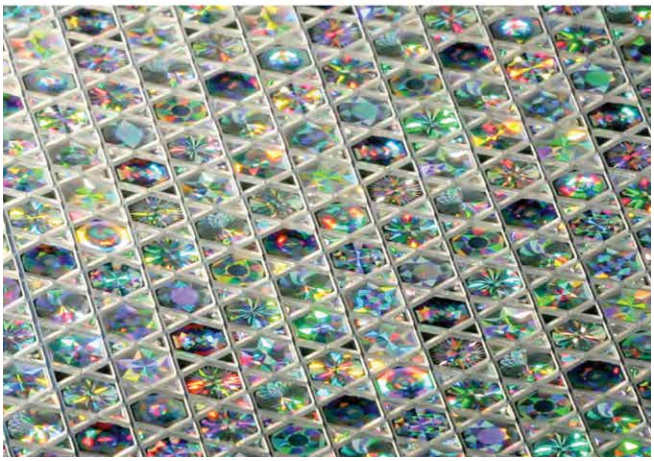
Manufacturing and fabrication processes are often difficult to perfect without detailed knowledge of microscopic properties. LightSmyth's SEM imaging allows convenient and economical access to nanometer-level diagnostics.

Sample preparation and sample images will be processed quickly and efficiently with PhD-level insight and precision.

Contact us with your needs.

Precision Dicing Service



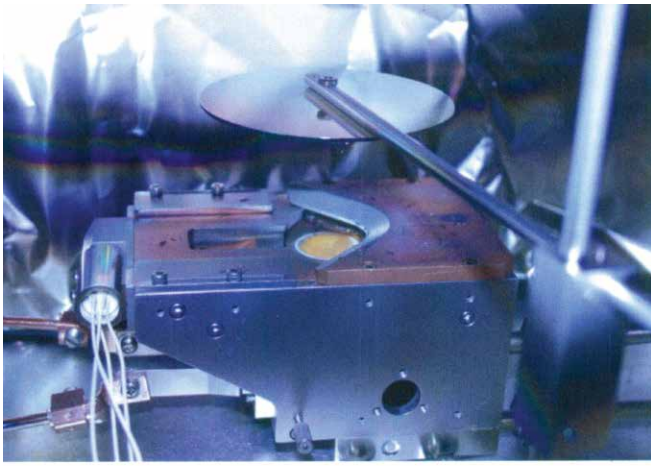


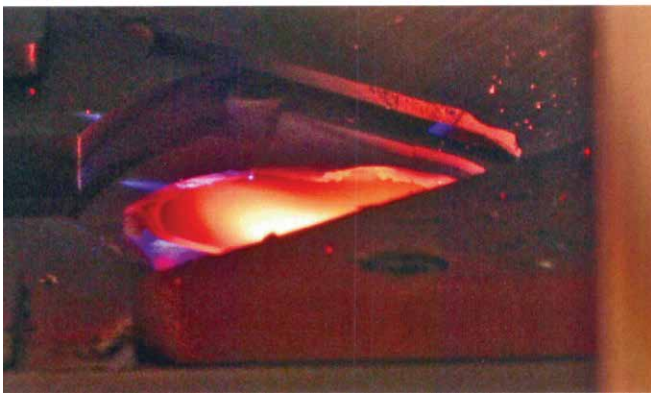
LightSmyth is pleased to offer comprehensive dicing services for wafers or other materials up to 200 mm in diameter. Saws employed include high performance Disco units operating in semi-automatic mode.

Wafer cleaning and various diagnostics are available.

Contact LightSmyth for an economical quotation on the dicing services you require.

Optical Coating Services





LightSmyth offers economical precision thin-film coating. The coating method employed is e-beam based evaporation. Single and multilayer, dielectric and metallic coatings can be provided on a variety of substrates. Up to seven 150-mm wafers or three 200-mm wafers can be coaled simultaneously. LightSmyth coatings can be tailored to provide high homogeneity on typical flat or curved substrates or to provide optimal position-dependent coverage of non-uniform surfaces, such as gratings. We are specialists in efficient grating coating.

LightSmyth is able lo provide SEM diagnostics of surfaces coated as well spectral characterization.

Class 100 clean room surface preparation service is available.

Contact LightSmyth with the details of your coating needs for a quotation.

LightSmyth™ Technologies a Finisar Company



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Phone +1.541.431.0026 • Fax +1.541.284.5607

About LightSmyth

LightSmyth™ Technologies, a Finisar Company, was founded in June of 2000 to develop innovative nanophotonic products. The development efforts culminated in the introduction of high efficiency diffraction gratings for optical telecommunications, defense and biological markets in 2007. Today, LightSmyth offers more than 100 grating products optimized for various applications. LightSmyth products and innovations leverage holographic and diffractive principles combined with state-of-the-art semiconductor manufacturing patterning tools such as Deep UltraViolet (DUV) steppers/scanners.

LightSmyth Technologies
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