

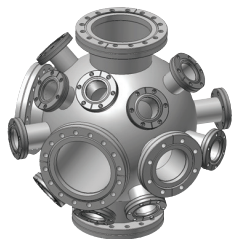
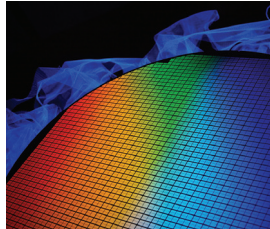
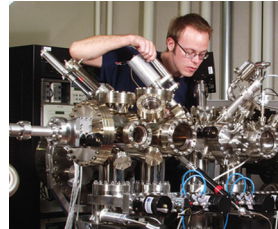
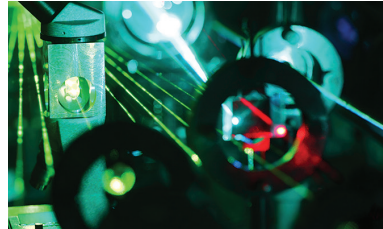


Nor-Cal Products
NC
by PFEIFFER VACUUM



Nor-Cal Products

where technology takes shape



vacuum products catalog

Viewports, Shutters & Glass Adapters

Section Eight



8.1	General Information	184
8.2	Viewports & Weld Stubs	185
8.3	Glass Adapters & Viewport Shutters	186



Nor-Cal Products, Inc.
1967 South Oregon St.
Yreka, CA 96097 USA
Tel: **800-824-4166**
or 530-842-4457
Fax: 530-842-9130
www.n-c.com

Sales Office
3375 Scott Blvd., Ste. 100
Santa Clara, CA 95054, USA
Tel: **408-980-8992**
Fax: 408-980-8947

Nor-Cal Europe Ltd.
Suite D, Dittons Engineering Park
Dittons Road
Polegate BN26 6HY
United Kingdom
Tel: **+44(0)1323 810854**
www.nor-cal.eu

Nor-Cal Korea
Gadong 2nd Floor, 531-8 Gajang-ro
Osan-si, Gyeonggi-do,
South Korea, 18103
Republic of Korea
Tel: **+82(0)31-222-6086**
Fax: +82(0)31-8003-1342

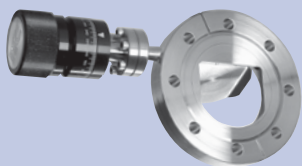
**Nor-Cal Products
Asia Pacific Pte. Ltd.**
Serangoon Garden
P. O. Box 428
Singapore 915531
Tel: **+65 6634-1228**
Fax: +65 6634-1008





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 7056 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.

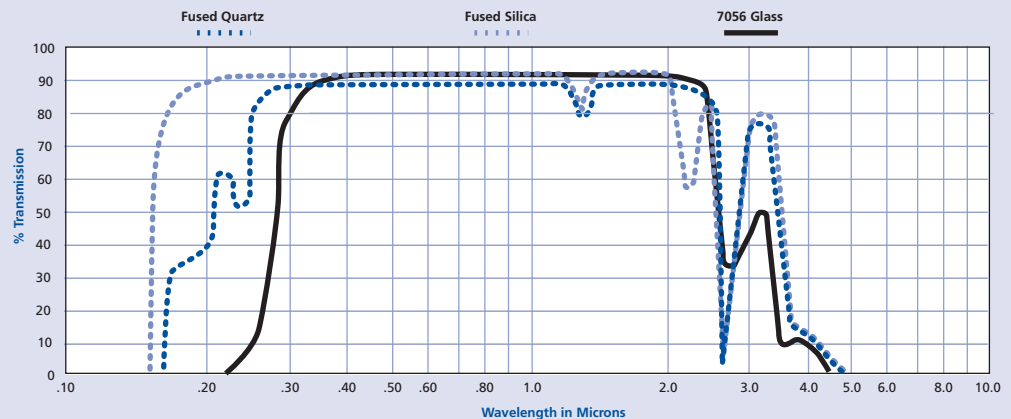
Nor-Cal Products manufactures glass adapters in 7740 borosilicate and 7052 glass. These adapters are useful for mounting glass accessories to metal high vacuum systems, or to attach flange mounted components to glass systems. Glass adapters are available with NW, CF, and ISO flanges as standards.



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 2³/₄, 4¹/₂, 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.

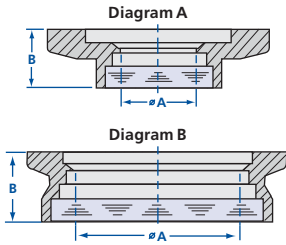
Viewport Optical Transmission Curves



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

Viewports & Shutters

Viewports & Weld Stubs



NW Viewports

7056 glass NW viewports in 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	7056 Glass	0.62 (15.75)	0.385 (9.78)
VP-NW-25	A	NW-25	7056 Glass	0.62 (15.75)	0.385 (9.78)
VP-NW-40	B	NW-40	7056 Glass	1.51 (38.35)	0.554 (14.07)
VP-NW-50	B	NW-50	7056 Glass	1.51 (38.35)	0.554 (14.07)

SPECIFICATIONS

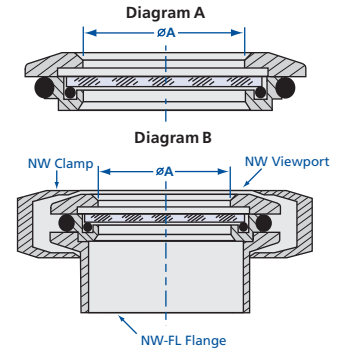
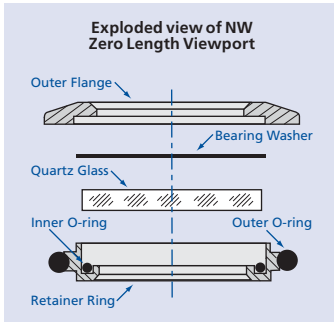
Materials
 Flanges: 304 stainless steel
 Viewports: Glass or fused quartz
 Seal: FKM

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

Temperature range: -20°C to 200°C

NW Zero Length Viewports

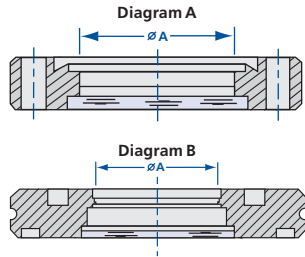
Nor-Cal Products' zero length viewports have an innovative design which places the viewing glass inside the centering ring. The clear, polished quartz can be removed for cleaning or replacement. Zero length viewports are available for NW-40 and NW-50 flange sizes.



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	7056 Glass	0.63 (16.00)
ZV-100	A	2.12 CF	7056 Glass	0.63 (16.00)
ZV-150	A	2.75 CF	7056 Glass	1.49 (37.85)
ZVQ-150	A	2.75 CF	Fused silica	1.40 (35.56)
ZV-200	A	3.38 CF	7056 Glass	1.49 (37.85)
ZVQ-200	A	3.38 CF	Fused silica	1.40 (35.56)
ZV-250	A	4.50 CF	7056 Glass	2.66 (67.56)
ZVQ-250	A	4.50 CF	Fused silica	2.69 (68.33)
ZV-300	A	4.62 CF	7056 Glass	2.66 (67.56)
ZVQ-300	A	4.62 CF	Fused silica	2.69 (68.33)
ZV-400	A	6.00 CF	7056 Glass	3.97 (100.84)
ZVQ-400	A	6.00 CF	Fused silica	3.88 (98.55)
ZV-500	A	6.75 CF	7056 Glass	3.97 (100.84)
ZVQ-500	A	6.75 CF	Fused silica	3.88 (98.55)
ZV-600	A	8.00 CF	7056 Glass	5.60 (142.24)
ZVQ-600	A	8.00 CF	Fused silica	5.37 (136.40)
ZV-800	A	10.00 CF	7056 Glass	5.60 (142.24)
ZVQ-800	A	10.00 CF	Fused silica	7.78 (197.61)
ZV-ISO-63-OF	B	ISO-63	7056 Glass	1.49 (37.85)
ZV-ISO-80-OF	B	ISO-80	7056 Glass	1.49 (37.85)
ZV-ISO-100-OF	B	ISO-100	7056 Glass	2.66 (67.56)
ZV-ISO-160-OF	B	ISO-160	7056 Glass	3.97 (100.84)
ZV-ISO-200-OF	B	ISO-200	7056 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

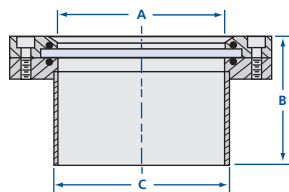
Vacuum range
 Weld stubs: $\geq 1 \times 10^{-9}$ mbar - High vacuum
 ISO flange: $\geq 1 \times 10^{-9}$ mbar - High vacuum
 CF flange: $\geq 1 \times 10^{-11}$ mbar - UHV

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.

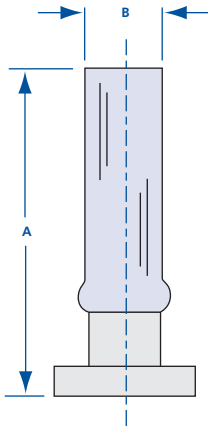


MODEL NUMBER	FLANGE OD	VIEW MATERIAL	VIEW Ø A	B	C
VP-250	4.47 (113.54)	Borosilicate glass	2.37 (60.2)	2.88 (73.15)	2.50 (63.50)
VPQ-250	4.47 (113.54)	Fused quartz	2.37 (60.2)	2.88 (73.15)	2.50 (63.50)
VP-400	5.97 (151.64)	Borosilicate glass	3.83 (97.28)	2.88 (73.15)	4.00 (101.60)
VPQ-400	5.97 (151.64)	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 7052 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.

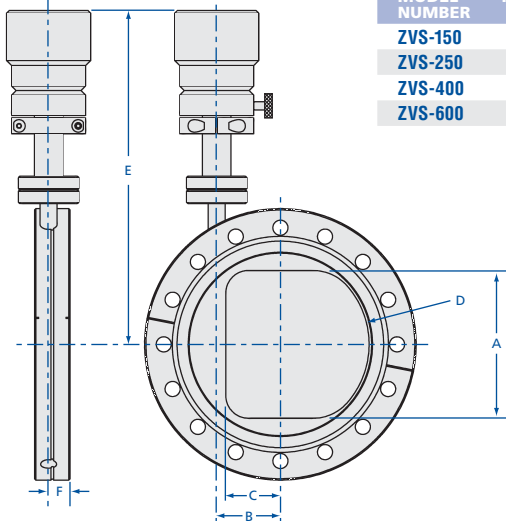
MODEL NUMBER	FLANGE TYPE	GLASS/SLEEVE MATERIALS	A	B
1GA-NW-038P	NW-10	7740 borosilicate/stainless steel	4.90 (124.46)	0.38 (9.65)
1GA-NW-075P	NW-16	7740 borosilicate/stainless steel	4.90 (124.46)	0.75 (19.05)
1GA-NW-100P	NW-25	7740 borosilicate/stainless steel	4.90 (124.46)	1.00 (25.40)
1GA-NW-150P	NW-40	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	7052 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	7052 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	7052 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	7052 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	7052 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	7052 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	7052 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	7052 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	7052 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	7052 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	7052 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	7052 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	7052 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

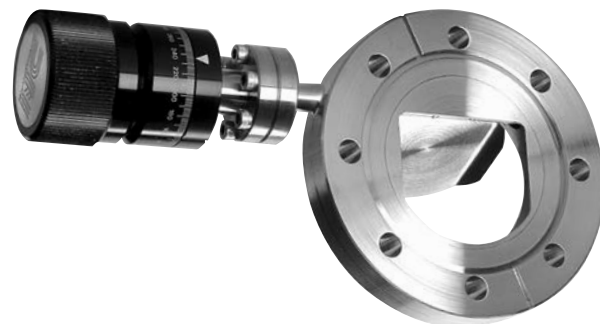
- Materials**
 - Flanges: 304 stainless steel
 - Flange type: 2³/₄ to 8 inch (69.85 to 203.2) CF, clearance bolt holes
 - Actuation: PRM-133 rotary feedthrough
- Temperature range:** -20°C to 150°C
- Vacuum range:** $\geq 10^{-10}$ mbar - UHV



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)



Order Information

Regional Sales Contacts

Nor-Cal Products



by PFEIFFER VACUUM

Manufacturing & Corporate Global Headquarters

1967 South Oregon Street, Yreka, CA 96097

Phone: 530-842-4457 | Toll Free: 800-824-4166 | Fax: 530-842-9189

Silicon Valley Sales & Applications Office

3375 Scott Blvd., Suite 100, Santa Clara, CA 95054

Phone: 408-980-8992 | Fax: 408-980-8947 | E-mail: ncsales@n-c.com

DIRECT SALES:

www.n-c.com | 1-800-824-4166 | ncsales@n-c.com

Locate your
sales representative
at
www.n-c.com/sales
or call
800-824-4166
for assistance

Send drawings
and quote
requests to
ncsales@n-c.com

Follow us on
LinkedIn

Sylvie Bouhier

*European
Regional Sales Manager*

Ph: +44 (0)799 057 1405
sbouhier@nor-cal.eu

Nor-Cal Products, Europe

Suite D, Dittons Engineering Park
Dittons Road, Polegate BN26 6HY
United Kingdom

Ph: +44 (0)1323 810 854

www.nor-cal.eu

Lena Tan

*Asia-Pacific
Regional Sales Manager*

Ph: +65 6634-1228
sales@n-c.asia

Nor-Cal Products, Asia Pacific

2 Ang Mo Kio Street 64 #01-03A
ECON Industrial Building
Singapore 569084

MAILING ADDRESS:

Nor-Cal Products, Asia Pacific

Serangoon Garden
P. O. Box 428
Singapore 915531

IT Jang

*South Korea
Regional Sales Manager*

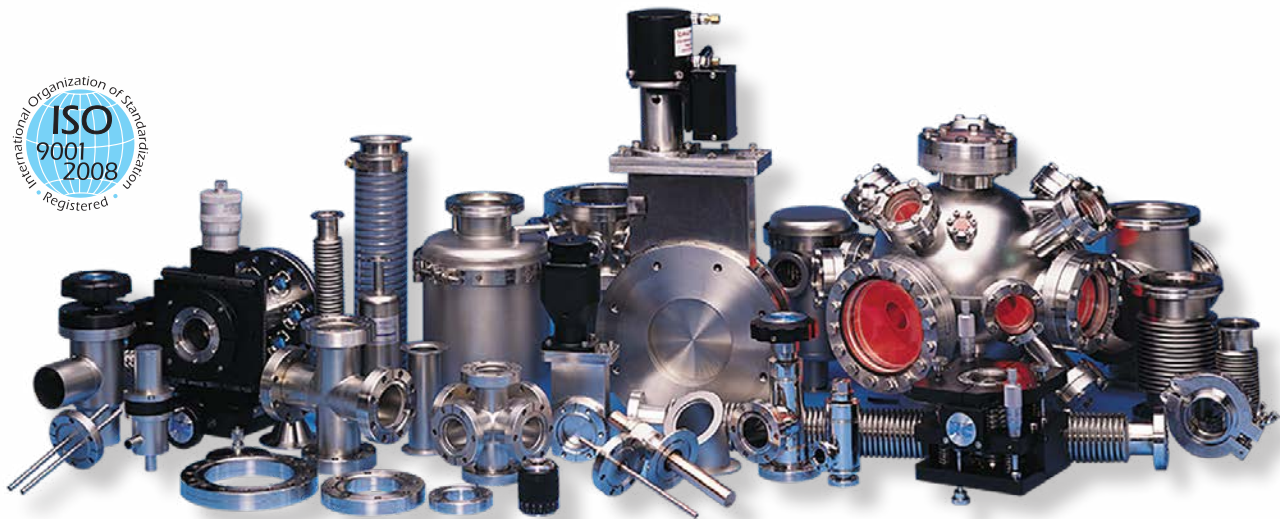
Ph: +82-10-7554-0117
itjang@n-c.com

Nor-Cal Products, South Korea

Gadong 2nd Floor, 531-8 Gajang-ro,
Osan-si, Gyeonggi-do,
South Korea, 18103
Republic of Korea

Ph: +82-31-8003-1341

Fax: +82-31-8003-1342



Terms & Conditions of Sale

Payment terms are net 30 days from the date of the invoice once credit has been approved. Otherwise, C.O.D. Most major credit cards are accepted.

If payment in full is not received within 30 days, a 1.5% per month late charge may be added to the unpaid balance. Discounts may be revoked if an account is not paid within these terms.

MINIMUM ORDERS: The minimum domestic order is \$40. The minimum international order is \$100.00.

QUANTITY PRICING:

Quantity pricing is valid on single shipments only.

AVAILABILITY: Our inventory is updated automatically, but there is always a possibility that an item may be unavailable or sold-out. If this occurs, customers are notified as soon as possible and alternative options are offered if available.

PACKAGING: The factory will determine the most cost effective method to package items for shipment. A \$5.00 USD per cardboard box charge will be applied to all orders with a maximum charge of \$25.00 USD per shipment. Large products requiring a wooden crate will be charged an amount consistent with the fabrication of the necessary crate.

FOB POINT: All orders ship FOB Yreka from 1967 S. Oregon, Yreka, California, 96097, USA unless quoted otherwise.

LOST OR DAMAGED ITEMS: Nor-Cal does not assume responsibility for items lost or damaged in transit, or for any direct or indirect damages incurred. Shipping damages are to be handled by the customer. Nor-Cal will provide the tracking number and contact information for the shipping company as needed. All items are purchased at the customer's risk.

EXPORTED COMMODITIES: US Export administration Regulations must be followed. Diversion contrary to US Law is prohibited.

Pricing & Dimensions

In order to meet the changing needs of our customers we periodically make design revisions in our standard product line. As a result, the dimensions, pricing and specifications are subject to change without notice. International pricing may also vary.

SPECIAL TOOLING: Products ordered to non-standard specifications should state specification requirements in detail. Fee for special tooling may apply. On request, test report(s) and/or certification(s) can be supplied at additional cost.

Discounts

OEM and quantity discounts are available to qualified customers.

Return Policy

An RMA (Return Materials Authorization) number must be obtained from Nor-Cal Products before returning any merchandise. The RMA form can be found under SUPPORT in the footer of pages at www.n-c.com. To expedite the assignment of an RMA number, complete the form online and submit online. You may also print and email the completed form to rma@n-c.com or fax to the attention of the RMA Coordinator at 866-640-9012.

- Nor-Cal Products reserves the right to refuse the return of non-stocked items. A twenty-five (25) percent restocking fee may be charged.
- Nor-Cal Products shall incur no liability for damage, shortages or other cause alleged to have occurred at, or prior to, delivery to the carrier unless buyer shall have entered full details thereof on its receipt to the carrier. Products over 60 days old from the date of shipment will not be accepted for return.
- Nor-Cal Products must be allowed time to investigate all returns.

Cancellations & Rescheduling

Any request by customers to reschedule or cancel in total or part of any purchase order must be approved at the sole discretion of Nor-Cal Products and shall be subject to the following conditions. Nor-Cal must receive written notice of Request for Cancellation or Reschedule, stating the reasons therefore.

Customer shall be liable for payment of the following charges to Nor-Cal in the event of Cancellation or Reschedule.

- For all charges incurred (including overhead, G&A, and profit) prior to the date that notice of cancellation is received by Nor-Cal for all parts peculiar to customer's requirements. Upon payment by the customer of these charges, such parts become the property of customer, Nor-Cal will store said parts for a reasonable period of time pending the receipt of customer's instructions for disposition. Such storage is at customer's risk and may be subject to storage charges if stored by Nor-Cal for longer than 30 days from the cancellation date; plus
- Charges to convert modified standard parts for return to Nor-Cal's inventory; plus
- A restocking charge of twenty (25) percent of the purchase price of the cancelled item.

Warranty Products manufactured by Nor-Cal Products are warranted against defects in material and workmanship for a period of twelve (12) months from the date of shipment from Nor-Cal Products to the buyer. Any modification to the product by the buyer or their agent voids this warranty. Liability under this warranty is expressly limited to the replacement or repair (at Nor-Cal Products' option) of defective parts. Nor-Cal Products may at any time discharge its warranty as to any of its products by refunding the purchase price and taking back the products. This warranty applies only to parts manufactured and labor provided by Nor-Cal Products under valid warranty claims received by Nor-Cal Products within the applicable warranty period and shall be subject to the terms and conditions hereof.

- Expendable items such as tubes, heaters, sources, bellows, etc., by their nature, may not function for one year; if such items fail to give reasonable service for a reasonable period of time, as determined solely by Nor-Cal Products, they will be repaired or replaced by Nor-Cal Products at its election.
- All warranty replacement or repair of parts shall be limited to equipment malfunctions which, in the sole opinion of Nor-Cal Products, are due or traceable to defects in original materials or workmanship. Malfunctions caused by abuse or neglect of the equipment are expressly not covered by this warranty. Nor-Cal Products expressly disclaims responsibility for any loss or damage caused by the use of its products other than in accordance with proper operating and safety procedures. Reasonable care must be taken by the user to avoid hazards.
- The buyer shall give Nor-Cal Products prompt notice of any claim under this warranty. If Nor-Cal Products, in its sole discretion, determines that the product does not conform to this warranty, Nor-Cal Products shall replace or repair the product free of charge. If such replacement or repair is not feasible, Nor-Cal Products may, at its sole option, refund the purchase price.
- In-warranty repaired or replacement parts are warranted only for the remaining unexpired portion of the original warranty period applicable to the parts which have been repaired or replaced.
- After the expiration of the applicable warranty period, the buyer shall be charged at Nor-Cal Products' then current prices for parts and labor plus transportation.
- Except as stated herein, Nor-Cal Products makes no warranty, expressed or implied (either in fact or operation of law), statutory or otherwise: and, except as stated herein, Nor-Cal Products shall have no liability for special or consequential damages of any kind or from any cause arising out of the sale, installation, or use of any of its products. Statements made by any person, including representatives of Nor-Cal Products, which are inconsistent or in conflict with the terms of this warranty shall not be binding upon Nor-Cal unless reduced to writing and approved by an officer of Nor-Cal Products.
- This warranty shall not extend to any product, that in Nor-Cal Products' judgment, has been affected by damage or wear resulting from operations performed after the sale, or misuse, abrasion, negligence, accident, tampering, faulty installation, inadequate maintenance, damage or casualty.

DISCLAIMER OF WARRANTY: NOR-CAL MAKES NO WARRANTIES WITH RESPECT TO THIS SALE, WHETHER EXPRESSED OR IMPLIED, EXCEPT AS STATED HEREIN, NOR-CAL PRODUCTS MAKES NO WARRANTY OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE.

LIMITATION OF REMEDY AND DAMAGES: THE EXCLUSIVE REMEDY OF THE BUYER WITH RESPECT TO THE TRANSACTIONS CONTEMPLATED HEREIN SHALL BE THE REPLACEMENT OR REPAIR OF SAID PRODUCTS, OR THE RETURN OF THE PURCHASE PRICE, AS SET FORTH UNDER "WARRANTY".

EXCEPT AS HEREIN PROVIDED, EVERY FORM OF LIABILITY FOR DIRECT OR CONSEQUENTIAL DAMAGE FOR LOSS, ARISING FROM CONTRACT, TORT OR OTHERWISE, IS EXPRESSLY EXCLUDED AND DENIED, INCLUDING WITHOUT LIMITATION, LOSS OR DAMAGES TO BUILDINGS, CONTENTS, PRODUCTS OR PERSONS.

Order Information

Patents & Trademarks

Nor-Cal Products, Inc. patents and trademarks:

Genesis Modular Valves are manufactured under patent number 6289932

Intellisys Pressure Control Products are manufactured under patent number 6612331

Genesis is a trademark of Nor-Cal Products, Inc.

Intellisys is a registered trademark of Nor-Cal Products, Inc.

Other registered patents and trademarks:

Magnetic Linear/Rotary Feedthroughs are manufactured under patent number 5514925

Sample Transfer Systems are manufactured under patent number 5705128

Alumel is a registered trademark of Concept Alloys, Inc.

Cajon is a registered trademark of Swagelok Company

Chemraz is a registered trademark of Greene Tweed Company

Chromel is a registered trademark of Concept Alloys, Inc.

ConFlat is a registered trademark of Varian Associates Corp.

DeviceNet is a trademark of the Open DeviceNet Vendor Association (ODVA)

Dupra is a registered trademark of Daikin Industries, Ltd.

Ethernet is a trademark of Xerox Corporation

EVAC-CeFix is a registered trademark of EVAC AG

Inconel is a registered trademark of Special Metals Corp.

KF is a registered trademark of Leybold Vacuum Products Inc.

Kalrez is a registered trademark of DuPont Dow Elastomers

Kovar is a registered trademark of CRS Holdings Inc.

Macor is a registered trademark of Corning, Inc.

Microdot is a registered trademark of Tyco Electronics Corp.

Modbus is a registered trademark of Schneider Electric USA Inc.

Omicron is a registered trademark of Omicron Electric GmbH

Pendurroll is a patented technology of V-Tex Corporation

Perlast is a registered trademark of Precision Polymer Engineering LTD.

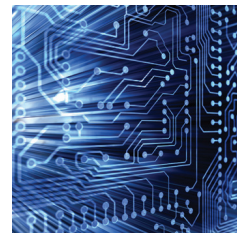
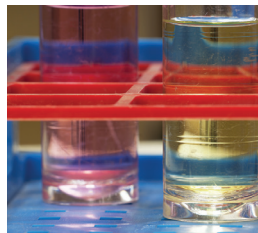
SolidWorks is a registered trademark of Dassault Systèmes SolidWorks Corp.

Swagelok is a registered trademark of Swagelok Company

UL is a registered trademark of Underwriters Laboratories, Inc.

VCR is a registered trademark of Swagelok Company

Windows is a registered trademark of Microsoft Corporation



Nor-Cal Products



by PFEIFFER VACUUM

Nor-Cal Products, Inc.
1967 South Oregon Street
Yreka, California 96097
800-824-4166 or 530-842-4457
Fax: 530-841-9189
www.n-c.com