

Vibration Isolator Model VI-1



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

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.

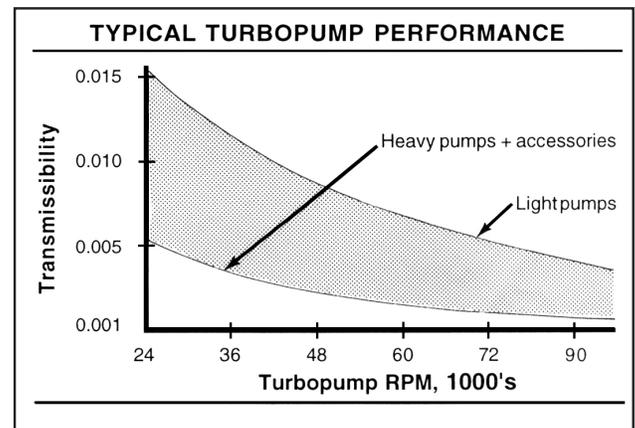
DESIGN

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 turbopumps, 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 turbopumps, isolation effectiveness depends on the particular pump and accessories installed.

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CONFIGURATION

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

Turbomolecular pumps

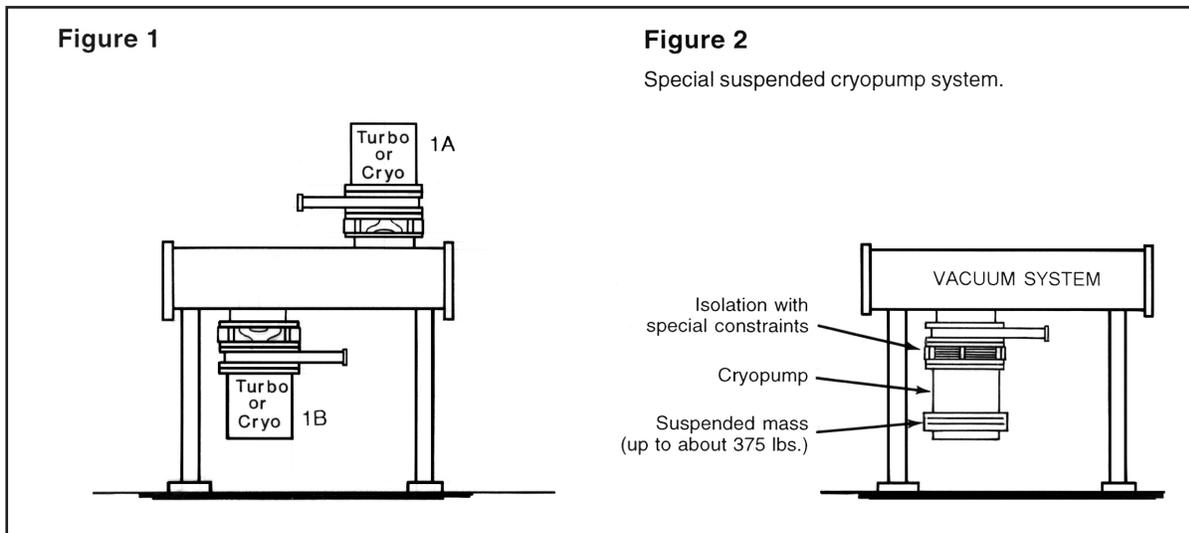
For turbomolecular pumps the VI-1 vibration isolator can support a pump and gate valve either above (Fig. 1A) or below (Fig. 1B) the vacuum system. The elastomer isolators restrain the bellows in both compression and tension, up to the load rating of the particular size VI-1 used. Performance is essentially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