

CF high temperature and high vacuum sapphire glass window

1. Overview:

This CF window is made of 304/316 stainless steel flanges that have undergone high-temperature solution heat treatment, and then brazed with low-expansion alloy 4J34 Kovar and optical sapphire at high temperatures. It can withstand temperatures up to 450 °C, and the brazing material is a silver-based alloy filler metal. It can be used in high-temperature, normal-pressure, and 1×10^{-11} ultra-high vacuum environments. The optical sapphire crystal has a bending strength greater than 850 MPa and excellent optical properties, capable of penetrating the 0.19-5.0 μ m mid-infrared spectrum, covering the ultraviolet, visible, near-infrared, and mid-infrared bands.

Our company's brazed CF mid-infrared windows can be demagnetized according to customer requirements to reduce the interference of electromagnetic fields on test signals. They can also be coated with an AR anti-reflective film, and the glass surface can achieve a flatness of PV1/2 to 1/20.2.

2. Performance specifications of CF mid-infrared sapphire windows

Project Description	Parameters
Model	CF16-250
Structure	304/316 Stainless steel flange+4J34 Kovar alloy+Optical sapphire glass+Silver-based alloys
Temperature resistance	-196 °C / +450 °C
Ultimate vacuum/leakage rate	1.0×10^{-11} Torr / 1.0×10^{-11} Pa.m ³ S ⁻¹
Baking (heating/cooling) rate	≤ 3 °C / min
Flange surface treatment	Electropolishing
Kovar alloy	4J34
Brazing materials	Silver-based alloys
Glass materials	Optical sapphire glass
Glass transmission wavelength (nm)	190-5000
Transmittance T=%	190-240nm, T $\geq$ 85%, AR coating 240-5000nm, T $\geq$ 92%, AR coating
Glass-face PV	PV 1/2--1/20
Glass surface smoothness	80/50 、 60/40、 20/10
Non-magnetic treatment of metal parts	Demagnetization processing according to customer requirements.

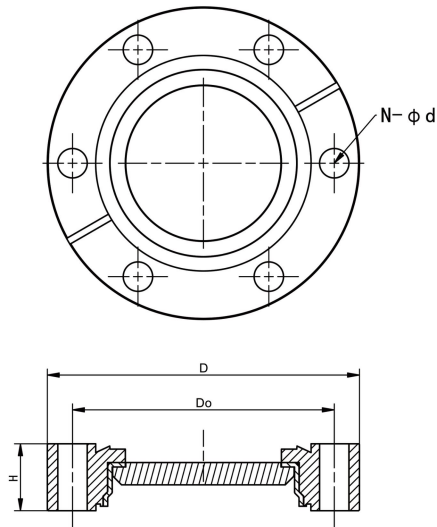


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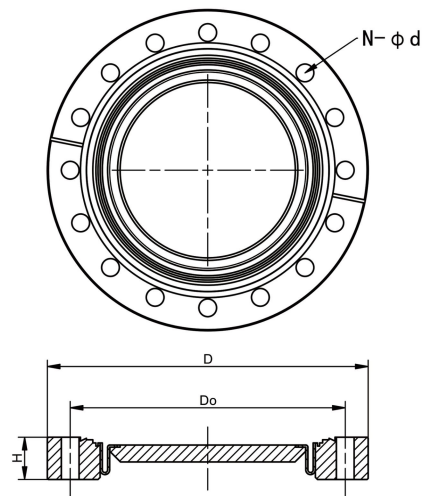
3. CF Model Data Sheet

Number	Specification	Glass size	glass material	Flange outer diameter	Number of bolt holes * diameter	center distance	Flange thickness
No.	Size	Glass	Material	D	N-Φd	Do	H
1	CF16	15.6*5	sapphire glass	34	6*φ4.3	27	12
2	CF20	23.6*5	sapphire glass	54	6*φ6.6	41.3	15
3	CF25	30.6*5	sapphire glass	60	6*φ6.6	47	15
4	CF40 (CF35)	40.6*5	sapphire glass	70	6*φ6.6	58.7	15
5	CF50	51.6*5	sapphire glass	86	8*φ8.4	72.4	20
6	CF63	70.6*5	sapphire glass	114	8*φ8.4	92.2	20
7	CF80	85.5*6	sapphire glass	130	16*φ8.4	110	20
8	CF100	92.6*6	sapphire glass	152	16*φ8.4	130.3	20
9	CF160	144.6*8	sapphire glass	202	20*φ8.4	181	22
10	CF200	190.6*10	sapphire glass	253	24*φ8.4	231.8	24.5
11	CF250	246*12	sapphire glass	305	32*φ8.4	284	26

4. CF sapphire glass window, internally welded design.

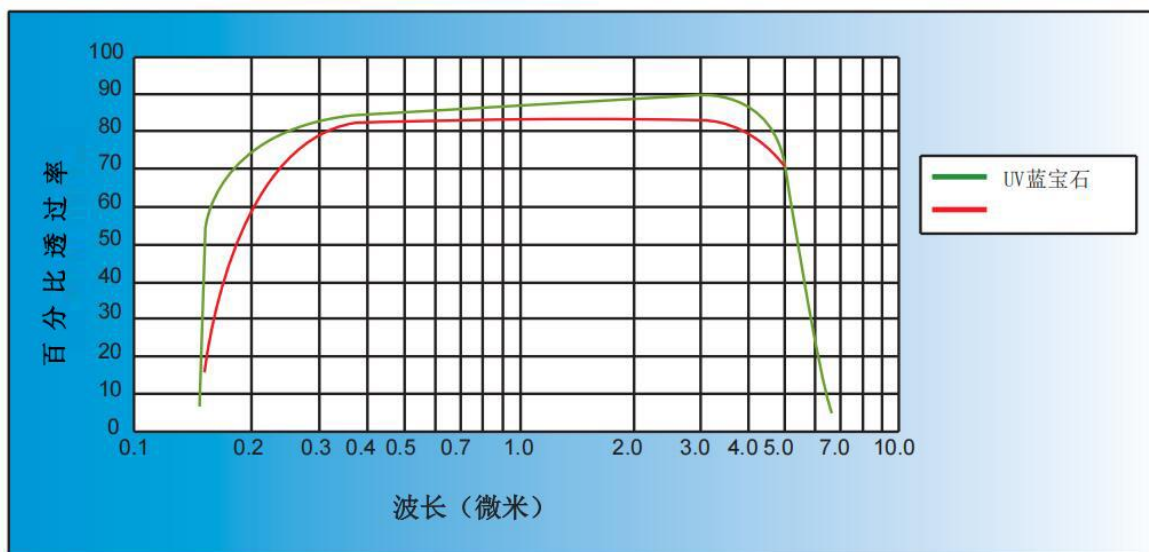


CF16-CF80 window structure diagram:



CF100-CF250 window structure diagram

5. Sapphire glass transmittance curve



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Special Warnings:

1. The viewing window should be sealed with a fully annealed copper gasket to reduce induced strain.
2. We cannot guarantee that quartz and sapphire windows are unaffected by strain or polarization effects.
3. If the mounting port length exceeds the recommended length, the listed viewing angle will be affected.
4. If the process involves material deposition, we strongly recommend using a window shutter, as some deposits can cause permanent damage to certain windows. Although quartz and sapphire have reasonable thermal conductivity, for safety reasons, we strongly recommend against exposing the window to temperature changes exceeding 2-3°C per minute and to direct heat radiation. To limit the thermal gradient when heating the window, we recommend covering the observation area and flange with multiple layers of aluminum foil as a reflective shield.

6. Transmission curves of other optical glasses

