



Sill OPTICS

Laser Optics

F-Theta Lenses - Beam Expanders

Aspheric Lenses - Trapped Ion Lenses

2022





Customized Laser Optics

Benefit from our expertise

Sill Optics has been a trusted partner for customized laser optic solutions for years. Our specialties lie in many different areas of application and a wide variety of designs. Sill Optics also has many years of experience with various projects for customized optical designs and individual mechanical layouts.

The close coordination between various internal departments, our large range of manufacturing capabilities and our high quality series production are the reasons why we are able to build your prototype in the shortest time possible.

In recent years, we have successfully completed more than 60% of laser optic orders as development projects based on individual inquiries and participation in public research projects. Most of these developments took part in the field of high-power solutions in solar systems, consumer electronics, eMobility or additive manufacturing applications for mechanical engineering processing.

**semiconductor & display
manufacturing**

**automotive industry, e.g.
battery production
body welding etc.**

**consumer
electronics**

**solarcell
production**

**additive
manufacturing**

Your benefits from a Sill Optics development

- development of specification sheet close to design and production possibilities
- direct contact to optical designer and project manager
- short distances between design, development and production
- prototypes at short notice
- high quality of series production
- quality assurance according to individual needs

Customized Laser Optics

Benefit from our expertise



Requirement analysis with our customer

Detailed in-house specification

In-House design & development

In-House optics prototyping

In-House mechanics prototyping

System integration

In-House test & measurement

F-Theta lenses

Beam Expanders

Aspheric lenses

Trapped Ion lenses

Sill Optics has been manufacturing high-quality laser optics for almost 40 years. These lenses are specifically designed for laser material processing applications for industrial mechanical engineering.

They are specially designed for applications in CE, automotive, semiconductor, additive or solar cell manufacturing. In addition to medical and biotech applications (confocal microscopy, ophthalmology) and science and research. The design and the quality of the optical components play a key role in the lens performance.

Glass Optics

Part Number	Wave-length [nm]	Focal Length [mm]	Scan Area [mm x mm]	Focus Size (1/e ²)	Max. Beam-Ø [mm]	Max. Telecentricity Error [°]	Working Distance [mm]	SP/USP*	Achromatic
S4LFT7010/450	1000-1100	100	35 x 35	18.3	10	1.5	115.0	yes	yes
S4LFT0350/126	1064	350	212 x 212	56.3	12	16	412.2	no	no
S4LFT1254/126	1064	254	160 x 160	41.4	12	14.9	306.5	no	no
S4LFT0163/126	1064	163	107 x 107	26.4	12	15	181.2	no	no
S4LFT0253/126	1064	254	160 x 160	35.2	14	16.7	284.9	no	no
S4LFT0508/126	1064	508	325 x 325	55.6	20	16.3	651.4	no	no
S4LFT0635/126	1064	635	370 x 370	51.3	25	16.3	732.8	no	no
S4LFT0080/126	1064	80	39 x 39	6.5	25	3.8	79.4	no	no
S4LFT0420/126	1064	420	242 x 242	27.7	30	14.8	480.9	no	no
S4LFT3254/126	1064	254	115 x 115	16.6	30	8.5	297.0	no	no
S4LFT1163/081	532+1064	163	102 x 102	13.3 / 20.0	12	12.7	159.0	no	yes
S4LFT8254/081	532+1064	254	180 x 180	16.6 / 33.0	15	19.7	211.6	no	yes
S4LFT7012/292	515-589	100	35 x 35	9.4	10	1.3	101.4	yes	yes
S4LFT5100/121	532	100	69 x 69	9.8	10	2.4	126.7	no	no
S4LFT0300/121	532	300	200 x 200	19.4	14	15.8	324.1	no	no

Besides our standard portfolio and customized optics, we also offer a variety of F-Theta lenses and Beam Expanders from our former portfolio with outstanding specifications upon request. This also includes lenses for different lens markets, applications and specifications.

- [more wavelengths](#)
- [more focal lengths](#)
- [more magnifications](#)

*usable for SP=Short Pulse, USP=Ultra Short Pulse

In case of deviations from the standard portfolio and delivery times, please contact our Customer Care Team.

F-Theta Lenses

Benefit from our 40 years of experience



Fused Silica Optics

Part Number	Wavelength [nm]	Focal Length [mm]	Scan Area [mm x mm]	Focus Size (1/e ²)	Max. Beam-Ø [mm]	Max. Telecentricity Error [°]	Working Distance [mm]	SP/USP*
S4LFT0710/328	1064	100	60 x 60	39.1	5	11.5	120.7	yes
S4LFT0763/328	1064	163	100 x 100	45.6	7	14.6	194.1	yes
S4LFT0725/328	1064	254	140 x 140	61.5	8	16.2	282.8	yes
S4LFT3167/328	1064	163	100 x 100	32.6	10	11.6	200.7	yes
S4LFT4010/328	1064	100	35 x 35	19.5	10	1.3	129.8	yes
S4LFT1420/328	1064	420	280 x 280	58.5	14	17.3	499.2	yes
S4LFT3250/328	1064	254	160 x 160	33.2	15	10.7	321.3	yes
S4LFT3162/328	1064	163	90 x 90	21.2	15	5.6	201.5	yes
S4LFT4127/328	1064	125	50 x 50	13.6	15	1.5	157.6	yes
S4LFT4065/328	1064	65	15 x 15	9.4	15	2	83.1	yes
S4LFT4147/328	1064	48	7 x 7	6.3	15	2.1	61.1	yes
S4LFT1655/328	1064	650	410 x 410	63.3	20	22.5	581.6	yes
S4LFT1330/328	1064	330	215 x 215	33.3	20	23.5	203.4	yes
S4LFT0910/328	1064	910	500 x 500	65.8	30	16.2	1048.8	yes
S4LFT3161/292	532	163	90 x 90	15.4	10	4.8	219	yes
S4LFT4126/292	532	125	53 x 53	12	10	1.6	167	yes
S4LFT4010/292	532	100	35 x 35	9.8	10	1.5	130.2	yes
S4LFT4262/292	532	163	65 x 65	12.7	12	1.7	195.4	yes
S4LFT1330/292	532	330	212 x 212	24.3	14	20.3	279	yes
S4LFT4066/292	532	65	15 x 15	4.8	15	1.5	85.8	yes
S4LFT4148/292	532	48	6 x 6	3.2	15	1.8	60	yes
S4LFT1330/373	450	330	180 x 180	10.7	20	11.1	268.2	yes
S4LFT3250/373	450	241	115 x 115	10	20	7.4	304.8	yes
S4LFT3170/373	450	168	75 x 75	7.6	20	3.2	228.3	yes
S4LFT4125/373	450	125	45 x 45	6.1	20	1.6	160.2	yes
S4LFT3170/075	355	163	90 x 90	11.4	10	4.3	221.7	yes
S4LFT4262/075	355	163	65 x 65	10.5	10	2	193.7	yes
S4LFT4125/075	355	125	53 x 53	8	10	1.1	156.9	yes
S4LFT4010/075	355	100	35 x 35	6.5	10	1.2	132	yes
S4LFT1330/075	355	330	210 x 210	15.4	14	21	260.5	yes
S4LFT4067/075	355	65	15 x 15	3.1	15	1.8	81.7	yes
S4LFT4149/075	355	48	6 x 6	2.1	15	2.1	69.3	yes
S4LFT4263/199	266	163	70 x 70	9.2	10	2.6	218.4	yes
S4LFT3170/199	266	154	85 x 85	7.7	10	3.8	208.1	yes

*usable for SP=Short Pulse, USP=Ultra Short Pulse

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Sill Optics has been manufacturing high-quality laser optics for almost 40 years. These lenses are specifically designed for laser material processing applications of industrial mechanical engineering.

They are specially designed for applications in CE, automotive, semiconductor, additive or solar cell manufacturing. In addition to medical and biotech applications (confocal microscopy, ophthalmology) and science and research. The design and the quality of the optical components play a key role in the lens performance.

Many of our Beam Expanders can also be used in reverse direction. Using a Beam Expander reverse may the result in increased divergence and possibly other disadvantages as the Beam Expanders are usually designed to magnify beams. Therefore, please feel free to contact our technical support if you have any questions.

Zoom Beam Expanders

Part Number	Wavelength [nm]	Magnification	Clear Input Aperture [mm]	Clear Output Aperture [mm]	Length [mm]	Thread
S6EXZ5310/328	1064	1-3x	10.5	20.0	85.2	C-Mount
S6EXZ5311/328	1064	1-3x	10.5	20.0	85.2	M30x1
S6EXZ5076/328	1064	1-8x	10.3	31.0	162.0	C-Mount
S6EXZ5310/292	532	1-3x	10.5	20.0	85.2	C-Mount
S6EXZ5311/292	532	1-3x	10.5	20.0	85.2	M30x1
S6EXZ5076/292	532	1-8x	10.3	31.0	162.0	C-Mount
S6EXZ5310/075	355	1-3x	10.5	20.0	85.2	C-Mount
S6EXZ5311/075	355	1-3x	10.5	20.0	85.2	M30x1
S6EXZ5075/075	355	1-8x	10.3	31.0	162.0	C-Mount
S6EXZ0940/574	343-355	0.9-4x	16.0	28.0	191.0	M30x1
S6EXZ5310/574	343-355	1-3x	10.5	20.0	85.2	C-Mount
S6EXZ5311/574	343-355	1-3x	10.5	20.0	85.2	M30x1
S6EXZ5075/574	343-355	1-8x	10.3	31.0	162.0	C-Mount
S6EXZ5075/199	266	1-8x	10.3	31.0	162.0	C-Mount

Fix Magnification Beam Expanders

Part Number	Wavelength [nm]	Magnification	Clear Input Aperture [mm]	Clear Output Aperture [mm]	Length [mm]	Thread
S6EXK0005/328	1064	0.5	12.0	12.0	44.7	M30x1
S6EXK0008/328	1064	0.8	12.0	12.0	44.7	M30x1
S6EXK0010/328	1064	1.0	12.0	14.0	44.7	M30x1
S6EXK0012/328	1064	1.2	12.0	26.0	44.7	M30x1
S6EXK0015/328	1064	1.5	12.0	26.0	44.7	M30x1
S6EXK0020/328	1064	2.0	12.0	26.0	44.7	M30x1
S6EXK0025/328	1064	2.5	11.0	26.0	44.7	M30x1
S6EXK0030/328	1064	3.0	8.0	26.0	44.7	M30x1
S6EXK0035/328	1064	3.5	8.0	20.0	44.7	M30x1
S6EXK0040/328	1064	4.0	8.0	20.0	44.7	M30x1
S6EXK0005/292	532	0.5	12.0	12.0	44.7	M30x1
S6EXK0008/292	532	0.8	12.0	12.0	44.7	M30x1
S6EXK0010/292	532	1.0	12.0	14.0	44.7	M30x1
S6EXK0012/292	532	1.2	12.0	26.0	44.7	M30x1
S6EXK0015/292	532	1.5	12.0	26.0	44.7	M30x1
S6EXK0020/292	532	2.0	12.0	26.0	44.7	M30x1
S6EXK0025/292	532	2.5	11.0	26.0	44.7	M30x1
S6EXK0030/292	532	3.0	8.0	26.0	44.7	M30x1
S6EXK0035/292	532	3.5	8.0	20.0	44.7	M30x1
S6EXK0040/292	532	4.0	8.0	20.0	44.7	M30x1

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Beam Expanders

Benefit from our 40 years of experience



Fix Magnification Beam Expanders

Part Number	Wavelength [nm]	Magnification	Clear Input Aperture [mm]	Clear Output Aperture [mm]	Length [mm]	Thread
S6EXK0008/075	355	0.8	12.0	12.0	44.7	M30x1
S6EXK0012/075	355	1.2	12.0	26.0	44.7	M30x1
S6EXK0015/075	355	1.5	12.0	26.0	44.7	M30x1
S6EXK0020/075	355	2.0	12.0	26.0	44.7	M30x1
S6EXK0025/075	355	2.5	11.0	26.0	44.7	M30x1
S6EXK0030/075	355	3.0	8.0	26.0	44.7	M30x1
S6EXK0035/075	355	3.5	8.0	20.0	44.7	M30x1
S6EXK0040/075	355	4.0	8.0	20.0	44.7	M30x1
S6EXK0008/574	343-355	0.8	12.0	12.0	44.7	M30x1
S6EXK0010/574	343-355	1.0	12.0	14.0	44.7	M30x1
S6EXK0012/574	343-355	1.2	12.0	26.0	44.7	M30x1
S6EXK0015/574	343-355	1.5	12.0	26.0	44.7	M30x1
S6EXK0020/574	343-355	2.0	12.0	26.0	44.7	M30x1
S6EXK0025/574	343-355	2.5	11.0	26.0	44.7	M30x1
S6EXK0030/574	343-355	3.0	8.0	26.0	44.7	M30x1
S6EXK0035/574	343-355	3.5	8.0	20.0	44.7	M30x1
S6EXK0040/574	343-355	4.0	8.0	20.0	44.7	M30x1
S6EXP0005/328	1064	0.5	14.0	31.0	85.0	M30x1
S6EXP0008/328	1064	0.8	14.0	20.0	85.0	M30x1
S6EXP0012/328	1064	1.2	14.0	28.0	85.0	M30x1
S6EXP0015/328	1064	1.5	8.0	31.0	85.0	M30x1
S6EXP0020/328	1064	2.0	8.0	31.0	85.0	M30x1
S6EXP0025/328	1064	2.5	8.0	31.0	85.0	M30x1
S6EXP0030/328	1064	3.0	8.0	31.0	85.0	M30x1
S6EXP0040/328	1064	4.0	8.0	31.0	85.0	M30x1
S6EXP0050/328	1064	5.0	8.0	31.0	85.0	M30x1
S6EXP0005/292	532	0.5	14.0	31.0	85.0	M30x1
S6EXP0008/292	532	0.8	14.0	20.0	85.0	M30x1
S6EXP0015/292	532	1.5	8.0	31.0	85.0	M30x1
S6EXP0020/292	532	2.0	8.0	31.0	85.0	M30x1
S6EXP0025/292	532	2.5	8.0	31.0	85.0	M30x1
S6EXP0030/292	532	3.0	8.0	31.0	85.0	M30x1
S6EXP0040/292	532	4.0	8.0	31.0	85.0	M30x1
S6EXP0050/292	532	5.0	8.0	31.0	85.0	M30x1
S6EXP0015/075	355	1.5	8.0	31.0	85.0	M30x1
S6EXP0020/075	355	2.0	8.0	31.0	85.0	M30x1
S6EXP0025/075	355	2.5	8.0	31.0	85.0	M30x1
S6EXP0030/075	355	3.0	8.0	31.0	85.0	M30x1
S6EXP0040/075	355	4.0	8.0	31.0	85.0	M30x1
S6EXP0050/075	355	5.0	8.0	31.0	85.0	M30x1
S6EXP0015/574	343-355	1.5	8.0	31.0	85.0	M30x1
S6EXP0020/574	343-355	2.0	8.0	31.0	85.0	M30x1
S6EXP0025/574	343-355	2.5	8.0	31.0	85.0	M30x1
S6EXP0030/574	343-355	3.0	8.0	31.0	85.0	M30x1
S6EXP0040/574	343-355	4.0	8.0	31.0	85.0	M30x1
S6EXP0050/574	343-355	5.0	8.0	31.0	85.0	M30x1
S6EXP0015/199	266	1.5	8.0	31.0	85.0	M30x1
S6EXP0020/199	266	2.0	8.0	31.0	85.0	M30x1
S6EXP0030/199	266	3.0	8.0	31.0	85.0	M30x1
S6EXP0040/199	266	4.0	8.0	31.0	85.0	M30x1
S6EXP0050/199	266	5.0	8.0	31.0	85.0	M30x1

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Aspheres

The use of aspheric lenses in optical systems is increasing. Aspheric lenses enable an enhancement of resolution especially for optical systems with a high numerical aperture. The aspheric deviation of the high end series is smaller than 0.05 μm RMSi.

Aspheres offer the great advantage to accomplish monochromatic imaging tasks with one optical element where multiple lens elements would otherwise be needed. Main advantages of aspheres are less spherical aberrations, less weight, increased transmission and no internal ghosts.

Multi-element Lens Systems

Part Number	Wavelength [nm]	Focal Length [mm]	Lens- \emptyset [mm]	Center Thickness [mm]	Working Distance [mm]
S1ADX0540/328	1064	400	52.0	8.0	395.2
S1ADX0330/328	1064	300	30.0	9.0	294.7
S1ADX0325/328	1064	250	38.1	8.9	245.2
S1ADX0320/328	1064	200	38.1	8.9	194.8
S1ADX0316/328	1064	150	30.0	9.6	144.4
S1ADX0312/328	1064	120	38.1	10.3	114.0
S1ADX0310/328	1064	100	38.1	11.0	93.7
S1ADX0380/328	1064	80	38.1	12.0	73.1
S1ADX0370/328	1064	72	38.1	11.0	63.6
S1ADX0260/328	1064	60	30.0	11.3	53.5
S1ADX0250/328	1064	50	30.0	13.7	42.1
S1ADX0240/328	1064	40	30.0	15.0	31.3
S1ADX0230/328	1064	30	30.0	16.0	20.9
S1ADX0220/328	1064	20	25.0	13.2	13.3

Lens Systems

Multi-element lens systems minimize the imaging errors of single lenses and provide precision focusing for non-scanning applications.

Multi-element Lens Systems

Part Number	Wavelength [nm]	Focal Length [mm]	Focus Size $1/e^2$ [μm]	Housing- \emptyset [mm]	Length [mm]	Working Distance [mm]
S6ASS2020/292	532	25	2.4	25.0	13.5	19.3
S6ASS2060/292	532	62	3.0	40.0	32.0	47.9
S6ASS5300/292	532	100	5.4	41.0	16.0	86.7
S6ASS6151/292	532	150	7.2	56.0	20.0	135.0
S6ASS6200/292	532	200	6.6	54.0	15.0	188.5
S6ASS2020/075	355	25	1.6	25.0	17.0	17.9
S6ASS2060/075	355	60	2.8	40.0	30.0	46.5
S6ASS5120/075	355	114	5.6	48.0	20.0	104.4
S6ASS2020/199	266	24	1.4	25.0	17.0	17.1
S6ASS2060/199	266	57	2.2	40.0	30.0	43.9
S6ASS5120/199	266	109	4.6	48.0	20.0	99.1

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Trapped Ion Lenses

Benefit from our capabilities

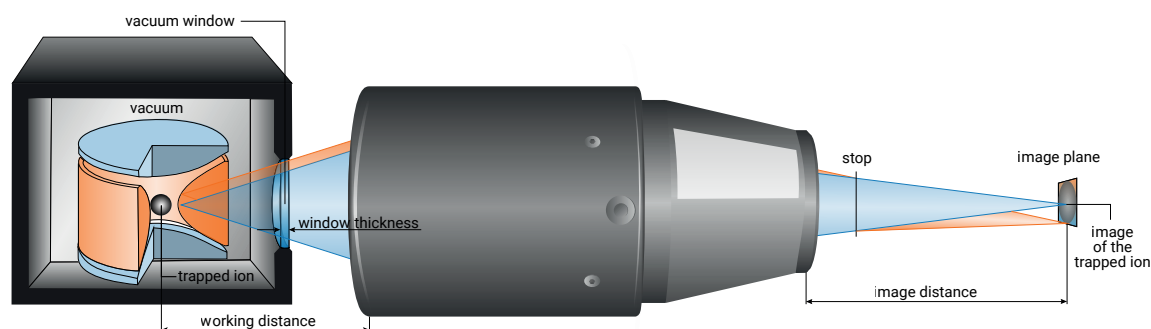


Trapped Ion Lenses

Trapped (cold) ions are a research topic with increasing interest over the last few years because of their possibility to store Qubits (quantum bits) and the related use for quantum computers. To make the qubits usable under certain conditions, we must observe and study their behaviour in detailed experiments first.

Sill Optics has designed lenses both, for just observation and observation combined with laser focusing for these experiments. Those lenses are exceptional for their high NA and adjustment to specific wavelengths (UV to IR). As the vacuum cryostats differ in dimension (e.g. the window thickness) every lens has to be designed specifically for the existing conditions.

Part Number	Wave-length 1 [nm]	Wave-length 2 [nm]	Material	Focus Length [mm]	NA	f#	Max. FOV [mm]	Magnification @ wave-length 1	Magnification @ wave-length 2	Thickness Window	Material Window	Working Distance [mm]
S6ASS2243/126	1064	-	optical glass	40.5	0.4	1.4	0.71	infinity	-	6.0	fused silica	50.7
S6ASS2242/081	590	1064	optical glass	40.0	0.4	1.4	0.71	infinity	infinity	6.0	fused silica	50.7
S6ASS2224	494	671	optical glass	22.0	0.5	1.0	0.08	infinity	infinity	-	-	11.6
S6ASS22255	422	-	fused silica	45.0	0.4	1.2	0.27	10.0	-	19.1	fused silica	63.4
S6ASS22256	422	-	fused silica	44.9	0.4	1.2	0.27	10.0	-	19.1	N-BK7	63.8
S6ASS22258	397	422	optical glass	44.8	0.4	1.1	0.28	10.0	10.0	19.1	N-BK7	62.3
S6ASS22258/006	397	422	optical glass	45.5	0.4	1.2	0.29	10.0	10.0	6.3	fused silica	60.5
S6ASS22241	395	729	optical glass	66.9	0.3	1.7	0.2	20.0	20.0	6.0	fused silica	55.7
S6ASS22241/045	395	729	optical glass	66.9	0.3	1.8	0.19	20.0	20.0	6.0	fused silica	55.7
S6ASS22341	370	-	optical glass	82.1	0.2	2.1	0.2	6.0	-	6.0	fused silica	55.7
S6ASS22245	369	-	fused silica	40.0	0.4	1.3	0.35	infinity	-	8.0	fused silica	39.3
S6ASS22246	369	-	fused silica	41.2	0.4	1.3	0.36	infinity	-	4.3	fused silica	38.7
S6ASS22247	369	493	fused silica	50.1	0.2	2.5	0.95	8.0	78.0	2.0	sapphire	49.4
S6ASS22247/389	313	397	fused silica	49.0	0.2	2.5	0.95	8.2	79.0	2.0	sapphire	48.2
S6ASS22248	313	397	fused silica	49.0	0.3	1.6	0.27	15.0	145.0	3.0	fused silica	46.5



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Karen Bloss
Customer Care



Lenka Hightower
Customer Care



Sabine Mueller
Customer Care



Paulo Chaniotis
Customer Care



Martin Kolb
Product Management



Nayan Ghinaiya
Project Management

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