

AirgasTM

GUIDE TO
SPECIALTY GASES
AND EQUIPMENT



Airgas™

SPECIALTY GASES, MIXTURES AND EQUIPMENT

FOR INDUSTRIES THAT NEED PRECISION

In many processes and analytical procedures, high purity gases and gas mixtures are critical to achieve accurate, consistent results. Impure or poorly characterized gases can lead to questionable data or potentially costly rework. Airgas brings you gases that have been purified by our exceptional purification blending and analytical capabilities to ensure you get precise, reproducible performance.

At Airgas, highly skilled technicians process your order in plants equipped with the most modern, sensitive instrumentation,

using stringent quality control procedures. Where applicable, each pure gas listing also includes a purity specification or typical analysis section, providing you a representative reading of the amount and type of impurities which may be present.

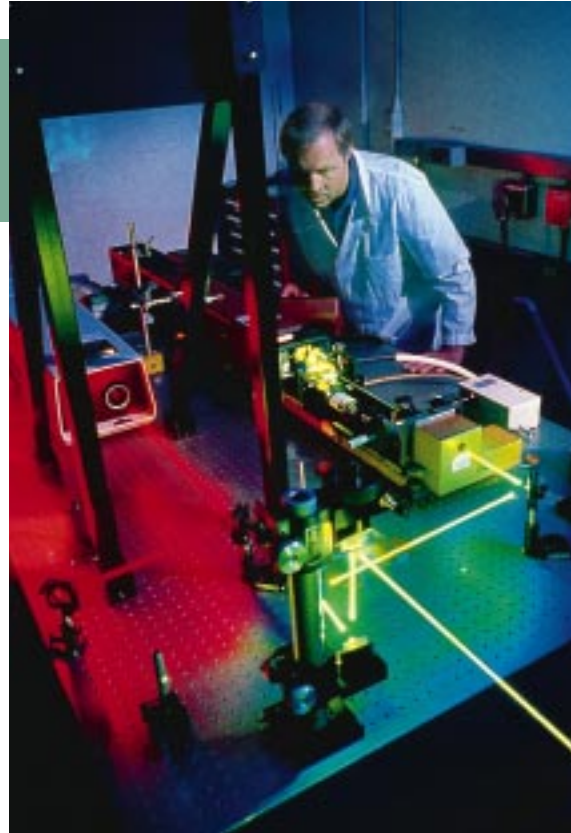
FOR OPERATIONS THAT REQUIRE A RELIABLE SUPPLY

Our goal at Airgas is to minimize your costs, with value-added solutions, such as consignment programs, maintaining on-site inventory, or providing cylinder tracking. We have the nation's largest gas distribution network, with over 400 locations to serve you—the national resources you require with local service you expect. With 22 laboratory/production facilities throughout the country, Airgas is the reliable source that responds to your needs.

A cross functional team of over 800 Airgas sales, service and distribution personnel help make gas selection easy for you. Our investment in people, facilities, and equipment enables us to provide you with the consistent, reliable specialty gases you want, when you need them.

EPA Protocol Gases help industrial companies monitor exhaust gases to comply with EPA regulations on acid rain and other major pollutants.

Gas lasers depend upon ultra-high purity gases from Airgas to generate precise, focused beams of light used in a wide variety of industrial applications.



Test laboratories around the country depend upon Airgas for a source of pure elements and compounds.





Specialty gases from Airgas enable fruit distributors to deliver freshly ripened fruit year round to markets across the country.



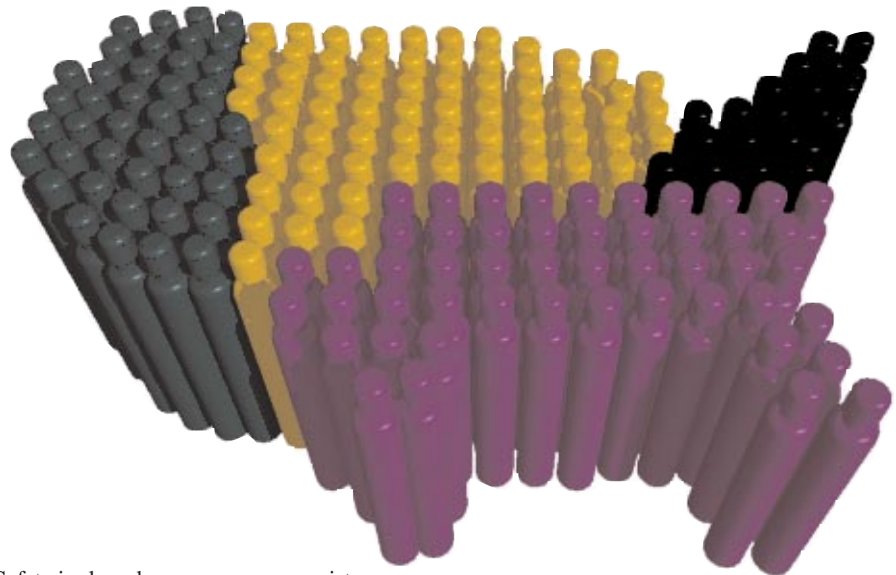
Airgas Specialty gases are available in a range of purities for the precision calibration of gas chromatography equipment.



Physicians and other healthcare professionals depend on Airgas medical gases to do their work effectively.



High purity inert gases from Airgas help manufacturers of vacuum tubes achieve consistent performance and reliability.



FOR MANAGERS THAT WANT CLOSE-QUARTER SUPPORT

At Airgas, we make an effort to understand your business practices, so we can provide you with products, training, and technical assistance to help reduce your costs. We focus on helping you with all aspects of selection, use, and handling of specialty gases. A variety of training programs are available to help you run your business more effectively.

Safety is also a key concern—we assist with safety seminars on proper storage and application of specialty gases, and show you how to establish emergency response teams. When you need applications assistance, our experienced staff of technical professionals is only a phone call away.

As the largest distributor of industrial, medical and specialty gases in the US, Airgas has a strong local presence on over 400 locations in four major divisions.

Pure Gas and Mixed Gas Properties

CUSTOM FORMULATIONS OR OFF-THE-SHELF ANSWERS

Helping you stay ahead in your industry is a vital service objective for Airgas. We have full stocking points of the products you use most in your applications, and our new Specialty Gases & Equipment Catalog describes pure gases and mixtures immediately available.

In addition to a full range of pure products, Airgas produces primary standards, certified standards, unanalyzed mixtures, or custom gas mixtures from two or more components. We also provide calibration standards that meet or exceed the latest EPA or IM240 specifications. A large fleet of tube trailers is available to serve your needs for high purity, high pressure gas and gas mixtures.

Experienced specialists are available to help you define your gas needs, develop new applications, and specify the right gas handling equipment. Let us assist you with customized total supply concepts.

Gas	Formula	Molecular Weight
Acetylene	C ₂ H ₂	26.038
Ammonia	NH ₃	17.031
Argon	Ar	39.95
Boron Trichloride	BCl ₃	117.17
Boron Trifluoride	BF ₃	67.82
1,3-Butadiene	C ₄ H ₆	54.09
Butane	C ₄ H ₁₀	58.12
cis-2-Butene	C ₄ H ₈	56.11
Trans-2-Butene	C ₄ H ₈	56.11
Carbon Dioxide	CO ₂	44.01
Carbon Monoxide	CO	28.01
Chlorine	Cl ₂	70.91
Dimethylamine	(CH ₃) ₂ NH	45.08
Dimethyl Ether	(CH ₃) ₂ O	46.07
Ethane	C ₂ H ₆	30.07
Ethyl Chloride	C ₂ H ₅ Cl	64.52
Ethylene	C ₂ H ₄	28.05
Ethylene Oxide	C ₂ H ₄ O	44.05
Fluorine	F ₂	38.00
Halocarbon-11	CCl ₃ F	137.38
Halocarbon-12	CCl ₂ F ₂	120.91
Halocarbon-13	CClF ₃	104.46
Halocarbon-13B1	CBrF ₃	148.91
Halocarbon-14	CF ₄	88.005
Halocarbon-22	CHClF ₂	86.47
Halocarbon-23	CHF ₃	70.014
Halocarbon-113	C ₂ Cl ₃ F ₃	187.38
Halocarbon-114	C ₂ Cl ₂ F ₄	170.926
Halocarbon-116	C ₂ F ₆	138.01
Helium	He	4.003
Hydrogen	H ₂	2.02
Hydrogen Bromide	HBr	80.92
Hydrogen Chloride	HCl	36.46
Hydrogen Sulfide	H ₂ S	34.08
Isobutane	C ₄ H ₁₀	58.12
Isobutylene	C ₄ H ₈	56.11
Krypton	Kr	83.8
Methane	CH ₄	16.04
Methyl Bromide	CH ₃ Br	94.94
Methyl Chloride	CH ₃ Cl	50.49
Methyl Mercaptan	CH ₃ SH	48.11
Methylamine	CH ₃ NH ₂	31.06
Neon	Ne	20.18
Nitric Oxide	NO	30.006
Nitrogen	N ₂	28.01
Nitrogen Dioxide	NO ₂	46.01
Nitrous Oxide	N ₂ O	44.01
Oxygen	O ₂	32.00
Perfluoropropane	C ₃ F ₈	188.02
Propane	C ₃ H ₈	44.1
Propylene	C ₃ H ₆	42.08
Sulfur Dioxide	SO ₂	64.06
Sulfur Hexafluoride	SF ₆	146.05
Trimethylamine	(CH ₃) ₃ N	59.11
Xenon	Xe	131.3

	Melting Point (°F)	Boiling Point (°F@1atm)	Vapor* Pressure (psia)	Gas** Density (lb/ft³)	Specific** Volume (ft³/lb)	Specific** Gravity (air=1)	Critical Temp (°F)	Critical Pressure (psia)	Critical Density (lb/ft³)
	-119.2	-103.0	649.6	0.068	14.7	0.906	95.4	897.8	14.39
	-107.9	-28.2	128.8	0.044	22.6	0.594	270.3	1635.6	14.64
	-308.9	-302.6	-	0.103	9.7	1.380	-188.4	705.4	33.07
	-161.1	54.3	19.1	0.308	3.3	4.100	353.8	561.4	-
	-198.4	-147.8	-	0.179	5.6	2.380	10.0	723.0	34.21
	-164.0	24.1	36.1	0.145	6.9	1.878	305.6	627.5	15.26
	-216.9	31.1	31.0	0.156	6.4	2.110	305.6	550.7	14.21
	-218.0	38.7	27.7	0.149	6.7	1.997	324.3	609.9	14.95
	-158.0	33.6	29.7	0.149	6.7	1.997	311.8	595.2	14.7
	-69.9	-109.2	844.7	0.114	8.8	1.522	87.9	1070.6	29.16
	-337.0	-312.7	-	0.072	13.8	0.967	-220.4	507.4	18.75
	-149.8	-29.3	100.0	0.185	5.4	2.473	291.2	1118.4	35.7
	-133.9	44.4	26.0	0.116	8.6	1.557	328.4	770.1	15.02
	-222.7	-12.7	77.0	0.119	8.4	1.621	260.4	764.2	16.88
	-297.9	-127.5	557.7	0.078	12.8	1.048	90.2	712.8	13.22
	-213.5	54.1	20.0	0.167	6.0	2.230	369.0	764.2	20.1
	-272.5	-154.7	-	0.072	13.8	0.974	49.8	742.1	16.59
	-170.5	50.9	22.0	0.114	8.8	1.490	384.4	1043.0	19.56
	-363.3	-306.6	-	0.098	10.2	1.312	-199.0	756.4	35.76
	-168.0	74.9	13.4	0.334	3.0	-	388.4	639.3	34.52
	-252.4	-21.6	84.9	0.319	3.1	4.200	233.2	598.3	34.77
	-293.8	-114.5	473.4	0.286	3.5	3.610	83.9	561.4	36.01
	-270.4	-72.0	207.7	0.385	2.6	5.310	152.6	574.9	46.42
	-304.2	-198.4	-	0.227	4.4	3.050	-50.0	542.3	39.19
	-251.4	-41.2	137.7	0.227	4.4	3.110	204.8	721.9	32.71
	-247.4	-115.6	649.7	0.182	5.5	2.417	78.3	697.0	32.71
	-31.0	117.6	5.5	0.185	5.4	-	417.4	495.3	35.89
	-137.2	38.8	27.6	0.435	2.3	5.930	294.3	473.2	36.2
	-149.1	-108.8	445.0	0.357	2.8	4.823	67.5	432.1	37.88
	-457.5	-452.1	-	0.010	96.7	0.138	-450.3	33.2	4.32
	-434.6	-423.0	-	0.005	192.0	0.070	-399.8	188.1	1.88
	-124.4	-88.1	334.7	0.208	4.8	2.812	193.6	234.5	45.79
	-173.5	-121.1	627.7	0.094	10.6	1.267	124.5	1197.7	26.17
	-122.0	-76.6	266.7	0.089	11.2	1.188	212.7	1306.5	21.74
	-255.3	10.9	45.4	0.154	6.5	2.064	275.0	529.1	13.77
	-220.6	19.6	39.0	0.149	6.7	1.947	292.5	580.2	14.58
	-251.3	-244.0	-	0.217	4.6	2.890	-82.8	796.5	56.6
	-296.5	-258.7	-	0.042	23.7	0.555	-115.8	673.1	10.12
	-136.5	38.4	27.7	0.244	4.1	3.355	381.2	757.0	38.01
	-143.9	-11.6	73.4	0.132	7.6	1.784	289.6	968.7	21.99
	-189.4	44.2	29.7	0.125	8.0	1.660	386.2	1049.3	20.69
	-113.8	61.8	16.9	0.083	12.1	1.610	361.4	815.6	15.2
	-415.5	-411.0	-	0.052	19.2	0.696	-379.7	394.7	30.12
	-262.6	-241.2	-	-0.077	13.0	1.036	-135.2	949.4	32.21
	-345.8	-320.4	-	0.072	13.8	0.967	-232.4	492.9	19.38
	11.8	70.1	14.7	0.213	4.7	2.620	316.8	1469.6	34.7
	-131.5	-127.4	759.7	0.115	8.7	1.530	97.6	1052.2	28.19
	-361.8	-297.4	-	0.083	12.1	1.105	-181.4	731.4	27.17
	-297.4	-34.1	114.8	0.500	2.0	6.690	161.4	388.7	39.19
	-305.9	-43.7	123.7	0.116	8.7	1.550	206.3	618.7	14.02
	-301.4	-53.9	151.3	0.110	9.1	1.480	197.2	667.1	14.52
	-103.9	14.0	49.1	0.169	5.9	2.263	315.7	1143.5	32.71
	-59.4	-82.7	334.7	0.400	2.5	5.114	114.0	545.2	45.86
	-178.4	37.2	28.0	0.156	6.4	2.087	320.2	590.7	14.52
	-169.4	-162.6	-	0.341	2.9	4.553	61.9	846.7	68.86



THE PROFESSIONAL ADVANTAGE

As a leader in providing specialty gases, Airgas repackages, analyzes and distributes a wide variety of gas products safely and reliably, and assists customers with applications and training. Experienced professionals are available to help answer your questions about the handling and use of our specialty gases.