

- 1 Sub-D
- 2 CM + DIL F/T
- 3 Coax F/T
- 4 Power High Voltage
- 5 Thermo-couple
- 6 Cables Accessories
- 7 Viewports Fiberoptic
- 8 Valves
- 9 Motion Manipulation
- 10 Process Control
- 11 CF Hardware
- 12 KF Hardware
- 13 ISO-K Hardware
- 14 Adaptors Specials
- 15 HV / UHV Chambers
- 16 Atlas Bi-Metal

## Viewports

In this section hermetically sealed optical components are listed, which are typically used for visual or broad band energy transmission into and out of vacuum systems. The usable part of the spectra is defined by the optics material. For visible access, standard Boro-Silicate glass is used.

Quartz (or better Fused Silica) enlarges the transmission to the UV and near IR range. Fused Silica is synthetically made Quartz; this is a very pure material with minimal inclusions or bubbles. Various qualities are offered.

Other materials including Sapphire, Calcium-Fluoride and Magnesium-Fluoride are offered as well for special applications.

Single and Multi-layer coatings can be added to viewports to optimize transmission performance. All viewports are suitable for UHV or HV applications.

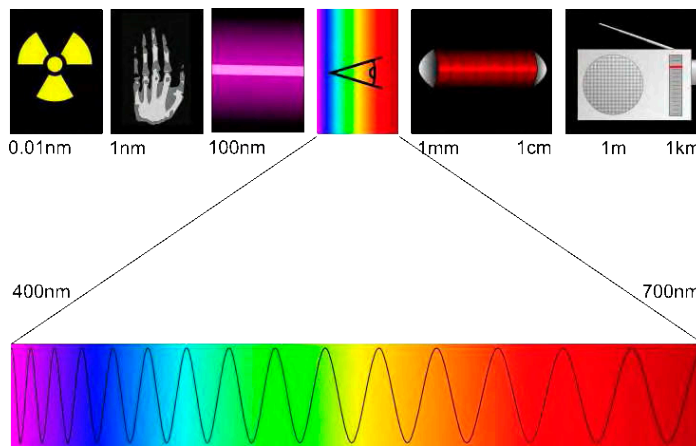
## Polishing Quality

The quality of polishing is normally given by two numbers called scratch-dig. The first one refers to the max. width of a scratch in  $\mu\text{m}$ , the second gives the diameter of digs or bubble defects in  $10\mu\text{m}$ .

So a typical polish of 40-20 refers to a maximum scratch width of 0.04mm and a maximum dig diameter of 0.2mm. Two digs must be separated by minimum 20mm from each other

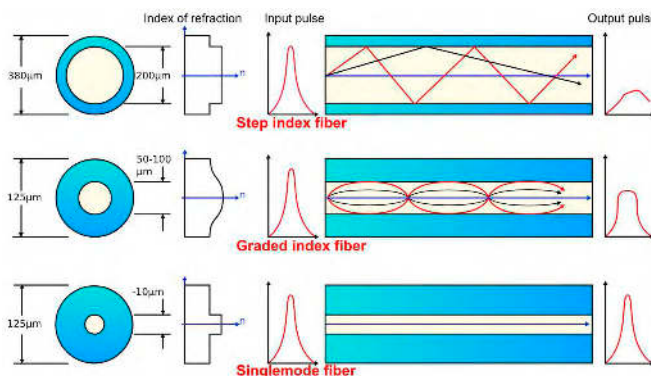
## Fibreoptic

For an increasing number of applications, Optical Fibres are used in vacuum either to get signals out or to bring "light" to the right point into the chamber. A variety of feedthrough types as well as fibres enable the right component to be found.



Spectra of electromagnetic rays. The visible range from about 400nm to 700nm is shown in detail.

Allectra offers materials from the X-Ray region to the infra-red (IR).



The 3 different types of Optical Fibres:

The Step Index Fibres are the thickest Fibres used. They are used for illumination or heat transfer by light and applications such as Spectroscopy. These Fibres have an Outside Diameter of 400 or 600 microns.

The Graded Index Fibres are typically data fibers. They have the advantage that the signal is kept sharper.

The best signal fibers are the Single Mode types. By having a very small diameter (6-9  $\mu\text{m}$ ), which is much smaller than the wavelength of the light, there is only one optical path available and the signal keeps its shape.

Both Graded Index and Single Mode have an Outside Diameter of 125 microns.

Allectra offers Feedthroughs and components with all three types.

## Viewports and Fibre Optics for HV and UHV



### 7.1 STANDARD SERIES GLASS VIEWPORTS

-> Page 7.3

Standard Glass Viewports for UHV and HV  
 Standard Glass Viewports, O-Ring Sealed ISO-K types  
 Standard Glass Viewports with Broad Band Anti-Reflective coating



### 7.2 SAPPHIRE VIEWPORTS

-> Page 7.4

- UV GRADE Sapphire Viewports
- DUV GRADE Sapphire Viewports
- REGULAR GRADE Sapphire Viewports
- Large versions up to 137mm View Diameter
- High Vacuum Versions



### 7.3 FUSED SILICA (QUARTZ) VIEWPORTS

-> Page 7.5

Fused Silica Viewports UV grade  
 Fused Silica Viewports DUV grade  
 Fused Silica Viewports EXCIMER grade



### 7.4 BBAR COATED VIEWPORTS

-> Page 7.7

Broad Band Anti-Reflection coated Quartz  
 DUV Base material  
 40CF and 63CF sizes



### 7.5 LASER VIEWPORTS

-> Page 7.8

Laser Viewports with AR coating  
 40CF and 63CF sizes



### 7.6 NON-MAGNETIC AND CRYSTAL QUARTZ

-> Page 7.9

Non-magnetic Fused Silica Viewports  
 UV and DUV Quality  
 Crystal Quartz Viewports

### 7.7 SPECIAL MATERIALS VIEWPORTS

-> Page 7.10

Calcium-Fluoride/ Magnesium Fluoride/ Zinc Selenide  
 BBAR Coated Zinc Selenide

### 7.7 SPECIAL PURPOSE VIEWPORTS

-> Page 7.11

Re-Entrant Windows  
 Differentially pumped Geo-Chronology Zinc Selenide  
 X-Ray Beryllium Viewports

### 7.8 VIEWPORT ACCESSORIES

-> Page 7.12

Viewport Shutter  
 Lead Glass Radiation Protection Screen  
 External Viewport Door for Radiation Protection

### 8.0 FIBRE OPTICS (SUBSECTION)

-> Page 8.1- 8.5

High Vacuum Fibre Optic Feedthroughs O-Ring sealed  
 UHV Fibre Optic All Metal sealed Feedthroughs  
 Fibre Optic Cables for UHV and High Vacuum

- 1 Sub-D
- 2 CM + DIL F/T
- 3 Coax F/T
- 4 Power High Voltage
- 5 Thermo-couple
- 6 Cables Accessories
- 7 Viewports Fiberoptic
- 8 Valves
- 9 Motion Manipulation
- 10 Process Control
- 11 CF Hardware
- 12 KF Hardware
- 13 ISO-K Hardware
- 14 Adaptors Specials
- 15 HV / UHV Chambers
- 16 Atlas Bi-Metal

## Standard Series Glass Viewports

Standard Glass Viewports are available on CF, KF and ISO-K Flanges. The glass material is Kodial (Boro-Silicate glass). These viewports are for normal visible light. For more demanding applications, Fused Silica (Quartz) is recommended.



### Specification Standard Series Viewports

Vacuum	UHV	
Material	Glass	Kodial
	Transition	Kovar
	Flange	SS grade 304
Bakeable	400°C (CF) / 150°C (KF)	
Max. Gradient	5°C/ min	
Transmission	ca. 300 - 2500 nm	
Annealed gaskets or Allectra W type gaskets should be used for CF types.		

### Metal sealed Glass Viewports UHV

FLANGE	VIEW DIAM.	PART NUMBER
16CF	16	120-VPG-C16
40CF	38	120-VPG-C40
63CF	63	120-VPG-C63
100CF	90	120-VPG-C100
160CF	135	120-VPG-C160
200CF	135	120-VPG-C200

### Metal sealed Glass Viewports High Vacuum KF Types

FLANGE	VIEW DIAM.	PART NUMBER
16KF	16	120-VPG-K16
25KF	16	120-VPG-K25
40KF	32	120-VPG-K40
50KF	32	120-VPG-K50



### Specification O-Ring Sealed ISO-K Viewports

Material	S/S holder
	Viton O-Ring
	Kodial glass

The O-Ring sealed viewports are an alternative to the metal sealed types. One O-Ring is used to seal the flange as well as the viewport. A significantly enlarged view diameter is obtained.

### O-Ring sealed Glass Viewports ISO-K Types

FLANGE	VIEW DIAM.	PART NUMBER
63 ISO	72	120-VPGO-ISO63
100 ISO	104	120-VPGO-ISO100
160 ISO	152	120-VPGO-ISO160
200 ISO	210	120-VPGO-ISO200

### Specification Anti-Reflective (BBAR) coating

Vacuum	UHV
Temperature	400°C
Coating	multi-layer coating
Transmission	typ. >99.5% in the visible range
Surface quality	60/40 scratch/dig

### Standard Series Glass Viewports with Broad Band Anti-Reflective coating

FLANGE	VIEW DIAM.	PART NUMBER
16CF	16	120-VPG-C16-BBAR
40CF	38	120-VPG-C40-BBAR
63CF	63	120-VPG-C63-BBAR

Sapphire Viewports

Sapphire has high transmission over wavelengths from 180nm up to 5500nm. It is a very rigid material with high bakeout temperatures. This makes Sapphire an ideal material for a lot of demanding applications.

- Three qualities are available: Regular Grade, UV and DUV
- Sizes up to 136mm View Ø
- Broad band or single band Coated versions available on request



General Specification UHV Sapphire Viewports

Vacuum UHV  
 Material Sapphire,  
 90° Orientation  
 Bakeable 400°C (CF Flange)  
 Max. Gradient 5°C/min  
 These Viewports should be installed with annealed copper gaskets.

Specification UV Grade Sapphire Viewports

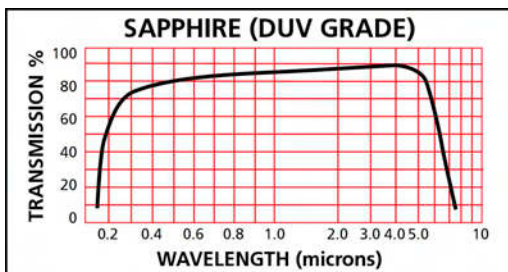
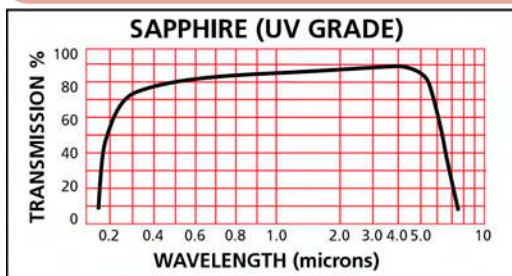
Parallelism < 3 arc min  
 Surface finish 50-20 Scratch-Dig  
 Transmission ~ 180 – 5500nm  
 >50% at 250nm

Specification DUV Grade Sapphire Viewports

Parallelism < 3 arc min  
 Surface finish 20-10 Scratch-Dig  
 Transmission ~ 180 – 5500nm  
 >70% at 250nm

Specification Regular Grade Sapphire Viewports

Parallelism not specified  
 Surface finish 60-40 Scratch-Dig  
 Transmission ~ 250 – 5500nm



UV GRADE Sapphire Viewports  
 UHV - no coating

FLANGE	VIEW Ø	THICKN.	PART NUMBER
16CF	15	1.6	130-VPS-C16-15
40CF	24	2.0	130-VPS-C40-24
40CF	36	2.0	130-VPS-C40-36
63CF	49	2.4	130-VPS-C63-49

Note: also available on KF flanges or as weld adaptors

DUV GRADE Sapphire Viewports  
 UHV - no coating

FLANGE	VIEW Ø	THICKN.	PART NUMBER
40CF	17.5	2.0	130-VPSDUV-C40-17
40CF	23.8	2.0	130-VPSDUV-C40-24
63CF	36	2.0	130-VPSDUV-C63-36
63CF	49	2.4	130-VPSDUV-C63-49

Note: also available as weld adaptors

Regular Grade Sapphire Viewports  
 UHV - no coating

FLANGE	VIEW Ø	THICKN.	PART NUMBER
16CF	16	1.5	131-VPS-C16-16
40CF	32	1.5	131-VPS-C40-32
40CF	38	1.5	131-VPS-C40-40
63CF	63	2.0	131-VPS-C63-63
100CF	89	3.0	131-VPS-C100-89
160CF	136	4.0	131-VPS-C160-136

non-magnetic versions are available on request

Regular Grade Sapphire Viewports  
 HIGH VACUUM - no coating

FLANGE	VIEW Ø	THICKN.	PART NUMBER
25 KF	20	1.5	131-VPS-K25-20
40 KF	38	1.5	131-VPS-K40-38
50 KF	38	1.5	131-VPS-K50-38
100 ISO-K	63	2.0	131-VPS-ISO100-63

Note: also available with BBAR or VAR coating

- 1 Sub-D
- 2 CM + DIL F/T
- 3 Coax F/T
- 4 Power High Voltage
- 5 Thermo-couple
- 6 Cables Accessories
- 7 Viewports Fiberoptic
- 8 Valves
- 9 Motion Manipulation
- 10 Process Control
- 11 CF Hardware
- 12 KF Hardware
- 13 ISO-K Hardware
- 14 Adaptors Specials
- 15 HV / UHV Chambers
- 16 Atlas Bi-Metal

- 1 Sub-D
- 2 CM + DIL F/T
- 3 Coax F/T
- 4 Power High Voltage
- 5 Thermo-couple
- 6 Cables Accessories
- 7 Viewports Fiberoptic
- 8 Valves
- 9 Motion Manipulation
- 10 Process Control
- 11 CF Hardware
- 12 KF Hardware
- 13 ISO-K Hardware
- 14 Adaptors Specials
- 15 HV / UHV Chambers
- 16 Atlas Bi-Metal

## Fused Silica (Quartz) Viewports

Fused Silica is an isotropic material with no crystal orientation. It has an almost flat transmission curve from UV to near IR with more than 90% transmission in the visible range.

Three qualities are offered:

- UV grade - 200nm to 2 $\mu$ m
- DUV grade - 200nm to 2 $\mu$ m- high purity
- EXCIMER grade 185nm to 2.2 $\mu$ m



### General Specification Fused Silica Viewports

Vacuum	UHV
Leak rate	<2x 10 <sup>-10</sup> mbar l /s
Temperature	-100 ... 200°C
Gradient	<5K/min
Transmission	>90% in visible range

### Specification UV Grade Fused Silica

Parallelism	<30 arc sec
Surface Finish	40-20 scratch/dig
Transmission	>90% @ 250nm
Usable range	200 ... 2000nm
Inclusions	max. 0.25mm <sup>2</sup> /100cm <sup>3</sup> (class 2)
Isotropy	2D Material
Homogeneity	Grade F

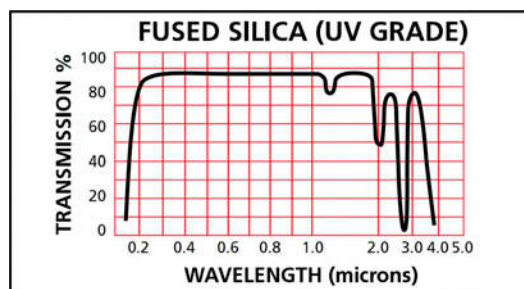
### Specification DUV Grade Fused Silica

Parallelism	<10 arc sec
Surface Finish	20-10 scratch/dig
Flatness	$\lambda/4$ @ 632nm
Transmission	>99,8% @ 248nm (internal)
Usable range	200 ... 2000nm
Inclusions	max. 0.03mm <sup>2</sup> /100cm <sup>3</sup> (class 0)
Isotropy	3D Material
Homogeneity	Grade A

Fused Silica (Quartz) Thickness:			
16CF	2.5mm	40CF	3.3mm
63CF	6.4mm	100CF	6.4mm
160CF	9.4mm	200CF	6.4mm

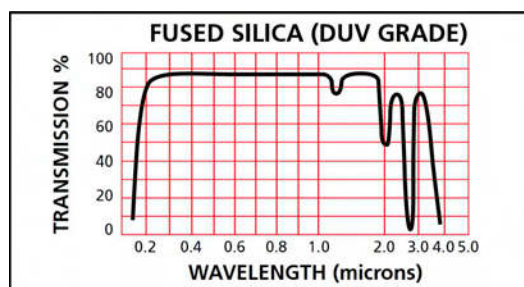
### Fused Silica (Quartz) Viewports UV grade UHV 0.2 to 2 microns - NO coating

FLANGE	VIEW DIAM.	PART NUMBER
16CF	16	110-VPQZ-C16-UV
40CF	35	110-VPQZ-C40-UV
63CF	68	110-VPQZ-C63-UV
100CF	98	110-VPQZ-C100-UV
160CF	137	110-VPQZ-C160-UV
200CF	198	110-VPQZ-C200-UV



### Fused Silica (Quartz) Viewports DUV grade UHV 0.2 to 2 microns - NO coating

FLANGE	VIEW DIAM.	PART NUMBER
16CF	16	110-VPQZ-C16-DUV
40CF	35	110-VPQZ-C40-DUV
63CF	68	110-VPQZ-C63-DUV
100CF	98	110-VPQZ-C100-DUV
160CF	137	110-VPQZ-C160-DUV
200CF	198	110-VPQZ-C200-DUV



Coated Quartz Viewports are available: See pages 7.7 and 7.8 for details of broad band coatings and single line coatings for laser applications.

## Excimer Grade Quartz Viewports

Designed for use with ArF based Excimer lasers (193nm) a high quality Fused Silica (Quartz) material is offered, which gives an internal transmission at this wavelength of more than 99.5%. These windows can also be used for other demanding applications in the UV region.

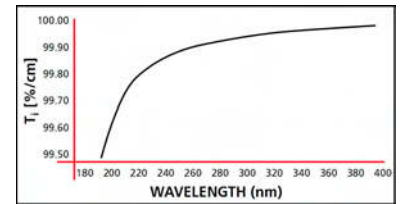
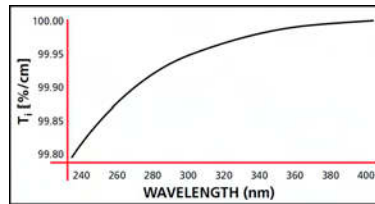
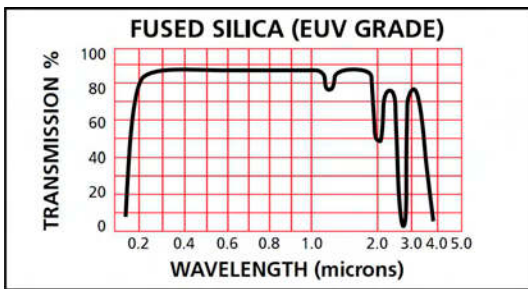


### Specification EXCIMER (EUV) GRADE Fused Silica

Parallelism	<10 arc sec.
Surface Finish	20-10 scratch/dig
Flatness	$\lambda/4$ @ 632nm
Transmission	>99.5% @ 193nm (internal)
Usable range	180 ... 2000nm
Inclusions	max. 0.03mm <sup>2</sup> /100cm <sup>3</sup> (class 0)
Isotropy	3D Material
Homogeneity	Grade A

### Fused Silica Viewports - EXCIMER grade UHV 0.18 to 2 microns - NO coating

FLANGE	VIEW DIAM.	PART NUMBER
40CF	35	110-VPQZ-C40-EX
63CF	68	110-VPQZ-C63-EX



Internal transmission curves for DUV and Excimer grade material.

## Fused Silica (Quartz) Viewports on KF Flanges

The UV-Quartz quality is offered for use with KF flanges. Other Fused Silica grades are available on request. Please ask the Sales Office for a quote.



### Specification for Quartz KF-Viewports

Vacuum	10 <sup>-9</sup> mbar
Temperature	-100 to 200°C <5K/min
Transmission	200 ... 20000nm
Inclusions	max 0.25mm <sup>2</sup> /100cm <sup>3</sup>
Isotropy	2D Material

### Fused Silica Viewports Versions on KF Flanges

FLANGE	VIEW DIAM.	PART NUMBER
25KF	16	110-VPQZ-K25
40KF	35	110-VPQZ-K40
50KF	35	110-VPQZ-K50

Weldable versions are available as well in all three different qualities! Please ask for a quote

- 1 Sub-D
- 2 CM + DIL F/T
- 3 Coax F/T
- 4 Power High Voltage
- 5 Thermo-couple
- 6 Cables Accessories
- 7 Viewports Fiberoptic
- 8 Valves
- 9 Motion Manipulation
- 10 Process Control
- 11 CF Hardware
- 12 KF Hardware
- 13 ISO-K Hardware
- 14 Adaptors Specials
- 15 HV / UHV Chambers
- 16 Atlas Bi-Metal

# 7.7 COATED QUARTZ VIEWPORTS

DE: Info@allectra.com  
 UK: uk@allectra.com  
 F: fr@allectra.com



## Fused Silica (Quartz) Viewports with BBAR coating

Three types of broad band anti-reflection coatings are offered as standard for 40CF and 63CF Flanges:

- UV Coating 225nm to 450nm
- Visible Spectra Coating 425 to 760nm
- Near IR Coating 550 to 1100nm



### Specification BBAR Coated Fused Silica

Vacuum	UHV
Leak rate	<2x 10 <sup>-10</sup> mbar l /s
Temperature	-100 ... 200°C
Gradient	<5K/min
Reflectance	see graphs, max. 2% in given range
Parallelism	<10 arc sec.
Surface Finish	20-10 scratch/dig
Flatness	λ/4 at 632nm
Inclusions	max. 0.03mm <sup>2</sup> /100cm <sup>3</sup> (class 0)
Isotropy	3D Material
Homogeneity	Grade A

### Fused Silica (Quartz) Viewports with BBAR coating UV Range 225 - 450nm

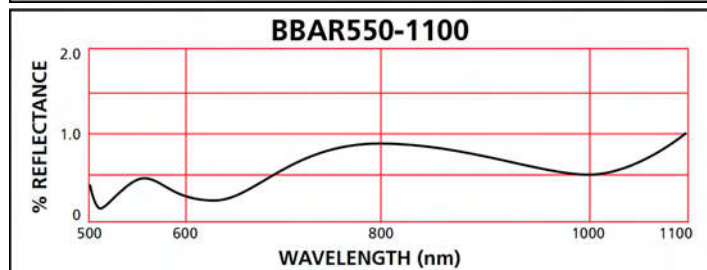
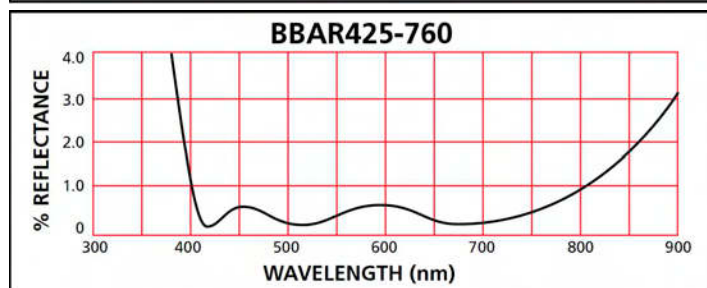
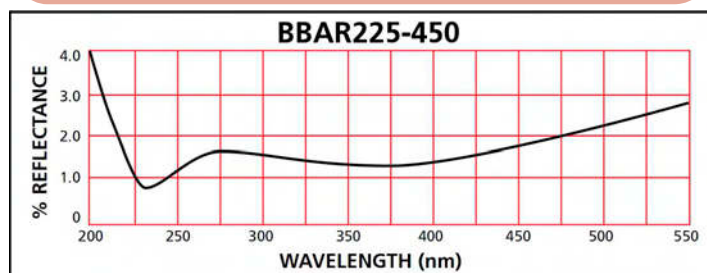
FLANGE	View ø	PART NUMBER
40CF	35 mm	110-QZ-UV-C40
63CF	68 mm	110-QZ-UV-C63

### Fused Silica (Quartz) Viewports with BBAR coating Visible Range 425 - 760nm

FLANGE	View ø	PART NUMBER
40CF	35 mm	110-QZ-VIS-C40
63CF	68 mm	110-QZ-VIS-C63

### Fused Silica (Quartz) Viewports with BBAR coating IR Range 550 - 1100 nm

FLANGE	View ø	PART NUMBER
40CF	35 mm	110-QZ-IR-C40
63CF	68 mm	110-QZ-IR-C63



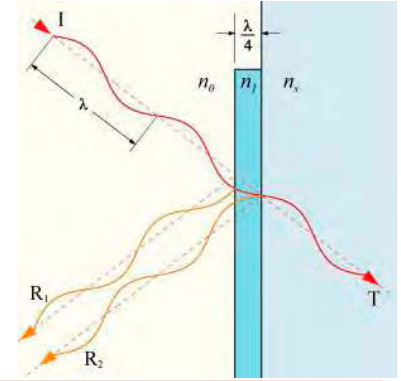
Reflectance versus wavelength for the 3 different types of standard broad band coating.

- Top: UV-range
- Middle: Visible range
- Bottom: IR range

Sub-D  
1  
CM + DIL  
F/T  
2  
Coax  
F/T  
3  
Power  
High Voltage  
4  
Thermo-  
couple  
5  
Cables  
Accessories  
6  
Viewports  
Fiberoptic  
7  
Valves  
8  
Motion  
Manipulation  
9  
Process  
Control  
10  
CF  
Hardware  
11  
KF  
Hardware  
12  
ISO-K  
Hardware  
13  
Adaptors  
Specials  
14  
HV / UHV  
Chambers  
15  
Atlas  
Bi-Metal  
16

## Laser Viewports with AR coating

For Laser applications Allectra offers high quality Quartz viewports with optimized coatings. All viewports have more than 99.5% transmission / surface at the given wavelength. A high quality 20/10 surface finish and a flatness of  $\lambda / 4$  allow high performance. They are offered on DN40CF flanges with 35mm view diameter and on DN63CF with 68mm view diameter.



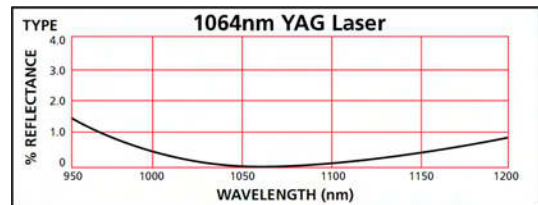
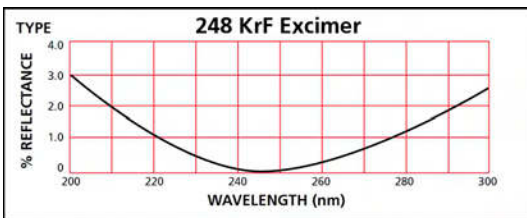
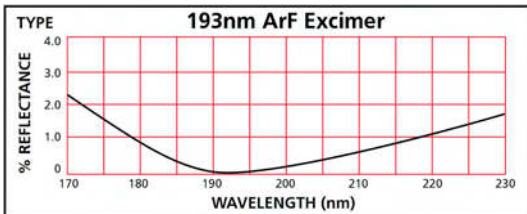
### Specification for UHV Laser Viewports

Vacuum	UHV
Temperature	-100 to 200°C
Parallelism	<10 arc sec
Flatness	$\lambda/4$ @ 632nm
Surface finish	20/10 Scratch/Dig
Homogeneity	Grade A
Inclusion class	0
Coating	V-Coat with <0.25% Reflection/surf.
Material	
ArF (193nm)	Excimer Grade
KrF (248nm)	DUV Grade
Diode (780nm)	UV Grade
YAG (1064nm)	IR Grade
Laser Damage Threshold	
ArF	1 J/cm <sup>2</sup> for 10ns Pulse
KrF	10 J/cm <sup>2</sup> for 10ns Pulse
Diode	10 J/cm <sup>2</sup> for 10ns Pulse
YAG	10 J/cm <sup>2</sup> for 10ns Pulse

### Laser Viewports with AR coating 40CF and 63CF flanges

FLANGE	WAVELENGTH	PART NUMBER
40CF	193 nm	110-ARF-C40
63CF	193 nm	110-ARF-C63
40CF	248 nm	110-KRF-C40
63CF	248 nm	110-KRF-C63
40CF	780 nm	110-DIODE-C40
63CF	780 nm	110-DIODE-C63
40CF	1064 nm	110-YAG-C40
63CF	1064 nm	110-YAG-C63

Coatings for other wave lengths are possible. Please ask for a quote  
 Also V-coats for 2 different wave lengths are available.



Reflectance versus wavelength for the different coatings:

- Top left: for ArF Excimer Laser
- Bottom left: for KrF Excimer Laser
- Top right: for 780nm Diode Laser
- Bottom right: For YAG Laser

- 1 Sub-D
- 2 CM + DIL F/T
- 3 Coax F/T
- 4 Power High Voltage
- 5 Thermo-couple
- 6 Cables Accessories
- 7 Viewports Fiberoptic
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- 14 Adaptors Specials
- 15 HV / UHV Chambers
- 16 Atlas Bi-Metal



# 7.9 NON-MAGNETIC VIEWPORTS

DE: Info@allectra.com  
 UK: uk@allectra.com  
 F: fr@allectra.com



## Non-magnetic Fused Silica Viewports

Standard Fused Silica viewports have very low magnetic permeability, as no Kovar or other magnetic materials are used. For very demanding applications, Allectra offers UV and DUV viewports with Titanium sleeves, mounted in 316LN Flanges. The sizes 16CF and 40CF are offered as standard.

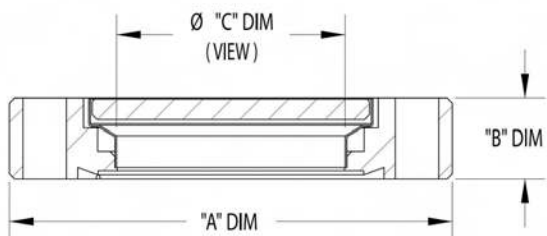


### Specification Non-Magnetic Fused Silica

Vacuum	UHV, $10^{-10}$ mbar
Temperature	-100 to 200°C
Material	Flange 316LN SS Sleeve Titanium Window Fused Silica, UV / DUV
For UV/DUV specification see page 7.5	

### Non-Magnetic Fused Silica Viewports UV and DUV Quality

FLANGE	TYPE	PART NUMBER
16CF	UV Grade	110-QZ-NM-C16-UV
40CF	UV Grade	110-QZ-NM-C40-UV
16CF	DUV Grade	110-QZ-NM-C16-DUV
40CF	DUV Grade	110-QZ-NM-C40-DUV

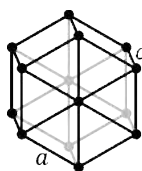


Viewport dimensions:

DN16CF: A= 34mm, B= 8.9mm, C= 16mm

DN40CF: A= 70mm, B=12.7mm, C= 35.5mm

## Crystal Quartz Viewports



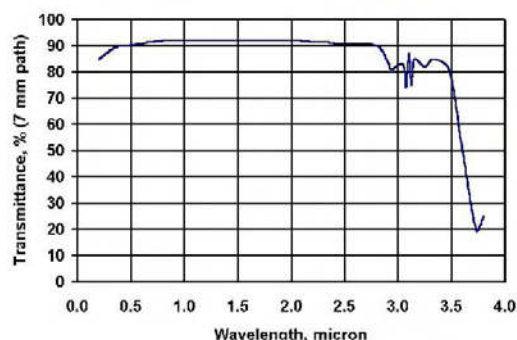
Optical Quality Crystalline Quartz features high transmittance in ultraviolet, visible and infrared spectrum from 190 to 2900 nm, birefringence, ability to rotate plane polarized light, high damage threshold and resistance to scratching. Optical quality material is virtually bubble and inclusion free, grade A.

### Crystal Quartz Viewports UHV

FLANGE	VIEW $\varnothing$	PART NUMBER
40CF	22.8mm	110-QZ-C40-CRYST
63CF	48.2mm	110-QZ-C63-CRYST
100CF	48.2mm	110-QZ-C100-CRYST

### Specification Crystal Quartz

Vacuum	UHV, $10^{-10}$ mbar
Temperature	-100 to 200°C
Orientation	Z-Cut
Parallelism	<10 arc sec
Surface Finish	20/10 scratch/dig
Flatness	$\lambda/2 @ 632\text{nm}$

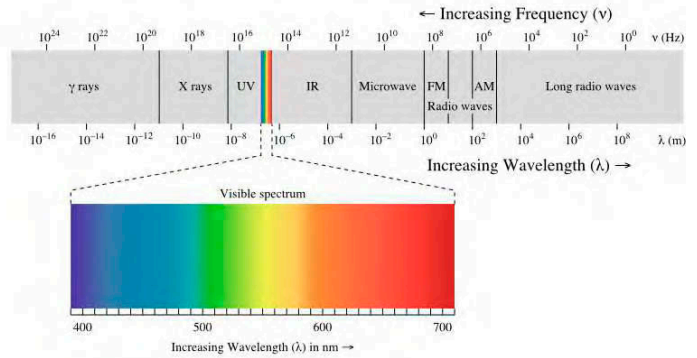


Transmission spectrum of Crystal Quartz

- 1 Sub-D
- 2 CM + DIL F/T
- 3 Coax F/T
- 4 Power High Voltage
- 5 Thermo-couple
- 6 Cables Accessories
- 7 Viewports Fiberoptic
- 8 Valves
- 9 Motion Manipulation
- 10 Process Control
- 11 CF Hardware
- 12 KF Hardware
- 13 ISO-K Hardware
- 14 Adaptors Specials
- 15 HV / UHV Chambers
- 16 Atlas Bi-Metal

## Special Materials Viewports

UHV Viewports made of Special Materials are available when other wavelengths than standard glass or quartz are needed. Calcium-Fluoride and Magnesium-Fluoride cover a wide transmission range from UV to Infrared down to 20 $\mu$ m (see the transmission curves below). With the optional AR coating higher transmission can be reached.



### Specification Special Material Viewports

Vacuum	UHV, 10 <sup>-10</sup> mbar
Temperature	200°C (150°C for coated ZnSe)
Transmission:	
CaF2	150nm ... 9 $\mu$ m
MgF2	180nm ... 8 $\mu$ m
ZnSe	600nm ... 20 $\mu$ m
View Diameters	40CF: 23mm 63CF: 48mm
Flatness:	$\lambda$ / 4
Surface finish	20/10 (CaF2 , MgF2) 40/20 (ZnSe)

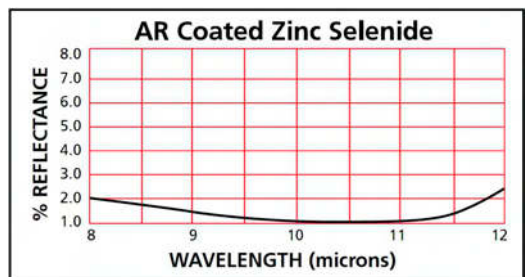
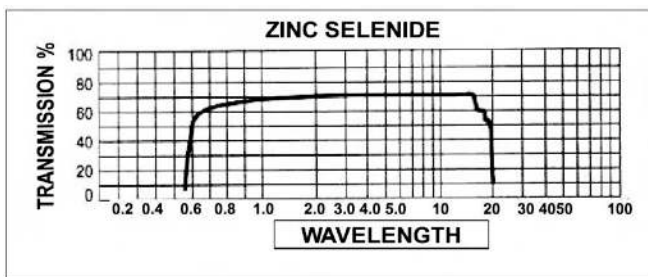
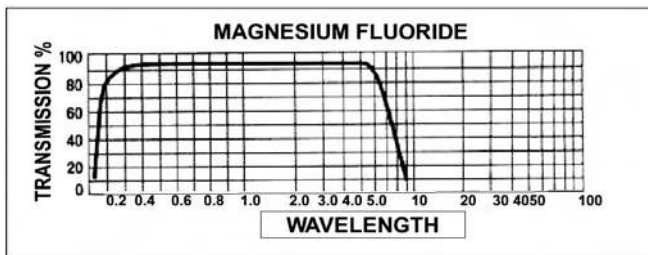
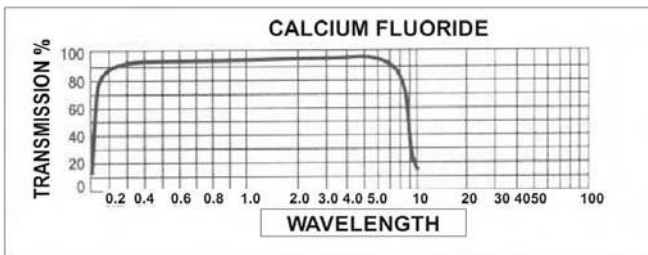
### Special Materials Viewports - NO COATING UHV

FLANGE	TYPE	PART NUMBER
40CF	CaF2	130-CAF-23-C40
63CF	CaF2	130-CAF-48-C63
40CF	MgF2	130-MGF-23-C40
63CF	MgF2	130-MGF-48-C63
40CF	ZnSe	130-ZNSE-23-C40
63CF	ZnSe	130-ZNSE-48-C63

### Special Materials Viewports ZnSe - AR COATED UHV

FLANGE	TYPE	PART NUMBER
40CF	ZnSe	130-ZNSE-23-AR-C40
63CF	ZnSe	130-ZNSE-48-AR-C63

The standard coating for ZnSe is a Broad Band AR ( for 8 - 12  $\mu$ m); the reflection loss is <0.5% per surface. Please note that coated viewports are bakeable to 150°C only.



- 1 Sub-D
- 2 CM + DIL F/T
- 3 Coax F/T
- 4 Power High Voltage
- 5 Thermo-couple
- 6 Cables Accessories
- 7 Viewports Fiberoptic
- 8 Valves
- 9 Motion Manipulation
- 10 Process Control
- 11 CF Hardware
- 12 KF Hardware
- 13 ISO-K Hardware
- 14 Adaptors Specials
- 15 HV / UHV Chambers
- 16 Atlas Bi-Metal

- 1 Sub-D
- 2 CM + DIL F/T
- 3 Coax F/T
- 4 Power High Voltage
- 5 Thermo-couple
- 6 Cables Accessories
- 7 Viewports Fiberoptic
- 8 Valves
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## Special purpose Viewports: - Re-Entrant Windows

Re-Entrant Windows allow optical systems or cameras to be inserted "inside" the vacuum system. Other tube lengths can be offered on request.



### Specification Re-Entrant Windows

Vacuum UHV,  $<10^{-10}$  mbar  
 Temperature 200°C  
 Material Fused Silica UV or DUV grade (see p. 82 for full spec)

Basic dimensions	63CF	100CF
View Diameter	35.5mm	68mm
In-Vacuum length	89mm	89mm
Tube ID	48mm	72mm
Tube OD	51mm	76.5mm

### Re-Entrant Windows 63CF / 100CF with Fused Silica

FLANGE	TYPE	PART NUMBER
63CF	UV	110-REQZ-C63-UV
100CF	UV	110-REQZ-C100-UV
63CF	DUV	110-REQZ-C63-DUV
100CF	DUV	110-REQZ-C100-DUV

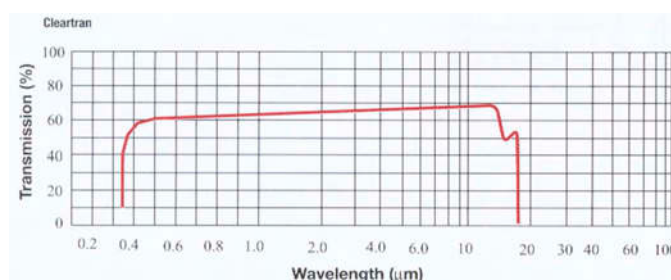
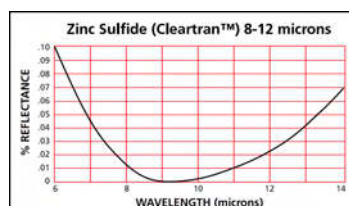
## Special purpose Viewports: - Differentially pumped XHV

These special windows are used typically for Geo-chronology measurements. Two UHV windows are sealed together and can be differentially pumped. Coated Cleartran gives good transmission from ~350nm to the far IR.



### Specification for Geo-Chronology Viewport

Vacuum XHV,  $<10^{-11}$  mbar (2 UHV sealed viewports, differentially pumped)  
 Temperature 200°C  
 Material Cleartran® (Zinc Sulfide), AR coated 8 - 12µm  
 Transmission 350nm - 15µm  
 View Diameter 40CF: 23.6mm  
 63CF: 48mm  
 Flatness  $\lambda / 4$   
 Surface finish 40/20



Please ask the sales office for a quote for these special components.

## Special Purpose Viewports: - Beryllium X-Ray Viewports

A Beryllium Viewport acts as a barrier between the vacuum or inert gas environment inside an X-ray source tube or detector and atmospheric conditions external to the device, while at the same time allowing X-rays to pass through. Standard size is 40CF with a thickness of 130µm and a view diameter of 39mm.



**Viewport Accessories**

Alllectra offer Accessories for Viewports:

- Viewport Shutter
- Lead Glass Radiation Protection Screen
- External Viewport Door for Radiation Protection

**Specification for Viewport Shutter**

Vacuum	to 10 <sup>-10</sup> mbar
Construction	All Metal
Bakeable	to 250°C
Mechanism	Shutter plate with rotary drive Drive with position lock
Flange	Double sided with through holes



140-VPSH-ISO100F

**Specification Lead Glass Kit**

Thickness	5.6 mm
Lead Equivalent	1.6 mm (to 110kV) 1.4 mm (to 200kV)

The Lead Glass Screen is offered as a kit comprising the Lead Glass, a Retaining Ring and a Set of Long Bolts which hold the retaining ring onto the front of the viewport. The Viewport is not included.



140-LG-C63

**Specification External Viewport Door**

Use	External closure for Viewports for X-Ray or Laser light protection
Thickness	6mm SS door
Micro-Switch	included for Interlock Circuits

**Viewport Shutter  
UHV and High Vacuum**

FLANGE	TYPE	PART NUMBER
63CF	MANUAL	140-VPSH-C63
100CF	MANUAL	140-VPSH-C100
160CF	MANUAL	140-VPSH-C160
63 ISO	MANUAL	140-VPSH-ISO63F
100 ISO	MANUAL	140-VPSH-ISO100F



140-VPSH-C100

**Lead Glass Radiation Protection Screen  
~1.5 mm lead equivalent**

FLANGE	TYPE	PART NUMBER
16CF	KIT	140-LG-C16
40CF	KIT	140-LG-C40
63CF	KIT	140-LG-C63
100CF	KIT	140-LG-C100
160CF	KIT	140-LG-C160

**External Viewport Door for Radiation Protection  
with microswitch for interlock circuit**

FLANGE	TYPE	PART NUMBER
63CF	MANUAL	140-VPXD-C63
100CF	MANUAL	140-VPXD-C100
160CF	MANUAL	140-VPXD-C160

*The External Viewport Door fits over the profile of a CF flange using extra long bolts or studding (not included). The microswitch can be fitted into a Safety Interlock circuit so that the 6mm Stainless Steel door can only be opened when a Laser or other device is switched off. The External Viewport Door does not make a Vacuum Seal.*

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- 2 CM + DIL F/T
- 3 Coax F/T
- 4 Power High Voltage
- 5 Thermo-couple
- 6 Cables Accessories
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## Fibre Optics -Introduction

Four different types of Fibre Optic Feedthroughs are offered by Allectra:

### 1) High Vacuum Coupler Feedthrough

This type is sealed by an O-ring and is suitable down to  $10^{-8}$  mbar. The seal is made by the in-vacuum connector. The air side Fibre can be removed without breaking the vacuum. For air and vacuum, Fibres with an SMA-F connector are required.

-> Page 8.2



### 2) UHV Feedthrough with SMA Connectors on both sides- All-metal types

A short Fibre is sealed into the Flange with an all-metal seal. The Fibres are coupled in the usual way with Fibre Couplers on the air and vacuum sides. Fibres with 200 / 400 / 600 $\mu$ m core diameter are used; a UV and an IR version are available. A disadvantage is that two Fibre junctions are required

-> Page 8.3



### 3) UHV Feedthrough with attached In-Vacuum Fibre - All metal types

This type comes with the In-vacuum Fibre already attached to the flange. Only one coupling is required, which results in lower losses and a reduced overall system price. This system is offered with SMA connectors and 200 / 400 / 600 $\mu$ m Step Index Multimode Fibres.

UV and IR types are available.

-> Page 8.4



### 4) UHV Feedthrough with attached 125 $\mu$ m OD In-Vacuum Fibre and FC-PC connectors

With FC-PC connectors several types of Fibres can be offered:

- The typical 50 $\mu$ m core data fibre as a Multimode fibre
- Single mode fibre with 9 $\mu$ m core
- Single mode fibre with 6 $\mu$ m core

The FC connector on the air side allows the direct combination also with ST-Connectors by using an adapter coupler. So a special ST-type feedthrough is obsolete.

-> Page 8.5



### High Vacuum Fibre Optic Coupler Feedthrough

A low cost and simple solution for High Vacuum Fibre applications. Only one coupling is required to go into the vacuum system, the two F-SMA terminated Fibres are connected directly within the feedthrough and the seal is made with a Buna-N O Ring. Viton O-Ring option.  
 As fibres versions with 200 / 400 / 600µm core diameter are offered.



#### Specification Fibre Optic Coupler F/T

Vacuum	HV, down to 10 <sup>-8</sup> mbar
Temperature	-20°C to 150°C
Flanges	16KF, 25KF, 40KF and custom 16CF, 40CF and custom
Material	SS for F/T and coupler
O-Ring	Buna-N included, Viton optional

With the Coupler Feedthrough, a Buna-N O-ring is supplied as standard. A Viton O Ring is an option. Spare O-Rings are offered below.

152-FCF-K40



#### Fibre Optic Coupler Feedthroughs KF Flanges, O-Ring Sealed

FLANGE	No of F/T	PART NUMBER
16KF	1	152-FCF-K16
25KF	1	152-FCF-K25
40KF	1	152-FCF-K40
40KF	2	152-FCF-K40-2
40KF	3	152-FCF-K40-3
40KF	4	152-FCF-K40-4

#### Fibre Optic Coupler Feedthroughs CF Flanges, O-Ring Sealed

FLANGE	No of F/T	PART NUMBER
16CF	1	152-FCF-C16
40CF	1	152-FCF-C40
40CF	2	152-FCF-C40-2
40CF	3	152-FCF-C40-3
40CF	4	152-FCF-C40-4

#### Specification In-Vacuum Fibre for Coupler F/T

Vacuum	10 <sup>-10</sup> mbar
Fibre Type	Step Index Multimode 400µm
Core	High Purity Synthetic Silica
Cladding	Doped Silica
Shielding	Stainless Steel
Minimum Bend Radius	80mm
Connectors	F-SMA-905 Ferrule on one side as option
Transmission	See Spectra on page 7.16



In-vacuum cable: F-SMA connector with SS shielded fibre.

This Vacuum Side Plug is used to vacuum seal unused feedthroughs.

#### In-Vacuum Multimode Fibres UHV Versions 400 micron

TYPE	LENGTH	PART NUMBER
UV, SMA-SMA	300	151-C-UV4-S-S-300
UV, SMA-SMA	600	151-C-UV4-S-S-600
UV, SMA-Ferrule	600	151-C-CV4-S-X-600
IR, SMA-SMA	300	151-C-IR4-S-S-300
IR, SMA-SMA	600	151-C-IR4-S-S-600
IR, SMA-Ferrule	600	151-C-IR4-S-X-600

Other lengths available! 200µm and 600µm on request.

#### Replacement O-Rings

O-RING	No per PKT.	PART NUMBER
BUNA-N	10	152-FCF-OB-10
VITON	1	152-FCF-OV

#### Fibre Optic Coupler Feedthroughs Vacuum Side Plug

TYPE	No per PKT.	PART NUMBER
PLUG	1	152-FPLUG

- 1 Sub-D
- 2 CM + DIL F/T
- 3 Coax F/T
- 4 Power High Voltage
- 5 Thermo-couple
- 6 Cables Accessories
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- 8 Valves
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## UHV Fibre Optic All Metal Feedthroughs

Alllectra offers Fibre Optic All Metal Feedthroughs:

- UHV Fibre Optic All-Metal feedthrough - 600  $\mu\text{m}$  Multi-mode Fibre
- Also available with 200 $\mu\text{m}$  and 400 $\mu\text{m}$  fibre
- UHV Fibre Optic F-SMA Couplers - Air and Vacuum Service
- Max. Power: 100kW/  $\text{cm}^2$  CW  
 500kW/  $\text{cm}^2$  Pulses < 1 $\mu\text{s}$   
 (theoretical values by ideal beam profile)



**UHV Fibre Optic All-Metal feedthrough includes 600 micron Multimode Fibre**

FLANGE	TYPE	PART NUMBER
16CF	UV	150-FFT-UV6-C16
40CF	UV	150-FFT-UV6-C40
40CF	UV x 2	150-FFT-UV6-C40-2
16CF	IR	150-FFT-IR6-C16
40CF	IR	150-FFT-IR6-C40
40CF	IR x 2	150-FFT-IR6-C40-2

### Specification UHV Fibre Optic All-Metal F/T

Vacuum	UHV, <2x 10 <sup>-10</sup> mbar l/s
Temperature	200°C max. bakeout
Fibre	600 $\mu\text{m}$ Step index Multimode
Damping UV Type	<1.2db/m at 248nm
	<0.26db/m at 308nm
Damping IR Type	<0.01db/m at 1064nm
Transmission spectra	see next page



*Feedthrough with Vacuum Side Coupler*



*150-FFT-UV-C40*

### Specification for In-Vacuum Fibre (600 $\mu\text{m}$ ) for All-metal Feedthrough

Vacuum	10 <sup>-10</sup> mbar
Fibre Type	Step Index Multimode 600 $\mu\text{m}$
Core	High Purity Synthetic Silica
Cladding	Doped Silica
Shielding	Stainless Steel
Minimum Bend Radius	80mm
Connectors	F-SMA-905 Ferrule on one side as option

### In-Vacuum Fibres UHV Versions Step Index Multimode 600 $\mu\text{m}$

TYPE	LENGTH	PART NUMBER
UV, SMA-SMA	300	151-C-UV6-S-S-300
UV, SMA-SMA	600	151-C-UV6-S-S-600
UV, SMA-Ferrule	300	151-C-UV6-S-X-300
UV, SMA-Ferrule	600	151-C-UV6-S-S-600
IR, SMA-SMA	300	151-C-IR6-S-S-300
IR, SMA-SMA	600	151-C-IR6-S-S-600
IR, SMA-Ferrule	600	151-C-IR6-S-X-600

Other lengths available on request

### UHV Fibre Optic F-SMA Couplers Air and Vacuum Service

VACUUM	TYPE	PART NUMBER
UHV	F-SMA	151-FC-UHV
AIR	F-SMA	151-FC-AIR



*The UHV Feedthroughs use the same in-vacuum fibre as the Coupler Feedthroughs. We can offer custom lengths as required.*

- 1 Sub-D
- 2 CM + DIL F/T
- 3 Coax F/T
- 4 Power High Voltage
- 5 Thermo-couple
- 6 Cables Accessories
- 7 Viewports Fiberoptic
- 8 Valves
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- 16 Atlas Bi-Metal

### UHV Fibreoptic Feedthrough with attached In-vacuum Fibre, SMA Types

Fibreoptic Feedthroughs with attached In-vacuum Fibre reduce transmission losses as well as costs. The 400µm fibre has F-SMA905 connectors on both ends. A ferrule on the vacuum end is also available. Also available with 200µm and 600µm fibres and with FC-PC connectors.

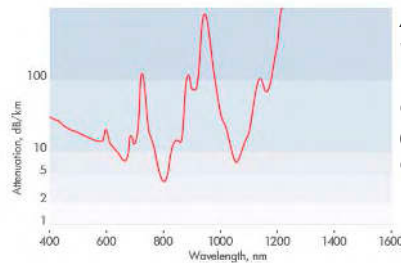


#### General Specification for Multi-mode Fibres

Vacuum	UHV, <math>5 \times 10^{-10}</math> mbar l/s
Seal	All Metal
Connectors	SS (Vacuum side)
Temperature	200°C bakeout -25...+75°C working
Fibre Type	Multi-Mode Fibre, Step Index, 400µm Core ø
Nom. Aperture	0.22
Connectors	FSMA-905 both sides (= SMA) ferrule without nut optional on vacuum side
Standard length	up to 1000mm

#### UHV Fibre Feedthroughs 400 micron Multi-mode F-SMA to F-SMA, UV Type, 1m Fibre

FLANGE	FIBRE	PART NUMBER
16CF	1x UV	150-UV4-S-S-1000-C16
40CF	1x UV	150-UV4-S-S-1000-C40
40CF	2x UV	150-UV4-S-S-1000-C40-2
40CF	3x UV	150-UV4-S-S-1000-C40-3



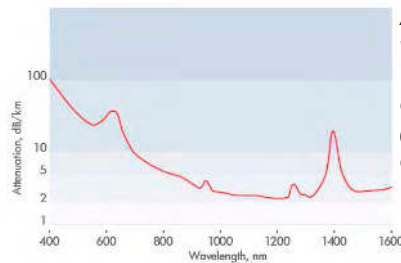
Attenuation versus wavelength for UV fibre. Values are given in dB/km (valid for 200µm/400µm and 600µm fibres)

#### Specification for UV Fibre 200/400/600 micron Multi-mode

UV FIBRE Type	(200...) 400 – 1600nm
Transmission	(200...) 400 – 1600nm
Damping of fibre	~3 dB /m at 200nm ~0.05 dB/m at 400nm <0.15 dB/m 400 ... 900nm

#### UHV Fibre Feedthroughs 400 micron Multi-mode F-SMA to F-SMA, IR Type, 1m Fibre

FLANGE	FIBRE	PART NUMBER
16CF	1x IR	150-IR4-S-S-1000-C16
40CF	1x IR	150-IR4-S-S-1000-C40
40CF	2x IR	150-IR4-S-S-1000-C40-2
40CF	3x IR	150-IR4-S-S-1000-C40-3



Attenuation versus wavelength for IR fibre. Values are given in dB/km (valid for 200µm/400µm and 600µm fibres)

#### Specification for IR Fibre 200/400/600 micron Multi-mode

IR FIBRE Type	(400...) 600 – 2000nm
Transmission	(400...) 600 – 2000nm
Damping of fibre	~0.1 dB /m at 400nm ~0.05 dB/m at 600nm ~0.03 dB/m at 1000nm ~0.03 dB/m at 1600nm

These fibres can be extended in Vacuum by using a Fibre Coupler and a SMA UHV Fibre

- 1 Sub-D
- 2 CM + DIL F/T
- 3 Coax F/T
- 4 Power High Voltage
- 5 Thermo-couple
- 6 Cables Accessories
- 7 Viewports Fiberoptic
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## 125µm UHV Fibre Feedthroughs, Multi-Mode and Single Mode

Fibres with a cladding diameter of 125µm are offered with FC-PC Connectors. On the air side, the fibre has a standard length of 300mm. On the vacuum side a version with a Ferrule instead of the FC connector is offered.

A Multi-mode version with 50µm core is available as well as two Single mode types with 9µm or 6µm cores.

*Air and vacuum side lengths can be made according your requirements.*

### General Specification 125µm Fibre types

Vacuum	UHV, <math>5 \times 10^{-10}</math> mbar l/s
Sealing	All Metal
Temperature	200°C bakeout -25...+75°C working
Connectors	FC-PC (physical contact) both sides Ferrule on vacuum side optional
Fibres	Graded-Index Fibre, 125µm cladding diameter
Standard Lengths	up to 1000mm, 300mm on Air



FC-PC connector with ceramic ferrule on the vacuum end of the feedthrough. Alternatively the fibre end can be terminated with a ferrule. Customised lengths are possible.

### Specification 125/50µm Multi-Mode Fibre F/T

Fibre Type	Multimode, 50µm Core Ø, 125µm OD
Transmission	600 – 2000 nm
Nom. Aperture	0.22
Damping	~0.014 dB /m at 1300nm

### UHV Fibre Optic All-Metal Feedthrough 50µm Core, 125µm OD, Multi-Mode Fibre 1m long

FLANGE	FIBRE	PART NUMBER
16CF	1x 125/50µm, 1000 mm	150-50-F-F-1000-300-C16
40CF	1x 125/50µm, 1000 mm	150-50-F-F-1000-300-C40
40CF	2x 125/50µm, 1000 mm	150-50-F-F-1000-300-C40-2
40CF	3x 125/50µm, 1000 mm	150-50-F-F-1000-300-C40-3

### Specification 125/9µm Single-Mode Fibre F/T

Fibre Type	Monomode, 9µm Core Ø, 125µm OD
Transmission	1300 – 1600 nm
Cut-Off	<1250 nm
Num. Aperture	0.13
Damping	~0.0055 dB /m at 1300nm

### UHV Fibre Optic All-Metal feedthrough 9µm Core, 125µm OD, Single-Mode Fibre 1m long

FLANGE	FIBRE	PART NUMBER
16CF	1x 125/9µm, 1000 mm	150-09-F-F-1000-300-C16
40CF	1x 125/9µm, 1000 mm	150-09-F-F-1000-300-C40
40CF	2x 125/9µm, 1000 mm	150-09-F-F-1000-300-C40-2
40CF	3x 125/9µm, 1000 mm	150-09-F-F-1000-300-C40-3

### Specification 125/6µm Single-Mode Fibre F/T

Fibre Type	Monomode, 6µm Core Ø, 125µm OD
Transmission	800 – 900 nm
Cut-Off	<770 nm
Num. Aperture	0.13
Damping	~0.0105 dB /m at 850nm

### UHV Fibre Optic All-Metal Feedthrough 6µm Core, 125µm OD, Single-Mode Fibre 1m long

FLANGE	FIBRE	PART NUMBER
16CF	1x 125/6µm, 1000 mm	150-06-F-F-1000-300-C16
40CF	1x 125/6µm, 1000 mm	150-06-F-F-1000-300-C40
40CF	2x 125/6µm, 1000 mm	150-06-F-F-1000-300-C40-2
40CF	3x 125/6µm, 1000 mm	150-06-F-F-1000-300-C40-3

Fibre Coupler for air and vacuum side are available: we offer FC-FC and FC-ST types.