



Applied Gas, Inc.



At Applied Gas, we are dedicated to providing our customers with the superior specialty gas mixtures and support which enable them to achieve high quality and efficient results. Our internally developed manufacturing, analytical, and software solutions are unique and result in our ability to safely meet customer delivery schedules in a timely and when required, expedited, fashion. We believe in maintaining open and honest communication with our customers and vendors throughout the order process. Applied Gas employees have safety and customer satisfaction as their primary goals. We take pride in meeting these expectations everyday.

We are here for you.....

At Applied Gas, Inc. we take a great deal of pride in what we do, both personally and professionally, and we view every client and job as a personal challenge to achieve perfection. We have a passion for our work and truly enjoy helping people address their technological needs. From analytical and process applications to research and development requirements, reliable customer service, production, delivery and technical support are our bottom line. It gives us a great sense of accomplishment knowing that a job was done well.

As a leading supplier of custom specialty gas mixtures, advanced order management, sophisticated software, proven analytical instrumentation and reliable production equipment are only a few of the systems employed in the quality control and assurance that provides products to meet the demands of our customers.

Our employees understand that on occasion a customer may have a special circumstance that would require our products on an expedited basis. Our dedicated staff will work holidays, weekends and overtime to provide custom products as quickly as possible. We will ship products by air freight, express local delivery or any other means possible in order to meet shipping dates.

Please feel free to contact us by...

phone: (979) 922-1804

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P.O. Box 939.

Alvin, Tx. 77551



C u s t o m G a s a n d L i q u i d M i x t u r e s

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Terms and conditions

All prices are in U.S. dollars, Ex-works our shipping point. The prices published in this catalog are appropriate as of the date of its printing and are subject to change without further notice. Prices do not include federal, state or local taxes. Sales taxes or other applicable taxes will be charged unless a current valid exemption certificate is provided. Credit will not be given under any circumstances without prior approval for any products returned to Applied Gas, Inc. Restocking or cancellation fees may be instituted for changes or cancellations of an order at the discretion of Applied Gas, Inc.

Buyer acknowledges; there are hazards associated with the use of the product; Buyer understands such hazards; it is the responsibility of Buyer to warn and protect its employees and all others exposed to such hazards in use and in storage of the product. Buyer shall hold harmless, indemnify, and defend Seller from and against any liability incurred by Seller because such warnings were not made. Buyer assumes all risk and liability for loss, damages or injury to persons or to property of Buyer or others arising out of the presence or use of the product. Seller shall not be liable in contract or tort for any other direct or any indirect, special, incidental, consequential or contingent damages arising out of its performance or non-performance.

This warranty is exclusive and Seller makes no other warranty, express or implied, including any implied warranty of merchantability. Seller shall not be liable for any special, incidental, consequential or contingent damages. The burden of safe usage of products sold by the Seller rests solely with the Buyer. Seller directs the attention of the Buyer to the hazards listed in this catalog but assumes no liability for the accuracy or completeness of any information supplied. Seller shall not be liable for , special, incidental, consequential or contingent damages arising from the non-willful failure to deliver products or deliver products by an express or implied time.

All cylinders, caps, valves and fitting provided in connection with a product remain the property of Applied Gas, Inc. No one may refill any cylinder owned by Applied Gas, Inc. without prior approval as per the code of federal regulations part 49.



Custom Gas and Liquid Mixtures

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The Applied Gas Advantage

The mixed gas business can be frustrating, time consuming, and costly if you do not have a company that understands your needs. Applied Gas will invest the time to make sure that the experience with us will be as simple as turning on the lights. With over 50 years of experience in the industry we have assembled this company to make mix procurement, and delivery user friendly. Please read below to see if some of our solutions can resolve your current issues.

- **Pricing consistency**
- **Technical support**
- **On time delivery***
- **Reorder notification**
- **Delivery status via website**
- **Specialized labeling**
- **On line cert capabilities**
- **Raw material qualification**
- **NIST traceable reporting**
- **Order forms specific to your request for ease of ordering**
- **Specialty gas equipment**
- **Quotes provide within 24 hours on routine requests**
- **One call customer service**
- **No annual price increases to boost profits**
- **Global shipping capabilities**
- **E-mail, fax, or phone ordering**
- **Lab surveys at no cost to the customer**
- **Easy to read invoices and delivery tickets Professional, and courteous service**

For more details please feel free to contact us...



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Custom mixtures

As a leading supplier of custom specialty gas mixtures, advanced order management, sophisticated software, proven analytical instrumentation and reliable production equipment are only a few of the systems employed in the quality control and assurance that provides products to meet the demands of our customers. Custom mixtures are currently prepared by either volumetric or gravimetric techniques. Applied Gas, Inc. clearly states the methods utilized to prepare custom mixtures under “Standard Specifications”.

Ordering a mixture

The virtually unlimited possible combination of components and concentrations makes the ordering of a custom mixture a crucial process in obtaining the appropriate mixture for the user’s satisfaction. Possible steps to help customers through this process are outlined below.

1. Determine the components and their concentrations.
2. Determine the component to be added as the balance material.
Note: If the balance material has an actual requested concentration the sum of all component concentrations should equal 100%.
3. Determine the required “Make Tolerance” and “Certification Accuracy” from the standard “Mixture Tolerances” table on the page 14 or state your own required tolerances.
4. State the unit of measure (i.e. weight percent, mole percent, or liquid volume percent).
5. Determine the desired cylinder size or indicate the desired quantity of product.
(See the table at the begin of this catalog)
6. Indicate the desired shipment date and the preferred carrier and mode: air, motor freight, etc...

Should you have difficulty in determining any of the above your customer service representative will be glad to assist you.

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Capabilities

Refinery standards: Refinery Gas Standards, ASTM D3710, ASTM D2887, Hydrogen Sulfide standards, and other mixtures useful in the gasoline refinery.

Petrochemical standards: An unlimited combination of components and concentrations make a comprehensive listing of calibration mixtures utilized in the laboratory and process control impossible. A partial listing of components and concentrations follows:

Propylene standards : Percent to part per million Methane, Ethane, Propane, Hydrogen, Carbon Dioxide, Carbon Monoxide, Hydrogen Sulfide, Carbonyl Sulfide, Methyl Acetylene, Propadiene, Cyclopropane, and other minor components.

Ethylene standards : Percent to parts per million Methane, Ethane, Oxygen, Nitrogen, Hydrogen, Carbon Dioxide, Carbon Monoxide, and other minor components.

1,3-Butadiene standards : Percent to parts per million Methane, Ethane, Ethylene, Propylene, Cis 2 Butene, Trans 2 Butene, 1 Butene, Isobutylene, 1,2 Butadiene, Methyl Acetylene, Propadiene, Vinyl Acetylene, and other minor components.

Natural gas standards : GPA Reference, Calorimetric, BTU Reference, High Ethane, Natural gas processing and custom gas and liquid mixtures.

Liquid standards : Percent to parts per million Benzene, Toluene, Ethyl Benzene, Xylenes, Cumene, MTBE, TAME, Styrene Alcohols, Ethers, and Ketones. ASTM D3710, ASTM D2887, ASTM D5399 and other ASTM calibration mixtures including Piston Cylinder mixtures.

Sulfur standards: Percent to parts per million Hydrogen Sulfide, Carbonyl Sulfide, Methyl Mercaptan, Ethyl Mercaptan, Methyl Sulfide, Dimethyl Sulfide, Ethyl Sulfide, and Thiophene.

Fugitive emission standards: Methane in Air and Hexane in Air, HRVOC mixtures.

Air monitoring standards: Percent to parts per million Nitric Oxide, Sulfur Dioxide, Oxygen, Nitrogen Dioxide, and Total

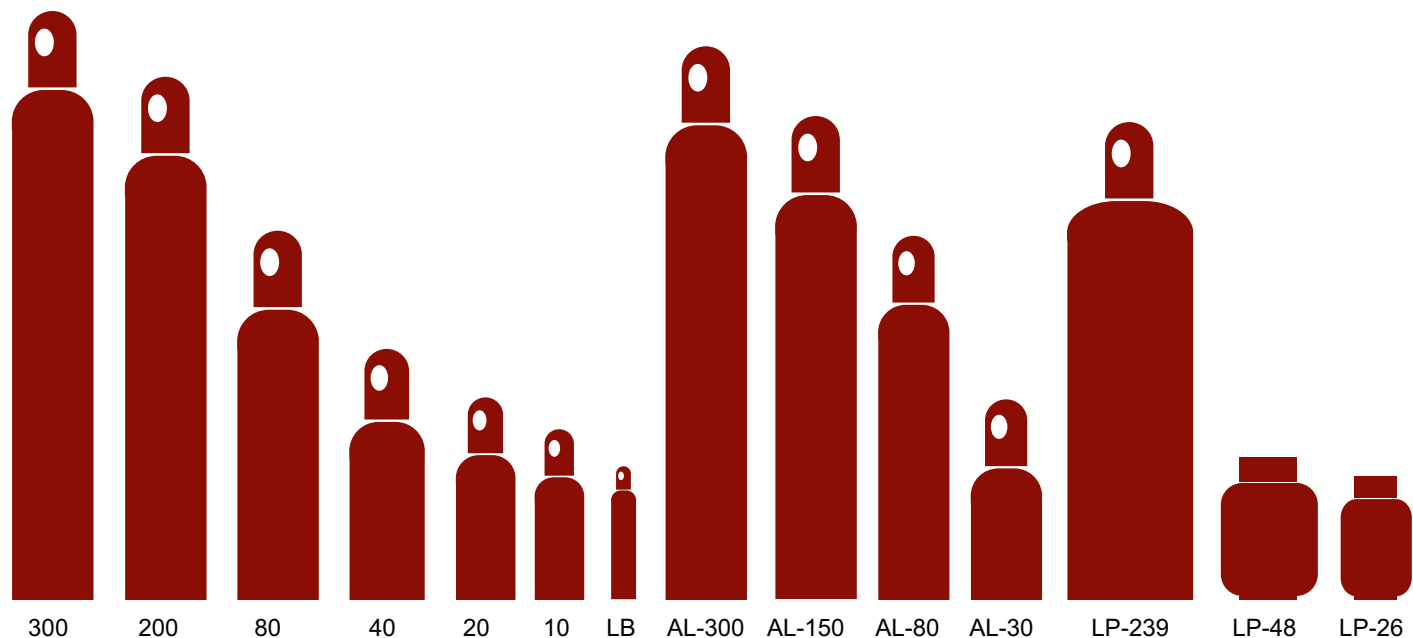
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CYLINDER DATA





Cylinder cross-reference

Applied Gas	Airgas	Air Liquide	Air Products	Matheson	Praxair	Scott
300	300	49	A	1L	T	K
200	200	44	B	1A	K	A
80	80	16	C	2	Q	B
40	40		D		F	
20	20	7	D1		G	C
LB	LB	LB	LB	LB	LB	LB
AL-300	AL300		AAL		AT	
AL-150	AL150	30AL	BAL	1R	AS	AL
AL-80	AL80	16AL	CAL	2R	AQ	BL
AL-30	AL30	7AL	D1AL	3R	AH	CL
AL-5			4XAL	6R		
LP-239	350	110	A1	1F	FX	XL
LP-48	LP5	LP5	LP5		LP5	
LP-26			LP2.5			
LP-48AL	LP5AL		LP5AL			

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Cylinder data

	Cylinder size	Nominal Weight (lbs / kg)	Water Capacity (lbs / ltr)	DOT Designation	O.D. (in / mm)	Length (in / mm)
<i>High pressure steel</i>	300	135 / 61.3	110 / 49	3AA-2400	10 / 254	60 / 1524
	200	115 / 52.2	96 / 44	3AA-2015	9 / 229	57 / 1448
	80	45 / 20.4	38 / 16	3AA-2015	7 / 178	31 / 788
	40	26 / 11.8	19 / 7.9	3AA-2015	7 / 178	18 / 457
	20	11 / 5	10 / 4	3AA-2015	5 / 133	14 / 355
	LB	2 / 1	1 / 0.45	3A-1800	2 / 51	15 / 381
<i>High pressure aluminum</i>	AL-150	52 / 23.6	65 / 30	3AL-2015	8 / 204	54 / 1372
	AL-80	33 / 15	34.6 / 15.7	3AL-2216	7 / 178	39 / 991
	AL-30	19 / 8.6	13 / 5.9	3AL-2216	7 / 178	21 / 533
	AL-5	2.1 / 0.95	2.2 / 1.02	3AL-2015	3.2 / 81	11.7 / 298
<i>Low pressure steel</i>	LP-239	72 / 32.7	239 / 110	4BW-240	15 / 381	50 / 1270
	LP-48	18 / 8.2	48 / 21.8	4BW-240	12 / 305	19 / 493
	LP-26	13 / 5.9	26 / 11.8	4BW-240	10 / 254	16 / 407
<i>Low pressure aluminum</i>	LP-48AL	13 / 5.9	48 / 21.8	4E-240	21 / 533	21 / 533
	LP-26AL	10 / 4.5	24 / 10.9	4E-240	10 / 254	16 / 254



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Cylinder suffixes

Suffix	Valve type
<i>none</i>	Brass
s	Stainless steel
dt	Brass with dip-tube
dp	Brass with pressurizing port and dip-tube
dps	Stainless steel with pressurizing port and dip-tube

Hydrostatic test pressures

DOT Designation	Test pressure (<i>psig / kg/cm²</i>)
3AA-2400	4000 / 281
3AA-2015	3360 / 236
3AL-2015	3360 / 236
4BW-240	480 / 34



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Some components available in custom mixtures

1-BUTENE	1-BUTYNE	1-PROPANOL
1,2 BUTADIENE	1,2 DIBROMOMETHANE	1,3 BUTADIENE
1,3 PENTADIENE	1,4 DIETHYLBENZENE	1,4 PENTADIENE
1-PENTENE	2,2,4 TRIMETHYLPENTANE	2,3,5 TRIMETHYLHEXANE
2-HEXENE	2-METHYL HEPTANE	2-ETHYL-1-BUTENE
2-BUTANONE	2-BUTYNE	2-CHLOROPROPANE
2-METHYL 1 BUTENE	2-METHYL-2-BUTENE	2-METHYL HEXANE
2-METHYL PENTANE	2,2 DIMETHYLBUTANE	2,2 DIMETHYLPROPANE
2,3 DIMETHYLBUTANE	2,4 DIMETHYLHEXANE	3-METHYL-1-BUTENE
3-METHYL HEPTANE	3-METHYL HEXANE	ACETALDEHYDE
ACETONE	ACETONITRILE	ALLENE
ALLYL CHLORIDE	AMMONIA	ARGON
BENZENE	BUTANE	BUTYL ALCOHOL
CARBON DIOXIDE	CARBON MONOXIDE	CARBON TETRACHLORIDE
CARBONYL SULFIDE	CHLORINE	CHLORODIFLUOROMETHANE
CHLOROFORM	CHLOROTRIFLUOROETHYLENE	CIS-2-BUTENE
CIS-2-PENTENE	CUMENE	CYCLOBUTANE
CYCLOHEPTANE	CYCLOHEXANE	CYCLOHEXANOL
CYCLOHEXENE	CYCLOPENTENE	CYCLOPROPANE
DECANE	DEUTERIUM	DICHLOROMETHANE
DIBROMODIFLUOROMETHANE	DIETHYL ETHER	DIETHYL KETONE
DIETHYL SULFIDE	DIETHYLAMINE	DIMETHYL DISULFIDE
DIMETHYL ETHER	DIMETHYLAMINE	DIMETHYL SULFIDE
DODECANE	EICOSANE	ETHANE
ETHANOL	ETHYL ACETATE	ETHYL ACETYLENE
ETHYL ACRYLATE	ETHYL BENZENE	ETHYL BROMIDE
ETHYL CHLORIDE	ETHYL FORMIDE	ETHYL IODIDE
ETHYL MERCAPTAN	ETHYLENE	ETHYLENE OXIDE
HALOCARBON 11	HALOCARBON 113	HALOCARBON 1132A
HALOCARBON 114	HALOCARBON 115	HALOCARBON 116
HALOCARBON 12	HALOCARBON 13	HALOCARBON 1301
HALOCARBON 142B	HALOCARBON 152A	HALOCARBON 21
HALOCARBON 22	HALOCARBON 23	HELIUM
HEPTANE	HYDROGEN	HYDROGEN BROMIDE
HYDROGEN CHLORIDE	ISOBUTANE	ISOBUTYL ALCOHOL
ISOBUTYL MERCAPTAN	ISOPENTANE	ISOPRENE
ISOPROPANOL	ISOPROPYLACETATE	ISOPROPYLSULFIDE
KRYPTON	M-XYLENE	METHANE
METHANETHIOL	METHANOL	METHYL ACETATE
METHYL ACETYLENE	METHYL BROMIDE	METHYL CHLORIDE
METHYL CYCLOHEPTANE	METHYL CYCLOHEXANE	METHYL CYCLOPENTANE
METHYL DISULFIDE	METHYL ETHYL KETONE	METHYL FORMATE
METHYL HEPTANE	METHYL IODIDE	METHYL MERCAPTAN
METHYL SULFIDE	NEON	NEOPENTANE
NITROGEN	NITROGEN DIOXIDE	NITRIC OXIDE
NONANE	O-XYLENE	NITROUS OXIDE
OCTANE	P-XYLENE	
OXYGEN	PERFLUOROPROPANE	
PENTANE	PROPANE	
PERFLUORO- 2-BUTENE	PROPYL MERCAPTAN	
PROPADIENE	PROPYLENE OXIDE	
PROPYL BENZENE	STYRENE	
PROPYLENE	SULFUR HEXAFLUORIDE	
SEC BUTYL ALCOHOL	TERT BUTYL MERCAPTAN	
SULFUR DIOXIDE	TETRACHLOROETHYLENE	
TERT BUTYL ALCOHOL	TETRACOSANE	
TERT BUTYL METHYL ETHER	THIOPHENE	
TETRACHLOROETHYLENE	TRANS-2-BUTENE	
TETRAHYDROFURAN	TRICHLORETHANE	
TOLUENE	TRICHLOROFLUOROMETHANE	
TRANS-2-PENTENE		
TRICHLOROETHYLENE		

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Mixture type	Requested concentration (From-To)	Manufacturing tolerances	Certification accuracies
Master	5-100 PPM	+/-10 %	+/-1 %
	101-5000 PPM	+/-5 %	+/-1 %
	0.5%-UP	+/-2 %	+/-1 %
Primary	5-100 PPM	+/-15 %	+/-1 %
	101-5000 PPM	+/-5 %	+/-1 %
	0.5%-UP	+/-2 %	+/-1 %
Certified	< 100 PPB	+/-30 %	+/-20 %
	101-999 PPB	+/-20 %	+/-10 %
	1-4.9 PPM	+/-20 %	+/-5 %
	5-100 PPM	+/-20 %	+/-2 %
	101-5000 PPM	+/-10 %	+/-2 %
	0.5%-UP	+/-5 %	+/-2 %

Applied Gas can also offer Gravimetric and Unanalyzed mixtures upon request.

Note: Blend tolerance and analytical accuracy may vary depending on the specific component, cylinder size, and other factors specific to an individual mixture. Manufacturing tolerances and Certification accuracies are expressed as relative deviation from the requested concentration of the individual component.

Specifications

Master standard:

Manufactured gravimetrically on high capacity, high precision balances and all components analyzed by gas chromatography or other suitable analytical methodology. Both gravimetric and analytical values must agree within the stated certification accuracy.

Primary standard:

Manufactured gravimetrically on high capacity, high precision balances and analyzed by gas chromatography or other suitable analytical methodology where reactive components or mass weights are not sufficient to certify to the stated accuracy.

Certified standard:

Manufactured gravimetrically on high capacity, high precision balances, volumetrically or by partial pressure techniques and analyzed by gas chromatography or other suitable analytical methodology where necessary to certify to the stated accuracy.



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PURE GAS



Air

(Synthetic, not for breathing)

Purity	Cylinder Size	Contents (cubic feet)	Pressure (psia)
Ultra Zero	300	310	2655
	200	230	2215
Zero	300	310	2655
	200	230	2215

Technical Specifications

Molecular Weight.....	28.96
Boiling Point.....	-317.8 F (-194.3 C)
Specific Volume.....	13.3cf/lb (0.833m3/kg)
Critical Temperature.....	-221.1 F (-140.6 C)
Critical Pressure.....	546.8 psia
Lower Flammable Limits.....	Non-Flammable
Toxicity.....	Simple asphyxiant
Compatibility.....	Non-corrosive

CGA..... 590

Shipping Information

DOT Name.....	Air, Compressed
Hazard Class.....	2.2
ID/UN Number.....	UN1002
DOT Label.....	Non-Flammable Gas
CAS Number.....	132259-10-0
Reportable Quantity.....	N/A

*other sizes are available upon request

Notes:

Recommended Regulator : LABE-3-Delivery pressure-590

Allene

$H_2C=C=CH_2$

Purity	Cylinder Size	Contents (grams)	Pressure (psia)
Grade 1.5 95%	LP-26	4540	116
	LB	227	116
	LB	100	116

Technical Specifications

Molecular Weight.....	40.07
Boiling Point.....	-30.1 F (-34.5 C)
Density.....	4.999 lbs/gal @ 60 F
Critical Temperature.....	248.0 F (120 C)
Critical Pressure.....	793.36 psia
Lower Flammable Limits.....	1.5 %
Toxicity.....	Simple asphyxiant
Compatibility.....	Most metals

CGA..... 510 (LB : 110)

Shipping Information

DOT Name.....	Propadiene, Inhibited
Hazard Class.....	2.1
ID/UN Number.....	UN2200
DOT Label.....	Flammable Gas
CAS Number.....	463-49-0
Reportable Quantity.....	N/A

*other sizes are available upon request

Please specify Gas or Liquid with-drawl

Please check availability

Notes:

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Argon | Ar

Purity	Cylinder Size	Contents (cubic feet)	Pressure (psia)
Grade 5.0	300	330	2655
99.999%	200	250	2215
Grade 4.8	300	330	2655
99.998%	200	250	2215

*other sizes are available upon request

Notes:

Recommended Regulator : LABE-3-Delivery pressure -580

Technical Specifications

Molecular Weight.....	39.95
Boiling Point.....	-302.6 F (-185.9 C)
Specific Volume.....	9.7 cf/lb (0.604 m3/kg)
Critical Temperature.....	-188.1 F (-122.4 C)
Critical Pressure.....	710 psia
Lower Flammable Limits.....	Non-Flammable
Toxicity.....	Simple asphyxiant
Compatibility.....	Non-corrosive
CGA.....	580

Shipping Information

DOT Name.....	Argon, Compressed
Hazard Class.....	2.2
ID/UN Number.....	UN1066
DOT Label.....	Non-Flammable Gas
CAS Number.....	7440-37-1
Reportable Quantity.....	N/A

1,2-Butadiene | $H_2C=CHCH=CH_2$

Purity	Cylinder Size	Contents (grams)	Pressure (psia)
Grade 1.7	LB	227	34
97%	LB	100	34

*other sizes are available upon request

Please specify Gas or Liquid with-drawl

Please check availability

Notes:

Technical Specifications

Molecular Weight.....	54.09
Boiling Point.....	51.53 F (10.85 C)
Density.....	5.482 lbs/gal @ 60 F
Critical Temperature.....	339.53 F (170.85 C)
Critical Pressure.....	652.67 psia
Lower Flammable Limits.....	2.0 %
Toxicity.....	
Compatibility.....	Most metals
CGA.....	110

Shipping Information

DOT Name.....	Butadienes, Inhibited
Hazard Class.....	2.1
ID/UN Number.....	UN1010
DOT Label.....	Flammable Gas
CAS Number.....	590-19-2
Reportable Quantity.....	N/A

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1,3-Butadiene | H2C=CHCH=CH2

Purity	Cylinder Size	Contents (pounds)	Pressure (psia)
Grade 2.5	LP-239dt	100	36
99.5%	LP-26dt	10	36
Grade 2	LP-239dt	100	36
99.0%	LP-26dt	10	36

Technical Specifications

Molecular Weight.....	54.09
Boiling Point.....	24.06 F (-4.4 C)
Density.....	5.230 lbs / gal @ 60 F
Critical Temperature.....	306 F (152.2 C)
Critical Pressure.....	628 psia
Lower Flammable Limits.....	2.0 %
Toxicity.....	TLV 10 ppm
Compatibility.....	Most metals

CGA..... 510

Shipping Information

DOT Name.....	Butadienes, Inhibited
Hazard Class.....	2.1
ID/UN Number.....	UN1010
DOT Label.....	Flammable Gas
CAS Number.....	106-99-0
Reportable Quantity.....	10 lbs (4.54 kg)

Purity excludes dimer

**other sizes are available upon request*

Please specify Gas or Liquid with-drawl

Notes:

Recommended Gas Regulator : LABD-1-Delivery pressure -510

n-Butane | H3CCH2CH2CH3

Purity	Cylinder Size	Contents (pounds)	Pressure (psia)
Grade 2.5	LP-239dt	100	31
99.5%	LP-26dt	10	31
Grade 2	LP-239dt	100	31
99.0%	LP-26dt	10	31

Technical Specifications

Molecular Weight.....	58.123
Boiling Point.....	31.1 F (-0.5 C)
Density.....	4.869 lbs/gal @ 60 F
Critical Temperature.....	305.62 F (152.01 C)
Critical Pressure.....	550.6 psia
Lower Flammable Limits.....	1.8 %
Toxicity.....	TLV 800 ppm
Compatibility.....	Most metals

CGA..... 510

Shipping Information

DOT Name.....	Butane
Hazard Class.....	2.1
ID/UN Number.....	UN1011
DOT Label.....	Flammable Gas
CAS Number.....	106-97-8
Reportable Quantity.....	N/A

**other sizes are available upon request*

Please specify Gas or Liquid with-drawl

Notes:

Recommended Gas Regulator : LABD-1-Delivery pressure -510

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1-Butene | H2C=CHCH2CH3

Purity	Cylinder Size	Contents (cubic feet)	Pressure (psia)
Grade 2 99 %	LP-239dt	100	38
	LP-26dt	10	38

Technical Specifications

Molecular Weight.....	56.12
Boiling Point.....	20.7 F (-6.3 C)
Density.....	5.006 lbs/gal @ 60 F
Critical Temperature.....	295.59 F (146.44 C)
Critical Pressure.....	583 psia
Lower Flammable Limits.....	1.6 %
Toxicity.....	
Compatibility.....	Most metals

CGA..... 510

Shipping Information

DOT Name.....	Butylene
Hazard Class.....	2.1
ID/UN Number.....	UN1012
DOT Label.....	Flammable Gas
CAS Number.....	106-98-9
Reportable Quantity.....	N/A

**other sizes are available upon request*

Please specify Gas or Liquid with-drawl

Notes:

Recommended Gas Regulator : LABD-1-Delivery pressure -510

cis-2-Butene | H3CHC=CHCH3

Purity	Cylinder Size	Contents (grams)	Pressure (psia)
Grade 2 98+ %	LP-239dt	45400* ²	28
	LP-48dt	4540	28
	LB	227	28
	LB	100	28

Technical Specifications

Molecular Weight.....	56.12
Boiling Point.....	38.7 F (3.72 C)
Density.....	5.241 lbs/gal @ 60 F
Critical Temperature.....	324.37 F (162.43 C)
Critical Pressure.....	610 psia
Lower Flammable Limits.....	1.7 %
Compatibility.....	Most metals

CGA..... 510 (LB : 110)

Shipping Information

DOT Name.....	Butylene
Hazard Class.....	2.1
ID/UN Number.....	UN1012
DOT Label.....	Flammable Gas
CAS Number.....	590-18-1
Reportable Quantity.....	N/A

**other sizes are available upon request*

Please check price and availability. Price subject to change without notice.

Please specify Gas or Liquid with-drawl

Notes:

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trans-2-Butene | H3CHC=CHCH3

Purity	Cylinder Size	Contents (grams)	Pressure (psia)
Grade 2 98+ %	LP-239dt	45400* ²	28
	LP-48dt	4540	28
	LB	227	28
	LB	100	28

Technical Specifications

Molecular Weight.....	56.12
Boiling Point.....	33.58 F (0.88 C)
Density.....	5.095 lbs/gal @ 60 F
Critical Temperature.....	311.86 F (155.48 C)
Critical Pressure.....	595 psia
Lower Flammable Limits.....	1.7 %
100	28
Compatibility.....	Most metals

CGA..... 510 (LB : 110)

Shipping Information

DOT Name.....	Butylene
Hazard Class.....	2.1
ID/UN Number.....	UN1012
DOT Label.....	Flammable Gas
CAS Number.....	624-64-6
Reportable Quantity.....	N/A

**other sizes are available upon request*

Please check price and availability. Price subject to change without notice.

Please specify Gas or Liquid with-drawl

Notes:

Recommended Gas Regulator : LABD-1-Delivery pressure -510

Carbon dioxide | CO2

Purity	Cylinder Size	Contents (pounds)	Pressure (psia)
Grade SFC 99.99 %	AL-150dt	35	845
Grade 2 99 %	200dt	50	845
	200	50	845

Technical Specifications

Molecular Weight.....	44.01
Boiling Point.....	-109.12 F (-78.4 C)
Density.....	6.82 lbs/gal @ 60 F
Critical Temperature.....	87.91 F (31.06 C)
Critical Pressure.....	1071 psia
Flammable Limits.....	Non-flammable
Toxicity.....	TLV 10,000 ppm
Compatibility.....	Moisture promotes corrosion

CGA..... 320

Shipping Information

DOT Name.....	Carbon dioxide
Hazard Class.....	2.2
ID/UN Number.....	UN1013
DOT Label.....	Non Flammable
CAS Number.....	124-38-9
Reportable Quantity.....	N/A

**other sizes are available upon request*

Please specify Gas or Liquid with-drawl

Notes:

Recommended Gas Regulator : SG9012-320-320

Teflon washer (package of 25) SG6076

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Carbon monoxide | CO

Purity	Cylinder Size	Contents (cubic feet)	Pressure (psia)
Grade 4	300	240	2015
99.99 %	200	176	1665
Grade 3	300	240	2015
99.9 %	200	176	1665

*other sizes are available upon request

Notes:

Recommended Regulator : LABE-3-Delivery pressure -350

Technical Specifications

Molecular Weight.....	28.01
Boiling Point.....	-312.7 F (-191.5 C)
Specific Volume.....	13.8cf/lb (0.862m3/kg)
Critical Temperature.....	-220.41 F (-140.2 C)
Critical Pressure.....	507.45 psia
Lower Flammable Limits.....	12.5 %
Toxicity.....	TLV 50 ppm
Compatibility.....	Can be corrosive
CGA.....	350 (LB : 110)

Shipping Information

DOT Name.....	Carbon monoxide, compressed
Hazard Class.....	2.3 Zone D
ID/UN Number.....	UN1016
DOT Label.....	Inhalation hazard, Flammable Gas
CAS Number.....	74-84-0
Reportable Quantity.....	N/A

Ethane | H3CCH3

Purity	Cylinder Size	Contents (pounds)	Pressure (psia)
Grade 2	200dt	30	558
99 %	200	30	558

*other sizes are available upon request

Please specify Gas or Liquid with-drawl

Notes:

Recommended Gas Regulator : LABE-3-Delivery pressure-350

Technical Specifications

Molecular Weight.....	30.07
Boiling Point.....	-127.5 F (-88.6 C)
Density.....	2.97 lbs/gal @ 60 F
Critical Temperature.....	89.92 F (32.18 C)
Critical Pressure.....	706.5 psia
Lower Flammable Limits.....	3 %
Toxicity.....	Simple asphyxiant
Compatibility.....	Non-corrosive
CGA.....	350

Shipping Information

DOT Name.....	Ethane
Hazard Class.....	2.1
ID/UN Number.....	UN1035
DOT Label.....	Flammable Gas
CAS Number.....	74-84-0
Reportable Quantity.....	N/A

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Ethyl acetylene | $\text{CH}_3\text{CH}_2\text{C}\equiv\text{CH}$

Purity	Cylinder Size	Contents (grams)	Pressure (psia)
Grade 1.5 95 %	LP-26dt	4540	23
	LB	227	23
	LB	100	23

Technical Specifications

Molecular Weight.....	54.09
Boiling Point.....	46.53 F (8.07 C)
Density.....	3.481 lbs/gal @ 60 F
Critical Temperature.....	374.9 F (190.5 C)
Critical Pressure.....	683.13 psia
Lower Flammable Limits.....	1.6 %
Toxicity.....	
Compatibility.....	Most metals, except copper
CGA.....	510 (LB : 110)

Shipping Information

DOT Name.....	Ethylacetylene
Hazard Class.....	2.1
ID/UN Number.....	UN2452
DOT Label.....	Flammable Gas
CAS Number.....	107-00-6
Reportable Quantity.....	N/A

**other sizes are available upon request*

Please check availability

Notes:

Ethylene | $\text{H}_2\text{C}=\text{CH}_2$

Purity	Cylinder Size	Contents (pounds)	Pressure (psia)
Grade 3 99.9 %	300	35	1215
	200	30	1215
Grade 2 99 %	300	37	1215
	200	30	1215

Technical Specifications

Molecular Weight.....	28.05
Boiling Point.....	-154.68 F (-103.7 C)
Density (Estimated).....	2.91 lbs/gal @ 60 F
Critical Temperature.....	48.58 F (9.21 C)
Critical Pressure.....	729.8 psia
Lower Flammable Limits.....	3.1 %
Toxicity.....	Simple asphyxiant
Compatibility.....	Non-corrosive
CGA.....	350 (LB : 110)

Shipping Information

DOT Name.....	Ethylene, Compressed
Hazard Class.....	2.1
ID/UN Number.....	UN1962
DOT Label.....	Flammable Gas
CAS Number.....	74-85-1
Reportable Quantity.....	N/A

**other sizes are available upon request*

Notes:

Recommended Regulator : LABE-3-Delivery pressure-350

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Helium | He

Purity	Cylinder Size	Contents (cubic feet)	Pressure (psia)
Grade 5	300	291	2655
99.999 %	200	217	2215
Grade 4	300	291	2655
99.99 %	200	217	2215

*other sizes are available upon request

Notes:

Recommended Regulator : LABE-3-Delivery pressure-580

Technical Specifications

Molecular Weight.....	4.003
Boiling Point.....	-452.07 F (-268.9 C)
Specific Volume.....	96.7 cf/lb (6.03 m3/kg)
Critical Temperature.....	-453.71 F (-234.28 C)
Critical Pressure.....	33 psia
Lower Flammable Limits.....	Non-flammable
Toxicity.....	Simple asphyxiant
Compatibility.....	Non-corrosive
CGA.....	580

Shipping Information

DOT Name.....	Helium, Compressed
Hazard Class.....	2.2
ID/UN Number.....	UN1046
DOT Label.....	Non-Flammable
CAS Number.....	7440-59-7
Reportable Quantity.....	N/A

Hydrogen | H2

Purity	Cylinder Size	Contents (cubic feet)	Pressure (psia)
Grade 5	300	262	2415
99.999 %	200	198	2015

*other sizes are available upon request

Notes:

Recommended Regulator : LABE-3-Delivery pressure-350

Technical Specifications

Molecular Weight.....	2.0159
Boiling Point.....	-422.98 F (-262.76 C)
Specific Volume.....	191.3cf/lb (12.0m3/kg)
Critical Temperature.....	-399.82 F (-239.9 C)
Critical Pressure.....	190.8 psia
Lower Flammable Limits.....	4.0 %
Toxicity.....	Simple asphyxiant
Compatibility.....	Non-corrosive
CGA.....	350

Shipping Information

DOT Name.....	Hydrogen, Compressed
Hazard Class.....	2.1
ID/UN Number.....	UN1049
DOT Label.....	Flammable Gas
CAS Number.....	1333-74-0
Reportable Quantity.....	N/A

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Isobutane | H3CCH2CH2CH3

Purity	Cylinder Size	Contents (pounds)	Pressure (psia)
Grade 4 99.99 %	LP-26dt	10	46
Grade 2.5 99.5 %	LP-239dt	100	46
	LP-26dt	10	46
Grade 2 99 %	LP-239dt	100	46

**other sizes are available upon request*

Please specify Gas or Liquid with-drawl

Notes:

Recommended Gas Regulator : LABD-1-Delivery pressure -510

Technical Specifications

Molecular Weight.....	58.123
Boiling Point.....	10.78 F (-11.79 C)
Density.....	4.693 lbs/gal @ 60 F
Critical Temperature.....	274.46 F (134.7 C)
Critical Pressure.....	527.9 psia
Lower Flammable Limits.....	1.8 %
Toxicity.....	Simple asphyxiant
Compatibility.....	Most metals
CGA.....	510 (LB : 110)

Shipping Information

DOT Name.....	Isobutane
Hazard Class.....	2.1
ID/UN Number.....	UN1969
DOT Label.....	Flammable Gas
CAS Number.....	75-28-5
Reportable Quantity.....	N/A

Methane | CH4

Purity	Cylinder Size	Contents (cubic feet)	Pressure (psia)
Grade 4 99.99 %	200	260	2015
Grade 2.5 99.5 %	300	360	2415
	200	260	2015

**other sizes are available upon request*

Notes:

Recommended Regulator : LABE-3-Delivery pressure -350

Technical Specifications

Molecular Weight.....	16.043
Boiling Point.....	-258.73 F (-161.52 C)
Specific Volume.....	23.7 cf/lb (1.48 m3/kg)
Critical Temperature.....	-116.67 F (-82.59 C)
Critical Pressure.....	665 psia
Lower Flammable Limits.....	5.0 %
Toxicity.....	Simple asphyxiant
Compatibility.....	Non-corrosive
CGA.....	350 (LB : 110)

Shipping Information

DOT Name.....	Methane, Compressed
Hazard Class.....	2.1
ID/UN Number.....	UN1971
DOT Label.....	Flammable Gas
CAS Number.....	74-82-8
Reportable Quantity.....	N/A

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Methyl acetylene | CH3C#CH

Purity	Cylinder Size	Contents (grams)	Pressure (psia)
Grade 2	LP-26dt	4540	75
99 %	LB	227	75
	LB	100	75

**other sizes are available upon request*

Please check price and availability. Price subject to change without notice.

Please specify Gas or Liquid with-drawl

Notes:

Recommended Gas Regulator : LABD-1-Delivery pressure -510

Technical Specifications

Molecular Weight.....	40.06
Boiling Point.....	-9.8 F (-23.22 C)
Density.....	5.179 lbs/gal @ 60 F
Critical Temperature.....	264.3 F (129.05 C)
Critical Pressure.....	816.22 psia
Flammable Limits.....	1.7 %
Toxicity.....	Simple asphyxiant
Compatibility.....	Most metals, except copper

CGA..... 510 (LB : 110)

Shipping Information

	Compressed Gas, Flammable, N.O.S., (Methyl acetylene)
DOT Name.....	
Hazard Class.....	2.1
ID/UN Number.....	UN1954
DOT Label.....	Flammable Gas
CAS Number.....	74-99-7
Reportable Quantity.....	N/A

Neopentane | CC(C)(C)C

Purity	Cylinder Size	Contents (grams)	Pressure (psia)
Grade 1.8	LP-26	908	22
98 %	LB	227	22
	LB	100	22

**other sizes are available upon request*

Please specify Gas or Liquid with-drawl

Please check price and availability. Price subject to change without notice.

Notes:

Recommended Gas Regulator : LABD-1-Delivery pressure -510

Technical Specifications

Molecular Weight.....	72.15
Boiling Point.....	49.1 F (9.5 C)
Density.....	4.981 lbs/gal @ 60 F
Critical Temperature.....	321.13 F (160.63 C)
Critical Pressure.....	464 psia
Lower Flammable Limits.....	1.4 %
Toxicity.....	Simple asphyxiant
Compatibility.....	Non-corrosive

CGA..... 510 (LB : 110)

Shipping Information

DOT Name.....	2,2-Dimethylpropane
Hazard Class.....	2.1
ID/UN Number.....	UN2044
DOT Label.....	Flammable Gas
CAS Number.....	463-82-1
Reportable Quantity.....	N/A

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Nitrogen | N₂

Purity	Cylinder Size	Contents (cubic feet)	Pressure (psia)
Grade 5	300	305	2655
99.999 %	200	230	2215
Grade 4.5	300	305	2655
99.995 %	200	230	2215

*other sizes are available upon request

Notes:

Recommended Regulator : LABE-3-Delivery pressure -580

Technical Specifications

Molecular Weight.....	28.0134
Boiling Point.....	-320.4 F (-195.8 C)
Specific Volume.....	13.8cf/lb (0.862m3/kg)
Critical Temperature.....	-232.4 F (-146.9 C)
Critical Pressure.....	492.9 psia
Lower Flammable Limits.....	Non-flammable
Toxicity.....	Simple asphyxiant
Compatibility.....	Non-corrosive
CGA.....	580 (LB : 110)

Shipping Information

DOT Name.....	Nitrogen, Compressed
Hazard Class.....	2.2
ID/UN Number.....	UN1066
DOT Label.....	Non-Flammable Gas
CAS Number.....	7727-37-9
Reportable Quantity.....	N/A

Nitrous oxide | N₂O

Purity	Cylinder Size	Contents (cubic feet)	Pressure (psia)
Grade 4	200	50	760
99.99 %			
Grade 2	200	50	760
99 %			

*other sizes are available upon request

Notes:

Recommended Regulator : SG9012-296

Technical Specifications

Molecular Weight.....	44.01
Boiling Point.....	-127.26 F (C)
Specific Volume.....	8.7 cf/lb (0.543 m3/kg)
Critical Temperature.....	97.56 F (36.42 C)
Critical Pressure.....	1050.76 psia
Lower Flammable Limits.....	Supports combustion
Toxicity.....	Simple asphyxiant
Compatibility.....	No fuels
CGA.....	296

Shipping Information

DOT Name.....	Nitrous oxide
Hazard Class.....	2.2
ID/UN Number.....	UN1070
DOT Label.....	Non-Flammable, Oxidizer
CAS Number.....	10024-97-2
Reportable Quantity.....	N/A

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Oxygen | O₂

Purity	Cylinder Size	Contents (cubic feet)	Pressure (psia)
Grade 4	300	330	2655
99.99 %	200	244	2215
Grade 2.6	300	330	2655
99.6 %	200	244	2215

*other sizes are available upon request

Notes:

Recommended Regulator : LABE-3-Delivery pressure -540

Technical Specifications

Molecular Weight.....	32.00
Boiling Point.....	-297.33 F (-182.96 C)
Specific Volume.....	12.1cf/lb (0.756m3/kg)
Critical Temperature.....	-181.1 F (-118.6 C)
Critical Pressure.....	736.9 psia
Flammable Limits.....	Supports combustion
Toxicity.....	Non-toxic
Compatibility.....	No fuels
CGA.....	540

Shipping Information

DOT Name.....	Oxygen, Compressed
Hazard Class.....	2.2
ID/UN Number.....	UN1072
DOT Label.....	Non-Flammable, Oxidizer
CAS Number.....	7782-44-7
Reportable Quantity.....	N/A

Propane | H₃CCH₂CH₃

Purity	Cylinder Size	Contents (pounds)	Pressure (psia)
Grade 2.5	LP-239dt	95	125
99.5 %	LP-26dt	10	125
Grade 2	LP-239dt	95	125
99 %	LP-26dt	10	125

*other sizes are available upon request

Please specify Gas or Liquid with-drawl

Notes:

Recommended Regulator : LABD-1-Delivery pressure-510

Technical Specifications

Molecular Weight.....	44.097
Boiling Point.....	-43.75 F (-42.08 C)
Density.....	4.227 lbs/gal @ 60 F
Critical Temperature.....	206.06 F (96.7 C)
Critical Pressure.....	616 psia
Flammable Limits.....	2.15 %
Toxicity.....	Simple asphyxiant
Compatibility.....	Non-corrosive
CGA.....	510

Shipping Information

DOT Name.....	Propane
Hazard Class.....	2.1
ID/UN Number.....	UN1978
DOT Label.....	Flammable Gas
CAS Number.....	74-98-6
Reportable Quantity.....	N/A

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Propylene | H2C=CHCH3

Purity	Cylinder Size	Contents (pounds)	Pressure (psia)
Grade 2.5	LP-239dt	100	151
99.5 %	LP-26dt	10	151
Grade 2	LP-239dt	100	151
99 %			

*other sizes are available upon request

Please specify Gas or Liquid with-drawl

Notes:

Recommended Regulator : LABD-1-Delivery pressure -510

Technical Specifications

Molecular Weight.....	42.08
Boiling Point.....	-53.86 F (-47.7 C)
Density.....	4.343 lbs/gal @ 60 F
Critical Temperature.....	196.9 F (91.61 C)
Critical Pressure.....	669 psia
Flammable Limits.....	2.4 %
Toxicity.....	Simple asphyxiant
Compatibility.....	Non-corrosive
CGA.....	510

Shipping Information

DOT Name.....	Propylene
Hazard Class.....	2.1
ID/UN Number.....	UN1077
DOT Label.....	Flammable Gas
CAS Number.....	115-07-1
Reportable Quantity.....	N/A

Sulfur hexafluoride | SF6

Purity	Cylinder Size	Contents (pounds)	Pressure (psia)
Grade 4	200	110	335
99.99 %			
Grade 2	200	110	335
99 %	LB	0.5	335

*other sizes are available upon request

Notes:

Recommended Regulator : LABD-2-Delivery pressure -590

Technical Specifications

Molecular Weight.....	146.05
Boiling Point.....	-83 F (-63.8 C)
Specific Volume.....	2.5 cf/lb (0.16 m3/kg)
Critical Temperature.....	114 F (45.6 C)
Critical Pressure.....	545 psia
Lower Flammable Limits.....	Non-Flammable
Toxicity.....	TLV 1000 ppm
Compatibility.....	Non-corrosive
CGA.....	590 (LB : 110)

Shipping Information

DOT Name.....	Sulfur hexafluoride
Hazard Class.....	2.2
ID/UN Number.....	UN1080
DOT Label.....	Non-Flammable
CAS Number.....	2551-62-4
Reportable Quantity.....	N/A

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Vinyl acetylene

VA (dissolved in 50 % Xylene)

Purity	Cylinder Size	Contents (grams)	Pressure (psia)
Grade 1.8	LB	113 (227)	26
98 %	LB	50 (100)	26

**other sizes are available upon request
Please check availability*

Notes:

Technical Specifications

Molecular Weight.....	52.08
Boiling Point.....	41.18 F (C)
Density (Estimated).....	5.75 lbs/gal @ 60 F
Critical Temperature.....	357.53 F (C)
Critical Pressure.....	704.89 psia
Lower Flammable Limits.....	2.22 %
Toxicity.....	
Compatibility.....	Most metals, except copper
CGA.....	330

Shipping Information

	Compressed Gas, Flammable, N.O.S., (1-But-3-yne, Xylene)
DOT Name.....	Xylene)
Hazard Class.....	2.1
ID/UN Number.....	UN1954
DOT Label.....	Flammable Gas
CAS Number.....	689-97-4
Reportable Quantity.....	N/A

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GAS MIXTURES

Ammonia | NH_3

Background	Concentration (molar)	Cylinder Size	Est. Contents (cubic feet)	CGA
Argon, Helium or Nitrogen	* 5 - 999 ppm	AL-150s	138	705
		AL-80s	75	
		AL-30s	28	
	0.1 – 49 %	AL-150s	138	705
		AL-80s	75	
		AL-30s	28	
Air	* 5 - 999 ppm	AL-150s	138	705
		AL-80s	75	
		AL-30s	28	
	0.1 – 11.25 %	AL-150s	138	705
		AL-80s	75	
		AL-30s	28	

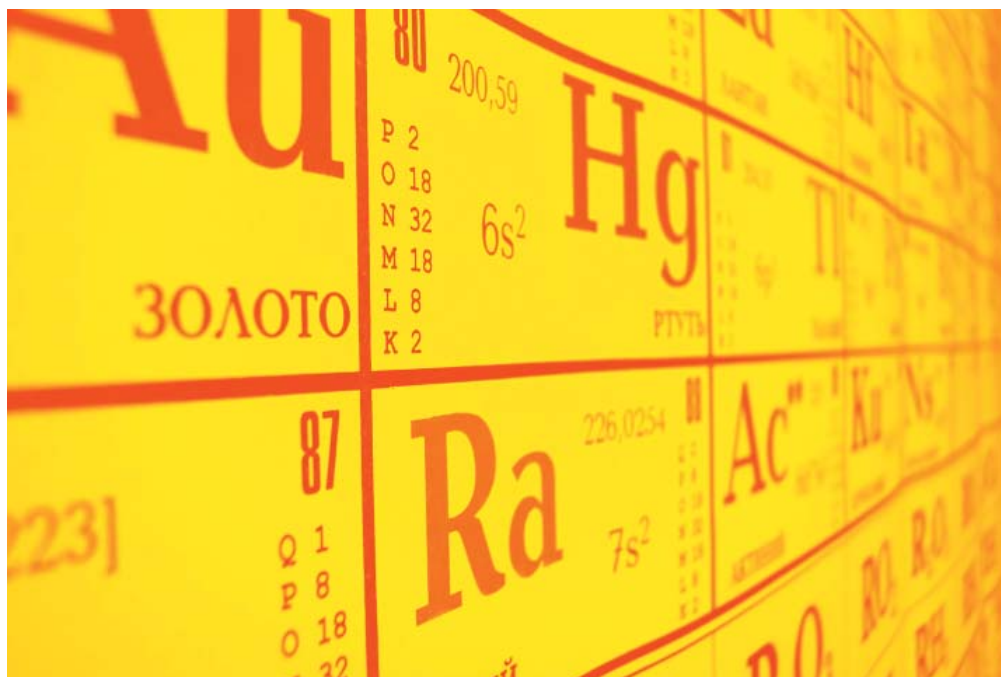
* = +/-20% certification.

Notes :

Reduced pressure and volume apply above 2.85 % mole.

3 month shelf life.

Extended lead times may be required.



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Benzene | C₆H₁₄

Background	Concentration (molar)	Cylinder Size	Est. Contents (cubic feet)	CGA
Argon, Helium or Nitrogen	5 – 999 ppm	AL-150	138	350
		AL-80	75	
		AL-30	28	
	0.1 – 49 %	AL-150	138	350
		AL-80	75	
		AL-30	28	
Air	5 - 999 ppm	AL-150	138	590
		AL-80	75	
		AL-30	28	
	0.1 – 0.975 %	AL-150	138	590
		AL-80	75	
		AL-30	28	

Notes : Reduced pressure and Contents apply above 200 ppm mole, or in Air

Butane | C₄H₁₀

Background	Concentration (molar)	Cylinder Size	Est. Contents (cubic feet)	CGA
Argon, Helium or Nitrogen	5 – 999 ppm	200	208	350
		40	37	
	0.1 – 49 %	200	208	350
		40	37	
	5 - 999 ppm	200	208	590
		40	37	
Air	0.1 – 1.35 %	200	208	590
		40	37	

Notes : Reduced pressure and volume apply above 0.68 % mole, or in Air

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Carbon dioxide | CO₂

Background	Concentration (molar)	Cylinder Size	Est. Contents (cubic feet)	CGA
Argon, Helium or Nitrogen	5 – 999 ppm	AL-150	138	320
		AL-80	75	
		AL-30	28	
	0.1 – 49 %	200	208	320
		40	37	
Air	5 - 999 ppm	AL-150	138	590
		AL-80	75	
		AL-30	28	
	0.1 – 49 %	200	208	590
		40	37	

Notes : Reduced pressure and volume apply above 31 % mole

Carbon monoxide | CO

Background	Concentration (molar)	Cylinder Size	Est. Contents (cubic feet)	CGA
Argon, Helium or Nitrogen	5 – 999 ppm	AL-150	138	580
		AL-80	75	
		AL-30	28	
	0.1 – 49 %	AL-150	138	580
		AL-80	75	
		AL-30	28	
Air	50 - 999 ppm	AL-150	138	590
		AL-80	75	
		AL-30	28	
	0.1 – 9.375 %	AL-150	138	590
		AL-80	75	
		AL-30	28	

Notes : Reduced pressure and volume apply in Air above 3 % mole



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Carbonyl sulfide | COS

Background	Concentration (molar)	Cylinder Size	Est. Contents (cubic feet)	CGA
Argon, Helium or Nitrogen	5 – 999 ppm	AL-150s	138	330
		AL-80s	75	
		AL-30s	28	

Notes :

Extended lead times may be required.

Chlorine | Cl₂

Background	Concentration (molar)	Cylinder Size	Est. Contents (cubic feet)	CGA
Argon, Helium or Nitrogen	* 100 – 999 ppm	AL-150s	138	330
		AL-80s	75	
		AL-30s	28	
	** 0.1 – 49 %	200s	208	330
		40s	37	

* = +/-20% certification.

** = +/-10% certification.

Notes :

Reduced pressure and volume apply above 2.45 % mole.

3 month shelf life

Extended lead times may be required.



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Ethane | C₂H₆

Background	Concentration (molar)	Cylinder Size	Est. Contents (cubic feet)	CGA
Argon, Helium or Nitrogen	5 - 999 ppm	200	208	350
		40	37	
	0.1 – 49 %	200	208	350
		40	37	
Air	5 - 999 ppm	200	208	590
		40	37	
	0.1 – 2.25 %	200	208	590
		40	37	

Notes : Reduced pressure and volume apply above 18.65 % mole or in Air.

Ethylene oxide | C₂H₄O

Background	Concentration (molar)	Cylinder Size	Est. Contents (cubic feet)	CGA
Air, Argon, Helium or Nitrogen	100 - 999 ppm	200	208	350
		40	37	
	0.1 – 2.25 %	200	208	350
		40	37	

Notes : Reduced pressure and volume apply above 0.2 % mole or in Air.



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Ethylene | C₂H₄

Background	Concentration (molar)	Cylinder Size	Est. Contents (cubic feet)	CGA
Argon, Helium or Nitrogen	5 - 999 ppm	200	208	350
		40	37	
	0.1 – 49 %	200	208	350
		40	37	
Air	5 - 999 ppm	200	208	590
		40	37	
	0.1 – 2.025 %	200	208	590
		40	37	

Notes :

Reduced pressure and volume apply in Air.

Helium | He

Background	Concentration (molar)	Cylinder Size	Est. Contents (cubic feet)	CGA
Argon or Nitrogen	100 – 999 ppm	200	208	580
		40	37	
	0.1 – 49 %	200	208	580
		40	37	
Air	100 – 999 ppm	200	208	590
		40	37	
	0.1 – 49 %	200	208	590
		40	37	

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Hexane | C₆H₁₄

Background	Concentration (molar)	Cylinder Size	Est. Contents (cubic feet)	CGA
Argon, Helium or Nitrogen	5 – 999 ppm	AL-150	138	350
		AL-80	75	
		AL-30	28	
	0.1 – 49 %	AL-150	138	350
		AL-80	75	
		AL-30	28	
Air	5 - 999 ppm	AL-150	138	590
		AL-80	75	
		AL-30	28	
	0.1 – 0.9 %	AL-150	138	590
		AL-80	75	
		AL-30	28	

Notes : Reduced pressure and Contents apply above 350 ppm mole, or in Air

Hydrogen chloride | HCl

Background	Concentration (molar)	Cylinder Size	Est. Contents (cubic feet)	CGA
Air, Argon, Helium or Nitrogen	* 100 – 999 ppm	AL-150s	138	330
		AL-80s	75	
		AL-30s	28	
	** 0.1 – 49 %	200s	208	330
		40s	37	

* = +/-20% certification.

** = +/-10% certification.

Notes : Reduced pressure and volume apply above 20 % mole.
3 month shelf life
Extended lead times may be required.

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Hydrogen sulfide | H₂S

Background	Concentration (molar)	Cylinder Size	Est. Contents (cubic feet)	CGA
Argon, Helium or Nitrogen	5 – 999 ppm	AL-150s	138	330
		AL-80s	75	
		AL-30s	28	
	0.1 – 13.5 %	AL-150s	138	330
		AL-80s	75	
		AL-30s	28	

Notes : Reduced pressure and volume apply above 7.4 % mole.

Hydrogen | H₂

Background	Concentration (molar)	Cylinder Size	Est. Contents (cubic feet)	CGA
Argon, Helium or Nitrogen	100 – 999 ppm	200	208	350
		40	37	
	0.1 – 49 %	200	208	350
		40	37	
	100 - 999 ppm	200	208	590
		40	37	
Air	0.1 – 3 %	200	208	590
		40	37	

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Isobutane | C₄H₁₀

Background	Concentration (molar)	Cylinder Size	Est. Contents (cubic feet)	CGA
Argon, Helium or Nitrogen	5 - 999 ppm	200	208	350
		40	37	
	0.1 – 49 %	200	208	350
		40	37	
Air	5 - 999 ppm	200	208	590
		40	37	
	0.1 – 1.35 %	200	208	590
		40	37	

Notes : Reduced pressure and volume apply above 1 % mole, or in Air.

Methane | CH₄

Background	Concentration (molar)	Cylinder Size	Est. Contents (cubic feet)	CGA
Argon, Helium or Nitrogen	5 - 999 ppm	200	208	350
		40	37	
	0.1 – 49 %	200	208	350
		40	37	
Air	5 - 999 ppm	200	208	590
		40	37	
	0.1 – 3.75 %	200	208	590
		40	37	

Notes : Reduced pressure and volume apply in Air.



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Methyl chloride | CCl₄

Background	Concentration (molar)	Cylinder Size	Est. Contents (cubic feet)	CGA
Argon, Helium or Nitrogen	5 - 999 ppm	200	208	350
		40	37	
	0.1 – 49 %	200	208	350
		40	37	
Air	5 - 999 ppm	200	208	590
		40	37	
	0.1 – 5.25 %	200	208	590
		40	37	

Notes : Reduced pressure and volume apply above 1.7 % mole, or in Air.

Nitric oxide | NO

Background	Concentration (molar)	Cylinder Size	Est. Contents (cubic feet)	CGA
Argon, Helium or Nitrogen	50- 999 ppm	AL-150s	138	660
		AL-80s	75	
		AL-30s	28	

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Nitrogen | N₂

Background	Concentration (molar)	Cylinder Size	Est. Contents (cubic feet)	CGA
Helium	50- 999 ppm	200	208	580
		40	37	
	0.1 – 49 %	200	208	580
		40	37	

Oxygen | O₂

Background	Concentration (molar)	Cylinder Size	Est. Contents (cubic feet)	CGA
Argon, Helium or Nitrogen	10- 999 ppm	200	208	580
		80	76	
		40	37	
	1000 ppm – 5 %	200	208	580
		80	76	
		40	37	
	5.01 -23 %	200	208	590
		80	76	
		40	37	
	23.01 % - up	200	208	296
		80	76	
		40	37	

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Propane | C₃H₈

Background	Concentration (molar)	Cylinder Size	Est. Contents (cubic feet)	CGA
Argon, Helium or Nitrogen	5 - 999 ppm	200	208	350
		40	37	
	0.1 – 49 %	200	208	350
		40	37	
Air	5 - 999 ppm	200	208	590
		40	37	
	0.1 – 1.57 %	200	208	590
		40	37	

Notes : Reduced pressure and volume apply above 0.53 % mole, or in Air.

Propylene | C₃H₆

Background	Concentration (molar)	Cylinder Size	Est. Contents (cubic feet)	CGA
Argon, Helium or Nitrogen	5 - 999 ppm	200	208	350
		40	37	
	0.1 – 49 %	200	208	350
		40	37	
Air	5 - 999 ppm	200	208	590
		40	37	
	0.1 – 1.8 %	200	208	590
		40	37	

Notes : Reduced pressure and volume apply above 0.6 % mole, or in Air.

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Sulfur Dioxide | SO₂

Background	Concentration (molar)	Cylinder Size	Est. Contents (cubic feet)	CGA
Air, Argon, Helium or Nitrogen	50- 999 ppm	AL-150s	138	660
		AL-80s	75	
		AL-30s	28	
	0.1 – 49 %	AL-150s	138	660
		AL-80s	75	
		AL-30s	28	

Notes : Reduced pressure and volume apply above 0.96 % mole.

Sulfur hexafluoride | SF₆

Background	Concentration (molar)	Cylinder Size	Est. Contents (cubic feet)	CGA
Argon, Helium or Nitrogen	50- 999 ppm	200	208	580
		40	37	
	0.1 – 49 %	200	208	580
		40	37	
Air	50- 999 ppm	200	208	590
		40	37	
	0.1 – 49 %	200	208	590
		40	37	

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Toluene | C₇H₁₄

Background	Concentration (molar)	Cylinder Size	Est. Contents (cubic feet)	CGA
Argon, Helium or Nitrogen	5 – 999 ppm	AL-150	138	350
		AL-80	75	
		AL-30	28	
	0.1 – 49 %	AL-150	138	350
		AL-80	75	
		AL-30	28	
Air	5 - 999 ppm	AL-150	138	590
		AL-80	75	
		AL-30	28	
	0.1 – 0.9 %	AL-150	138	590
		AL-80	75	
		AL-30	28	

Notes : Reduced pressure and Contents apply above 70 ppm mole, or in Air

Vinyl chloride | C₂CL₂

Background	Concentration (molar)	Cylinder Size	Est. Contents (cubic feet)	CGA
Argon, Helium or Nitrogen	5 – 999 ppm	AL-150	138	350
		AL-80	75	
		AL-30	28	
	0.1 – 0.49 %	AL-150	138	350
		AL-80	75	
		AL-30	28	
	0.5 – 49 %	200	208	350
		40	37	
Air	5 - 999 ppm	AL-150	138	590
		AL-80	75	
		AL-30	28	
	0.1 – 0.49 %	AL-150	138	590
		AL-80	75	
		AL-30	28	
	0.5 – 2.7%	200	208	590
		40	37	

Notes : Reduced pressure and Contents apply above 1.29% mole, or in Air

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GAS HANDLING EQUIPMENT



SINGLE-STAGE, GENERAL PURPOSE REGULATORS (MODELS SSD, SSE)

General purpose single-stage regulators are designed for use in noncorrosive gas service. They are recommended for general laboratory use where inlet pressure does not vary greatly (such as liquefied gases) and where high purity is not a consideration.

STANDARD FEATURES

- Filter in Seat Assembly traps foreign matter, extends regulator life and reduces maintenance.
- Neoprene Diaphragm permits accurate delivery pressure settings.
- Outlet metering valve provides flow control.

OPTIONAL FEATURES

- Relief Valve protects regulator components from the effects of overpressurization.

SPECIFICATIONS

Maximum Inlet Pressure:

Model SSD: 3000 psig

Model SSE: 300 psig

Inlet Pressure Gauge (dual scale):

Model SSD: 0–4000 psig/0–275 bar

Model SSE: 0–400 psig/0–27 bar

Delivery Pressure Range: See Tables

Delivery Pressure Gauge: See Tables

Gauge Size: 2" Dial

Operating Temperature Range:

Regulators with Flowmeters:

+32°F to +165°F

Regulators without Flowmeters:

–40°F to +165°F

Flow Coefficient:

Regulator: $C_v = 0.18$

Outlet Valve: $C_v = 0.4$

Inlet Connection:

Model SSD: CGA 296, 320, 326, 346, 350, 540, 580, 590 or 660 as ordered

Model SSE: CGA 300, 510 or 660 as ordered

Outlet Connection:

1/4" NPT male (on outlet valve)

1/8" NPT female (on flowmeter)

Optional Relief Valve Vent Connection:

1/4" NPT male

Supply Pressure Effect: 1.0 psi per 100 psi

Approximate Weight: 4 lbs

MATERIALS OF CONSTRUCTION

Body: Brass Bar Stock

Outlet Valve and Gauges: Brass

Bonnet: Painted Zinc

Other Metal Parts Exposed to Gas:

Brass and Stainless Steel

Seat and Seals: Teflon®

Diaphragm: Neoprene

Flowmeter: See Series 50 Flowmeter,

Model FM4350



SSD Regulator



SSD Regulator with Flowmeter

TABLE I, Regulators with Metering Valves

Delivery Pressure	Part No.	Part No.	Range	Gauge	(dual scale)
Part No.			(psig)	(psig)	(bar)
Model SSD		Model SSE			
SSD-15-(CGA)		SSE-15-(CGA)	2–15	0–30	0–2
SSD-50-(CGA)		SSE-50-(CGA)	4–50	0–100	0–7
SSD-125-(CGA)		SSE-125-(CGA)	10–125	0–150	0–10
SSD-250-(CGA)		SSE-250-(CGA)	20–250	0–400	0–27

TABLE II, Regulators with Flowmeters

All regulators with flowmeters have a delivery pressure range of 4–50 psig and are equipped with 0–100 psig pressure gauge on the delivery side.

Part No.	Part No.	Flowmeter Range,
Model SSD	Model SSE	Air at 70°F and 14.7 psia
SSD-600-(CGA)	SSE-600-(CGA)	8–50 sccm
SSD-601-(CGA)	SSE-601-(CGA)	5–85 sccm
SSD-602-(CGA)	SSE-602-(CGA)	40–440 sccm
SSD-603-(CGA)	SSE-603-(CGA)	100–950 sccm
SSD-604-(CGA)	SSE-604-(CGA)	0.2–1.8 slpm
SSD-605-(CGA)	SSE-605-(CGA)	0.4–3.6 slpm
SSD-606-(CGA)	SSE-606-(CGA)	0.5–7.0 slpm
SSD-607-(CGA)	SSE-607-(CGA)	1–13 slpm
SSD-608-(CGA)	SSE-608-(CGA)	6–24 slpm
SSD-609-(CGA)	SSE-609-(CGA)	4–44 slpm

OPTIONAL EQUIPMENT

Equipment	Part No.
Relief Valves: for SSD-15, SSE-15	RV5572-25i
for SSD-50, SSE-50, SSD-600 Series and SSE-600 Series	RV5572-90i
for SSD-125 and SSE-125	RV5572-140i
for SSD-250 and SSE-250	RV5572-300i

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SINGLE-STAGE, HIGH PURITY REGULATORS FOR NON-CORROSIVE GASES (MODEL LABD)

These metal diaphragm single-stage regulators are specially designed for laboratory applications requiring both high reliability and diffusion resistance. They are recommended for high purity non-corrosive gases where inlet pressure does not vary greatly (such as liquefied gases), or where periodic readjustment of delivery pressure setting does not present a problem.

STANDARD FEATURES

- Stainless Steel Diaphragm minimizes diffusion of air into regulator and eliminates "off gassing" associated with elastomeric diaphragms, thus maintaining gas purity.
- High Purity Regulator Design permits vacuum purging of regulator.
- Diaphragm Seal Outlet Valve maintains gas purity.
- Chrome-Plated Surfaces provide polished appearance and ease of cleaning.
- Cartridge (Encapsulated) Seat Assembly provides for ease of maintenance and repair.
- Filter in Seat Assembly traps foreign matter, extends regulator life and reduces maintenance.

OPTIONAL FEATURES

- Relief Valve protects regulator components from the effects of overpressurization.

SPECIFICATIONS

Maximum Inlet Pressure: See Table I
Inlet Pressure Gauge: See Table I
Delivery Pressure Range: See Table I
Delivery Pressure Gauge: See Table I

Filter: 10 micron
Gauge Size: 2" Dial
Operating Temp. Range: -40°F to +140°F
Flow Coefficient:
Regulator: Cv = 0.18
Outlet Valve: Cv = 0.17
Inlet Connection: CGA 296, 320, 326, 346, 350, 540, 580, 590, or 660 as ordered
Outlet Connection:
1/4" NPT female (on outlet valve)
Optional Relief Valve Vent Connection:
1/4" NPT male
Supply Pressure Effect: 1.0 psi per 100 psi
Approximate Weight: 3 lbs.

MATERIALS OF CONSTRUCTION

Body: Chrome-Plated Brass Bar Stock
Gauges: Chrome-Plated Brass
Bonnet: Chrome-Plated Zinc
Filter: Nickel-Plated Sintered Bronze
Other Metal Parts Exposed to Gas:
Brass and Stainless Steel
Seat and Seals: Teflon® in Regulator
Diaphragm: Type 304 Stainless Steel
Outlet Valve:
Body: Nickel-Plated Brass Bar Stock
Seat: PCTFE
Diaphragm: Type 316L Stainless Steel



LABD Regulator

OPTIONAL EQUIPMENT

Equipment	Part No.
Relief Valves: for LABD-x-15	Series RV5573-25i
for LABD-x-50	Series RV5573-90i
for LABD-x-125	Series RV5573-150i
for LABD-x-250	Series RV5573-300i

TABLE I, Regulators with Metering Valves

Part No.	Inlet Pressure		Delivery Pressure			
	Maximum (psig)	Gauge (dual scale) (psig) (bar)	Range (psig)	Gauge (dual scale) (psig) (bar)		
LABD-3-15-(CGA)	3000	0-4000 0-275	2-15	-30" Hg-0-30	-1-0-2	
LABD-3-50-(CGA)	3000	0-4000 0-275	4-50	-30" Hg-0-100	-1-0-7	
LABD-3-125-(CGA)	3000	0-4000 0-275	10-125	-30" Hg-0-200	-1-0-14	
LABD-3-250-(CGA)	3000	0-4000 0-275	20-250	0-400 0-27		
LABD-2-15-(CGA)	800	0-1000 0-69	2-15	-30" Hg-0-30	-1-0-2	
LABD-2-50-(CGA)	800	0-1000 0-69	4-50	-30" Hg-0-100	-1-0-7	
LABD-2-125-(CGA)	800	0-1000 0-69	10-125	-30" Hg-0-200	-1-0-14	
LABD-2-250-(CGA)	800	0-1000 0-69	20-250	0-400 0-27		
LABD-1-15-(CGA)	300	0-400 0-27	2-15	-30" Hg-0-30	-1-0-2	
LABD-1-50-(CGA)	300	0-400 0-27	4-50	-30" Hg-0-100	-1-0-7	
LABD-1-125-(CGA)	300	0-400 0-27	10-125	-30" Hg-0-200	-1-0-14	
LABD-1-250-(CGA)	300	0-400 0-27	20-250	0-400 0-27		

Where "(CGA)" is indicated above, insert appropriate Compressed Gas Association connection number to complete the part number.
Example: LABD-3-15-580. Order by complete part number.

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TWO-STAGE, HIGH PURITY REGULATORS FOR NON-CORROSIVE GASES (MODEL LABE)

These metal diaphragm two-stage regulators are specially designed for laboratory applications requiring both high reliability and diffusion resistance. Recommended for high purity non-corrosive gases or gas mixtures, they provide constant outlet pressure regardless of changes in cylinder (inlet) pressure.

STANDARD FEATURES

- Stainless Steel Diaphragms minimize diffusion of air into regulator and eliminate “off gassing” associated with elastomeric diaphragms, thus maintaining gas purity.
- High Purity Regulator Design permits vacuum purging of regulator.
- Diaphragm Seal Outlet Valve maintains gas purity.
- Two-Stage Regulator Design ensures constant delivery pressure over varying inlet pressures.
- Chrome-Plated Surfaces provide polished appearance and ease of cleaning.
- Cartridge (Encapsulated) Seat Assemblies provide for ease of maintenance and repair.
- Filter in Each Seat Assembly traps foreign matter, extends regulator life and reduces maintenance.

OPTIONAL FEATURES

- Relief Valve protects regulator components from the effects of overpressurization.

OPTIONAL EQUIPMENT

Equipment	Part No.
Relief Valves:	
for LABE-3-15 Series	RV5573-25i
for LABE-3-50 Series	RV5573-90i
for LABE-3-125 Series	RV5573-150i
for LABE-3-250 Series	RV5573-300i

SPECIFICATIONS

Maximum Inlet Pressure: 3000 psig
 Inlet Pressure Gauge (dual scale):
 0–4000 psig / 0–275 bar
 Delivery Pressure Range: See Table I
 Delivery Pressure Gauge: See Table I
 Filters: 10 micron
 Gauge Size: 2” Dial
 Operating Temperature Range:
 -40°F to +140°F
 Flow Coefficient:
 Regulator: Cv = 0.15
 Outlet Valve: Cv = 0.17
 Inlet Connection: CGA 296, 320, 326, 346,
 350, 540, 580, 590, or 660 as ordered
 Outlet Connection:
 1/4” NPT female (on outlet valve)
 Optional Relief Valve Vent Connection:
 1/4” NPT male
 Supply Pressure Effect: 0.04 psi per 100 psi
 Approximate Weight: 5 lbs.

MATERIALS OF CONSTRUCTION

Body: Chrome-Plated Brass Forging
 Gauges: Chrome-Plated Brass
 Bonnets: Chrome-Plated Zinc
 Filters: Nickel-Plated Sintered Bronze
 Other Metal Parts Exposed to Gas:
 Brass and Stainless Steel
 Seat and Seals: Teflon® in Regulator
 Diaphragms: Type 304 Stainless Steel
 Outlet Valve:
 Body: Nickel-Plated Brass Bar Stock
 Seat: PCTFE
 Diaphragm: Type 316L Stainless Steel



LABE Regulator

TABLE I

Part No.	Delivery Pressure	
	Range	Gauge (dual scale)
	(psig)	(psig) (bar)
LABE-3-15-(CGA)	2–15	-30” Hg–0–30 -1–0–2
LABE-3-50-(CGA)	4–50	-30” Hg–0–100 -1–0–7
LABE-3-125-(CGA)	10–125	-30” Hg–0–200 -1–0–14
LABE-3-250-(CGA)	20–250	0–400 0–27

Where “(CGA)” is indicated above, insert appropriate Compressed Gas Association connection number to complete the part number. Example: LABE-3-15-580. Order by complete part number.

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SINGLE-STAGE REGULATORS FOR CORROSIVE, HIGH PURITY GASES (MODEL APC)

The Model APC regulator is designed for use in applications requiring both corrosion and diffusion resistance. These regulators are specially suited for use in gas delivery systems requiring high leak integrity and minimal internal volume for maintaining guaranteed gas purity levels.

These single-stage regulators are recommended for use with gases where inlet pressure does not vary greatly (such as liquefied gases), or where periodic readjustment of delivery pressure setting does not present a problem.



APC Regulator

STANDARD FEATURES

- Stainless Steel Diaphragm minimizes
- Type 316 Stainless Steel Bar Stock Construction provides maximum corrosion resistance.
- Metal to Metal Diaphragm Seal assures maximum diffusion resistance.
- High Purity Regulator Design permits vacuum purging of regulator.
- Low Internal Volume facilitates purging and reduces contamination potential.
- Diaphragm Seal Outlet Valve maintains gas purity.
- Filter in Inlet traps foreign matter, extends regulator life and reduces maintenance.
- Threaded Holes in Rear of Regulator permit front panel mounting.

OPTIONAL FEATURES

- Captured Venting Configuration provides 1/16" NPTF vent port and stem packing allowing for complete capturing of bonnet when connected to a vent line or disposal system.
- Mounting Ring permits regulator to be panel mounted.
- Internal (Inboard) Helium Leak Test and Test Report determines inboard leak rate of gas from regulator to atmosphere; test report certifies leak rate of less than 2×10^{-8} secs air equivalent.
- External (Outboard) Helium Leak Test and Test Report determines outboard leak rate of gas from regulator to atmosphere; test report certifies leak rate of less than 5×10^{-7} secs air equivalent.

SPECIFICATIONS

Maximum Inlet Pressure:

APC-3: 3000 psig

APC-2: 800 psig

APC-1: 300 psig

Inlet Pressure Gauge: See Table I

Delivery Pressure Range: See Table I

Delivery Pressure Gauge: See Table I

Filter: 40 micron

Gauge Size: 2" Dial

Operating Temp. Range: -40°F to +140°F

Flow Coefficient:

Regulator: $C_v = 0.06$

Outlet Valve: $C_v = 0.17$

Internal Volume:

Regulator (body only): 6.0 cc

Inlet Connection: CGA 296, 320, 326, 330, 346, 350, 510, 540, 580, 590, 660 or 705 as ordered

Outlet Connection:

1/4" NPT female (on outlet valve)

Approximate Weight: 3 lbs.

MATERIALS OF CONSTRUCTION

Body and Outlet Valve:

Type 316 Stainless Steel Bar Stock

Gauges: Type 316 Stainless Steel

Bonnet: 300 Series Stainless Steel

Other Metal Parts Exposed to Gas:

Type 316 Stainless Steel

Seats: PCTFE

Seals: Teflon®

Diaphragms: Type 316 Stainless Steel

TABLE I

Part No.	Inlet Pressure Gauge (dual scale)			Delivery Pressure Range Gauge (dual scale)	
	(psig)	(bar)	(psig)	(psig)	(bar)
APC-3-30-(CGA)	0-4000	0-275	2-30	-30" Hg-0-60	-1-0-4
APC-3-75-(CGA)	0-4000	0-275	4-75	30" Hg-0-100	-1-0-7
APC-3-150-(CGA)	0-4000	0-275	10-150	-30" Hg-0-200	-1-0-14
APC-3-300-(CGA)	0-4000	0-275	20-300	0-400	0-27
APC-3-500-(CGA)	0-4000	0-275	30-500	0-600	0-34
APC-2-30-(CGA)	0-1000	0-69	2-30	-30" Hg-0-60	-1-0-4
APC-2-75-(CGA)	0-1000	0-69	4-75	-30" Hg-0-100	-1-0-7
APC-2-150-(CGA)	0-1000	0-69	10-150	-30" Hg-0-200	-1-0-14
APC-2-300-(CGA)	0-1000	0-69	20-300	0-400	0-27
APC-2-500-(CGA)	0-1000	0-69	30-500	0-600	0-34
APC-1-30-(CGA)	0-400	0-27	2-30	-30" Hg-0-60	-1-0-4
APC-1-75-(CGA)	0-400	0-27	4-75	-30" Hg-0-100	-1-0-7
APC-1-150-(CGA)	0-400	0-27	10-150	-30" Hg-0-200	-1-0-14

Where "(CGA)" is indicated above, insert appropriate Compressed Gas Association connection number to complete the part number. Example: APC-3-30-580. Order by complete part number.

OPTIONAL EQUIPMENT

Equipment	Part No.
Panel Mounting Ring*	PM3803
Inboard Helium Leak Test and Test Report	HT1000
Outboard Helium Leak Test and Test Report	HT1001
Compression Fittings* (male connectors)	
1/4" NPT male x 1/8" compression	SG6713
1/4" NPT male x 1/4" compression	SG6714
Safety Mounting Brackets*	See page XX
Captured Venting Configuration	SG5650

* If selected, these items are not installed on the regulator. They are shipped as separate items.

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TWO-STAGE REGULATORS FOR CORROSIVE, HIGH PURITY GASES (MODEL APG)

The Model APG regulator is specially suited for applications requiring both corrosion and diffusion resistance in a two-stage regulator. It is recommended for high purity gases or gas mixtures that have corrosive properties. The two-stage design provides constant outlet pressure regardless of changes in cylinder (inlet) pressure.



APG Regulator

STANDARD FEATURES

- Type 316 Stainless Steel Bar Stock Construction provides maximum corrosion resistance.
- Metal to Metal Diaphragm Seal assures maximum diffusion resistance.
- High Purity Regulator Design permits vacuum purging of regulator.
- Diaphragm Seal Outlet Valve maintains high purity regulator design.
- Filter in Inlet traps foreign matter, extends regulator life and reduces maintenance.

OPTIONAL FEATURES

- Captured Venting Configuration provides 1/16" NPTF vent ports and stem packing allowing for complete capturing of second stage bonnet when connected to a vent line or disposal system.
- Mounting Ring permits regulator to be panel mounted.
- Internal (Inboard) Helium Leak Test and Test Report determines inboard leak rate of gas from regulator to atmosphere; test report certifies leak rate of less than 2×10^{-8} sccs air equivalent.
- External (Outboard) Helium Leak Test and Test Report determines outboard leak rate of gas from regulator to atmosphere; test report certifies leak rate of less than 5×10^{-7} sccs air equivalent.

SPECIFICATIONS

Maximum Inlet Pressure: 3000 psig
Inlet Pressure Gauge (dual scale):
0–4000 psig / 0–275 bar
Delivery Pressure Range: See Table I
Delivery Pressure Gauge: See Table I
Filter: 40 micron
Gauge Size: 2" Dial

Operating Temperature Range:
–40°F to +140°F
Flow Coefficient:
Regulator: $C_v = 0.05$
Outlet Valve: $C_v = 0.17$
Inlet Connection: CGA 296, 320, 326,
330, 346, 350, 510, 540, 580, 590,
660 or 705 as ordered
Outlet Connection:
1/4" NPT female (on outlet valve)
Supply Pressure Effect:
0.04 psi per 100 psi
Approximate Weight: 5 lbs.

MATERIALS OF CONSTRUCTION

Body and Outlet Valve:
Type 316 Stainless Steel Bar Stock
Gauges: Type 316 Stainless Steel
Bonnet: 300 Series Stainless Steel
Other Metal Parts Exposed to Gas:
Type 316 Stainless Steel
Seats: PCTFE
Seals: Teflon®
Diaphragms: Type 316 Stainless Steel

TABLE I

Part No.	Delivery Pressure	
	Range (psig)	Gauge (dual scale) (psig) (bar)
APG-3-30-(CGA)	2–30 –30"	Hg–0–60 –1–0–4
APG-3-75-(CGA)	4–75 –30"	Hg–0–100 –1–0–7
APG-3-150-(CGA)	10–150	–30" Hg–0–200 –1–0–14
APG-3-300-(CGA)	20–300	0–400 0–27
APG-3-500-(CGA)	30–500	0–600 0–34

Where "(CGA)" is indicated above, insert appropriate Compressed Gas Association connection number to complete the part number. Example: APG-3-30-580. Order by complete part number.

OPTIONAL EQUIPMENT

Equipment	Part No.
Panel Mounting Ring*	PM3803
Inboard Helium Leak Test and Test Report	HT1000
Outboard Helium Leak Test and Test Report	HT1001
Compression Fittings* (male connectors)	
1/4" NPT male x 1/8" compression	SG6713
1/4" NPT male x 1/4" compression	SG6714
Safety Mounting Brackets*	
Captured Venting Configuration	SG5650

* If selected, these items are not installed on the regulator. They are shipped as separate items.

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LINE REGULATORS FOR ULTRA HIGH PURITY GASES (MODELS AG3800, AG3810)

The Models AG3800 and AG3810 regulators are designed for ultra high purity gases used in line applications at inlet pressures up to 3000 psig. These regulators are specially suited for point-of-use gas delivery systems requiring high leak integrity and guaranteed gas purity levels. Model AG3800 is for non-corrosive gases; Model AG3810 is suitable for use with corrosive gases.

STANDARD FEATURES

- Metal to Metal Diaphragm Seals assure maximum diffusion resistance.
- High Purity Regulator Design permits vacuum purging of regulator.
- In-line Porting permits direct installation of regulator in piping system.
- Stainless Steel Filter in Inlet traps foreign matter, extends regulator life and reduces maintenance.
- Threaded Holes in Rear of Regulator permit front panel mounting.

OPTIONAL FEATURES

- Mounting Ring permits regulator to be panel mounted
- Compression Fittings installed in inlet and outlet ports allow connection to 1/4" or 1/8" tubing.
- Internal (Inboard) Helium Leak Test and Test Report determines inboard leak rate of gas from regulator to atmosphere; test report certifies leak rate of less than 2 x 10⁻⁸ sccs air equivalent.
- External (Outboard) Helium Leak Test and Test Report determines outboard leak rate of gas from regulator to atmosphere; test report certifies leak rate of less than 5 x 10⁻⁷ sccs air equivalent.

SPECIFICATIONS

Maximum Inlet Pressure: 3000 psig
Delivery Pressure Range: See Table I and II
Delivery Pressure Gauge: See Table I and II
Filter: 40 micron
Gauge Size: 2" Dial
Operating Temperature Range:
-40°F to +140°F
Flow Coefficient: Cv = 0.06
Inlet and Outlet Connections: 1/4" NPT female (standard). Compression fittings available as an option
Approximate Weight: 2 lbs.

MATERIALS OF CONSTRUCTION

Body:
Model AG3800: Brass Bar Stock
Model AG3810: Type 316 SS Bar Stock
Gauges:
Model AG3800: Brass
Model AG3810: Type 316 Stn. Stl.
Bonnet:
Model AG3800: Brass
Model AG3810: 300 Series Stn. Stl.



AG3810 Regulator

Other Metal Parts Exposed to Gas:
Model AG3800: Brass
Model AG3810: Type 316 Stn. Stl.
Seat: PCTFE
Diaphragm: Type 316 Stainless Steel
Seals: Teflon®

TABLE I, Brass Models

Part No.	Range (psig)	Delivery Pressure	
		Gauge (dual scale) (psig)	(bar)
AG3800-30	4-30	0-60	0-4
AG3800-100	10-100	0-200	0-14
AG3800-300	20-300	0-400	0-27
AG3800-500	30-500	0-600	0-41

TABLE II, Stainless Steel Models

Part No.	Range (psig)	Delivery Pressure	
		Gauge (dual scale) (psig)	(bar)
AG3810-30	4-30	0-60	0-4
AG3810-100	10-100	0-200	0-14
AG3810-300	20-300	0-400	0-27
AG3810-500	30-500	0-600	0-41

OPTIONAL EQUIPMENT

Equipment	Part No.
Panel Mounting Ring*	PM3803
Inboard Helium Leak Test and Test Report	HT1000
Outboard Helium Leak Test and Test Report	HT1001
Compression Fittings (two required)*	
1/8" compression for Model AG3800	SG6703
1/4" compression for Model AG3800	SG6704
1/8" compression for Model AG3810	SG6713
1/4" compression for Model AG3810	SG6714

* If selected, these items are not installed on the regulator. They are shipped as separate items.

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LINE REGULATORS FOR ULTRA HIGH PURITY GASES (MODELS AG3800, AG3810)

The Models AG3800 and AG3810 regulators are designed for ultra high purity gases used in line applications at inlet pressures up to 3000 psig. These regulators are specially suited for point-of-use gas delivery systems requiring high leak integrity and guaranteed gas purity levels. Model AG3800 is for non-corrosive gases; Model AG3810 is suitable for use with corrosive gases.



AG3810 Regulator

STANDARD FEATURES

- Metal to Metal Diaphragm Seals assure maximum diffusion resistance.
- High Purity Regulator Design permits vacuum purging of regulator.
- In-line Porting permits direct installation of regulator in piping system.
- Stainless Steel Filter in Inlet traps foreign matter, extends regulator life and reduces maintenance.
- Threaded Holes in Rear of Regulator permit front panel mounting.

OPTIONAL FEATURES

- Mounting Ring permits regulator to be panel mounted
- Compression Fittings installed in inlet and outlet ports allow connection to 1/4" or 1/8" tubing.
- Internal (Inboard) Helium Leak Test and Test Report determines inboard leak rate of gas from regulator to atmosphere; test report certifies leak rate of less than 2×10^{-8} sccs air equivalent.
- External (Outboard) Helium Leak Test and Test Report determines outboard leak rate of gas from regulator to atmosphere; test report certifies leak rate of less than 5×10^{-7} sccs air equivalent.

SPECIFICATIONS

Maximum Inlet Pressure: 3000 psig
 Delivery Pressure Range: See Table I and II
 Delivery Pressure Gauge: See Table I and II
 Filter: 40 micron
 Gauge Size: 2" Dial
 Operating Temperature Range: -40°F to +140°F
 Flow Coefficient: $C_v = 0.06$
 Inlet and Outlet Connections: 1/4" NPT female (standard). Compression fittings available as an option
 Approximate Weight: 2 lbs.

MATERIALS OF CONSTRUCTION

Body:
 Model AG3800: Brass Bar Stock
 Model AG3810: Type 316 SS Bar Stock
 Gauges:
 Model AG3800: Brass
 Model AG3810: Type 316 Stn. Stl.
 Bonnet:
 Model AG3800: Brass
 Model AG3810: 300 Series Stn. Stl.

Other Metal Parts Exposed to Gas:
 Model AG3800: Brass
 Model AG3810: Type 316 Stn. Stl.
 Seat: PCTFE
 Diaphragm: Type 316 Stainless Steel
 Seals: Teflon®

TABLE I, Brass Models

Part No.	Delivery Pressure	
	Range (psig)	Gauge (dual scale) (psig) (bar)
AG3800-30	4-30	0-60 0-4
AG3800-100	10-100	0-200 0-14
AG3800-300	20-300	0-400 0-27
AG3800-500	30-500	0-600 0-41

TABLE II, Stainless Steel Models

Part No.	Delivery Pressure	
	Range (psig)	Gauge (dual scale) (psig) (bar)
AG3810-30	4-30	0-60 0-4
AG3810-100	10-100	0-200 0-14
AG3810-300	20-300	0-400 0-27
AG3810-500	30-500	0-600 0-41

OPTIONAL EQUIPMENT

Equipment	Part No.
Panel Mounting Ring*	PM3803
Inboard Helium Leak Test and Test Report	HT1000
Outboard Helium Leak Test and Test Report	HT1001
Compression Fittings (two required)*	
1/8" compression for Model AG3800	SG6703
1/4" compression for Model AG3800	SG6704
1/8" compression for Model AG3810	SG6713
1/4" compression for Model AG3810	SG6714

* If selected, these items are not installed on the regulator. They are shipped as separate items.

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SINGLE-STAGE REGULATORS FOR NITROUS OXIDE AND CARBON DIOXIDE (MODELS SG9011, SG9012, SG9014)

Nitrous Oxide and Carbon Dioxide frequently cause ordinary regulators to freeze up. Models SG9011, SG9012 and SG9014 will handle these gases at flow rates up to 100 scfh at 70°F without freeze-up and without the need for electrical connections.
Note: These regulators are not manufactured to meet FDA standards and should not be used for medical gases. Regulators for medical gases are shown on page 30.

STANDARD FEATURES

- Filter in Seat Assembly traps foreign matter, extends regulator life and reduces maintenance.
- Unique Regulator Design operates at flow rates up to 100 scfh at 70°F without freeze-up.
- Pressure Relief Valve protects regulator and downstream system from overpressurization.

SPECIFICATIONS

Maximum Inlet Pressure: 1500 psig
Inlet Pressure Gauge: 0–1500 psig
Maximum Flow Rate: 100 scfh
Delivery Range: See Table I
Delivery Gauge/Flowmeter: See Table I
Gauge Size: 2" Dial
Inlet Connection:
CGA 326 for Nitrous Oxide
CGA 320 for Carbon Dioxide
Outlet Connection: 1/4" NPT female
Relief Valve: Self-Reseating 200 psig
Approximate Weight: 3 lbs

MATERIALS OF CONSTRUCTION

Body and Bonnet: Aluminum
Gauges: Chrome-Plated Brass
Seat: Polyurethane
Seals and Diaphragm: Neoprene
Flowmeter (Model SG9012):
Chrome-plated Brass with Lexan plastic tube and shield



SG9014 Regulator



SG9012 Regulator

TABLE I

Part No.	Configuration	Delivery Range	Delivery Gauge or Flowmeter
SG9011-(CGA)	Regulator with flow gauge*	10–100 scfh	0–100 scfh
SG9012-(CGA)	Regulator with flowmeter	30–100 scfh	30–100 scfh
SG9014-(CGA)	Regulator with pressure gauge	10–150 psig	0–200 psig

* Note: A Regulator equipped with a flow gauge is not accurate when a backpressure in excess of 2 psig exists at the outlet. In applications where backpressure in excess of 2 psig can be expected, a regulator with a flowmeter should be used.

OPTIONAL EQUIPMENT

Equipment	Part No.
Teflon® Washers for CGA 320 (package of 25)	SG6076

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SINGLE-STAGE REGULATORS FOR HIGH INLET PRESSURES (AG3850, AG3910 SERIES)

These single-stage, piston sensed, pressure regulators are designed for use with inlet pressures up to 5000 psig; such as required for use on 3500 psig (3K) and 4500 psig (HC-500) cylinders. Constructed of either brass or stainless steel, they are available in both cylinder and line configurations.

STANDARD FEATURES

- High Delivery Pressures up to 2500 psig.
- Piston Sensor Design ensures safe reliable service.
- Filter in Inlet traps foreign matter, extends regulator life and reduces maintenance.
- Diaphragm Seal Outlet Valve provides for on/off flow control (cylinder regulators only).

OPTIONAL FEATURES

- Mounting Ring permits regulator to be panel mounted
- Captured Venting Configuration provides 1/16" NPTF vent port and stem packing allowing for complete capturing of bonnet when connected to a vent line or disposal system.

SPECIFICATIONS

Maximum Inlet Pressure: 5000 psig
Inlet Pressure Gauge:
Cylinder Regulators: 0–5000 psig
Line Regulators: None
Delivery Pressure Range: See Tables I & II
Delivery Pressure Gauge: See Tables I & II
Filter: 40 micron
Gauge Size: 2" Dial
Operating Temp. Range: -15°F to +140°F
Flow Coefficient:
Regulator: $C_v = 0.06$
Outlet Valve: $C_v = 0.17$
Inlet Connections:
Cylinder Regulators: CGA 347, 350, 580, 680 or 685 as ordered
Line Regulators: 1/4" NPT female
Outlet Connection: 1/4" NPT female
Approximate Weight: 3 lbs.

OPTIONAL EQUIPMENT

Equipment	Part No.
Panel Mounting Ring*	PM3803
Captured Venting Configuration:	
AG3850 Series	SG5651
AG3910 Series	SG5650

* If selected, these items are not installed on the regulator. They are shipped as separate items.

MATERIALS OF CONSTRUCTION

Body and Outlet Valve:

AG3850 Series: Brass Bar Stock

AG3910 Series: Type 316 SS Bar Stock

Gauges:

AG3850 Series: Brass

AG3910 Series: Type 316 SS

Bonnet:

AG3850 Series: Brass Bar Stock

AG3910 Series: 300 Series SS

Other Metal Parts Exposed to Gas:

AG3850 Series: Brass and Stn. Stl.

AG3910 Series: Type 316 Stn. Stl.

Seat: Teflon®

Seals: Viton® and Teflon®

Outlet Valve:

Seat: PCTFE

Diaphragm: Type 316 Stn. Stl.



AG3850 Regulator

TABLE I, AG3850 Series (Brass)

Part No.	Type	Delivery Pressure		Gauge (dual scale)	
		Range (psig)		(psig)	(bar)
AG3850-(CGA)	Cylinder	50–800		0–1000	0–69
AG3851-(CGA)	Cylinder	100–1500		0–2000	0–138
AG3852-(CGA)	Cylinder	200–2500		0–3000	0–207
AG3853	Line	50–800		0–1000	0–69
AG3854	Line	100–1500		0–2000	0–138
AG3855	Line	200–2500		0–3000	0–207

TABLE II, AG3910 Series (Stainless Steel)

Part No.	Type	Delivery Pressure		Gauge (dual scale)	
		Range (psig)		(psig)	(bar)
AG3910-(CGA)	Cylinder	50–800		0–1000	0–69
AG3911-(CGA)	Cylinder	100–1500		0–2000	0–138
AG3912-(CGA)	Cylinder	200–2500		0–3000	0–207
AG3913	Line	50–800		0–1000	0–69
AG3914	Line	100–1500		0–2000	0–138
AG3915	Line	200–2500		0–3000	0–207

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SINGLE-STAGE REGULATORS FOR VERY HIGH INLET PRESSURES (SG3600 SERIES)

These piston-type regulators are designed for use on 6000 psig (6K) cylinders. The stainless steel models are designed for applications requiring inlet pressures up to 10,000 psig. Both brass and stainless models are available as line regulators.

WARNING: Self-relieving regulators should not be used in a confined area or with flammable gases. Injury or death may result.

STANDARD FEATURES

- Large Low-Torque Handle allows easy adjustment of delivery pressure.
- Filter in Inlet traps foreign matter, extends regulator life and reduces maintenance.
- Outlet Metering Valve provides flow control (cylinder regulators only).
- Self-Relieving Models automatically vent downstream pressure should it exceed delivery pressure setting and permits operator to reduce pressure setting by venting downstream pressure through hand-knob.

OPTIONAL FEATURES

- Mounting Ring permits regulator to be panel mounted.

SPECIFICATIONS

Maximum Inlet Pressure: See Tables
Inlet Pressure Gauge: See Tables
Delivery Pressure Range: See Tables
Delivery Pressure Gauge: See Tables
Gauge Size: 2 1/2" Dial
Operating Temp. Range: -65°F to +140°F
Flow Coefficient:
Regulator: Cv = 0.06
Outlet Valve: Cv = 0.45
Inlet Connection:
Self-Relieving Cylinder Regulators:
CGA 347, 677, 680 or 702 as ordered
Non-Relieving Cylinder Regulators:
CGA 347, 677, 680, 695, 701,
702 or 703 as ordered
Line Regulators: 1/4" NPT female
Outlet Connection:
Cylinder Regulators:
1/4" NPT male (on outlet valve)
Line Regulators: 1/4" NPT female
Supply Pressure Effect: 1.0 psi per 100 psi
Approximate Weight: 6 lbs

OPTIONAL EQUIPMENT

Equipment	Part No.
Panel Mounting Ring	PM3804
Oxygen Cleaning for inlet pressures above 3000 psig (required for CGA 701)	OC100

MATERIALS OF CONSTRUCTION

Body and Gauges: See Tables
Outlet Valve: Type 316 Stainless Steel
Bonnet:
Brass Regulators: Brass
Stainless Steel Regulators:
Electroless Nickel-Plated Brass
Other Metal Parts Exposed to Gas:
Brass Regulators: Brass and Stn. Stl.
Stainless Steel Regulators:
Type 303 and Type 316 Stn. Stl
Seat: PCTFE
Seals:
Regulator: Viton®
Outlet Valve: Teflon®



**SG3610
Cylinder Regulator**



**SG3611
Line Regulator**

TABLE I, Non-Relieving Cylinder Regulators

Part No.	Body Material	Gauge Material	Inlet Pressure (psig)		Delivery Pressure (psig)	
			Max.	Gauge	Range	Gauge
SG3610-(CGA)	Brass	Brass	6000	0-7500	400-6000	0-7500
SG3612-(CGA)	Brass	Brass	6000	0-7500	300-3500	0-4000
SG3614-(CGA)	Brass	Brass	6000	0-7500	200-1500	0-2000
SG3620-(CGA)	Type 303 SS	Type 316 SS	10,000	0-10,000	300-6000	0-7500
SG3622-(CGA)	Type 303 SS	Type 316 SS	10,000	0-10,000	200-3500	0-4000

TABLE II, Self-Relieving Cylinder Regulators

Part No.	Body Material	Gauge Material	Inlet Pressure (psig)		Delivery Pressure (psig)	
			Max.	Gauge	Range	Gauge
SG3600-(CGA)	Brass	Brass	6000	0-7500	400-6000	0-7500
SG3602-(CGA)	Brass	Brass	6000	0-7500	300-3500	0-4000
SG3604-(CGA)	Brass	Brass	6000	0-7500	200-1500	0-2000

Where "(CGA)" is indicated in Tables I and II, insert appropriate Compressed Gas Association connection number to complete the part number. For example: SG3610-677. Order by complete part number.

TABLE III, Line Regulators

Part No.	Body Material	Gauge Material	Inlet Pressure (psig)		Delivery Pressure (psig)	
			Max.	Gauge	Range	Gauge
SG3611	Brass	Brass	6000	None	400-6000	0-7500
SG3613	Brass	Brass	6000	None	300-3500	0-4000
SG3621	Type 303 SS	Type 316 SS	10,000	None	300-6000	0-7500
SG3623	Type 303 SS	Type 316 SS 1	0,000	None	200-3500	0-4000

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REGULATOR SAFETY MOUNTING BRACKETS (RM SERIES)

RM Series Safety Mounting Brackets help organize work areas, improve safety and ensure gas purity by eliminating the installment of a regulator directly onto a gas cylinder valve. The fixed mounting of a cylinder regulator to an Advanced RM Series Mounting Bracket eliminates hazards incurred with regulator and cylinder during change-outs while allowing fast and easy cylinder replacement. The RM Series is available in wall-mount or bench-mount configurations to provide versatility to meet any application requirement. The bench-mount model includes a built-in cylinder clamp and adjustable regulator mast. Two diaphragm seal inlet isolation valves are provided standard with dual-cylinder wall mount models.

STANDARD FEATURES

- Fixed Mounting eliminates recurring leaks, ensures proper regulator alignment and prevents damage to regulator.
- Bracket Dimensions allow for installment of single or two-stage regulators.
- Spare Access Port in Block provides versatility to install options such as pressure switches, valves or additional pigtails.

OPTIONAL FEATURES

- Double Braided (all metal) Stainless Steel Flexible Hose maintains gas purity and provides ease of connecting cylinder.
- Teflon®-lined Stainless Steel Flexible Hose provides convenience while reducing cost (not recommended for high-purity applications).
- Check Valve prevents discharge of gas from regulator and pigtail during cylinder changeout.
- Purge and Vent Assemblies enhance system purity and operator safety.

SPECIFICATIONS

Maximum Inlet Pressure: 3000 psig
Valve (Dual Cyl. only): SG5460N and SG5480N Series (page 95)
Inlet Connection:
CGA Connection as Specified
Outlet Connection: CGA Connection as Specified, (suitable for direct mounting of a pressure regulator with inlet CGA)
Plugged Access Port: 1/4" NPT female (on RM block)
Rigid Pigtail: 36" long, 0.25" OD tubing with 5" ID service loop, providing a 23" useable length
Flexible Hose (Teflon®-lined): 36" long, 0.187" nominal I.D., 0.312" nominal O.D.
Flexible Hose (all metal): 30" long, 0.25" nominal I.D., 0.312" nominal O.D.
Approximate Weight:
RMB Models: 9 lbs.
RMW-X-1: 3 lbs.
RMW-X-2: 5 lbs.

MATERIALS OF CONSTRUCTION

Block and CGA Fittings:
Brass with Brass Assemblies
Type 316SS with Stn. Stl. Assemblies
Bracket and Clamp: 12-Gauge Hot Rolled Steel with Powder Coat Epoxy Finish
Pigtails:
Rigid:
Brass with Brass assemblies,
Type 316L SS with Stn.Stl. assemblies
Flexible Hose (Teflon®-lined):
extruded PTFE Teflon® inner core with Type 304SS single overbraid and Type 316SS end fittings
Flexible Hose (all metal):
Type 316L SS inner core with Type 321 SS double overbraid and Type 316 SS end fittings
Seats:
Check Valves:
EPDM with brass systems,
Viton® with stainless steel systems
Valves: PCTFE



Wall Mount: Dual Cylinder



Wall Mount: Single Cylinder



Bench Mount: Single Cylinder

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PART NUMBER KEY FOR RM SERIES MOUNTING BRACKETS

Model Number	Materials of Construction (Metal Parts): Brass = B Type 316 Stainless Steel = S	Cylinder Leads (Pigtails) 316 SS Flexible Hose = F Teflon-Lined Flexible Hose = T Rigid Tubing = Leave Blank	CGA Connection Number
	Bracket Style Bench Model = B Wall Model = W	Total Number of Cylinders 1 (Both Models) 2 (RMW Model only)	Check Valves: With Check Valves = CV Without Check Valves = Leave Blank

ORDERING INFORMATION

To order a regulator safety mounting bracket, complete the part number using the "Part Number Key" above. For example, to order a single cylinder wall-mount in brass, with rigid pigtail, check valve and a CGA 580 connection, the part number would be RMW-B-1-CV-580.

Regulator Safety Mounting Bracket Assemblies for acetylene service require flashback arrestors (SG6545). All assemblies ordered with CGA 510 will be billed and shipped with optional flashback arrestors installed on each pigtail, unless the order specifies with which gas it will be used.

Advanced recommends the use of an optional purge and vent assembly without the check valve option when using toxic and/or corrosive gases.

Advanced does not recommend the use of Teflon-lined stainless steel flexible hoses in bracket assemblies designed for oxygen service and will not provide such assemblies when ordered with CGA 540 connections.

Advanced does not recommend the use of Teflon-lined, stainless steel flexible hoses with hydrogen or helium and with high purity applications. Although these gases are compatible with the materials of construction, experience shows that permeation through the PTFE core can occur.

TABLE I, Non-Relieving Cylinder Regulators

Equipment and Replacement Parts	Part No.
Vent Valve (Installed in Access Port)	
Brass Valve	SG6684
Stainless Steel Valve	SG6685
Purge Valve (Installed in Access Port)	
Brass Valve	SG6690
Stainless Steel Valve	SG6691
Isolation Valve (Installed Between Pigtail and Block on One Cylinder Units)	
Brass System with Rigid Type Pigtail	SG6686
Brass System with 316 Stn. Stl. Flexible or Teflon-lined Type Hose	SG6687
Stainless Steel System with Rigid Type Pigtail	SG6688
Stainless Steel System with 316 Stn. Stl. Flexible or Teflon-lined Type Hose	SG6689
Purge and Vent Assembly (Installed in Access Port)	
Brass Assembly	SG6682
Stainless Steel Assembly	SG6683
Flashback Arrestor for Acetylene Service—One per Cylinder Installed between CGA and Pigtail on Brass Systems	SG6545
Replacement Pigtails, Rigid Type	
Brass without Check Valve	SG6646-(CGA)
Brass with Check Valve	SG6647-(CGA)
Stainless Steel without Check Valve	SG6648-(CGA)
Stainless Steel with Check Valve	SG6649-(CGA)
Replacement Pigtails, Teflon-lined Flexible Type	
Brass System without Check Valve	SG6620-(CGA)
Brass System with Check Valve	SG6621-(CGA)
Stainless Steel without Check Valve	SG6622-(CGA)
Stainless Steel with Check Valve	SG6623-(CGA)
Replacement Pigtails, 316 Stn. Stl. Flexible Type	
Brass System without Check Valve	SG6633-(CGA)
Brass System with Check Valve	SG6634-(CGA)
Stainless Steel without Check Valve	SG6635-(CGA)
Stainless Steel with Check Valve	SG6636-(CGA)



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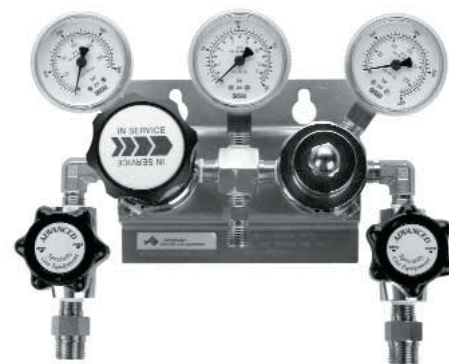
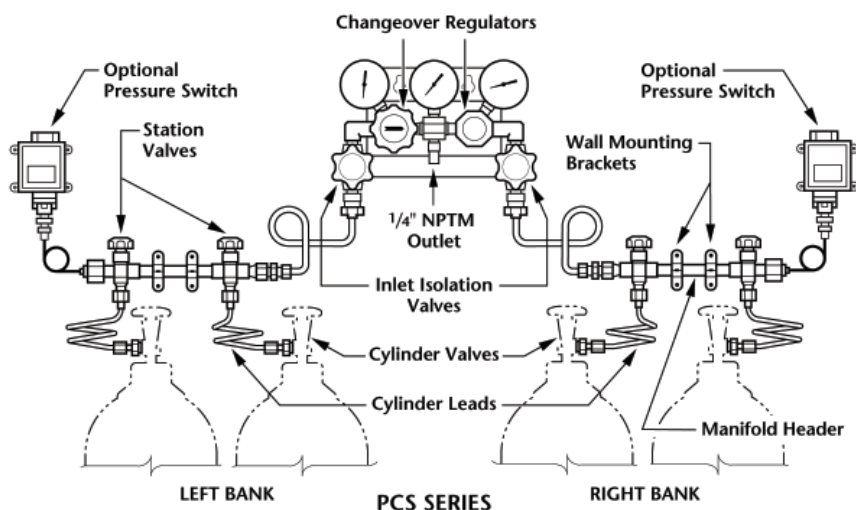
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HIGH PURITY, CHANGEOVER REGULATOR SYSTEMS (PCS, CRS SERIES)

Changeover Systems are designed to provide a continuous supply of gas from two or more cylinders containing compressed or liquefied gases with vapor pressures above 300 psig. Advanced changeovers allow the user to deplete gas in a cylinder without the concerns of gas outages and of wasting unused gas as a result of premature change-outs. Advanced Changeover Systems incorporate two diffusion-resistant regulators with diaphragm seal inlet valves allowing for cylinder isolation when a change of cylinders is required. Available in either brass or stainless steel construction, they are supplied entirely installed on a stainless steel panel providing for convenient, wall-mounted installation. The overall compact design allows for installation in areas where space is at a premium.

PCS SERIES

Primary Changeover Systems are designed for use in processes incorporating downstream line or station regulators located at the point of use. The PCS Series incorporates two regulators set at slightly different delivery pressures. Gas discharges from the side with the higher setting first (primary side) which is indicated by the "In Service" arrow located on the hand knob. The side with the lower delivery pressure setting will remain closed until the primary side has been exhausted (approximately 150 psi residual pressure). The changeover will automatically switch to the reserve bank (secondary side). A fluctuation in pressure will occur at this point at the outlet of the changeover. Downstream line regulator(s) (not included) will eliminate pressure variations to the process.



PCS Regulator

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CRS SERIES

Changeover Regulator Systems provide constant delivery pressure control to instrumentation by incorporating an outlet line regulator and utilize a compact design housing two changeover regulators in a single body. Downstream line or station regulation is not necessary unless various distribution point pressures are required. Operation is the same as described for the PCS Series with approximately 200 psi residual cylinder pressure maintained.



CRS Regulator

STANDARD FEATURES

- Modular Construction allows field installation of additional stations without the need for welding or soldering.
- Diaphragm Seal Isolation Valves allow for complete isolation of the gas source when making a changeout.
- Diffusion-Resistant, Diaphragm Seal Station Valves (on four cylinder or larger systems) ensure that gas purity is maintained and allow for isolation of individual cylinders on the manifold without interrupting gas flow.
- High Purity Diffusion-Resistant Regulators minimize the diffusion of air into the system, maintaining the purity of the gas.

OPTIONAL FEATURES

- Double-Braided (All Metal) 3' Stainless Steel Flexible Cylinder Hoses (available for cylinder leads) extend service life and provide ease of connecting cylinders.
- Check Valves prevent discharge of gas from manifold and pigtails when changing cylinders.
- Pressure Switches monitor line pressure and can activate an external alarm (see page 90) when a certain predetermined pressure is reached (see page 88).
- Purge/Vent Valves allow for complete removal of entrapped air and moisture from the system upon start-up, or after a cylinder changeout thus maintaining the high purity nature of the system.

SPECIFICATIONS

Manifolds:
Maximum Inlet Pressure: 3000 psig
Flow Coefficient (each station valve):
 $C_v = 0.43$
Inlet Connections:
CGA connection as specified
Changeover Regulators:
Maximum Inlet Pressure: 3000 psig
Inlet Pressure Gauge: 0–4000 psig
Minimum Inlet Pressure: 300 psig
Gauge Size: 2" Dial
Operating Temperature Range:
–40°F to +165°F
Flow Coefficient: $C_v = 0.06$
Line Regulators (CRS Series only):
Maximum Inlet Pressure: 3000 psig
Delivery Pressure Range: 10–150 psig
Delivery Pressure Gauge: 0–200 psig
Gauge Size: 2" Dial
Operating Temperature Range:
–40°F to +165°F
Flow Coefficient: $C_v = 0.15$
Outlet Connection: 1/4" NPT female

MATERIALS OF CONSTRUCTION

Manifolds:
Metal Parts: Brass or Type 316 Stn. Stl. as specified when ordering
Seals: Teflon®
Check Valve Seats:
EPDM with Brass Systems;
Viton® with Stainless Steel Systems
Station Valve Seats: PCTFE
Regulators:
Body:
Brass Systems: Brass Bar Stock
Stainless Steel Systems:
Type 316 Stn. Stl. Bar Stock
Gauges:
Brass Systems: Brass
Stn. Stl. Systems: Type 316 Stn. Stl.
Bonnets:
Brass Systems: Brass Bar Stock
Stn. Stl. Systems: 300 Series SS
Internal Metal Parts Exposed to Gas:
Brass Systems: Brass and Stn. Stl.
Stn. Stl. Systems: Type 316 Stn. Stl.
Seats: Teflon®
Diaphragms: Type 316 Stainless Steel
Seals: Teflon®

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ORDERING INFORMATION

To order a changeover system, complete the part number using the "Part Number Key" shown at right. For example, to order a 4 cylinder, CRS Series brass changeover regulator system, with flexible pigtails, with check valves, and with CGA 580 connections, the part number would be CRSB-4F-4-580. Order by complete part number.

Note: A two cylinder changeover system does not include manifold headers. The cylinders are connected directly to the regulator inlet pigtails (cylinder leads). Advanced does not recommend the use of stainless steel components in manifolds designed for Oxygen service and will not provide such manifolds with CGA 540 connections.

ORDERING INFORMATION

When both sides of the changeover are connected to a gas supply, gas will flow only from the primary side (bank no. 1), which will be indicated by the "In Service" arrow located on the hand knob. The secondary side (bank no. 2) will remain closed. When the gas in the primary bank has been exhausted, the regulator will automatically switch to the secondary, or reserve bank. A fluctuation in outlet pressure will occur at this point. The CRS Series changeover incorporates a built-in line regulator which eliminates this fluctuation and insures a constant delivery pressure to the use point. The PCS Series changeover, supplied without a line regulator, should be utilized for applications incorporating downstream line or station regulation.

Once a changeover has occurred, the hand knob on the changeover regulator should be turned 180° to indicate that bank no. 2 is now in service. This also resets the changeover regulator with bank no. 2 becoming the primary bank. To replenish the gas supply in bank no. 1, the isolation valve is closed and the empty cylinder(s) is replaced with a full cylinder(s). The isolation valve is then reopened, with bank no. 1 now functioning as the secondary, or reserve side.

Note: The CRS is factory preset to changeover at approximately 200 psig. Liquefied gases or Cryogenic Liquids with vapor pressures less than 300 psig should not be used with the standard changeover systems. Contact your Advanced distributor if lower factory settings are required.

PART NUMBER KEY FOR REGULATOR CHANGEOVER SYSTEMS

Model Number	Materials of Construction (Metal Parts): Brass = B Type 316 Stainless Steel = S	Cylinder Leads (Pigtails) 316 SS Flexible Hose = F Teflon-Lined Flexible Hose = T Rigid Tubing = Leave Blank	CGA Connection Number
Bracket Style Bench Model = B Wall Model = W	Total Number of Cylinders 1 (Both Models) 2 (RMW Model only)	Check Valves: With Check Valves = CV Without Check Valves = Leave Blank	

OPTIONAL EQUIPMENT AND REPLACEMENT PARTS

Equipment and Replacement Parts	Part No.
Annunciators	See page 90
Pressure Switches	See page 88
Purge/Vent Valves (set of 2 installed prior to isolation valves)	
For Brass Systems	SG6680
For Stainless Steel Systems	SG6681
Teflon® O-Ring Kits (package of 25 ea.)	
For connection between pigtail and station valve	SG6081
For header connection on:	
Brass Systems	SG6082B
Stainless Steel Systems	SG6082S
Replacement Pigtails, Rigid Type	
Brass without Check Valves	SG6640-(CGA)
Brass with Check Valves	SG6641-(CGA)
Stainless Steel without Check Valves	SG6642-(CGA)
Stainless Steel with Check Valves	SG6643-(CGA)
Replacement Pigtails, Flexible Type	
Without Check Valves	SG6638-(CGA)
With Check Valves	SG6639-(CGA)
Replacement Station Valves	
Brass	0202-5083
Stainless Steel	Not Available
Repair Kit for Station Valves	
For Brass Valves	0202-3079
For Stainless Steel Valves	0202-3076
Additional Stations—For adding stations to the following existing manifolds (specify left or right bank when ordering)	
Brass System with Rigid Pigtails without Check Valves	SG6660-(CGA)
Brass System with Rigid Pigtails with Check Valves	SG6661-(CGA)
Brass System with Flexible Pigtails without Check Valves	SG6662-(CGA)
Brass System with Flexible Pigtails with Check Valves	SG6663-(CGA)
Stn. Stl. System with Rigid Pigtails without Check Valves	SG6664-(CGA)
Stn. Stl. System with Rigid Pigtails with Check Valves	SG6665-(CGA)
Stn. Stl. System with Flexible Pigtails without Check Valves	SG6666-(CGA)
Stn. Stl. System with Flexible Pigtails with Check Valves	SG6667-(CGA)

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STATIONARY CYLINDER PROCESS RACKS (PR SERIES)

Stationary Cylinder Process Racks are designed to provide a safe and cost effective means to mount cylinders and delivery systems where wall space is inaccessible. They are available in two, four and six cylinder configurations and can be supplied with or without process panels. The process panels can be used to mount changeovers, regulators, valves, and other components of a gas delivery system.

These racks are constructed from 11 gauge steel and finished in chemical resistant epoxy. Polypropylene straps with non-slip spring catches safely secure gas cylinders to racks. Steel safety chains can be added as an optional secondary support and security in case of fire. Each rack is supplied with predrilled holes for mounting to a floor. Floor mounting bolts are required (not included). All racks are shipped partially assembled and can ship UPS for freight savings.

TABLE I

Part No.	Configuration	Dimensions H" x D" x W"	Approximate Weight (lbs)
PR-2	2-Cyl. Process Rack	30 x 12 x 28	41
PR-4	4-Cyl. Process Rack	30 x 24 x 37	88
PR-6	6-Cyl. Process Rack	30 x 24 x 49	96
PR-2-PP	2-Cyl. Process Rack with Panel	72 x 12 x 28	56
PR-4-PP	4-Cyl. Process Rack with Panel	72 x 24 x 37	108
PR-6-PP	6-Cyl. Process Rack with Panel	72 x 24 x 49	120

OPTIONAL EQUIPMENT

Equipment	Part No.
Safety Chain (1 each)	SG6215



Model PR-2-PP Process Rack with Panel



Model PR-6-PP Process Rack with Panel



Model PR-6-PP Process Rack with optional mounted CRS Series Changeovers

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65 MM, DIRECT READING, VARIABLE AREA FLOWMETERS (SERIES 50 AND 50K)

Series 50 flowmeters offer an economical means of measuring gas or liquid flow at low pressures where $\pm 10\%$ accuracy is acceptable. They are suitable for plant and general laboratory applications. These flowmeters are direct reading for air; however, approximate flow ranges for other gases are listed in the Tube Selection Table on the following page.

STANDARD FEATURES

- Ribbed Tubes stabilize float and improve accuracy and readability.
- Borosilicate Glass Tubes allow operating temperatures up to 250°F (100°F for Series 50K).
- Threaded Fittings with Locking Nuts (Standard on Series 50) permit front panel mounting.*
- Unique Valve Design allows bubbletight shutoff.
- Availability of Aluminum, Stainless Steel or Kynar® Construction provides a wide material selection for maximum gas compatibility.

OPTIONAL FEATURES

- Baseplate with Leveling Screws permits bench use.
 - Aluminum Bezel permits flush panel mounting.
 - Inlet Filter traps foreign matter, extends flowmeter life and reduces maintenance.
- * Series 50K Flowmeters may be front panel mounted using predrilled holes on rear of flowmeter and self-tapping screws.

SPECIFICATIONS

Maximum Operating Pressure and Temperature:

Series 50: 200 psig at 250°F

Series 50K: 150 psig at 100°F

Minimum Operating Temperature: 32°F

Accuracy: $\pm 10\%$ of full scale from 10% to 100% of range

Repeatability: Within 0.5% of full scale

Tube Graduations: Standard cubic centimeters per minute or standard liters per minute of Air depending upon range. See Tube Selection Tables.

Scale Length: 65 mm

Inlet and Outlet Connections:

Series 50: 1/8" NPT female

Series 50K: 1/4" NPT female

Approximate Weight: 0.75 lb

MATERIALS OF CONSTRUCTION

Tubes: Borosilicate Glass with float stops of Teflon®

Floats: Borosilicate Glass, Type 316
Stainless Steel or Carboloy as specified in Tube Selection Tables

End Blocks: See Table I

Inlet/Outlet Adaptors: See Table I

Side Plates: Aluminum

Back Plate: White Plastic

Front Plate: Clear Plastic

Seals and Packing: Viton® (other materials available on special order)

Valve: Type 316 Stainless Steel



Series 50 Flowmeter



FM 4711

Optional Panel Mounting Bezel

TABLE I

Series	Part No.	End Blocks Material	Inlet/Outlet Adaptor Material
50	FM4350-()	Aluminum	Aluminum
50	FM4360-()	Type 316 Stn. Stl.	Type 316 Stn. Stl.
50K	FM4451-()	Kynar®	None

Where "()" is indicated above, complete the part number by inserting applicable tube number from Tube Selection Table below. Example: FM4350-5. Order by complete part number.

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OPTIONAL EQUIPMENT

Equipment	Part No.
Baseplate	FM4702
Inlet Filter, 2 micron	
Aluminum	FM4741
Type 316 Stainless Steel (Series 50)	FM4746
Type 316 Stainless Steel (Series 50K)	SG6113
Aluminum Bezel for Flush Panel Mounting	FM4711
Replacement Metering Valves	
Flowmeters with Tube Numbers FM4340 –FM4344	0202-4113 (L)
Flowmeters with Tube Numbers FM4345 –FM4346	0202-4114 (M)
Flowmeters with Tube Numbers FM4347 –FM4349	0202-4115 (H)
Replacement Tubes	See Table Below

TUBE SELECTION TABLES FOR SERIES 50 AND 50K FLOWMETERS

Flow rates shown are at 70°F and 14.7 psia.

Tube No.	Float Material	Air (Actual Graduations)	Argon* (Approx. Range)	Carbon Dioxide* (Approx. Range)	Helium* (Approx. Range)
0	Glass	8.0–50 sccm	4.3–43 sccm	6.1–61 sccm	4.7–47 sccm
1	Glass	5.0–85 sccm	7.1–71 sccm	10.4–104 sccm	7.9–79 sccm
2	Glass	40–440 sccm	38–375 sccm	36–355 sccm	52–513 sccm
3	316 Stn. Stl.	100–950 sccm	81–808 sccm	77–767 sccm	0.15–1.5 slpm
4	Glass	0.2–1.8 slpm	0.15–1.5 slpm	0.16–1.6 slpm	0.38–3.8 slpm
5	316 Stn. Stl.	0.4–3.6 slpm	0.31–3.1 slpm	0.32–3.2 slpm	0.78–7.8 slpm
6	Glass	0.5–7 slpm	0.6–5.9 slpm	0.6–5.9 slpm	1.55–15.5 slpm
7	316 Stn. Stl.	1.0–13 slpm	1.1–11.1 slpm	1.1–10.9 slpm	3.1–30.6 slpm
8	316 Stn. Stl.	6.0–24 slpm	2.1–20.5 slpm	2.0–20.1 slpm	5.7–56.4 slpm
9	Carboloy	4.0–44 slpm	3.8–37.4 slpm	3.6–36.3 slpm	10.4–103 slpm

Tube No.	Hydrogen* (Approx. Range)	Nitrogen* (Approx. Range)	Oxygen* (Approx. Range)
0	10.5–105 sccm	5.1–51 sccm	4.5–45 sccm
1	17.8–178 sccm	8.7–87 sccm	9.3–93 sccm
2	0.1–1.1 slpm	45–449 sccm	41–411 sccm
3	0.3–2.8 slpm	97–969 sccm	88–884 sccm
4	0.6–6.0 slpm	0.2–1.8 slpm	0.2–1.7 slpm
5	1.2–12.0 slpm	0.4–3.7 slpm	0.3–3.4 slpm
6	2.4–23.8 slpm	0.7–7.1 slpm	0.8–8.2 slpm
7	4.6–45.8 slpm	1.4–13.2 slpm	1.6–15.5 slpm
8	8.5–84.5 slpm	2.5–24.5 slpm	2.9–28.7 slpm
9	15.5–155 slpm	4.5–44.9 slpm	5.3–52.4 slpm

Replacement Tubes and Packing Part No.
FM4340
FM4341
FM4342
FM4343
FM4344
FM4345
FM4346
FM4347
FM4348
FM4349



* Series 50 flow tubes are directly calibrated for air at 70°F and 14.7 psia. Flow rates shown for other gases are for reference purposes only. Flow capacities for gases not listed may be obtained by contacting your Advanced Representative.

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HEATING AND INSULATION JACKETS FOR GAS CYLINDERS (CJ SERIES)

The CJ Series Jackets are designed to heat and insulate cylinders in order to prevent gases from condensing inside the cylinder. Cylinder jackets are commonly used with hydrocarbon and protocol mixtures to protect against inaccurate calibration and process control when cylinders are exposed to low temperatures.

These cylinder jackets are constructed with a self-limiting heating element that prevents over-heating. As temperature increases, element resistance rises resulting in lower amperage to the heater. Lower amperage causes a temperature drop, thus limiting maximum attainable temperatures. Jackets can be supplied to maintain cylinders at 60°F during outdoor winter conditions or to heat cylinders up to 110°F indoors.

STANDARD FEATURES

- Snug Fitting Design provides even heat distribution for various size cylinders.
- Jacket Construction of fiberglass insulation with silicon impregnated liner and laminated exterior provides for maximum weather resistance.
- Heating Design will not produce “hot spots” that can cause dangerous cylinder heating conditions.

SPECIFICATIONS

Electrical Power Requirements:

110/120 VAC

Power Cord Length: 6 ft.

Power Cord Connection:

110/120 VAC; 3-pin grounding plug

Dimensions: See Table I

Cylinder Temperature: See Table I



CJ Series Heating Jacket

TABLE I

Part No.	Fits Cylinders with Dimensions OD (in.) x H (in.)	Jacket Dimensions OD (in.) x H (in.)	Cylinder Temperature (°F)
SGCJ-350H	15 x 49	19 x 45	120
SGCJ-300L	9 x 60	14 x 55	60
SGCJ-200L	9 x 56	13.5 x 51	60
SGCJ-150AL	8 x 53	12.5 x 47	60

Note: Other sizes, temperatures and voltage ratings are available. Contact your Advanced Representative.

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**Adjustable Cylinder Wall Bracket
(Part No. SG6206) –**

molded from glass reinforced thermoplastic, it can be adjusted to fit any cylinder from 3.5" OD to 14" OD. The 1 1/2" wide by 50" long polypropylene strap has a nickel-plated, steel, non-slip spring catch and buckle for fast adjustment. A steel chain with bitsnap closure is provided for secondary security. Recessed mounting holes are located in each end of the bracket for mounting to a wall.



**Cylinder Bench Clamp with Safety Chain
(Part No. SG6202C*) –**

Same as our SG6202 Cylinder Wall Bracket, but includes a sturdy safety chain for extra security in case of fire.



**Two Cylinder Wall Bracket
(Part No. SG6207)
and Three Cylinder Wall Bracket
(Part No. SG6208) –**

forged from heavy 11 gauge HR steel, finished in chemical resistant epoxy, and fitted with steel reinforced polyethylene edge guards, they will safely support cylinders up to 12" OD. Each bracket includes 1 1/2" wide by 40" long polypropylene straps with nickel-plated steel non-slip spring catches and buckles for fast adjustment.



**Cylinder Wall Bracket with Safety
Chain (Part No. SG6203C*) –**

Same as our SG6203 Cylinder Wall Bracket, but includes a sturdy safety chain for extra security in case of fire.



**Cylinder Bench Clamp
(Part No. SG6202*) -**

made of cast aluminum, it can safely secure cylinders up to 14" OD to most bench and table tops. The bracket clamps to any flat surface up to 1 7/8" thick with a minimum 1 1/2" overhang and is tightened by two steel screws with sliding T-handles and swivel pads. The 1 inch wide by 54" long nylon strap has a nickel-plated, steel, non-slip spring catch and buckle for fast adjustment.



**Cylinder Wall Bracket
(Part No. SG6203*) –**

made of cast aluminum, it can support cylinders up to 14" OD. The 1 inch wide by 54" long nylon strap has a nickel-plated, steel, non-slip spring catch and buckle for fast adjustment. Recessed mounting holes are located in each end of the bracket for mounting to a wall, or any vertical surface.

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**8 Ounce Snoop® Liquid Leak Detector
(Part No. 0202-3032) –**

designed for leak-testing pressurized gas systems, it is provided in a squeezable plastic bottle with an extendible 12" tube for detecting gas leaks in hard-to-reach places.

Note: Snoop® exceeds the performance requirements of military specifications: Mil-L-25567D Type 1, Leak Detection Compound, Oxygen Systems, for use over a temperature range of +27°F to +200°F.



**Teflon® TFE Thread
Sealant Tape (Part No. 0202-5126)–**

designed for application on 1/8", 1/4" and 3/8" male tapered pipe threads as a lubricant to prevent galling of pipe threads. The tape measures 1/4" wide x 576" long and is supplied in a plastic case.

Note: Tape is manufactured to conform to military specifications: MIL-T-27730A and for use with temperatures up to 450°F.



**Valve Handwheel Covers -
Package of 12 (Part No. SG6217) –**

made of heavy duty vinyl, they install on the cylinder valve handle to provide a cushion grip for ease of opening and closing high pressure cylinders.



***Replacement Strap
(Part No. SG6209) –**

The nylon replacement strap for Models SG6202 and SG6203.



**1 Gallon Snoop® Liquid
Leak Detector
(Part No. 0202-3031) –**

designed for use in filling small trays or tanks for immersion leak-testing of pressurized components, or for refilling the smaller 8 oz. bottles (0202-3032).

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Cylinder carts are made of arc welded tubular steel construction and finished with scratch resistant, high gloss electrostatically applied powder coat oven baked paint. All models roll quietly and smoothly on ball bearing, semi-pneumatic rubber wheels.



**Four Wheel Double Cylinder Cart
(Part No. SG6214) –**

designed to safely hold and easily transport two 91/4" OD cylinders. The cart has two retractable rear casters that drop into place when needed for additional load handling safety or lock into the frame when not required. Cylinder binding chains secure cylinders in place and double grip handle bars provide for good load control.



**Two Wheel Single Cylinder Cart
(Part No. SG6210) –**

designed to safely and easily transport a cylinder up to 10" OD. The cylinder is securely held by a spring-loaded holdchain which is encased in a plastic tube to prevent rattling.



**Four Wheel Single Cylinder Cart
(Part No. SG6212) –**

designed to safely hold and easily transport a cylinder up to 10" OD. The cart has two rear casters which fall into place automatically after removing a locking pin when the cart is leaned backward. The operator carries no load. The rear wheel assembly can be locked into the retracted position for fast wheeling if desired. The cylinder is securely held by a spring-loaded hold-chain which is encased in a plastic tube to prevent rattling.



**Medical E Single Cylinder Cart
(Part No. SG6218) –**

designed to safely hold and carry one small medical cylinder (D & E styles) up to 41/2" OD. A thumb screw is located in top ring to secure the cylinder in place.



**Medical E Double Cylinder Cart
(Part No. SG6219) –**

designed to safely hold and carry two small medical cylinders (D & E styles) up to 41/2" OD. A thumb screw is located in top ring to secure the cylinders in place.

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**Small Cylinder Stand
(Part No. SG6201) –**

made of sturdy lightweight plastic, the two thumb screws provide a tight fit for cylinders from 3" to 4 3/8" OD. Three recessed mounting holes are located on the base for floor mounting. These stands are ideal for medical "D" or "E" type cylinders.



**Adjustable Cylinder Stand
(Part No. SG6204) –**

made of cast aluminum, the stand hinges open so it can be placed around the cylinder without lifting the cylinder. The three adjustable uprights can be adjusted to accommodate cylinders from 6" OD to 9 1/4" OD.



**Cylinder Stand
(Part No. SG6200) –**

used for securing cylinders where a wall or bench is not available, these stands are made of cast aluminum, and are hinged so they can be placed around the cylinder without lifting the cylinder. Four thumb screws provide a tight fit after closing. The stand fits any cylinder with an 8" to 9" OD.



Cylinder Inverter (Part No. SG6205) –

This device allows for liquid withdrawal from cylinders not equipped with eductor tubes. They are made of heavy gauge steel and screw onto the threaded collar of a compressed gas cylinder providing a secure connection for inverting the cylinder. The inverter can be used with any small cylinder having a standard threaded collar and cap assembly.

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UOP MOLECULAR SIEVES*

UOP Molecular Sieves* are synthetically produced, crystalline metal aluminosilicates that have been activated for adsorption by removing their water of hydration. Unlike other adsorbents, Molecular Sieves have a precise uniform size and molecular dimension. According to the size of these pores, molecules may be readily adsorbed, slowly adsorbed or completely excluded. This sieve-like selectivity, based on molecular size, plus a selectable preference for polar or polarizable molecules, gives Molecular Sieves an extremely high level of adsorption efficiency, and permits close tailoring of the adsorbent to the specific use. Pore sizes vary by the “type” of Molecular Sieve; for example, Type 4A has a uniform pore size of 4 angstroms while Type 13X has a uniform pore size of 10 angstroms.

Molecular Sieves are available in a variety of forms which include powder, pellets, mesh and beads:

- Powders are white finely divided free-flowing particles with an average diameter of 4–5 microns.
- Pellets are cylindrically formed products whose diameters are controlled (1/16” or 1/8” as specified).

- Mesh are granular shaped products, and Beads are spherically shaped products. The sizes of both of these products are specified jointly by the screen sizes that the material will pass through and be retained by. For example, a 14 x 30 mesh product will pass through a 14 mesh screen, and be retained by a 30 mesh screen. Listed below are the screen openings for some common screen sizes.

Screen Size	Opening (mm)
4	4.760
8	2.380
12	1.680
14	1.410
30	0.595



Available Molecular Sieve Packages

UOP Molecular Sieves are available in a variety of package sizes from 1/2 lb. up to 50 lbs.

* Advanced Specialty Gas Equipment repackages and markets Molecular Sieves manufactured by UOP.

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GAS COMPATIBILITY

The compatibility data* shown on the following pages has been compiled to assist in evaluating the appropriate materials to use in handling various gases. It is extremely important that all gas control equipment be compatible with the gas being passed through it. The use of a device that is not compatible with the service gas may damage the unit and cause a leak that could result in property damage or personal injury. To reduce potentially dangerous situations, always check for compatibility of materials before using any gases in your gas control equipment.

Since combinations of gases are virtually unlimited, mixtures (except for Ethylene Oxide/Halocarbon and Ethylene Oxide/CO₂ sterilizing gas mixtures) are not listed in the Compatibility Chart. Before using a gas mixture or any gas not listed in the chart, we strongly urge you to contact your nearest Advanced Representative for information and assistance.

DIRECTIONS

To use this chart, proceed as follows:

1. Locate the gas you are using in the first column.
2. Compare the materials of construction for the equipment you intend to use with the "materials of construction" shown in the Compatibility Chart. Then use the "Key to Materials Compatibility" to determine compatibility.

KEY TO MATERIALS COMPATIBILITY

S: Satisfactory for use with the intended gas.

U: Unsatisfactory for use with the intended gas.

I: Insufficient data available to determine compatibility with the intended gas.

C1 thru C8: Conditionally acceptable for use with the intended gas as follows:

C1: Satisfactory with brass having a low (65–70% maximum) copper content. Brass with higher copper content is unacceptable.

C2: Satisfactory with acetylene; however, cylinder acetylene is packaged dissolved in a solvent (generally acetone) which may be incompatible with these elastomers.

C3: Compatibility varies depending on specific Kalrez® compound used. Consult E.I. DuPont for information on specific applications.

C4: Satisfactory with brass, except where acetylene or acetylides are present.

C5: Generally unsatisfactory, except where specific use conditions have proven acceptable.

C6: Satisfactory below 1000 psig.

C7: Satisfactory below 1000 psig where gas velocities do not exceed 30 ft./sec.

C8: Material compatibility depends on condition of use.

IMPORTANT

This information is for experienced operators who know the general principles and the safety precautions to be observed in handling specialty gases and associated equipment. If you are not certain you fully understand these safety precautions, we urge you to obtain and read the applicable Material Safety Data Sheet (MSDS) and Equipment Instruction Booklet.

The information contained in the Compatibility Chart has been compiled by Advanced from what it believes are authoritative sources and it is offered solely as a convenience to its customers. While Advanced believes that this information is accurate and factual as of the date of this publication, this information is intended to be used only as a guide in providing general information with respect to the products mentioned; and, therefore, it is not to be taken as a warranty or representation for which Advanced assumes legal responsibility.

Since the user's product formulation, specific use application, and conditions of use are all outside Advanced's control, Advanced makes no warranty or representation regarding the result which may be obtained by the user. It shall be the responsibility of the user to determine the suitability of the user's gas control equipment for use with the products mentioned.

* This chart has been prepared for use with dry (anhydrous) gases at normal operating temperature of 70°F. Information may vary if different operating conditions exist. Systems and equipment used in oxidizer gas service (e.g., Oxygen or Nitrous Oxide) must be cleaned for oxidizer service.

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GAS COMPATIBILITY CHART

		MATERIALS OF CONSTRUCTION																	
		Metals							Plastics						Elastomers				
		Brass	303 Stainless Steel	316 Stainless Steel	Aluminum	Zinc	Copper	Monel	PCTFE	Teflon	Tefzel	Kynar	PVC	Polycarbonate	Kalrez	Viton	Buna-N	Neoprene	Polyurethane
Common Name	Chemical Formula																		
Acetylene	C ₂ H ₂	C1	S	S	I	U	U	S	S	S	S	S	I	I	S	C2	C2	C2	C2
Air	—	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S
Allene	C ₃ H ₄	S	S	S	S	I	U	S	S	S	S	S	I	I	S	S	S	S	I
Ammonia	NH ₃	U	S	S	S	U	U	S	S	S	S	U	S	U	C3	U	S	S	U
Argon	Ar	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S
Arsine	AsH ₃	S	S	S	C5	I	S	S	S	S	S	S	S	I	S	S	S	S	U
Boron Trichloride	BCl ₃	U	S	S	I	I	S	S	S	S	S	I	S	I	C3	I	I	I	I
Boron Trifluoride	BF ₃	S	S	S	S	I	S	S	S	S	S	I	S	I	C3	I	I	I	I
1,3-Butadiene	C ₄ H ₆	S	S	S	S	S	S	S	S	S	S	S	S	U	S	S	U	S	U
Butane	C ₄ H ₁₀	S	S	S	S	S	S	S	S	S	S	S	S	U	S	S	S	S	S
1-Butene	C ₄ H ₈	S	S	S	S	S	S	S	S	S	S	S	S	U	S	S	S	S	S
Cis-2-Butene	C ₄ H ₈	S	S	S	S	S	S	S	S	S	S	S	S	U	S	S	S	S	S
Trans-2-Butene	C ₄ H ₈	S	S	S	S	S	S	S	S	S	S	S	S	U	S	S	S	S	S
Carbon Dioxide	CO ₂	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S
Carbon Monoxide	CO	S	S	S	S	S	S	S	S	S	S	S	S	S	S	I	S	S	S
Carbonyl Sulfide	COS	S	S	S	S	I	S	S	S	S	S	S	S	I	I	S	I	I	I
Chlorine	Cl ₂	U	S	S	U	U	U	S	S	S	S	S	U	U	S	S	U	U	U
Deuterium	D ₂	S	S	S	S	S	S	S	S	S	S	S	S	I	S	S	S	S	S
Diborane	B ₂ H ₆	S	S	S	S	I	S	S	S	S	S	I	I	I	S	I	I	I	I
Dichlorosilane	H ₂ SiCl ₂	I	S	S	I	I	I	S	S	S	S	S	I	I	S	I	I	I	I
Dimethyl Ether	C ₂ H ₆ O	S	S	S	S	S	S	S	S	S	S	S	S	U	S	S	S	S	I
Ethane	C ₂ H ₆	S	S	S	S	S	S	S	S	S	S	S	S	I	S	S	S	S	S
Ethyl Acetylene	C ₄ H ₆	I	S	S	S	I	U	S	S	S	I	S	I	I	S	S	I	S	I
Ethyl Chloride	C ₂ H ₅ Cl	S	S	S	U	I	S	S	S	S	S	S	U	U	S	S	S	S	U
Ethylene	C ₂ H ₄	S	S	S	S	S	S	S	S	S	S	S	I	I	S	S	S	S	I
Ethylene Oxide**	C ₂ H ₄ O	C4	S	S	C5	I	U	I	S	S	I	I	U	U	C3	U	U	U	U

** Satisfactory for use with EPR (Ethylene Propylene Rubber) and EPDM.

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GAS COMPATIBILITY CHART (continued)

		MATERIALS OF CONSTRUCTION																	
		Metals							Plastics						Elastomers				
		Brass	303 Stainless Steel	316 Stainless Steel	Aluminum	Zinc	Copper	Monel	PCTFE	Teflon	Tefzel	Kynar	PVC	Polycarbonate	Kalrez	Viton	Buna-N	Neoprene	Polyurethane
Common Name	Chemical Formula																		
Ethylene Oxide/Carbon Dioxide Mixtures**		C4	S	S	I	I	U	I	S	S	I	I	U	U	C3	U	U	U	U
Ethylene Oxide/Halocarbon Mixtures**		C4	S	S	I	I	U	I	S	S	I	I	U	U	C3	U	U	U	U
Ethylene Oxide/HCFC-124		C4	S	S	I	I	U	I	S	S	I	I	U	U	C3	U	U	U	U
Halocarbon 11	CCl3F	S	S	S	C5	I	S	S	S	S	S	S	U	U	C3	S	S	U	U
Halocarbon 12	CCl2F2	S	S	S	C5	I	S	S	S	S	S	S	U	U	C3	S	S	S	S
Halocarbon 13	CClF3	S	S	S	C5	I	S	S	S	S	S	S	U	U	C3	S	S	S	S
Halocarbon 13B1	CBF3	S	S	S	C5	I	S	S	S	S	S	S	U	U	C3	S	S	S	S
Halocarbon 14	CF4	S	S	S	C5	I	S	S	S	S	S	S	U	U	C3	S	S	S	S
Halocarbon 21	CHCl2F	S	S	S	C5	I	S	S	S	S	S	S	U	U	C3	U	U	S	S
Halocarbon 22	CHClF2	S	S	S	C5	I	S	S	S	S	S	S	U	U	C3	U	U	S	U
Halocarbon 23	CHF3	S	S	S	C5	I	S	S	S	S	S	S	U	U	C3	I	I	I	S
Halocarbon 113	CCl2FCClF2	S	S	S	C5	U	S	S	S	S	S	S	U	U	C3	S	S	S	S
Halocarbon 114	C2Cl2F4	S	S	S	C5	I	S	S	S	S	S	S	U	U	C3	S	S	S	S
Halocarbon 115	C2ClF5	S	S	S	C5	I	S	S	S	S	S	S	U	U	C3	S	S	S	S
Halocarbon 116	C2F6	S	S	S	C5	I	S	S	S	S	S	S	U	U	C3	I	I	I	S
Halocarbon 142B	C2H3ClF2	S	S	S	C5	I	S	S	S	S	S	S	U	U	C3	U	S	S	S
Halocarbon 152A	C2H4F2	S	S	S	C5	I	S	S	S	S	S	S	U	U	C3	U	S	S	S
Halocarbon C-318	C4F8	S	S	S	C5	I	I	S	S	S	S	S	U	U	C3	S	S	S	S
Halocarbon 502	CHClF2/CClF2-CF3	I	S	S	C5	I	I	S	S	S	I	S	U	U	C3	S	S	S	S
Halocarbon 1132A	C2H2F2	S	S	S	C5	I	S	S	I	S	S	S	U	U	C3	I	I	I	S
Helium	He	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S
Hydrogen	H2	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S
Hydrogen Chloride	HCl	U	S	S	I	U	U	S	S	S	S	S	S	U	S	S	U	U	U
Hydrogen Sulfide	H2S	U	S	S	S	I	I	S	S	S	S	S	S	S	S	U	S	S	S
Isobutane	C4H10	S	S	S	S	S	S	S	S	S	S	S	S	U	S	S	S	S	S
Isobutylene	C4H8	S	S	S	S	I	S	S	S	S	S	S	S	I	S	S	S	S	I

** Satisfactory for use with EPR (Ethylene Propylene Rubber) and EPDM.

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GAS COMPATIBILITY CHART (continued)

		MATERIALS OF CONSTRUCTION																	
		Metals							Plastics						Elastomers				
		Brass	303 Stainless Steel	316 Stainless Steel	Aluminum	Zinc	Copper	Monel	PCTFE	Teflon	Tefzel	Kynar	PVC	Polycarbonate	Kalrez	Viton	Buna-N	Neoprene	Polyurethane
Common Name	Chemical Formula	S	S	S	S	S	S	S	S	S	S	S	S	U	S	S	S	S	S
Isopentane	C ₅ H ₁₂	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S
Krypton	Kr	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S
Methane	CH ₄	S	S	S	S	S	S	S	S	S	S	S	S	I	S	S	S	S	S
Methyl Chloride	CH ₃ Cl	S	S	S	U	U	S	S	S	S	S	S	I	I	S	S	U	U	U
Methyl Mercaptan	CH ₃ SH	S	S	S	U	I	U	U	S	S	S	I	I	I	S	I	I	S	I
Neon	Ne	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S
Nitric Oxide	NO	U	S	S	S	I	S	S	S	S	S	I	S	I	S	I	I	S	I
Nitrogen	N ₂	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S
Nitrogen Dioxide	NO ₂	I	S	S	S	I	I	S	S	S	S	I	U	I	S	U	U	U	U
Nitrous Oxide	N ₂ O	S	C6	C6	C5	S	S	S	S	C5	S	S	S	I	C3	S	S	S	S
Oxygen	O ₂	S	C7	C7	C7	S	S	S	S	C5	S	S	S	S	C3	C8	C8	C8	S
Perfluoropropane	C ₃ F ₈	S	S	S	S	I	S	S	S	S	S	I	I	I	I	I	S	S	I
Phosphine	PH ₃	I	S	S	S	I	I	S	S	S	S	I	I	I	S	I	I	I	I
Phosphorous Pentafluoride	PF ₅	I	S	S	I	I	I	S	S	S	S	I	I	I	I	I	I	I	I
Propane	C ₃ H ₈	S	S	S	S	S	S	S	S	S	S	S	S	U	S	S	S	S	S
Propylene	C ₃ H ₆	S	S	S	S	S	S	S	S	S	S	S	S	U	S	S	U	U	U
Propylene Oxide	C ₃ H ₆ O	I	S	S	I	I	I	I	S	S	S	I	U	S	C3	U	U	U	U
Refrigerant Gases	—	See Halocarbons																	
Silane	SiH ₄	S	S	S	S	I	S	S	S	S	S	S	S	I	S	S	S	S	S
Silicon Tetrachloride	SiCl ₄	I	S	S	U	I	I	S	S	S	I	I	U	I	C3	I	I	I	I
Silicon Tetrafluoride	SiF ₄	S	S	S	S	I	S	S	S	S	S	S	S	I	C3	S	S	S	S
Sulfur Dioxide	SO ₂	U	S	S	S	U	U	S	S	S	S	S	S	U	S	S	U	U	S
Sulfur Hexafluoride	SF ₆	S	S	S	S	I	S	S	S	S	S	S	S	I	C3	S	S	S	S
Trichlorosilane	HSiCl ₃	I	S	S	U	I	I	S	S	S	I	I	U	I	C3	I	I	I	I
Vinyl Methyl Ether	C ₃ H ₆ O	S	S	S	S	I	U	S	S	S	S	I	I	U	C3	I	I	I	I
Xenon	Xe	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S

Applied Gas, Inc. 

C u s t o m G a s a n d L i q u i d M i x t u r e s

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CONVERSION FACTORS

DENSITY

	TO OBTAIN				
	gms/cm ³	kg/m ³	lbs/ft ³	lbs/in ³	lbs/U.S. gal
MULTIPLY	BY				
gms/cm ³	—	1000	62.428	0.0361273	8.3454
kg/m ³	0.001	—	0.062428	3.61273 x 10 ⁻⁵	0.0083454
lbs/ft ³	0.0160185	16.018463	—	5.78704 x 10 ⁻⁴	0.13368
lbs/in ³	27.679905	27,679.9	1728	—	231
lbs/U.S. gal	0.1198264	119.8264	7.4805195	0.004329	—

FLOW

	TO OBTAIN							
	cm ³ /min (ml/min)	cm ³ /sec (ml/sec)	ft ³ /hr	ft ³ /min	m ³ /hr	m ³ /min	L/hr	Lpm
MULTIPLY	BY							
cm ³ /min (ml/min)	—	0.0166667	0.0021189	0.0000353	0.00006	0.000001	0.06	0.001
cm ³ /sec (ml/sec)	60	—	0.1271340	0.0021189	0.0036	0.00006	3.6	0.06
ft ³ /hr	471.9474	7.865790	—	0.0166667	0.0283168	0.0004719	28.31685	0.4719474
ft ³ /min	28,316.85	471.9474	60	—	1.699008	0.0283168	1699.008	28.31685
m ³ /hr	16,666.67	277.7778	35.31467	0.5885777	—	0.0166667	1000	16.66667
m ³ /min	1,000,000	16,666.67	2118.876	35.31467	60	—	60,000	1000
L/hr	16.66667	0.2777778	0.0353147	0.0005885	0.001	0.0000167	—	0.0166667
Lpm	1000	16.66667	2.118876	0.0353147	0.06	0.001	60	—

LENGTH

	TO OBTAIN							
	Å	cm	ft	in	m	micron	mm	yd
MULTIPLY	BY							
Å	—	1 x 10 ⁻⁸	3.2808399 x 10 ⁻¹⁰	3.937008 x 10 ⁻⁹	1 x 10 ⁻¹⁰	0.0001	0.0000001	1.0936133 x 10 ⁻¹⁰
cm	1 x 10 ⁸	—	0.0328084	0.3937008	0.01	10,000	10	0.0109361
ft	3.048 x 10 ⁹	30.48	—	12	0.3048	304,800	304.8	0.3333333
in	2.54 x 10 ⁸	2.54	0.0833333	—	0.0254	25,400	25.4	0.0277778
m	1 x 10 ¹⁰	100	3.2808399	39.3700787	—	1,000,000	1000	1.0936133
micron	10,000	0.0001	3.2808399 x 10 ⁻⁶	3.9370079 x 10 ⁻⁵	0.0000010	—	0.001	1.0936133 x 10 ⁻⁶
mm	10,000,000	0.1	0.00328084	0.03937008	0.001	1,000	—	0.0010936
yd	9.144 x 10 ⁹	91.44	3	36	0.9144	914,400	914.4	—

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CONVERSION FACTORS (continued)

PRESSURE

	TO OBTAIN								
	atm	bars	ft of H ₂ O at 60°F	in of Hg at 0°C	in of H ₂ O at 60°F	kg/cm ²	kpa	mm of Hg at 0°C (torr)	psi
MULTIPLY	BY								
atm	—	1.01325	33.932	29.921	407.1827	1.0332	101.3171	760	14.696
bars	0.98692	—	33.4883	29.530	401.8596	1.019716	100	750.062	14.50368
ft of H ₂ O at 60°F	0.02947	0.029891	—	0.882646	12	0.03048	2.9890	22.4198	0.433107
in of Hg at 0°C	0.03342	0.033864	1.1340	—	13.6	0.034532	3.376895	25.4	0.49115
in of H ₂ O at 60°F	0.00246	0.002499	0.083333	0.073556	—	0.00254	0.249089	1.86832	0.03609
kg/cm ²	0.96787	0.980665	32.8084	28.95903	393.7008	—	98.03922	735.5592	14.22334
kpa	0.00987	0.010	0.33456	0.29613	4.01472	0.01020	—	7.5006	0.14504
mm of Hg at 0°C (torr)	0.00132	0.001333	0.044603	0.03937	0.535240	0.001360	0.133322	—	0.019337
psi	0.06805	0.068948	2.3089	2.0360	27.70851	0.070307	6.89465	51.715	—

TEMPERATURE

	TO OBTAIN			
	°C	°F	°K	°R
MULTIPLY	BY			
°C + 17.78	—	1.8	—	—
°C + 273.16	—	—	1	—
°F - 32	5/9	—	—	—
°F + 459.72	—	—	—	1
°K - 273.16	1	—	—	—
°R - 459.72	—	1	—	—

VOLUME

	TO OBTAIN					
	cm ³ *	ft ³	in ³	m ³	gal (U.S. liquid)	L
MULTIPLY	BY					
cm ³ *	—	0.00003531	0.0610237	0.000001	0.0002641	0.001
ft ³	28,316.847	—	1728	0.02831685	7.480519	28.316847
in ³	16.387064	0.0005787	—	0.00001637	0.0043290	0.0163871
m ³	1,000,000	35.31467	61,023.74	—	264.172	1000
gal (U.S. liquid)	3785.412	0.13368056	231	0.00378541	—	3.785412
L	1000	0.03531467	61.02374	0.001	0.2641721	—

* 1 cm³ = 1 ml

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CONVERSION FACTORS (continued)

WEIGHT

	TO OBTAIN					
	gms	kg	mg	oz*	lbs*	tons (short, U.S.)
MULTIPLY	BY					
gms	—	0.001	1000	0.0352740	0.0022046	1.102×10^{-6}
kg	1000	—	1,000,000	35.273962	2.2046226	0.0011023
mg	0.001	0.000001	—	3.5274×10^{-5}	2.2046×10^{-6}	1.102×10^{-9}
oz*	28.34952	0.0283495	28,349.5	—	0.0625	3.125×10^{-5}
lbs*	453.59237	0.4535924	453,592	16	—	0.0005
tons (short, U.S.)	907,185	907.18474	9.07185×10^8	32,000	2000	—

*avoirdupois

CONCENTRATION

EXPONENTIAL EQUIVALENTS

Concentration	Equivalent
1,000,000 ppm	100%
100,000 ppm	10.0%
10,000 ppm	1.0%
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	0.01 ppm
1 ppb	0.001 ppm

Scientific Notation	Equivalent
1×10^{10}	10,000,000,000
1×10^9	1,000,000,000
1×10^8	100,000,000
1×10^7	10,000,000
1×10^6	1,000,000
1×10^5	100,000
1×10^4	10,000
1×10^3	1,000
1×10^2	100
1×10^1	10

Scientific Notation	Equivalent
1×10^{-1}	0.1
1×10^{-2}	0.01
1×10^{-3}	0.001
1×10^{-4}	0.0001
1×10^{-5}	0.00001
1×10^{-6}	0.000001
1×10^{-7}	0.0000001
1×10^{-8}	0.00000001
1×10^{-9}	0.000000001
1×10^{-10}	0.0000000001

MISCELLANEOUS PHYSICAL CONSTANTS

Numerical Constant	Value	Units
Avogadro's Number	6.022045×10^{23}	Molecules/gm-mole
Gas-Law Constant R	1.98719	cal/(gm-mole)(°K)
	1.98719	Btu/(lb-mole)(°R)
	82.0568	(cm ³)(atm)/(gm-mole)(°K)
	0.0820568	(liter)(atm)/(gm-mole)(°K)
	10.7314	(ft ³)(lb)/(in ²)(lb-mole)(°R)
	0.730228	(ft ³)(atm)/(lb-mole)(°R)

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MOISTURE CONVERSION TABLE

Dew Point		Vapor Pressure (Water/Ice in Equilibrium) mm of Mercury	PPM on Volume Basis at 760 mm of Hg Pressure	Relative Humidity at 70°F%	PPM on Weight Basis in Air
°C	°F				
-90	-130	0.00007	0.0921	0.00037	0.057
-88	-126	0.00010	0.132	0.00054	0.082
-86	-123	0.00014	0.184	0.00075	0.11
-84	-119	0.00020	0.263	0.00107	0.16
-82	-116	0.00029	0.382	0.00155	0.24
-80	-112	0.00040	0.562	0.00214	0.33
-78	-108	0.00056	0.737	0.00300	0.46
-76	-105	0.00077	1.01	0.00410	0.63
-74	-101	0.00105	1.38	0.00559	0.86
-72	-98	0.00143	1.88	0.00762	1.17
-70	-94	0.00194	2.55	0.0104	1.58
-68	-90	0.00261	3.43	0.0140	2.13
-66	-87	0.00349	4.59	0.0187	2.84
-64	-83	0.00464	6.11	0.0248	3.79
-62	-80	0.00614	8.08	0.0328	5.01
-60	-76	0.00808	10.6	0.0430	6.59
-58	-72	0.0106	13.9	0.0565	8.63
-56	-69	0.0138	18.2	0.0735	11.3
-54	-65	0.0178	23.4	0.0948	14.5
-52	-62	0.0230	30.3	0.123	18.8
-50	-58	0.0295	38.8	0.157	24.1
-48	-54	0.0378	49.7	0.202	30.9
-46	-51	0.0481	63.3	0.257	39.3
-44	-47	0.0609	80	0.325	49.7
-42	-44	0.0768	101	0.410	62.7
-40	-40	0.0966	127	0.516	78.9
-38	-36	0.1209	159	0.644	98.6
-36	-33	0.1507	198	0.804	122.9
-34	-29	0.1873	246	1.00	152
-32	-26	0.2318	305	1.24	189
-30	-22	0.2859	376	1.52	234
-28	-18	0.351	462	1.88	287
-26	-15	0.430	566	2.3	351
-24	-11	0.526	692	2.81	430
-22	-8	0.640	842	3.41	523
-20	-4	0.776	1020	4.13	633
-18	0	0.939	1240	5.00	770
-16	3	1.132	1490	6.03	925
-14	7	1.361	1790	7.25	1110
-12	10	1.632	2150	8.69	1335
-10	14	1.950	2570	10.4	1596
-8	18	2.326	3060	12.4	1900
-6	21	2.765	3640	14.7	2260
-4	25	3.280	4320	17.5	2680
-2	28	3.880	5100	20.7	3170
0	32	4.579	6020	24.4	3640
2	36	5.294	6970	28.2	4330
4	39	6.101	8030	32.5	4990
6	43	7.013	9230	37.4	5730
8	46	8.045	10590	42.9	6580
10	50	9.029	12120	49.1	7530
12	54	10.52	13840	56.1	8600
14	57	11.99	15780	63.9	9800
16	61	13.63	17930	72.6	11140
18	64	15.48	20370	82.5	12650
20	68	17.54	23080	93.5	14330



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ABBREVIATIONS & SYMBOLS

Symbol	Definition
Å	angstrom(s)
ACGIH	American Conference of Governmental Industrial Hygienists
ASTM	American Society for Testing Materials
atm	atmosphere(s)
avg	average
Btu	British thermal unit(s)
cal	calorie(s)
CAS	Chemical Abstract Services
cc	cubic centimeters
ccm	cubic centimeters per minute
CGA	Compressed Gas Association
cm	centimeter
cm ²	square centimeter
cm ³	cubic centimeter
CP	Chemically Pure
Cp	specific heat at constant pressure
CSA	Canadian Standards Association
Cv	coefficient of flow
°C	degree(s) Centigrade
°F	degree(s) Fahrenheit
°K	degree(s) Kelvin
°R	degree(s) Rankine
ea	each
EPA	Environmental Protection Agency
EPDM	Ethylene-Propylene Terpolymer
EPR	Ethylene Propylene Rubber
ft	foot, feet
ft ³	cubic foot (feet)
gal	gallon(s)
gms	gram(s)
HCFC-124	Hydrochlorofluorocarbon
hr	hour
Hz	hertz

Symbol	Definition
ID	identification or inside diameter
in, ins	inch(es)
in ³	cubic inch
kg	kilogram(s)
kpa	kilopascal(s)
lb, lbs	pound(s)
L	liter(s)
Lpm	liters per minute
m	meter(s)
m ³	cubic meter(s)
mA	milliampere
max	maximum
mg	milligram(s)
min	minute(s)
ml	milliliter(s)
mm	millimeter(s)
mol. wt.	molecular weight
MOS	Metal Oxide Semiconductor
NA	not applicable
nbp	normal boiling point
NER	normal evaporation rate
NF	National Formulary
NIST	National Institute of Standards and Technology
No	number
nom	nominal
NOS	not otherwise specified
NPT	national pipe thread
NTP	normal temperature and pressure
OD	outside diameter
OSHA	Occupational Safety and Health Administration
oz	ounce(s)
ppb	part(s) per billion
ppm	part(s) per million
psi	pound(s)-force per square inch

Symbol	Definition
psia	pound(s)-force per square inch absolute
psig	pound(s)-force per square inch gauge
scc	standard cubic centimeters
sccm	standard cubic centimeters per minute
sccs	standard cubic centimeters per second
scfh	standard cubic feet per hour
scfm	standard cubic feet per minute
scfs	standard cubic feet per second
sec	second(s)
slpm	standard liters per minute
sp. gr.	specific gravity
sp. vol.	specific volume
SS, Stn. Stl.	Stainless Steel
STEL	Short Term Exposure Limit
STP	Standard Temperature and Pressure
Temp.	Temperature
THC	Total Hydrocarbon Content
TLV	Threshold Limit Value
tp	triple point
TWA	Time Weighted Average
UHP	Ultra High Purity
UN	United Nations
USP	United States Pharmacopoeia
VAC	volts alternating current
VDC	volts direct current
wt%	weight percent (percent by weight)
wt. ppm	weight parts per million
yd	yard(s)
>	greater than
<	less than
≥	greater than or equal to
≤	less than or equal to

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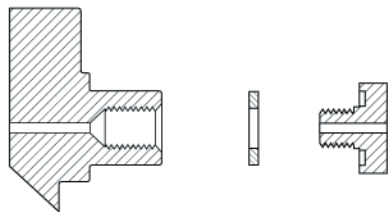
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CGA CONNECTIONS

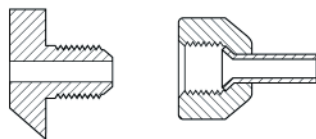
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.3125-32UNEF-2B-RH-INT



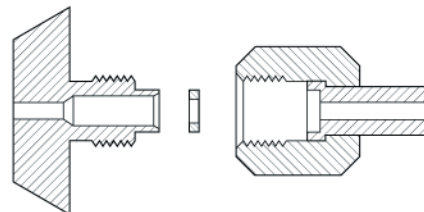
CGA 165

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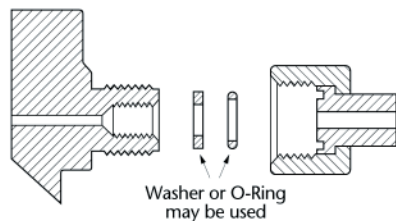
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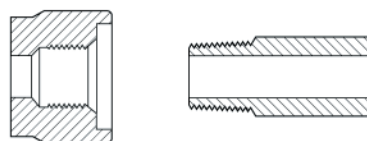
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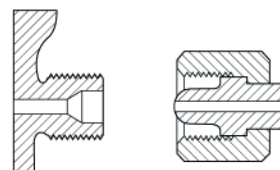
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.375-18NGT-RH-INT



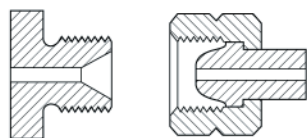
CGA 280

.745-14NGO-RH-EXT



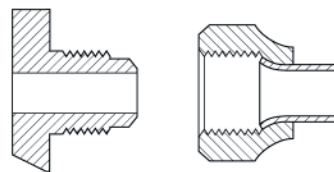
CGA 290

.745-14NGO-LH-EXT



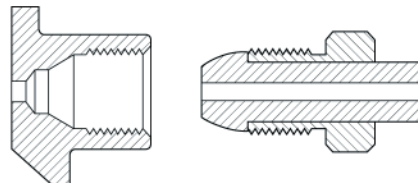
CGA 295

.750-16UNF-2A-RH-EXT (1/2" SAE Flare)



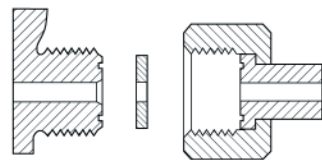
CGA 296

.803-14UNS-2B-RH-INT



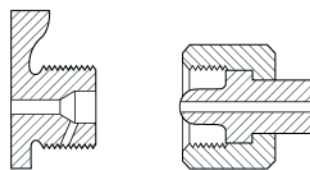
CGA 320

.825-14NGO-RH-EXT (Flat Nipple)



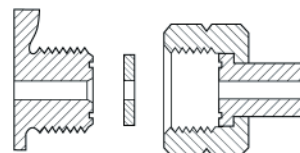
CGA 326

.825-14NGO-RH-EXT (Small Round Nipple)



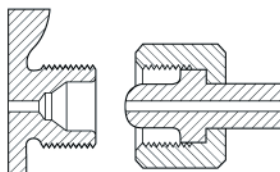
CGA 330

.825-14NGO-LH-EXT (Flat Nipple)



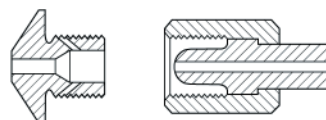
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.825-14NGO-RH-EXT (Large Round Nipple)



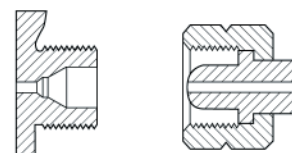
CGA 347

.825-14NGO-RH-EXT (Long Round Nipple)



CGA 350

.825-14NGO-LH-EXT (Round Nipple)



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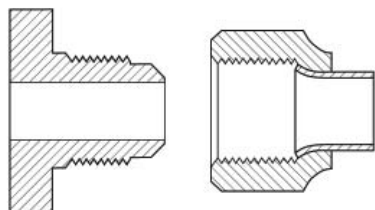
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CGA CONNECTIONS (continued)

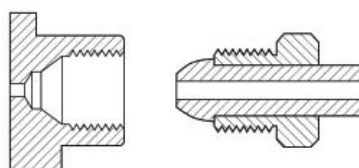
CGA 440

.875-14UNF-2A-RH-EXT (5/8" SAE Flare)



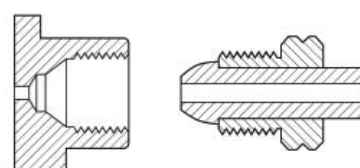
CGA 500

.885-14NGO-RH-INT (Bullet Nipple)



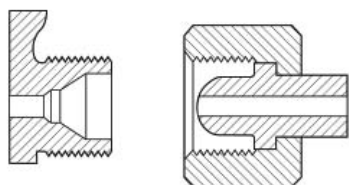
CGA 510

.885-14NGO-LH-INT (Bullet Nipple)



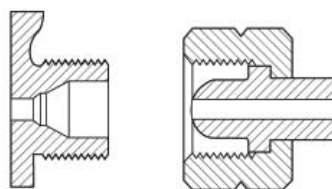
CGA 540

.903-14NGO-RH-EXT



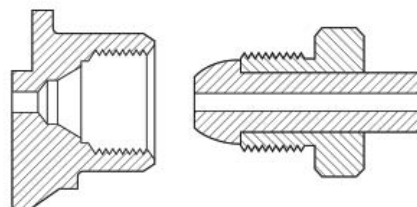
CGA 555

.903-14NGO-LH-EXT



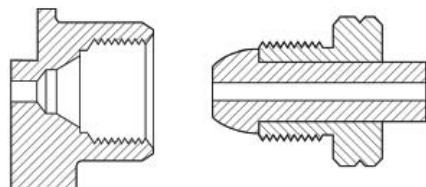
CGA 580

.965-14NGO-RH-INT



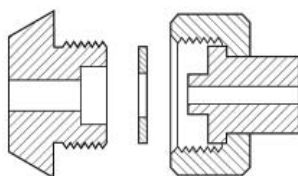
CGA 590

.965-14NGO-LH-INT



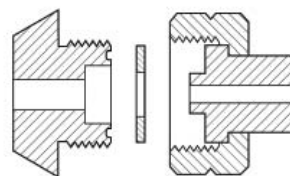
CGA 660

1.030-14NGO-RH-EXT (Face Washer)



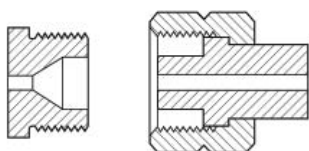
CGA 670

1.030-14NGO-LH-EXT (Face Washer)



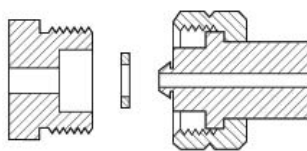
CGA 677

1.030-14NGO-LH-EXT (Round Nipple)



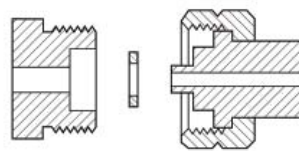
CGA 678

1.030-14NGO-LH-EXT (Recessed Washer)



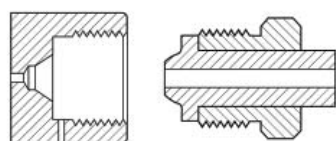
CGA 679

1.030-14NGO-LH-EXT (Tipped Nipple)



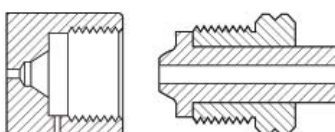
CGA 680

1.045-14NGO-RH-INT



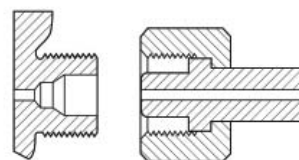
CGA 695

1.045-14NGO-LH-INT



CGA 701

1.103-14NGO-RH-EXT



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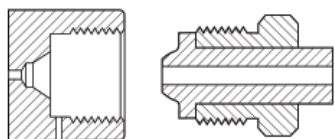
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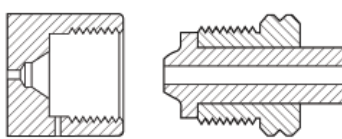
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1.125-14NGO-RH-INT



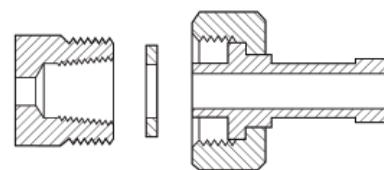
CGA 703

1.125-14NGO-LH-INT



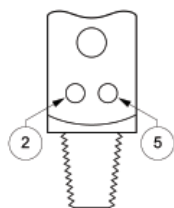
CGA 705

1.125-14UNS-2A-RH-EXT



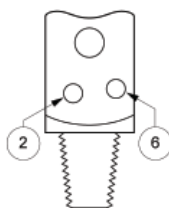
CGA 870

Pin-Indexed Yoke, Pins 2-5



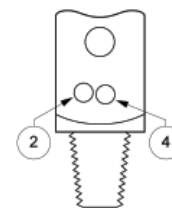
CGA 880

Pin-Indexed Yoke, Pins 2-6



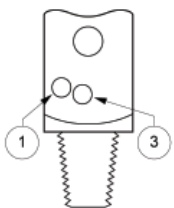
CGA 890

Pin-Indexed Yoke, Pins 2-4



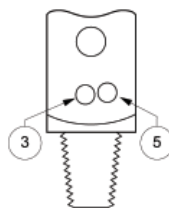
CGA 900

Pin-Indexed Yoke, Pins 1-3



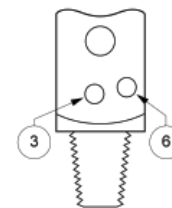
CGA 910

Pin-Indexed Yoke, Pins 3-5



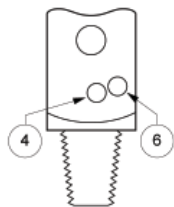
CGA 920

Pin-Indexed Yoke, Pins 3-6



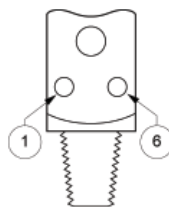
CGA 930

Pin-Indexed Yoke, Pins 4-6



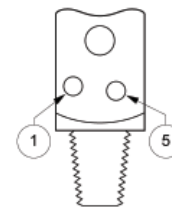
CGA 940

Pin-Indexed Yoke, Pins 1-6



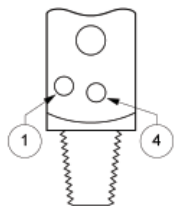
CGA 950

Pin-Indexed Yoke, Pins 1-5



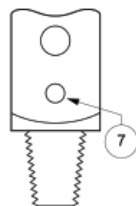
CGA 960

Pin-Indexed Yoke, Pins 1-4



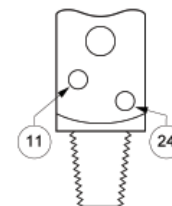
CGA 965

Pin-Indexed Yoke, Pin No. 7



CGA 973

Pin-Indexed Yoke, Pins 11-24



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