

**NEW Versions**

# LINOS F-Theta-Ronar Lenses made of Fused Silica

Qioptiq has developed a range of F-Theta-Ronar scan lenses made of fused silica for high power and ultra-short-pulse laser material processing. Fused silica minimizes focus shift while providing high power density. The optical designs are optimized with respect to back reflections of the input beam, which

significantly reduces the risk of damage to the galvo mirrors. The LINOS F-Theta-Ronar lenses are all treated with a sophisticated broad band and angle optimized coating, making them suitable for a wide variety of laser material processing applications.

## Features

- Wavelengths 355 nm, 450 nm, 532 nm, 1064 nm or 1940 nm
- Focal length ranging from 70 mm to 440 mm
- Broad band coating 340-360 nm, 440-460 nm, 515-540 nm, 1030-1080 nm or 1900-2000 nm
- Using leading-edge production technologies to ensure long-term optical stability

## Technical Data

- Diffraction limited designs
- Lens material is exclusively made of fused silica
- Transmission  $T(340-360) \geq 96\%$ ,  $T(440-460) \geq 96\%$ ,  $T(515-540) \geq 96\%$ ,  $T(1030-1080) \geq 96\%$  and  $T(1940) \geq 95\%$
- Low absorption coating  $\leq 30$  ppm at 532 nm and  $\leq 20$  ppm at 1064 nm per surface for special lens types
- LIDT up to 40 J/cm<sup>2</sup> at 1064 nm, 12 ns  
LIDT up to 0.9 J/cm<sup>2</sup> at 1030 nm, 291 fs  
LIDT up to 20 J/cm<sup>2</sup> at 532 nm, 8 ns  
LIDT up to 0.6 J/cm<sup>2</sup> at 515 nm, 204 fs  
LIDT up to 4 J/cm<sup>2</sup> at 355 nm, 6 ns  
LIDT up to 0.4 J/cm<sup>2</sup> at 343 nm, 200 fs
- Includes interchangeable fused-silica protective glasses, coated with equivalent coating
- Dust-tight on the output side incl. protective glass according to the criteria of IP6X



## LINOS F-Theta-Ronar lenses made of fused silica

Wavelength (nm)	Focal length (mm)	Entrance-beam diameter at $1/e^2$ (mm)	Scan field (mm <sup>2</sup> )	Spot size ( $\mu$ m)	Part No.
340 - 360	160	7	98 x 98	15	4401-399-000-21
340 - 360	255	10	170 x 170	17	4401-481-000-21
<b>NEW</b> 340 - 360	330	14	212 x 212	15	4401-617-000-28 <sup>1)</sup>
<b>NEW</b> 340 - 360	330	14	212 x 212	15	4401-617-000-29 <sup>2)</sup>
<b>NEW</b> 440 - 460	262	30	61 x 61	8	4401-611-000-26 <sup>3)</sup>
515 - 540	160	14	83 x 83	12	4401-587-000-26 <sup>3)</sup>
515 - 540	255	10	183 x 183	25	4401-496-000-26 <sup>3)</sup>
<b>NEW</b> 515 - 540	265	20	133 x 133	13	4401-605-000-26 <sup>3)</sup>
515 - 540	420	14	251 x 251	29	4401-590-000-26 <sup>3)</sup>
1030 - 1080	163	14	85 x 85	23	4401-589-000-26 <sup>3)</sup>
1030 - 1080	255	10	187 x 187	50	4401-499-000-26 <sup>3)</sup>
<b>NEW</b> 1030 - 1080	270	20	136 x 136	27	4401-604-000-26 <sup>3)</sup>
1030 - 1080	340	20	176 x 176	33	4401-546-000-26 <sup>3)</sup>
1030 - 1080	420	20	254 x 254	42	4401-508-000-26 <sup>3)</sup>
1900 - 2000	265	14	155 x 155	68	4401-588-000-21
1900 - 2000	354	14	214 x 214	90	4401-569-000-21
1900 - 2000	437	14	292 x 292	100	4401-568-000-21

<sup>1)</sup> Version -28: low outgassing lenses    <sup>2)</sup> Version -29: reduced outgassing lenses    <sup>3)</sup> Version -26: low absorption coating

## LINOS F-Theta-Ronar lenses made of fused silica - Telecentric design

Wavelength (nm)	Focal length (mm)	Max. telecentric error (°)	Entrance-beam diameter at $1/e^2$ (mm)	Scan field (mm <sup>2</sup> )	Spot size ( $\mu$ m)	Part No.
340 - 360	70	0.8	10	28 x 28	5	4401-576-000-21
340 - 360	100	0.5	10	46 x 46	7	4401-509-000-21
340 - 360	167	0.2	10	65 x 65	13	4401-511-000-21
515 - 540	75	1.4	14	24 x 24	5	4401-599-000-26 <sup>1)</sup>
515 - 540	100	1.7	14	43 x 43	9	4401-547-000-26 <sup>1)</sup>
515 - 540	114	1.2	10	65 x 65	11	4401-608-000-26 <sup>1)</sup>
515 - 540	167	3.4	14	86 x 86	12	4401-517-000-26 <sup>1)</sup>
515 - 540	250	0.4	14	69 x 69	17	4401-616-000-26 <sup>1)</sup>
1030 - 1080	70	1.8	14	26 x 26	10	4401-551-000-26 <sup>1)</sup>
1030 - 1080	100	2.1	14	44 x 44	15	4401-561-000-26 <sup>1)</sup>
1030 - 1080	118	1.6	14	50 x 50	17	4401-607-000-26 <sup>1)</sup>
1030 - 1080	167	3.7	20	84 x 84	16	4401-513-000-26 <sup>1)</sup>
1030 - 1080	251	0.6	20	63 x 63	25	4401-631-000-26 <sup>1)</sup>

<sup>1)</sup> Version -26: low absorption coating

- When using differing beam diameters (depending on the optical design, varies from 7 mm to 30 mm), scan fields and spot size diameters can be modified.

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