

### Description

#### Differentially Pumped, Extended Range, Viewports for Extreme High Vacuum (EHV) Applications

EHV applications demand exceedingly high seal reliability. These requirements for vacuum integrity lead to consideration of two limits to commercial leak detection. First, what is the typical helium sensitivity for commercially available leak detectors; and second, what are the practical limitations of helium mass spectrometer (MS) leak rate certification.

While helium MS leak detection systems are sensitive to leak rates less than  $10^{-11}$  STD cc/sec, commercial vacuum seals are certified only for leak rates of less than  $10^{-10}$  STD cc/sec. In these instances, the discrepancy between that achievable versus the reported sensitivity is not due to the presence of small, measurable leaks ( $<10^{-11}$  STD cc/sec). Rather, the reduced certification is due to the difficulty of performing a reliable leak test with de-mountable hardware. An all metal welded joint to an MS leak detector, for example, could readily and reliably be certified to leak rates less than  $10^{-11}$ . This type of joint is not practical for most de-mountable vacuum components. Even in the case of a copper gasket seal, the process of sealing is not only too time consuming but also would cosmetically alter the finished part.

In other instances, such as in inert gas chronology measurements, where the desired background levels due to atmospheric argon or helium are actually below the level of instrument sensitivity; it is not possible to measure with sensitivity at the desired leak rate with commercially available Helium MS leak detectors.

In both instances, a differentially pumped vacuum seal can ensure EHV reliability. Arranging two or more seals such that the space between the seals is accessible to an appended vacuum pump creates a differentially pumped seal. Typically, each seal is readily qualified to have leak rates  $<10^{-10}$  STD cc/sec. By actively pumping the region between the seals, minute leakage through the atmospheric seal is further rarified to ensure that leakage through the inner seal is reduced by several orders of magnitude. Thus, differential pumping ensures EHV reliability.

CeramTec's differentially pumped, extended range, viewports have been designed specifically for such extreme high vacuum (EHV) applications including inert gas chronology.

#### Extreme / Custom Design

- Larger viewport view diameters to fit within a 4 1/2" ConFlat flange.

- Different optics are available upon request. For example, Silicon, Germanium, Zinc Sulfide
- Specialized coatings are also available.
- Custom pumping port termination options are available.

#### Installation

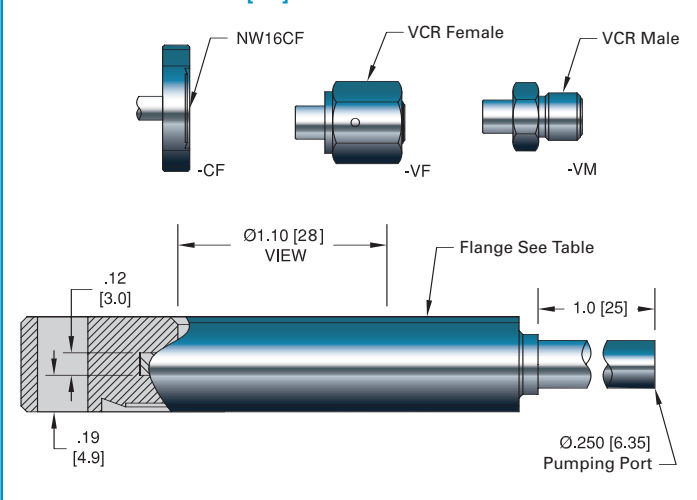
All of CeramTec's standard differentially pumped viewports are mounted within a 2 3/4" or 4 1/2" ConFlat flange. For information on ConFlat flange installation, refer to the Technical Reference section.

#### Applications

A few of the many applications in which these differentially pumped viewports are commonly used are:

- Geochronology
- Geology
- Argon Dating

#### View Diameter: 1.10 [28]



### Specifications

#### Materials

Flange: 304 Stainless steel  
 O-ring: Viton®  
 Optics: Zinc Selenide or Cleartran  
 Magnetic Materials: Yes

**Transmission Range** 10.6 Micron optimized

**Anti-reflective Coating** Yes

**Temperature Range** -8°C to 204°C

1.10 View Dia.  
ConFlat

MATERIAL	INSTALLATION	TRANSMISSION RANGE	%MIN	TERMINATION OPTIONS	PART NUMBER
Zinc Selenide	2 3/4" (NW35CF)	10.6 Micron optimized	98	Tube	19286-01-A
Zinc Selenide	2 3/4" (NW35CF)	10.6 Micron optimized	98	1 1/3" ConFlat	19286-01-CF
Zinc Selenide	2 3/4" (NW35CF)	10.6 Micron optimized	98	Male VCR	19286-01-VM
Zinc Selenide	2 3/4" (NW35CF)	10.6 Micron optimized	98	Female VCR	19286-01-VF
Cleartran™	2 3/4" (NW35CF)	10.6 Micron optimized	98	Tube	19286-02-A
Cleartran™	2 3/4" (NW35CF)	10.6 Micron optimized	98	1 1/3" ConFlat	19286-02-CF
Cleartran™	2 3/4" (NW35CF)	10.6 Micron optimized	98	Male VCR	19286-02-VM
Cleartran™	2 3/4" (NW35CF)	10.6 Micron optimized	98	Female VCR	19286-02-VF
Zinc Selenide	4 1/2" (NW63CF)	10.6 Micron optimized	98	Tube	19781-01-A
Zinc Selenide	4 1/2" (NW63CF)	10.6 Micron optimized	98	1 1/3" ConFlat	19781-01-CF
Zinc Selenide	4 1/2" (NW63CF)	10.6 Micron optimized	98	Male VCR	19781-01-VM
Zinc Selenide	4 1/2" (NW63CF)	10.6 Micron optimized	98	Female VCR	19781-01-VF
Cleartran™	4 1/2" (NW63CF)	10.6 Micron optimized	98	Tube	19781-02-A
Cleartran™	4 1/2" (NW63CF)	10.6 Micron optimized	98	1 1/3" ConFlat	19781-02-CF
Cleartran™	4 1/2" (NW63CF)	10.6 Micron optimized	98	Male VCR	19781-02-VM
Cleartran™	4 1/2" (NW63CF)	10.6 Micron optimized	98	Female VCR	19781-02-VF

