



VACUUM COMPONENTS

National Electrostatics Corp.

Vibration Isolator Model VI-1

APPLICATIONS

The NEC vibration isolator, Model VI-1, mounts between a turbomolecular pump or cryopump and a vacuum system. It significantly reduces vibration transmitted to target chambers, microscopes, wafer processing chambers, end stations, or other vacuum apparatus which must be kept motionless.

The VI-1 was originally developed for use with cryopumps on the NEC 3MeV production ion implantation system. It proved to be very effective in isolating the cryopump vibration from the wafer processing end station.



- Simple installation
- Large clear aperture
- High conductance
- UHV compatible materials
- Short insertion length
- Common vacuum flanges

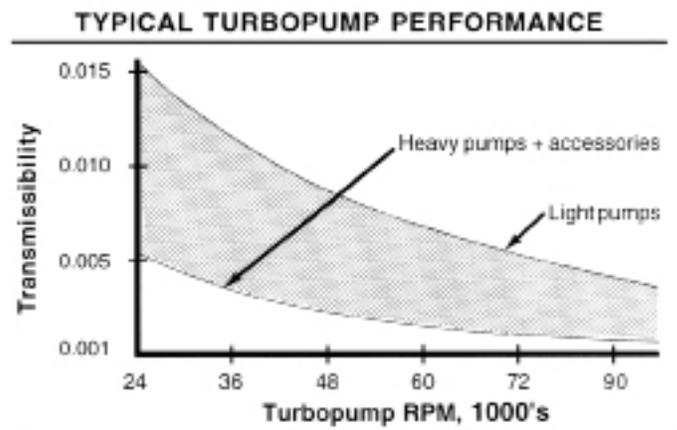
DESIGN

The VI-1 consists of two vacuum flanges separated by a compliant, large-aperture welded bellows and a set of low profile elastomer vibration isolators. In all flange sizes and versions, the aperture of the bellows has been chosen to maximize conductance and clearance and to minimize interference with flange hardware. Construction is from UHV compatible welded stainless steel bellows and flanges.

PERFORMANCE

As with any vibration isolator system, the effectiveness of the NEC vibration isolator depends on the frequency spectrum of the pump. Turbo pumps have relatively high frequency vibrations. Isolation with the VI-1 is excellent, with typical values for transmissibility between 0.001 and 0.01 depending on pump RPM and weight. Additional weight from components such as a gate valve mounted on the pump side of the isolator further improves isolation.

For typical turbo pumps, it is possible to reduce equipment vibration to levels required for sub-micron resolution processes.



Cryopumps usually have large low frequency components as well as assorted higher frequency components from drive motors. In practice, the VI-1 significantly reduces total vibration from a cryopump system even though it cannot attenuate frequency components below about 20-40Hz. As with the turbo pumps, isolation effectiveness depends on the particular pump and accessories installed.

CONFIGURATION

The VI-1 can be used in both vertical or horizontal positions for both pump isolation and isolation of other beamline components.

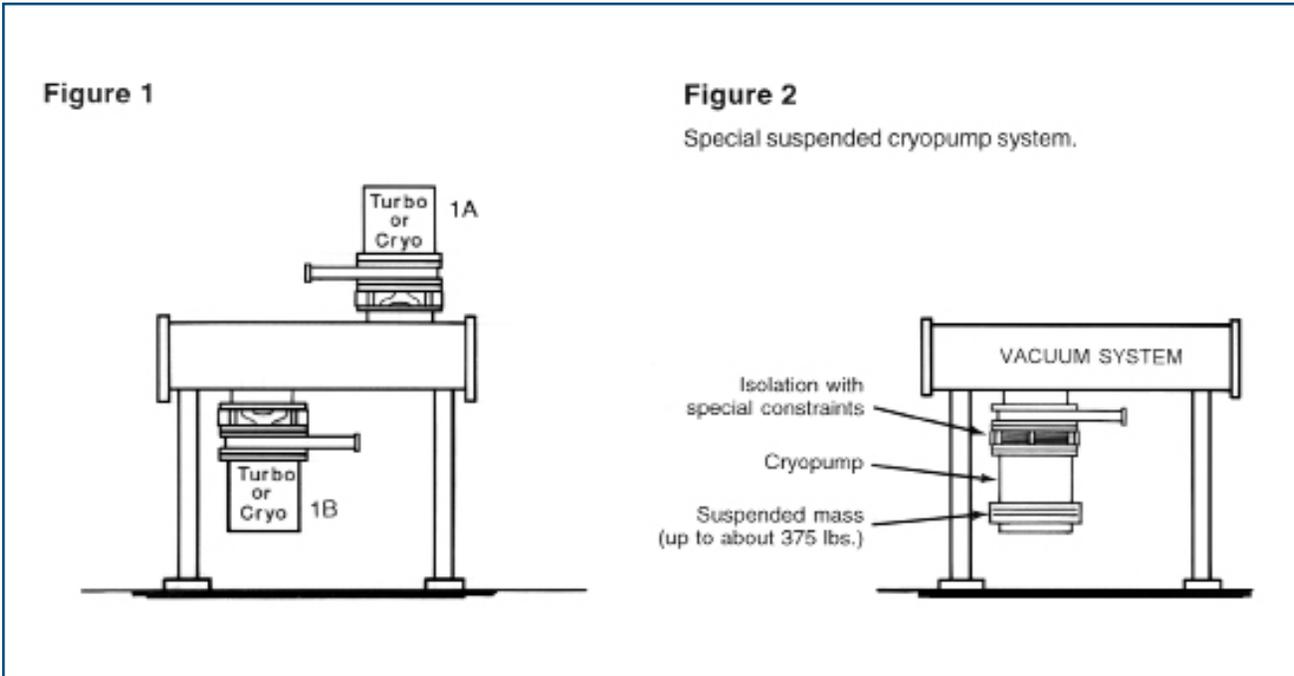
TURBO MOLECULAR PUMPS

For turbo molecular pumps the VI-1 vibration isolator can support a pump and gate valve either above (Fig. 1A) or below (Fig. 1B) the vacuum system. The elastomer isolators restrain the bellows in both the compression and tension, up to the load rating of the particular size VI-1 used. Performance is essentially the same in either position.

CRYOPUMPS

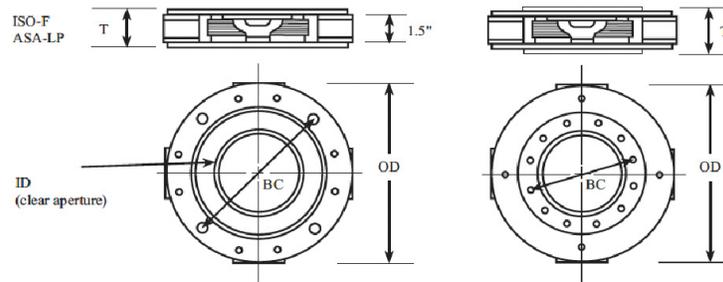
In cryopump applications, the VI-1 can simply support the pump and gate valve above or below the vacuum system as with a turbo pump (Fig. 1A and 1B) or may be used with an independent pump support system for maximum isolation (Fig. 2). In the simple mounting scheme, the isolator greatly attenuates the assorted higher frequency components of the cryopump drives, and reduces some portion of the low frequency vibration spectrum in most cryopumps.

For the most demanding applications the freely suspended cryopump system (Fig. 2) gives very high isolation. The vacuum system must support the weight required to counteract the force of the atmosphere acting on the bellows, and special, optional constraints must be added to the system before use.



Available Flange Sizes

4" ASA-LP	2.75" CF	100 ISO-F
6" ASA-LP	4.5" CF	160 ISO-F
	6" CF	200 ISO-F
	8" CF	250 ISO-F
	10" CF	
	12" CF	



Flange Type	T	ID	BC	No. Bolts	OD	Maximum Supported Load	Maximum Suspended Load
100 ISO-F	2.50"	3.75"	5.71"	8	9.00"	192 lbs.	208 lbs.
160 ISO-F	2.75"	4.98"	7.87"	8	11.25"	107 lbs.	413 lbs.
160 ISO-F (LB) ♦♦	2.75"	5.88"	7.87"	8	11.25"	suspend only	400 lbs. ♦
200 ISO-F	2.75"	4.98"	10.24"	12	11.25"	107 lbs.	413 lbs.
200 ISO-F (LB) ♦♦	3.44"	7.80"	10.24"	6/12	13.25"	suspend only	400 lbs. ♦
250 ISO F (LB) ♦♦	3.25"	9.50"	14.25"	6/12	16.00"	350 lbs.	1200 lbs.
2.75" O.D. CF	2.00"	0.76"	2.31"	6	2.75"	suspend only	20 lbs. ♦
4.5" O.D. CF	3.00"	2.25"	3.62"	8	9.00"	93 lbs.	87 lbs.
6" O.D. CF	3.00"	3.64"	5.12"	16	10.00"	116 lbs.	184 lbs.
8" O.D. CF	3.00"	5.40"	7.12"	20	12.00"	116 lbs.	404 lbs.
10" O.D. CF	3.00"	4.98"	9.12"	24	14.00"	107 lbs.	413 lbs.
10" O.D. CF (LB) ♦♦	3.88"	7.80"	9.12"	24	14.00"	suspend only	400 lbs. ♦
12" O.D. CF	3.50"	9.50"	11.18"	32	16.00"	350 lbs.	1200 lbs.
4" ASA-LP	2.50"	4.50"	7.50"	4	10.20"	82 lbs.	318 lbs.
6" ASA-LP	2.50"	4.98"	9.50"	4	11.00"	107 lbs.	413 lbs.

ASA flanges: through holes standard, threaded holes on request.
 Captured o-ring assemblies available for ISO and ASA flanges.
 (LB) Large Bore.

* Vertical orientation, pump below isolator,
 optional constraints required.

♦ Modified versions available for pumps above isolator.

♦♦ (LB) flanged isolators not available with rotatable flanges.

To specify part number last digit, X:

ISO flanges:

- X=0 Both flanges threaded
- X=1 One flange threaded
- X=2 Both flanges through holes

CF flanges (one is rotatable):

- X=0 Both flanges threaded
- X=1 One flange threaded (non-rotatable)
- X=2 Both flanges through holes

CF flanges (both non-rotatable):

- X=3 Both flanges threaded
- X=4 One flange threaded (non-rotatable)
- X=5 Both flanges through holes

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