

Gas Data & Equipment Recommendations

The following information is provided as a guide to assist you in your choice of a pressure regulator for specific cylinder gases. It is divided into three distinct groupings—Pure Gases (pages 6-13); Pure Gases in Lecture Bottles (pages 14-16); and Two-Component Gas Mixtures (pages 17-19).

To use this guide, simply locate the gas or gas mixture you are using within the appropriate grouping. The tables for Pure Gases, and Pure Gases in Lecture Bottles have their information initially arranged alphabetically by the gas of interest, and then secondarily alphabetized by the specific grade of that gas. The information in the Two-Component Gas Mixtures table is listed first alphabetically by minor component, and then alphabetically by the balance gas, or major component. For example, 2% Ammonia, 98% Helium would be listed first under Ammonia (the minor component), and then under "In Helium" (the balance gas) within the Ammonia grouping.

Across from each individual listing you will find that product's corresponding valve outlet connection number (CGA Connection); the recommended regulator model; and a reference page number directing you to where additional information and complete specifications on that regulator can be found. In the Pure Gas Table you will also find certain physical properties of the gas, such as chemical formula, molecular weight, vapor pressure (for liquefied gases), specific gravity and specific volume. In certain cases, where pressure reduction is not desired or required—as with very low pressure products such as Boron Trichloride—a manual control valve has been recommended instead of a pressure regulator. Please remember that Manual Control Valves control flow, not pressure.

You should note that the recommendations contained herein are valid, and generally preferred for the more common applications of the products indicated; and consideration has been given to safety, materials compatibility, as well as to convenience and suitability for these common applications. However, the recommendations shown may not be the only models that are suitable, and your specific application may have subtleties that would indicate another selection is a more preferable choice. If you feel this is the case, or if you are using a product that is not listed within these tables, please do not hesitate to contact one of our Technical Representatives, or your Advanced Specialty Gas Equipment Distributor to discuss your requirements.

Pure Gases

Gas Grade	Mol. Weight	Vapor Pressure (psig at 70°F)	Specific Gravity (Air = 1)	Specific Volume (ft ³ /lb. at 70°F)	CGA Connection Number	Equipment Recommendations	Page No.
Acetylene (C₂H₂)	26.038	—	0.91 at 32°F	14.5			
Atomic Absorption					510	SSG9048	46
Commercial Grade, 98.0% Purified					510	SSG9048	46
Technical					510	SSG9048	46
Air	28.975	—	1.00	13.3			
Blended Air					590	TSD	23
CO ₂ Free					590	LABE/HPE	25, 27
Compressed Air					346	TSD	23
Dry					346/590*	TSD	23
High Pressure (3500 psig)					347	AG3850 Series	55
High Pressure (6000 psig)					702	SG3600 or SG3610	56
Hydrocarbon Free					346/590*	LABE/HPE	25, 27
USP					346/950*	AG3660 Series	48
Ultra Pure Carrier					590	HPE	27
Ultra Zero					590	HPE	27
Vehicle Emission Zero					590	LABE/HPE	25, 27
V.O.C. Free Air					590	LABE/HPE	25, 27
Zero					346/590*	LABE/HPE	25, 27
Allene (C₃H₄)	40.065	116.7	1.415 at 68°F	9.6			
					510	SSE	22

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Pure Gases

Gas Grade	Mol. Weight	Vapor Pressure (psig at 70°F)	Specific Gravity (Air = 1)	Specific Volume (ft ³ /lb. at 70°F)	CGA Connection Number	Equipment Recommendations	Page No.
Ammonia (NH₃)	17.031	114.1	0.597	22.7			
Anhydrous					705	ARG	32
Electronic					660	AG3870 Series	30
Nitride					660	AG3870 Series	30
Research					660	AG3870 Series	30
Semiconductor Purity					660	AG3870 Series	30
SFC Grade					660	MV5800 Series	138
ULSI Purity					660	AG3870 Series	30
Ultra High Purity					660	AG3870 Series	30
Argon (Ar)	39.948	—	1.378	9.68			
Grade 6™					580	HPE	27
High Pressure (3500 psig)					680	AG3850 Series	55
High Pressure (6000 psig)					677	SG3600 or SG3610	56
High Purity					580	LABE	25
Oxygen Free					580	LABE/HPE	25, 27
Prepurified					580	LABE	25
Research					580	HPD	26
Semiconductor Purity					580	HPE	27
Sputtering					580	HPE	27
ULSI Purity					580	HPE	27
Ultra High Purity					580	HPE	27
Ultraplus™					580	HPE	27
Ultra Pure Carrier					580	LABE/HPE	25, 27
Zero					580	LABE/HPE	25, 27
Arsine (AsH₃)	77.946	205	2.69	5.0			
Electronic					350/632*	AG3870 Series	30
ULSI Purity					350/632*	AG3870 Series	30
Boron Trichloride (BCl₃)	117.169	4.4	4.03	3.3			
CP					660	MV5800 Series	138
Electronic					660	MV5800 Series	138
Semiconductor Purity					660	MV5800 Series	138
VLSI Etchant					660	MV5800 Series	138
Boron Trifluoride (BF₃)	67.805	—	2.387	5.7			
CP					330	ASB	34
1,3 Butadiene (C₄H₆)	54.092	21.4	1.915 at 60°F	6.9			
CP					510	SSE	22
High Purity (Inhibited)					510	LABD	24
Instrument					510	LABD	24
Research					510	HPD	26
Butane (C₄H₁₀)	58.123	16.3	2.110 at 68°F	6.4			
CP					510	SSE	22
Instrument					510	LABD	24
Technical					510	SSE	22
n-Butane See Butane							
iso-Butane See Isobutane							
1-Butene (C₄H₈)	56.108	23.5	1.937	6.7			
CP					510	SSE	22
High Purity					510	LABD	24
Research					510	HPD	26
cis-2-Butene (C₄H₈)	56.108	13	1.997 at 68°F	6.7			
High Purity					510	LABD	24
Technical					510	SSE	22
trans-2-Butene (C₄H₈)	56.108	15	1.997 at 68°F	6.7			
High Purity					510	LABD	24
Technical					510	SSE	22

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Pure Gases

Gas Grade	Mol. Weight	Vapor Pressure (psig at 70°F)	Specific Gravity (Air = 1)	Specific Volume (ft ³ /lb. at 70°F)	CGA Connection Number	Equipment Recommendations	Page No.
(cis & trans) 2-Butene (C ₄ H ₈) Technical	56.108	14	1.997 at 68°F	6.7	510	SSE	22
iso-Butylene See Isobutylene							
Carbon Dioxide (CO ₂)	44.011	830	1.522	8.76			
Anaerobic					320	LABE	25
Bone Dry					320	SG9011 or SG9014	44
CP					320	SG9011 or SG9014	44
Commercial					320	SG9011 or SG9014	44
Electronic					320	HPE	27
Instrument (Coleman)					320	LABE	25
Precision Aquarator®					320	HPE	27
Research					320	HPE	27
SFC Grade					320	MV5700 Series	138
SFE					320	MV5700 Series	138
Spectra-Clean®, Grade 5™					320	HPE	27
USP					320/940*	AG3660 Series	48
Carbon Monoxide (CO)	28.010	—	0.968	13.8			
CP					350	LABE	25
Commercial					350	TSD	23
Research					350	HPD	26
Technical					350	LABE	25
Ultra High Purity					350	HPE	27
Carbon Tetrafluoride See Halocarbon 14							
Carbonyl Sulfide (COS)	60.070	160	2.10 at 68°F	6.4	330	ARG	32
Chlorine (Cl ₂)	70.906	85.3	2.473 at 68°F	5.4			
High Purity					660	CRH/ASB	33, 34
Research					660	AG3870 Series	30
Semiconductor Purity					660	AG3870 Series	30
ULSI Purity					660	AG3870 Series	30
Ultra High Purity					660	CRH/ASB	33, 34
Cyclopropane (C ₃ H ₆)	42.081	75.0	1.453 at 68°F	9.2	510	SSE	22
Deuterium (D ₂)	4.032	—	0.139 at 32°F	95.9			
CP					350	HPE	27
Research					350	HPD	26
Dichlorosilane (H ₂ SiCl ₂)	101.010	9.1	3.52 at 77°F	3.83			
Electronic					678	SG3860	47
Semiconductor Purity					678	SG3860	47
ULSI Purity					678	SG3860	47
Ultraplus™					678	SG3860	47
Dimethylamine (C ₂ H ₇ N)	45.085	11.3	1.557 at 77°F	8.6	705	CRH	33
Dimethyl Ether (C ₂ H ₆ O)	46.069	62.3	1.59	8.4	510	SSE	22
2,2-Dimethylpropane (C ₅ H ₁₂)	72.151	7.0	2.49 at 77°F	5.3			
Research					510	MV5700 Series	138
Ethane (C ₂ H ₆)	30.07	544	1.047 at 60°F	12.8			
CP					350	LABD	24
Research					350	HPD	26
Technical					350	SSD	22
Ultra High Purity					350	HPD	26

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Ethyl Acetylene (C ₄ H ₆)	54.092	8.5	1.93 at 77°F	7.2	510	MV5800 Series	138
Ethyl Chloride (C ₂ H ₅ Cl) High Purity	64.515	5.3	2.22 at 68°F	6.0	300	MV5700 Series	138
Ethylene (C ₂ H ₄) CP Polymer Grade Research Technical	28.054	—	0.978 at 32°F	13.8	350 350 350 350	LABE LABE HPD TSD	25 25 26 23
Ethylene Oxide (C ₂ H ₄ O) 99.90%	44.054	6.5	1.52	8.78	510	MV5800 Series	138
Halocarbon 12 (CCl ₂ F ₂) (Dichlorodifluoromethane)	120.914	70.2	4.26	3.14	660	SSE	22
Halocarbon 13 (CClF ₃) (Chlorotrifluoromethane)	104.459	458.7	3.70	3.61	320/660*	LABD	24
Halocarbon 13B1 (CBrF ₃) (Bromotrifluoromethane)	148.910	189	5.30	2.6	320/660*	SSE	22
Halocarbon 14 (CF ₄) (Tetrafluoromethane) Electronic Semiconductor Purity Ultraplus™ VLSI	88.005	—	3.038	4.39	320/660* 320/580* 320/660* 580	HPE HPE HPE HPE	27 27 27 27
Halocarbon 21 (CHCl ₂ F) (Dichlorofluoromethane)	102.923	8.4	3.82 at 68°F	3.5	660	MV5700 Series	138
Halocarbon 22 (CHClF ₂) (Chlorodifluoromethane)	86.469	123	3.08	4.4	660	SSE	22
Halocarbon 23 (CHF ₃) (Trifluoromethane) Technical Ultraplus™ 99.90%	70.014	635	2.43	5.5	660 320/660* 320/660*	SSD HPD LABD	22 26 24
Halocarbon 114 (C ₂ Cl ₂ F ₄) (1,2-Dichlorotetrafluoroethane)	170.922	12.9	5.93 at 77°F	2.3	660	SSE	22
Halocarbon 115 (C ₂ ClF ₅) (Chloropentafluoroethane)	154.467	102	5.569	2.4	660	SSE	22
Halocarbon 116 (C ₂ F ₆) (Hexafluoroethane) 99.90% Semiconductor Purity	138.012	430.3	4.773	2.8	320/660* 660	LABD HPD	24 26
Halocarbon 142B (C ₂ H ₃ ClF ₂) (1-Chloro-1,1-Difluoroethane)	100.496	27.8	3.63	3.68	510	SSE	22
Halocarbon 152A (C ₂ H ₄ F ₂) (1,1-Difluoroethane)	66.051	63	2.36	5.85	510	SSE	22

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Halocarbon C-318 (C₄F₈) (Octafluorocyclobutane)	200.031	25	7.33	1.85			
					660	SSE	22
Halocarbon 500 (73.8 wt.% Halocarbon 12 26.2 wt.% Halocarbon 152A)	100.1	82.3	3.5	3.82			
					660/510*	SSE	22
Halocarbon 502 (48.8 wt.% Halocarbon 22 51.2 wt.% Halocarbon 115)	111.63	132.2	3.87	3.45			
					320/660*	SSE	22
Halocarbon 503 (60 wt.% Halocarbon 23 40 wt.% Halocarbon 13)	87.247	613	3.07	4.3			
					320	SSD	22
Halocarbon 1113 (C₂ClF₃) (Chlorotrifluoroethylene)	116.47	62	4.13	3.30			
					510	SSE	22
Halocarbon 1132A (C₂H₂F₂) (1,1-Difluoroethylene)	64.035	518	2.21 at 77°F	6.0			
					350	SSD	22
Helium (He)	4.003	—	0.138	96.7			
Carrier Grade					580	LABE/HPE	25, 27
Chromatographic					580	HPE	27
ECD Grade					580	HPE	27
Grade 6™					580	HPE	27
High Pressure (3500 psig)					680	AG3850 Series	55
High Pressure (6000 psig)					677	SG3600 or SG3610	56
High Purity					580	LABE	25
Oxygen Free					580	LABE/HPE	25, 27
Research					580	HPD	26
Semiconductor Purity					580	HPE	27
Ultra High Purity					580	HPE	27
Ultraplus™					580	HPE	27
Ultra Pure Carrier					580	HPE	27
ULSI					580	HPE	27
USP					580/930*	AG3660 Series	48
Zero					580	LABE/HPE	25, 27
Hexafluoropropylene (C₃F₆)	150.023	85	5.18 at 68°F	2.58			
					660	LABD	24
Hydrogen (H₂)	2.016	—	0.0696	191.7			
Carrier Grade					350	LABE/HPE	25, 27
Extra Dry					350	LABE	25
High Pressure (3500 psig)					695	AG3850 Series	55
High Pressure (6000 psig)					703	SG3610	56
High Purity					350	LABE	25
Prepurified					350	LABE	25
Purified					350	LABE	25
Research					350	HPD	26
Semiconductor Purity					350	HPE	27
ULSI Purity					350	HPE	27
Ultra High Purity					350	HPE	27
Ultraplus™					350	HPE	27
Ultra Pure Carrier					350	HPE	27
Zero					350	LABE/HPE	25, 27

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Pure Gases

Gas Grade	Mol. Weight	Vapor Pressure (psig at 70°F)	Specific Gravity (Air = 1)	Specific Volume (ft ³ /lb. at 70°F)	CGA Connection Number	Equipment Recommendations	Page No.
Hydrogen Bromide (HBr) Grade 2.8™ ULSI Purity	80.912	320	2.812 at 77°F	4.8	330	APC	28
					330	APC	28
Hydrogen Chloride (HCl) Electronic Research Technical ULSI Purity Ultra High Purity	36.461	613	1.268 at 68°F	10.6	330	AG3870 Series	30
					330	AG3870 Series	30
					330	CRH/ASB	33, 34
					330	AG3870 Series	30
					330	CRH/ASB	33, 34
Hydrogen Selenide (H₂Se) Research Semiconductor Purity ULSI Purity	80.976	124.9	2.80 at 77°F	4.8	660	AG3870 Series	30
					350	AG3870 Series	30
					350	AG3870 Series	30
Hydrogen Sulfide (H₂S) CP Research Technical	34.076	252	1.189 at 59°F	11.23	330	APC	28
					330	APC	28
					330	ARG	32
Isobutane (C₄H₁₀) CP Instrument Research Technical	58.124	30.7	2.01	6.5	510	SSE	22
					510	LABD	24
					510	HPD	26
					510	SSE	22
Isobutylene (C₄H₈) CP High Purity Research	56.108	24.3	1.997	6.7	510	SSE	22
					510	SSE	22
					510	HPD	26
Isopentane (C₅H₁₂) CP	72.151	-3.2	2.48	—	510	MV5700 Series	138
Krypton (Kr) Purified Research	83.800	—	2.899	4.6	580	HPE	27
					580	HPD	26
Methane (CH₄) Commercial CP High Pressure (3500 psig) High Pressure (6000 psig) Instrument Purified Research Technical Ultra High Purity Ultra Pure	16.043	—	0.554 at 32°F	23.7	350	TSD	23
					350	LABE	25
					695	AG3850 Series	55
					703	SG3610	56
					350	LABE	25
					350	LABE	25
					350	HPD	26
					350	TSD	23
					350	HPE	27
					350	HPE	27
Methyl Bromide (CH₃Br)	94.939	13	3.355 at 77°F	4.1	330/320*	LABD	24
Methyl Chloride (CH₃Cl)	50.488	58.7	1.74 at 32°F	7.6	510/660*	LABD	24
Methyl Mercaptan (CH₃SH)	48.107	15	1.66 at 68°F	8.0	330	APC	28
Monomethylamine (CH₃NH₂)	31.058	28.8	1.08 at 68°F	12.1	705	CRH	33
Natural Gas	17.656	—	0.55	24	350	TSD	23

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Neon (Ne)	20.183	—	0.696	19.2			
CP					580	LABE	25
First Run					580	TSD	23
High Purity					580	HPE	27
Research					580	HPD	26
Ultra High Purity					580	HPE	27
Ultra Pure					580	HPE	27
Nitric Oxide (NO)	30.006	—	1.04	1.04			
CP					660	CRH	33
Nitrogen (N₂)	28.013	—	0.967	13.8			
ECD Grade					580	HPE	27
Extra Dry					580	LABE	25
Grade 6™					580	HPE	27
High Pressure (3500 psig)					680	AG3850 Series	55
High Pressure (6000 psig)					677	SG3600 or SG3610	56
High Purity					580	LABE	25
Low Oxygen					580	LABE	25
NF—High Purity					580/960*	AG3660 Series	48
Oxygen Free					580	LABE/HPE	25, 27
Prepurified					580	LABE	25
Research					580	HPD	26
Semiconductor Purity					580	HPE	27
Ultra High Purity					580	HPE	27
Ultraplus™					580	HPE	27
Ultra Pure Carrier					580	HPE	27
Ultra Zero Ambient Monitoring Zero					580	HPE	27
Vehicle Emission Zero					580	HPE	27
VOC Free Nitrogen					580	HPE	27
Zero					580	LABE/HPE	25, 27
Nitrogen Dioxide (NO₂)	46.005	0.0 psig	1.58	4.7			
CP					660	MV5800 Series	138
Nitrous Oxide (N₂O)	44.013	745	1.53 at 68°F	8.7			
Atomic Absorption					326	SG9011	44
CP					326	SG9011	44
Electronic Grade					326	HPD	26
High Purity					326	LABD	24
Industrial					326	SG9011	44
Research					326	HPD	26
Semiconductor Purity					326	HPD	26
SFC Purity					326	MV5700 Series	138
Technical					326	SG9011	44
Ultra High Purity					326	HPD	26
Ultraplus™					326	HPD	26
USP					326/910*	AG3660 Series	48
Oxygen (O₂)	32.00	—	1.105 at 77°F	12.1			
Extra Dry					540	LABE	25
Grade 5™					540	LABE	25
Hydrocarbon Free UHP					540	HPE	27
MOS					540	HPE	27
Research					540	HPD	26
Ultra High Purity					540	HPE	27
Ultra Pure Carrier					540	HPE	27
Ultra Zero					540	HPE	27
USP					540/870*	AG3660 Series	48
Zero					540	LABE/HPE	25, 27
Perfluoropropane (C₃F₈)	188.020	100.1	6.69 at 68°F	2.02			
Semiconductor Purity					660	HPD	26

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Gas Grade	Mol. Weight	Vapor Pressure (psig at 70°F)	Specific Gravity (Air = 1)	Specific Volume (ft ³ /lb. at 70°F)	CGA Connection Number	Equipment Recommendations	Page No.
Phosgene (COCl₂)	98.916	10.7	3.48 at 77°F	3.9	660	MV5800 Series	138
Phosphine (PH₃)	33.998	593	1.184	11.4	350/632*	AG3870 Series	30
Electronic ULSI Purity					350/632*	AG3870 Series	30
Phosphorous (PF₅) Pentafluoride	125.966	400	4.46	3.1	330/660*	AG3870 Series	30
Propane (C₃H₈)	44.097	109	1.55 at 68°F	8.5	510	LABD	24
CP					510	LABD	24
Instrument					510	SSE	22
Natural					510	HPD	26
Research							
Propylene (C₃H₆)	42.081	136.6	1.48 at 68°F	9.06	510	LABD	24
CP					510	LABD	24
Polymer Purity					510	HPD	26
Research							
Silane (SiH₄)	32.118	—	1.114	12.0	350/632*	SG3862 or SG3865	47
Electronic Nitride					350	SG3862 or SG3865	47
Semiconductor Purity					350/632*	SG3862 or SG3865	47
Solar/VLSI					350	SG3862 or SG3865	47
ULSI Purity					350/632*	SG3862 or SG3865	47
Ultraplus™					350/632*	SG3862 or SG3865	47
Silicon Tetrafluoride (SiF₄)	104.080	—	3.63 at 68°F	3.7	330	APC	28
Semiconductor Purity							
Sulfur Dioxide (SO₂)	64.063	34.4	2.262	5.9	660	APC	28
Anhydrous					660	ARG	32
Commercial							
Sulfur Hexafluoride (SF₆)	146.051	320	5.11 at 68°F	2.5	590	LABD	24
Commercial					590	LABD	24
CP					590	HPD	26
Electronic					590	HPD	26
Etchant					590	LABD	24
Grade 3™					590	LABD	24
Grade 4™					590	LABD	24
Instrument Purity					590	LABD	24
SFC					590	MV5700 Series	138
ULSI Purity					590	HPD	26
Ultraplus™					590	HPD	26
Sulfur Tetrafluoride (SF₄)	108.058	140	3.783 at 68°F	3.6	330	CRH	33
Technical							
Trimethylamine (C₃H₉N)	59.112	13.3	2.087 at 68°F	6.4	705	CRH	33
Vinyl Methyl Ether (C₃H₆O)	58.080	10.6	1.99 at 68°F	6.7	290	MV5800 Series	138
Xenon (Xe)	131.300	—	4.560	2.9	580	HPE	27
Purified					580	HPD	26
Research							

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