



Beijing EFR Laser S&T Co., Ltd.



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EFR Laser sincerely looks forward to working  
with you to develop together!

The manufacturing base of EFR brand has obtained nearly 30  
domestic carbon dioxide laser technology patent certificates, and  
successfully registered a number of domestic trademarks.



**2019**

Implemented TUV Field Certification Audit



Passed the CE Certification

**2016**

The product has passed the US FDA registration

**2020**

**Continuously Innovating New Technology  
and Uncompromising Quality**





## Company Introduction

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Beijing EFR Laser S&T Co., Ltd. is a modern enterprise specializing in the research, development and sales of carbon dioxide lasers and series of products. We are committed to the research and experiment of carbon dioxide lasers for 20 years, with a research team that has mastered the industry's leading technology, the company has a research and development center and manufacturing base in Beijing.

The manufacturing base of EFR brand, equipped with a group of exquisite technicians, is a national high-tech enterprise and a national specialized special new enterprise, and has obtained nearly 30 carbon dioxide laser technology patent certificates in China.

EFR brand laser tube has the characteristics of small size, good spot pattern, fast cutting speed and high stability. EFR brand products enjoy a good reputation and high customer recognition in the global market, products have been exported to more than 100 countries and regions around the world.

EFR brand, attaches great importance to after-sales service work. Good and thoughtful service is as important as excellent products.

EFR brand, looking forward to working with more quality partners!

# CL SERIES



# CL SERIES

## CO<sub>2</sub> Laser Tube

### Product Parameters

Model	Length (mm)	Diameter (mm)	Output Power (W)	Peak Power (W)	Warranty Period (day)	Catalyst
700CL	700±20	Φ50±2	35	40	360	Yes
800CL	800±20	Φ50±2	40	50		
1000CL	1000±20	Φ50±2	50	60		
1200CL	1200±20	Φ55±2	60	70		
1600CL	1600±20	Φ60±2	80	95		

- ① It is our classic product, with excellent spot, fast response, long life, and stable output power.
- ② The unique metal coating on the electrode surface effectively avoid electromagnetic sputtering and lens contamination.
- ③ The product performance is stable using a high-end optical lens made by the American II-VI Company.
- ④ It is highly recognized as a star product and is widely used in laser inscription, engraving, laser marking, carving, and precision small fonts.



## E SERIES



# E SERIES

## CO<sub>2</sub> Laser Tube

### Product Parameters

Model	Length (mm)	Diameter (mm)	Output Power (W)	Peak Power (W)	Warranty period (day)	Catalyst
E1	1100±20	Φ65±2	75	90	360	Yes
E2	1250±20	Φ65±2	90	100		
E4	1400±20	Φ65±2	100	130		
E6	1650±20	Φ65±2	130	160		
E7	1750±20	Φ65±2	140	170		

- ① Metal and glass sealing technology, high structural stability, non-tunable optical resonator consistency is better;
- ② Made in II-VI Singapore factory with global optical coating standard, the output is more stable.
- ③ Germany SCHOTT core vacuum discharge tube, high-durability nano-material catalyst coating, meager sputtering rate and diffraction rate, and highly stable working response without fluctuation.
- ④ The laser beam has a high taper, smooth taper curve, and more concentrated energy; the laser beam mode can reach the quasi-TEM<sub>00</sub> mode, and the cutting speed is faster.
- ⑤ The product has a small size, high building accuracy, advanced processing, high material configuration, and is exceptionally cost-effective.



## F SERIES



# F SERIES

## CO<sub>2</sub> Laser Tube

### Product Parameters

Model	Length (mm)	Diameter (mm)	Output Power (W)	Peak Power (W)	Warranty Period (day)	Catalyst
F2	1250±20	Φ80±2	80	95	360	Yes
F4	1450±20	Φ80±2	100	120		
F6	1670±20	Φ80±2	130	150		
F7	1700±20	Φ80±2	140	160		
F8	1850±20	Φ80±2	150	170		
F10	2050±20	Φ80±2	170	190		

- ① It is the most selling product in the last ten years. It has high power, good beam quality, and a long working life.
- ② The imported Germany discharge tube, vacuum evaporation catalyst, higher power, longer life.
- ③ The lens cold water jacket is made of integrated forming high-density polyethylene HDPE material, which has the characteristics of lightweight, anti-breakdown and anti-collision.
- ④ High-precision CNC machining center processed electrode and radiator with good consistency.



## X SERIES



# X SERIES CO<sub>2</sub> Laser Tube

## Product Parameters

Model	Length (mm)	Diameter (mm)	Output Power (W)	Peak Power (W)	Warranty Period (day)	Catalyst
X1	1100±20	Φ80±2	75	90	540	Yes
X2	1250±20	Φ80±2	90	100		
X4	1400±20	Φ80±2	100	130		
X6	1650±20	Φ80±2	130	160	360	
X8	1850±20	Φ90±2	150	180		

① The non-adjustable resonator+ Glass to Metal Seals technology provides a theoretical 36-month working life.

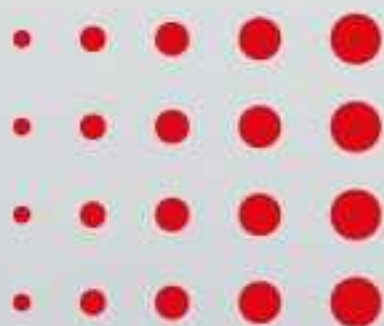
② The cavity mirror & windows are designed by EFR laser and produced in the II-VI Singapore factory with the highest optical standard.

③ Manufacture new industrial-grade and more stable laser tubes and provide global users with sincere electronic product experience and innovative application solutions.

④ Optical grade processing center to ensure the consistency and stability of the optical resonant cavity.

⑤ Use an imported spot analyzer and an American Coherent power meter to create high quality products.

# A SERIES



# A SERIES

## CO<sub>2</sub> Laser Tube

### Product Parameters

Model	Length (mm)	Diameter (mm)	Output Power (W)	Peak Power (W)	Warranty Period (day)	Catalyst
A1	1100±20	Φ80±2	70	85	540	Yes
A2	1250±20	Φ80±2	80	90		
A4	1400±20	Φ80±2	90	110		
A6	1650±20	Φ80±2	120	140	360	

① The non-adjustable resonator+Glass to Metal Seals technology provides a theoretical 36 months working life.

② The upgraded cavity mirror & windows provide good beam quality, which is very close to TEM00.

③ With excellent beam quality, small beam size, and fast response, it is widely used for the laser marking machine.

④ A cap is installed on the laser tube output windows to protect the windows from dust and smoke in various workshops.



**F 300**



# F SERIES

## CO<sub>2</sub> Laser Tube

### Product Parameters

Model	Size (mm)	Output Power (W)	Peak Power (W)	Warranty Period (day)	Catalyst
F300	1740±20×200×116	260	300	360	Yes
F300-I	1780×260×160	260	300		
F450	1760±20×285×116	400	450		
F450-I	1800×345×160	400	450		

① Single-tube and multi-tube output can be switched at will, and the output power can be adjusted arbitrarily within the range of 50W to rated power;

② Configure a dedicated power supply and adjust the actual output power (dedicated power supply and conventional power supply are used together).

③ The optimal design of the U-shaped structure resonator makes the beam more concentrated and efficient and results in a stable output of high power efficiency.

④ The United States II-VI full reflector and output mirror, independently developed water cooling system of laser lens, not only makes the product efficient and stable output power, but also the power fluctuation is small, significantly improve the cutting thickness and cutting speed of metal and non-metal materials;

⑤ Strict quality process control: using imported spot analyzer and imported power meter, each laser tube has high power, good spot quality, and achieves quasi-TEM00 basic mode.



## ENHANCED LASER TUBE

CO<sub>2</sub> Laser Tube



### F300-I

- ① PVC material shell: high-pressure resistance, aging resistance, non-flammable, high strength, stable structure, high hardness, good formability, suitable for various industrial environments.
- ② Visual window for working status, maintenance-free, convenient, and efficient.
- ③ Equipped with a dedicated high-voltage fast plug: high-voltage resistance, insulating materials, good contact, and easy to use.



**X 300**



# X SERIES

## CO<sub>2</sub> Laser Tube

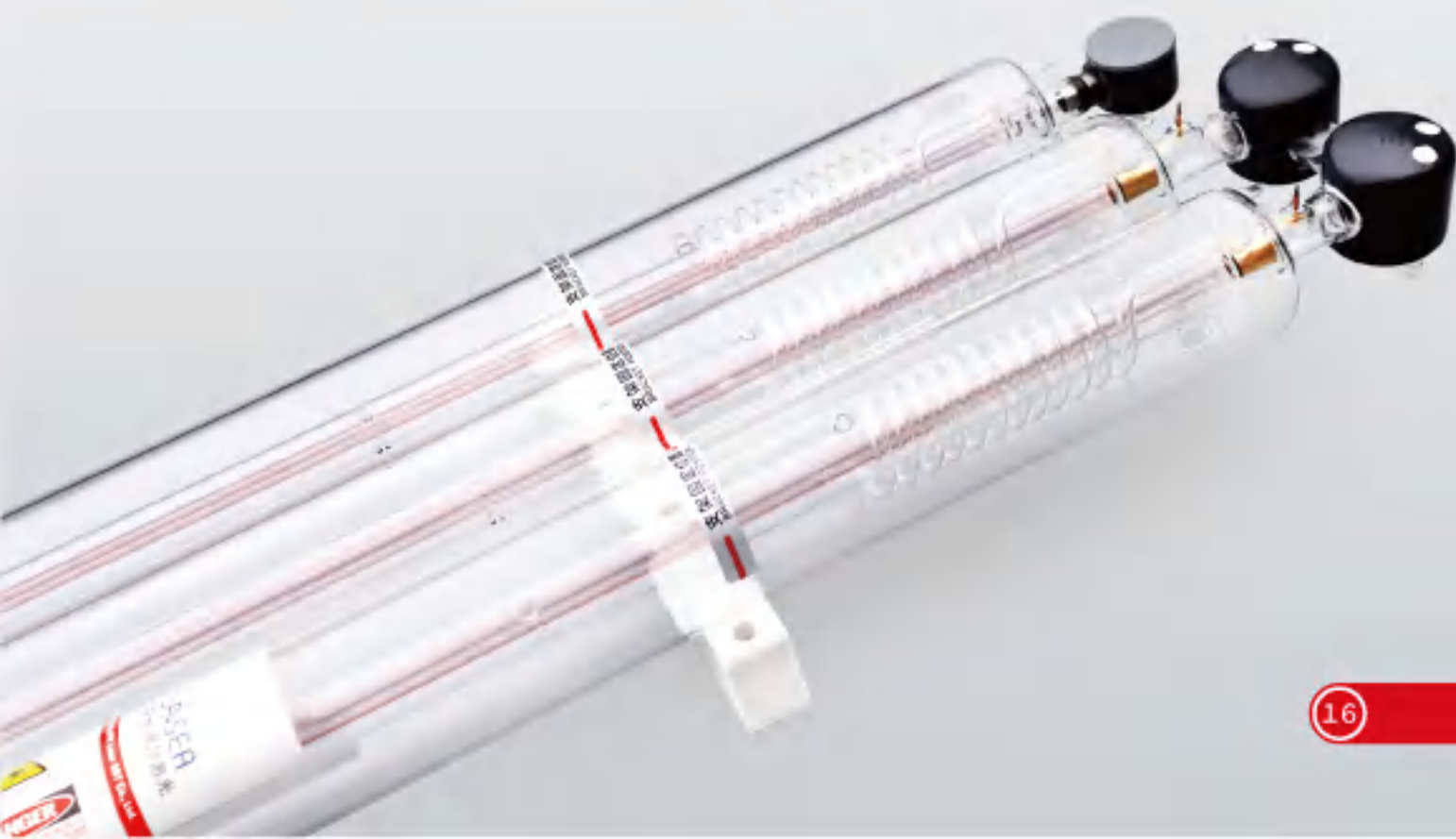
### Product Parameters

Model	Size (mm)	Output Power (W)	Peak Power (W)	Warranty Period (day)	Catalyst
X300	1760±20×200×116	260	300	360	Yes
X300-I	1780×260×160	260	300		
X450	1760±20×285×116	400	450		
X450-I	1800×345×160	400	450		

- ① Single-tube and multi-tube output can be switched at will, and the output power can be adjusted arbitrarily within the range of 50W to rated power.
- ② Configure a dedicated power supply and adjust the actual output power (dedicated power supply and conventional power supply are used together).
- ③ The laser cavity lens is designed by our company and produced by II-VI Singapore factory in accordance with global optical standards. The water-cooling system of laser lens is independently developed, which not only has high efficiency and stable output power, but also has low power fluctuation, significantly improving the cutting thickness and cutting speed of metal and non-metal materials.
- ④ The optimized design of U-shaped resonator makes the beam more concentrated and efficient, stable output high power efficiency.
- ⑤ The metal and glass sealing technology solves the problem of the output mode change caused by the deformation of the resonant cavity of the carbon dioxide laser, and the product has high stability, which greatly improves the use value of the supporting products.



**X 450**





# X300-I

## ENHANCED LASER TUBE

### CO<sub>2</sub> Laser Tube

- ① PVC material shell: high-pressure resistance, aging resistance, non-flammable, high strength, stable structure, high hardness, good formability, suitable for various industrial environments;
- ② Visual window for working status, maintenance-free, convenient, and efficient;
- ③ Equipped with a dedicated high-voltage fast plug: high-voltage resistance, insulating materials, good contact, and easy to use;

## Application Field

Thin metal cutting



Acrylic cutting & engraving



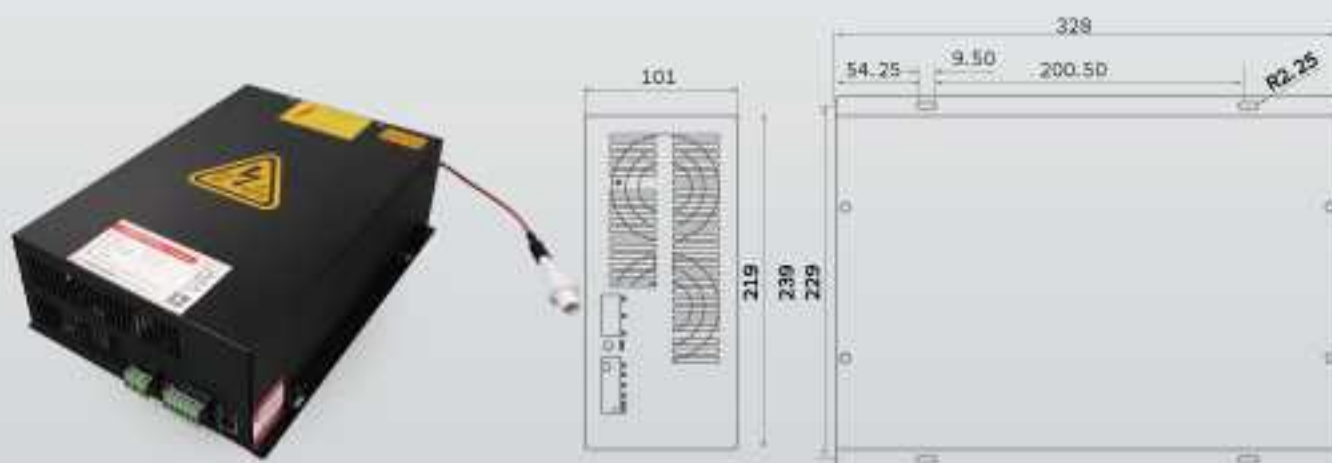
Laser engraving



Die board cutting



# PS -100/150A



## Product Parameters

Model	PS-100/150A
Input Voltage	AC90-264V
AC Frequency	47--63Hz
Max Input Power	950W
Max Input Current	9A
Max Output Voltage	55kV
Max Output Current	35mA
Efficiency	≥90% (at full load)
MTBF(mean time between failure)	≥10000 hours
Response Speed	≤1mS (the time from when the switch signal is given to when the output current rises to 90% of the set current)
Withstand Voltage	Input-laser tube:AC1500V 10mA 60s;output negative electrode is connected to the laser tube
Control Interface	TTL level switch control, the effective level can be selected as high or low (see the description of the control terminal for details)
Working Environment	Working temperature (-10~40) °C, relative humidity: ≤90%
Cooling	Forced air cooling
Dimension L*W*H(mm)	L×W×H=325*240*97 (mm)
Weight (KG)	4.6kg
Color	black

### Product Features:

- ☆ Targeted design: Special power supply for 200W-800W high-power CO<sub>2</sub> laser tube.
- ☆ With voltage stabilization function: with active PFC function, to meet the global universal input voltage range (AC90-264V, 47/63Hz).
- ☆ Stronger power: In the entire input voltage range, the maximum current of 35mA is guaranteed to be constant.
- ☆ Outputs positive and negative high voltage suspension to the ground: can be used for positive high voltage output or negative high voltage output, easy to adapt to multi-tube folding applications.
- ☆ High safety of laser equipment: With an open circuit protection function, it is safer to use and significantly prolongs the life of the power supply.
- ☆ The laser power control is simple: it can be controlled by 0-5V analog signal, and can also be controlled by 5V PWM signal.
- ☆ Equipped with manual light emission test button: convenient to test the laser tube and power supply and easy to maintain.

# PS-N



## POWER SUPPLY

The metal enclosure meets industrial product standards.

It is aesthetically pleasing, rugged, and durable, with excellent heat dissipation.



## Product Parameters

ITEM	PS-N80	PS-N100	PS-N150
Input Voltage	AC90-250V		
AC Frequency	47-63Hz		
Max Input Power	600W	650W	900W
Max Input Current (90V input)	5.5A	6A	8A
Max Output Voltage	40kV	45kV	55kV
Max Output Current	28mA	32mA	38mA
Efficiency	≥90% (Full load)		
MTBF(Mean time between failure)	≥10000 Hours		
Response Speed	≤1ms (The time from the signal is given to output current reaches 90% of set current)		
Withstand Voltage	input-output input-shell AC1500V 10mA 60s;		
Working Environment	Temperature: (-10~40) °C, Relative Humidity:≤90%		
Cooling	Force Air cooling		
Matching Laser Tube Power	50-80W	80-120W	130-180W
Dimension L*W*H(mm)	235*144*104	278*144*104	330*144*104
Weight (KG)	2.15kg	2.45kg	3.2kg
Color	Silver		

☆ Better adaptability: built-in active PFC circuit to achieve higher power factor and meet the global universal input voltage range (AC90-250V, 47/63Hz), effectively resist the influence of significant changes in grid voltage on the output current.

☆ More powerful power: In the entire input voltage range, the maximum current is guaranteed to be constant.

☆ Adopting metal shell that meets industrial product standards, is beautiful, durable, and has excellent heat dissipation performance.

☆ Equipped with LCD: digital display of the current size; light indicator, light signal, water protection signal can indicate standard and faulty signals; integrated potentiometer can manually adjust the current.

☆ The laser power control is simple: It can be controlled by 0-5V analog signal or 5V PWM signal.

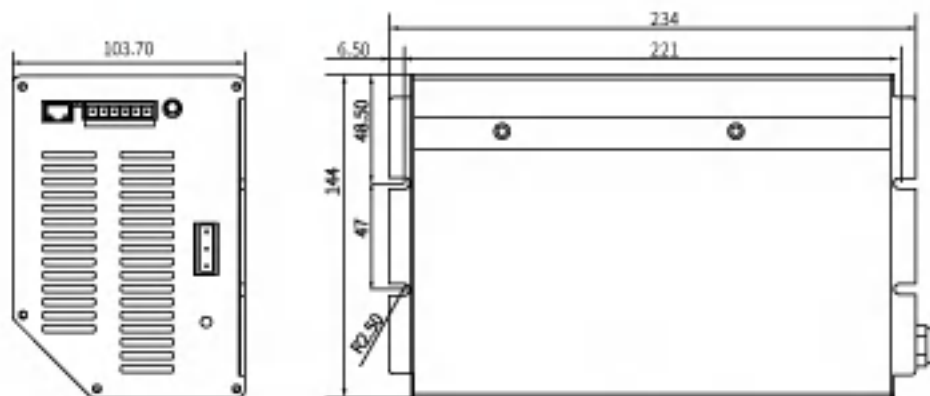
☆ Safer to use: It has an open circuit protection function, which significantly improves the life of the power supply and laser.

☆ More stable performance: Newly developed improved current control mode, more stable light, better compatibility;

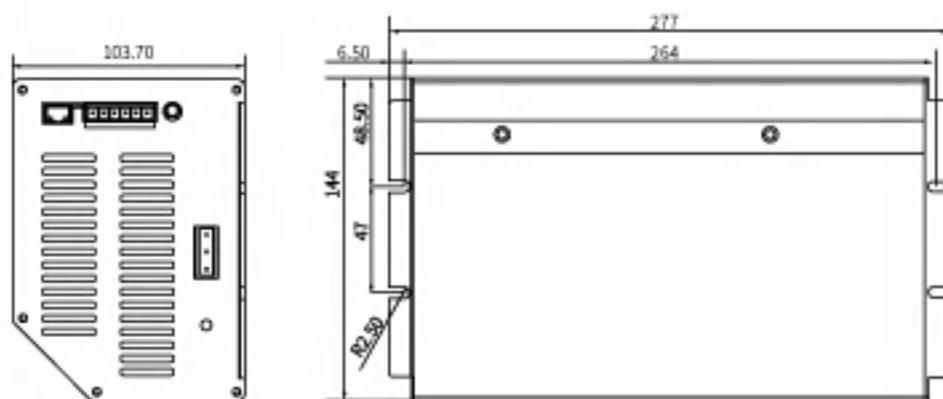
☆ Good compatibility: It can match most of the 50W-150W CO<sub>2</sub> lasers at home and abroad.

☆ Equipped with manual light emission test button: convenient to test the laser tube and power supply and easy to maintain.

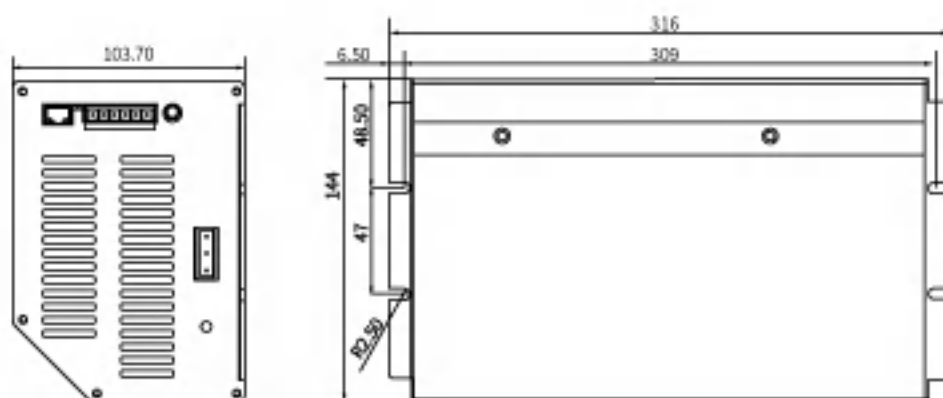
# POWER SUPPLY



PS-N80



PS-N100



PS-N150

# LENS



**II-VI**

All lenses are from II-VI America

# FOCUSING LENS

## ZnSe Laser Focusing Lens

### Product Parameters



Designed Wavelength	10.6 $\mu$ m
Focus Length Tolerance	$\pm 1\%$
Appearance Tolerance	0/-0.1mm
Thickness Tolerance	$\pm 0.1$ mm
Finish	20-10
Eccentric	<3
Effective Aperture	>90%
Chamfer	<0.2 $\times$ 45°
Coating Film	10.6 $\mu$ m (AR-coating)

① ZnSe is made by CVD imported from the United States; the material absorption rate is low, the lens can withstand high power density, and the surface film is firm, not easy to fall off, and resistant to wiping.

② Imported zinc selenide is coated with anti-reflection coating on both sides so that the transmittance is close to 99.5% at 10.6  $\mu$ m, which is commonly used in the CO<sub>2</sub> laser industry.

③ The diffraction and aberration angles are optimized to make the actual focusing spot diameter smaller under the same focal length.

④ We can also individually design lenses according to the different requirements of users on focal length, back focal length, lens aperture, and incident light diameter.

# REFLECTOR

## Si Dielectric Film Mirror

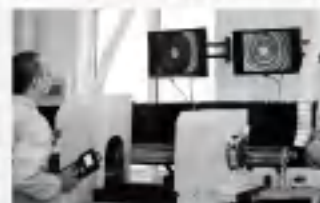
### Product Parameters



Appearance Tolerance	0/-0.1mm
Thickness Tolerance	±0.1mm
Finish	S1:40-20, S2: (Finish grinding)
Parallel Degree	<1'
Effective Aperture	>90%
Chamfer	<0.2×45°
Coating Film	(Coating high anti-membrane)

- ① Si mirror is currently the most used mirror, with good optical and thermal properties.
- ② The film total reflection mirror is a new type of total reflection mirror that uses Si single crystal as the bottom of the village and is coated with dielectric materials to reflect the CO<sub>2</sub> laser.
- ③ It has the advantages of high reflectivity, lightweight, scratch resistance, and strong oxidation resistance.





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