



■非球面

非球面は、本来なら複数枚のレンズエレメントを必要とする光学系を、1枚の光学エレメントのみで理想的な単色光を結像させることができます。

非球面の主な長所は以下となります。

- 球面収差が少ない 高開口数
- 軽量
- 高効率
- 内部ゴーストがない

高純度合成石英と低吸収コーティングの組み合わせにより、焦点距離および作動距離の熱シフトを減少させることができます。

非球面レンズの別用途では、強度分布又は位相に関するビーム成形です。典型的な例は、ガウスプロファイルのトップハットプロファイルへの変換です。トップハットのプロファイルでは、より均質に除去加工できるという利点があり、除去ゾーンと周囲の材料との間のより急勾配になり、結果として熱影響ゾーン(HAZ)が小さくなります。

Sill Optics社のMRFマシンの能力では、直径200mmまでの非球面レンズを製造することができます。測定セットアップ(干渉波面試験、光学3D形状測定)により、 $0.15\mu\text{m}$ PV(fWD)およびRMSi $< 0.025\mu\text{m}$ の表面品質を保証することです。21mmまでのサジタル高さz(r)でさえ測定可能です。特定の直径で非常に急勾配の半径でも製造と検査を行うことができます。

標準品としては、フォーカシング・コリメーションに対応した、焦点距離は20mmから400mm、硝材は合成石英です。

ご要望に応じて、特注品も1本から製作しております。技術的な可能性については、次ページに紹介します。

■ Aspheres

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
- no internal ghosts

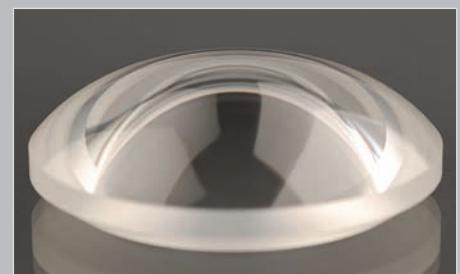
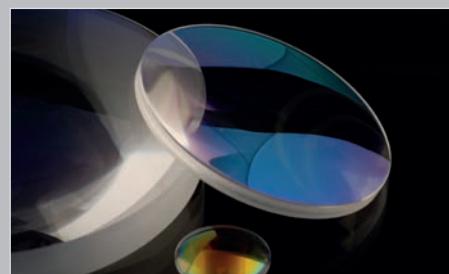
The combination of high purity fused silica and low absorption coatings decreases the thermal induced shift of focal length and working distance.

Another application of an asphere is beam shaping with respect to the intensity distribution or the phase. A typical conversion is the change of a Gaussian profile into a top-hat profile. For material processing, this form has the advantage of a more homogeneous removal of surface material, steeper borders between removal zone and surrounding material and a resulting smaller heat affected zone (HAZ).

The capability of Sill Optics MRF machines allows production of aspheres up to diameter 200 mm. Measurement setup (interferometric wavefront test, tactile and optical 3D profilometry) enables us to ensure a surface quality of $0.15\mu\text{m}$ PV(fWD) and RMSi $< 0.025\mu\text{m}$ depending on geometry. Even sagittal heights z(r) up to 21 mm are measurable enabling the production and test of very steep radii at certain diameters.

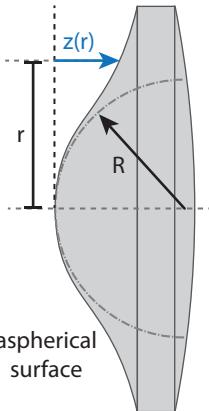
Our range of products covers unmounted and mounted precision aspheres out of fused silica with focal lengths from 20 mm to 400 mm, which are usable for focusing and collimation.

Special forms and customized versions are available on request. Technological possibilities will be presented on the next pages.



非球面は、一般的に曲率半径とコーニック定数によって表されます。
さらに補正した多項式は表面調整のために使用されます。
奇数係数 A_{2i+1} はあまり使用されません。

An aspheric surface is typically described by a radius of curvature and the conic constant. Additional correction polynomials are often used for further surface adjustments. Note, that the odd coefficients are used very rarely.



$$z(r) = \frac{\rho r^2}{1 + \sqrt{1 - (1+k) \cdot (\rho r)^2}} + \sum_{i=2}^n A_{2i} \cdot r^{2i} + \sum_{i=1}^m A_{2i+1} \cdot |r|^{2i+1}$$

$z(r)$ = サグ量 / sag height

r = 光軸からの距離 / distance to optical axis

$\rho = \frac{1}{R}$ = 頂点曲率半径 / vertex curvature

k = コーニック定数 / conic constant

Technologische Möglichkeiten

Technological possibilities

Dimensions	
diameter	12 mm - 200 mm
diameter tolerance	± 0.01 mm
thickness tolerance	± 0.025 mm
Surface form and tolerances (ISO 10110; @ 546 nm)	
concave radius of curvature (local)	> 35 mm
sagitta deviation (PV)	< 0.5 fr ($\cong 0.137$ μm)
irregularity (PV)	< 0.5 fr ($\cong 0.137$ μm)
rotational invariant irregularity (PV)	< 0.2 fr ($\cong 0.055$ μm)
RMSi	< 0.1 fr ($\cong 0.025$ μm)
centration (tilt angle between surfaces)	< 1 arcmin
cleanliness / imperfections	3 x 0.04 (S/D: 10/5)
Materials	
<ul style="list-style-type: none"> all fused silica types (Corning, Heraeus, Nikon, Ohara) optical glasses (CDGM, Hoya, Nikon, Ohara, Schott, ...) 	
Metrology	
<ul style="list-style-type: none"> tactile 2D measurement 2D/3D profilometry via white light interferometry interferometric wavefront measurement (632.8 nm) 	

非球面レンズ設計のガイドライン

考慮事項

多くの異なるタイプのガラス硝材を使用して非球体に製造することはできますが、いくつかの硝材に制限することを推奨します。すべての合成石英のタイプは選択肢として良好です。光学ガラスの場合、推奨される硝材は、約600のヌープ硬度と低い化学応答性(Schott N-BK7またはN-SF11)を有するガラスです。硬度および化学的感受性が異なると、研磨剤の必要性または精巧な取り扱いが必要になるため、製造コストが膨らみます。

非球面設計のためのコスト面の重要な要因は、レンズ直径および表面公差です。直径が大きくなるにつれ、研磨される表面は増えるためです。しかし、球面レンズ製造と比較して非球面の表面は大きな研磨ツールで処理することができません。さらに、非球面レンズの製造はより複雑であり、計測と製造機械との間の密接な相互作用に関連しています。厳しい許容差を実現するために、要求仕様を満たすために個々の製造ステップを繰り返す必要があるので、コストが増します。

ローカルサーフェースの曲率の制限

非球面形状の変曲点は製造できないという誤った情報はまだ存在しています。しかし、背後にある本当の制限は製造ツールです：非球面製造では、ホイールベースのツールが多くステップで使用されます。それらの空間的広がり(最小半径)

は可能な最小限の局所的な表面曲率を制限します。

Sill Optics社では、最小のツール半径は25 mmであるため、すべての局所的な凹面の曲率は35 mm以上にする必要があります。一方、変曲点（表面の曲率が凸面から凹面に、またはその逆に切り替わる場所）は、前述の問題を引き起こすことが多いため、最初の指標です。

Guideline for asphere design

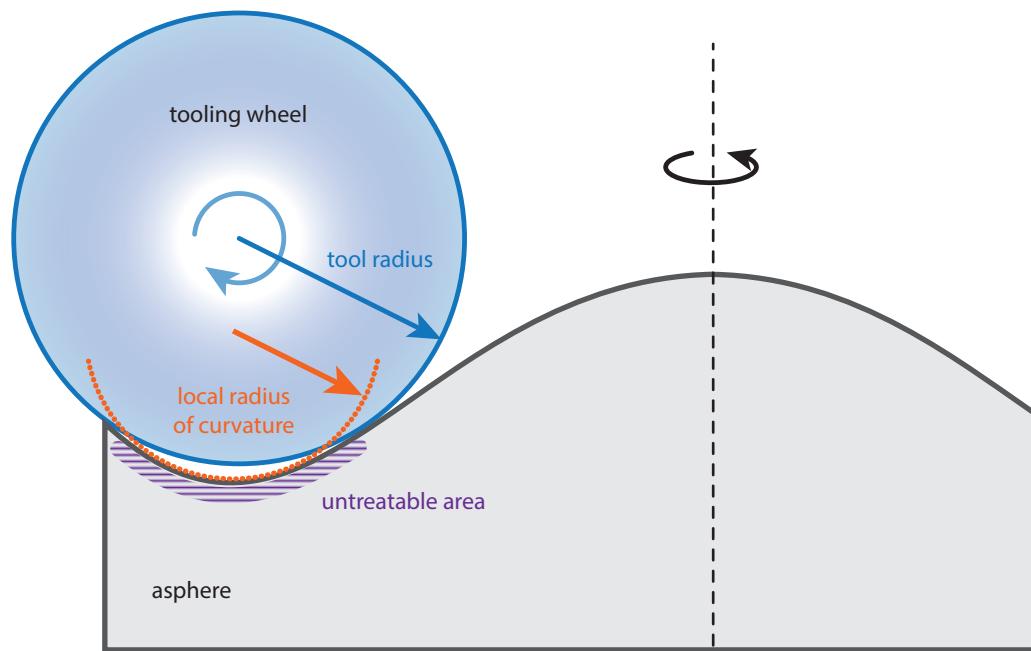
Preliminary considerations

Even though many different glass types can be manufactured to aspheres, it is recommended to confine this selection onto a few standards whenever possible. All fused silica types are always a good choice. Recommended optical glasses have a Knoop hardness around 600 and low chemical responsiveness (e.g. Schott N-BK7 or N-SF11). Different hardness and chemical susceptibility increase production costs because of the need of alternative polishing agents or elaborate handling.

Further significant factors for economic asphere design are the lens diameter and surface tolerances. With increasing diameter, the surface to be processed increases. But in comparison to spherical lens production, the surface of aspheres cannot be treated with large-area tools. Furthermore asphere production is more complex and is tied to a close interaction between metrology and production machines. Strict tolerances lead to raised cost as in some circumstances individual production steps have to be repeated to fulfill the demanded requirements.

Limitation of local surface curvature

The misinformation, that inflection points in asphere surface forms cannot be manufactured, is still existent. But the real limitation behind are production tools: During asphere manufacturing, wheel based tools are used at many steps. Their spatial extend – in other words their minimal radius – limit the minimal possible local surface curvature. At Sill Optics, the smallest tool radius is 25 mm, thus all local concave surface curvatures should not be smaller than 35 mm. Otherwise manufacturing these areas is not possible. Inflection points (where the surface curvature switches from convex to concave or vice versa) on the other hand often lead to the described problem, thus are a first indicator.



非球面帯のパラメーター

この説明においては、非球面設計における重要なベースラインを反映します。多くのパラメーターは、アルゴリズムを最適化するための良好な解を見つけることを複雑にし、文書化および製造中のエラーのリスクを増加させるだけでなく、エッジに向かって非常に強い表面勾配をもたらす可能性があります。これは、製造のために過大サイズの直径が必要である場合には、さらに悪くなる可能性があります。

さらに、円錐定数および4次パラメーターは互いに独立していないため、両方を同時に変数として設定すると、最適化が妨げられる可能性があります。同様に、2次パラメーターは頂点半径にリンクされています。したがって、2次パラメーターはほとんど使用されません。

エッジの厚み

前述のように、非球面は、典型的には、直径が4mm～6mmの大きさで開発されます。

さらに、少なくとも2 mm～3 mmのエッジの厚さをお勧めします。1つ目は、重要なエッジの厚さによりレンズの取り扱いが容易になることです。2つ目は、製造時のエッジでのガラスの割れが少なくなることです。

スロープエラーによる許容誤差

非球面に対する要求が高い場合、形状の偏差と不規則性を許容するだけでは不十分な場合があります。球体と比較した場合、非球体は大きな研磨ツールで製造することができないです。このことは、局所的な表面誤差/偏差をもたらす可能性があります。これらの誤差を処理するために、表面勾配公差の追加仕様が推奨されます。通常、 Δz (傾き許容値/積分長/サンプリングステップサイズ)で表されます。

積分長に応じて、許容可能な中空間または高空間周波数誤差の指標として使用することができます。

Aspherical parameters

"Use as few aspherical parameters as possible, but as many as necessary" – This sentence reflects an important baseline in asphere design. A lot of parameters do not only complicate finding a good solution for optimizing algorithms and increase the risk for errors during documentation and production, but could also lead to very strong surface slopes towards the edges. This might even get worse, when an oversize of the diameter is necessary for production.

Additionally note, that the conic constant and the fourth order parameter are not independent of each other, which could impede with optimizing when both are set as variables at the same time. Likewise, the second order parameter is linked to the vertex radius. The second order parameter is therefore barely used.

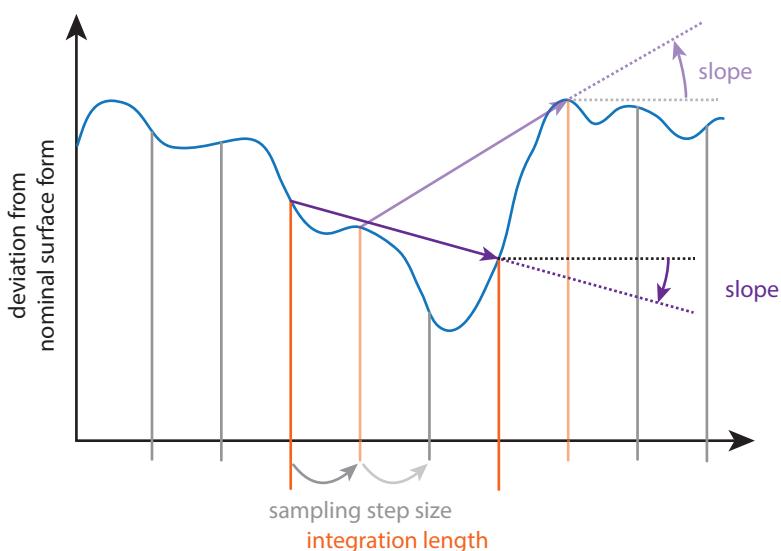
Edge thickness and oversize

As mentioned before, aspheres are typically developed with 4 mm–6 mm oversize in diameter: Production steps are facilitated as the tools are allowed to process the surface evenly beyond the final diameter. Surface from errors towards the edges are therefore avoided.

Furthermore, an edge thickness of at least 2 mm–3 mm is recommended: First, a significant edge thickness eases handling of the lens and second, splitting of glass at the edge during manufacturing is diminished.

Tolerancing via slope error

For high requirements for the aspherical surface, tolerancing form deviation and irregularity might not be enough. In comparison to spheres, aspheres cannot be manufactured with large-area tools, which could result in local surface errors/deviations. To handle these errors, an additional specification of the surface slope tolerance is recommended. It is typically given as Δz (slope tolerance/integration length/sampling step size). Depending on the integration length, it can be used as indicator for the acceptable mid-spacial or high-spacial frequency errors.



Sill Optics社はマウントタイプ(鏡筒付)の非球面レンズのラインナップを数多く取り揃えています。コリメーションと集光の用途でご使用いただけるよう、鏡筒サイズはφ36mm、41mmおよび56mmの3種類をご用意しています。特に高出力、ファイバーレーザーの用途では、高効率と大口径により複数の光学エレメントを要する組レンズの光学系から置き換えることが可能です。



■ 1030 - 1090 nm

Artikelnummer <i>part number</i>	Brennweite <i>focal length</i> [mm]	Außen-Ø <i>housing-Ø</i> [mm]	freier-Ø <i>clear-Ø</i> [mm]	Mittendicke <i>center thickness</i> [mm]	Arbeitsabstand <i>working distance</i> [mm]
S6ASS8420/328	20.0	36.0	23.0	20.5	10.7
S6ASS8430/328	30.0	36.0	28.0	20.5	18.8
S6ASS8440/328	40.0	36.0	28.0	20.5	28.5
S6ASS8450/328	50.0	36.0	28.0	20.5	38.9
S6ASS8460/328	60.0	36.0	28.0	20.5	50.1
S6ASS7480/328	80.0	41.0	37.0	15.0	71.3
S6ASS8481/328	80.0	36.0	28.0	20.5	69.6
S6ASS7580/328	80.9	56.0	50.0	20.0	70.0
S6ASS7410/328	100.0	41.0	37.0	15.0	91.7
S6ASS7510/328	100.0	56.0	50.0	20.0	89.0
S6ASS8411/328	100.0	36.0	28.0	20.5	90.0
S6ASS7412/328	120.0	41.0	37.0	15.0	111.9
S6ASS7512/328	120.0	56.0	50.0	20.0	108.6
S6ASS8413/328	120.0	36.0	28.0	20.5	110.3
S6ASS7415/328	150.0	41.0	37.0	15.0	142.2
S6ASS7515/328	150.0	56.0	50.0	20.0	142.2
S6ASS8416/328	150.0	36.0	28.0	20.5	140.6
S6ASS7420/328	200.0	41.0	37.0	15.0	192.5
S6ASS7520/328	200.1	56.0	50.0	20.0	193.5
NEW S6ASS7425/328	250.1	41.0	37.0	15.0	242.0
NEW S6ASS7540/328	400.0	56.0	50.0	18.3	393.5

Legende / Explanation: ● KP & UKP tauglich / SP & USP useable ! Lieferzeit auf Anfrage / Time of delivery on request

光学系における非球面レンズの需要は増加しています。非球面レンズは、特に高開口数を有する光学系の分解能を向上させることができます。高精度シリーズの非球面の偏差は $0.05\mu\text{m}$ RMS未満です。

特別な形状などのカスタム対応も承っておりますので、お問合せください。



■ 1030 - 1090 nm

Artikelnummer <i>part number</i>	Brennweite <i>focal length</i> [mm]	Linsen-Ø <i>lens-Ø</i> [mm]	Mittendicke <i>center thickness</i> [mm]	Arbeitsabstand <i>working distance</i> [mm]
S1ADX0220/328 ●	20.0	25.0	13.2	13.3
S1ADX0230/328 ●	30.0	30.0	16.0	20.9
S1ADX0240/328 ●	40.0	30.0	15.0	31.3
S1ADX0250/328 ●	50.0	30.0	13.7	42.1
S1ADX0260/328 ●	60.0	30.0	11.3	53.5
NEW S1ADX0370/328 ●	71.8	38.1	11.0	63.6
S1ADX0380/328 ●	80.0	38.1	12.0	73.1
S1ADX0381/328 ●	80.0	30.0	12.0	73.1
S1ADX0580/328 ●	80.9	52.0	17.8	70.4
S1ADX0310/328 ●	100.0	38.1	11.0	93.7
S1ADX0311/328 ●	100.0	30.0	11.0	93.7
S1ADX0510/328 ●	100.0	52.0	17.5	89.8
S1ADX0312/328 ●	120.0	38.1	10.3	114.0
S1ADX0313/328 ●	120.0	30.0	10.3	114.0
S1ADX0512/328 ●	120.0	52.0	18.0	109.6
S1ADX0315/328 ●	150.0	38.1	9.6	144.4
S1ADX0316/328 ●	150.0	30.0	9.6	144.4
S1ADX0515/328 ●	150.0	52.0	11.0	143.5
S1ADX0320/328 ●	200.0	38.1	8.9	194.8
S1ADX0520/328 ●	200.1	52.0	8.9	195.0
NEW S1ADX0325/328 ●	250.1	38.1	8.9	245.2
NEW S1ADX0330/328 ●	300.0	30.0	9.0	294.7
S1ADX0530/328 ●	300.0	52.0	9.0	294.6
S1ADX0540/328 ●	400.0	52.0	8.0	395.2

■ 420 - 480 nm

Artikelnummer <i>part number</i>	Brennweite <i>focal length</i> [mm]	Linsen-Ø <i>lens-Ø</i> [mm]	Mittendicke <i>center thickness</i> [mm]	Arbeitsabstand <i>working distance</i> [mm]
NEW S1ADX4350/373 ●	50.0	38.1	14.0	41.8
NEW S1ADX4360/373 ●	60.0	38.1	12.0	52.9
NEW S1ADX4370/373 ●	70.0	38.1	11.0	63.5
NEW S1ADX4380/373 ●	80.0	38.1	10.0	74.1

Legende / Explanation: ● KP & UKP tauglich / SP & USP useable ! Lieferzeit auf Anfrage / Time of delivery on request





■ イオントラップレンズ

イオントラップ（レーザ冷却）は、量子ビット（Qubit）の記憶と量子コンピュータ関連での使用のために、近年で関心が高まっている研究トピックです。もちろん、それらを使用することだけでなく、さまざまな基本的な実験を通じて詳細を知ることも重要です。

Sill Optics社では、イオントラップの実験のために観察系とレーザ集光と組み合わせた観察系の2種類のレンズを開発しました。これらのレンズは、高NA、特定の波長（UVからIR）へ対応させることができます。

真空クライオスタッフ（極低温冷凍機）では、寸法（ウインドウの厚さなど）は異なるため、すべてのレンズは既存の条件に合わせて特別に設計する必要があります。

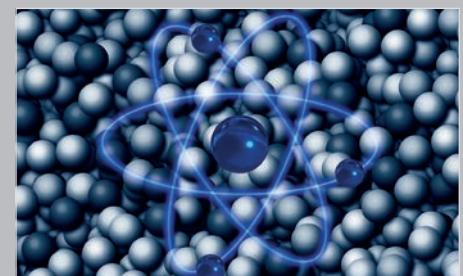
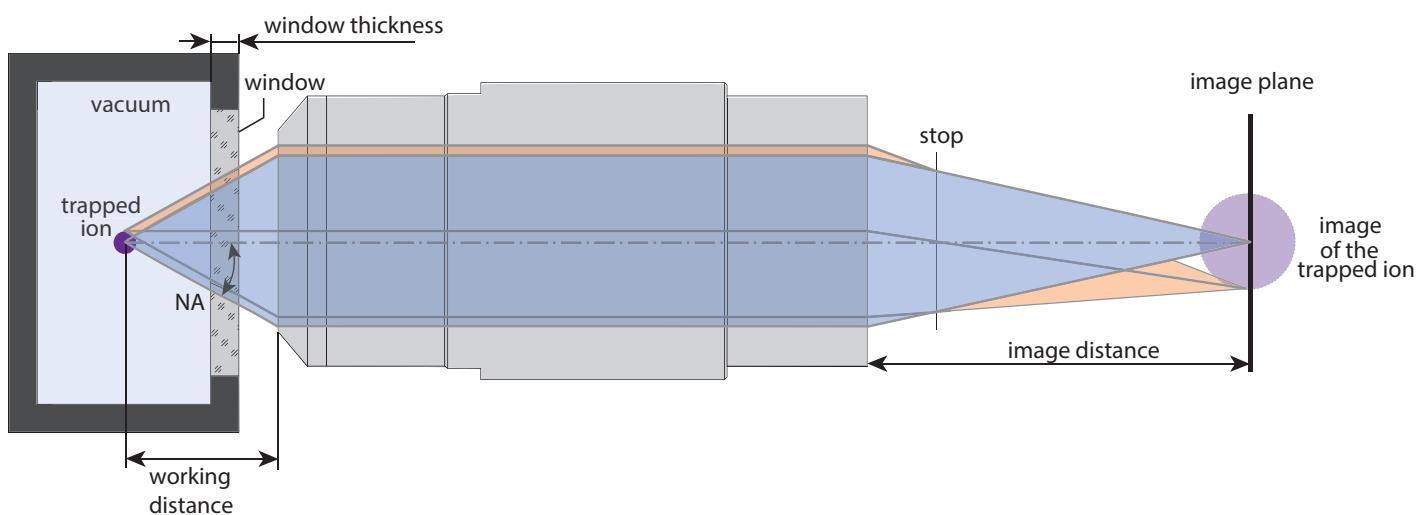
Sill Optics社では、ご要望の寸法などに合わせるなどカスタム対応を承っておりますので、お問合せください。

■ *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. Of course, it is not only important to use them, but to know their behaviour in detail via various basic experiments.

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.

Adaption for your window thickness is possible. We are also pleased to develop lenses according to your requirements.



■ 589.6 + 1064 nm

Artikelnummer part number	Wellenlänge wavelength	Material material	Brennweite focal length	NA	f#	max. Objektgröße max. FOV	Vergrößerung magnification	Dicke Fenster thickness window	Material Fenster material window	Arbeitsabstand working distance		
	[nm]	[nm]	[mm]			[mm]	[mm]	[mm]		[mm]		
@590 nm @1064 nm												
NEW S6ASS2242/081	590	1064	optical glass	40.0	0.4	1.4	0.71	infinity	infinity	6.0	fused silica	50.7

■ 395 + 729 nm

Artikelnummer part number	Wellenlänge wavelength	Material material	Brennweite focal length	NA	f#	max. Objektgröße max. FOV	Vergrößerung magnification	Dicke Fenster thickness window	Material Fenster material window	Arbeitsabstand working distance		
	[nm]	[nm]	[mm]			[mm]	[mm]	[mm]		[mm]		
@395 nm @729 nm												
NEW S6ASS2241	395	729	optical glass	66.9	0.3	1.7	0.2	20.0	20.0	6.0	fused silica	55.7
NEW S6ASS2241/045	395	729	optical glass	66.9	0.3	1.8	0.19	20.0	20.0	6.0	fused silica	55.7

■ 494 + 671 nm

Artikelnummer part number	Wellenlänge wavelength	Material material	Brennweite focal length	NA	f#	max. Objektgröße max. FOV	Vergrößerung magnification	Dicke Fenster thickness window	Material Fenster material window	Arbeitsabstand working distance		
	[nm]	[nm]	[mm]			[mm]	[mm]	[mm]		[mm]		
@494 nm @671 nm												
NEW S6ASS2224	494	671	optical glass	22.0	0.5	1.0	0.08	infinity	infinity	---	in vacuum	11.6

■ 369 + 493 nm

Artikelnummer part number	Wellenlänge wavelength	Material material	Brennweite focal length	NA	f#	max. Objektgröße max. FOV	Vergrößerung magnification	Dicke Fenster thickness window	Material Fenster material window	Arbeitsabstand working distance		
	[nm]	[nm]	[mm]			[mm]	[mm]	[mm]		[mm]		
@369 nm @493 nm												
NEW S6ASS2247	369	493	fused silica	50.1	0.2	2.5	0.95	8.0	78.0	2.0	sapphire	49.4

■ 397 + 422 nm

Artikelnummer part number	Wellenlänge wavelength	Material material	Brennweite focal length	NA	f#	max. Objektgröße max. FOV	Vergrößerung magnification	Dicke Fenster thickness window	Material Fenster material window	Arbeitsabstand working distance		
	[nm]	[nm]	[mm]			[mm]	[mm]	[mm]		[mm]		
@397 nm @422 nm												
NEW S6ASS2258	397	422	optical glass	44.8	0.4	1.1	0.28	10.0	10.0	19.1	N-BK7	62.3
NEW S6ASS2258/006	397	422	optical glass	45.5	0.4	1.2	0.29	10.0	10.0	6.3	fused silica	60.5

■ 313 + 397 nm

Artikelnummer part number	Wellenlänge wavelength	Material material	Brennweite focal length	NA	f#	max. Objektgröße max. FOV	Vergrößerung magnification	Dicke Fenster thickness window	Material Fenster material window	Arbeitsabstand working distance		
	[nm]	[nm]	[mm]			[mm]	[mm]	[mm]		[mm]		
@313 nm @397 nm												
NEW S6ASS2248	313	397	fused silica	49.0	0.3	1.6	0.27	15.0	145.0	3.0	fused silica	46.5
NEW S6ASS2247/389	313	397	fused silica	49.0	0.2	2.5	0.95	8.2	79.0	2.0	sapphire	48.2

Legende / Explanation: ● KP & UKP tauglich / SP & USP useable ! Lieferzeit auf Anfrage / Time of delivery on request

イオントラップレンズ(レーザー冷却) Trapped Ion lenses

■ 1030 - 1090 nm

Artikelnummer <i>part number</i>	Wellenlänge <i>wavelength</i> [nm]	Material <i>material</i>	Brennweite <i>focal length</i> [mm]	NA	f#	max. Objektgröße <i>max. FOV</i> [mm]	Vergrößerung <i>magnification</i> [mm]	Dicke Fenster <i>thickness window</i> [mm]	Material Fenster <i>material window</i>	Arbeitsabstand <i>working distance</i> [mm]
[NEW] S6ASS2243/126	1064	optical glass	40.5	0.4	1.4	0.71	infinity	6.0	fused silica	50.7

■ 422 nm

Artikelnummer <i>part number</i>	Wellenlänge <i>wavelength</i> [nm]	Material <i>material</i>	Brennweite <i>focal length</i> [mm]	NA	f#	max. Objektgröße <i>max. FOV</i> [mm]	Vergrößerung <i>magnification</i> [mm]	Dicke Fenster <i>thickness window</i> [mm]	Material Fenster <i>material window</i>	Arbeitsabstand <i>working distance</i> [mm]
[NEW] S6ASS2256	422	fused silica	44.9	0.4	1.2	0.27	10.0	19.1	N-BK7	63.8
[NEW] S6ASS2255	422	fused silica	45.0	0.4	1.2	0.27	10.0	19.1	fused silica	63.4

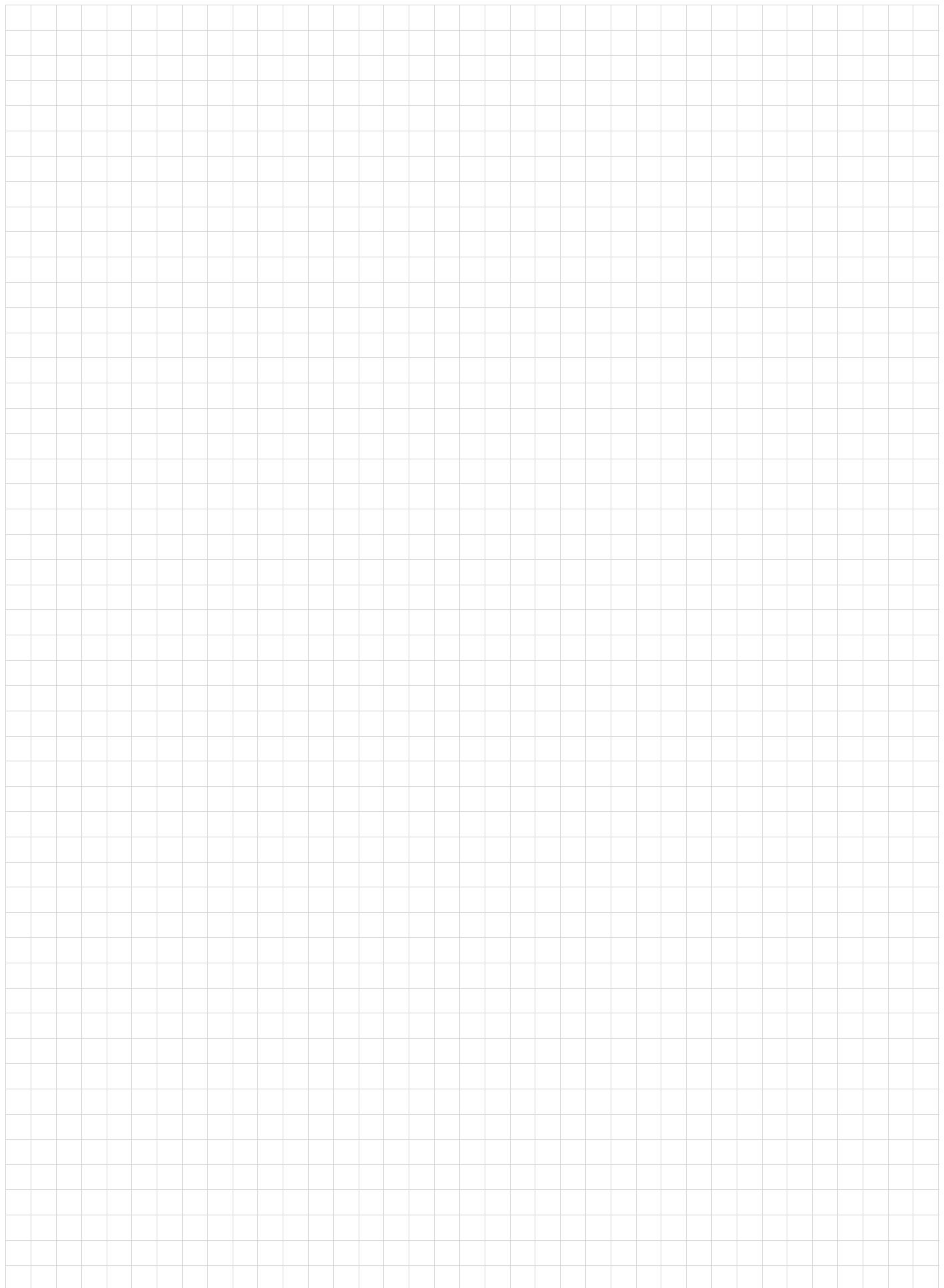
■ 370 nm

Artikelnummer <i>part number</i>	Wellenlänge <i>wavelength</i> [nm]	Material <i>material</i>	Brennweite <i>focal length</i> [mm]	NA	f#	max. Objektgröße <i>max. FOV</i> [mm]	Vergrößerung <i>magnification</i> [mm]	Dicke Fenster <i>thickness window</i> [mm]	Material Fenster <i>material window</i>	Arbeitsabstand <i>working distance</i> [mm]
[NEW] S6ASS2341	370	optical glass	82.1	0.2	2.1	0.2	6.0	6.0	fused silica	55.7

■ 369 nm

Artikelnummer <i>part number</i>	Wellenlänge <i>wavelength</i> [nm]	Material <i>material</i>	Brennweite <i>focal length</i> [mm]	NA	f#	max. Objektgröße <i>max. FOV</i> [mm]	Vergrößerung <i>magnification</i> [mm]	Dicke Fenster <i>thickness window</i> [mm]	Material Fenster <i>material window</i>	Arbeitsabstand <i>working distance</i> [mm]
[NEW] S6ASS2245	369	fused silica	40.0	0.4	1.3	0.35	infinity	8.0	fused silica	39.3
[NEW] S6ASS2246	369	fused silica	41.2	0.4	1.3	0.36	infinity	4.3	fused silica	38.7

Legende / Explanation: ● KP & UKP tauglich / SP & USP useable ! Lieferzeit auf Anfrage / Time of delivery on request





■ 集光レンズ

複数枚のレンズエレメントによるレンズ系は、単レンズによる結像誤差を最小化し、レーザーをスキャナーなどで走査させない用途では高精度の集光特性を提供します。単色光と多色光では、使用する光学系が異なります。

単色光の光学系は特定の波長に対してのみ補正を行います。そのためレーザー用途に最適です。特にエアースペース(ギャップ)タイプの合成石英を用いたレンズは、高出力レーザー用のコリメーションや集光の光学系としてご使用ください。Sill Optics社では合成石英もしくは光学ガラスを使用したレンズ複数枚によるエアースペース型の光学系を取り扱っております。

多色光の光学系では、屈折率と分散が異なる硝材のレンズを使って構成する必要があります。適切な組み合わせのみが特に可視範囲での色誤差を補正することができます。通常、構成されるレンズエレメントは接着材で固定されています。これにより色補正のレンズ系は損傷閾値が低くなるため、200ワット未満の平均出力によるレーザーでの使用を推奨します。

■ Lens systems

Multi-element lens systems minimize the imaging errors of single lenses and provide precision focusing for non-scanning applications. You have to distinguish between monochromatic and achromatic systems.

Monochromatic systems are only corrected for a specific wavelength. So they are most suitable for laser applications. Especially fused silica lenses in air-spaced design are preferably chosen for collimation or focusing of high power laser.

We offer mounted air spaced multi element systems in fused silica and optical glass.

Achromatic systems have to consist of lenses with different glass types and dispersions. Only a matched combination allows the correction of the chromatic error especially in the visible range. Usually components are cemented. That leads to a reduced damage threshold of the achromatic system, which limits the use of laser with average powers of less than 50 W.



■ 1030 - 1090 nm

Artikelnummer part number	Brennweite focal length [mm]	freier-Ø clear-Ø [mm]	Außen-Ø housing-Ø [mm]	Länge length [mm]	Arbeitsabstand working distance [mm]	Anzahl Linsen number of lenses
S6ASS2020/328 ●	25.1	12.5	25.0	13.5	19.8	3
S6ASS2550/328	49.7	23.0	30.0	9.8	48.4	2
S6ASS2560/328	59.9	23.0	30.0	22.5	57.5	2
S6ASS2060/328 ●	63.9	34.0	40.0	32.0	49.3	3
S6ASS5080/328	79.6	48.0	54.0	36.0	60.2	3
S6ASS1093/328 ●	100.6	42.0	48.0	22.0	86.1	2
S6ASS6101/328 ●	100.6	50.0	56.0	22.5	86.3	2
S6ASS5120/328 ●	128.7	40.0	48.0	20.0	110.8	2
S6ASS5151/328	148.9	48.0	54.0	43.0	152.3	2
S6ASS5152/328 ●	153.4	68.0	75.0	34.0	129.2	2
S6ASS5201/328 ●	200.1	68.0	75.0	23.0	186.2	2
S6ASS6200/328 ●	200.9	48.0	54.0	15.0	193.2	2
S6ASS2250/328 ●	249.8	50.0	54.0	20.0	247.5	2

■ 515 - 545 nm

Artikelnummer part number	Brennweite focal length [mm]	freier-Ø clear-Ø [mm]	Außen-Ø housing-Ø [mm]	Länge length [mm]	Arbeitsabstand working distance [mm]	Anzahl Linsen number of lenses
S6ASS2020/292 ●	24.5	12.5	25.0	13.5	19.3	3
S6ASS2550/292	49.3	23.0	30.0	20.0	45.7	2
S6ASS2560/292 ●	58.4	23.0	30.0	24.5	51.8	2
S6ASS2060/292 ●	62.4	34.0	40.0	32.0	47.9	3
S6ASS5300/292 ●	99.7	20.0	41.0	16.0	86.7	3
S6ASS6151/292 ●	146.3	50.0	56.0	20.0	135.0	2
S6ASS5370/292 ●	174.5	35.0	41.0	24.0	174.1	2
S6ASS6200/292 ●	196.1	48.0	54.0	15.0	188.5	2

■ 355 nm

Artikelnummer part number	Brennweite focal length [mm]	freier-Ø clear-Ø [mm]	Außen-Ø housing-Ø [mm]	Länge length [mm]	Arbeitsabstand working distance [mm]	Anzahl Linsen number of lenses
S6ASS2020/075 ●	25.4	12.5	25.0	17.0	17.9	3
S6ASS2550/075	48.2	23.0	30.0	20.0	43.5	2
S6ASS2060/075 ●	60.0	34.0	40.0	30.0	46.5	3
S6ASS5185/075 ●	86.4	31.0	40.0	15.0	77.6	2
S6ASS5120/075 ●	114.4	40.0	48.0	20.0	104.4	2

■ 266 nm

Artikelnummer part number	Brennweite focal length [mm]	freier-Ø clear-Ø [mm]	Außen-Ø housing-Ø [mm]	Länge length [mm]	Arbeitsabstand working distance [mm]	Anzahl Linsen number of lenses
S6ASS2020/199 ●	24.0	12.5	25.0	17.0	17.1	3
S6ASS2550/199	44.3	23.0	30.0	9.8	40.4	2
S6ASS2060/199 ●	57.3	34.0	40.0	30.0	43.9	3
S6ASS5185/199 ●	81.9	35.0	40.0	15.0	73.4	2
S6ASS5120/199 ●	109.0	40.0	48.0	20.0	99.1	2

Legende / Explanation: ● KP & UKP tauglich / SP & USP useable ! Lieferzeit auf Anfrage / Time of delivery on request



■ 1064 nm

Artikelnummer <i>part number</i>	Brennweite <i>focal length</i> [mm]	freier-Ø <i>clear-Ø</i> [mm]	Außen-Ø <i>housing-Ø</i> [mm]	Länge <i>length</i> [mm]	Arbeitsabstand <i>working distance</i> [mm]	Anzahl Linsen <i>number of lenses</i>
S6ASS1030/126	30.0	14.0	20.0	11.0	25.1	2
S6ASS1035/126	35.0	16.0	20.0	11.0	30.8	2
S6ASS0065/126	40.0	26.0	28.0	22.5	31.6	3
S6ASS0063/126	40.1	21.0	23.0	14.0	30.4	2
S6ASS0030/126	50.1	23.5	35.0	34.0	27.4	3
S6ASS0159/126	56.0	35.0	41.0	26.5	42.7	3
S6ASS5060/126	59.9	48.0	54.0	36.0	42.5	3
S6ASS0064/126	60.0	26.0	28.0	22.5	54.6	2
S6ASS0074/126	60.0	21.0	23.0	14.0	53.7	2
S6ASS0311/126	70.9	26.0	28.0	22.5	65.4	2
S6ASS0177/126	76.7	35.0	41.0	24.0	64.2	3
S6ASS6001/126	78.9	48.0	54.0	36.0	67.0	3
S6ASS0078/126	85.3	25.5	28.0	22.5	79.9	2
S6ASS0115/126	90.0	35.0	41.0	32.0	89.1	3
S6ASS0098/126	121.6	35.0	41.0	24.0	110.8	3
S6ASS0066/126	162.2	35.0	41.0	22.0	153.3	2

■ 532 nm

Artikelnummer <i>part number</i>	Brennweite <i>focal length</i> [mm]	freier-Ø <i>clear-Ø</i> [mm]	Außen-Ø <i>housing-Ø</i> [mm]	Länge <i>length</i> [mm]	Arbeitsabstand <i>working distance</i> [mm]	Anzahl Linsen <i>number of lenses</i>
S6ASS1030/121	29.8	14.0	20.0	11.0	25.0	2
S6ASS6001/121	76.1	48.0	54.0	36.0	63.9	3
S6ASS0177/121	76.6	35.0	41.0	24.0	64.0	3
S6ASS5340/121	88.9	31.0	41.0	21.8	64.4	2
S6ASS0115/121	89.4	35.0	41.0	32.0	88.7	3
S6ASS5320/121	114.5	31.0	41.0	15.5	105.8	2

Legende / Explanation: ● KP & UKP tauglich / SP & USP useable ! Lieferzeit auf Anfrage / Time of delivery on request

■ 1064 nm

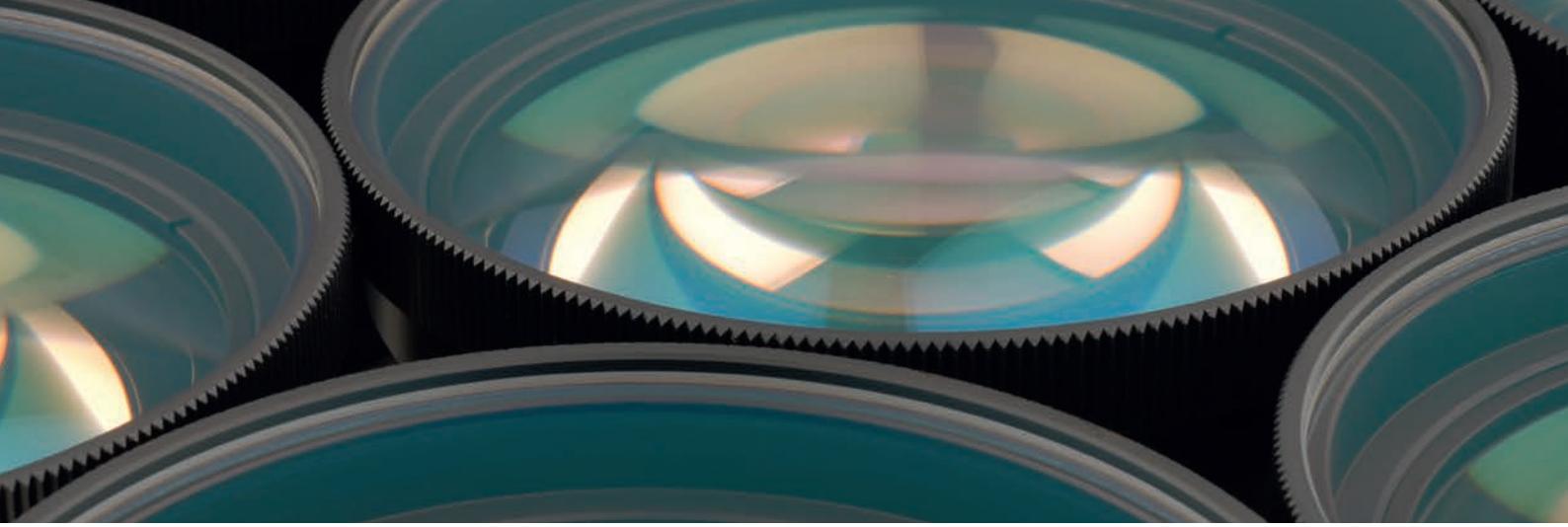
Artikelnummer <i>part number</i>	Brennweite <i>focal length</i> [mm]	Linsen-Ø <i>lens-Ø</i> [mm]	Mittendicke <i>center thickness</i> [mm]
S1LA00103/126	25.0	12.5	5.5
S1LA00063/126	50.0	25.0	9.1
S1LA00079/126	50.0	20.0	6.9
S1LA00025/126	60.0	30.0	12.5
S1LA00071/126	60.0	25.4	9.5
S1LA00075/126	60.0	18.0	6.0
S1LA000705/126	75.0	25.0	7.0
S1LA00028/126	80.0	31.5	11.2
S1LA00054/126	80.0	18.0	5.2
S1LA00067/126	80.0	50.0	20.2
S1LA00080/126	80.0	25.0	8.2
S1LA00115/126	90.0	30.0	11.0
S1LA00026/126	100.0	30.0	17.5
S1LA00066/126	100.0	50.0	17.5
S1LA00072/126	100.0	25.4	7.2
S1LA00029/126	120.0	31.5	9.4
S1LA00065/126	120.0	50.0	15.6
S1LA00073/126	120.0	25.4	7.2
S1LA00061/126	160.0	50.0	13.5
S1LA00070/126	160.0	31.5	8.6
S1LA00069/126	190.0	50.0	13.6
S1LA00098/126	200.0	50.0	12.6
S1LA00068/126	300.0	50.0	12.0
S1LA00101/126	310.0	80.0	18.5

■ VIS + 1064 nm

Artikelnummer <i>part number</i>	Brennweite <i>focal length</i> [mm]	Linsen-Ø <i>lens-Ø</i> [mm]	Mittendicke <i>center thickness</i> [mm]
S1LA00099/083	190.0	75.0	25.0

Legende / Explanation: ● KP & UKP tauglich / SP & USP useable ! Lieferzeit auf Anfrage / Time of delivery on request





■アクセサリー

取付治具付保護ガラスユニット

fθ(エフシータ)レンズの中には、標準として保護ガラスが付いていないラインナップがあります。そのようなタイプには、加工面側前玉レンズの保護のためにオプションでご用意している取付治具付き保護ガラスのユニット品をご使用いただくことを推奨します

調整式取付金具(ホルダー)

光学機器をレーザービームに合わせて調整することは、難しい場合が多いです。市販品のホルダーの多くは、あおりもしくは軸方向のどちらかの微動調整のみが可能です。Sill Optics社製ホルダーはその両方の微動調整を行うことができます。あおり ($\pm 0.5^\circ$) およびXおよびY軸二方向 ($\pm 1.5\text{mm}$) を一つのメカニカルな機構で微動調整可能です。

Sill Optics社が開発したこの調整式ホルダーはその他にも素晴らしい特長があります。本ホルダーは、芯出し調整軸ではなく、光軸を基準にして光学系のあおり軸の調整を行います。そのため、角度調整中に芯出し調整軸を追従する必要がありません。ホルダーは 0° 、 45° または、メカニカルホルダーにベースなしで取り付けることが可能です。

テレフォトレンズ

これらのレンズは、スキャンレンズを通して加工点をカメラシステムで観察するために設計されています。視野はスキャンレンズの焦点距離とカメラレンズの焦点距離との比により決定されます。照明を必要な視野に均一に照射させるためには同軸落射タイプのレンズを推奨します。

■ Accessories

Mounted protective windows

Some of our scan optics do not have protective windows as a standard. For these types, we recommend our mounted protective windows for the protection of the front lens.

Adjustable mount

The adjustment of optical components into a laser beam is often a challenge. Many commercial holders realize tilt or an axial offset by a fine adjustment only. The holder of Sill Optics realizes both: a tilt ($+\/- 0.5^\circ$) and a lateral shift (in X and Y of $+\/- 1.5\text{mm}$) in one mechanical component.

This developed holder has an additional remarkable advantage: It tilts the optical system in reference to the optical and not in terms of a lateral shifted axis. Therefore it is not necessary to track the lateral components while angular adjustment. The holder can be mounted in two positions (0° and 45°) or can or can be integrated directly into a mechanical holder without the base, too.

Telephoto lenses

These lenses are designed for observing the process by a camera system through the scan lens. The field of view is defined by the ratio of the focal lengths of the scan lens and of the camera lens. An integrated illumination system through the camera lens is recommended, which concentrates the light exactly onto the required field of view.

Special accessories are available on request.



Schutzglasvorsatz / mounted protective window 1064 nm

Artikelnummer <i>part number</i>	passend zu <i>for</i>	Befestigungs-Ø <i>mounting-Ø</i> [mm]	freier-Ø <i>clear-Ø</i> [mm]	max. Außen-Ø <i>max. outside-Ø</i> [mm]	Länge <i>length</i> [mm]
S4SET0420/126	S4LFT0420/126	136.0	120.0	146.0	22.5
S4SET0508/126	S4LFT0508/126	127.0	120.0	146.0	22.5
S4SET0635/126	S4LFT0635/126	133.0	120.0	146.0	22.5

Schutzglasvorsatz / mounted protective window 808 - 980 nm

Artikelnummer <i>part number</i>	passend zu <i>for</i>	Befestigungs-Ø <i>mounting-Ø</i> [mm]	freier-Ø <i>clear-Ø</i> [mm]	max. Außen-Ø <i>max. outside-Ø</i> [mm]	Länge <i>length</i> [mm]
S4SET0420/094	S4LFT0420/094	136.0	120.0	146.0	22.5
S4SET0635/094	S4LFT0635/094	133.0	120.0	146.0	22.5

Schutzglasvorsatz / mounted protective window 532 nm

Artikelnummer <i>part number</i>	passend zu <i>for</i>	Befestigungs-Ø <i>mounting-Ø</i> [mm]	freier-Ø <i>clear-Ø</i> [mm]	max. Außen-Ø <i>max. outside-Ø</i> [mm]	Länge <i>length</i> [mm]
S4SET1094/121	S4LFT1094/121	M79x0.75	73.0	85.0	11.5
S4SET0508/121	S4LFT0508/121	127.0	120.0	146.0	22.5

Schutzglasvorsatz / mounted protective window 355 nm

Artikelnummer <i>part number</i>	passend zu <i>for</i>	Befestigungs-Ø <i>mounting-Ø</i> [mm]	freier-Ø <i>clear-Ø</i> [mm]	max. Außen-Ø <i>max. outside-Ø</i> [mm]	Länge <i>length</i> [mm]
S4SET5256/075	S4LFT5256/075	138.0	128.0	144.0	22.5

Legende / Explanation: ● KP & UKP tauglich / SP & USP useable ! Lieferzeit auf Anfrage / Time of delivery on request



Schutzglas / protective window 1850 - 1980 nm

Artikelnummer <i>part number</i>	Wellenlänge <i>wavelength</i> [nm]	Material <i>material</i>	Ø [mm]	Dicke <i>thickness</i> [mm]
S4LPG3102/159 ¹	1850 - 1980	fused silica	50.0	1.5
S4LPG2250/159 ¹	1850 - 1980	fused silica	96.0	4.0
S4LPG4160/159 ¹	1850 - 1980	fused silica	115.0	3.0
S4LPG2175/159 ¹	1850 - 1980	fused silica	140.0	4.0

¹für Wellenlänge 1850-1980 nm - bei Verwendung der Sonderoptiken zum Schweißen von Kunststoffen, kann das Patent EP 1 098 751 B1 der Firma Lisa Laser products OHG Fuhrberg & Teichmann, Kaltenberg-Lindau, verletzt werden / for wavelength 1850-1980 nm - when using special optics for welding of plastics, the patent EP 1 098 751 B1 owned by Lisa laser products OHG Fuhrberg & Teichmann, Kaltenburg-Lindau, may be infringed

Schutzglas / protective window 1550 nm

Artikelnummer <i>part number</i>	Wellenlänge <i>wavelength</i> [nm]	Material <i>material</i>	Ø [mm]	Dicke <i>thickness</i> [mm]
S4LPG3102/008	1550	fused silica	50.0	1.5
S4LPG3100/008	1550	fused silica	73.0	1.5
S4LPG0005/008	1550	N-BK7	75.0	1.6
S4LPG2250/008	1550	fused silica	96.0	4.0
S4LPG4160/008	1550	fused silica	115.0	3.0
S4LPG2175/008	1550	fused silica	140.0	4.0

Schutzglas / protective window 1000 - 1100 nm

Artikelnummer <i>part number</i>	Wellenlänge <i>wavelength</i> [nm]	Material <i>material</i>	Ø [mm]	Dicke <i>thickness</i> [mm]
S4LPG0005/450	1000 - 1100	N-BK7	75.0	1.6

Schutzglas / protective window 1030 - 1090 nm

Artikelnummer <i>part number</i>	Wellenlänge <i>wavelength</i> [nm]	Material <i>material</i>	Ø [mm]	Dicke <i>thickness</i> [mm]
S4LPG4056/328	1030 - 1090	fused silica	42.0	2.0
S4LPG3102/328	1030 - 1090	fused silica	50.0	1.5
S4LPG3105/328	1030 - 1090	fused silica	51.0	1.5
S4LPG0394/328	1030 - 1090	fused silica	56.0	1.5
S4LPG3100/328	1030 - 1090	fused silica	73.0	1.5
S4LPG0082/328	1030 - 1090	fused silica	82.0	10.0
S4LPG0800/328	1030 - 1090	fused silica	85.0	4.0
S4LPG2250/328	1030 - 1090	fused silica	96.0	4.0
S4LPG4160/328	1030 - 1090	fused silica	115.0	3.0
S4LPG0440/328	1030 - 1090	fused silica	130.0	4.0
S4LPG2175/328	1030 - 1090	fused silica	140.0	4.0
S4LPG1118/328	1030 - 1090	fused silica	186.0	6.0
S4LPG1200/328	1030 - 1090	fused silica	200.0	6.0

Schutzglas / protective window 900 - 1070 nm

Artikelnummer <i>part number</i>	Wellenlänge <i>wavelength</i> [nm]	Material <i>material</i>	Ø [mm]	Dicke <i>thickness</i> [mm]
S4LPG0082/449	900 - 1070	fused silica	82.0	10.0
S4LPG2250/449	900 - 1070	fused silica	96.0	4.0
S4LPG4160/449	900 - 1070	fused silica	115.0	3.0
S4LPG0440/449	900 - 1070	fused silica	130.0	4.0
S4LPG2175/449	900 - 1070	fused silica	140.0	4.0

Schutzglas / protective window 532 + 1064 nm

Artikelnummer <i>part number</i>	Wellenlänge <i>wavelength</i> [nm]	Material <i>material</i>	Ø [mm]	Dicke <i>thickness</i> [mm]
S4LPG0090/081	532 + 1064	N-BK7	96.0	3.0
S4LPG0300/081	532 + 1064	N-BK7	123.0	4.0

Legende / Explanation: ● KP & UKP tauglich / SP & USP useable ! Lieferzeit auf Anfrage / Time of delivery on request

Schutzglas / protective window 355 + 1064 nm

Artikelnummer part number	Wellenlänge wavelength [nm]	Material material	Ø Ø [mm]	Dicke thickness [mm]
S4LPG4160/387	355 + 1064	fused silica	115.0	3.0

Schutzglas / protective window 1064 nm

Artikelnummer part number	Wellenlänge wavelength [nm]	Material material	Ø Ø [mm]	Dicke thickness [mm]
S4LPG4056/126	1064	fused silica	42.0	2.0
S4LPG0116/126	1064	N-BK7	44.0	2.0
S4LPG0001/126	1064	N-BK7	45.0	2.0
S4LPG0105/126	1064	N-BK7	51.5	1.6
S4LPG0004/126	1064	N-BK7	65.0	1.6
S4LPG0005/126	1064	N-BK7	75.0	1.6
S4LPG0003/126	1064	N-BK7	82.0	3.0
S4LPG1080/126	1064	N-BK7	93.0	3.0
S4LPG0090/126	1064	N-BK7	96.0	3.0
S4LPG0250/126	1064	N-BK7	96.0	4.0
S4LPG6100/126	1064	N-BK7	105.0	3.0
S4LPG0300/126	1064	N-BK7	123.0	4.0
S4LPG2175/126	1064	fused silica	140.0	4.0
S4LPG0220/126	1064	N-BK7	220.0	5.0

Schutzglas / protective window 808 - 980 nm

Artikelnummer part number	Wellenlänge wavelength [nm]	Material material	Ø Ø [mm]	Dicke thickness [mm]
S4LPG0057/094	808 - 980	N-BK7	37.0	1.5
S4LPG0394/094	808 - 980	fused silica	56.0	1.5
S4LPG0004/094	808 - 980	N-BK7	65.0	1.6
S4LPG0005/094	808 - 980	N-BK7	75.0	1.6
S4LPG1080/094	808 - 980	N-BK7	93.0	3.0
S4LPG0090/094	808 - 980	N-BK7	96.0	3.0
S4LPG2250/094	808 - 980	fused silica	96.0	4.0
S4LPG4160/094	808 - 980	fused silica	115.0	3.0
S4LPG0300/094	808 - 980	N-BK7	123.0	4.0
S4LPG0440/094	808 - 980	fused silica	130.0	4.0
S4LPG2175/094	808 - 980	fused silica	140.0	4.0

Schutzglas / protective window 400 - 550 nm

Artikelnummer part number	Wellenlänge wavelength [nm]	Material material	Ø Ø [mm]	Dicke thickness [mm]
S4LPG0300/322	400 - 550	N-BK7	123.0	4.0

Schutzglas / protective window 515 - 545 nm

Artikelnummer part number	Wellenlänge wavelength [nm]	Material material	Ø Ø [mm]	Dicke thickness [mm]
S4LPG4056/292	515 - 545	fused silica	42.0	2.0
S4LPG3102/292	515 - 545	fused silica	50.0	1.5
S4LPG0394/292	515 - 545	fused silica	56.0	1.5
S4LPG3100/292	515 - 545	fused silica	73.0	1.5
S4LPG0005/292	515 - 545	N-BK7	75.0	1.6
S4LPG2250/292	515 - 545	fused silica	96.0	4.0
S4LPG4160/292	515 - 545	fused silica	115.0	3.0
S4LPG1118/292	515 - 545	fused silica	186.0	6.0
S4LPG1200/292	515 - 545	fused silica	200.0	6.0

Legende / Explanation: ● KP & UKP tauglich / SP & USP useable ! Lieferzeit auf Anfrage / Time of delivery on request



Schutzglas / protective window 532 nm

Artikelnummer <i>part number</i>	Wellenlänge <i>wavelength</i> [nm]	Material <i>material</i>	Ø ∅ [mm]	Dicke <i>thickness</i> [mm]
S4LPG0001/121	532	N-BK7	45.0	2.0
S4LPG0105/121	532	N-BK7	51.5	1.6
S4LPG0004/121	532	N-BK7	65.0	1.6
S4LPG0005/121	532	N-BK7	75.0	1.6
S4LPG1081/121	532	N-BK7	93.0	3.0
S4LPG0090/121	532	N-BK7	96.0	3.0
S4LPG0250/121	532	N-BK7	96.0	4.0
S4LPG0300/121	532	N-BK7	123.0	4.0
S4LPG0220/121	532	N-BK7	220.0	5.0

Schutzglas / protective window 420 - 480 nm

Artikelnummer <i>part number</i>	Wellenlänge <i>wavelength</i> [nm]	Material <i>material</i>	Ø ∅ [mm]	Dicke <i>thickness</i> [mm]
S4LPG2250/373	420 - 480	fused silica	96.0	4.0
S4LPG4160/373	420 - 480	fused silica	115.0	3.0
S4LPG2175/373	420 - 480	fused silica	140.0	4.0

Schutzglas / protective window 405 nm

Artikelnummer <i>part number</i>	Wellenlänge <i>wavelength</i> [nm]	Material <i>material</i>	Ø ∅ [mm]	Dicke <i>thickness</i> [mm]
S4LPG3100/173	405	fused silica	73.0	1.5
S4LPG2250/173	405	fused silica	96.0	4.0
S4LPG6100/076	405	N-BK7	105.0	3.0
S4LPG4160/173	405	fused silica	115.0	3.0

Schutzglas / protective window 355 nm

Artikelnummer <i>part number</i>	Wellenlänge <i>wavelength</i> [nm]	Material <i>material</i>	Ø ∅ [mm]	Dicke <i>thickness</i> [mm]
S4LPG4056/075	355	fused silica	42.0	2.0
S4LPG3102/075	355	fused silica	50.0	1.5
S4LPG0394/075	355	fused silica	56.0	1.5
S4LPG3100/075	355	fused silica	73.0	1.5
S4LPG0815/075	355	fused silica	86.0	2.0
S4LPG2250/075	355	fused silica	96.0	4.0
S4LPG4160/075	355	fused silica	115.0	3.0
S4LPG1200/075	355	fused silica	200.0	6.0

Schutzglas / protective window 266 nm

Artikelnummer <i>part number</i>	Wellenlänge <i>wavelength</i> [nm]	Material <i>material</i>	Ø ∅ [mm]	Dicke <i>thickness</i> [mm]
S4LPG3100/199	266	fused silica	73.0	1.5
S4LPG4160/199	266	fused silica	115.0	3.0

Legende / Explanation: ● KP & UKP tauglich / SP & USP useable ! Lieferzeit auf Anfrage / Time of delivery on request

Justierhalter / adjustable mount

Artikelnummer part number	Beschreibung description	Anschlussgewinde thread	Abstand Grundplatte zu opt. Achse distance between plate to optical axis [mm]
SSSET0125	X, Y und Winkelverstellung; Strahlhöhe bitte bei Anfrage vermerken / X, Y and angle adjustment; please mention your beam height	C-mount	100.0
SSSET0150	X, Y und Winkelverstellung; Strahlhöhe bitte bei Anfrage vermerken / X, Y and angle adjustment; please mention your beam height	M60 x 0.75	100.0

Adapter / adaptor

Artikelnummer part number	Beschreibung description	Gesamtlänge total length [mm]
S4MEC3985	Adapter M39x1 auf M85x1 / adaptor M39x1 to M85x1	6.0
S4MEC5585	Adapter M55x1 auf M85x1 / adaptor M55x1 to M85x1	6.0
S6MEC0107	Adapter M30x1 auf C-mount / adaptor M30x1 to C-mount	10.0
S6MEC0127	Adapter M30x1 auf C-mount / adaptor M30x1 to C-mount	20.0
S6MEC0134	Adapter M43x0,5 und C-mount / adaptor M43x0.5 to C-mount	10.0
S6MEC2530	Adapter C-mount auf M30x1 / adaptor C-mount to M30x1	4.0
S6MEC3133	Adapter 50,8 mm Durchmesser auf M60x0,75 / adaptor 50.8 mm diameter to M60x0.75	20.0
S6MEC5075	Adapter 49 mm Durchmesser auf M60x0,75 / adaptor 49 mm diameter to M60x0.75	20.0

Teleobjektiv / telephoto lens 633 + 1064 nm

Artikelnummer part number	Brennweite focal length [mm]	F / #	max. Feldwinkel max. field angle [°]	max. Bilddiagonale max. image diameter [mm]	max. Verzeichnung max. distortion [%]	max. Außen-Ø max. outside-Ø [mm]	Länge length [mm]	Beleuchtung light source	Anschluss mount
SSLPL0305	150.2	8.0	3.0	8.0	0.1	48.0 + 45.9	116.5	6 mm fiber coupling	C-mount
SSLPL0305/CCS	150.2	8.0	3.0	8.0	0.1	48.0 + 43.7	113.9	8 mm fiber coupling	C-mount
SSLPL0305/LED	150.2	8.0	3.0	8.0	0.1	48.0 + 49.3	113.9	with LED 627 nm	C-mount
SSLPJ0305	150.3	8.0	3.0	8.0	0.1	48.0	106.3	---	C-mount
SSVPJ0303	305.0	16.0	1.5	11.0	0.53	48.00x70.00	118.3	---	C-Mount
SSLPJ0303	305.3	16.0	1.5	11.0	0.3	48.0	118.5	---	C-mount
SSLPL0303	305.3	16.0	1.5	11.0	0.3	48.0 + 45.9	128.4	6 mm fiber coupling	C-mount
SSLPL0303/CCS	305.3	16.0	1.5	11.0	0.3	48.0 + 43.7	128.4	8 mm fiber coupling	C-mount
SSLPL0303/LED	305.3	16.0	1.5	11.0	0.3	48.0 + 60.4	128.4	with LED 627 nm	C-mount

Legende / Explanation: ● KP & UKP tauglich / SP & USP useable ! Lieferzeit auf Anfrage / Time of delivery on request





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