





## F-THETA LENS - MINI SERIES

Sill Optics offers now a series of scan lenses in a compact housing. This compact lens series which was already offered with 63 mm and 163 mm focal length was completed with new versions with 100 mm, 254 mm and 300 mm focal length. The mounting interface comprises an M39x1 thread. Optional adapters to M55x1, M79x1 or M85x1 threads are available. The footprint of the scan lenses fit perfectly to the compact scan head series of all major scan head suppliers. A scan head aperture of maximum 8 mm aperture is recommended for this compact series. All scan lenses offer a very good spot performance in slightly reduced field size compared to our standard scan lenses. All lenses are available in 1064 nm configuration; the 63 mm and 163 mm version are also available in 532 nm.

## F-THETA LENS - LOW COST SERIES

Sill Optics presents new cost-optimized scan lenses as a result of cost pressure in labeling sector. The low cost series covers popular focal lengths 100 mm, 160 mm and 254 mm. These lenses are designed with one element less to reduce the manufacturing costs. We gladly pass these savings on to our customers. However, design offers a suitable performance for these applications.

All lenses have the standard thread M85x1 and are optimized for scan heads up to 14 mm aperture.

## ALPHA - BEAM EXPANDERS

Sill Optics expanded the series of ALPHA (Absorption Low Plus High Aperture) beam expanders with 5x and 6x magnification. This series offers large exit beam diameter up to 48 mm. The beam expanders operate nominally diffraction-limited and supply the entire magnification up to the maximum entrance beam diameter ( $1/e^2$ ) of 8 mm (5.0x) respectively 7 mm (6.0x). The low absorption coating is optimized for a wavelength range between 1030 nm and 1090 nm.

The beam expanders produce no internal focus and are based on the Galilean design. Compared to the 2.0x - 4.0x models, they offer a very short construction length. The divergence adjustment works as usual by axial shift (no rotating elements). Thus they provide accuracy in pointing stability and allow an exact adjustment of the beam collimation, targeting in focusing or defocusing adjustment.

## COMPACT BEAM EXPANDERS FOR UV LASER

Additionally to wavelength range 515 nm - 545 nm and 1030 nm - 1064 nm, our series of compact beam expanders (EXK) with fixed magnification has been extended for UV Laser wavelength 343 nm - 355 nm.

The lenses are available with 0.8x, 1.2x, 1.5x, 2.0x, 3.0x and 4.0x magnification in two coating versions as standard and low absorption coating. Lens elements are fused silica.

EXK beam expanders offer good performance with a very small length of only 44.7 mm and they include divergence adjustment like our standard beam expanders.

## ZOOM BEAM EXPANDERS

Sill Optics offers zoom beam expanders from 1x-8x, with increasing demand over the last years. Their most interesting benefit are the large magnification range and divergence adjustability, independent from magnification. Beneath manual adjustment (S6EXZ series) we also offer motorized beam expanders with magnification 1x - 3x respectively 1x - 8x (S6EXM series).

Furthermore S6EXZ5312 provides beam expansion for large input diameters up to 18.5 mm in manual version.

All lenses are available in fused silica and for wavelength ranges 343 - 355 nm, 515 - 545 nm, 1030 - 1090 nm.

## COLOR CORRECTED F-THETA LENSES 405-650 NM

Many applications in fluorescence equipments need a good color correction and high transmission even in the deep blue waveband region.

Due to multiple customer requests, Sill Optics offers scan lenses with focal lengths 40 mm, 60 mm and 80 mm. These lenses glass types are using with high transmission of > 80% at 405 nm and the lenses are working color corrected from 405 nm to 650 nm.

## LENS HOLDERS

Many commercial lens holders realize either tilt or an axial offset by a fine adjustment only. The new holder of Sill Optics realizes both: A tilt ( $\pm 0.5^\circ$ ) and an axial shift (in x and y of  $\pm 1.5$  mm) in one mechanical component.

Furthermore, the optical component can be fixed by screws in the desired position, which avoids an involuntary maladjustment. The holder can be mounted in two positions ( $0^\circ$  and  $45^\circ$ ) on the base, or can be integrated directly into a mechanical holder without the base. The holder is available in two sizes (C-mount and M60x0.75). Special sizes on request.

## ASPHERES

Aspheres have the advantage of most easily assembly and minimum losses, because only two surfaces contribute to reflections. This minimizes the heating of the complete assembly at high power laser systems and reduces the weight. Our aspheres are made of high purity fused silica material to avoid internal absorption. We also apply a very low absorption antireflection coating, to avoid heating of the lens and so called thermal shift of the focus.

Standard versions are available in diameters of 30 mm, 38.1 mm and 52 mm with a focal length from 40 mm up to 400 mm. Low absorption coatings are available for wavelengths from 515 nm up to 1980 nm. Each aspherical focusing lens will be offered with lens mount and unmounted. Special forms and customized versions are available on request.



## FOCUSING LENSES FOR MANUAL LASER WELDING SYSTEMS

Manual Laser Welding systems are also being used worldwide in times of automation due to their fast readiness for action and their easy handling. For this purpose, Sill Optics offers special focusing lenses, which are corrected both for the laser wavelength and the visible range. This is true for the imaging performance and also for the antireflection coating used. The visual image is free of color fringes and color faults. Therefore, the use of a visual monitoring system is easily possible. Welding spot and center of the visual controlled area are coincident.

In addition the focal plane for the laser and the vision system are identically. Sill Optics offers different focal lengths, 56 mm, 77 mm, 90 mm and 120 mm. The housing diameter is one and the same for all lenses, allowing an easy process changeover of the welding system.



## F-THETA SCAN LENS FOR HIGH POWER DIODE LASERS

Sill Optics developed a new coating which is suited for state of the art direct diode laser. For efficiency reasons, the wavelengths provided by diode lasers shifted from the typical 808 nm to 980 nm band to longer wavelengths. Current laser systems emit laser light from 900 nm to 1070 nm in the multi-kilowatt regime with high brightness.

The new coating covers this range and provides reflection losses smaller than 0.25%. The key feature is that the coating has a very low absorption compared to standard coatings. In combination with fused silica lenses Sill Optics offers optical components supporting the use of these powerful lasers, which are already successfully used in the latest laser cutting heads and scan lenses. This coating for fused silica lasers is available on request, the coating code is 449.



## ASPHERICAL TELECENTRIC CONDENSER

“SILL is offering a new telecentric condenser for backlight illumination based on an asphere lens. It has a clear aperture of 90 mm. Telecentric illumination provides high contrast image edges for high resolution imaging. The benefit of the aspherical design is higher transmission as the asphere replaces a larger number of spherical elements.

LEDs are available in red, green, blue and IR in standard as well as in high power version. According to previous condenser lines, for the high-power version we offer a current limiter and miscellaneous dimmers for manually operated or computer controlled flicker free operating.



## DOUBLE SIDED TELECENTRIC LENSES

Sill offers double sided telecentric lenses with an extra high numerical aperture. The advantage of double sided telecentric lenses is that they show hardly any geometric aberrations. These lenses are especially suitable for particularly precise applications with large sensors. This series consists of lenses with a working distance of 100 mm and magnifications from 3.0x to 8.0x. The combination of double sided telecentric design and large numerical aperture provides high resolution and excellent light transmission.

