



# METAL/CERAMIC ASSEMBLIES

## National Electrostatics Corp.

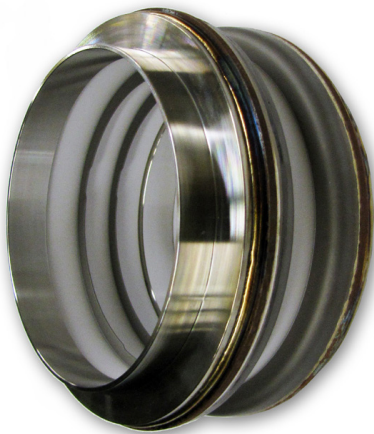
## Beamline Insulator

### APPLICATIONS

The NEC beamline insulator provides complete electrical isolation with ultra-high vacuum compatibility on beamline systems.

The beamline insulators have been very effective in isolating sensitive detection equipment from electrical noise that may be generated by very high voltage ion beam accelerators. Although there is no voltage specification for these insulators, customers have reported maintaining a potential difference of 6 to 7kV in clean, dry, ambient air for the 4" diameter version.

These beamline insulators also have been used for a wide variety of special applications that require exceptional mechanical strength and the ability to withstand thermal shock.



*Single gap 4" beamline insulator with weldable tube ends*

### DESIGN

The beamline insulator is of all-metal and ceramic construction with no organic materials in the vacuum volume. The metal/ceramic bond is accomplished by a unique metal diffusion process for bonding alumina ceramic to titanium. This assembly is bakeable to over 200°C.

This metal/ceramic assembly is capable of withstanding extreme thermal and mechanical shock. Tests have been performed where the beamline insulator was submerged in liquid nitrogen until boiling stopped, then removed and heated to a minimum of 100°C with a hot air blower. The assembly was then found to be leak tight with a helium leak detector with a sensitivity of  $1 \times 10^{-10}$  std. cc/seconds.

Pull deformation tests were also performed on the 4" beamline insulator which had a stainless steel tube, 46 cm x 10 cm O.D. x 1.6 mm wall thickness welded to each end. The beamline insulator was pulled on axis until permanent deformation occurred at 454kg. No leak developed. There was no indication of permanent deformation up to 454kg pull.

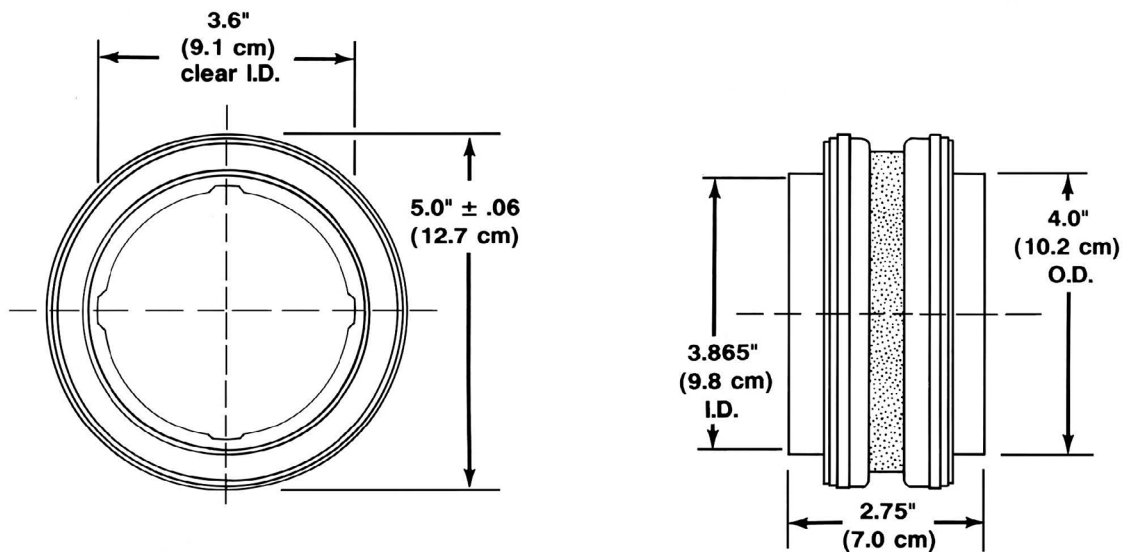
With the same assembly described above, bending moment deformation tests were also performed. The beam line insulator was supported horizontally at one end by the tube extension and weighted on the opposite tube extension end at a distance of 25.4cm from the insulator. A permanent bend occurred at 73kg. No leak developed.

### OPTIONS

The beamline insulator has a 4" O.D. steel ring at each end and a single insulating gap of 1/2" width. A 6" O.D. version is also available. On request, multi-gap assemblies are available. In addition to weldable tube ends, a wide variety of flanges are available.

# SPECIFICATIONS

Ultimate Pressure:	Less than $1 \times 10^{-9}$ Torr, after bakeout
Bakeable:	To 200°C maximum
Insulating Gap:	Single, 0.5" width (multi-gap available on request)
Ceramic:	Alumina, 4.375" O.D., 4.0" I.D.
Mechanical Strength:	No deformation at 450kg pull No deformation at 70kg horizontal load (see text)
Flanges:	6.0" O.D. NEC, tapped 6.0" O.D. CF, tapped Custom flanges available on request.



## ORDERING INFORMATION

**Catalog No.: 2GW012010** (with tube ends)

*Quantity discounts available.*

## Contact NEC

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