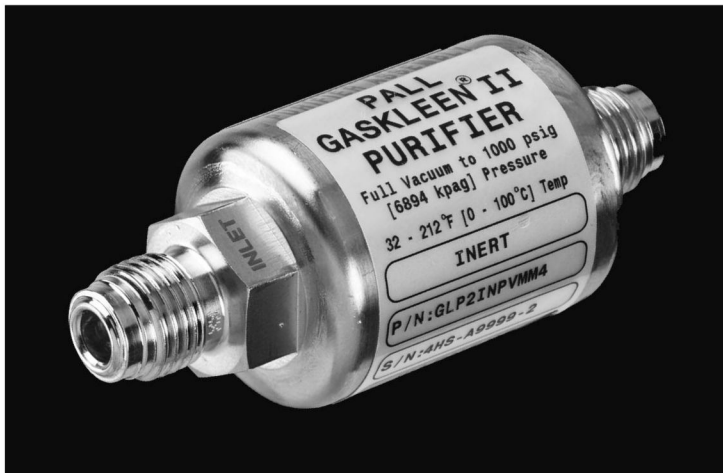


## Gaskleen® II Purifier



### Description

A unique combination of Pall's leading edge AresKleen™ purification material combined with Ultramet-L® stainless steel filter media creating the industry's most advanced true point-of-use purifier.

The Gaskleen® II Purifier assembly is designed to remove contamination from most process gases. Sub ppb level purification is achieved at designed flow rates of up to 3 slpm while providing 0.003 µm filtration.

- Controls and reduces impurities such as O<sub>2</sub>, H<sub>2</sub>O, CO<sub>2</sub>, CO, NMHC, Ni(CO)<sub>4</sub> and Fe(CO)<sub>5</sub>
- One-for-one dimensional replacement of conventional in-line particle filter assemblies
- Assembly hardware is made of 316 L stainless steel
- High efficiency diffusion barrier ensures integrity of reactive material during installation
- Superior pressure drop characteristics
- Wide variety of gases purified
- 100% helium leak and pressure tested
- Compact size
- Not orientation sensitive<sup>1</sup>
- Does not generate hazardous waste when used in non-hazardous gas service
- Will not release hydrocarbons
- No detectable metal contribution above background in HCl gas with HCLP material
- No detectable metal contribution above background in HBr gas with HBRP material

### Specifications

#### Materials

- Electropolished 316L stainless steel components
- ≤ 10 µin / 0.25 µm R<sub>a</sub> internal surface finish

#### Particle Removal Efficiency Rating

- 1x10<sup>9</sup> retention of particles ≥ 0.003 µm up to 5 slpm

#### Connections

- ¼" Gasket Seal, Male/Male (VCR<sup>2</sup> compatible)

#### Operating Conditions

- Maximum Operating Pressure: 1000 psig / 69 bar
- Maximum operating temperature: 100°C / 212°F (INP, SIP, FCP, SF6P), 40°C / 104°F (NH3P, GEH4P, OXP, CLXP, HCLP, HBRP, CDAP)
- EU Pressure Equipment Directive: Assemblies have been evaluated and are CE marked per the European Union's Pressure Equipment Directive 97/23/EC

#### Design Flow Rate

- 0-3 slpm @ 15 psig / 1 bar
- Higher intermittent flow rates of up to 5 slpm can be accommodated with reduced lifetime<sup>3</sup>

#### Packaging

- Double bagged
- Outer bag: aluminized mylar<sup>4</sup>
- Inner bag: polyethylene
- End fittings capped with metal seals
- Product packaged in an argon environment

#### Nominal Dimensions

- Length: 3.31" / 84 mm
- Diameter: 1.36" / 34.5 mm

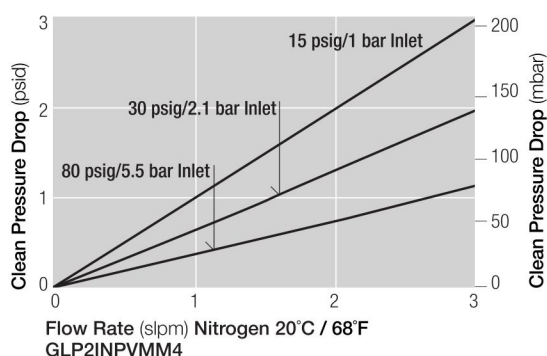
<sup>1</sup> Vertical installation recommended for NH3P.

<sup>2</sup> VCR is a trademark of Swagelok Co.

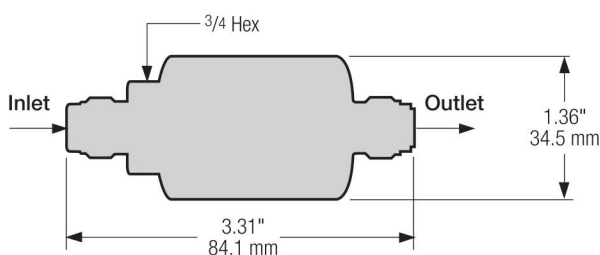
<sup>3</sup> Contact the Pall Microelectronics Group for further information.

<sup>4</sup> Mylar is a registered trademark of Dupont Teijin Films.

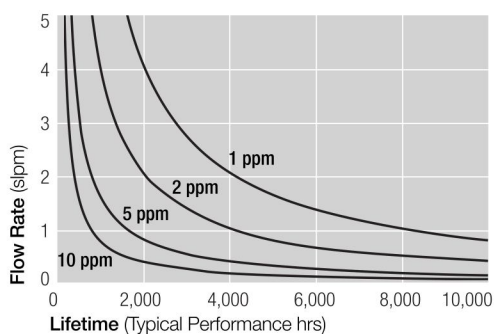
## Pressure Drop vs. Gas Flow Rate



## Nominal Dimensions

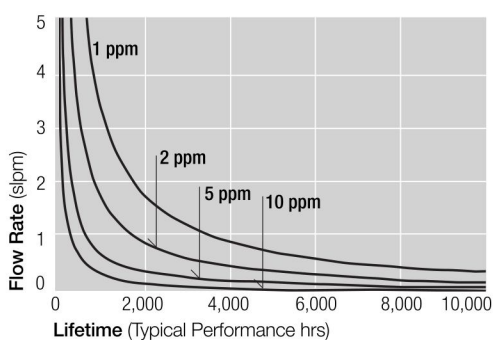


## Lifetime Calculations



Pall AresKleen Purification Material: Inert Gas Service  
Gaskleen II Purifier Assembly, Part # GLP2INPVMM4

Inlet Pressure: 30 psig (2.1 bar) Contaminant Challenge  
as H<sub>2</sub>O



Pall AresKleen Purification Material: Inert Gas Service  
Gaskleen II Purifier Assembly, Part # GLP2INPVMM4

Inlet Pressure: 30 psig (2.1 bar) Contaminant Challenge  
as O<sub>2</sub>

## Part Numbers / Ordering Information

| Part Number   | Specific Gas   | Effluent Purity Specifications  |
|---------------|--|---|
| GLP2INPVMM4   | <i>Inert Gases:</i> Nitrogen, Argon, Helium, Xenon, Krypton, Neon  | < 1 ppb H <sub>2</sub> O, O <sub>2</sub> , CO <sub>2</sub> , CO   |
| GLP2SIPVMM4   | <i>Flammable Gases:</i> Silane, Hydrogen, Methane, Ethane, Cyclopropane, Propane, Dimethyl Ether<br><br>Carbon Monoxide  | < 1 ppb H <sub>2</sub> O, CO <sub>2</sub> , O <sub>2</sub> , CO<br><br>< 1 ppb H <sub>2</sub> O, O <sub>2</sub> , CO <sub>2</sub> , Ni(CO) <sub>4</sub> , Fe(CO) <sub>5</sub>                     |
| GLP2NH3PVMM4  | Ammonia  | < 1 ppb H <sub>2</sub> O, CO <sub>2</sub> , O <sub>2</sub> , CO   |
| GLP2FCPVMM4   | Fluoromethane, Difluoromethane, Trifluoromethane, Tetrafluoroethane, Pentafluoroethane, Heptafluoropropane, Carbon Tetrafluoride, Perfluoropropane, Perfluorocyclobutane, Hexafluoroethane | < 1 ppb H <sub>2</sub> O, CO <sub>2</sub> , O <sub>2</sub>  |
| GLP2GEH4PVMM4 | Germane  | < 1 ppb H <sub>2</sub> O, CO <sub>2</sub> , O <sub>2</sub> , CO   |
| GLP2SF6PVMM4  | Sulfur Hexafluoride  | < 1 ppb H <sub>2</sub> O, CO <sub>2</sub> , O <sub>2</sub> , CO   |
| GLP2OXPVMM4   | <i>Oxygenated Gases:</i> Carbon Dioxide, Oxygen, Nitrous Oxide   | < 10 ppb H <sub>2</sub> O   |
| GLP2CLXPVMM4  | <i>Chlorinated Gases:</i> Boron Trichloride, Chlorine, Trichlorosilane, Dichlorosilane   | < 100 ppb H <sub>2</sub> O  |
| GLP2HCLPVMM4  | Hydrogen Chloride  | < 15 ppb H <sub>2</sub> O   |
| GLP2HBRPVMM4  | Hydrogen Bromide   | < 50 ppb H <sub>2</sub> O   |
| GLP2CDAPVMM4  | Photolithography clean dry air   | < 1 ppb H <sub>2</sub> O, < 300 ppt organics (as C <sub>4</sub> ), < 10 ppt acid gases (as SO <sub>2</sub> ), < 15 ppt basic gases (as NH <sub>3</sub> ), < 1 ppt refractory compounds (as HMDSO) |

## Technical Information

### Impurity Removal as Tested in Specific Gases

| Specific Gas   | Impurity Removal Efficiency   |
|--|---|
| <i>Inert Gases:</i> Nitrogen, Argon, Helium, Xenon, Krypton, Neon  | < 1 ppb H <sub>2</sub> O, CO <sub>2</sub> , O <sub>2</sub> , and CO as tested in argon and nitrogen using APIMS analyzer  |
| <i>Flammable Gases:</i> Silane, Hydrogen, Methane, Ethane, Cyclopropane, Propane, Dimethyl Ether   | < 1 ppb H <sub>2</sub> O, CO <sub>2</sub> , O <sub>2</sub> , and CO as tested in argon, nitrogen and hydrogen using APIMS analyzer<br>< 1 ppb H <sub>2</sub> O as tested in carbon monoxide using trace moisture analyzer<br>H <sub>2</sub> O and siloxanes removed to trace levels as tested in silane using APIMS   |
| Carbon Monoxide  | < 1 ppb Ni(CO) <sub>4</sub> , and < 1 ppb Fe(CO) <sub>5</sub> as tested in carbon monoxide using GC-ECD analyzer  |
| Ammonia  | < 1 ppb H <sub>2</sub> O, CO <sub>2</sub> , and O <sub>2</sub> as tested in argon using APIMS<br>< 12 ppb H <sub>2</sub> O as tested in ammonia using NIR-TDLAS<br>Removal of O <sub>2</sub> and CO <sub>2</sub> to trace levels as tested in ammonia using GC-DID  |
| Fluoromethane, Difluoromethane, Trifluoromethane, Tetrafluoroethane, Pentafluoroethane, Heptafluoropropane, Carbon Tetrafluoride, Perfluoropropane, Perfluorocyclobutane, Hexafluoroethane | < 1 ppb H <sub>2</sub> O, CO <sub>2</sub> , O <sub>2</sub> , and CO as tested in argon and nitrogen using APIMS analyzer<br>< 1 ppb O <sub>2</sub> as tested in trifluoromethane using trace oxygen analyzer<br>< 10 ppb H <sub>2</sub> O as tested in trifluoromethane using trace moisture analyzer and FTIR  |
| Germane  | < 1 ppb H <sub>2</sub> O, CO <sub>2</sub> , O <sub>2</sub> , and CO as tested in argon and nitrogen using APIMS analyzer  |
| Sulfur Hexafluoride  | < 1 ppb H <sub>2</sub> O, CO <sub>2</sub> , and O <sub>2</sub> as tested in argon using APIMS   |
| <i>Oxygenated Gases:</i> Carbon Dioxide, Oxygen, Nitrous Oxide, Clean Dry Air  | < 10 ppb H <sub>2</sub> O<br>< 1 ppb H <sub>2</sub> O, and CO <sub>2</sub> , as tested in argon using APIMS analyzer  |
| <i>Chlorinated Gases:</i> Boron Trichloride, Chlorine, Trichlorosilane, Dichlorosilane   | < 100 ppb H <sub>2</sub> O<br>< 1 ppb H <sub>2</sub> O, and CO <sub>2</sub> , as tested in argon using APIMS analyzer   |
| Hydrogen chloride  | < 15 ppb H <sub>2</sub> O as tested in hydrogen chloride using CRDS<br>< 1 ppb H <sub>2</sub> O as tested in argon using APIMS analyzer   |
| Hydrogen Bromide   | < 50 ppb H <sub>2</sub> O as tested in hydrogen bromide using CRDS<br>< 1 ppb H <sub>2</sub> O as tested in argon using APIMS analyzer  |
| Photolithography clean dry air   | < 1 ppb H <sub>2</sub> O as tested in argon using APIMS analyzer<br>< 300 ppt C <sub>4</sub> H <sub>8</sub> as tested in argon using APIMS Analyzer<br>< 10 ppt SO <sub>2</sub> as tested in nitrogen using ion chromatograph<br>< 15 ppt NH <sub>3</sub> as tested in nitrogen using ion chromatograph<br>< 1 ppt HMDSO as tested in argon using APIMS analyzer and baseline subtraction |

Unit conversion: 1 bar = 100 kilopascals



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