

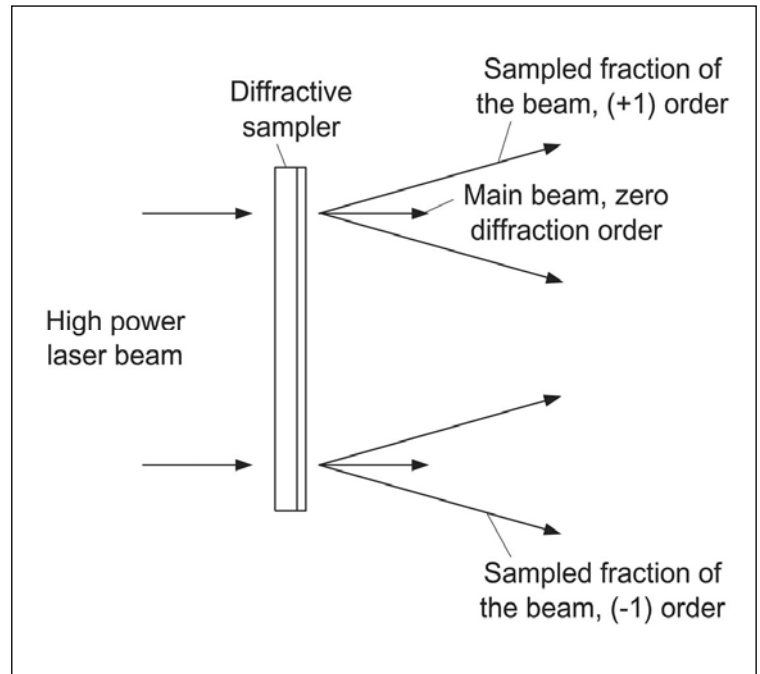
Diffraction Beam Sampler

INLINE MONITORING OF HIGH POWER LASER BEAMS

Beam Sampler elements are gratings that are used for inline monitoring of high power lasers. Variations in intensity can be reliably monitored inline with this method.

FEATURES

- Small fraction of total power
- Exact copy of main beam
- High power threshold
- Inline measurement possible



Optical setup for beam sampler element

DESIGN DETAILS

The Beam Sampler enables measurements for a high power laser beam in line. Due to their design, the +/- first diffraction order can be used for beam measurement. Their intensity is significantly lower than that of the main beam and can be custom designed. Higher diffraction orders can also be used for measurement with even lower intensity.

The diffraction order is an exact copy of the main beam and therefore can also be used for laser beam profile measurements. The main part of the master beam keeps travelling and can be used during the measurement of the sampled part.

- The main beam lies in the zero order
- The first diffraction orders can cause heating making heat dissipation necessary where detection does not occur



TYPICAL PERFORMANCE

Wavelength	UV-VIS-IR
Material	ZnSe, Fused Silica
Angle of sampling	1° - 30°
Power fraction	0.1 % - 15 % each beam
Diameter of substrate	Up to 50.8 mm
Thickness of substrate	1 – 5 mm
Accuracy of separation angle	+/- 0.001°
Diffraction efficiency	Up to 96 %
Power handling	Up to several kW CW
Coating	AR/AR (optional)

PART NUMBER NOMENCLATURE

SA –	010 –	I –	x –	A
function	design description	wavelength code	coating code	grade
Beam <u>s</u> ampler		A: 10.6 μm I: 1064 nm Q: 532 nm U: 355 nm W: 266 nm	Y: with AR coating N: uncoated for 10.6 μm typically always with coating, for other wavelengths to customer need	A to E possible typically A



STANDARD PARTS

Part No.	Wave-length [μm]	Material	Dim. [mm]	Clear aperture [mm]	Thickness [mm]	Nominal Sampled angles [deg]	Sampled Ratio/angle
SA-010-I-x-B	1.064	F.S.	12 x 12	10 x 10	1.524	15.2	0.40 %
SA-014-I-x-A	1.064	F.S.	25.4	23	3.0	15.2	0.40 %
SA-011-Q-x-B	0.532	F.S.	12 x 12	10 x 10	1.524	7.6	1.64 %
SA-012-U-x-B	0.355	F.S.	12 x 12	10 x 10	1.524	5.1	3.87 %
SA-012-W-x-B	0.266	F.S.	12 x 12	10 x 10	1.524	3.8	7.35 %
SA-014-I-x-B	1.064	F.S.	25.4	23	2.286	15.2	0.40 %
SA-014-Q-x-A	0.532	F.S.	25.4	23	2.286	7.6	1.64 %
SA-014-U-x-A	0.355	F.S.	25.4	23	2.286	5.1	3.87 %
SA-014-W-x-A	0.266	F.S.	25.4	23	2.286	3.8	7.35 %
SA-020-A-Y-A	10.6	ZnSe	27.94	25.4	3.0	12.76	1.00 %
SA-021-A-Y-A	10.6	ZnSe	25.4	23	3.0	10.0	1.00 %
SA-022-A-Y-A	10.6	ZnSe	25.4	23	3.0	21.0	1.00 %
SA-204-A-Y-A	10.6	ZnSe	25.4	23	3.0	21.0	0.50 %

Note:

The tooling can be used for custom wavelength, this does require special manufacturing, and changes the performance parameter, this can be calculated easily with:

$$\text{Wavelength} / \sin(\text{sampling angle}) = \text{const.}$$

Custom sampling angles are of course possible as well.

