



Gratings technologies for advanced light sources

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Sales Engineer & Business developer, Custom Gratings



**EPIC OTM on Photonics Technologies
for Advanced Light Sources**

28.10.2024

From HORIBA to optical gratings...



Automotive Test Systems



Process & Environmental



Medical



Semiconductor



Scientific

HORIBA

Scientific

- Analytical instrumentation (Molecular spectroscopy, emission spectroscopy, particle size analyzers,...)
- OEM systems (Spectrometers, Monochromators, HSI cameras), OEM gratings and Custom gratings

Custom Gratings:

- VUV/Synchrotron applications (high-quality, full customization)
- High-Energy Lasers applications (largest gratings manufactured for PW Lasers)
- Space/Astronomy applications (> 40 years & > 50 missions this field)

Custom gratings are designed and manufactured at:
HORIBA France: a Center of Excellence
Initially Jobin Yvon

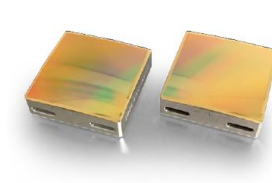
Created in 1819 from the collaboration between
Augustin Fresnel and Jean-Baptiste Soleil

200 years of optical innovation

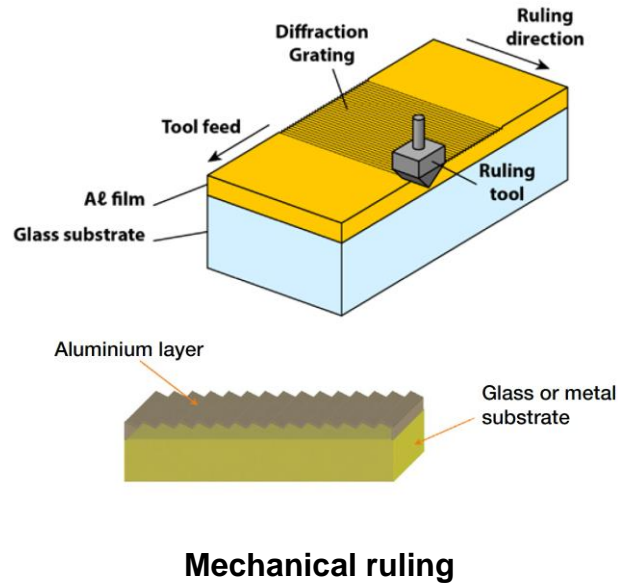
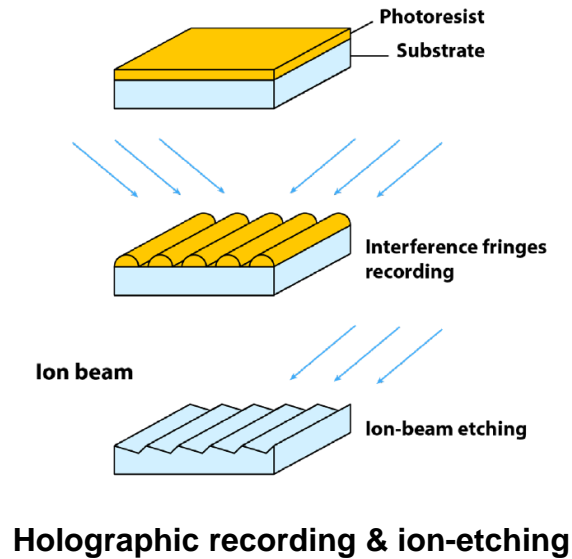


European Research at Paris Saclay

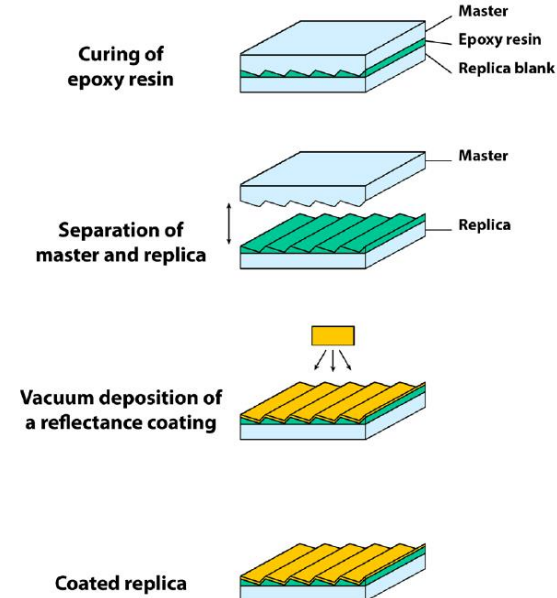
HORIBA's Gratings Technologies



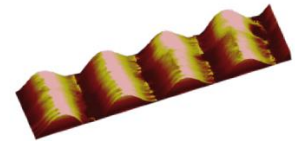
Masters



Replicas



Sinusoidal



Triangular (sawtooth)



Lamellar



Substrate shape	Substrate material	Aberration correction	Groove density	Metallic coating	Spectral range
Plane, spherical, toroidal, freeform, prisms	Silica, Zerodur®, SiC, Aluminum	Type IV or Variable Line Spaced	From 30 l/mm to 4800 l/mm	Gold, Aluminum, AlMgF2, Platinum, Nickel	From deep UV to MIR

FULL CUSTOMIZATION POSSIBLE THANKS TO COMPUTATION TOOLS
Grating efficiency calculations, Zemax optimization

Laser Gratings

Gold coated gratings manufacturer since 40 years

Gratings for Ti:Saph (800nm), OPCPA (900nm) or Yb (1053/1030) Lasers

Size: up to **H700xW1450xT100**

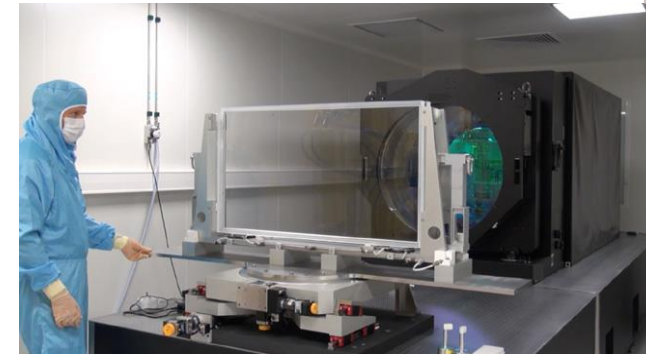
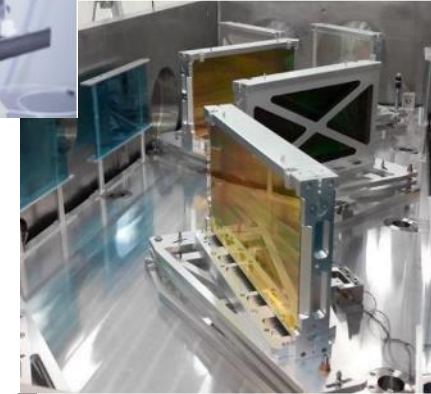
Groove density: 1200/1400/1480 or 1740 gr/mm, custom available upon request

Grating efficiency > 90% on TM Polarization

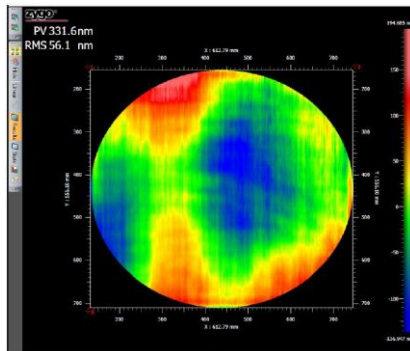
Wavefront error, depending on size: up to $\lambda/20$ RMS

Substrate material: Fused silica, ultra-low expansion glass

LIDT: Please contact us!



Metrology:



Ref	Séri	Number	50	202,5	355	507,5	660	812,5	965		
50	Point 1 93,4										
168,75	Point 2 93,6		Point 3 93,8		Point 4 94,1		Point 5 93,7		Point 6 93,9		
287,5	Point 7 92,8	Point 8 93,8		Point 9 94,0		Point 10 93,9		Point 11 93,7		Point 12 93,9	Point 13 93,8
406,25	Point 14 93,1		Point 15 93,4		Point 16 94,0		Point 17 93,7		Point 18 93,5		
525	Point 19 93,8										

VUV & soft X-Ray Gratings

Gratings manufacturer for Monochromators or spectrometers

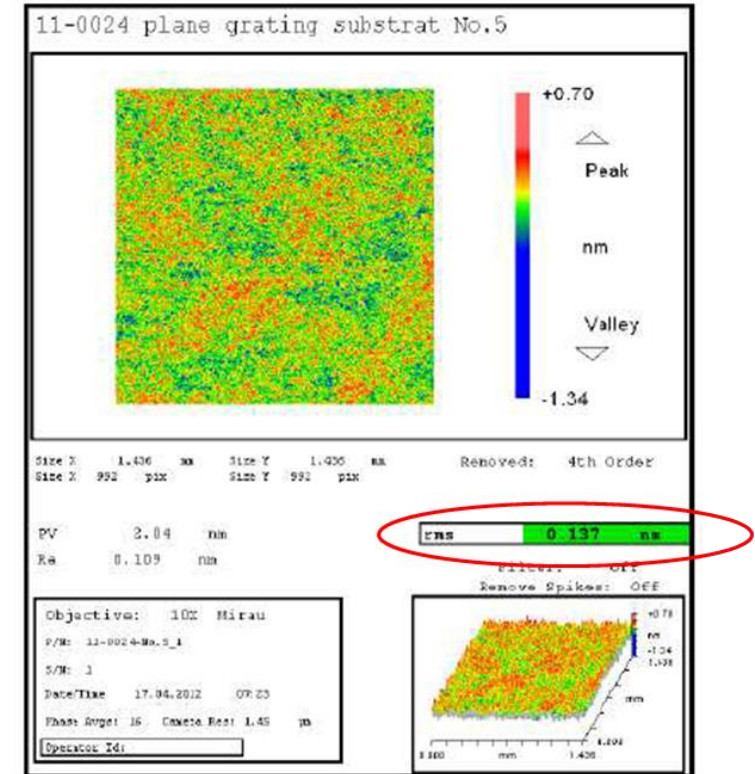
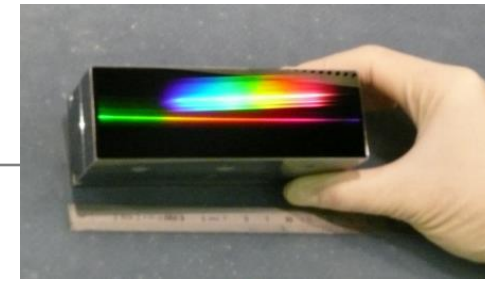
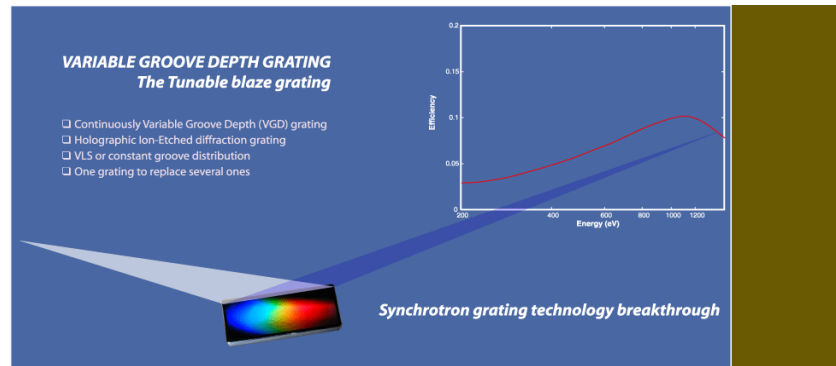
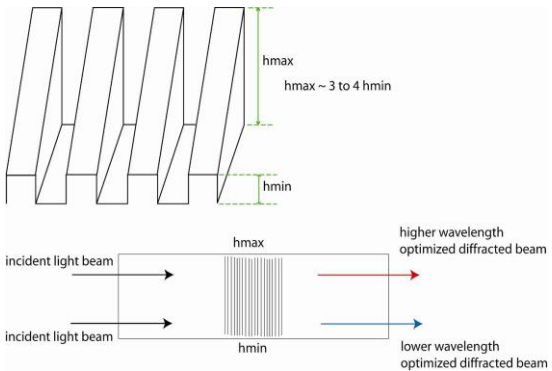
Based on customer requirements:

- Definition of the substrate parameters
- VLS Law calculation / Recording setup feasibility
- Grating groove profile optimization and efficiency calculation

→ Dedicated R&D team

Our benefits with grating manufacturing

- We provide Lamellar gratings
- We process state of the art substrates (very low slope error and roughness)
- Tight manufacturing and VLS law tolerances
- We can offer **replica gratings**
- We can offer **Variable Groove depth (VGD) gratings**



RMS microroughness < 0.3 nm

Thank you! Now we can keep in touch:

- **Feel free to contact me:**

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- **What we need?**

→ As a Mono/spectro manufacturer, is there any needs for custom VUV mono/spectrometers?

→ With Laser/secondary source power increase, we might be interested to do LIDT / damaged tests on VUV gratings (coatings, replica gratings, master gratings)

- **The whole team is available to discuss feasibility of your custom gratings!**

Omoshiro-okashiku
Joy and Fun



Thank you in various languages:

- Danke
- Grazie
- Tack ska du ha
- Gracias
- Terima kasih
- 謝謝
- Σας ευχαριστώ πάρα πολύ
- धन्यवाद
- شُكْرًا
- ขอบคุณครับ
- Большое спасибо
- ありがとうございます
- Cảm ơn
- Merci
- 감사합니다
- Obrigado

THANK YOU