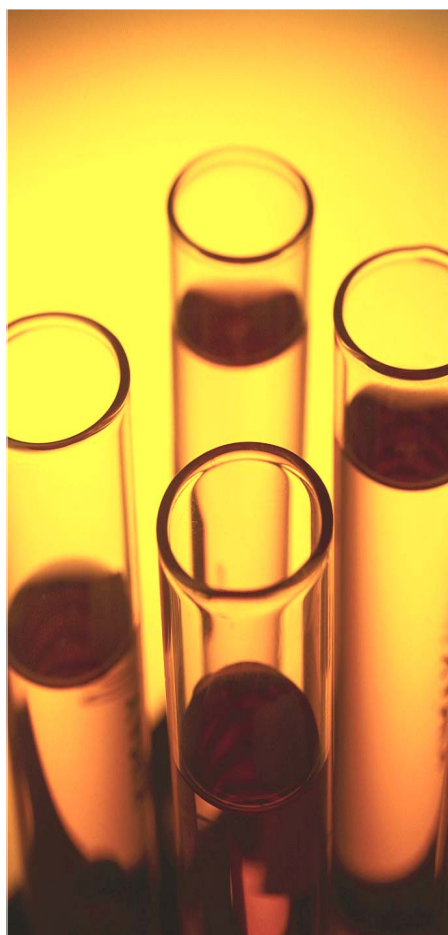


ROBERTS



OXYGEN

SPECIALTY GASES & EQUIPMENT



Biotechnology



Environmental



Laboratory and Analytical

Petrochemical & Refining

Pharmaceutical...

www.robertsoxygen.com

Specialty Gases & Equipment

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About Roberts Oxygen



Cylinder Fill Plant

Since our founding in 1966 as a local distributor of compressed industrial and specialty gases, cryogenic equipment, welding equipment and supplies, we have expanded our capabilities and services to meet the ever changing needs of our customers. Today, Roberts Oxygen is recognized as the finest service oriented distributor in the Mid-Atlantic region and the Carolinas with over 38 locations.



Liquid Ar, CO2, N2, O2 Transport



Roberts Helium Tube Trailer

Capabilities



• MEDICAL & INDUSTRIAL GASES

Industrial and Medical gas cylinders are filled under the most exacting conditions to insure that their purity complies with the customer specifications. Each cylinder undergoes inspection during the filling operation to ensure cylinder cleanliness, usability and product integrity.



• BULK GASES / MICROBULK SOLUTIONS

Your total gas and liquid requirements can be supplied by Roberts Oxygen with our expanded commitment to **BULK GASES** and **MicroBulk** supply in the Mid-Atlantic region.



• INSTALLATION OF COMPRESSED GAS AND CRYOGENIC SYSTEMS

Specializing in sales and installation of bulk tanks, manifolds for compressed gases and cryogenic systems. Vacuum jacketed piping installation. Complete freezer repair service.



• IGSA - Industrial Gas Suppliers Alliance

Roberts Oxygen a member of the Industrial Gas Suppliers Alliance, the 'Best of the Best' suppliers of industrial and specialty gases within North America. The IGSA can provide local service, national products and technical expertise.

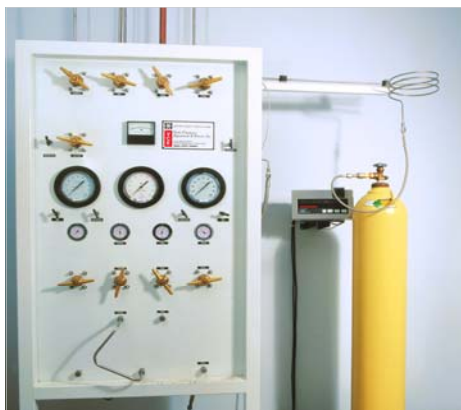
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ROBERTS



OXYGEN

Specialty Gases



Roberts Oxygen Specialty Gas Lab- Gaithersburg, MD

Roberts Oxygen serves a wide range of industries including biotechnology, petrochemical, environmental, utilities, semiconductor, and pharmaceutical. The need for Specialty Gases is becoming more commonplace within the industries we serve. You can depend on Roberts Oxygen with complete confidence for all specialty gas mixtures. "Precision Blending System" is the latest in technology and guarantees a perfect mixture in every cylinder. Our state-of-the-art gas analysis ensures the highest quality specifications, every cylinder is guaranteed to meet our customers strict specifications when it leaves our laboratory.

Full Line Distributors...



**MATHESON
TRI-GAS**



Taylor-Wharton



**Custom
BioGenic
Systems**



**WESTERN
ENTERPRISES**
GAS CONTROL TECHNOLOGY



Count on Roberts Oxygen...

Our team of sales representatives and customer service personnel can provide the guidance and support you need. *Our 13 fill plants and 15 distribution facilities* enables us to provide responsive service and support to all our specialty, industrial and medical gas customers.

We closely control the quality and consistency of all our specialty gases.

www.robertsoxygen.com



Roberts Oxygen offers Online Ordering

Customized Order Pad of the items you use most.

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Search All Manufacturers All Categories

Item List	Description	Quantity
R23	CARBON DIOXIDE, EXTRA DRY 50LB	<input type="text"/>
RLN160	LIQUID NITROGEN VL 160 LITERS	<input type="text"/>
R31	NITROGEN, 255 CU FT GRADE 4.5 HIGH PURITY	<input type="text"/>
R0121002001	O2-CO2 GAS MIXTURE SIZE 200 30/70 CERTIFIED STANDARD	<input type="text"/>

Check out is fast and simple.

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Check Out

Request Date:	<input type="text" value="Next Day"/> (mm/dd/yyyy or Next Delivery/Business Day)
Customer PO#:	<input type="text" value="123"/>
Ordered By:	<input type="text" value="Roberts Customer"/>
Phone #:	<input type="text" value="1-800-123-4567"/>
Ship Via:	<input type="text" value="ROBERTS OXYGEN TRUCK NEXT DAY"/>
Ship To:	<input type="text" value="Customer Location"/>
Payment: (This info will be passed through a secure site)	<input checked="" type="radio"/> checked >Account <input type="radio"/> >Credit Card Credit Card Number: <input type="text"/> Name on Card: <input type="text"/> Expiration Date - Month: <input type="text" value="07"/> - <input type="text" value="July"/> Expiration Date - Year: <input type="text" value="2007"/>
Special Instructions:	<input type="text"/>
Email: (for order confirmation)	<input type="text" value="customer@email.com"/>

[Place Order Now](#)

Please call your local Roberts Oxygen store location or 301-948-2205 for assistance regarding online ordering.

www.robertsoxygen.com

Pure Gases

ROBERTS



OXYGEN

- Acetylene
- Air
- Ammonia
- Argon
- Arsine
- Boron Trichloride
- Boron Trifluoride
- Butadiene 1,3
- Butane (Normal)
- Butene (1)
- Carbon Dioxide
- Carbon Monoxide
- Chlorine
- Dichlorosilane
- Disilane
- Ethane
- Ethylene
- Halocarbon-116
- Halocarbon-134A
- Halocarbon-14
- Halocarbon-218
- Halocarbon-22
- Halocarbon-23
- Hydrogen
- Hydrogen Bromide
- Hydrogen Chloride
- Hydrogen Sulfide
- Isobutane
- Isobutylene
- Krypton
- Methane
- Methyl Chloride
- Neon
- Nitric Oxide
- Nitrogen
- Nitrogen Dioxide
- Nitrogen Trifluoride
- Nitrous Oxide
- Oxygen
- Phosphine
- Propane
- Propylene
- Silane
- Silicon Tetrachloride
- Sulfur Dioxide
- Sulfur Hexafluoride

Semiconductor Pure Gases

- Ammonia
- Argon
- Arsine
- Boron Trichloride
- Boron Trifluoride
- Carbon Monoxide
- Chlorine
- Dichlorosilane
- Disilane
- Germane
- Halocarbon 14
- Halocarbon 23
- Halocarbon 32
- Halocarbon 41
- Halocarbon 116
- Halocarbon 125
- Halocarbon 134a
- Halocarbon 152a
- Halocarbon 218
- Halocarbon 236a
- Halocarbon C318
- Helium
- Hydrogen
- Hydrogen Bromide
- Hydrogen Chloride
- Hydrogen Fluoride
- Methylsilane
- Nitrogen
- Nitrogen Trifluoride
- Nitrous Oxide
- Octafluorocyclopentene
- Oxygen
- Phosphine
- Silane
- Silicon Tetrachloride
- Silicon Tetrafluoride
- Sulfur Hexafluoride
- Tungsten Hexafluoride

Gas Mixtures

- Acetaldehyde
- Acetone
- Acetylene
- Acrylonitrile
- Ammonia
- Argon
- Benzene
- 1,3-Butadiene
- Butane
- 1-Butene
- 2-Butene
- Carbon Dioxide
- Carbon Disulfide
- Carbon Monoxide
- Carbonyl Sulfide
- Chlorine
- Chloroform
- Deuterium
- Dimethyl Disulfide
- Dimethyl Ether
- Dimethyl Sulfide
- Ethane
- Ethanol
- Ethyl Mercaptan
- Ethylene
- Ethylene Oxide
- Fluorine
- Halocarbon 12 (Dichlorodifluoromethane)
- Halocarbon 22 (Chlorodifluoromethane)
- Halocarbon 114 (1,2-Dichlorotetrafluoroethane)
- Halocarbon 134A (1,1,1,2-Tetrafluoroethane)
- Halocarbon 1113 (Chlorotrifluoroethylene)
- Halocarbon C318 (Octafluorocyclobutane)
- Helium
- Hexafluoropropylene
- Hexane
- Hydrogen
- Hydrogen Bromide
- Hydrogen Chloride
- Hydrogen Cyanide
- Hydrogen Fluoride
- Hydrogen Sulfide
- Isobutane
- Isobutylene
- Isopropanol (2-Propanol)
- Methane
- Methanol
- Methyl Mercaptan
- Nitric Oxide
- Nitrogen
- Nitrogen Dioxide
- Nitrogen Trifluoride
- Nitrous Oxide
- n-Octane
- Oxygen
- n-Pentane
- 1-Pentene
- Perfluoropropane
- Phosgene
- Propane
- n-Propyl Mercaptan
- Propylene
- Styrene
- Sulfur Dioxide
- Sulfur Hexafluoride
- Toluene
- 1,1,1-Trichloroethane
- 1,1,2-Trichloroethane
- Vinyl Chloride
- Vinyl Methyl Ether
- Xylene

Semiconductor Gas Mixtures

- Arsine
- Diborane
- Phosphine
- Silane

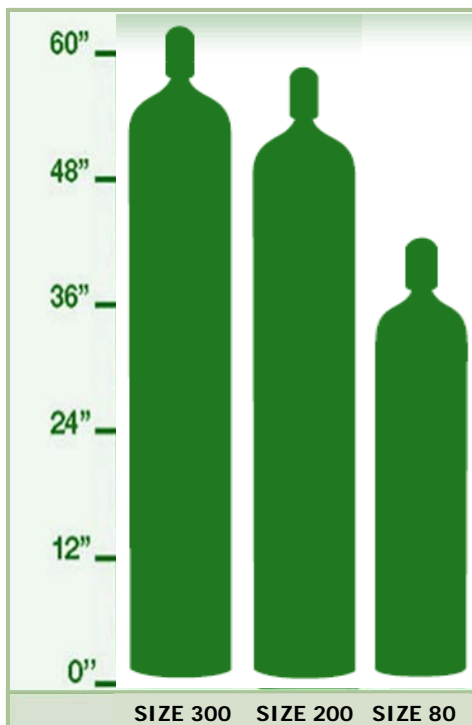


Roberts Oxygen Produces Specialty Gases for the Following Industries:

- *Aerospace*
- *Aviation*
- *Biotech*
- *Chemicals*
- *Electronics*
- *Electronics Assembly*
- *Fuel Cells*
- *Glass*
- *Pharmaceutical*
- *Plastics*
- *Printing*
- *Pulp & Paper*
- *Research Universities*
- *Refining*
- *Specialty Ceramics*
- *Textiles*
- *Thermal Spray*
- *Utilities*
- *Waste*
- *Water/Wastewater Treatment*



www.robertsoxygen.com



Other specialty gas cylinder sizes are available upon request. Please contact your local Roberts Oxygen location for assistance.

Cylinder Information

The gases and mixtures described in this catalog are shipped in cylinders that meet or exceed U.S. Department of Transportation guidelines. All cylinders are identified by gas name (by stencil or label) and tagged for ready identification and basic hazardous warning information. All gases are supplied with valves having Compressed Gas Association (CGA) approved outlet connections.

Material Safety Data Sheets (MSDS) are available upon request.

Return of Cylinders

Before being offered for transportation, cylinders must have all valve openings tightly closed. If outlet caps or plugs have been provided, these must be securely tightened to the cylinder valve outlet. All transport caps must be in place and securely tightened.

Only cylinders belonging to or having been filled by Roberts Oxygen will be accepted. Roberts Oxygen reserves the right to refuse complete shipments containing cylinders owned by others. If there are any questions on Roberts Oxygen cylinder identification, please contact Roberts Oxygen for assistance.

Cylinder Size	Approximate Dimensions (inches) (Cap Included)	Average Tare Weight (lbs) (Valve Included)	Internal Water Volume @70°F, 1Atm		Service Pressure (psig)
			liters	cu. in.	
Size 300	10x61	143	49	2980	2640
Size 200	9x56	133	43.5	2640	2490
Size 80	7x32	63	16	960	2015
3500 psi	9x51	180	43.3	2640	3500
6000 psi	10x51	267	37.4	2285	6000

Other specialty gas cylinder sizes are available upon request. Please contact your local Roberts Oxygen location for assistance.



Description Formula: C₂H₂

Technical Data

Molecular Weight: 26.04
 Density: 1.09 kg/m³ @ 21.1°C, 101.325 kPa
 0.0680 lb/ft³ @ 70°F, 14.696 psia
 Specific Volume: 0.917 m³/kg @ 21.1°C, 101.325 kPa
 14.7 ft³/lb @ 70°F, 14.696 psia
 VP @ 21.1°C (kPa): 4,479
 VP @ 70°F (psia): 650

Safety Information

LFL in Air: 2.5%
 UFL in Air: 100%
 Property Statement: Forms explosive acetylides with copper, mercury or silver. Dissolved in acetone.

Shipping Information

CAS Registry Number: 74-86-2
 UN Number: UN 1001
 DOT Proper Shipping Name: Acetylene, Dissolved
 DOT Classification: 2.1 (Flammable Gas)
 DOT Label: FLAMMABLE GAS
 TC Shipping Name: Acetylene, Dissolved
 TC Classification: 2.1
 TC Label: FLAMMABLE GAS

Pure Gases Acetylene

We Also Sell...

Single Stage / Dual Stage Regulators
 Flowmeters
 Purge Assemblies/Tees
 Distribution Accessories
 Manifolds
 Cylinder Stands and Carts
 Brackets
 Wall Mounts

Acetylene

Purified 99.6%

Part Number	CGA	Size	Cubic Ft.	Dimensions
R401	300	4	330 c.f. (max.)	12"O.D. x 46" L

Commercial 98.0%

Part Number	CGA	Size	Cubic Ft.	Dimensions
R4	300	4	220-325	12"O.D. x 46" L
R3	300	3	100-147	8"O.D. x 39" L

Other acetylene cylinder sizes are available upon request. Please contact your local Roberts Oxygen location for assistance and pricing

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Technical Data

Density: 1.200 kg/m³ @ 21.1°C, 101.325 kPa
 0.07493 lb/ft³ @ 70°F, 14.696 psia
 Specific Volume: 0.8333 m³/kg @ 21.1°C, 101.325 kPa
 13.35 ft³/lb @ 70°F, 14.696 psia

Shipping Information

CAS Registry Number: 132259-10-0
 UN Number: UN 1002
 ECCN Number: EAR99
 DOT Proper Shipping Name: Air, Compressed
 DOT Classification: 2.2 (Nonflammable Gas)
 DOT Label: NON-FLAMMABLE GAS
 TC Shipping Name: Air, Compressed
 TC Classification: 2.2
 TC Label: NON-FLAMMABLE GAS,
 NON-POISONOUS GAS

Pure Gases

Air

We Also Sell...

Single Stage / Dual Stage Regulators
 Flowmeters
 Purge assemblies/Tees
 Distribution Accessories
 Manifolds
 Cylinder Stands and Carts
 Brackets
 Wall Mounts

Air				
Ultra Zero THC < 0.5 ppm	Part Number	CGA	*Size	Cubic Ft.
	R106A3	590	300	241 c.f.
	R106A8	590	80	77 c.f.
Zero Gas THC < 2 ppm	Part Number	CGA	*Size	Cubic Ft.
	R106B3	590	300	310 c.f.
	R106B2	590	200	260 c.f.
	R106B8	590	80	77 c.f.
Breathing Quality THC<25PPM	Part Number	CGA	*Size	Cubic Ft.
	R61	346	300	310 c.f.
	R68	346	200	260 c.f.
	R63	346	150	141 c.f.
	R62	346	80	77 c.f.
	RAIR6	702	443	519 c.f.
Compressed THC<25PPM	Part Number	CGA	*Size	Cubic Ft.
	R60	590	200	260 c.f.
	R601	590	80	80 c.f.

A Certificate of Conformance will be provided on request. A lot analysis is available at a nominal charge.

* Other Cylinder sizes are available upon request.

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ROBERTS**OXYGEN****Description: Formula: NH₃****Technical Data**

Molecular Weight: 17.03
 Density: 0.709 kg/m³ @ 21.1°C, 101.325 kPa
 0.0442 lb/ft³ @ 70°F, 14.696 psia
 Specific Volume: 1.41 m³/kg @ 21.1°C, 101.325 kPa
 22.6 ft³/lb @ 70°F, 14.696 psia
 VP @ 21.1°C (kPa): 888
 VP @ 70°F (psia): 129

Safety Information

LFL in Air: 16%
 UFL in Air: 25%
 Permissible Exposure
 Limit (TLV): 25 ppm

Shipping Information

CAS Registry Number: 7664-41-7
 UN Number: UN 1005
 DOT Proper Shipping Name: Ammonia, Anhydrous
 DOT Classification: 2.2 (Nonflammable Gas)
 DOT Label: NON-FLAMMABLE GAS
 TC Shipping Name: Ammonia, Anhydrous, Liquefied
 TC Classification: 2.4, 9.2

Pure Gases

Ammonia

We Also Sell...

Single Stage / Dual Stage Regulators
 Flowmeters
 Purge Assemblies/Tees
 Distribution Accessories
 Manifolds
 Cylinder Stands and Carts
 Brackets
 Wall Mounts

Ammonia

Anhydrous 99.5% Liquid Phase

Part Number	CGA	*Size
MS115012115	705	150 lb.
MS115012131	705	100 lb.
MS115012016	705	40 lb.

A Certificate of Conformance will be provided on request.

A lot analysis is available at a nominal charge.

**Other Cylinder sizes are available upon request.*

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**Description: Formula: Ar****Technical Data**

Molecular Weight 39.95

Density: 1.65 kg/m³ @ 21.1°C, 101.325 kPa0.103 lb/ft³ @ 70°F, 14.696 psiaSpecific Volume: 0.606 m³/kg @ 21.1°C, 101.325 kPa9.71 ft³/lb @ 70°F, 14.696 psia**Shipping Information:**

CAS Number: 7440-37-1

UN Number: UN 1006

DOT Proper Shipping Name: Argon, Compressed

DOT Classification: 2.2 (Nonflammable Gas)

DOT Label: NON-FLAMMABLE GAS

TC Shipping Name: Argon, Compressed

TC Classification: 2.2

TC Label: NON-FLAMMABLE GAS,

NON-POISONOUS GAS

Pure Gases

Argon

We Also Sell...

Single Stage / Dual Stage Regulators

Flowmeters

Purge assemblies/Tees

Distribution Accessories

Manifolds

Cylinder Stands and Carts

Brackets

Wall Mounts

Argon

5.5 Grade 99.9995%

Part Number	CGA	*Size	Cubic Ft.
R105C3	580	300	337 c.f.

UHP Carrier 99.999%

Part Number	CGA	*Size	Cubic Ft.
R104C3	580	300	337 c.f.
R104C2	580	200	382 c.f.
R104C8	580	80	88 c.f.

Zero Grade 99.998%

Part Number	CGA	*Size	Cubic Ft.
R104D3	580	300	337 c.f.
R104D8	580	80	88 c.f.

HP Grade 99.995%

Part Number	CGA	*Size	Cubic Ft.
R40	580	300	336 c.f.
R41	580	125	141 c.f.
R42	580	80	80 c.f.

6000 PSI 99.998%

Part Number	CGA	Size	Cubic Ft.
R104H3	677	444	577 c.f.

PPF Grade 99.998%

Part Number	CGA	*Size	Cubic Ft.
R103A3	580	300	337 c.f.

A Certificate of Conformance will be provided on request. A lot analysis is available at a nominal charge.

**Other Cylinder sizes are available upon request.*

Description: Formula: Ar**Technical Data**

Boiling Point - 302.6° F

Freezing Point - 308.9° F

Liquid Density 11.63 lb/gal

Conversion

Liquid to Gas 112.5 SCF/gal

Safety Data

Liquid or cold gas argon can cause frostbite-type burns. Protect eyes and skin from exposure to these low temperature materials. Wear protective goggles, gloves and clothing where cold liquid might be spilled.

Caution: Pressure buildup due to liquid vaporization. One volume of liquid argon at its boiling point and atmospheric pressure will vaporize into approximately 840 volumes of gaseous argon at 70° F and one atmosphere.

ROBERTS**OXYGEN**

Liquid Argon

Shipping Data

DOT Name	Argon, Refrigerated Liquid
Hazard Class	2.2
ID No.	UN1951
DOT Label	Nonflammable Gas

Argon, Refrigerated Liquid 99.997%

Part Number	Size	Dimension (diameter x height)
*RLN230	5947 c.f.	26" x 54.8"
RLN178	5290 c.f.	20" x 65.8"
RLN163	4961 c.f.	20" x 63.5"
RLN145	4303 c.f.	20" x 59.6"

* Dewar on square base with castors



Part# AN87U4S



Anthony Welded Products has the most complete line of liquid cylinder carts, racks and wall brackets plus storage products all conforming to federal D.O.T., OSHA, N.F.P.A., C.G.A. & ANSI standards. Call for Pricing



Harpers four wheel Lo-Load dolly allows cryogenic dewars to be loaded directly from truck or rolled on to the base easily.

Part# H8547. Call for Pricing.

www.robertsoxygen.com

**Description: Formula: CO₂****Technical Data**

Molecular Weight: 44.01
 Density: 1.833 kg/m³ @ 21.1°C, 101.325 kPa
 0.1144 lb/ft³ @ 70°F, 14.696 psia
 Specific Volume: 0.5456 m³/kg @ 21.1°C, 101.325 kPa
 8.741 ft³/lb @ 70°F, 14.696 psia
 VP @ 21.1°C (kPa): 5,824
 VP @ 70°F (psia): 845

Shipping Information

CAS Registry Number: 124-38-9
 UN Number: UN 1013
 DOT Proper Shipping Name: Carbon Dioxide
 DOT Classification: 2.2 (Non Flammable Gas)
 DOT Label: NON-FLAMMABLE GAS
 TC Shipping Name: Carbon Dioxide
 TC Classification: 2.2
 TC Label: NON-FLAMMABLE GAS,
 NON-POISONOUS GAS

Pure Gases

Carbon Dioxide

We Also Sell...

Single Stage / Dual Stage Regulators
 Flowmeters
 Purge assemblies/Tees
 Distribution Accessories
 Manifolds
 Cylinder Stands and Carts
 Brackets
 Wall Mounts

Carbon Dioxide

For grades of CO₂ purer than 99.99 %, see page 32

Coleman Instrument 99.99%

Part Number	CGA	*Size
R108B2	320	50 lb.
R108B8	320	20 lb.

Extra Dry Grade 99.8%

Part Number	CGA	*Size
R23	320	50 lb.
R21	320	20

Syphon Tube 99.8%

Part Number	CGA	*Size
R2475	320	75 lb.
R24	320	50 lb.
R28	320	20 lb.

A Certificate of Conformance will be provided on request. A lot analysis is available at a nominal charge.

** Other Cylinder sizes are available upon request.*

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ROBERTS**OXYGEN****Description: Formula: CO₂****Technical Data**

Molecular Weight 44.01

Boiling Point - 109.3° F

Specific Volume 8.74 cf/lb

Critical Temperature 87.8° F

Critical Pressure 1071 psia

Safety Data

Flammable Limits Nonflammable

Toxicity TLV 5000 ppm

Compatibility Moisture promotes corrosion

Liquid or cold gas CO₂ can cause frostbite-type burns. Protect eyes and skin from exposure to these low temperature materials. Wear protective goggles, gloves and clothing where cold liquid might be spilled.

Liquid Carbon Dioxide

Shipping Data

DOT Name	Carbon Dioxide
Hazard Class	2.2
ID No.	UN1013
DOT Label	Nonflammable Gas

Carbon Dioxide, Refrigerated Liquid 99.9%

Part Number	Size	Dimensions (diameter x height)
RLN384	384 lb	20" x 59.6"

Carbon Dioxide, Microbulk 99.9%

RT400C	400 lb.	20" x 64.6"
RT600C	600 lb.	22" x 70"

**RT400C****Part# AN87U4S**

Anthony Welded Products has the most complete line of liquid cylinder carts, racks and wall brackets plus storage products all conforming to federal D.O.T., OSHA, N.F.P.A., C.G.A. & ANSI standards. Call for Pricing

Call Your local Roberts Oxygen location for assistance.

A Certificate of Conformance will be provided on request. A lot analysis is available at a nominal charge.

www.robertsoxygen.com



CO2 Incubator in your Lab?

MORE CAPACITY. LESS USED SPACE

- One 400lb. capacity eliminates up to 8 each 50lb. high pressure cylinders.
- No more cylinder change outs.

FILLS FROM THE OUTSIDE

- No more interruptions for CO2 deliveries.
- Fill / vent lines are located outside.
- Roberts Oxygen monitors usage and refills.
- No need to order ever. No more run outs.

CONSISTENT CO2 SUPPLY

- The bulk liquidator tank provides an uninterrupted supply of CO2.
- No residual CO2 sent back that you have paid for, all product is used.

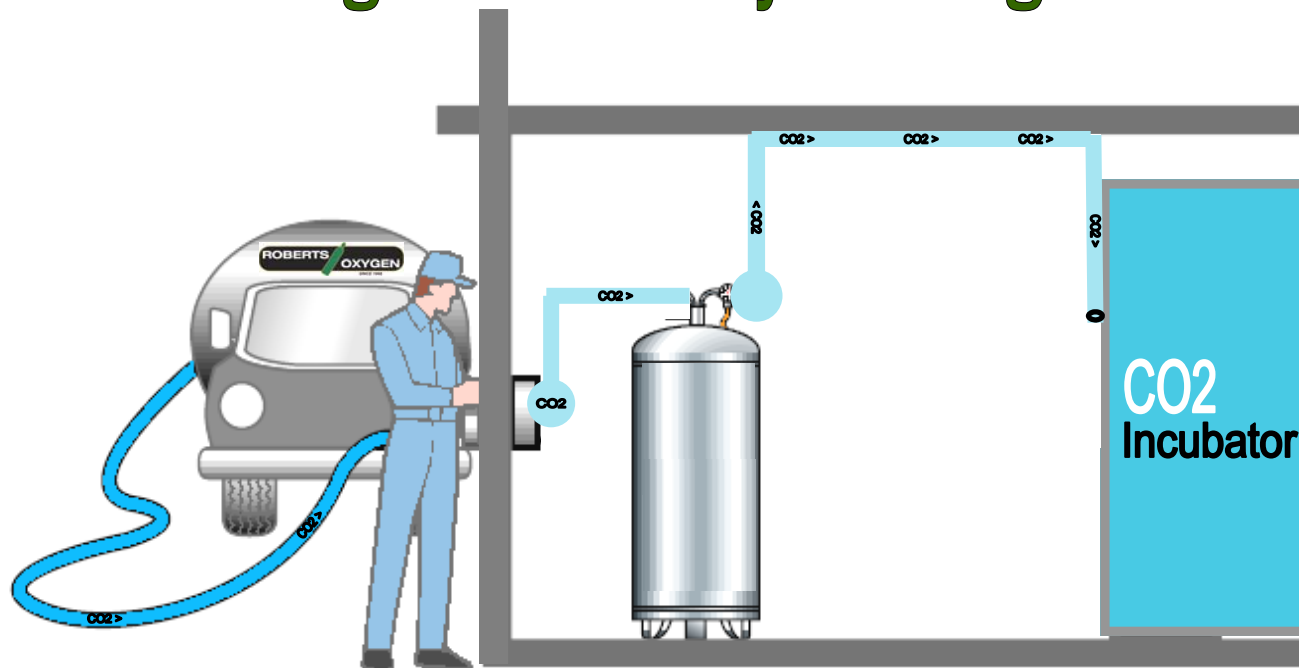
A SAFER SYSTEM

- No heavy cylinders to move around.
- No more possible damage to walls, floors, tiles from moving cylinders.

ONE CENTRAL LOCATION FOR CO2 or N2

- All CO2 requirements in your building can be serviced from one source of CO2.

Never Changeout a CO2 Cylinder Again!



For more information please call your local Roberts Oxygen store location.

www.robertsoxygen.com

DRY ICE FACTS

Dry Ice is very cold –109 degrees F and is widely used for freezing and keeping things cold. Dry Ice sublimates, converts from a solid to a gas, at a minimum rate of about 5% per 24 hour period. The rate of sublimation will vary depending on the outside temperature and the quality of the insulated container that the ice is stored or shipped in. The better the insulating capacity of the container the lower the sublimation rate.

When shipping with Dry Ice, it is important to use a well insulated container. This will reduce the amount of ice needed while extending the shipping times. Because of the extremely cold temperatures associated with **Dry Ice**, *always handle the product carefully using insulated gloves and other protective clothing*. Prolonged skin contact with Dry Ice can freeze skin cells and will cause injury similar to burns.

PICK-UP TIME AND TRANSPORTING

Plan to pick up the Dry Ice as close to the time it is needed as possible. It sublimates at 10%, or 5 to 10 pounds every 24 hours, whichever is greater. Carry it in a well-insulated container such as an ice chest.

If it is transported inside a car or van make sure your vehicle windows are open for ventilation.



"Polar" Insulated Container System for Dry Ice

Dry ice bins are available for storing or transporting dry ice. Constructed of a special Compounded-Melt Blend Plastic to resist cold impact better for greater durability. Use to transport frozen, refrigerated or perishable items to maintain product quality and integrity, or for storing dry ice.

Available in a variety of sizes with or without castors for rental or purchase.



For locations where dry ice is available for pick up, please see store listing on back cover with this notation



Dry Ice

Dry Ice pellets or Dry Ice rice from **Roberts Oxygen Company** are easy to use and reduce the time and effort spent in sizing conventional blocks to fit your needs. **No Cutting, scraping, crushing or breaking** is required because, unlike blocks, Dry Ice pellets or rice can be easily scooped and poured in between and around products filling any space or cavity. **Roberts Dry Ice** pellets or rice delivered to your facility are made at our plant to your order so you can always be assured of a consistent, fresh and stable product

INDUSTRIAL, MEDICAL AND LABORATORY APPLICATIONS

Blast Cleaning
Life Sciences
Food Processing and Shipping

METALLURGY

(Shrink-Fitting, Cold Testing)

OTHER INDUSTRIAL APPLICATIONS

(Cold Grinding, Deflashing, Inerting and Cooling, Construction and Repairs)

RECREATIONAL AND RESIDENTIAL APPLICATIONS

Camping, Hunting, Fishing and Boating
Power Failure
Halloween



www.robertsoxygen.com



Description: Formula: He

Technical Data

Molecular Weight: 4.00
 Density: 0.165 kg/m³ @ 21.1°C, 101.325 kPa
 0.0103 lb/ft³ @ 70°F, 14.696 psia
 Specific Volume: 6.06 m³/kg @ 21.1°C, 101.325 kPa
 97.1 ft³/lb @ 70°F, 14.696 psia

Shipping Information

CAS Registry Number: 7440-59-7
 UN Number: UN 1046
 DOT Proper Shipping Name: Helium, Compressed
 DOT Classification: 2.2 (Nonflammable Gas)
 DOT Label: NON-FLAMMABLE GAS
 TC Shipping Name: Helium, Compressed
 TC Classification: 2.2
 TC Label: NON-FLAMMABLE GAS,
 NON-POISONOUS GAS

Pure Gases

Helium

We Also Sell...

Single Stage / Dual Stage Regulators
 Flowmeters
 Purge assemblies/tees
 Distribution Accessories
 Manifolds
 Cylinder Stands and Carts
 Brackets
 Wall Mounts

Helium

Research Purity 99.9999%

Part Number	CGA	*Size	Cubic Ft.
MS121371018	580	200	244 c.f.

5.5 Grade 99.9995%

Part Number	CGA	*Size	Cubic Ft.
R105B3	580	300	291 c.f.

UHP Carrier 99.999%

Part Number	CGA	*Size	Cubic Ft.
R103B3	580	300	291 c.f.
R103B2	580	200	244 c.f.

Zero Gas 99.998%

Part Number	CGA	*Size	Cubic Ft.
R102D3	580	300	291 c.f.
R105D8	580	80	72 c.f.

6000 PSI 99.995%

Part Number	CGA	Size	Cubic Ft.
R102H3	677	444	515

A Certificate of Conformance will be provided on request. A lot analysis is available at a nominal charge.

**Other Cylinder sizes are available upon request.*

www.robertsoxygen.com

Description: Formula: He

Technical Data

Boiling Point - 452.1° F

Liquid Density 1.0423 lb/gal

Conversion

Liquid to Gas 100.8 SCF/gal

Liquid Helium is the coldest liquefied gas.

Safety Data

Liquid or cold gas Helium can cause frostbite-type burns. The eyes and lungs are especially sensitive to the cold vapors. Protect eyes and skin from exposure to these low temperature materials. Wear protective goggles, gloves and clothing where cold liquid might be spilled or splashed.



Liquid Helium

Shipping Data

DOT Name	Helium, Refrigerated Liquid
Hazard Class	2.2
ID No.	UN1963
DOT Label	Nonflammable Gas

Helium, Refrigerated Liquid

Part Number	Size	Dimensions (Diameter x height)
RHE030	30 Liter	20" x 48"
RHE060	60 Liter	24" x 51"
RHE100	100 Liter	24" x 59"
RHE250	250 Liter	32" x 70"
RHE500	500 Liter	42" x 75"



Helium is the only substance known that does not become a solid at temperatures approaching absolute zero and at atmospheric pressure. Many metals and alloys completely lose their resistance to the flow of electric currents and become superconductors at liquid helium temperatures. This has led to the development of superconducting magnets that produce intense magnetic fields at low energy cost.

These magnets are used in magnetic resonance imaging (MRI), an important diagnostic imaging technique that relies on magnetic fields to produce cross sectional images of the human anatomy.

Call Your local Roberts Oxygen store location for assistance.

www.robertsoxygen.com

ROBERTS**OXYGEN****Description: Formula: H₂****Technical Data**

Molecular Weight: 2.02

Density: 0.08235 kg/m³ @ 25°C, 101.325 kPa0.00521 lb/ft³ @ 77°F, 14.696 psiaSpecific Volume: 12.0 m³/kg @ 21.1°C, 101.325 kPa192 ft³/lb @ 70°F, 14.696 psia**Safety Information**

LFL in Air: 4%

UFL in Air: 74%

Shipping Information

CAS Registry Number: 1333-74-0

UN Number: UN 1049

DOT Proper Shipping Name: Hydrogen, Compressed

DOT Classification: 2.1 (Flammable Gas)

DOT Label: FLAMMABLE GAS

TC Shipping Name: Hydrogen, Compressed

TC Classification: 2.1

Pure Gases

Hydrogen

We Also Sell...

Single Stage / Dual Stage Regulators

Flowmeters

Purge assemblies/Tees

Distribution Accessories

Manifolds

Cylinder Stands and Carts

Brackets

Wall Mounts

Hydrogen**UHP Carrier 99.999%**

Part Number	CGA	*Size	Cubic Ft.
R101C3	350	300	291 c.f.
R101C2	350	250	200 c.f.
R101C8	350	80	80 c.f.

Zero Gas 99.99%

Part Number	CGA	*Size	Cubic Ft.
R102D2	350	200	250 c.f.
R102D8	350	80	73 c.f.

3500 PSI 99.95%

Part Number	CGA	Size	Cubic Ft
MS111503083	695	300	322 c.f.

Industrial 99.9%

Part Number	CGA	*Size	Cubic Ft.
R70	350	200	250 c.f.
R72	350	80	75 c.f.

*A Certificate of Conformance will be provided on request.**A lot analysis is available at a nominal charge.***www.robertsoxygen.com**

Description: Formula: N₂

Technical Data

Molecular Weight: 28.01
Density: 1.153 kg/m³ @ 21.1°C, 101.325 kPa
0.07199 lb/ft³ @ 70°F, 14.696 psia
Specific Volume: 0.8673 m³/kg @ 21.1°C, 101.325 kPa
13.89 ft³/lb @ 70°F, 14.696 psia

Shipping Information

CAS Registry Number: 7727-37-9
UN Number: UN 1066
DOT Proper Shipping Name: Nitrogen, Compressed
DOT Classification: 2.2 (Nonflammable Gas)
DOT Label: NON-FLAMMABLE GAS
TC Shipping Name: Nitrogen, Compressed
TC Classification: 2.2
TC Label: NON-FLAMMABLE GAS,
NON-POISONOUS GAS

ROBERTS**OXYGEN**

Pure Gases

Nitrogen

We Also Sell...

Single Stage / Dual Stage Regulators
Flowmeters
Purge assemblies/tees
Distribution Accessories
Manifolds
Cylinder Stands and Carts
Brackets
Wall Mounts

Nitrogen

5.5 Grade 99.9995%

Part Number	CGA	*Size	Cubic Ft.
R105A3	580	300	305 c.f.

Ultra High Purity 99.999%

Part Number	CGA	*Size	Cubic Ft.
R104A3	580	300	305 c.f.
R104A8	580	80	83 c.f.
R104A60	580	60	52.5

Zero Grade 99.998%

Part Number	CGA	*Size	Cubic Ft.
R103D3	580	300	305 c.f.
R103D8	580	80	83 c.f.

HP Grade 99.995%

Part Number	CGA	*Size	Cubic Ft.
R31	580	200	255 c.f.
R32	580	125	128 c.f.
R33	580	80	85 c.f.

NF Grade 99.5%

Part Number	CGA	*Size	Cubic Ft.
R103G3	580	300	310 c.f.
R103G2	580	200	255 c.f.
R103G1	580	125	129 c.f.

A Certificate of Conformance will be provided on request. A lot analysis is available at a nominal charge.

**Other Cylinder sizes are available upon request.*



Description: Formula: N₂

Technical Data

Molecular Weight: 28.01
 Density: 1.153 kg/m³ @ 21.1°C, 101.325 kPa
 0.07199 lb/ft³ @ 70°F, 14.696 psia
 Specific Volume: 0.8673 m³/kg @ 21.1°C, 101.325 kPa
 13.89 ft³/lb @ 70°F, 14.696 psia

Shipping Information

CAS Registry Number: 7727-37-9
 UN Number: UN 1066
 DOT Proper Shipping Name: Nitrogen, Compressed
 DOT Classification: 2.2 (Nonflammable Gas)
 DOT Label: NON-FLAMMABLE GAS
 TC Shipping Name: Nitrogen, Compressed
 TC Classification: 2.2
 TC Label: NON-FLAMMABLE GAS,
 NON-POISONOUS GAS

Pure Gases

Nitrogen

We Also Sell...

Single Stage / Dual Stage Regulators
 Flowmeters
 Purge assemblies/Tees
 Distribution Accessories
 Manifolds
 Cylinder Stands and Carts
 Brackets
 Wall Mounts

Nitrogen (continued)

3500 PSI 99.998%

Part Number	CGA	Size	Cubic Ft.
R37	680	200	345 c.f.

6000 PSI 99.998%

Part Number	CGA	Size	Cubic Ft.
R38	677	200	444 c.f.

PPF Grade 99.998%

Part Number	CGA	*Size	Cubic Ft
R103F2	580	200	261 c.f.
R103F3	580	300	305 c.f.

A Certificate of Conformance will be provided on request. A lot analysis is available at a nominal charge.

**Other Cylinder sizes are available upon request.*

www.robertsoxygen.com



Description: Formula: N₂

Technical Data

Boiling Point - 320.4° F
Triple Boiling Temp. - 346.01° F
Liquid Density 6.745 lb/gal
Conversion
Liquid to Gas 93.11SCF/gal

Safety Data

Liquid or cold gas Nitrogen can cause frostbite-type burns. Protect eyes and skin from exposure to these low temperature materials. Wear protective goggles, gloves and clothing where cold liquid might be spilled.

Caution: Pressure buildup due to liquid vaporization. One volume of Liquid Nitrogen at its boiling point and atmospheric pressure will vaporize into approximately 695 volumes of gaseous Nitrogen at 70° F at one atmosphere.

Liquid Nitrogen

Shipping Data

DOT Name	Nitrogen, Refrigerated Liquid
Hazard Class	2.2
ID No.	UN1977
DOT Label	Nonflammable Gas

Liquid Nitrogen for...

- Preserving, shipping, freezing biological products
- Storing, shipping cryogenic fluids
- Using liquid nitrogen in dermatology

Nitrogen , Refrigerated Liquid 99.999%

Part Number	*Size	Dimensions (diameter x height)
RLN160	160 Liter	20" x 59.6"
RLN240	240 Liter	26" X 54.8"
**RLN148	3640 Cubic Feet	20" x 59.6"

** Gas withdrawal, * Other sizes are available



Cryogenic Phase Separators

Designed to minimize hazardous splashing and vaporization, phase separators are available in three different sizes to accommodate transferring liquids into various open containers. The two larger phase separators are designed to fit the 3/8 in. NPT end of Taylor-Wharton transfer hoses. Call for Pricing.

2 3/4" x 1 3/8 OD, 3/8" – 18 NPTP/N 1193-8C80
1 1/4" x 1 OD, 3/8" – NPTP/N 1193-8C82



Harpers four wheel Lo-Load dolly allows cryogenic dewars to be loaded directly from truck or rolled on to the base easily.
Part# H8547. Call for Pricing.



Transfer Hoses

Transfer hoses are constructed of a flexible stainless steel suitable for the transfer of cryogenic fluids and are available in 4 ft. (1.2 m) or 6 ft. (1.8 m) lengths. Hoses

are fitted with a 3/8 in. NPT male fitting on one end and a CGA female fitting on the other end. Call for Pricing.
4' – CGA295 to 3/8" NPTP/N 1700-9C65
6' – CGA295 to 3/8" NPTP/N 1600-9C66

www.robertsoxygen.com



Description: Formula: N2O

Synonyms: Nitrogen Monoxide, Dinitrogen Monoxide, Laughing Gas

Technical Data

Molecular Weight: 44.01
 Density: 1.947 kg/m³ @ 21.1°C, 101.325 kPa
 0.1215 lb/ft³ @ 70°F, 14.696 psia
 Specific Volume: 0.5136 m³/kg @ 21.1°C, 101.325 kPa
 8.230 ft³/lb @ 70°F, 14.696 psia

Shipping Information

CAS Registry Number: 10024-97-2
 UN Number: UN 1070
 ECCN Number: EAR99
 DOT Proper Shipping Name: Nitrous Oxide
 DOT Classification: 2.2 (Nonflammable Gas)
 DOT Label: NON-FLAMMABLE GAS, OXIDIZER
 TC Shipping Name: Nitrous Oxide, compressed
 TC Classification: 2.2, 5.1
 TC Label: NON-FLAMMABLE GAS, NON-POISONOUS GAS, OXIDIZER

Pure Gases

Nitrous Oxide

We Also Sell...

Single Stage / Dual Stage Regulators
 Flowmeters
 Purge assemblies/Tees
 Distribution Accessories
 Manifolds
 Cylinder Stands and Carts
 Brackets
 Wall Mounts

Nitrous Oxide

CP GRADE 99%

Part Number	CGA	*Size	Cubic Ft.
R44	326	65 lb.	534 c.f.

SFC Purity 99.995%

Part Number	CGA	*Size	Cubic Ft.
MS124681181	326	39 lb.	320 c.f.

Research Purity 99.999%

Part Number	CGA	*Size	Cubic Ft.
MS121745047	326	60 lb.	493 c.f.
MS121745510	326	6 lb.	49 c.f.

A Certificate of Conformance will be provided on request.

A lot analysis is available at a nominal charge.

**Other Cylinder sizes are available upon request.*

Caution: Not for human consumption.

www.robertsoxygen.com

ROBERTS**OXYGEN****Description: Formula: O₂****Technical Data**

Molecular Weight: 32.00
 Density: 1.326 kg/m³ @ 21.1°C, 101.325 kPa
 0.08279 lb/ft³ @ 70°F, 14.696 psia
 Specific Volume: 0.7541 m³/kg @ 21.1°C, 101.325 kPa
 12.08 ft³/lb @ 70°F, 14.696 psia

Shipping Information

CAS Registry Number: 7782-44-7
 UN Number: UN 1072
 ECCN Number: EAR99
 DOT Proper Shipping Name: Oxygen, Compressed
 DOT Classification: 2.2 (Nonflammable Gas)
 DOT Label: NON-FLAMMABLE GAS, OXIDIZER
 TC Shipping Name: Oxygen, Compressed
 TC Classification: 2.2, 5.1
 TC Label: NON-FLAMMABLE GAS,
 NON-POISONOUS GAS, OXIDIZER

Pure Gases**Oxygen****We Also Sell...**

Single Stage / Dual Stage Regulators
 Flowmeters
 Purge assemblies/tees
 Distribution Accessories
 Manifolds
 Cylinder Stands and Carts
 Brackets
 Wall Mounts

Oxygen**Research 99.998%**

Part Number	CGA	*Size	Cubic Ft.
MS121821012	540	200	249 c.f.

UHP Grade 99.98%

Part Number	CGA	*Size	Cubic Ft.
MS119791128	540	300	337 c.f.
MS119791011	540	200	249 c.f.

Zero Grade 99.8%

Part Number	CGA	*Size	Cubic Ft.
MS120601126	540	300	337 c.f.
MS120601019	540	200	249 c.f.

Extra Dry 99.6%

Part Number	CGA	*Size	Cubic Ft.
R107A1	540	200	200 c.f.

Aviator 99.5%

Part Number	CGA	*Size	Cubic Ft.
R5A	540	300	282 c.f.

Compressed 99.5%

Part Number	CGA	*Size	Cubic Ft.
RO	540	300	282 c.f.
R1	540	200	141 c.f.

A Certificate of Conformance will be provided on request. A lot analysis is available at a nominal charge.

** Other Cylinder sizes are available upon request.*

www.robertsoxygen.com

Description: Formula: O₂

Technical Data

Boiling Point - 297.3° F
Triple Point Temp. - 361.8° F
Liquid Density
Conversion 9.527 lb/gal
Liquid to Gas 115.1 SCF/gal

Safety Data

Liquid or cold gas Oxygen can cause frostbite-type burns. Protect eyes and skin from exposure to these low temperature materials. Wear protective goggles, gloves and clothing where cold liquid might be spilled.

Caution: Pressure buildup due to liquid vaporization. One volume of Liquid Oxygen at its boiling point and atmospheric pressure will vaporize into approximately 860 volumes of gaseous Oxygen at 70° F at one atmosphere.

ROBERTS**OXYGEN**

Liquid Oxygen

Shipping Data

DOT Name	Oxygen Refrigerated Liquid
Hazard Class	2.2
ID No.	UN1073
DOT Label	Nonflammable Gas and Oxidizer

Oxygen, Refrigerated Liquid 99.5%

Part Number	Size	Dimensions
RL05	200 Liter	20" X 58"



Part# AN87U4S

Anthony Welded Products has the most complete line of liquid cylinder carts, racks and wall brackets plus storage products all conforming to federal D.O.T., OSHA, N.F.P.A., C.G.A. & ANSI standards. Call for Pricing



www.robertsoxygen.com

Specialty Gas Mixtures

-Carbon Dioxide-

ROBERTS



OXYGEN



We Also Sell...

Single Stage / Dual Stage Regulators
Flowmeters
Purge Assemblies/Tees
Distribution Accessories
Manifolds
Cylinder Stands and Carts
Brackets
Wall Mounts

Carbon Dioxide Mixtures

Carbon Dioxide In Air

2.5% / 97.5%

5% / 95%

5% / 95%

Part Number	CGA	*Size	Cubic Ft.
R0120002002	500	200	214 c.f.
R0120002003	500	200	214 c.f.
R012000E001	973	E	23 c.f.

Carbon Dioxide In Argon

15% / 85%

Part Number	CGA	*Size	Cubic Ft.
R0120503001	500	300	255 c.f.

Carbon Dioxide In Nitrogen

5% / 95%

10% / 90%

Part Number	CGA	*Size	Cubic Ft.
R0123502002	500	200	211 c.f.
R012350E001	973	E	23 c.f.

Carbon Dioxide In Oxygen

5% / 95%

5% / 95%

Part Number	CGA	*Size	Cubic Ft.
R110	280	200	225 c.f.
R110E	880	E	23 c.f.

A Certificate of Conformance will be provided on request.

A lot analysis is available at a nominal charge.

**Other Cylinder sizes are available upon request.*

www.robertsoxygen.com



Specialty Gas Mixtures

Carbon Dioxide



We Also Sell...

Single Stage / Dual Stage Regulators
Flowmeters
Purge Assemblies/Tees
Distribution Accessories
Manifolds
Cylinder Stands and Carts
Brackets
Wall Mounts

Carbon Dioxide & Hydrogen Mixtures

Carbon Dioxide & Hydrogen In Nitrogen	Part Number	CGA	*Size	Cubic Ft.
5% / 5% / 90%	R0133502013	350	200	210 c.f.
5% / 10% / 85%	R0133502019	350	200	209 c.f.
10% / 5% / 85%	R0133502018	350	200	211 c.f.
10% / 10% / 80%	R0133502014	350	200	210 c.f.

Carbon Dioxide & Nitrogen Mixtures

Carbon Dioxide & Nitrogen In Helium	Part Number	CGA	*Size	Cubic Ft.
3.4% / 15.6% / 81%	R0132002002	500	200	196 c.f.
4.5% / 13.5% / 82%	P003200E001	973	E	23 c.f.
9% / 15% / 76%	P003200E003	973	E	23 c.f.

Carbon Dioxide & Oxygen Mixtures

Carbon Dioxide & Oxygen In Nitrogen	Part Number	CGA	*Size	Cubic Ft.
5% / 1% / 94%	R0133502016	500	200	215 c.f.
5% / 5% / 90%	R0133502001	500	200	212 c.f.
5% / 20% / 75%	R0133502003	500	200	214 c.f.
10% / 5% / 85%	R0133502005	500	200	213 c.f.

*A Certificate of Conformance will be provided on request. A lot analysis is available at a nominal charge. *Other Cylinder sizes are available upon request.*

www.robertsoxygen.com

Specialty Gas Mixtures

Hydrogen



ROBERTS



OXYGEN

We Also Sell...

Single Stage / Dual Stage Regulators
Flowmeters
Purge assemblies/tees
Distribution Accessories
Manifolds
Cylinder Stands and Carts
Brackets
Wall Mounts

Hydrogen Mixtures

Hydrogen In Argon

2% / 98%

5% / 95%

Part Number	CGA	*Size	Cubic Ft.
R0120502003	350	200	222 c.f.
R144	350	200	221 c.f.

Hydrogen In Nitrogen

3% / 97%

10% / 90%

Part Number	CGA	*Size	Cubic Ft.
R0123502005	350	200	210 c.f.
R131	350	200	209 c.f.

A Certificate of Conformance will be provided on request.

A lot analysis is available at a nominal charge.

**Other Cylinder sizes are available upon request.*

www.robertsoxygen.com

Specialty Gas Mixtures

Oxygen

ROBERTS



OXYGEN



CONCOA



We Also Sell...

Single Stage / Dual Stage Regulators
Flowmeters
Purge Assemblies/Tees
Distribution Accessories
Manifolds
Cylinder Stands and Carts
Brackets
Wall Mounts

Oxygen Mixtures

Oxygen In Carbon Dioxide

30% / 70%

Part Number	CGA	**Size	Cubic Ft.
R0121002001	500	200	110 c.f.

Oxygen In Helium

21% / 79%

Part Number	CGA	*Size	Cubic Ft.
R101D2	280	200	199 c.f.
R101DE	890	E	21 c.f.

Oxygen In Nitrogen

21% / 79%

Part Number	CGA	*Size	Cubic Ft.
R012350E005	973	E	23 c.f.

A Certificate of Conformance will be provided on request.

A lot analysis is available at a nominal charge.

**Other Cylinder sizes are available upon request.*

www.robertsoxygen.com

ROBERTS**OXYGEN**

Pure Laser Gases



We Also Sell...

Single Stage / Dual Stage Regulators
Flowmeters
Purge Assemblies/Tees
Distribution Accessories
Manifolds
Cylinder Stands and Carts
Brackets

Carbon Dioxide

	Part Number	CGA	*Size	Cubic Ft.
Research Grade 99.99%	MS121101019	320	60lb	524
4.8 Grade 99.998%	T0033112402200	320	60lb	524
UHP Grade 99.995%	MS112670450	320	60lb	524

Oxygen

	Part #	CGA	*Size	Cubic Ft.
UHP Grade 99.98%	MS119791011	540	200	249 c.f.

Helium

	Part Number	CGA	*Size	Cubic Ft.
Research Purity 99.9999%	MS121371018	580	200	244 c.f.
5.5 Grade 99.9995%	R105B3	580	300	291 c.f.
UHP Carrier 99.999%	R103B3	580	300	291 c.f.
	R103B2	580	200	244 c.f.
Zero Gas 99.998%	R102D3	580	300	291 c.f.
	R105D8	580	80	72 c.f.

Nitrogen

	Part #	CGA	*Size	Cubic Ft.
5.5 Grade 99.9995%	R105A3	580	300	305 c.f.
UHP Grade 99.999%	R104A3	580	300	291 c.f.
Zero Grade 99.998%	R103D3	580	300	305 c.f.

Other sizes of Pure Laser Gases may be available. Please call Roberts Oxygen for more information.

www.robertsoxygen.com

ROBERTS**OXYGEN**

Laser Gas Mixtures



We Also Sell...

Single Stage / Dual Stage Regulators
 Flowmeters
 Purge assemblies/Tees
 Distribution Accessories
 Manifolds
 Cylinder Stands and Carts
 Brackets
 Wall Mounts

Carbon Dioxide/ Nitrogen/ Helium (Non-Medical)

	Part #	CGA	*Size	Cubic Ft.
4.5% / 13.5% / 82%	R0132002001	580	250	196 c.f.
4.5% / 13.5% / 82%	R0132003001	580	300	279 c.f.
4.5% / 13.5% / 82%	P003200E001	973	E	23 c.f.
3.14% / 31.4% / Bal Helium	R0132003002	580	300	231 c.f.

Custom mixtures also available for 4-15% CO₂/ 10-25% N₂ / Balance Helium .

Carbon Monoxide/ Carbon Dioxide/ Helium/ Nitrogen (Non-Medical)

	Part #	CGA	*Size	Cubic Ft.
4% / 8% / 28% / 60%	R0143502003	350	250	179 c.f.

Custom mixtures also available for 1-15% CO/ 1-10% CO₂/1-25% Helium/Bal N₂

Other laser mixtures may also available upon request. Please call Roberts Oxygen for pricing and availability.

www.robertsoxygen.com

ROBERTS



Laser Pak

High Flow, High Pressure Gas Delivery System

Specifically Designed to Meet the Demanding Requirements of Today's High Flow and High Pressure Laser Applications

- **Automatic Manifold:** Continuous flow of product. Never lose production time changing cylinders, cradles or dewars.
- **Normal to High Flow Applications:** Supply Gas System capable of supplying from 200 psig to over 500 psig continuously.
- **Stationary or Portable Onsite Systems:** Stationary Gas Supply System or a portable pallet base system designed to be moved by forklift from receiving to the laser.
- **Custom Laser Gases and Mixtures:** Laser Gases and Mixtures are made to the exact specifications required to maximize the performance of the laser.
- **High Purity Customized Laser Gas Installations:** The Laser Gas Supply System can be installed from the laser gases and gas mixtures to the laser(s) on the shop floor to your exact specifications.



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Special Application Mixtures

ROBERTS



OXYGEN



We Also Sell...

Single Stage / Dual Stage Regulators
Flowmeters
Purge Assemblies/Tees
Distribution Accessories
Manifolds
Cylinder Stands and Carts
Brackets
Wall Mounts

P-5 / P-10 (Argon In Methane) Nuclear Counter & Electron Capture Gases

P-5 (Argon In Methane)

5% / 95%

Ultra P-5 (Argon in Methane) UHP

5% / 95%

Part Number	CGA	*Size	Cubic Ft.
R04212	350	200	225 c.f.
R0120502009	350	200	225 c.f.
R0120508007	350	80	80 c.f.

P-10 (Argon In Methane)

10% / 90%

Ultra P-10(Argon in Methane) UHP

10% / 90%

Part Number	CGA	*Size	Cubic Ft.
R042121	350	200	226 c.f.
R0120502005	350	200	226 c.f.
R0120508002	350	80	80 c.f.

A Certificate of Conformance will be provided on request.

A lot analysis is available at a nominal charge.

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Special Application Mixtures



We Also Sell...

Single Stage / Dual Stage Regulators
Flowmeters
Purge assemblies/Tees
Distribution Accessories
Manifolds
Cylinder Stands and Carts
Brackets
Wall Mounts

Vehicle Emission Calibration Gas

Maryland (Propane, CO & CO₂ In Nitrogen)

2000ppm / 8% / 11% / Bal

Part Number	CGA	*Size
S303MX	165	200 Liter

Maryland 5-Gas (Propane, Nitric Oxide, CO & CO₂ In Nitrogen)

1200ppm / 4000ppm - 4% / 12% / Bal

Part Number	CGA	*Size
S505MX	165	200 Liter

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Cylinder Storage and Use

Storage

Storage Area – Store gas cylinders in a ventilated and well-lit area away from combustible materials. Separate gases by type and store in assigned locations that can be readily identified. Store cylinders containing flammable gases separated from oxygen cylinders and other oxidants, by a fire-resistant wall (having a fire-resistance rating of at least a half-hour) or locate them at least 20 feet apart from each other. Poison, cryogenic and inert gases should be stored separately. Labels, decals or other cylinder content identification should not be obscured or removed from the gas cylinder. Cylinders should also be stored where they can be protected from tampering by unauthorized personnel.

Storage Area Conditions – Storage areas should be located away from sources of excess heat, open flame or ignition, and not located in closed or subsurface areas. The area should be dry, cool and well-ventilated. Use of a vent hood does not provide for a safe storage area except for when a cylinder is actually in use. Outdoor storage should be above grade, dry and protected from the weather.

Securing Cylinders in Storage – The risk of a cylinder falling over and possibly shearing off its valve demands that a cylinder always be held in place with a chain or another type of fastener such as a bench or wall clamp. While in storage, cylinder valve protection caps **MUST** be firmly in place.

Empty Cylinders – Arrange the cylinder storage area so that old stock is used first. Empty cylinders should be stored separately and clearly identified. Return empty cylinders promptly. Some pressure should be left in a depleted cylinder to prevent air backflow that would allow moisture and contaminants to enter the cylinder.

Usage

Labeling – If a cylinder's content is not clearly identified by proper labels, it should not be accepted for use.

Securing Cylinders Before Use – When a cylinder is in use, it must be secured with a fastener. Floor or wall brackets are ideal when a cylinder will not be moved. Portable bench brackets are recommended when a cylinder must be moved around. Stands are available for small cylinders as well as for lecture bottles. Your Roberts Oxygen Representative can assist you in determining which type of cylinder bracket, stand or cart meets your needs.

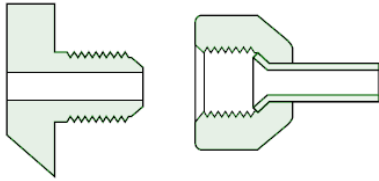


Safety glasses, gloves and shoes should be worn at all times when handling cylinders.

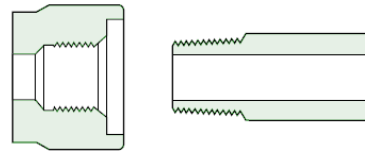
Call Roberts Oxygen for all your safety equipment needs.

www.robertsoxygen.com

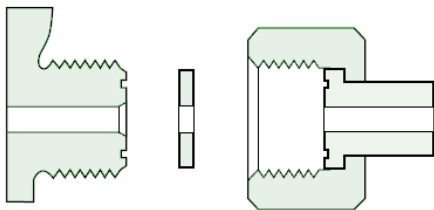
CGA Cylinder Valve Outlets and Connections



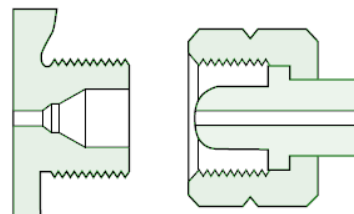
CGA 165 0.4375" – 20 UNF 2A RH EXT.



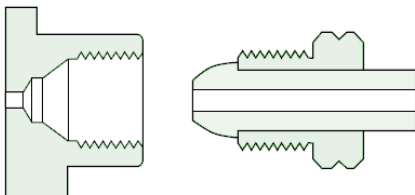
CGA 240 3/8" – 18 NGT – RH INT.



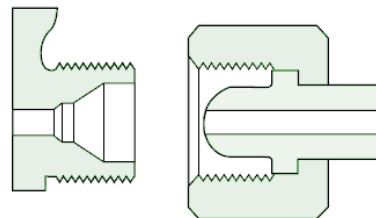
CGA 320 0.825" – 14 RH EXT. with Gasket



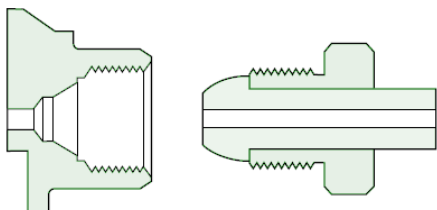
CGA 326 0.825" – 14 RH EXT.
CGA 350 0.825" – 14 LH EXT.



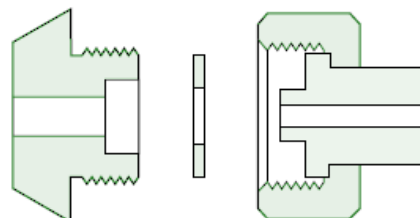
CGA 510 0.885" – 14 LH INT.



CGA 540 0.903" – 14 RH EXT.



CGA 580 0.965" – 14 RH INT.
CGA 590 0.965" – 14 LH INT.



CGA 660 1.030" – 14 RH EXT. with Gasket

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CGA #	GAS DESCRIPTION
CGA 240	Ammonia
CGA 290	Vinyl Bromide, Vinyl Chloride, Vinyl Methyl Ether
CGA 300	Acetylene, Ethyl Chloride
CGA 320	Carbon Dioxide, Methyl Fluoride
CGA 326	Nitrous Oxide
CGA 330	Antimony Pentafluoride, Boron Trifluoride, Carbonyl Sulfide, Deuterium Chloride, Deuterium Sulfide, Hexafluoroacetone, Hydrogen Bromide, Hydrogen Chloride, Hydrogen Iodide, Hydrogen Sulfide, Methyl Bromide, Methyl Mercaptan, Nitrogen Trifluoride, Nitrosyl Chloride, Nitrosyl Fluoride, Nitryl Fluoride, Phenylcarbylamine Chloride, Phosphorous Pentafluoride, Phosphorous Trifluoride, Silicon Tetrafluoride, Sulfur Tetrafluoride, Trifluoroacetyl Chloride, Uranium Hexafluoride
CGA 346	Breathing Air
CGA 350	Arsine, Carbon Monoxide, Deuterium, Deuterium Selenide, Diborane, 1,1 Difluoroethylene, Ethane, Ethylene, Germane, Hydrogen, Hydrogen Selenide, Methane, Methyl Fluoride, Methylene Fluoride, Natural Gas, Pentaborane, Phosphine, Silane, Stibine, Tetrafluoroethylene, Vinyl Fluoride
CGA 510	Acetylene, Allene, Bromotrifluoroethylene, 1,3-Butadiene, Butane, 1-Butene, 2-Butene, 1-Chloro-1,1-difluoroethane, Chlorofluoromethane, Chlorotrifluoroethylene, Cyclobutane, Cyclopropane, Diethylzinc, 1,1-Difluoroethane, Dimethyl Ether, 2,2 Dimethylpropane, Ethylacetylene, Ethylene Oxide, Ethyl Ether, Isobutane, Isobutylene, Methane, Methylacetylene, 3-Methyl-1-Butene, Methyl Chloride, Methyl Ethyl Ether, Natural Gas, Propane, Propylene, Silane, Triethylaluminum, 1,1,1 Trifluoroethane Trifluoroethylene, Vinyl Bromide, Vinyl Chloride, Vinyl Methyl Ether
CGA 540	Oxygen
CGA 555	Liquid withdrawal of Butane and Propane
CGA 580	Argon, Helium, Krypton, Neon, Nitrogen, Tetra FluoroMethane, Xenon
CGA 590	Industrial Air, Sulfur Hexafluoride
CGA 670	Bromine Pentafluoride, Bromine Trifluoride, Chlorine Pentafluoride, Chlorine Trifluoride, Deuterium Fluoride, Hydrogen Fluoride, Iodine Pentafluoride, Nitrogen Trifluoride, Perchloryl Fluoride, Tungsten Hexafluoride
CGA 792	Liquid withdrawal of Helium and Neon

Cylinder Valve Outlets and Connections courtesy of CONCOA.

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Conversion Factors



MULTIPLY BY	TO OBTAIN
DENSITY	
g/cm ³	62.43 lb/ft ³
	0.03613 lb/in ³
	8.345 lb/gal
lb/ft ³	16.02 kg/m ³
lb/in ³	1728 lb/ft ³
	27.68 g/cm ³
PRESSURE	
atm	101.3 kPa
	760 mm of Hg
	29.92 in of Hg
	33.90 ft of H ₂ O
	10330 kg/m ²
	14.70 lb/in ²
	2116 lb/ft ²
	1.013 bar
	1.033 kg/cm ²
bar	100 kPa
cm of Hg	5.353 in of H ₂ O
	0.4460 ft of H ₂ O
	1.333 kPa
	0.1934 lb/in ²
	27.84 lb/ft ²
	136.0 kg/m ²
ft of H ₂ O	0.02950 atm
	0.4335 lb/in ²
	62.43 lb/ft ²
	2.989 kPa
in of Hg	0.03342 atm
	13.60 in of H ₂ O
	1.133 ft of H ₂ O
	3.386 kPa
	0.4912 lb/in ²
	70.73 lb/ft ²
	345.3 kg/m ²
in of H ₂ O	0.2491 kPa
	0.03612 lb/in ²
	5.202 lb/ft ²
	25.40 kg/m ²
kg/cm ²	0.9678 atm
	98.07 kPa
	14.22 lb/in ²
lb/in ²	70.31 g/cm ²
	6.895 kPa
	2.036 in of Hg
	2.307 ft of H ₂ O
FLOW	
ft ³ /min	471.9 cm ³ /sec
	28.32 ltr/min
ft ³ /hr	7.866 cm ³ /sec
	.4719 ltr/min
	28.32 ltr/sec
	1699 ltr/min
	28320 cm ³ /sec
gal/hr	6.309 x 10 ⁻³ m ³ /min
	3.785 ltr/hr
ltr/min	0.03531 ft ³ /min
	2.119 ft ³ /hr
HEATING VALUE	
Btu/ft ³	0.03725 J/cm ³
Btu/lb	2.326 J/g

Conversion factors courtesy of Matheson Tri-Gas

MULTIPLY BY	TO OBTAIN
VOLUME	
cm ³	0.001 ltr
	0.610 in ³
ltr	0.2642 gal
	0.03531 ft ³
	1.057 qt
	61.02 in ³
ft ³	28320 cm ³
	1728 in ³
	0.03704 yd ³
	7.481 gal
	28.32 ltr
	0.02832 m ³
in ³	16.39 cm ³
	0.01639 ltr
	4.329 x 10 ⁻³ gal
	0.01732 qt
	1.639 x 10 ⁻³ m ³
g-mol of Ideal Gas@0°C&760 mm Hg	22.41 ltr
lb-mol of Ideal Gas@0°C&760 mm Hg	359 ft ³
MASS	
lb	0.4536 kg
	453.6 g
lb of H ₂ O	0.01602 ft ³
	27.68 in ³
	0.1198 gal
oz	28.35 g
ton (long)	1016 kg
	2240 lb
ton (short)	907.2 kg
	2000 lb
VISCOSITY (Absolute)	
	1 g/(cm)(sec)
	1 (dyn)(sec) / cm ²
	100 cP
cP	6.720 x 10 ⁻⁴ lb / (ft)(sec)
	2.089 x 10 ⁻³ (lb)(sec) / ft ²
	2.419 lb / (ft)(hr)
VISCOSITY (Kinematic)	
St	1 cm ² /sec
	0.1549 in ² /sec
	1.076 x 10 ⁻³ ft ² /sec
	density (g/cm ³) P

Key

atm	atmosphere
bar	bar
Btu	British thermal unit
°C	degree Celsius
cal	calorie, thermo chemical
cP	centipoise
cm	centimeter
cm ²	square centimeter
cm ³	cubic centimeter
dyn	dyne
°F	degree Fahrenheit
ft	foot
ft ²	square foot
ft ³	cubic foot
g	gram
gal	gallon
g-mol	gram mole
hr	hour
Hg	mercury
H ₂ O	water
in	inch
in ²	square inch
in ³	cubic inch
J	joule
K	Kelvin
kg	kilogram
kPa	kilopascal
k-mol	kilo mole
ltr	liter
lb	pound
lb-force	pound force
lb-mol	pound mole
m	meter
min	minute
mm	millimeter
m ²	square meter
m ³	cubic meter
oz	ounce
P	poise
qt	quart
°R	degree Rankine
sec	second
St	stokes
yd ³	cubic yard

Temperature

$$^{\circ}\text{F} = 1.8(^{\circ}\text{C}) + 32 \quad \text{K} = ^{\circ}\text{C} + 273.2 \quad ^{\circ}\text{R} = ^{\circ}\text{F} + 459.7$$

Miscellaneous Physical Constants

CONSTANT	NUMERICAL VALUE	UNITS
Avogadro's Number	6.022 x 10 ²³	molecules / g-mol
Gas-Law Constant R	1.987	cal / (g-mol)(K)
	1.987	Btu / (lb-mol)(°R)
	82.06	(cm ³)(atm) / (g-mol)(K)
	0.08206	(ltr)(atm) / (g-mol)(K)
	1545	(ft)(lb-force) / (lb-mol)(°R)
	0.7302	(ft ³)(atm) / (lb-mol)(°R)
	8314	J / (k-mol)(K)

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Weight and Volume Equivalents

	Weight of Liquid or Gas	Volume of Liquid @ Normal Boiling Point		Volume of Gas @70° and 14.7 psia
	lb	L	gal	ft ³
AR (Argon)	1.000 3.072 11.628 .10340	0.326 1.000 3.785 .03366	0.086 0.264 1.000 .00889	9.67 29.71 112.45 1.000
CO₂ (Carbon Dioxide)	1.000 2.238 8.470 .11440	0.447 1.000 3.785 .05113	0.118 0.264 1.000 .01351	8.741 19.559 74.039 1.000
He (Helium)	1.000 0.275 1.042 .01034	3.631 1.000 3.785 .03754	0.959 0.264 1.000 .00992	96.71 26.63 100.82 1.000
H (Hydrogen)	1.000 0.156 0.591 .00521	6.490 1.000 3.785 .03339	1.693 0.264 1.000 .00882	192.00 29.95 113.37 1.000
N₂ (Nitrogen)	1.000 1.782 6.746 .07245	0.561 1.000 3.785 .04065	0.148 0.264 1.000 .01074	13.79 24.60 93.11 1.000
O₂ (Oxygen)	1.000 2.517 9.527 .08281	0.397 1.000 3.785 .03290	0.105 0.264 1.000 .00869	12.08 30.39 115.05 1.000

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ROBERTS
OXYGEN

Additional Supply Modes



BULK GASES

Roberts Oxygen gases can be supplied in bulk quantity.

Tank trucks are used for over-the-road transportation of cryogenic liquids. Liquid product is then trans-filled to cryogenic storage tanks at customer locations. Tube trailers provide over-the-road shipment of high-pressure gases, gaseous chemicals, and gas mixtures.

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. Roberts Oxygen MicroBulk delivery is the best way to get the cost efficiencies of bulk deliveries in smaller volumes. Roberts Oxygen MicroBulk delivery system eliminates the extra expense of cylinders and liquid dewars and provides a safer work environment. A representative from Roberts Oxygen can discuss your requirements and the economics of alternate supply systems.

Tube Trailers

Roberts Oxygen can provide Tube Trailer service for Oxygen, Nitrogen, Helium, Argon, Hydrogen and Air. Below are tube trailer charts including sizes, service pressures, and performance information.



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BULK GASES

Roberts Oxygen provides custom solutions for the bulk gas application you require. The Roberts Oxygen cryogenic experts design and install the exact system that allows your applications to run smoothly, safely and profitably. Rely on our experience to analyze your requirements and design complete, cost-effective, reliable solutions. Roberts Oxygen can provide bulk storage tanks for liquid argon, carbon dioxide, nitrogen and oxygen appropriately sized for your unique applications.

Bulk Tank Specifications

*Tanks are vertical unless noted otherwise by **

TANK SIZE		525	900	*1,500 (TW)	1,500	*3000 (TW)	3,000	6,000	9,000
Capacity									
Net, Liquid	(gal) (l)	491 1859	845 3197	1,509 5,714	1,490 5,640	3,037 11,495	3,000 11,356	5,880 22,258	9,240 34,977
Dimensions									
Height	(ft-in) (m)	8-7 2.6	11-2 3.4	6-7 2.1	15-9 4.8	6-7 2.2	15-11 4.9	26-2 8.0	26-10 8.2
Length	(ft-in) (m)	-	-	15.7 4.8	-	19-5 6.0	-	-	-
Diameter	(ft-in) (m)	5-6 1.7	5-6 1.7	5-7 1.8	6.6 1.9	7-10 2.5	8-0 2.4	8-0 2.4	10-2 3.1
Nominal Evaporation O ₂ (% capacity/day)		.55	.45	.56	0.35	.32	0.35	0.25	0.18
Max Working (psig) Pressure ** (bar/kPa)		250 17.2 / 1724							

** Horizontal bulk tank*

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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. Roberts Oxygen MicroBulk delivery is the best way to get the cost efficiencies of bulk deliveries in smaller volumes.

Roberts Oxygen MicroBulk delivery system eliminates the extra expense of cylinders and liquid dewars and provides a safer work environment. A representative from Roberts Oxygen can discuss your requirements and the economics of alternate supply systems.



MicroBulk Tank Specifications

BIOTECHNOLOGY.....Cryogenic Storage, Blanketing, Purging

LABORATORIES.....R&D, Analytical, Cryogenic Storage

FOOD.....Processing, Preservation, Flash Freezing

MicroBulk Tank Capacity	GALLONS	Cubic Ft. (N2)	DIMENSIONS
230 Liters	54	5,024	26" dia. x 62" h.
450 Liters	119	10,332	30" dia. x 68" h.
1,000 Liters	264	23,370	42" dia. x 81" h.
1,500 Liters	396	35,550	48" dia. x 91" h.
2,000 Liters	538	45,113	48" dia. x 110" h.



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Tube Trailers

Roberts Oxygen can provide Tube Trailer service for Oxygen, Nitrogen, Helium, Argon, Hydrogen and Air. Below are tube trailer charts including sizes, service pressures, and performance information. Use these charts to help you select.

Tube Trailer Specifications

MODULAR TUBE TRAILER PAYLOADS

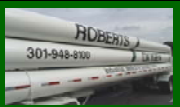
9-5/8" OD x 20' 6" L x .283" MW x 8.6 cf x 625 lbs., 3A-2400 Tubes

	Trailer Size				
	18-Tube	27-Tube	36-Tube	45-Tube	54-Tube
Gas Payload	SCF	SCF	SCF	SCF	SCF
Helium	25,730	38,592	51,456	64,319	77,183
Hydrogen	25,104	37,655	50,207	62,759	75,311
Nitrogen	26,867	40,300	53,734	67,167	80,600
Oxygen	29,727	44,590	59,453	74,316	89,180
Air	27,492	41,238	54,984	68,730	82,476

NOTES: All gas payloads, are based upon filling to 10% overfill (i.e. 2,640-psig). Single or tandem-axle chassis will be supplied, depending upon weight of tubes & gas. **SCF**/ Standard Cubic Feet.

SUPER-INTERMEDIATE TUBE TRAILER PAYLOADS

14" OD x 18' 6" L x .409" MW x 16.4 cf H₂O x 1,239 lbs., 3AAX-2845 Tubes

	Trailer Size			
	12-Tube	15-Tube	18-Tube	20-Tube
Gas Payload	SCF	SCF	SCF	SCF
Helium	38,196	47,745	57,294	63,660
Hydrogen	37,080	46,350	55,620	61,800
Nitrogen	39,528	49,410	59,292	65,880
Oxygen	44,448	55,560	66,672	74,080
Air	40,548	50,685	60,822	67,580

NOTES: All gas payloads, consider a 10% overfill (i.e. 3,130-psig). Trailers with other tube quantities are available. Single or tandem-axle chassis will be supplied, depending upon weight of tubes & gas. **SCF**/ Standard Cubic Feet.

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VACUUM JACKETED PIPING to Your LAB

VJ Piping is the preferred piping solution for the safe, reliable, cost-effective transfer of cryogenic liquids -- such as liquefied nitrogen, oxygen, argon and helium from storage tanks to points-of-use within your lab.

Vacuum Jacketed Pipe consists of:

- An inner stainless steel pipe through which the cryogenic liquid flows.
- An outer stainless steel pipe that seals a vacuum space forming the "vacuum jacket".
- External or internal bellows compensate for thermal contraction.
- Insulation between the pipes is multi-layered paper and foil providing reflective barriers coupled with a low vacuum to ensure optimal thermal efficiency.
- Two joint connection options: bayonet and field joint coupling.

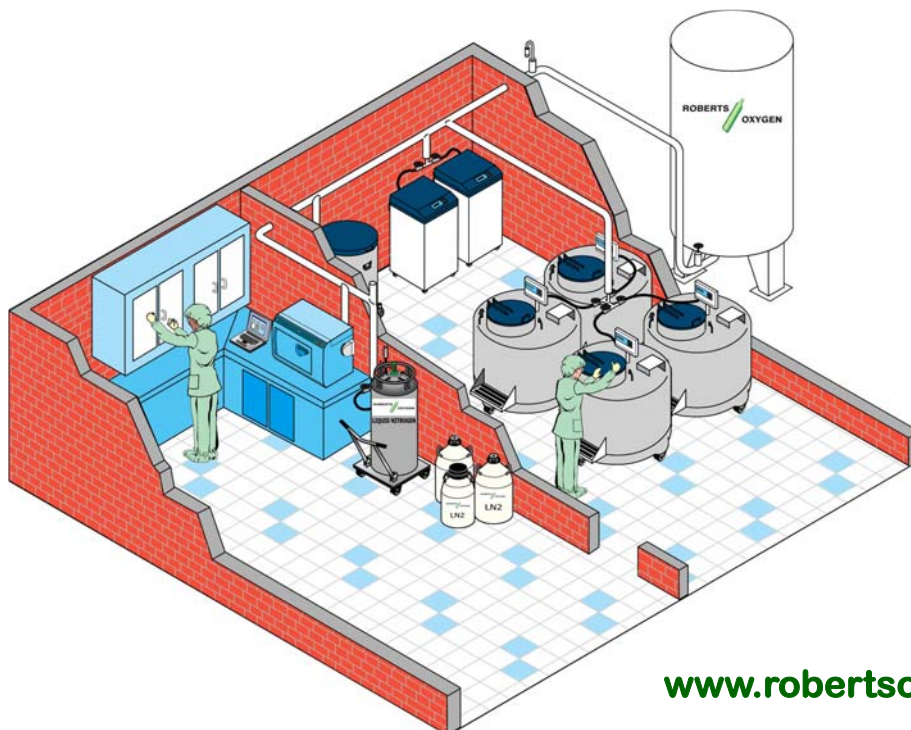


Cut Away View of VJ Pipe

Why Choose Vacuum Jacketed Pipe?

The biggest problem in transferring cryogenic liquids is loss of product due to heat transfer. Vacuum Jacketed Piping is ideally suited to prevent product loss. The vacuum seal prevents heat loss due to convection, conduction, or radiation.

- Cryogenic valves
- Bayonet connections
- Welded field joint couplings
- Stainless steel pipe with multi-layered insulation
- Internal/external bellows compensate for thermal contraction
- Factory sealed sections up to 34 feet long
- Systems can include vacuum jacketed valves, internal liquid traps, liquid globe valves, flexible sections



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402, 412 Series - Single Stage & Dual Stage Brass Cylinder Regulators

- Brass Barstock Body
- Single or Dual Stage
- Six-Port Configuration
- 316L Stainless Steel Diaphragm



The 412 Series regulators are intended for primary pressure control of non corrosive, high purity or liquefied gases for applications requiring constant pressure control and delivery regardless of supply pressure variations.

315 Series - Dual Stage Cylinder Regulator with Flowgauge

- Dual Stage
- Chrome Plated Brass Body
- 316L Stainless Steel Diaphragm
- Custom Calibration



The 315 Series regulators are specifically designed for use in the medical laboratory for blood gases, laser gases, and other clinical gas applications requiring constant pressure control and delivery regardless of supply pressure variations. In addition to standard 2-15 lpm flow gauge for Carbon Dioxide (CO₂) in laser applications, CONCOA also offers a custom 2-15 lpm calibration for any non-corrosive gas or mixture. The outlet orifice is sized to the flow requirements for a specific gas using a thermal mass flowmeter.

202, 212 Series - Single Stage & Dual Stage Chrome Cylinder Regulators

- Single or Dual Stage
- Chrome Plated Brass Body
- Five Port Configuration
- 316L Stainless Steel Diaphragm



The 212 Series regulators are intended for primary pressure control of non-corrosive, high purity or liquefied gases (up to grade 4.5) for applications requiring constant pressure control and delivery regardless of supply pressure variations.

Full Line of CONCOA Accessories...

- Purges
- Flowmeters
- Filters & Flashback Arrestors
- Traps
- Gauges & Leak Detectors
- Cylinder Accessories and Connections
- Valves



Roberts Oxygen carries the full line of CONCOA products. Please call for pricing and availability.

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529 Series - Protocol Station

- Prevents Regulator Damage
- Improves Safety
- Brass or 316L Stainless Steel Construction
- Maximum Inlet Pressure of 6000 PSIG
- Includes Everything Shown Except Regulator

The 529 Series Protocol Station is a regulator option designed for the convenient wall mounting of any CONCOA high purity regulator. Wall mounting of a regulator provides ease of use, prevents regulator damage and improves safety.



527 Series - Open Automatic Switchover with Stainless Steel Components

- Automatic Switchover System
- Ultra-High Purity Gas Service
- 316L Stainless Steel Components

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



539 Series - IntelliSwitch Gas - Liquid Dewar or High Pressure Cylinder Manifold

- Automatic Switchover System
- Cryogenic or High Pressure Supply
- High Flow
- On-Site Source Selection
- Low Loss Technology
- Microprocessor Control

The 539 Series IntelliSwitch electronic switchover is CONCOA's next generation of gas management systems. The IntelliSwitch provides continuous gas supply from liquid cylinders, high pressure cylinders or a combination of the two allowing the end-user to select the most economical mode of gas supply by the touch of a button. Microprocessor control lowers yearly gas cost by eliminating liquid cylinder vent loss and excess residual return, which makes the IntelliSwitch the perfect choice for laboratory, pilot plant or process applications.



Roberts Oxygen carries the full line of CONCOA products.
Please call for pricing and availability.

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Taylor-Wharton

ROBERTS



OXYGEN

Cryogenic Refrigerators, Dewars and Shippers



Roberts Oxygen carries the complete line of Taylor-Wharton's advanced range of cryogenic refrigerators and dewars meets your needs - flexibly, efficiently and economically. TW's comprehensive series of high-performance refrigerators incorporates durable and lightweight construction maximum holding times for optimum capacities.

- **CX Series** - Environmental and Biological Shippers.
- **HC Series** - Refrigerators for storing large quantities of materials at cryogenic materials.
- **LD Series** - Dewars for storing and dispensing small amounts of liquid nitrogen.
- **LS Series** - Aluminum Refrigerators designed for large vial capacities up to 6000 vials in box type racks.
- **LABS Series** - All Stainless Steel Freezers designed for -180C vapor storage for large vial capacities up to 80K in box type racks.
- **XT Series (Extended Time)** - Refrigerators designed for long-term storage of materials at cryogenic temperatures.
- **K Series** - Liquid nitrogen storage with controllable temperatures between (-100°C to -196°C).

Please contact your Roberts Oxygen sales representative or retail-distribution location for pricing information on all Taylor Wharton products.

TW Accessories...

- Transfer Hoses
- Dippers and Measuring Rods
- Low-Liquid Alarm
- Liquid Withdrawal Device
- Roller Base & Tipping Stand
- Cryogenic Phase Separators



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CRYO-GLOVES

HAND AND ARM PROTECTION FOR ULTRA COLD ENVIRONMENTS.

CRYO GLOVE FEATURES

- Superior thermal protection
- Water resistant
- Comfortable / Lightweight / Excellent dexterity
- Breathable / Stay-dry lining

APPLICATIONS

- Ultra low and Blast freezers
- Cold rooms
- Dry ice handling

ENVIRONMENTS

- Clinical Laboratory
- Bio-Medical
- Blood Banks
- Frozen food processing
- Pharmaceutical

AVAILABLE IN SIZES

- S (small)-Part # MAS
- L (large)- Part # MAL
- M (medium)- Part #MAM
- XL (extra large)- Part #MAXLWP

Roberts Oxygen carries the full line of Tempshield products. Please call for pricing and availability.



CRYO-APRONS

PROTECTION FROM CRYOGENIC ATMOSPHERES AND SPLASHES.

CRYO APRON FEATURES

- Superior thermal protection
- Waterproof
- Comfortable / Lightweight / Breathable
- Warmth and splash protection for torso and legs
- Adjustable straps at neck and waist
- Side release buckles for quick on / off

APPLICATIONS

- Cold rooms / Walk-in freezers
- Blast freezers
- Delivery and filling of cryogenic liquids
- HAZMAT CRYO liquid spill response

ENVIRONMENTS

- CRYO preservation facilities
- Cryogenic liquid producers
- Clinical Laboratory
- Bio-Medical
- Blood Banks
- Frozen food processing
- Pharmaceutical



TEMPCA48

www.robertsoxygen.com



1495

Premium top grain goatskin. Reinforced thumb to protect severe stress areas, longer elastic cuff for additional support and protection, breathable finger design wicks away moisture, double reinforced finger tips maximize protection. Hook and loop closure on top provides secure fit, less bulk, and side

bolsters for additional protection for side surface work. Nylon spandex back for precision fit. M, L, XL, 2X



1508

Features cowhide split palm, canvas back, 2 1/2 inch rubberized safety cuff, cotton lined palm with unlined back and economy shoulder slit cowhide.

L



1485

Premium top grain pigskin, naturally moisture resistant, Thinsulate™ winter lined. Blue spandex back.

M, L, XL, 2X



1539

Economy latex dipped string knit. Light-weight red latex coating. Ideal for tasks including general maintenance, shipping receiving, assembly, concrete/brick/lumber handling.

L

Warning: Products contain natural rubber latex which may cause allergic reaction in some individuals.



1540

Brown Jersey #1540 features 9oz., 100% cotton, and knit wrist. Designed for general purpose lightweight work applications.

L



1538

Standard latex dipped string knit. Smooth blue latex coating. Provides added abrasion, snag and cut resistance for light duty applications. Ideal for tasks including general maintenance, shipping, receiving, assembly, concrete/brick/lumber handling. L



SAFETY EYEWEAR



- Stylish and lightweight
- Detachable side shields
- Meets ANSI Z87.1 standards with or without side shields
- High quality mirrored lens, perfect for different lighting conditions.

NOMAD SAFETY SPECTACLES

LENS COLOR	BLACK FRAME	PLATINUM FRAME
CLEAR	J14390000	J14390005
SMOKE	J14390001	J14390006
SILVER MIRROR	J14390002	J14390007
METALLIC RAINBOW	J14390003	J14390008
METALLIC BLUE	J14390004	J14390009

Uvex Ultra-Spec ® 2000

- Adjustable temple length
- Lens tints: Clear, Gray, Amber and SCT® -Orange
- Clear lens available with solid sideshields and spatula temples



Uvex Astrospec 3000®

- Contemporary, lightweight unilens offers panoramic vision.
- Easy and economical lens replacement system
- Adjustable temple length
- Frame colors: Black, Blue or Patriot
- Wide variety of lens tints available including: Traditional, SCT® , and Infradura® welding shades
- Meets Mil VO ballistic test for impact



SIGHTTECH CLEAR SAFETY GOGGLES

Model ST8600 Sighttech Clear Safety Goggles provide protection from flying debris and dust. Soft rolled edge provides close fit and comfort. Perforations around the lens area ensure ventilation and evaporation.



F-300

Roberts Oxygen carries a large variety of clear and tinted face-shields in a variety of styles and sizes for protection against dust, dirt and debris.

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For all your Specialty Equipment needs please call a Roberts Oxygen location near you for assistance.

ROBERTS



OXYGEN

Custom BioGenic Systems

- Liquid Level Controls.
- Liquid Level Alarms.
- Temperature Alarms: Supply Tank Switching Systems.
- Temperature controls.

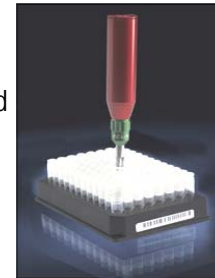


World Leader in Cryosurgical Equipment Since 1966
#1 Choice of Dermatologists

Brymill
CRYOGENIC SYSTEMS

nunc™

Nunc is an ISO 9001 and ISO 13485-certified world leader in the production and supply of laboratory plastic ware for use within molecular biology, cell culture, genomics and immunology.



Harris Calorific offers a wide range of Gas Manifolds, Pressure Regulators, Flowmeters, Traps, Purifiers and Filters to meet each application.

HARRIS
SPECIALTY GAS
EQUIPMENT



Anthony Welded Products has the most complete line of cylinder carts, racks and wall brackets plus storage products all conforming to federal D.O.T., OSHA, N.F.P.A., C.G.A. & ANSI standards.



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Roberts Oxygen carries the complete line of Anthony cylinder handling equipment for your lab that conforms to Federal OSHA, D.O.T., N.F.P.A., C.G.A. & ANSI standards.

CYLINDER CARTS

Single and dual cylinder carts recommended for the transport and handling of large high pressure cylinders. They feature newly designed longer handles for ease of mobility, large 10" solid rubber front wheels and 4" rear casters for better maneuverability over carpets and rough or uneven surfaces.



AN6214



AN6114

CYLINDER WALL BRACKETS & BENCH MOUNTS

These double reinforced steel single and dual wall mount cylinder brackets are designed to be bolted to the wall and feature either nylon belting with spring loaded, quick release, nickel plated buckles or bright plated safety chain.



ANWB200C



ANWB20015

CYLINDER FLOOR STAND DESIGNS.

NO MORE damaged floors or carpets from rusty cylinder bottoms. NO MORE lifting heavy stands up over the top of cylinders. NO MORE damaged gauges or regulators. NO MORE unsafe cylinder "ride up" on the stand due to unsafe steel thumbscrews causing gouging, scraping and marring of cylinders (especially aluminum cylinders). The cylinders can be rolled on or off with ease and firmly locked in place, or quickly unlocked with our PATENTED cylinder placement band and large plastic turning knobs.



AN610FWE



AN610F

www.robertsoxygen.com

Fill Plant / Distribution Locations

- **Baltimore, MD**, 1601 South Caton Ave. 21227
Phone (410) 644-5015
Fax (410) 644-5086
- **Gaithersburg, MD**, 17011 Railroad St. 20877
Phone (301) 948-8100
Fax (301) 948-2465
- **Marlow Heights, MD**, 4811 Stamp Rd. 20748
Phone (301) 899-6400
Fax (301) 423-4540
- **Portsmouth, VA**, 3931 Garwood Ave. 23701
Phone (757) 487-7005
Fax (757) 487-1510
- **Richmond, VA**, 2117 N. Hamilton St. 23230
Phone (804) 353-1355
Fax (804) 353-0892
- **Waynesboro, VA**, 716 N. Bath Ave. 22980
Phone (540) 949-7178
Fax (540) 943-2148
- **Winchester, VA**, 221 Brick Kiln Rd. 22603
Phone (540) 662-1180
Fax (540) 722-9353



- **Johnstown, PA**, 101 Ferndale Ave. 15905
Phone (814) 539-2833
Fax (814) 539-2994
- **Pleasant Gap, PA** 380 W. College Ave, 16823
Phone (814) 359-3399
Fax (814) 359-4376
- **Lancaster, PA**, 3150 Hempland Rd. 17601
Phone (717) 390-3009
Fax (717) 390-3091
- **Collingdale, PA**, 1230 Macdade Blvd. 19023
Phone (610) 461-1952
Fax (610) 461-1964
- **Bridgeville, DE**, 16223 Sussex Hwy. 19933
Phone (302) 337-9666
Fax (302) 337-9633
- **Charlotte, NC** 3320 Service St. 28206
Phone (704) 371-3030
Fax (704) 371-3033
- **Greensboro, NC** 8311 Triad Dr. 27409
Phone (336) 664-6565
Fax (336) 664-6566
- **Pleasantville, NJ**, 580 West Delilah Rd. 08232
Phone (609) 484-8181
Fax (609) 484-0281



ROBERTS**OXYGEN**

MARYLAND



Annapolis, MD 21401, 1801 George Ave. #B.
Phone: (410) 263-5506 Fax: (410) 268-6892



Distribution Location and Retail Store
Baltimore, MD 21227, 1601 South Caton Ave.
Phone: (410) 644-5015 Fax: (410) 644-5086



Baltimore, MD 21224, 4520 ODonnell St.
Phone: (410) 522-7440 Fax: (410) 522-7455



Bladensburg, MD 20710, 4246 Kenilworth Ave. #A.
Phone: (301) 927-5600 Fax: (301) 927-7280



Cockeysville, MD 21030, 10626 York Rd.
Phone: (410) 683-1783 Fax: (410) 683-0198



Edgewood, MD 21040, 2014 Pulaski Highway.
Phone: (410) 676-3900 Fax: (410) 676-3370



Essex, MD 21221, 712 Stemmers Run Rd.
Phone: (410) 574-7501 Fax: (410) 574-4633



Frederick, MD 21704, 5705 Industry Lane. #Q.
Phone: (301) 696-0044 Fax: (301) 696-0681

Distribution Location

Gaithersburg, MD 20877, 17011 Railroad St.
Phone: (301) 948-8100 Fax: (301) 948-2465

Glen Burnie, MD 21061, 706 N. Crain Highway North #B.
Phone: (410) 768-1175 Fax: (410) 787-9733



Hagerstown, MD 21740, 916 South Potomac St.
Phone: (301) 791-6800 Fax: (301) 791-7600



Laurel, MD 20707, 13309 Baltimore Ave.
Phone: (301) 470-1431 Fax: (301) 470-2133



Distribution Location and Retail Store
Marlow Heights, MD 20748, 4811 Stamp Rd.
Phone: (301) 899-6400 Fax: (301) 423-4540



Rockville, MD 20855, 15830 Redland Rd.
Phone: (301) 948-2205 Fax: (301) 948-0037



Salisbury, MD 21801, 2002 N. Salisbury Blvd.
Phone: (410) 749-9620 Fax: (410) 749-9651



Westminster, MD 21157, 96 John St.
Phone: (410) 840-0400 Fax: (410) 840-1912

VIRGINIA



Charlottesville, VA 22903, 770 Harris St. #101.
Phone: (434) 296-1615 Fax: (434) 295-3848



Fairfax, VA 22031, 2929 Eskridge Rd. #A.
Phone: (703) 698-5322 Fax: (703) 204-2913



Manassas, VA 20110, 8607 Quarry Rd.
Phone: (703) 369-0400 Fax: (703) 631-8264



Petersburg, VA 28303, 2200 E. Washington St.
Phone: (804) 733-4944 Fax: (804) 732-3468

LOCATIONS

Distribution Location and Retail Store

Portsmouth, VA 23701, 3931 Garwood Ave.
Phone: (757) 487-7005 Fax: (757) 487-1510



Springfield, VA 22153, 7653 Fullerton Rd.
Phone: (703) 644-5065 Fax: (703) 644-2630



Sterling, VA 20166, 45000 Underwood Lane #N.
Phone: (703) 471-9586 Fax: (703) 471-9638



Distribution Location and Retail Store

Richmond, VA 23230, 2117 N. Hamilton St.
Phone: (804) 353-1355 Fax: (804) 353-0892



Distribution Location and Retail Store

Waynesboro, VA 22980, 716 N. Bath Ave.
Phone: (540) 949-7178 Fax: (540) 943-2148



Distribution Location and Retail Store

Winchester, VA 22603, 221 Brick Kiln Rd.
Phone: (540) 662-1180 Fax: (540) 722-9353



PENNSYLVANIA

Distribution Location and Retail Store

Collingdale, PA 19023, 1230 MacDade Blvd.
Phone: (610) 461-1952 Fax: (610) 461-1964



Distribution Location and Retail Store

Johnstown, PA 15904, 125 Allison Drive
Phone: (814) 266-6500 Fax: (814) 266-4353



Distribution Location and Retail Store

Lancaster, PA 17601, 3150 Hempland Rd.
Phone: (717) 390-3009 Fax: (717) 390-2059



Distribution Location and Retail Store

Pleasant Gap, PA 16823, 380 West College Ave
Phone: (814) 359-3399 Fax: (814) 359-4375



West Chester, PA 19382, 614 Westtown Rd.
Phone: (610) 701-0700 Fax: (610) 701-9898



DELAWARE

Distribution Location and Retail Store

Bridgeville, DE 19933, 16223 Sussex Highway.
Phone: (302) 337-9666 Fax: (302) 337-9633



NEW JERSEY

Distribution Location and Retail Store

Pleasantville, NJ 08232, 580 West Delilah Rd.
Phone: (609) 484-8181 Fax: (609) 484-0281



NORTH CAROLINA

Distribution Location and Retail Store

Charlotte, NC 28206, 3320 Service St.
Phone: (704) 371-3030 Fax: (704) 371-3033



Distribution Location and Retail Store

Greensboro, NC 27409, 8311 Triad Dr.
Phone: (336) 664-6565 Fax: (336) 664-6566



Bessemer City, NC 28016, 1206 Edgewood Rd.
Ph: (704)629-9898 Fax: (704)629-9696



SOUTH CAROLINA

North Charleston, SC , 3270-A Associate Drive
Phone: (843) 760-4000 Fax: (843) 552-8005

www.robertsoxygen.com



Dry Ice available for pick up at locations with this notation. Please call first to assure availability.