

# Laser Optics Lens

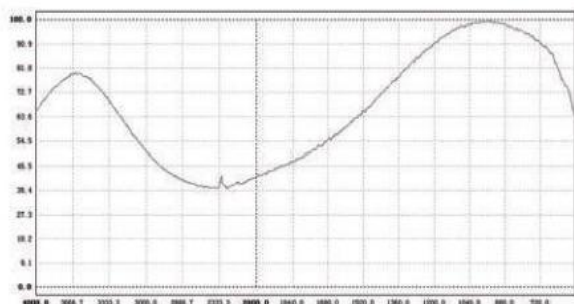
Polished Standard (For example: ZnSe)

<b>Dia Tol</b>	+0/-0.01mm
<b>Thickness Tol</b>	+0.05/-0.05mm
<b>Surface Figure</b>	$\lambda/4/25\text{mm Dia@}560\text{nm}$
<b>S / D</b>	40/20
<b>Flatness</b>	$\leq 5''$
<b>Centration</b>	$\leq 0.005\text{mm}$
<b>Clear Aperture</b>	$\leq 90\%$
<b>EFL Tol</b>	$< \pm 1\%$

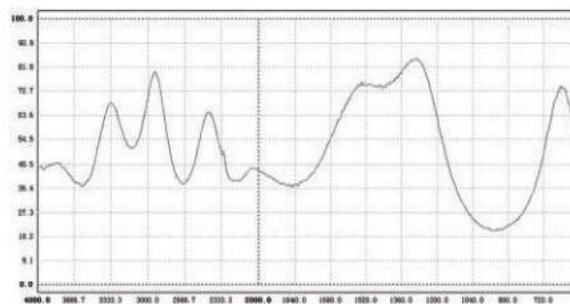
## Coating Technology Introduction

<b>Conventional Substrate</b>	ZnSe, Si, Ge, Fused Silica, BK7, CaF2, Sapphire, etc.
<b>Coating Range</b>	Mainly infrared band 0.2-20um and some ultraviolet and visible light films
<b>Conventional Membrane System</b>	Anti-reflection film, high-reflection film, semi-reflection film, enhanced gold film, broadband anti-reflection, double-point anti-reflection, narrow-band filter film, spectroscopic film, etc.
<b>Coating Equipment</b>	Japan Showa coating machine (oil-free pump)

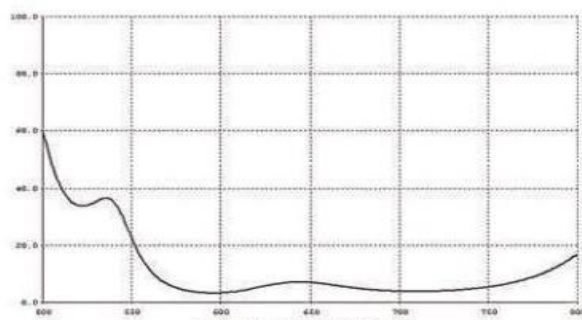




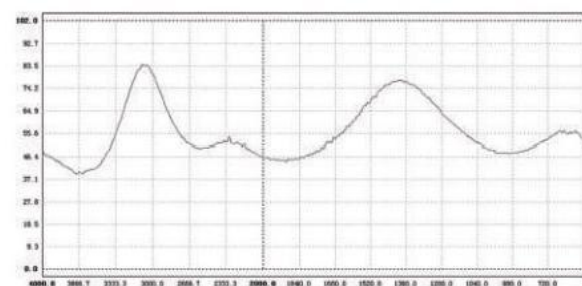
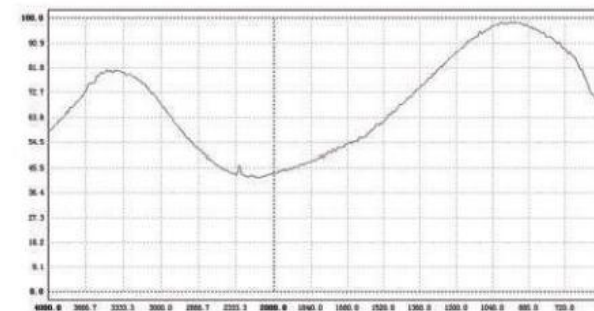
Anti-reflection Coating  
AR/AR@10.6 $\mu$ m, For ZnSe



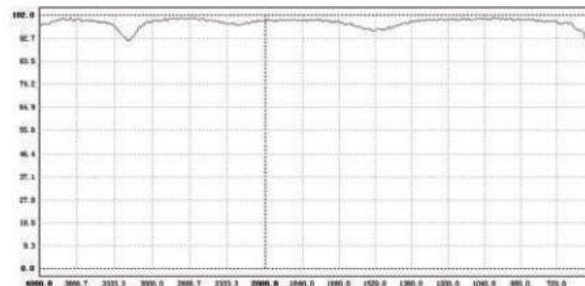
Partial Reflective Coating  
PR/AR@10.6 $\mu$ m, R=80%, For ZnSe



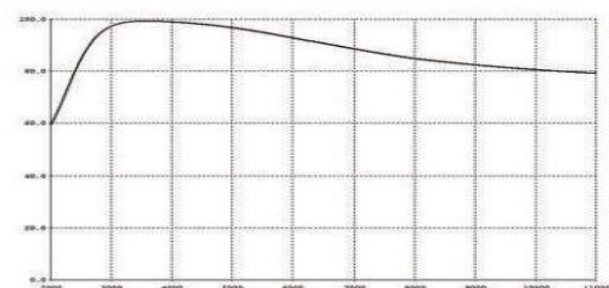
Beam Combiners T > 98% @ 10.6 $\mu$ m, R > 90% @ 632.8nm, For ZnSe(AOI=45°)



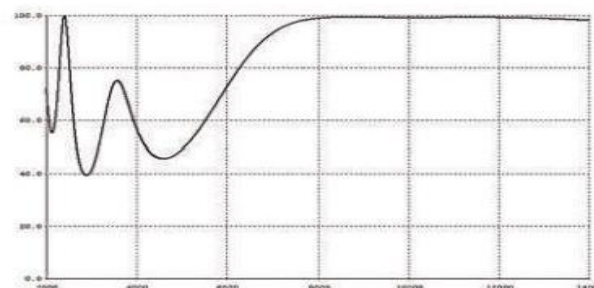
Beam Splitter Plate  
R=50%(P) @ 10.6 $\mu$ m, For ZnSe



High-Reflective Coating  
HR @ 10.6 $\mu$ m, For Si



Wideband Coating  
IBAR @ 3000-5000nm, For ZnSe



Wideband Coating  
IBAR@8000-12000nm, For ZnSe

# 10.6μm F-theta Scan Lens

The F-theta Scan Lens can provide a small focused spot size within a large field of view and minimize distortion, thereby achieving high-speed operation in applications such as marking, engraving, welding, and PCB drilling.

## Product Description and Features:

Our F-theta Scan Lens uses imported ZnSe material and is designed and produced according to the needs and characteristics of the CO2 laser marking market. The principle is to use the special dispersion properties of the material to eliminate chromatic aberration and correct aberration through the optical system, while reducing the volume and weight of the system. Aberration analysis shows that the system has excellent chromatic aberration, field curvature, and F-theta error characteristics. In particular, the output spot is small (diffraction limit) and uniform, with excellent scanning characteristics, meeting the actual needs of high-speed, high-precision laser marking machines.



Part NO.	Material	Scan Field (mm)	EFL (mm)	Full Beam Diameter (mm)	Max Input Angle (degree)	Mirror To Lens Edge (mm)	Diameter (mm)	Mirror Base Size(mm)
FT-10.6-50-75	ZnSe	50 x 50	75	14	25	25	48	Outer Diameter 90, Height 24, Installation Thread M85×1
FT-10.6-50-100	ZnSe	50 x 50	100	14	25	25	48	
FT-10.6-70-100	ZnSe	70 x 70	100	14	25	25	35/48	
FT-10.6-90-129	ZnSe	90 x 90	128	14	25	25	45	
FT-10.6-110-150	ZnSe	110 x 110	150	14	25	25	35/48	
FT-10.6-140-200	ZnSe	140 x 140	200	14	25	25	48	
FT-10.6-175-250	ZnSe	175 x 175	250	14	25	25	48	
FT-10.6-210-300	ZnSe	210 x 210	300	14	25	25	48	
FT-10.6-250-360	ZnSe	250 x 250	340	14	25	25	48	
FT-10.6-300-420	ZnSe	300 x 300	420	14	25	25	48	
FT-10.6-300-420	ZnSe	300 x 300	420	14	25	25	65	
FT-10.6-400-539	ZnSe	400 x 400	539	14	25	25	48	
FT-10.6-400-539	ZnSe	400 x 400	539	14	25	25	65	

Note: The F-Theta lens also supports wavelength of 9.3μm. The Part NO. is: FT-9.3-xxx.xxx.

# 10.6 $\mu$ m Beam Expander

Beam expanders are lens assemblies that can change the diameter and divergence of a laser beam. Use Galilean telescope (no internal focus) beam expanders to change the diameter of a high power CO<sub>2</sub> laser beam for a variety of applications. These beam expanders are available in a variety of different input beam diameter and magnification combinations.

## Features:

1. Using imported ZnSe material;
2. Galileo design, good collimation of the emitted light; small light energy loss;
3. Laser beam expansion multiples range from 1.5 to 10 times, with a full range of specifications;
4. Adjustable beam expander can improve the collimation of laser beams with divergence angles up to 19~30 milliradians;



Part NO.	Material	Magnification	Input Aperture (mm)	Out Aperture (mm)	Eyepiece Shape	O.D. x Length (mm)
BES-10.6-1.5X	ZnSe	1.5	12	23	M22×0.75	30×49
BES-10.6-1.8X	ZnSe	1.8	12	23	M22×0.75	30×44
BES-10.6-2D	ZnSe	2	10	22	M22 x 0.75	32 x (45-55)
BES-10.6-2X-1	ZnSe	2	10	10	Straight Ag M17 x 1	22 x 47
BES-10.6-2X-2	ZnSe	2	14	14	Straight M20x1/M22x0.75	22 x 37 / 25 x 37
BES-10.6-2X-3	ZnSe	2	14	14	Straight	22 x 37
BES-10.6-2X-4	ZnSe	2	12	25	Cone M20 x 1	(20-32) x 49
BES-10.6-2.5D	ZnSe	2.5	10	18	M22 x 0.75	27 x (54-62)
BES-10.6-2.5X	ZnSe	2.5	10	18	Straight M22x1/M22x0.75	27 x 55
BES-10.6-2.5D-2	ZnSe	2.5	12	23	M22×0.75	33×(55-63)
BES-10.6-2.5X-2	ZnSe	2.5	12	23	M22×0.75	30×59
BES-10.6-2.5X-H	ZnSe	2.5	20	28	M22×0.75	50×(81-88)
BES-10.6-3D	ZnSe	3	10	15	Adjustable M22 x 0.75	25 x 61
BES-10.6-3X-1	ZnSe	3	10	15	Straight M20 x 0.75	20 x 61
BES-10.6-3X-2	ZnSe	3	10	15	Straight M22 x 0.75	22 x 61 / 25 x 61
BES-10.6-3D-2	ZnSe	3	12	23	M22×0.75	33×(59-72)
BES-10.6-3X-3	ZnSe	3	12	23	M22×0.75	30×63
BES-10.6-4D	ZnSe	4	10	18	Adjustable M22 x 0.75	25 x 67
BES-10.6-4X	ZnSe	4	10	18	Straight M22 x 0.75	25 x 67
BES-10.6-5X	ZnSe	5	11	22	L&S head M22 x 0.75	(20-30) x 72
BES-10.6-5D	ZnSe	5	11	22	Adjustable M22 x 0.75	30 x 54
BES-10.6-6X	ZnSe	6	10	28	L&S head M22 x 0.75	(20-36) x 75
BES-10.6-6D	ZnSe	6	10	28	Adjustable M22 x 0.75	36 x 72
BES-10.6-8X	ZnSe	8	10	30	L&S head M22 x 0.75	(20-36) x 73
BES-10.6-8D	ZnSe	8	10	30	M22×0.75	40× (66-83)
BES-10.6-8D-H	ZnSe	8	23	30	M22×0.75	(78-88) ×50
BES-10.6-10X	ZnSe	10	10	32	M22×0.75	40×89

Note: The beam expander also supports wavelength of 9.3μm. The Part NO. is: BES-9.3-xxx.xxx.

# 10.6μm ZnSe Meniscus Focusing Lens

Excellent optical performance and economy can be achieved with ZnSe precision meniscus lenses. Meniscus lenses are the "best form" single optical element of ZnSe due to their high refractive index. They focus smaller spot sizes than plano-convex lenses but cost less than aspheric lenses because they are easier to manufacture.

## Features:

1. Using imported ZnSe material
2. Suitable for various specifications of CO2 cutting machines, engraving machines, welding machines and other equipment;
3. The focus spot pattern is smaller and rounder, meeting the requirements of fine processing;
4. Some lenses have dual-band anti-reflection of 650nm and 10.6μm.





Part NO.	Material	Diameter (mm)	EFL (mm)	ET (mm)	Coating
ZM12001862	ZnSe	12	18.6	2	AR@10.6μm
ZM16001002	ZnSe	16	100.0	2	AR@10.6μm
ZM19053812	ZnSe	19.05	38.1	2	AR@10.6μm
ZM19055082	ZnSe	19.05	50.8	2	AR@10.6μm
ZM19056352	ZnSe	19.05	63.5	2	AR@10.6μm
ZM19057622	ZnSe	19.05	76.2	2	AR@10.6μm
ZM19051012	ZnSe	19.05	101.6	2	AR@10.6μm
ZM19051272	ZnSe	19.05	127.0	2	AR@10.6μm
ZM20003812	ZnSe	20	38.1	2	AR@10.6μm
ZM20005082	ZnSe	20	50.8	2/3	AR@10.6μm
ZM20006352	ZnSe	20	63.5	2/3	AR@10.6μm
ZM20007622	ZnSe	20	76.2	2	AR@10.6μm
ZM20001002	ZnSe	20	100	2/3	AR@10.6μm
ZM20001273	ZnSe	20	127.0	3	AR@10.6μm
ZM20001503	ZnSe	20	150	3	AR@10.6μm
ZM25403813	ZnSe	25.4	38.1	3	AR@10.6μm&650nm
ZM25405083	ZnSe	25.4	50.8	2	AR@10.6μm&650nm
ZM25406353	ZnSe	25.4	63.5	3	AR@10.6μm&650nm
ZM25407633	ZnSe	25.4	76.3	3	AR@10.6μm&650nm
ZM25401273	ZnSe	25.4	127	3	AR@10.6μm&650nm
ZM25401523	ZnSe	25.4	152.8	3	AR@10.6μm&650nm
ZM27945083	ZnSe	27.94	50.8	3	AR@10.6μm&650nm
ZM27946352	ZnSe	27.94	63.5	3	AR@10.6μm&650nm
ZM27949523	ZnSe	27.94	95.25	3	AR@10.6μm&650nm
ZM27941273	ZnSe	27.94	127	2	AR@10.6μm&650nm
ZM27941353	ZnSe	27.94	135	3	AR@10.6μm&650nm
ZM27941503	ZnSe	27.94	150	3	AR@10.6μm&650nm
ZM27941903	ZnSe	27.94	190.5	3	AR@10.6μm&650nm
ZM38105023	ZnSe	38.1	50.2	3	AR@10.6μm&651nm
ZM38106352	ZnSe	38.1	63.5	2	AR@10.6μm&652nm
ZM38101278	ZnSe	38.1	127	8	AR@10.6μm&650nm
ZM38101909	ZnSe	38.1	190.5	9	AR@10.6μm&650nm
DT30 Lens Set	ZnSe	55/55			AR@10.6μm
DT50 Lens Set	ZnSe	50/70			AR@10.6μm
DT70 Lens Set	ZnSe	65/85			AR@10.6μm

# 10.6μm Reflector Mirror

Use these silicon mirrors, which combine excellent thermal stability and high reflectivity, to build cost-effective optical systems.

## 10.6μm Mirror:

1. The reflectivity is higher at 10.6μm wavelength, and the power loss is minimized
2. The film has good firmness and is resistant to scratching.

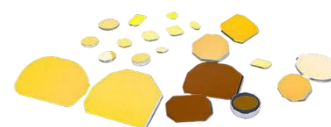


Part NO.	Matiral	Diameter (mnm)	E.T. (mm)	Coating (Reflective Film)
RS190503	Si	19.05	3	10.6μm
RS250003	Si	25	3	10.6μm
RS300003	Si	30	3	10.6μm
RS300005	Si	30	5	10.6μm
RS381005	Si	38.1	5	10.6μm



# 10.6μm Galvo Mirrors

These silicon mirrors, which combine excellent thermal stability and high reflectivity, enable cost-effective, high-performance galvo scanning systems to be built. These optics are available in a variety of sizes and shapes, with coatings optimized for any wavelength in the 1.0 to 12.0 μm range, as well as dual-wavelength coatings for reflecting infrared lasers and visible alignment beams.



Part NO.	Material	Size	Beam Size	Coating (Reflective Film)
TJ-15-12.1-1	Si	15 x 12.1 x 1	8mm-X	10.6μm
TJ-20.5-12.8-1	Si	20.5 x 12.8 x 1	8mm-Y	10.6μm
TJ-15-13-1.5	Si	15 x 13 x 1.5	8mm-X	10.6μm
TJ-20-13-1.5	Si	20 x 13 x 1.5	8mm-Y	10.6μm
TJ-16-13.2-1.5	Si	16 x 13.2 x 1.5	9mm-X	10.6μm
TJ-22-14-1.5	Si	22 x 14 x 1.5	9mm-Y	10.6μm
TJ-18-14-1.5	Si	18 x 14 x 1.5	10mm-X	10.6μm
TJ-24-16-1.5	Si	24 x 16 x 1.5	10mm-Y	10.6μm
TJ-18-14-2	Si	18 x 14 x 2	10mm-X	10.6μm
TJ-24-16- 2	Si	24 x 16 x 2	10mm-Y	10.6μm
TJ-21-16.8-2	Si	21 x 16.8 x 2	12mm-X	10.6μm
TJ-30-19-2	Si	30 x 19 x 2	12mm-Y	10.6μm
TJ-20-16.5-2	Si	20 x 16.5 x 2	12mm-X	10.6μm
TJ-30.5-18.5-2	Si	30.5 x 18.5 x 2	12mm-Y	10.6μm
TJ-35-25-2	Si	35 x 25 x 2	25mm-X	10.6μm
TJ-35-30-2	Si	35 x 30 x 2	25mm-Y	10.6μm
TJ-55-34-4	Si	55 x 34 x 4	30mm-X	10.6μm
TJ-63-43-4	Si	63 x 43 x 4	30mm-Y	10.6μm
TJ-54-34.5-3.5	Si	54 x 34.5 x 3.5	30mm-X	10.6μm
TJ-61.5-43-3.5	Si	61.5 x 43 x 3.5	30mm-Y	10.6μm
TJ-72-45.5-4	Si	72 x 45.5 x 4	40mm-X	10.6μm
TJ-86-60-4	Si	86 x 60 x 4	40mm-Y	10.6μm
TJ-68-43-4	Si	68 x 43 x 4	40mm-X	10.6μm
TJ-79-53-3.5	Si	79 x 53 x 3.5	40mm-Y	10.6μm
TJ-88-60-4.5	Si	88 x 60 x 4.5	50mm-X	10.6μm
TJ-106-76.5-4.5	Si	106 x 76.5 x 4.5	50mm-Y	10.6μm
TJ-91-57.4-5	Si	91 x 57.4 x 5	50mm-X	10.6μm
TJ-113.8-70.5-4.5	Si	113.8 x 70.5 x 4.5	50mm-Y	10.6μm
TJ-91-57.4-6	Si	91 x 57.4 x 6	50mm-X	10.6μm
TJ-107-79-4.5	Si	107 x 79 x 4.5	50mm-Y	10.6μm
TJ-130-76-7	Si	130 x 76 x 7	70mm-X	10.6μm
TJ-136-106-5.5	Si	136 x 106 x 5.5	70mm-Y	10.6μm

## 10.6μm ZnSe Windows

These flat windows, made of imported ZnSe material, protect valuable scanning lenses and focusing optics in industrial laser systems from debris, backslash and other workplace hazards. These windows can be integrated directly into scanning lenses or focusing assemblies, or used separately.



Part NO.	Material	Diameter (mm)	E.T. (mm)	Coating
WZ211903	ZnSe	19.05	3	AR@10.6μm
WZ212003	ZnSe	20	3	AR@10.6μm
WZ212503	ZnSe	25	3	AR@10.6μm
WZ212543	ZnSe	25.4	3	AR@10.6μm
WZ213813	ZnSe	38.1	3	AR@10.6μm
WZ215083	ZnSe	50.8	3	AR@10.6μm
WZ218060	ZnSe	80×60	3.5	AR@10.6um
WZ2110670	ZnSe	106×70	3.5	AR@10.6um
WZ21135102	ZnSe	135×102	3.5	AR@10.6um

## 10.6μm Beam Combiner

Made of imported ZnSe material, these optical components precisely introduce CO<sub>2</sub> lasers into the optical path along with other infrared laser beams, thus simplifying the process of aligning infrared optical systems.



Part NO.	Material	Diameter (mm)	E.T. (mm)	Coating
BZ221915	ZnSe	19.05	1.5	AR@10.6μm&650μm
BZ222015	ZnSe	20	1.5	AR@10.6μm&650μm
BZ222253	ZnSe	25.4	3	AR@10.6μm&650μm
BZ228060	ZnSe	80×60	3.5	AR@10.6μm&650μm