

# Viewports, Shutters & Glass Adapters

## Section Eight



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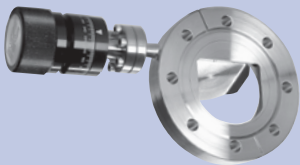
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Nor-Cal Products offers a complete line of viewports for vacuum chambers with NW, ISO and CF flanges. CF flanged viewports are available with fully annealed borosilicate glass or fused silica. Weld stub viewports are available for welding onto new or existing chambers. Special materials and coatings, such as sapphire and anti-reflective (AR) coating, are available on request. Glass provides a large distortion free viewing area at low cost. Quartz and fused silica provide superior ultraviolet radiation transmission and resistance to thermal shock.

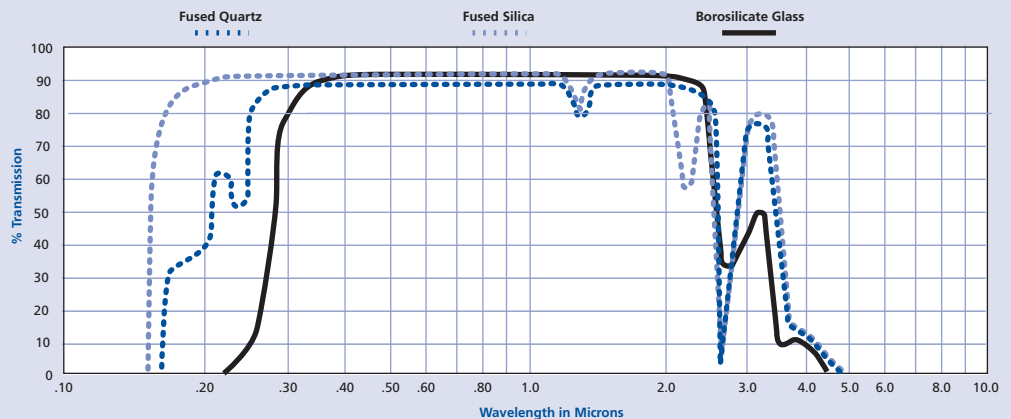
Nor-Cal Products manufactures glass adapters in 7740 and 7052 borosilicate glass. These adapters are useful for mounting glass accessories to metal high vacuum systems, or to attach flange mounted components to glass systems. Glass adapters are available with NW, CF, and ISO flanges as standards.



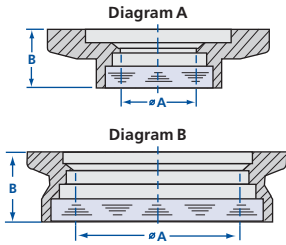
### Viewport Shutters

These shutters mount behind a viewport to prevent deposition process build-up on the viewports. We now offer CF shutters in 4 sizes for mounting to 2<sup>3</sup>/<sub>4</sub>, 4<sup>1</sup>/<sub>2</sub>, 6 and 8 inch (69.85, 114.3, 152.4 and 203.2) CF flanged ports. An integrated PRM-133 rotary motion feedthrough provides smooth actuation and a positive locking screw.

Viewport Optical Transmission Curves



All dimensions are in inches (mm) & weights are in pounds (kg), unless otherwise noted.



### NW Viewports

Borosilicate glass NW viewports are a one-piece assembly. This viewport replaces a blank off cap and uses a standard NW centering ring assembly and clamp for sealing.

MODEL NUMBER	DIAGRAM	FLANGE TYPE	VIEW MATERIAL	VIEW Ø A	B
VP-NW-16	A	NW-16	Borosilicate glass	0.62 (15.75)	0.385 (9.78)
VP-NW-25	A	NW-25	Borosilicate glass	0.62 (15.75)	0.385 (9.78)
VP-NW-40	B	NW-40	Borosilicate glass	1.51 (38.35)	0.554 (14.07)
VP-NW-50	B	NW-50	Borosilicate glass	1.51 (38.35)	0.554 (14.07)

### SPECIFICATIONS

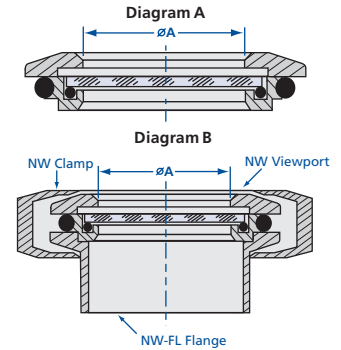
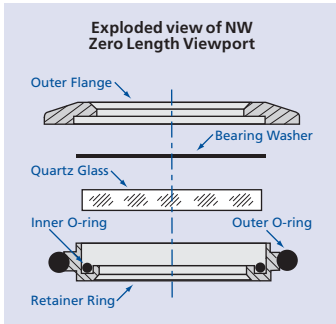
**Materials**  
 Flanges: 304 stainless steel  
 Viewports: Glass or fused quartz  
 Seal: FKM

**Vacuum range:**  $\geq 1 \times 10^{-9}$  mbar - High vacuum

**Temperature range:** -20°C to 200°C

### NW Zero Length Viewports

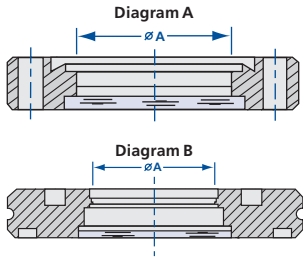
Nor-Cal Products' zero length viewports have an innovative design which places the viewing glass inside the centering ring. The clear, polished quartz can be removed for cleaning or replacement. Zero length viewports are available for NW-40 and NW-50 flange sizes.



MODEL NUMBER	DIAGRAM	FLANGE TYPE	VIEW MATERIALS	VIEW Ø A
ZV-NW-40	A	NW-40	Fused quartz	1.26 (32.00)
ZV-NW-50	A	NW-50	Fused quartz	1.63 (41.40)
ZV-NW-40A	B	NW-40	Fused quartz	1.26 (32.00)
ZV-NW-50A	B	NW-50	Fused quartz	1.63 (41.40)

### ISO & CF Zero Length Viewports

ISO and CF viewports are one-piece assemblies (See diagram to the left). Refer to the appropriate flange section for clamps and fastening hardware.



MODEL NUMBER	DIAGRAM	FLANGE TYPE	VIEW MATERIALS	VIEW Ø A
ZV-075	A	1.33 CF	Borosilicate glass	0.63 (16.00)
ZV-100	A	2.12 CF	Borosilicate glass	0.63 (16.00)
ZV-150	A	2.75 CF	Borosilicate glass	1.49 (37.85)
ZVQ-150	A	2.75 CF	Fused silica	1.40 (35.56)
ZV-200	A	3.38 CF	Borosilicate glass	1.49 (37.85)
ZVQ-200	A	3.38 CF	Fused silica	1.40 (35.56)
ZV-250	A	4.50 CF	Borosilicate glass	2.66 (67.56)
ZVQ-250	A	4.50 CF	Fused silica	2.69 (68.33)
ZV-300	A	4.62 CF	Borosilicate glass	2.66 (67.56)
ZVQ-300	A	4.62 CF	Fused silica	2.69 (68.33)
ZV-400	A	6.00 CF	Borosilicate glass	3.97 (100.84)
ZVQ-400	A	6.00 CF	Fused silica	3.88 (98.55)
ZV-500	A	6.75 CF	Borosilicate glass	3.97 (100.84)
ZVQ-500	A	6.75 CF	Fused silica	3.88 (98.55)
ZV-600	A	8.00 CF	Borosilicate glass	5.60 (142.24)
ZVQ-600	A	8.00 CF	Fused silica	5.37 (136.40)
ZV-800	A	10.00 CF	Borosilicate glass	5.60 (142.24)
ZVQ-800	A	10.00 CF	Fused silica	7.78 (197.61)
ZV-ISO-63-OF	B	ISO-63	Borosilicate glass	1.49 (37.85)
ZV-ISO-80-OF	B	ISO-80	Borosilicate glass	1.49 (37.85)
ZV-ISO-100-OF	B	ISO-100	Borosilicate glass	2.66 (67.56)
ZV-ISO-160-OF	B	ISO-160	Borosilicate glass	3.97 (100.84)
ZV-ISO-200-OF	B	ISO-200	Borosilicate glass	5.60 (142.24)

### SPECIFICATIONS

**Materials**  
 Flanges: 304 stainless steel  
 Tubes: 304 stainless steel  
 Viewports: Glass, fused silica, or fused quartz  
 Weld stub seals: FKM

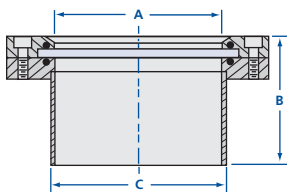
**Vacuum range**  
 Weld stubs:  $\geq 1 \times 10^{-9}$  mbar - High vacuum  
 ISO flange:  $\geq 1 \times 10^{-9}$  mbar - High vacuum  
 CF flange:  $\geq 1 \times 10^{-11}$  mbar - UHV

**Temperature range**  
 Weld stubs: -20°C to 200°C  
 ISO flange: -20°C to 200°C  
 CF flange, Glass: -20°C to 400°C  
 CF flange, Silica: -20°C to 200°C

All dimensions are in inches (mm) & weights are in pounds (kg), unless otherwise noted.

### Viewport Weld Stubs

Provided with a tube for welding onto an existing chamber.



MODEL NUMBER	FLANGE OD	VIEW MATERIAL	VIEW Ø A	B	C
VP-250	4.47 (113.54)	Borosilicate glass	2.37 (60.2)	2.88 (73.15)	2.50 (63.50)
VPQ-250	4.47 (113.54)	Fused quartz	2.37 (60.2)	2.88 (73.15)	2.50 (63.50)
VP-400	5.97 (151.64)	Borosilicate glass	3.83 (97.28)	2.88 (73.15)	4.00 (101.60)
VPQ-400	5.97 (151.64)	Fused quartz	3.83 (97.28)	2.88 (73.15)	4.00 (101.60)
VP-600	7.97 (202.44)	Borosilicate glass	5.83 (148.08)	2.88 (73.15)	6.00 (152.40)
VPQ-600	7.97 (202.44)	Fused quartz	5.83 (148.08)	2.88 (73.15)	6.00 (152.40)



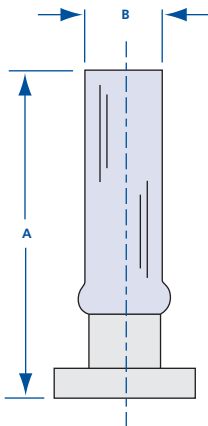
# Viewports & Shutters

## Glass Adapters & Viewport Shutters



### NW, ISO & CF Glass Adapters

Nor-Cal Products manufactures glass adapters in 7740 borosilicate and borosilicate glass. These adapters are useful for mounting glass accessories to metal high vacuum systems, or to attach flange mounted components to glass systems. These adapters are also available standard with NW, CF, and ISO flanges.



MODEL NUMBER	FLANGE TYPE	GLASS/SLEEVE MATERIALS	A	B
1GA-NW-038P	NW-10	7740 borosilicate/stainless steel	4.90 (124.46)	0.38 (9.65)
1GA-NW-075P	NW-16	7740 borosilicate/stainless steel	4.90 (124.46)	0.75 (19.05)
1GA-NW-100P	NW-25	7740 borosilicate/stainless steel	4.90 (124.46)	1.00 (25.40)
1GA-NW-150P	NW-40	7740 borosilicate/stainless steel	4.90 (124.46)	1.50 (38.10)
1GA-NW-200P	NW-50	7740 borosilicate/stainless steel	5.40 (137.16)	2.00 (50.80)
1GA-ISO-63-OF-K	ISO-63	Borosilicate glass/Kovar	7.36 (186.94)	2.50 (63.50)
1GA-ISO-63-OF-P	ISO-63	7740 borosilicate/stainless steel	5.50 (139.70)	2.50 (63.50)
1GA-ISO-80-OF-K	ISO-80	Borosilicate glass/Kovar	7.36 (186.94)	3.00 (76.20)
1GA-ISO-80-OF-P	ISO-80	7740 borosilicate/stainless steel	6.50 (165.10)	3.00 (76.20)
1GA-ISO-100-OF-K	ISO-100	Borosilicate glass/Kovar	10.25 (260.35)	4.00 (101.60)
1GA-ISO-100-OF-P	ISO-100	7740 borosilicate/stainless steel	6.50 (165.10)	4.00 (101.60)
1GA-ISO-160-OF-K	ISO-160	Borosilicate glass/Kovar	10.88 (276.35)	6.00 (152.40)
1GA-ISO-160-OF-P	ISO-160	7740 borosilicate/stainless steel	8.63 (219.20)	6.00 (152.40)
1GA-075K	1.33 CF	Borosilicate glass/Kovar	5.43 (137.92)	0.75 (19.05)
1GA-075P	1.33 CF	7740 borosilicate/stainless steel	4.93 (125.22)	0.75 (19.05)
1GA-100K	2.12 CF	Borosilicate glass/Kovar	5.42 (137.67)	1.00 (25.40)
1GA-100P	2.12 CF	7740 borosilicate/stainless steel	4.92 (124.97)	1.00 (25.40)
1GA-150K	2.75 CF	Borosilicate glass/Kovar	5.46 (138.68)	1.50 (38.10)
1GA-150P	2.75 CF	7740 borosilicate/stainless steel	4.96 (125.98)	1.50 (38.10)
1GA-200K	3.38 CF	Borosilicate glass/Kovar	5.98 (151.89)	2.00 (50.80)
1GA-200P	3.38 CF	7740 borosilicate/stainless steel	5.48 (139.19)	2.00 (50.80)
1GA-250K	4.50 CF	Borosilicate glass/Kovar	7.76 (197.10)	2.50 (63.50)
1GA-250P	4.50 CF	7740 borosilicate/stainless steel	5.63 (143.00)	2.50 (63.50)
1GA-300K	4.62 CF	Borosilicate glass/Kovar	7.66 (194.56)	3.00 (76.20)
1GA-300P	4.62 CF	7740 borosilicate/stainless steel	6.53 (165.86)	3.00 (76.20)
1GA-400K	6.00 CF	Borosilicate glass/Kovar	10.44 (265.18)	4.00 (101.60)
1GA-400P	6.00 CF	7740 borosilicate/stainless steel	6.69 (169.93)	4.00 (101.60)
1GA-500K	6.75 CF	Borosilicate glass/Kovar	10.96 (278.38)	5.00 (127.00)
1GA-500P	6.75 CF	7740 borosilicate/stainless steel	8.71 (221.23)	5.00 (127.00)
1GA-600K	8.00 CF	Borosilicate glass/Kovar	11.00 (279.40)	6.00 (152.40)
1GA-600P	8.00 CF	7740 borosilicate/stainless steel	8.75 (222.25)	6.00 (152.40)

#### SPECIFICATIONS

##### Materials

Flange: 304 stainless steel  
Glass: 7052 glass or 7740 borosilicate  
Sleeve: Kovar or 304 stainless steel

##### Vacuum range

Elastomer seal:  $\geq 1 \times 10^{-8}$  mbar - High vacuum  
Metal seal:  $\geq 1 \times 10^{-10}$  mbar - UHV

##### Temperature range

Elastomer seal: -20°C to 200°C  
Metal seal: -20°C to 400°C

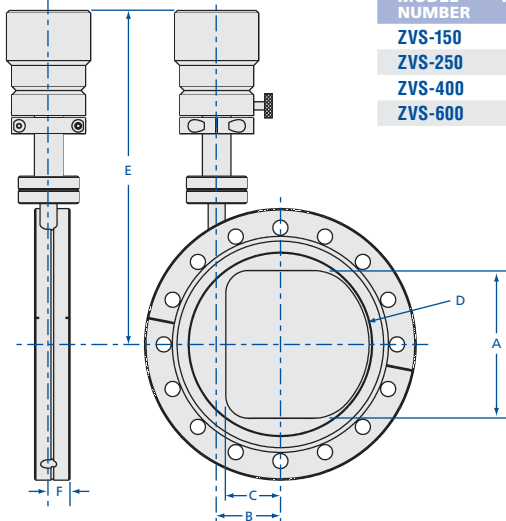
#### SPECIFICATIONS

##### Materials

Flanges: 304 stainless steel  
Flange type: 2<sup>3</sup>/<sub>4</sub> to 8 inch (69.85 to 203.2) CF, clearance bolt holes  
Actuation: PRM-133 rotary feedthrough

Temperature range: -20°C to 150°C

Vacuum range:  $\geq 10^{-10}$  mbar - UHV



### Viewport Shutters

Nor-Cal Products manufactures shutters for viewport shielding. These shutters are mounted behind a viewport to prevent build-up of deposition materials on viewports while in the closed position. They use a single plate shutter with a 90° opening rotation. Our design completely shields the viewing glass when the shutter is in the closed position. An integrated PRM-133 rotary motion feedthrough provides smooth actuation and a positive locking screw. Please call for custom actuation options, such as motor drives or special flanges.

MODEL NUMBER	FLANGE TYPE	FITS TUBE DIAMETER	A	B	C	D	E	F
ZVS-150	2.75 CF	1.510 (38.35)	1.12 (28.45)	0.57 (14.48)	0.42 (10.67)	0.70 (17.78)	5.99 (152.15)	0.44 (11.18)
ZVS-250	4.50 CF	2.510 (63.75)	2.00 (50.80)	0.85 (21.59)	0.65 (16.51)	1.18 (29.97)	6.92 (175.77)	0.34 (8.64)
ZVS-400	6.00 CF	4.010 (101.85)	3.25 (82.55)	1.40 (35.56)	1.20 (30.48)	1.90 (48.26)	7.34 (186.44)	0.47 (11.94)
ZVS-600	8.00 CF	6.020 (152.91)	5.00 (127.00)	2.06 (52.32)	1.75 (44.45)	2.90 (73.66)	8.49 (215.65)	0.50 (12.70)

