

Pure Gases

Specialty Gases and Equipment Product Reference Guide

Engineering the Right Solutions



Airgas
You'll find it with us.™

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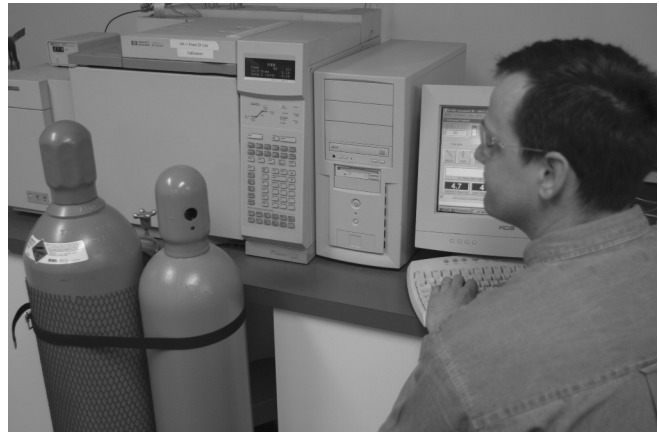
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Meeting the ISO 9001:2008 Standard for Quality Management Systems

Airgas is committed to providing top-quality products and services to meet the needs of our customers. Our procedures, processes and products are designed to meet or exceed your expectations. From raw material sourcing, cylinder preparation and filling, to delivery and customer service, we make sure you get the quality you expect.

The Airgas specialty gas network includes 11 national labs, 67 regional labs, two equipment centers, and one R&D center that support products including high-purity, rare, calibration, and specialty-blend gases — nearly three-quarters of specialty gas labs are ISO 9001 registered; eight are also ISO/IEC 17025 accredited. Meeting the highest standards for quality management is important to Airgas because it is important to our customers.

The International Organization for Standardization (ISO) is a worldwide federation of national standards bodies from more than 140 countries, one from each country. The ISO 9001:2008 standard specifies requirements for a quality management system for any organization that needs to demonstrate its ability to consistently provide products that meet customer and applicable regulatory requirements and aims to enhance customer satisfaction. Independent third-party registrars, like Quality Systems Registrars, Inc., conduct audits and grant certifications based on the ISO 9000 standards. QSR is accredited by RAB (United States) and RvA (Dutch).



Airgas maintains the latest analytical equipment and techniques to assure precise analytical data. The majority of Airgas' specialty gas facilities are certified to the ISO 9001:2008 standard for quality management systems, and seven laboratories are also accredited to the stringent ISO 17025 standards.



With more than 60 specialty gas facilities, Airgas maintains the industry's largest specialty gas production and analysis capabilities. Each Airgas facility maintains strict calibration standards. A systematic Round Robin testing procedure assures that each facility produces consistent products. So whether your specialty gas needs are across town or across the country, you can be sure of getting the quality and consistency you need.



Airgas developed and patented AcuGrav™, the company's proprietary computerized high-tolerance specialty gas filling system, enabling quality, precision, and consistent filling of multi-component blends. AcuGrav enables Airgas to reduce the variability in manual filling, providing greater accuracy, consistency and reliability for high-tolerance gas mixtures.

Specialty Gas Cylinder Size Comparison Chart

Specialty Gas Cylinder Size Comparison Chart							
Approximate Dimensions (inches)	Airgas	Linde	Air Liquide	Praxair	Matheson Trigas	MG	Air Liquide/Scott Specialty Gases
High Pressure Steel							
9 x 55	300	049	49	T	1L	300	K
9 x 51	200	044	44	K	1A	200	A
7 x 33	80	016	16	Q	2	80	B
7 x 19	35	007	7	G	3	35	C
2 x 12	LB	LBR	LB	LB	LB	LB	LB
4 x 26	E	005	MEDE	ANE	3L	E	ER
10 x 51	3HP	485	44H	6K	1U	6K	—
9 x 51	2HP	—	44H	3K	1H	3K	—
Aluminum							
10 x 52	300A	—	AT	—	—	—	—
8 x 48	150A	A31	30AL	AS	1R	150AL	AL
7 x 33	80A	A16	22AL	AQ	2R	80AL	BL
7 x 16	33A	A07	7AL	AG	3R	33AL	CL
4.5 x 15	9A	—	9AL	—	—	9AL	—

Additional Supply Modes —

Bulk Specialty Gases and Chemicals

Many Airgas specialty gases and chemicals can be supplied in bulk quantity. Products available in bulk quantity are identified throughout the catalog by the symbols shown below:



Tank trucks are used for over-the-road transportation of cryogenic liquids. Liquid product is then transfilled to cryogenic storage tanks at customer locations.



Tube trailers (T.T.) provide over-the-road shipment of high-pressure gases, gaseous chemicals, and gas mixtures. The trailers serve as on-site storage systems at customer locations.

Cryogenic Liquid Cylinders

Cryogenic liquids such as nitrogen and helium are supplied in dewars (low-pressure cryogenic tanks) for larger requirements near customers' point of use.



MicroBulk

As your need for higher gas volumes increases, time lost to changing out cylinders and gas lost to venting liquid dewars can take a bigger bite out of your bottom line. Airgas MicroBulk delivery is the perfect way to get the cost efficiencies of bulk deliveries, but in smaller volumes. Airgas' integrated MicroBulk delivery system eliminates the hassles and extra expense of cylinders and liquid dewars and provides a safer work environment.



If you are considering large-volume supply, a representative from Airgas can discuss your requirements and the economics of alternate supply systems.

Cylinder Identification

Packaging and Color

Airgas uses a teal paint to identify specialty gas cylinders. Here are the highlights of our cylinder packaging:

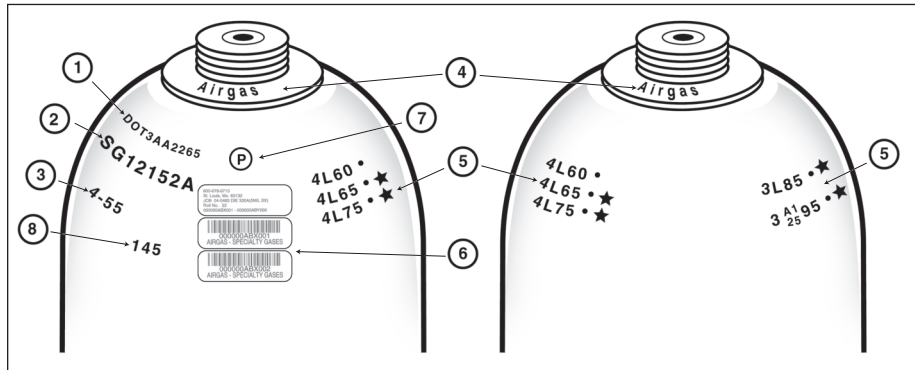
- A cylinder neck ring is permanently fixed below the base of the valve. Airgas does not use color coding to identify cylinder contents. Cylinder color should never be used to identify contents. Please read the contents label.
- A shoulder label indicates the product's shipping name and identification number. On pure products, a grade label is also applied to the cylinder shoulder. The shoulder label identifies cylinder contents.

Markings

Airgas specialty gas cylinders are stamped with markings designed to indicate ownership, specifications, pressure ratings, and other important data. Airgas also utilizes a bar code label for product identification and tracking.

1. Cylinder Specification:

- DOT—Department of Transportation (previously ICC – Interstate Commerce Commission), which is the regulatory body that governs the use of cylinders.



- Specification of the cylinder type of material of construction (e.g., 3AA).
- Service or working pressure in pounds per square inch (e.g., 2,265 psig).

2. Cylinder Serial Number

3. Date of Manufacture:

- This date (month-year) also indicates the original hydrostatic test.

4. Neck Ring Identification:

- The cylinder neck ring displays the name of the original owner of the cylinder.

5. Retest Markings:

- The format for a retest marking is: Month – Facility – Year – Plus Rating – Star Stamp.
- The + symbol (Plus Rating) indicates that the cylinder qualifies for 10% overfill.
- The ★ symbol (Star Stamp) indicates that the cylinder meets the requirements for 10-year retest, instead of a 5-year retest.

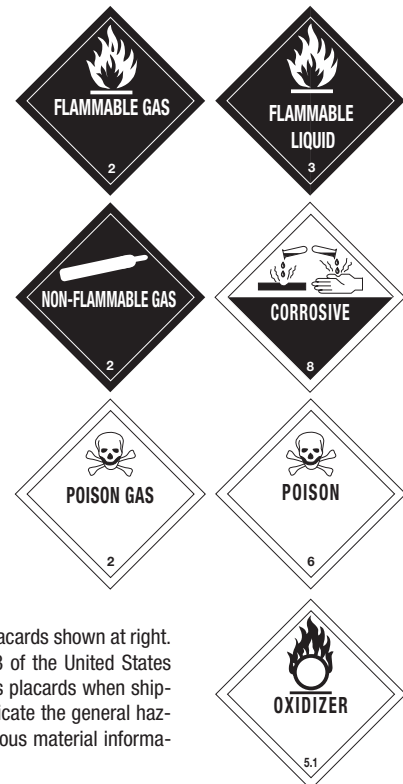
6. Bar Code Label:

- The bar code label provides a unique cylinder identifier and is used by computer systems to track cylinders throughout the fill process. As an optional service, we have the capability of tracking cylinders to and from customers.

7. Cylinder Manufacturer's Inspection Marking

8. Cylinder Tare (Empty) Weight:

- This value may be preceded by the letters TW.



D.O.T. Classifications

Your compressed gas cylinders will have one or more of the hazardous materials placards shown at right. The United States Department of Transportation (US DOT) in Title 49 Section 173 of the United States Code of Federal Regulations (49 CFR 173) requires the use of hazardous materials placards when shipping compressed gases. These hazardous materials placards are intended to indicate the general hazards associated with the contents of the gas in the cylinder. For complete hazardous material information, refer to the Material Data Safety Sheet (MSDS).

Acetylene (C₂H₂)

A colorless, flammable gas, with a garlic-like odor, that is dissolved in acetone.

Warning: Do not discharge this gas at pressures exceeding 15 psig.

Product Specifications	Minimum Purity	Air	Phosphine	Total Sulfurs
Atomic Absorption (AA)	99.6%	≤ 0.4%	≤ 25	≤ 25

Concentrations given are ppm by volume unless otherwise specified.

PRODUCT	Ordering Information					Equipment Recommendations		
	Cylinder Size	Contents ft ³	Standard Valve Outlet (CGA)	Product Number	Cylinder Pressure at 70°F (psig)	Description Product Number	Delivery Pressure Range (psig)	Page Number
Atomic Absorption (AA)	5	323	510	AC AA5	250	Single-Stage Regulator Y11-120A510	0-15	E55
	4	132	510	AC AA4	250			
Individual or Batch Certificate of Analysis available upon request.						Acetylene Filter Y80-73100		E154

Technical Data & Shipping Information	
Molecular Weight	26.0373
Specific Volume	14.24 cf/lb @70° F & 1 ATM
Flammability Limits in Air	2.5 - 100% in Air
U.S. DOT Name	Acetylene, Dissolved
ID Number	UN 1001
U.S. DOT Hazard Class	2.1
U.S. DOT Label	Flammable Gas
CAS Registry	74-86-2

Airgas offers unique acetylene automatic changeover systems, regulators and filters that allow Atomic Absorption detector users to get continuous acetylene supply while protecting the analyzer from acetone.

Airgas Quality Policy

The purpose of the Airgas Quality System is to continually improve our manufacturing and related processes to provide our customers with the highest product purity, consistency, and service.

Air

A colorless, odorless, nonflammable gas.
A synthetic blend of oxygen and nitrogen.

Not for breathing applications.

Grade	%O ₂	H ₂ O	THC	CO ₂	CO	NO _x	SO ₂
Semiconductor ^(#)	20-22	2	0.1	1 ⁽¹⁾	1 ⁽¹⁾		
Continuous Emissions Monitoring (CEM) ⁽²⁾	20-21		0.1	1	0.5	0.1	0.1
Vehicle Emissions Zero	18-21		1	400	1	0.1	
Vehicle Emissions Part 1065	20.5 – 21.5		0.05	10	1	0.02	
Ultra Zero	20-22	2	0.1	1 ⁽¹⁾	1 ⁽¹⁾		
Zero	20-22	3	1				
Dry	20-22	7					

Concentrations given are ppm by volume unless otherwise specified.

Notes

⁽¹⁾Combined CO and CO₂ impurities not to exceed 1 ppm.

⁽²⁾Meets all California B.A.R. 97 specifications.

^(#)Semiconductor grade valve material is brass for standard CGA connection. Cylinders can be provided with SS or DISS valves and additional proper regulator options upon request.

PRODUCT	Ordering Information					Equipment Recommendations		
	Cylinder Size	Contents ft ³	Standard Valve Outlet (CGA)	Product Number	Cylinder Pressure at 70°F (psig)	Description Product Number	Delivery Pressure Range (psig)	Page Number
Semiconductor	300	318	590	AI SM300	2,640	Single-Stage Regulators Y11-N145 * 590 Y11-244 * 590 Two-Stage Regulators Y12-N145 * 590 Y12-244 * 590 Y12-N245 * 590	A = 0-25 B = 0-50 D = 0-100 E = 0-150	E20 E11 E21 E12
	200	238	590	AI SM200	2,200			
Individual or Batch Certificate of Analysis available upon request.								
Continuous Emissions Monitoring (CEM)	300	318	590	AI CZ300	2,640			
	200	238	590	AI CZ200	2,200			
	150A	144	590	AI CZ15A	2,000			
	80A	84	590	AI CZ80A	2,200			
	33A	32	590	AI CZ33A	2,200			
Batch Certificate of Analysis included. Complies with 40 CFR Part 72.2. Meets all California BAR 97 Specifications.								
Vehicle Emissions Zero	300	318	590	AI VE300	2,640			
	200	238	590	AI VE200	2,200			
	150A	144	590	AI VE15A	2,000			
	80A	84	590	AI VE80A	2,200			
	33A	32	590	AI VE33A	2,200			
Individual or Batch Certificate of Analysis available upon request. For use in BAR 97 applications. Complies with 40 CFR Part 86.114-94								
Vehicle Emissions Part 1065	300	318	590	AI VE300	2,640			
	200	238	590	AI VE200	2,200			
	150A	144	590	AI VE15A	2,000			
	80A	84	590	AI VE80A	2,200			
	33A	32	590	AI VE33A	2,200			
Batch Certificate of Analysis included. Complies with 40 CFR Part 1065.750								

* Insert Delivery Pressure Range Code

Air Cont.

A colorless, odorless, nonflammable gas.
A synthetic blend of oxygen and nitrogen.

Not for breathing applications.

PRODUCT	Ordering Information					Equipment Recommendations		
	Cylinder Size	Contents ft ³	Standard Valve Outlet (CGA)	Product Number	Cylinder Pressure at 70°F (psig)	Description Product Number	Delivery Pressure Range (psig)	Page Number
Ultra Zero	300	318	590	AI UZ300	2,640	Two-Stage Regulators Y12-N245 * 590 Y12-244 * 590 Single-Stage Regulators Y11-N245 * 590 Y11-244 * 590	A = 0-25 B = 0-50 D = 0-100 E = 0-150	E21 E12 E20 E11
	200	238	590	AI UZ200	2,200			
	80	94	590	AI UZ80	2,200			
	35	37	590	AI UZ35	2,200			
	Individual or Batch Certificate of Analysis available upon request.							
Zero	300	318	590	AI Z300	2,640			
	200	238	590	AI Z200	2,200			
	80	94	590	AI Z80	2,200			
	35	37	590	AI Z35	2,200			
	An individual or batch analysis is available upon request at a nominal charge.							
Dry	300	318	590	AI D300	2,640			
	200	238	590	AI D200	2,200			
	80	94	590	AI D80	2,200			
	35	37	590	AI D35	2,200			
	An individual or batch analysis is available upon request at a nominal charge.							

* Insert Delivery Pressure Range Code

Technical Data & Shipping Information	
Molecular Weight	28.97
Specific Volume	13.354 cf/lb @70° F & 1 ATM
Flammability Limits in Air	Nonflammable
U.S. DOT Name	Air, Compressed
ID Number	UN 1002
U.S. DOT Hazard Class	2.2
U.S. DOT Label	Nonflammable Gas
CAS Registry	N/A

Ask about an Airgas gas generator for use with your FID applications. We offer a wide range of gas generators all with carefully matched components engineered for easy installation, operation, and long-term reliability. With Airgas, you'll find the right gases and equipment for even the most sensitive applications. Pictured is the Airgas TOC-1250 Zero Air Generator.



Airgas Quality Policy

The purpose of the Airgas Quality System is to continually improve our manufacturing and related processes to provide our customers with the highest product purity, consistency, and service.

Ammonia (NH₃)

A colorless, toxic, alkaline, flammable, liquefied gas with a pungent odor, irritating to eyes, skin and mucous membranes in high concentrations.

Grade	% Purity	O ₂	H ₂ O	THC	CO ₂	CO	H ₂
Semiconductor ^(#) ⁽¹⁾	99.99994	0.1	0.2	0.05	0.1	0.05	0.1
Electronic	99.9995	1	3	1	1		
Premium	99.995		33				
Anhydrous	99.99						

Concentrations given are ppm by volume unless otherwise specified.

Notes

^(#)Semiconductor grade valve material is SS, DISS 720 only.

⁽¹⁾ Metals analysis available for Sb, Cd, Ca, Cr, Co, Cu, Ga, Pb, Li, Mg, Mn, Mo, Ni, K, Si, Na, Te, Sn, Zn

PRODUCT	Ordering Information					Equipment Recommendations		
	Cylinder Size	Contents lbs	Standard Valve Outlet (CGA, DISS)	Product Number	Cylinder Pressure at 70°F (psig)	Description Product Number	Delivery Pressure Range (psig)	Page Number
Semiconductor	300	55	720	AM SM300DS	114	Single-Stage Regulator Y11-E464C660	0-100	E29
	Certificate of Analysis provided upon request.							
Electronic	200	52	660	AM EL200	114	Cross Purge Y99-CPA4660	0-100	E50
	150A	35	660	AM EL15A	114			
	80	21	660	AM EL80	114			
Certificate of Conformance provided upon request.						Tee Purge Y99-TP4C660		E51
Premium	200	52	660	AM PR200	114	Single-Stage Regulator Y11-C520C705	0-50	E45
	150A	35	660	AM PR15A	114			
	80	21	660	AM PR80	114			
	Certificate of Conformance provided upon request.							
						Tee Purge Y99-TP4C705		E51
Anhydrous	400 ⁽²⁾	150	240/705	AM AH400	114			
	200	52	240/705	AM AH200	114			
	80	21	240/705	AM AH80	114			
	Certificate of Conformance provided upon request.							
⁽²⁾ Available only in Anhydrous grade								

Technical Data & Shipping Information		Ask your Airgas® representative about our unmatched bulk ammonia supply capabilities.
Molecular Weight	17.0305	
Specific Volume	22.72 cf/lb @70° F & 1 ATM	
Flammability Limits in Air	15 - 28% in Air	
U.S. DOT Name	Ammonia, Anhydrous	
ID Number	UN 1005	
U.S. DOT Hazard Class	2.2	
U.S. DOT Label	Inhalation Hazard	
CAS Registry	7664-41-7	

Airgas Quality Policy

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Argon (Ar)

A colorless, odorless, nonflammable gas or a colorless, odorless, nonflammable cryogenic liquid.

Grade	% Purity	O ₂	H ₂ O	THC	CO	CO ₂	N ₂
Research Plus	99.9999	0.1	0.2	0.1	0.1	0.1	2
Research ⁽¹⁾	99.9997	0.2	0.5	0.2	0.5	0.5	3
Ultra Pure Carrier (UPC)	99.9993	0.5	0.5	0.3	1 ⁽²⁾	1 ⁽²⁾	5
Semiconductor ^(#)	99.999	1	1	0.5	1 ⁽²⁾	1 ⁽²⁾	5
Ultra High Purity (UHP)	99.999	1	1	0.5	1 ⁽²⁾	1 ⁽²⁾	5
Laser PLUS TM	99.998		5	1			
Zero Grade	99.998	4	3	0.5			
High Purity/High Pressure	99.998	4	3				

Concentrations given are ppm by volume unless otherwise specified.

Notes

⁽¹⁾ The total impurities shall not exceed 3ppm.



⁽²⁾ Total impurity CO + CO₂

^(#) Semiconductor grade valve material is brass for standard CGA connection. Cylinders can be provided with SS or DISS valves and additional proper regulator options upon request.

PRODUCT	Ordering Information					Equipment Recommendations		
	Cylinder Size	Contents ft ³	Standard Valve Outlet (CGA)	Product Number	Cylinder Pressure at 70°F (psig)	Description Product Number	Delivery Pressure Range (psig)	Page Number
Research Plus	300	336	580	AR RP300	2,640	Single-Stage Regulators Y12-N145 * 580 Two-Stage Regulators Y11-N145 * 580 Y11-245 * 580	A = 0-25 B = 0-50 D = 0-100 E = 0-150 F = 0-250 G = 0-500**	E21 E20
	200	251	580	AR RP200	2,200			
150A	152	580	AR RP15A	2,000				
Certificate of Analysis included.								
Research	300	336	580	AR R300	2,640			
	200	251	580	AR R200	2,200			
	150A	152	580	AR R15A	2,000			
	80	99	580	AR R80	2,200			
	35	39	580	AR R35	2,200			
Certificate of Analysis included.								
Ultra Pure Carrier (UPC)	300	336	580	AR UPC300	2,640			
	200	251	580	AR UPC200	2,200			
	80	99	580	AR UPC80	2,200			
	35	39	580	AR UPC35	2,200			
	Individual or Batch Certificate of Analysis available upon request.							
Semiconductor	300	336	580	AR SM300	2,640			
	200	251	580	AR SM200	2,200			
Individual or Batch Certificate of Analysis available upon request.						* Insert Delivery Pressure Range Code		

Argon (Ar) Cont.

A colorless, odorless, nonflammable gas or a colorless, odorless, nonflammable cryogenic liquid.

PRODUCT	Ordering Information					Equipment Recommendations		
	Cylinder Size	Contents ft ³	Standard Valve Outlet (CGA)	Product Number	Cylinder Pressure at 70°F (psig)	Description Product Number	Delivery Pressure Range (psig)	Page Number
Ultra High Purity (UHP) 	300	336	580	AR UHP300	2,640	Two-Stage Regulator Y12-244 * 580 Y12-N245 * 580 Single-Stage Regulator Y11-244 * 580 Y11-N245 * 580	A = 0-25 B = 0-50 D = 0-100 E = 0-150 F = 0-250 G = 0-500**	E12 E21 E11 E20
	200	251	580	AR UHP200	2,200			
	80	99	580	AR UHP80	2,200			
	35	39	580	AR UHP35	2,200			
	Individual or Batch Certificate of Analysis available upon request.							
Zero 	300	336	580	AR Z300	2,640	Two-Stage Regulator Y12-244 * 580 Y12-N245 * 580 Single-Stage Regulator Y11-244 * 580 Y11-N245 * 580	A = 0-25 B = 0-50 D = 0-100 E = 0-150 F = 0-250 G = 0-500**	E12 E21 E11 E20
	200	251	580	AR Z200	2,200			
	80	99	580	AR Z80	2,200			
	35	39	580	AR Z35	2,200			
	Individual or Batch Certificate of Analysis available upon request.							
High Pressure / High Purity	300	336	580	AR HP300	2,640	Two-Stage Regulator Y12-244 * 580 Y12-N245 * 580 Single-Stage Regulator Y11-244 * 580 Y11-N245 * 580	A = 0-25 B = 0-50 D = 0-100 E = 0-150 F = 0-250 G = 0-500**	E12 E21 E11 E20
	200	251	580	AR HP200	2,200			
	80	99	580	AR HP80	2,200			
	35	39	580	AR HP35	2,200			
	6K	566	580	AR HP6K	6,000			
	3K	382	580	AR HP3K	3,500			
Certificate of Analysis included.								
Liquid	Various grades, sizes, and volumes available upon request. Individual or Batch Certificate of Analysis available upon request.					* Insert Delivery Pressure Range Code ** Single Stage Only		

Technical Data & Shipping Information		For LaserPLUS™ Applications, see SA17.
Molecular Weight	39.948	
Specific Volume	9.68 cf/lb @70° F & 1 ATM	
Flammability Limits in Air	Nonflammable	
U.S. DOT Name	Argon, Compressed	
ID Number	UN 1006	
U.S. DOT Hazard Class	2.2	
U.S. DOT Label	Nonflammable Gas	
CAS Registry	7440-37-1	



Airgas offers a wide range of gas supply modes, including high-pressure cylinders, liquid cylinders (or dewars), MicroBulk and bulk. Your Airgas specialty gas representative can help you decide which option is best for your operation. Be sure to ask about our unique line of specialty gas equipment, including automatic changeover systems for uninterrupted gas supply.

Airgas Quality Policy

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Boron Trichloride (BCl₃)

A colorless, corrosive, highly toxic, nonflammable, liquefied gas with a pungent, irritating odor.

Product Specifications	Minimum Purity
Chemically Pure (CP)	99.9%

PRODUCT	Ordering Information					Equipment Recommendations		
	Cylinder Size	Contents lbs	Standard Valve Outlet (CGA)	Product Number	Cylinder Pressure at 70°F (psig)	Description Product Number	Delivery Pressure Range (psig)	Page Number
Chemically Pure (CP)	200	70	660	BC CP200	4.4	Single-Stage Regulator Y11-C440N Cross Purge Manual Flow Control Valve Y99-CPA4330 Y30-311660 Y30-411660	0-100	E35
	80	40	660	BC CP80	4.4			E50
	35	10	660	BC CP35	4.4			E112 E112
Certificate of Conformance provided upon request.								

Technical Data & Shipping Information	
Molecular Weight	117.170
Specific Volume	3.30 cf/lb @70° F & 1 ATM
Flammability Limits in Air	Nonflammable
U.S. DOT Name	Boron Trichloride
ID Number	UN 1741
U.S. DOT Hazard Class	2.3
U.S. DOT Label	Inhalation Hazard, Poison Gas
CAS Registry	10294-34-5

Boron Trifluoride (BF₃)

A colorless, highly toxic and corrosive, nonflammable gas with a strong, suffocating odor. Fumes strongly in moist air.

Product Specifications	Minimum Purity
Chemically Pure (CP)	99.9%

PRODUCT	Ordering Information					Equipment Recommendations		
	Cylinder Size	Contents lbs	Standard Valve Outlet (CGA)	Product Number	Cylinder Pressure at 70°F (psig)	Description Product Number	Delivery Pressure Range (psig)	Page Number
Chemically Pure (CP)	200	50	330	BF CP200	800	Two-Stage Regulator Y12-E444A330 Y12-E444B330 Y12-E444D330	0-30 0-60 0-100	E29 E29 E29
	35	6	330	BF CP35	800			
	Certificate of Conformance available upon request.					Single-Stage Regulator Y11-E444A330 Y11-E444B330 Y11-E444C330 Y11-E444D330 Y11-E464A330 Y11-E464B330 Y11-E464C330 Y11-E464E330	0-30 0-60 0-100 0-150 0-30 0-50 0-100 0-150	E29 E29 E29 E29 E29 E29 E29 E29
						Cross Purge Y99-CPA4330		E50

Technical Data & Shipping Information	
Molecular Weight	67.806
Specific Volume	5.70 cf/lb @70° F & 1 ATM
Flammability Limits in Air	Nonflammable
U.S. DOT Name	Boron Trifluoride, Compressed
ID Number	UN 1008
U.S. DOT Hazard Class	2.3
U.S. DOT Label	Inhalation Hazard, Poison Gas
CAS Registry	7637-07-2

Airgas Quality Policy

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1,3-Butadiene (C₄H₆)

A colorless, flammable, liquefied gas with a mildly aromatic odor.

Product Specifications	Minimum Purity	Butadiene Dimer	Other C ₄ 's	H ₂ O	Sulfur
Instrument	99.5%	≤ 400	≤ 4000	≤ 5	≤ 1
Chemically Pure (CP)	99.0%				

Concentrations given are ppm by volume unless otherwise specified.

PRODUCT	Ordering Information					Equipment Recommendations		
	Cylinder Size	Contents lbs	Standard Valve Outlet (CGA)	Product Number	Cylinder Pressure at 70°F (psig)	Description Product Number	Delivery Pressure Range (psig)	Page Number
Instrument	350 LP5	129 25	510 510	B3 I350 B3 ILP5	21.4 21.4	Single-Stage Regulator Y11-LC241A510	0-25	E16
	Certificate of Conformance provided upon request.							
Chemically Pure (CP)	350 LP5	129 25	510 510	B3 CP350 B3 CPLP5	21.4 21.4	Single-Stage Regulator Y11-LC241A510	0-25	E16
	Certificate of Conformance available upon request.							

Technical Data & Shipping Information	
Molecular Weight	54.09
Specific Volume	7.15 cf/lb @70° F & 1 ATM
Flammability Limits in Air	2.0 - 12% in Air
U.S. DOT Name	Butadienes, Stabilized
ID Number	UN 1010
U.S. DOT Hazard Class	2.1
U.S. DOT Label	Flammable Gas
CAS Registry	106-99-0

Airgas Quality Policy

The purpose of the Airgas Quality System is to continually improve our manufacturing and related processes to provide our customers with the highest product purity, consistency, and service.

n-Butane (C₄H₁₀)

A flammable, colorless, liquefied gas with gasoline-like odor.

Product Specifications	Purity	N ₂	O ₂	Other HC's	H ₂ O	Sulfurs
Research	99.99%	≤ 20	≤ 5	≤ 90*	≤ 3	≤ 1
Instrument	99.5%	≤ 400	≤ 100	≤ 4,500*	≤ 5	≤ 1
Chemically Pure (CP)	99.0%					

Concentrations given are ppm by volume unless otherwise specified.

Analysis based on liquid phase.

*Other HC's are defined as Iso-Butane, N-Pentane, Iso-Pentane, Butene, Ethane, and Propane.

PRODUCT	Ordering Information					Equipment Recommendations					
	Cylinder Size	Contents lbs	Standard Valve Outlet (CGA)	Product Number	Cylinder Pressure at 70°F (psig)	Description Product Number	Delivery Pressure Range (psig)	Page Number			
Research	350	116	510	NB R350	16	Single-Stage Regulator Y11-LC241A510	0-25	E16			
	LP5	23	510	NB RLP5	16						
	LP1	5	510	NB RLP1	16						
Individual Certificate of Analysis available upon request.											
Instrument	1/2 TON	485	510	NB IHTN	16						
	350	116	510	NB I350	16						
	LP5	23	510	NB ILP5	16						
	Individual or Batch Certificate of Analysis available upon request.										
Chemically Pure (CP)	1/2 TON	485	510	NB CPHTN	16						
	350	116	510	NB CP350	16						
	LP5	23	510	NB CPLP5	16						
	Individual or Batch Certificate of Analysis available upon request.										

Technical Data & Shipping Information	
Molecular Weight	58.1222
Specific Volume	6.66 cf/lb @70° F & 1 ATM
Flammability Limits in Air	1.6 - 8.4% in Air
U.S. DOT Name	Butane
ID Number	UN 1011
U.S. DOT Hazard Class	2.1
U.S. DOT Label	Flammable Gas
CAS Registry	106-97-8

Airgas Quality Policy

The purpose of the Airgas Quality System is to continually improve our manufacturing and related processes to provide our customers with the highest product purity, consistency, and service.

1-Butene (1-C₄H₈)

A flammable non-corrosive and non-toxic, liquified gas.

Product Specifications	Minimum Purity	Other Hydrocarbons	N ₂	O ₂	H ₂ O
Instrument	99.5%	≤ 4500	≤ 400	≤ 100	≤ 5
Chemically Pure (CP)	99.0%				

Concentrations given are ppm by volume unless otherwise specified.

PRODUCT	Ordering Information					Equipment Recommendations		
	Cylinder Size	Contents lbs	Standard Valve Outlet (CGA)	Product Number	Cylinder Pressure at 70°F (psig)	Description Product Number	Delivery Pressure Range (psig)	Page Number
Instrument	350 LP5	120	510	B1 I350	23.5	Single-Stage Regulator Y11-LC241A510	0-25	E16
	24	510	B1 ILP5	23.5				
Certificate of Conformance available upon request.								
Chemically Pure (CP)	350 LP5	120	510	B1 CP350	23.5	Single-Stage Regulator Y11-LC241A510	0-25	E16
	24	510	B1 CPLP5	23.5				
Certificate of Conformance available upon request.								

Technical Data & Shipping Information	
Molecular Weight	56.1063
Specific Volume	6.90 cf/lb @70° F & 1 ATM
Flammability Limits in Air	1.6 - 9.3%
U.S. DOT Name	Butylene
ID Number	UN 1012
U.S. DOT Hazard Class	2.1
U.S. DOT Label	Flammable Gas
CAS Registry	106-98-9

2-Butenes (2-C₄H₈)

A flammable, colorless, liquified gas.

Product Specifications	Minimum Purity
Chemically Pure (CP)	99.5%

PRODUCT	Ordering Information					Equipment Recommendations		
	Cylinder Size	Contents lbs	Standard Valve Outlet (CGA)	Product Number	Cylinder Pressure at 70°F (psig)	Description Product Number	Delivery Pressure Range (psig)	Page Number
Chemically Pure (CP)	1/2 TON	523	510	2B CPHTN	15	Single-Stage Regulator Y11-LC241A510	0-25	E16
	Certificate of Conformance available upon request.							

Technical Data & Shipping Information	
Molecular Weight	56.1063
Specific Volume	6.90 cf/lb @70° F & 1 ATM
Flammability Limits in Air	1.7 - 9.3% in Air
U.S. DOT Name	Butylene
ID Number	UN 1012
U.S. DOT Hazard Class	2.1
U.S. DOT Label	Flammable Gas
CAS Registry	107-01-7

cis-2-Butene (cis-2-C₄H₈) A colorless, flammable, liquefied gas with a slightly aromatic odor.

Product Specifications	Minimum Purity
Chemically Pure (CP)	99.0%

PRODUCT	Ordering Information					Equipment Recommendations		
	Cylinder Size	Contents lbs	Standard Valve Outlet (CGA)	Product Number	Cylinder Pressure at 70°F (psig)	Description Product Number	Delivery Pressure Range (psig)	Page Number
Chemically Pure (CP)	LP5	24	510	T2 CPLP5	15.2	Single-Stage Regulator Y11-LC241A510	0-25	E16
	Certificate of Conformance available upon request.							

trans-2-Butene (trans-2-C₄H₈) A flammable, colorless, noncorrosive and nontoxic liquefied gas.

Product Specifications	Minimum Purity
Chemically Pure (CP)	99.0%

PRODUCT	Ordering Information					Equipment Recommendations		
	Cylinder Size	Contents lbs	Standard Valve Outlet (CGA)	Product Number	Cylinder Pressure at 70°F (psig)	Description Product Number	Delivery Pressure Range (psig)	Page Number
Chemically Pure (CP)	LP5	24	510	TT CPLP5	12.7	Single-Stage Regulator Y11-LC241A510	0-25	E16
	Certificate of Conformance available upon request.							

Technical Data & Shipping Information	
Molecular Weight	56.1063
Specific Volume	6.90 cf/lb @70° F & 1 ATM
Flammability Limits in Air	
cis-2-Butene	1.7 - 9% in Air
trans-2-Butene	1.6 - 9.7% in Air
U.S. DOT Name	Butylene
ID Number	UN 1012
U.S. DOT Hazard Class	2.1
U.S. DOT Label	Flammable Gas
CAS Registry	
cis-2-Butene	590-18-1
trans-2-Butene	624-64-6

Carbon Dioxide (CO₂)

A colorless, odorless nonflammable, liquefied gas.

Grade	% Purity	H ₂ O	THC	Ar	CO	N ₂	O ₂
SFE ⁽¹⁾	99.9995 ⁽³⁾	1	0.5 ⁽⁴⁾	1	1	5	1
SFC ⁽²⁾	99.999 ⁽³⁾	3	1 ⁽⁴⁾	1	1	5	1
Research Plus	99.999 ⁽³⁾	2	0.5			4	1
Research	99.999 ⁽³⁾	3	1	1	1	5	1
Semiconductor ^(#)	99.995	5	5 ⁽⁴⁾				
LaserPlus™ - Ultra	99.996 ⁽⁵⁾	5	1				10
LaserPlus™	99.995 ⁽⁵⁾	5	5				
Laser™	99.99 ⁽⁵⁾	10	10			70	20
Pure Clean	99.995	5	5 ⁽⁴⁾				
Instrument/Coleman	99.99	10	10			70	20
Refrigerant (R744)	99.99	10					
Anaerobic	99.9			10			10
Bone Dry	99.9	10					

Concentrations given are ppm by volume unless otherwise specified.

Notes

⁽¹⁾ SFE grade also carries a Halocarbon spec of ≤ 1 ppb. THC spec is <0.5ppm for C1-C6 hydrocarbons and <10ppb for C7-C26 hydrocarbons.

⁽²⁾ SFC grade also carries a Halocarbon spec of ≤ 10 ppb.

⁽³⁾ Total indicated components must be less than stated impurity.

⁽⁴⁾ C1 through C6

⁽⁵⁾ Details of Laser grades can be found in the Special Applications section.

^(#) Semiconductor grade valve material is brass for standard CGA connection. Cylinders can be provided with SS or DISS valves and additional proper regulator options upon request.

PRODUCT	Ordering Information					Equipment Recommendations					
	Cylinder Size	Contents lbs	Standard Valve Outlet (CGA)	Product Number	Cylinder Pressure at 70°F (psig)	Description Product Number	Delivery Pressure Range (psig)	Page Number			
SFE	150A	39	320	CD SFE15AS	835	Cylinder Connection Kit Y99-TP18C320K	N/A	E148			
	Certificate of Analysis included. Equipped with siphon tube. Up to 2000 psig Helium head option available.										
SFC	150A	39	320	CD SFC15AS	835	Cylinder Connection Kit Y99-TP18C320K	N/A	E148			
	Certificate of Analysis included.										
Research	200	60	320	CD R200	835	Two-Stage Regulators Y12-N245 * 320 Y12-244 * 320 Single-Stage Regulators Y11-N245 * 320 Y11-244 * 320	A = 0-25 B = 0-50 D = 0-100 E = 0-150 F = 0-250 G = 0-500**	E21 E12			
	150A	39	320	CD R15A	835						
Certificate of Analysis included.											
Individual or Batch Certificate of Analysis available upon request.											
Semiconductor	200	60	320	CD SM200	835	Two-Stage Regulators Y12-N245 * 320 Y12-244 * 320 Single-Stage Regulators Y11-N245 * 320 Y11-244 * 320	A = 0-25 B = 0-50 D = 0-100 E = 0-150 F = 0-250 G = 0-500**	E21 E12			
	150A	39	320	CD SM15A	835						
Individual or Batch Certificate of Analysis available upon request.											
Individual or Batch Certificate of Analysis available upon request.											
Pure Clean	200	60	320	CD PC200S	835	Two-Stage Regulators Y12-N245 * 320 Y12-244 * 320 Single-Stage Regulators Y11-N245 * 320 Y11-244 * 320	A = 0-25 B = 0-50 D = 0-100 E = 0-150 F = 0-250 G = 0-500**	E20 E11			
	Individual or Batch Certificate of Analysis available upon request.										
Instrument/Coleman	200	60	320	CD I200S	835				Two-Stage Regulators Y12-N245 * 320 Y12-244 * 320 Single-Stage Regulators Y11-N245 * 320 Y11-244 * 320	A = 0-25 B = 0-50 D = 0-100 E = 0-150 F = 0-250 G = 0-500**	E20 E11
	80	26	320	CD I80S	835						
	Individual or Batch Certificate of Analysis available upon request.										
For cooling applications order this product with a siphon tube for liquid withdrawal. Add "S" to the end of the product number.											
Refrigerant	200	60	320	REFR744R200	835	Two-Stage Regulators Y12-N245 * 320 Y12-244 * 320 Single-Stage Regulators Y11-N245 * 320 Y11-244 * 320	A = 0-25 B = 0-50 D = 0-100 E = 0-150 F = 0-250 G = 0-500**	E9 E8			
	80	26	320	REFR744R80	835						
	Individual or Batch Certificate of Analysis available upon request.										
Anaerobic	200	60	320	CD AN200	835				Two-Stage Regulators Y12-N245 * 320 Y12-244 * 320 Single-Stage Regulators Y11-N245 * 320 Y11-244 * 320	A = 0-25 B = 0-50 D = 0-100 E = 0-150 F = 0-250 G = 0-500**	E9 E8
	80	26	320	CD AN80	835						
	Individual or Batch Certificate of Analysis available upon request.										
Bone Dry	200	60	320	CD BD200	835	Two-Stage Regulators Y12-N245 * 320 Y12-244 * 320 Single-Stage Regulators Y11-N245 * 320 Y11-244 * 320	A = 0-25 B = 0-50 D = 0-100 E = 0-150 F = 0-250 G = 0-500**	E9 E8			
	80	26	320	CD BD80	835						
	Individual or Batch Certificate of Analysis available upon request.										
Individual or Batch Certificate of Analysis available upon request.											

* Insert Delivery Pressure Range Code
** Single Stage Only

* Insert Delivery Pressure Range Code
** Single Stage Only

Carbon Dioxide (CO₂) Cont. A colorless, odorless nonflammable, liquefied gas.

Technical Data & Shipping Information		For LaserPLUS™ Applications, see SA17. Need Dry Ice? You'll find it with us. Ask your local Airgas representative.
Molecular Weight	44.0095	
Specific Volume	8.79 cf/lb @70° F & 1 ATM	
Flammability Limits in Air	Nonflammable	
U.S. DOT Name	Carbon Dioxide	
ID Number	UN 1013	
U.S. DOT Hazard Class	2.2	
U.S. DOT Label	Nonflammable Gas	
CAS Registry	124-38-9	



Ask about our unique SFE/SFC Cylinder connection designed specifically for supercritical applications.

Carbon Monoxide (CO)

A flammable, odorless, colorless, and toxic gas.

Grade	% Purity	O ₂	H ₂ O	CO ₂	THC	H ₂	N ₂	Fe (CO) ₅	Ni (CO) ₄	Sulfurs
Research Plus	99.999	2	2	2	2	1	5			
Semiconductor ^(#)	99.997	3	1	3	1	1	10	0.1 ppmw	0.1 ppmw	0.5
Research	99.99	5	3		5	1	40			
UHP**	99.9									
Chemically Pure (CP)	99.3									

Concentrations given are ppm by volume unless otherwise specified.

Notes

^(#)Semiconductor grade valve material is brass for standard CGA connection. Cylinders can be provided with SS or DISS valves and additional proper regulator options upon request.

**Total Impurities ≤ 1000 ppm

PRODUCT	Ordering Information					Equipment Recommendations		
	Cylinder Size	Contents ft ³	Standard Valve Outlet (CGA)	Product Number	Cylinder Pressure at 70°F (psig)	Description Product Number	Delivery Pressure Range (psig)	Page Number
Research Plus	300A	230	350	CM RP3HA	2,000	Two-Stage Regulators Y12-N245 * 350 Y12-244 * 350 Single-Stage Regulators Y11-N245 * 350 Y11-244 * 350	A = 0-25 B = 0-50 D = 0-100 E = 0-150 F = 0-250 G = 0-500**	E21 E12 E20 E11
	150A	140	350	CM RP15A	2,000			
80A	75	350	CM RP80A	2,000				
Certificate of Analysis included.								
Semiconductor	300A	230	350	CM SM3HA	2,000			
	150A	140	350	CM SM15A	2,000			
Individual or Batch Certificate of Analysis available upon request.								
Research	300	240	350	CM R300	2,000			
	200	180	350	CM R200	1,675			
	150A	140	350	CM R15A	2,000			
	80	70	350	CM R80	1,675			
Certificate of Analysis included.								
Ultra High Purity (UHP)	300	240	350	CM UHP300	2,000			
	200	180	350	CM UHP200	1,675			
	150A	140	350	CM UHP15A	2,000			
	80	70	350	CM UHP80	1,675			
Individual or Batch Certificate of Analysis available upon request.								
Chemically Pure (CP)	300	240	350	CM CP300	2,000			
	200	180	350	CM CP200	1,675			
	150A	140	350	CM CP15A	2,000			
	80	70	350	CM CP80	1,675			
Individual or Batch Certificate of Analysis available upon request.								
Industrial	300	240	350	CM 300	2,000			
	200	180	350	CM 200	1,675			
Individual or Batch Certificate of Analysis available upon request.								

* Insert Delivery Pressure Range Code
** Single Stage Only

Technical Data & Shipping Information

Molecular Weight	28.010
Specific Volume	13.81 cf/lb @70° F & 1 ATM
Flammability Limits in Air	12.5 - 74% in Air
U.S. DOT Name	Carbon Monoxide
ID Number	UN 1016
U.S. DOT Hazard Class	2.3
U.S. DOT Label	Inhalation Hazard & Flammable Gas
CAS Registry	630-08-0

Chlorine (Cl₂)

A greenish-yellow, liquefied gas with a choking odor. May react violently with ammonia, hydrocarbons and hydrogen.

Grade	% Purity	O ₂	CO	CO ₂	N ₂	THC
Electronic	99.99	50	5	5		1
Ultra High Purity	99.9	100		50	100	
High Purity	99.5 ⁽¹⁾					

Concentrations given are ppm by volume unless otherwise specified.

Notes

⁽¹⁾ Total impurities <5000ppm

PRODUCT	Ordering Information					Equipment Recommendations				
	Cylinder Size	Contents lbs	Standard Valve Outlet (CGA)	Product Number	Cylinder Pressure at 70°F (psig)	Description Product Number	Delivery Pressure Range (psig)	Page Number		
Semiconductor	200	90	660	CL SM200	85	Single-Stage Positive Seal Regulators Y11-E444 * 660 Y11-E464 * 660 Cross Purge Assembly Y99-CPA4660 Tee Purge Y99-TP4C660	A = 0-25 B = 0-50 D = 0-100	E29 E29 E50 E51		
	80	40	660	CL SM80	85					
Certificate of Conformance available upon request.										
Ultra High Purity (UHP)	200	90	660	CL UHP200	85					
	Certificate of Conformance available upon request.									
High Purity (HP)	200	90	660	CL HP200	85					
	Certificate of Conformance available upon request.									

* Insert Delivery Pressure Range Code

Technical Data & Shipping Information

Molecular Weight	70.906
Specific Volume	5.46 cf/lb @70° F & 1 ATM
Flammability Limits in Air	Oxidizer
U.S. DOT Name	Chlorine
ID Number	UN 1017
U.S. DOT Hazard Class	2.3, 8
U.S. DOT Label	Inhalation Hazard & Corrosive
CAS Registry	7782-50-5

For more details, see Process Chemicals in Special Applications section.

Airgas Quality Policy

The purpose of the Airgas Quality System is to continually improve our manufacturing and related processes to provide our customers with the highest product purity, consistency, and service.

Dimethylamine (CH₃)₂NH

A colorless, flammable liquefied gas with a characteristic fishy or ammonia-like odor.

Product Specifications	Minimum Purity
Chemically Pure (CP)	99.5%

PRODUCT	Ordering Information					Equipment Recommendations		
	Cylinder Size	Contents lbs	Standard Valve Outlet (CGA)	Product Number	Cylinder Pressure at 70°F (psig)	Description Product Number	Delivery Pressure Range (psig)	Page Number
Chemically Pure (CP)	1/2 TON	550	705	DM CPHTN	26	Manual Flow Control Valve Y30-411705	N/A	E112
	350	125	705	DM CP350	26			
Certificate of Conformance available upon request.								

Technical Data & Shipping Information	
Molecular Weight	45.0837
Specific Volume	8.58 cf/lb @70° F & 1 ATM
Flammability Limits in Air	2.8 - 14.4% in Air
U.S. DOT Name	Dimethylamine, Anhydrous
ID Number	UN 1032
U.S. DOT Hazard Class	2.1
U.S. DOT Label	Flammable Gas
CAS Registry	124-40-03

Airgas Quality Policy

The purpose of the Airgas Quality System is to continually improve our manufacturing and related processes to provide our customers with the highest product purity, consistency, and service.

Ethane (C₂H₆)

A flammable, colorless liquefied gas.

Product Specifications	Minimum Purity	O ₂	H ₂ O	Other Hydrocarbons	CO/CO ₂	N ₂
Research Plus	99.999%	≤ 1	≤ 3	≤ 6	≤ 2	≤ 3
Research	99.99%	≤ 5	≤ 5	≤ 80	≤ 5	≤ 10
Technical	98.5%					

Concentrations given are ppm by volume unless otherwise specified.

PRODUCT	Ordering Information					Equipment Recommendations		
	Cylinder Size	Contents lbs	Standard Valve Outlet (CGA)	Product Number	Cylinder Pressure at 70°F (psig)	Description Product Number	Delivery Pressure Range (psig)	Page Number
Research Plus	200	32	350	ET RP200	543	Y11-244 * 350	A = 0-25 B = 0-50 D = 0-100 F = 0-250	E11
	80	11	350	ET RP80	543			
Certificate of Analysis included.								
Research	200	32	350	ET R200	543	Two-Stage Regulator Y12-215 * 350		E9
	80	11	350	ET R80	543			
Certificate of Analysis included.								
Technical	300	40	350	ET T300	543	Single-Stage Regulator Y11-215 * 350		E8
	200	32	350	ET T200	543			
	80	11	350	ET T80	543			
Individual or Batch Certificate of Analysis available upon request.								

* Insert Delivery Pressure Range Code

Technical Data & Shipping Information	
Molecular Weight	30.0690
Specific Volume	12.86 cf/lb @70° F & 1 ATM
Flammability Limits in Air	3.0 - 12.5% in Air
U.S. DOT Name	Ethane
ID Number	UN 1035
U.S. DOT Hazard Class	2.1
U.S. DOT Label	Flammable Gas
CAS Registry	74-84-0

Airgas Quality Policy

The purpose of the Airgas Quality System is to continually improve our manufacturing and related processes to provide our customers with the highest product purity, consistency, and service.

Ethyl Chloride (C₂H₅Cl) A colorless, flammable, liquefied gas with a pungent, ethereal odor.

Product Specifications	Minimum Purity
Chemically Pure (CP)	99.9%

PRODUCT	Ordering Information					Equipment Recommendations		
	Cylinder Size	Contents lbs	Standard Valve Outlet (CGA)	Product Number	Cylinder Pressure at 70°F (psig)	Description Product Number	Delivery Pressure Range (psig)	Page Number
Chemically Pure (CP)	TON	1300	300	EC CPTON	5.6	Manual Control Valve Y30-111300	N/A	E112
	1/2 TON	800	300	EC CPHTN	5.6			
	1/4 TON	390	300	EC CP400	5.6			
	350	195	300	EC CP350	5.6			
	Individual or Batch Certificate of Analysis available upon request.							

Technical Data & Shipping Information	
Molecular Weight	64.514
Specific Volume	6.00 cf/lb @70° F & 1 ATM
Flammability Limits in Air	3.8 - 15.4% in Air
U.S. DOT Name	Ethyl Chloride
ID Number	UN 1037
U.S. DOT Hazard Class	2.1
U.S. DOT Label	Flammable Gas
CAS Registry	75-00-3

Ethylene (C₂H₄) A flammable, colorless liquefied gas.

Product Specifications	Minimum Purity	O ₂	H ₂ O	Other Hydrocarbons	CO	CO ₂	N ₂
Research Plus	99.9995%	≤ 1	≤ 1	≤ 4	≤ 1	≤ 1	≤ 1
Research	99.995%	≤ 2	≤ 5	≤ 40	≤ 2	≤ 5	≤ 5
Ultra High Purity (UHP)	99.9%	≤ 10	≤ 5	≤ 800	≤ 5	≤ 10	≤ 50
Chemically Pure (CP)	99.5%			≤ 1000			
Plant Growth	98.5%			≤ 1000			


Concentrations given are ppm by volume unless otherwise specified.

PRODUCT	Ordering Information					Equipment Recommendations		
	Cylinder Size	Contents lbs	Standard Valve Outlet (CGA)	Product Number	Cylinder Pressure at 70°F (psig)	Description Product Number	Delivery Pressure Range (psig)	Page Number
Research Plus	300	37	350	EY RP300	1200	Two-Stage Regulator Y12-215 * 350	A = 0-25 B = 0-50 D = 0-100 F = 0-250	E12
	200	30	350	EY RP200	1200			
	80	11	350	EY RP80	1200			
	35	4	350	EY RP35	1200			
	Certificate of Analysis included.							
Research	300	37	350	EY R300	1200	Single-Stage Regulator Y11-215 * 350	A = 0-25 B = 0-50 D = 0-100 F = 0-250	E11
	200	30	350	EY R200	1200			
	80	11	350	EY R80	1200			
	35	4	350	EY R35	1200			
	Certificate of Analysis included.							

* Insert Delivery Pressure Range Code

Ethylene (C₂H₄) Cont.

A flammable, colorless liquefied gas.

PRODUCT	Ordering Information					Equipment Recommendations		
	Cylinder Size	Contents lbs	Standard Valve Outlet (CGA)	Product Number	Cylinder Pressure at 70°F (psig)	Description Product Number	Delivery Pressure Range (psig)	Page Number
Ultra High Purity (UHP)	300	37	350	EY UHP300	1200	Two-Stage Regulator Y12-215 * 350 Single-Stage Regulator Y11-215 * 350	A = 0-25 B = 0-50 D = 0-100 F = 0-250	E9
	200	30	350	EY UHP200	1200			
	80	11	350	EY UHP80	1200			
	35	4	350	EY UHP35	1200			
	Individual or Batch Certificate of Analysis available upon request.							
Chemically Pure (CP)	300	37	350	EY CP300	1200			
	200	30	350	EY CP200	1200			
	80	11	350	EY CP80	1200			
	35	4	350	EY CP35	1200			
	Individual or Batch Certificate of Analysis available upon request.							
Plant Growth Regulator (PGR) 	300	37	350	EY PGR300	1200			
	200	30	350	EY PGR200	1200			
	80	11	350	EY PGR80	1200			
	35	4	350	EY PGR35	1200			
	Individual or Batch Certificate of Analysis available upon request.							

* Insert Delivery Pressure Range Code

Technical Data & Shipping Information		Additional Information: PGR Grade is FIFRA registered and labeled as a Plant Growth Regulator. Recommended for produce ripening and degreening. Please inquire about customer-owned fill guidelines.
Molecular Weight	28.0532	
Specific Volume	13.79 cf/lb @70° F & 1 ATM	
Flammability Limits in Air	2.7 - 36% in Air	
U.S. DOT Name	Ethylene, Compressed	
ID Number	UN 1962	
U.S. DOT Hazard Class	2.1	
U.S. DOT Label	Flammable Gas	
CAS Registry	74-85-1	

Airgas Quality Policy

The purpose of the Airgas Quality System is to continually improve our manufacturing and related processes to provide our customers with the highest product purity, consistency, and service.

Halocarbon-14 (CF₄)

(Tetrafluoromethane, Carbon Tetrafluoride)

A colorless, nonflammable, noncorrosive gas.

Grade	% Purity	O ₂	SF ₆	N ₂	CO	CO ₂	H ₂ O	Acidity (HF)	Other Halocarbons	THC
Semiconductor ^(#)	99.999	2	1	4	1	1	1	0.1 ppmw	2	1
UHP	99.99	15	1	60	5	5	1	0.25 ppmw	10	
Chemically Pure (CP) ⁽¹⁾	99.9									

Concentrations given are ppm by volume unless otherwise specified.

Notes

⁽¹⁾ Total impurities not to exceed 1000 ppm.

^(#) Semiconductor grade valve material is brass for standard CGA connection. Cylinders can be provided with SS or DISS valves and additional proper regulator options upon request.

PRODUCT	Ordering Information					Equipment Recommendations		
	Cylinder Size	Contents lbs	Standard Valve Outlet (CGA)	Product Number	Cylinder Pressure at 70°F (psig)	Description Product Number	Delivery Pressure Range (psig)	Page Number
Semiconductor	Y	720	580	RD SMY	1875			
	300	88	580	RD SM300	2000			
	200	70	580	RD SM200	1875			
Certificate of Analysis included. Vapor phase analysis.								
Ultra High Purity (UHP)	200	70	580	RD UHP200	1875	Two-Stage Regulator Y12-C445 * 580	A = 0-25 B = 0-50 D = 0-100 E = 0-150 F = 0-250 G = 0-500**	E28
	Individual or Batch Certificate of Analysis available upon request. Vapor phase analysis.						Single-Stage Regulator Y11-C444 * 580	
Chemically Pure (CP)	200	70	580	RD CP200	1875			
	Individual or Batch Certificate of Analysis available upon request. Vapor phase analysis.							

* Insert Delivery Pressure Range Code ** Single Stage Only

Technical Data & Shipping Information

Molecular Weight	88.0043
Specific Volume	4.40 cf/lb @70° F & 1 ATM
Flammability Limits in Air	Nonflammable
U.S. DOT Name	Tetrafluoromethane, Compressed
ID Number	UN 1982
U.S. DOT Hazard Class	2.2
U.S. DOT Label	Nonflammable Gas
CAS Registry	75-73-0

Airgas Quality Policy

The purpose of the Airgas Quality System is to continually improve our manufacturing and related processes to provide our customers with the highest product purity, consistency, and service.

Halocarbon-23 (CHF₃)

(Trifluoromethane, Fluoroform)

A colorless, nontoxic, nonflammable gas with a slightly ethereal odor.

Grade	% Purity	O ₂	H ₂ O	CO ₂	N ₂	THC	Other Halocarbons	Acidity (HF)
Semiconductor ^(#)	99.999	2	1	8	6	1	1	1
Ultra High Purity (UHP)	99.99	20	10	20	60	10	10	
Chemically Pure (CP) ⁽¹⁾	99.9							

Concentrations given are ppm by volume unless otherwise specified.

Notes

^(#)Semiconductor grade valve material is brass for standard CGA connection. Cylinders can be provided with SS or DISS valves and additional proper regulator options upon request.

⁽¹⁾ Total impurities not to exceed 1000 ppm.

PRODUCT	Ordering Information					Equipment Recommendations		
	Cylinder Size	Contents lbs	Standard Valve Outlet (CGA)	Product Number	Cylinder Pressure at 70°F (psig)	Description Product Number	Delivery Pressure Range (psig)	Page Number
Semiconductor	200	70	660	RF SM200	635	Single-Stage Regulator Y11-C444 * 660	A = 0-25 B = 0-50 D = 0-100	E27
	Certificate of Analysis included.							
Ultra High Purity (UHP)	200	70	660	RF UHP200	635			
	Certificate of Analysis included.							
Chemically Pure (CP)	200	70	660	RF CP200	635			
	Certificate of Analysis included.							

* Insert Delivery Pressure Range Code

Technical Data & Shipping Information	
Molecular Weight	70.0138
Specific Volume	5.52 cf/lb @70° F & 1 ATM
Flammability Limits in Air	Nonflammable
U.S. DOT Name	Trifluoromethane, Compressed
ID Number	UN 1984
U.S. DOT Hazard Class	2.2
U.S. DOT Label	Nonflammable Gas
CAS Registry	75-46-7

Airgas Quality Policy

The purpose of the Airgas Quality System is to continually improve our manufacturing and related processes to provide our customers with the highest product purity, consistency, and service.

Halocarbon-116 (C₂F₆)

(Hexafluoroethane)

A colorless, noncorrosive, nonflammable liquefied gas.

Grade	% Purity	O ₂	H ₂ O	Other Halocarbons	Acidity (HF)	CO	CO ₂	N ₂	THC
Semiconductor ^(#)	99.999	2	5	10	0.1 ppmw	1	1	8	1
Chemically Pure (CP) ⁽¹⁾	99.9								

Concentrations given are ppm by volume unless otherwise specified.

Notes

^(#)Semiconductor grade valve material is brass for standard CGA connection. Cylinders can be provided with SS or DISS valves and additional proper regulator options upon request.

⁽¹⁾Total impurities not to exceed 1000 ppm.

PRODUCT	Ordering Information					Equipment Recommendations		
	Cylinder Size	Contents lbs	Standard Valve Outlet (CGA)	Product Number	Cylinder Pressure at 70°F (psig)	Description Product Number	Delivery Pressure Range (psig)	Page Number
Semiconductor	Y	950	660	RI SMY	417	Single-Stage Regulator Y11-C444 * 660	A = 0-25 B = 0-50 D = 0-100 E = 0-150	E27
	200	95	660	RI SM200	417			
Certificate of Analysis included.								
Chemically Pure (CP)	200	95	660	RI CP200	417	* Insert Delivery Pressure Range Code		
	Certificate of Analysis included.							

Technical Data & Shipping Information

Molecular Weight	138.0118
Specific Volume	2.80 cf/lb @70° F & 1 ATM
Flammability Limits in Air	Nonflammable
U.S. DOT Name	Hexafluoromethane, Compressed
ID Number	UN 2193
U.S. DOT Hazard Class	2.2
U.S. DOT Label	Nonflammable Gas
CAS Registry	76-16-4

Airgas Quality Policy

The purpose of the Airgas Quality System is to continually improve our manufacturing and related processes to provide our customers with the highest product purity, consistency, and service.

Halocarbon-218 (C₃F₈)

(Perfluoropropane, Octafluoropropane)

A colorless, nonflammable liquefied gas with a faintly sweet odor.

Product Specifications	Minimum Purity	Air	H ₂ O	Other Halocarbons	Acidity (HF)
Semiconductor	99.995%	20	10	30	0.1 ppmw

Concentrations given are ppm by volume unless otherwise specified.

PRODUCT	Ordering Information					Equipment Recommendations		
	Cylinder Size	Contents lbs	Standard Valve Outlet (CGA)	Product Number	Cylinder Pressure at 70°F (psig)	Description Product Number	Delivery Pressure Range (psig)	Page Number
Semiconductor	½ TON	1,100	660	3R SMHTN	100	Single-Stage Regulator Y11-C444 * 590	A = 0-25 B = 0-50 D = 0-100	E27
	200	88	660	3R SM200	100			
Certificate of Analysis included.						* Insert Delivery Pressure Range Code		

Technical Data & Shipping Information	
Molecular Weight	188.0193
Specific Volume	2.06 cf/lb @70° F & 1 ATM
Flammability Limits in Air	Nonflammable
U.S. DOT Name	Octafluoropropane, Compressed
ID Number	UN 2424
U.S. DOT Hazard Class	2.2
U.S. DOT Label	Nonflammable Gas
CAS Registry	76-19-7

Airgas Quality Policy

The purpose of the Airgas Quality System is to continually improve our manufacturing and related processes to provide our customers with the highest product purity, consistency, and service.

Halocarbon-C318 (C₄F₈)

A colorless, odorless, nonflammable liquefied gas.

(Octafluorocyclobutane)

Grade	% Purity	O ₂	N ₂	H ₂ O	Other Halocarbons	Acidity (HF)
Semiconductor ^(#)	99.995	4	16	10	20	0.1 ppmw
Chemically Pure (CP)	99.98	20	80	50	50	0.1 ppmw

Concentrations given are ppm by volume unless otherwise specified.

Notes

^(#) Semiconductor grade valve material is brass for standard CGA connection. Cylinders can be provided with SS or DISS valves and additional proper regulator options upon request.

PRODUCT	Ordering Information					Equipment Recommendations		
	Cylinder Size	Contents lbs	Standard Valve Outlet (CGA)	Product Number	Cylinder Pressure at 70°F (psig)	Description Product Number	Delivery Pressure Range (psig)	Page Number
Semiconductor	½ TON	1,100	660	R3 SMHTN	25	Single-Stage Regulator Y11-C444 A660	0-25	E27
	200	110	660	R3 SM200	25			
Certificate of Analysis included.								
Chemically Pure (CP)	½ TON	1,100	660	R3 CPHTN	25	Single-Stage Regulator Y11-C444 A660	0-25	E27
	200	110	660	R3 CP200	25			
Individual or Batch Certificate of Analysis available upon request.								

Technical Data & Shipping Information

Molecular Weight	200.0300
Specific Volume	1.93 cf/lb @70° F & 1 ATM
Flammability Limits in Air	Nonflammable
U.S. DOT Name	Octafluorocyclobutane
ID Number	UN 1976
U.S. DOT Hazard Class	2.2
U.S. DOT Label	Nonflammable Gas
CAS Registry	115-25-3

Halocarbon-1216 (C₃F₆)

An odorless, colorless, noncombustible gas.

(Hexafluoropropylene)

Product Specifications	Minimum Purity	O ₂	H ₂ O
Polymer	99.9%	50	20

Concentrations given are ppm by volume unless otherwise specified.

PRODUCT	Ordering Information					Equipment Recommendations		
	Cylinder Size	Contents lbs	Standard Valve Outlet (CGA)	Product Number	Cylinder Pressure at 70°F (psig)	Description Product Number	Delivery Pressure Range (psig)	Page Number
Polymer	½ TON	1,100	660	HN PHTN	85	Single-Stage Regulator Y11-C444 A660	0-25	E27
Certificate of Analysis available upon request.								

Technical Data & Shipping Information	
Molecular Weight	150.0225
Specific Volume	2.58 cf/lb @70° F & 1 ATM
Flammability Limits in Air	Nonflammable
U.S. DOT Name	Hexafluoropropylene
ID Number	UN 1858
U.S. DOT Hazard Class	2.2
U.S. DOT Label	Nonflammable Gas
CAS Registry	116-15-4

Helium (He)

A colorless, odorless, nonflammable, inert gas.

Grade	% Purity	O ₂	H ₂ O	THC	CO	CO ₂	Ar	N ₂
Research ⁽¹⁾	99.9999	0.5	0.2	0.1	0.1	0.1	0.5	0.5
Chromatographic	99.9999	0.5	0.2	0.1	0.1	0.1	0.5	0.5
Ultra Pure Carrier (UPC)	99.9995	1	1	0.5	1 ⁽²⁾	1 ⁽²⁾		3
Semiconductor ^(#)	99.999	1	1	0.5	1 ⁽²⁾	1 ⁽²⁾		5
Ultra High Purity (UHP)	99.999	1	1	0.5	1 ⁽²⁾	1 ⁽²⁾		5
LaserPlus™ Ultra	99.999 ⁽³⁾	1	2	0.5				
LaserPlus™	99.998 ⁽³⁾		5	1				
Laser	99.999 ⁽³⁾	1	1	0.5				
Zero	99.998	4	3	0.5				
High Purity/High Pressure	99.997	5	3					

Concentrations given are ppm by volume unless otherwise specified.

Notes

Purity levels given are excluding Neon.

(1) Total of impurities listed shall not exceed 1 ppm.

(2) Total CO + CO₂ shall not exceed 1 ppm

(3) Details of Laser grades can be found in the Special Applications section.

^(#)Semiconductor grade valve material is brass for standard CGA connection. Cylinders can be provided with SS or DISS valves and additional proper regulator options upon request.


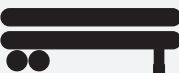
PRODUCT	Ordering Information					Equipment Recommendations		
	Cylinder Size	Contents ft ³	Standard Valve Outlet (CGA)	Product Number	Cylinder Pressure at 70°F (psig)	Description Product Number	Delivery Pressure Range (psig)	Page Number
Research	300	291	580	HE R300	2,640	Two-Stage Regulators Y12-244 * 580 Y12-N245 * 580 Y12-T265 * 580	A = 0-25 B = 0-50 D = 0-100 E = 0-150	E12 E21 E23
	200	213	580	HE R200	2,200			
	80	84	580	HE R80	2,200	Single-Stage Regulator Y11-N145 * 580 Y11-244 * 580 Y11-T265 * 580 Y11-N245 * 580	E20 E11 E22 E20	
	35	33	580	HE R35	2,200			
	Certificate of Analysis included.					* Insert Delivery Pressure Range Code		
Chromatographic	300	291	580	HE CH300	2,640			
	200	213	580	HE CH200	2,200			
	80	84	580	HE CH80	2,200			
	35	33	580	HE CH35	2,200			
	Individual or Batch Certificate of Analysis available upon request.							
Ultra Pure Carrier (UPC)	300	291	580	HE UPC300	2,640	Two-Stage Regulators Y12-N145 * 580 Y12-244 * 580 Y12-N245 * 580	A = 0-25 B = 0-50 D = 0-100 E = 0-150 F = 0-250	E21 E12 E21
	200	213	580	HE UPC200	2,200			
	80	84	580	HE UPC80	2,200	Single-Stage Y11-N145 * 580 Y11-244 * 580 Y11-N245 * 580	E20 E11 E20	
	35	33	580	HE UPC35	2,200			
	Individual or Batch Certificate of Analysis available upon request.							
Semiconductor	300	291	580	HE SM300	2,640			
	200	213	580	HE SM200	2,200			
	Individual or Batch Certificate of Analysis available upon request.							
Ultra High Purity (UHP)	300	291	580	HE UHP300	2,640			
	200	213	580	HE UHP200	2,200			
	80	84	580	HE UHP80	2,200			
	35	33	580	HE UHP35	2,200			
	Individual or Batch Certificate of Analysis available upon request.					* Insert Delivery Pressure Range Code		

Airgas Quality Policy

The purpose of the Airgas Quality System is to continually improve our manufacturing and related processes to provide our customers with the highest product purity, consistency, and service.

Helium (He) Cont.

A colorless, odorless, nonflammable, inert gas.

PRODUCT	Ordering Information					Equipment Recommendations		
	Cylinder Size	Contents ft ³	Standard Valve Outlet (CGA)	Product Number	Cylinder Pressure at 70°F (psig)	Description Product Number	Delivery Pressure Range (psig)	Page Number
Zero 	300	29	580	HE Z300	2,640	Two-Stage Regulators Y12-N245 * 580 Y12-244 * 580	A = 0-25 B = 0-50 D = 0-100 E = 0-150 F = 0-250	E21 E12
	200	213	580	HE Z200	2,200			
High Purity / High Pressure 	80	84	580	HE Z80	2,200	Single-Stage Regulators Y11-N245 * 580	E20 E11	
	35	33	580	HE Z35	2,200			
	Individual or Batch Certificate of Analysis available upon request.							
	300	291	580	HE HP300	2,640			
	200	213	580	HE HP200	2,200			
	80	84	580	HE HP80	2,200			
35	33	580	HE HP35	2,200				
6K	512	677	HE HP6K	6,000				
3K	328	680	HE HP3K	3,500				
Individual or Batch Certificate of Analysis available upon request.								
* Insert Delivery Pressure Range Code								
Liquid	Various sizes, volumes, and grades available upon request. Individual or Batch Certificate of Analysis available upon request.							

Technical Data & Shipping Information		For LaserPLUS™ Applications, see SA14.
Molecular Weight	4.0026	
Specific Volume	96.65 cf/lb @70° F & 1 ATM	
Flammability Limits in Air	Nonflammable	
U.S. DOT Name	Helium, Compressed or Refrigerated Liquid	
ID Number	UN 1046 or UN1963	
U.S. DOT Hazard Class	2.2	
U.S. DOT Label	Nonflammable Gas	
CAS Registry	7440-59-7	



Airgas offers a wide range of gas supply modes, including high-pressure cylinders, liquid cylinders (or dewars), MicroBulk and bulk. Your Airgas specialty gas representative can help you decide which option is best for your operation. Be sure to ask about our unique line of specialty gas equipment, including automatic changeover systems for uninterrupted gas supply.

Hydrogen (H₂)

A flammable, colorless, odorless, compressed gas at high pressure.

Grade	% Purity	O ₂	H ₂ O	THC	Ar	CO	CO ₂	N ₂
Research ⁽¹⁾	99.9999	0.5	0.5	0.1	0.5	0.1	0.1	0.5
Ultra Pure Carrier	99.9995	1	1	0.5		1 ⁽²⁾	1 ⁽²⁾	3
Semiconductor ^(#)	99.999	1	2	0.5		1 ⁽²⁾	1 ⁽²⁾	5
Ultra High Purity	99.999	1	2	0.5		1 ⁽²⁾	1 ⁽²⁾	5
Zero Grade	99.998	5	3	0.5				
High Purity/High Pressure	99.995	4	3					
Prepurified	99.99	10	5					

Concentrations given are ppm by volume unless otherwise specified.

Notes

⁽¹⁾ Total of impurities listed shall not exceed 1 ppm.

⁽²⁾ CO + CO₂ shall not exceed 1 ppm

^(#) Semiconductor grade valve material is brass for standard CGA connection. Cylinders can be provided with SS or DISS valves and additional proper regulator options upon request.

PRODUCT	Ordering Information					Equipment Recommendations					
	Cylinder Size	Contents ft ³	Standard Valve Outlet (CGA)	Product Number	Cylinder Pressure at 70°F (psig)	Description Product Number	Delivery Pressure Range (psig)	Page Number			
Research	300	260	350	HY R300	2,400	Two-Stage Regulators Y12-N145 * 350 Y12-244 * 350 Y12-N245 * 350 Y12-T265 * 350 Single-Stage Regulators Y11-N145 * 350 Y11-244 * 350 Y11-T265 * 350 Y11-N245 * 350	A = 0-25 B = 0-50 D = 0-100 E = 0-150 F = 0-250 G = 0-500**	E21 E12 E21 E23 E20 E11 E22 E20			
	200	216	350	HY R200	2,000						
	80	85	350	HY R80	2,000						
	35	34	350	HY R35	2,000						
Individual or Batch Certificate of Analysis available upon request.											
Ultra Pure Carrier (UPC)	300	260	350	HY UPC300	2,400						
	200	216	350	HY UPC200	2,000						
	80	85	350	HY UPC80	2,000						
	35	34	350	HY UPC35	2,000						
Certificate of Analysis included.											
Semiconductor	300	260	350	HY SM300	2,400						
	200	216	350	HY SM200	2,000						
	80	85	350	HY SM80	2,000						
	35	34	350	HY SM35	2,000						
Individual or Batch Certificate of Analysis available upon request.											
Ultra High Purity (UHP)	300	260	350	HY UHP300	2,400						
	200	216	350	HY UHP200	2,000						
	80	85	350	HY UHP80	2,000						
	35	34	350	HY UHP35	2,000						
Individual or Batch Certificate of Analysis available upon request.											
Zero	300	260	350	HY Z300	2,400						
	200	216	350	HY Z200	2,000						
	80	85	350	HY Z80	2,000						
	35	34	350	HY Z35	2,000						
Individual or Batch Certificate of Analysis available upon request.											
High Purity / High Pressure	300	260	350	HY HP300	2,400						
	200	216	350	HY HP200	2,000						
	80	85	350	HY HP80	2,000						
	35	34	350	HY HP35	2,000						
	6K	453	703	HY HP6K	6,000						
	3K	318	695	HY HP3K	3,500						
Individual or Batch Certificate of Analysis available upon request.											
Prepurified	300	260	350	HY PP300	2,400						
	200	216	350	HY PP200	2,000						
	80	85	350	HY PP80	2,000						
	35	34	350	HY PP35	2,000						
Individual or Batch Certificate of Analysis available upon request.											

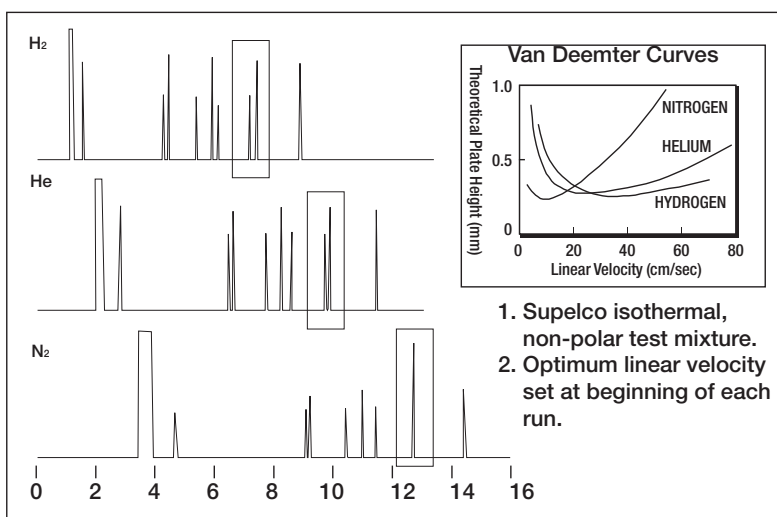
* Insert Delivery Pressure Range Code
** Single Stage Only

Hydrogen (H₂) Cont.

A flammable, colorless, odorless, compressed gas at high pressure.

Technical Data & Shipping Information

Molecular Weight	2.01588
Specific Volume	191.9 cf/lb @70° F & 1 ATM
Flammability Limits in Air	4.0 - 75% in Air
U.S. DOT Name	Hydrogen, Compressed
ID Number	UN 1049
U.S. DOT Hazard Class	2.1
U.S. DOT Label	Flammable Gas
CAS Registry	1333-74-0



When used as a carrier gas, hydrogen typically provides higher resolution at higher linear velocities than both helium and nitrogen.



Consider using a hydrogen generator to supply your FID carrier gas and/or fuel gas.

Airgas Quality Policy


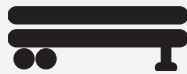

The purpose of the Airgas Quality System is to continually improve our manufacturing and related processes to provide our customers with the highest product purity, consistency, and service.

Hydrogen Chloride (HCl)

A colorless, toxic, corrosive, nonflammable liquefied gas with a sharp, suffocating odor; severely irritating to the upper respiratory tract and corrosive to eyes, skin, and mucous membranes.

Product Specifications	Minimum Purity	O ₂ + Ar	H ₂ O	THC	CO	CO ₂	N ₂	Iron	Metals
VLSI	99.999%	≤ 1	≤ 1	≤ 1	≤ 1	≤ 2	≤ 2	≤ 0.5	≤ 1
Electronic	99.997%	≤ 4	≤ 2	≤ 2	≤ 1	≤ 5	≤ 10		
Technical/NG	99.5%								

Concentrations given are ppm by volume unless otherwise specified.

PRODUCT	Ordering Information					Equipment Recommendations		
	Cylinder Size	Contents lbs	Standard Valve Outlet (CGA)	Product Number	Cylinder Pressure at 70°F (psig)	Description Product Number	Delivery Pressure Range (psig)	Page Number
VLSI 	Y	645	330	HC VLY	611	Single-Stage Regulator Y11-E464 * 330	A = 0-30 B = 0-60 C = 0-100	E29
	300	71	330	HC VL300	611			
	200	62	330	HC VL200	611			
Certificate of Conformance available upon request.								
Electronic 	Y	645	330	HC ELY	611	Cross Purge Assembly Y99-CPAM330		E50
	300	71	330	HC EL300	611			
	200	62	330	HC EL200	611			
Certificate of Conformance available upon request.								
* Insert Delivery Pressure Range Code								
Technical/NG 	Y	645	330	HC NGTT	611	Single-Stage Regulators Y11-C334C330 Y11-C330C330 Y11-E464C330	0-50 0-50 0-100	E49 E49 E29
	300	71	330	HC NGY	611			
Certificate of Conformance available upon request.								
						Cross Purge Assembly Y99-CPAM330 Y99-CPA4330		E50 E50

Technical Data & Shipping Information	
Molecular Weight	36.461
Specific Volume	10.61 cf/lb @70° F & 1 ATM
Flammability Limits in Air	Nonflammable
U.S. DOT Name	Hydrogen Chloride, Anhydrous
ID Number	UN 1050
U.S. DOT Hazard Class	2.3
U.S. DOT Label	Inhalation Hazard & Corrosive
CAS Registry	7647-01-0

Airgas Quality Policy

The purpose of the Airgas Quality System is to continually improve our manufacturing and related processes to provide our customers with the highest product purity, consistency, and service.

Hydrogen Sulfide (H₂S)

A flammable, colorless, liquefied gas with rotten egg-like odor.

Product Specifications	Minimum Purity
Chemically Pure (CP)	99.5%

PRODUCT	Ordering Information					Equipment Recommendations				
	Cylinder Size	Contents lbs	Standard Valve Outlet (CGA)	Product Number	Cylinder Pressure at 70°F (psig)	Description Product Number	Delivery Pressure Range (psig)	Page Number		
Chemically Pure (CP)	200	60	330	HS CP200	247	Single-Stage Regulators Y11-E444A330 Y11-E444B330 Y11-E444C330 Y11-E444D330 Y11-C444A330 Y11-C444B330 Y11-C444D330 Cross Purge Y99-CPA4330 Tee Purge Y99-TP4C330	0-30 0-60 0-100 0-150 0-30 0-60 0-100	E29 E29 E29 E29 E27 E27 E27		
	80	20	330	HS CP80	247					
Certificate of Conformance available upon request.										

Technical Data & Shipping Information	
Molecular Weight	34.081
Specific Volume	11.35 cf/lb @70° F & 1 ATM
Flammability Limits in Air	4.0 - 44% in Air
U.S. DOT Name	Hydrogen Sulfide
ID Number	UN 1053
U.S. DOT Hazard Class	2.3
U.S. DOT Label	Inhalation Hazard & Flammable Gas
CAS Registry	7783-06-4

Airgas Quality Policy

The purpose of the Airgas Quality System is to continually improve our manufacturing and related processes to provide our customers with the highest product purity, consistency, and service.

Isobutane (iso-C₄H₁₀)

A flammable, colorless liquefied gas.

Product Specifications	Minimum Purity	H ₂ O	O ₂	Other Hydrocarbons	Sulfur	N ₂
Research	99.99%	≤ 2	≤ 5	≤ 90	≤ 1	≤ 20
Instrument	99.5%	≤ 3	≤ 100	≤ 4500	≤ 1	≤ 400
Chemically Pure (CP)	99.0%					

Concentrations given are ppm by volume unless otherwise specified.

PRODUCT	Ordering Information					Equipment Recommendations					
	Cylinder Size	Contents lbs	Standard Valve Outlet (CGA)	Product Number	Cylinder Pressure at 70°F (psig)	Description Product Number	Delivery Pressure Range (psig)	Page Number			
Research	350	111	510	BI R350	31	Single-Stage Regulators Y11-244 * 510 Y11-LC241 * 510 Y11-C440N	A = 0-25 B = 0-50 0-10	E11 E16 E35			
	LP5	22	510	BI RLP5	31						
	LP1	5	510	BI RLP1	31						
Certificate of Analysis available upon request.											
Instrument	1/2 TON	466	510	BI IHTN	31						
	350	111	510	BI I350	31						
	LP5	22	510	BI ILP5	31						
Individual or Batch Certificate of Analysis available upon request.											
Chemically Pure (CP)	1/2 TON	466	510	BI CPHTN	31						
	350	111	510	BI CP350	31						
	LP5	22	510	BI CPLP5	31						
Individual or Batch Certificate of Analysis available upon request.											

* Insert Delivery Pressure Range Code

Technical Data & Shipping Information	
Molecular Weight	58.1222
Specific Volume	6.66 cf/lb @70° F & 1 ATM
Flammability Limits in Air	1.8 - 8.4% in Air
U.S. DOT Name	Isobutane
ID Number	UN 1969
U.S. DOT Hazard Class	2.1
U.S. DOT Label	Flammable Gas
CAS Registry	75-28-5

Airgas Quality Policy

The purpose of the Airgas Quality System is to continually improve our manufacturing and related processes to provide our customers with the highest product purity, consistency, and service.

Isobutylene (iso-C₄H₈)

A colorless, flammable liquefied gas with a detectable odor.

Product Specifications	Minimum Purity	Other Hydrocarbons	H ₂ O	Sulfur
Instrument	99.5%	≤ 4500	≤ 3	≤ 1
Chemically Pure (CP)	99.0%			

Concentrations given are ppm by volume.

PRODUCT	Ordering Information					Equipment Recommendations		
	Cylinder Size	Contents lbs	Standard Valve Outlet (CGA)	Product Number	Cylinder Pressure at 70°F (psig)	Description Product Number	Delivery Pressure Range (psig)	Page Number
Instrument	350 LP5	120 24	510 510	IY I350 IY ILP5	24 24	Single-Stage Regulators Y11-LC241 * 510	A = 0-25 B = 0-50	E16
	Individual or Batch Certificate of Analysis available upon request.							
Chemically Pure (CP)	350 LP5	120 24	510 510	IY CP350 IY CPLP5	24 24			
	Individual or Batch Certificate of Analysis available upon request.							

* Insert Delivery Pressure Range Code

Technical Data & Shipping Information	
Molecular Weight	56.1063
Specific Volume	6.90 cf/lb @70° F & 1 ATM
Flammability Limits in Air	1.8 - 9.6% in Air
U.S. DOT Name	Isobutylene
ID Number	UN 1055
U.S. DOT Hazard Class	2.1
U.S. DOT Label	Flammable Gas
CAS Registry	115-11-7

Airgas Quality Policy

The purpose of the Airgas Quality System is to continually improve our manufacturing and related processes to provide our customers with the highest product purity, consistency, and service.

Krypton (Kr)

A colorless, odorless, inert gas.

Product Specifications	Minimum Purity	O ₂	H ₂ O	THC	CO	CO ₂	N ₂	Xe	CF ₄
Research Plus	99.999%	≤ 1	≤ 1	≤ 1	≤ 0.5	≤ 0.5	≤ 3	≤ 5	≤ 0.5
Research	99.995%	≤ 2	≤ 1	≤ 1	≤ 1	≤ 0.5	≤ 15	≤ 20	
Window	99.9%		≤ 20						

Concentrations given are ppm by volume unless otherwise specified.

PRODUCT	Ordering Information					Equipment Recommendations		
	Cylinder Size	Contents liters	Standard Valve Outlet (CGA)	Product Number	Cylinder Pressure at 70°F (psig)	Description Product Number	Delivery Pressure Range (psig)	Page Number
Research Plus	300	9,000	580	KR RP3009000LT	2,085	Two-Stage Regulators Y12-N245 * 580 Y12-244 * 580 Single-Stage Regulators Y11-N245 * 580 Y11-244 * 580	A = 0-25 B = 0-50 D = 0-100	E21 E12 E20 E11
	200	5,000	580	KR RP2005000LT	1,400			
80	1,000	580	KR RP801000LT	880				
Certificate of Analysis is included.								
Research	300	10,000	580	KR RP30010000LT	2,285			
	200	5,000	580	KR RP2005000LT	1,400			
	80	2,500	580	KR RP825000LT	1,900			
	9A	250	580	KR RP9A250LT	1,200			
	LB	50	580	KR RLB50LT	1,400			
	Certificate of Analysis is included.							
Window	300	7,500	580	KR W3007500LT	1,800			
	Individual or Batch Certificate of Analysis available upon request.							

* Insert Delivery Pressure Range Code

Technical Data & Shipping Information	
Molecular Weight	83.798
Specific Volume	4.62 cf/lb @70° F & 1 ATM
Flammability Limits in Air	Nonflammable
U.S. DOT Name	Krypton, Compressed
ID Number	UN 1056
U.S. DOT Hazard Class	2.2
U.S. DOT Label	Nonflammable Gas
CAS Registry	7439-90-0

Airgas Quality Policy

The purpose of the Airgas Quality System is to continually improve our manufacturing and related processes to provide our customers with the highest product purity, consistency, and service.

Methane (CH₄)

A colorless, odorless, flammable compressed gas.

Product Specifications	Minimum Purity	O ₂	H ₂ O	CO/CO ₂	C ₂ H ₆	Other HC	H ₂	N ₂	C ₃ H ₈	C ₃ H ₆
Research	99.999%	≤ 1	≤ 2	≤ 5	≤ 5	≤ 1	1	≤ 5	≤ 1	≤ 1
Ultra High Purity (UHP)	99.99%	≤ 5	≤ 5		≤ 20	≤ 20		≤ 70		
Chemically Pure (CP)	99.5%	≤ 50	≤ 10		≤ 1000			≤ 4000		

Concentrations given are ppm by volume unless otherwise specified.

PRODUCT	Ordering Information					Equipment Recommendations			
	Cylinder Size	Contents ft ³	Standard Valve Outlet (CGA)	Product Number	Cylinder Pressure at 70°F (psig)	Description Product Number	Delivery Pressure Range (psig)	Page Number	
Research	300	360	350	ME R300	2,400		Two-Stage Regulators Y12-N245 * 350 Y12-244 * 350	A = 0-25 B = 0-50 D = 0-100 *E = 0-150 F = 0-250 *G = 0-500	E21 E12
	200	262	350	ME R200	2,000				
	80	100	350	ME R80	2,000				
	35	40	350	ME R35	2,000				
	Certificate of Analysis is included.								
Ultra High Purity (UHP)	300	360	350	ME UHP300	2,400	Single-Stage Regulators Y11-N245 * 350 Y11-244 * 350	* Only available for the N245 series	E20 E11	
	200	262	350	ME UHP200	2,000				
	80	100	350	ME UHP80	2,000				
	35	40	350	ME UHP35	2,000				
	Individual or Batch Certificate of Analysis available upon request.								
	* Insert Delivery Pressure Range Code								
Chemically Pure (CP)	300	360	350	ME CP300	2,400	Two-Stage Regulators Y12-N215 * 350	A = 0-25 B = 0-50 D = 0-100 F = 0-250	E9	
	200	262	350	ME CP200	2,000				
	80	100	350	ME CP80	2,000				
	35	40	350	ME CP35	2,000				
	Individual or Batch Certificate of Analysis available upon request.								
	* Insert Delivery Pressure Range Code								



Technical Data & Shipping Information	
Molecular Weight	16.0425
Specific Volume	24.11 cf/lb @70°F & 1 ATM
Flammability Limits in Air	5 - 15% in Air
U.S. DOT Name	Methane, Compressed
ID Number	UN 1971
U.S. DOT Hazard Class	2.1
U.S. DOT Label	Flammable Gas
CAS Registry	74-82-8

Airgas Quality Policy

The purpose of the Airgas Quality System is to continually improve our manufacturing and related processes to provide our customers with the highest product purity, consistency, and service.

Methyl Chloride (CH₃Cl)

A colorless, flammable liquefied gas with a slightly sweet odor.

Product Specifications	Minimum Purity
Chemically Pure (CP)	99.5%

PRODUCT	Ordering Information					Equipment Recommendations		
	Cylinder Size	Contents lbs	Standard Valve Outlet (CGA)	Product Number	Cylinder Pressure at 70°F (psig)	Description Product Number	Delivery Pressure Range (psig)	Page Number
Chemically Pure (CP)	1/2 TON	830	510	MC CPHTN	59	Single-Stage Regulators Y11-C441A510	0-25	E26
	1/4 TON	398	510	MC CPA2	59			
	350	175	510	MC CP350	59			
	LP5	25	510	MC CPLP5	59			
	Individual or Batch Certificate of Analysis available upon request.							
						Manual Flow Control Valve Y30-411510		E112

Technical Data & Shipping Information	
Molecular Weight	50.488
Specific Volume	7.66 cf/lb @70° F & 1 ATM
Flammability Limits in Air	8.1 - 17.2% in Air
U.S. DOT Name	Methyl Chloride
ID Number	UN 1063
U.S. DOT Hazard Class	2.1
U.S. DOT Label	Flammable Gas
CAS Registry	74-87-3

Methylamine (CH₃NH₂)

A colorless, flammable liquefied gas with a characteristic fishy or ammonia-like odor.

Product Specifications	Minimum Purity
Chemically Pure (CP)	99.5%

PRODUCT	Ordering Information					Equipment Recommendations		
	Cylinder Size	Contents lbs	Standard Valve Outlet (CGA)	Product Number	Cylinder Pressure at 70°F (psig)	Description Product Number	Delivery Pressure Range (psig)	Page Number
Chemically Pure (CP)	1/2 TON	550	705	MN CPHTN	30	Manual Flow Control Valve Y30-411705	N/A	E112
	350	125	705	MN CP350	30			
Certificate of Conformance is available upon request.								

Technical Data & Shipping Information	
Molecular Weight	31.0571
Specific Volume	12.46 cf/lb @70° F & 1 ATM
Flammability Limits in Air	4.9 - 20.7% in Air
U.S. DOT Name	Methylamine, Anhydrous
ID Number	UN 1061
U.S. DOT Hazard Class	2.1
U.S. DOT Label	Flammable Gas
CAS Registry	74-89-5

Neon (Ne)

A colorless, odorless, inert compressed gas.

Grade	% Purity	O ₂	H ₂ O	THC	CO	CO ₂	Ar	N ₂	He
Semiconductor ^(#)	99.999	0.5	1	0.5	0.5	0.5	1	2	8
Research	99.999	0.5	1	0.5	0.5	0.5	1	2	8
Ultra High Purity	99.996	2	2	0.5	0.5	0.5	1	10	30

Concentrations given are ppm by volume unless otherwise specified.

Notes

^(#)Semiconductor grade valve material is brass for standard CGA connection. Cylinders can be provided with SS or DISS valves and additional proper regulator options upon request.

PRODUCT	Ordering Information					Equipment Recommendations		
	Cylinder Size	Contents liters	Standard Valve Outlet (CGA)	Product Number	Cylinder Pressure at 70°F (psig)	Description Product Number	Delivery Pressure Range (psig)	Page Number
Semiconductor	300	7,500	580	NE SM3007500LT	2,400	Two-Stage Regulators Y12-N245 * 580 Y12-244 * 580 Single-Stage Regulators Y11-N245 * 580 Y11-244 * 580	A = 0-25 B = 0-50 D = 0-100 *E = 0-150	E21 E12 E20 E11
	200	6,000	580	NE SM2006000LT	2,200			
Individual or Batch Certificate of Analysis available upon request.								
Research	300	7,500	580	NE R3007500LT	2,400			
	200	6,000	580	NE R2006000LT	2,200			
	80	2,000	580	NE R802000LT	2,200			
	9A	100	580	NE R9A100LT	580			
	LB	50	580	NE RLB50LT	1,900			
Certificate of Analysis included.								
Ultra High Purity (UHP)	300	7,500	580	NE UHP3007500LT	2,400			
	200	6,000	580	NE UHP3006000LT	2,200			
	80	2,000	580	NE UHP802000LT	2,200			
	9A	100	580	NE UHP9A100LT	580			
	LB	50	580	NE UHPLB50LT	1,900			
Individual or Batch Certificate of Analysis available upon request.								
						* Insert Delivery Pressure Range Code		

Technical Data & Shipping Information

Molecular Weight	20.1797
Specific Volume	19.17 cf/lb @70° F & 1 ATM
Flammability Limits in Air	Nonflammable
U.S. DOT Name	Neon, Compressed
ID Number	UN 1065
U.S. DOT Hazard Class	2.2
U.S. DOT Label	Nonflammable Gas
CAS Registry	7440-01-9

Nitric Oxide (NO)

A colorless, corrosive, poisonous, oxidizing gas.

Grade	Minimum Purity
Ultra High Purity (UHP)	99.9%
Chemically Pure (CP)	99.5%

PRODUCT	Ordering Information					Equipment Recommendations		
	Cylinder Size	Contents ft ³	Standard Valve Outlet (CGA)	Product Number	Cylinder Pressure at 70°F (psig)	Description Product Number	Delivery Pressure Range (psig)	Page Number
Ultra High Purity (UHP)	150A	53	660	NC UHP15A	500	Two-Stage Regulator Y12-C445 * 660 Single-Stage Regulator Y11-C444 * 660 Cross Purge Y99-CPA4 * 660	A=0-30 B=0-60 D=0-100	E28 E27 E50
	Certificate of Conformance is available upon request.							
Chemically Pure (CP)	200	53	660	NC CP200	500	Two-Stage Regulator Y12-C445 * 660 Single-Stage Regulator Y11-C444 * 660 Cross Purge Y99-CPA4 * 660	A=0-30 B=0-60 D=0-100	E28 E27 E50
	35	8	660	NC CP35	500			

* Insert Delivery Pressure Range Code

Technical Data & Shipping Information	
Molecular Weight	30.0061
Specific Volume	12.89 cf/lb @70° F & 1 ATM
Flammability Limits in Air	Nonflammable
U.S. DOT Name	Nitric Oxide, Compressed
ID Number	UN 1660
U.S. DOT Hazard Class	2.3, 5.1, 8
U.S. DOT Label	Inhalation Hazard, Oxidizer, Corrosive
CAS Registry	10102-43-9

Nitrogen (N₂)

A colorless, odorless, nonflammable gas or a colorless, odorless, nonflammable cryogenic liquid.

Grade	% Purity	O ₂	H ₂ O	THC	CO	CO ₂	H ₂	NO _x	SO ₂
Research Plus	99.9999	0.2	0.2	0.1	0.3	0.1			
Research	99.9997	0.5	0.5	0.2	0.5	0.5	2		
Semiconductor ^(#)	99.9993	1	1	0.5	1 ⁽¹⁾	1 ⁽¹⁾			
Continuous Emissions Monitoring	99.9995			0.1	0.5	1		0.1	0.1
Vehicle Emissions Part 1065	99.999	2		0.05	1	10		0.02	
Ultra Pure Carrier (UPC)	99.9993	1	1	0.5	1 ⁽¹⁾	1 ⁽¹⁾			
Ultra High Purity (UHP)	99.999	1	1	0.5	1 ⁽¹⁾	1 ⁽¹⁾			
LaserPlus™ - Ultra	99.999	1	2	0.5					
LaserPlus™	99.998		5	1					
Laser	99.999	1	1	0.5					
Zero Grade	99.998	4	3	0.5					
High Purity/High Pressure	99.998	5	3						

Concentrations given are ppm by volume unless otherwise specified.

Notes

Purities do not include Argon impurities @ <100 ppm

⁽¹⁾ Combined CO and CO₂ shall not exceed 1 ppm.

^(#)Semiconductor grade valve material is brass for standard CGA connection. Cylinders can be provided with SS or DISS valves and additional proper regulator options upon request.

PRODUCT	Ordering Information					Equipment Recommendations		
	Cylinder Size	Contents ft ³	Standard Valve Outlet (CGA)	Product Number	Cylinder Pressure at 70°F (psig)	Description Product Number	Delivery Pressure Range (psig)	Page Number
Research Plus	300	304	580	NI RP300	2,640	Two-Stage Regulators Y12-N245 * 580 Y12-T265 * 580 Single-Stage Regulators Y11-N245 * 580 Y11-244 * 580 Y11-T265 * 580	A = 0-25 B = 0-50 D = 0-100	E21 E23
	200	235	580	NI RP200	2,200			
80	93	580	NI RP80	2,200				
35	36	580	NI RP35	2,200				
Certificate of Analysis included.								
Research	300	304	580	NI R300	2,640			
	200	235	580	NI R200	2,200			
	80	93	580	NI R80	2,200			
	35	36	580	NI R35	2,200			
Certificate of Analysis included.								
Semiconductor	300	304	580	NI SM300	2,640			
	200	235	580	NI SM200	2,200			
Individual or Batch Certificate of Analysis available upon request.						* Insert Delivery Pressure Range Code		
Continuous Emissions Monitoring (CEM)	300	304	580	NI CZ300	2,640	Two-Stage Regulators Y12-N245 * 580 Y12-244 * 580 Single-Stage Regulators Y11-N245 * 580 Y11-244 * 580	A = 0-25 B = 0-50 D = 0-100 E = 0-150 F = 0-250 G = 0-500**	E21 E12
	200	235	580	NI CZ200	2,200			
	150A	144	580	NI CZ15A	2,000			
	80	93	580	NI CZ80	2,200			
	35	36	580	NI CZ35	2,200			
Batch Certificate of Analysis included. Complies with 40 CFR Part 72.2 for Continuous Emission Monitoring								
Vehicle Emissions Part 1065	300	304	580	NI VE300	2,640			
	200	235	580	NI VE200	2,200			
	150A	144	580	NI VE15A	2,000			
	80	93	580	NI VE80	2,200			
	35	36	580	NI VE35	2,200			
Batch Certificate of Analysis included. Complies with 40 CFR Part 1065.750						* Insert Delivery Pressure Range Code ** Single Stage Only		

Nitrogen (N₂) Cont.

A colorless, odorless, inert compressed gas at high pressure.

PRODUCT	Ordering Information					Equipment Recommendations		
	Cylinder Size	Contents ft ³	Standard Valve Outlet (CGA)	Product Number	Cylinder Pressure at 70°F (psig)	Description Product Number	Delivery Pressure Range (psig)	Page Number
Ultra Pure Carrier (UPC)	300	304	580	NI UPC300	2,640	Two-Stage Regulators Y12-N245 * 580 Y12-244 * 580 Single-Stage Regulators Y11-N245 * 580 Y11-244 * 580	A = 0-25 B = 0-50 D = 0-100 E = 0-150 F = 0-250 G = 0-500**	E21 E12 E20 E11
	200	235	580	NI UPC200	2,200			
80	93	580	NI UPC80	2,200				
35	36	580	NI UPC35	2,200				
Individual or Batch Certificate of Analysis available upon request.								
Ultra High Purity (UHP)	300	304	580	NI UHP300	2,640			
	200	235	580	NI UHP200	2,200			
80	93	580	NI UHP80	2,200				
35	36	580	NI UHP35	2,200				
Individual or Batch Certificate of Analysis available upon request.								
Zero	300	304	580	NI Z300	2,640			
	200	235	580	NI Z200	2,200			
80	93	580	NI Z80	2,200				
35	36	580	NI Z35	2,200				
Individual or Batch Certificate of Analysis available upon request.								
High Purity / High Pressure	300	304	580	NI HP300	2,640	Single-Stage Regulators Y11-N198J (CGA)† Y11-N198K (CGA)† Y11-820H	0-2,000 0-4,000 0-6,000	E62 E62 E61
	200	235	580	NI HP200	2,200			
	80	93	580	NI HP80	2,200			
	35	36	580	NI HP35	2,200			
	6K	482	677	NI HP6K	6,000			
	3K	337	680	NI HP3K	3,500			
Individual or Batch Certificate of Analysis available upon request.								
Liquid	Various sizes, volumes, and grades available upon request.					† Insert Delivery Pressure Range Code		
	Individual or Batch Certificate of Analysis available upon request.							

* Insert Delivery Pressure Range Code
 ** Single Stage Only

† Insert Delivery Pressure Range Code

Technical Data & Shipping Information

Molecular Weight	28.0134
Specific Volume	13.81 cf/lb @70° F & 1 ATM
Flammability Limits in Air	Nonflammable
U.S. DOT Name	Nitrogen, Compressed
ID Number	UN 1066
U.S. DOT Hazard Class	2.2
U.S. DOT Label	Nonflammable Gas
CAS Registry	7727-37-9



Airgas offers a wide range of gas supply modes, including high-pressure cylinders, liquid cylinders (or dewars), MicroBulk and bulk. Your Airgas specialty gas representative can help you decide which option is best for your operation. Be sure to ask about our unique line of specialty gas equipment, including automatic changeover systems for uninterrupted gas supply.

Nitrogen Trifluoride (NF₃)

An odorless, colorless, noncombustible, oxidizing gas.

Purity Specifications	% Purity	O ₂ + Ar	N ₂	CF ₄	CO	CO ₂	N ₂ O	SF ₆	H ₂ O	Acidity (HF)
Semiconductor	99.995	3	5	40	1	5	5	5	1	1

Concentrations given are ppm by volume unless otherwise specified.

PRODUCT	Ordering Information					Equipment Recommendations		
	Cylinder Size	Contents lbs	Standard Valve Outlet (DISS)	Product Number	Cylinder Pressure at 70°F (psig)	Description Product Number	Delivery Pressure Range (psig)	Page Number
Semiconductor	300	50	640	NT SM300DS	1,450	Y12-HP950 * 640	A = 0-25 B = 0-50 D = 0-100	E28
	200	44	640	NT SM200DS	1,450			
Certificate of Analysis included.						* Insert Delivery Pressure Range Code		

Technical Data & Shipping Information	
Molecular Weight	71.002
Specific Volume	5.426 cf/lb @ 70° F
Flammability Limits in Air	Nonflammable
U.S. DOT Name	Nitrogen Trifluoride
ID Number	UN 2451
U.S. DOT Hazard Class	2.2, (5.1)
U.S. DOT Label	Nonflammable Gas, Oxidizer
CAS Registry	7883-54-2

Airgas Quality Policy

The purpose of the Airgas Quality System is to continually improve our manufacturing and related processes to provide our customers with the highest product purity, consistency, and service.

Nitrous Oxide (N₂O)

A colorless, oxidizing liquified gas.

Grade	% Purity	N ₂	O ₂ + Ar	THC	CO	CO ₂	H ₂ O	NH ₃	NO	NO ₂
VLSI	99.9999	0.3	0.3	0.1	0.2	0.3	0.2	0.1	0.1	0.3
Semiconductor ^(#)	99.999	2	2	0.2	0.5	2	2	0.5	0.3	0.2
Ultra High Purity	99.99	25	2	1	10	10	3	25	2	1
Atomic Absorption/CP	99.6	3200	800				50			
Cryocath ⁽¹⁾	99.5						10			
Cryocath ⁽¹⁾ Unanalyzed	99.5						50			

Concentrations given are ppm by volume unless otherwise specified.

Notes

⁽¹⁾ Cryocath Grade filled to 10 lbs. in customer owned cylinders equipped with CGA 326 valve.

^(#) Semiconductor grade valve material is brass for standard CGA connection. Cylinders can be provided with SS or DISS valves and additional proper regulator options upon request.

PRODUCT	Ordering Information					Equipment Recommendations		
	Cylinder Size	Contents lbs	Standard Valve Outlet (CGA)	Product Number	Cylinder Pressure at 70°F (psig)	Description Product Number	Delivery Pressure Range (psig)	Page Number
VLSI	150A	40	326	NS VL15A	745	Two-Stage Regulator Y12-C445 * 326	A = 0-25 B = 0-50 D = 0-100 E = 0-150	E28
	33A	6	326	NS VL33A	745			
Certificate of Analysis included.								
Semiconductor	200	60	326	NS SM200	745	Single-Stage Regulator Y11-C444 * 326	A = 0-25 B = 0-50 D = 0-100 E = 0-150	E27
	150A	40	326	NS SM15A	745			
Individual or Batch Certificate of Analysis available upon request.								
Ultra High Purity (UHP)	200	60	326	NS UHP200	745	* Insert Delivery Pressure Range Code		
	80	20	326	NS UHP80	745			
Individual or Batch Certificate of Analysis available upon request.								
Atomic Absorption/CP (AA)	200	60	326	NS AA200	745	Two-Stage Regulator Y12-215 * 326	A = 0-25 B = 0-50 D = 0-100 E = 0-150	E9
	80	20	326	NS AA80	745			
Individual or Batch Certificate of Analysis available upon request.								
						Single-Stage Regulator Y11-215 * 326		E8
* Insert Delivery Pressure Range Code								

Technical Data & Shipping Information	
Molecular Weight	44.0128
Specific Volume	8.79 cf/lb @70° F & 1 ATM
Flammability Limits in Air	Oxidizer
U.S. DOT Name	Nitrous Oxide
ID Number	UN 1070
U.S. DOT Hazard Class	2.2
U.S. DOT Label	Nonflammable Gas & Oxidizer
CAS Registry	10024-97-2

Nitrous Oxide is also available in medical and food grades. Ask your Airgas representative for details.

Airgas Quality Policy

The purpose of the Airgas Quality System is to continually improve our manufacturing and related processes to provide our customers with the highest product purity, consistency, and service.

Oxygen (O₂)

A colorless, odorless, oxidizing compressed gas.

Grade	% Purity	H ₂ O	THC	CO	CO ₂	Ar	N ₂	Kr
Research	99.999	0.5	0.2	0.5	0.5	3	5	2
Ultra Pure Carrier (UPC)	99.996	1	0.5	1	1	20	10	
Semiconductor (#)	99.994	2	0.5	1	1	35	15	
Ultra High Purity (UHP)	99.994	2	0.5	1	1	35	15	
LaserPlus™	99.98	5	1					
Zero	99.8	3	0.5					

Concentrations given are ppm by volume unless otherwise specified.

Notes

(#)Semiconductor grade valve material is brass for standard CGA connection. Cylinders can be provided with SS or DISS valves and additional proper regulator options upon request.

PRODUCT	Ordering Information					Equipment Recommendations											
	Cylinder Size	Contents ft ³	Standard Valve Outlet (CGA)	Product Number	Cylinder Pressure at 70°F (psig)	Description Product Number	Delivery Pressure Range (psig)	Page Number									
Research	300	337	540	OX R300	2,640	Single-Stage Regulator Y11-215 * OX	A = 0-25 B = 0-50 D = 0-100	E56									
	200	251	540	OX R200	2,200												
	80	85	540	OX R80	2,200												
Certificate of Analysis included.																	
Ultra Pure Carrier (UPC)	300	337	540	OX UPC300	2,640				Single-Stage Regulator Y11-215 * OX	A = 0-25 B = 0-50 D = 0-100	E56						
	200	251	540	OX UPC200	2,200												
	80	85	540	OX UPC80	2,200												
Individual or Batch Certificate of Analysis available upon request.																	
Semiconductor	300	337	540	OX SM300	2,640							Single-Stage Regulator Y11-215 * OX	A = 0-25 B = 0-50 D = 0-100	E56			
	200	251	540	OX SM200	2,200												
	Individual or Batch Certificate of Analysis available upon request.																
Ultra High Purity (UHP)	300	337	540	OX UHP300	2,640										Single-Stage Regulator Y11-215 * OX	A = 0-25 B = 0-50 D = 0-100	E56
	200	251	540	OX UHP200	2,200												
	80	85	540	OX UHP80	2,200												
Individual or Batch Certificate of Analysis available upon request.																	
Zero	300	337	540	OX Z300	2,640	Single-Stage Regulator Y11-215 * OX	A = 0-25 B = 0-50 D = 0-100	E56									
	200	251	540	OX Z200	2,200												
	80	85	540	OX Z80	2,200												
Individual or Batch Certificate of Analysis available upon request.																	

* Insert Delivery Pressure Range Code

Technical Data & Shipping Information

Molecular Weight	31.9988
Specific Volume	12.09 cf/lb @70° F & 1 ATM
Flammability Limits in Air	Oxidizer
U.S. DOT Name	Oxygen, Compressed
ID Number	UN 1072
U.S. DOT Hazard Class	2.2
U.S. DOT Label	Nonflammable Gas & Oxidizer
CAS Registry	7782-44-7

For LaserPLUS™ Applications, see SA17.

Airgas Quality Policy

The purpose of the Airgas Quality System is to continually improve our manufacturing and related processes to provide our customers with the highest product purity, consistency, and service.

Propane (C₃H₈)

A flammable, colorless liquefied gas.

Grade	% Purity	H ₂ O	O ₂	Other HC's	C ₃ H ₈	N ₂	CO ₂
Semiconductor* ^(#)	99.999	1	1	1	1	1	1
Research*	99.99	3	2	80 ⁽¹⁾	10	10	2
Instrument*	99.5	5	100	4000 ⁽¹⁾	400	400	100
Chemically Pure*	99.0						

Concentrations given are ppm by volume unless otherwise specified.

Notes

* Non-odorized product less than 1ppm sulfurs

⁽¹⁾ Other HC's are defined as Methane, Ethane, and Ethylene.

^(#) Semiconductor grade valve material is brass for standard CGA connection. Cylinders can be provided with SS or DISS valves and additional proper regulator options upon request.

PRODUCT	Ordering Information					Equipment Recommendations		
	Cylinder Size	Contents lbs	Standard Valve Outlet (CGA)	Product Number	Cylinder Pressure at 70°F (psig)	Description Product Number	Delivery Pressure Range (psig)	Page Number
Semiconductor	350	95	510	PR SM350	110	Single-Stage Regulator Y11-244 * 510	A = 0-25 B = 0-50 D = 0-100	E11
	LP5	19	510	PR SMLP5	110			
Individual or Batch Certificate of Analysis available upon request.								
Research	350	95	510	PR R350	110	* Insert Delivery Pressure Range Code	A = 0-25 B = 0-50 D = 0-100	E8
	LP5	19	510	PR RLP5	110			
	LP1	4	510	PR RLP1	110			
Individual or Batch Certificate of Analysis available upon request.								
Instrument	1/2 Ton	400	510	PR IHTN	110	Single-Stage Regulator Y11-215 * 510	A = 0-25 B = 0-50 D = 0-100	E8
	350	95	510	PR I350	110			
	LP5	19	510	PR ILP5	110			
Individual or Batch Certificate of Analysis available upon request.								
Chemically Pure (CP)	1/2 Ton	400	510	PR CPHTN	110	* Insert Delivery Pressure Range Code	A = 0-25 B = 0-50 D = 0-100	E8
	350	95	510	PR CP350	110			
	LP5	19	510	PR CPLP5	110			
Individual or Batch Certificate of Analysis available upon request.								

* Insert Delivery Pressure Range Code

Technical Data & Shipping Information	
Molecular Weight	44.0956
Specific Volume	8.77 cf/lb @70° F & 1 ATM
Flammability Limits in Air	2.1 - 9.5% in Air
U.S. DOT Name	Propane
ID Number	UN 1978
U.S. DOT Hazard Class	2.1
U.S. DOT Label	Flammable Gas
CAS Registry	74-98-6

Airgas Quality Policy

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Propylene (C₃H₆)

A flammable, colorless liquefied gas with a detectable odor.

Grade	% Purity	N ₂	Other Hydrocarbons	O ₂	H ₂ O	CO ₂
Semiconductor* (#)	99.99	5	90 ⁽¹⁾	1	2	1
Electronic*	99.95	20	450 ⁽¹⁾	3	3	3
Polymer*	99.5	50	4500 ⁽¹⁾	5	5	5
Chemically Pure (CP)* (2)	99.0					

Concentrations given are ppm by volume unless otherwise specified.

Notes

⁽¹⁾ Other HC's are defined as Ethane, Propane, N-Butane, Isobutane.

^(#) Semiconductor grade valve material is brass for standard CGA connection. Cylinders can be provided with SS or DISS valves and additional proper regulator options upon request.

⁽²⁾ Total impurities not to exceed 1%.

* Non-odorized product less than 1ppm sulfurs

PRODUCT	Ordering Information					Equipment Recommendations		
	Cylinder Size	Contents lbs	Standard Valve Outlet (CGA)	Product Number	Cylinder Pressure at 70°F (psig)	Description Product Number	Delivery Pressure Range (psig)	Page Number
Semiconductor	350	99	510	PP SM350	138	Single-Stage Regulator Y11-LC241 * 510	A = 0-25 B = 0-50	E16
	Individual or Batch Certificate of Analysis available upon request.							
Electronic	1/2 Ton	418	510	PP ELHTN	138			
	350	99	510	PP EL350	138			
Certificate of Analysis included.								
Polymer	1/2 Ton	418	510	PP PLHTN	138			
	350	99	510	PP PL350	138			
Individual or Batch Certificate of Analysis available upon request.								
Chemically Pure (CP)	1/2 Ton	418	510	PP CPHTN	138			
	350	99	510	PP CP350	138			
Individual or Batch Certificate of Analysis available upon request.								

* Insert Delivery Pressure Range Code

Technical Data & Shipping Information

Molecular Weight	42.0797
Specific Volume	9.19 cf/lb @70° F & 1 ATM
Flammability Limits in Air	2.4 - 11% in Air
U.S. DOT Name	Propylene
ID Number	UN 1077
U.S. DOT Hazard Class	2.1
U.S. DOT Label	Flammable Gas
CAS Registry	115-07-1

Sulfur Dioxide (SO₂)

A colorless, poisonous, corrosive, liquefied gas with a detectable odor.

Product Specifications	Minimum Purity
Anhydrous	99.98%

PRODUCT	Ordering Information					Equipment Recommendations		
	Cylinder Size	Contents lbs	Standard Valve Outlet (CGA)	Product Number	Cylinder Pressure at 70°F (psig)	Description Product Number	Delivery Pressure Range (psig)	Page Number
Anhydrous	Ton	1,240	660	SD AHTON	34	Single-Stage Regulator Y11-C480A660 Manual Flow Control Valve Y30-411660	0-15	E48
	65	150	660	SD AH65	34			
	200	50	660	SD AH200	34			E112
Certificate of Conformance available upon request.								

Technical Data & Shipping Information	
Molecular Weight	64.064
Specific Volume	6.04 cf/lb @70° F & 1 ATM
Flammability Limits in Air	Nonflammable
U.S. DOT Name	Sulfur Dioxide
ID Number	UN 1079
U.S. DOT Hazard Class	2.3
U.S. DOT Label	Inhalation Hazard & Corrosive
CAS Registry	7446-09-5

Airgas Quality Policy

The purpose of the Airgas Quality System is to continually improve our manufacturing and related processes to provide our customers with the highest product purity, consistency, and service.

Sulfur Hexafluoride (SF₆)

A colorless, odorless, nonflammable, non-reactive, nontoxic gas.

Grade	% Purity	Air (O ₂ +N ₂)	Halocarbon 14	H ₂ O	Acidity (HF)	Mineral Oil
Electronic	99.999	10	2	3	0.1 ppmw	1 ppmw
Semiconductor ^(#)	99.99	75	25	5	0.1 ppmw	1 ppmw
Instrument	99.99	75	25	5	0.1 ppmw	1 ppmw
Chemically Pure (CP) Dielectric Grade ⁽¹⁾	99.8	500	500	8	0.3 ppmw	1 ppmw

Concentrations given are ppm by volume unless otherwise specified.

Notes

⁽¹⁾ Dielectric Grade meets ASTM D-2472 specifications

^(#) Semiconductor grade valve material is brass for standard CGA connection. Cylinders can be provided with SS or DISS valves and additional proper regulator options upon request.

PRODUCT	Ordering Information					Equipment Recommendations		
	Cylinder Size	Contents lbs	Standard Valve Outlet (CGA)	Product Number	Cylinder Pressure at 70°F (psig)	Description Product Number	Delivery Pressure Range (psig)	Page Number
Electronic	300	130	590	SH EL300	298	Single-Stage Regulator Y11-C444 * 590	A = 0-25 B = 0-50 D = 0-100	E27
	200	115	590	SH EL200	298			
	150A	77	590	SH EL15A	298			
	80	35	590	SH EL80	298			
	35	17	590	SH EL35	298			
Certificate of Analysis included. Vapor phase analysis						* Insert Delivery Pressure Range Code		
Semiconductor	300	130	590	SH SM300	298	Single-Stage Regulators Y12-N145 * 580 Two-Stage Regulators Y11-N145 * 580 Y11-245 * 580	A = 0-25 B = 0-50 D = 0-100 E = 0-150 F = 0-250	E21
	200	115	590	SH SM200	298			
	Individual or Batch Certificate of Analysis available upon request.							
Instrument	300	130	590	SH I300	298			
	200	115	590	SH I200	298			
	80	35	590	SH I80	298			
	35	17	590	SH I35	298			
	Individual or Batch Certificate of Analysis available upon request. Liquid phase analysis.							
Chemically Pure Dielectric Grade⁽¹⁾	Y	1,100	590	SH CPY	298			
	300	130	590	SH CP300	298			
	200	115	590	SH CP200	298			
	80	35	590	SH CP80	298			
	35	17	590	SH CP35	298			
	Individual or Batch Certificate of Analysis available upon request. Liquid phase analysis.							
						* Insert Delivery Pressure Range Code		

Technical Data & Shipping Information

Molecular Weight	146.055
Specific Volume	2.65 cf/lb @70° F & 1 ATM
Flammability Limits in Air	Nonflammable
U.S. DOT Name	Sulfur Hexafluoride
ID Number	UN 1080
U.S. DOT Hazard Class	2.2
U.S. DOT Label	Nonflammable Gas
CAS Registry	2551-62-4

Airgas SF₆ Emission Reduction Program Save on costs while you save the environment.

That's the win-win impact of the Airgas SF₆ Emission Reduction Program particularly for utilities reporting under Subpart DD of the U.S. EPA Greenhouse Gas Reporting Rule and equipment manufacturers subject to Subpart SS reporting. As the national leader in SF₆ distribution we're also the leader in best practices for cylinder management, used product recycling and environmental/safety training.

Specially designed for the utility industry, the Airgas SF₆ Emission Reduction Program saves you money in supply costs by lowering your consumption and cylinder inventory. Our team of experts will help you maximize cylinder utilization, minimize contamination.

Trimethylamine (CH₃)₃N

A colorless, flammable liquefied gas with a characteristic fishy or Ammonia-like odor.

Product Specifications	Minimum Purity
Chemically Pure (CP)	99.5%

PRODUCT	Ordering Information					Equipment Recommendations		
	Cylinder Size	Contents lbs	Standard Valve Outlet (CGA)	Product Number	Cylinder Pressure at 70°F (psig)	Description Product Number	Delivery Pressure Range (psig)	Page Number
Chemically Pure (CP)	1/2 TON	550	705	TM CPHTN	13	Manual Flow Control Value Y30-411705	N/A	E112
	350	125	705	TM CP350	13			
Certificate of Conformance available upon request.								

Technical Data & Shipping Information	
Molecular Weight	59.1103
Specific Volume	6.54 cf/lb @70° F & 1 ATM
Flammability Limits in Air	2 - 11.6% in Air
U.S. DOT Name	Trimethylamine, Anhydrous
ID Number	UN 1083
U.S. DOT Hazard Class	2.1
U.S. DOT Label	Flammable Gas
CAS Registry	75-50-3

Airgas Quality Policy

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Xenon (Xe)

A colorless, odorless, nonflammable, inert gas.

Product Specifications	Minimum Purity	O ₂	H ₂ O	THC	CO	CO ₂	N ₂	Kr	Ar	H ₂	Total Halo-carbons
Propulsion	99.9995%	≤ 0.2	≤ 0.1	≤ 0.1	≤ 0.1	≤ 0.1	≤ 1	≤ 2	≤ 1	≤ 1	≤ 0.1
Research Plus	99.999%	≤ 0.5	≤ 0.5	≤ 0.5	≤ 0.5	≤ 0.5	≤ 3	≤ 5			
Research	99.995%	≤ 1	≤ 1	≤ 1	≤ 1	≤ 1	≤ 5	≤ 25			

PRODUCT	Ordering Information					Equipment Recommendations					
	Cylinder Size	Contents liters	Standard Valve Outlet (CGA)	Product Number	Cylinder Pressure at 70°F (psig)	Description Product Number	Delivery Pressure Range (psig)	Page Number			
Propulsion	80A	2,500	580	XE PL80A2500LT	900	Two-Stage Regulator Y12-N245 * 580 Single-Stage Regulator Y11-N245 * 580	A = 0-25 B = 0-50 D = 0-100 E = 0-150	E21			
	33A	1,000	580	XE PL33A1000LT	900						
6A	100	580	XE PL6A100LT	855							
LB	50	580	XE PLLB50LT	845							
LB	25	580	XE PLLB25LT	610							
Certificate of Analysis included.											
Research Plus	80A	2,000	580	XE RP80A2000LT	900						E20
	33A	1,000	580	XE RP33A1000LT	900						
	9A	250	580	XE RP9A250LT	790						
	LB	25	580	XE RPLB25LT	845						
	Certificate of Analysis included.										
Research	200	5,000	580	XE R2005000LT	900						
	80	500	580	XE R80500LT	900						
	9A	250	580	XE R9A250LT	790						
	LB	50	580	XE RLB50LT	845						
	Certificate of Analysis included.										

* Insert Delivery Pressure Range Code

Technical Data & Shipping Information	
Molecular Weight	131.293
Specific Volume	2.95 cf/lb @70° F & 1 ATM
Flammability Limits in Air	Nonflammable
U.S. DOT Name	Xenon, Compressed
ID Number	UN 2036
U.S. DOT Hazard Class	2.2
U.S. DOT Label	Nonflammable Gas
CAS Registry	7440-63-3

Airgas Quality Policy

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