

## 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
- 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 316 L 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

- 1/4 in Gasket seal, male / male (VCR<sup>1</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 (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 2014/68/EU

#### 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>2</sup>

#### Packaging

- Double bagged
- Outer bag: aluminized mylar<sup>3</sup>
- Inner bag: polyethylene
- End fittings capped with metal seals
- Product packaged in an argon environment

#### Nominal Dimensions

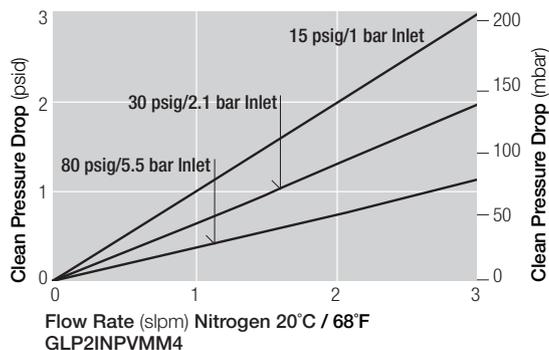
- Length: 3.31" / 84 mm
- Diameter: 1.36" / 34.5 mm

<sup>1</sup> VCR is a trademark of Swagelok Co.

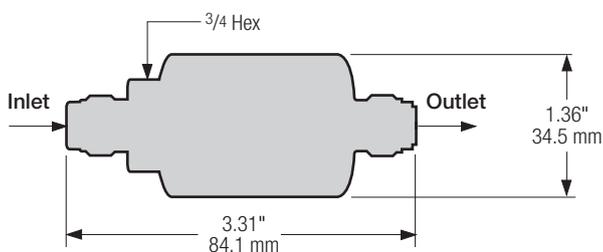
<sup>2</sup> Contact the Pall Microelectronics Group for further information.

<sup>3</sup> Mylar is a registered trademark of Dupont Teijin Films

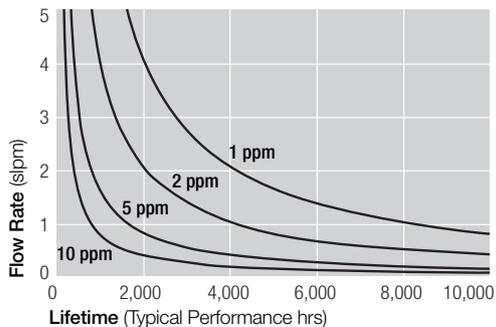
## Pressure Drop vs. Gas Flow Rate



## Nominal Dimensions

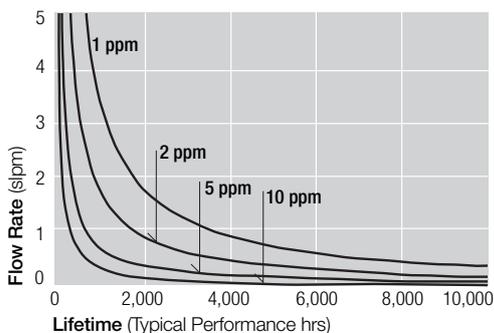


## Lifetime Calculations



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  Carbon Monoxide	< 1 ppb H <sub>2</sub> O, CO <sub>2</sub> , O <sub>2</sub> , CO  < 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>
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 < 1 ppb H <sub>2</sub> O as tested in carbon monoxide using trace moisture analyzer 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
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 < 1 ppb O <sub>2</sub> as tested in trifluoromethane using trace oxygen analyzer < 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 < 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 < 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 < 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 < 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 < 300 ppt C <sub>4</sub> H <sub>8</sub> as tested in argon using APIMS Analyzer < 10 ppt SO <sub>2</sub> as tested in nitrogen using ion chromatograph < 15 ppt NH <sub>3</sub> as tested in nitrogen using ion chromatograph < 1 ppt HMDSO as tested in argon using APIMS analyzer and baseline subtraction

Unit conversion: 1 bar = 100 kilopascals