NANOCHEM®

NANOCHEM® Bulk Gas Purifier (MegaShield™)

Features and Benefits

- For bulk and high flow specialty gas purification
- **Highest Lifetimes**
- **Best Impurity Removal Efficiencies**
  - Removes critical contaminants to sub part-per-billion levels
- **End-Point Detection available for many gases**
- Enhances manufacturing process economy and improves equipment performance
- Provides consistently high purity gas, regardless of inlet impurity fluctuations
- Improves component lifetime and reduces particle generation by removing moisture from corrosive gases
- Easy to install & operate
- No heating or cooling required
- Quick start up
- Inlet and outlet isolation valves
- All metal parts, Type 316L stainless steel, or Nickel 200
- Mounting bracket
- Refills available for most gases (except toxic or corrosive gases)

Specifications

- 0.003 µm filter with 99.9999999% retention – Standard on MS-4000 and all ammonia purifiers
- Internal surface finish < 15 µin Ra
- Maximum operating temperature is 40°C
- Maximum operating pressure is 150 psig (1.13 MPa) with endpoint detection; 350 psig (3.51 MPa) without endpoint detection

Connections

- Female inlet and outlet connections, 1/2" face seal fittings

Options

- 0.003 µm filter with 99.9999999% retention available
- Three-valve bypass manifold with isolation and bypass valves allows disconnection of purifier without interrupting process gas flow

Overview

NANOCHEM® MegaShield™ Purifiers ensure gas consistency for bulk gas purification. Select MS-Series purifiers for flow rates up to 1000 - 1500 slpm (60-90 Nm^3/hr). A variety of sizes are available to meet capacity and lifetime requirements. Eleven (11) different purification media are available to purify over 70 gases.

MegaShield™ (MS-Series)

MS-Series purifiers enable higher flow rates and lower pressure drops than the corresponding P-Series Models. MS-Series purifiers are available in 4, 8, 16, and 32 liter sizes. The purifier comes completely assembled, and consists of an inlet and outlet springless diaphragm valve; 2-4 canisters with suitable purification media, and a 100 µm SS frit on the inlet and outlet.

MS-Series purifiers are completely retrofittable in P-Series installations. Media refills are available through Nippon Sanso Matheson for all sizes.

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Impurities Removed

Gas Type	Contaminants	Outlet Purity
Inerts - Nitrogen (N_2), Argon (Ar), other inerts	H_2O	< 86 ppt
	O_2	< 50 ppt
	CO	< 100 ppt
	CO_2	< 24 ppt
	Benzene	< 156 ppq
	Toluene	< 93 ppq
	Ethylbenzene	< 96 ppq
	m,p-Xylene	< 79 ppq
	o-Xylene	< 112 ppq
	Refractories*	< 134 ppq
	H_2	< 1 ppb
Ammonia (NH_3)	H_2O	< 45 ppb
	O_2	< 0.1 ppb
	CO_2	< 11 ppb
	Carbamate	< 11 ppb
	GeH_4	< 1 ppb
	SiH_4	< 3 ppb
	Siloxanes	< 40 ppb
	Metals	
	Al	< 0.6 ppb
	Cu	< 0.27 ppb
	Fe	< 0.8 ppb
	K	< 0.35 ppb
	Na	< 0.27 ppb
	Si	< 1.3 ppb
	W	< 0.11 ppb
	Zn	< 0.27 ppb
	Zr	< 0.11 ppb
	Hydrocarbons from Liquid NH_3	
	Napthenic and Paraffins	85% removal
	Ethyl Benzene	96% removal
	Dissolved other HC	<200 ppb
	Hydrocarbons from Gaseous NH_3	
	n-Butane	< 30 ppb
	Ethylbenzene	< 30 ppb
Carbon Dioxide (Purifier material HCX)	Isopropyl Alcohol	< 200 ppt
	Acetone	< 93 ppt
	Propene	< 1 ppt
	Ethanol	< 1 ppt
	Carbon Disulfide	< 1 ppt
	Hexane	< 1 ppt
	Benzene	< 1 ppt

Gas Type	Contaminants	Outlet Purity
Carbon Dioxide (Purifier material HCX) *continued*	Heptane	< 1 ppt
	Toluene	< 1 ppt
	m,p-Xylene	< 1 ppt
	o-Xylene	< 1 ppt
	Ethyl Toluene	< 1 ppt
	1,3,5-Trimethyl Benzene	< 1 ppt
	1,2,4-Trimethyl Benzene	< 1 ppt
	DichloroBenzene	< 1 ppt
Silane (SiH_4)	H_2O	< 100 ppt
	O_2	< 100 ppt
	CO_2	< 100 ppt
	CO**	< 1 ppb
	Chlorosilanes, disilane, siloxanes, arsine, phosphine	
Hydrogen (H_2)	H_2O	< 100 ppt
	O_2	< 100 ppt
	CO_2	< 100 ppt
Methane (CH_4)	CO**	< 1 ppb
Ethane (C_2H_6), other HC	NOx, SOx, H2S	
Sulfur Hexafluoride (SF_6)	H_2O in inert gas	< 100 ppt
	O_2 in inert gas	< 100 ppt
	CO_2 in inert gas	< 100 ppt
Carbon Tetrafluoride (CF_4)	H_2O in sulfur hexafluoride	< 10 ppb
	O_2 in sulfur hexafluoride	< 10 ppb
Other Fluorocarbons	H_2O in sulfur hexafluoride	< 10 ppb
	O_2 in sulfur hexafluoride	< 10 ppb
Oxygen (O_2),	H_2O	< 10 ppb
Carbon Dioxide (CO_2),	H_2O	< 10 ppb
Nitrous Oxide (N_2O)	H_2O	< 10 ppb
Carbon Monoxide (CO)	Metal Carbonyls: Fe, Ni	
Corrosives (HCl, HBr, Cl_2, SiH_2Cl_2, $SiHCl_3$, BCl_3)	H_2O in inert gas	< 1 ppb
	H_2O in HBr	< 100 ppb
	H_2O in HCl	< 100 ppb
	Volatile Metals* **	
	Mo	< 4 ppb
	Ti	< 13 ppb
	Fe(CO)5	< 50 ppb

Impurity removal depends on purifier material and incoming gas specification
*Refractories as TMDSO (Tetramethyldisiloxane)
**CO is removed efficiently by OMX & OMX-PlusTM media at low flow rates (recommend 1/10 of normal flow rate)
***Metals removed as measured on wafer via VPD-ICPMS:
Al, Ca, Cr, Fe, Mg, Ni, K, Na, Zn
Metals removal as demonstrated by intrinsic resistivity measurements on wafer grown by TCS:
Without MTX Purifier: <200 ohm-cm
With MTX Purifier: > 2500 ohm-cm and total metals on water <1E10 atoms/cm2

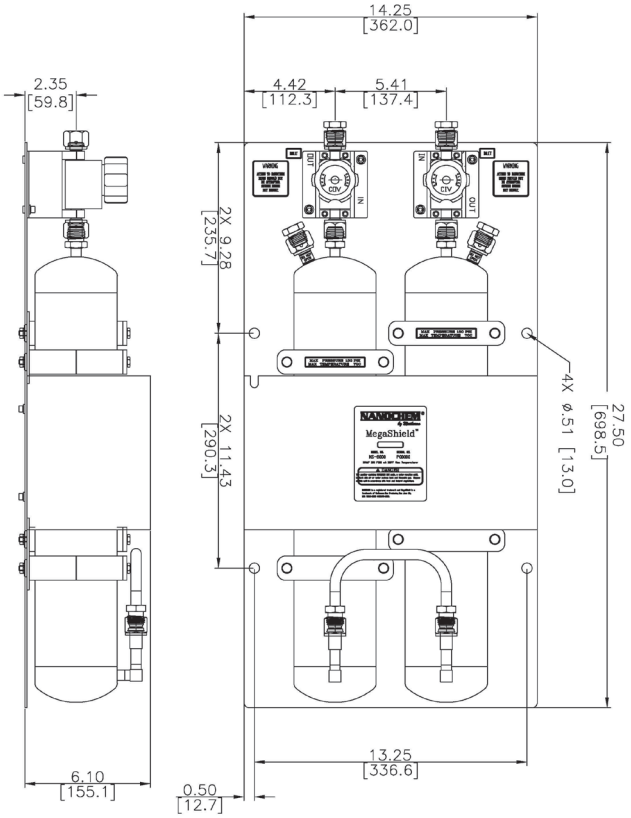
NANOCHEM® MegaShield™ Gas Purifiers

Specifications	Model	
	MS-4000 / 8000	MS-16000 / 32000
Max flow rate, slpm (NM^3/hr) of N_2 *	1000 (60)*	
Max Pressure, psig (MPa)**	350 (2.51)	
Purification Medium Bed Volume, Liters	4, 8	16, 32
Wetted Parts	316L SS, Nickel 200 gaskets, PCTFE & TFE valve components	
Connection Type	1/2" Female face-seal fittings	
Standard outlet filter	100 µm frit	
Optional filter***	0.003 µm; 9-log retention	
Flow Rate w/ optional filter, slpm N_2*	1000	
Dimensions, inches (mm) **A** - Width of purifier mounting plate	14.25 (361.95)	14.25 (361.95)
B - Depth of purifier	7.00 (177.8)	11.29 (286.77)
C - Height of purifier mounting plate	27.5 (69.85)	49.38 (1254.25)
D - In/Out center line to mounting plate	2.35 (59.69)	3.38 (85.73)
E - Mounting plate top to in / out connection	0.45 (11.43)	0.45 (11.43)
F - Distance between bolt holes	13.25 (336.55)	13.25 (336.55)
G - Distance between in / out connections	5.41 (137.41)	5.41 (137.41)
H - Distance between plate top & bolt hole	9.28 (235.71)	9.73 (247.14)
I - Bolt hole diameter	Ø 0.50 (12.70)	Ø 0.50 (12.70)

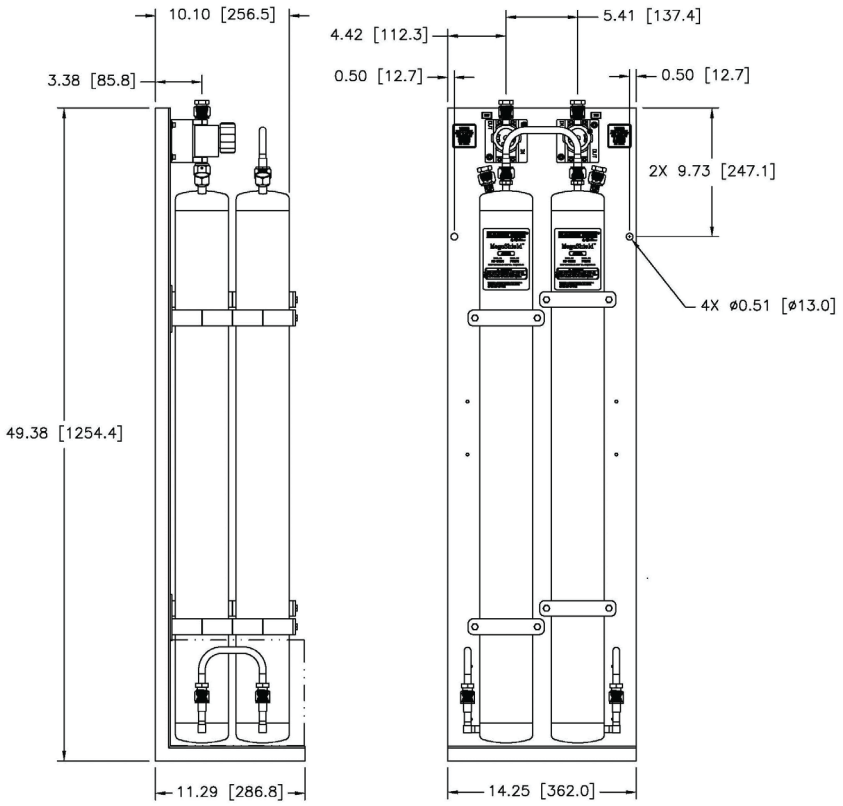
NOTE: The maximum specified flow rate is based upon a 10 psi (0.07 MPa) pressure drop.
Flow rates up to 1500 slpm (90 NM3/hr) can be attained with the MS-Series, if higher pressure drops are acceptable
** Maximum operating pressure is 150 psi (1.13 MPa) when the endpoint detector is installed.
*** 0.003m filter standard on MS-4000

See Drawings on next page

Dimensions



MS-4000, MS-8000 (shown)



MS-16,000, MS-32000 (shown)

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