

Specialty Gases + World-Class Performance



Specialty Gases & Equipment Catalog

Please fill out all requested information, tear out sheet and fax your request information to 317-562-1484. Or you can contact us online at www.purityplusgas.com.



Additional Information Request (Please fill out all requested information)

Full Name _____

Company Name _____

Address _____

City _____

State _____ Postal Code _____

Country _____

Telephone (____) _____ Fax (____) _____

E-mail _____

Questions/Concerns _____

☐

Have a PurityPlus Sales Representative contact me.

Catalog Request (Please fill out all requested information)

Full Name _____

Company Name _____

Address _____

City _____

State _____ Postal Code _____

Country _____

Telephone (____) _____ Fax (____) _____

E-mail _____

☐

Have a PurityPlus Sales Representative contact me.

Table Of Contents

Introduction	i-vi	Mixture Specifications	2.2
Section 1: Pure Gases		Ammonia	2.3
Acetylene.....	1.1	Argon.....	2.4 – 2.7
Air	1.2	n-Butane.....	2.8 – 2.10
Ammonia	1.3	Carbon Dioxide.....	2.11 – 2.14
Argon.....	1.4	Carbon Monoxide.....	2.15 – 2.16
Boron Trichloride	1.5	Ethane	2.17 – 2.18
Boron Trifluoride	1.6	Ethylene	2.19 – 2.20
1,3-Butadiene	1.7	Helium	2.21 – 2.22
n-Butane.....	1.8	Hexane	2.23
1-Butene.....	1.9	Hydrogen.....	2.24 – 2.27
CIS-2-Butene.....	1.10	Hydrogen Sulfide.....	2.28
Carbon Dioxide.....	1.11	Isobutane.....	2.29 – 2.30
Carbon Monoxide.....	1.12	Methane	2.31 – 2.34
Carbonyl Sulfide.....	1.13	Nitric Oxide.....	2.35
Chlorine.....	1.14	Nitrogen.....	2.36 – 2.38
Deuterium.....	1.15	Nitrogen Dioxide.....	2.39
Dimethyl Ether (DME)	1.16	Nitrous Oxide.....	2.40
Ethane	1.17	Oxygen	2.41 – 2.42
Ethylene	1.18	n-Pentane.....	2.43
Helium	1.19	Propane.....	2.44 – 2.45
Hexafluoropropylene	1.20	Propylene	2.46 – 2.47
Hydrogen.....	1.21	Sulfur Dioxide.....	2.48 – 2.49
Hydrogen Bromide	1.22	Sulfur Hexafluoride.....	2.50 – 2.51
Hydrogen Chloride	1.23	Three Component Mixtures.....	2.52
Hydrogen Sulfide.....	1.24	Section 3: Special Application Mixtures	
Isobutane.....	1.25	Beverage and Food Gases	3.1 – 3.2
Krypton.....	1.26	Biological Atmosphere Gas Mixtures.....	3.3
Methane	1.27	Electron Capture Mixtures.....	3.4
Methyl Chloride	1.28	Nuclear Counter Mixtures.....	3.4
Methyl Fluoride.....	1.29	EPA Protocol Mixtures.....	3.5
Methyl Mercaptan.....	1.30	Portable Calibration Standards	3.6 – 3.8
Monomethylamine (MMA)	1.31	Flame Ionization Fuel Mixtures	3.9
Neon.....	1.32	Leak Detection Mixtures.....	3.9
Neopentane (Dimethylpropane)	1.33	Laser Mixtures.....	3.10
Nitric Oxide.....	1.34	TCD Carrier Gas Mixture.....	3.11
Nitrogen.....	1.35	Spark Chamber Mixtures.....	3.11
Nitrogen Dioxide.....	1.36	Multicomponent Hydrocarbon Mixtures.....	3.12
Nitrogen Trifluoride	1.37	Liquid Hydrocarbon Mixtures.....	3.13
Nitrous Oxide.....	1.38	Semiconductor Gases	3.14
Octafluoropropane (HC-218).....	1.39	Medical Gases	3.15– 3.18
Oxygen.....	1.40	Section 4: Equipment	4.1 - 4.135
Propane.....	1.41	Detailed Index listed after Section 4 page divider	
Propylene	1.42	Section 5: Technical Information	
Sulfur Dioxide	1.43	Gas Safety and Material	
Sulfur Hexafluoride.....	1.44	Compatibility Data Chart	5.1 - 5.2
Tetrafluoromethane (HC-14).....	1.45	Conversion Factors	5.3 - 5.4
Trimethylamine (TMA).....	1.46	Gases CGA Selection Chart.....	5.5
Xenon.....	1.47	Section 6: Glossary	6.1 - 6.2
Section 2: Mixed Gases			
Introduction.....	2.1		

How to Use This Catalog

Section 1 – Pure Gases

Pure gases are listed in alphabetical order. Additional products are available upon request. If you do not see your requirement listed, please contact the nearest PurityPlus sales office.

Many Specialty Gas products are available in bulk quantities. If you need special size cylinders, manifolded cylinder banks, ton containers, tube trailers or cryogenic trailers, please contact the nearest PurityPlus sales office.

Section 2 – Mixed gases

Two Component Mixtures are listed alphabetically by MINOR component. Standard balance gases are listed. Additional balance gases may be available. Please check with our technical staff.

Three Component Mixtures – Common components and balance gases listed.

Section 3 – Special Application Mixtures

These common mixtures are listed by use.

Section 4 – Equipment

Specialty Gas Handling Equipment is listed by type of product, i.e. regulators, flowmeters, etc. There is an index at the beginning of the section.

Equipment recommendations for each gas can also be found on the product pages with a reference to the proper catalog page.

Section 5 – Technical Information

Material Compatibility Chart
Unit Conversion Tables

Section 6 – Glossary

Introduction

PurityPlus Specialty Gases and Gas Handling Equipment are offered by the Independent Welding Distributor Cooperative (IWDC) to their customers in North America. Over 150 Independent Distributors in North America are proud to offer this quality brand of Specialty Gases. The quality of PurityPlus Specialty Gases combined with the service and dependability of our Independent Distributors are unequaled by anyone. Most of our family owned businesses have been servicing their customers for the better part of a century.

The map on page vi shows the distribution points available to the IWDC. Many products are already stock items for our customers. Please check with the nearest sales office to see if they can stock products for your requirements.

We have over twenty producing laboratories in North America. The combined technical experience of our laboratory personnel and our state-of-the-art facilities allow us to provide you with the best product for your application.

Quality Assurance: To ensure that you receive only the highest quality products, our producing laboratories exercise strict QA inspection standards for incoming material and maintain the most stringent quality control throughout the entire production process.

Availability and Service: With over 150 Independent Distributors with over 600 locations throughout North America, IWDC has one of the largest networks to supply your specialty gas and equipment requirements. Many of the hundreds of products that we offer are stocked locally for our customers. Please contact your local sales office if you have a need to stock additional products or package sizes. We pride ourselves on our ability to service our customers. We can meet many special delivery needs. Please contact us if you have any special requirements.

Nonstandard Containers and Products: Many of the products listed are available in special non-standard containers. Many products are also available in bulk and mini-bulk quantities. This includes tube trailers, liquid trailers, liquid cylinders, manifolded cylinder skids, ton containers and more. Additionally, non-standard and special order specialty gases may also be available. This is especially true for gas mixtures. We are able to supply many different non-standard liquid and gas components with various balance gases, taking physical or safety limitations into consideration. Please contact the nearest sales office for availability and pricing.

Gas Handling Equipment: We carry only the highest quality gas handling equipment from regulators to filters to cylinder gas manifolds. Please refer to the recommended equipment for each gas that you need. Please contact us if you have any questions as to how to safely handle the products you are using.

Product Safety

The gases available through this catalog are hazardous. Some of the gases are flammable, toxic, or corrosive. As with any chemical or compressed gas improper use can cause serious injury or even death. Please be sure to review all available safety precautions when handling these gases, including the applicable Material Safety Data Sheet which is provided with each gas product. If you have any questions regarding the safe handling or use of any product we supply, please contact the nearest PurityPlus Sales Office.

Additional safety information is available from the Compressed Gas Association, DOT regulations, and applicable OSHA guidelines. Many other industry associated references are available to review the safety requirements for the handling and storage of industrial and specialty gases.

Terms and Conditions

The PurityPlus producers have the following terms and conditions for the sales of the products in this catalog. All sales of the products listed in this catalog shall be governed by these terms and conditions.

- 1. Terms of sale.** Gas prices are FOB stocking point unless otherwise noted. All freight, handling, and additional related charges relating to the shipment of these products will be at the account of the Purchaser. Purchaser will pay the sales, use or excise tax imposed on the sales or delivery of these products. Terms of payment will be net 15 days from date of invoice. Seller reserves the right to increase or decrease prices from time to time. Seller's price in effect at time of shipment will apply to all orders. There is a minimum charge of \$50.00 per invoice (excluding cylinder rent or demurrage).
- 2. Warranty.** Gases - Seller warrants that the products will meet the specifications listed in this catalog. Gas products will be adequately packaged and labeled in accordance with all appropriate regulations and industry standards. Equipment will be free from defects in material and workmanship. Purchaser shall inspect and examine each shipment upon receipt, and, unless a written claim is delivered to Seller within 10 days thereafter, all claims with respect to said shipment or the products contained therein shall be conclusively deemed waived and Purchaser shall be conclusively deemed to have accepted delivery of such product and that Seller is in full compliance with all of the obligations to Purchaser with respect to such product. No claim against the seller shall be made, whether or not based on negligence or warranty, shall exceed the purchase price of the product. THERE ARE NO EXPRESS WARRANTIES OTHER THAN THOSE SPECIFIED IN THIS PARAGRAPH. SELLER MAKES NO OTHER WARRANTY OF ANY KIND, EITHER EXPRESSED OR IMPLIED, IN FACT OR BY LAW, INCLUDING, BUT NOT LIMITED TO ANY WARRANTY OF MERCHANTABILITY OR WARRANTY OF FITNESS FOR A PARTICULAR PURPOSE.
- 3. WARNING!** SELLER WARNS PURCHASER THAT THERE ARE HAZARDS ASSOCIATED WITH THE USE OF THE PRODUCTS LISTED IN THIS CATALOG. PURCHASER ACKNOWLEDGES THAT THERE ARE HAZARDS ASSOCIATED WITH THE USE AND STORAGE OF THESE PRODUCTS OR EQUIPMENT, THAT IT UNDERSTANDS SUCH HAZARDS, AND THAT IT IS THE RESPONSIBILITY OF THE PURCHASER TO WARN AND PROTECT ITS EMPLOYEES AND OTHERS EXPOSED TO SUCH HAZARDS THROUGH THE STORAGE AND USE OF THESE PRODUCTS OR EQUIPMENT. PURCHASER ASSUMES ALL RISK AND LIABILITY FOR LOSS, DAMAGES OR INJURY TO PERSONS OR TO PROPERTY ARISING FROM THE PRESENCE OR USE OF THESE PRODUCTS OR EQUIPMENT. SELLER SHALL NOT BE LIABLE FOR ANY INDIRECT, INCIDENTAL, OR CONSEQUENTIAL DAMAGES ASSOCIATED WITH THE USE OR MISUSE OF THESE PRODUCTS OR EQUIPMENT. Determination of the suitability of the products purchased and the results of using product alone or in combination with other articles or substances and in any manufacturing, medical, or other process or procedure is the sole responsibility of Purchaser. Seller shall have no responsibility in connection therewith.
- 4. Contingencies.** Neither the seller nor purchaser will be liable to the other for default or delay in the performance of any of their obligations to each other in connection with the purchase, sale, shipment or delivery of the products due to an Act of God, accident, fire, flood, storm, riot, war, sabotage, explosion, strike or other labor disturbance, national defense requirement, governmental law, ordinance, rule or regulation, inability to obtain electricity, or other type of energy, raw material, labor, equipment or transportation, or any other contingency beyond their reasonable control.
- 5. Cylinders.** Most gas products will be supplied in Seller owned, returnable cylinders. There may be a charge for the use of these cylinders. Purchaser will return these cylinders to the Seller in a non-contaminated condition with all valves tightly closed. If dust plugs or dust caps have been provided, these must be reinstalled and securely tightened to the cylinder valve outlet. Cylinder caps must be in place and securely tightened. All returnable cylinders will remain the property of the seller at all times. Purchaser will pay seller for any damage beyond normal wear and tear while in the possession of the Purchaser. This does not apply to any non-returnable or disposable container. ALL CYLINDERS MUST BE RETURNED FREIGHT PREPAID. Purchaser will be charged current replacement cost for any lost cylinders.

CYLINDER DATA AND CROSS REFERENCE CHART

	PurityPlus	DOT Number	Size (inches)	Tare Weight (pounds)	Water Volume (cu. ft.)	Airgas	BOC/ Linde	Air Products	Praxair	Scott	Matheson	Air Liquide	
STEEL	300	3AA2400	9x60	143	1.73	300	300	A	T	K	IL	49	STEEL
	200	3AA2015	9x56	133	1.54	200	200	B	K	A	IA	44	
	80	3AA2015	8.5x31	65	0.52	80	80	C	Q	B	2	16	
	30	3AA2015	6x24	29	0.26	35	30	D1	G	C	3	7	
	10	3AA2015	4x20	10	0.11	10	12	D	F	D	4	3	
	LB	3E1800	2x16	4	0.015	LB	2	LB	LB	LB	LB	LB	
	ELB	3E1800	2x16	4	0.015	LX	7X	LG	ELB		7X		
	E	3AA2015	4.5x31	13	0.17	E	E	Med.E	ANE	ER		MEDE	
	AA380	8AL	12x8	195	N/A	380	5	A	Lab380	XF	IB	380	
	LP300	4BW240	15x48	75	3.83	350		A1	FX	XL	1F	350	
	LP150	4AA480	15x52	151	4.46	150	150	AA	FA	XG	1K	150	
	LP60	4BA300	10x53	55	1.97	65		A3	FC	XP	IJ	65	
ALUMINUM	6000	3AA-6000	10x51	303	1.5	3HP	485		6K		1U	44H	ALUMINUM
	3500	3AA-3600	9.25x51	189	1.54	2HP			3K		1H		
ALUMINUM	AL150	3AL2015	8x53	48	1.04	150A	150A	B(AL)	ALS	AI	1R	30AL	ALUMINUM
	AL80	3AL2015	7x38	30	0.55	80A	80A	C(AL)	ALQ	BL	2R	22AL	
	AL30	3AL2015	7x21	9	0.14	33A	30A	DL(AL)	ALH	CL	3R	7AL	

Compressed Gas Cylinders



Low Pressure Cylinders



LOW PRESSURE LIQUID CYLINDERS

Specifications											
MODEL SIZE		160L	160L	180L	180L	200L	200L	230L	230L	265L	265L
	Pressure	MP	HP	MP	HP	MP	HP	MP	HP	MP	HP
LCCM	Part Number	10508748	10508756	10508764	10496433	10508772	10496417	10496468	10496492	10510039	10512561
MCR	Part Number	10783424	10783467	10783491	10783539	10783598	10783619	10783635	10783651	10783678	10783694
CAPACITY											
Liquid (Gross)	(liters)	176	176	196	196	209	209	240	240	276	276
Liquid (Net)	(liters)	165	165	185	185	196	196	230	230	265	265
Gas (N ₂)*	ft ³ / Nm ³	3685 / 97	3464 / 91	4099 / 108	3864 / 102	4375 / 115	4072 / 108	5024 / 132	4734 / 124	5769 / 152	5438 / 143
Gas (O ₂)*	ft ³ / Nm ³	4577 / 120	4348 / 114	5096 / 134	4843 / 127	5435 / 143	5048 / 133	6244 / 164	5930 / 156	7186 / 189	6811 / 179
Gas (Ar)*	ft ³ / Nm ³	4448 / 117	4226 / 111	4961 / 130	4709 / 124	5290 / 139	4932 / 130	6073 / 160	5763 / 151	6982 / 183	6634 / 174
Gas (CO ₂)*	ft ³ / Nm ³	--	3382 / 89	--	3766 / 99	--	4011 / 105	--	4614 / 121	--	5305 / 139
Gas (N ₂ O)*	ft ³ / Nm ³	--	3207 / 84	--	3574 / 94	--	3810 / 100	--	4378 / 115	--	5034 / 132
PERFORMANCE											
NER (N ₂)	% per day	2	2	1.9	1.9	1.85	1.85	1.8	1.8	2	2
NER (O ₂ - Ar)	% per day	1.4	1.4	1.3	1.3	1.2	1.2	1.2	1.2	1.4	1.4
NER (CO ₂ - N ₂ O)	% per day	--	0.5	--	0.5	--	0.5	--	0.5	--	0.5
Gas Flow (N ₂ , O ₂ , Ar)	ft ³ /hr / Nm ³ /hr	350 / 9.2	350 / 9.2	350 / 9.2	350 / 9.2	400 / 10.5	400 / 10.5	400 / 10.5	400 / 10.5	400 / 10.5	400 / 10.5
Gas Flow (CO ₂ , N ₂ O)	ft ³ /hr / Nm ³ /hr	--	110 / 2.9	--	110 / 2.9	--	110 / 2.9	--	110 / 2.9	--	110 / 2.9
DIMENSIONS & PRESSURE RATINGS											
Relief Valve Setting	psig / barg	230 / 16	350 / 24	230 / 16	350 / 24	230 / 16	350 / 24	230 / 16	350 / 24	230 / 16	350 / 24
DOT/CTC Rating		4L200	4L292	4L200	4L292	4L200	4L292	4L200	4L292	4L200	4L292
Diameter	in / cm	20/50.8	20/50.8	20/50.8	20/50.8	20/50.8	20/50.8	26/66.0	26/66.0	26/66.0	26/66.0
Height	in / cm	59.6 / 151.3	59.6 / 151.3	63.5 / 161.3	63.5 / 161.3	65.8 / 167.1	65.8 / 167.1	52.9 / 131.9	52.9 / 131.9	57.8 / 146.8	57.8 / 146.8
Empty Weight	lb / kg	250 / 113.4	280 / 126.9	260 / 117.9	300 / 136.1	280 / 126.9	320 / 145.1	300 / 136.1	340 / 154.2	340 / 154.2	360 / 163.6
Full Weight (N ₂)	lb / kg	517 / 234	531 / 241	557 / 253	580 / 263	597 / 271	618 / 280	664 / 301	683 / 310	758 / 344	754 / 343
(O ₂)	lb / kg	629 / 285	640 / 290	682 / 309	701 / 318	730 / 331	747 / 339	817 / 370	831 / 377	935 / 424	924 / 420
(Ar)	lb / kg	710 / 322	717 / 325	773 / 351	787 / 357	827 / 375	839 / 380	928 / 421	936 / 424	1062 / 481	1046 / 475
(CO ₂)	lb / kg	--	667 / 303	--	731 / 331	--	779 / 353	--	868 / 393	--	967 / 439
*At relief valve settings											



PurityPlus Distribution Centers Located Throughout North America

PurityPlus is supplied through a network of Independent Distributor Members known as the IWDC – a 60 year old North American cooperative of producers and distributors of specialty gases



With over 150 members and more than 600 locations, no matter where you are throughout the U.S., Canada, and Mexico, a local PurityPlus distribution center will be ready to provide quick and dedicated service. Corporations with operations in multiple locations can rely on the exclusive network of PurityPlus producers to ensure that each of their facilities receive the same high quality gases and gas mixtures, with the same stringent specifications, wherever they are.

Pure Gases



PurityPlus®
Specialty Gases

Section 1 - Pure Gases

Gas	Page Number
Acetylene	1.1
Air	1.2
Ammonia	1.3
Argon	1.4
Boron Trichloride	1.5
Boron Trifluoride	1.6
1,3-Butadiene	1.7
n-Butane	1.8
1-Butene	1.9
CIS-2-Butene	1.10
Carbon Dioxide	1.11
Carbon Monoxide	1.12
Carbonyl Sulfide	1.13
Chlorine	1.14
Deuterium	1.15
Dimethyl Ether (DME)	1.16
Ethane	1.17
Ethylene	1.18
Helium	1.19
Hexafluoropropylene	1.20
Hydrogen	1.21
Hydrogen Bromide	1.22
Hydrogen Chloride	1.23
Hydrogen Sulfide	1.24
Isobutane	1.25
Krypton	1.26
Methane	1.27
Methyl Chloride	1.28
Methyl Fluoride	1.29
Methyl Mercaptan	1.30
Monomethylamine (MMA)	1.31
Neon	1.32
Neopentane (Dimethylpropane)	1.33
Nitric Oxide	1.34
Nitrogen	1.35
Nitrogen Dioxide	1.36
Nitrogen Trifluoride	1.37
Nitrous Oxide	1.38
Octafluoropropane (HC-218)	1.39
Oxygen	1.40
Propane	1.41
Propylene	1.42
Sulfur Dioxide	1.43
Sulfur Hexafluoride	1.44
Tetrafluoromethane (HC-14)	1.45
Trimethylamine (TMA)	1.46
Xenon	1.47

A colorless, highly flammable gas.

Acetylene

Technical Information:	
Chemical Symbol:	C ₂ H ₂
Molecular Weight:	26.04
Specific Volume	14.7 ft ³ /lb (0.91 m ³ /kg)
CAS Registry Number:	74-86-2

Shipping Information:	
DOT Proper Name:	Acetylene, dissolved
Hazard Class:	2.1
I.D. Number:	UN 1001
Labels:	Flammable Gas

Grade	Part No.	Purity	Impurity	Specification	Equipment Recommended
PurityPlus Purified 2.6 (For Atomic Absorption)	ACE-26-XX	99.6%	Oxygen plus CH ₄ PH ₃	< 4000 ppm < 20 ppm	200 series brass regulator see page 4.6

XX - Complete the part number with the desired cylinder size listed below. (ie. ACE-26-380)

Standard Cylinder Sizes *	Contents ft ³ /m ³	Cylinder Pressure PSIG	CGA Valve Connection
380	330	250	510
140	130	250	510

*Nonstandard cylinder sizes available upon request

Air

A colorless, odorless, nonflammable gas.

Technical Information:

Chemical Symbol:	N/A
Molecular Weight:	28.96
Specific Volume	13.3 ft ³ /lb (0.83 m ³ /kg)
CAS Registry Number:	132259-10-0

Shipping Information:

DOT Proper Name:	Air, Compressed
Hazard Class:	2.2
I.D. Number:	UN 1002
Labels:	Nonflammable Gas

Grade	Part No.	Purity	Impurity	Specification	Equipment Recommended
PurityPlus Ultra Zero	AIR-UZ-XX		Total Hydrocarbons Moisture Oxygen Carbon Dioxide Carbon Monoxide	< 0.1 ppm < 3 ppm 19.5% to 23.5% < 1 ppm < 1 ppm	300 series brass regulator see page 4.12
PurityPlus Zero	AIR-ZE-XX		Total Hydrocarbons Oxygen	1 ppm 19.5% to 23.5%	300 series brass regulator see page 4.12
PurityPlus Extra Dry	AIR-ED-XX		Moisture Oxygen	< 8 ppm 19.5% to 23.5%	200 series brass regulator see page 4.8

XX - Complete the part number with the desired cylinder size listed below. (ie. AIR-UZ-300)

Standard Cylinder Sizes *	Contents ft ³ /m ³	Cylinder Pressure PSIG	CGA Valve Connection
300	311	2640	590
200	233	2200	590
80	88	2200	590

*Nonstandard cylinder sizes available upon request

A colorless, pungent, toxic gas.

Ammonia

Technical Information:	
Chemical Symbol:	NH ₃
Molecular Weight:	17.03
Specific Volume	22.6 ft ³ /lb (1.41 m ³ /kg)
CAS Registry Number:	7664-41-7

Shipping Information:	
DOT Proper Name:	Ammonia, Anhydrous
Hazard Class:	2.2
I.D. Number:	UN 1005
Labels:	Non-Flammable Gas

Grade	Part No.	Purity	Impurity	Specification	Equipment Recommended
PurityPlus VLSI 4.5 (Liquid Phase)	AMM-VL-XX	99.995%	Oil Moisture	< 0.5 ppm < 3 ppm	400 series stainless steel regulator see page 4.14
PurityPlus 2.5 (Liquid Phase)	AMM-25-XX	> 99.5%	Total Impurities	< 0.5%	400 series stainless steel regulator see page 4.14

XX - Complete the part number with the desired cylinder size listed below. (ie. AMM-VL-400)

Standard Cylinder Sizes *	Contents lbs.	Cylinder Pressure PSIG	CGA Valve Connection
400	150	114	660/240
150A	30	114	660/705
80A	15	114	660/705
33A	7	114	660/705

*Nonstandard cylinder sizes available upon request

Argon

A chemically inert, colorless, odorless, nontoxic gas.

Technical Information:

Chemical Symbol:	Ar
Molecular Weight:	39.948
Specific Volume	9.7 ft ³ /lb (0.606 m ³ /kg)
CAS Registry Number:	7440-37-1

Shipping Information:

DOT Proper Name:	Argon, Compressed
Hazard Class:	2.2
I.D. Number:	UN 1006
Labels:	Nonflammable Gas

Grade	Part No.	Purity	Impurity	Specification	Equipment Recommended
PurityPlus 6.0 (Research)	ARG-60-XX	99.9999%	Oxygen Moisture Nitrogen Total Hydrocarbons CO/CO ₂	< 0.15 ppm < 0.15 ppm < 0.40 ppm < 0.10 ppm < 0.10 ppm	400 series stainless steel regulator see page 4.16
PurityPlus N₂ Free 5.0	ARG-NF-XX	99.999%	Oxygen Moisture Nitrogen Total Hydrocarbons	< 2 ppm < 2 ppm < 5 ppm < 0.5 ppm	300 series brass regulator see page 4.12
PurityPlus 5.0 (Ultra High Purity)	ARG-50-XX	99.999%	Oxygen Moisture Total Hydrocarbons	< 2 ppm < 2 ppm < 0.5 ppm	300 series brass regulator see page 4.12
PurityPlus 4.8 (Prepurified)	ARG-48-XX	99.998%	Oxygen Moisture Total Hydrocarbons	< 5 ppm < 5 ppm < 2 ppm	300 series brass regulator see page 4.12
PurityPlus Zero 4.8	ARG-ZE-XX	99.998%	Total Hydrocarbons	< 0.5 ppm	300 series brass regulator see page 4.12
PurityPlus 4.8 (6000 PSIG)	ARG-6K	99.998%	Oxygen Moisture	< 10 ppm < 5 ppm	492 series ultra high pressure regulator see page 4.44

XX - Complete the part number with the desired cylinder size listed below. (ie. ARG-60-300)

Standard Cylinder Sizes *	Contents ft ³ /m ³	Cylinder Pressure PSIG	CGA Valve Connection
300	337 / 9.37	2640	580
200	250 / 6.79	2200	580
80	83 / 2.3	2200	580
6K	575 / 15.94	6000	677

*Nonstandard cylinder sizes available upon request

A colorless, toxic, corrosive gas shipped as a liquid under its own vapor pressure.

Boron Trichloride

Technical Information:	
Chemical Symbol:	BCl ₃
Molecular Weight:	117.17
Specific Volume	3.3 ft ³ /lb (0.202 m ³ /kg)
CAS Registry Number:	10294-34-5

Shipping Information:	
DOT Proper Name:	Boron Trichloride
Hazard Class:	2.3
I.D. Number:	UN1741
Labels:	Poison Gas, Corrosive

Grade	Part No.	Purity	Impurity	Specification	Equipment Recommended
PurityPlus 5.0 (Research)	BTC-50-XX	> 99.999%	Total Impurities	< 10 ppm	Series 8500 stainless steel manual control valve see page 4.106
PurityPlus 3.0 (Electronic)	BTC-30-XX	> 99.9%	Total Impurities	< 1000 ppm	
PurityPlus 2.5 (Chemically Pure)	BTC-25-XX	> 99.5%	Total Impurities	< 0.5%	
Higher grades available upon request.					

XX - Complete the part number with the desired cylinder size listed below. (ie. BTC-50-200)

Standard Cylinder Sizes *	Contents lbs.	Cylinder Pressure PSIG	CGA Valve Connection
200	100	4.4	660
35	14	4.4	660
LB	1	4.4	660

*Nonstandard cylinder sizes available upon request

Boron Trifluoride

A nonflammable, toxic and corrosive gas.

Technical Information:

Chemical Symbol:	BF ₃
Molecular Weight:	67.781
Specific Volume	5.6 ft ³ /lb (0.350 m ³ /kg)
CAS Registry Number:	7637-07-2

Shipping Information:

DOT Proper Name:	Boron Trifluoride, Compressed
Hazard Class:	2.3
I.D. Number:	UN1008
Labels:	Poison Gas

Grade	Part No.	Purity	Impurity	Specification	Equipment Recommended
PurityPlus 2.5 (Chemically Pure)	BTF-25-XX	> 99.5%	Total Impurities	< 0.5%	400 series stainless steel regulator see page 4.16

XX - Complete the part number with the desired cylinder size listed below. (ie. BTF-25-200)

Standard Cylinder Sizes *	Contents lbs.	Cylinder Pressure PSIG	CGA Valve Connection
200	60	1800	330
35	10	1800	330
LB	0.375	1800	180

*Nonstandard cylinder sizes available upon request

A colorless, flammable gas shipped as a liquid under its own vapor pressure.

1,3-Butadiene

Technical Information:	
Chemical Symbol:	C ₄ H ₆
Molecular Weight:	54.09
Specific Volume	6.9 ft ³ /lb (0.431 m ³ /kg)
CAS Registry Number:	106-99-0

Shipping Information:	
DOT Proper Name:	Butadienes, Inhibited
Hazard Class:	2.1
I.D. Number:	UN1010
Labels:	Flammable Gas

Grade	Part No.	Purity	Impurity	Specification	Equipment Recommended
PurityPlus 2.0 (Chemically Pure)	13B-20-XX	> 99.0% Liquid Phase	Total Impurities	< 1 %	3700 HP series LP gas regulator see page 4.53

XX - Complete the part number with the desired cylinder size listed below. (ie. 13B-20-33)

Standard Cylinder Sizes *	Contents lbs.	Cylinder Pressure	CGA Valve Connection
454, 400	570	21	510
350, 400	135	21	510
33	7	21	510
LB	0.375	21	170

*Nonstandard cylinder sizes available upon request

n-Butane

A colorless, flammable gas shipped as a liquid under its own vapor pressure.

Technical Information:	
Chemical Symbol:	C ₄ H ₁₀
Molecular Weight:	58.12
Specific Volume	6.34 ft ³ /lb (0.396 m ³ /kg)
CAS Registry Number:	106-97-8

Shipping Information:	
DOT Proper Name:	Butane
Hazard Class:	2.1
I.D. Number:	UN1011
Labels:	Flammable Gas

Grade	Part No.	Purity	Impurity	Specification	Equipment Recommended
PurityPlus 2.5 (Instrument)	NBA-25-XX	> 99.5%	Total Impurities	< 0.5%	3700 HP series LP gas regulator see page 4.53
PurityPlus 2.0 (Chemically Pure)	NBA-20-XX	> 99.0%	Total Impurities	< 1%	

XX - Complete the part number with the desired cylinder size listed below. (ie. NBA-25-454)

Standard Cylinder Sizes *	Contents ft ³ /m ³	Cylinder Pressure	CGA Valve Connection
454	540	16.3	510
350	120	16.3	510
200	40	16.3	510
80	6	16.3	510
LB	0.375	16.3	170

*Nonstandard cylinder sizes available upon request

A colorless, flammable gas shipped as a liquid under its own vapor pressure.

1-Butene

Technical Information:	
Chemical Symbol:	C ₄ H ₈
Molecular Weight:	56.11
Specific Volume	6.55 ft ³ /lb (0.409 m ³ /kg)
CAS Registry Number:	106-98-9

Shipping Information:	
DOT Proper Name:	Liquid Petroleum Gas (Butene)
Hazard Class:	2.1
I.D. Number:	UN 1012
Labels:	Flammable Gas

Grade	Part No.	Purity	Impurity	Specification	Equipment Recommended
PurityPlus 3.0 (Research)	1BE-30-XX	> 99.9% Liquid Phase	Total Impurities	< 1000 ppm	3700 HP series LP gas regulator see page 4.53
PurityPlus 2.0 (Chemically Pure)	1BE-20-XX	> 99.0 % Liquid Phase	Total Impurities	< 1 %	

XX - Complete the part number with the desired cylinder size listed below. (ie. 1BE-20-454)

Standard Cylinder Sizes *	Contents lbs.	Cylinder Pressure	CGA Valve Connection
454	540	23	510
350	128	23	510
80	17	23	510
LB	0.375	23	170

*Nonstandard cylinder sizes available upon request

CIS-2-Butene

A colorless, flammable gas shipped as a liquid under its own vapor pressure.

Technical Information:	
Chemical Symbol:	C ₄ H ₈
Molecular Weight:	56.1
Specific Volume	6.7 ft ³ /lb (0.42 m ³ /kg)
CAS Registry Number:	590-18-1

Shipping Information:	
DOT Proper Name:	Liquid Petroleum Gases (CIS-2-Butene)
Hazard Class:	2.1
I.D. Number:	UN1075
Labels:	Flammable Gas

Grade	Part No.	Purity	Impurity	Specification	Equipment Recommended
PurityPlus 2.0 (Chemically Pure)	C2B-20-XX	> 99.0% Liquid Phase	Total Impurities	< 1%	3700 HP series LP gas regulator see page 4.53
PurityPlus 1.5 (Technical)	C2B-15-XX	> 95.0% Liquid Phase	Total Impurities	< 5%	

XX - Complete the part number with the desired cylinder size listed below. (ie. C2B-20-350)

Standard Cylinder Sizes *	Contents lbs	Cylinder Pressure	CGA Valve Connection
350	135	23	510
80	17	23	510
33	7	23	510
LB	0.375	23	170

*Nonstandard cylinder sizes available upon request

A colorless, odorless, nonflammable slightly acidic gas.

Carbon Dioxide

Technical Information:	
Chemical Symbol:	CO ₂
Molecular Weight:	44.04
Specific Volume	8.76 ft ³ /lb (0.55 m ³ /kg)
CAS Registry Number:	124-38-9

Shipping Information:	
DOT Proper Name:	Carbon Dioxide
Hazard Class:	2.2
I.D. Number:	UN 1013
Labels:	Nonflammable Gas

Grade	Part No.	Purity	Impurity	Specification	Equipment Recommended
PurityPlus 5.0 (Research)	CDI-50-XX	99.999%	Oxygen Nitrogen Carbon Monoxide Hydrogen Methane Water	< 1 ppm < 1 ppm < 0.1 ppm < 1 ppm < 0.5 ppm < 2 ppm	300 series brass regulator see page 4.12
PurityPlus 4.8 (Scientific)	CDI-48-XX	99.998	Argon + Oxygen Water Carbon Monoxide Nitrogen THC (as methane)	< 2 ppm < 3 ppm < 1 ppm < 8 ppm < 2 ppm	300 series brass regulator see page 4.12
PurityPlus Laser 4.5	CDI-45-XX	99.995%	Moisture Oxygen Total Hydrocarbons	< 5 ppm < 5 ppm < 1 ppm	400 series stainless steel regulator see page 4.16
PurityPlus Coleman 4.0 (Instrument)	CDI-40-XX	99.99%	Moisture Oxygen Nitrogen	< 10 ppm < 20 ppm < 50 ppm	300 series brass regulator see page 4.12
PurityPlus Anaerobic 3.0	CDI-30-XX	99.9%	Oxygen	< 20 ppm	200 series brass regulator see page 4.8
PurityPlus 2.8 (Bone Dry)	CDI-28-XX	99.8%	Moisture	< 20 ppm	200 series brass regulator see page 4.8

XX - Complete the part number with the desired cylinder size listed below. (ie. CDI-45-200)

Standard Cylinder Sizes *	Contents lb	Cylinder Pressure PSIG	CGA Valve Connection
200	50	838	320
80	20	838	320

*Nonstandard cylinder sizes available upon request

Carbon Monoxide

A colorless, odorless, toxic, flammable gas.

Technical Information:

Chemical Symbol:	CO
Molecular Weight:	28.01
Specific Volume	13.8 ft ³ /lb (0.86 m ³ /kg)
CAS Registry Number:	630-08-0

Shipping Information:

DOT Proper Name:	Carbon Monoxide, Compressed
Hazard Class:	2.3
I.D. Number:	UN 1016
Labels:	Poison Gas, Flammable Gas

Grade	Part No.	Purity	Impurity	Specification	Equipment Recommended
PurityPlus 4.0	CMO-40-XX	99.99%	Nitrogen Oxygen Carbon Dioxide Hydrogen Total Hydrocarbons Moisture	< 10 ppm < 2 ppm < 20 ppm < 10 ppm < 5 ppm < 5 ppm	400 series stainless steel regulator see page 4.14
PurityPlus 2.5 (Chemically Pure)	CMO-25-XX	> 99.5%	Total Impurities	< 0.5%	300 series brass regulator see page 4.12
PurityPlus 2.0 (Technical)		99.0%	Total Impurities	< 1.0%	200 series brass regulator see page 4.6

XX - Complete the part number with the desired cylinder size listed below. (ie. CMO-40-300)

Standard Cylinder Sizes *	Contents ft ³ /m ³	Cylinder Pressure PSIG	CGA Valve Connection
300	236	2000	350
200	175	1660	350
150A	148	2000	350
80A	78	2000	350
33A	34	2000	350

*Nonstandard cylinder sizes available upon request

A colorless gas with an unpleasant smell.

Carbonyl Sulfide

Technical Information:	
Chemical Symbol:	COS
Molecular Weight:	60.7
Specific Volume	2.1 ft ³ /lb
CAS Registry Number:	463-58-1

Shipping Information:	
DOT Proper Name:	Carbonyl Sulfide
Hazard Class:	2.3
I.D. Number:	UN 2204
Labels:	Flammable Gas

Grade	Part No.	Purity	Impurity	Specification	Equipment Recommended
PurityPlus 3.0	COS-30-XX	99.9%	Oxygen Nitrogen Moisture Carbon Dioxide Hydrogen Sulfide	< 0.01% < 0.03% < 0.01% < 0.03% < 0.01%	400 series stainless steel regulator see page 4.14

XX - Complete the part number with the desired cylinder size listed below. (ie. COS-30-200)

Standard Cylinder Sizes *	Contents lbs	Cylinder Pressure PSIG	CGA Valve Connection
200	44	174.7	330
80	16	174.7	330
33	7	174.7	330

*Nonstandard cylinder sizes available upon request

Chlorine A greenish-yellow, toxic, corrosive gas with an extremely disagreeable odor.

Technical Information:	
Chemical Symbol:	Cl ₂
Molecular Weight:	70.91
Specific Volume	5.4 ft ³ /lb (0.33 m ³ /kg)
CAS Registry Number:	7782-50-5

Shipping Information:	
DOT Proper Name:	Chlorine
Hazard Class:	2.3
I.D. Number:	UN 1017
Labels:	Poison Gas, Corrosive

Grade	Part No.	Purity	Impurity	Specification	Equipment Recommended
PurityPlus 3.0 (Liquid Phase) (High Purity)	CHL-30-XX	> 99.9%	Total Impurities	< 1000 ppm	400 series stainless steel regulator see page 4.14
PurityPlus 2.5 (Liquid Phase) (Chemically Pure)	CHL-25-XX	> 99.5%	Total Impurities	< 0.5%	400 series stainless steel regulator see page 4.14

XX - Complete the part number with the desired cylinder size listed below. (ie. CHL-30-400)

Standard Cylinder Sizes *	Contents lbs	Cylinder Pressure PSIG	CGA Valve Connection
400	150	85	660
200	100	85	660
80	40	85	660
30	15	85	660

*Nonstandard cylinder sizes available upon request

A colorless, odorless, flammable, stable isotope of hydrogen.

Deuterium

Technical Information:	
Chemical Symbol:	D ₂
Molecular Weight:	4.03
Specific Volume	95.9 ft ³ /lb (5.95 m ³ /kg)
CAS Registry Number:	7782-39-0

Shipping Information:	
DOT Proper Name:	Deuterium
Hazard Class:	2.1
I.D. Number:	UN 1957
Labels:	Flammable Gas

Grade	Part No.	Purity	Impurity	Specification	Equipment Recommended
PurityPlus 5.0	DEU-50-XX	99.999%	Hydrogen Oxygen Nitrogen Moisture Deuterium Hydride Total Hydrocarbons Carbon Monoxide Carbon Dioxide	< 100 ppm < 1 ppm < 1 ppm < 1 ppm < 3000 ppm < 1 ppm < 1 ppm < 1 ppm	300 series brass regulator see page 4.12
PurityPlus 4.0	DEU-40-XX	> 99.99%	Total Impurities	< 100 ppm	300 series brass regulator see page 4.12
PurityPlus 2.7	DEU-27-XX	> 99.7%	Total Impurities	< 0.3%	200 series regulator see page 4.8

XX - Complete the part number with the desired cylinder size listed below. (ie. DEU-50-200)

Standard Cylinder Sizes *	Contents liters	Cylinder Pressure	CGA Valve Connection
200	5000	1760	350
80	1000	890	350
30	500	1090	350

*Nonstandard cylinder sizes available upon request

Dimethyl Ether (DME) A colorless, flammable gas shipped as a liquid under its own vapor pressure.

Technical Information:	
Chemical Symbol:	(CH ₃) ₂ O
Molecular Weight:	46.07
Specific Volume	8.4 ft ³ /lb (0.524 m ³ /kg)
CAS Registry Number:	115-10-6

Shipping Information:	
DOT Proper Name:	Dimethyl Ether
Hazard Class:	2.1
I.D. Number:	UN1033
Labels:	Flammable Gas

Grade	Part No.	Purity	Impurity	Specification	Equipment Recommended
PurityPlus 2.8 (Chemically Pure)	DME-28-XX	Min. 99.8 wt% Liquid Phase	Other Volatiles Sulfur Compounds Moisture Non-Volatile Residue	Max 0.2 wt% Max 500 ppmw Max 100 ppmw Max 50g/100 ml	3700 HP series LP gas regulator see page 4.53
PurityPlus 2.5 (Technical)	DME-25-XX	> 99.5% Liquid Phase	Total Impurities	< 0.5%	

XX - Complete the part number with the desired cylinder size listed below. (ie. DME-28-350)

Standard Cylinder Sizes *	Contents lbs.	Cylinder Pressure	CGA Valve Connection
350	100	62.3	510
30	16	62.3	510
LB	0.5	62.3	170

*Nonstandard cylinder sizes available upon request

A colorless, odorless, flammable gas.

Ethane

Technical Information:	
Chemical Symbol:	C ₂ H ₆
Molecular Weight:	30.07
Specific Volume	12.80 ft ³ /lb (0.79 m ³ /kg)
CAS Registry Number:	74-84-0

Shipping Information:	
DOT Proper Name:	Ethane, Compressed
Hazard Class:	2.1
I.D. Number:	UN 1035
Labels:	Flammable Gas

Grade	Part No.	Purity	Impurity	Specification	Equipment Recommended
PurityPlus 2.0 (Chemically Pure)	ETA-20-XX	> 99.0%	Total Impurities	< 1.0%	200 series brass regulator see page 4.6

XX - Complete the part number with the desired cylinder size listed below. (ie. ETA-20-200)

Standard Cylinder Sizes *	Contents lbs	Cylinder Pressure PSIG	CGA Valve Connection
200	34	544	350
80	11	544	350
30	4	544	350

*Nonstandard cylinder sizes available upon request

Ethylene

A colorless, flammable gas with a sweet odor.

Technical Information:

Chemical Symbol:	C ₂ H ₄
Molecular Weight:	28.05
Specific Volume	13.70 ft ³ /lb (0.86 m ³ /kg)
CAS Registry Number:	74-85-1

Shipping Information:

DOT Proper Name:	Ethylene, Compressed
Hazard Class:	2.1
I.D. Number:	UN 1962
Labels:	Flammable Gas

Grade	Part No.	Purity	Impurity	Specification	Equipment Recommended
PurityPlus 4.0	ETH-40-XX	99.99%	Total Impurities	< 100 ppm	300 series brass regulator see page 4.12
PurityPlus 3.0 (Polymer Grade)	ETH-30-XX	99.9%	Total Impurities	< 0.1%	200 series brass regulator see page 4.8
PurityPlus 2.5 (Chemically Pure)	ETH-25-XX	99.5%	Total Impurities	< 0.5%	200 series brass regulator see page 4.8

XX - Complete the part number with the desired cylinder size listed below. (ie. ETH-40-300)

Standard Cylinder Sizes *	Contents lbs	Cylinder Pressure PSIG	CGA Valve Connection
300	37	1600	350
200	30	1200	350
80	10	1200	350

*Nonstandard cylinder sizes available upon request

A colorless, odorless, tasteless, inert gas.

Helium

Technical Information:	
Chemical Symbol:	He
Molecular Weight:	4.003
Specific Volume	96.7 ft ³ /lb (6.0 m ³ /kg)
CAS Registry Number:	7440-59-7

Shipping Information:	
DOT Proper Name:	Helium, Compressed
Hazard Class:	2.2
I.D. Number:	UN 1046
Labels:	Nonflammable Gas

Grade	Part No.	Purity	Impurity	Specification	Equipment Recommended
PurityPlus 6.0 (Chromatographic)	HEL-60-XX	99.9999%	Oxygen Moisture Nitrogen Total Hydrocarbons Carbon Monoxide Carbon Dioxide Total of all impurities	< 0.5 ppm < 1 ppm < 1 ppm < 0.2 ppm < 0.1 ppm < 0.1 ppm < 1 ppm	400 series stainless steel regulator see page 4.16
PurityPlus 5.5	HEL-55-XX	99.9995%	Oxygen Nitrogen Moisture Total Hydrocarbons	< 1 ppm < 4 ppm < 1 ppm < 0.5 ppm	300 series brass regulator see page 4.12
PurityPlus 5.0 (Ultra High Purity)	HEL-50-XX	99.999%	Oxygen Moisture Total Hydrocarbons	< 2 ppm < 2 ppm < 0.5 ppm	300 series brass regulator see page 4.12
PurityPlus N2 Free 5.0	HEL-NF-XX	99.999%	Oxygen Moisture Nitrogen Total Hydrocarbons	< 2 ppm < 2 ppm < 6 ppm < 0.5 ppm	300 series brass regulator see page 4.12
PurityPlus Zero 4.8	HEL-48-XX	99.998%	Total Hydrocarbons	< 0.5 ppm	300 series brass regulator see page 4.12
PurityPlus 4.7 (Prepurified)	HEL-47-XX	99.997%	Oxygen Moisture	< 5 ppm < 5 ppm	300 series brass regulator see page 4.12
PurityPlus 4.7 (6000 PSIG)	HEL-6K	99.997%	Oxygen Moisture	< 5 ppm < 5 ppm	492 series ultra high pressure regulator see page 4.44

XX - Complete the part number with the desired cylinder size listed below. (ie. HEL-60-300)

Standard Cylinder Sizes *	Contents ft ³ /m ³	Cylinder Pressure PSIG	CGA Valve Connection
300	291	2640	580
200	217	2200	580
80	73	2200	580
6K	515	6000	677

*Nonstandard cylinder sizes available upon request

Hexafluoropropylene

A colorless, odorless, nonflammable gas.

Technical Information:

Chemical Symbol:	C ₃ F ₆
Molecular Weight:	150.03
Specific Volume	2.58 ft ³ /lb (0.161 m ³ /kg)
CAS Registry Number:	116-15-4

Shipping Information:

DOT Proper Name:	Hexafluoropropylene, Compressed
Hazard Class:	2.2
I.D. Number:	UN 1858
Labels:	Nonflammable Gas

Grade	Part No.	Purity	Impurity	Specification	Equipment Recommended
PurityPlus 3.0	HXP-30-XX	99.9%	Saturated Hydrocarbons Unsaturated Hydrocarbons Oxygen Acidity	< 0.2 ppm < 0.3 ppm < 50 ppm < 0.0001%	3700 HP series LP gas regulator see page 4.53

XX - Complete the part number with the desired cylinder size listed below. (ie. HXP-30-LP300)

Standard Cylinder Sizes *	Contents lbs.	Cylinder Pressure	CGA Valve Connection
LP300	125	85	660
LP150	30	85	660
LP60	14	85	660

*Nonstandard cylinder sizes available upon request

A colorless, odorless, flammable gas.

Hydrogen

Technical Information:	
Chemical Symbol:	H ₂
Molecular Weight:	2.02
Specific Volume	192 ft ³ /lb (11.9 m ³ /kg)
CAS Registry Number:	1333-74-0

Shipping Information:	
DOT Proper Name:	Hydrogen, Compressed
Hazard Class:	2.1
I.D. Number:	UN 1049
Labels:	Flammable Gas

Grade	Part No.	Purity	Impurity	Specification	Equipment Recommended
PurityPlus 6.0 (Research)	HYD-60-XX	99.9999%	Oxygen Water Nitrogen THC CO ₂ + CO	< 0.2 ppm < 0.5 ppm < 0.3 ppm < 0.1 ppm < 0.1 ppm	300 series brass regulator see page 4.12
PurityPlus 5.5	HYD-55-XX	99.9995%	Oxygen Water Nitrogen Methane Carbon Dioxide Carbon Monoxide	< 0.5 ppm < 2 ppm < 2 ppm < 0.2 ppm < 0.1 ppm < 0.2 ppm	300 series brass regulator see page 4.12
PurityPlus 5.0 (Ultra High Purity)	HYD-50-XX	99.999%	Moisture Oxygen Nitrogen Total Hydrocarbons	< 3 ppm < 1 ppm < 5 ppm < 1 ppm	300 series brass regulator see page 4.12
PurityPlus 4.8 (6000 PSIG)	HYD-6K	99.998%	Moisture Oxygen	< 3 ppm < 5 ppm	492 series ultra high pressure regulator see page 4.44
PurityPlus Zero 4.5	HYD-45-XX	99.995%	Total Hydrocarbons	< 0.5 ppm	300 series brass regulator see page 4.12
PurityPlus 4.0 (Prepurified)	HYD-40-XX	99.99%	Moisture Oxygen	< 10 ppm < 20 ppm	300 series brass regulator see page 4.12

XX - Complete the part number with the desired cylinder size listed below. (ie. HYD-50-300)

Standard Cylinder Sizes *	Contents ft ³ /m ³	Cylinder Pressure PSIG	CGA Valve Connection
300	261	2400	350
200	195	2000	350
80	71	2000	350
6K	483	6000	703

*Nonstandard cylinder sizes available upon request

Hydrogen Bromide

A colorless, corrosive, irritating, toxic gas shipped as a liquid under its own vapor pressure.

Technical Information:

Chemical Symbol:	HBr
Molecular Weight:	80.91
Specific Volume	4.76 ft ³ /lb (0.297 m ³ /kg)
CAS Registry Number:	10035-10-6

Shipping Information:

DOT Proper Name:	Hydrogen Bromide, Anhydrous
Hazard Class:	2.3
I.D. Number:	UN1048
Labels:	Inhalation Hazard, Corrosive

Grade	Part No.	Purity	Impurity	Specification	Equipment Recommended
PurityPlus 2.8 (Chemically Pure)	HYB-28-XX	> 99.8% Liquid Phase	Total Impurities	< 2000 ppm	400 series stainless steel regulator see page 4.14

XX - Complete the part number with the desired cylinder size listed below. (ie. HYB-28-80)

Standard Cylinder Sizes *	Contents lbs.	Cylinder Pressure	CGA Valve Connection
80	30	320	330
30	10	320	330
LB	1	320	180

*Nonstandard cylinder sizes available upon request

A colorless, corrosive, irritating, toxic gas.

Hydrogen Chloride

Technical Information:	
Chemical Symbol:	HCl
Molecular Weight:	36.46
Specific Volume	10.6 ft ³ /lb (0.68 m ³ /kg)
CAS Registry Number:	7647-01-0

Shipping Information:	
DOT Proper Name:	Hydrogen Chloride, Anhydrous
Hazard Class:	2.3
I.D. Number:	UN 1050
Labels:	Poison Gas, Corrosive

Grade	Part No.	Purity	Impurity	Specification	Equipment Recommended
PurityPlus 5.0 (Liquid Phase) (Research)	HCL-50-XX	99.999%	Total Impurities (Nitrogen, Oxygen, CO, CO ₂ , Total Hydrocarbons)	< 10 ppm	400 series stainless steel regulator see page 4.10
PurityPlus 4.5 (Liquid Phase)	HCL-45-XX	99.995%	Total Impurities (Nitrogen, Oxygen, CO, CO ₂ , Total Hydrocarbons)	< 50 ppm	400 series stainless steel regulator see page 4.10
PurityPlus 4.0 (Liquid Phase)	HCL-40-XX	> 99.99%	Total Impurities	< 100 ppm	400 series stainless steel regulator see page 4.10
PurityPlus 2.0 (Liquid Phase) (Technical)	HCL-20-XX	> 99%	Total Impurities	< 1.0%	400 series stainless steel regulator see page 4.10

XX - Complete the part number with the desired cylinder size listed below. (ie. HCL-50-200)

Standard Cylinder Sizes *	Contents lbs	Cylinder Pressure PSIG	CGA Valve Connection
200	60	613	330
80	20	613	330
30	8	613	330

*Nonstandard cylinder sizes available upon request

Hydrogen Sulfide

A colorless, flammable, toxic gas with the odor of rotten eggs.

Technical Information:

Chemical Symbol:	H ₂ S
Molecular Weight:	34.08
Specific Volume	11.2 ft ³ /lb (0.69 m ³ /kg)
CAS Registry Number:	7783-06-4

Shipping Information:

DOT Proper Name:	Hydrogen Sulfide, Liquefied
Hazard Class:	2.3
I.D. Number:	UN 1053
Labels:	Poison Gas, Flammable Gas

Grade	Part No.	Purity	Impurity	Specification	Equipment Recommended
PurityPlus 2.5 (Liquid Phase) (Chemically Pure)	H2X-25-XX	> 99.5%	Total Impurities	< 0.5%	400 series stainless steel regulator see page 4.14 408 series aluminum regulator see page 4.18

XX - Complete the part number with the desired cylinder size listed below. (ie. H2X-25-400)

Standard Cylinder Sizes *	Contents lbs.	Cylinder Pressure	CGA Valve Connection
400	170	252	330
200	60	252	330
80	20	252	330

*Nonstandard cylinder sizes available upon request

A colorless, flammable gas.

Isobutane

Technical Information:	
Chemical Symbol:	C ₄ H ₁₀
Molecular Weight:	58.12
Specific Volume	6.5 ft ³ /lb (0.40 m ³ /kg)
CAS Registry Number:	75-28-5

Shipping Information:	
DOT Proper Name:	Isobutane
Hazard Class:	2.1
I.D. Number:	UN 1969
Labels:	Flammable Gas

Grade	Part No.	Purity	Impurity	Specification	Equipment Recommended
PurityPlus 2.5 (Liquid Phase) (Instrument)	ISB-25-XX	> 99.5%	Total Impurities	< 0.5%	3700 HP series LP gas regulator see page 4.53
PurityPlus 2.0 (Liquid Phase) (Chemically Pure)	ISB-20-XX	> 99%	Total Impurities	< 1.0%	3700 HP series LP gas regulator see page 4.53

XX - Complete the part number with the desired cylinder size listed below. (ie. ISB-25-350)

Standard Cylinder Sizes *	Contents lbs	Cylinder Pressure PSIG	CGA Valve Connection
350	116	31	510
LP20	20	31	510

*Nonstandard cylinder sizes available upon request

Krypton

A colorless, odorless, nonflammable, inert, rare gas.

Technical Information:

Chemical Symbol:	Kr
Molecular Weight:	83.80
Specific Volume	4.6 ft ³ /lb (0.29 m ³ /kg)
CAS Registry Number:	7439-90-9

Shipping Information:

DOT Proper Name:	Krypton, Compressed
Hazard Class:	2.2
I.D. Number:	UN 1056
Labels:	Nonflammable Gas

Grade	Part No.	Purity	Impurity	Specification	Equipment Recommended
PurityPlus 5.0	KRY-50-XX	99.999%	Nitrogen Oxygen Hydrogen CO/CO ₂ Tetrafluoromethane Total Hydrocarbons Moisture Xenon Total Impurities	< 10 ppm	300 series brass regulator see page 4.12
PurityPlus 4.5	KRY-45-XX	99.995%	Nitrogen Oxygen Hydrogen CO/CO ₂ Tetrafluoromethane Total Hydrocarbons Moisture Xenon	< 10 ppm < 2 ppm < 1 ppm < 1 ppm < 1 ppm < 1 ppm < 1 ppm < 20 ppm	300 series brass regulator see page 4.12
PurityPlus 2.0	KRY-20-XX	> 99%	Total Impurities	< 1.0%	300 series regulator see page 4.12

XX - Complete the part number with the desired cylinder size listed below. (ie. KRY-50-300)

Standard Cylinder Sizes *	Contents liters	Cylinder Pressure PSIG	CGA Valve Connection
300	10,000	2100	580
200	5000	1400	580
80	2500	1700	580
LB	100	760	580/110

*Nonstandard cylinder sizes available upon request

A colorless, odorless, tasteless, flammable gas.

Methane

Technical Information:	
Chemical Symbol:	CH ₄
Molecular Weight:	16.04
Specific Volume	23.7 ft ³ /lb (1.47 m ³ /kg)
CAS Registry Number:	74-82-8

Shipping Information:	
DOT Proper Name:	Methane, Compressed
Hazard Class:	2.1
I.D. Number:	UN 1971
Labels:	Flammable Gas

Grade	Part No.	Purity	Impurity	Specification	Equipment Recommended
PurityPlus 5.0 (Research)	MET-50-XX	> 99.999%	Total Impurities	< 10 ppm	300 series brass regulator see page 4.12
PurityPlus 4.0 (Ultra High Purity)	MET-40-XX	> 99.99%	Total Impurities	< 100 ppm	300 series brass regulator see page 4.12
PurityPlus 2.0 (Chemically Pure)	MET-20-XX	> 99%	Total Impurities	< 1.0%	200 series regulator see page 4.8
PurityPlus 1.3 (Commercial)	MET-13-XX	> 93%	Total Impurities	< 7.0 %	200 series regulator see page 4.8

XX - Complete the part number with the desired cylinder size listed below. (ie. MET-50-300)

Standard Cylinder Sizes *	Contents ft ³ /m ³	Cylinder Pressure PSIG	CGA Valve Connection
300	356	2400	350
200	260	2000	350
80	88	2000	350

*Nonstandard cylinder sizes available upon request

Methyl Chloride

A colorless, flammable, potentially harmful, liquefied gas.

Technical Information:

Chemical Symbol:	CH ₃ Cl
Molecular Weight:	50.49
Specific Volume	7.5 ft ³ /lb (0.47 m ³ /kg)
CAS Registry Number:	74-87-3

Shipping Information:

DOT Proper Name:	Methyl Chloride
Hazard Class:	2.1
I.D. Number:	UN1063
Labels:	Flammable Gas

Grade	Part No.	Purity	Impurity	Specification	Equipment Recommended
PurityPlus 2.5 (Chemically Pure)	MEC-25-XX	> 99.5% Liquid Phase	Total Impurities	< 0.5%	200 series brass regulator see page 4.6

XX - Complete the part number with the desired cylinder size listed below. (ie. MEC-25-454)

Standard Cylinder Sizes *	Contents lbs.	Cylinder Pressure	CGA Valve Connection
454	800	59	510
350	100	59	510
80	25	59	510
LB	0.5	59	180

*Nonstandard cylinder sizes available upon request

A colorless, flammable, liquefied gas.

Methyl Fluoride

Technical Information:	
Chemical Symbol:	CH ₃ F
Molecular Weight:	34.03
Specific Volume	11.36 ft ³ /lb (0.709 m ³ /kg)
CAS Registry Number:	593-53-3

Shipping Information:	
DOT Proper Name:	Methyl Fluoride
Hazard Class:	2.1
I.D. Number:	UN2454
Labels:	Flammable Gas

Grade	Part No.	Purity	Impurity	Specification	Equipment Recommended
PurityPlus 2.0 (Chemically Pure)	MEF-20-XX	> 99.0%	Total Impurities	< 1%	300 series brass regulator see page 4.10

XX - Complete the part number with the desired cylinder size listed below. (ie. MEF-20-10)

Standard Cylinder Sizes *	Contents lbs.	Cylinder Pressure	CGA Valve Connection
10	0.25	538	350

*Nonstandard cylinder sizes available upon request

Methyl Mercaptan

A colorless, flammable, potentially harmful, liquefied gas.

Technical Information:

Chemical Symbol:	CH ₃ SH
Molecular Weight:	48.1
Specific Volume	8.0 ft ³ /lb (0.499 m ³ /kg)
CAS Registry Number:	74-93-1

Shipping Information:

DOT Proper Name:	Methyl Mercaptan
Hazard Class:	2.3
I.D. Number:	UN1064
Labels:	Flammable Gas

Grade	Part No.	Purity	Impurity	Specification	Equipment Recommended
PurityPlus 2.5 (Chemically Pure)	MEM-25-XX	> 99.5%	Total Impurities	< 0.5%	Series 3920 stainless steel lecture bottle regulator see page 4.32

XX - Complete the part number with the desired cylinder size listed below. (ie. MEM-25-XX)

Standard Cylinder Sizes *	Contents lbs.	Cylinder Pressure	CGA Valve Connection
LB	0.5	15	110

*Nonstandard cylinder sizes available upon request

A colorless, toxic, flammable, alkaline, liquefied gas.

Monomethylamine (MMA)

Technical Information:	
Chemical Symbol:	CH ₃ NH ₂
Molecular Weight:	31.06
Specific Volume	12.1 ft ³ /lb (0.755 m ³ /kg)
CAS Registry Number:	74-89-5

Shipping Information:	
DOT Proper Name:	Methylamine, Anhydrous
Hazard Class:	2.1
I.D. Number:	UN1061
Labels:	Flammable Gas

Grade	Part No.	Purity	Impurity	Specification	Equipment Recommended
PurityPlus 2.5 (Chemically Pure)	MMA-25-XX	> 99.5% Liquid Phase	Total Impurities	< 0.5%	400 series stainless steel regulator see page 4.14

XX - Complete the part number with the desired cylinder size listed below. (ie. MMA-25-350)

Standard Cylinder Sizes *	Contents lbs.	Cylinder Pressure	CGA Valve Connection
350	125	29	705
LB	0.375	29	180

*Nonstandard cylinder sizes available upon request

Neon

A colorless, odorless, nonflammable, inert gas.

Technical Information:

Chemical Symbol:	Ne
Molecular Weight:	20.18
Specific Volume	19.2 ft ³ /lb (1.19 m ³ /kg)
CAS Registry Number:	7440-01-9

Shipping Information:

DOT Proper Name:	Neon, Compressed
Hazard Class:	2.2
I.D. Number:	UN 1065
Labels:	Nonflammable Gas

Grade	Part No.	Purity	Impurity	Specification	Equipment Recommended
PurityPlus 5.0 (Ultra High Purity)	NEO-50-XX	99.999%	Helium Nitrogen Oxygen Moisture Hydrogen Total Hydrocarbons	< 8 ppm < 4 ppm < 1 ppm < 1 ppm < 1 ppm < 0.5 ppm	300 series brass regulator see page 4.12

XX - Complete the part number with the desired cylinder size listed below. (ie. NEO-50-300)

Standard Cylinder Sizes *	Contents liters	Cylinder Pressure PSIG	CGA Valve Connection
300	7500	2400	580
200	6000	2200	580
80	2000	1775	580
LB	100	770	580/110

*Nonstandard cylinder sizes available upon request

A colorless, flammable, liquefied gas.

Neopentane (Dimethylpropane)

Technical Information:	
Chemical Symbol:	C ₅ H ₁₂
Molecular Weight:	72.15
Specific Volume	5.30 ft ³ /lb (0.330 m ³ /kg)
CAS Registry Number:	463-82-1

Shipping Information:	
DOT Proper Name:	2,2-Dimethylpropane
Hazard Class:	2.1
I.D. Number:	UN2044
Labels:	Flammable Gas

Grade	Part No.	Purity	Impurity	Specification	Equipment Recommended
PurityPlus 2.0 (Chemically Pure)	NPT-20-XX	> 99.0%	Total Impurities	< 1%	3700 HP series LP gas regulator see page 4.53

XX - Complete the part number with the desired cylinder size listed below. (ie. NPT-20-LPS)

Standard Cylinder Sizes *	Contents lbs.	Cylinder Pressure	CGA Valve Connection
LPS	5	7 psig	510

*Nonstandard cylinder sizes available upon request

Nitric Oxide

A colorless, nonflammable, toxic, oxidizing gas with an irritating odor.

Technical Information:

Chemical Symbol:	NO
Molecular Weight:	30.01
Specific Volume	12.9 ft ³ /lb (0.80 m ³ /kg)
CAS Registry Number:	10102-43-9

Shipping Information:

DOT Proper Name:	Nitric Oxide, Compressed
Hazard Class:	2.3
I.D. Number:	UN 1660
Labels:	Poison Gas, Oxidizer, Corrosive

Grade	Part No.	Purity	Impurity	Specification	Equipment Recommended
PurityPlus 3.0	NOX-30-XX	> 99.9%	Total Impurities	< 1000 ppm	400 series stainless steel regulator see page 4.14
PurityPlus 2.0 (Chemically Pure)	NOX-20-XX	> 99.0%	Total Impurities	< 1.0%	400 series stainless steel regulator see page 4.14

XX - Complete the part number with the desired cylinder size listed below. (ie. NOX-30-200)

Standard Cylinder Sizes *	Contents ft ³ /m ³	Cylinder Pressure PSIG	CGA Valve Connection
200	53	500	660
80	19	500	660

*Nonstandard cylinder sizes available upon request

A colorless, odorless, chemically inert gas.

Nitrogen

Technical Information:	
Chemical Symbol:	N ₂
Molecular Weight:	28.01
Specific Volume	13.8 ft ³ /lb (0.86 m ³ /kg)
CAS Registry Number:	7727-37-9

Shipping Information:	
DOT Proper Name:	Nitrogen, Compressed
Hazard Class:	2.2
I.D. Number:	UN 1066
Labels:	Nonflammable Gas

Grade	Part No.	Purity	Impurity	Specification	Equipment Recommended
PurityPlus 6.0 (Research)	NIT-60-XX	99.9999%	Oxygen Moisture Total Hydrocarbons CO/CO ₂	< 0.15 ppm < 0.15 ppm 0.10 ppm 0.10 ppm	400 series stainless steel regulator see page 4.16
PurityPlus 5.0 (Ultra High Purity)	NIT-50-XX	99.999%	Oxygen Moisture Total Hydrocarbons	< 2 ppm < 3 ppm < 0.5 ppm	300 series brass regulator see page 4.12
PurityPlus 4.8 (Prepurified)	NIT-48-XX	99.998%	Oxygen Moisture	< 5 ppm < 5 ppm	300 series brass regulator see page 4.12
PurityPlus Zero 4.8	NIT-48-XX	99.998%	Total Hydrocarbons	< 0.5 ppm	300 series brass regulator see page 4.12
PurityPlus O₂ Free 4.8	NIT-OF-XX	99.998%	Oxygen	< 0.5 ppm	300 series brass regulator see page 4.12
PurityPlus 4.8 (3500 or 6000 PSIG)	NIT-3K NIT-6K	99.998%	Oxygen Moisture	< 5 ppm < 5 ppm	492 series ultra high pressure regulator see page 4.44

XX - Complete the part number with the desired cylinder size listed below. (ie. NIT-60-300)

Standard Cylinder Sizes *	Contents ft ³ /m ³	Cylinder Pressure PSIG	CGA Valve Connection
300	304	2640	580
200	228	2200	580
80	76	2200	580
6K	494	6000	677

*Nonstandard cylinder sizes available upon request

Nitrogen Dioxide (Dinitrogen Tetroxide) A brownish, toxic, corrosive, liquefied gas.

Technical Information:	
Chemical Symbol:	NO ₂
Molecular Weight:	46.01
Specific Volume	4.7 ft ³ /lb (0.29 m ³ /kg)
CAS Registry Number:	10102-44-0

Shipping Information:	
DOT Proper Name:	Nitrogen Dioxide, Liquefied
Hazard Class:	2.3
I.D. Number:	UN 1067
Labels:	Poison Gas, Oxidizer, Corrosive

Grade	Part No.	Purity	Impurity	Specification	Equipment Recommended
PurityPlus 2.5 (liquid phase)	NDI-25-XX	99.5%	Moisture Particle (Metal Residue)	< 0.15% < 10 mg/L	400 series stainless steel regulator see page 4.14

XX - Complete the part number with the desired cylinder size listed below. (ie. NDI-25-200)

Standard Cylinder Sizes *	Contents lbs.	Cylinder Pressure	CGA Valve Connection
200	120	15	660
35	10	15	660

*Nonstandard cylinder sizes available upon request

A toxic, colorless, odorless, nonflammable gas.

Nitrogen Trifluoride

Technical Information:	
Chemical Symbol:	NF ₃
Molecular Weight:	71.00
Specific Volume	5.043 ft ³ /lb (0.337 m ³ /kg)
CAS Registry Number:	7783-54-2

Shipping Information:	
DOT Proper Name:	Nitrogen Trifluoride, Compressed
Hazard Class:	2.2
I.D. Number:	UN 2451
Labels:	Nonflammable Gas, Oxidizer

Grade	Part No.	Purity	Impurity	Specification	Equipment Recommended
PurityPlus 4.0	NTF-40-XX	99.99%	Oxygen/Argon Nitrogen Tetrafluoromethane Carbon Dioxide Nitrous Oxide Sulfur Hexafluoride Moisture Hydrogen Fluoride Carbon Monoxide Methane	< 5 ppm < 5 ppm < 40 ppm < 3 ppm < 3 ppm < 5 ppm < 1 ppm < 1 ppm < 1 ppm < 1 ppm	300 series brass regulator see page 4.12

XX - Complete the part number with the desired cylinder size listed below. (ie. NTF-40-200)

Standard Cylinder Sizes *	Contents lbs	Cylinder Pressure PSIG	CGA Valve Connection
200	44	1450	330

*Nonstandard cylinder sizes available upon request

Nitrous Oxide

A colorless, sweet-tasting, oxidizing gas.

Technical Information:

Chemical Symbol:	N ₂ O
Molecular Weight:	44.01
Specific Volume	8.7 ft ³ /lb (0.54 m ³ /kg)
CAS Registry Number:	10024-97-2

Shipping Information:

DOT Proper Name:	Nitrous Oxide, Compressed
Hazard Class:	2.2
I.D. Number:	UN 1070
Labels:	Nonflammable Gas, Oxidizer

Grade	Part No.	Purity	Impurity	Specification	Equipment Recommended
PurityPlus VLSI 5.0 (Liquid Phase)	N2O-VL-XX	99.999%	Nitrogen Oxygen Carbon Dioxide Total Hydrocarbons Moisture Carbon Monoxide Ammonia Nitric Oxide Nitrogen Dioxide Halogens	< 5 ppm < 2 ppm < 2 ppm < 1 ppm < 3 ppm < 1 ppm < 5 ppm < 0.5 ppm < 0.5 ppm < 0.5 ppm	400 series stainless steel regulator see page 4.14
PurityPlus 4.5	N2O-45-XX	99.995%	Oxygen Moisture Nitrogen Total Hydrocarbons CO/CO ₂	< 5 ppm < 5 ppm < 20 ppm < 5 ppm < 5 ppm	300 series brass regulator see page 4.10 308 series heated regulator see page 4.28
PurityPlus 3.0	N2O-30-XX	99.9%	Nitrogen Oxygen Carbon Dioxide Total Hydrocarbons Moisture Carbon Monoxide	< 400 ppm < 100 ppm < 250 ppm < 30 ppm < 50 ppm < 50 ppm	200 series brass regulator see page 4.6 308 series heated regulator see page 4.28
PurityPlus AA 2.6	N2O-26-XX	99.6%	Moisture O ₂ /N ₂	< 30 ppm < 2000 ppm	200 series brass regulator see page 4.6 308 series regulator see page 4.28

XX - Complete the part number with the desired cylinder size listed below. (ie. N2O-VL-200)

Standard Cylinder Sizes *	Contents lb	Cylinder Pressure PSIG	CGA Valve Connection
200	60	745	326

*Nonstandard cylinder sizes available upon request

A colorless, relatively non-reactive gas.

Octafluoropropane (HC-218)

Technical Information:	
Chemical Symbol:	C ₃ F ₈
Molecular Weight:	188.0
Specific Volume	2.02 ft ³ /lb (0.126 m ³ /kg)
CAS Registry Number:	76-19-7

Shipping Information:	
DOT Proper Name:	Octafluoropropane
Hazard Class:	2.2
I.D. Number:	UN 2424
Labels:	Nonflammable Gas

Grade	Part No.	Purity	Impurity	Specification	Equipment Recommended
PurityPlus 5.0	OFP-50-XX	99.999%	Organic Impurities Moisture Carbon Monoxide Carbon Dioxide Nitrogen/Oxygen Acidity (as HF)	< 10 ppm	3700 HP series LP gas regulator see page 4.53
PurityPlus 3.0	OFP-30-XX	> 99.9%	Total Impurities	< 1000 ppm	3700 HP series LP gas regulator see page 4.53

XX - Complete the part number with the desired cylinder size listed below. (ie. OFP-50-200)

Standard Cylinder Sizes *	Contents lbs	Cylinder Pressure PSIG	CGA Valve Connection
200	95	25	660
80	20	25	660

*Nonstandard cylinder sizes available upon request

Oxygen

A colorless, odorless, tasteless, highly oxidizing gas.

Technical Information:

Chemical Symbol:	O ₂
Molecular Weight:	32
Specific Volume	12.1 ft ³ /lb (0.76 m ³ /kg)
CAS Registry Number:	7782-44-7

Shipping Information:

DOT Proper Name:	Oxygen, Compressed
Hazard Class:	2.2
I.D. Number:	UN 1072
Labels:	Nonflammable Gas, Oxidizer

Grade	Part No.	Purity	Impurity	Specification	Equipment Recommended
PurityPlus 5.0 (Research)	OXY-50-XX	99.999%	Argon Moisture Nitrogen Total Hydrocarbons CO/CO ₂	< 5 ppm < 2 ppm < 5 ppm < 1 ppm < 1 ppm	300 series brass regulator see page 4.12
PurityPlus 4.3 (Ultra High Purity)	OXY-43-XX	99.993%	Argon Moisture Nitrogen Total Hydrocarbons	< 40 ppm < 3 ppm < 10 ppm < 0.5 ppm	300 series brass regulator see page 4.12
PurityPlus Zero 2.8	OXY-28-XX	99.8%	Total Hydrocarbons	< 0.5 ppm	300 series regulator see page 4.12
PurityPlus Extra Dry 2.6	OXY-26-XX	99.6%	Moisture	< 10 ppm	200 series regulator see page 4.8

XX - Complete the part number with the desired cylinder size listed below. (ie. OXY-50-300)

Standard Cylinder Sizes *	Contents ft ³ /m ³	Cylinder Pressure PSIG	CGA Valve Connection
300	337	2640	540
200	249	2200	540
80	83	2200	540

*Nonstandard cylinder sizes available upon request

A colorless, flammable, liquefied, hydrocarbon gas.

Propane

Technical Information:	
Chemical Symbol:	C ₃ H ₈
Molecular Weight:	44.11
Specific Volume	8.5 ft ³ /lb (0.531 m ³ /kg)
CAS Registry Number:	74-98-6

Shipping Information:	
DOT Proper Name:	Propane
Hazard Class:	2.1
I.D. Number:	UN1978
Labels:	Flammable Gas

Grade	Part No.	Purity	Impurity	Specification	Equipment Recommended
PurityPlus 3.0 (Research)	PPE-30-XX	> 99.9%	Total Impurities	< 1000 ppm	3700 HP series LP gas regulator see page 4.53
PurityPlus 2.5 (Instrument)	PPE-25-XX	> 99.5%	Total Impurities	< 0.5%	3700 HP series LP gas regulator see page 4.53
PurityPlus 2.0 (Chemically Pure)	PPE-20-XX	> 99.0%	Total Impurities	< 1.0%	3700 HP series LP gas regulator see page 4.53

XX - Complete the part number with the desired cylinder size listed below. (ie. PPP-30-200)

Standard Cylinder Sizes *	Contents lbs	Cylinder Pressure PSIG	CGA Valve Connection
350	105	109	510
200	35	109	510
80	13	109	510
LB	0.3	109	170

*Nonstandard cylinder sizes available upon request

Propylene

A colorless, flammable, liquefied, hydrocarbon gas.

Technical Information:	
Chemical Symbol:	C ₃ H ₆
Molecular Weight:	42.08
Specific Volume	8.88 ft ³ /lb (0.554 m ³ /kg)
CAS Registry Number:	115-07-1

Shipping Information:	
DOT Proper Name:	Propylene
Hazard Class:	2.1
I.D. Number:	UN1077
Labels:	Flammable Gas

Grade	Part No.	Purity	Impurity	Specification	Equipment Recommended
PurityPlus 2.5 (Polymer)	PPY-25-XX	> 99.5%	Total Impurities	< 0.5%	3700 HP series LP gas regulator see page 4.53
PurityPlus 2.0 (Chemically Pure)	PPY-20-XX	> 99.0%	Total Impurities	< 1.0%	

XX - Complete the part number with the desired cylinder size listed below. (ie. PPY-25-350)

Standard Cylinder Sizes *	Contents lbs.	Cylinder Pressure	CGA Valve Connection
350	105	137	510
200	35	137	510
80	13	137	510
LB	0.3	137	170

*Nonstandard cylinder sizes available upon request

A colorless, irritating, nonflammable, toxic, liquefied gas.

Sulfur Dioxide

Technical Information:	
Chemical Symbol:	SO ₂
Molecular Weight:	64.06
Specific Volume	5.99 ft ³ /lb (0.374 m ³ /kg)
CAS Registry Number:	7446-09-5

Shipping Information:	
DOT Proper Name:	Sulfur Dioxide, Liquefied
Hazard Class:	2.2
I.D. Number:	UN 1080
Labels:	Nonflammable Gas

Grade	Part No.	Purity	Impurity	Specification	Equipment Recommended
PurityPlus 3.8 (Anhydrous)	SDO-38-XX	> 99.98%	Moisture Residue Sulfuric Acid	< 20 ppm < 50 ppm < 20 ppm	Series 400 stainless steel regulator see page 4.14

XX - Complete the part number with the desired cylinder size listed below. (ie. SDO-38-761)

Standard Cylinder Sizes *	Contents lbs.	Cylinder Pressure	CGA Valve Connection
761	2000	34	660
400	150	34	660
40	40	34	660
LB	1	34	180

*Nonstandard cylinder sizes available upon request

Sulfur Hexafluoride

A colorless, odorless, liquefied gas.

Technical Information:	
Chemical Symbol:	SF ₆
Molecular Weight:	146.05
Specific Volume	2.50 ft ³ /lb (0.16 m ³ /kg)
CAS Registry Number:	2551-62-4

Shipping Information:	
DOT Proper Name:	Sulfur Hexafluoride
Hazard Class:	2.2
I.D. Number:	UN 1080
Labels:	Nonflammable Gas

Grade	Part No.	Purity	Impurity	Specification	Equipment Recommended
PurityPlus 5.0	SF6-50-XX	99.999%	Air Tetrafluoromethane Moisture	< 6 ppm < 2 ppm < 2 ppm	300 series brass regulator see page 4.10
PurityPlus 4.0	SF6-40-XX	99.99%	Air Tetrafluoromethane Moisture Oil Acidity (as HF)	< 50 ppm < 40 ppm < 5 ppm < 2 ppm < 0.3 ppm	300 series brass regulator see page 4.10
PurityPlus 3.0	SF6-30-XX	99.9%	Air Tetrafluoromethane Moisture Oil Acidity (as HF)	< 300 ppm < 300 ppm < 8 ppm < 5 ppm < 0.3 ppm	200 series brass regulator see page 4.6

XX - Complete the part number with the desired cylinder size listed below. (ie. SF6-50-200)

Standard Cylinder Sizes *	Contents lbs	Cylinder Pressure PSIG	CGA Valve Connection
200	115	320	590
80	35	320	590
30	10	320	590

*Nonstandard cylinder sizes available upon request

A colorless, odorless, nonflammable gas.

Tetrafluoromethane (HC-14)

Technical Information:

Chemical Symbol:	CF ₄
Molecular Weight:	88.005
Specific Volume	4.40 ft ³ /lb (0.027 m ³ /kg)
CAS Registry Number:	75-73-0

Shipping Information:

DOT Proper Name:	Compressed Gas NOS Tetrafluoromethane
Hazard Class:	2.2
I.D. Number:	UN 1982
Labels:	Nonflammable Gas

Grade	Part No.	Purity	Impurity	Specification	Equipment Recommended
PurityPlus 5.0	TFM-50-XX	99.999%	Oxygen/Argon Nitrogen CO/CO ₂ Other Halocarbons Sulfur Hexafluoride Moisture Acidity (as HF)	< 1 ppm < 4 ppm < 1 ppm < 2 ppm < 1 ppm < 1 ppm < 0.1 ppm	300 series brass regulator see page 4.12
PurityPlus 4.0	TFM-40-XX	99.99%	Oxygen/Argon Nitrogen CO/CO ₂ Other Halocarbons Sulfur Hexafluoride Moisture Acidity (as HF)	< 5 ppm < 20 ppm < 10 ppm < 5 ppm < 5 ppm < 3 ppm < 0.01 ppm	300 series brass regulator see page 4.12

XX - Complete the part number with the desired cylinder size listed below. (ie. TFM-50-200)

Standard Cylinder Sizes *	Contents lbs	Cylinder Pressure PSIG	CGA Valve Connection
200	70	2000	320
80	20	2000	320
LB	0.1	500	320/180

*Nonstandard cylinder sizes available upon request

Trimethylamine (TMA)

A colorless, toxic, flammable gas.

Technical Information:	
Chemical Symbol:	(CH ₃) ₃ N
Molecular Weight:	59.11
Specific Volume	6.4 ft ³ /lb (0.4 m ³ /kg)
CAS Registry Number:	75-50-3

Shipping Information:	
DOT Proper Name:	Trimethylamine, Anhydrous
Hazard Class:	2.1
I.D. Number:	UN1083
Labels:	Flammable Gas

Grade	Part No.	Purity	Impurity	Specification	Equipment Recommended
PurityPlus 2.5 (Chemically Pure)	TMA-25-XX	> 99.5%	Total Impurities	< 0.5%	400 series stainless steel regulator see page 4.14

XX - Complete the part number with the desired cylinder size listed below. (ie. TMA-25-350)

Standard Cylinder Sizes *	Contents lbs.	Cylinder Pressure	CGA Valve Connection
350	125	13	510
LB	0.375	13	180

*Nonstandard cylinder sizes available upon request

A colorless, odorless, nontoxic, inert gas.

Xenon

Technical Information:

Chemical Symbol:	Xe
Molecular Weight:	131.3
Specific Volume	2.90 ft ³ /lb (0.18 m ³ /kg)
CAS Registry Number:	7440-63-3

Shipping Information:

DOT Proper Name:	Xenon
Hazard Class:	2.2
I.D. Number:	UN 2036
Labels:	Nonflammable Gas

Grade	Part No.	Purity	Impurity	Specification	Equipment Recommended
PurityPlus 5.0 (Research)	XEN-50-XX	99.999%	Krypton Moisture Hydrogen Oxygen Nitrogen Nitrous Oxide Total Hydrocarbons Tetrafluoromethane Carbon Dioxide Hexafluoroethane Total Impurities	< 10 ppm	400 series brass regulator see page 4.16

XX - Complete the part number with the desired cylinder size listed below. (ie. XEN-50-200)

Standard Cylinder Sizes *	Contents liters	Cylinder Pressure PSIG	CGA Valve Connection
200	5000	900	580
80	2500	930	580
35	500	680	580

*Nonstandard cylinder sizes available upon request

Notes:

[illegible]

Notes:

[illegible]

Notes:

[illegible]

Mixed Gases



PurityPlus®
Specialty Gases

Section 2 - Mixed Gases

Gas	Page Number
Introduction	2.1
Mixture Specifications	2.2
Ammonia	2.3
Argon	2.4 – 2.7
n-Butane	2.8 – 2.10
Carbon Dioxide	2.11 – 2.14
Carbon Monoxide	2.15 – 2.16
Ethane	2.17 – 2.18
Ethylene	2.19 – 2.20
Helium	2.21 – 2.22
Hexane	2.23
Hydrogen	2.24 – 2.27
Hydrogen Sulfide	2.28
Isobutane	2.29 – 2.30
Methane	2.31 – 2.34
Nitric Oxide	2.35
Nitrogen	2.36 – 2.38
Nitrogen Dioxide	2.39
Nitrous Oxide	2.40
Oxygen	2.41 – 2.42
n-Pentane	2.43
Propane	2.44 – 2.45
Propylene	2.46 – 2.47
Sulfur Dioxide	2.48 – 2.49
Sulfur Hexafluoride	2.50 – 2.51
Three Component Mixtures	2.52

Mixed Gases

Our independently audited and certified laboratories use high accuracy scales combined with the state-of-the-art cylinder preparation techniques to ensure the most accurate and stable mixtures in the industry.

Our laboratories also employ the most sensitive instrumentation and certified reference gases to accurately analyze all of the raw materials used in the manufacture of our mixed gases. This allows for the correction of any cross contamination and ensures that our customers receive the most accurate mixtures possible. This is especially important in hydrocarbon mixtures where impurities can alter the final composition of a mixture.

We offer several grades of mixtures:

PRIMARY STANDARD GRADE - precisely blended mixtures using the most advanced gravimetric techniques, resulting in the highest accuracy of gas mixtures available. NIST traceable weights are used to calibrate the high precision scales.

CERTIFIED STANDARD – calibration gases prepared by automated filling operations, using gravimetric or partial pressure methods. They are then analyzed against Primary Reference Standards, the results of which are reported on the Certificate of Analysis (COA).

CUSTOM MIXTURES – process gas standards that are prepared in the same fashion, and to the same specifications as the Certified Standards, but the analysis is not reported. The requested composition is reported on the label.

ENVIRONMENTAL MIXTURES – high accuracy reference gas mixtures used for the calibration of emission monitoring equipment. These mixtures are manufactured to stringent EPA specifications and procedures to maximize stability and shelf life. NIST traceable Reference Materials are used to certify these mixtures.

Dynamic blending and batch analyses are also available for multiple cylinder batches. Please contact us for more details.

AVAILABLE ANALYSES

Component Analysis – the determination of the concentration of each minor component in the requested mixture. - Results reported on the COA.

Specific Impurity Analysis – determination of the concentration of a specific impurity of concern. - Results reported on the COA.

We can prepare a wide variety and quantity of gases, such as 15 component hydrocarbon mixtures. There may be restrictions in the preparation of some mixtures. For example:

- Components that chemically react, even under limited conditions, will not be mixed together. Mixtures of fuels and oxidizers are given special consideration. Limits are determined by the fuel's lower explosive limit in an oxidizer, as well as the potential energy contained in the mixture.
- If a requested mixture contains a liquefied gas, such as propane, the final pressure of the mixture may be limited to prevent condensation of the component in the cylinder. Condensation of a component would result in separation of the component and the mixture would not be stable.

If there are any questions or concerns, our technical staff is available to assist you in selecting a mixture or series of mixtures to meet your needs. Please contact your nearest PurityPlus sales office with any issue that you may have.

MIXTURE SPECIFICATIONS:

There are two considerations used to determine the mixture grade required, the Mixture Preparation Tolerance and the Analytical Certification Tolerance.

Mixture Preparation Tolerance is the variation of a component from the requested concentration. Tighter tolerance requirements such as in the Aerospace or Electronics industries require Primary Standard grade mixtures. Other requirements, such as process monitoring operations can use the Custom Grade gas mixtures, where only the requested concentration is reported on the label. Whatever your gas requirements may be, you can be assured that our technicians will use the proper care and techniques in the manufacture of your mixture.

Mixture Preparation Tolerance			
Requested concentration	Primary Standard	Certified Standard	Custom Mixture
0.1-50%	± 1% of requested concentration	± 2% of requested concentration	Custom Mixtures are manufactured to the same Mixture Preparation Tolerances as our Certified Standard. However, the analysis is not reported and the mixture is labeled with the requested value.
10-999 PPM	± 5% of requested concentration	± 10% of requested concentration	
1-10 PPM	± 10% or requested concentration	± 20% of requested concentration	

Analytical Certification Tolerance, is the term used to indicate the level of certainty of an analysis. Any analytical measurement has a small amount of acceptable variation in the results. The higher accuracy methods of analysis have less variation. The Primary Standard Grade has the highest accuracy and the certainty is within ± 200 PPM for components greater than 2.0%. Please contact us if you have any questions as to which is the right mixture for your requirement.

Analytical Certification Tolerance			
Requested concentration	Primary Standard	Certified Standard	Custom Mixture
0.1-50%	± 1% of reported concentration or 0.02% absolute, whichever is smaller	± 2% of reported concentration	Custom Mixtures are manufactured to the same Mixture Preparation Tolerances as our Certified Standard. However, the analysis is not reported and the mixture is labeled with the requested value.
10-999 PPM	± 1% of reported concentration	± 5% of reported concentration	
1-10 PPM	± 0.1 PPM of reported concentration	± 10% of reported concentration	

Ammonia

Ammonia, in Air							
Grade	Part No.	Concentration	Cylinder Size	Contents cu.ft.	Pressure psig @ 70° F	Equipment Recommended	CGA Valve Connection
Primary	PS-2-AIR-XX-DN	0.1-4%	200	214	2000	400 series stainless steel regulator see page 4.16	705
			150AL	144	2000		
Certified	CS-2-AIR-XX-DN	10-99ppm	150AL	144	2000	400 series stainless steel regulator see page 4.16	705
			35AL	29	2000		
		100-999ppm	150AL	144	2000		
			35AL	29	2000		
		0.1-4%	200	214	2000		
			150AL	144	2000		
			35AL	29	2000		

XX - Complete the part number with the desired cylinder size listed above.

DN - Description number assigned by manufacturing location.

Ammonia, in Nitrogen							
Grade	Part No.	Concentration	Cylinder Size	Contents cu.ft.	Pressure psig @ 70° F	Equipment Recommended	CGA Valve Connection
Primary	PS-2-NIT-XX-DN	0.1-4%	200	208	2000	400 series stainless steel regulator see page 4.16	705
			150AL	140	2000		
Certified	CS-2-NIT-XX-DN	10-99ppm	150AL	140	2000	400 series stainless steel regulator see page 4.16	705
			35AL	28	2000		
		100-999ppm	150AL	140	2000		
			35AL	28	2000		
		0.1-4%	200	208	2000		
			150AL	140	2000		
			35AL	28	2000		

XX - Complete the part number with the desired cylinder size listed above.

DN - Description number assigned by manufacturing location.

Shipping Information:	
DOT/TC Proper Name:	Compressed Gas, N.O.S.
Hazard Class:	2.2
I.D. Number:	UN 1956
Labels:	Nonflammable Gas

Ammonia in other balance gases are available upon request.

Argon

Argon, in Helium							
Grade	Part No.	Concentration	Cylinder Size	Contents cu.ft.	Pressure psig @ 70° F	Equipment Recommended	CGA Valve Connection
Primary	PS-2-HEL-XX-DN	100 ppm-50%	200	200	2000	300 series brass regulator see page 4.12	580
Certified	CS-2-HEL-XX-DN	1-49ppm	200	200	2000	300 series brass regulator see page 4.12	580
			80	73	2000		
		50-99 ppm	35	32	2000		
			200	200	2000		
		0.1-50%	80	73	2000		
			35	32	2000		
			200	200	2000		
			80	73	2000		
Custom	CM-2-HEL-XX-DN	50-999 ppm	35	32	2000	300 series brass regulator see page 4.12	580
			200	200	2000		
			80	73	2000		
		0.1-50%	35	32	2000		
			200	200	2000		

XX - Complete the part number with the desired cylinder size listed above.

DN - Description number assigned by manufacturing location.

Shipping Information:

DOT/TC Proper Name:	Rare Gases, Mixtures, Compressed
Hazard Class:	2.2
I.D. Number:	UN 1979
Labels:	Nonflammable Gas

Argon in other balance gases are available upon request.

Argon (cont.)

Argon, in Hydrogen							
Grade	Part No.	Concentration	Cylinder Size	Contents cu.ft.	Pressure psig @ 70° F	Equipment Recommended	CGA Valve Connection
Primary	PS-2-HYD-XX-DN	100 ppm-50%	200	197	2000	300 series brass regulator see page 4.12	350
Certified	CS-2-HYD-XX-DN	1-49ppm	200	197	2000	300 series brass regulator see page 4.12	350
			80	72	2000		
		50-99 ppm	35	31	2000		
			200	197	2000		
		0.1-50%	80	72	2000		
			35	31	2000		
			200	197	2000		
			80	72	2000		
			35	31	2000		
Custom	CM-2-HYD-XX-DN	50-999 ppm	200	197	2000	300 series brass regulator see page 4.12	350
			80	72	2000		
			35	31	2000		
		0.1-50%	200	197	2000		
			80	72	2000		
			35	31	2000		

XX - Complete the part number with the desired cylinder size listed above.

DN - Description number assigned by manufacturing location.

Shipping Information:	
DOT/TC Proper Name:	Compressed Gas, Flammable N.O.S.
Hazard Class:	2.3
I.D. Number:	UN 1954
Labels:	Flammable Gas

Argon in other balance gases are available upon request.

Argon (cont.)

Argon, in Nitrogen							
Grade	Part No.	Concentration	Cylinder Size	Contents cu.ft.	Pressure psig @ 70° F	Equipment Recommended	CGA Valve Connection
Primary	PS-2-NIT-XX-DN	100 ppm-50%	200	208	2000	300 series brass regulator see page 4.12	580
Certified	CS-2-NIT-XX-DN	1-49ppm	200	208	2000	300 series brass regulator see page 4.12	580
			80	76	2000		
		50-99 ppm	35	32	2000		
			200	108	2000		
		0.1-50%	80	76	2000		
			35	32	2000		
			200	208	2000		
			80	76	2000		
Custom	CM-2-NIT-XX-DN	50-999 ppm	35	32	2000	300 series brass regulator see page 4.12	580
			200	208	2000		
			80	76	2000		
		0.1-50%	200	208	2000		
			80	76	2000		
			35	32	2000		

XX - Complete the part number with the desired cylinder size listed above.

DN - Description number assigned by manufacturing location.

Shipping Information:

DOT/TC Proper Name:	Rare Gases and Nitrogen Mixtures Compressed
Hazard Class:	2.2
I.D. Number:	UN 1981
Labels:	Nonflammable Gas

Argon in other balance gases are available upon request.

Argon (cont.)

Argon, in Oxygen							
Grade	Part No.	Concentration	Cylinder Size	Contents cu.ft.	Pressure psig @ 70° F	Equipment Recommended	CGA Valve Connection
Primary	PS-2-OXY-XX-DN	100 ppm-50%	200	226	2000	300 series brass regulator see page 4.12	296
Certified	CS-2-OXY-XX-DN	1-49ppm	200	226	2000	300 series brass regulator see page 4.12	296
			80	83	2000		
		50-99 ppm	35	35	2000		
			200	226	2000		
		0.1-50%	80	83	2000		
			35	35	2000		
			200	226	2000		
			80	83	2000		
Custom	CM-2-OXY-XX-DN	50-999 ppm	35	35	2000	300 series brass regulator see page 4.12	296
			200	226	2000		
			80	83	2000		
		0.1-50%	35	35	2000		
			200	226	2000		
			80	83	2000		

XX - Complete the part number with the desired cylinder size listed above.

DN - Description number assigned by manufacturing location.

Shipping Information:

DOT/TC Proper Name:	Compressed Gas Oxidizing N.O.S.
Hazard Class:	2.2
I.D. Number:	UN 3156
Labels:	Nonflammable Gas and Oxidizer

Argon in other balance gases are available upon request.

n-Butane

n-Butane in Air							
Grade	Part No.	Concentration	Cylinder Size	Contents cu.ft.	Pressure psig @ 70° F	Equipment Recommended	CGA Valve Connection
Primary	PS-2-AIR-XX-DN	50ppm-0.9%	200	214	2000	300 series brass regulator see page 4.12	590
Certified	CS-2-AIR-XX-DN	100-999 ppb	150AL	144	2000	300 series brass regulator see page 4.12	590
			35AL	29	2000		
			200	214	2000		
			80	78	2000		
			35	33	2000		
		50-999 ppm	200	214	2000		
			80	78	2000		
			35	33	2000		
		0.1-0.9%	200	214	2000		
			80	78	2000		
			35	33	2000		
Custom	CM-2-AIR-XX-DN	50-999 ppm	200	214	2000	300 series brass regulator see page 4.12	590
			80	78	2000		
			35	33	2000		
		0.1-0.9%	200	214	2000		
			80	78	2000		
			35	33	2000		

XX - Complete the part number with the desired cylinder size listed above.
 DN - Description number assigned by manufacturing location.

Shipping Information:

DOT/TC Proper Name:	Compressed Gas, N.O.S.
Hazard Class:	2.2
I.D. Number:	UN 1956
Labels:	Nonflammable Gas

n-Butane in other balance gases are available upon request.

n-Butane (cont.)

n-Butane in Helium							
Grade	Part No.	Concentration	Cylinder Size	Contents cu.ft.	Pressure psig @ 70° F	Equipment Recommended	CGA Valve Connection
Primary	PS-2-HEL-XX-DN	50ppm-0.9%	200	200	2000	300 series brass regulator see page 4.12	350
Certified	CS-2-HEL-XX-DN	100-999 ppb	150AL	135	2000	300 series brass regulator see page 4.12	350
			35AL	27	2000		
			1-49 ppm	200	2000		
			80	73	2000		
			35	32	2000		
		50-999 ppm	200	200	2000		
			80	73	2000		
			35	32	2000		
		0.1-0.9%	200	200	2000		
			80	73	2000		
			35	32	2000		
			35	32	2000		
Custom	CM-2-HEL-XX-DN	50-999 ppm	200	200	2000	300 series brass regulator see page 4.12	350
			80	73	2000		
			35	32	2000		
		0.1-0.9%	200	200	2000		
			80	73	2000		
			35	32	2000		

XX - Complete the part number with the desired cylinder size listed above.

DN - Description number assigned by manufacturing location.

Shipping Information:	
DOT/TC Proper Name:	Compressed Gas, N.O.S.
Hazard Class:	2.2
I.D. Number:	UN 1956
Labels:	Nonflammable Gas

n-Butane in other balance gases are available upon request.

n-Butane (cont.)

n-Butane in Nitrogen							
Grade	Part No.	Concentration	Cylinder Size	Contents cu.ft.	Pressure psig @ 70° F	Equipment Recommended	CGA Valve Connection
Primary	PS-2-NIT-XX-DN	50ppm-0.9%	200	208	2000	300 series brass regulator see page 4.12	350
Certified	CS-2-NIT-XX-DN	100-999 ppb	150AL	140	2000	300 series brass regulator see page 4.12	350
			35AL	28	2000		
			200	208	2000		
			80	76	2000		
			35	32	2000		
		50-999 ppm	200	208	2000		
			80	76	2000		
			35	32	2000		
		0.1-0.9%	200	208	2000		
			80	76	2000		
			35	32	2000		
Custom	CM-2-NIT-XX-DN	50-999 ppm	200	208	2000	300 series brass regulator see page 4.12	350
			80	76	2000		
			35	32	2000		
		0.1-0.9%	200	208	2000		
			80	76	2000		
			35	32	2000		

XX - Complete the part number with the desired cylinder size listed above.

DN - Description number assigned by manufacturing location.

Shipping Information:

DOT/TC Proper Name:	Compressed Gas, N.O.S.
Hazard Class:	2.2
I.D. Number:	UN 1956
Labels:	Nonflammable Gas

n-Butane in other balance gases are available upon request.

Carbon Dioxide

Carbon Dioxide in Air							
Grade	Part No.	Concentration	Cylinder Size	Contents cu.ft.	Pressure psig @ 70° F	Equipment Recommended	CGA Valve Connection
Primary	PS-2-AIR-XX-DN	50ppm-30%	200	214	2000	300 series brass regulator see page 4.12	590
Certified	CS-2-AIR-XX-DN	1-99 ppm	200	214	2000	300 series brass regulator see page 4.12	590
			150AL	144	2000		
			80	78	2000		
			35	33	2000		
			35AL	29	2000		
		100-999 ppm	200	214	2000		
			80	78	2000		
			35	33	2000		
		0.1-30%	200	214	2000		
			80	78	2000		
			35	33	2000		
			35	33	2000		
Custom	CM-2-AIR-XX-DN	100-999 ppm	200	214	2000	300 series brass regulator see page 4.12	590
			80	78	2000		
			35	33	2000		
		0.1-30%	200	214	2000		
			80	78	2000		
			35	33	2000		

XX - Complete the part number with the desired cylinder size listed above.

DN - Description number assigned by manufacturing location.

Shipping Information:	
DOT/TC Proper Name:	Compressed Gas, N.O.S.
Hazard Class:	2.2
I.D. Number:	UN 1956
Labels:	Nonflammable Gas

Carbon Dioxide in other balance gases are available upon request.

Carbon Dioxide (cont.)

Carbon Dioxide in Helium							
Grade	Part No.	Concentration	Cylinder Size	Contents cu.ft.	Pressure psig @ 70° F	Equipment Recommended	CGA Valve Connection
Primary	PS-2-HEL-XX-DN	50ppm-30%	200	200	2000	300 series brass regulator see page 4.12	580
Certified	CS-2-HEL-XX-DN	1-99 ppm	200	200	2000	300 series brass regulator see page 4.12	580
			150AL	135	2000		
			80	73	2000		
			35	32	2000		
			35AL	27	2000		
		100-999 ppm	200	200	2000		
			80	73	2000		
			35	32	2000		
		0.1-30%	200	200	2000		
			80	73	2000		
			35	32	2000		
			35	32	2000		
Custom	CM-2-HEL-XX-DN	100-999 ppm	200	200	2000	300 series brass regulator see page 4.12	580
			80	73	2000		
			35	32	2000		
		0.1-30%	200	200	2000		
			80	73	2000		
			35	32	2000		

XX - Complete the part number with the desired cylinder size listed above.

DN - Description number assigned by manufacturing location.

Shipping Information:

DOT/TC Proper Name:	Compressed Gas, N.O.S.
Hazard Class:	2.2
I.D. Number:	UN 1956
Labels:	Nonflammable Gas

Carbon Dioxide in other balance gases are available upon request.

Carbon Dioxide (cont.)

Carbon Dioxide in Nitrogen							
Grade	Part No.	Concentration	Cylinder Size	Contents cu.ft.	Pressure psig @ 70° F	Equipment Recommended	CGA Valve Connection
Primary	PS-2-NIT-XX-DN	50ppm-30%	200	208	2000	300 series brass regulator see page 4.12	580
Certified	CS-2-NIT-XX-DN	1-99 ppm	200	208	2000	300 series brass regulator see page 4.12	580
			150AL	140	2000		
			80	76	2000		
			35	32	2000		
			35AL	28	2000		
		100-999 ppm	200	208	2000		
			80	76	2000		
			35	32	2000		
		0.1-30%	200	208	2000		
			80	76	2000		
			35	32	2000		
			35	32	2000		
Custom	CM-2-NIT-XX-DN	100-999 ppm	200	208	2000	300 series brass regulator see page 4.12	580
			80	76	2000		
			35	32	2000		
		0.1-30%	200	208	2000		
			80	76	2000		
			35	32	2000		

XX - Complete the part number with the desired cylinder size listed above.

DN - Description number assigned by manufacturing location.

Shipping Information:	
DOT/TC Proper Name:	Compressed Gas, N.O.S.
Hazard Class:	2.2
I.D. Number:	UN 1956
Labels:	Nonflammable Gas

Carbon Dioxide in other balance gases are available upon request.

Carbon Dioxide (cont.)

Carbon Dioxide in Oxygen							
Grade	Part No.	Concentration	Cylinder Size	Contents cu.ft.	Pressure psig @ 70° F	Equipment Recommended	CGA Valve Connection
Primary	PS-2-OXY-XX-DN	50ppm-30%	200	226	2000	300 series brass regulator see page 4.12	296
Certified	CS-2-OXY-XX-DN	1-99 ppm	200	226	2000	300 series brass regulator see page 4.12	296
			150AL	152	2000		
			80	83	2000		
			35	35	2000		
			35AL	30	2000		
		100-999 ppm	200	226	2000		
			80	83	2000		
			35	35	2000		
		0.1-30%	200	226	2000		
			80	83	2000		
			35	35	2000		
			35	35	2000		
Custom	CM-2-OXY-XX-DN	100-999 ppm	200	226	2000	300 series brass regulator see page 4.12	296
			80	83	2000		
			35	35	2000		
		0.1-30%	200	226	2000		
			80	83	2000		
			35	35	2000		

XX - Complete the part number with the desired cylinder size listed above.
DN - Description number assigned by manufacturing location.

Shipping Information:	
DOT/TC Proper Name:	Carbon Dioxide and Oxygen Mixtures, Compressed
Hazard Class:	2.2
I.D. Number:	UN 1014
Labels:	Nonflammable Gas and Oxidizer

Carbon Dioxide in other balance gases are available upon request.

Carbon Monoxide

Carbon Monoxide in Air							
Grade	Part No.	Concentration	Cylinder Size	Contents cu.ft.	Pressure psig @ 70° F	Equipment Recommended	CGA Valve Connection
Primary	PS-2-AIR-XX-DN	1-9 ppm	150AL	144	2000	300 series brass regulator see page 4.12	590
		10-999ppm	150AL	144	2000		
		0.1-4%	200	177	1650		
Certified	CS-2-AIR-XX-DN	0.5-9.9 ppm	150AL	144	2000	300 series brass regulator see page 4.12	590
			35AL	29	2000		
		10-999ppm	150AL	144	2000		
			35AL	29	2000		
			200	177	1650		
			80	64	1650		
Custom	CM-2-AIR-XX-DN	0.1-4%	35	28	1650	300 series brass regulator see page 4.12	590
			200	177	1650		
			80	64	1650		
			35	28	1650		
			200	177	1650		
			80	64	1650		

XX - Complete the part number with the desired cylinder size listed above.

DN - Description number assigned by manufacturing location.

Shipping Information:	
% of Carbon Monoxide:	< 20.0%
DOT/TC Proper Name:	Compressed Gas, N.O.S.
Hazard Class:	2.2
I.D. Number:	UN 1956
Labels:	Nonflammable Gas

Carbon Monoxide in other balance gases are available upon request.

Carbon Monoxide (cont.)

Carbon Monoxide in Nitrogen							
Grade	Part No.	Concentration	Cylinder Size	Contents cu.ft.	Pressure psig @ 70° F	Equipment Recommended	CGA Valve Connection
Primary	PS-2-NIT-XX-DN	1-9 ppm	150AL	140	2000	300 series brass regulator see page 4.12	350
		10-999ppm	150AL	140	2000		
		0.1-4%	200	173	1650		
Certified	CS-2-NIT-XX-DN	0.5-9.9 ppm	150AL	140	2000	300 series brass regulator see page 4.12	350
			35AL	28	2000		
		10-999ppm	150AL	140	2000		
			35AL	28	2000		
		0.1-9.9%	200	173	1650		
			80	64	1650		
			35	28	1650		
		10-50%	200	173	1650		
			80	64	1650		
			35	28	1650		
Custom	CM-2-NIT-XX-DN	0.1-9.9%	200	173	1650	300 series brass regulator see page 4.12	350
			80	64	1650		
			35	28	1650		
		10-50%	200	173	1650		
			80	64	1650		
			35	28	1650		

XX - Complete the part number with the desired cylinder size listed above.

DN - Description number assigned by manufacturing location.

Shipping Information:	
% of Carbon Monoxide:	> 20.0%
DOT/TC Proper Name:	Compressed Gas, Flammable, N.O.S.
Hazard Class:	2.1
I.D. Number:	UN 1954
Labels:	Flammable Gas

Carbon Monoxide in other balance gases are available upon request.

Ethane

Ethane in Air							
Grade	Part No.	Concentration	Cylinder Size	Contents cu.ft.	Pressure psig @ 70° F	Equipment Recommended	CGA Valve Connection
Primary	PS-2-AIR-XX-DN	50ppm-1.5%	200	214	2000	300 series brass regulator see page 4.12	350
Certified	CS-2-AIR-XX-DN	100-999 ppb	150AL	144	2000	300 series brass regulator see page 4.12	350
			35AL	29	2000		
			1-49 ppm	200	214		
			80	78	2000		
			35	33	2000		
		50-999 ppm	200	214	2000		
			80	78	2000		
			35	33	2000		
		0.1-1.5%	200	214	2000		
			80	78	2000		
			35	33	2000		
			35	33	2000		
Custom	CM-2-AIR-XX-DN	50-999 ppm	200	214	2000	300 series brass regulator see page 4.12	350
			80	78	2000		
			35	33	2000		
		0.1-1.5%	200	214	2000		
			80	78	2000		
			35	33	2000		

XX - Complete the part number with the desired cylinder size listed above.

DN - Description number assigned by manufacturing location.

Shipping Information:		
% of Ethane:	< 12.0%	> 12.0%
DOT/TC Proper Name:	Compressed Gas, N.O.S.	Compressed Gas, Flammable, N.O.S.
Hazard Class:	2.2	2.1
I.D. Number:	UN 1956	UN 1954
Labels:	Nonflammable Gas	Flammable Gas

Ethane in other balance gases are available upon request.

Ethane (cont.)

Ethane in Nitrogen							
Grade	Part No.	Concentration	Cylinder Size	Contents cu.ft.	Pressure psig @ 70° F	Equipment Recommended	CGA Valve Connection
Primary	PS-2-NIT-XX-DN	50ppm-1.5%	200	208	2000	300 series brass regulator see page 4.12	590
Certified	CS-2-NIT-XX-DN	100-999 ppb	150AL	140	2000	300 series brass regulator see page 4.12	590
			35AL	28	2000		
			200	208	2000		
				76	2000		
				32	2000		
		50-999 ppm	200	208	2000		
			80	76	2000		
			35	32	2000		
			200	208	2000		
			80	76	2000		
		0.1-20%	35	32	2000		
			200	208	2000		
			80	76	2000		
			35	32	2000		
Custom	CM-2-NIT-XX-DN	50-999 ppm	200	208	2000	300 series brass regulator see page 4.12	590
			80	76	2000		
			35	32	2000		
		0.1-20%	200	208	2000		
			80	76	2000		
			35	32	2000		

XX - Complete the part number with the desired cylinder size listed above.

DN - Description number assigned by manufacturing location.

Shipping Information:		
% of Ethane:	< 12.0%	> 12.0%
DOT/TC Proper Name:	Compressed Gas, N.O.S.	Compressed Gas, Flammable, N.O.S.
Hazard Class:	2.2	2.1
I.D. Number:	UN 1956	UN 1954
Labels:	Nonflammable Gas	Flammable Gas

Ethane in other balance gases are available upon request.

Ethylene

Ethylene in Air							
Grade	Part No.	Concentration	Cylinder Size	Contents cu.ft.	Pressure psig @ 70° F	Equipment Recommended	CGA Valve Connection
Primary	PS-2-AIR-XX-DN	10-49 ppm	200	214	2000	300 series brass regulator see page 4.12	590
		50 ppm-1.55%	200	214	2000		
Certified	CS-2-AIR-XX-DN	100-999 ppb	150AL	144	2000	300 series brass regulator see page 4.12	590
			35AL	29	2000		
			200	214	2000		
				78	2000		
				33	2000		
		50-999 ppm	200	214	2000		
			80	78	2000		
			35	33	2000		
		0.1-1.55%	200	214	2000		
			80	78	2000		
			35	33	2000		
			200	214	2000		
Custom	CM-2-AIR-XX-DN	50-999 ppm	200	214	2000	300 series brass regulator see page 4.12	590
			80	78	2000		
			35	33	2000		
		0.1-1.55%	200	214	2000		
			80	78	2000		
			35	33	2000		

XX - Complete the part number with the desired cylinder size listed above.

DN - Description number assigned by manufacturing location.

Shipping Information:		
% of Ethylene:	< 6.0%	> 6.0%
DOT/TC Proper Name:	Compressed Gas, N.O.S.	Compressed Gas, Flammable, N.O.S.
Hazard Class:	2.2	2.1
I.D. Number:	UN 1956	UN 1954
Labels:	Nonflammable Gas	Flammable Gas

Ethylene in other balance gases are available upon request.

Ethylene (cont.)

Ethylene in Nitrogen							
Grade	Part No.	Concentration	Cylinder Size	Contents cu.ft.	Pressure psig @ 70° F	Equipment Recommended	CGA Valve Connection
Primary	PS-2-NIT-XX-DN	10-49 ppm	200	214	2000	300 series brass regulator see page 4.12	350
		50 ppm-50%	200	214	2000		
Certified	CS-2-NIT-XX-DN	100-999 ppb	150AL	144	2000	300 series brass regulator see page 4.12	350
			35AL	29	2000		
			200	214	2000		
			80	78	2000		
			35	33	2000		
		1-49ppm	200	214	2000		
			80	78	2000		
			35	33	2000		
		50-999 ppm	200	214	2000		
			80	78	2000		
			35	33	2000		
		0.1-50%	200	214	2000		
			80	78	2000		
			35	33	2000		
Custom	CM-2-NIT-XX-DN	50-999 ppm	200	214	2000	300 series brass regulator see page 4.12	350
			80	78	2000		
			35	33	2000		
		0.1-50%	200	214	2000		
			80	78	2000		
			35	33	2000		

XX - Complete the part number with the desired cylinder size listed above.

DN - Description number assigned by manufacturing location.

Shipping Information:		
% of Ethylene:	< 6.0%	> 6.0%
DOT/TC Proper Name:	Compressed Gas, N.O.S.	Compressed Gas, Flammable, N.O.S.
Hazard Class:	2.2	2.1
I.D. Number:	UN 1956	UN 1954
Labels:	Nonflammable Gas	Flammable Gas

Ethylene in other balance gases are available upon request.

Helium

Helium in Argon							
Grade	Part No.	Concentration	Cylinder Size	Contents cu.ft.	Pressure psig @ 70° F	Equipment Recommended	CGA Valve Connection
Primary	PS-2-ARG-XX-DN	500 ppm -50%	200	226	2000	300 series brass regulator see page 4.12	580
Certified	CS-2-ARG-XX-DN	1-49 ppm	200	226	2000	300 series brass regulator see page 4.12	580
			80	83	2000		
			35	35	2000		
		50-999 ppm	200	226	2000		
			80	83	2000		
			35	35	2000		
		0.1-50%	200	226	2000		
			80	83	2000		
			35	35	2000		
Custom	CM-2-ARG-XX-DN	50-999 ppm	200	226	2000	300 series brass regulator see page 4.12	580
			80	83	2000		
			35	35	2000		
		0.1-50%	200	226	2000		
			80	83	2000		
			35	35	2000		

XX - Complete the part number with the desired cylinder size listed above.

DN - Description number assigned by manufacturing location.

Shipping Information:	
Major Component:	Argon
DOT/TC Proper Name:	Rare Gases Mixtures, Compressed
Hazard Class:	2.2
I.D. Number:	UN 1979
Labels:	Nonflammable Gas

Helium in other balance gases are available upon request.

Helium (cont.)

Helium in Nitrogen							
Grade	Part No.	Concentration	Cylinder Size	Contents cu.ft.	Pressure psig @ 70° F	Equipment Recommended	CGA Valve Connection
Primary	PS-2-NIT-XX-DN	500 ppm -50%	200	208	2000	300 series brass regulator see page 4.12	580
Certified	CS-2-NIT-XX-DN	1-49 ppm	200	208	2000	300 series brass regulator see page 4.12	580
			80	76	2000		
			35	32	2000		
		50-999 ppm	200	208	2000		
			80	76	2000		
			35	32	2000		
		0.1-50%	200	208	2000		
			80	76	2000		
			35	32	2000		
Custom	CM-2-NIT-XX-DN	50-999 ppm	200	208	2000	300 series brass regulator see page 4.12	580
			80	76	2000		
			35	32	2000		
		0.1-50%	200	208	2000		
			80	76	2000		
			35	32	2000		

XX - Complete the part number with the desired cylinder size listed above.

DN - Description number assigned by manufacturing location.

Shipping Information:	
Major Component:	Nitrogen
DOT/TC Proper Name:	Rare Gases and Nitrogen Mixtures, Compressed
Hazard Class:	2.2
I.D. Number:	UN 1981
Labels:	Nonflammable Gas

Helium in other balance gases are available upon request.

Hexane

Hexane in Air							
Grade	Part No.	Concentration	Cylinder Size	Contents cu.ft.	Pressure psig @ 70° F	Equipment Recommended	CGA Valve Connection
Primary	PS-2-AIR-XX-DN	10-49 ppm	200	214	2000	300 series brass regulator see page 4.12	590
		50-700 ppm	200	214	2000		
Certified	CS-2-AIR-XX-DN	100-999 ppb	150AL	144	2000	300 series brass regulator see page 4.12	590
			35AL	29	2000		
		1-99 ppm	200	214	2000		
			35	33	2000		
		100-700 ppm	200	214	2000		
			35	33	2000		
Custom	CM-2-AIR-XX-DN	100-700 ppm	200	214	2000	300 series brass regulator see page 4.12	590
			35	33	2000		

Hexane in Nitrogen							
Grade	Part No.	Concentration	Cylinder Size	Contents cu.ft.	Pressure psig @ 70° F	Equipment Recommended	CGA Valve Connection
Primary	PS-2-NIT-XX-DN	10-49 ppm	200	208	2000	300 series brass regulator see page 4.12	350
		50-700 ppm	200	208	2000		
Certified	CS-2-NIT-XX-DN	100-999 ppb	150AL	140	2000	300 series brass regulator see page 4.12	350
			35AL	28	2000		
		1-99 ppm	200	208	2000		
			35	32	2000		
		100-700 ppm	200	208	2000		
			35	32	2000		
Custom	CM-2-NIT-XX-DN	100-700 ppm	200	208	2000	300 series brass regulator see page 4.12	350
			35	32	2000		

XX - Complete the part number with the desired cylinder size listed above.

DN - Description number assigned by manufacturing location.

Shipping Information:	
DOT/TC Proper Name:	Compressed Gas, N.O.S.
Hazard Class:	2.2
I.D. Number:	UN 1956
Labels:	Nonflammable Gas

Hexane in other balance gases are available upon request.

Hydrogen

Hydrogen in Air							
Grade	Part No.	Concentration	Cylinder Size	Contents cu.ft.	Pressure psig @ 70° F	Equipment Recommended	CGA Valve Connection
Primary	PS-2-AIR-XX-DN	10 ppm-0.1%	150AL	144	2000	300 series brass regulator see page 4.12	590
		0.1-2.0%	200	214	2000		
Certified	CS-2-AIR-XX-DN	5-49 ppm	200	214	2000	300 series brass regulator see page 4.12	590
			80	78	2000		
			35	33	2000		
		50-999ppm	200	214	2000		
			80	78	2000		
			35	33	2000		
		0.1-2.0%	200	214	2000		
			80	78	2000		
			35	33	2000		
			35	33	2000		
Custom	CM-2-AIR-XX-DN	50-999 ppm	200	214	2000	300 series brass regulator see page 4.12	590
			80	78	2000		
			35	33	2000		
		0.1-2.0%	200	214	2000		
			80	78	2000		
			35	33	2000		

XX - Complete the part number with the desired cylinder size listed above.

DN - Description number assigned by manufacturing location.

Shipping Information:	
Major Component:	Air
% of Hydrogen:	< 2.8%
DOT/TC Proper Name:	Compressed Gas, N.O.S.
Hazard Class:	2.2
I.D. Number:	UN 1956
Labels:	Nonflammable Gas

Hydrogen in other balance gases are available upon request.

Hydrogen (cont.)

Hydrogen in Argon							
Grade	Part No.	Concentration	Cylinder Size	Contents cu.ft.	Pressure psig @ 70° F	Equipment Recommended	CGA Valve Connection
Primary	PS-2-ARG-XX-DN	0.1-50%	150AL	226	2000	300 series brass regulator see page 4.12	350
Certified	CS-2-ARG-XX-DN	5-49 ppm	200	226	2000	300 series brass regulator see page 4.12	350
			80	83	2000		
			35	35	2000		
		50-999ppm	200	226	2000		
			80	83	2000		
			35	35	2000		
		0.1-50%	200	226	2000		
			80	83	2000		
			35	35	2000		
Custom	CM-2-ARG-XX-DN	50-999 ppm	200	226	2000	300 series brass regulator see page 4.12	350
			80	83	2000		
			35	35	2000		
		0.1-50%	200	226	2000		
			80	83	2000		

XX - Complete the part number with the desired cylinder size listed above.

DN - Description number assigned by manufacturing location.

Shipping Information:			Hydrogen in other balance gases are available upon request.
Major Component:	Argon	Argon	
% of Hydrogen:	< 2.9%	> 2.9%	
DOT/TC Proper Name:	Compressed Gas, N.O.S.	Compressed Gas, Flammable, N.O.S.	
Hazard Class:	2.2	2.1	
I.D. Number:	UN 1956	UN 1954	
Labels:	Nonflammable Gas	Flammable Gas	

Hydrogen (cont.)

Hydrogen in Helium							
Grade	Part No.	Concentration	Cylinder Size	Contents cu.ft.	Pressure psig @ 70° F	Equipment Recommended	CGA Valve Connection
Primary	PS-2-HEL-XX-DN	0.1-50%	200	200	2000	300 series brass regulator see page 4.12	350
Certified	CS-2-HEL-XX-DN	5-49 ppm	200	200	2000	300 series brass regulator see page 4.12	350
			150AL	135	2000		
			80	73	2000		
			35	32	2000		
			35AL	27	2000		
		50-999ppm	200	200	2000		
			80	73	2000		
			35	32	2000		
			200	200	2000		
			80	73	2000		
		0.1-50%	200	200	2000		
			80	73	2000		
Custom	CM-2-HEL-XX-DN	50-999 ppm	200	200	2000	300 series brass regulator see page 4.12	350
			80	73	2000		
			35	32	2000		
		0.1-50%	200	200	2000		
			80	73	2000		

XX - Complete the part number with the desired cylinder size listed above.

DN - Description number assigned by manufacturing location.

Shipping Information:		
Major Component:	Helium	Helium
% of Hydrogen:	< 3.9%	> 3.9%
DOT/TC Proper Name:	Compressed Gas, N.O.S.	Compressed Gas, Flammable, N.O.S.
Hazard Class:	2.2	2.1
I.D. Number:	UN 1956	UN 1954
Labels:	Nonflammable Gas	Flammable Gas

Hydrogen in other balance gases are available upon request.

Hydrogen (cont.)

Hydrogen in Nitrogen							
Grade	Part No.	Concentration	Cylinder Size	Contents cu.ft.	Pressure psig @ 70° F	Equipment Recommended	CGA Valve Connection
Primary	PS-2-NIT-XX-DN	10 ppm-0.1%	150AL	208	2000	300 series brass regulator see page 4.12	350
Certified	CS-2-NIT-XX-DN	5-49 ppm	200	208	2000	300 series brass regulator see page 4.12	350
			80	76	2000		
			35	32	2000		
		50-999ppm	200	208	2000		
			80	76	2000		
			35	32	2000		
		0.1-2.0%	200	208	2000		
			80	76	2000		
			35	32	2000		
			35	32	2000		
Custom	CM-2-NIT-XX-DN	50-999 ppm	200	208	2000	300 series brass regulator see page 4.12	350
			80	76	2000		
			35	32	2000		
		0.1-50%	200	208	2000		
			80	76	2000		
			35	32	2000		

XX - Complete the part number with the desired cylinder size listed above.

DN - Description number assigned by manufacturing location.

Shipping Information:		
Major Component:	Nitrogen	Nitrogen
% of Hydrogen:	< 5.7%	> 5.7%
DOT/TC Proper Name:	Compressed Gas, N.O.S.	Compressed Gas, Flammable, N.O.S.
Hazard Class:	2.2	2.1
I.D. Number:	UN 1956	UN 1954
Labels:	Nonflammable Gas	Flammable Gas

Hydrogen in other balance gases are available upon request.

Hydrogen Sulfide

Hydrogen Sulfide in Nitrogen							
Grade	Part No.	Concentration	Cylinder Size	Contents cu.ft.	Pressure psig @ 70° F	Equipment Recommended	CGA Valve Connection
Primary	PS-2- NIT-XX-DN	10 ppm -0.5%	150AL	140	2000	400 series stainless steel regulator see page 4.16	330
Certified	CS-2-NIT-XX-DN	0.5-9.9 ppm	150AL	140	2000	400 series stainless steel regulator see page 4.16	330
		10-50 ppm	150AL	140	2000		
		51-99 ppm	150AL	140	2000		
			35AL	28	2000		
		100 ppm-0.49%	150AL	140	2000		
			35AL	28	2000		
		0.5%-1%	200	208	2000		
			150AL	140	2000		
			35AL	28	2000		

XX - Complete the part number with the desired cylinder size listed above.

DN - Description number assigned by manufacturing location.

Hydrogen Sulfide in other balance gases are available upon request.

Shipping Information:			
Major Component:	Nitrogen	Nitrogen	Nitrogen
% of Hydrogen Sulfide:	< 4.3	>4.3% <14.24%	> 14.24%
DOT/TC Proper Name:	Compressed Gas, N.O.S.	Compressed Gas, Flammable, N.O.S.	Compressed Gas, Toxic, Flammable, N.O.S.
Hazard Class:	2.2	2.1	2.3
I.D. Number:	UN 1956	UN 1954	UN 1953
Labels:	Nonflammable Gas	Flammable Gas	Poison Gas, Inhalation Hazard and Flammable Gas

Isobutane

Isobutane in Air							
Grade	Part No.	Concentration	Cylinder Size	Contents cu.ft.	Pressure psig @ 70° F	Equipment Recommended	CGA Valve Connection
Primary	PS-2-AIR-XX-DN	10-49 ppm	200	214	2000	300 series brass regulator see page 4.12	590
		50ppm -0.9%	200	214	2000		
Certified	CS-2-AIR-XX-DN	100-999 ppb	150AL	144	2000	300 series brass regulator see page 4.12	590
			35AL	29	2000		
		1-49 ppm	200	214	2000		
			35	33	2000		
		50-999 ppm	200	214	2000		
			35	33	2000		
		0.1-0.9%	200	214	2000		
			35	33	2000		
Custom	CM-2-AIR-XX-DN	50-999 ppm	200	214	2000	300 series brass regulator see page 4.12	590
			35	33	2000		
		0.1-0.9%	200	214	2000		
			35	33	2000		

XX - Complete the part number with the desired cylinder size listed above.

DN - Description number assigned by manufacturing location.

Shipping Information:	
DOT/TC Proper Name:	Compressed Gas, N.O.S.
Hazard Class:	2.2
I.D. Number:	UN 1956
Labels:	Nonflammable Gas

Isobutane in other balance gases are available upon request.

Isobutane (cont.)

Isobutane in Nitrogen							
Grade	Part No.	Concentration	Cylinder Size	Contents cu.ft.	Pressure psig @ 70° F	Equipment Recommended	CGA Valve Connection
Primary	PS-2-NIT-XX-DN	10-49 ppm	200	208	2000	300 series brass regulator see page 4.12	350
		50ppm -1.0%	200	208	2000		
Certified	CS-2-NIT-XX-DN	100-999 ppb	150AL	140	2000	300 series brass regulator see page 4.12	350
			35AL	28	2000		
		1-49 ppm	200	208	2000		
			35	32	2000		
		50-999 ppm	200	208	2000		
			35	32	2000		
		0.1-1.0%	200	208	2000		
			35	32	2000		
Custom	CM-2-NIT-XX-DN	50-999 ppm	200	208	2000	300 series brass regulator see page 4.12	350
			35	32	2000		
		0.1-1.0%	200	208	2000		
			35	32	2000		

XX - Complete the part number with the desired cylinder size listed above.

DN - Description number assigned by manufacturing location.

Shipping Information:

DOT/TC Proper Name:	Compressed Gas, N.O.S.
Hazard Class:	2.2
I.D. Number:	UN 1956
Labels:	Nonflammable Gas

Isobutane in other balance gases are available upon request.

Methane

Methane in Air							
Grade	Part No.	Concentration	Cylinder Size	Contents cu.ft.	Pressure psig @ 70° F	Equipment Recommended	CGA Valve Connection
Primary	PS-2-AIR-XX-DN	10ppm-2.5%	200	214	2000	300 series brass regulator see page 4.12	350
Certified	CS-2-AIR-XX-DN	1-49 ppm	200	214	2000	300 series brass regulator see page 4.12	350
			80	78	2000		
			35	33	2000		
		50-999 ppm	200	214	2000		
			80	78	2000		
			35	33	2000		
		0.1-2.5%	200	214	2000		
			80	78	2000		
			35	33	2000		
Custom	CM-2-AIR-XX-DN	50-999 ppm	200	214	2000	300 series brass regulator see page 4.12	350
			80	78	2000		
			35	33	2000		
		0.1-2.5%	200	214	2000		
			80	78	2000		
			35	33	2000		

XX - Complete the part number with the desired cylinder size listed above.

DN - Description number assigned by manufacturing location.

Shipping Information:	
Major Component:	Air
% of Methane:	< 2.5%
DOT/TC Proper Name:	Compressed Gas, N.O.S.
Hazard Class:	2.2
I.D. Number:	UN 1956
Labels:	Nonflammable Gas

Methane in other balance gases are available upon request.

Methane (cont.)

Methane in Argon							
Grade	Part No.	Concentration	Cylinder Size	Contents cu.ft.	Pressure psig @ 70° F	Equipment Recommended	CGA Valve Connection
Primary	PS-2-ARG-XX-DN	1-49 ppm	200	226	2000	300 series brass regulator see page 4.12	350
		50 ppm-50%	200	226	2000		
Certified	CS-2-ARG-XX-DN	1-49 ppm	200	226	2000	300 series brass regulator see page 4.12	350
			80	83	2000		
			35	35	2000		
		50-999 ppm	200	226	2000		
			80	83	2000		
			35	35	2000		
		0.1-50%	200	226	2000		
			80	83	2000		
			35	35	2000		
Custom	CM-2-ARG-XX-DN	50-999 ppm	200	226	2000	300 series brass regulator see page 4.12	350
			80	83	2000		
			35	35	2000		
		0.1-50%	200	226	2000		
			80	83	2000		
			35	35	2000		

XX - Complete the part number with the desired cylinder size listed above.

DN - Description number assigned by manufacturing location.

Shipping Information:		
Major Component:	Argon	Argon
% of Methane:	<10.0%	>10.0%
DOT/TC Proper Name:	Compressed Gas, N.O.S.	Compressed Gas, Flammable, N.O.S.
Hazard Class:	2.2	2.1
I.D. Number:	UN 1956	UN 1954
Labels:	Nonflammable Gas	Flammable Gas

Methane in other balance gases are available upon request.

Methane (cont.)

Methane in Hydrogen							
Grade	Part No.	Concentration	Cylinder Size	Contents cu.ft.	Pressure psig @ 70° F	Equipment Recommended	CGA Valve Connection
Primary	PS-2-HYD-XX-DN	10-49 ppm	200	197	2000	300 series brass regulator see page 4.12	350
		50 ppm-50%	200	197	2000		
Certified	CS-2-HYD-XX-DN	1-49 ppm	200	197	2000	300 series brass regulator see page 4.12	350
			80	72	2000		
			35	31	2000		
		50-999 ppm	200	197	2000		
			80	72	2000		
			35	31	2000		
		0.1-50%	200	197	2000		
			80	72	2000		
			35	31	2000		
			35	31	2000		
Custom	CM-2-HYD-XX-DN	50-999 ppm	200	197	2000	300 series brass regulator see page 4.12	350
			80	72	2000		
			35	31	2000		
		0.1-50%	200	197	2000		
			80	72	2000		
			35	31	2000		

XX - Complete the part number with the desired cylinder size listed above.

DN - Description number assigned by manufacturing location.

Shipping Information:	
Major Component:	Hydrogen
DOT/TC Proper Name:	Compressed Gas, Flammable, N.O.S.
Hazard Class:	2.1
I.D. Number:	UN 2034
Labels:	Flammable Gas

Methane in other balance gases are available upon request.

Methane (cont.)

Methane in Nitrogen							
Grade	Part No.	Concentration	Cylinder Size	Contents cu.ft.	Pressure psig @ 70° F	Equipment Recommended	CGA Valve Connection
Primary	PS-2-NIT-XX-DN	1-9 ppm	200	208	2000	300 series brass regulator see page 4.12	350
		10 ppm-50%	200	208	2000		
Certified	CS-2-NIT-XX-DN	1-49 ppm	200	208	2000	300 series brass regulator see page 4.12	350
			80	76	2000		
			35	32	2000		
		50-999 ppm	200	208	2000		
			80	76	2000		
			35	32	2000		
		0.1-50%	200	208	2000		
			80	76	2000		
			35	32	2000		
			35	32	2000		
Custom	CM-2-NIT-XX-DN	50-999 ppm	200	208	2000	300 series brass regulator see page 4.12	350
			80	76	2000		
			35	32	2000		
		0.1-50%	200	208	2000		
			80	76	2000		
			35	32	2000		

XX - Complete the part number with the desired cylinder size listed above.

DN - Description number assigned by manufacturing location.

Shipping Information:		
Major Component:	Nitrogen	Nitrogen
% of Methane:	< 14.3%	> 14.3%
DOT/TC Proper Name:	Compressed Gas, N.O.S.	Compressed Gas, Flammable, N.O.S.
Hazard Class:	2.2	2.1
I.D. Number:	UN 1956	UN 1954
Labels:	Nonflammable Gas	Flammable Gas

Methane in other balance gases are available upon request.

Nitric Oxide

Nitric Oxide in Nitrogen							
Grade	Part No.	Concentration	Cylinder Size	Contents cu.ft.	Pressure psig @ 70° F	Equipment Recommended	CGA Valve Connection
Primary	PS-2-NIT-XX-DN	2.9-9 ppm	150AL	140	2000	400 series stainless steel regulator see page 4.16	660
		10-999 ppm	150AL	140	2000		
		0.1-0.5%	150AL	140	2000		
Certified	CS-2-NIT-XX-DN	0.4-9.9 ppm	150AL	140	2000	400 series stainless steel regulator see page 4.16	660
			35AL	28	2000		
		10-99 ppm	150AL	140	2000		
			35AL	28	2000		
		100-999 ppm	150AL	140	2000		
			35AL	28	2000		
		0.1-0.99%	150AL	140	2000		
			35AL	28	2000		

XX - Complete the part number with the desired cylinder size listed above.

DN - Description number assigned by manufacturing location.

Shipping Information:	
% of Nitric Oxide:	< 2.3%
DOT/TC Proper Name:	Compressed Gas, N.O.S.
Hazard Class:	2.2
I.D. Number:	UN 1956
Labels:	Nonflammable Gas

Nitric Oxide in other balance gases are available upon request.

Nitrogen

Nitrogen in Argon							
Grade	Part No.	Concentration	Cylinder Size	Contents cu.ft.	Pressure psig @ 70° F	Equipment Recommended	CGA Valve Connection
Primary	PS-2-ARG-XX-DN	200ppm - 50%	200	226	2000	300 series brass regulator see page 4.12	580
Certified	CS-2-ARG-XX-DN	1- 49 ppm	200	226	2000	300 series brass regulator see page 4.12	580
			80	83	2000		
			35	35	2000		
		50-999 ppm	200	226	2000		
			80	83	2000		
			35	35	2000		
		0.1-50%	200	226	2000		
			80	83	2000		
			35	35	2000		
Custom	CM-2-ARG-XX-DN	50-999ppm	200	226	2000	300 series brass regulator see page 4.12	580
			80	83	2000		
			35	35	2000		
		0.1-50%	200	226	2000		
			80	83	2000		

XX - Complete the part number with the desired cylinder size listed above.

DN - Description number assigned by manufacturing location.

Shipping Information:

Major Component:	Argon
DOT/TC Proper Name:	Rare Gases and Nitrogen Mixtures, Compressed
Hazard Class:	2.2
I.D. Number:	UN 1981
Labels:	Nonflammable Gas

Nitrogen in other balance gases are available upon request.

Nitrogen (cont.)

Nitrogen in Helium							
Grade	Part No.	Concentration	Cylinder Size	Contents cu.ft.	Pressure psig @ 70° F	Equipment Recommended	CGA Valve Connection
Primary	PS-2-HEL-XX-DN	200ppm - 50%	200	200	2000	300 series brass regulator see page 4.12	580
Certified	CS-2-HEL-XX-DN	1- 49 ppm	200	200	2000	300 series brass regulator see page 4.12	580
			80	73	2000		
			35	32	2000		
		50-999 ppm	200	200	2000		
			80	73	2000		
			35	32	2000		
		0.1-50%	200	200	2000		
			80	73	2000		
			35	32	2000		
			200	200	2000		
Custom	CM-2-HEL-XX-DN	50-999ppm	200	200	2000	300 series brass regulator see page 4.12	580
			80	73	2000		
			35	32	2000		
		0.1-50%	200	200	2000		
			80	73	2000		

XX - Complete the part number with the desired cylinder size listed above.

DN - Description number assigned by manufacturing location.

Shipping Information:	
Major Component:	Helium
DOT/TC Proper Name:	Rare Gases and Nitrogen Mixtures, Compressed
Hazard Class:	2.2
I.D. Number:	UN 1981
Labels:	Nonflammable Gas

Nitrogen in other balance gases are available upon request.

Nitrogen (cont.)

Nitrogen in Hydrogen							
Grade	Part No.	Concentration	Cylinder Size	Contents cu.ft.	Pressure psig @ 70° F	Equipment Recommended	CGA Valve Connection
Primary	PS-2-HYD-XX-DN	200ppm - 50%	200	197	2000	300 series brass regulator see page 4.12	350
Certified	CS-2-HYD-XX-DN	1- 49 ppm	200	197	2000	300 series brass regulator see page 4.12	350
			80	72	2000		
			35	31	2000		
		50-999 ppm	200	197	2000		
			80	72	2000		
			35	31	2000		
		0.1-50%	200	197	2000		
			80	72	2000		
			35	31	2000		
Custom	CM-2-HYD-XX-DN	50-999ppm	200	197	2000	300 series brass regulator see page 4.12	350
			80	72	2000		
			35	31	2000		
		0.1-50%	200	197	2000		
			80	72	2000		
			80	31	2000		

XX - Complete the part number with the desired cylinder size listed above.

DN - Description number assigned by manufacturing location.

Shipping Information:	
Major Component:	Hydrogen
DOT/TC Proper Name:	Compressed Gas, Flammable, N.O.S.
Hazard Class:	2.1
I.D. Number:	UN 1954
Labels:	Flammable Gas

Nitrogen in other balance gases are available upon request.

Nitrogen Dioxide

Nitrogen Dioxide in Air							
Grade	Part No.	Concentration	Cylinder Size	Contents cu.ft.	Pressure psig @ 70° F	Equipment Recommended	CGA Valve Connection
Primary	PS-2-AIR-XX-DN	500 ppm - 1.0%	150AL	144	2000	400 series stainless steel regulator see page 4.16	660
Certified	CS-2-AIR-XX-DN	1-19.9 ppm	150AL	144	2000	400 series stainless steel regulator see page 4.16	660
			35AL	29	2000		
		20-999 ppm	150AL	144	2000		
			35AL	29	2000		
		0.1-1%	200	214	2000		
			150AL	144	2000		
			35AL	29	2000		

Nitrogen Dioxide in Nitrogen							
Grade	Part No.	Concentration	Cylinder Size	Contents cu.ft.	Pressure psig @ 70° F	Equipment Recommended	CGA Valve Connection
Primary	PS-2-NIT-XX-DN	500 ppm - 2.2%	150AL	140	2000	400 series stainless steel regulator see page 4.16	660
Certified	CS-2-NIT-XX-DN	1-19.9 ppm	150AL	140	2000	400 series stainless steel regulator see page 4.16	660
			35AL	28	2000		
		20-999 ppm	150AL	140	2000		
			35AL	28	2000		
		0.1-2.2%	200	208	2000		
			150AL	140	2000		
			35AL	28	2000		

XX - Complete the part number with the desired cylinder size listed above.

DN - Description number assigned by manufacturing location.

Shipping Information:	
% of Nitrogen Dioxide:	< 2.2%
DOT/TC Proper Name:	Compressed Gas, N.O.S.
Hazard Class:	2.2
I.D. Number:	UN 1956
Labels:	Nonflammable Gas

Nitrogen Dioxide in other balance gases are available upon request.

Nitrous Oxide

Nitrous Oxide in Nitrogen							
Grade	Part No.	Concentration	Cylinder Size	Contents cu.ft.	Pressure psig @ 70° F	Equipment Recommended	CGA Valve Connection
Primary	PS-2-NIT-XX-DN	50 ppm -50%	200	208	2000	300 series brass regulator see page 4.12	590
Certified	CS-2-NIT-XX-DN	1-99 ppm	200	208	2000	300 series brass regulator see page 4.12	590
			150AL	140	2000		
			80	76	2000		
			35	32	2000		
			35AL	28	2000		
		100-9999 ppm	200	208	2000		
			150AL	140	2000		
			80	76	2000		
			35	32	2000		
			35AL	28	2000		
		1-50%	200	208	2000		
			80	76	2000		
			35	32	2000		
			35AL	28	2000		
Custom	CM-2-NIT-XX-DN	100-9999 ppm	200	208	2000	300 series brass regulator see page 4.12	590
			150AL	140	2000		
			80	76	2000		
			35	32	2000		
			35AL	28	2000		
		1-50%	200	208	2000		
			80	76	2000		
			35	32	2000		

XX - Complete the part number with the desired cylinder size listed above.

DN - Description number assigned by manufacturing location.

Shipping Information:

DOT/TC Proper Name:	Compressed Gas, N.O.S.
Hazard Class:	2.2
I.D. Number:	UN 1956
Labels:	Nonflammable Gas

Nitrous Oxide in other balance gases are available upon request.

Oxygen

Oxygen in Argon							
Grade	Part No.	Concentration	Cylinder Size	Contents cu.ft.	Pressure psig @ 70° F	Equipment Recommended	CGA Valve Connection
Primary	PS-2-ARG-XX-DN	100-999 ppm	150AL	152	2000	300 series brass regulator see page 4.12	Varies with Oxygen concentration
		0.1-50%	200	226	2000		
Certified	CS-2-ARG-XX-DN	1-49 ppm	150AL	152	2000	300 series brass regulator see page 4.12	Varies with Oxygen concentration
			35AL	30	2000		
		50-999 ppm	150AL	152	2000		
			35AL	30	2000		
		0.1-50%	200	226	2000		
			80	83	2000		
Custom	CM-2-ARG-XX-DN	0.1-50%	35	35	2000	300 series brass regulator see page 4.12	Varies with Oxygen concentration
			200	226	2000		
			80	83	2000		
			35	35	2000		

Oxygen in Helium							
Grade	Part No.	Concentration	Cylinder Size	Contents cu.ft.	Pressure psig @ 70° F	Equipment Recommended	CGA Valve Connection
Primary	PS-2-HEL-XX-DN	100-999 ppm	150AL	135	2000	300 series brass regulator see page 4.12	Varies with Oxygen concentration
		0.1-50%	200	200	2000		
Certified	CS-2-HEL-XX-DN	1-49 ppm	150AL	135	2000	300 series brass regulator see page 4.12	Varies with Oxygen concentration
			35AL	27	2000		
		50-999 ppm	150AL	135	2000		
			35AL	27	2000		
		0.1-50%	200	200	2000		
			80	73	2000		
Custom	CM-2-HEL-XX-DN	0.1-50%	35	32	2000	300 series brass regulator see page 4.12	Varies with Oxygen concentration
			200	200	2000		
			80	73	2000		
			35	32	2000		

XX - Complete the part number with the desired cylinder size listed above.

DN - Description number assigned by manufacturing location.

Shipping Information:		
Major Component:	Argon or Helium	(Argon, Helium, Nitrogen) Note:
DOT/TC Proper Name:	Rare Gases and Oxygen Mixtures, Compressed <23.5%	> 23.5% O2 Compressed Gas, Oxidizing N.O.S.
Hazard Class:	2.2	2.2
I.D. Number:	UN 1980	UN 3156
Labels:	Nonflammable Gas	Nonflammable Gas and Oxidizers

Oxygen in other balance gases are available upon request.

Oxygen (cont.)

Oxygen in Nitrogen							
Grade	Part No.	Concentration	Cylinder Size	Contents cu.ft.	Pressure psig @ 70° F	Equipment Recommended	CGA Valve Connection
Primary	PS-2-NIT-XX-DN	100-999 ppm	150AL	140	2000	300 series brass regulator see page 4.12	Varies with Oxygen concentration
		0.1-50%	200	208	2000		
Certified	CS-2-NIT-XX-DN	1-49 ppm	150AL	140	2000	300 series brass regulator see page 4.12	Varies with Oxygen concentration
			35AL	28	2000		
		50-999 ppm	150AL	140	2000		
			35AL	32	2000		
		0.1-50%	200	208	2000		
			80	76	2000		
			35	32	2000		
Custom	CM-2-NIT-XX-DN	0.1-50%	200	208	2000	300 series brass regulator see page 4.12	Varies with Oxygen concentration
			80	76	2000		
			35	28	2000		

XX - Complete the part number with the desired cylinder size listed above.

DN - Description number assigned by manufacturing location.

Shipping Information:			Oxygen in other balance gases are available upon request.
Major Component:	Nitrogen	(Argon, Helium, Nitrogen) Note:	
DOT/TC Proper Name:	Compressed Gas, N.O.S.	> 23.5% O2 Compressed Gas, Oxidizing N.O.S.	
Hazard Class:	2.2	2.2	
I.D. Number:	UN 1956	UN 3156	
Labels:	Nonflammable Gas	Nonflammable Gas and Oxidizers	

n-Pentane

n-Pentane in Air							
Grade	Part No.	Concentration	Cylinder Size	Contents cu.ft.	Pressure psig @ 70° F	Equipment Recommended	CGA Valve Connection
Primary	PS-2-AIR-XX-DN	1 ppm -0.7%	200	214	2000	300 series brass regulator see page 4.12	590
Certified	CS-2-AIR-XX-DN	1 ppm-0.7%	200	214	2000	300 series brass regulator see page 4.12	590
			80	78	2000		
			35	33	2000		

n-Pentane in Nitrogen							
Grade	Part No.	Concentration	Cylinder Size	Contents cu.ft.	Pressure psig @ 70° F	Equipment Recommended	CGA Valve Connection
Primary	PS-2-NIT-XX-DN	1 ppm -1.0%	200	208	2000	300 series brass regulator see page 4.12	350
Certified	CS-2-NIT-XX-DN	1 ppm-1.0%	200	208	2000	300 series brass regulator see page 4.12	350
			80	76	2000		
			35	32	2000		

XX - Complete the part number with the desired cylinder size listed above.
DN - Description number assigned by manufacturing location.

Shipping Information:	
DOT/TC Proper Name:	Compressed Gas, N.O.S.
Hazard Class:	2.2
I.D. Number:	UN 1956
Labels:	Nonflammable Gas

n-Pentane in other balance gases are available upon request.

Propane

Propane in Air							
Grade	Part No.	Concentration	Cylinder Size	Contents cu.ft.	Pressure psig @ 70° F	Equipment Recommended	CGA Valve Connection
Primary	PS-2-AIR-XX-DN	1-9.9 ppm	200	214	2000	300 series brass regulator see page 4.12	590
		10 ppm -1.05%	200	214	2000		
Certified	CS-2-AIR-XX-DN	100-999 ppb	150AL	144	2000	300 series brass regulator see page 4.12	590
			35AL	29	2000		
		1-49 ppm	200	214	2000		
			35	33	2000		
		50-999 ppm	200	214	2000		
			35	33	2000		
		0.1-1.05%	200	214	2000		
			35	33	2000		
Custom	CM-2-AIR-XX-DN	50-999 ppm	200	214	2000	300 series brass regulator see page 4.12	590
			35	33	2000		
		0.1-1.05%	200	214	2000		
			35	33	2000		

XX - Complete the part number with the desired cylinder size listed above.

DN - Description number assigned by manufacturing location.

Shipping Information:

DOT/TC Proper Name:	Compressed Gas, N.O.S.
Hazard Class:	2.2
I.D. Number:	UN 1956
Labels:	Nonflammable Gas

Propane in other balance gases are available upon request.

Propane (cont.)

Propane in Nitrogen							
Grade	Part No.	Concentration	Cylinder Size	Contents cu.ft.	Pressure psig @ 70° F	Equipment Recommended	CGA Valve Connection
Primary	PS-2-NIT-XX-DN	1-9.9 ppm	200	208	2000	300 series brass regulator see page 4.12	350
		10 ppm -4%	200	208	2000		
Certified	CS-2-NIT-XX-DN	100-999 ppb	150AL	140	2000	300 series brass regulator see page 4.12	350
			35AL	28	2000		
		1-49 ppm	200	208	2000		
			35	32	2000		
		50-999 ppm	200	208	2000		
			35	32	2000		
		0.1-4%	200	208	2000		
			35	32	2000		
Custom	CM-2-NIT-XX-DN	50-999 ppm	200	208	2000	300 series brass regulator see page 4.12	350
			35	32	2000		
		0.1-4%	200	208	2000		
			35	32	2000		

XX - Complete the part number with the desired cylinder size listed above.

DN - Description number assigned by manufacturing location.

Shipping Information:	
DOT/TC Proper Name:	Compressed Gas, N.O.S.
Hazard Class:	2.2
I.D. Number:	UN 1956
Labels:	Nonflammable Gas

Propane in other balance gases are available upon request.

Propylene

Propylene in Air							
Grade	Part No.	Concentration	Cylinder Size	Contents cu.ft.	Pressure psig @ 70° F	Equipment Recommended	CGA Valve Connection
Primary	PS-2-AIR-XX-DN	1-9.9 ppm	200	214	2000	300 series brass regulator see page 4.12	590
		10-49 ppm	200	214	2000		
		50 ppm-1.2%	200	214	2000		
Certified	CS-2-AIR-XX-DN	100-999 ppb	150AL	144	2000	300 series brass regulator see page 4.12	590
			35AL	29	2000		
		1-49 ppm	200	214	2000		
			35	33	2000		
		50-999 ppm	200	214	2000		
			35	33	2000		
		0.1-1.2%	200	214	2000		
			35	33	2000		
Custom	CM-2-AIR-XX-DN	50-999 ppm	200	214	2000	300 series brass regulator see page 4.12	590
			35	33	2000		
		0.1-1.2%	200	214	2000		
			35	33	2000		

XX - Complete the part number with the desired cylinder size listed above.

DN - Description number assigned by manufacturing location.

Shipping Information:		
% of Propylene:	< 5.6%*	> 5.6%*
DOT/TC Proper Name:	Compressed Gas, N.O.S.	Compressed Gas, Flammable, N.O.S.
Hazard Class:	2.2	2.1
I.D. Number:	UN 1956	UN 1954
Labels:	Nonflammable Gas	Flammable Gas
*According to CGA-PQ3		

Propylene in other balance gases are available upon request.

Propylene (cont.)

Propylene in Nitrogen							
Grade	Part No.	Concentration	Cylinder Size	Contents cu.ft.	Pressure psig @ 70° F	Equipment Recommended	CGA Valve Connection
Primary	PS-2-NIT-XX-DN	1-9.9 ppm	200	208	2000	300 series brass regulator see page 4.12	350
		10-49 ppm	200	208	2000		
		50 ppm-6%	200	208	2000		
Certified	CS-2-NIT-XX-DN	100-999 ppb	150AL	140	2000	300 series brass regulator see page 4.12	350
			35AL	28	2000		
		1-49 ppm	200	208	2000		
			35	32	2000		
		50-999 ppm	200	208	2000		
			35	32	2000		
		0.1-6%	200	208	2000		
			35	32	2000		
Custom	CM-2-NIT-XX-DN	50-999 ppm	200	208	2000	300 series brass regulator see page 4.12	350
			35	32	2000		
		0.1-6%	200	208	2000		
			35	32	2000		

XX - Complete the part number with the desired cylinder size listed above.

DN - Description number assigned by manufacturing location.

Shipping Information:		
% of Propylene:	< 5.6%*	> 5.6%*
DOT/TC Proper Name:	Compressed Gas, N.O.S.	Compressed Gas, Flammable, N.O.S.
Hazard Class:	2.2	2.1
I.D. Number:	UN 1956	UN 1954
Labels:	Nonflammable Gas	Flammable Gas
*According to CGA-PQ3		

Propylene in other balance gases are available upon request.

Sulfur Dioxide

Sulfur Dioxide in Air							
Grade	Part No.	Concentration	Cylinder Size	Contents cu.ft.	Pressure psig @ 70° F	Equipment Recommended	CGA Valve Connection
Primary	PS-2-AIR-XX-DN	100 ppm-1%	150AL	144	2000	400 series stainless steel regulator see page 4.16	660
Certified	CS-2-AIR-XX-DN	0.4-9.9 ppm	150AL	144	2000	400 series stainless steel regulator see page 4.16	660
		10-99 ppm	150AL	144	2000		
			35AL	29	2000		
		100-999 ppm	150AL	144	2000		
			35AL	29	2000		
		0.1-1%	200	214	2000		
			150AL	144	2000		
			35AL	29	2000		

XX - Complete the part number with the desired cylinder size listed above.

DN - Description number assigned by manufacturing location.

Shipping Information:

DOT/TC Proper Name:	Compressed Gas, N.O.S.
Hazard Class:	2.2
I.D. Number:	UN 1956
Labels:	Nonflammable Gas

Sulfur Dioxide in other balance gases are available upon request.

Sulfur Dioxide (cont.)

Sulfur Dioxide in Nitrogen							
Grade	Part No.	Concentration	Cylinder Size	Contents cu.ft.	Pressure psig @ 70° F	Equipment Recommended	CGA Valve Connection
Primary	PS-NIT-XX-DN	100 ppm-1%	150AL	140	2000	400 series stainless steel regulator see page 4.16	660
Certified	CS-2-NIT-XX-DN	0.4-9.9 ppm	150AL	140	2000	400 series stainless steel regulator see page 4.16	660
			35AL	28	2000		
		10-99 ppm	150AL	140	2000		
			35AL	28	2000		
		100-999 ppm	150AL	140	2000		
			35AL	28	2000		
		0.1-1%	200	208	2000		
			150AL	140	2000		
			35AL	28	2000		

XX - Complete the part number with the desired cylinder size listed above.
 DN - Description number assigned by manufacturing location.

Shipping Information:	
DOT/TC Proper Name:	Compressed Gas, N.O.S.
Hazard Class:	2.2
I.D. Number:	UN 1956
Labels:	Nonflammable Gas

Sulfur Dioxide in other balance gases are available upon request.

Sulfur Hexafluoride

Sulfur Hexafluoride in Air							
Grade	Part No.	Concentration	Cylinder Size	Contents cu.ft.	Pressure psig @ 70° F	Equipment Recommended	CGA Valve Connection
Primary	PS-2-AIR-XX-DN	50 ppm -0.9%	200	214	2000	300 series brass regulator see page 4.12	590
		1%-4.9%	200	214	2000		
		5-10%	200	214	2000		
Certified	CS-2-AIR-XX-DN	1-49 ppm	200	214	2000	300 series brass regulator see page 4.12	590
			80	78	2000		
			35	33	2000		
		50-999 ppm	200	214	2000		
			80	78	2000		
			35	33	2000		
		0.1-0.9%	200	214	2000		
			80	78	2000		
			35	33	2000		
		1.0-4.9%	200	214	2000		
			80	78	2000		
			35	33	2000		
		5-10%	200	214	2000		
			80	78	2000		
			35	33	2000		
Custom	CM-2-AIR-XX-DN	50-999 ppm	200	214	2000	300 series brass regulator see page 4.12	590
			80	78	2000		
			35	33	2000		
		0.1-0.9%	200	214	2000		
			80	78	2000		
			35	33	2000		
		1.0-4.9%	200	214	2000		
			80	78	2000		
			35	33	2000		
		5-10%	200	214	2000		
			80	78	2000		
			35	33	2000		

XX - Complete the part number with the desired cylinder size listed above.

DN - Description number assigned by manufacturing location.

Shipping Information:	
DOT/TC Proper Name:	Compressed Gas, N.O.S.
Hazard Class:	2.2
I.D. Number:	UN 1956
Labels:	Nonflammable Gas

Sulfur Hexafluoride in other balance gases are available upon request.

Sulfur Hexafluoride (cont.)

Sulfur Hexafluoride in Air							
Grade	Part No.	Concentration	Cylinder Size	Contents cu.ft.	Pressure psig @ 70° F	Equipment Recommended	CGA Valve Connection
Primary	PS-2-AIR-XX-DN	50 ppm -0.9%	200	208		300 series brass regulator see page 4.12	590
		1%-4.9%	200	208			
		5-10%	200	208			
Certified	CS-2-AIR-XX-DN	1-49 ppm	200	208		300 series brass regulator see page 4.12	590
			80	76			
			35	32			
		50-999 ppm	200	208			
			80	76			
			35	32			
		0.1-0.9%	200	208			
			80	76			
			35	32			
		1.0-4.9%	200	208			
			80	76			
			35	32			
		5-10%	200	208			
			80	76			
			35	32			
Custom	CM-2-AIR-XX-DN	50-999 ppm	200	208		300 series brass regulator see page 4.12	590
			80	76			
			35	32			
		0.1-0.9%	200	208			
			80	76			
			35	32			
		1.0-4.9%	200	208			
			80	76			
			35	32			
		5-10%	200	208			
			80	76			
			35	32			

XX - Complete the part number with the desired cylinder size listed above.

DN - Description number assigned by manufacturing location.

Shipping Information:	
DOT/TC Proper Name:	Compressed Gas, N.O.S.
Hazard Class:	2.2
I.D. Number:	UN 1956
Labels:	Nonflammable Gas

Sulfur Hexafluoride in other balance gases are available upon request.

Three Component Mixtures

Primary Standard, Certified Standard, and Custom Mixture grades are available in a wide variety of gas combinations from two components to fifteen components or more. Listed below are common minor components in a variety of balance gases. For additional components, or for components not listed in the tables, contact the nearest sales office.

The cylinder pressure, cylinder contents, CGA connections, and recommended equipment will vary according to the gases and gas concentrations in the final mixture. Please contact the nearest sales office for the specific details of your mixture.

Minor Components			
Argon	Ethane	Isobutane	Oxygen
Butane	Ethylene	Methane	Propane
Carbon Dioxide	Helium	Nitrogen	Propylene
Carbon Monoxide	Hydrogen	Nitrous Oxide	

Balance Gases	
Air	Nitrogen
Argon	Oxygen
Hydrogen	

Recommended Equipment
Series 300 regulators**
see page 4.12

Standard Cylinder Sizes *	Contents**	CGA Valve Connection**
300		
200		
80		

*Nonstandard cylinder sizes available upon request

**The cylinder pressure, cylinder contents, CGA connections, and recommended equipment will vary according to the gases and gas concentrations in the final mixture. Please contact the nearest sales office for the specific details of your mixture.

[illegible]



Special Application Mixtures



PurityPlus[®]
Specialty Gases

Section 3 - Special Application Mixtures

Gas	Page Number
Beverage and Food Gases	3.1 – 3.2
Biological Atmosphere Gas Mixtures	3.3
Electron Capture Mixtures	3.4
Nuclear Counter Mixtures	3.4
EPA Protocol Mixtures	3.5
Portable Calibration Standards	3.6 – 3.8
Flame Ionization Fuel Mixtures	3.9
Leak Detection Mixtures	3.9
Laser Mixtures	3.10
TCD Carrier Gas Mixture	3.11
Spark Chamber Mixtures	3.11
Hydrocarbon Mixtures	3.12 - 3.13
Semiconductor Gases	3.14
Medical Gases	3.15– 3.18

Beverage and Food Gases

3

Carbonation

Many of the most popular beverages are soft drinks supplied with carbonation. To maintain the intricate taste of the drinks, high quality carbon dioxide is required. When carbon dioxide is dissolved into a water based liquid, it reacts with the water to form carbonic acid. This carbonic acid exists in equilibrium with the carbon dioxide and participates in the flavor of the product. The carbon dioxide must be of the highest quality to prevent undesirable flavors from being introduced into the product. PurityPlus use only the highest quality products and the most advanced manufacturing techniques to ensure product consistency.



Sparkling beverages where carbon dioxide is a by-product of the fermentation process can also be enhanced with beverage gases. Additional carbon dioxide can be added to these beverages. Pure carbon dioxide is used for wine, but a mixture of carbon dioxide and nitrogen can be used with beer to improve pressurization and dispensing. These mixtures are also used to control the “head” on the beer. The higher the nitrogen content, the flatter the product will be in the glass.

Food Freezing and Chilling

To improve flavor and shelf life, many of today’s food products are frozen very quickly. Liquid carbon dioxide and liquid nitrogen can be used to increase the speed at which food products are frozen. Faster freezing reduces the product’s core temperature thereby maintaining flavor, increasing shelf life, and reducing processing time, and increasing food safety. This is also true for products that are quick chilled, without actually freezing of the product.

Fish Hatcheries

Dissolved oxygen is important for the survival of hatchery raised fish and crustaceans. High concentration of animals along with naturally occurring algae can act to reduce the oxygen needed for survival. Adding oxygen to the water can increase the survivability of the animals. This is also true when transporting live animals.



Modified Atmosphere Packaging

Aerobic bacteria, molds, and oxygen can cause undesirable changes in foods. Food can become at best, unpalatable, or at worst, unsafe for consumption due to these processes. Use of Modified Atmosphere Packaging (MAP), with specially designed packaging, can extend the shelf life of some food products by slowing or preventing or slowing the reaction with oxygen, or preventing or slowing the growth of micro organisms.

The gases used in this process are primarily oxygen, nitrogen, and carbon dioxide. In special instances, carbon monoxide and the noble gases are also used.

Oxygen can be both detrimental as well as beneficial to packaged food items. Oxygen can cause oxidation of fats and pigments. Oxygen also supports the growth of aerobic micro organisms which are the primary cause of spoilage. On the other hand too little oxygen will cause deleterious changes in the coloration of meats. In addition, too little oxygen can also allow for the growth of anaerobic bacteria which can cause food poisoning. For these reasons, the oxygen concentration must be carefully controlled.

Beverage and Food Gases

3

Nitrogen is a non-reactive gas that does not support the growth of aerobic micro organisms and thus can inhibit the growth of spoilage bacteria. Nitrogen, however, does not effect the growth of anaerobic micro organisms. Since nitrogen does not react or dissolve into food products, it is also used to prevent package collapse caused by the absorption of other MAP gases.

Carbon dioxide is an acid gas. It readily dissolves into water and produces carbonic acid, thereby decreasing the pH of a solution. Carbon dioxide is also soluble in organic compounds and fats. Carbon dioxide does inhibit the growth of some pathogenic bacteria and is an important addition to many MAP gas mixtures. Unfortunately, too much carbon dioxide can lead to package collapse due to the absorption of carbon dioxide by the food product or permeation through the packaging. If package collapse is not desirable, nitrogen can be added to the MAP mixture to prevent or minimize collapse.



Carbon monoxide is a very flammable, reactive, and toxic gas. However, small amounts of carbon monoxide will enhance desirable pigmentation of red meat. Carbon monoxide is also used to prevent browning of packaged lettuce. Care must be taken when dealing with this flammable and toxic gas.

Other gases that can be added to MAP gas mixtures are the noble gases. These gases are truly non-reactive gases. They include **helium, argon, krypton, and xenon**. These gases have similar actions as nitrogen. Argon is used to extend the shelf life of several fruits and berries.

Depending on volume requirements, MAP gases are supplied premixed in size 300 cylinders. For larger volumes, micro and mini-bulk installations are available. Please contact our technical staff for additional information and consultation regarding your specific requirements.

Biological Atmosphere Gas Mixtures

3

These mixtures are used as control atmospheres for the growth of aerobic and anaerobic biological cultures. Anerobic cultures thrive when deprived of oxygen. These gas mixtures contain less than 10 PPM of oxygen. Aerobic cultures require oxygen to survive. COA not included.

Anaerobic Mixtures	Part No.	Cylinder Size	Contents	Connection
0-5% Hydrogen	BIO-2-CDI-XX-DN	300	100 cf	350
Balance Carbon Dioxide		200	81 cf	350
5-10% Carbon Dioxide	BIO-3-NIT-XX-DN	300	276 cf	350
5-10% Hydrogen		200	207 cf	350
Balance Nitrogen				
0.5% Carbon Dioxide	BIO-2-NIT-XX-DN	300	301 cf	580
Balance Nitrogen		200	226 cf	580

Aerobic Mixtures				
5-10% Carbon Dioxide	BIO-2-OXY-XX-DN	300	293 cf	296
Balance Oxygen		200	220 cf	296
0.5-10% Carbon Dioxide	BIO-2-AIR-XX-DN	300	285 cf	590
Balance Air		200	214 cf	590

XX - Complete the part number with the desired cylinder size listed above.

DN - Description number assigned by manufacturing location.

Recommended Equipment

300 series brass regulators
see page 4.12

Electron Capture Mixtures

Specially manufactured for use with Gas Chromatographs that utilize Electron Capture Detectors. Please refer to the Pure Gas section for helium and nitrogen carrier gases.

P-5 Mixture	Part No.	Cylinder Size	Pressure	Contents	Connection
5% Methane	ECD-2-ARG-XX-DN	300	2400 PSIG	315 cf	350
95% Argon		200	2000 PSIG	232 cf	350
P-10 Mixture					
10% Methane	ECD-2-ARG-XX-DN	300	2400 PSIG	315 cf	350
95% Argon		200	2000 PSIG	232 cf	350

XX - Complete the part number with the desired cylinder size listed above.

DN - Description number assigned by manufacturing location.

Recommended Equipment

300 series brass regulators, see page 4.12

Nuclear Counter Mixtures

For measuring radioactivity and ionization.

Ultra P-5	Part No.	Cylinder Size	Pressure	Contents	Connection
5% Methane UHP	NCM-2-ARG-XX-DN	300	2400 PSIG	315 cf	350
95% Argon UHP		200	2000 PSIG	232 cf	350
Ultra P-10					
10% Methane UHP	NCM-2-ARG-XX-DN	300	2400 PSIG	315 cf	350
90% Argon UHP		200	2000PSIG	232 cf	350
Quench Gas					
1.3% n-Butane	NCM-2-HEL-XX-DN	300	1050 PSIG	121 cf	350
98.7% Helium		200	1050 PSIG	107 cf	350

Geiger Flow Gases	Part No.	Cylinder Size	Pressure	Contents	Connection
0.95% Isobutane	NCM-2-HEL-XX-DN	300	2400 PSIG	262 cf	350
99.05% Helium		200	2000 PSIG	197 cf	350
1.5% Propane	NCM-2-HEL-XX-DN	300	2400 PSIG	262 cf	350
98.5% Helium		200	2000 PSIG	197 cf	350

Recommended Equipment

300 series brass regulators, see page 4.12

XX - Complete the part number with the desired cylinder size listed above.

DN - Description number assigned by manufacturing location.

EPA Protocol Mixtures

3

EPA Protocol Mixtures are manufactured to stringent EPA specifications and procedures, utilizing the most advanced cylinder preparation procedures. These mixtures are then analyzed with NIST traceable standards. Aluminum cylinders are recommended for maximum shelf life.

EPA Protocol Mixtures - Two Component Mixtures

Minor Component/Balance Gas	Part No.	Connection	Minor Component/Balance Gas	Part No.	Connection
CO₂ in Air 1-20% CO ₂ /Air 300-9999 PPM CO ₂ /Air 100-299 PPM CO ₂ /Air	EPA-2-AIR-XX-DN	590	NO in N₂ 0.5-1% NO/N ₂ 100-4999 PPM NO/N ₂ 30-99 PPM NO/N ₂	EPA-2-NIT-XX-DN	660
CO₂ in N₂ 1-20% CO ₂ /N ₂ 300-2999 PPM CO ₂ /N ₂ 100-299 PPM CO ₂ /N ₂	EPA-2-NIT-XX-DN	580	10-29.9 PPM NO/N ₂ 5-9.9 PPM NO/N ₂ 1-3.9 PPM NO/N ₂		
CO in Air 1-3% CO/Air 100-9999 PPM CO/Air 10-99 PPM CO/Air 8-9.9 PPM CO/Air	EPA-2-AIR-XX-DN	590	NO_x in Air 500-5000 NO _x /Air 100-499 NO _x /Air 80-99 NO _x /Air 5-29.9 NO _x /Air 1-4.9 NO _x /Air	EPA-2-AIR-XX-DN	660
CO in N₂ 1-10% CO/N ₂ 100-9999 PPM CO/N ₂ 10-99 PPM CO/N ₂ 8-9.9 PPM CO/N ₂ .5-7.9% CO/N ₂	EPA-2-NIT-XX-DN	350	O₂ in N₂ 23-49% O ₂ /N ₂ 5-22.9% O ₂ /N ₂ 0.8-4.9% O ₂ /N ₂	EPA-2-NIT-XX-DN	<23% O ₂ - 590 >23% O ₂ - 296
H₂S in Air 100-999 PPM H ₂ S/Air 10-99 PPM H ₂ S/Air 1-9.9 PPM H ₂ S/Air	EPA-2-AIR-XX-DN	330	C₃H₈ in Air 1000-6000 PPM C ₃ H ₈ /Air 100-999 PPM C ₃ H ₈ /Air 1-99 PPM C ₃ H ₈ /Air	EPA-2-AIR-XX-DN	590
H₂S in N₂ 100-999 PPM H ₂ S/N ₂ 10-99 PPM H ₂ S/N ₂ 4-9.9 PPM H ₂ S/N ₂ 1-3.9 PPM H ₂ S/N ₂	EPA-NIT-XX-DN	330	SO₂ in Air 500-4999 PPM SO ₂ /Air 100-499 SO ₂ /Air 40-99 SO ₂ /Air 10-39 SO ₂ /Air	EPA-2-AIR-XX-DN	660
CH₄ in Air > 1 PPM CH ₄ /Air < 1 PPM CH ₄ /Air	EPA-2-AIR-XX-DN	590	SO₂ in N₂ 500-4999 PPM SO ₂ /N ₂ 100-499 SO ₂ /N ₂ 40-99 SO ₂ /N ₂ 10-39 SO ₂ /N ₂	EPA-2-NIT-XX-DN	660
CH₄ in N₂ > 1 PPM CH ₄ /N ₂ <1 PPM CH ₄ /N ₂	EPA-2-NIT-XX-DN	350	C₃H₈ in N₂ 1000 PPM C ₃ H ₈ /N ₂ 100-999 C ₃ H ₈ /N ₂ 1-99 C ₃ H ₈ /N ₂	EPA-2-NIT-XX-DN	350

XX - Complete the part number with the desired cylinder size.
DN - Description number assigned by manufacturing location.

3 and 4 Component Mixtures available with concentrations of minor components as listed in this section. Please contact the nearest Sales Office for pricing and availability.

Recommended Equipment

400 series stainless steel regulator, see page 4.16

Cylinder Sizes *	Contents
150A	150 cf
80A	80 cf
35A	35 cf

Portable Calibration Standards

3

Refillable, Portable Calibration Gases

The portable calibration gas cylinder is an alternative to standard disposable cylinders. The Enviro-Cyl™ calibration gas cylinder offers many advantages over disposables:

- portable light weight refillable
- economical 50 - 100% more capacity than disposables
- no cylinders to dispose of...simply return for refill
- eliminates disposal fees and regulatory paperwork
- no more problems with landfills or recycling
- cost efficient; no deposits or rental fees



C-10

C10 Cylinder Specifications

- | | |
|--|--|
| <ul style="list-style-type: none"> • Refillable aluminum cylinder • 105 liters capacity at 1100 psi • 12.5" tall • 3.2" diameter | <ul style="list-style-type: none"> • C-10 valve connection • 5 year DOT stamp • Safety on cylinder valve • Stainless steel valve |
|--|--|

EC180 Cylinder Specifications

- | | |
|---|---|
| <ul style="list-style-type: none"> • Refillable aluminum cylinder • Up to 160 liter capacity at 2200 psig • 14" tall (with valve) • 3.2" diameter | <ul style="list-style-type: none"> • CGA 180/110 connection • 5 year DOT stamp • Safety on cylinder valve • Brass or Stainless steel valves |
|---|---|



EC-180



Complete, Portable Calibration Kits

- | |
|--|
| <ul style="list-style-type: none"> • Sturdy carrying case • Enviro-Cyl™ refillable cylinder(s) or "One Timers" disposable cylinders • A regulator/flowmeter • Tedlar sample bags - available • Calibration tubing - available |
|--|

Portable Calibration Standards

3

One Timers are perfect for all your calibration applications. They cover a broad range of applications from industrial hygiene to petrol chemical.

One Timers provide outstanding quality, performance, and value. They also eliminate cylinder rental and demurrage charges, and the added portability of these cylinders makes them perfect for small jobs.

103 Liter Steel Disposable Cylinder for Non-Reactive Gas

- Steel disposable
- 103 liter low pressure capacity
- Cylinder height: 13.77"
- Cylinder diameter: 3.27"
- CGA: C-10 5/8" - 18 UNF
- Contents: 103 liters
- Weight: 2.3 lbs
- Service pressure: 1000 psi
- DOT Specs: 39 steel cylinder



34 Liter Steel Disposable Cylinder for Non-Reactive Gas

- Steel disposable
- 34 liter low pressure capacity
- Cylinder height: 10.75"
- Cylinder diameter: 3"
- CGA: 600
- Contents: 34 liters
- Weight: 1.8 lbs
- Service pressure: 500 psi
- DOT specs: 39 steel cylinder



17 Liter Steel Disposable Cylinder for Non-Reactive Gas

- Steel disposable
- 17 liter low pressure capacity
- Cylinder height: 10.75"
- Cylinder diameter: 3"
- CGA: 600
- Contents: 17 liters
- Weight: 1.1 lbs
- Service pressure: 250 psi
- DOT specs: 39 steel cylinder



58 Liter Aluminum Disposable Cylinder for Reactive Gas

- Aluminum disposable
- 58 liter low pressure capacity
- Cylinder height: 14.25"
- Cylinder diameter: 3.5"
- Outlet Fitting: C-10 5/8" 18 UNF
- Contents: 58 liters
- Weight 1.6 lbs
- Service pressure: 500 psi
- DOT specs: 39 NRC aluminum cylinder



29 Liter Aluminum Disposable Cylinder for Reactive Gas

- Aluminum disposable
- 29 liter low pressure capacity
- Cylinder height: 10.64"
- Cylinder diameter: 3"
- Outlet Fitting: C-10 5/8" 18 UNF
- Contents: 34 liters
- Weight 1.3 lbs
- Service pressure: 500 psi
- DOT specs: 39 NRC aluminum cylinder



Portable Calibration Standards

3

All Portable Gas Standards are manufactured to meet certified standards and are manufactured with NIST traceable standards. These standards are also manufactured under ISO 17025 Quality Requirements.

Confined Space Standards

Entry into confined spaces require testing for several contaminants.

4 & 5 Component Mixtures normally contain the following products, but the minor components can vary. The concentrations of these components can vary according to the equipment manufacturer. Please check with your equipment manufacturer as to the exact mixture you need.

5 Component Mixture	Part No.	4 Component Mixture	Part No.
Hydrogen Sulfide Carbon Monoxide Methane Oxygen Balance Nitrogen	CS-5-NIT-XX-DN	Hydrogen Sulfide Carbon Monoxide Methane Balance Nitrogen	CS-4-NIT-XX-DN

Common Environmental Compliance Mixtures

Environmental Compliance Mixtures are primarily for remediation and testing. These are normally just two component mixtures, but additional minor components are available.

	Part No.		Part No.
Isobutylene Balance Air	CS-2-AIR-XX-DN	Carbon Monoxide Balance Air	CS-2-AIR-XX-DN
Propane Balance Nitrogen	CS-2-NIT-XX-DN	HCFC 134a Balance Nitrogen	CS-2-NIT-XX-DN
Methane Balance Air	CS-2-AIR-XX-DN	Chlorine Balance Nitrogen	CS-2-NIT-XX-DN
Ammonia Balance Nitrogen	CS-2-NIT-XX-DN	Ethylene Oxide Balance Nitrogen	CS-2-NIT-XX-DN

Additional minor components are available. Please contact the nearest Sales office for additional details.

BTEX Standards	Part No.		
Benzene Toluene Ethyl Benzene o-Xylene Balance Nitrogen	CS-5-NIT-XX-DN		

Disposable Cylinder Sizes	Approximate Contents	Connection
58AL*	58 Liters	C-10
29AL*	29 Liters	C-10
103S	103 liters	C-10
34S	34 Liters	CGA 600
17S	17 Liters	CGA 600
Refillable-Cyl Cylinders		
C-10*	105 Liters	C-10
C-180*	160 Liters	CGA 180/110

XX - Complete the part number with the desired cylinder size.

DN - Description number assigned by manufacturing location.

Recommended Equipment

Regulators for Portable Calibration Standards, see page 4.57

Calibration Kits and Accessories Available

* Aluminum Cylinders recommended for reactive gases

www.purityplusgas.com

Flame Ionization Fuel Mixtures

3

These mixtures are used with Flame Ionization Detectors (FIDs) in gas chromatography or Total Hydrocarbon Analyzer (THC) when analyzing for trace quantities of hydrocarbons. Please refer to the Pure Gas section for Zero and Hydrocarbon Free grades of air, argon, helium, hydrogen, nitrogen, and oxygen carrier gases.

FID Fuel	Part No.	Cylinder Size	Contents	Connection
40% Hydrogen	FID-2-NIT-XX-DN	300	266 cf	350
60% Nitrogen		200	203 cf	350
40% Hydrogen	FID-2-HEL-XX-DN	300	259 cf	350
60% Helium		200	195 cf	350

XX - Complete the part number with the desired cylinder size listed above.

DN - Description number assigned by manufacturing location.

Recommended Equipment

300 series brass regulators, see page 4.12

Leak Detection Mixtures

Leak detection mixtures are used with special instrumentation designed to detect the minor component at very low concentrations. The primary use is to detect very minute leaks in gas systems.

Leak Detection Mixtures	Part No.	Cylinder Size	Contents	Connection
.5%-10% Helium	LDM-2-NIT-XX-DN	300	285	580
Balance Nitrogen		200	210	580
50ppm-1% Sulfur Hexafluoride	LDM-2-NIT-XX-DN	300	289	580
Balance Nitrogen		200	213	580
1%-5% Sulfur Hexafluoride	LDM-2-NIT-XX-DN	300	292	580
Balance Nitrogen		200	215	580

XX - Complete the part number with the desired cylinder size listed above.

DN - Description number assigned by manufacturing location.

Recommended Equipment

300 series brass regulators, see page 4.12

Laser Mixtures

3

Source Material Purities::	
Carbon Dioxide:	99.99%
Nitrogen	99.999%
Helium	99.999%
Carbon Monoxide:	99.5%
Hydrogen	99.99%

Carbon Dioxide Laser Mixtures	Part No.	Cylinder Size	Contents	Connection
3.4% CO ₂ / 15.6% N ₂ / He 4.5% CO ₂ / 13.5% N ₂ / He 6% CO ₂ / 18% N ₂ / He 4.5% CO ₂ / 13.5% N ₂ / He 5% CO ₂ / 40% N ₂ / He	LZR-4-HEL-XX-DN LZR-4-HEL-XX-DN LZR-3-HEL-XX-DN LZR-3-HEL-XX-DN LZR-3-HEL-XX-DN	300 200	264 cf 200 cf	580
2% CO / 6% CO ₂ / 6% N ₂ / He 2% CO / 8% CO ₂ / 8% N ₂ / He 2% CO / 8% CO ₂ / 16% N ₂ / He 4% CO / 8% CO ₂ / 16% N ₂ / He 4% CO / 8% CO ₂ / 16% He / N ₂ 4% CO / 8% CO ₂ / 28% He / N ₂	LZR-4-HEL-XX-DN LZR-4-HEL-XX-DN LZR-4-HEL-XX-DN LZR-4-HEL-XX-DN LZR-4-HEL-XX-DN LZR-4-HEL-XX-DN	300 200	229 cf 167 cf	350
0.4% H ₂ / 4% CO / 8% CO ₂ / 8% N ₂ / He 0.4% H ₂ / 4% CO / 6% CO ₂ / 12% N ₂ / He	LZR-4-HEL-XX-DN LZR-4-HEL-XX-DN	300 200	229 cf 167 cf	350

XX - Complete the part number with the desired cylinder size listed above.

DN - Description number assigned by manufacturing location.

Recommended Equipment

601 series laser regulator, see page 4.48

*Other combinations and sizes available upon request

TCD Carrier Gas Mixture

3

This mixture is intended to enhance the sensitivity of a chromatograph using a thermal conductivity detector.

TCD Carrier Gas Mixture	Part No.	Cylinder Size	Contents	Connection
8.5% Hydrogen	TCD-2-HEL-XX-DN	300	262 cf	350
91.5% Helium		200	192 cf	350

XX - Complete the part number with the desired cylinder size listed above.

DN - Description number assigned by manufacturing location.

Recommended Equipment

300 series brass regulators, see page 4.12

Spark Chamber Mixtures

Used as the medium for atomic particle studies.

Spark Chamber Mixtures	Part No.	Cylinder Size	Contents	Connection
10% Helium	SCM-2-NE-XX-DN	300	269	580
90% Neon		200	201	580
		150A	135	580
20% Helium	SCM-2-NE-XX-DN	300	269	580
80% Neon		200	201	580
		150A	135	580
25 % Helium	SCM-2-NE-XX-DN	300	269	580
75% Neon		200	201	580
		150A	135	580

XX - Complete the part number with the desired cylinder size listed above.

DN - Description number assigned by manufacturing location.

Recommended Equipment

300 series brass regulators, see page 4.12

Multi-Component Hydrocarbon Mixtures

3

Today's gas and oil industries are more demanding than ever. With critical specifications and tolerances tighter than ever, it is imperative, for continued top level operation, that **gas and liquid standards** be manufactured with the highest quality gases in the highest quality labs. Our hydrocarbon gases are manufactured to meet the most stringent requirements that our customers demand. Whether your hydrocarbon requirement is for a refinery, petrochemical plant, chemical plant, or gas processing plant you can depend on PurityPlus gases to meet your processing challenges with reliable gas standards the first time, every time. Five, ten, twenty or more components mixtures are routine for us. For pricing and delivery, please contact the nearest sales office with your mixture requirements.

Typical reference standards can include any or all of the following gases.

Argon	Hydrogen Sulfide
Benzene	Isobutane
1-3 Butadiene	Isobutylene
n-Butane	Isopentane
cis-2-Butene	Isoprene
trans-2-Butene	Methane
1-Butene	2-Methylpentane
Carbon Dioxide	3-Methylpentane
Carbon Monoxide	Nitrogen
Cyclohexane	n-Nonane
Cyclopentane	n-Octane
n-Decane	n-Pentene
2,2 Dimethyl butane	Propane
n-Dodecane	Propylene
Ethane	Neopentane
Ethylene	n-Tridecane
Helium	n-Undecane
n-Heptane	

Recommended Equipment

300 series brass regulators, see page 4.12

*For mixtures containing hydrogen sulfide:
400 series stainless steel regulators, see
page 4.14



Liquid Hydrocarbon Mixtures

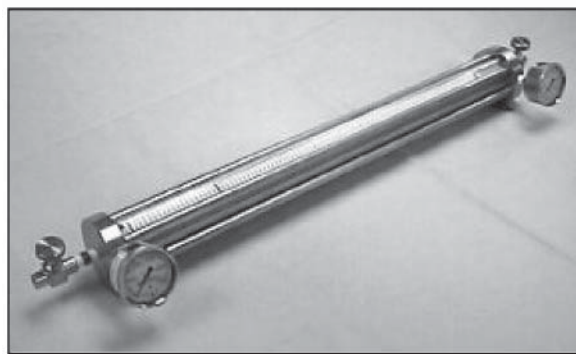
3

Liquid Hydrocarbon Standards are often required for analysis of liquid petroleum gas or liquefied hydrocarbon streams. PurityPlus liquid hydrocarbon standards are available in low pressure cylinders with dual valves and/or full length eductor tubes. When the composition of these mixtures span a wide range of vapor pressures and boiling points, we recommend the use of Welker Piston Cylinders to provide constant supply pressure and limit fractionalization of the mixture. These cylinders can supply up to 3600 PSI working pressure by applying equivalent nitrogen pressure to the gas side of the piston, thus maintaining the pressure and mixture you need. This cylinder is available in several volumes and can be refilled.

Please contact your nearest sales office for pricing of mixtures and cylinders.



Welker Engineering Constant Pressure Sample Cylinder
style cp-42-ga



Welker Engineering High Pressure DOT Cylinder
style cp2-hp

Semiconductor Gases

3

PurityPlus gas manufacturers are committed to the semiconductor industry with the implementation of our ISO Quality Management Program. From silanes to dopant gases to etchant gases and purge gases, the network of PurityPlus manufactures have implemented the strict SOPs and QA procedures to meet the semiconductor industry demands. The table below outlines the available process gases. For detailed information, please contact the nearest sales office.

PurityPlus gas manufacturers have been supplying electronic grade gases to the semi-conductor industry since its inception. We currently supply bulk hydrogen, nitrogen, argon, and oxygen to many semiconductor manufacturers. We also supply cylinder gases to the exacting demands of this industry. If you have an electronic gas requirement please contact us for pricing and availability.

Silanes	Dopants	Etchants	Purge Gases	Other
Silane - SiH ₄	Arsine - AsH ₃	Chlorine - Cl ₂	Argon - Ar	Ammonia - NH ₃
Dichlorosilane - SiH ₂ Cl ₂	Phosphine - PH ₃	Hydrogen Bromide - HBr	Helium - He	Carbon Dioxide - CO ₂
Disilane - SiH ₆	Boron Trifluoride - BF ₃	Hydrogen Chloride - HCl	Hydrogen - H ₂	Nitrous Oxide - N ₂ O
Silicon Tetrachloride - SiCl ₄		Sulfur Hexafluoride - SF ₆	Nitrogen - N ₂	
Trichlorosilane - SiHCl ₃		Halocarbon 14 - CF ₄	Oxygen - O ₂	
		Halocarbon 22 - CHClF ₂		
		Halocarbon 23 - CHF ₃		
		Halocarbon C318 - C ₄ F ₈		

Recommended Equipment

432 series regulator, see page 4.16

Medical Gases

3

PurityPlus Medical Gases are manufactured in compliance to FDA current Good Manufacturing Practices (cGMPs). Our manufacturing facilities are independently audited by a third party auditor, as well as by the FDA (in Canada, the Health Products and Food Branch Inspectorate - HPFBI) to insure stringent compliance with all applicable regulations.

Our Medical Gases are manufactured to meet all U.S. Pharmacopeia (USP) and National Formulary (NF) specifications in accordance with cGMPs.

IWDC Members provide a full range of gases and related equipment for the Healthcare, Pharmaceutical, and Biotechnology fields. We use state-of-the-art filling facilities and analytical laboratories to provide high purity gases and high accuracy mixtures for all research, inhalation, and diagnostic applications.

We carry a full line of cryogenic equipment including cryogenic freezers, liquid withdrawal devices, and personal safety equipment. We have a full line capability from portable liquid containers, to micro and mini-bulk systems, to large bulk gas installations.

Included in this section are the most common medical gases and medical gas mixtures. Depending on use, special request mixtures may require additional approvals.



Medical Gases

3

Product	Part No.	Purity	Impurity	Maximum	Cylinder Size	Contents	Connection
Medical Air Purified natural air or a blend of oxygen and nitrogen. Contains 19.5 to 23.5 vol% Oxygen	AIR-USP-XX	Oxygen 19.5-23.5% Bal N2	CO	≤ 10ppm	200	233 cf	346
			CO2	≤ 500 ppm	20	23 cf	950
			SO2	≤ 5 ppm	10	14 cf	950
			NO + NO2	≤ 2.5 ppm			
			Odor:	None			
			Condensed H2O:	None			
			Condensed Oil:	None			
Carbon Dioxide USP Chemical Symbol: CO2	CDI-USP-XX	> 99.0%	H2S< 1 ppm	≤ 1 ppm	200	64 lb	320
			CO	≤ 10 ppm	20	6.5 lb	940
			NO	≤ 2.5 ppm	10	4.0 lb	940
			NH3	≤ 25 ppm			
			SO2	≤ 5 ppm			
			H2O	≤ 200 ppm			
			NO2	≤ 2.5 ppm			
Carbon Dioxide Cryogenic Liquid					170L	378 lb	Gas-320 Liq.-172
Helium USP Chemical Symbol: He	HEL-USP-XX	> 99.0%	CO	≤ 10 ppm	200	218 cf	580
			Air	≤ 1.0%	20	22 cf	930
			Odor:	None	10	13 cf	930

XX - Complete the part number with the desired cylinder size listed above.

Recommended Equipment - Gas Cyls

200 series brass regulator, page 4.8

Cryogenic Product

See Cryogenic Equipment Section, page 4.130

*Nonstandard cylinder sizes available upon request

Medical Gases

3

Product	Part No.	Purity	Impurity	Maximum	Cylinder Size	Contents	Connection
Nitrogen NF	NIT-USP-XX	≥ 99.0%	CO	< 10 ppm	200	228	580
			O ₂	≤ 1.0%	20	23	960
			Odor:	None	10	14	960
Nitrogen NF Cryogenic Liquid					160L	3690	gas-580
					180L	4110	Liq.-295
Nitrous Oxide USP	N2O-USP-XX	≥ 99.0	CO	≤ 10 ppm	200	64 lb	326
			Air	≤ 1.0%	20	6.4 lb	910
			CO ₂	≤ 300 ppm	10	3.9 lb	910
			NO	≤ 1 ppm			
			NO ₂	≤ 1 ppm			
			NH ₃	≤ 25 ppm			
			Halogens	≤ 1 ppm			
Oxygen USP**	OXY-USP-XX	≥ 99.0%	CO	≤ 10 ppm	200	249 cf	540
			CO ₂	≤ 300 ppm	20	25 cf	870
			Odor	None	10	15 cf	870
Oxygen Cryogenic Liquid					160L	4580 cf	Gas-540
							Liq-440

XX - Complete the part number with the desired cylinder size listed above.

Recommended Equipment

200 series brass regulator, see page 4.8

Cryogenic Product

See Cryogenic Equipment Section, page 4.130

*Nonstandard cylinder sizes available upon request

**Oxygen that is produced by the air-liquefaction process is exempt from the requirements of the tests for carbon dioxide and carbon monoxide.

Medical Gases

3

Medical Drug Gases - Therapy	Part No.	Cylinder Size	Contents	Connection
5% Carbon Dioxide in Oxygen	USP-2-OXY-XX-DN	200	226 cf	280
10% Carbon Dioxide in Oxygen	USP-2-OXY-XX-DN	200	226 cf	500
20% Oxygen in Helium	USP-2-HEL-XX-DN	200	199 cf	280
30% Oxygen in Helium	USP-2-HEL-XX-DN	200	199 cf	280
Medical Device Gases - Diagnostic - Certified Standards*	Part No.	Cylinder Size	Contents	Connection
Lung Diffusion Gases				
0.3% Carbon Monoxide, 10% Helium, 21% Oxygen in Nitrogen	MDV-4-NIT-XX-DN	200	209 cf	500
0.3% Carbon Monoxide, 0.5% Neon, 21% Oxygen in Nitrogen	MDV-4-NIT-XX-DN	200	213 cf	500
0.3% Carbon Monoxide, 0.3% Methane, 21% Oxygen in Nitrogen	MDV-4-NIT-XX-DN	200	213 cf	500
0.3% Acetylene, 0.3% Carbon Monoxide, 0.3% Methane, 21% Oxygen in Nitrogen	MDV-5-NIT-XX-DN	200	213 cf	500
Blood Gas Mixtures				
2-14% Carbon Dioxide in Nitrogen	MDV-2-NIT-XX-DN	200	228 cf**	500
7-12% Carbon Dioxide in Oxygen		200	233 cf**	500
1-19% Oxygen in Nitrogen		200	228 cf**	500
2-12% Carbon Dioxide, 12-15% Oxygen in Nitrogen	MDV-3-NIT-XX-DN	200	228 cf**	500
		** Contents Approximate		

XX - Complete the part number with the desired cylinder size listed above.

DN - Description number assigned by manufacturing location.

Recommended Equipment

300 series brass regulator, see page 4.12

*Primary Standard Grade Mixtures are also available

*Nonstandard cylinder sizes available upon request

*Additional custom blends are available upon request

Notes:

3

[illegible]

3

[illegible]



Equipment



PurityPlus[®]
Specialty Gases

Section 4 - Equipment

How to choose a regulator	4.1	Series 7950 – Gas Proportioner	4.84
How to Order PurityPlus Regulators	4.2	Series 7974 & 7975 – Large Flow Acrylic	4.85
Recommended Regulator Chart	4.3 - 4.5	Series 7923 – Economic Acrylic	4.86
Regulators		Series 7900 – Eagle-Eye Flowmeter Alarm	4.89
Cylinder Regulators		Series 810C – Mass-Trak Mass Flowmeter	4.87
202 Series – Single Stage, Brass	4.6	Series 820 – Top-Trak Mass Flowmeter	4.90
212 Series – Two Stage, Brass	4.8	Purifiers and Filters	
302 Series – High Purity Single Stage, Brass	4.10	Series 6200 – Indication Oxygen Trap	4.92
312 Series – High Purity, Two Stage, Brass	4.12	Series 6210 – Oxygen Removing Purifier for Hydrogen	4.93
422 Series – High Purity, Single Stage, Corrosion Resistant, SS	4.14	Series 6400 – Carbon Dioxide Trap	4.94
432 Series – High Purity, Two Stage, Corrosion Resistant, SS	4.16	Series 8000 – High Capacity Water and Oil	4.95
408 Series – High Purity, Single Stage, Aluminum	4.18	Series 8010 – High Pressure Water and Oil	4.96
492 Series – Single Stage, Brass, 6000 PSIG	4.44	Series 8012 – 120 cc Indicating Purifier	4.97
493 Series – Single Stage, Ultra High Pressure	4.46	Series 8020 – 200 cc Indicating Purifier	4.97
601 Series – Laser Regulator, Internal Purge	4.48	Series 8040 – 400 cc Indicating Purifier	4.97
3550 Series – Two Stage, Corrosion Resistant, SS	4.50	Series 8050 – 735 cc and 1500 cc Purifiers	4.97
3460 Series – Single Stage, Corrosion Resistant, Monel®	4.51	Series 8200 – Hydrocarbon Trap	4.98
3470 Series – Single Stage, Corrosion Resistant, Nickel Plated Brass	4.52	Series 5000 – 0.01 micron Filter	4.99
3700HP Series – Single Stage, Low Pressure, Zinc	4.53	Series 7500 – In-Line Filter	4.126
308 Series – Single Stage, Brass, Heated	4.28	Purge Assemblies	
451 Series – Single Stage, SS	4.38	Series 4500 – Tee Purge, Brass or SS	4.129
452 Series – Single Stage, SS Heated	4.40	Series 4800 – Cross Purge, SS	4.128
453 Series – Single Stage, SS	4.42	Gas Detection Systems	
Regulators for Portable Calibration Standards	4.54	Beacon 100 – Single Point Controller	4.107
Series EZ3000 – Easy-Mount Regulator Bracket	4.106	Beacon 200 – Two Point Controller	4.107
Line Regulators		Beacon 800 – Eight Point Controller	4.107
304 Series – Single Stage, Brass	4.20	Eagle Portable Gas Detector	4.111
445 Series – Single Stage, SS	4.22	Bio Medical/Cryogenic Equipment	
483 Series – High Flow, Single Stage, Brass	4.24	Director™ Storage Vessels	4.130
484 Series – High Flow, Single Stage, Brass, Smooth Finish	4.26	Liquid Nitrogen Shipping Vessels	4.131
428 Series – High Purity, Single Stage, Chrome Plated Brass	4.34	Dewars	4.132
429 Series – High Purity, Single Stage, SS, Corrosion Resistant	4.36	Refrigerators	4.133
Lecture Bottle Regulators		Whisper Valve™	4.134
325 Series – Single Stage, Brass	4.30	Accessories	4.130
3910 Series – Single Stage, Chrome Plated Brass, Compact Design	4.32	Series CTM75 – Automatic Switchover Manifolds for Cryogenic Liquid Supply	4.135
3920 Series – Single Stage SS, Compact Design	4.32	Cylinder Connections	
Misc. Lecture Bottle Equipment		CGA Connections	4.122
Model 475 – Lecture Bottle Stand	4.33	DISS Connections	4.124
Model 480 – Lecture Bottle Bracket	4.33	DISS Gaskets	4.124
Model 3990 – 3993 – Lecture Bottle Control Valves	4.33	Valves	
Manifolds		Series 8500 – Manual Control Valves	4.106
529 Series – Protocol Switchover Station	4.56	Series 8100 – Miniature Forged Needle Valves	4.103
522 Series – Auto Switch	4.58	Series 8600 – Relief Valves	4.105
523 Series – Auto Switch, Corrosion Resistant	4.60	Series 8400 – Check Valves	4.103
536 Series – Auto Switch GL	4.62	Series 8300 – High Purity Packless Diaphragm Valves	4.104
537 Series – Auto Switch GL, Corrosion Resistant	4.64	Miscellaneous	
539 Series – IntelliSwitch Electronic Switchover	4.66	Wall Mounted Protocol Switchover Stations	4.55-4.56
540 Series – Back-up Panel	4.68	Flash Arrestors	4.102
526 Series – Semiautomatic Changeover	4.70	Electronic Cylinder Scales	4.100
527 Series – Semiautomatic Changeover, Corrosion Resistant	4.72	Liquefied Gas Cylinder Scale	4.101
530 Series – High Pressure Automatic Switchover System	4.74	Small Cylinder and Large Cylinder Stands	4.114
52 Series – Maniflex, modular manifolds	4.78	Cylinder Floor Stands	4.115
529 Series – Protocol Switchover Station Alarm	4.57	Cylinder Brackets	4.113
Advantium 8 – Manifold Alarm	4.76	Cylinder Wrenches	4.120
Advantium 1 – 1 Input Remote Manifold Alarm	4.77	Gas Process Stations	4.116
Advantium 2 – 2 Input Remote Manifold Alarm	4.77	Cylinder Storage Racks	4.117
Series 9900 Low Pressure Gas Alarm	4.127	Gas Safety Storage Cabinets	4.119
Flowmeters		Cylinder Hand Trucks	4.118
Tutorial	4.81	Pressure Gauges	4.125
Series 7920 – Tube Cube	4.82	Gas Heater	4.126
		Flexible Stainless Steel Hoses	4.121
		Leak Detector Solution	4.80

How to Choose a Regulator

While all regulators can reduce pressure in a gas system, PurityPlus high purity regulators conform to very exacting standards of pressure control. Below, we discuss some bases of comparison that can help you navigate this catalog and choose a regulator that best suits your needs. Of course, your nearest PurityPlus sales office would be happy to answer any further questions you may have about regulator design and operation.

Single Stage vs. Dual Stage

Single stage regulators reduce pressure in a single step to deliver a pressure within a specific range. Regulators designed in this way will show a slight variation in delivery pressure as the cylinder pressure falls during use. For this reason, single stage regulators are best suited for applications where a constant outlet pressure is not critical, where an operator can monitor and readjust pressure, or where inlet pressure is constant.

Dual stage regulators perform the same function as single stage regulators. However, delivery pressure remains constant as cylinder pressure decreases and greater accuracy in pressure control is maintained because the pressure reduction is performed in two steps. Dual stage regulators are recommended for applications requiring a constant outlet pressure over the life of a gas cylinder.

Helium Leak Integrity

Helium leak integrity is a measure of how well a regulator prevents gases from leaking into or out of a regulator body. The measured quantity is expressed as a flow rate such as 1×10^{-9} cc/sec He (1 billionth of a cc/sec). In this case, a Helium Leak integrity rating of 1×10^{-9} would indicate that the regulator would leak enough gas to fill a cubic centimeter every 33 years. If the rating were 1×10^{-3} the regulator would leak enough gas to fill a cubic centimeter in just 17 minutes.

Helium is used as the test gas because it is chemically inert, it is easy to detect, and it is an extremely small molecule able to pass through the smallest leak. The lower the helium leak specification, the better the regulator will be at preventing leaks into the atmosphere and at minimizing contamination from gases outside the body.

Materials of Construction

The materials of construction for a regulator should be based on the properties and purity of the gas. PurityPlus offers regulators made of brass, aluminum, and 316L stainless steel. Brass is compatible with most of the non-reactive gases. A choice of forged body or barstock construction is available. Forged body regulators are economical; however, their internal surface finishes are relatively rough as compared to barstock body regulators. Barstock body regulators have all wetted surfaces machined to a smooth finish which reduces the possibility of contamination. 316L stainless steel is highly corrosion resistant and is suitable for use with many of the highly corrosive gases in their anhydrous form. Aluminum is an economical lightweight alternative to stainless steel for many of the mildly corrosive gases. Refer to the Regulator Selection Chart on pages 4.3-4.5 or consult your nearest PurityPlus sales office to determine suitable materials of construction.

Cylinder Connections

PurityPlus offers cylinder connections which conform to all worldwide standards. In the US the Compressed Gas Association (CGA) has designated specific cylinder connections for each gas service and pressure rating. Refer to CGA publication V-1 for more information. A few of the international standards PurityPlus provides include DIN 477, BS 341, JIS (Japan), and KS (Korea). Please note that a CGA connection limits the temperature range of a regulator to the guidelines of the connection.

Flow Charts

The flow charts on each catalog page are a graphical representation of test results which show the change in outlet pressure with varying flow rate. To use the chart, determine the maximum no-flow pressure permitted by your system. Locate this pressure on the vertical axis of the chart. If there is no curve for your specific condition, interpolate a curve. Follow the curve to the desired flow rate on the horizontal scale. Read horizontally to the left to determine the corresponding pressure drop. Because flow rate is dependent on inlet pressure, data is presented at full cylinder pressure (2000 PSIG), partially full (500 PSIG) and nearly empty (200 PSIG).

Diaphragms

The diaphragm is a sensing element crucial to the function of the regulator and the purity of gas delivery. Stainless steel diaphragms are corrosion resistant and have low leakage rate characteristics. Neoprene diaphragms may offer more sensitive pressure control, but do not offer the gas purity of stainless steel. Coating a neoprene diaphragm with PTFE enhances gas purity greatly.

Specific Applications

While a single or dual stage regulator of the appropriate material will suffice in most gas service, some applications require specially designed regulators. For example in the 400 Series, the 455 Series regulators are specifically designed for use with highly corrosive gases and the 492 Series regulators can safely deliver gas at extremely high pressures. If you are unsure about your requirements, please contact your IWDC distributor for assistance.

Ordering PurityPlus Regulators

In accordance with our philosophy of flexible design, PurityPlus has developed a versatile modular manufacturing system to accommodate any individual requirement. With all the options PurityPlus offers, listing discrete part numbers for each regulator series would be impossible. Therefore, we have created a part number matrix which allows you to design a regulator to meet the needs of any application.

- Step One** The first choice in completing the Part Number Matrix is selecting a particular regulator series. Determine which regulator series are compatible with the gases involved in the application by consulting the Regulator Selection Chart on pages 4.3-4.5. For further criteria, consider page 4.1 entitled Choosing a Regulator and finally the description of each regulator series in this catalog. If you are having problems deciding, please contact your nearest PurityPlus sales office for assistance. The regulator series number then becomes the first three digits of the part number.
- Step Two** Select the desired outlet pressure range from those available in the A column. The selection of an outlet pressure range automatically specifies the outlet pressure gauge which appears in the adjacent column. For example, a regulator with a 0-250 PSIG outlet pressure range will have a 0-400 PSIG pressure gauge installed.
- Step Three** Choose the inlet pressure gauge from those available in the B column. While the most common cylinder pressure is between 2200 PSIG and 2400 PSIG, several gases are stored in cylinders at other pressures. Choosing the inlet gauge with a range that most closely approximates the actual pressure range of the cylinder allows easy readability of cylinder contents. Please note that by indicating the 0-6000 PSIG inlet gauge, you are also selecting a special PCTFE Capsule® with a maximum inlet pressure of 4500 PSIG.
- Step Four** Indicate the outlet assembly desired from those available in the C column. Since there are a wide variety of tubing and piping systems in use, the matrix accommodates virtually any style of connection, eliminating the need for adapters and reducing potential leak paths. PurityPlus also offers a choice of valve options for gas flow control.
- Step Five** Select an assembly option from those available in the D column. A bare body regulator is shipped without peripherals, with all ports open and unplugged. A standard assembly regulator comes completely assembled with all selected peripherals, ready for use; a Cleanroom regulator is completely assembled in a Class 10 environment. Finally, each regulator must pass a battery of rigorous operational tests and a Helium Leak Integrity check.
- Step Six** Specify an inlet connection. On all regulator series, PurityPlus distributors will provide any CGA, DIN 477, BS 341, or other standard connection provided it is recognized as safe for the materials of construction and pressure rating of the regulator. Consult your nearest PurityPlus sales office for proper selection of the inlet connection. A "-000" at the end of the part number indicates no inlet connection (1/4" female NPT).
- Step Seven** Choose an installed option from a range of protocol stations and purges. By ordering these options as a component of the part number, PurityPlus can assure the appropriate materials, maximum pressure, and connections of the option chosen.

For example, using the table below to order a 422 Series regulator with an outlet pressure range of 0-50 PSIG, a 0-4000 PSIG inlet pressure gauge, a diaphragm valve with a 1/4" tube fitting, PSIG/kPa pressure gauges, and a CGA 580 connection for Nitrogen service, the part number would be 422-2331-580.

422	A		B	C	D	-Inlet	Options
Series 422	Outlet Pressure	Outlet Gauge	Inlet Gauge	Outlet Assemblies	Assembly/ Gauges	Inlet Connections	Installed Options
	1: 0-15*	30"-0-30 PSIG	0: None	0: 1/4" FPT Port	0: Bare Body	000: 1/4" FPT	A: Protocol Alarm Station (110V)
	2: 0-50	30"-0-100 PSIG	3: 0-4000 PSIG	1: 1/4" MPT	1: Standard Assembly (PSIG/kPa Gauges)	TF2: 1/8" Tube	B: Protocol Alarm Station (220V)
	3: 0-100	30"-0-200 PSIG		2: 1/4" Tube Fitting	2: Standard Assembly (BAR/PSIG Gauges)	TF4: 1/4" Tube	C: Protocol Switchover Station
	4: 0-250	0-400 PSIG	5: 0-1000 PSIG	3: Diaphragm Valve 1/4" Tube Fitting	4: Cleanroom Assembly (PSIG/kPa Gauges)	TF6: 3/8" Tube	D: Deep Purge
	5: 0-500	0-1000 PSIG	6: 0-300 PSIG	4: Diaphragm Valve 1/4" MPT	5: Cleanroom Assembly (BAR/PSIG Gauges)	M06: 6mm Tube	G: Protocol Switchover Station with Alarm (110V)
	7: 0-150	30"-0-200 PSIG	7: 0-400 PSIG	5: Needle Valve 1/4" MPT		CGA	H: Protocol Switchover Station with Alarm (220V)
			8: 0-6000 PSIG*	6: 1/8" Tube Fitting		DIN 477	
				7: 3/8" Tube Fitting		BS 341	
				8: Diaphragm Valve 1/8" Tube Fitting		and others available	
				9: Diaphragm Valve 1/4" FPT			
				A: 3/8" BSP Right Hand Fitting			
				M: 6mm Tube Fitting			
				S: Diaphragm Valve 6mm Tube Fitting			

Recommended Regulator Chart

		200 series	300 series		400 series			Other	
Pure Gases			Brass	Plated Brass	Al3	Brass	SS	Brass	SS
Acetylene	Grade 2.6 (Purified)	x							
Air	Ultra Zero		x	x		x	x	x	x
	Zero	x	x	x	x	x	x	x	x
	Extra Dry	x	x	x	x	x	x	x	x
Ammonia	VLSI 4.5 Grade 2.5						x x		
Argon	6.9 (Research)						x		x
	N2 Free 5.0		x			x	x	x	x
	Grade 5.0, (UHP)		x			x	x	x	x
	Grade 4.8 (Prepurified)	x	x			x	x	x	x
	Zero		x			x	x	x	x
	6000 PSI					x	x	x	x
Arsine	Electronic						x		
Boron Trichloride	Grade 5.0 (Research)								
	Grade 3.0 (Electronic)								
	Grade 2.5 (CP)								
Boron Trifluoride	Grade 2.5 (CP)						x		x
1,3-Butadiene	Grade 2.0 (CP)	x	x	x	x	x	x	x	x
n-Butane	Grade 2.5 (Instrument)	x	x	x	x	x	x	x	x
	Grade 2.0 (CP)	x	x	x	x	x	x	x	x
1-Butene	Grade 3.0 (Research)		x	x	x	x	x	x	x
	Grade 2.0 (CP)	x	x	x	x	x	x	x	x
cis-2-Butene	Grade 2.0 (CP)	x	x	x	x	x	x	x	x
	Grade 1.5 (Technical)	x	x	x	x	x	x	x	x
Carbon Dioxide	Grade 5.0 (Research)		x	x	x	x	x	x	x
	Grade 4.8 (Scientific)		x	x	x	x	x	x	x
	Laser 4.5		x	x	x	x	x	x	x
	Grade 4.0 (Instrument)	x	x	x	x	x	x	x	x
	Anerobic	x	x	x	x	x	x	x	x
	Grade 2.8 (Bone Dry)	x	x	x	x	x	x	x	x
Carbon Monoxide	Grade 4.0						x		x
	Grade 2.5 (CP)	x	x	x	x	x	x	x	x
	Grade 2.0 (Technical)	x	x	x	x	x	x	x	x
Carbonyl Sulfide	Grade 3.0						x		
Chlorine	Grade 3.0 (UHP)						x		x
	Grade 2.5 (High Purity)						x		x
Duterium	Grade 5.0		x	x		x	x	x	x
	Grade 4.0	x	x	x		x	x	x	x
	Grade 3.0	x	x	x		x	x	x	x
Dimethylether	Grade 2.8 (CP)	x	x	x	x	x	x	x	x
	Grade 2.5 (Technical)	x	x	x	x	x	x	x	x
Ethane	Grade 2.0 (CP)	x	x	x	x	x	x	x	x
Ethylene	Grade 4.0	x	x	x	x	x	x	x	x
	Grade 3.0 (Polymer)	x	x	x	x	x	x	x	x
	Grade 2.5 (CP)	x	x	x	x	x	x	x	x
Helium	Grade 6.0 (Chromatographic)		x	x	x	x	x	x	x
	Grade 5.5		x	x	x	x	x	x	x
	Grade 5.0 (UHP)		x	x	x	x	x	x	x
	N2 Free 5.0		x	x	x	x	x	x	x
	Zero	x	x	x	x	x	x	x	x
	Grade 4.8 (Prepurified)	x	x	x	x	x	x	x	x
	6000 PSI					x	x	x	x
Hexafluoropropylene	Grade 3.0	x	x	x	x	x	x	x	x

		200 series	300 series		400 series			Other	
Pure Gases			Brass	Plated Brass	Al3	Brass	SS	Brass	SS
Hydrogen	Grade 6.0 (Research)		x	x		x	x	x	x
	Grade 5.5		x	x		x	x	x	x
	Grade 5.0 (UHP)		x	x		x	x	x	x
	Zero	x	x	x		x	x	x	x
	Grade 4.0 (Prepurified) 6000 PSI	x	x	x		x	x	x	x
Hydrogen Bromide	Grade 2.8 (CP)						x		x
Hydrogen Chloride	Grade 5.0 (Research)						x		x
	Grade 4.5						x		x
	Grade 4.0						x		x
	Grade 2.0 (Technical)						x		x
Hydrogen Sulfide	Grade 2.5 (CP)				x		x		x
Isobutane	Grade 2.5 (Instrument)	x	x	x	x	x	x	x	x
	Grade 2.0 (CP)	x	x	x	x	x	x	x	x
Krypton	Grade 5.0		x	x		x	x		x
	Grade 4.5		x	x		x	x		x
	Grade 2.0	x	x	x	x	x	x	x	x
Methane	Grade 5.0 (Research)		x	x		x	x	x	x
	Grade 4.0 (UHP)	x	x	x		x	x	x	x
	Grade 2.0 (CP)	x	x	x		x	x	x	x
	Grade 1.3 (Commercial)	x	x	x		x	x	x	x
Methyl Chloride	Grade 2.5 (CP)	x	x	x		x	x	x	x
Methyl Fluoride	Grade 2.0 (CP)	x	x	x		x	x	x	x
Methyl Mercaptan	Grade 2.5 (CP)						x		
Monomethylamine	Grade 2.5 (CP)						x		x
Neon	Grade 5.0 (UHP)		x	x		x	x	x	x
Neopentane	Grade 2.0 (CP)	x	x	x	x	x	x	x	x
Nitric Oxide	Grade 3.0						x		x
	Grade 2.0 (CP)						x		x
Nitrogen	Grade 6.0 (Research)		x	x	x	x	x	x	x
	Grade 5.0 (UHP)		x	x	x	x	x	x	x
	Grade 4.8 (Prepurified)	x	x	x	x	x	x	x	x
	Zero	x	x	x	x	x	x	x	x
	Oxygen Free 4.8	x	x	x	x	x	x	x	x
	6000 PSI						x		x
Nitrogen Dioxide	Grade 2.5						x		x
Nitrogen Trifluoride	Grade 4.0	x	x	x		x	x	x	x
Nitrous Oxide	VLSI 5.0						x		x
	Grade 4.5		x	x	x	x	x	x	x
	Grade 3.0	x	x	x	x	x	x	x	x
	AA 2.6	x	x	x	x	x	x	x	x
Octafluoropropane	Grade 5.0		x	x	x	x	x	x	x
	Grade 3.0	x	x	x	x	x	x	x	x
Oxygen	Grade 5.0 (Research)		x	x		x		x	
	Grade 4.3 (UHP)		x	x		x		x	
	Zero	x	x	x		x		x	
	Grade 2.6 (Extra Dry)	x	x	x		x		x	
Phosphine	Electronic						x		
Propane	Grade 4.0 (Research)		x	x	x	x	x	x	x
	Grade 2.5 (Instrument)	x	x	x	x	x	x	x	x
	Grade 2.0 (CP)	x	x	x	x	x	x	x	x
Propylene	Grade 2.5 (Polymer)	x	x	x	x	x	x	x	x
	Grade 2.0 (CP)	x	x	x	x	x	x	x	x
Silane	VLSI						x		x
	CCD						x		x
	Semiconductor						x		x
Sulfur Dioxide	Grade 3.8 (Anhydrous)						x		x
Sulfur Hexafluoride	Grade 5.0		x	x	x	x	x	x	x
	Grade 4.0		x	x	x	x	x	x	x
	Grade 3.0	x	x	x	x	x	x	x	x

		200 series	300 series		400 series			Other	
Pure Gases			Brass	Plated Brass	Al3	Brass	SS	Brass	SS
Tetrafluoromethane	Grade 5.0 Grade 4.0	x	x x	x x	x x	x x	x x	x x	x x
Trimethylamine	Grade 2.5 (CP)						x		x
Xenon	Grade 5.0 (research)		x	x	x	x	x	x	x
Mixtures			Brass	Plated Brass	Al3	Brass	SS	Brass	SS
Ammonia	in Helium in Hydrogen in Nitrogen						x x x		x x x
Argon	in Helium in Hydrogen in Nitrogen in Oxygen		x x x x	x x x x	x x x x	x x x x	x x x x	x x x x	x x x x
n-Butane	in Air in Helium in Nitrogen in Oxygen		x x x x	x x x x	x x x x	x x x x	x x x x	x x x x	x x x x
Carbon Dioxide	in Air in Argon in Helium in Hydrogen in Nitrogen in Oxygen		x x x x x x	x x x x x x	x x x x x x	x x x x x x	x x x x x x	x x x x x x	x x x x x x
Carbon Monoxide	in Air in Nitrogen		x x	x x	x x	x x	x x	x x	x x
Ethane	in Air in Nitrogen		x x	x x	x x	x x	x x	x x	x x
Ethylene	in Air in Nitrogen		x x	x x	x x	x x	x x	x x	x x
Helium	in Argon in Nitrogen		x x	x x	x x	x x	x x	x x	x x
Hexane	in Air in Nitrogen		x x	x x	x x	x x	x x	x x	x x
Hydrogen	in Argon in Helium in Nitrogen		x x x	x x x	x x x	x x x	x x x	x x x	x x x
Hydrogen Sulfide	in Air in Nitrogen						x x		x x
Isobutane	in Air in Nitrogen		x x	x x	x x	x x	x x	x x	x x
Methane	in Argon in Helium in Hydrogen		x x x	x x x	x x x	x x x	x x x	x x x	x x x
Nitrogen Dioxide	in Air in Nitrogen						x x		x x
Nitrous Oxide	in Nitrogen		x	x	x	x	x	x	x
Nitric Oxide	in Argon						x		x
Oxygen	in Argon in Helium in Nitrogen		x x x	x x x	x x x	x x x	x x x	x x x	x x x
n-Pentane	in Air in Nitrogen		x x	x x	x x	x x	x x	x x	x x
Propane	in Air in Nitrogen		x x	x x	x x	x x	x x	x x	x x
Propylene	in Air in Nitrogen		x x	x x	x x	x x	x x	x x	x x
Sulfur Dioxide	in Air in Nitrogen						x x		x x
Sulfur Hexafluoride	in Air		x	x	x	x	x	x	x

202 Series

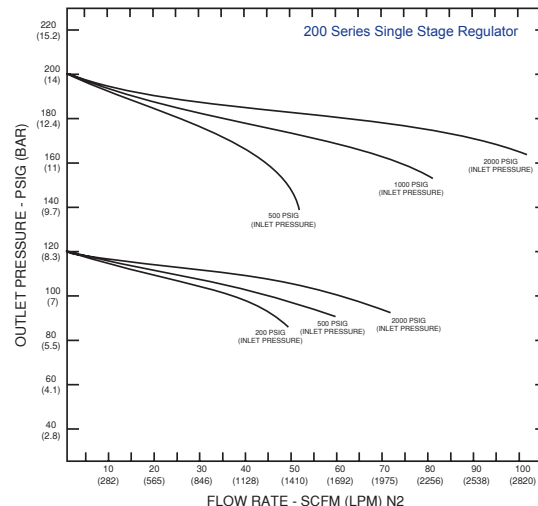
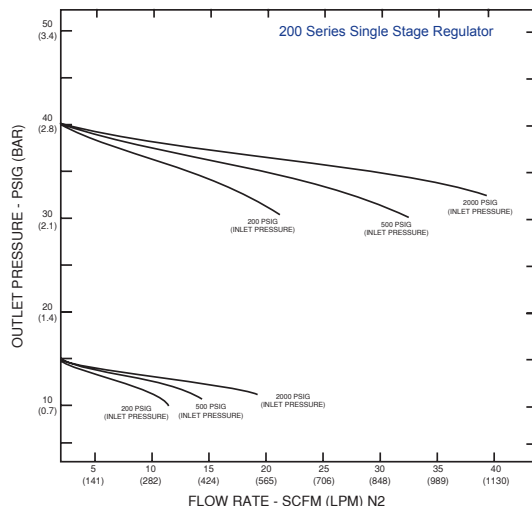
single stage, brass body regulator



Description	Advanced Features	Typical Applications
The 202 Series regulators are intended for primary pressure control of non-corrosive, high purity or liquefied gases (up to grade 4.5) in applications where minor fluctuations in outlet pressure due to diminishing inlet supply pressure can be tolerated.	• Chrome-plated forged brass body Economical high purity design • High flow capacity Supply multiple user locations • Pressure ranges 0-15 to 0-200 PSIG Broad range of applications	• Gas supply purging • Gas system charging • Fuel gas supply control • Calibration gas control • Atomic absorption acetylene

200 Series Advantage	Materials	Specifications
• Capsule® seat Increased serviceability and life • 316L stainless steel diaphragm No inboard diffusion • Forged body Durable, long-lasting construction • Field-adjustable pressure limit Safeguard downstream equipment • Large convoluted diaphragm Smooth pressure changes • Standard relief valve Diaphragm and gauge protection	Body Chrome-plated forged brass Bonnet Chrome-plated die cast zinc Seat PTFE PCTFE with 4500 PSIG inlet option Filter 10 micron sintered bronze Diaphragm 316L stainless steel Internal Seals PTFE	Maximum Inlet Pressure 3000 PSIG (210 BAR) 4500 PSIG (310 BAR) optional Temperature Range -40°F to 140°F (-40°C to 60°C) Gauges 2½" diameter chrome-plated brass Ports ¼" FPT Helium Leak Integrity 1 x 10⁻⁸ scc/sec Cv 0.2 Weight (202-3331-580) 3.8 lbs. (1.74 kg)

Flow Performance



4

Ordering Information and Configuration Options

202	A		B	C	D	-Inlet	Options
Series 202	Outlet Pressure	Outlet Gauge	Inlet Gauge	Outlet Assemblies	Assembly/ Gauges	Inlet Connections	Installed Options
	1: 0-15*	0-30 PSIG	0: None	0: 1/4" FPT Port	0: Bare Body	000: 1/4" FPT	A: Protocol Alarm Station (110V)
	2: 0-40	0-60 PSIG	3: 0-4000 PSIG	1: 1/4" MPT	1: Standard Assembly (PSIG/kPa Gauges)	TF2: 1/8" Tube	B: Protocol Alarm Station (220V)
	3: 0-120	0-200 PSIG	5: 0-1000 PSIG	2: 1/4" Tube Fitting	2: Standard Assembly (BAR/PSIG Gauges)	TF4: 1/4" Tube	C: Protocol Switchover Station
	4: 0-200	0-400 PSIG	6: 0-400 PSIG	3: Diaphragm Valve 1/4" Tube Fitting		TF6: 3/8" Tube	G: Protocol Switchover Station with Alarm (110V)
	5: 0-15*	0-30 PSIG with redline for acetylene use	9: 0-600 PSIG	4: Diaphragm Valve 1/4" MPT		M06: 6mm Tube	H: Protocol Switchover Station with Alarm (220V)
	*Not available with 4500 PSIG maximum inlet pressure			5: Needle Valve 1/4" MPT		CGA DIN 477 BS 341 and others available	M: Protocol Station
				6: 1/8" Tube Fitting			T: Tee Purge
				7: 3/8" Tube Fitting			
				8: Diaphragm Valve 1/8" Tube Fitting			
				9: Diaphragm Valve 1/4" FPT			
				A: 3/8" BSP Right Hand Fitting			
				B: Diaphragm Valve 3/8" Tube Fitting			
				M: 6mm Tube Fitting			
				S: Diaphragm Valve 6mm Tube Fitting			

212 Series

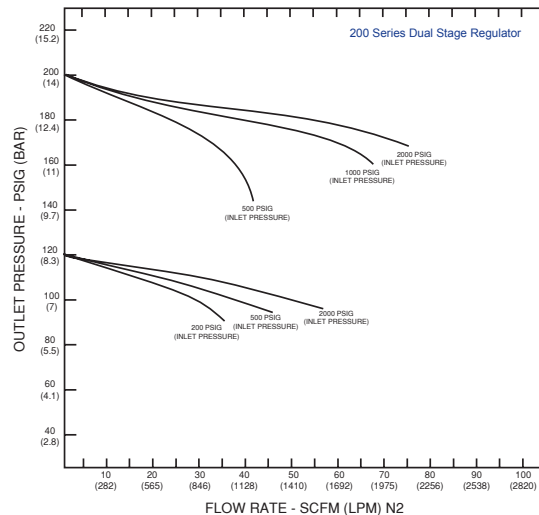
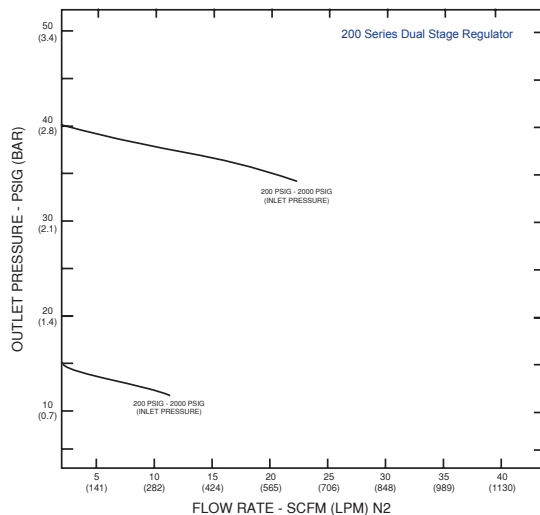
two stage, brass body regulator



Description	Advanced Features	Typical Applications
The 212 Series regulators are intended for primary pressure control of non-corrosive, high purity or liquefied gases (up to grade 4.5) for applications requiring constant pressure control and delivery regardless of supply pressure variations.	• Chrome-plated forged brass body Economical high purity design • High flow capacity Supply multiple user locations • Pressure ranges 0-15 to 0-200 PSIG Broad range of applications • 3000 PSIG inlet pressure rating Safe use with high pressure cylinders	• Gas supply purging • Gas system charging • Fuel gas supply control • Calibration gas control

200 Series Advantage	Materials	Specifications
• <i>Capsule® seat</i> Increased serviceability and life • <i>316L stainless steel diaphragm</i> No inboard diffusion • <i>Forged body</i> Durable, long-lasting construction • <i>Field-adjustable pressure limit</i> Safeguard downstream equipment • <i>Large convoluted diaphragm</i> Smooth pressure changes • <i>Standard relief valve</i> Diaphragm and gauge protection	<i>Body</i> Chrome-plated forged brass <i>Bonnet</i> Chrome-plated die cast zinc <i>Seat</i> PTFE PCTFE with 4500 PSIG inlet option <i>Filter</i> 10 micron sintered bronze <i>Diaphragm</i> 316L stainless steel <i>Internal Seals</i> PTFE	<i>Maximum Inlet Pressure</i> 3000 PSIG (210 BAR) 4500 PSIG (310 BAR) optional <i>Temperature Range</i> -40°F to 140°F (-40°C to 60°C) <i>Gauges</i> 2½" diameter chrome-plated brass <i>Ports</i> ¼" FPT <i>Helium Leak Integrity</i> 1 x 10⁻⁸ scc/sec <i>Cv</i> 0.28 <i>Weight (212-3331-580)</i> 5.1 lbs. (2.3 kg)

Flow Performance



4

Ordering Information and Configuration Options

212	A		B	C	D	-Inlet	Options
Series 212	Outlet Pressure	Outlet Gauge	Inlet Gauge	Outlet Assemblies	Assembly/ Gauges	Inlet Connections	Installed Options
	1: 0-15	0-30 PSIG	0: None	0: 1/4" FPT Port	0: Bare Body	000: 1/4" FPT	A: Protocol Alarm Station (110V)
	2: 0-40	0-60 PSIG	3: 0-4000 PSIG	1: 1/4" MPT	1: Standard Assembly (PSIG/kPa Gauges)	TF2: 1/8" Tube	B: Protocol Alarm Station (220V)
	3: 0-120	0-200 PSIG	5: 0-1000 PSIG	2: 1/4" Tube Fitting	2: Standard Assembly (BAR/PSIG Gauges)	TF4: 1/4" Tube	C: Protocol Switchover Station
	4: 0-200	0-400 PSIG	6: 0-400 PSIG PSIG*	3: Diaphragm Valve 1/4" Tube Fitting		TF6: 3/8" Tube	G: Protocol Switchover Station with Alarm (110V)
	5: 0-15	0-30 PSIG with redline for acetylene use	8: 0-6000 PSIG*	4: Diaphragm Valve 1/4" MPT		M06: 6mm Tube	H: Protocol Switchover Station with Alarm (220V)
			9: 0-600 PSIG	5: Needle Valve 1/4" MPT		CGA DIN 477 BS 341 and others available	M: Protocol Station
			Maximum inlet pressure 4500 PSIG (300 BAR) with PCTFE Seat Capsule	6: 1/8" Tube Fitting			T: Tee Purge
				7: 3/8" Tube Fitting			
				8: Diaphragm Valve 1/8" Tube Fitting			
				9: Diaphragm Valve 1/4" FPT			
				A: 3/8" BSP Right Hand Fitting			
				B: Diaphragm Valve 3/8" Tube Fitting			
				M: 6mm Tube Fitting			
				S: Diaphragm Valve 6mm Tube Fitting			

*Not available with 4500 PSIG max inlet pressure

302 Series

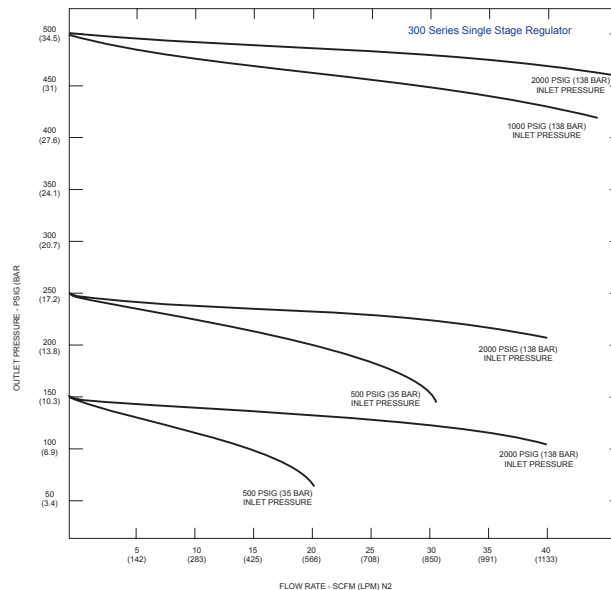
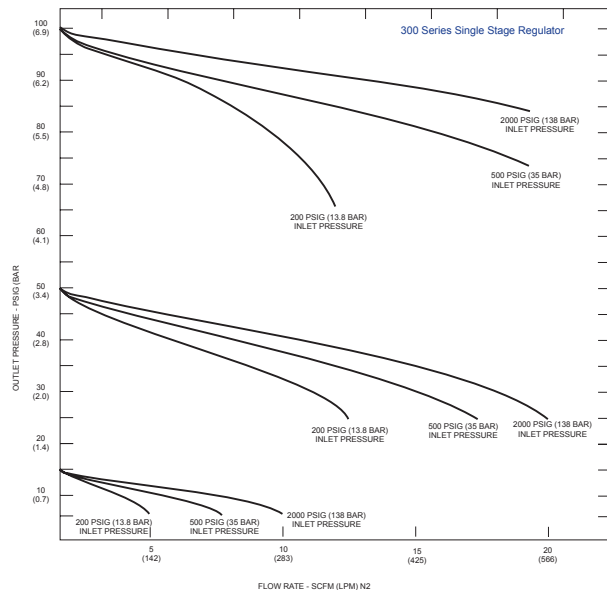
high purity, single stage, brass barstock regulator



Description	Advanced Features	Typical Applications
The 302 Series regulators are intended for primary pressure control of noncorrosive, high purity or liquefied gases or for applications where minor fluctuations in outlet pressure due to diminishing inlet supply can be tolerated.	• Chrome-plated brass barstock body Smooth surface finish • Rear panel mountable Easy installation • Pressure ranges 0-15 to 0-500 PSIG Broad range of applications	• Gas and liquid chromatography • High purity carrier gases • Zero, span and calibration gases • High purity chamber pressurization • Liquefied hydrocarbon gas control • Control of cryogenic gases

300 Series Advantage	Materials	Specifications
• <i>Capsule® seat</i> Increased serviceability and life • <i>316L stainless steel diaphragm</i> No inboard diffusion • <i>Low wetted surface area</i> Minimal purge requirements • <i>Field-adjustable pressure limit</i> Safeguard downstream equipment • <i>Convolute diaphragm</i> Smooth pressure changes • <i>Compact design</i> Easily transported and integrated	<i>Body</i> Chrome-plated brass barstock <i>Bonnet</i> Chrome-plated die cast zinc <i>Seat</i> PTFE PCTFE with 4500 PSIG inlet option <i>Filter</i> 10 micron sintered bronze <i>Diaphragm</i> 316L stainless steel <i>Internal Seals</i> PTFE	<i>Maximum Inlet Pressure</i> 3000 PSIG (210 BAR) 4500 PSIG (310 BAR) optional <i>Temperature Range</i> -40°F to 140°F (-40°C to 60°C) <i>Gauges</i> 2" diameter chrome-plated <i>Ports</i> 1/4" FPT <i>Helium Leak Integrity</i> 1 x 10⁻⁸ scc/sec <i>Cv</i> 0.1 <i>Weight (302-2331-580)</i> 3.1 lbs. (1.40 kg)

Flow Performance



4

Ordering Information and Configuration Options

302	A		B	C	D	-Inlet	Options
Series 302	Outlet Pressure	Outlet Gauge	Inlet Gauge	Outlet Assemblies	Assembly/ Gauges	Inlet Connections	Installed Options
	1: 0-15*	30"-0-30 PSIG	0: None	0: 1/4" FPT Port	0: Bare Body	000: 1/4" FPT	A: Protocol Alarm Station (110V)
	2: 0-50	30"-0-100 PSIG	3: 0-4000 PSIG	1: 1/4" MPT	1: Standard Assembly (PSIG/kPa Gauges)	TF2: 1/8" Tube	B: Protocol Alarm Station (220V)
	3: 0-100	30"-0-200 PSIG	5: 0-1000 PSIG	2: 1/4" Tube Fitting	2: Standard Assembly (BAR/PSIG Gauges)	TF4: 1/4" Tube	C: Protocol Switchover Station
	4: 0-250	0-400 PSIG	6: 0-300 PSIG	3: Diaphragm Valve 1/4" Tube Fitting		TF6: 3/8" Tube	G: Protocol Switchover Station with Alarm (110V)
	5: 0-500	0-1000 PSIG	7: 0-400 PSIG	4: Diaphragm Valve 1/4" MPT		M06: 6mm Tube	H: Protocol Switchover Station with Alarm (220V)
	7: 0-150	30"-0-200 PSIG	8: 0-6000 PSIG	5: Needle Valve 1/4" MPT		CGA	M: Protocol Station
				6: 1/8" Tube Fitting		DIN 477	T: Tee Purge*
				7: 3/8" Tube Fitting		BS 341	
				8: Diaphragm Valve 1/8" Tube Fitting		and others available	
				9: Diaphragm Valve 1/4" FPT			
				A: 3/8" BSP Right Hand Fitting			
				M: 6mm Tube Fitting			
				S: Diaphragm Valve 6mm Tube Fitting			
	*Not available with 4500 PSIG maximum inlet pressure						*Not available with 4500 PSIG max inlet pressure

312 Series

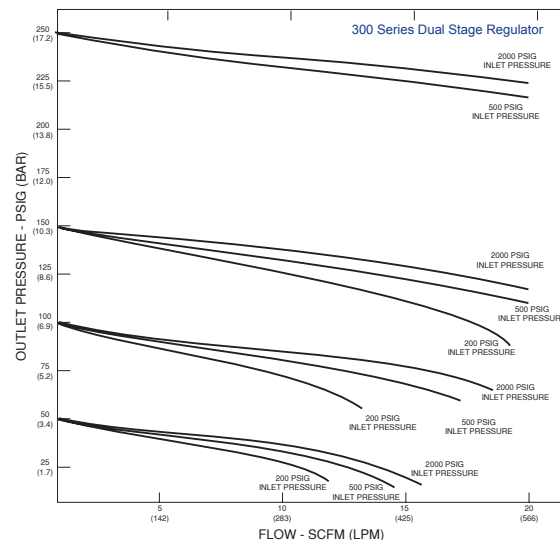
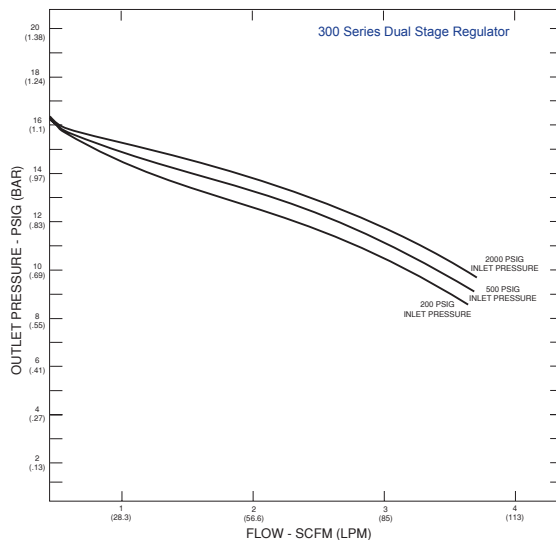
high purity, two stage, brass barstock regulator



Description	Advanced Features	Typical Applications
The 312 Series regulators are intended for primary pressure control of noncorrosive, high purity or liquefied gases for applications requiring constant pressure control and delivery regardless of supply pressure variations.	• Chrome-plated brass barstock body Smooth surface finish • 10 micron filtration in both stages Fail-safe seat performance • Pressure ranges 0-15 to 0-250 PSIG Broad range of applications	• EPA Protocol gases • Gas and liquid chromatography • High purity carrier gases • Zero, span, and calibration gases • High purity chamber pressurization

300 Series Advantage	Materials	Specifications
• <i>Capsule® seat</i> Increased serviceability and life • <i>316L stainless steel diaphragm</i> No inboard diffusion • <i>Low wetted surface area</i> Minimal purge requirements • <i>Field-adjustable pressure limit</i> Safeguard downstream equipment • <i>Convolute diaphragm</i> Smooth pressure changes • <i>Compact design</i> Easily transported and integrated	<i>Body</i> Chrome-plated brass barstock <i>Bonnet</i> Chrome-plated die cast zinc <i>Seat</i> PTFE PCTFE with 4500 PSIG inlet option <i>Filter</i> 10 micron sintered bronze <i>Diaphragm</i> 316L stainless steel <i>Internal Seals</i> PTFE	<i>Maximum Inlet Pressure</i> 3000 PSIG (210 BAR) 4500 PSIG (310 BAR) optional <i>Temperature Range</i> -40°F to 140°F (-40°C to 60°C) <i>Gauges</i> 2" diameter chrome-plated <i>Ports</i> 1/4" FPT <i>Helium Leak Integrity</i> 1 x 10⁻⁸ scc/sec <i>Cv</i> 0.1 <i>Weight (312-2331-58)</i> 4.4 lbs. (1.98 kg)

Flow Performance



4

Ordering Information and Configuration Options

312	A		B	C	D	-Inlet	Options
Series 312	Outlet Pressure	Outlet Gauge	Inlet Gauge	Outlet Assemblies	Assembly/ Gauges	Inlet Connections	Installed Options
	1: 0-15	30"-0-30 PSIG	0: None	0: 1/4" FPT Port	0: Bare Body	000: 1/4" FPT	A: Protocol Alarm Station (110V)
	2: 0-50	30"-0-100 PSIG	3: 0-4000 PSIG	1: 1/4" MPT	1: Standard Assembly (PSIG/kPa Gauges)	TF2: 1/8" Tube	B: Protocol Alarm Station (220V)
	3: 0-100	30"-0-200 PSIG	5: 0-1000 PSIG	2: 1/4" Tube Fitting	2: Standard Assembly (BAR/PSIG Gauges)	TF4: 1/4" Tube	C: Protocol Switchover Station
	4: 0-250	0-400 PSIG	6: 0-300 PSIG	3: Diaphragm Valve 1/4" Tube Fitting		TF6: 3/8" Tube	G: Protocol Switchover Station with Alarm (110V)
	7: 0-150	30"-0-200 PSIG	7: 0-400 PSIG	4: Diaphragm Valve 1/4" MPT		M06: 6mm Tube	H: Protocol Switchover Station with Alarm (220V)
			8: 0-6000 PSIG	5: Needle Valve 1/4" MPT		CGA	M: Protocol Station
				6: 1/8" Tube Fitting		DIN 477	T: Tee Purge*
				7: 3/8" Tube Fitting		BS 341	
				8: Diaphragm Valve 1/8" Tube Fitting		and others available	
				9: Diaphragm Valve 1/4" FPT			
				A: 3/8" BSP Right Hand Fitting			
				M: 6mm Tube Fitting			
				S: Diaphragm Valve 6mm Tube Fitting			

*Not available with 4500 PSIG max inlet pressure

422 Series

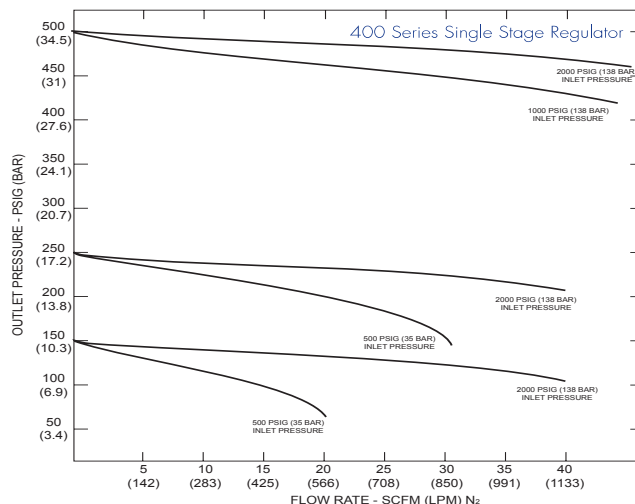
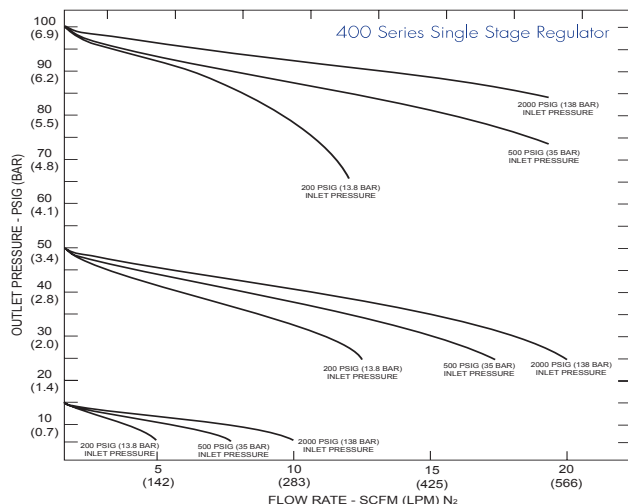
high purity, single stage, stainless steel barstock regulator



Description	Advanced Features	Typical Applications
The 422 Series regulators are intended for primary pressure control of ultra high purity and corrosive gases in applications where minor fluctuations in outlet pressure due to diminishing inlet supply can be tolerated.	• 316L stainless steel barstock body Increased corrosion resistance • Front and rear panel mountable Versatile system configuration • Pressure ranges 0-15 to 0-500 PSIG Broad range of applications	• Gas and liquid chromatography • Ultra high purity carrier gases • Zero, span and calibration gases • High purity chamber pressurization • Liquefied hydrocarbon gas control • Control of cryogenic gases • Corrosive gases

400 Series Advantage	Materials	Specifications
• <i>Metal-to-metal diaphragm seal</i> No possibility of gas contamination • <i>Capsule® seat</i> Increased serviceability and life • <i>316L stainless steel diaphragm</i> No inboard diffusion • <i>Orientable captured vent capable</i> Safety in any installation • <i>Low wetted surface area</i> Minimal purge requirements • <i>Field-adjustable pressure limit</i> Safeguard downstream equipment • <i>Pipe away relief valve</i> Safely vent exhaust gases • <i>Delivery pressure range easily changed</i> Maximum flexibility	<i>Body</i> 316L stainless steel barstock <i>Bonnet</i> Chrome-plated brass barstock <i>Seat</i> PTFE PCTFE with 4500 PSIG inlet option <i>Filter</i> 10 micron stainless steel multi-layer mesh <i>Diaphragm</i> 316L stainless steel <i>Internal Seals</i> PTFE	<i>Maximum Inlet Pressure</i> 3000 PSIG (210 BAR) 4500 PSIG (310 BAR) optional <i>Temperature Range</i> -40°F to 140°F (-40°C to 60°C) <i>Gauges</i> 2" diameter stainless steel <i>Ports</i> 1/4" FPT <i>Helium Leak Integrity</i> 1 x 10⁻⁹ scc/sec <i>Cv</i> 0.1 <i>Weight (422-2331-580)</i> 3.8 lbs. (1.73 kg)

Flow Performance



4

Ordering Information and Configuration Options

422	A		B	C	D	-Inlet	Options
Series 422	Outlet Pressure	Outlet Gauge	Inlet Gauge	Outlet Assemblies	Assembly/ Gauges	Inlet Connections	Installed Options
	1: 0-15*	30"-0-30 PSIG	0: None	0: 1/4" FPT Port	0: Bare Body	000: 1/4" FPT	A: Protocol Alarm Station (110V)
	2: 0-50	30"-0-100 PSIG	3: 0-4000 PSIG	1: 1/4" MPT	1: Standard Assembly (PSIG/kPa Gauges)	TF2: 1/8" Tube	B: Protocol Alarm Station (220V)
	3: 0-100	30"-0-200 PSIG	5: 0-1000 PSIG	2: 1/4" Tube Fitting	2: Standard Assembly (BAR/PSIG Gauges)	TF4: 1/4" Tube	C: Protocol Switchover Station
	4: 0-250	0-400 PSIG	6: 0-300 PSIG	3: Diaphragm Valve 1/4" Tube Fitting	4: Cleanroom Assembly (PSIG/kPa Gauges)	TF6: 3/8" Tube	D: Deep Purge
	5: 0-500	0-1000 PSIG	7: 0-400 PSIG	4: Diaphragm Valve 1/4" MPT	5: Cleanroom Assembly (BAR/PSIG Gauges)	M06: 6mm Tube	G: Protocol Switchover Station with Alarm (110V)
	7: 0-150	30"-0-200 PSIG	8: 0-6000 PSIG*	5: Needle Valve 1/4" MPT		CGA DIN 477 BS 341 and others available	H: Protocol Switchover Station with Alarm (220V)
	*Not available with 4500 PSIG maximum inlet pressure		*Maximum inlet pressure 4500 PSIG (310 BAR) with PCTFE Seat Capsule	6: 1/8" Tube Fitting			M: Protocol Station
				7: 3/8" Tube Fitting			
				8: Diaphragm Valve 1/8" Tube Fitting			
				9: Diaphragm Valve 1/4" FPT			
				M: 6mm Tube Fitting			
				S: Diaphragm Valve 6mm Tube Fitting			
Related Options			- Panel Mount Kit (550-0002) - Helium Leak Certification (476-0002) - Captured Vent Kit (550-0001) - Passivation for Fluorine Service				

432 Series

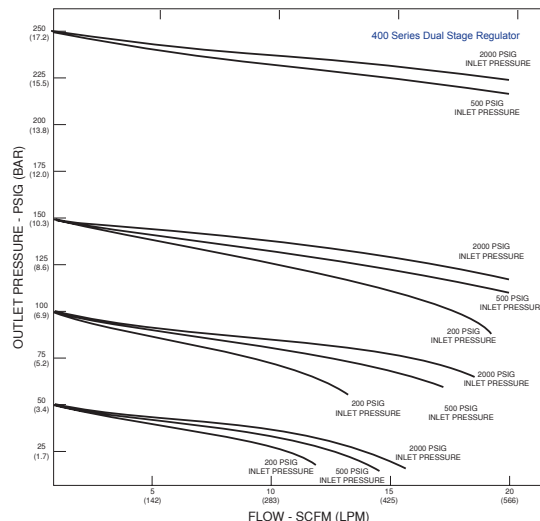
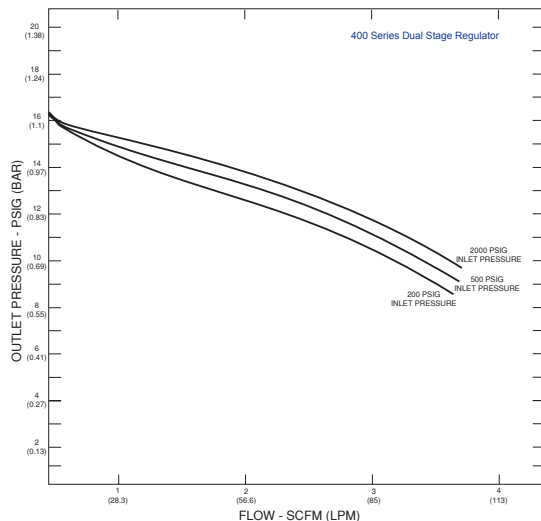
high purity, two stage, stainless steel barstock regulator



Description	Advanced Features	Typical Applications
The 432 Series regulators are intended for primary pressure control of ultra high purity or corrosive gases for applications requiring constant pressure control and delivery regardless of supply pressure variations.	• 316L stainless steel barstock body Increased corrosion resistance • Front panel mountable Easy installation • 10 micron filtration in both stages Fail-safe seat performance • Pressure ranges 0-15 to 0-250 PSIG Broad range of applications	• EPA protocol gases • Gas and liquid chromatography • High purity carrier gases • Zero, span and calibration gases • High purity chamber pressurization • Corrosive gases

400 Series Advantage	Materials	Specifications
• <i>Metal-to-metal diaphragm seal</i> No possibility of gas contamination • <i>Capsule® seat</i> Increased serviceability and life • <i>316L stainless steel diaphragm</i> No inboard diffusion • <i>Orientable captured vent capable</i> Safety in any installation • <i>Low wetted surface area</i> Minimal purge requirements • <i>Field-adjustable pressure limit</i> Safeguard downstream equipment • <i>Pipe away relief valve</i> Safely vent exhaust gases • <i>Delivery pressure range easily changed</i> Maximum flexibility	<i>Body</i> 316L stainless steel barstock <i>Bonnet</i> Chrome-plated brass barstock <i>Seat</i> PTFE PCTFE with 4500 PSIG inlet option <i>Filter</i> 10 micron stainless steel multi-layer mesh <i>Diaphragm</i> 316L stainless steel <i>Internal Seals</i> PTFE	<i>Maximum Inlet Pressure</i> 3000 PSIG (210 BAR) 4500 PSIG (310 BAR) optional <i>Temperature Range</i> -40°F to 140°F (-40°C to 60°C) <i>Gauges</i> 2" diameter stainless steel <i>Ports</i> ¼" FPT <i>Helium Leak Integrity</i> 1 x 10⁻⁹ scc/sec <i>Cv</i> 0.1 <i>Weight (432-2021-580)</i> 5.09 lbs. (2.31 kg)

Flow Performance



4

Ordering Information and Configuration Options

432	A		B	C	D	-Inlet	Options
Series 432	Outlet Pressure	Outlet Gauge	Inlet Gauge	Outlet Assemblies	Assembly/ Gauges	Inlet Connections	Installed Options
	1: 0-15	30"-0-30 PSIG	0: None	0: 1/4" FPT Port	0: Bare Body	000: 1/4" FPT	A: Protocol Alarm Station (110V)
	2: 0-50	30"-0-100 PSIG	3: 0-4000 PSIG	1: 1/4" MPT	1: Standard Assembly (PSIG/kPa Gauges)	TF2: 1/8" Tube	B: Protocol Alarm Station (220V)
	3: 0-100	30"-0-200 PSIG	5: 0-1000 PSIG	2: 1/4" Tube Fitting	2: Standard Assembly (BAR/PSIG Gauges)	TF4: 1/4" Tube	C: Protocol Switchover Station
	4: 0-250	0-400 PSIG	6: 0-300 PSIG	3: Diaphragm Valve 1/4" Tube Fitting	4: Cleanroom Assembly (PSIG/kPa Gauges)	TF6: 3/8" Tube	D: Deep Purge
	7: 0-150	30"-0-200 PSIG	7: 0-400 PSIG	4: Diaphragm Valve 1/4" MPT	5: Cleanroom Assembly (BAR/PSIG Gauges)	M06: 6mm Tube	G: Protocol Switchover Station with Alarm (110V)
			8: 0-6000 PSIG*	5: Needle Valve 1/4" MPT		CGA	H: Protocol Switchover Station with Alarm (220V)
			*Maximum inlet pressure 4500 PSIG (310 BAR) with PCTFE Seat Capsule	6: 1/8" Tube Fitting		DIN 477	M: Protocol Station
				7: 3/8" Tube Fitting		BS 341	
				8: Diaphragm Valve 1/8" Tube Fitting		and others available	
				9: Diaphragm Valve 1/4" FPT			
				M: 6mm Tube Fitting			
				S: Diaphragm Valve 6mm Tube Fitting			
Related Options			- Panel Mount Kit (550-0002) - Captured Vent Kit (550-0001) - Helium Leak Certification (476-0002) - Passivation for Fluorine Service				

408 Series

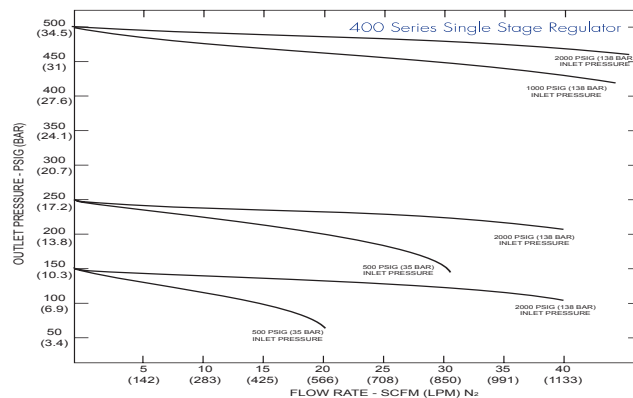
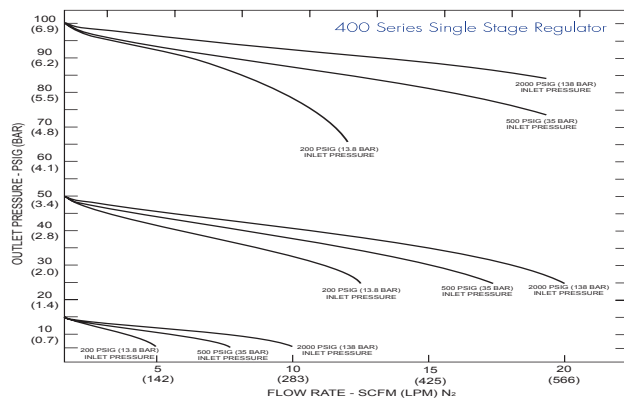
single stage, aluminum barstock regulator



Description	Advanced Features	Typical Applications
The 408 Series regulators are intended for primary pressure control of mildly corrosive high purity gases such as ammonia, hydrogen sulfide and sulfur dioxide or for applications requiring the light weight of an aluminum body regulator.	<i>Anodized aluminum body</i> Cost-effective corrosion resistance - Front and rear panel mountable Versatile system configuration - Pressure ranges 0-15 to 0-500 PSIG Broad range of applications	- Semi-corrosive gases and mixtures - Gas and liquid chromatography - High purity carrier gases - Zero, span and calibration gases - High purity chamber pressurization - Mildly corrosive gases

400 Series Advantage	Materials	Specifications
<i>Metal-to-metal diaphragm seal</i> No possibility of gas contamination <i>Capsule® seat</i> Increased serviceability and life <i>316L stainless steel diaphragm</i> No inboard diffusion <i>Orientable captured vent capable</i> Safety in any installation <i>Low wetted surface area</i> Minimal purge requirements <i>Field-adjustable pressure limit</i> Safeguard downstream equipment <i>Pipe away relief valve</i> Safely vent exhaust gases <i>Delivery pressure range easily changed</i> Maximum flexibility	<i>Body</i> Anodized aluminum barstock <i>Bonnet</i> Anodized aluminum barstock <i>Seat</i> PTFE <i>Filter</i> 10 micron stainless steel multi-layer mesh <i>Diaphragm</i> 316L stainless steel <i>Internal Seals</i> PTFE	<i>Maximum Inlet Pressure</i> 3000 PSIG (210 BAR) <i>Temperature Range</i> -40°F to 140°F (-40°C to 60°C) <i>Gauges</i> 2" diameter stainless steel <i>Ports</i> ¼" FPT <i>Helium Leak Integrity</i> 1 x 10⁻⁹ scc/sec <i>Cv</i> 0.1 <i>Weight (408-2331-660)</i> 2.7 lbs. (1.24 kg)

Flow Performance



4

Ordering Information and Configuration Options

408	A	B	C	D	-Inlet
Series 408	Outlet Pressure Outlet Gauge 1: 0-15 2: 0-50 3: 0-100 4: 0-250 5: 0-500 7: 0-150 30"-0-30 PSIG 30"-0-100 PSIG 30"-0-200 PSIG 0-400 PSIG 0-1000 PSIG 30"-0-200 PSIG	Inlet Gauge 0: None 3: 0-4000 PSIG 5: 0-1000 PSIG 6: 0-300 PSIG 7: 0-400 PSIG	Outlet Assemblies 0: 1/4" FPT Port 1: 1/4" MPT 2: 1/4" Tube Fitting 3: Diaphragm Valve 1/4" Tube Fitting 4: Diaphragm Valve 1/4" MPT 5: Needle Valve 1/4" MPT 6: 1/8" Tube Fitting 7: 3/8" Tube Fitting 8: Diaphragm Valve 1/8" Tube Fitting 9: Diaphragm Valve 1/4" FPT M: 6mm Tube Fitting S: Diaphragm Valve 6mm Tube Fitting	Assembly/Gauges 0: Bare Body 1: Standard Assembly (PSIG/kPa Gauges) 2: Standard Assembly (BAR/PSIG Gauges) 4: Cleanroom Assembly (PSIG/kPa Gauges) 5: Cleanroom Assembly (BAR/PSIG Gauges)	Connections 000: 1/4" FPT TF2: 1/8" Tube TF4: 1/4" Tube TF6: 3/8" Tube CGA DIN 477 BS 341 and others available

Related Options

Option	Order No.	Description
Panel Mount Kit	550-0002	To mount the regulator using bonnet threads. Material: Nickel-plated brass
Captured Vent Kit	550-0001	360° orientation for easy piping of vented gases to a safe location in the event of diaphragm failure. Material: Nickel-plated brass
Helium Leak Certification	476-0002	Inboard Helium leak certification to less than 1 x 10 ⁻⁸ cc/sec
Protocol Station	Add letter "M" after inlet	Convenient regulator wall mount, including tee, bracket, and flexible stainless steel pigtail with check valve in the inlet gland
Deep Purge	Add letter "D" after inlet	Installed on the inlet of the regulator to assure complete purging of the cylinder connection and regulator body. (Please see page 117 for more information about purges.)

304 Series

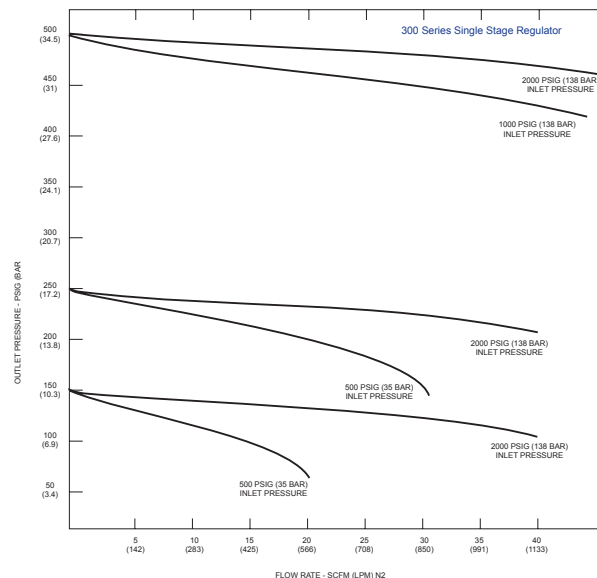
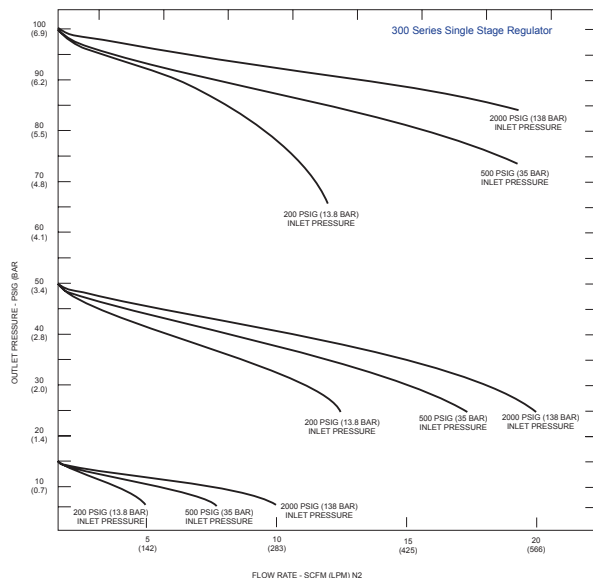
single stage, brass barstock line regulator



Description	Advanced Features	Typical Applications
The 304 Series regulators are intended for secondary pressure control of non-corrosive, high purity or liquefied gases or as point of use pressure control in high purity gas distribution systems.	• Chrome-plated brass barstock body Smooth surface finish • Rear panel mountable Easy installation • Pressure ranges 0-15 to 0-500 PSIG Broad range of applications • 3000 PSIG inlet pressure rating Safe use with high pressure cylinders	• Bulk gas distribution systems • Gas and liquid chromatography • High purity carrier gases • Zero, span, and calibration gases • High purity chamber pressurization • Liquefied hydrocarbon gas control • Control of cryogenic gases

300 Series Advantage	Materials	Specifications
• <i>Capsule® seat</i> Increased serviceability and life • <i>316L stainless steel diaphragm</i> No inboard diffusion • <i>Low wetted surface area</i> Minimal purge requirements • <i>Field-adjustable pressure limit</i> Safeguard downstream equipment • <i>Convolute diaphragm</i> Smooth pressure changes • <i>Compact design</i> Easily transported and integrated	<i>Body</i> Chrome-plated brass barstock <i>Bonnet</i> Chrome-plated die cast zinc <i>Seat</i> PTFE <i>Filter</i> 10 micron sintered bronze <i>Diaphragm</i> 316L stainless steel <i>Internal Seals</i> PTFE	<i>Maximum Inlet Pressure</i> 3000 PSIG (210 BAR) <i>Temperature Range</i> -40°F to 140°F (-40°C to 60°C) <i>Gauges</i> 2" diameter chrome-plated <i>Ports</i> 1/4" FPT <i>Helium Leak Integrity</i> 1 x 10⁻⁹ scc/sec <i>Cv</i> 0.1 (Max outlet 50 PSIG or below) 0.2 (Max outlet about 50 PSIG) <i>Weight (304-2021-TF4)</i> 1.7 lbs. (0.78 kg)

Flow Performance



4

Ordering Information and Configuration Options

304	A		B	C	D	-Inlet	Options
Series 304	Outlet Pressure	Outlet Gauge	Inlet Gauge	Outlet Assemblies	Assembly/ Gauges	Inlet Connections	Installed Options
	1: 0-15	30"-0-30 PSIG	0: None	0: 1/4" FPT Port	0: Bare Body	000: 1/4" FPT	None
	2: 0-50	30"-0-100 PSIG		1: 1/4" MPT	1: Standard Assembly (PSIG/kPa Gauges)	TF2: 1/8" Tube	
	3: 0-100	30"-0-200 PSIG		2: 1/4" Tube Fitting	2: Standard Assembly (BAR/PSIG Gauges)	TF4: 1/4" Tube	
	4: 0-250	0-400 PSIG		3: Diaphragm Valve 1/4" Tube Fitting		TF6: 3/8" Tube	
	5: 0-500	0-1000 PSIG		4: Diaphragm Valve 1/4" MPT		M06: 6mm Tube	
	7: 0-150	30"-0-200 PSIG		5: Needle Valve 1/4" MPT			
				6: 1/8" Tube Fitting			
				7: 3/8" Tube Fitting			
				8: Diaphragm Valve 1/8" Tube Fitting			
				9: Diaphragm Valve 1/4" FPT			
				A: 3/8" BSP Right Hand Fitting			
				M: 6mm Tube Fitting			
				S: Diaphragm Valve 6mm Tube Fitting			

445 Series

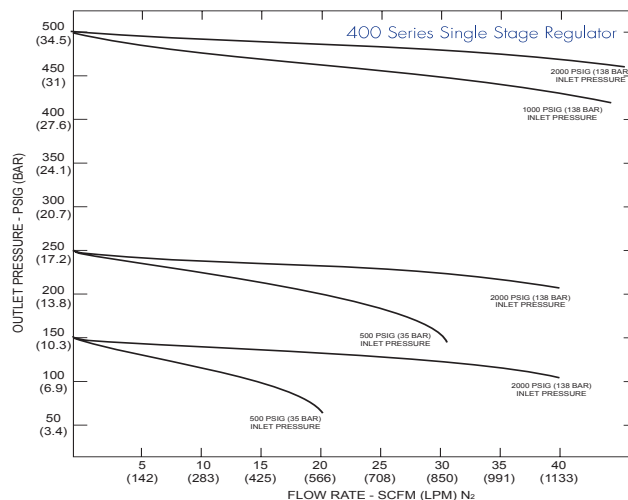
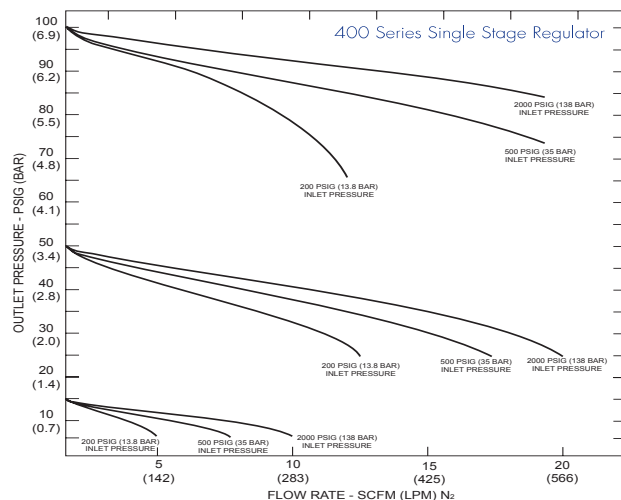
single stage, stainless steel barstock line regulator



Description	Advanced Features	Typical Applications
The 445 Series regulators are intended for secondary pressure control of ultra high purity and corrosive gases or as point-of-use pressure control in high purity gas distribution systems.	- Stainless steel barstock body Smooth surface finish - Front and rear panel mountable Versatile system configuration - Pressure ranges 0-15 to 0-500 PSIG Broad range of applications 3000 PSIG inlet pressure rating Safe use with high pressure cylinders	- Bulk gas distribution systems - Gas and liquid chromatography - High purity carrier gases - Zero, span and calibration gases - High purity chamber pressurization - Liquefied hydrocarbon gas control - Control of cryogenic gases - Corrosive service

400 Series Advantage	Materials	Specifications
Metal-to-metal diaphragm seal No possibility of gas contamination Capsule® seat Increased serviceability and life 316L stainless steel diaphragm No inboard diffusion Orientable captured vent capable Safety in any installation Low wetted surface area Minimal purge requirements Field-adjustable pressure limit Safeguard downstream equipment Pipe away relief valve Safely vent exhaust gases Delivery pressure range easily changed Maximum flexibility	Body 316L stainless steel barstock Bonnet Chrome-plated brass barstock Seat PTFE Filter 10 micron stainless steel multi-layer mesh Diaphragm 316L stainless steel Internal Seals PTFE	Maximum Inlet Pressure 3000 PSIG (210 BAR) Temperature Range -40°F to 140°F (-40°C to 60°C) Gauge 2" diameter stainless steel Ports 1/4" FPT Helium Leak Integrity 1 x 10⁻⁹ scc/sec Cv 0.1 (Max outlet 50 PSIG or below) 0.2 (Max outlet above 50 PSIG) Weight (445-2021-TF4) 2.57 lbs. (1.17 kg)

Flow Performance



4

Ordering Information and Configuration Options

445	A		B	C	D	-Inlet	Options
Series 445	Outlet Pressure	Outlet Gauge	Inlet Gauge	Outlet Assemblies	Assembly/ Gauges	Inlet Connections	Installed Options
	1: 0-15	30"-0-30 PSIG	0: None	0: 1/4" FPT Port	0: Bare Body	000: 1/4" FPT	S: Stainless Steel Bonnet
	2: 0-50	30"-0-100 PSIG		1: 1/4" MPT	1: Standard Assembly (PSIG/kPa Gauge)	TF2: 1/8" Tube	
	3: 0-100	30"-0-200 PSIG		2: 1/4" Tube Fitting	2: Standard Assembly (BAR/PSIG Gauge)	TF4: 1/4" Tube	
	4: 0-250	0-400 PSIG		3: Diaphragm Valve 1/4" Tube Fitting	4: Cleanroom Assembly (PSIG/kPa Gauge)	TF6: 3/8" Tube	
	5: 0-500	0-1000 PSIG		4: Diaphragm Valve 1/4" MPT	5: Cleanroom Assembly (BAR/PSIG Gauge)	M06: 6mm Tube	
	7: 0-150	30"-0-200 PSIG		5: Needle Valve 1/4" MPT			
				6: 1/8" Tube Fitting			
				7: 3/8" Tube Fitting			
				8: Diaphragm Valve 1/8" Tube Fitting			
				9: Diaphragm Valve 1/4" FPT			
				M: 6mm Tube Fitting			
				S: Diaphragm Valve 6mm Tube Fitting			
Related Options			- Panel Mount Kit (550-0002) - Captured Vent Kit (550-0001) - Helium Leak Certification (476-0002) - Passivation for Fluorine Service				

483 Series

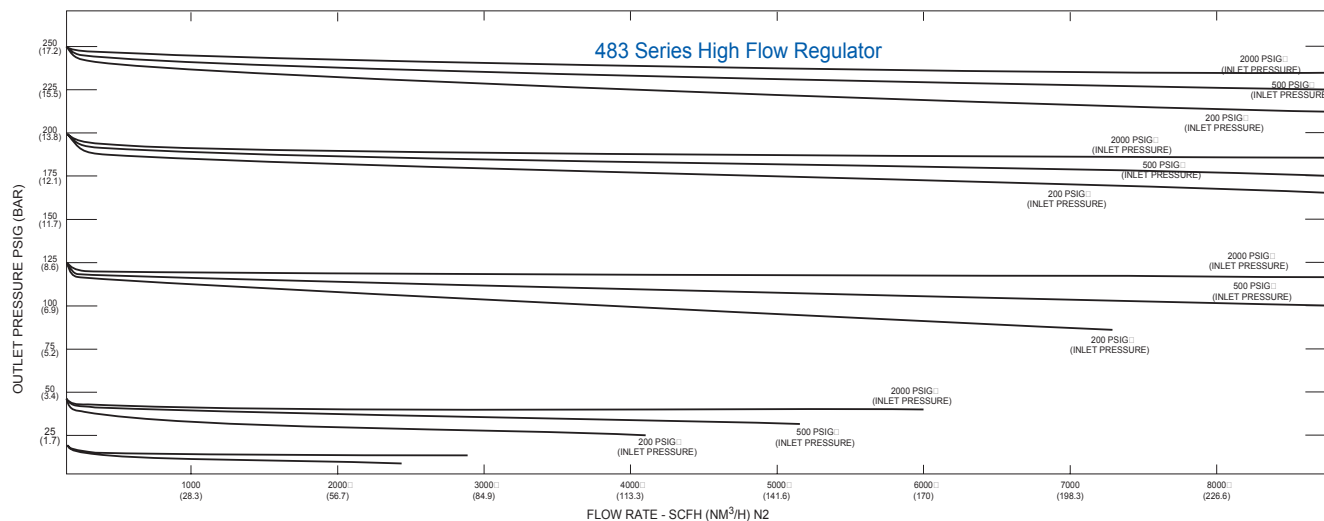
high flow, single stage, brass barstock line regulator



Description	Advanced Features	Typical Applications
The 483 Series regulator applications are wide and varied including high flow purging, semiconductor manufacturing, manifold and line regulation.	• Ultra High Flow • Bulk gas distribution systems • Gas and liquid chromatography • High purity carrier gases • Zero, span, and calibration gases • High purity chamber pressurization • Liquefied hydrocarbon gas control	• Brass barstock body Smooth surface finish • Rear panel mountable Versatile system configuration • Pressure ranges 0-15 to 0-250 PSIG Broad range of applications • 3000 PSIG inlet pressure rating Safe use with high pressure cylinders

400 Series Advantage	Materials	Specifications
• <i>Metal-to-metal diaphragm seal</i> No possibility of gas contamination • <i>Capsule® seat</i> Increased serviceability and life • <i>316L stainless steel diaphragm</i> No inboard diffusion • <i>Orientable captured vent capable</i> Safety in any installation • <i>Low wetted surface area</i> Minimal purge requirements • <i>Field-adjustable pressure limit</i> Safeguard downstream equipment • <i>Pipe away relief valve</i> Safely vent exhaust gases • <i>Delivery pressure range easily changed</i> Maximum flexibility	<i>Body</i> Brass barstock <i>Bonnet</i> Chrome-plated die cast zinc <i>Seat</i> PTFE <i>Filter</i> 40 micron 316L stainless steel <i>Diaphragm</i> 316L stainless steel <i>Internal Seals</i> PTFE	<i>Maximum Inlet Pressure</i> 3000 PSIG (210 BAR) <i>Temperature Range</i> -40°F to 140°F (-40°C to 60°C) <i>Gauge</i> 2" diameter brass <i>Ports</i> ½" FPT (inlet/outlet) ¼" FPT (gauge/relief valve) <i>Helium Leak Integrity</i> 1 x 10⁻⁸ scc/sec <i>Cv</i> 1.0 <i>Weight (483-3001-TF8)</i> 4.79 lbs. (2.17 kg)

Flow Performance



Ordering Information and Configuration Options

483	A		B	C	D	-Inlet	Options
Series 483	Outlet Pressure	Outlet Gauge	Inlet Gauge	Outlet Assemblies	Assembly/ Gauges	Inlet Connections	Installed Options
	1: 0-15	0-30 PSIG	0: None	0: ½" FPT Port	0: Bare Body	000: ½" FPT	None
	2: 0-40	0-60 PSIG		1: ½" Tube Fitting	1: Standard Assembly (PSIG/kPa Gauges)	TF8: ½" Tube	
	3: 0-120	0-200 PSIG		P: 12mm Tube Fitting	2: Standard Assembly (BAR/PSIG Gauges)	M12: 12mm Tube	
	4: 0-200	0-400 PSIG			6: Mirror Image Assembly (PSIG/kPa Gauges)		
	5: 0-250	0-400 PSIG			7: Mirror Image Assembly (BAR/PSIG Gauges)		
Related Options			None				

484 Series

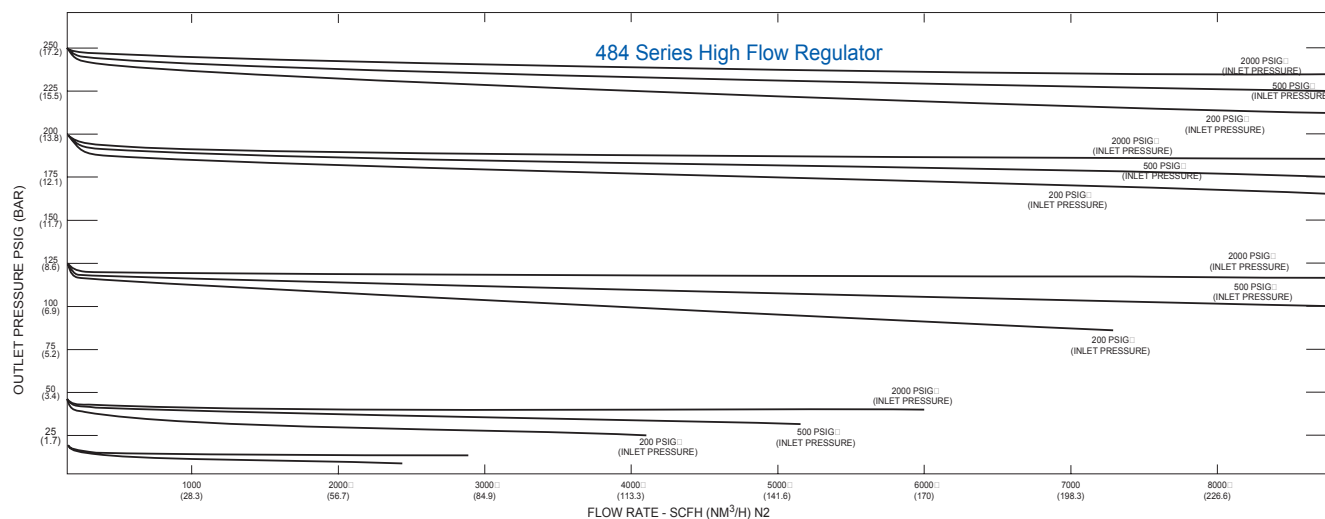
high flow, single stage, stainless steel barstock line regulator



Description	Advanced Features	Typical Applications
The 484 Series regulator applications are wide and varied including high flow purging, semiconductor manufacturing, manifold and line regulation.	• Ultra High Flow • Bulk gas distribution systems • Gas and liquid chromatography • High purity carrier gases • Zero, span, and calibration gases • High purity chamber pressurization • Liquefied hydrocarbon gas control	• 316L stainless steel barstock body Smooth surface finish • Rear panel mountable Versatile system configuration • Pressure ranges 0-15 to 0-250 PSIG Broad range of applications • 3000 PSIG inlet pressure rating Safe use with high pressure cylinders

400 Series Advantage	Materials	Specifications
• <i>Metal-to-metal diaphragm seal</i> No possibility of gas contamination • <i>Capsule® seat</i> Increased serviceability and life • <i>316L stainless steel diaphragm</i> No inboard diffusion • <i>Orientable captured vent capable</i> Safety in any installation • <i>Low wetted surface area</i> Minimal purge requirements • <i>Field-adjustable pressure limit</i> Safeguard downstream equipment • <i>Pipe away relief valve</i> Safely vent exhaust gases • <i>Delivery pressure range easily changed</i> Maximum flexibility	<i>Body</i> 316L stainless steel barstock <i>Bonnet</i> Chrome-plated die cast zinc <i>Seat</i> PCTFE <i>Filter</i> 40 micron 316L stainless steel <i>Diaphragm</i> 316L stainless steel <i>Internal Seals</i> PTFE	<i>Maximum Inlet Pressure</i> 3000 PSIG (210 BAR) <i>Temperature Range</i> -40°F to 140°F (-40°C to 60°C) <i>Gauge</i> 2" diameter stainless steel <i>Ports</i> ½" FPT (inlet/outlet) ¼" FPT (gauge/relief valve) <i>Helium Leak Integrity</i> 1 x 10⁻⁸ scc/sec <i>Cv</i> 1.0 <i>Weight (484-3011-TF8)</i> 4.52 lbs. (2.05 kg)

Flow Performance



Ordering Information and Configuration Options

484	A		B	C	D	-Inlet	Options
Series 484	Outlet Pressure	Outlet Gauge	Inlet Gauge	Outlet Assemblies	Assembly/ Gauges	Inlet Connections	Installed Options
	1: 0-15	0-30 PSIG	0: None	0: ½" FPT Port	0: Bare Body	000: ½" FPT	None
	2: 0-40	0-60 PSIG		1: ½" Tube Fitting	1: Standard Assembly (PSIG/kPa Gauges)	TF8: ½" Tube	
	3: 0-120	0-200 PSIG		P: 12mm Tube Fitting	2: Standard Assembly (BAR/PSIG Gauges)	M12: 12mm Tube	
	4: 0-200	0-400 PSIG					
	5: 0-250	0-400 PSIG					
Related Options			None				

308 Series

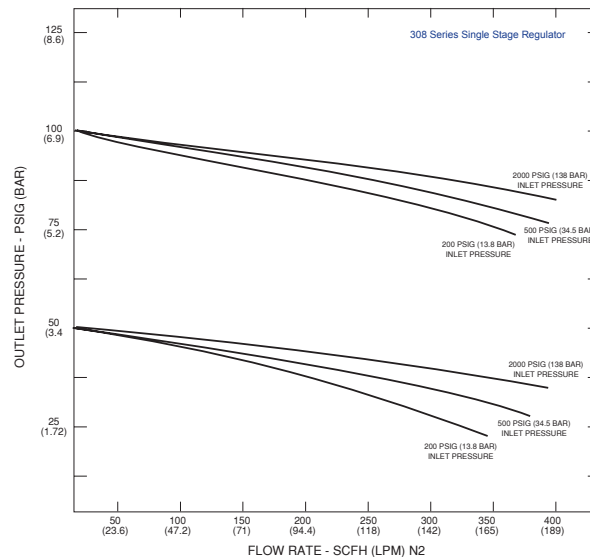
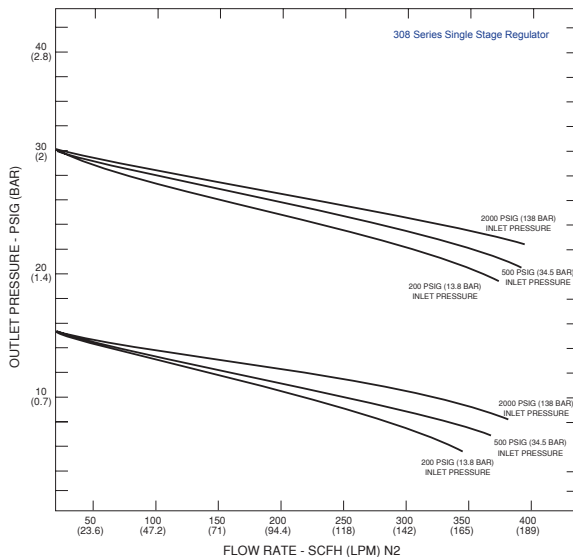
heated, single stage, brass barstock regulator



Description	Advanced Features	Typical Applications
The 308 Series regulators are specifically designed to prevent freeze-up problems associated with high flows of carbon dioxide and nitrous oxide. As CO ₂ or N ₂ O passes through a regulator seat, dry ice can form if the flow is too high, causing the regulator to freeze up.	• Chrome-plated brass barstock body Smooth surface finish • Three 50 watt heaters Maintain gas flow up to 350 scfh • 316L stainless steel diaphragm Unaffected by low temperatures	• Chemical storage blanketing • Anaerobic chambers • Inert gas purging • Atomic absorption oxidizer gas • Semiconductor reactor furnace • Inductively coupled plasma systems • Ph control

300 Series Advantage	Materials	Specifications
• <i>Capsule® seat</i> Increased serviceability and life • <i>316L stainless steel diaphragm</i> No inboard diffusion • <i>Low wetted surface area</i> Minimal purge requirements • <i>Field-adjustable pressure limit</i> Safeguard downstream equipment • <i>Convoluted diaphragm</i> Smooth pressure changes • <i>Compact design</i> Easily transported and integrated	<i>Body</i> Chrome-plated brass barstock <i>Bonnet</i> Chrome-plated die cast zinc <i>Seat</i> PTFE <i>Filter</i> 10 micron sintered bronze <i>Diaphragm</i> 316L stainless steel <i>Internal Seals</i> PTFE	<i>Maximum Inlet Pressure</i> 3000 PSIG (210 BAR) <i>Temperature Range (Thermostat)</i> 95°F to 120°F (35°C to 49°C) <i>Heaters</i> 3 @ 50 watts each (110 or 220 VAC) <i>Gauges</i> 2" diameter chrome-plated <i>Ports</i> 1/4" FPT <i>Helium Leak Integrity</i> 1 x 10⁻⁸ scc/sec <i>Cv</i> 0.1 <i>Weight (308-3031-320)</i> 5.4 lbs. (2.45 kg)

Flow Performance



4

Ordering Information and Configuration Options

308	A		B	C	D	-Inlet	Options
Series 308	Outlet Pressure	Outlet Gauge	Inlet Gauge	Outlet Assemblies	Assembly/ Gauges	Inlet Connections	Installed Options
	1: 0-15	0-30 PSIG	0: None	0: 1/4" FPT Port	0: Bare Body	000: 1/4" FPT	M: Protocol Station
	2: 0-30	0-60 PSIG	3: 0-4000 PSIG	1: 1/4" MPT	110 VAC	TF2: 1/8" Tube	
	3: 0-50	0-100 PSIG		2: 1/4" Tube Fitting	1: Standard Assembly	TF4: 1/4" Tube	
	5: 0-100	0-200 PSIG		3: Diaphragm Valve 1/4" Tube Fitting	110 VAC (PSIG/kPa Gauges)	TF6: 3/8" Tube	
				4: Diaphragm Valve 1/4" MPT	2: Bare Body	M06: 6mm Tube	
				5: Needle Valve 1/4" MPT	220 VAC	CGA	
				6: 1/8" Tube Fitting	3: Standard Assembly	DIN 477	
				7: 3/8" Tube Fitting	220 VAC (PSIG/kPa Gauges)	BS 341	
				8: Diaphragm Valve 1/8" Tube Fitting	4: Standard Assembly	and others available	
				9: Diaphragm Valve 1/4" FPT	110 VAC (BAR/PSIG Gauges)		
				A: 3/8" BSP Right Hand Fitting	5: Standard Assembly		
				M: 6mm Tube Fitting	220 VAC (BAR/PSIG Gauges)		
				S: Diaphragm Valve 6mm Tube Fitting			

325 Series

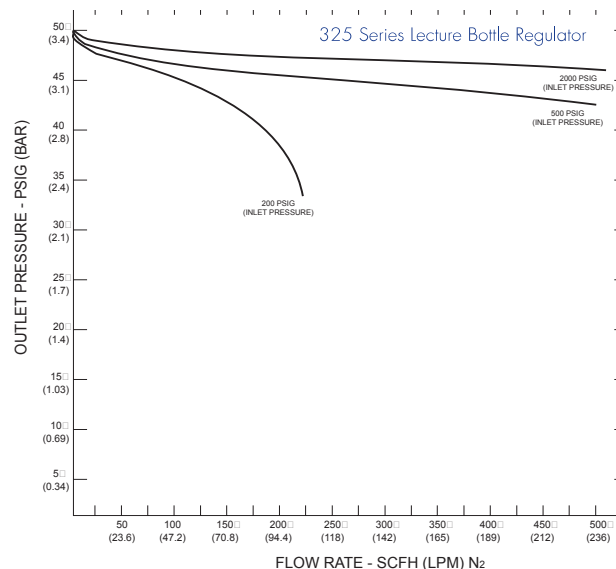
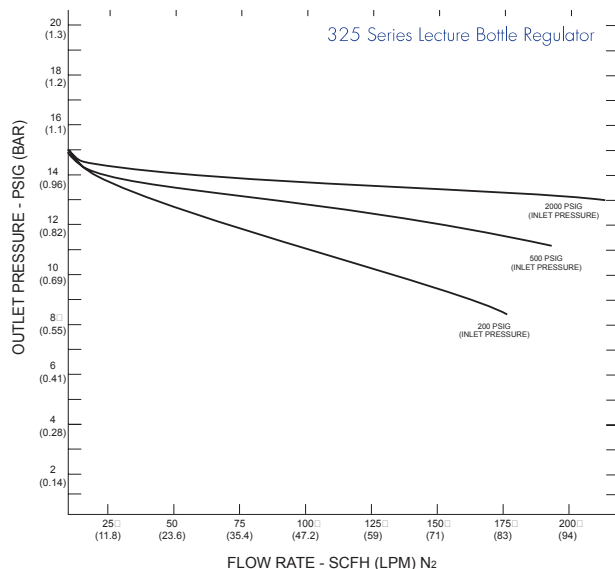
single stage, brass barstock lecture bottle regulator



Description	Advanced Features	Typical Applications
The 325 Series regulators are specifically designed for use with noncorrosive gases in lecture bottles. The incorporation of our smallest Capsule® allows excellent pressure regulation over the useful pressure range of a lecture bottle.	• Chrome-plated brass barstock body Smooth surface finish • Low droop Stable outlet pressure • 1½" pressure gauges Small envelope	• University classrooms • University laboratories • Chemical research • Pharmaceutical manufacturing

300 Series Advantage	Materials	Specifications
• <i>Capsule® seat</i> Increased serviceability and life • <i>316L stainless steel diaphragm</i> No inboard diffusion • <i>Low wetted surface area</i> Minimal purge requirements • <i>Field-adjustable pressure limit</i> Safeguard downstream equipment • <i>Convolute diaphragm</i> Smooth pressure changes • <i>Compact design</i> Easily transported and integrated	<i>Body</i> Chrome-plated brass barstock <i>Bonnet</i> Chrome-plated die cast zinc <i>Seat</i> PTFE <i>Filter</i> 10 micron sintered bronze <i>Diaphragm</i> 316L stainless steel <i>Internal Seals</i> PTFE	<i>Maximum Inlet Pressure</i> 3000 PSIG (210 BAR) <i>Temperature Range</i> -40°F to 140°F (-40°C to 60°C) <i>Gauges</i> 1½" diameter chrome-plated brass <i>Ports</i> ⅛" FPT (¼" FPT relief valve) <i>Helium Leak Integrity</i> 1 x 10⁻⁸ scc/sec <i>Cv</i> 0.02 <i>Weight (325-3351-180)</i> 2.0 lbs. (0.89 kg)

Flow Performance



4

Ordering Information and Configuration Options

325	A		B	C	D	-Inlet	Options
Series 325	Outlet Pressure 1: 0-15 3: 0-50	Outlet Gauge 0-30 PSIG 0-100 PSIG	Inlet Gauge 0: None 3: 0-4000 PSIG	Outlet Assemblies 0: 1/8" FPT Port 1: 1/4" MPT 5: Needle Valve 1/8" MPT	Assembly/ Gauges 0: Bare Body 1: Standard Assembly	Connections 000: 1/8" FPT CGA 110 CGA 170 CGA 180	Installed Options None

Lecture Bottle Equipment



Series 3910 single stage brass lecture bottle regulator

Series 3920 single stage stainless steel lecture bottle regulator

Description	Advanced Features		
The Series 3910 regulator is designed for use with non-corrosive, non-toxic gases in lecture bottles. The Series 3920 lecture bottle regulator is designed for use with corrosive, and/or toxic lecture bottle gases. These light weight, compact single stage regulators incorporate many features found in our larger high purity regulators	• Small compact design. • Needle valve installed on outlet.		
	Specifications		
	<i>Max. Inlet Pressure</i> <i>Operating Temp. Range</i> <i>Flow Coefficient (C_v)</i> <i>Body Inlet Connection</i> <i>Body Outlet Connection</i> <i>Outlet Valve Connection</i>	Series 3910 3000 psig 0 to +140°F 0.02 1/8" NPT female 1/4" NPT female 1/4" NPT female	Series 3900 3000 psig -40 to +140°F 0.06 1/8" NPT female 1/8" NPT female 1/8" NPT female

Materials			
<i>Body</i> <i>Internal Seals</i> <i>Seat</i> <i>Diaphragm</i> <i>Filter</i> <i>Bonnet</i> <i>Gauges</i> <i>Outlet Valve</i>	Series 3910 chrome-plated brass nylon polyurethane neoprene 50 micron sintered bronze chrome plated brass chrome plated brass chrome plated brass	Series 3920 316 stainless steel Teflon® & Kel-F® Teflon PFA® 316 stainless steel 50 micron stainless steel anodized aluminum stainless steel stainless steel	Series 3900 Aluminum Teflon® & Kel-F® Teflon PFA® 316 stainless steel 50 micron stainless steel anodized aluminum brass brass

Ordering Information			
Model Number	Del. Press. Range psig	Del. Press. Gauge psig	Inlet Press. Gauge psig
3910-15-170	2-15	0-30	0-4000
3910-60-170	4-60	0-100	0-4000
3910-15-180	2-15	0-30	0-4000
3910-60-180	4-60	0-100	0-4000
3900-30-170	2-30	0-60	0-3000
3900-30-180	2-30	0-60	0-3000
3900-60-170	2-60	0-100	0-3000
3900-60-180	2-60	0-100	0-3000
T3920-30-180	2-30	0-60	0-3000
T3920-60-180	2-60	0-100	0-3000

Lecture Bottle Equipment (cont.)

Description

Lecture bottles have rounded ends and require some means of support when in use. We provide two types of holders here that meet most requirements.

Non-Tip Stand - Model 475

This stand offers a convenient method of securing a lecture bottle on a table or lab bench. The stand is made of light weight brushed aluminum and, yet the large diameter base provides stability even when a regulator is installed on the bottle.

Wall Mount Lecture Bottle Bracket - Model 480

This bracket is made of powder coated steel and has spring steel clips that provide firm, secure support to the lecture bottle. The bracket is ideal for securing lecture bottles to lab cart or bench set-ups, in carrying cases for portable systems, or in storage cabinets.

Lecture Bottle Control Valves - Models 3990-3993

These valves are specifically designed for attachment to lecture bottles to dispense their contents. They do not control pressure and should only be used when the operator is in attendance.



Materials

	3990	3991	3992	3993
<i>Body</i>	brass	brass	316 stainless steel	aluminum-silicon bronze
<i>Stem</i>	303 stainless steel	303 stainless steel	316 stainless steel	Monel®
<i>Packing</i>	Teflon®	Teflon®	Teflon®	Teflon®
<i>Tubing</i>	hose barb	brass	316 stainless steel	Monel®

Ordering Information

Model Number	Inlet Connection	Outlet Connection
3990-CGA	Specify CGA 170 or 180	1/4" O.D. hose barb
3991-CGA	Specify CGA 170 or 180	1/4" compression fitting w/10" long brass tubing
3992-180	CGA 180	1/4" compression fitting w/10" long SS tubing
3993-ASB-180	CGA 180	1/4" compression fitting w/10" long monel® tubing

428 Series

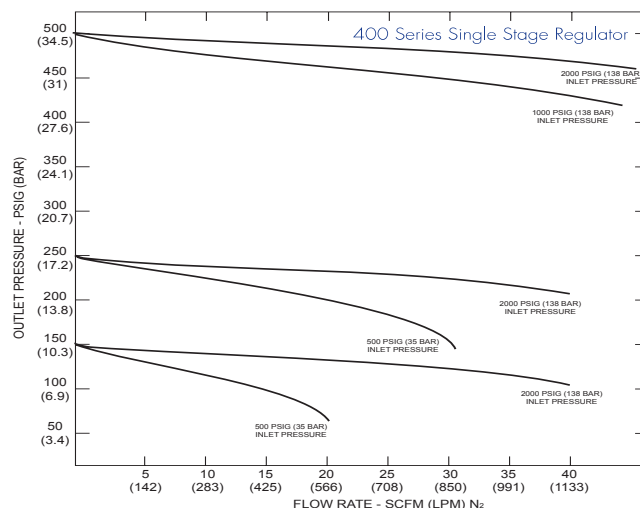
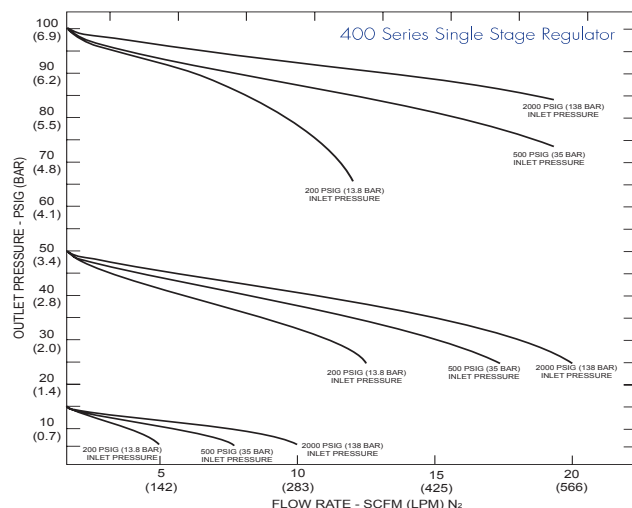
single stage, stainless steel barstock line regulator



Description	Advanced Features	Typical Applications
The 428 Series regulators are intended for secondary pressure control of the highest purity gases or as point of use pressure control in high purity gas distribution systems.	• Butt-welded VCR® connections Highest leak integrity available • 316L stainless steel barstock body Increased corrosion resistance • Front and rear panel mountable Versatile system configuration • 3000 PSIG inlet pressure rating Safe use with high pressure cylinders	• Semiconductor process gases • Gas and liquid chromatography • Ultra-high purity carrier gases • Zero, span and calibration gases • Liquefied hydrocarbon gas control • Control of cryogenic gases

400 Series Advantage	Materials	Specifications
• <i>Metal-to-metal diaphragm seal</i> No possibility of gas contamination • <i>Capsule® seat</i> Increased serviceability and life • <i>316L stainless steel diaphragm</i> No inboard diffusion • <i>Orientable captured vent capable</i> Safety in any installation • <i>Low wetted surface area</i> Minimal purge requirements • <i>Field-adjustable pressure limit</i> Safeguard downstream equipment • <i>Pipe away relief valve</i> Safely vent exhaust gases • <i>Delivery pressure range easily changed</i> Maximum flexibility	<i>Body</i> 316L stainless steel barstock <i>Bonnet</i> Chrome-plated brass barstock <i>Seat</i> PTFE <i>Filter</i> 10 micron stainless steel multi-layer mesh <i>Diaphragm</i> 316L stainless steel <i>Internal Seals</i> PTFE	<i>Maximum Inlet Pressure</i> 3000 PSIG (210 BAR) <i>Temperature Range</i> -40°F to 140°F (-40°C to 60°C) <i>Gauge</i> 2" diameter stainless steel <i>Ports</i> ¼" VCR® <i>Helium Leak Integrity</i> 1 x 10⁻⁹ scc/sec <i>Cv</i> 0.1 <i>Weight (428-1302)</i> 2.46 lbs. (1.12 kg)

Flow Performance



4

Ordering Information and Configuration Options

428	A	B	C	D
Series 428	Outlet Pressure 1: 0-15 2: 0-30 3: 0-50 4: 0-100 5: 0-250 6: 0-500 7: 0-150	Outlet Gauge 0: None 1: 30"-0-30 PSIG 2: 30"-0-60 PSIG 3: 30"-0-100 PSIG 4: 30"-0-200 PSIG 5: 0-400 PSIG 6: 0-1000 PSIG	Inlet Gauge 0: None	Connections 1: FVCR in/MVCR out 2: MVCR in/MVCR out 3: MVCR in/FVCR out 4: FVCR in/FVCR out

Related Options

Option	Order No.	Description
Panel Mount Kit Captured Vent Kit	550-0002 550-0001	To mount the regulator using bonnet threads. Material: Nickel-plated brass 360° orientation for easy piping of vented gases to a safe location in the event of diaphragm failure. Material: Nickel-plated brass
Helium Leak Certification	476-0002	Inboard Helium leak certification to less than 1 x 10 ⁻⁸ scc/sec
Special Treatment 0.01 micron filter	550-0003 580-2001	Regulator preconditioned in actual gas usage (required for some fluoridated compounds) Attached at outlet for low particle count gases (with 1/4" VCR® connections only)

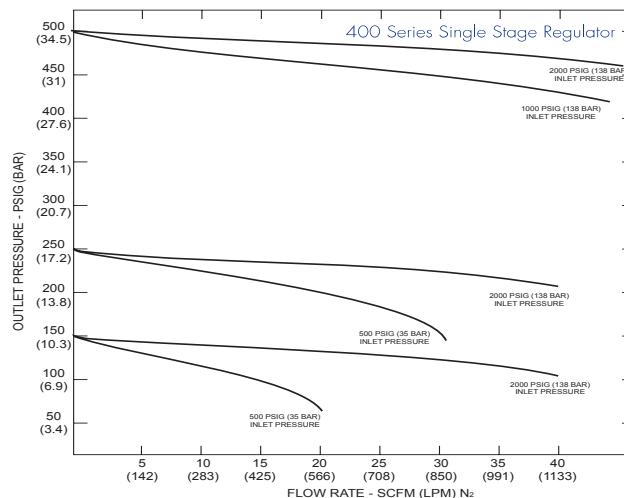
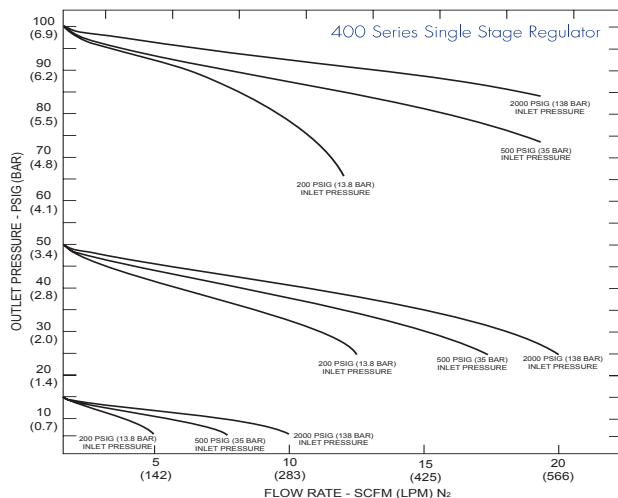
429 Series corrosion resistant, single stage, stainless steel barstock line regulator



Description	Advanced Features	Typical Applications
The 429 Series regulators are intended for primary pressure control of the highest purity gases or for applications where minor fluctuations in outlet pressure due to diminishing inlet supply pressure can be tolerated.	- Semiconductor process gases - Gas and liquid chromatography - Ultra-high purity carrier gases - Zero, span and calibration gases - Liquefied hydrocarbon gas control - Control of cryogenic gases	- Butt-welded VCR® connections Highest leak integrity available 316L stainless steel barstock body Increased corrosion resistance - Front and rear panel mountable Versatile system configuration 3000 PSIG inlet pressure rating Safe use with high pressure cylinders

400 Series Advantage	Materials	Specifications
<i>Metal-to-metal diaphragm seal</i> No possibility of gas contamination <i>Capsule® seat</i> Increased serviceability and life <i>316L stainless steel diaphragm</i> No inboard diffusion <i>Orientable captured vent capable</i> Safety in any installation <i>Low wetted surface area</i> Minimal purge requirements <i>Field-adjustable pressure limit</i> Safeguard downstream equipment <i>Pipe away relief valve</i> Safely vent exhaust gases <i>Delivery pressure range easily changed</i> Maximum flexibility	<i>Body</i> 316L stainless steel barstock <i>Bonnet</i> Chrome-plated brass barstock <i>Seat</i> PTFE <i>Filter</i> 10 micron stainless steel multi-layer mesh <i>Diaphragm</i> 316L stainless steel <i>Internal Seals</i> PTFE	<i>Maximum Inlet Pressure</i> 3000 PSIG (210 BAR) <i>Temperature Range</i> -40°F to 140°F (-40°C to 60°C) <i>Gauges</i> 2" diameter stainless steel <i>Ports</i> ¼" VCR® <i>Helium Leak Integrity</i> 1 x 10⁻⁹ scc/sec <i>Cv</i> 0.1 <i>Weight (429-1312)</i> 2.73 lbs. (1.24 kg)

Flow Performance



4

Ordering Information and Configuration Options

429	A	B	C	D
Series 429	Outlet Pressure 1: 0-15 2: 0-30 3: 0-50 4: 0-100 5: 0-250 6: 0-500 7: 0-150	Outlet Gauge 0: None 1: 30"-0-30 PSIG 2: 30"-0-60 PSIG 3: 30"-0-100 PSIG 4: 30"-0-200 PSIG 5: 0-400 PSIG 6: 0-1000 PSIG	Inlet Gauge 0: None 1: 0-4000 PSIG 2: 0-400 PSIG 3: 0-1000 PSIG 4: 0-3000 PSIG 5: 30"-0-200 PSIG 6: 30"-0-100 PSIG 7: 30"-0-60 PSIG 8: 30"-0-30 PSIG	Connections 1: FVCR in/MVCR out 2: MVCR in/MVCR out 3: MVCR in/FVCR out 4: FVCR in/FVCR out

Related Options

Option	Order No.	Description
Panel Mount Kit	550-0002	To mount the regulator using bonnet threads. Material: Nickel-plated brass 360° orientation for easy piping of vented gases to a safe location in the event of diaphragm failure. Material: Nickel-plated brass
Captured Vent Kit	550-0001	
Helium Leak Certification	476-0002	Inboard Helium leak certification to less than 1 x 10 ⁻⁸ scc/sec
Special Treatment	550-0003	Regulator preconditioned in actual gas usage (required for some fluoridated compounds) Attached at outlet for low particle count gases (with 1/4" VCR® connections only)
0.01 micron filter	580-2001	

451 Series

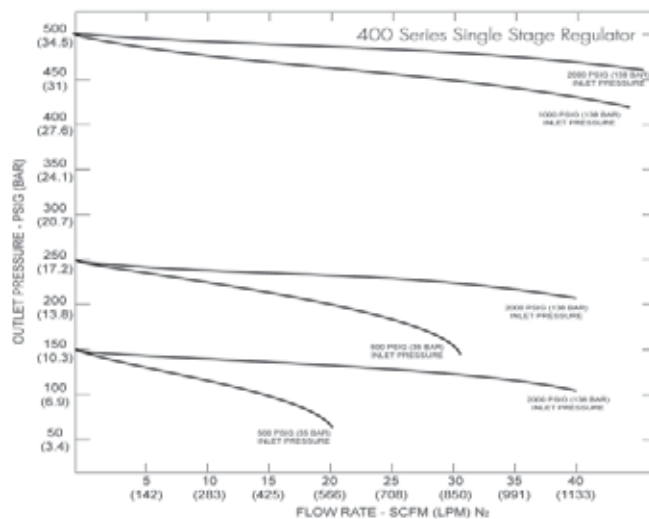
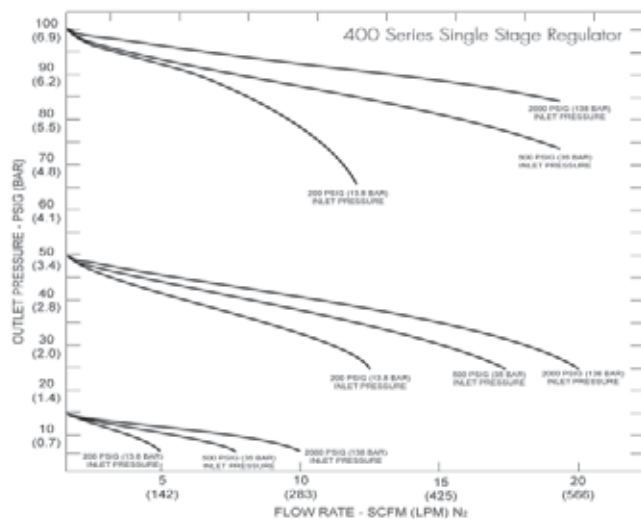
high temperature, single stage, line regulator



Description	Advanced Features	
The 451 Series high temperature is designed to withstand the rigorous demands of high temperature ambient or process applications to 550°F (288°C). The corrosion and heat resistant design make it ideal for pressure control in petrochemical process systems or high temperature furnace applications.	• <i>316L stainless steel barstock body</i> Increased corrosion resistance • <i>Pressure ranges 0 - 15 to 0 - 500 PSIG</i> Wide variety of applications • <i>Metal to metal seals</i> No possibility of gas contamination	• <i>Capsule Seat</i> Increased serviceability and life • <i>Temperature rating to 550°F (288°C)</i> High level of heat resistance

400 Advantage	Materials	Specifications
• <i>Metal-to-metal diaphragm seal</i> No possibility of gas contamination • <i>Capsule seat</i> Increased serviceability and life • <i>316L stainless steel diaphragm</i> No inboard diffusion • <i>Orientable captured vent capable up to 400°F (200°C)</i> Safety in any installation • <i>Low wetted surface area</i> Minimal purge requirements • <i>10 micron sintered wire mesh inlet filter</i> Protects seat from damaging in particulate	• <i>Body</i> 316L stainless steel barstock • <i>Bonnet</i> Stainless steel barstock • <i>Diaphragm</i> 316L stainless steel • <i>Capsule Seat®</i> Arlon (PEEK)	• <i>Maximum Inlet Pressure</i> 3000 PSIG (210 BAR) • <i>Temperature Range</i> 550°F (288°C) • <i>Inlet Connection</i> ¼" FPT • <i>Outlet Connection</i> ¼" FPT • <i>Helium Leak Integrity</i> 1 x 10⁻⁸ scc/sec • <i>Weight</i> 2.3 lbs. (1.04 kg)

Flow Performance



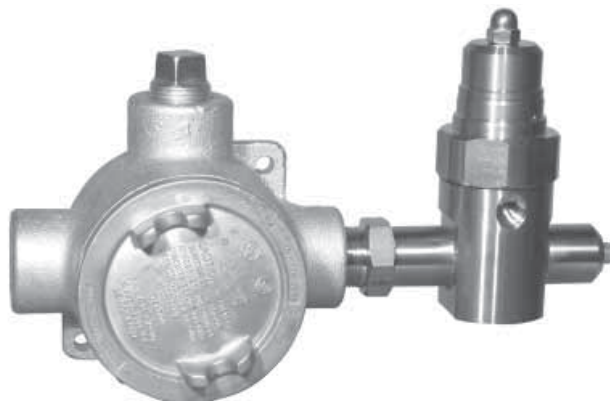
4

Ordering Information and Configuration Options

451	A	B	C	D	-Inlet
Series 451	Max Delivery Pressure 1: 15 PSIG 2: 50 PSIG 3: 100 PSIG 4: 250 PSIG 5: 500 PSIG 7: 150 PSIG	0	Outlet Connection 0: 1/4" FPT 1: 1/8" Tube Fitting 2: 1/4" Tube Fitting 3: 3/8" Tube Fitting M: 6mm Tube Fitting	0	Connections 000: 1/8" FPT TF2: 1/8" Tube TF4: 1/4" Tube TF6: 3/8" Tube M06: 6mm Tube

452 Series

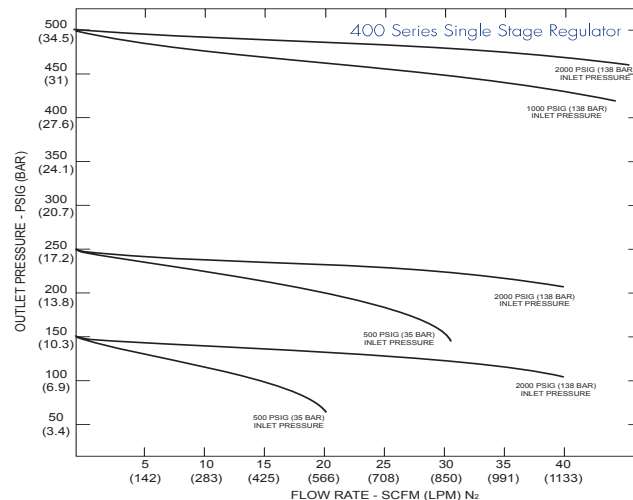
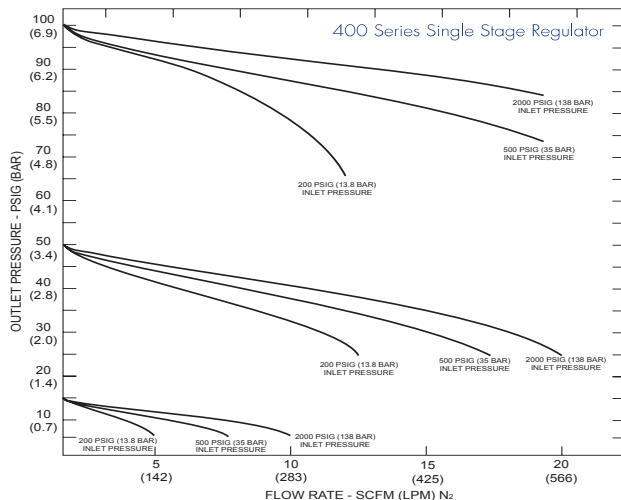
heated, single stage, stainless steel barstock regulator



Description	Advanced Features	Typical Applications
The 452 Series electrically-heated vaporizing regulator is designed to heat and vaporize an inlet gas stream containing heavy hydrocarbons so that they will remain in the vapor state for chromatographic analysis. The entire system is explosion proof for safety. Included are three temperature ranges, three heater wattages, and seven outlet pressure ranges.	- Increased serviceability and life - Internal heat exchanger Improved heat transfer - Adjustable thermistor controller Close control of gas temperature	316L stainless steel barstock body Increased corrosion resistance - Pressure ranges 0 - 15 to 0 - 500 PSIG Wide variety of applications - Metal to metal seals No possibility of gas contamination - Capsule Seat

400 Series Advantage	Materials	Specifications
Metal-to-metal diaphragm seal No possibility of gas contamination Capsule® seat Increased serviceability and life 316L stainless steel diaphragm No inboard diffusion Orientable captured vent capable Safety in any installation Low wetted surface area Minimal purge requirements Field-adjustable pressure limit Safeguard downstream equipment Pipe away relief valve Safely vent exhaust gases Delivery pressure range easily changed Maximum flexibility	Body 316L stainless steel barstock Bonnet Stainless steel barstock Seat Arlon® (PEEK) Diaphragm 316L stainless steel Heat Exchanger 316L stainless steel Explosion-proof Enclosure Iron alloy/Aluminum Heater Wattage 50, 100 or 150 watts	Maximum Inlet Pressure 3000 PSIG (210 BAR) Temperature Range 77°F to 180°F (25°C to 82°C) 160°F to 280°F (71°C to 138°C) 250°F to 380°F (121°C to 193°C) Maximum Flow (100 PSIG) 600 SCFH (283 LPM) Inlet Connection 1/8" FPT Outlet Connection 1/4" FPT Helium Leak Integrity 1 x 10⁻⁸ scc/sec Weight (452-3301) 6 lbs. (2.7 kg)

Flow Performance



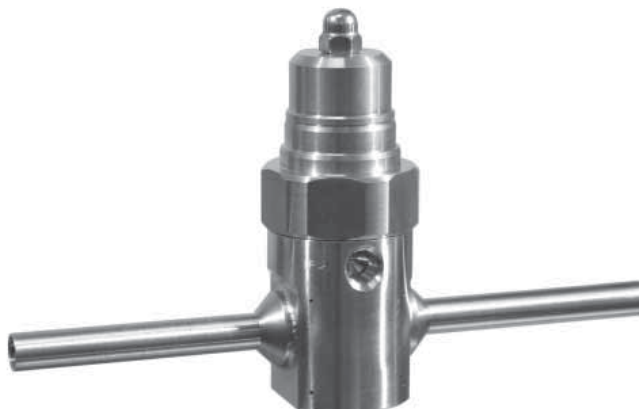
4

Ordering Information and Configuration Options

452	A	B	C	D	-Inlet
Series 452 1: 15 PSIG 2: 50 PSIG 3: 100 PSIG 4: 250 PSIG 5: 500 PSIG 7: 150 PSIG	Max Delivery Pressure 1: 15 PSIG 2: 50 PSIG 3: 100 PSIG 4: 250 PSIG 5: 500 PSIG 7: 150 PSIG	Heater Wattage 1: 50 Watts 2: 100 Watts 3: 150 Watts	Outlet Connection 0: ¼" FPT 1: ⅛" Tube Fitting 2: ¼" Tube Fitting 3: ⅜" Tube Fitting M: 6mm Tube Fitting	Temperature Range/Voltage 1: 77 ° - 180°F/120 VAC 2: 160 ° - 280°F/120 VAC 3: 250 ° - 380°F/120 VAC* 4: 77 ° - 180°F/220 VAC 5: 160 ° - 280°F/220 VAC 6: 250 ° - 380°F/220 VAC* <i>*Not available with 50 Watt heater</i>	Connections 000: ⅛" FPT TF2: ⅛" Tube TF4: ¼" Tube TF6: ⅜" Tube M06: 6mm Tube

453 Series

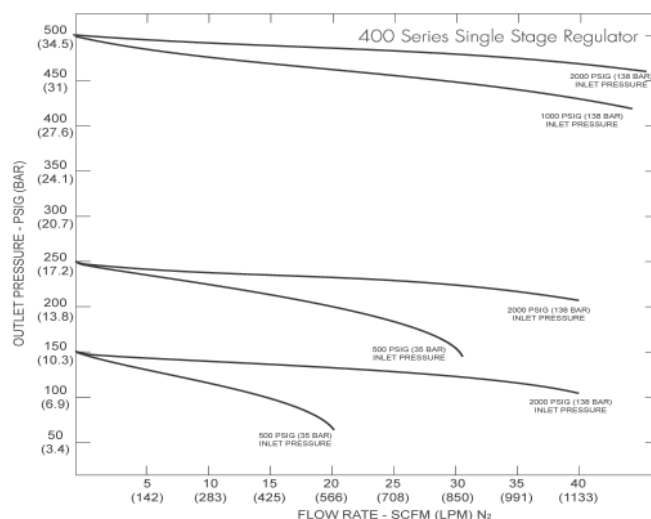
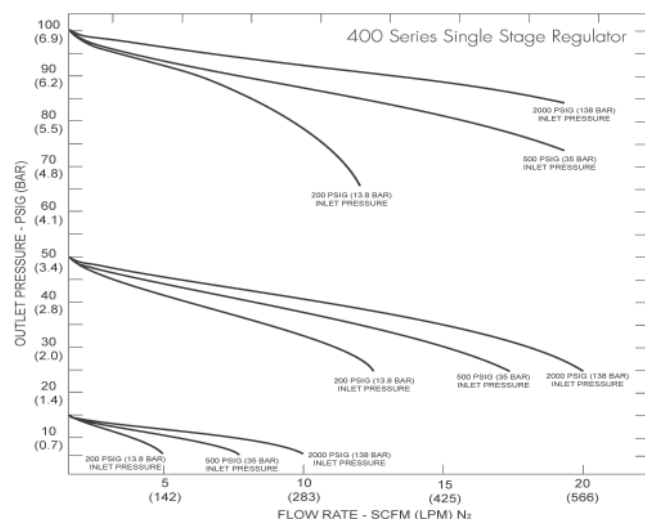
steam heated, single stage, stainless steel barstock regulator



Description	Advanced Features	Typical Applications
The 453 Series Steam-heated vaporizing regulator is designed to heat and vaporize an inlet gas stream containing heavy hydrocarbons so that they will remain in the vapor state for chromatographic analysis. The unique heat exchanger portion of the regulator is designed to maximize contact with the media steam for highly efficient heat transfer.	• <i>316L stainless steel barstock body</i> • <i>Pressure ranges available: 0-15 to 0-500 PSIG</i> Wide variety of applications • <i>Metal to metal seals</i> No possibility of gas contamination	• <i>Capsule Seat</i> Increased serviceability and life • <i>Internal heat exchanger</i> Improved heat transfer • <i>Temperature rating to 550°F (288°C)</i> High level of heating capability

400 Series Advantage	Materials	Specifications
• <i>Metal-to-metal diaphragm seal</i> No possibility of gas contamination • <i>Capsule® seat</i> Increased serviceability and life • <i>316L stainless steel diaphragm</i> No inboard diffusion • <i>Orientable captured vent capable</i> Safety in any installation • <i>Low wetted surface area</i> Minimal purge requirements • <i>Field-adjustable pressure limit</i> Safeguard downstream equipment • <i>Pipe away relief valve</i> Safely vent exhaust gases • <i>Delivery pressure range easily changed</i> Maximum flexibility	<i>Body</i> 316L stainless steel barstock <i>Bonnet</i> 316L stainless steel barstock <i>Seat</i> Arlon® (PEEK) <i>Diaphragm</i> 316L stainless steel <i>Heat Exchanger</i> 316L stainless steel barstock	<i>Maximum Inlet Pressure</i> 3000 PSIG (210 BAR) <i>Maximum Temperature</i> 550°F (288°C) <i>Maximum Flow (100 PSIG)</i> 600 SCFH (283 LPM) <i>Inlet Connection</i> 1/8" FPT <i>Outlet Connection</i> 1/4" FPT <i>Steam Tubing</i> 1/2" O.D. x .049 wall thickness <i>Helium Leak Integrity</i> 1 x 10⁻⁸ scc/sec <i>Weight</i> 3.5 lbs. (1.59 kg)

Flow Performance



4

Ordering Information and Configuration Options

453	A	B	C	D	-Inlet
Series 453 Max Delivery Pressure 1: 15 PSIG 2: 50 PSIG 3: 100 PSIG 4: 250 PSIG 5: 500 PSIG 7: 150 PSIG		0	Outlet Connection 0: 1/4" FPT 1: 1/8" Tube Fitting 2: 1/4" Tube Fitting 3: 3/8" Tube Fitting M: 6mm Tube Fitting	0	Connections 000: 1/8" FPT TF2: 1/8" Tube TF4: 1/4" Tube TF6: 3/8" Tube M06: 6mm Tube

492 Series

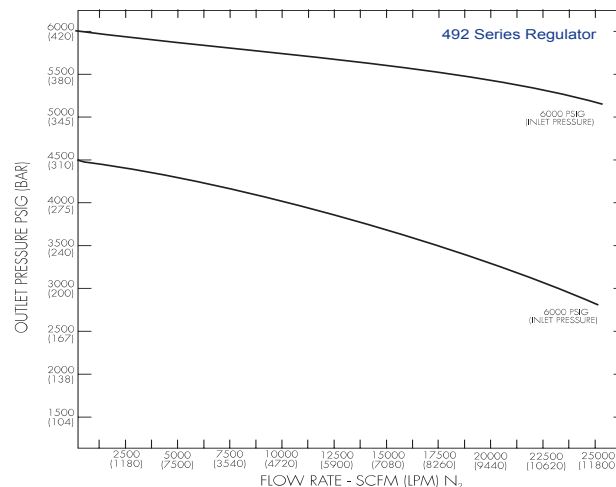
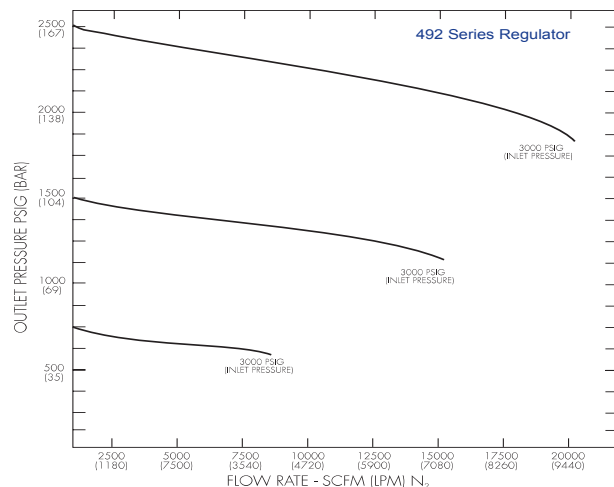
ultra high pressure, single stage, brass barstock regulator



Description	Advanced Features	Typical Applications
The 492 Series regulators are intended for primary pressure control of non-corrosive gases at a maximum inlet pressure of 6000 PSIG.	• Chrome-plated brass barstock body Smooth surface finish • Front and rear panel mountable Versatile system configuration • Pressure ranges 0-750 to 0-6000 PSIG Broad range of applications • Six-port design Flexible installation alternatives	• Airplane strut charging • Research and development laboratories • Chemical manufacturing • Aerospace hydraulic systems • Pharmaceutical manufacturing • Gauge calibration

400 Series Advantage	Materials	Specifications
• <i>Metal-to-metal diaphragm seal</i> No possibility of gas contamination • <i>Capsule® seat</i> Increased serviceability and life • <i>316L stainless steel diaphragm</i> No inboard diffusion • <i>Orientable captured vent capable</i> Safety in any installation • <i>Low wetted surface area</i> Minimal purge requirements • <i>Field-adjustable pressure limit</i> Safeguard downstream equipment • <i>Pipe away relief valve</i> Safely vent exhaust gases • <i>Delivery pressure range easily changed</i> Maximum flexibility	<i>Body</i> Chrome-plated brass barstock <i>Bonnet</i> Chrome-plated brass barstock <i>Seat</i> PCTFE (3000 and 4500 PSIG inlet) Arlon® (PEEK) (6000 PSIG inlet) <i>Piston</i> Brass barstock <i>Filter</i> 10 micron sintered bronze <i>Internal Seals</i> Viton®	<i>Maximum Inlet Pressure</i> 6000 PSIG (420 BAR) <i>Temperature Range</i> -40°F to 140°F (-40°C to 60°C) <i>Gauges</i> 2½" diameter chrome-plated brass <i>Ports</i> ¼" FPT <i>Cv</i> 0.1 <i>Weight (492-4851-680)</i> 5.59 lbs. (2.54 kg)

Flow Performance



4

Ordering Information and Configuration Options

492	A		B		C	D	-Inlet	Options
Series 492	Outlet Pressure	Outlet Gauge	Inlet Maximum	Inlet Gauge	Outlet Assemblies	Assembly/ Gauges	Inlet Connections	Installed Options
	1: 0-750	0-1000 PSIG	0: 6000 PSIG	None	0: ¼" FPT	0: Bare Body*	CGA	A: Protocol Alarm Station (110V)
	2: 0-1500	0-4000 PSIG	3: 3000 PSIG	0-4000 PSIG	1: ¼" MPT	1: Standard Assembly (PSIG/kPa Gauges)	DIN 477	B: Protocol Alarm Station (220V)
	3: 0-2500	0-4000 PSIG	8: 5500 PSIG	0-6000 PSIG	2: ¼" Tube	2: Standard Assembly (BAR/PSIG Gauges)	BS 341 and others available	C: Protocol Switchover Station
	4: 0-4500*	0-6000 PSIG	9: 6000 PSIG	0-10,000 PSIG	5: Needle Valve ¼" MPT			G: Protocol Switchover Station with Alarm (110V)
	5: 0-6000†	0-10,000 PSIG			6: ⅛" Tube			H: Protocol Switchover Station with Alarm (220V)
	6: 0-3500*	0-6000 PSIG			7: ⅜" Tube			M: Protocol Station
	*Not available with 3000 PSIG maximum inlet pressure				M: 6mm Tube			
	†Only available with 6000 PSIG maximum inlet pressure					*6000 PSIG maximum inlet only		
Related Options			• Panel Mount Kit (830-6483)					

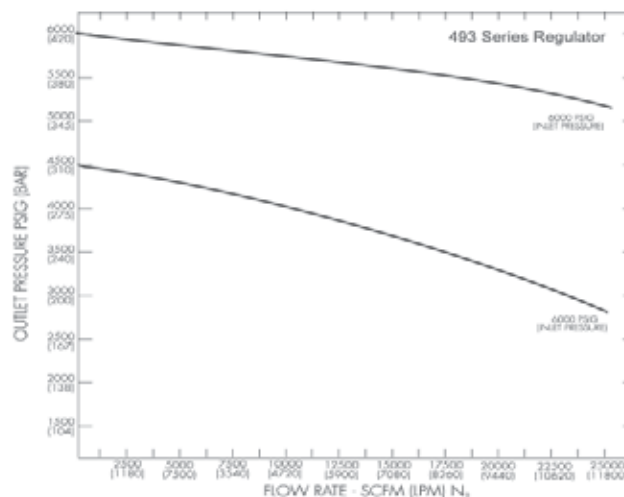
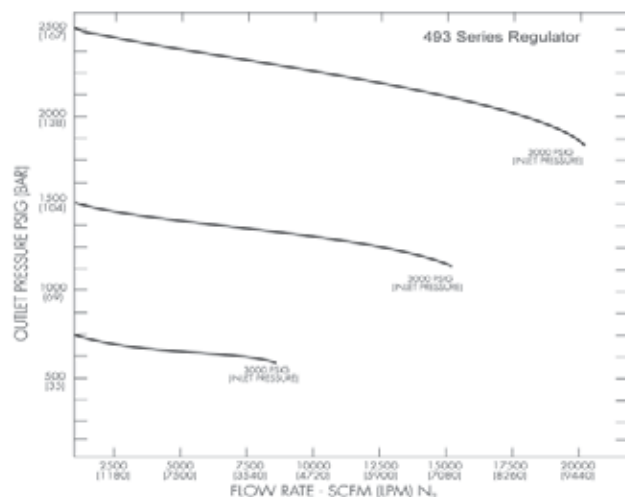
493 Series ultra high pressure, single stage, piston-sensed stainless steel barstock regulator



Description	Advanced Features	Typical Applications
The 493 Series regulators are intended for primary pressure control of non-corrosive gases at a maximum inlet pressure of 6000 PSIG.	• <i>316L stainless steel barstock body</i> Smooth surface finish • <i>Front and rear panel mountable</i> Versatile system configuration • <i>Pressure ranges 0-750 to 0-6000 PSIG</i> Broad range of applications • <i>Six-port design</i> Flexible installation alternatives	• <i>Airplane strut charging</i> • <i>Research and development laboratories</i> • <i>Chemical manufacturing</i> • <i>Aerospace hydraulic systems</i> • <i>Pharmaceutical manufacturing</i> • <i>Gauge calibration</i>

Features	Materials	Specifications
• <i>Large Piston sensor</i> Safely control pressures to 6000 PSIG • <i>Capsule® seat</i> Increased serviceability and life • <i>Low wetted surface area</i> Minimal purge requirements • <i>Field-adjustable pressure limit</i> Safeguard downstream equipment	<i>Body</i> 316L stainless steel barstock <i>Bonnet</i> 304 stainless steel <i>Seat</i> PCTFE (3000 and 4500 PSIG inlet) Arlon® (PEEK) (6000 PSIG inlet) <i>Piston</i> 316L stainless steel <i>Filter</i> 10 micron stainless steel multi-layer wire mesh <i>Internal Seals</i> Viton®	<i>Maximum Inlet Pressure</i> 6000 PSIG (420 BAR) <i>Temperature Range</i> -40°F to 140°F (-40°C to 60°C) <i>Gauges</i> 2½" diameter stainless steel <i>Ports</i> 1/4" FPT <i>Cv</i> 0.1 <i>Weight (493-5951-677)</i> 4.64 lbs. (2.10 kg)

Flow Performance



Ordering Information and Configuration Options

493	A		B		C	D	-Inlet	Options
Series 493	Outlet Pressure	Outlet Gauge	Inlet Maximum	Inlet Gauge	Outlet Assemblies	Assembly/ Gauges	Inlet Connections	Installed Options
	1: 0-750	0-1000 PSIG	0: 6000 PSIG	None	0: ¼" FPT	0: Bare Body*	CGA	A: Protocol Alarm Station (110V)
	2: 0-1500	0-4000 PSIG	3: 3000 PSIG	0-4000 PSIG	1: ¼" MPT	1: Standard Assembly (PSIG/kPa Gauges)	DIN 477	B: Protocol Alarm Station (220V)
	3: 0-2500	0-4000 PSIG	8: 5500 PSIG	0-6000 PSIG	2: ¼" Tube	2: Standard Assembly (BAR/PSIG Gauges)	BS 341 and others available	C: Protocol Switchover Station
	4: 0-4500*	0-6000 PSIG	9: 6000 PSIG	0-10,000 PSIG	5: Needle Valve ¼" MPT			G: Protocol Switchover Station with Alarm (110V)
	5: 0-6000†	0-10,000 PSIG			6: ⅛" Tube			H: Protocol Switchover Station with Alarm (220V)
	6: 0-3500*	0-6000 PSIG			7: ⅜" Tube			M: Protocol Station
	*Not available with 3000 PSIG maximum inlet pressure				M: 6mm Tube			
	†Only available with 6000 PSIG maximum inlet pressure					*6000 PSIG maximum inlet only		
Related Options			• Panel Mount Kit (830-6483)					

601 Series

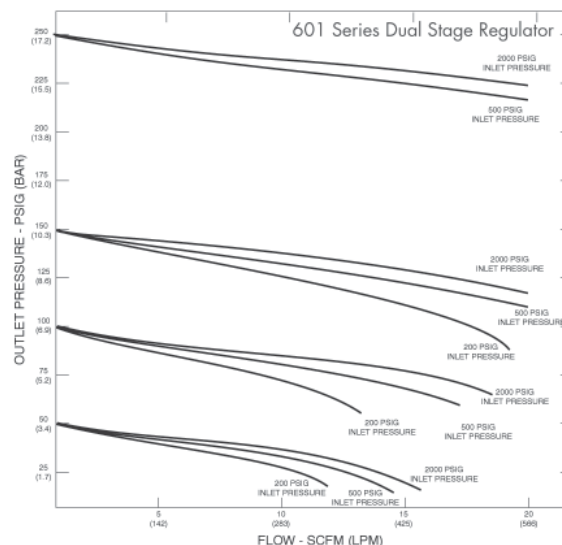
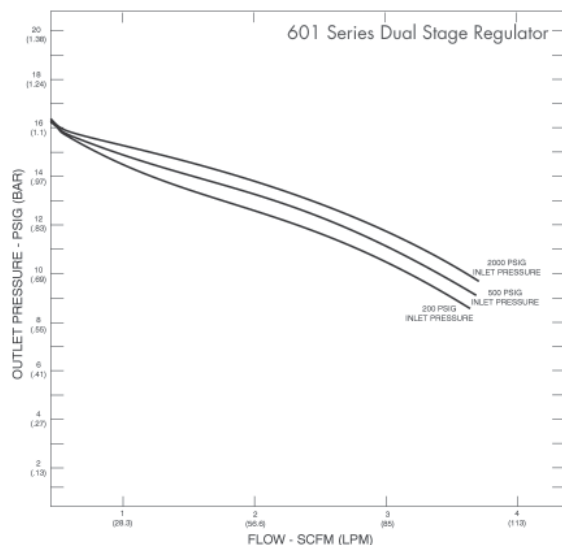
high purity, two stage brass barstock regulator



Description	Advanced Features	
The 601 Series dual-stage regulator was designed with beam-mode quality in mind. The 601 offers M ² technology that virtually eliminates atmospheric contamination during a cylinder change. Low level moisture and hydrocarbon contents yield a more stable emission and higher resonator efficiencies which makes the 601 Series the right choice.	• <i>Machined Brass Barstock Body</i> Smooth surface finish • <i>Low Wetted Surface Area</i> Minimal purge requirements • <i>Convuluted 316L Diaphragm</i> No inboard diffusion • <i>Optional Integral Purge</i> Eliminates atmospheric contamination	• <i>10-Micron Filtration in Both Stages</i> Reduces particle contamination • <i>Optional CGA Check Valve</i> Minimizes atmosphere exposure • <i>Optional Pressure Cycle Purge</i> Eliminates dead-space contaminate • <i>Capsule Seat</i> Increase serviceability and life

Applications		
Laser Pure Resonator Gases Helium Nitrogen Carbon Dioxide Laser Mixed Resonator Gases Three gas premix Four gas premix Five gas premix Laser Purging Gases Zero Air Nitrogen Maintenance Gases Nitrogen	Body Machined brass barstock Bonnet Chrome-plated die cast zin Seat PTFE Filter 10 micron sintered bronze Diaphragm 316L stainless steel Internal Seals PTFE	Maximum Inlet Pressure 3,000 PSIG (210 BAR) 4,500 PSIG (310 BAR) Temperature Range -40°F to 140°F (-40°C to 60°C) Gauges 2" diameter dual scale Ports ¼" FPT Cv 0.1 Weight (493-5951-677) 4.8 lbs. (2.16 kg)

Flow Performance



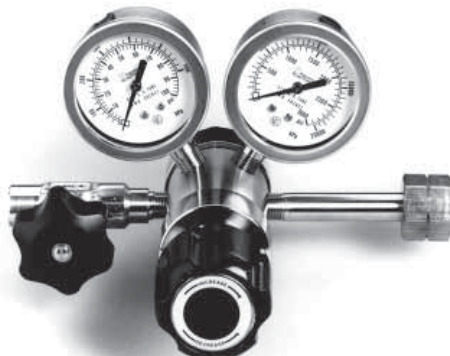
4

Ordering Information and Configuration Options

601	A		B	C	D	Inlet	Options
Series 601	Outlet Pressure	Outlet Gauge	Inlet Gauge	Outlet Assemblies	Assembly/Gauges	Inlet Connections	Installed Options
	1: 0-750	0-1000 PSIG	0: None	0: 1/4" FPT Port	0: Bare Body		A: Laser Gas Station Alarm (110V)
	2: 0-1500	0-4000 PSIG	3: 0-4000 PSI	1: 1/4" MPT	1: Standard Assembly (PSI/kPa Gauges)	000: 1/4" FPT	C: Laser Gas Switchover Station
	3: 0-2500	0-4000 PSIG	8: 0-6000 PSI*	2: 1/4" Tube Fitting	2: Standard Assembly (BAR/PSI Gauges)	TF2": 1/8" Tube	M: Laser Gas Station
	4: 0-4500*	0-6000 PSIG		6: 1/8" Tube Fitting	3: Integral Purge (PSI/kPa Gauges)	TF4: 1/4" Tube	N: Regulator CGA Check Valve Gland
	5: 0-6000†	0-10,000 PSIG		7: 3/8" Tube Fitting	4: Integral Purge (BAR/PSI Gauges)	TF6: 3/8" Tube	P: Inlet Pressure Cycle Purge
	6: 0-3500*	0-6000 PSIG		A: 3/8" BSP Right Hand Fitting	5: Integral Purge with Fitting* (PSI/kPa Gauges)	M06: 6mm Tube	
				M: 6mm Tube Fitting	6: Integral Purge with Fitting* (BAR/PSI Gauges)	CGA DIN 477 BS 341 and others available	
			<i>*Alarm option not available</i>		<i>*Fitting matches outlet assembly</i>		

3550 Series

two stage, stainless steel regulator



Description	Advanced Features	Typical Applications
The series 3550 two stage regulators are designed and constructed for use with reactive and corrosive gases and gas mixtures. Compact in design, these regulators provide outstanding performance, comparable to most larger diaphragm competitive models. The monel® diaphragms, inlet filter, poppets and nozzle assemblies installed in a 316L stainless steel body create an economical, high purity, corrosive gas regulator.	- Monel® internal parts and body for added corrosion resistance. - High purity diffusion resistant, metal diaphragm construction on both stages. - Diffusion resistant, stainless steel diaphragm packless control valve installed on outlet as standard.	The 3550 Series regulators are ideal for critical pressure reduction applications involving higher pressure reactive and/or corrosive gases, where the precise control of pressure or flow is required. They are an excellent choice for use with gas mixtures of such components having a full cylinder pressure of 1000 psig or more.

Materials			Specifications
Body 316L stainless steel	Seats 1st stage - Tefzel 2nd stage - Tefzel	Inlet Filter Monel®	Max. Inlet Pressure 3000 psig
Poppets Monel®	Diaphragms Monel®	Bonnet chrome plated aluminum	Operating Temp. Range -40 ° to +185 °F
Poppet spring Inconel®	Diaphragm Gaskets Teflon®	Gauges stainless steel	Flow Coefficient (Cv) 0.07
		Outlet Valve stainless steel	Inlet and Outlet 1/4" NPT female

Ordering Information * * *				Outlet Options	
Model Number	Del. Press. Range psig	Del. Press. Gauge psig	Inlet Press. Gauge psig		P/N Suffix
3551-25-CGA*	5-25	0-30	0-3000	No Outlet Valve	NV
3551-50-CGA*	5-50	0-100	0-3000	1/4" Compression Fitting	T4F
3551-100-CGA*	10-100	0-200	0-3000	1/8" Compression Fitting	T2F
				1/4" NPT Male	P4M
				1/4" Hose Barb	4HB

*Specify CGA Connection Number when ordering.

***For panel mounting bonnet add "PM" to base number (i.e., 3461PM-50-CGA).

Warning: A Purge assembly is strongly suggested when using the above regulators with any corrosive gas.

corrosion resistant, single stage, monel® regulator

3460 Series



4

Description	Advanced Features	Typical Applications
The series 3460 single stage regulators are specifically designed and constructed for use with difficult to handle gases, like chlorine and hydrogen chloride. The monel® diaphragm, inlet filter, poppet and nozzle assembly installed in a monel® body with a 316 stainless steel bonnet create a high purity corrosive gas regulator for most difficult environments.	• Monel® internal parts and body for added corrosion resistance. • High purity diffusion resistant, metal diaphragm construction. • Diffusion resistant, aluminum-silicon-bronze diaphragm packless control valve installed on outlet.	The 3460 Series regulators are ideal for use with many corrosive gases, such as chlorine, hydrogen chloride, boron trichloride, and boron trifluoride under demanding environmental conditions. They are also useful for controlling the pressure of gas mixtures containing these corrosive gas components, particularly at high concentration levels.

Materials			Specifications
<i>Body</i> monel®	<i>Seat</i> Tefzel	<i>Inlet Filter</i> Monel®	<i>Max. Inlet Pressure</i> 3000 psig
<i>Poppet</i> Monel®	<i>Diaphragm</i> Monel®	<i>Bonnet</i> stainless steel	<i>Operating Temp. Range</i> -40° to +185 °F
<i>Poppet spring</i> Inconel®	<i>Diaphragm Gasket</i> Teflon®	<i>Gauges</i> Monel®	<i>Flow Coefficient (Cv)</i> 0.07
			<i>Inlet and Outlet</i> 1/4" NPT female

Ordering Information * * *				Outlet Options	
Model Number	Del. Press. Range psig	Del. Press. Gauge psig	Inlet Press. Gauge psig		P/N Suffix
3461-25-CGA*	5-25	0-60	0-3000	No Outlet Valve 1/4" Compression Fitting	NV T4F
3461-50-CGA*	5-50	0-100	0-3000		
3461-100-CGA*	10-100	0-200	0-3000		
3462-25-CGA*	5-25	0-60	0-1000		
3462-50-CGA*	5-50	0-100	0-1000		
3462-100-CGA*	10-100	0-200	0-1000		
3463-25-CGA*	5-25	0-60	0-400		
3463-50-CGA*	5-50	0-100	0-400		
3464-25-CGA*	5-25	0-60	none		
3464-50-CGA*	5-50	0-100	none		

Warning: A Purge assembly is strongly suggested when using the above regulators with any corrosive gas.

*Specify CGA Connection Number when ordering. ***For panel mounting bonnet add "PM" to base number (i.e., 3461PM-50-CGA).

3470 Series

corrosion resistant, single stage, nickel plated brass regulator



Description	Advanced Features	Typical Applications
The series 3470 single stage regulators are specifically designed and constructed for use with difficult to handle gases, such as chlorine and hydrogen chloride. The large monel nozzle and Kel-F seat combined with the tied diaphragm assembly greatly reduces the possibility of failure due to creep so common in other corrosive gas regulators. A Teflon-lining on the stainless steel diaphragm forms a protective coating to extend regulator life.	• Four built-in Kel-F seats provide convenient maintenance and long regulator life. • Large Teflon-lined 302 stainless steel diaphragm. • Monel valve with Teflon packing installed on outlet. • Captured vent bonnet provides for safe venting in the event of a diaphragm failure	The 3470 Series regulators are ideal for use with many corrosive gases, such as chlorine, hydrogen chloride, boron trichloride, and boron trifluoride. They are also useful for controlling the pressure of high concentration gas mixtures containing these corrosive gas components.

Materials		Specifications
Body Electroless nickel-plated brass	Diaphragm Teflon-lined 302 stainless steel	Max. Inlet Pressure 3000 psig
Nozzle Monel	Inlet Filter Electroless nickel-plated sintered bronze	Operating Temp. Range 20° to +160°F
Seat Kel-F	Seals Teflon	Body Inlet and Outlet 1/4" NPT female
		Valve outlet 1/4" NPT male

Ordering Information			
Model Number	Del. Press. Range psig	Del. Press. Gauge psig	Inlet Press. Gauge psig
3470-80-CGA*	5-80	0-100	0-3000
3470-160-CGA*	10-160	0-300	0-3000
3471-80-CGA*	5-80	0-100	0-1000
3471-160-CGA*	10-160	0-300	0-1000
3472-80-CGA*	5-80	0-100	0-300
3473-80-CGA*	5-80	0-100	none

*Specify CGA Connection Number when ordering.

Warning: A Purge assembly is strongly suggested when using the above regulators with any corrosive gas.

single stage, low delivery pressure regulator

Series 3700HP



4

Description	Advanced Features	Typical Applications
These regulators were designed to meet the needs of applications requiring reliable low-pressure control while maintaining gas purity. The low pressure stage has a large sensitive aluminum-faced neoprene diaphragm to provide delivery pressures as low as 2" of water.	- Extremely low delivery pressures. - Knob for adjusting delivery pressure. - Aluminum faced diaphragm for high purity applications. - Maximum inlet pressure 250 psig. - Diaphragm packless valve on outlet is standard.	The Series 3700HP regulators are available in two delivery pressure ranges; 2-35" of water, and 0.5-5 psig. As a line regulator they have a maximum inlet pressure rating of 250 psig. Inlet and outlet connections are 1/4" NPT female. The series 3700HP has an aluminum faced natural rubber diaphragm to provide a diffusion resistant metal barrier for high purity gas applications.

Materials	Specifications
<i>Body & Bonnet</i> Zinc <i>Seat</i> Nitrile <i>Diaphragm</i> Aluminum-faced natural rubber <i>Internal parts</i> Steel, brass and zinc	

Ordering Information			
Model Number	Del. Press. Range psig	Del. Press. Gauge psig	Inlet Press. Gauge psig
3701HP	2-25" water	0-30" water	none
3702HP	0.5-5 psig	0-10 psig	none

Appropriate CGA connection for use with LP gas cylinders are ordered separately.

Regulators for Portable Calibration Standards

4



PR 150 Single Stage Calibration Gas Regulator

- Non-Corrosive Service
- Inlet Fitting: CGA-600
- Maximum Inlet Pressure: 500 PSIG
- Outlet Flow Settings: .25 LPM, .5 LPM, 1.0 LPM, 1.5 LPM
- Body: Brass Bar Stock
- Spring Housing Cap: Chrome Plated Brass Bar Stock
- Seat: Teflon®
- Piston: Brass
- Piston "O" Rings: Buna-N®



PR 160 Single Stage Calibration Gas Regulator

- Non-Corrosive Service
- Inlet Fitting: 5/8" - 18 UNF (C-10)
- Maximum Inlet Pressure: 500 PSIG
- Outlet Flow Settings: .25 LPM, .5 LPM, 1.0 LPM, 1.5 LPM
- Body: Brass Bar Stock
- Spring Housing Cap: Chrome Plated Brass Bar Stock
- Seat: Teflon®
- Piston: Brass
- Piston "O" Rings: Buna-N®



PR 190 Single Stage Click Style Regulator

- Corrosive and Non-Corrosive Service
- C-10, CGA-180
- Multi Flow Capability: .2 LPM, .3 LPM, .5 LPM, 1.0 LPM, 1.5 LPM, 2.5 LPM, 5.0 LPM, 6.0 LPM
- Body: Aluminum
- Spring Housing Cap: Aluminum
- Nozzle: Aluminum
- Seat: KEL-F
- Seals: Nylon
- Inboard Filter: 50 Micron Sintered Stainless Steel

Wall Mount Protocol Station

Description

The 529 Series Protocol Station is a regulator option designed for the convenient wall mounting of any CONCOA high purity regulator. Wall mounting of a regulator provides ease of use, prevents regulator damage and improves safety. The 529 Series Protocol Station is available in chrome-plated brass or 316 stainless steel construction as specified by the regulator series. This option comes complete with a 3 foot long flexible all stainless steel pigtail with armor casing.



4

Features	Specifications								
<i>Plugged port in gas block</i> Facilitates purging <i>Integral check valve at inlet</i> No internal contamination during cylinder change <i>Bracket mounts</i> Attaches conveniently to any surface	<table> <tr> <td><i>Gas Block</i> 316 stainless steel, brass or chrome-plated brass barstock</td><td><i>Maximum Inlet Pressure</i> 3000 PSIG (210 BAR) 4500 PSIG (310 BAR) optional 6000 PSIG (380 BAR) optional</td></tr> <tr> <td><i>Inlet Connection</i> 316 stainless steel or brass barstock</td><td><i>Temperature Range</i> -40°F to 140°F (-40°C to 60°C)</td></tr> <tr> <td><i>Check Valve "O" Ring</i> Viton®</td><td><i>Weight (Single Stage)</i> 3.1 lbs. (1.4 kg)</td></tr> <tr> <td><i>See page 119 for pigtail specifications</i></td><td><i>Weight (Dual Stage)</i> 3.5 lbs. (1.6 kg)</td></tr> </table>	<i>Gas Block</i> 316 stainless steel, brass or chrome-plated brass barstock	<i>Maximum Inlet Pressure</i> 3000 PSIG (210 BAR) 4500 PSIG (310 BAR) optional 6000 PSIG (380 BAR) optional	<i>Inlet Connection</i> 316 stainless steel or brass barstock	<i>Temperature Range</i> -40°F to 140°F (-40°C to 60°C)	<i>Check Valve "O" Ring</i> Viton®	<i>Weight (Single Stage)</i> 3.1 lbs. (1.4 kg)	<i>See page 119 for pigtail specifications</i>	<i>Weight (Dual Stage)</i> 3.5 lbs. (1.6 kg)
<i>Gas Block</i> 316 stainless steel, brass or chrome-plated brass barstock	<i>Maximum Inlet Pressure</i> 3000 PSIG (210 BAR) 4500 PSIG (310 BAR) optional 6000 PSIG (380 BAR) optional								
<i>Inlet Connection</i> 316 stainless steel or brass barstock	<i>Temperature Range</i> -40°F to 140°F (-40°C to 60°C)								
<i>Check Valve "O" Ring</i> Viton®	<i>Weight (Single Stage)</i> 3.1 lbs. (1.4 kg)								
<i>See page 119 for pigtail specifications</i>	<i>Weight (Dual Stage)</i> 3.5 lbs. (1.6 kg)								

Ordering Information and Configuration Options

Stock Number	Description
Add letter "M" after any regulator stock number	For example, to order a 422-1331-580 with a Protocol Station wall mount, the stock number would be 422-1331-580M
529-0101-CON	Protocol Station for single stage brass regulators with 3000 PSIG max inlet pressure
529-0102-CON	Protocol Station for single stage chrome-plated brass regulators with 3000 PSIG max inlet pressure
529-0103-CON	Protocol Station for single stage 316L stainless steel regulators with 3000 PSIG max inlet pressure
529-0104-CON	Protocol Station for dual stage brass regulators with 3000 PSIG max inlet pressure
529-0105-CON	Protocol Station for dual stage chrome-plated brass regulators with 3000 PSIG max inlet pressure
529-0106-CON	Protocol Station for dual stage 316L stainless steel regulators with 3000 PSIG max inlet pressure
529-0121-CON	Protocol Station for single stage brass regulators with 4500 PSIG max inlet pressure
529-0122-CON	Protocol Station for single stage chrome-plated brass regulators with 4500 PSIG max inlet pressure
529-0123-CON	Protocol Station for single stage 316L stainless steel regulators with 4500 PSIG max inlet pressure
529-0124-CON	Protocol Station for dual stage brass regulators with 4500 PSIG max inlet pressure
529-0125-CON	Protocol Station for dual stage chrome-plated regulators with 4500 PSIG max inlet pressure
529-0126-CON	Protocol Station for dual stage 316L stainless steel regulators with 4500 PSIG max inlet pressure
529-0133-CON	Protocol Station for single stage regulators with 6000 PSIG max inlet pressure

Wall Mount Protocol Switchover Station

Description

The 529 Series Protocol Switchover Station combines all of the safety and convenience features of a standard Protocol Station with the added efficiency of having a reserve cylinder connected to the system. The Protocol Switchover Station valving allows manual switching and isolation of the depleted cylinder for safe change-out. The system comes complete with Protocol Station, two 3-foot all stainless steel pigtails with armor casing, and two valves (diaphragm, 3,000 PSIG or needle 4,500 or 6,000 PSIG).



Features	Specifications	
<i>Plugged port in gas block</i> Facilitates purging <i>Integral check valve at inlet</i> No internal contamination during cylinder change <i>Bracket mounts</i> Attaches conveniently to any surface	<i>Protocol Tee</i> Brass or 316 stainless steel barstock	<i>Maximum Inlet Pressure</i> 3000 PSIG (210 BAR) 4500 PSIG (310 BAR) optional 6000 PSIG (380 BAR) optional
	<i>Flexible Pigtails</i> 316 stainless steel barstock Monel innercore for oxygen service	<i>Temperature Range</i> -40°F to 140°F (-40°C to 60°C)
	<i>Inlet Connection</i> 316 stainless steel or brass barstock	<i>Weight (Single Stage)</i> 3.6 lbs. (1.4 kg)
	<i>Check Valve "O" Ring</i> Viton®	<i>Weight (Dual Stage)</i> 4.0 lbs. (1.6 kg)
	<i>Bracket</i> 304 Stainless Steel	

Ordering Information and Configuration Options

Stock Number	Description
Add letter "C" after any regulator stock number To order separately: 529-0154-CON 529-0155-CON 529-0156-CON 529-0157-CON 529-0158-CON 529-0159-CON 529-0160-CON	For example, to order a 422-1331-580 with a Protocol Switchover, the stock number would be 422-1331-580C Protocol Switchover Station for brass regulators with max inlet 3,000 PSIG (4,000 PSIG Gauge) Protocol Switchover Station for chrome-plated brass regulators with max inlet 3,000 PSIG (4,000 PSIG Gauge) Protocol Switchover Station for 316L stainless steel regulators with max inlet 3,000 PSIG (4,000 PSIG Gauge) Protocol Switchover Station for brass regulators with max inlet 4,500 PSIG (6,000 PSIG Gauge) Protocol Switchover Station for chrome-plated brass regulators with max inlet 4,500 PSIG (6,000 PSIG Gauge) Protocol Switchover Station for 316L stainless steel regulators with max inlet 4,500 PSIG (6,000 PSIG Gauge) Protocol Switchover Station for 316L stainless steel regulators with max inlet 6,000 PSIG (10,000 PSIG Gauge)

Protocol Switchover Alarm

Description

The 529 Series Protocol Switchover Alarm combines all of the features of the Protocol Switchover Station with the added security of a remote alarm system. The Protocol Switchover Alarm will provide an audio/visible warning when a cylinder is nearly depleted. The system comes complete with Protocol Switchover Station, two 3-foot all stainless steel pigtails with armor casing, two valves (diaphragm, 3,000 PSIG or needle 4,500 or 6,000 PSIG) and remote alarm.



4

Features	Specifications
Plugged port in gas block Facilitates purging Integral check valve at inlet No internal contamination during cylinder change Bracket mounts Attaches conveniently to any surface Pressure Switch Gauge Provides visible warning of cylinder depletion Remote Alarm Provides audible and visible warning of cylinder depletion	Protocol Tee Brass or 316 stainless steel barstock Flexible Pigtails 316 stainless steel barstock Monel innercore for oxygen service Inlet Connection 316 stainless steel or brass barstock Check Valve "O" Ring Viton® Bracket 304 Stainless Steel Maximum Inlet Pressure 3000 PSIG (210 BAR) 4500 PSIG (310 BAR) optional 6000 PSIG (380 BAR) optional Temperature Range -40°F to 140°F (-40°C to 60°C) Weight (Single Stage) 4.4 lbs. (2 kg) Weight (Dual Stage) 4.8 lbs. (2.2 kg) Intrinsic Safety Barriers Required for flammable gas service or for use in hazardous environments

Ordering Information and Configuration Options

Stock Number	Description
Add letter "G" after any regulator stock number Add letter "H" after any regulator stock number To order separately: 529-0151-CONG 529-0152-CONG 529-0153-CONG 529-0154-CONG 529-0155-CONG 529-0156-CONG 529-0157-CONG 529-0158-CONG 529-0159-CONG 529-0160-CONG	For example, to order a 422-1331-580 with a 110V Protocol Switchover Alarm, the stock number would be 422-1331-580G For example, to order a 422-1331-580 with a 220V Protocol Switchover Alarm, the stock number would be 422-1331-580H 110V Protocol Switchover Alarm for brass regulators with max inlet 600 PSIG 110V Protocol Switchover Alarm for chrome-plated brass regulators with max inlet 600 PSIG 110V Protocol Switchover Alarm for 316L stainless steel regulators with max inlet 600 PSIG 110V Protocol Switchover Alarm for brass regulators with max inlet 3,000 PSIG 110V Protocol Switchover Alarm for chrome-plated brass regulators with max inlet 3,000 PSIG 110V Protocol Switchover Alarm for 316L stainless steel regulators with max inlet 3,000 PSIG 110V Protocol Switchover Alarm for brass regulators with max inlet 4,500 PSIG 110V Protocol Switchover Alarm for chrome-plated brass regulators with max inlet 4,500 PSIG 110V Protocol Switchover Alarm for 316L stainless steel regulators with max inlet 4,500 PSIG 110V Protocol Switchover Alarm for 316L stainless steel regulators with max inlet 6,000 PSIG <i>For 220V Protocol Switchover Alarm replace "G" after Part Number with "H"</i>

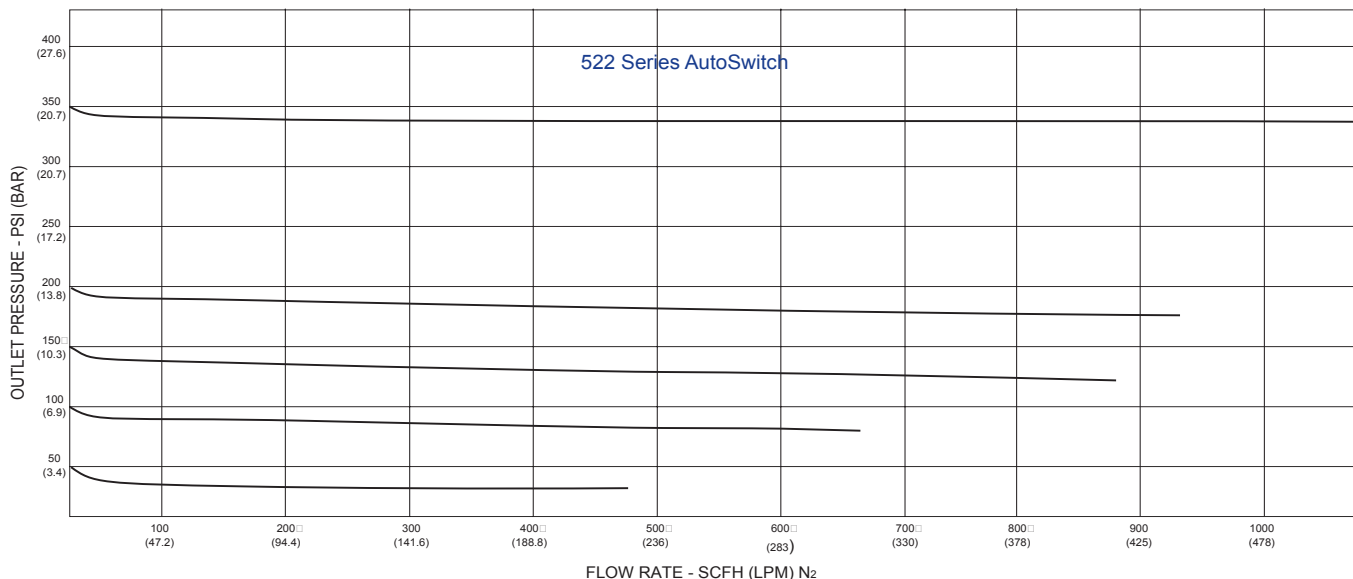
522 Series

automatic switchover system



Description	Advanced Features	
The 522 Series AutoSwitch is a continuous gas delivery system for high purity gas service, typically in the laboratory or process plant, that automatically changes cylinder or bank priority from the primary source to a reserve supply without transmitting pressure fluctuations to the use line. Internal pressure switches, warning lights, and remote alarm indicate low bank pressure.	• 400 Series Brass System Components Capsule® seat • Metal to metal seals No possibility of gas contamination • Integral Line Regulator Stable line pressure during change over	• Variable Line Pressure Line pressure changeable on site • User-Friendly Priority Valve One knob switches cylinder priority • Integral Manifold System Easy installation
Remote Alarm	Materials	Specifications
Providing audible and visible notification of cylinder depletion, one Advantium 8 remote alarm can monitor and power up to four switchover stations. See page 4.76. Intrinsic Safety Barriers Safe use with flammable gases or in hazardous areas (class 1, division 1, group A, B, C or D) Relay Output Easy integration with other alarm systems Telephone Dialer Notify multiple off-site locations of the need to change depleted cylinders Computer Interface Serial communication through RS-232 port	Priority Valve Brass barstock Line Regulator Brass barstock Diaphragms 316L stainless steel Enclosure Acrylic powder-coated steel Tubing and Fittings 316 stainless steel Internal Seats and Seals PTFE Pressure Gauges and Switches Brass, Bronze and Stainless Steel Check Valves Brass with Viton® seals	Maximum Inlet Pressure 3000 PSIG (210 BAR) Temperature Range -40°F to 140°F (-40°C to 60°C) Maximum Flow (100 PSIG) 600 scfh (283 lpm) Inlet Connection ½" FPT Outlet Connection ¼" stainless steel compression tube Helium Leak Integrity 1 x 10⁻⁸ scc/sec Weight 40 lbs. (18 kg) <i>See page 5.66 for manifold specifications</i>

Flow Performance



4

Ordering Information and Configuration Options

522	A	B	C	D	-Inlet
Series 522	Outlet Pressure 2: 0-50 PSIG 3: 0-100 PSIG 4: 0-200 PSIG 5: 0-350 PSIG 7: 0-150 PSIG	Inlet Connection 0: ½" FPT 1: Brass Manifolds (36" flexible pigtails at each station) 3: Diaphragm Valves* (Two 36" stainless flexible pigtails) 4: Brass Manifolds (24" flexible pigtails at each station) 5: Chrome-Plated Brass Manifolds (36" flexible pigtails at each station) 6: ½" FPT with captured vent 7: Chrome-Plated Brass Manifolds (24" flexible pigtails at each station) 9: Diaphragm Valves* (Two 72" stainless steel pigtails) <i>*One cylinder/side only</i>	Cylinders/Side 0: No Inlet Connection* 1: One Cylinder 2: Two Cylinders 3: Three Cylinders 4: Four Cylinders 5: Five Cylinders 6: Six Cylinders 7: Seven Cylinders 8: Eight Cylinders 9: Nine Cylinders <i>* If manifold option is selected in B, 0 = Ten Cylinders</i>	Assembly 1: Without Alarm Capability 4: With Alarm Capability* (Alarm Sold Separately) <i>*Intrinsic safety barriers are required for flammable gas service or for use in hazardous environments.</i>	Pigtail Please specify inlet connection (if applicable) CGA DIN 477 BS 341 and others available
Related Options		See Pages 4.76 and 4.77 for Alarm Options			

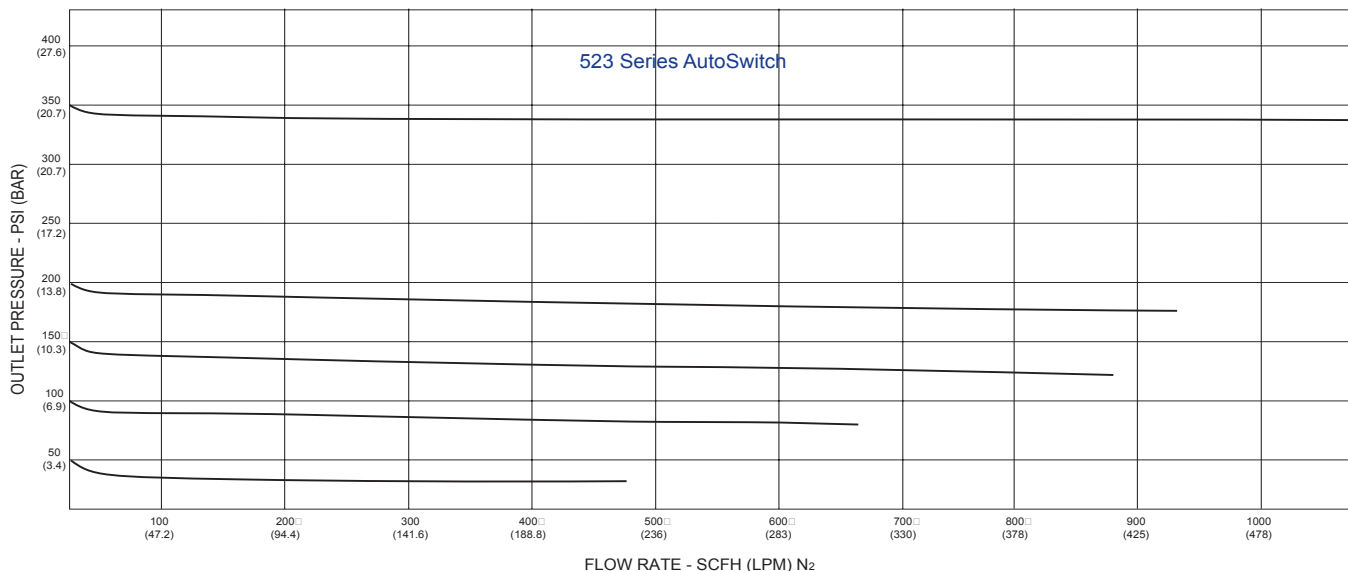
523 Series

corrosion resistant, automatic switchover system



Description	Advanced Features	
The 523 Series AutoSwitch is a continuous gas delivery system for ultra-high purity or corrosive gas service, typically in the laboratory or process plant, that automatically changes cylinder or bank priority from primary source to a reserve supply without transmitting pressure fluctuations to the use line. Internal pressure switches, warning lights, and remote alarm indicate low bank pressure and the need to change depleted cylinders.	• 400 Series 316L Stainless Components Capsule® seat • Metal to metal seals No possibility of gas contamination • Integral Line Regulator Stable line pressure during change over	• Variable Line Pressure Line pressure changeable on site • User-Friendly Priority Valve One knob switches cylinder priority • Integral Manifold System Easy installation
Remote Alarm	Materials	Specifications
Providing audible and visible notification of cylinder depletion, one Advantium 8 remote alarm can monitor and power up to four switchover stations. See page 4.76. Intrinsic Safety Barriers Safe use with flammable gases or in hazardous areas (class 1, division 1, group A, B, C or D) Relay Output Easy integration with other alarm systems Telephone Dialer Notify multiple off-site locations of the need to change depleted cylinders Computer Interface Serial communication through RS-232 port	Priority Valve 316L stainless steel barstock Line Regulator 316L stainless steel barstock Diaphragms 316L stainless steel Enclosure Acrylic powder-coated steel Tubing and Fittings 316 stainless steel Internal Seats and Seals PTFE Pressure Gauges and Switches 316 stainless steel Check Valves 316 stainless steel with Viton® seal	Maximum Inlet Pressure 3000 PSIG (210 BAR) Temperature Range -40°F to 140°F (-40°C to 60°C) Maximum Flow (100 PSIG) 600 scfh (283 lpm) Inlet Connection ½" FPT Outlet Connection ¼" stainless steel compression tube Helium Leak Integrity 1 x 10⁻⁸ scc/sec Weight 40 lbs. (18 kg) See page 5.66 for manifold specifications

Flow Performance



4

Ordering Information and Configuration Options

523	A	B	C	D	-Inlet
Series 523	Outlet Pressure 2: 0-50 PSIG 3: 0-100 PSIG 4: 0-200 PSIG 5: 0-350 PSIG 7: 0-150 PSIG	Inlet Connection 0: ½" FPT for Non-Toxic Gases 1: Stainless Steel Manifolds for Non-Toxic Gases (36" flexible pigtails at each station) 3: Diaphragm Valves for Non-Toxic Gases* (Two 36" flexible pigtails) 4: Stainless Steel Manifolds for Non-Toxic Gases (24" flexible pigtails at each station) 5: Stainless Steel Manifolds for Toxic Gases† (36" flexible pigtails at each station) 6: ½" FPT with captured vent 7: Stainless Steel Manifolds for Toxic Gases† (24" flexible pigtails at each station) 8: Diaphragm Valves for Toxic Gases*† (Two 36" flexible pigtails) 9: Diaphragm Valves* (Two 72" stainless steel pigtails) <i>*One cylinder/side only</i> <i>†Includes captured vent</i>	Cylinders/Side 0: No Inlet Connection* 1: One Cylinder 2: Two Cylinders 3: Three Cylinders 4: Four Cylinders 5: Five Cylinders 6: Six Cylinders 7: Seven Cylinders 8: Eight Cylinders 9: Nine Cylinders A: Eleven Cylinders B: Twelve Cylinders C: Thirteen Cylinders D: Fourteen Cylinders	Assembly 1: Without Alarm Capability 4: With Alarm Capability* (Alarm Sold Separately) <i>*Intrinsic safety barriers are required for flammable gas service or for use in hazardous environments.</i>	Pigtail Please specify inlet connection (if applicable) CGA DIN 477 BS 341 and others available
Related Options		See Pages 4.76 and 4.77 for Alarm Options			

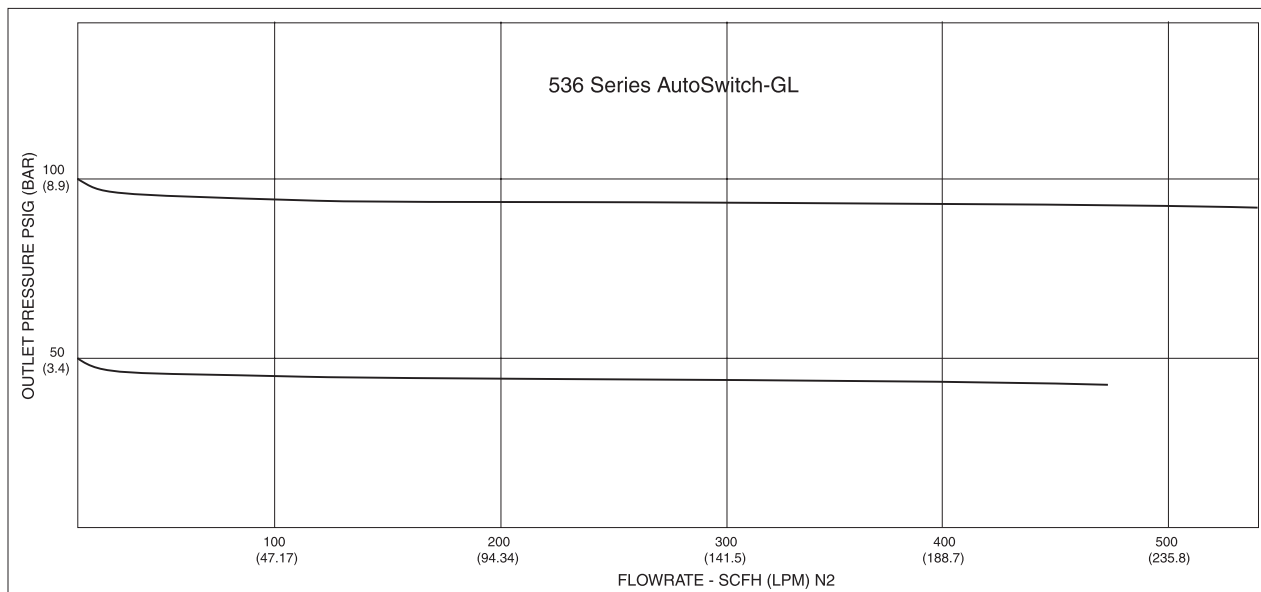
536 Series automatic switchover system from LP cryogenic source to HP cylinders



Description	Advanced Features	
The 536 Series AutoSwitch GL is a continuous gas delivery system for high purity gas service that automatically changes cylinder or bank priority from a cryogenic source to a reserve bank of high pressure cylinders without transmitting pressure fluctuations to the use line.	• Integral Line Regulator Stable line pressure during change over • 400 Series Brass System Components Capsule® seat • Metal to metal seals No possibility of gas contamination	• Variable Line Pressure Line pressure changeable on site • Preset Switching Pressure Prevents tampering or adjustment • Integral Manifold System Easy installation

Remote Alarm	Materials	Specifications
Providing audible and visible notification of cylinder depletion, one Advantium 8 remote alarm can monitor and power up to four switchover stations. See page 4.76. Intrinsic Safety Barriers Safe use with flammable gases or in hazardous areas (class 1, division 1, group A, B, C or D) Relay Output Easy integration with other alarm systems Telephone Dialer Notify multiple off-site locations of the need to change depleted cylinders Computer Interface Serial communication through RS-232 port	Priority Valve Brass barstock Line Regulator Brass barstock Diaphragms 316L stainless steel Enclosure Acrylic powder-coated steel Tubing and Fittings 316 stainless steel Internal Seats and Seals PTFE Pressure Gauges and Switches Brass, bronze and stainless steel Check Valves Brass with Vitor® seals	Maximum Inlet Pressure 3000 PSIG (210 BAR) Temperature Range -40°F to 140°F (-40°C to 60°C) Maximum Flow (100 PSIG) 600 scfh (283 lpm) Inlet Connection ½" FPT Outlet Connection ¼" stainless steel compression tube Helium Leak Integrity 1 x 10⁻⁸ scc/sec Weight 40 lbs. (18 kg) See page 5.66 for manifold specifications

Flow Performance



4

Ordering Information and Configuration Options

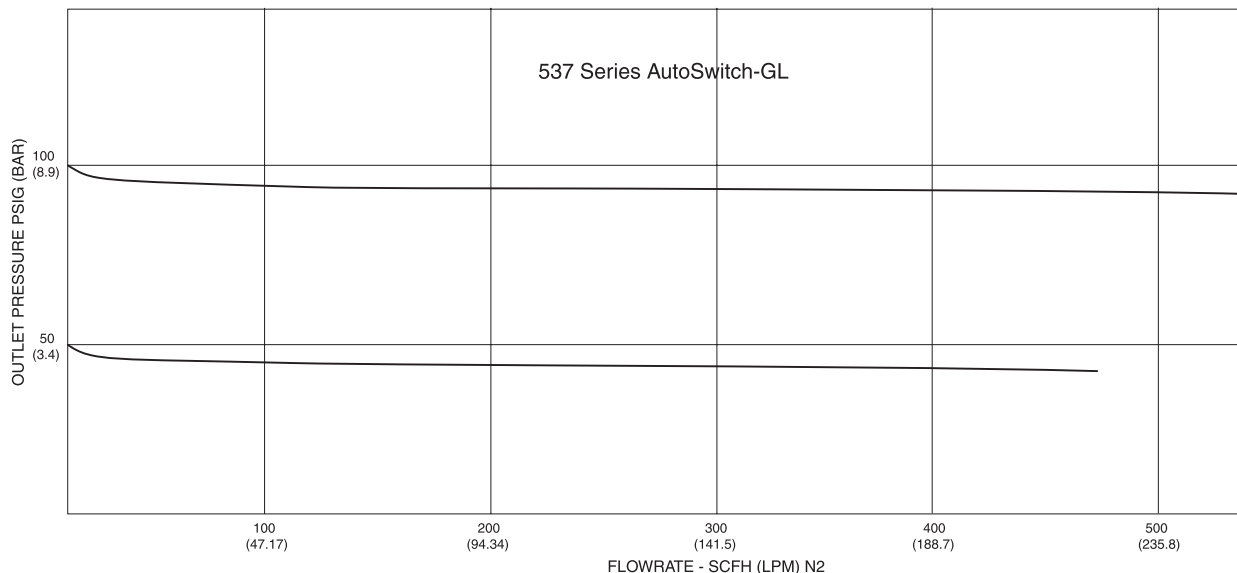
536	A	B	C	D	-Inlet
Series 536	Outlet Pressure 2: 0-50 PSIG 3: 0-100 PSIG	Liquid Cylinders (Primary) 0: No Inlet Connection 1: One Cylinder* 2: Two Cylinders† 3: Three Cylinders† 4: Four Cylinders† <i>* Includes 36" flexible pigtail and diaphragm valve</i> <i>† Each manifold header includes 36" flexible pigtail, manifold extensions and mounting hardware</i>	High Pressure (Reserve) 0: No Inlet Connection 1: One Cylinder* 2: Two Cylinders† 3: Three Cylinders† 4: Four Cylinders† 5: Five Cylinders† 6: Six Cylinders† <i>* Includes 36" flexible pigtail and diaphragm valve</i> <i>† Each manifold header includes 36" flexible pigtail, manifold extensions and mounting hardware</i>	Assembly 1: Without Alarm Capability 4: With Alarm Capability* (Alarm Sold Separately) <i>*Intrinsic safety barriers are required for flammable gas service or for use in hazardous environments.</i>	Pigtail Please specify inlet connection (If applicable). CGA DIN 477 BS 341 and others available
Related Options		See Pages 4.76 and 4.77 for Alarm Options			

537 Series corrosion resistant, automatic switchover system from LP cryogenic source to HP cylinders



Description	Advanced Features	
The 537 AutoSwitch GL is a continuous gas delivery system for high purity gas service that automatically changes cylinder or bank priority from a cryogenic source to a reserve bank of high pressure cylinders without transmitting pressure fluctuations to the use line.	• 400 Series 316L Stainless Components Capsule® seat • Metal to metal seals No possibility of gas contamination • Integral Line Regulator Stable line pressure during change over	• Variable Line Pressure Line pressure changeable on site • Preset Switching Pressure Prevents tampering or adjustment • Integral Manifold System Easy installation
Remote Alarm	Materials	Specifications
Providing audible and visible notification of cylinder depletion, one Advantium 8 remote alarm can monitor and power up to four switchover stations. See page 4.76. Intrinsic Safety Barriers Safe use with flammable gases or in hazardous areas (class 1, division 1, group A, B, C or D) Relay Output Easy integration with other alarm systems Telephone Dialer Notify multiple off-site locations of the need to change depleted cylinders Computer Interface Serial communication through RS-232 port	Priority Valve 316L stainless steel barstock Line Regulator 316L stainless steel barstock Diaphragms 316L stainless steel Enclosure Acrylic powder-coated steel Tubing and Fittings 316 stainless steel Internal Seats and Seals PTFE Pressure Gauges and Switches 316 stainless steel Check Valves 316 stainless steel with Viton® seal	Maximum Inlet Pressure 3000 PSIG (210 BAR) Temperature Range -40°F to 140°F (-40°C to 60°C) Maximum Flow (100 PSIG) 400 scfh (190 lpm) Inlet Connection ½" FPT Outlet Connection ¼" stainless steel compression tube Helium Leak Integrity 1 x 10⁻⁸ scc/sec Weight 40 lbs. (18 kg) See page 5.66 for manifold specifications

Flow Performance



4

Ordering Information and Configuration Options

537	A	B	C	D	-Inlet
Series 537	Outlet Pressure 2: 0-50 PSIG 3: 0-100 PSIG	Liquid Cylinders (Primary) 0: No Inlet Connection 1: One Cylinder* 2: Two Cylinders† 3: Three Cylinders† 4: Four Cylinders† <i>* Includes 36" flexible pigtail and diaphragm valve</i> <i>† Each manifold header includes 36" flexible pigtail, manifold extensions and mounting hardware</i>	High Pressure (Reserve) 0: No Inlet Connection 1: One Cylinder* 2: Two Cylinders† 3: Three Cylinders† 4: Four Cylinders† 5: Five Cylinders† 6: Six Cylinders† <i>* Includes 36" flexible pigtail and diaphragm valve</i> <i>† Each manifold header includes 24" flexible pigtail, manifold extensions and mounting hardware</i>	Assembly 1: Without Alarm Capability 4: With Alarm Capability* (Alarm Sold Separately) <i>*Intrinsic safety barriers are required for flammable gas service or for use in hazardous environments.</i>	Pigtail Please specify inlet connection (if applicable) CGA DIN 477 BS 341 and others available
Related Options	See Pages 4.76 and 4.77 for Alarm Options				

539 Series

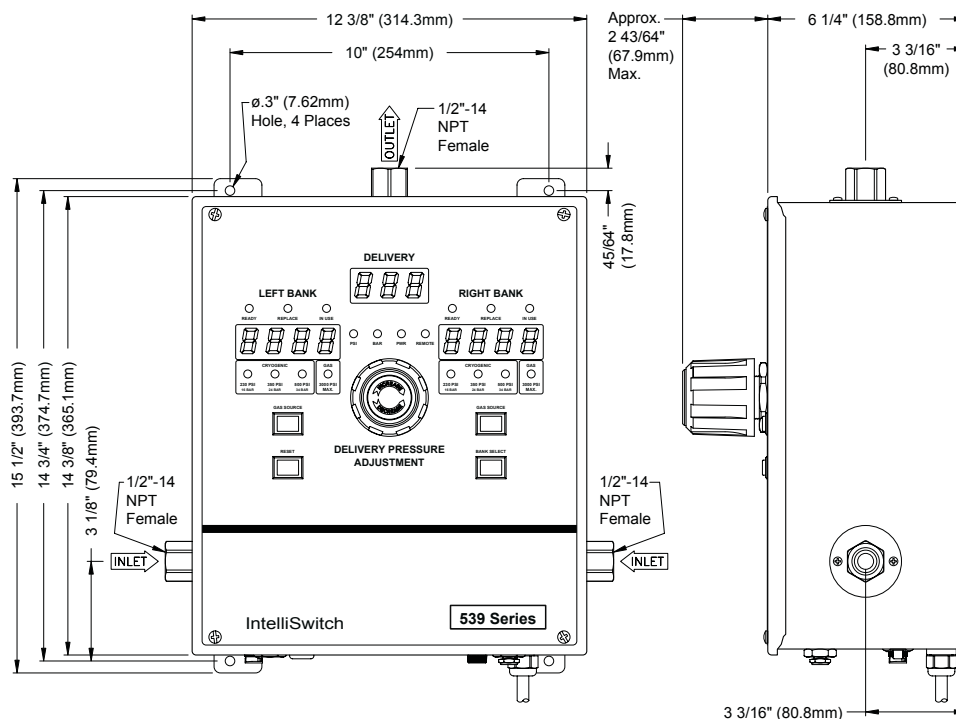
microprocessor control electronic switchover system



Description	Advanced Features	
The IntelliSwitch electronic switchover provides continuous gas supply from liquid cylinders, high pressure cylinders, or a combination of the two allowing the end-user to select the most economical mode of gas supply. Microprocessor control lowers yearly gas cost by eliminating liquid cylinder vent loss and excess residual return, making the IntelliSwitch the perfect choice for laboratory, pilot plant or process applications.	• Microprocessor Control Fully automatic priority assignment • Field Adjustable Parameters Enables process flexibility • On-Site Source Selection Liquid cylinder or high-pressure service • Low Loss Technology Reduces residual return	• Electronic Economizer Eliminates vent loss from 230, 350 or 500 PSIG liquid cylinders • Process Gas or Air Actuated Pilot Valves Simple installation • RS 232 or 485 Communications Provides remote monitoring of supply

Low Loss Principle	Materials	Specifications
The Low Loss Principle consists of two features, the Look-Back and the Economizer. When the IntelliSwitch electronics sense that the primary bank pressure is low, it automatically switches to the reserve bank. After a period of time, the system looks back at the depleted source to sense if it has rebuilt pressure. If it has, the system switches back and continues to draw product from this source, eliminating false switchovers and reducing residual return. The Electronic Economizer has selectable settings for 230, 350 & 500 PSIG liquid cylinders. The IntelliSwitch continuously monitors the pressure in the reserve bank. When the pressure goes above the Economizer setting, the IntelliSwitch will draw gas from the headspace of the reserve bank, preventing vent losses.	<i>Regulator and Valve Bodies</i> Brass barstock <i>Valve Stems</i> 316L stainless steel <i>Valve Seats</i> PCTFE <i>Seals</i> PTFE, PCTFE and Viton® <i>Enclosure</i> Powder-coated steel	<i>Power Requirements</i> 110 or 220 VAC <i>Maximum Inlet Pressure</i> 3,000 PSIG (210 BAR) <i>Temperature Range</i> 0°F to 140°F (-18°C to 60°C) <i>Flow Capacity</i> Cv = 1.0 <i>Filter</i> 40-micron <i>Inlet Connection</i> ½" FPT <i>Outlet Connection</i> ½" FPT <i>Weight</i> 67 lbs. (30.4 kg)

Installation Dimensions



Ordering Information and Configuration Options

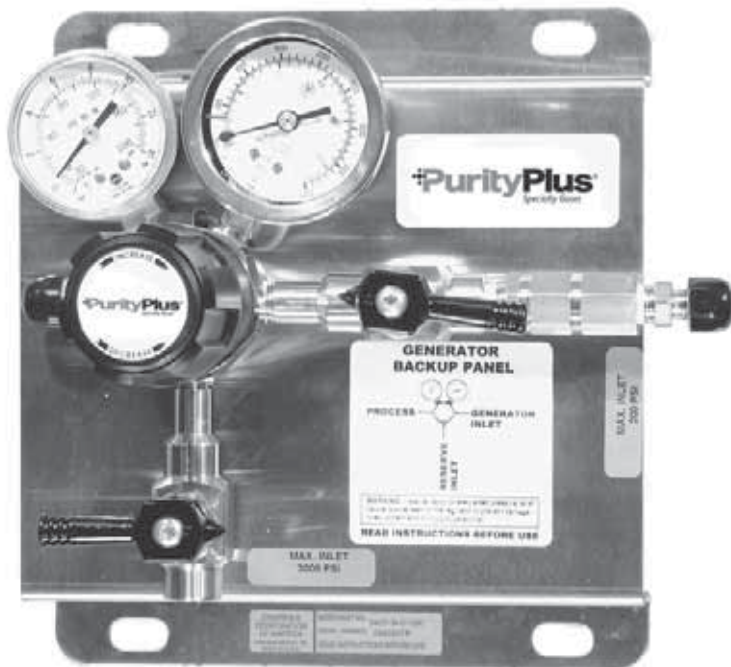
539	A	B	C	D	-Inlet
Series 539	Outlet Pressure 2: 0-50 PSIG 3: 0-100 PSIG 4: 0-150 PSIG 5: 0-200 PSIG	Right Side Connection 0: 1/2" FPT 1: Diaphragm Valve with 36" stainless flexible pigtail 2: Diaphragm Valve with 72" stainless flexible pigtail 3: Manifold Connector	Left Side Connection 0: 1/2" FPT 1: Diaphragm Valve with 36" stainless flexible pigtail 2: Diaphragm Valve with 72" stainless flexible pigtail 3: Manifold Connector	Assembly 0: 110 VAC External Pilot 1: 220 VAC External Pilot 2: 110 VAC Internal Pilot 3: 220 VAC Internal Pilot	Pigtail Please specify inlet connection (if applicable) CGA DIN 477 BS 341 and others available
Related Options		See Pages 4.76 and 4.77 for Alarm Options			

540 Series

gas generator back-up panel

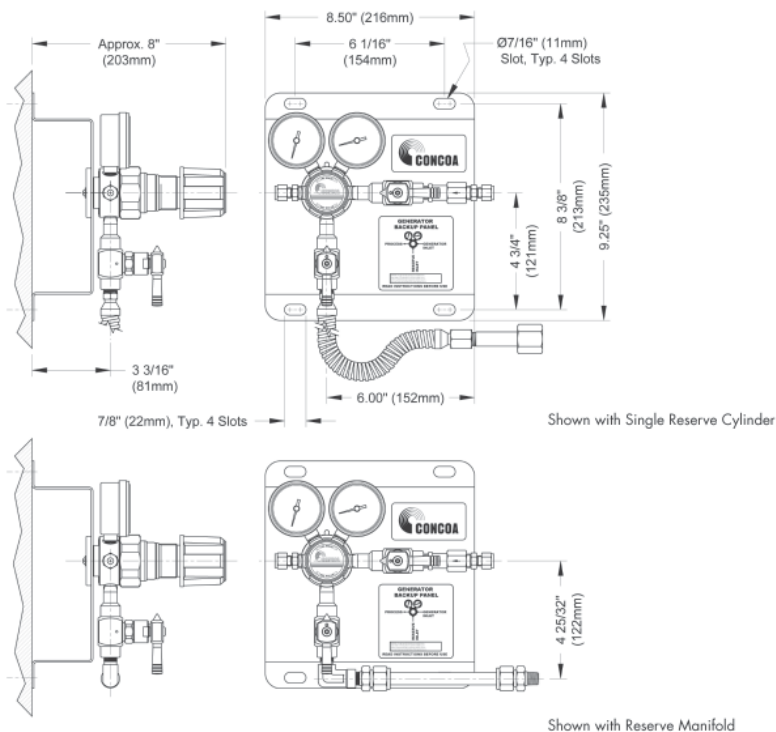
Description

The 540 Series Generator Back-Up Panel is designed to provide a reserve supply to a gas generator. If there is a loss of power, or if the gas generator cannot provide sufficient gas to the system, the reserve supply will automatically activate and supply gas without interruption. When the generator is capable of supplying the system, the reserve shuts down. Generator back-up panels are available for nitrogen, air or hydrogen generators in brass or 316 stainless steel construction. With the available remot ealarm package, the system can signal when the reserve supply is active or running low.



Features	Materials	Specifications
Adjustable pressure User determines the pressure at which the reserve supplies system Check valves on both generator and reserve Prevents back flow to the generator or reserve cylinder Shut-off valves on both generator and reserve Allows isolation and disconnection of either line	Regulator body Brass or 316L stainless steel barstock Bonnet Brass or chrome-plated brass barstock Seat PTFE (3000 PSIG) Filter 10 micron multi-layer sintered wire mesh Diaphragm and Pigtail 316L stainless steel CGA Connections Brass or 316L stainless steel with check valve Check Valve Seat Viton® Panel 304 stainless steel	Maximum Inlet Pressure 3000 PSIG (210 BAR) Temperature Range -40°F to 140°F (-40°C to 60°C) Gauges 2" diameter brass or 316L stainless steel Helium Leak Integrity 1 x 10⁻⁹ scc/sec Adjustable Pressure Range 0 to 150 PSIG (0 to 10 BAR) Cv 0.1 Weight lbs. (kg)

Installation Dimensions



Ordering Information and Configuration Options

540	A	B	C	D	-CON
Series 540	Material 1: Brass 2: 316L stainless steel	Number of Reserve Cylinders 1: 1 Cylinder with Diaphragm Valve 2: 2 Cylinder Manifold 3: 3 Cylinder Manifold 4: 4 Cylinder Manifold 5: 5 Cylinder Manifold	Pigtail Style 2: 24" Flexible 316 stainless steel with check valve 3: 36" Flexible 316 stainless steel with check valve 6: 72" Flexible 316 stainless steel with check valve	Assembly/Gauges 1: 0-4000 PSIG/kPa Gauge No alarm capability 2: 0-4000 BAR/PSIG Gauge No alarm capability 3: 0-4000 BAR/PSIG Gauge with Pressure Switch and 120V Remote Alarm 4: 0-4000 BAR/PSIG Gauge with Pressure Switch and 220V Remote Alarm 5: 0-4000 BAR/PSIG Gauge with Pressure Switch and without Remote Alarm	Inlet Connection CGA DIN 477 BS 341 and others available

526 Series

corrosion resistant, semiautomatic changeover

4

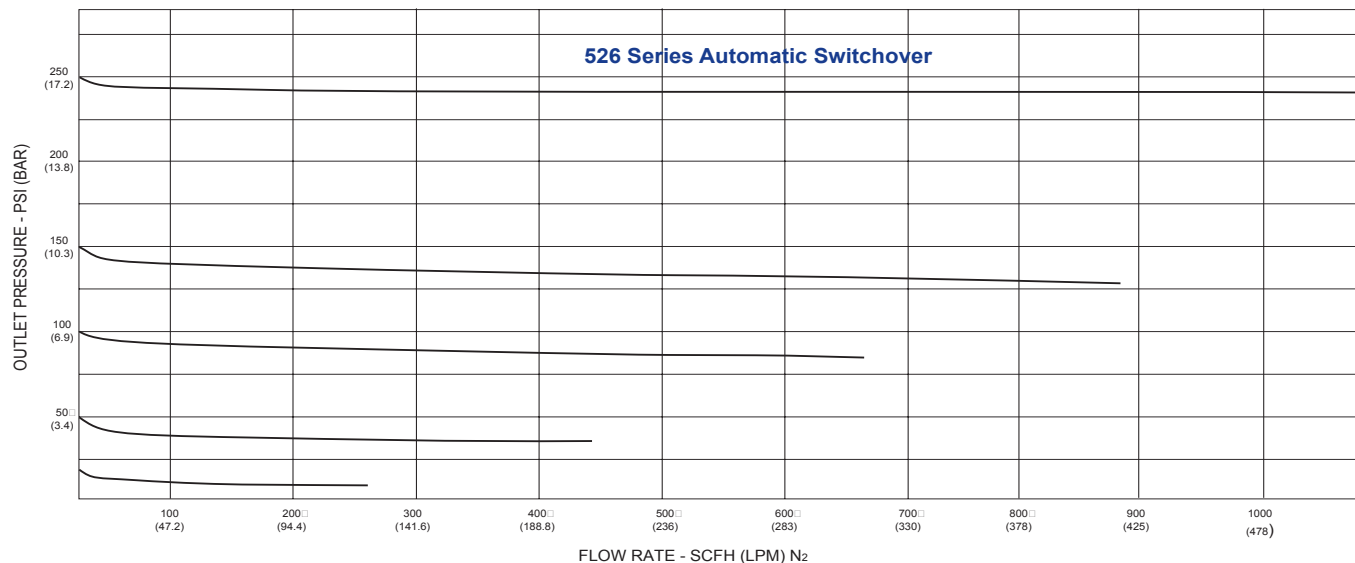
Description

The 526 Series Switchover is an automatic switchover system designed to supply a continuous supply of high purity, non-corrosive gas. The system comes with either flexible pigtailed for use with two cylinders or manifold connectors for use with the Maniflex Modular Manifold System. Due to pressure differential considerations, an integral line regulator is available to maintain constant downstream pressure.



Features	Materials	Specifications
• <i>400 Series brass barstock regulators</i> Capsule® seat • <i>Metal-to-metal diaphragm seal</i> No possibility of gas contamination • <i>User-Friendly</i> One knob switches cylinder priority • <i>Check valves in pigtail inlet glands</i> Prevents contamination and back flow • <i>Compatible with Maniflex Manifolds</i> Multiple cylinders per side • <i>Optional Line Regulator</i> Stable line pressure during change over	<i>Bodies</i> Brass barstock <i>Diaphragms</i> 316L stainless steel <i>Seats</i> PTFE PCTFE with 4500 PSIG inlet <i>Filters</i> 10 micron sintered bronze <i>Internal Seals</i> PTFE	<i>Maximum Inlet Pressure</i> 3000 PSIG (210 BAR) 4500 PSIG (310 BAR) optional <i>Temperature Range</i> -40°F to 140°F (-40°C to 60°C) <i>Gauges</i> 2" diameter brass <i>Outlet Connection</i> 1/4" MPT (without line regulator) 1/4" FPT (with line regulator) <i>Helium Leak Integrity</i> 1 x 10⁻⁸ scc/sec <i>Cv</i> 0.1 <i>Weight</i> 8.25 lbs. (3.71 kg)

Flow Performance



4

Ordering Information and Configuration Options

526	A	B	C	D	-Inlet
Series 526 Switching Pressure (Priority Right/Left) 1: 125 PSIG/105 PSIG* 2: 70 PSIG/50 PSIG* 3: 100 PSIG/75 PSIG 4: 200 PSIG/170 PSIG 5: 500 PSIG/470 PSIG 7: 150 PSIG/130 PSIG 8: 300 PSIG/270 PSIG <i>*Not available with 4500 PSIG inlet</i>	Inlet Connections 0: ¼" FPT Ports 1: Flexible Stainless Steel Pigtails (36") 2: Manifold Connectors* 3: Flexible Stainless Steel Pigtails (24") 4: Diaphragm Valves with ¼" FPT Port 5: Diaphragm Valves with Pigtails (36") 6: Diaphragm Valves with Manifold Connectors* 7: Diaphragm Valves with Pigtails (24") 8: Flexible PTFE-lined Pigtails (36") (4500 PSIG maximum inlet pressure) A: Flexible Stainless Steel Pigtails (36") with Flashback Arrestor for Acetylene	Line Regulator 0: None 1: 0-15 PSIG 2: 0-50 PSIG 3: 0-100 PSIG 4: 0-250 PSIG 5: 0-400 PSIG 7: 0-150 PSIG A: 0-15 PSIG Redline for Acetylene	Assembly/Gauges 1: 0-4000 PSI/kPa Gauges* No alarm capability 2: 0-4000 BAR/PSI Gauges* No alarm capability 3: 0-4000 BAR/PSI* with Pressure Switches and 110V Remote Alarm 4: 0-4000 BAR/PSI* with Pressure Switches and 220V Remote Alarm 5: 0-600 BAR/PSI Gauges No alarm capability 6: 0-600 BAR/PSI with Pressure Switches and 110V Remote Alarm 7: 0-600 BAR/PSI with Pressure Switches and 220V Remote Alarm 8: 0-4000 BAR/PSI* with Pressure Switches and without Remote Alarm <i>*0-6000 PSI gauges with 4500 PSIG maximum inlet option</i>	Pigtail Please specify inlet connection (if applicable) CGA DIN 477 BS 341 and others available	

527 Series

corrosion resistant, semiautomatic changeover

4

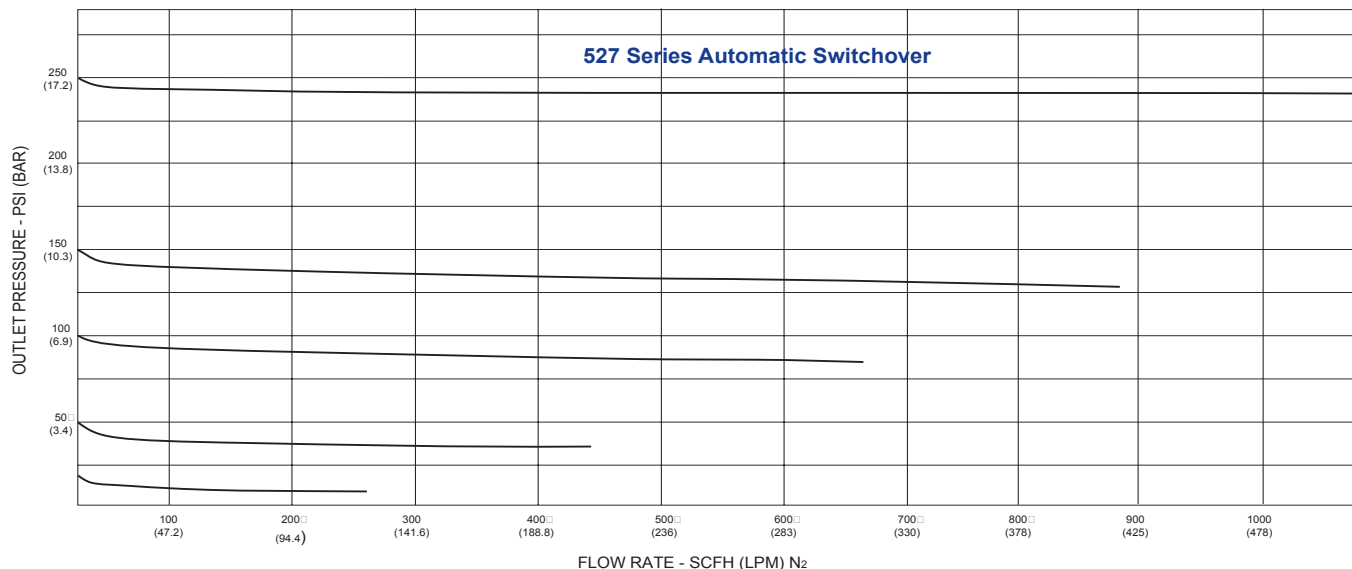
Description

The 527 Series Switchover is an automatic switchover system designed to supply a continuous supply of high purity, corrosive gas. The system comes with either flexible pigtailed for use with two cylinders or manifold connectors for use with the Maniflex Modular Manifold System. Due to pressure differential considerations, an integral line regulator is available to maintain constant downstream pressure.



Features	Materials	Specifications
400 Series stainless steel regulators Capsule® seat - Metal-to-metal diaphragm seal No possibility of gas contamination - User-Friendly Priority Valve One knob switches cylinder priority - Check valves in inlet gland Prevents contamination and back flow. - Compatible with Maniflex Manifolds Multiple cylinders per side - Optional Line Regulator Stable line pressure during change over	<i>Bodies</i> 316L stainless steel barstock <i>Diaphragms</i> 316L stainless steel <i>Seats</i> PTFE PCTFE with 4500 PSIG inlet <i>Filters</i> 10 micron sintered stainless steel <i>Internal Seals</i> PTFE	<i>Maximum Inlet Pressure</i> 3000 PSIG (210 BAR) 4500 PSIG (310 BAR) optional <i>Temperature Range</i> -40°F to 140°F (-40°C to 60°C) <i>Gauges</i> 2" diameter stainless steel <i>Outlet Connection</i> 1/4" MPT (without line regulator) 1/4" FPT (with line regulator) <i>Helium Leak Integrity</i> 1 x 10⁻⁸ scc/sec <i>Cv</i> 0.1 <i>Weight</i> 8.25 lbs. (3.71 kg)

Flow Performance



4

Ordering Information and Configuration Options

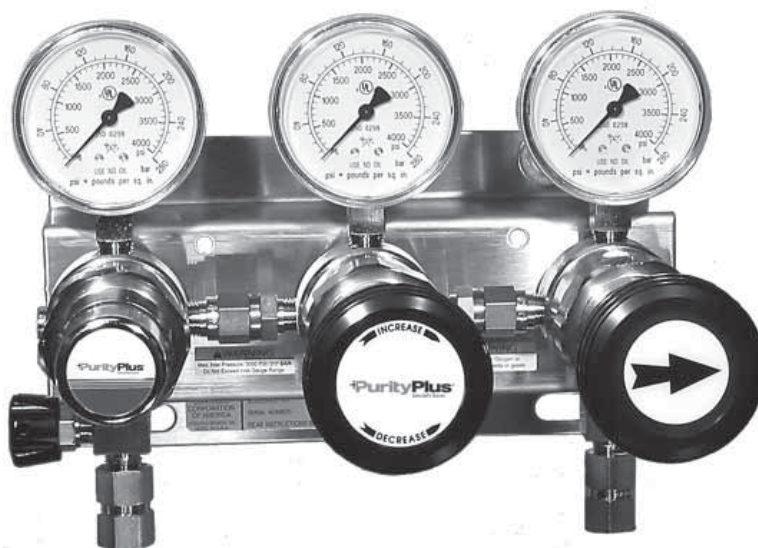
527	A	B	C	D	-CON
Series 527	Switching Pressure (Priority Right/Left) 1: 125 PSIG/105 PSIG* 2: 70 PSIG/50 PSIG* 3: 100 PSIG/75 PSIG 4: 200 PSIG/170 PSIG 5: 500 PSIG/470 PSIG 7: 150 PSIG/130 PSIG 8: 300 PSIG/270 PSIG <i>*Not available with 4500 PSIG inlet</i>	Inlet Connections 0: ¼" FPT Ports 1: Flexible Stainless Steel Pigtails (36") 2: Manifold Connectors* 3: Flexible Stainless Steel Pigtails (24") 4: Diaphragm Valves with ¼" FPT Port 5: Diaphragm Valves with Pigtails (36") 6: Diaphragm Valves with Manifold Connectors* 7: Diaphragm Valves with Pigtails (24") 8: Flexible PTFE-lined Pigtails (36") (4500 PSIG maximum inlet pressure) <i>*See page 5.66 for manifold ordering information</i>	Line Regulator 0: None 1: 0-15 PSIG 2: 0-50 PSIG 3: 0-100 PSIG 4: 0-250 PSIG 5: 0-400 PSIG 7: 0-150 PSIG	Assembly/Gauges 1: 0-4000 PSI/kPa Gauges No alarm capability 2: 0-4000 BAR/PSI Gauges No alarm capability 3: 0-4000 BAR/PSI with Pressure Switches and 110V Remote Alarm 4: 0-4000 BAR/PSI with Pressure Switches and 220V Remote Alarm 5: 0-600 BAR/PSI Gauges No alarm capability 6: 0-600 BAR/PSI with Pressure Switches and 110V Remote Alarm 7: 0-600 BAR/PSI with Pressure Switches and 220V Remote Alarm 8: 0-4000 BAR/PSI with Pressure Switches and without Remote Alarm	Pigtail Please specify inlet connection (if applicable) CGA DIN 477 BS 341 and others available

530 Series

high flow automatic switchover system

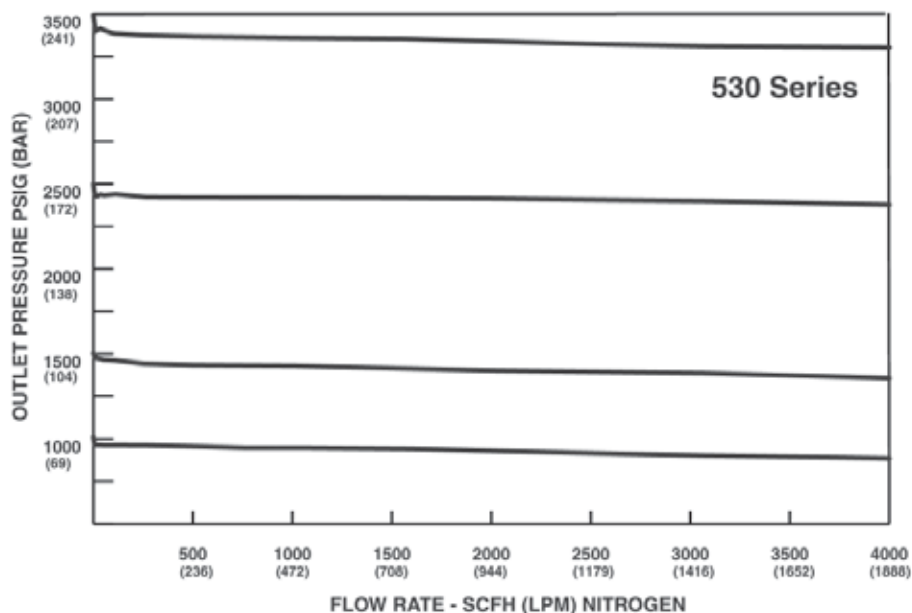
Description

The 530 Series Switchover is an automatic switchover system designed to deliver a continuous supply of high pressure non-corrosive, non-oxidizing gas at flows up to 4000 SCFH. The system comes either with flexible pigtails for use with one or two cylinders per side, or with 1/4" Female NPT connection. A shut-off valve is standard to isolate the depleted bank during cylinder change. A line regulator is also standard to control downstream pressure regardless of bank priority. An alarm system is available to notify the user when a bank is depleted.



Features	Materials	Specifications
• 492 Series brass barstock regulators Safely controls pressures to 6000 PSIG • User-Friendly One knob switches cylinder priority • Check valves in pigtail inlet glands Prevents contamination and back flow • Line Regulator Stable line pressure during change over • Capsule® Seat Increased serviceability and life	Bodies Chrome-plated brass barstock Cartridges Brass Barstock Seats Arlon® (PEEK) Filters 10 micron sintered bronze Internal Seals Viton® Weight 22.5lbs. (10.2 kg)	Inlet Pressure Available 3000 PSIG (207 BAR) 4500 PSIG (310 BAR) 6000 PSIG (414 BAR) Temperature Range -40°F to 140°F (-40°C to 60°C) Gauges 2 1/2" diameter chrome-plated brass (non-pressure switch models) 2 1/2" diameter stainless steel (pressure switch models) Outlet Connection 1/4" tube fitting Cv 0.1 Not for O₂, N₂O, or CO₂

Flow Performance



4

Ordering Information and Configuration Options

530	A	B	C	D	-CON
Series 530	Delivery Pressure 1: 1000 PSIG 2: 1500 PSIG 3: 2500 PSIG 4: 3500 PSIG	Inlet Pressure (Inlet Gauges) 1: 3000 PSIG (4000 PSIG/280 BAR) 2: 4500 PSIG (6000 PSIG/414 BAR) 3: 6000 PSIG (10,000 PSIG/700 BAR)	Inlet Connection 0: 1/4" FPT Port 1: Two Diaphragm Valves with Two 36" Flexible Pigtails (One Station per Side) 2: Two Diaphragm Valves with Four 36" Flexible Pigtails (Two Stations per Side)	Assembly Gauges 2: PSIG/BAR Gauges No alarm capability 3: PSIG/BAR Gauges with Pressure Switches† and 110V Remote Alarm 4: PSIG/BAR Gauges with Pressure Switches† and 220V Remote Alarm †Intrinsic safety barriers are required for flammable gas service or for use in hazardous environments.	Pigtail Please specify inlet connection (if applicable) CGA DIN 477 BS 341 and others available Not for use in O ₂ , CO ₂ , or N ₂ O.

Advantium 8 Alarm

manifold alarm

Description

Designed for use with all CONCOA automatic switchover systems, the new Advantium Series offers superior integration, protection, and convenience by allowing end-users to monitor normally open or closed contact devices with a single flip of a switch. Systems can be configured for inert or flammable gases utilizing CONCOA's innovative intrinsic safety barriers, allowing end-users to safely monitor flammable gas cylinder contents via a remote alarm on a CONCOA switchover or Protocol station.



Features

- High profile visible and audible notification
- Audible alarm silence function
- Thirteen input and output channels
Eight input and five output
- Dry contact relay output
Four discrete or one general
- RS232 data interface capability
- NO or NC switch compatibility
- Auto-reset when cylinders are replenished
- Custom configure one to four systems

Specifications

Sound

93 db audible alarm

Power

120 VAC or 220 VAC

Relay Contact

Single pole, double throw (SPDT)

Relay Contact Rating

1A@24 VDC or .5A@120 VAC

RS232 Serial Port

No parity
9600 baud rate

Dimensions

9.59" x 5.48" x 2.95"

Power Fuses

.5A normal blow, type 3AG, 120 VAC
.25A normal blow, type 3AG, 220 VAC

System Fuses

Internal resettable poly-fuse

Connections

Input connector (D25)
Relay output connector (D15)
RS232 serial output connector (D9)

Ordering Information and Configuration Options

Part Number	Description
529-5310	Multi-Station Remote Alarm (120V)
529-5311	Multi-Station Remote Alarm (220V)
529-5312	Intrinsic Safety Barriers for 526 or 527 Series Switchover Systems (required for flammable gas or hazardous environments)
529-5296	Intrinsic Safety Barriers for 522, 523, 536 or 537 Series AutoSwitch Systems (required for flammable gas or hazardous environments)
529-5306	AD2000 Telemetry Auto-dialer for 529-5310 and 529-5311 Alarms
529-5390	RS232 Advantium Monitoring Software
	Contact CONCOA for pre-made patch cables

2 input remote manifold alarm

Advantium 2 Remote Alarm

Features

- High profile visible and audible notification
- Audible alarm silence function
- Two input channels and one output channel
- One general dry contact relay output
- NO or NC switch compatibility
- Auto-reset when cylinders are replenished



Specifications

- **Audio**
93 db audible alarm
- **Power**
120 VAC or 220 VAC
- **Relay Contact**
Single pole, double throw (SPDT)
- **Relay Contact Rating**
1A@24 VDC or .5A@120 VAC
- **Dimensions**
3 1/4" x 6" x 2"
- **System Fuses**
Internal resettable poly-fuse
- **Connections**
Input connector (6-pin circular)
Relay output connector (4-pin circular)
- **Intrinsic Safety Barriers**
Required for flammable gas service or for use in hazardous environments

Ordering Information

Part Number	Description
529-5106-120	Single-System Remote Alarm (120V)
529-5106-220	Single-System Remote Alarm (220V)
529-5312	Intrinsic Safety Barriers for 526 or 527 Series Switchover Systems
529-5296	Intrinsic Safety Barriers for 522, 523, 536 or 537 AutoSwitch Systems

1 input remote manifold alarm

Advantium 1 Remote Alarm

Features

- High profile visible and audible notification
- Audible alarm silence function
- One input channel and one output channel
- One general dry contact relay output
- NO or NC switch compatibility
- Auto-reset when cylinders are replenished



Specifications

- **Audio**
93 db audible alarm
- **Power**
120 VAC or 220 VAC
- **Relay Contact**
Single pole, double throw (SPDT)
- **Relay Contact Rating**
1A@24 VDC or .5A@120 VAC
- **Dimensions**
3 1/4" x 6" x 2"
- **System Fuses**
Internal resettable poly-fuse
- **Connections**
Input connector (6-pin circular)
Relay output connector (4-pin circular)
- **Intrinsic Safety Barriers**
Required for flammable gas service or for use in hazardous environments

Ordering Information

Part Number	Description
529-5135-120	Protocol Station Remote Alarm (120V)
529-5135-220	Protocol Station Remote Alarm (220V)
529-5313	Intrinsic Safety Barriers for Protocol Alarm Stations
	Contact CONCOA for pre-made patch cables

52 Series

maniflex, modular manifolds

4

Description

The 52B, 52C and 52S series Maniflex are modular gas distribution systems that may be connected to regulators, dual regulator switchovers, and AutoSwitch systems. A modular gas distribution system allows the user to size the inlet capacity of a system so that cylinder changes will not be as frequent. The Maniflex system provides the user with the capability of purchasing an unlimited number of manifold stations connected to a single header. The Maniflex headers themselves may be purchased as a complete system (unassembled) or as individual components.



Specifications

Maximum Inlet Pressure
3000 PSIG (210 BAR)

Temperature Range
-40°F to 140°F

Header

0.625 OD x 0.188 wall (Brass)

0.625 OD x 0.095 wall (Stainless)

Diaphragm Valve

Brass or stainless steel barstock (Body)

PCTFE (Seat)

303/304 stainless steel (Stems)

Elgiloy® (Diaphragms)

Advanced Features

- Modular Design
Flexible field installation
- Integral Diaphragm Valves
Leak-tight integrity
Independent shut-off capability
- Expandable System
Future growth capability
- Brass, Chrome-Plated Brass or Stainless Steel
No possibility of gas contamination
- Metal to Metal Field-Assembled Joints
Easy leak-tight field assembly
Ease of transportation
- Silver-Brazed or TIG Welded Connectors
Contamination-free installation

Dimensions ("A", "B", and "C" refer to the lengths specified on the diagram below.)

Cylinders per Side	1	2	3	4	5	6	7	8	9	10
"A" Standard (Single Row)	2.5"	14.5"	26.5"	38.5"	50.5"	62.5"	74.5"	86.5"	98.5"	110.5"
"B" Standard (Single Row)	17.891"	29.891"	41.891"	53.891"	65.891"	77.891"	89.891"	101.89"	113.89"	125.89"
"C" Standard (Single Row)	35.781"	59.781"	83.781"	107.78"	131.78"	155.78"	179.78"	203.78"	227.78"	251.78"
Weight Standard (Brass Single Row)	3.45 lbs	7.07 lbs	10.69 lbs	14.31 lbs	17.93 lbs	21.55 lbs	25.17 lbs	28.79 lbs	32.41 lbs	36.03 lbs
Weight Standard (SS Single Row)	3.33 lbs	6.45 lbs	9.57 lbs	12.69 lbs	15.81 lbs	18.93 lbs	22.05 lbs	25.17 lbs	28.29 lbs	31.41 lbs
"A" Compact (Single Row)	2.5"	8.5"	14.5"	20.5"	26.5"	32.5"	38.5"	44.5"	50.5"	56.5"
"B" Compact (Single Row)	17.891"	23.891"	29.891"	35.891"	41.891"	47.891"	53.891"	59.891"	65.891"	71.891"
"C" Compact (Single Row)	35.781"	47.781"	59.781"	71.781"	83.781"	95.781"	107.78"	119.78"	131.78"	143.78"
Weight Compact (Brass Single Row)	3.45 lbs	6.62 lbs	9.79 lbs	12.96 lbs	16.13 lbs	19.3 lbs	22.47 lbs	25.64 lbs	28.81 lbs	31.98 lbs
Weight Standard (SS Single Row)	3.33 lbs	6.27 lbs	9.21 lbs	12.15 lbs	15.09 lbs	18.03 lbs	20.97 lbs	23.91 lbs	26.85 lbs	29.79 lbs

4

Ordering Information and Configuration Options

52X	A	B	C	D	-CON
Series	Orientation	Stations	Pigtail Style	Outlet Connection	Pigtail Connection
52B Brass	1: Standard Single Row (right or left) (one cylinder/station)	0: 10 stations 1: 1 stations	0: None	1: ¼" FPT Connection	CGA
52C Chrome-Plated Brass	2: Standard Double Row (right or left) (two cylinders/stations)	2: 2 stations	2: 24" Flexible 316 Stainless Steel with Check Valve	2: Cylinder Connection Adapter	DIN 477
52S Stainless Steel	3: Standard Single Duplex (right and left) (one cylinder/station)	3: 3 stations 4: 4 stations	3: 36" Flexible 316 Stainless Steel with Check Valve		BS 341 and others available
	4: Compact Single Row (right or left) (one cylinder/station)	5: 5 stations 6: 6 stations	6: 72" Flexible 316 Stainless Steel with Check Valve		
	5: Compact Double Row (right or left) (two cylinders/stations)	7: 7 stations 8: 8 stations			
	6: Compact Single Duplex (right and left) (one cylinder/station)	9: 9 stations A: 11 stations B: 12 stations C: 13 stations D: 14 stations E: 15 stations			

Leak-Tector™ Testing Solution

4



Description	Specifications
Leak-Tector is specially formulated for testing lines, cylinders, and systems carrying oxygen and other compressed gases for leaks. The formulation contains no oil, grease fatty acids, ammonias, or any other ingredient that could combine with pure oxygen to form either a flammable or explosive mixture. Leak-Tector is simple to use. Apply the solution to a connection or surface suspected of leaking and watch for bubble clusters. Large leaks form large bubble clusters. Very fine leaks form white foam that builds up for several minutes, making detection easy and certain. Solution dries clean with no greasy residue and does not need to be removed after testing. Tests have shown that Leak-Tector clearly detects leaks as small as one pound of gas in 100 years, a leak rate of 1.16×10^{-4} cc/sec of nitrogen.	<i>Temperature range</i> +35° to +160°F <i>Meets Air Force Spec.</i> MIL-L-25567

Ordering Information

Model Number	Description
LT-8	8 oz squeeze bottle of Leak-Tector
LT-8X12	case of 12 8 oz bottles of Leak-Tector
LT-1G	one gallon bottle of Leak-Tector
LT-1GX4	case of four one gallon bottle of Leak-Tector

Flowmeter Tutorial

4

Flowmeters are used to measure the rate of flow of liquids or gases. They do not control the rate of flow unless they are equipped with a control valve or flow controller. There are two basic types of flowmeters; rotameters and electronic mass flowmeters.

ROTAMETERS

Rotameters are a simple, precise and economical way to measure flow rates. They consist of a precision tapered glass tube containing one or more spherical floats. A measuring scale is etched on the glass tube. The diameter of the tube at the bottom, or inlet is approximately equal to the diameter of the float.

As fluid enters the tube, the float rises to a point where the area between the float and the tube wall is large enough to permit unrestricted flow, and the float is stationary. This position corresponds to a point on the tube scale and thus permits a reading of the rate of flow.

The capacity, or flow range of a tube can be varied by changing the float material. Materials of a lower density such as pyrex glass or sapphire give a lower flow capacity than materials of a higher density like tantalum or stainless steel (see Figure 1).

Rotameters, unlike mass flowmeters, are affected by temperature and pressure variation (see Figure 2.) When equipped with a control valve on the inlet, readings are correct as long as the outlet pressure is equal to the pressure at which the tube was calibrated. When a valve is installed on the outlet, the tube calibration pressure must match the inlet pressure to the flowmeter unit.

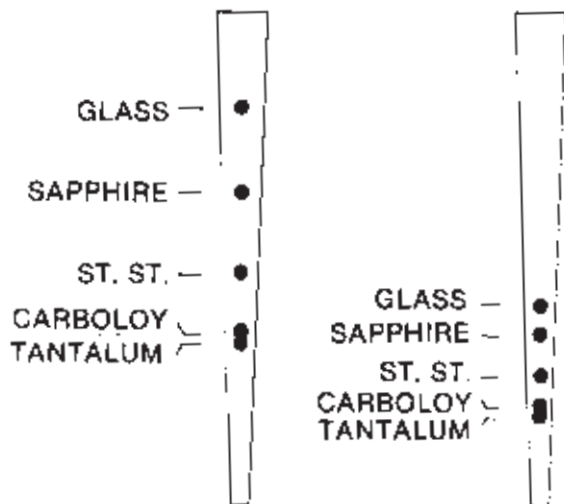


Figure 1

Relative positions of floats of various densities for the same rate of flow with 1 atmosphere outlet pressure.

Figure 2

Effect of float position for the same rate of flow in Figure 1, but with increased pressure at the flowmeter outlet.

Series 7920

high resolution flowmeter

Description

The 7920 flowmeters provide the most accurate indication and precise control of fluids available for a wide range of applications. This versatile meter is functionally and dimensionally interchangeable with other current designs while incorporating many innovative features.

All 7920 glass metering tubes have integral float guides to assure the accuracy of $\pm 5\%$ of full scale. Glass and stainless steel floats are standard. The meters are available in a wide range of flows.

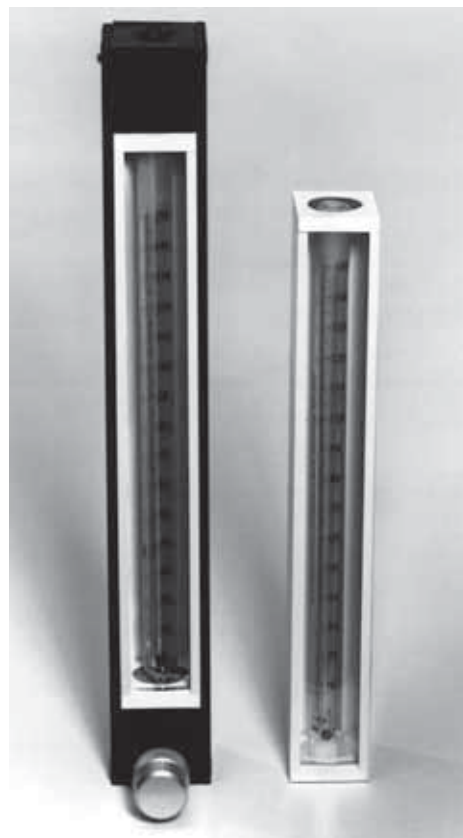
Standard with this series is the TUBE-CUBE™, a unique, design concept. The "cube", a unitized tube holder, aligns the tube quickly and easily for a simple tube installation or replacement, reduces chipped tube ends, broken tubes, and misalignment. The TUBE-CUBE™ also provides tube protection during handling and storage and affords a 1.5 X scale magnification factor for more accurate tube reading. End seals in the design are direct-acting and non-rotating for fast alignment and convenient service access.

Design Features

- High resolution 150mm scale length
- Many standard direct reading scales available
- Precision taper, fluted metering tube
- Lowest available pressure drop via maximum flow path area increases available flow rates at low feed pressures
- Standard front panel mounting requires minimum hardware - easy installation, quick access.
- Available utility and high precision metering valves do not require special fittings
- Simplified; direct acting non-rotating compression seal

Applications

- Carrier and fuel gas chromatography
- Atomic absorption
- Semiconductor manufacture
- Chemical processing
- General research and industrial uses



Materials

End Blocks

Chrome plated brass, 316 stainless, or Monel®

"O" Rings & packing

Viton® - standard

Buna-N, EPR rubber and Teflon are available options

Side Plates

Anodized Aluminum

Specifications

Maximum Pressure

250 psig

Temperature Range

-20°F to +250°F

-30°C to 120°C

Accuracy

$\pm 5\%$ of full scale

Repeatability

$\pm 0.25\%$ of scale reading

Series 7920 (cont.)

Model	Material	Valve Type
B7920*	Brass	None
B7920V*	Brass	Standard
B7920HA*	Brass	High Accuracy
S7920	316 Stainless Steel	None
S7920V*	316 Stainless Steel	Standard
S7920HA*	316 Stainless Steel	High Accuracy
M7920*	Monel®	None
M7920V*	Monel®	Standard

* Each model includes one tube from the table below; specify your choice when ordering.

Options	P/N Suffix
· 1/4" NPT female inlet & outlet	P4FF
· 1/4" hose barbs inlet and outlet - add suffix "HB"	HB
· 1/4" compression tube fittings inlet and outlet	T4FF
· 1/8" compression tube fittings inlet and outlet	T2FF
Bench stand - Model 7920B	
Eagle Eye Alarm - Model 7926-AVA** (Requires special modified unit - add prefix "EE" to model number)	

Ordering Information

Model - X - Y	
X=tube required Y=optional fittings	1, 2, 3, 4, 5, 6, 7, 8, 10 HB=hose barbs P4FF=1/4" NPT female T4FF=1/4" compression T2FF=1/8" compression
Example:	B7920V-2-T4FF is a brass unit with a 7920-2 flow tube and 1/4" compression fittings on inlet and outlet.

4

Flowmeter Tubes in TUBE-CUBE®

Model	Typical Flow Range*		
	Float	Air scc/min.	Water cc./min.
7920-1	Glass St. Steel	3 - 56 11 - 158	0.04 - 0.66 0.12 - 3.18
7920-2	Glass St. Steel	6 - 91 16 - 271	0.08 - 1.0 0.17 - 5.5
7920-3	Glass St. Steel	22 - 388 63 - 845	0.24 - 7.8 0.68 - 17
7920-4	Glass St. Steel	64 - 847 217 - 1707	1 - 17 2 - 46
7920-5	Glass St. Steel	550 - 2560 1070 - 5080	6 - 54 21 - 135
7920-6	Glass St. Steel	610 - 3830 1330 - 7670	9 - 89 30 - 217
7920-7	Glass St. Steel	820 - 8610 2090 - 16580	14 - 200 53 - 482
7920-8	Glass St. Steel	2220 - 24920 4190 - 45940	47 - 568 102 - 1319
7920-10	Glass	1.0 - 100	

*Actual flow rates will vary from one manufacturing lot to another. Calibration data is supplied for each tube shipped.

Selected Correction Factors flow = air flow x correction factor

Gas	Correction Factors
air	1.00
acetylene	1.054
ammonia	1.304
argon	0.851
n-butane	0.706
carbon dioxide	0.811
carbon monoxide	1.017
ethane	0.981
ethylene	1.016
helium	2.689
hydrogen	3.810
methane	1.343
nitrogen	1.017
nitrous oxide	0.811
oxygen	0.951
propane	0.810

Series 7950

dual gas proportioner

Description

The gas proportioner meters the flow of each of two gases and mixes them thoroughly in a special mixing tube to produce homogeneous two-component mixtures.

Concentration accuracies of 10% of component value are maintained with a standard unit using typical calibration curves. (In a desired mixture of 1% gas A and 99% of gas B, a concentration between .9% and 1.1% is maintained.) Individual units can be calibrated for non-corrosive gases to attain an accuracy of 5% of the component value. Individual calibration curves are supplied with these specially calibrated units.

The control valves are installed at the outlets making these gas proportioners back pressure compensated. The readings on the tubes are accurate regardless of the down-stream pressure, so long as the inlet pressures are maintained at the levels for which the tubes were calibrated.

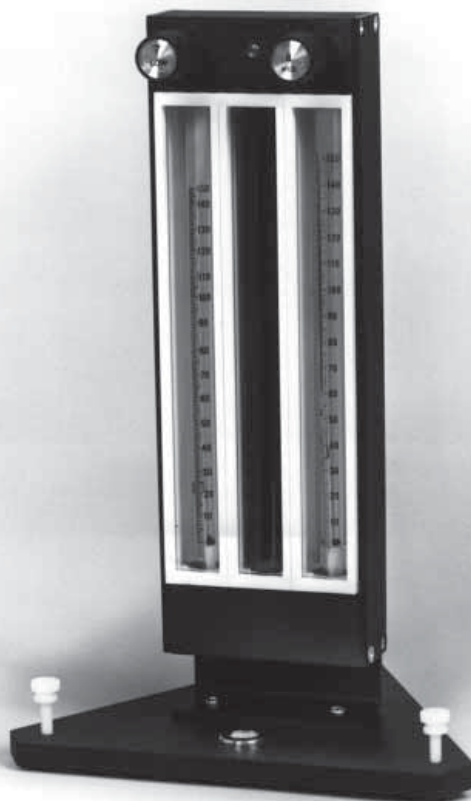
The unit is recommended for 50 psig pressure but can be used at any pressure between 10 and 200 psi.*

These proportioners are available in both aluminum and stainless steel construction. When ordering a gas proportioner, specify the composition of the desired mixture, the gases, the discharge rate, and inlet pressure in addition to the model number.

*For best performance, it is recommended that tubes have only one float.

How to order

All models include baseplate, mixing tube and two flowmeter tubes of your choice. If unsure of correct tubes, provide the composition range of intended mixtures, total outlet flow and operating inlet pressure. We will select the tubes.



Model	Material	Valve	Connections
7951	Aluminum	Standard	1/8" NPT female
7951H	Aluminum	Standard	1/4" hose barb
7951T	Aluminum	Standard	1/4" compression
7952	Aluminum	High Accuracy	1/8" NPT female
7952H	Aluminum	High Accuracy	1/4" hose barb
7952T	Aluminum	High Accuracy	1/4" compression
7953	Stainless Steel	Standard	1/8" NPT female
7953H	Stainless Steel	Standard	1/4" hose barb
7953T	Stainless Steel	Standard	1/4" compression
7954	Stainless Steel	High Accuracy	1/8" NPT female
7954H	Stainless Steel	High Accuracy	1/4" hose barb
7954T	Stainless Steel	High Accuracy	1/4" compression

large flow acrylic flowmeters

Series 7974 & 7975

Description

The Series 7974 and 7975 acrylic flowmeters are useful in a wide variety of applications involving non-corrosive gases where flow rates exceed those of traditional laboratory models. All units have direct reading scales in either liters/minute or cubic feet/minute of air. Correction factors for other gases can be provided.



Series 7974

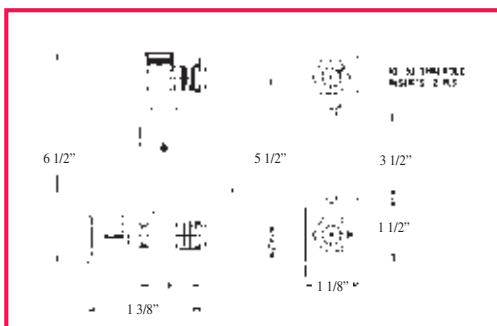


Series 7975

Features	Materials	Specifications
- Easy to read scales. - Air ranges from 14 lpm to 3400 lpm (0.5 to 100 scfm) - Durable one-piece clear acrylic construction - Optional built-in cartridge type valve available	Body clear acrylic Fittings 7974 series - brass 7975 series - PVC Valve brass Seals Buna-N	Max. Operating Pressure 100 psig Operating Temperature Range 0° to +150°F Body Inlet and Outlet 7974 - 1/4" NPT female 7975 - 1" NPT female Accuracy 7974 Series - +3% of full scale 7975 Series - +2% of full scale

Ordering Information

Model Number	Flow Range	Model Number	Flow Range
B7974-1	0.5 - 5.0 SCFM	7975-1	3 - 25 SCFM
B7974-2	1 - 10 SCFM	7975-2	4 - 50 SCFM
B7974-3	2 - 20 SCFM	7975-3	10 - 100 SCFM
B7974-4	14 - 140 lpm	7975-4	100 - 700 lpm
B7974-5	30 - 280 lpm	7975-5	100 - 1400 lpm
B7974-6	60 - 560 lpm	7975-6	400 - 3400 lpm
Option: Inlet needle valve - add suffix "V" to model number, i.e. 7974V-1		Option: Inlet needle valve - add suffix "V" to model number, i.e. 7975V-1	



Series 7974



Series 7975

Series 7923

economic acrylic flowmeter

Description

The Series 7923 acrylic flowmeters are an ideal low cost tool for measuring flow rates of inert and non-reactive gases. The 1/8" female standard inlet and outlet connections are contained in brass inserts to ensure a secure leak-free connection to prevent cracking of the acrylic body. A needle valve to control the flow rate is included.

Specifications

Maximum inlet pressure
100 psig

Maximum operating temperature
150°F

Dimensions
1" wide x 4" high x 2 1/8" deep

Accuracy
+5% full scale

Repeatability
+1% of scale reading

Inlet and Outlet
1/8" NPT female standard on 3" centers

Seals
Buna-N



Options

- 1/4" hose barbs inlet and outlet - add suffix "HB"
- 1/4" compression tube fittings inlet and outlet - add suffix "T4FF"
- 1/8" compression tube fittings inlet and outlet - add suffix "T2FF"
- 7923-AVA alarm

Model	Flow Range (SCFH Air)	Float
7923-2A00	0.1 - 1 SCFH	glass
7923-2A01	0.2 - 2 SCFH	SS
7923-2A02	0.5 - 5 SCFH	glass
7923-2A03	0.5 - 10 SCFH	glass
7923-2A04	2 - 20 SCFH	SS
7923-2A05	3 - 30 SCFH	SS
7923-2A06	4 - 50 SCFH	glass
7923-2A07	10 - 100 SCFH	SS
7923-2A08	20 - 200 SCFH	SS
7923-2A12	0.04 - 0.5 slpm	glass
7923-2A13	0.1 - 1.0 slpm	SS
7923-2A29	0.2 - 2.5 slpm	glass
7923-2A14	0.4 - 5.0 slpm	glass
7923-2A15	1 - 10.0 slpm	SS
7923-2A16	2 - 25 slpm	glass
7923-2A17	4 - 50 slpm	SS
7923-2A18	10 - 100 slpm	SS

mass flow controllers

Series 810C Mass-Trak



4

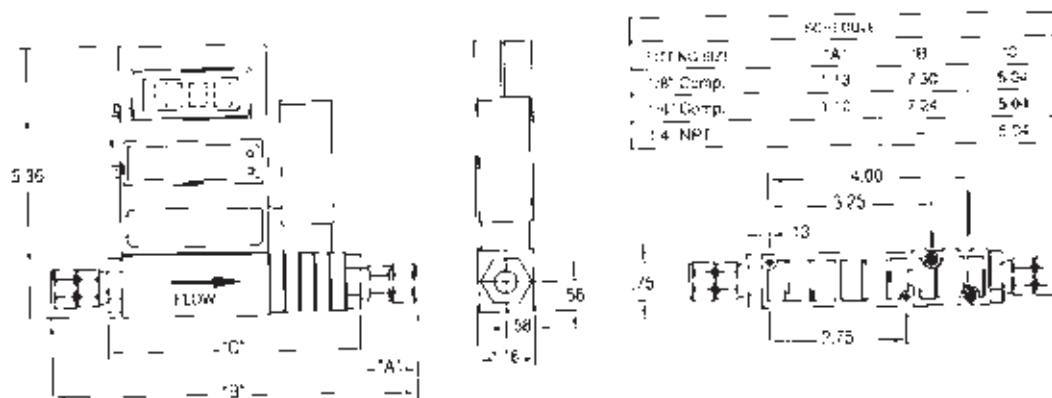
Description	How It Works
Thermal mass flow controllers like the Series 810C Mass-Trak are more reliable than volumetric flow devices like rotameters because they are relatively immune to changes in gas temperature and pressure. Because these instruments measure molecular flow, they provide the most reliable, repeatable and accurate method of delivering gas to your system. The 810C is designed to control the flow of non-corrosive gases. The instruments built-in display and set-point control eliminate the need for separate power supply and readout electronics, standard on most mass flow controllers. A straight, large diameter sensor tube prevents clogging and contamination. The fast response valve provides precise one-step control of critical gas flows. You simply, set it and forget it. Available in flow ranges from 0-10 sccm to 0-50 slpm. The standard unit accepts 0-5 VDC or 4-20 mA command signals for applications that require remote set point control.	Gas enters the Mass-Trak and divides into two flow paths. Most of the flow goes through the laminar-flow bypass. This creates a pressure drop that forces a known fraction of the flow through the sensor tube. Two resistance temperature detector coils around the sensor tube direct a constant amount of heat into the gas stream. Heat transfer between these elements results in the interaction with the molecules of the flowing gas, independent of temperature and pressure fluctuations. The sensor signal is amplified, linearized and calibrated to achieve a direct reading of gas mass flow rate. As the gas leaves the sensor and bypass, it flows through the servo-control valve. This valve is similar to an on-off solenoid valve, except that the current to the valve is modulated so that the valve plug assumes the exact height above the valve orifice necessary to maintain the valve's commanded flow. Built-in electronics allow Mass-Trak to maintain continuous proportional control by comparing the measured sensor signal to the command valve flow rate.

Materials	Specifications	
<i>Wetted materials are</i> 10% glass-filled nylon 6/6 316 stainless steel 430F stainless steel - nickel plating - Viton o-rings	<i>Accuracy</i> +1.5% of full scale <i>Repeatability</i> +0.25% of full scale <i>Gas and ambient temperature</i> 32 to 120°F <i>Gas pressure</i> 20 psig optimum, 150 psig max. <i>Leak integrity</i> 1 x 10⁻⁴ ATM cc/sec of helium	<i>Control range</i> calibrated for 10 to 100% of full scale <i>Output signal</i> linear 0-5 VDC into 2000 ohm minimum load resistance and linear 4-20 mA into 1000 ohm maximum load resistance (500 ohm-watt/15 VDC supply) <i>Response time</i> 1 second

Series 810C Mass-Trak

mass flow controllers

4



Series 810C Dimensional Drawing

Ordering Information

P/N 810C-DR-W-X-Y-Z

(Select X, Y, and Z parameters from table below)

W = Inlet and outlet connections:

P4FF = 1/4" NPT female

T2FF = 1/8" compression fittings (up to 15 slpm)

T4FF = 1/4" compression fittings

X = inlet and outlet pressure calibration:

NF = normal pressure (up to 40 psig)

MP = 40-150 psig

Y = flow range:

0-10 sccm = 00010

0-20 sccm = 00020

0-50 sccm = 00050

0-100 sccm = 00100

0-500 sccm = 00500

0-1 slpm = 01000

0-2 slpm = 02000

0-5 slpm = 05000

0-10 slpm = 10000

0-20 slpm = 20000

0-30 slpm = 30000

0-40 slpm = 40000

0-50 slpm = 50000

All flows are based on standard conditions
of 70°F and 1 ATM unless otherwise
specified when ordering.

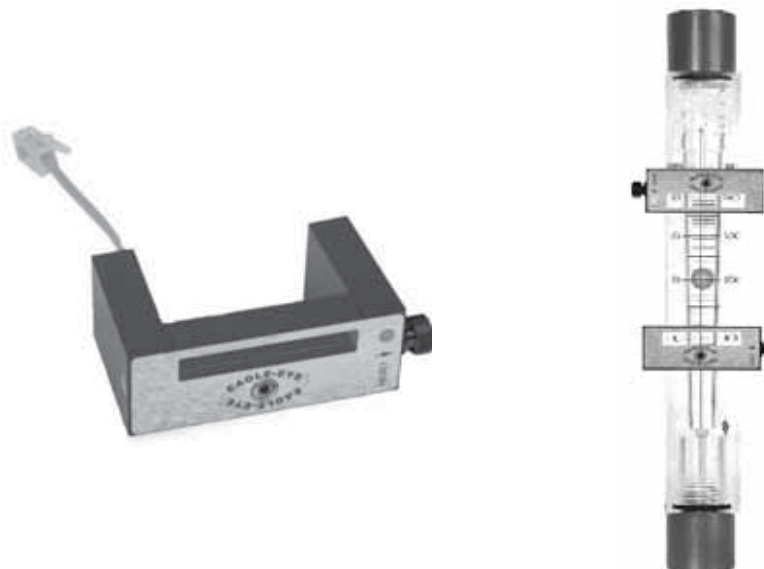
Z = factory set output option:

V = 0-5 VDC

A = 4-20 mA

Eagle-Eye™ flowmeter alarm

Series 7900



4

Description	Advanced Features	Specifications
The Eagle-Eye alarm is a non-contact sensor designed to alert the user when flow rates exceed defined thresholds. The Eagle-Eye alarm has red and green LED visual indicators and an audible buzzer indicator to provide flow rate status. A single unit can indicate either increased flow rate or decreased flow rate. The use of two units on a single flowmeter can provide both increasing and decreasing flow rates. The Eagle-Eye is easily attached to any acrylic flowmeter of the 7923, 7974 or 7975 Series flowmeters.	• Integral red and green LED indicators and an audible buzzer provide operating status. • Field installable while flowmeter is in service • Non-contact sensor is not affected by the fluid in the flow stream • Multiple operating modes 1. Standard - unit will alarm until reset by the user 2. Automatic reset - unit will alarm until flow returns to acceptable levels. • Multiple units may be installed on a single flowmeter to provide both high and low level alarms • Rugged splash resistant enclosure • Advance power supply provides a low level digital output representing the operating status	<i>Body Material</i> ABS <i>Spacer Material</i> SBR <i>Operating temperature range</i> 32° to 160°F <i>Buzzer volume</i> 90 dB <i>Supply voltage</i> 5VDC regulated <i>Supply current</i> 250 mA

Ordering Information

Model	Description
7923-AVA	for use with 7923 series acrylic flowmeters
7926-AVA*	for use with 7920 and 7965 series
7974-AVA	for use with 7974 series acrylic flowmeters
7975-AVA	for use with 7975 series acrylic flowmeters
7920-PS	basic power supply for all models
7920-APS	advanced power supply with battery backup and 0-5 VDC logic output for all models

* This unit can only be used on units with special side plates and Tube Cube assemblies.

Series 820 Top-Trak

mass flowmeters



Description

Thermal mass flowmeters like the Series 820 Top-Trak are more reliable than volumetric flow devices like rotameters because they are relatively immune to changes in gas temperature and pressure. Because these instruments measure molecular flow, they provide the most reliable and accurate method of delivering gas to your system.

The 820 is designed to measure the flow of non-corrosive gases. The instruments built-in display, power supply, and readout electronics, provides an easy and convenient method of accurately monitoring the gas flow of your system. A straight, large diameter sensor tube prevents clogging and contamination.

Available in flow ranges from 0-10 sccm to 0-40 slpm. The standard unit can be supplied with either 0-5 VDC or 4-20 mA output signals.

How It Works

Gas enters the Top-Trak and divides into two flow paths. Most of the flow goes through the laminar flow by-pass. This creates a pressure drop that forces a known fraction of the flow through the sensor tube. Two resistance temperature detector coils around the sensor tube direct a constant amount of heat into the gas stream. Heat transfer between these elements results in the interaction with the molecules of the flowing gas, independent of temperature and pressure fluctuations. The sensor signal is amplified, linearized and calibrated to achieve a direct reading of gas mass flow rate.

Materials

Wetted materials are
 10% glass-filled nylon 6/6
 316 stainless steel
 nickel plating
 Viton o-rings

Specifications

Accuracy

$\pm 1.5\%$ of full scale

Repeatability

$\pm 0.5\%$ of full scale

Gas and ambient temperature

32 to 120°F

Gas pressure

20 psig optimum, 150 psig max.

Leak integrity

1×10^{-4} ATM cc/sec of helium

Input power

12-18 VDC

Output signal

linear 0-5 VDC standard 4-20 mA optional

Response time

800 ms time constant

Pressure Coefficient

0.02% of full scale per psi
 (0.07 kg/cm²) or better

Pressure drop

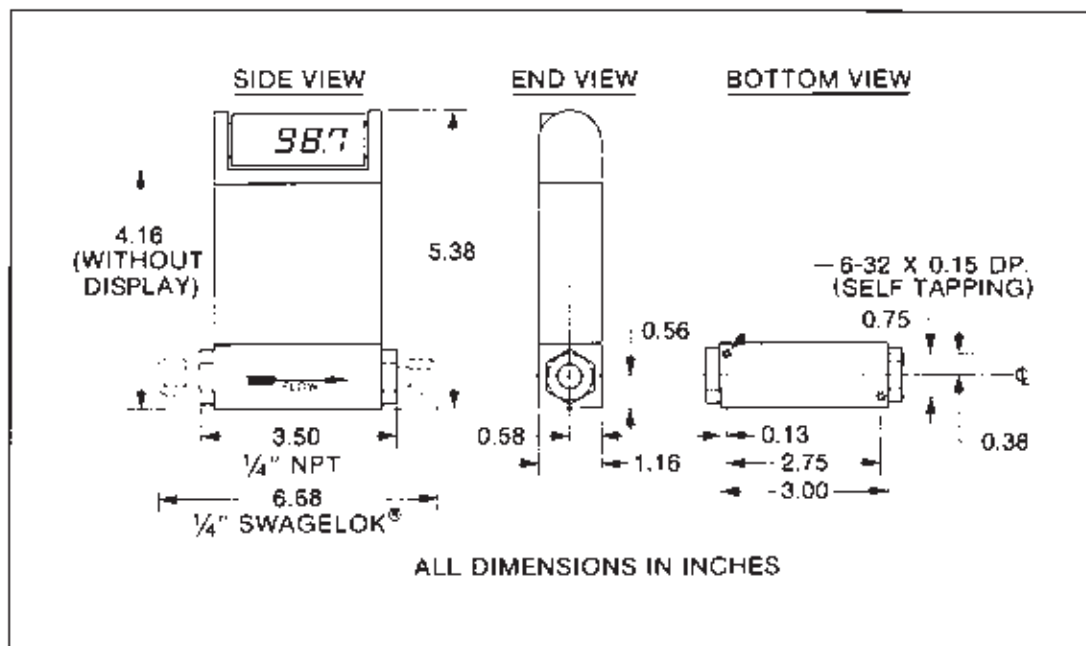
Flow Rate	Max ΔP
SLM	cm of
water	
up to 10	7
20	25
30	47
40	88

Temperature coefficient

0.15% of full scale per °C
 or better

mass flowmeters

Series 820 Top-TraK



Series 820 Dimensional Drawing

Ordering Information

822-W-X-Y-Z

(Select X, Y, and Z parameters from table below)

W = Inlet and outlet connections: P4FF = 1/4" NPT female
T2FF = 1/8" compression fittings (up to 15 slpm)
T4FF = 1/4" compression fittings

X = inlet and outlet pressure calibration: NF = normal pressure (up to 40 psig)
MP = 40-150 psig

Y = flow range:

- 0-10 sccm = 00010
- 0-20 sccm = 00020
- 0-50 sccm = 00050
- 0-100 sccm = 00100
- 0-500 sccm = 00500
- 0-1 slpm = 01000
- 0-2 slpm = 02000
- 0-5 slpm = 05000
- 0-10 slpm = 10000
- 0-20 slpm = 20000
- 0-30 slpm = 30000
- 0-40 slpm = 40000
- 0-50 slpm = 50000

All flows are based on standard conditions of 70°F and 1 ATM unless otherwise specified when ordering.

Z = factory set output option: V = 0-5 VDC
A = 4-20 mA

Series 6200

indicating oxygen trap

Description

This unit is a step above other indicating oxygen traps. The unit comes to you completely assembled and ready for installation. It is ideal for use in-line directly after our Series 6300 oxygen removing trap to determine when to replace the larger unit. Used in this way the 6200 unit will last a considerable time if it is monitored regularly. A centimeter scale on the tube helps you to monitor the condition of the reactants.

The 6200 Series actually removes oxygen rather than convert it to another form of contamination. Oxygen reacts with the activated bed material to form manganese oxide that has a deep brown color providing a dramatic and progressive color change. The presence of moisture does not affect the oxygen removing capacity of the unit.

Features

- Reduces oxygen to less than 15 ppb.
- Reactive materials are contained in a glass tube protected by a clear plastic outer tube. The reactive materials are only in contact with glass and metal.
- Centimeter scale on reaction tube helps to monitor activity.
- The expended reactant material is non-hazardous, non-toxic, non-flammable, and non-reactive.
- Mounting clip available for convenient installation.
- Oxygen removing capacity: 6200 - 30 mg, 6250 - 150 mg
- Working pressure: 100 psig
- Dimensions: 6200 - 1.125" O.D. x 9.5" long,
6250 - 1.5" O.D. x 10.25" long



Ordering Information

Model	Connections
6200-2*	1/8" tubing compression
6200-4*	1/4" tubing compression
6250-2*	1/8" tubing compression
6250-4*	1/4" tubing compression
6200C	mounting clip for 6200
8012C	mounting clip for 6250

* Available with stainless steel compression fittings - add "SS" to part number.

Gas traps should be mounted in a vertical position to ensure proper contact of the gas with the adsorbent. Use model 6200C mounting clip with 6200 Series hydrocarbon trap.



6200C Mounting Clip

oxygen removing purifier for hydrogen

Series 6210

4



Description

The Series 6210 Purifiers remove oxygen from hydrogen by catalytic action. They are capable of removing up to 1% oxygen from a hydrogen stream down to a level of less than 1 ppm. This reaction is normally accomplished at room temperature. At higher oxygen impurity concentrations, some-what elevated temperatures may be experienced depending on operating conditions.

The purification is carried out by the formation of water from the oxygen impurity and the hydrogen background. If water presents a problem in your system it is suggested that a Model 8010 or 8000 purifier be installed in the system after the Series 6210 unit.

The catalytic materials do not require regeneration and will function indefinitely providing that they are not contaminated. Sulfur and halogens are the primary contaminants of concern.

Ordering Information

Model	Max. Flow SCFH	Max. Oper. Press. psig	Connections female	Dimensions inches
6210-10	10	2000	1/4" compression	1.05" dia. x 9.5" long
6210-25	25	2200	1/4" compression	1.32" dia. x 14.5" long
6210-50	50	1200	1/4" compression	1.66" dia. x 15" long
6210-100	100	1400	1/4" compression	2.38" dia. x 15.5" long
6210-200	200	1300	1/4" compression	2.88" dia x 19.5" long
6210-500	500	900	1/2" compression	4.0" dia. x 23" long

Series 6400

CO₂ trap

4

Description

The 6400 Series carbon dioxide trap is designed to remove CO₂ gas from air, argon, helium, hydrogen, or nitrogen. The trap body is constructed of borosilicate glass with nickel plated end fittings with stainless steel sintered frits.* The absorption media is a formulation of sodium hydroxide and calcium hydroxide with an high absorptive capacity and indicating properties. Typically, this material will absorb 15-20% of its weight in carbon dioxide before the material is saturated and needs to be replaced. Replacement is indicated when the normally white color of the material turns violet. If moisture is detrimental to your system, a moisture trap should be installed down stream from this unit to absorb water evolved from the absorption of the carbon dioxide.

*Units with stainless steel fittings are also available. Add "SS" to part number.

Features

- Removes carbon dioxide to less than 0.5 ppm
- Inlet and outlet fitted with 40 micron stainless steel frits.
- Reaction with carbon dioxide indicated by color change from white to violet.
- CO₂ removing capacity:

6410	45 grams CO ₂
6425	90 grams CO ₂
- Dimensions:

6410	1.5" O.D. x 12.5" long
6425	1.75" O.D. x 16.5" long



Gas traps should be mounted in a vertical position to ensure proper contact of the gas with the adsorbent. Use model 6400C or 8040C mounting clip with 6400 Series carbon dioxide trap.

Ordering Information

Model	Connections	End fittings
6410-2	carbon dioxide trap - 100 cc	1/8" compression
6410-4	carbon dioxide trap - 100 cc	1/4" compression
8012C	mounting clip for 6410 trap	
6425-2	carbon dioxide trap - 250 cc	1/8" compression
6425-4	carbon dioxide trap - 250 cc	1/4" compression
8040C	mounting clip for 6425 trap	

* Add suffix "SS" to part number for stainless steel compression fitting.



8012C Mounting Clip



8040C Mounting Clip

high capacity units

Series 8000

Description

The model 8000 replaceable cartridge gas purifier is similar to the Model 8010 but is designed for higher capacities and a lower working pressure. the Model 8000 is constructed of an aluminum shell that accepts a large capacity cartridge. This shell may be permanently mounted when installed in the gas line and can be serviced without disturbing the line connections. Spring pressure holds the replaceable cartridge tightly against the bottom gasket to prevent the gas to be purified from bypassing the cartridge. The side inlet is located at the bottom of the unit oriented 90° from the outlet located at the top of the unit.

The model 8000 purifier shell must be used in conjunction with specially designed replaceable cartridges (Model 8000-1, 8000-2 or 8000-3) filled with various adsorbents. These are described below. These cartridges are shipped in hermetically sealed cans with convenient pull-tab ends for easy opening. This improved packaging ensures full retention of capacity in storage until the time of use.



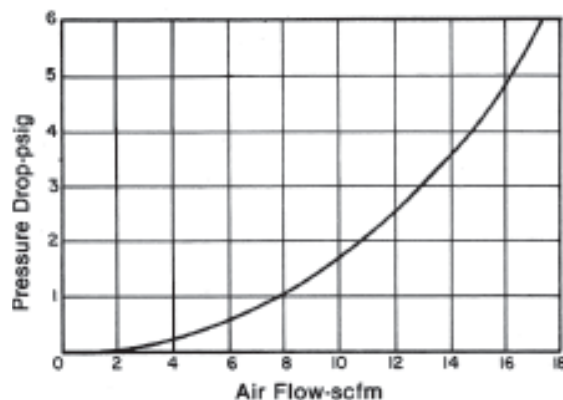
Materials

Shell Body: anodized aluminum
Strainer Assembly: monel® and brass
Gaskets: Neoprene
Cartridges: 8000-1 Molecular Sieve 13x
8000-2 Molecular Sieve 4A
8000-3 Activated Charcoal

Specifications

Max. Operating Pressure
350 psig
Operating Temperature
-40° to +200°F
Inlet and Outlet Ports
1/4" NPT male
Dimensions
4 3/4" dia. x 15 5/8" long
Weight with Cartridge
14.3 lbs
Dew Point Achievable
-100° F

PRESSURE DROP VS. FLOW



Ordering Information

Model	Description	Absorption Capacity	General Application
8000	Purifier Shell Only		
8000-1	Molecular Sieve 13x	126 grams water	Removal of oil & water
8000-2	Molecular Sieve 4A	134 grams water	Removal of water
8000-3	Activated Charcoal (Warning: Do not use with oxygen concentrations in excess of 21%)		Removal of heavy hydrocarbons acetone level control in acetylene used for atomic absorption

Series 8010

for pressure applications up to 3000 psig

4

Description

The model 8010 replaceable cartridge gas purifier is useful in many laboratory and industrial applications where the introduction of oil and/or water can result in poor performance or equipment shut-down. It is not uncommon to find varying levels of these impurities in some industrial gases and occasionally even in specialty carrier gases. The small daily operating costs are easily justified by the prevention of a system shut-down and the subsequent cleaning and/or repair costs.

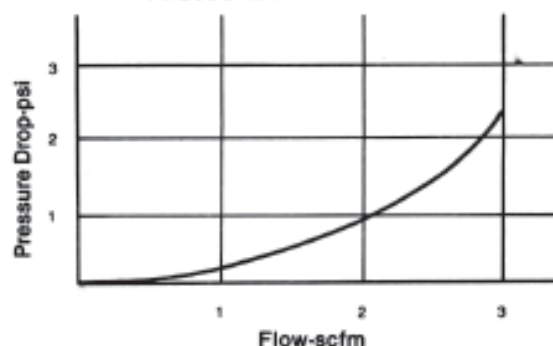
The units are especially useful in GC carrier gas lines to ensure that undesirable moisture does not enter the instrument. Water can contribute to inaccurate results and the rapid deterioration of expensive chromatography column separation phases.

The model 8010 purifier shell must be used in conjunction with specially designed replaceable cartridges.

Models 8010-1, 8010-2 or 8010-3 are filled with various adsorbents. Model 8010-4 contains a 5 micron sintered bronze filter element. These are described below. These cartridges are shipped in hermetically sealed cans with convenient pull-tab tops for easy opening. This improved packaging ensures full retention of capacity in storage until the time of use.



PRESSURE DROP VS FLOW



Materials	Specifications	
Shell Body: anodized aluminum Shell Head: nickel plated brass O-ring seal: buna-N Cartridges: 8010-1 Molecular Sieve 13x 8010-2 Molecular Sieve 4A 8010-3 Activated Charcoal 8010-4 Sintered Bronze	Max. Operating Pressure 3000 psig (500 psig for oxygen) Operating Temperature -40° to +165°F Inlet and Outlet Ports 1/4" NPT female	Dimensions 2" dia. x 5 3/4" long Weight with Cartridge 1.5 lbs Dew Point Achievable -100° F

Ordering Information

Model	Description	Absorption Capacity	General Application
8010	Purifier Shell Only		
8010-1	Molecular Sieve 13x	6.5 grams water	Removal of oil & water
8010-2	Molecular Sieve 4A	7.2 grams water	Removal of water
8010-3	Activated Charcoal (Warning: Do not use with oxygen concentrations in excess of 21%)		Removal of heavy hydrocarbons acetone level control in acetylene used for atomic absorption
8010-4	5 micron sintered bronze element		Particulate removal

indicating moisture traps

Series 8012, 8020, & 8040, 8050

Description

These units are designed to remove water, oil and organics from gases commonly used as gas chromatography carrier gases. They are constructed from Lexan® polycarbonate tubing with aluminum end caps sealed with Viton® o-rings, except for the 8050 which has a solid aluminum housing and is thus non-indicating. All units are filled with a mixture of molecular sieve 13X and indicating molecular sieve 4A. These are the highest capacity molecular sieves available and the preferred choice for gas drying. The blue indicating sieves turn buff color at 20% relative humidity.

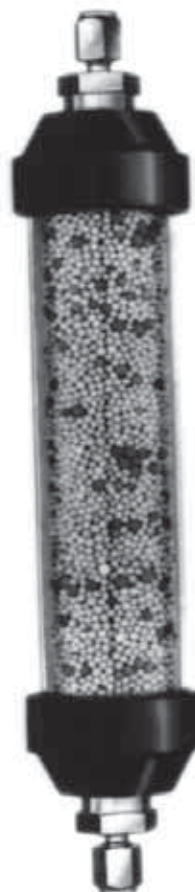
Features

- Reduces water to less than 20 ppb.
- Available in 3 sizes (120 cc, 200 cc, 400 cc, 1600 cc) that can easily be refilled.
- Inlet and outlet o-ring sealed connectors are equipped with 40 micron sintered stainless steel frits to prevent particulates from entering your system.
- Mixed spherically shaped 13X and 4A absorbents provides superior bed packing with less resistance to flow.
- Mounting clip available for convenient installation.
- Moisture removal capacity:

8012	21.6 grams
8020	36.0 grams
8040	72.0 grams
8050	132 grams
- Dimensions:

8012-2 or -4	1.5" O.D. x 9.0" long
8020-2 or -4	1.5" O.D. x 12.5" long
8040-2 or -4	1.75" O.D. x 17.5" long
8050-8	2 3/8" O.D. x 17" long
- Working Pressure:

8012, 8020, 8040	125 psig
8050	250 psig



8012C Mounting Clip

Gas traps should be mounted in a vertical position to ensure proper contact of the gas with the adsorbent. Use model 8012C, 8040C or 8050C mounting clip with 8012, 8020 and 8040 Series moisture traps.

Ordering Information

Model	Capacity	Connections
8012-2*	120 cc	1/8" tubing compression fitting
8012-4*	120 cc	1/4" tubing compression fitting
8020-2*	200 cc	1/8" tubing compression fitting
8020-4*	200 cc	1/4" tubing compression fitting
8040-2*	400 cc	1/8" tubing compression fittings
8040-4*	400 cc	1/4" tubing compression fittings
8040R	400 cc	Provides enough for three 120 cc, two 200 cc, or one 400 cc refill
8050-8*+	735 cc	1/2" tubing compression fitting
8050R	1500 cc	provides enough for two refill
8012C		for mounting 8012 and 8020 units
8040C		for mounting 8040 units only
8050C		for mounting 8050 units only

+ 8050 is a non-indicating trap.

* Available with stainless steel compression fittings - add "SS: to part number.

Series 8200

hydrocarbon traps

4

Description

These units are designed to remove organics, such as alcohols, aromatics, chlorinated hydrocarbons, esters, ethers, hydrocarbons, and ketones from air, hydrogen and inert carrier gases used in gas chromatography. They are constructed of aluminum and filled with extremely high surface area coconut shell based activated carbon.

The 8200 is a refillable purifier. Since impregnated carbons do not readily desorb all compounds, we recommend that the units be changed or refilled on a regular schedule using our 8200R refill kit that provides enough material for two charges of an 8200 or the 8250R which provides one charge of an 8250.

Features

- Removes organics from air, hydrogen, and inert carrier gases. Does not remove light hydrocarbons like methane.
- Highly active coconut shell based carbon efficiently removes many types of hydrocarbon compounds.
- All metal housing
- Refillable 200 cc or 1600 cc capacity
- 40 micron filters on the inlet and outlet
- Mounting clip available for convenient installation
- Working pressure: 250 psig
- Dimensions: 8200 1.5" O.D. x 12.5" overall length
8250 2 3/8" O.D. x 17" overall length

Ordering Information

Model	Connections
8200-2*	1/8" tubing compression fittings
8200-4*	1/4" tubing compression fittings
8250-8*	1/2" tubing compression fittings
8250R	Refill kit - contains 3 charges
8200R	Refill kit - contains 2 charges
8012C	Mounting clip
8050C	Mounting clip for 8250

* Available with stainless steel compression fittings - add "SS:" to part number.



8012C Mounting Clip

Gas traps should be mounted in a vertical position to ensure proper contact of the gas with the adsorbent. Use model 8012C mounting clip with 8200 Series hydrocarbon traps.

Filter Applications

Gas Chromatography

Particulates in an instrument carrier gas stream can reduce the overall performance of laboratory analytical work. Removing particles can reduce background noise levels and enhance instrument accuracy and precision

Pharmaceutical Manufacturing

The capability of these filters to remove bacteria and other particulate matter enables pharmaceutical manufacturers to install a filter in gas lines to those systems requiring process, purge or blanket gases, thus ensuring a virtually sterile gas atmosphere.

Pneumatic Operated Devices

Because of the small orifices normally associated with these devices, they often malfunction and require frequent servicing. Installation of a particulate filter in the air or nitrogen feed lines helps to ensure longer trouble free operation, thus reducing down-time.

Semiconductor Manufacturing

With increasing levels of device density the effect of particulate contamination becomes more damaging to potential yields. Semiconductor manufacturers install these filters in virtually all their gas lines to reduce the effects of particulates and improve their production yields.

4

Teflon® membrane gas line filter 0.01 microns

Series 5000



Description	Features	Specifications
The Teflon® medium in this filter efficiently traps particles down to 0.01 microns. These units may be installed in gas lines supplied by cylinders or bulk sources. Both the materials and manner of construction render the Series 5000 units compatible with a wide variety of gases.	• 100% efficient at 0.01 micron level • Filter medium - porous PTFE Teflon® membrane • All welded 316L stainless steel construction • Internal finish - less than 15 R_a • 0.5 sq. ft. filter area provides high particle retention capacity • Excellent compatibility with a wide variety of gases	<i>Filtration</i> 100% @ 0.01 microns <i>Max. Operating Pressure</i> 1000 psig @ 70°F <i>Max. Operating Temperature</i> 100°F <i>Max. Flow</i> 250 slpm @ 15 psi ΔP

Ordering Information

Type of End Connection	Model Number	Connection Size		Dimensions			
		Inlet**	Outlet**	Length		Diameter	
				Inch	mm	Inch	mm
Standard Pipe	5000-P4FF	1/4" NPT female	1/4" NPT female	4.75	120.6	2.20	55.9
Tubing Compression	5100-T4FF	1/4" tubing compression	1/4" tubing compression	5.56	141.2	2.20	55.9
	5100-T8FF	1/2" tubing compression	1/4" tubing compression	5.81	147.6	2.20	55.9
VCR® Compatible Face Seal	5200-V4MM	1/4" face seal male	1/4" face seal male	5.62	142.7	2.20	55.9

** Other end fitting configurations available on request.

Electronic Cylinder Scales

Description

The pressure of a liquefied gas remains constant as material is withdrawn as long as a liquid phase remains in the cylinder. When the liquid phase is exhausted the pressure drops very quickly and the cylinder empties without warning. This phenomenon renders a cylinder pressure gauge virtually useless. A similar situation arises when using cryogenic containers of liquid nitrogen, oxygen, and argon. The only way to monitor the contents of a cylinder of liquefied gas or a cryogenic container is by weight.

The Series 620 and 320 electronic scales are designed to give a positive indication of the amount of product remaining in the cylinder as material is being withdrawn. These units allow the user to electronically subtract the tare weight of the cylinder so that only the net contents can be read directly. The built-in alarm can be set for any weight value from 0-100% of the scales capacity. The units provide a red LED visual alarm and an audible alarm with silence function. An integral solid state relay is provided for the activation of external alarms or other equipment when the alarm set point is reached.

The scales are ruggedly constructed using one or more load cells in a sturdy stainless steel and/or aluminum diamond plate platform with mechanical stops at 150% of capacity to prevent damage. The model 620G-300 with a capacity of 300 pounds has a 9.5" x 9.5" stainless steel platform that accommodates most compressed gas cylinders. For larger diameter cylinders, the 320D-500 is available with a capacity of 500 pounds has a 20" x 27" diamond plate steel platform.

The model 320M- 1000 has a 1000 pound capacity and accommodates cryogenic containers with its 20" x 27" aluminum diamond plate steel platform. A ramp is available for each model so that cylinders can easily be rolled on and of the scale platform without lifting.



320 Series



620G-300

Features

- Controller has large 1" high LCD digital display in water resistant housing
- Rugged load cell weighing technology with 300, 500, or 1000 pound capacity
- Weight resolution up to 0.1 pound
- Accuracy 0.1% of full scale
- Built-in visual alarm and audible alarm with silence function
- Built-in solid state relay
- 0-100% of full scale tare weight adjustment
- 0-100% of full scale alarm set point adjustment
- Both large and small platform sizes available
- Easy unit conversion from pounds to kilograms

Applications

Recommended for use with all liquefied and cryogenic containers in applications where running out of gas will cause a serious disruption in operations or a loss of product.

Ordering Information

Model	Total Capacity Pounds	Resolution pounds	Platform Dimensions
620G-300	300	0.1	9.25" w x 9.25" d x 1.5" h
320D-500	500	0.1	20" w x 27" d x 1-7/8" h
320M-1000	1000	0.2	20" w x 27" d x 1-7/8" h
620R	ramp for 620G		9" w x 5.5" d x 1.5" h
320R	ramp for 320D & 320M		20" w x 18" d x 1-7/8" h

cylinder scale for liquefied gases

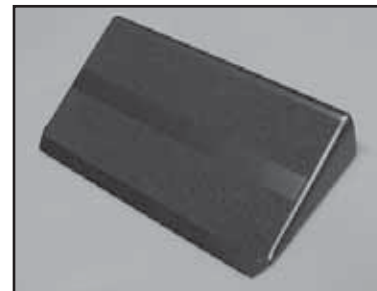
Model 900

Description

The pressure of a liquefied gas remains constant as material is withdrawn as long as a liquid phase remains in the cylinder. When the liquid phase is exhausted the pressure drops very quickly and empties without warning. This phenomenon renders a cylinder pressure gauge virtually useless. The only way to monitor the contents of a cylinder containing a liquefied gas is by weight.

The Model 900 cylinder scale is designed to give a positive indication of the amount of product remaining in the cylinder. It allows the user to subtract the tare weight of the cylinder so that the net contents can be read directly. A color coded dial reads in pounds and kilograms. A nonskid ramp is available to make loading cylinders convenient and easy.

The scale is ruggedly constructed and features a stainless steel cover for durability.



900-6 Scale Ramp

4

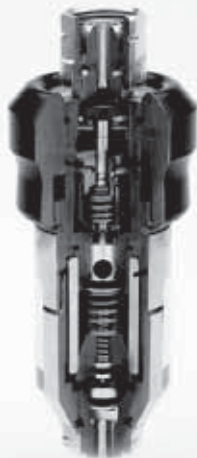
Applications	Features	Specifications
Recommended for use with all liquefied gases such as carbon dioxide, ammonia, nitrous oxide, fluorocarbons, hydrogen sulfide, sulfur dioxide, propane and heavier hydrocarbon gases.	• Heavy duty 16 gauge • Stainless steel cover • Dual dial scale - pounds and kilograms • Color-coded easy to read dial	• <i>Tare weight range</i> 0-150 lbs. (0-68 kg.) • <i>Product weight range</i> 0-150 lbs. (0-68 kg.) • <i>Total capacity</i> 300 lbs (136 kg.) in 5 lb. (2 kg.) divisions • <i>Readability</i> 1 lb. (0.5 kg.) by estimation • <i>Dimensions</i> 10 3/4" x 10 1/4" x 2" high

Ordering Information

Model	Description
900	Scale with non-skid ramp
900-5	Scale only
900-6	Ramp only

Series 8491

flash arrestor



Description

The new 8491 Series re-settable flashback arrestors offer four (4) safety devices in each unit. Safety features include protection against flashbacks with a wide range of mixtures of oxygen or air with flammable gases including hydrogen, acetylene, methane and LPG gases. The design includes a built-in non-return (check) valve to stop reverse flow and a thermal shut off which stops gas flow in the event of hose or pipe line fire. An easily re-settable pressure control stops gas flow in the event of reverse flow or a flashback that creates 10 psig back pressure. This feature alerts the user that a reverse flow or a flashback of greater than 10psig has occurred. These units are easily re-set by pulling up on the pressure control ring (shown above), no disassembly of the gas line or special tools are needed. The 8491 Series high flow capacity makes them suitable for a broad range of applications. Units are U/L listed and meet ISO 5175, EN 730, BS 6158, and AS 4603 standards.

Features

- 100% flashback tested after assembly
- U/L listed and meets strict international standards (see table)
- Automatically re-sets for flashbacks and revers flow below 10 psig
- Alerts user by shutting of gas flow in the event of a reverse flow or flashback exceeding 10 psig back pressure (captures back pressure in the housing, no flame or gas is exhausted to the atmosphere)
- Stainless steel flame barrier positively extinguishes flame within the housing
- Checks reverse flow and provides positive shut-off of revers flow over 10 psig
- Thermal cut-off
- Built-in 100 micron stainless steel sintered filter on inlet
- High flow capacity (see table)

Materials

Body
Alloy 360 brass

Internals
brass

Flame barrier
stainless steel

Elastomers
Neoprene

Working Pressure (U/L)

Gas	Pressure PSIG
Acetylene	15.0
Hydrogen/oxygen	50.0
Hydrogen/air	150.0
Methane/LPG	50.0
Oxygen	143.0

Ordering Information

Model	Gas Service	Connections	
		Inlet	Outlet
8491-F	flammables	1/4" NPT female	1/4" NPT female
8491-O	oxidizers	1/4" NPT female	1/4" NPT female
8491-FL	flammables	9/16-18 LH female	9/16-18 LH male
8491-OR	oxidizers	9/16-18 RH female	9/16-18 RH male

Flow Performance

Inlet Press. PSIG	Air Flow SCFH
7.3	231.0
14.5	465.0
21.8	725.0
36.3	1041.0
72.5	1933.0

miniature forged needle valves

Series 8100

Description

These valves are used in a wide variety of industrial and laboratory applications. They offer excellent flow control and both the brass and stainless steel models have Teflon® packing

Specifications

Max. Operating Pressure
3000 psig

Operating Temperature range
-65° to 165°F

Flow coefficient (C_v)
0.35



Ordering Information

Brass	Model 316 SS	Monel	Pattern	Connections
8111	8121	—	Straight	1/8" NPT male
8112	8122	8152	Straight	1/4" NPT male
8112A	—	8122A	Angle	1/4" NPT female
8113	8123	—	Straight	1/4" compression

check valves

Series 8400

Description

Check valves prevent the return flow of gas, thus keeping foreign substances out of lines, regulators and cylinders located upstream of the valve.

These valves are a spring loaded design with the spring on the high pressure side to protect it from foreign substances. The positive stop prevents over-stressing of the spring by sudden surges of gas pressure. An o-ring at the valve seat provides quick, efficient sealing.

The valves have a one piece body with 1/4" NPT female connections inlet and outlet. It is rated for 3000 psig with a cracking pressure of approximately 1 psig.



Ordering Information

Model	Material of Construction
8410V	Brass body, Viton® o-ring, stainless steel spring
8420E	316 stainless steel, EPDM o-ring, stainless steel spring
8420V	316 stainless steel, Viton® o-ring, stainless steel spring
8450V	Monel®, Viton® o-ring, stainless steel spring

Note: Check valves with other o-ring materials are available.

Series 8300

high purity diaphragm packless valves



Description	Advanced Features	Typical Applications
The multiple metal diaphragm design and Kel-F® seat are the key elements to the high purity success of these valves. They are available in a variety of styles and fitting configurations to meet virtually any application. The 90° lever operated option provides the inherent benefits of a diaphragm packless valve with the quick open/close action and easily identifiable operational status of a lever actuated valve.	• Metal diaphragm packless construction for diffusion resistant operation • Capable of passing a helium leak-rate test to 10⁻¹⁰ cc/sec • Available in multiple turn and 90° lever operated designs.	The Series 8300 valves are recommended whenever the diffusion of atmospheric gases and moisture into a gas system is undesirable. They are a must in all ultrahigh purity gas transfer systems, particularly those used for gas chromatography carrier gases, samples and calibration standards.

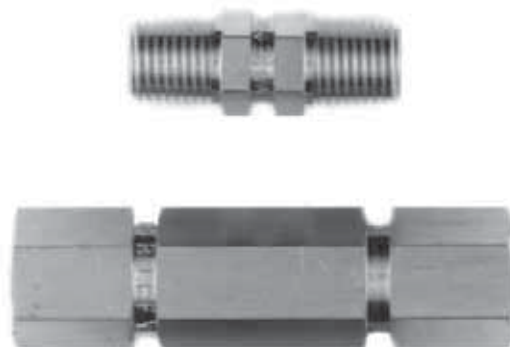
Materials		Specifications
Series 8310 <i>Body</i> Brass <i>Seat</i> Kel-F® <i>Diaphragm</i> Stainless Steel	Series 8320 <i>Body</i> 316 Stainless steel <i>Seat</i> Kel-F® <i>Diaphragm</i> Stainless steel	<i>Operating pressure</i> brass - 3000 psig stainless steel - 3000 psig <i>Operating temperature range</i> 40° to 140°F <i>Flow coefficient (Cv)</i> 0.13

Ordering Information			
Model*	Actuation	Inlet	Outlet
8310-P4FF	Multi-turn	1/4" NPT female	1/4" NPT female
8310L-P4MF	Multi-turn	1/4" NPT male long	1/4" NPT female
8310-P4MM	Multi-turn	1/4" NPT male	1/4" NPT male
8310-T4FF	Multi-turn	1/4" compression	1/4" compression
8320-P4FF	Multi-turn	1/4" NPT female	1/4" NPT female
8320L-P4MF	Multi-turn	1/4" NPT male long	1/4" NPT female
8320-P4MM	Multi-turn	1/4" NPT male	1/4" NPT male
8320-T4FF	Multi-turn	1/4" compression	1/4" compression
8321-P4FF	90° lever	1/4" NPT female	1/4" NPT female
8321L-P4MF	90° lever	1/4" NPT male long	1/4" NPT female
8321-P4MM	90° lever	1/4" NPT male	1/4" NPT male

* Other end connection configurations available upon request.

pressure relief valves

Series 8600



4

Description	Features	Specifications
These easily field adjustable relief valves provide for the protection of equipment components installed in systems where they may be exposed to over pressurization due to the failure of another component or an operator error.	- Working pressure to 3000 psig - Wide range of pressure adjustment 100% tested for crack and reseal performance - Available in brass and stainless steel	<i>Maximum Working Pressure @ 70°F</i> 3000 psig <i>Flow Coefficient (Cv)</i> 0.35 <i>Temperature Rating</i> with Buna-N o-ring -10 to 250°F with Viton® o-ring -10 to 375°F <i>O-ring Material</i> brass Buna-N stainless steel Viton®

Ordering Information

Model	Material	Adjustable Range	Connections inlet x outlet
8614-20-P4MM 8614-65-P4MM 8614-175-P4MM 8614-350-P4MM 8614-600-P4MM	brass brass brass brass brass	3-20 psig 20-65 psig 65-175 psig 175-350 psig 350-600 psig	1/4" NPT male x 1/4" NPT female 1/4" NPT male x 1/4" NPT female 1/4" NPT male x 1/4" NPT female 1/4" NPT male x 1/4" NPT female 1/4" NPT male x 1/4" NPT female
8614-20-P4FF 8614-65-P4FF 8614-175-P4FF 8614-350-P4FF 8614-600-P4FF	brass brass brass brass brass	3-20 psig 20-65 psig 65-175 psig 175-350 psig 350-600 psig	1/4" NPT female x 1/4" NPT female 1/4" NPT female x 1/4" NPT female 1/4" NPT female x 1/4" NPT female 1/4" NPT female x 1/4" NPT female 1/4" NPT female x 1/4" NPT female
8624-20-P4MM 8624-65-P4MM 8624-175-P4MM 8624-350-P4MM 8624-600-P4MM	stainless stainless stainless stainless stainless	3-20 psig 20-65 psig 65-175 psig 175-350 psig 350-600 psig	1/4" NPT male x 1/4" NPT male 1/4" NPT male x 1/4" NPT male 1/4" NPT male x 1/4" NPT male 1/4" NPT male x 1/4" NPT male 1/4" NPT male x 1/4" NPT male
8624-20-P4FF 8624-65-P4FF 8624-175-P4FF 8624-350-P4FF 8624-600-P4FF	stainless stainless stainless stainless stainless	3-20 psig 20-65 psig 65-175 psig 175-350 psig 350-600 psig	1/4" NPT female x 1/4" NPT female 1/4" NPT female x 1/4" NPT female 1/4" NPT female x 1/4" NPT female 1/4" NPT female x 1/4" NPT female 1/4" NPT female x 1/4" NPT female

Series 8500

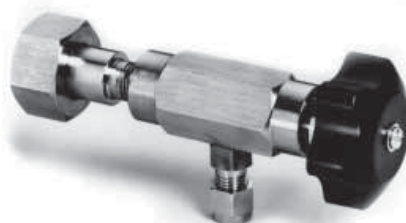
manual control valves

Description

Manual controls are designed for direct connection to a compressed gas cylinder valve outlet. They provide a simple means of transferring the contents of a cylinder to another system or vessel. They **DO NOT** control pressure and should never be used without an operator in attendance at all times.

Four models are presented here with the following basic design features:

- Maximum inlet pressure - 3000 psig
- Teflon® packing for smooth leak-free operation
- Finger-tip control of flow from only a few cc per minute to very rapid withdrawal



Ordering Information

Series 8520 - 303 Stainless steel		Series 8523 - 303 Stainless Steel with 0-3000 psig Cylinder pressure Gauge		Series 8550 - Monel®	
Model	Outlet Connection	Model	Outlet Connection	Model	Outlet Connection
8520H*	1/4" hose barb	8523H*	1/4" hose barb	8550H*	1/4" hose barb
8520T*	1/4" compression fitting	8523T*	1/4" compression fitting	8550T*	1/4" compression fitting
8520PF*	1/4" NPT female	8523PF*	1/4" NPT female	8550PF*	1/4" NPT female

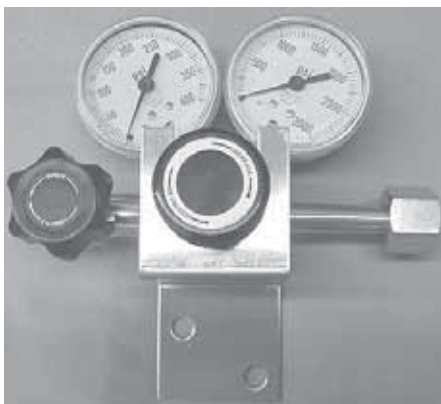
*Specify CGA connection number when ordering

Series EZ3000

Easy-Mount regulator bracket

Description

This bracket allows either single stage or two stage regulators to be mounted or removed without removing the adjusting knob or resetting the delivery pressure provided the regulator is supplied by the factory with the panel mount nut installed.



Ordering Information

Model	Description
EZ3100	For single stage regulators
EZ3200	For two stage regulators

fixed installation type – Beacon 100, Beacon 200, and Beacon 800

Gas Detection Systems

Description

Gas detection should not be complicated. The Beacon™ Series is gas detection simplified. The Beacon™ Series are powerful, low cost fixed system controllers for one, two, or up to eight points of gas detection. They are microprocessor controlled, versatile, simple to install and operate, and priced to be the industry's best value single and multiple gas detection controllers.

The wide variety of sensor heads available for the Beacon Series can provide protection for many of the gases commonly used in industry or laboratories today. A comprehensive list of available detectors is provided below.

Sensors can be mounted directly at the Beacon™ housing, or can be wired remote from the controller. The digital displays have backlighting and simultaneous readout of the gas type(s) and concentration(s). The bottom mounted wiring hubs make wiring easy. An external reset switch allows alarms to be silenced from outside the controller housing.

With 10 or 12 amp rated relays, the Beacon Series can be wired directly to a variety of devices like horns, buzzers, or lights eliminating the need for costly external relays from the controller to devices.

The Beacon™ Series is housed in a NEMA 4X rated case for a weather tight seal. This case design complies with the new lock out / tag out standard and can be fully secured. An external reset switch allows the alarm to be silenced from outside of the controller housing. The Beacon™ units ship complete with a wall mounting kit for easy installation.



Features

- Low cost versatile solution!!
- Compact, weatherproof, NEMA 4X enclosure
- 115 VAC or 12 VDC operation
- Long life sensors (2+ years typical)
- Accepts LEL/O₂ /H₂ S/CO direct wire sensors (Beacon 100 & 200)
- Accepts any 4-20 mA transmitter
- Audible alarm with reset button
- Three programmable alarm levels
- Built-in trouble alarm with relay
- Relay rating 10 or 12 amps, form C
- Provides 4-20 mA output

Industry Applications	About Sensors	Direct Wire Detectors
• Laboratories • Semiconductor manufacturing facilities • Petrochemical plants & refineries • Water & wastewater treatment plants • Pulp & paper mills • Gas, telephone, & electric utilities • Parking garages • Manufacturing facilities	The sensor is the actual device that is sensing the gas. Three sensor types are available for use with the Beacon Series Controller: direct wire, gas diffusion, and sample draw. Sensors typically last 2 to 4 years, but can last for a longer or shorter time depending on the nature of the application.	Direct wire detectors are hard wired diffusion sensors to the controller and do not require a transmitter. They are, therefore, more economical than detectors requiring a transmitter. Direct wire detectors can only be used with the Beacon 100 & 200 controllers. While the choice of gases is limited for hard wire detectors they can be an economical choice when available. In general, the use of a transmitter is preferred for distances over 300' to 500' to simplify calibration.

Gas Detection Systems fixed installation type – Beacon 100, Beacon 200, and Beacon 800

Ordering Information

When ordering a Beacon system please specify the following components:

1. Controller part number
2. Detector assemblies required

Model	Description
72-2101 RK	Beacon 100 single point controller
72-2102 RK	Beacon 200 two point controller
72-2108 RK	Beacon 800 eight point controller



Diffusion Detectors	Sample Draw Detectors	Transmitters
Diffusion detectors rely on the natural flow of air to bring the sample to the detection head. These are an excellent choice for gas cabinets or other forced flow environments where the detector is situated in a constant air flow from the potential gas release to the detector. All diffusion type detectors used with the Beacon Series have transmitters.	Sample draw detectors have an integral pump, which draws the surrounding air to the detector. They are a preferred choice when used in larger areas where there is no specific point at which one can expect a gas leak. All sample draw detectors used with the Beacon Series have transmitters.	Most sensors require a transmitter to amplify the sensor signal, and to convert the gas sensor signals into a standardized output, such as 4-20 mA, for transmitting the signal to a controller. The transmitter is usually in close proximity to the sensor, and zero and span adjustments must be done at the transmitter. Note that some sensors and controllers do not require the use of a transmitter for LEL or Oxygen detection (Beacon 100 & Beacon 200), and also one is not needed for short distance wiring of H₂S or CO sensors for the Beacon 100 & 200. All transmitters used with the Beacon Series are operated from 24 VDC, and utilize either 2 or 3 wires. In general, even if a sensor can be used without a transmitter, the use of a transmitter is often preferred for distances over 300' to 500' to simplify calibration.

Physical

• Enclosure

Wall mounting gray polycarbonate with hinged cover

Dimensions	Beacon 100	Beacon 200	Beacon 800
	Height: 8.5	Height: 8.5"	Height: 12.5"
	Width 7.0"	Width: 7.0"	Width: 11.0"
	Depth 4.3"	Depth: 4.3"	Depth: 6.4"

• Conduit Connection ½"

NPT conduit hubs	2	3	4
------------------	---	---	---

- **Wiring Termination:** Screw type terminal block 14 gauge max.
- **Environmental Operating Temp:** -4°F to 122°F (-20°C to 50°C)
- **Storage Temp:** -4°F to 158°F (-20°C to 70°C)
- **Relative Humidity:** 0 - 100% RH
- **Enclosure Rating:** NEMA-4X enclosure, waterproof, chemical, and weather resistant.

Inputs

• Direct Wired Sensors (Beacon 100 & 200 only)

• LEL / PPM Hydrocarbon

• Oxygen

• Carbon Monoxide

• Hydrogen Sulfide

• Remote amp not required for less than 500 feet.

- **4-20 mA Sensors:** Accepts any 4-20 mA transmitter (24VDC, 2 or 3 wire). A wide variety of sensors are available with 4-20 mA signals. (See list of detectable gases. Wiring distances up to 5000 feet.

Outputs

• Relays: Beacon 100: 4 relays

- 12 amp rating (at 115 VAC), SPDT isolated contacts. 3 relays for gas alarm levels 1 relay for malfunction

Beacon 200: 2 relays per channel

- 10 amp rating (@115 VAC), SPDT isolated contacts. 1 set of common relays: 2 for gas alarm levels, 1 for malfunction

Beacon 800: 2 relays per channel

- 10 amp rating (@115 VAC), SPDT isolated contacts. 1 set of common relays: 2 for gas alarm levels, 1 for malfunction

- **Relays fully programmable for:** Increasing or decreasing alarm, latching or self reset, normally energized or normally de-energized, time delay for alarm on and alarm off.

- **4-20 mA:** Signal output, 4-20 mA (into 500 ohms impedance maximum).

- **24 VDC:** 24 VDC output provided to operate sample drawing adapters or other accessories.

- **Display:** Alphanumeric display with back-lighting.

Beacon 100: 1 display, 16 characters per line; 2 lines.

Beacon 200: 1 display, 20 characters per line; 4 lines

Beacon 800: 2 displays, 16 characters per line; 4 lines each. All 8 channels continuously displayed.

- **Audible:** Built-in audible alarm, 94 dB, mounted on enclosure. Coded Output: pulsing = gas alarm steady = fail

- **Visual:** Beacon 100: 5 visual alarm LED's on the front cover for status indication, pilot, and malfunction.

Beacon 200: 4 visual alarm LED's on the front cover for status indication, pilot, and malfunction.

Beacon 800: 4 visual LED alarms on front cover for alarm indications, pilot, and malfunction.

Power

- **115 VAC or 12 VDC standard**

- **Optional**

- **230 VAC**

Battery backup option available

Warranty

- **Two years materials and workmanship.**

Measurable Gases	Standard Range	Diffusion Detector Assembly	Sample Draw Detector Assembly	Sensors For		
				100	200	800
Ammonia NH ₃	0 - 75 ppm	GD-K8A-NH ₃	GD-K7D2 NH ₃	X	X	X
Arsine AsH ₃	0 - 0.2 ppm	-	GD-K7D2ASH ₃	X	X	X
Boron Trichloride BCl ₃	0 - 15 ppm	GD-K8A-BCL ₃	GD-K7D2 BCL ₃	X	X	X
Boron Trifluoride BF ₃	0 - 9 ppm	-	GD-K7D2 BF ₃	X	X	X
Carbon Tetrachloride CCl ₄	0 - 30 ppm	-	GD-K8DT-CCL ₄	X	X	X
Carbon Monoxide (XP) CO	0 - 300 ppm	65-2432RK	X	X	X	
Chlorine Cl ₂	0 - 3 ppm	GD-K8A-CL ₂	GD-K7D2 Cl ₂	X	X	X
Chlorine Trifluoride ClF ₃	0 - 1 ppm	-	GD-K7D2 ClF ₃	X	X	X
Combustibles (XP) LEL	0 - 100 %	61-1000RK	X	X		
Combustibles (4-20mA) (XP) LEL	0 - 100 %	65-2400RK	-	X	X	X
Diborane B ₂ H ₆	0 - 0.3 ppm	GD-K8A-B ₂ H ₆	GD-K7D2 B ₂ H ₆	X	X	X
Dichlorosilane DCS	0 - 15 ppm	GD-K8A-DCS	GD-K7D2 DCS	X	X	X
Disilane Si ₂ H ₆	0 - 15 ppm	GD-K8A-Si ₂ H ₆	GD-K7D2 Si ₂ H ₆	X	X	X
Fluorine F ₂	0 - 3 ppm	-	GD-K7D2 F ₂	X	X	X
Germane GeH ₄	0 - 2 ppm	-	GD-K35PN-GEH ₄	X	X	X
Hydrazine N ₂ H ₄	0 - 10 ppm	-	GD-K34PN-N ₂ H ₄	X	X	X
Hydrogen H ₂	0 - 2000 ppm	GD-A8V-H ₂	GD-D8V-H ₂	X	X	X
Hydrogen (Direct) H ₂	0 - 2000 ppm	61-1050RK	X	X		
Hydrogen (Specific) H ₂ LEL	0 - 100%	61-1001RK	X	X		
Hydrogen (4-20mA) H ₂	0 - 2000 ppm	65-2440RK	X	X	X	
Hydrogen Bromide HBr	0 - 9 ppm	-	GD-K7D2 HBr	X	X	X
Hydrogen Chloride HCl	0 - 15 ppm	-	GD-K7D2 HCl	X	X	X
Hydrogen Chloride HCl	0 - 15 ppm	GD-K8A-HCL	X	X	X	
Hydrogen Cyanide HCN	0 - 30 ppm	-	GD-K35PN HCN	X	X	X
Hydrogen Cyanide HCN	0 - 40 ppm	GD-K8A-HCN	GD-K7D2 HCN	X	X	X
Hydrogen Fluoride HF	0 - 9 ppm	-	GD-K7D2 HF	X	X	X
Hydrogen Selenide H ₂ Se	0 - 0.2 ppm	-	GD-K35 H ₂ Se	X	X	X
Hydrogen Sulfide H ₂ S	0 - 1 ppm	-	GD-K7D2 H ₂ S	X	X	X
Hydrogen Sulfide H ₂ S	0 - 100 ppm	65-2422RK	-	X	X	X
Nitric Oxide NO	0 - 100 ppm	-	GD-K7D2 NO	X	X	X
Nitrogen Dioxide NO ₂	0 - 15 ppm	GD-K8A	GD-K7D2 NO ₂	X	X	X
Nitrogen Trifluoride NF ₃	0 - 30 ppm	-	GD-K8D NF ₃	X	X	X
Nitrogen Tetraoxide N ₂ O ₄	0 - 15 ppm	-	GD-K7D2 N ₂ O ₄	X	X	X
Oxygen (4-20mA) O ₂	0 - 25 %	65-2504RK	-	X	X	X
Oxygen (Direct) O ₂	0 - 25 %	65-2502RK	-	X	X	
Ozone O ₃	0 - 1 ppm	GD-K8A-O ₃	GD-K7D2 O ₃	X	X	X
Phosphine PH ₃	0 - 1 ppm	GD-K8A-PH ₃	GD-K7D2 PH ₃	X	X	X
Phosphorus Pentafluoride PF ₅	0 - 9 ppm	-	GD-K7D2 PF ₅	X	X	X
Phosphorus Trichloride PCl ₃	0 - 15 ppm	GD-K8A-PCL ₃	GD-K7D2 PCl ₃	X	X	X
Phosphorus Trifluoride PF ₃	0 - 9 ppm	-	GD-K7D2 PF ₃	X	X	X
Silane SiH ₄	0 - 15 ppm	GD-K8A-SiH ₄	GD-K7D2 SiH ₄	X	X	X
Silicon Tetrachloride SiCl ₄	0 - 15 ppm	GD-K8A-SiCL ₄	GD-K7D2 SiCl ₄	X	X	X
Silicon Tetrafluoride SiF ₄	0 - 9 ppm	-	GD-K7D2 SiF ₄	X	X	X
Sulfur Dioxide SO ₂	0 - 30 ppm	GD-K8A-SO ₂	GD-K7D2 SO ₂	X	X	X
Sulfur Tetrafluoride SF ₄	0 - 9 ppm	-	GD-K7D2 SF ₄	X	X	X
Tetraethyl Orthosilicate TEOS	0 - 15 ppm	-	GD-S8DG-TEOS	X	X	X
Trichlorosilane TCS	0 - 15 ppm	GD-S8DG-TCS	GD-K7D2 TCS	X	X	X
Tungsten Hexafluoride WF ₆	0 - 9 ppm	-	GD-K7D2 WF ₆	X	X	X
1,1,1-Trichloroethane C ₂ H ₃ Cl ₃	0 - 2000 ppm	GD-A8V	-	X	X	X

Eagle Portable Gas Detector

Description

The EAGLE is a powerful instrument that does more than offer standard confined space protection. The EAGLE also provides detection combinations never before offered in a portable gas monitor featuring the industry's widest selection of high quality, long life and field proven sensors.

The EAGLE's ergonomic design offers easy access to controls such as auto-calibration, alarm silence, demand zero, peak hold and a wide variety of other features. Each channel has 2 alarm levels plus TWA and STEL alarms for toxic channels. Alarm levels are adjustable and can be latching or self resetting. Standard features on the EAGLE, such as PPM/LEL hydrocarbon detection (5 ppm resolution) and a methane elimination switch for environmental applications are not available on most other competitive units. For quick response and recovery, the EAGLE has a strong internal pump that can draw samples from over 125 feet. The EAGLE will continuously operate for over 30 hours on alkaline batteries or 18 hours on rechargeable Ni-Cads. Many accessories such as long hoses, special probes, data-logging, continuous operation adapters, remote alarms and strobes, dilution fittings, internal hydrophobic filter, etc, are available to help satisfy almost any application. Rugged, weatherproof, easy to operate and maintain, the EAGLE is the industry's answer to portable gas detection.

Features

- Simultaneous detection of up to 6 different gases
- Wide variety of field proven gas sensors available
- PPM / LEL hydrocarbon detection
- Powerful long-life pump with 125' range
- Low flow pump shut off and alarm
- Methane elimination switch for environmental use
- Security "Adjustment Lockout Switch"
- Up to 30 hours of continuous operation
- Alkaline or Ni-Cad capability
- Ergonomic RF/EMI/Chemical resistant case
- Data-logging option
- Auto-calibration
- Intrinsically safe design (most versions), CSA/ NRTL & UL Classified



Ordering Information

Measurable Gas**	Range	Model Number
Ammonia	0-75 ppm	72-5111RK
Arsine	0-0.20 ppm	72-5107RKS
Arsine	0-1.0 ppm	72-5107RK
Carbon Dioxide	0-5000 ppm	72-5115RK-5K
	0-10000 ppm	72-5115RK-10K
	0-5%	72-5115RK-05
	0-20%	72-5115RK-20
	0-50%	72-5115RK-50
Carbon Monoxide	0-500 ppm	72-5104RK
Fluorine	0-5 ppm	72-5119RK
Hydrocarbon	0-100% LEL &	72-5101RK
	0-50,000 ppm	
Hydrogen Chloride	0-5 ppm	72-5110RK
Hydrogen Sulfide	0-100 ppm	72-5103RK
Nitrogen Dioxide	0-15 ppm	72-5114RK
Oxygen	0-40%	72-5102RK
Phosphine	0-1.0 ppm	72-5108RK
Silane	0-15 ppm	72-5117RK
Sulfur Dioxide	0-30 ppm	72-5105RK

Confined Space Instrument

(4 detectors in one housing)	72-5401RK
Hydrocarbons	0 - 100% LEL
Oxygen (O ₂)	0 - 40% Vol.
Carbon Monoxide (CO)	0 - 500 ppm
Hydrogen Sulfide (H ₂ S)	0 - 100 ppm

**Included Accessories – Most Eagle units come with a 5' polyurethane hose, shoulder strap, four alkaline batteries, and a 10" hydrophobic probe as standard accessories. Units for toxic gases are supplied with a 3' Teflon hose without the hydrophobic filter.*

***Gases & Detectable Ranges - The EAGLE can be provided with many gas sensors not specifically listed above. Units can contain up to 6 gas sensors (4 Toxics maximum). Please specify the gases desired when requesting a quotation.*

Specifications for Eagle Portable Gas Detector

- **Enclosure**
Weatherproof, chemical resistant, RF/EMI coated high impact poly-carbonate-polyester blend. Can be set in rain or into 2.5" water without damage. Ergonomically balanced with rugged top mounted handle.
- **Dimensions**
10.5" long x 5.9" x 7" tall
- **Weight**
5 lbs.
- **Detection Principle**
Catalytic combustion, electrochemical cell, and infrared.
- **Sensor Life**
2 years under normal conditions.
- **Sampling Method**
Powerful, long-life pump (over 6,000 hours) can draw samples over 125 feet. Flow rate approximately 2.0 SCFH.
- **Display**
4 x 20 LCD readout with backlighting. Viewed through window in case top. Display readings & status of all channels simultaneously.
- **Alarms**
2 alarms per channel plus TWA and STEL alarms. Fully adjustable for levels, latching or self-reset and silenceable.
- **Alarm Method**
Buzzer 85dB at 30 cm, dual high intensity LED's, and blinking display.
- **Controls**
6 external push buttons for operation, demand zero, and auto-calibration. Buttons also access LEL/ppm, alarm silence, peak hold, TWA/STEL values, battery status and many other features.
- **Continuous Operating Hours**
30 hours minimum using alkaline batteries, or 18 hours Ni-Cads.
- **Power Source**
Size D batteries, 4 alkaline or Ni-Cad, Charger has alkaline recognition to prevent battery damage if alkalines are charged.
- **Operating Temp. & Humidity**
-10°C to 40°C (14°F to 104°F), 0 to 95% RH, non-condensing.
- **Indication Accuracy**
Maximum variance +/- 5% of full scale.
- **Response Time**
30 seconds to 90% (for most gases).
- **Safety Design**
Intrinsically Safe, Class I, Division 1, Groups A, B, C and D. CSA/NRTL & UL Classified (most versions).
- **Standard Accessories**
Shoulder strap, alkaline batteries, hydrophobic probe, and 5 foot hose (for special toxic gas versions, shorter Teflon hose used without probe).
- **Optional Accessories**
 - Data-logging of up to 4 gases (No data-logging possible on 5 or 6 gas version or versions with more than 2 toxic sensors).
 - Remote alarm
 - Dilution fitting (50/50)
 - Ni-Cad batteries
 - Battery charger, 115 VAC or 12 VDC
 - Continuous Operation Adaptor, 115 VAC or 12 VDC
 - Extra loud buzzer
 - Extension probes
 - Internal Hydrophobic Filter (strong recommended)
- **Warranty**
One year material and workmanship.

cylinder holding devices

Model 400 & Model 420

OSHA regulations require compressed gas cylinders to be secured from toppling when in storage or in use. The devices shown here will help you comply with these regulations.

Description

**Wall Mount Cylinder Holder
Model 400**

This cast aluminum cylinder holder provides an easy way to secure cylinders to a wall, in a gas storage cabinet, or other stable surface. The holder is attached with bolts or lag screws using the pre-formed holes 7 inches apart. the holder can be used with cylinders from 4 to 14 inches in diameter. Cylinders are held firmly in place with a nylon strap fitted with a sturdy buckle, with an optional steel chain and hook, or both strap and chain.



Ordering Information

Model	Description
400	Wall mount cylinder holder with strap
400C	Wall mount cylinder holder with chain and hook
400CS	Wall mount cylinder with strap, chain and hook
400 RS	Replacement strap

Description

**Bench Type Cylinder Holder
Model 420**

This holder is designed to prevent toppling of cylinders when they are next to a lab or work bench and cannot be secured to a wall. The special screw clamp holds securely to a table top without marring the surface. The holder can be used with cylinders from 4 to 14 inches in diameter. Cylinders are held firmly in place with a nylon strap fitted with a sturdy buckle, with an optional steel chain and hook, or with both strap and chain.



Ordering Information

Model	Description
420	Bench mount cylinder holder with strap
420C	Bench mount cylinder holder with chain and hook
420CS	Bench mount cylinder with strap, chain and hook
400 RS	Replacement strap

Model 450 & Model 460

small & large cylinder stands

Description

Small Cylinder Stand Model 450

This stand provides increased stability to cylinders with diameters of 4" to 7-3/8". It is constructed of nickel plated steel. Four thumb screws hold the stand securely to the cylinder. Stand height is 10".



Non-tip Small Cylinder Stand Model 470

This stand offers a convenient method of securing a 3-1/4" cylinder on a table or lab bench. The stand is made of light weight brushed aluminum, yet the large diameter base provides stability even when a regulator is installed on the cylinder.



Description

Large Cylinder Stand Model 460

This stand provides increased stability to cylinders with a diameter of 9" to 9-1/2" in situations where it is not possible to secure the cylinder to a wall or a bench with the model 400 or 420 cylinder holders. The cylinder can be rolled on and off with ease and is firmly held in place or quickly released by the cylinder holding band. With this unique design the cylinder rests on a steel plate and uses the cylinder's own weight to help keep the cylinder and stand stable and eliminate unsafe cylinder "ride up" that is common in some competitive models. Constructed of steel painted green.

Dimensions: 18" x 18" x 12.5" high
Weight: 13 lbs.



Description

Lecture Bottle Holders

Lecture bottles have rounded ends and require some means of support when in use. We provide two types of holders here that meet most requirements.

Non-Tip Stand Model 475

This stand offers a convenient method of securing a lecture bottle on a table or lab bench. The stand is made of light weight brushed aluminum, yet the large diameter base provides stability even when a regulator is installed on the bottle.

Wall Mount Lecture Bottle Bracket Model 480

This bracket is made of powder coated steel and has spring steel clips that provide firm, secure support to the lecture bottle. The bracket is ideal for securing lecture bottles to lab cart or bench set-ups, in carrying cases for portable systems, or in storage cabinets.



cylinder floor stands

Series 465

Description

Available in two and three cylinder models, these floor stands are designed and built to provide safe storage of compressed gas cylinders with diameters up to 12" when a walk, post or bench is not available to secure the cylinder. Fully welded construction from 11 gauge and heavier plate steel and a quality epoxy powder paint finish provide structural integrity and long service life. Surfaces coming in contact with the cylinders are protected with vinyl edge guards. Cylinders are held securely in place with 1.5" polypropylene straps with steel cinch buckles.

Ordering Information

Model	Description	Dimensions	Weight
465-2	Two cylinder floor stand	28" w x 30" h x 12" d	41 lbs
465-3	Three cylinder floor stand	40" w x 30" h x 12" d	56 lbs



Series 495

“Gas Station” process stands

4

Description

There are many situations where it would be more convenient to locate gas cylinders and distribution systems near the process, but away from a wall or other secure fixture. The “Gas Station” solves this problem. It can be located in any open area and support two or three cylinders and the associated gas distribution equipment. The stand is secured to the floor with bolts through the four pre-drilled holes provided in the base. Cylinders sit on the base plate and are securely held to the 2"x2" square tubular steel frame painted gray with sturdy nylon belts. A changeover manifold or other distribution equipment can be conveniently mounted to the plate above the cylinders. The unit is shipped unassembled via UPS. Assembly is easily accomplished in 10-15 minutes.

Ordering Information

Model 495-2 Two Cylinder Gas Station

Dimensions: 28" w x 72 1/2" h x 12" d
Weight: 56 pounds

Model 495-3 Three Cylinder Gas Station

Dimensions: 40" w x 72" h x 12" d
Weight: 78 pounds



cylinder storage racks

Series 490

Description

The storage compressed gas cylinders to comply with Federal, State and Local regulations often presents a number of problems. These new cylinder storage racks can help organize your cylinder storage and help you comply with the myriad of regulations.

Because the frame is pre-drilled to accommodate anchoring the rack to the floor they are ideal for situations where cylinder must be located away from a wall or other securing fixture. Racks are available in standard sizes to hold one to nine cylinders. Custom racks are available. Standard rack configurations are show below.

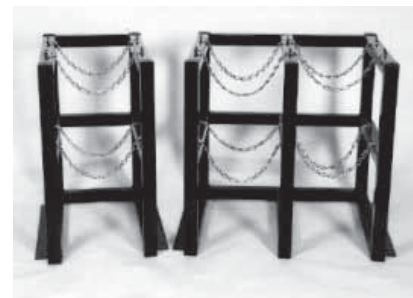
The unique design of square steel tubing (2" x 2") components welded together to form the frame provides the rigidity necessary to allow the frame to be constructed without a bottom. This allows cylinders to be rolled into the frame without lifting.

Racks are provided with either single or dual restraint steel chains to secure the cylinders. Single restraint racks secure the individual cylinders with a chain for each cylinder located at the top of the rack. Dual restraint models have a set of chains for each cylinder at 15" and 30" from the floor.

Racks are painted with nitro blue enamel to provide long lasting protection. These cylinder storage racks meet the requirements of the National Fire Protection Association, National Fire Codes, Uniform Fire Codes, Uniform Building Codes and Seismic Zone 4 Restraint Regulations, Compressed Gas Association and OSHA.

Features

- Safe cylinder restraint
- Organized gas cylinder storage
- Simple Installation
- Uses space efficiently
- Removable and relocatable



Gas cylinder restraint and storage



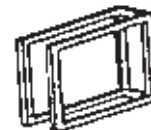
490-111



490-112



490-121



490-113



490-123



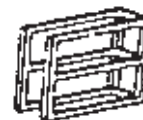
490-122



490-211



490-131



490-213



490-212



490-222



490-221



490-231



490-223

Ordering Information

Model	Description	Nominal Dimensions
Single restraint models		
490-111	1 cyl wide x 1 cyl deep	16" w x 14" d x 30" h
490-121	2 cyl wide x 1 cyl deep	30" w x 14" d x 30" h
490-131	3 cyl wide x 1 cyl deep	44" w x 14" d x 30" h
490-112	1 cyl wide x 2 cyl deep	16" w x 26" d x 30" h
490-122	2 cyl wide x 2 cyl deep	30" w x 26" d x 30" h
490-132	3 cyl wide x 2 cyl deep	44" w x 26" d x 30" h
490-113	1 cyl wide x 3 cyl deep	16" w x 38" d x 30" h
490-123	2 cyl wide x 3 cyl deep	30" w x 38" d x 30" h
490-133	3 cyl wide x 3 cyl deep	44" w x 38" d x 30" h
Dual restraint models		
490-211	1 cyl wide x 1 cyl deep	16" w x 14" d x 30" h
490-221	2 cyl wide x 1 cyl deep	30" w x 14" d x 30" h
490-231	3 cyl wide x 1 cyl deep	44" w x 14" d x 30" h
490-212	1 cyl wide x 2 cyl deep	16" w x 26" d x 30" h
490-222	2 cyl wide x 2 cyl deep	30" w x 26" d x 30" h
490-232	3 cyl wide x 2 cyl deep	44" w x 26" d x 30" h
490-213	1 cyl wide x 3 cyl deep	16" w x 38" d x 30" h
490-223	2 cyl wide x 3 cyl deep	30" w x 38" d x 30" h
490-233	3 cyl wide x 3 cyl deep	44" w x 38" d x 30" h

All cylinder racks must ship motor freight

Model 6114 & Model 6214

cylinder hand trucks

4

Description

These hand trucks are specially designed to hold and easily transport heavy compressed gas cylinder by persons of moderate strength. They feature welded tubular steel construction for strength. All models roll quietly and smoothly on large semi-pneumatic or solid rubber tired wheels and casters for better maneuverability over rough or uneven surfaces. Trucks are finished with green, scratch resistant, high gloss, electrostatically applied, oven baked powder coat.

Model 6114

Single Cylinder Hand Truck

This unit is designed to handle one T or K type cylinder. It has two 4" rear casters, that fall into place when in use, to provide greater stability. The operator carries no load and has greater control over the truck. The rear wheel assembly is easily returned to the retracted position for storage. The cylinder is held securely on the truck by a safety chain.

Model 6214

Two Cylinder Hand Truck

Designed to handle two T or K type cylinders the 6214 has longer handles for ease of mobility and good load control. Retractable 4" rear casters drop into place when needed for extra load handling safety or collapse and lock into the frame for storage. The truck has dual binding chains for extra security and solid 10" rubber front wheels.



gas safety storage cabinets

Series 7000

Description

Gas safety storage cabinets are designed to provide local exhaust gas control to enhance the safety of storing or using hazardous gases. The use of gas cabinets provides a convenient way to achieve separation of gases by their classifications to satisfy both national and local fire and building codes.

When connected to a suitable exhaust system, air is drawn through the cabinet ensuring that any gas leakage is carried away and does not accumulate in the storage or work area. The cabinets can be fitted with manifolds or other gas controls so that both the cylinder and the control system are enclosed. When operators access the controls through the access window and a proper exhaust system is in operation, the cabinet has the capacity to allow 150-200 linear feet per minute of air to pass across the open window face to ensure that workers are not exposed.



4

Ordering Information

Model	Description
7100	one cylinder cabinet
7200	two cylinder cabinet
7300	three cylinder cabinet
7400	four cylinder cabinet
Options	Model
• Keyed door latch(es)	7000-1
• Keyed window latch(es)	7000-2
• Adjustable small cylinder shelf	7000-3

Features

- All welded construction using 11 gauge steel, epoxy painted. Texture finish outside, smooth finish on inside of cabinet.
- Exhaust vent located on top of cabinet is 6" diameter x 3" high.
- 165° F. sprinkler head with bee's wax coating located in cabinet top.
- Cylinder brackets accommodate 7"-9" diameter cylinders. The brackets can move vertically and horizontally for precise pigtail alignment.
- Self-latching and closing window(s) with 1/4" thick wire glass.
- Self-latching and closing door(s) with bottom louvers and flush mounted stainless steel paddle latch(es). Optional keyed latches available.
- All stainless steel fasteners.
- Meets or exceeds the Uniform Fire Code.

Cabinet Physical Data

Model	Cylinder Capacity	Dimensions* Outside	Door Opening	Weight	Exhaust Flow Required (SCFM)
7100	one	18"w x 18"d x 72"h	16"w x 70"h	235 lbs.	175
7200	two	24"w x 18"d x 72"h	22"w x 70"h	283 lbs.	250
7300	three	36"w x 18"d x 72"h	left 22"w x 70"h right 16"w x 70"h	331 lbs.	450
7400	four	48"w x 18"d x 72"h	left 22"w x 70"h right 22"w x 70"h	391 lbs.	600

*Overall cabinet height including exhaust vent is 75".

Model 90001, 90002, 90003

cylinder wrenches

Description

Model 90001

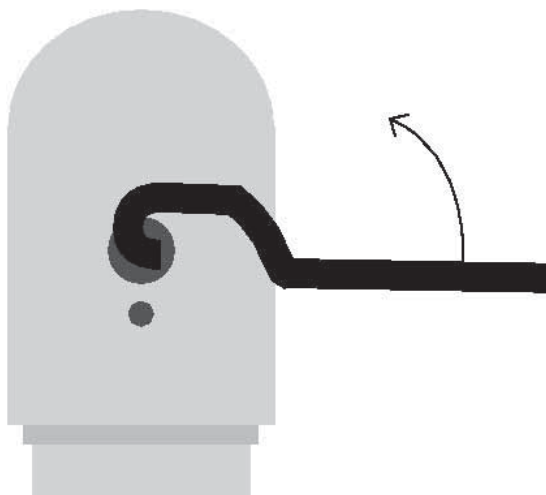
This universal cylinder wrench has 3 openings on one end (11/16", 1-1/8", 1-1/4") for tightening the various cylinder valve connections and most commonly used gas connections. The opposite end has 3/8" square box for opening cylinder valves that do not have hand wheels.

Model 90002

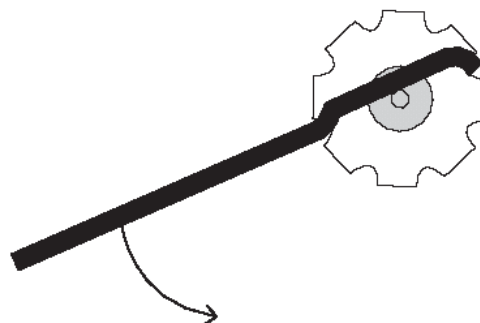
This wrench has a basic 3/8" square for opening cylinder valves that do not have hand wheels, such as chlorine and hydrogen sulfide.

Model 90003

The special configuration of this wrench provides an easy method of opening extra tight, hand wheel operated cylinder valves and removing difficult cylinder caps.



Remove difficult cylinder caps



Open tight valves easily

316 stainless steel flexible hose

Series 601, 602, 604, and 605

Description

Series 601 hoses are constructed of 1/4" I.D. Teflon® lined stainless steel braid, rated for 3000 psig. The 601 hoses are fitted with 1/4" NPT brass end connections; they make excellent economical manifold pigtails. The 602 hoses are fitted with 1/4" NPT stainless steel end connections.

The Series 604 hoses are constructed of double braided stainless steel, fitted with stainless steel 1/4" NPT end connections, rated for 3000 psig, and cleaned for oxygen service.



Special Hoses

We can provide any of the hoses on this page in different lengths and with a wide variety of end fittings.

Series 601 and 602

- 1/4" I.D. Teflon® lined 316 stainless steel braided hose
- Rated for 3000 psig
- 601 1/4" NPT female x 1/4" NPT female
- 601M 1/4" NPT male x 1/4" NPT male
- 601MF 1/4" NPT male x 1/4" NPT female
- 602 1/4" NPT female x 1/4" NPT female
- 602M 1/4" NPT male x 1/4" NPT male
- 602MF 1/4" NPT male x 1/4" NPT female
- Cleaned for oxygen service

Series 604 and 605

- 1/4" I.D. 316 stainless steel double braided hose (605 Series has protective outer armor to provide greater safety and kink resistance.)
- Rated for 3000 psig
- 1/4" NPT female or male stainless steel end connections
- Cleaned for oxygen service

Ordering Information

Model	Length	Model	Length	Model	Length
601-2	2.0 feet	602-3	3.0 feet	604-6	6.0 feet
601M-2	2.0 feet	602M-3	3.0 feet	604M-6	6.0 feet
601MF-2	2.0 feet	602MF-3	3.0 feet	604MF-6	6.0 feet
601-3	3.0 feet	602-6	6.0 feet	605-2	2.0 feet
601M-3	3.0 feet	602M-6	6.0 feet	605M-2	2.0 feet
601MF-3	3.0 feet	602MF-6	6.0 feet	605MF-2	2.0 feet
601-6	6.0 feet	604-2	2.0 feet	605-3	3.0 feet
601M-6	6.0 feet	604M-2	2.0 feet	605M-3	3.0 feet
601MF-6	6.0 feet	604MF-2	2.0 feet	605MF-3	3.0 feet
602-2	2.0 feet	604-3	3.0 feet	605-6	6.0 feet
602M-2	2.0 feet	604M-3	3.0 feet	605M-6	6.0 feet
602MF-2	2.0 feet	604MF-3	3.0 feet	605MF-6	6.0 feet

Cryogenic transfer hoses

Series 607C

- 1/2" I.D. 316 stainless steel double braided hose with protective outer armor to provide greater safety and kink resistance
- Rated for 2150 psig
- 1/2" 45° flare female stainless steel connections (CGA 295) or 5/8" 45° flare (CGA 440) for oxygen
- Cleaned for oxygen service

Ordering Information

Model	Length	Model
607C-4	for nitrogen and argon	4.0 feet
607C-6	for nitrogen and argon	6.0 feet
607C-4-440	for oxygen	4.0 feet
607C-6-6440	for oxygen	6.0 feet

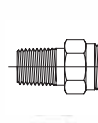
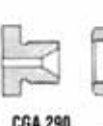
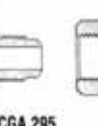
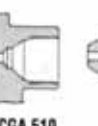
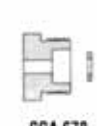
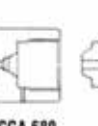
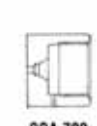


Special Hoses

We can provide any of the hoses on this page in different lengths and with a wide variety of end fittings.

CGA CONNECTIONS

CGA Connections Chart

 CGA 110 3125-32UNF-2B-RH-INT	 CGA 165 4375-20UNF-2A-RH-EXT (1/4 in. SAE Flare)	 CGA 180 625-18UNF-2A-RH-EXT	 CGA 240 375-18NGT-RH-INT	 CGA 280 745-14NGO-RH-EXT
 CGA 290 745-14NGO-LH-EXT	 CGA 295 750-16UNF-2A-RH-EXT (1/2 in. SAE Flare)	 CGA 296 824-14UNS-2B-RH-INT	 CGA 320 825-14NGO-RH-EXT (Flat Nipple)	 CGA 326 825-14NGO-RH-EXT (Small Round Nipple)
 CGA 330 825-14NGO-LH-EXT (Flat Nipple)	 CGA 346 825-14NGO-RH-EXT (Large Round Nipple)	 CGA 347 825-14NGO-RH-EXT (Long Round Nipple)	 CGA 350 825-14NGO-LH-EXT (Round Nipple)	 CGA 440 875-14UNF-2A-RH-EXT (5/8 in. SAE Flare)
 CGA 500 885-14NGO-RH-INT (Bullet Nipple)	 CGA 510 885-14NGO-LH-INT (Bullet Nipple)	 CGA 540 903-14NGO-RH-EXT	 CGA 555 903-14NGO-LH-EXT	 CGA 580 965-14NGO-RH-INT
 CGA 590 965-14NGO-LH-INT	 CGA 660 1.030-14NGO-RH-EXT (Face Washer)	 CGA 670 1.030-14NGO-LH-EXT (Face Washer)	 CGA 677 1.030-14NGO-LH-EXT (Round Nipple)	 CGA 678 1.030-14NGO-LH-EXT (Recessed Washer)
 CGA 679 1.030-14NGO-LH-EXT (Tipped Nipple)	 CGA 680 1.045-14NGO-RH-INT	 CGA 695 1.045-14NGO-LH-INT	 CGA 701 1.103-14NGO-RH-EXT	 CGA 702 1.125-14NGO-RH-INT
 CGA 703 1.125-14NGO-LH-INT	 CGA 705 1.125-14UNS-2A-RH-EXT	 CGA 792 1.500-12UNF-2A-RH-EXT	 CGA 870 PIN-INDEXED YOKE, PINS 2-5	 CGA 880 PIN-INDEXED YOKE, PINS 2-6
 CGA 890 PIN-INDEXED YOKE, PINS 2-4	 CGA 900 PIN-INDEXED YOKE, PINS 1-3	 CGA 910 PIN-INDEXED YOKE, PINS 3-5	 CGA 920 PIN-INDEXED YOKE, PINS 3-6	 CGA 930 PIN-INDEXED YOKE, PINS 4-6
 CGA 940 PIN-INDEXED YOKE, PINS 1-6	 CGA 950 PIN-INDEXED YOKE, PINS 1-5	 CGA 960 PIN-INDEXED YOKE, PINS 1-4	 CGA 965 PIN-INDEXED YOKE, PIN NO. 7	 CGA 973 PIN-INDEXED YOKE, PINS 11-24

Cylinder Connections

4

Description	Ordering Information			
Regulator inlet connections are available for most worldwide standards. Each connection includes nut, gland, and washer (if appropriate) on the inlet side to connect to the cylinder and ¼" MPT connection on the outlet side to connect to the inlet of any PurityPlus regulator. CGA (Compressed Gas Association) connections are manufactured in accordance with CGA standard V-1 (1997). BS (British Standard) connections are manufactured in accordance with BS 341(1990) and DIN (German Industrial Standards Organization) connections are manufactured in accordance with DIN 477 (1991). Please consult the gas supplier or appropriate standard to determine the correct connection for particular gases. Other international standard connections are available upon request.	Connection	Brass	Stainless Steel	Chrome-Plated Brass
	CGA 170	N/A	550-1004-170	550-1009-170
	CGA 180	N/A	550-1004-180	550-1009-180
	CGA 240	N/A	N/A	N/A
	CGA 280	N/A	N/A	550-1009-280
	CGA 290	N/A	550-1004-290	N/A
	CGA 296	550-1002-296	550-1004-296	550-1009-296
	CGA 300	550-1002-300	550-1004-300	550-1009-300
	CGA 320	550-1002-320	550-1004-320	550-1009-320
	CGA 326	550-1002-326	550-1004-326	550-1009-326
	CGA 330	N/A	N/A	N/A
	CGA 346	550-1002-346	550-1004-346	550-1009-346
	CGA 347	550-1002-347	550-1004-347	550-1009-347
	CGA 350	550-1002-350	550-1004-350	550-1009-350
	CGA 500	N/A	N/A	550-1009-500
	CGA 510	550-1002-510	550-1004-510	550-1009-510
	CGA 540	550-1002-540	550-1004-540	550-1009-540
	CGA 555	550-1002-555	550-1004-555	550-1009-555
	CGA 577	550-1002-577	550-1004-577	550-1009-577
	CGA 580	550-1002-580	550-1004-580	550-1009-580
	CGA 590	550-1002-590	550-1004-590	550-1009-590
	CGA 660	N/A	N/A	N/A
	CGA 670	N/A	550-1004-670	N/A
	CGA 677	N/A	N/A	N/A
	CGA 679	N/A	N/A	N/A
	CGA 680	550-1002-680	550-1004-680	550-1009-680
	CGA 695	550-1002-695	550-1004-695	550-1009-695
	CGA 702	N/A	N/A	N/A
	CGA 703	N/A	N/A	N/A
	CGA 705	N/A	N/A	N/A
	BS 341 #01	550-1002-B01	N/A	550-1009-B01
	BS 341 #02	550-1002-B02	550-1004-B02	550-1009-B02
	BS 341 #03	550-1002-B03	550-1004-B03	550-1009-B03
	BS 341 #04	550-1002-B04	550-1004-B04	550-1009-B04
	BS 341 #08	550-1002-B08	550-1004-B08	550-1009-B08
	BS 341 #10	N/A	550-1004-B10	N/A
	BS 341 #13	550-1002-B13	550-1004-B13	550-1009-B13
	BS 341 #14	550-1002-B14	550-1004-B14	550-1009-B14
	BS 341 #15	550-1002-B15	550-1004-B15	550-1009-B15
	DIN 477 #01	550-1002-D01	550-1004-D01	550-1009-D01
	DIN 477 #03	550-1002-D03	N/A	550-1009-D03
	DIN 477 #05	N/A	550-1004-D05	N/A
	DIN 477 #06	550-1002-D06	550-1004-D06	550-1009-D06
	DIN 477 #07	N/A	550-1004-D07	N/A
	DIN 477 #08	N/A	550-1004-D08	N/A
	DIN 477 #09	550-1002-D09	N/A	550-1009-D09
	DIN 477 #10	550-1002-D10	550-1004-D10	550-1009-D10
	DIN 477 #11	550-1002-D11	N/A	550-1009-D11
	DIN 477 #12	550-1002-D12	N/A	550-1009-D12
	DIN 477 #13	550-1002-D13	N/A	550-1009-D13
	DIN 477 #14	550-1002-D14	550-1004-D14	550-1009-D14
DIN 477 #15	550-1002-D15	550-1004-D15	550-1009-D15	

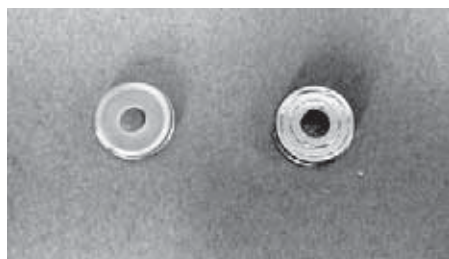
UHP (DISS) Cylinder Connections

4

Description	Features
This special group of cylinder connections was developed through the cooperation of industry and the Compressed Gas Association for use with ultra purity gases primarily used in conjunction with semiconductor chip manufacturing applications. The sealing surfaces are similar to a face seal connection used with tubing and they require either a nickel gasket or Kel-F gasket to achieve a seal. They are only available in stainless steel.	- Available with in three mating styles 1/4" face seal male 1/4" NPT male 1/4" tube stub - Supplied as a set nut, nipple, and nickel gasket

Ordering Information			
Model	Description	Model	Description
DISS632-P4M DISS632-V4M DISS632-T4S	632 x 1/4" NPT male 632 x 1/4" male face seal 632 x 1/4" tube stub	DISS714-P4M DISS714-V4M DISS714-T4S	714 x 1/4" NPT male 714 x 1/4" male face seal 714 x 1/4" tube stub
DISS634-P4M DISS634-V4M DISS634T4S	634 x 1/4" NPT male 634 x 1/4" male face seal 634 x 1/4" tube stub	DISS716-P4M DISS716-V4M DISS716-T4S	716 x 1/4" NPT male 716 x 1/4" male face seal 716 x 1/4" tube stub
DISS636-P4M DISS636-V4M DISS636-T4S	636 x 1/4" NPT male 636 x 1/4" male face seal 636 x 1/4" tube stub	DISS718-P4M DISS718-V4M DISS718-T4S	718 x 1/4" NPT male 718 x 1/4" male face seal 718 x 1/4" tube stub
DISS638-P4M DISS638-V4M DISS638-T4S	638 x 1/4" NPT male 638 x 1/4" male face seal 638 x 1/4" tube stub	DISS720-P4M DISS720-V4M DISS720-T4S	720 x 1/4" NPT male 720 x 1/4" male face seal 720 x 1/4" tube stub
DISS640-P4M DISS640-V4M DISS640-T4S	640 x 1/4" NPT male 640 x 1/4" male face seal 640 x 1/4" tube stub	DISS722-P4M DISS722-V4M DISS722-T4S	722 x 1/4" NPT male 722 x 1/4" male face seal 722 x 1/4" tube stub
DISS642-P4M DISS642-V4M DISS642T4S	642 x 1/4" NPT male 642 x 1/4" male face seal 642 x 1/4" tube stub	DISS724-P4M DISS724-V4M DISS724-T4S	724 x 1/4" NPT male 724 x 1/4" male face seal 724 x 1/4" tube stub
DISS712-P4M DISS712-V4M DISS712-T4S	712 x 1/4" NPT male 712 x 1/4" male face seal 712 x 1/4" tube stub	DISS726-P4M DISS726-V4M DISS726-T4S	726 x 1/4" NPT male 726 x 1/4" male face seal 726 x 1/4" tube stub

DISS Gaskets



Description

All DISS connections require a gasket to achieve a leak-free connection. Gaskets should be changed each time the connection is attached to the cylinder valve.

Ordering Information

Model	Length
DISS-NI	Nickel gasket for CGA 632 thru 726
DISS-K	Kel-F gasket for CGA 632 thru 726

Pressure Gauges



4

Description	Features
The selection of brass, stainless steel, and monel® gauges presented here represent those used on pressure regulators offered in this catalog. They can be used as repair parts or for installation in other systems.	• 1/4" NPT lower male connection • Cleaned for oxygen service - brass and stainless steel only

Ordering Information

Brass with Brass Case - 2-1/2" Dia.		316 Stainless Steel with Stainless Steel Case - 2-1/2" dia.		Monel® with Stainless Steel Case 2-1/2" dia.	
Model	Pressure Range psi	Model	Pressure Range psi	Model	Pressure Range psi
9131-4PM-0015	0-15	9132-4PM-3030	30" 0-30	9133-4PM-0100	0-100
9131-4PM-0030	0-30	9132-4PM-0030	0-30	9133-4PM-0300	0-300
9131-4PM-0060	0-60	9132-4PM-0060	0-60	9133-4PM-1000	0-1000
9131-4PM-0100	0-100	9132-4PM-0100	0-100	9133-4PM-3000	0-3000
9131-4PM-0200	0-200	9132-4PM-0200	0-200		
9131-4PM-0400	0-400	9132-4PM-0400	0-400		
9131-4PM-1000	0-1000	9132-4PM-1000	0-1000		
9131-4PM-2000	0-2000	9132-4PM-2000	0-2000		
9131-4PM-4000	0-4000	9132-4PM-3000	0-3000		
9131-4PM-6000	0-6000	9132-4PM-6000	0-6000		
9131-4PM-7500	0-7500	9132-4PM-10000	0-10000		

Other sizes and ranges available.

Gauges with Face Seal Fittings

Description	Features
On some high purity regulators the gauges are connected to the regulator body by using face seal fittings rather than NPT threads.	• 1/4" female face seal connection • Dual scale dial psig/bar • Cleaned for oxygen service

Ordering Information

316 stainless steel with stainless steel case - 2" dia.

Model	Pressure Range
9122-4VM-3030	30" vac.-0-30 psig (-1.0-2 bar)
9122-4VM-3060	30" vac.-0-60 psig (-1.0-4 bar)
9122-4VM-3100	30" vac. - 0-100 psig (-1.0-7 bar)
9122-4VM-0200	0-200 psig (0-14 bar)
9122-4VM-0400	0-400 psig (0-28 bar)
9122-4VM-1000	0-1000 psig (0-70 bar)
9122-4VM-4000	0-4000 psig (0-280 bar)



Series 7500

in-line filter

Features

- Compact in-line design with large filtration area
- Sintered 316 stainless steel element
- Choice of 1, 2, 5, 10, 50 or 100 micron filter element

Specifications

Operating Pressure: Brass: 3000 psig
316 SS: 6000 psig*
Operating Temp: Brass: -30°F to 275°F
316 SS: -15°F to 400°F

Materials of Construction

Model	Body	Seals	Filter Element
7510	Brass	Buna-N	316 stainless steel
7520	316 SS	Viton	316 stainless steel



Ordering Information

Model	Inlet and Outlet Connection
7510-X-P4MM	1/4" NPT male x 1/4" NPT male
7510-X-P4FF	1/4" NPT female x 1/4" NPT female
7510-X-T4FF	1/4" compression x 1/4" compression
7510-X-P8MM	1/2" NPT male x 1/2" NPT male
7510-X-P8FF	1/2" NPT female x 1/2" NPT female
7520-X-P4MM	1/4" NPT male x 1/4" NPT male
7520-X-P4FF	1/4" NPT female x 1/4" NPT female
7520-X-T4FF	1/4" compression x 1/4" compression
7520-X-P8MM**	1/2" NPT male x 1/2" NPT male
7520-X-P8FF**	1/2" NPT female x 1/2" NPT female

Other end fitting configurations are available.

X - Specify filter element 1, 2, 5, 10, 50, or 100 microns.

* 2 micron filter operating pressure is 3000 psig

** 2 micron filter not available in 1/2" units

Series 6284

gas heaters

Description

The series 6284 gas heaters when installed between the cylinder and the regulator are designed to reduce the problem of regulator icing that is associated with high flow withdrawal rates of some gases due to their expansion from high pressure to low pressure.

This thermostatically controlled heater will not overheat the gas and can be left unattended without any gas flow. A pilot light indicates when the thermostat is closed and the heating element is operative.

Specifications

Material: Steel case with black oxide finish covering a solid brass body
Max. flow: 90 cubic feet/hour
Voltage: 115 volt single phase 60 hz, 200 watts provided through a 5-foot grounded cord with molded plug.
Heating Range: Thermostat between 160° - 190°F.
Outer case temperature 85°F
Dimensions: 6-5/8" overall length, 2-1/2" diameter.
Weight: 2 pounds



Ordering Information

Model	Application
6284-320	Carbon Dioxide
6284-326	Nitrous Oxide
6284-580	Argon

low gas pressure alarm

Series 9900



Regulator sold separately

4

Description	Features
The Series 9900 complies with the requirements of NFPA 99 2002 paragraph 5.1.10.5.5 that mandates the continuous monitoring of purge gas while welding or brazing gas lines. These alarms are ideal for any gas application where a decrease in gas pressure could be detrimental to the operation. Rated for 3000 psig the Series 9900 can be installed between the cylinder valve and the user's pressure regulator or system. At low pressure, the Series 9900 provides both an audible and visual alert to the user when the container pressure reaches the pre-set level. Units are available in brass or stainless steel with the appropriate CGA connections for easy installation between an existing cylinder and regulator, or with pipe threads or compression fittings for permanent installation into a gas supply system. Standard models require 110 VAC power. For remote locations or where power is not readily available there are battery-powered models that operate on a standard 9V battery.	• Wide range of alarm pressure selection • Available in brass or stainless steel • Available with CGA connections or 1/4" NPT female inlet and outlet • Complies with the requirements of NFPA 99 2002 paragraph 5.1.10.5.5 • Choice of power source - 110 VAC, 9V battery • Provides both an audio (~90 dB @ 10 feet) and a visual alarm • Mating inlet and outlet connections

Ordering Information

Replace the PSI in P/N with the desired activation pressure)

Model Number	Description
9910-PSI-CGA	110 VAC brass unit with audio/visual alarm and silence button
9911-PSI-CGA	9 volt brass unit with audio/visual alarm and on/off switch (no silence button)
9910-PSI-P4FF	110 VAC brass unit with audio/visual alarm and silence button - 1/4" NPTF
9911-PSI-P4FF	9 volt brass unit with audio/visual alarm and on/off switch (no silence button)
9920-PSI-CGA	110 VAC SS unit with audio/visual alarm and silence button
9921-PSI-CGA	9 volt SS unit with audio/visual alarm and on/off switch (no silence button)
9920-PSI-P4FF	110 VAC SS unit with audio/visual alarm and silence button - 1/4" NPTF
9921-PSI-P4FF	9 volt SS unit with audio/visual alarm and on/off switch (no silence button)

Purge Assemblies

4

Description

The installation of a purge assembly on the inlet of your pressure regulator, pigtail inlet, or gas control system is highly recommended anytime a toxic, corrosive, flammable, or ultra high purity gas is to be used in the system. Purge assemblies perform the following multiple functions in your gas system during cylinder change-overs:

- Eliminate the release of toxic, corrosive, or flammable gases into the workplace.
- Maintain the integrity of an ultra high purity system.
- Protect equipment in corrosive gas service from exposure to moisture, thus preventing destructive corrosion.

Deep Purge Valve System Series 4800

Description

The Series 4800 deep purge valve system provides the ultimate in purging capability in a compact design with a very small internal volume. These units can be used in a wide variety of applications where contamination must be avoided during cylinder changeovers.

The deep purge valve system is an ideal accessory installed between the cylinder and the regulator of ultra high purity carrier lines for gas chromatography systems that cannot tolerate even a minimum amount of oxygen and moisture that can enter the system during cylinder changeovers.

The deep purge valve system can be used with gas mixtures containing reactive components to ensure that no moisture enters the sampling system to cause deterioration of the reactive components that can lead to concentration inaccuracies. Use of the 4820 also provides protection from the release of toxic gases into the atmosphere during cylinder changeovers.



Ordering Information

Model	Material of Construction	Valve Type	Connections	
			Inlet	Outlet
4820-P4FF	stainless steel	multi-turn	1/4" NPT female	1/4" NPT female
4820-P4FM	stainless steel	multi-turn	1/4" NPT female	1/4" NPT male (3" nipple)
4820-CGA	stainless steel	multi-turn	specify CGA	1/4" NPT male (3" nipple)
4821-P4FF	stainless steel	90° lever	1/4" NPT female	1/4" NPT female
4821-P4FM	stainless steel	90° lever	1/4" NPT female	1/4" NPT male (3" nipple)
4821-CGA	stainless steel	90° lever	specify CGA	1/4" NPT male (3" nipple)
4822-CGA	stainless steel	multi-turn	specify CGA	mating CGA
4823-CGA	stainless steel	90° lever	specify CGA	mating CGA

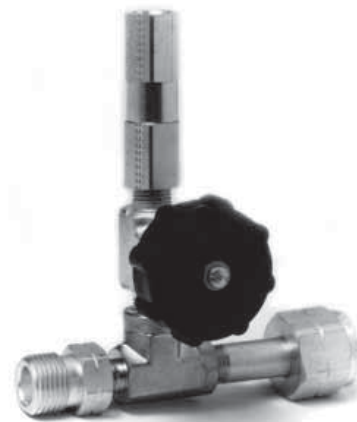
tee purge assemblies

Series 4500

Description

The Series 4500 tee purge assemblies are designed to be installed between the cylinder valve and the pressure regulator. They enable the user to purge the system through the regulator with an inert gas.

The Series 4500 units feature multi-turn diaphragm packless valves and a check valve installed on the purge gas inlet. They are rated for 3000 psig.

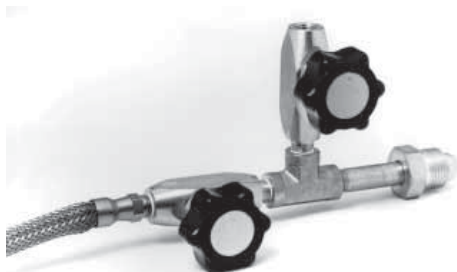


Ordering Information

Model	Material of Construction
4510-CGA*	brass
4520-CGA*	stainless steel
4550-CGA*	monel® and Al-Si-Bronze

tee purge assemblies

Series 4600



Description

The Series 4600 tee purge assembly was designed for use with inert gases such as argon, helium, and nitrogen. When installed either on the inlet to a pressure regulator or on the cylinder end of a pigtail they are an ideal device for purging the cylinder inlet connection after cylinder changeover to eliminate the introduction of oxygen and water to the system. These tee purges conveniently use the gas in the cylinder for purging.

The Series 4600 can be constructed either with multi-turn or 90° lever actuated diaphragm packless valves. This entire assembly is designed to pass a helium leak rated of 1 x 10⁻⁹ sccm. They are rated for 3000 psig.

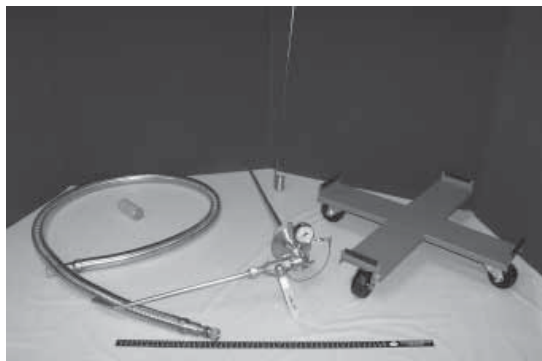
Ordering Information

Model*	Materials of Construction	Connections	
		Inlet	Outlet
4610-P4FF multi-turn	brass	1/4" NPT female	1/4" NPT female
4611-P4FF 90° lever	brass	1/4" NPT female	1/4" NPT female
4610-CGA multi-turn	brass	specify CGA	1/4" NPT female
4610-CGA 90° lever	brass	specify CGA	1/4" NPT female
4610M-CGA multi-turn	brass	specify CGA	1/4" NPT male
4611M-CGA 90° lever	brass	specify CGA	1/4" NPT male
4610F-CGA multi-turn	brass	specify CGA	1/4" NPT female
4611F-CGA 90° lever	brass	specify CGA	1/4" NPT female
4612-CGA multi-turn	brass	specify CGA	mating CGA
4613-CGA 90° lever	brass	specify CGA	mating CGA
4620-P4FF multi-turn	ss	1/4" NPT female	1/4" NPT female
4621-P4FF 90° lever	ss	1/4" NPT female	1/4" NPT female
4620-CGA multi-turn	brass	specify CGA	1/4" NPT female
4620-CGA 90° lever	brass	specify CGA	1/4" NPT female
4620M-CGA multi-turn	ss	specify CGA	1/4" NPT male
4621M-CGA 90° lever	ss	specify CGA	1/4" NPT male
4620F-CGA multi-turn	ss	specify CGA	1/4" NPT female
4621F-CGA 90° lever	ss	specify CGA	1/4" NPT female
4622-CGA multi-turn	ss	specify CGA	mating CGA
4623-CGA 90° lever	ss	specify CGA	mating CGA

*Specify CGA connection required when ordering

Accessories

4



- LN2 6' Non -Vacuum Transfer Line
- O2 6' Non - Vacuum Transfer Line
- 1/4" Phase Separator
- LN2 Dipper
- Measuring Stick
- Small Roller Base (For use with our 10 & 20 liter tanks)
- Large Roller base (For use with our 35 thru 50 liter tanks)
- Small Withdrawal Device (For use with 10D, 20D, 35D)
- Large Withdrawal Device (For use with our 35DX, 50D)

Directors

Director Series Storage Vessels Specifications



Optional accessories included in picture:

- Rollerbase
- Non-Vac Ln2 Transfer Line
- Model 250 Low-Level Alarm

Model	D-4000	D-2000C
LN2 Capacity	120 liters	60 liters
Static Hold Time	150 days	83 days
Evaporation Rate (liters/day)	0.80	0.72
Dimensions		
Necktube In.	8.5	8.5
Height In.	38	28
Outside Diameter In.	22	22
Weight		
Empty lb.	71	55
Full lb.	285	163
Racks		
Number	4	4
2 inch high boxes per rack	10	5
Box dimensions In.	5.25 x 5.25	5.25 x 5.25
Ampules per box	100	100
Boxes per vessel	40	20
Capacity		
Ampules in boxes (1.2 or 2.0 ml)	4000	2000

Liquid Nitrogen Shipping Vessels

4



- Increased capacity
- Lightweight
- Backed by more than 100 man years of cryogenic experience
- Convenient specimen loading/ unloading
- Durable exterior finish
- Greater necktube strength

Model		IC-2VS	IC-4VS	IC-7VS	IC-20VS
LN2 Capacity		2.4 Liters	4.6 Liters	6.1 Liters	6.3 Liters
Static Hold Time - Days		18	33	27	28
Evap. Rate - liters/ day		.13	.14	.23	.22
Dimensions:					
Necktube -	In	2.25	2.25	3.75	3.75
	mm	57	57	95	95
Outside Dia. -	In	8.75	8.75	11.25	15
	mm	222	222	286	380
Height -	In	16.5	20.6	20.6	30
	mm	419	523	523	762
Weight					
Empty -	lb	8	11	15	30
	kg	3.6	5	6.8	13.6
Full -	lb	12.2	20	26	41
	kg	5.5	9	11.8	18.6
Canisters					
Length -	In	5	11	11	11
	mm	127	279	279	279
Inside Dia -	In	1.75	1.75	2.96	2.96
	mm	44	44	75	75
Number		1	1	1	7
Capacity					
.5 cc Straws on canes		55	120	390	2730
.5 cc Straws bulk		165	300	970	6790
Vials 1.2 ml			36	132	924

Model letters denote type of unit and numbers approximate liter capacity; VS – Vapor Shipper
Weights are determined without canisters
Straw capacity based upon: Cane – 10 straws / cane Bulk - two levels in cups and goblets
Static hold time and evaporation rate are nominal.

Dewars



Dewar Specification Sheet

Model	IC-3D	IC-5D	IC-6D	IC-10D	IC-20D	IC-35D	IC-35DX	IC-50D
LN2 Capacity	3.6 Liters	5 Liters	6 Liters	10 Liters	20.5 Liters	35 Liters	35 Liters	50 Liters
Hold Time Days	21	23	30	66	100	140	140	125
Evap. Rate liters/ day	.14	.2	.2	.15	.2	.25	.25	.4
Dimensions:								
Necktube								
In	2.25	2.25	2.25	2.25	2.25	2.25	3.75	3.75
mm	57	57	57	57	57	57	95	95
Outside dia.								
In	8.75	8.75	8.75	11.25	15	18.5	18.5	18.5
mm	220	222	222	286	380	470	470	470
Height								
In	16.5	16.3	16.75	23	24.6	25.1	25.1	30.5
mm	419	414	425	584	625	638	638	775
Weight								
Empty								
lb	6.0	6	6.3	12.5	23	31	31	38
kg	3	3	3	5.6	10	14	14	17
Full								
lb	12	15	17	30.3	60	94	94	127
kg	5	7	8	13.6	27	42	42	58

Refrigerators



4

Model	IC-3R	IC-6R	IC-10R	IC-20R	IC-20RX	IC-35R	IC-35RX	IC-38RX/6	IC-38RX/10	IC-50RX	ARCTIC 22R	ARCTIC 22RX
LN2 Capacity	3.5 Liters	6 Liters	10 Liters	20 Liters	20 Liters	35 Liters	35 Liters	38 Liters	38 Liters	50 Liters	22 Liters	22 Liters
Hold Time, Days	21	30	100	205	105	291	180	135	135	125	146	146
Evap. Rate - Liters/ day	.13	.2	.10	.10	.19	.12	.19	.28	.28	.4	.15	.15
Work Time - Days/Weeks	13/2	18 / 3	62 / 9	128 / 18	65 / 9	182 / 26	112/ 16	84 / 12	84 / 12	78 / 11	120/16	120/ 16
Dimensions												
Necktube- In	2.25	2.25	2.25	2.25	3.75	2.25	3.75	5.0	5.0	3.75	2.62	2.62
mm	57	57	57	57	95	57	95	127	127	95	66	66
Outside Dia. In	8.75	8.75	11.25	15.0	15.0	19	19	19	19	19	15	15
mm	220	220	286	380	380	483	483	483	483	483	380	380
Height - In	16.5	18.5	23	25	25	25	25	27.6	27.6	30.5	26	26
mm	419	432	584	630	630	630	630	691	691	775	660	660
Weight												
Empty - lb	6.5	7.7	19.5	24	24	29	29	32	32	38	25	25
kg	3	3.5	8.8	10	10	13	13	14.5	14.5	17	11	11
Full - lb	11.5	14	37.3	60	60	90	90	99.7	99.7	127	64	64
kg	5	6	16.9	26	26	40	40	44.9	44.9	58	29	29
Canisters												
Length, In	5	5	11	11	11	11	11	11	11	N/A	11	11
Inside Dia.- In	1.75	1.75	1.75	1.75	2.96	1.75	2.96	4.1	2.96	N/A	2.0	2.0
mm	44	44	44	44	75	44	75	104	75	N/A	51	51
Number	6	6	6	6	6	6	6	6	10	6	3	6
Capacity												
.5 cc Straws on canes	330	330	660	660	2340	660	2340	4680	3900	2340	500	1000
.5 cc Straws Bulk	990	990	1800	1800	5820	1800	5820	10320	9700	5820	1360	2720
Vial 1.2 ml	-	-	216	216	792	216	792	1584	1320	768*	-	-

Straw capacity on canes: 10 Straws / cane for 11" canisters
5 Straws / cane for 5" canisters

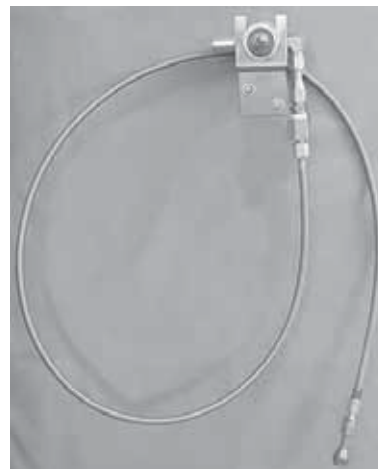
Bulk: Two level goblets for 11"; one level for 5"

Vial capacity on canes: 6 vials / cane

* with square canisters, 2 1/4 x 2 1/4 x 1 7/8 high box; 8 box / rack (768 - 1/2 x 1/2 x 1 7/8 compartments)

Series 8636 Whisper Valve™

silenced cryogenic safety relief valve



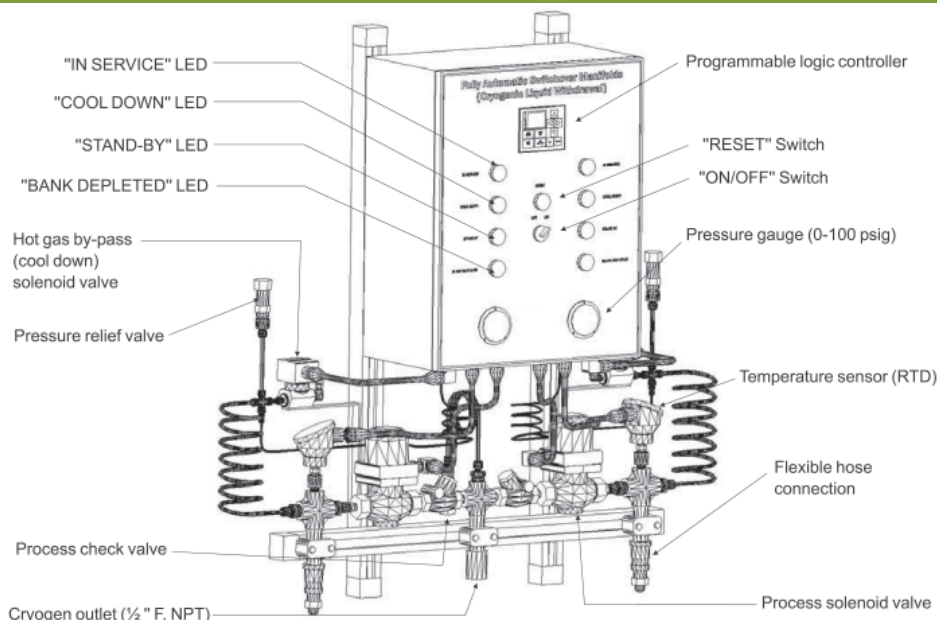
Description	Features
The Whisper Valve is a silenced safety device for use with cryogenic containers. The valve solves the problem of the loud noise, over 100 dB, associated with the activation of the relief valve in cryogenic containers containing nitrogen, argon or carbon dioxide. Many users of gas in cryogenic containers complain to their suppliers that the loud activation noise scares their employees and causes work disruptions and results in damaged product. The Whisper Valve is easily installed on the vent valve of any cryogenic container and silently relieves the container pressure slightly below the normally installed relief valve. Whisper Valve reduces the relief of gas pressure at a noise level of less than 40 dB, for reference the average library noise level is 30 dB. The Whisper Valve also reduces the gas losses of your cryogenic container to less than 48 cubic feet over 24 hours. Whisper Valves are available in three settings, 230 psig, 350 psig and 500 psig.	• Reduces cryogenic relief valve blow-off noise to less than 40 dB • Easily installs on any cryogenic argon, nitrogen or carbon dioxide container • Available in three ranges to prevent most container noisy blow-offs • Reduces gas losses to less than 48 cubic feet per 24 hours • Convenient wall mount kit available • Standard CGA 295 inlet connection

Ordering Information

Model Number	Description
8636-230	Whisper Valve for cryogenic containers with 230 or 235 psig relief setting
8636-350	Whisper Valve for cryogenic containers with 350 psig relief setting
8636-500	Whisper Valve for cryogenic containers with 500 psig relief setting
8636-KIT	Wall mount bracket, panel mount nut, and six-foot hose with CGA 295

fully automatic switchover manifolds for cryogenic liquid supply

Series CTM75



4

Description	Features
The CTM75 Cryo Transfer Manifold assures a continuous supply of cryogenic liquid. It is set to transfer from the "in use" empty bank to the "reserve" full bank based on pressure and temperature. This PLC-based system is continuously monitoring the pressure and temperature of both banks. In "read only" mode, the PLC screen indicates actual pressure and temperature of each bank and compares them to their switchover (target) settings. In "programming" mode, the PLC allows you to change the switchover settings. The LEDs indicate the status of each bank at all times.	- Continuous cryogenic liquid supply - Automatic switchover from "depleted" bank to "stand-by" bank without operator's involvement - Built-in "hot gas by-pass" for each manifold side - Audible (optional) and visual alarms indicating when a supply side is depleted - Two supply modes: - On Demand - Keep full - Use the entire amount of cryogen in the cylinders - Eliminates downtime due to empty cylinders - Easy field pressure and temperature settings to better meet your application needs

Ordering Information

Series	Fluid	Qty. of Cyl. left bank	Qty of cyl right bank	Application	Options
CTM75	Argon = 3	(Max. 2 cylinders)	(Max. 2 cylinders)	Bio Medical = BM Laser = L Industrial = I High Purity = HP	Floor Stand = FS Vacuum insulated flexible hose = VJH Flashing beacon = FB Audible Alarm = AA

Operation Mode Description

ON-DEMAND

The "On Demand" supply mode vents the "hot gas" coming from the liquid cylinders through the cool down solenoid valve before opening the process solenoid valve. The process solenoid valve will open only when receiving an external signal. The same process occurs during the switchover between the depleted "in use" side to the "full reserve" side.

KEEP FULL

The "Keep Full" supply mode assures instant liquid withdrawal whether or not dispensing. The system monitors both pressure and temperature and keeps optimal conditions by opening and closing the cool down solenoid valves. By doing so, quality liquefied gas is maintained up to the process solenoid valves. Thus, the CTM75 will dispense cryogenic liquid within seconds. Because both sides are "kept Full" at all times, the "reserve bank" will immediately supply cryogenic liquid as soon as the "in use" side is depleted. The end use must be aware that the "Keep Full" supply mode will vent product to atmosphere if the demand is low.

4

[illegible]



Technical Information



PurityPlus[®]
Specialty Gases

Section 5 - Technical Information

	Page Number
Gas Safety and Material	
Compatibility Data Chart	5.1
Conversion Factors	5.3
Gases CGA Selection Chart	5.5

Gas Safety and Material Compatibility Data Chart

This data has been compiled from the best information available and is offered as a guide to proper material selection. The data presented are generalized for average conditions of temperature and pressure. The user should always investigate the characteristics of the gas being handled and take all the proper precautions. Our technical staff will be pleased to give free advice and technical information on any gas or chemical product of interest.

	Hazards for Humans				Materials of Construction							Legend ◇ - Primary Hazard S - Satisfactory U - Unsatisfactory C - Conditional use	
	Toxic	Flammable	Corrosive		Aluminum	Copper	Brass	Carbon Steel	Stainless Steel	Monel®	Kel-F®		Teflon®
Gas												Special Characteristics	
Acetylene		◇			S	U	C	S	S		S	S	Do not use at pressures exceeding 15 psig
Air					S	S	S	S	S	S	S	S	
Ammonia	◇	◇	◇		S	U	U	C	S		S	S	Causes stress cracking of copper and copper alloys
Argon					S	S	S	S	S		S	S	
Arsine*	◇	◇			U	S	S	S	S		S	S	Highly toxic, excessive exposure may have delayed effect
Boron Trichloride	◇		◇		U	C	U	S	S	C	S	S	
Boron Trifluoride	◇		◇		U	C	C	S	S	S	S	S	
1-3, Butadiene		◇			S	S	S	S	S		S	S	
Butane		◇			S	S	S	S	S		S	S	
Butenes		◇			S	S	S	S	S		S	S	
Carbon Dioxide					S	S	S	S	S		S	S	
Carbon Monoxide	◇	◇			S	S	S	S	S		S	S	
Carbonyl Sulfide	◇	◇			S	S	S	S	S		S	S	Poor if moisture present; Treat as Hydrogen Sulfide, affects central nervous system
Chlorine	◇		◇		U	U	U	S	S	C	S	S	Very toxic and damaging to the respiratory system
Cyanogen*	◇	◇			U	U	U	S	S		S	S	Treat as cyanides
Deuterium		◇			S	S	S	S	S		S	S	
Dimethylamine	◇	◇	◇		U	U	U	S	S		S	S	Attacks copper and copper alloys rapidly
Dimethyl Ether		◇			S	S	S	S	S		C	S	
Ethane		◇			S	S	S	S	S		S	S	
Ethyl Chloride	◇	◇			U	C	C	C	C		S	S	
Ethylene		◇			S	S	S	S	S		S	S	
Ethylene Oxide	◇	◇			U	U	U	S	S		S	S	Carcinogen; Exposure of liquid on skin or clothing can cause dermatitis
Fluorine*	◇		◇		S	S	C		S	S	U	C	Strong oxidant, can ignite combustible materials and metals
Helium					S	S	S	S	S		S	S	
Hydrogen		◇			S	S	S	S	S		S	S	
Hydrogen Bromide	◇		◇		U	U	U	C	C	C	S	S	Steel or stainless steel serviceable in dry liquid or gas service
Hydrogen Chloride	◇		◇		U	U	U	C	C	C	S	S	Steel or stainless steel serviceable in dry liquid or gas service
Hydrogen Fluoride*	◇		◇		U	U	U	S	S		S	S	Exposure can attack skin, bones and fingernails
Hydrogen Selenide	◇	◇			U	U	U	S	S		S	S	Extremely toxic, odor deadens the olfactory nerves
Hydrogen Sulfide*	◇	◇			C	U	U	C	S		S	S	Odor deadens olfactory nerves, can cause paralysis
Isobutane		◇			S	S	S	S	S		S	S	
Isobutylene		◇			S	S	S	S	S		S	S	

Legend

- ◇ - Primary Hazard
- S - Satisfactory
- U - Unsatisfactory
- C - Conditional use

*It is recommended that users thoroughly familiarize themselves with the specific properties of this gas.

Gas Safety and Material Compatibility Data Chart

5

Gas	Hazards for Humans			Materials of Construction								Special Characteristics
	Toxic	Flammable	Corrosive	Aluminum	Copper	Brass	Carbon Steel	Stainless Steel	Monel®	Kel-F®	Teflon®	
Krypton				S	S	S	S	S		S	S	
Methane	◇	◇		S	S	S	S	S		S	S	
Methyl Acetylene		◇		S	U	C	S	S		S	S	
Methyl Bromide	◇	◇		U	U	U	S	S		S	S	Forms explosive compounds with aluminum
Methyl Chloride	◇	◇		U	C	C	S	S		S	S	Forms explosive compounds with aluminum
Methyl Mercaptan	◇	◇		U	U	U	S	S		S	S	
Monoethylamine	◇	◇		U	U	U	S	S		C	S	Attacks copper and copper alloys rapidly
Monomethylamine	◇	◇		U	U	U	S	S		C	S	Attacks copper and copper alloys rapidly
Neon				S	S	S	S	S		S	S	
Nitric Oxide	◇		◇	S	U	U	S	S	U	S	S	Readily reacts with Oxygen to form Nitrogen Dioxide
Nitrogen				S	S	S	S	S		S	S	
Nitrosyl Chloride	◇		◇	U	U	U	U	U	S		S	Very corrosive, attacks most metals except nickel
Nitrous Oxide				C	S	S	S	S		S	S	
Oxygen*				C	S	S	C	C	S	S	S	Strong oxidant, ignites combustible matter spontaneously
Phosgene	◇		◇	U	U	U	C	C		S	S	Very toxic
Phosphine*	◇	◇		S	U	S	S	S		S	S	Highly toxic, high concentrations are pyrophoric
Propane		◇		S	S	S	S	S		S	S	
Propylene		◇		S	S	S	S	S		S	S	
Silane*	◇	◇		S	S	S	S	S		S	S	Pyrophoric
Silicon Tetrafluoride	◇		◇	U	U	U	C	C		S	S	
Sulfur Dioxide	◇		◇	C	U	U	S	S		S	S	
Sulfur Hexafluoride				S	S	S	S	S		S	S	
Sulfur Tetrafluoride	◇		◇	C	S	S	S	S		S	S	
Trimethylamine	◇	◇		U	U	U	S	S		S	S	Attacks copper and copper alloys rapidly
Xenon				S	S	S	S	S		S	S	

*It is recommended that users thoroughly familiarize themselves with the specific properties of this gas.

All data presented are considered accurate and reliable but supplier assumes no liability or responsibility of any kind.

Legend

- ◇ - Primary Hazard
- S - Satisfactory
- U - Unsatisfactory
- C - Conditional use

Length

	Å	cm	ft	in	m	micron	mm	yd
Multiply By								
Å	-----	1×10^{-8}	3.28×10^{-9}	3.93×10^{-9}	1×10^{-10}	1×10^{-4}	1×10^{-7}	1.09×10^{-10}
cm	1×10^8	-----	3.28×10^{-2}	3.94×10^{-1}	1×10^{-2}	1×10^4	10	1.09×10^{-2}
ft	3.04×10^9	3.048×10^1	-----	1.2×10^1	3.04×10^{-1}	3.04×10^5	3.04×10^2	3.33×10^{-1}
in	2.54×10^8	2.54×10^0	8.33×10^{-2}	-----	2.54×10^2	2.54×10^4	2.54×10^1	2.77×10^2
m	1×10^{10}	1×10^2	3.281×10^0	3.93×10^1	-----	1×10^6	1×10^3	1.09×10^0
micron	1×10^4	1×10^{-4}	3.28×10^{-6}	3.93×10^{-5}	1×10^{-6}	-----	1×10^{-3}	1.09×10^{-6}
mm	1×10^7	1×10^{-3}	3.28×10^{-3}	3.93×10^{-2}	1×10^{-2}	1×10^3	-----	1.09×10^{-3}
yd	9.14×10^9	9.14×10^1	3×10^0	3.6×10^1	9.14×10^{-1}	9.14×10^5	9.14×10^2	-----

Flow

	cm ³ /min	cm ³ /sec	ft ³ /hr	ft ³ /min	m ³ /hr	m ³ /min	L/hr	L/min
Multiply By								
cm ³ /min	-----	1.66×10^{-2}	2.12×10^{-3}	3.53×10^{-5}	6×10^{-5}	1×10^{-6}	6.0×10^{-2}	1×10^{-2}
cm ³ /sec	6×10^1	-----	1.27×10^{-1}	2.12×10^{-3}	3.6×10^{-3}	6×10^{-5}	3.6×10^0	6×10^{-2}
ft ³ /hr	4.72×10^2	7.87×10^1	-----	1.67×10^{-2}	2.83×10^{-2}	4.72×10^{-4}	2.83×10^1	4.72×10^{-1}
ft ³ /min	2.83×10^4	4.72×10^2	6.0×10^1	-----	1.7×10^1	2.83×10^{-2}	1.7×10^{-2}	2.83×10^1
m ³ /hr	1.67×10^4	2.78×10^2	3.53×10^1	5.89×10^{-2}	-----	1.67×10^{-2}	1×10^3	1.67×10^1
m ³ /min	1×10^6	1.67×10^4	2.12×10^3	3.53×10^1	6.0×10^1	-----	6.0×10^4	1×10^3
L/hr	1.67×10^1	2.78×10^{-1}	3.53×10^{-2}	5.89×10^{-4}	1×10^{-3}	1.67×10^{-5}	-----	1.67×10^{-2}
L/min	1×10^3	1.67×10^1	2.12×10^0	3.53×10^{-2}	6.0×10^{-2}	1×10^{-3}	6.0×10^1	-----

Pressure

	atm	BAR	Ft of H ₂ O	in of Hg	in of H ₂ O	kg/cm ²	kPa	mm of Hg	PSI
Multiply By									
atm	-----	1.013	33.932	29.921	407.183	1.033	101.317	760	14.696
BAR	0.987	-----	33.488	29.530	401.859	1.019	100	750.062	14.504
Ft. of H ₂ O	0.029	0.029	-----	0.883	12	0.030	2.989	22.419	0.433
in of Hg	0.033	0.034	1.134	-----	13.6	0.035	3.377	25.4	0.491
in of H ₂ O	0.002	0.002	0.083	0.074	-----	0.003	0.025	1.868	0.036
kg/cm ²	0.968	0.981	32.808	28.959	393.701	-----	98.039	735.559	14.223
kPa	0.009	0.010	0.335	0.296	4.015	0.010	-----	7.501	0.145
mm of Hg	0.001	0.001	0.045	0.039	0.535	0.001	0.133	-----	0.019
PSI	0.06805	0.06895	2.3089	2.0360	27.7085	0.07031	6.89465	51.175	-----

Weight

	gm	kg	mg	oz	lbs	Ton
Multiply By						
gm	-----	.001	1000	0.035	0.002	1.1×10^{-6}
kg	1000	-----	1×10^6	3.53×10^1	2.205	0.001
mg	0.001	1×10^{-6}	-----	3.53×10^{-4}	2.205×10^{-6}	1.1×10^{-9}
oz	2.83×10^1	2.83×10^{-2}	2.83×10^4	-----	6.25×10^{-2}	3.13×10^{-5}
lbs	4.54×10^2	4.54×10^1	4.54×10^5	16	-----	5.0×10^{-4}
Ton	9.07×10^5	9.07×10^2	9.07×10^8	3.2×10^4	2.0×10^3	-----

Volume

	cm ³ (ml)	ft ³	in ³	m ³	US gal.	L
Multiply By						
cm ³ (ml)	-----	3.53×10^{-5}	6.10×10^{-2}	1×10^{-6}	2.56×10^{-3}	1×10^{-3}
ft ³	2.83×10^4	-----	1.73×10^3	2.83×10^{-2}	7.48	2.83
in ³	1.64	5.79×10^{-6}	-----	1.64×10^{-5}	4.33×10^{-3}	1.64×10^{-2}
m ³	1×10^6	3.53	6.10×10^4	-----	2.64×10^2	1×10^3
US gal.	3.79×10^3	1.34×10^{-1}	2.31×10^2	3.79×10^{-3}	-----	3.79
L	1×10^3	3.54×10^{-1}	6.10×10^1	1×10^{-3}	2.64×10^{-1}	-----

Concentration

Concentration	Equivalent
1,000,000 ppm	100%
100,000 ppm	10%
10,000 ppm	1%
1,000 ppm	0.1%
100 ppm	0.01%
10 ppm	0.001%
1 ppm	0.0001%
1,000 ppb	1 ppm
100 ppb	0.1 ppm
10 ppb	0.001 ppm

Temperature

	°C	°F	°K	°R
Multiply By				
°C + 17.78	-----	1.8	-----	-----
°C + 273.16	-----	-----	1	-----
°F - 32	0.55556	-----	-----	-----
°F + 459.72	-----	-----	-----	1
°K + 273.16	1	-----	-----	-----
°R - 459.72	-----	1	-----	-----

Physical Constants

	Value	Units
Avagadro's Number	6.022×10^{23}	molecules/gm-mole
Gas Law Constant	1.98719	cal/(gm-mol)(°K)
	1.98719	Btu/(lbs-mole)(°R)
	82.0568	(cm ³)(atm)/(gm-mole)(°K)
	0.0820568	(L)(atm)/(gm-mole)(°K)
	10.7314	(ft ³)(lb)/(in ²)(lbs-mole)(°R)
	0.730228	(ft ³)(atm)/(lbs-mole)(°R)

Density

	gms/cm ³	kg/cm ³	lbs/ft ³	lbs/in ³	lbs/US gal.
Multiply By					
gms/cm ³	-----	1000	6.24×10^1	3.61×10^{-2}	8.35
kg/cm ³	1×10^{-3}	-----	6.24×10^{-2}	3.61×10^{-3}	8.35×10^{-3}
lbs/ft ³	1.60×10^{-2}	1.60×10^1	-----	3.61×10^{-5}	1.33×10^{-1}
lbs/in ³	2.77×10^1	2.77×10^4	1.73×10^3	-----	2.31×10^2
lbs/US gal.	1.2×10^{-1}	1.2×10^2	7.48	4.33×10^{-3}	-----

Scientific Notation

Notation	Equivalent	Notation	Equivalent
1×10^{10}	10,000,000,000	1×10^{-1}	0.1
1×10^9	1,000,000,000	1×10^{-2}	0.01
1×10^8	100,000,000	1×10^{-3}	0.001
1×10^7	10,000,000	1×10^{-4}	0.0001
1×10^6	1,000,000	1×10^{-5}	0.00001
1×10^5	100,000	1×10^{-6}	0.000001
1×10^4	10,000	1×10^{-7}	0.0000001
1×10^3	1,000	1×10^{-8}	0.00000001
1×10^2	100	1×10^{-9}	0.000000001
1×10^1	10	1×10^{-10}	0.0000000001

PURE GASES CGA SELECTION CHART FOR FITTINGS

CGA Fittings Required	Pure Gases
510/300	Acetylene
590/346/347/702	Air
240/660/705	Ammonia
580/680/677	Argon
350	Arsine*
320	Carbon Dioxide
350	Carbon Monoxide
660	Chlorine
510	Cyclopropane
350	Deuterium
350	Ethane
350	Ethylene
510	Ethylene Oxide
580/680/677	Helium
350/695/703	Hydrogen
330	Hydrogen Chloride
330	Hydrogen Sulfide
580	Krypton
350/695/703	Methane
510	Methyl Chloride
580/680/677	Neon
580/680/677	Nitrogen
326	Nitrous Oxide
540/577/701	Oxygen*
350	Phosphine
510	Propane
350	Silane*
668/660	Sulfur Dioxide
590	Sulfur Hexafluoride
580/680/677	Xenon

MIXED GASES CGA SELECTION CHART FOR FITTINGS

CGA Fittings Required	Mixed Gases	
	Minor Component	Major Component
240/660/705	Ammonia	Nitrogen
350	Butane	Nitrogen
296	Carbon Dioxide	Oxygen
580	Carbon Dioxide	Helium or Nitrogen
580	Carbon Dioxide and/or Nitrogen	Helium
590	Carbon Monoxide	Air
330	Chlorine	Nitrogen
350	Diborane	Argon, Helium, Hydrogen, Nitrogen
580	Freon-12	Nitrogen
296	Helium	Oxygen
350	Hexane	Nitrogen
350	Isobutane	Nitrogen
580	Krypton	Argon
590	Methane	Air
580	Moisture	Argon, Helium or Nitrogen
660	Nitric Oxide	Nitrogen
660	Nitrogen Dioxide	Air or Nitrogen
590	Nitrous Oxide	Nitrogen
590	Oxygen	Nitrogen or Helium
350	Propane	Nitrogen or Helium
590	Propane	Air
660	Sulfur Dioxide	Air or Nitrogen
590	Sulfur Hexafluoride	Argon, Helium or Nitrogen
350	Sulfur Hexafluoride	Hydrogen

It is recommended that the user thoroughly familiarize himself with the specific properties of these gases.

The Compressed Gas Association (CGA) has selected and standardized the valve outlet to be used on each gas cylinder. These standards, contained in the document "CGA STANDARD V-1, Compressed Gas Cylinder Valve Outlet Connections", have been adopted to prevent the inadvertent mixing of gases which could be reactive and to avoid other possible misuse hazards.

The above chart may be used for guide purposes only. Consult your gas supplier to determine the actual CGA connection required when ordering a regulator.

Since the combined characteristics of a mixture of gases often differ from the properties of the separate components, different CGA connections are often required. The CGA has selected and standardized the valve outlets to be used with mixed gases. These standards are described in CGA publication V-7 - "Standard Method for Determining Cylinder Valve Outlet Connections for Industrial Gas Mixtures".

Mixtures which use the same CGA connection as if the minor component were in its pure gas form have not been included for the sake of brevity. The proper fitting for these mixtures can be determined by looking up the minor component on the chart for pure gases.

5

This image shows a single sheet of white paper with horizontal ruling lines. The lines are evenly spaced and run across the width of the page. There are no margins, text, or other markings on the paper.



Glossary



 **PurityPlus**[®]
Specialty Gases

Section 6 - Glossary

	Page Number
Glossary	6.1 - 6.2

Absolute Pressure – The total pressure exerted on a system, equal to the gauge pressure plus atmospheric pressure. Absolute pressure is designated as PSIA. Often pressure measurements utilize a gauge to record the difference between the system and the atmospheric pressure. This is called gauge pressure and is designated as PSIG.

Atmospheric Pressure – The pressure exerted by the weight of the atmosphere at sea level, equal to 14.696 PSI or 0.98692 Bar.

Absolute Zero – The zero point of the ideal gas temperature scale designated as 0° Kelvin, -273.15° Celsius, and -459.67° Fahrenheit.

Absorption – Physical or chemical process in which the atoms or molecules of a material penetrate into another material. The atoms or molecules are taken up by the volume in the material, not the surface.

Adsorption – Adhesion of the atoms or molecules of a material to the surface of another material (called an adsorbent). Usually a gas, a liquid or a dissolved substance will adhere to the surfaces of a solid.

Anhydrous – The general term describing a material that does not contain any water molecules.

Atomic Weight – Ratio of the average mass of a chemical element's atoms to carbon-12. The standard atomic weight of a naturally occurring element is the ratio of the weighted average of all of the naturally occurring isotopes to carbon-12, expressed in atomic mass units.

Atomic Mass Unit – 1/12th the mass of carbon 12.

Asphyxiant Gas – Non-toxic gas that can displace the oxygen containing atmosphere, resulting in unconsciousness and death.

ACGIH – American Conference of Government Industrial Hygienists – Professional Society devoted to the advancement of occupational and environmental health.

Boiling Point – Temperature at which the pressure of a liquid is equal to the pressure exerted by the surrounding atmosphere. See Normal Boiling Point.

BTU – British Thermal Unit – The quantity of heat required to raise the temperature of one pound of water 1° F.

Calibration Gas – A gas or gas mixture of accurately known composition used as a comparative standard.

Calorie – The amount of heat required to raise the temperature of one gram of water 1° C.

Catalyst – A substance that reduces the activation energy of a chemical reaction. Catalysts participate in reactions, but are not consumed by the reaction.

CGA – Compressed Gas Association – Professional Organization dedicated to the development and promotion of Safety Standards and Safe Practices in the Industrial Gas Industry.

CAS – Chemical Abstract Services – A division of the American Chemical Society (ACS) that provides comprehensive databases of publicly disclosed research in chemistry and related sciences, including the world's largest collection of substance information, the CAS RegistrySM.

Compressed Gas – Any Material or mixture with a pressure exceeding 40 PSIA at 70° F or having an absolute pressure exceeding 104 PSIA at 130° F or any flammable liquid having a vapor pressure exceeding 40 PSI at 100° F.

Corrosive – A Chemical compound which visibly destroys or irreversibly damages living tissue or chemically attacks and eats away rubber, metal, or other substances.

Critical Temperature – The lowest temperature at which a gas cannot be liquefied, no matter how much pressure is applied. At this temperature, the liquid and gas have the same density.

Critical Pressure – The pressure required to liquefy a gas at its critical temperature.

Cryogenic Liquid – A liquid with a boiling point below -60° C.

Density – The ration of the mass of a substance to its volume.

DOT – Department of Transportation – Government agency whose purview is to regulate the transportation of hazardous materials.

Dew Point – The temperature at which water vapor begins to condense into liquid water.

EPA – Environmental Protection Agency

– Government agency established in 1970 for the establishment and enforcement of environmental protection standards.

Fill Density – The percent ratio of the weight of a liquefied gas in a container to the weight of the water that the container will hold at 68° F.

Flammable Limits – The concentration of a flammable vapor in air at normal atmospheric pressure and temperature that will propagate a flame upon contact with an ignition source. See LEL, UEL.

Flash Point – The lowest temperature at which a liquid gives off enough vapor to form a flammable mixture with air.

Inert Gas – A gas which does not react with other materials at NTP.

Liquefied Compressed Gas – A gas that can be liquefied in a container with increased pressure at normal temperature.

LEL – Lower Explosive Limit – The maximum concentration of a specific flammable vapor in air at NPT that will propagate a flame upon contact with an ignition source. Concentrations below this level will not propagate a flame upon contact with an ignition source.

Mole – The mass in grams of a substance that is equal to the molecular weight the substance. Also called gram molecular weight.

Molecular Weight – The sum of the atomic weights of all atoms in a molecule.

Normal Boiling Point – The temperature at which the vapor pressure of a liquid equals 1 atmosphere (14.696 PSIA).

NTP – Normal Temperature and Pressure – 20° C and 760 torr.

OSHA – Occupational Safety and Health

Administration – An agency of the Department of Labor whose mission is to prevent work related injuries and illnesses by issuing and enforcing standards for workplace safety and health.

Oxidizer – Substance that causes or contributes to the combustion of another material. An oxidizer is not necessarily combustible in itself.

PPM – Parts Per Million – Notation for specifying precise amounts of very low concentrations of chemical elements or compounds. For gases, denotes the number of molecules of a gas or gas mixture found in every 1 million molecules of the gas of gas mixture.

Specific Gravity – The ration of the weight of a given volume of a substance to the weight of an equal volume of a reference material. Liquids and solids are normally compared to water (sp. gr. of H₂O = 1), while gases are normally compared to air (sp. gr. of air = 1).

Specific Heat – The amount of heat required to change the temperature of a unit of mass (or a quantity, such as a mole) of a substance one degree at either constant pressure (CV) or constant temperature (CP).

Specific Volume – The volume occupied by a unit mass of a material at a given temperature. The specific volume of a gas is normally expressed as cubic feet of volume per pound of gas.

STP - Standard Temperature and Pressure – 0° C at 760 Torr.

Torr – Common unit of measure for vapor pressure. 1 Torr = 1 mm of mercury.

Toxic Gas – A gas that has an LC50 in air of 200 PPM or less. Even low concentrations of a gas may cause injury or death.

UEL – Upper Explosive Limit – The maximum concentration of a specific flammable vapor in air at NTP which will propagate a flame upon contact with an ignition source. Concentrations above this level will not propagate a flame upon contact with an ignition source.

Vapor Pressure – The pressure exerted by a vapor in equilibrium with its liquid or solid phase at a given temperature. The vapor pressure of gases is normally measured at 70° F.



With over 150 members and more than 600 locations, no matter where you are throughout the U.S., Canada, and Mexico, a local PurityPlus distribution center will be ready to provide quick and dedicated service. Contact us at www.purityplusgas.com.