



EAGLE RAMAN-S

Highly Sensitive, Deeply Cooled Spectrometer from Ibsen Photonics

Ibsen 
photonics



EAGLE Raman-S Spectrometer – For High Performance Raman Spectroscopy

The EAGLE Raman-S is a robust, athermal, industrial grade camera-based spectrometer especially well-suited for Raman spectroscopy. With a designed numerical aperture of up to 0.3 (f-number 1.6), high diffraction efficiency transmission grating and deeply cooled Andor's iVac 316 camera, the Eagle Raman-S is an ideal solution for demanding Raman spectroscopy applications requiring the highest levels of resolution and sensitivity.

Key Specifications of the EAGLE Raman-S

- Wavelength range: 800-1100 nm enabling both 785 and 830 nm laser wavelengths
- Configurable input options (Free space, SMA or Custom fiber ferrule)
- High resolution of 0.4 nm (6 cm⁻¹ @ 830 nm)
- Designed with NA up to 0.3 (f-number 1.6)
- Highly efficient transmission grating design (Peak DE up to 95%)
- High detector QE (Peak QE up to 95%)
- Error free imaging of tall slit in image plane

Layout and Design

The EAGLE Raman-S spectrometer is based on Ibsen Photonics' LGL platform utilizing a collimating lens system, a transmission grating, and a focusing lens system. The nature of the athermal design enables a very low temperature-induced wavelength shift of < 0.01 nm/K.

The flexible nature of the mechanical design allows for several different input options that can be configured at the time of order. A standard Free Space, SMA terminated fiber, and a custom linear fiber bundle ferrule for additional entrance slit height can be specified.

Andor iVac 316 Camera

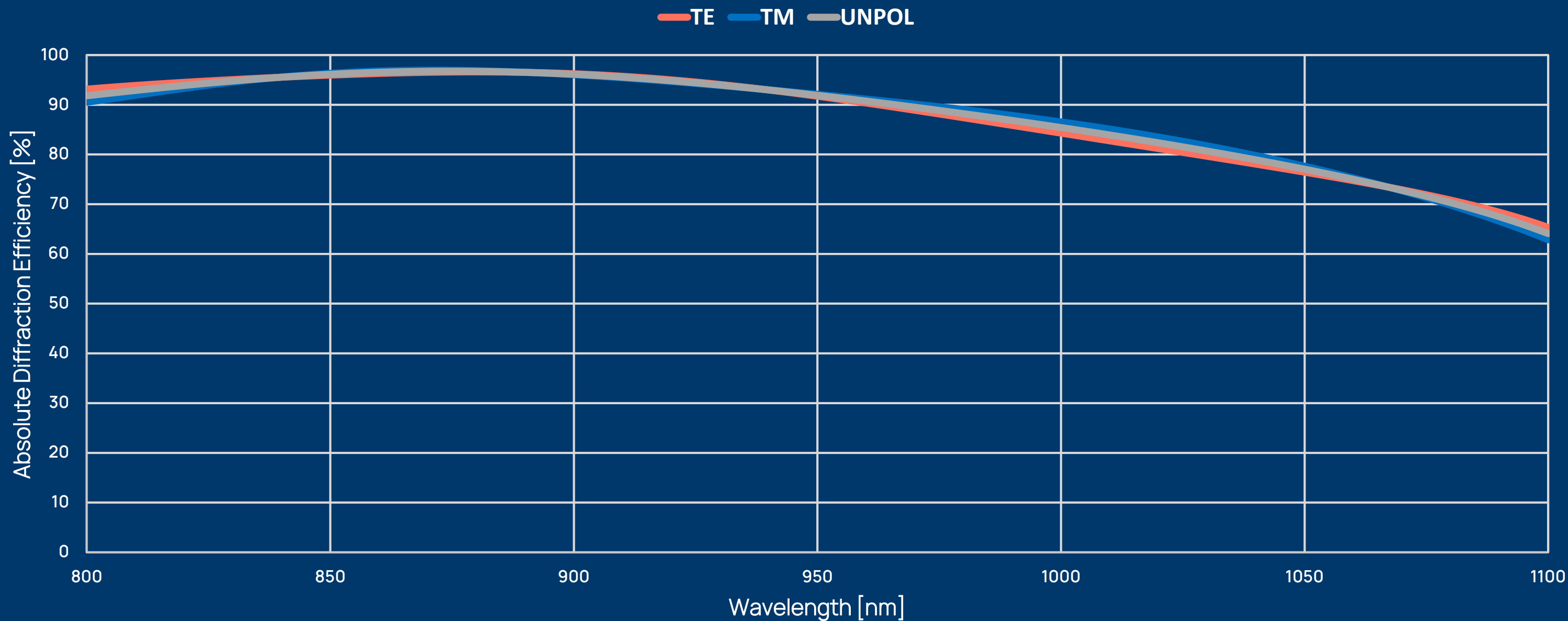
The spectrometer is by default equipped with the vacuum-sealed Andor iVac 316 camera that allows for cooling down to -60 C at normal ambient conditions. The camera sensor is a back-illuminated Low Dark Current Deep-Depletion (LCD-DD) CCD, which provides dark current levels as low as 0.033 e⁻/pixel/sec, while having a Quantum Efficiency of up to 95 percent. The electronic read noise is likewise low with levels down to 6.0 e⁻.

The detector array consists of 2000x256 (15x15µm) pixels and can be operated in either full 1D binning mode, 2D read-out mode, superpixels, or cropped mode.

Data is read over a standard USB 2.0 connection in a 16-bit format.

Technical Specifications

		EAGLE RAMAN-S	Comments
Optical entrance	Spectrometer slit	20 x 3000 μm	
	Spectrometer slit	50 x 3000 μm	
	Ferrule fiber SMA output	8 x 400 μm circular bundle	1420 μm dia. effective size
Spectral range	Excitation wavelength:		Total wavelength range
	785 nm	200 - 3650 cm ⁻¹	800-1100 nm
	830 nm	0 - 2960 cm ⁻¹	
Wavelength accuracy		< 0.05 nm	
Resolution	Slit width:		
	20 μm	3.3 - 6.3 cm ⁻¹	0.4 nm (typical)
	50 μm	5.8 - 10.9 cm ⁻¹	0.7 nm (typical)
Stray light	Monochromatic input	< 0.03 % (at +/- 40 nm from peak)	
Camera	BT-CCD	Andor iVac 316	
		2000 x 256 pixels	
		15 x 15 μm pixel size	
		30 x 3.84 mm area	
		Vacuum sealed deeply cooled to -60 °C.	
Temperature induced drift		< 0.01 nm/°C	
Operating temperature range		0 to +40 °C	Non-condensing
Storage temperature range		-25 to + 50 °C	Non-condensing
Dimensions		128 x 152 x 248 mm (Exc. fiber)	
Weight		3.5 kg (Exc. fiber)	



Transmission Gratings

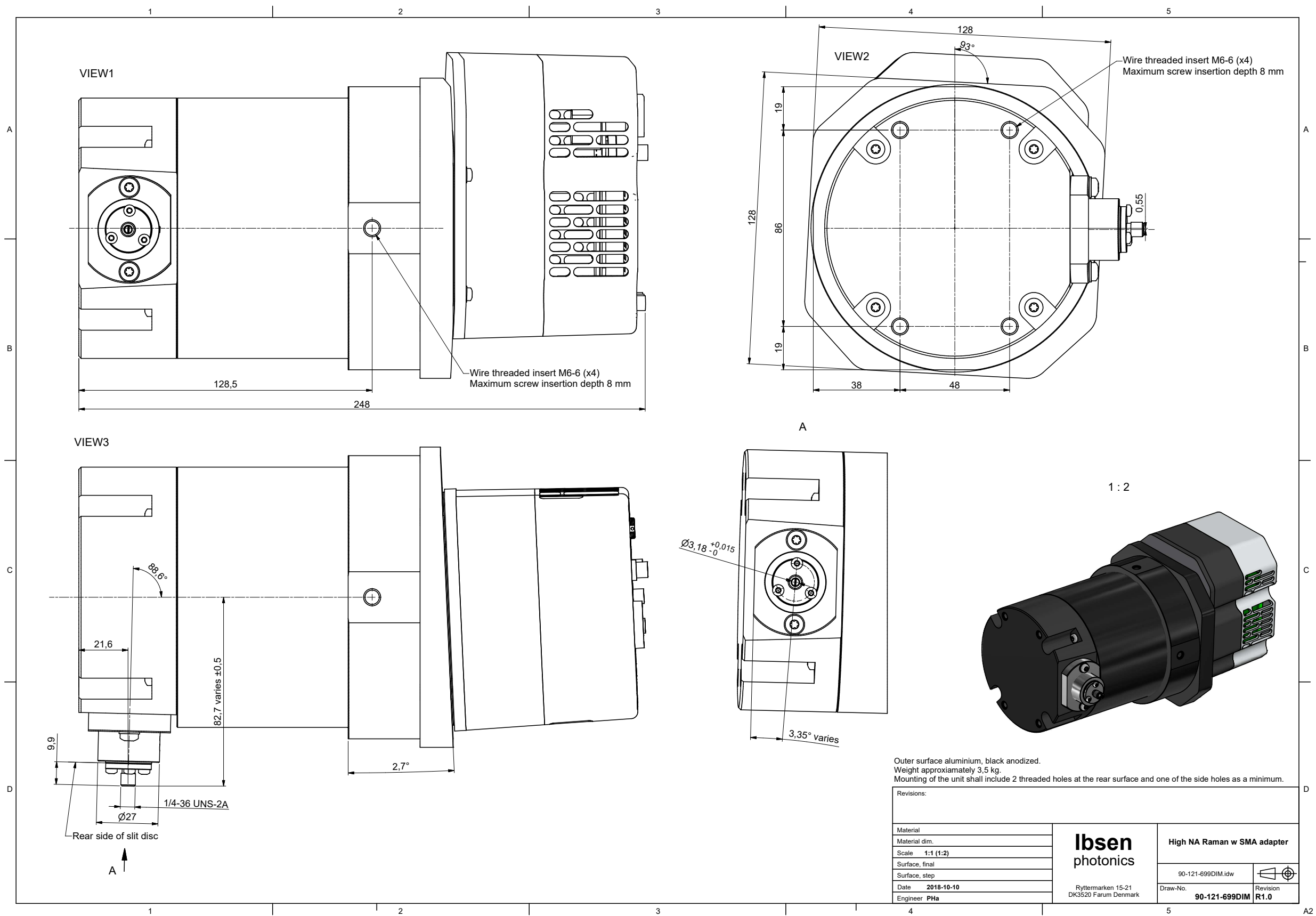
The EAGLE Raman-S spectrometer utilizes the Ibsen Photonics Raman transmission grating. The grating provides a high even diffraction efficiency, as shown by the absolute diffraction efficiency graph displayed above.

Additionally, the transmission grating ensures excellent wavelength stability due to the inherent self-corrective nature of transmission gratings, compensating for misalignment, shock, or vibrations that the spectrometer may experience.

The design also provides very low polarization dependence as an added benefit.

Every grating used in the EAGLE Raman-S spectrometer platform is a master grating fabricated at Ibsen Photonics' clean-room facility in Denmark.

Mechanical Drawings



About Ibsen Photonics

Ibsen was founded in 1991 by Per Ibsen under the name of Ibsen Micro Structures A/S. Today 88% of Ibsen Photonics' share is majority owned by Foss A/S, a world leader in analytical solutions for the Food and Agricultural industries. Ibsen management and employees hold the remaining 12 % of the shares.

The Ibsen spirit combines the dynamic, entrepreneurial culture of a medium size company with a disciplined, operational mentality of a large corporation. With an average employee tenure of more than 10 years, Ibsen makes for a very effective organization that builds on more than 30 years of experience as a company.

Ibsen employs more than 90 people at our R&D and manufacturing facility in Denmark and has achieved a turnover of more than 180 MDKK in 2022.

Working with Ibsen Photonics

The core expertise of Ibsen Photonics lies in the opto-mechanical design, grating technology and metrology. We master the cycle from optics, grating simulation and design, through optical and semiconductor production technologies, to high volume assembly, packaging and testing. Over the years we have developed many new designs, technologies and processes - many patented.

Our customers are large to medium-sized manufacturers of advanced optical devices and instruments, into which our products are integrated. With a highly organized production process, we are able to help customers obtain smooth instrument production, low unit-to-unit variation, high level of right first time, no field returns, and a low level of rework.

Our grating production facilities are world-class, including class 10 cleanroom facilities that we designed and built in 2000/2001, in which all environmental parameters are under continuous surveillance.

Our spectrometers are produced under strict quality control in our assembly facility in Denmark. We have been granted ISO 9001, ISO 13485, ISO 14001 and ISO 45001. This confirms Ibsen's' consistent capability to produce high quality products that meet market standards and all regulatory requirements.

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