Linde Healthcare Catalog

Medical Gases and Equipment

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Medipure® Medical Cylinder Gases

Linde offers a full line of pure medical gases in high-pressure cylinders distributed under the MEDIPURE® trademark, your assurance of quality and purity.

Linde's MEDIPURE medical gases are designated medical gases per the Food and Drug Administration (FDA) and are classified as drugs. These products are produced in accordance with current Good Manufacturing Practices (cGMPs) regulations. They meet United States Pharmacopia (USP) or National Formulary (NF) requirements and Linde's high quality standards. Linde facilities that manufacture and distribute medical gases are audited internally and by the FDA.

Linde's pure high-pressure medical gas cylinders should be verified before use by carefully reading the product label and should be used only by or under the supervision of a licensed practitioner and by prescription (Rx). Adapters must never be used to hookup a medical gas cylinder. Pure medical gases listed in this section are:

→ Medical Air USP
→ Carbon Dioxide USP
→ Helium USP
→ Nitrogen NF
→ Nitrous Oxide USP
→ Oxygen USP

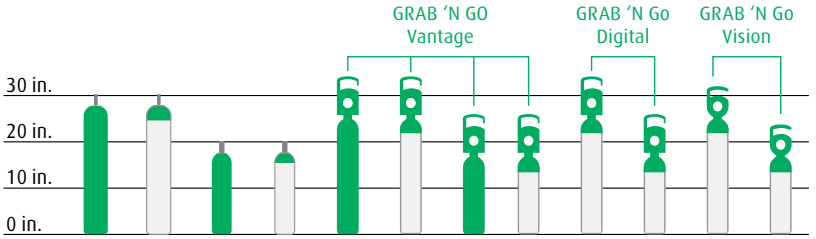
Purchasing managers have made Linde one of the leading suppliers of medical gases in the United States.

On the following pages, you will find safety and technical information about our pure gases. Technical references include:

→ Molecular weight, critical temperature, pressure and boiling point
→ DOT designation, label and hazard classification
→ Purity specifications
→ Compressed Gas Association (CGA) connection
→ Cylinder ordering information, cylinder sizes and nominal contents
→ Equipment recommendations

Pure Gases in High-Pressure Cylinders

Oxygen USP Portable Cylinder Sizes



Cylinder Size	E/ M-E	AE/ M-AE	D/ MD	AD/ M-AD	E/ M-E	AE/ M-AE	D/ MD	AD/ M-AD	AE/ M-AE	AD/ M-AD	AE/ M-AE	AD/ M-AD
Size Code	410 210	410 210	410 210	410 210	411	411	411	411	414	414	411	411
CGA Conn	870	870	870	870	1240	1240	1240	1240	1240	1240	1240	1240

Gas Specifications

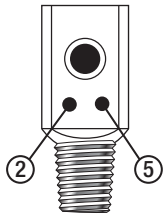
Major Hazards	Fire and high pressure
Odor	None
Toxicity	Nontoxic
Fire Potential	Highly oxidizing
Boiling Point (°F)	-297.4
Molecular Weight	32.00
Specific Gravity	1.105
Critical Temperature (°F)	-181.5
Critical Pressure (psia)	731.4
Specific Volume (cf/lbs)	12.1
UN No.	1072

DOT Designation

Name	Oxygen, compressed
Label	Yellow oxidizer
Hazard classification	2.2
SDS	P-4638

More Info

Purity	Oxygen > 99.0%, CO_2 ≤ 300 ppm, CO ≤ 10 ppm
Color code	
Shoulder color	Green
Body color	Steel, painted green aluminum, unpainted



CGA Connection No. 870
Post-type pin-indexed valves

Cylinder Specifications

Product code	Cylinder size	Cylinder type	Nominal contents	Press (psig) at 70 °F	CGA conn	Regulators	
OX M-AE	AE	Aluminum	24 cu. ft.	2000	870	WESOPA-870	WESM1-870-15FG
OX M-D	M-D	Steel	15 cu. ft.	2000	870	WESOPA-870	WESM1-870-15FG
OX M-AD	AD	Aluminum	15 cu. ft.	2000	870	WESOPA-870	WESM1-870-15FG
OX M-EGNGVNTG	M-AE	Aluminum	24 cu. ft.	2000	NR	Valve integrated pressure regulator	
OX M-ADGNGVNTG	M-AD	Aluminum	15 cu. ft.	2000	NR	Valve integrated pressure regulator	
OX M-AEGNGDIGIT	M-AE	Aluminum	24 cu. ft.	2000	NR	Valve integrated pressure regulator	
OX M-ADGNGDIGIT	M-AD	Aluminum	15 cu. ft.	2000	NR	Valve integrated pressure regulator	
OX M-AEGNGVISION	M-AE	Aluminum	24 cu. ft.	2000	NR	Valve integrated pressure regulator	
OX M-ADGNGVISION	M-AD	Aluminum	15 cu. ft.	2000	NR	Valve integrated pressure regulator	
OX M-AEGNGOPTI	M-AE	Aluminum	24 cu. ft.	2000	NR	Valve integrated pressure regulator	
OX M-ADGNGOPTI	M-AD	Aluminum	15 cu. ft.	2000	NR	Valve integrated pressure regulator	

Specifications subject to change without notice. Consult your Linde representative when ordering.

For Treatment or Prevention of Hypoxemia or Hypoxia
Used in first-aid treatment of emergencies such as suffocation and heart attacks; in the treatment of patients with respiratory disorders; in anesthesia; in hyperbaric oxygen chambers for the treatment of carbon monoxide poisoning and gas gangrene, and for other specialized oxygen therapies.

GRAB 'N GO® Digital Gas Delivery System

Portable medical oxygen system with audible and visible alarms

Linde's line of GRAB 'N GO® gas delivery systems makes a positive difference in the daily activities of healthcare professionals, allowing them to spend less time managing gases and more time focusing on patient needs. Linde's GRAB 'N GO digital gas delivery system for medical oxygen USP features a digital display showing time remaining in hours and minutes, along with visual and audible alarms that signal when contents are getting low and then again when time to replace the cylinder.

The easy-to-use package is built for convenience and portability. The GRAB 'N GO system's innovative design integrates a flowmeter-regulator with a lightweight aluminum cylinder. This design simplifies the use of medical oxygen USP with your equipment and is therapy ready.

The GRAB 'N GO system provides metered flow rates specifically calibrated for medical oxygen, from 0.5-25 liters per minute, and a constant 50 psi connection to supply auxiliary equipment.

Features and Benefits

Features	Benefits
Convenience	
→ Digital display	→ Displays time remaining in hours and minutes
→ Back-lit display	→ Easier to read in low-light, illuminates red in alarm or alert state
→ Visual and audible alarms	→ Signals low content and when time to replace the cylinder
→ Integrated regulator	→ Eliminates the need for an inventory of regulators or wrenches
→ Single knob operation	→ Open and set flow with one knob
→ Snap-set flow meter	→ Flow adjustment control includes most frequently prescribed settings
→ 50 psi auxiliary outlet	→ Provides additional connection with ample space for ease of use
Safety	
→ Built-in relief valve	→ Close off flow and isolate relief valve in one operation
→ Aluminum and composite design	→ MR Conditional up to 3.0 Tesla MRI environments
→ Durable, protective shroud	→ Protects valve and regulator
Savings	
→ Audible and visual alerts	→ Optimize content utilization → Can help reduce cylinder handling and inventory management

GRAB 'N GO® Vision Gas Delivery System

Medical oxygen USP gas delivery system

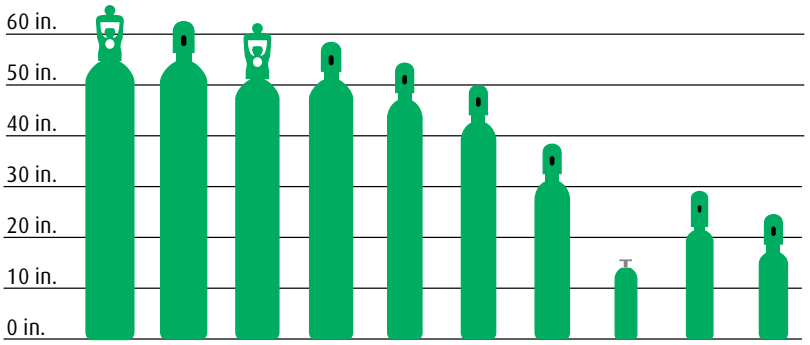
Linde's GRAB 'N GO® Vision, our newest portable oxygen USP system, features practical technology. A modern streamlined design includes an angled luminescent gauge to easily determine cylinder content, even in low light, reducing the possibility of product outages during transport.

The GRAB 'N GO Vision system provides metered flow rates from 0.25-25 liters per minute and a constant 50 psi connection to supply auxiliary equipment making it ideal for use by healthcare professionals in a variety of settings including: hospitals, skilled nursing and long-term care facilities, surgery centers, as well as dental and medical practices.

Features and Benefits

Features	Benefits
Convenience	
→ Angled gauge	→ Visible from top and front
→ Luminescent gauge	→ Easy to read in low-light environments
→ Integrated flowmeter	→ Open and set flow with one knob operation
→ 50 psi auxilliary outlet	→ Ready for use with other ventilation devices
→ Barbed outlet	→ Flow Settings 0.25, 0.50, 1, 2, 3, 4, 6, 8, 10, 15, 25
Safety	
→ Built-in relief valve	→ Close off flow and isolate relief valve in one operation
→ MR Conditional	→ Up to 3.0 Tesla MRI environments
→ Durable, protective shroud	→ Protects valve and regulator

Oxygen USP Cylinder Sizes



Cylinder Size	T	T	K	K	S	M/ DEY	Q	R	G	F
Size Code	431 –	430 230	431 –	430 230	430 230	430 230	410 210	410 210	410 210	410 210

DOT Designation

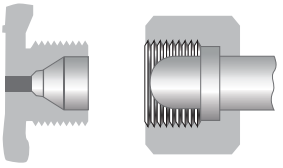
Name	Oxygen, compressed
Label	Yellow oxidizer
Hazard classification	2.2
SDS	P-4638

More Info

Purity	Oxygen > 99.0%, CO_2 ≤ 300 ppm, CO ≤ 10 ppm
Color code	
Shoulder color	Green
Body color	Steel, painted green

Gas Specifications

Major hazards	Fire and high pressure
Odor	None
Toxicity	Nontoxic
Fire potential	Highly oxidizing
Boiling point (°F)	-297.4
Molecular weight	32.00
Specific gravity	1.105
Critical temperature (°F)	-181.5
Critical pressure (psia)	731.4
Specific volume (cf/lbs)	12.1
UN No.	1072



CGA Connection No. 540
Threaded outlet-type valves

Cylinder Specifications

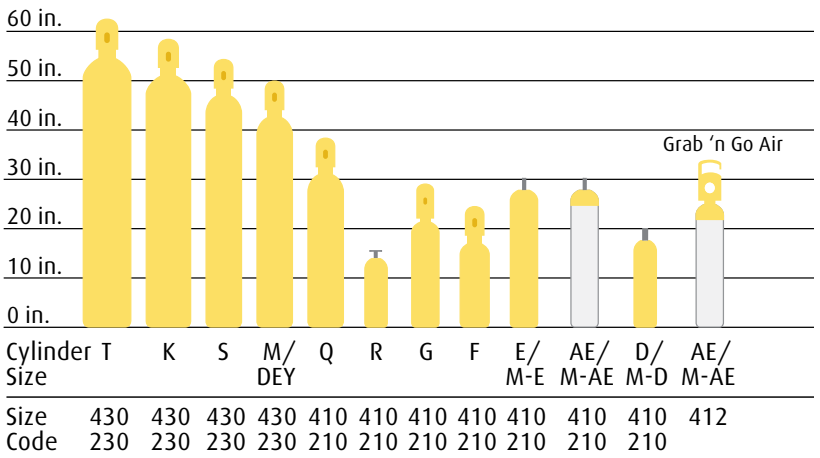
Product code	Cylinder size	Nominal contents	Press (psig) at 70 °F	CGA conn	Regulators
OX M-Q	Q	83 cu. ft.	2200	540	WESM1-540-PG, WESM1-540-P, WESM1-540-15FG , WESM1-540-8FG
OX M-S	S	154 cu. ft.	2200	540	WESM1-540-PG, WESM1-540-P, WESM1-540-15FG , WESM1-540-8FG
OX M-K	K	249 cu. ft.	2200	540	WESM1-540-PG, WESM1-540-P, WESM1-540-15FG , WESM1-540-8FG
OX M-T	T	337 cu. ft.	2640	540	WESM1-540-PG, WESM1-540-P, WESM1-540-15FG , WESM1-540-8FG
OX M-K-LC	K	249 cu. ft.	2200	DISS 1080	Valve integrated pressure regulator
OX M-T-LC	T	337 cu. ft.	2640	DISS 1080	Valve integrated pressure regulator

Specifications subject to change without notice. Consult your Linde representative when ordering.

For Treatment or Prevention of Hypoxemia or Hypoxia
Used in first-aid treatment of emergencies such as suffocation and heart attacks; in the treatment of patients with respiratory disorders; in anesthesia; in hyperbaric oxygen chambers for the treatment of carbon monoxide poisoning and gas gangrene, and for other specialized oxygen therapies.

Medical Air USP

Colorless, odorless, nonflammable inert gas



DOT Designation

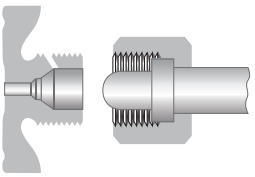
Name	Air, compressed
Label	Green, nonflammable gas
Hazard classification	2.2
SDS	P-4560

More Info

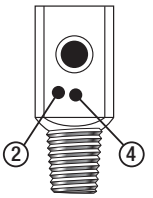
Purity	Oxygen 19.5-23.5%, Balance Nitrogen, SO_2 ≤ 5 ppm, $NO+NO_2$ ≤ 2.5 ppm, CO ≤ 10 ppm, CO_2 ≤ 500 ppm
Color code	
Shoulder color	Yellow
Body color	Steel, yellow; aluminum, unpainted

Gas Specifications

Major hazards	High pressure
Odor	None
Toxicity	Nontoxic
Fire potential	Supports combustion
Boiling point (°F)	-317.8
Molecular weight	28.96
Specific gravity	1
Critical temperature (°F)	-221.1
Critical pressure (psia)	546.85
Specific volume (cf/lbs)	13.3
UN No.	1002



CGA Connection No. 346



CGA Connection No. 950

Cylinder Specifications

Product code	Cylinder size	Nominal contents	Press (psig) at 70 °F	CGA conn	Regulators
AI M-D	M-D	14 cu. ft.	2000	950	WESM1-950-PG
AI M-E	M-E	23 cu. ft.	2000	950	WESM1-950-PG
AI M-AE	AE	22 cu. ft.	2000	950	WESM1-950-PG
AI M-K	K	232 cu. ft.	2000	346	WESM1-346-PG , WESM1-346-P
AI M-T	T	310 cu. ft.	2000	346	WESM1-346-PG , WESM1-346-P
AI M-AEGNG	AE	22 cu. ft.	2000	DISS	Valve integrated pressure regulator

Specifications subject to change without notice. Consult your Linde representative when ordering.

To Reduce the Risk of Hyperoxia
Respiratory therapy; humidity treatments using nebulizers, and a source of pneumatic pressure to power gas-operated medical devices.

GRAB ‘N GO® Air Gas Delivery System

Medical air USP

With their all-in-one design, Linde’s line of GRAB ‘N GO® gas delivery systems have helped users of medical oxygen USP and other medical gases simplify the use of portable cylinders. The increased ease of use makes a positive difference in the daily activities of healthcare professionals, allowing them to spend less time managing gases and more time focusing on patient needs.

Linde’s GRAB ‘N GO Air gas delivery system for medical air USP provides the gas you need in a self-contained, easy-to-use package built for convenience and portability. The GRAB ‘N GO system’s innovative design integrates a flowmeter-regulator with a lightweight aluminum cylinder. This design simplifies the use of medical air USP with your equipment and is therapy-ready.

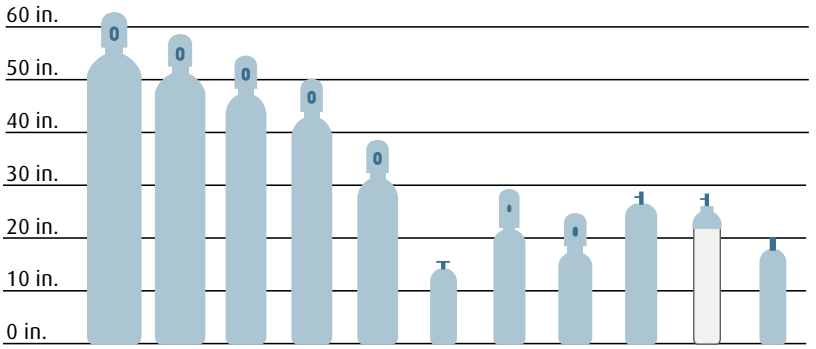
The GRAB ‘N GO Air system provides metered flow rates specifically calibrated for medical air USP, from 1-25 liters per minute, and a constant 50 psi connection to supply auxiliary equipment.

Features and Benefits

Features	Benefits
Convenience	
→ Integrated regulator	→ No additional equipment to attach. Regulator is maintained by Linde
→ Single knob operation	→ Open and set flow with one knob
→ Snap-set flow meter	→ Flow adjustment control includes most frequently prescribed settings
→ 50 psi auxiliary outlet	→ Provides additional connection with ample space for ease of use
Safety	
→ Built-in relief valve	→ Close off flow and isolate relief valve in one operation
→ Aluminum and composite design	→ MR Conditional up to 3.0 Tesla MRI environments
→ Analog pressure gauge	→ Displays a continuous indicator of cylinder contents
→ Durable, protective shroud	→ Protects valve and regulator
Savings	
→ Integrated package	→ Eliminates the need for an inventory of regulators or wrenches

Nitrous Oxide USP

Colorless, oxidizing, liquefied gas with a slightly sweetish taste and odor



Cylinder Size	T	K	S	M/ DEY	Q	R	G	F	E/ ME	AE	D/ MD
Size Code	430 230	430 230	430 230	430 230	410 210	410 210	410 210	410 210	410 210	410 210	410 210

Gas Specifications

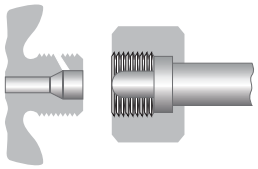
Major hazards	Fire and high pressure
Odor	None
Toxicity	Nontoxic anesthetic
Fire potential	Oxidizer
Boiling point (°F)	-127.3
Molecular weight	44.01
Specific gravity	1.53
Critical temperature (°F)	97.7
Critical pressure (psia)	1052.2
Specific volume (cf/lbs)	8.7
UN No.	1070

DOT Designation

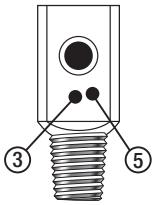
Name	Nitrous oxide
Label	Nonflammable gas, oxidizer
Hazard Classification	2.2
SDS	P-4636

More Info

Purity	Nitrous Oxide ≥ 99%, Air ≤ 1%, CO_2 ≤ 300 ppm, NO ≤ 1 ppm, NO_2 ≤ 1 ppm, NH_3 ≤ 25 ppm, Halogens ≤ 1 ppm, CO ≤ 10 ppm, H_2O ≤ 200 ppm
Color code	
Shoulder color	Blue
Body color	Steel, blue; aluminum, unpainted



CGA Connection No. 326
Threaded outlet-type valves



CGA Connection No. 910
Post-type pin-indexed valves

Cylinder Specifications

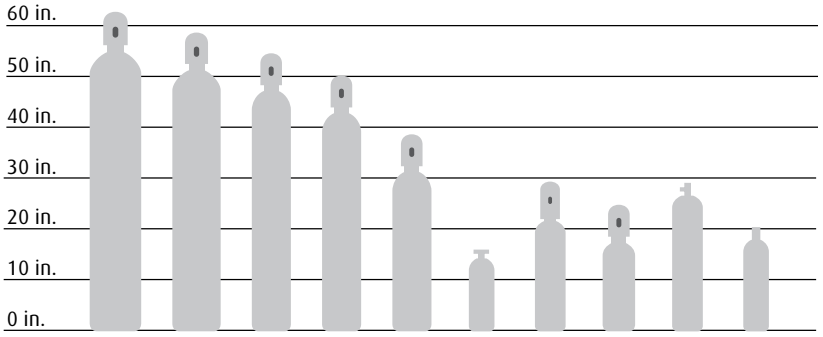
Product code	Cylinder size	Nominal contents	Press (psig) at 70 °F	CGA conn	Regulators
NS M-D	M-D	3.9 lbs.	745	910	WESM1-910-PG
NS M-E	M-E	6.4 lbs.	745	910	WESM1-910-PG
NS M-20	20 lbs.	20 lbs.	745	326	WESM1-326-PG, WESM1-326-P
NS M-50	K	50 lbs.	745	326	WESM1-326-PG, WESM1-326-P
NS M-64	K	64 lbs.	745	326	WESM1-326-PG, WESM1-326-P
NS M-AEALERT	M-AE	6.4 lbs.	745	910	Content gauge permanently attached, WESM1-910-PG or equivalent
NS M-56	K	56 lbs.	745	326	N/A

Specifications subject to change without notice. Consult your Linde representative when ordering.

For Analgesia
As an analgesic, often in combination with other agents for the production of anesthesia. Nitrous oxide is also used in cryosurgery.

Carbon Dioxide USP

Colorless, odorless, nonflammable, slightly acidic, liquefied gas



Cylinder Size	T	K	S	M/ DEY	Q	R	G	F	E/ ME	D/ MD
Size Code	430 230	430 230	430 230	430 230	410 210	410 210	410 210	410 210	410 210	410 210

DOT Designation

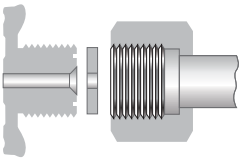
Name	Carbon dioxide
Label	Green, nonflammable gas
Hazard classification	2.2
SDS	P-4574

More Info

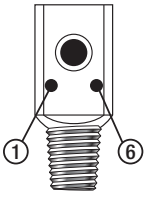
Purity	Carbon dioxide ≥ 99%, CO ≤ 10 ppm, NO ≤ 2.5 ppm, NH_3 ≤ 25 ppm, H_2O ≤ 200 ppm, NO_2 ≤ 2.5 ppm, H_2S ≤ 1 ppm, SO_2 ≤ 5 ppm
Color Code	
Shoulder Color	Gray
Body Color	Gray

Gas Specifications

Major hazards	High pressure and inhalation
Odor	None
Toxicity	Low toxicity, TLV of 5000 ppm
Fire potential	Nonflammable
Boiling point (°F)	-109.1
Molecular weight	44.01
Specific gravity	1.522
Critical temperature (°F)	87.8
Critical pressure (psia)	1070.6
Specific volume (cf/lbs)	8.76
UN No.	2187



CGA Connection No. 320
Threaded outlet-type valves



CGA Connection No. 940
Post-type pin-indexed valves

Cylinder Specifications

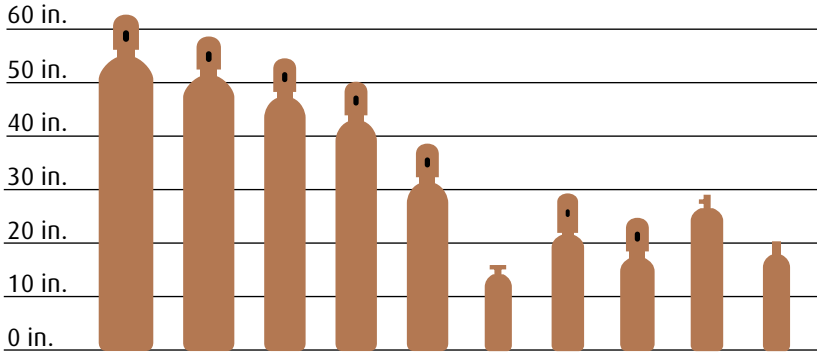
Product code	Cylinder size	Nominal contents	Press (psig) at 70 °F	CGA conn	Regulators
CD M-D	M-D	4 lbs.	830	940	WESM1-940-PG
CD M-E	M-E	6 lbs.	830	940	WESM1-940-PG
CD M-AE	AE	6 lbs.	830	940	WESM1-940-PG
CD M-Q	Q	20 lbs.	830	320	WESM1-320-PG , WESM1-320-P
CD M-20	20 lbs.	20 lbs.	830	320	WESM1-320-PG , WESM1-320-P
CD M-50S	50 lbs.	50 lbs.	830	320	N/A
CD M-50	K	50 lbs.	830	320	WESM1-320-PG , WESM1-320-P
CD M-64	64 lbs.	64 lbs.	830	320	WESM1-320-PG , WESM1-320-P

Specifications subject to change without notice. Consult your Linde representative when ordering.

For Use in Extracorporeal Membrane Oxygenation Therapy or Respiratory Stimulation
For close-to-physiologic atmospheres for the operation of artificial organs; in cryosurgery with insufflators during laparoscopic surgery; and as a component in a mixture of oxygen or air as a respiratory stimulant to promote deep breathing. Syphon cylinders are available on request. A syphon cylinder uses a full-length eductor tube to permit withdrawal of liquid-phase product.

Helium USP

Colorless, odorless, nonflammable inert gas



Cylinder Size	T	K	S	M/ DEY	Q	R	G	F	E/ ME	D/ MD
Size Code	430 230	430 230	430 230	430 230	410 210	410 210	410 210	410 210	410 210	410 210

Gas Specifications

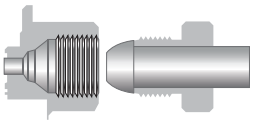
Major hazards	High pressure and asphyxiation
Odor	None
Toxicity	Nontoxic
Fire potential	Nonflammable
Boiling point (°F)	-452.1
Molecular weight	4.00
Specific gravity	0.138
Critical temperature (°F)	-450.4
Critical pressure (psia)	33.2
Specific volume (cf/lbs)	96.6
UN No.	1046

DOT Designation

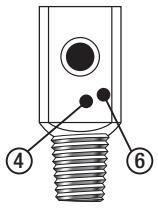
Name	Helium, compressed
Label	Nonflammable gas
Hazard classification	2.2
SDS	P-4602

More Info

Purity	Helium ≥ 99%, CO ≤ 10 ppm, Air ≤ 1.0%
Color code	
Shoulder color	Brown
Body color	Brown



CGA Connection No. 580
Threaded outlet-type valves



CGA Connection No. 930
Post-type pin-indexed valves

Cylinder Specifications

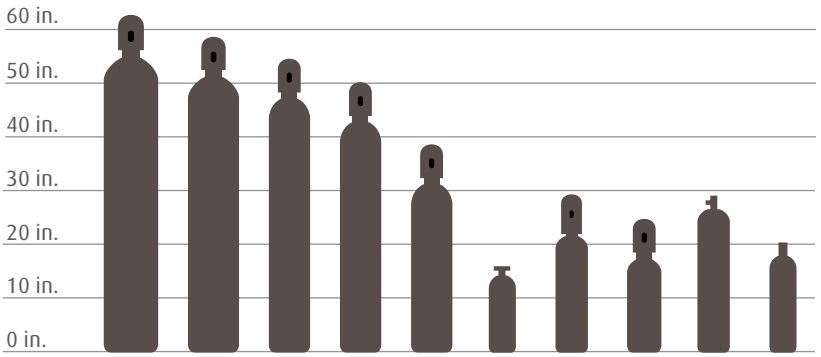
Product code	Cylinder size	Nominal contents	Press (psig) at 70 °F	CGA conn	Regulators
HE M-D	M-D	13 cu. ft.	2000	930	WESM1-930-PG
HE M-E	M-E	22 cu. ft.	2000	930	WESM1-930-PG
HE M-K	K	218 cu. ft.	2000	930	M1-580-PG

Specifications subject to change without notice. Consult your Linde representative when ordering.

For Treatment of Upper Airway Obstruction or Increased Airway Resistance
As a component of breathing mixtures to reduce the density of the mixture and thus facilitate breathing under certain physical and physiological conditions.

Nitrogen NF

Colorless, odorless, nonflammable insert gas



Cylinder Size	T	K	S	M/ DEY	Q	R	G	F	E/ ME	D/ MD
Size	430	430	430	430	410	410	410	410	410	410
Code	230	230	230	230	210	210	210	210	210	210

DOT Designation

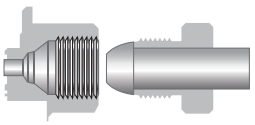
Name	Nitrogen, compressed
Label	Green, nonflammable gas
Hazard classification	2.2
SDS	P-4630

More Info

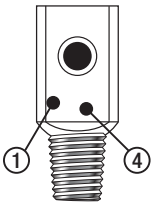
Purity	Nitrogen ≥ 99%, CO ≤ 10 ppm, O_2 ≤ 1.0%
Color code	
Shoulder color	Black
Body color	Black

Gas Specifications

Major hazards	High pressure and asphyxiation
Odor	None
Toxicity	Nontoxic
Fire potential	Nonflammable
Boiling point (°F)	-320.4
Molecular weight	28.01
Specific gravity	0.97
Critical temperature (°F)	-237.8
Critical pressure (psia)	492.2
Specific volume (cf/lbs)	13.8
UN No.	1066



CGA Connection No. 580
Threaded outlet-type valves



CGA Connection No. 960
Post-type pin-indexed valves

Cylinder Specifications

Product code	Cylinder size	Nominal contents	Press (psig) at 70 °F	CGA conn	Regulators	
NI M-D	M-D	14 cu. ft.	2000	960	WESM1-960-PG	
NI M-E	M-E	23 cu. ft.	2000	960	WESM1-960-PG	
NI M-K	K	228 cu. ft.	2200	580	WESM1-580-PG	WESMSH-180-580
NI M-T	T	304 cu. ft.	2640	580	WESM1-580-PG	WESMSH-180-580

Specifications subject to change without notice. Consult your Linde representative when ordering.

For Use In Hypoxic Challenge Testing
As a component in many gas mixtures; as a displacement medium in pharmaceutical vials; as a propellent in pressurized aerosal-type dispensers; as a coolant for carbon dioxide surgical lasers, and as a source of pneumatic pressure to power gas-operated medical devices.

Pure Gases in Liquid Cylinders

Pure Gases in Liquid Containers

Linde MEDIPURE® Liquefied Mini-Bulk Gases

Linde offers a full line of MEDIPURE® gases in transportable liquid cylinder containers for cyrogenic service for low to medium-pressure gas supply when high-pressure cylinders are not enough.

Pure Medical Gases Listed in This Section

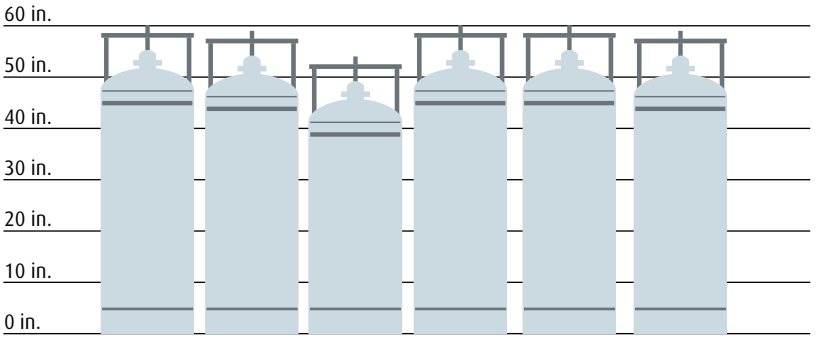
→ Carbon Dioxide USP
→ Nitrogen NF
→ Oxygen USP

On the following pages, you will find safety and technical information about our pure gases. Technical references include:

→ Molecular weight, critical temperature, pressure and boiling point
→ DOT designation, label and hazard classification
→ Purity specifications
→ CGA connection
→ Container ordering information, cylinder sizes and nominal contents
→ Equipment recommendations

Oxygen USP Cryogenic Liquid

Odorless, highly oxidizing, light blue cryogenic liquid



Cylinder Size	HP-180 (GP-55)	HP-160 (GP-55)	LS-160	CD-170	LS-180	XL-230/240
Size Code	471 271/274	471 271/274	471 271	471 271	471 271	472 272

DOT Designation

Name	Oxygen, refrigerated liquid
Label	Yellow oxidizer
Hazard classification	2.2
SDS	P-4637

More Info

Purity	Oxygen ≥ 99%, CO_2 ≤ 300 ppm, CO ≤ 10 ppm
Color Code	
Shoulder Color	N/A
Body Color	N/A

Gas Specifications

Major hazards	Fire and cryogenic burns
Odor	None
Toxicity	Nontoxic
Fire potential	Highly oxidizing
Boiling point (°F)	-297.4
Molecular weight	32.00
Specific gravity	1.14
Critical temperature (°F)	-181.5
Critical pressure (psia)	731.4
Specific volume (cf/lbs)	12.1
UN No.	1073

Cylinder Specifications

Product code	Cylinder size	Nominal contents	Press (psig) at 70 °F	CGA conn	Regulators
OX MLC160-230	160L	4580 cu. ft.	230	Gas 540 / liquid 440	WESM1-540-P, WESM1-540-PG
OX MLC160-22	160L	4580 cu. ft.	22	Gas 540 / liquid 440	N/A
OX MLC180-230	180L	4640 cu. ft.	230	Gas 540 / liquid 440	WESM1-540-P, WESM1-540-PG
OX MLC180-22	180L	4640 cu. ft.	22	Gas 540 / liquid 440	N/A
OX MLC230-230	230L	5930 cu. ft.	230	Gas 540 / liquid 440	WESM1-540-P, WESM1-540-PG
OX MLC230-22	230L	5930 cu. ft.	22	Gas 540 / liquid 440	N/A

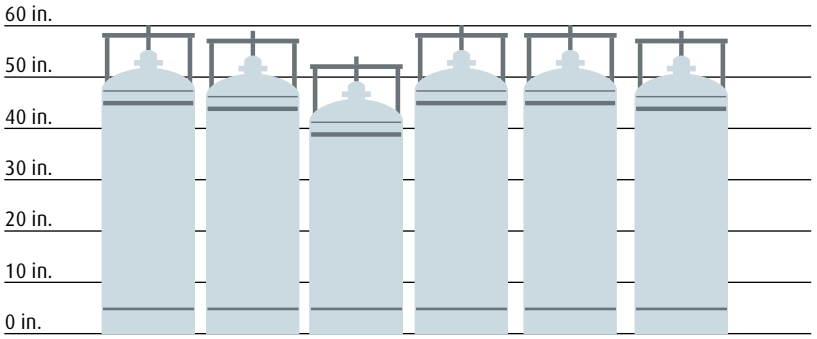
Specifications subject to change without notice. Consult your Linde representative when ordering.

For Treatment or Prevention of Hypoxemia or Hypoxia

Used in first-aid treatment of emergencies such as suffocation and heart attacks; in the treatment of patients with respiratory disorders; in anesthesia; in hyperbaric oxygen chambers for the treatment of carbon monoxide poisoning and gas gangrene, and for other specialized oxygen therapies.

Carbon Dioxide USP Cryogenic Liquid

Colorless, odorless, nonflammable slightly acidic, refrigerated gas



Cylinder Size	HP-180 (GP-55)	HP-160 (GP-55)	LS-160	CD-170	LS-180	XL-230/240
Size Code	471 271/274	471 271/274	471 271	471 271	471 271	472 272

DOT Designation

Name	Carbon dioxide, refrigerated liquid
Label	Green, nonflammable gas
Hazard classification	2.2
SDS	P-4573

More Info

Purity	Carbon Dioxide ≥ 99%, SO_2 ≤ 5 ppm, CO ≤ 10 ppm, NO ≤ 2.5 ppm, NH_3 ≤ 25 ppm, H_2S ≤ 1 ppm
Color code	
Shoulder color	N/A
Body color	N/A

Gas Specifications

Major hazards	High pressure and inhalation
Odor	None
Toxicity	Low toxicity, TLV of 5000 ppm
Fire potential	Nonflammable
Boiling point (°F)	-109.1
Molecular weight	44.01
Specific gravity	1.522
Critical temperature (°F)	87.8
Critical pressure (psia)	1071.6
Specific volume (cf/lbs)	8.76
UN No.	2187

Cylinder Specifications

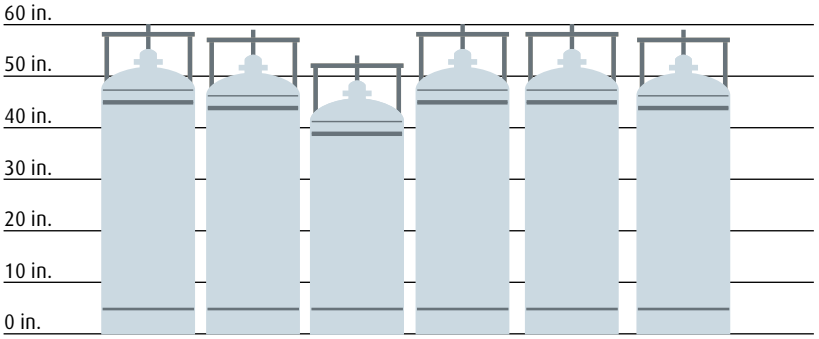
Product code	Cylinder size	Nominal contents	Press (psig) at 70 °F	CGA conn	Regulators	
CD MLC180-350	180L	400 lbs.	350	Gas 320 / liquid 622	WESM1-320-PG	WESM1-320-P
CD MLC170-350	170L	375 lbs.	350	Gas 320 / liquid 622	WESM1-320-PG	WESM1-320-P

Specifications subject to change without notice. Consult your Linde representative when ordering.

For Use In Extracorporeal Membrane Oxygenation Therapy or Respiratory Stimulation
For close-to-physiologic atmospheres for the operation of artificial organs; in cryosurgery with unsufflators during laparoscopic surgery; and as a component in a mixture of oxygen or air as a respiratory stimulant to promote deep breathing.

Nitrogen NF Cryogenic Liquid

Colorless, odorless, nonflammable cryogenic liquid



Cylinder Size	HP-180 (GP-55)	HP-160 (GP-55)	LS-160	CD-170	LS-180	XL-230/240
Size Code	471 271/274	471 271/274	471 271	471 271	471 271	472 272

DOT Designation

Name	Nitrogen, refrigerated liquid
Label	Green, nonflammable gas
Hazard classification	2.2
SDS	P-4630

More Info

Purity	Nitrogen ≥ 99%, O_2 ≤ 1%, CO ≤ 10 ppm
Color code	
Shoulder color	N/A
Body color	N/A

Gas Specifications

Major hazards	High pressure and asphyxiation
Odor	None
Toxicity	Nontoxic
Fire potential	Nonflammable
Boiling point (°F)	-320.4
Molecular weight	28.01
Specific gravity	0.967
Critical temperature (°F)	-237.8
Critical pressure (psia)	492.45
Specific volume (cf/lbs)	13.8
UN No.	1977

Cylinder Specifications

Product code	Cylinder size	Nominal contents	Press (psig) at 70 °F	CGA conn	Regulators
NI MLC160-230	160L	3690 cu. ft.	230	Gas 580 / liquid 295	WESM1-580-P, WESM1-580-PG
NI MLC160-22	160L	3690 cu. ft.	22	Gas 580 / liquid 295	N/A
NI MLC160-230	180L	4110 cu. ft.	230	Gas 580 / liquid 295	WESM1-580-P, WESM1-580-PG
NI MLC180-22	180L	4110 cu. ft.	22	Gas 580 / liquid 295	N/A
NI MLC230-22	LC230	5023 cu. ft.	22	Gas 580 / liquid 295	N/A

Specifications subject to change without notice. Consult your Linde representative when ordering.

For Use in Hypoxic Challenge Testing
As a component in many gas mixtures; as a displacement medium in pharmaceutical vials; as used in dermatology; as a propellent in pressurized aerosal-type dispensers; as a coolant for carbon dioxide surgical lasers, and as a source of pneumatic pressure to power gas-operated medical devices.

Medical Gas Therapies and Medical or Specialty Mixtures

NOXIVENT® (Nitric Oxide) Gas for Inhalation

National Reach, Local Service

NOXIVENT® (nitric oxide) gas for inhalation, along with the NOxBOX®$_i$ delivery system, offered with customizable, consumption-based billing, is backed by Linde's national network, responsive support and reputation for medical gas distribution.

Our Commitment

→ Integrated gas delivery system for inhaled nitric oxide NO therapy
→ 24/7 service and support
→ Simplified billing process
→ Reliable and responsive distribution network
→ Established reputation for quality and customer satisfaction

By Rx Only.
See selected safety information on page 20 and full prescribing information in the Appendix or www.noxiventUS.com.

The Delivery Device

NOXIVENT gas requires patient monitoring and management to help avoid patient complications and risks. NOXIVENT gas should only be used with a calibrated NOxBOX$_i$ delivery system operated by trained personnel. Satisfactory completion of a Linde-provided training program is required. Only validated ventilator systems should be used in conjunction with NOXIVENT and NOxBOX$_i$.

The NOxBOX$_i$ delivery device provides intelligent NO delivery with precise real-time monitoring of NO, nitrogen dioxide (NO_2), and oxygen (O_2) through a touch screen with step-by-step guided interface to enable ease of use. It is designed for in-hospital use, with a portable detachable head unit to provide uninterrupted treatment during transit and transfer situations, and may be used with invasive and non-invasive ventilation.

The NOxBOX$_i$ NO gas delivery system is reliable, accurate and easy to use. System features include:

→ Real-time, closed-loop monitoring with auto-adjusting alarms
→ Pre-packaged, configured circuits ready for use with validated ventilators
→ Disposable circuits, including the NOxFLOW sensor, for easy clean up
→ Auto-cylinder changeover with alerts, helping to avoid therapy interruptions

NOxBOX®$_i$ Nitric Oxide Delivery and Monitoring System

NOXIVENT® and NOxBOX®$_i$ Features

Delivery device features	
Mode of operation	Intelligent closed-loop delivery system with integrated real-time gas monitoring
Ventilator compatibility list	Validated for use with many common ventilators and delivery devices
NOxFLOW sensor	Disposible, single use
Display - user interface	Touch screen, step-by-step on-screen user guide option and 7-day standby feature
NO monitoring accuracy	+/- 3% or 0.3 ppm for doses >/= 0.6 ppm, plus the accuracy of the calibration gas
Battery power	4 hours fully charged
Safety of operation	
Alarms	Automatically adjusts when NO dose is changed Audible and visible
Cylinder monitoring	Automatic cylinder switchover
Manual and emergency backup features	
Backup availability	Backup delivery via integrated NOx mixer system
Inhaled nitric oxide backup flow rate	User adjustable NO flow rate
Manual backup mode	Dose calculator on screen for bagging or emergency backup dose setting
Calibration features	
Sensor zero	Low calibration every 24 hours with on-screen guidance
High calibration	Every 30 days
Other	
Pre-packaged patient circuit kits	Kits pre-configured for use by ventilator circuit size and for HFJV for quick and easy setup
Singular patient circuit parts	Adapters, fittings, and tubing available for customization

Reference the ventilator compatibility list: https://www.lindedirect.com/docs/default-source/health-care-solutions/us-ventilator-compatibility-list.pdf.

Indication

NOXIVENT® (nitric oxide) Gas for Inhalation Indication

NOXIVENT is a vasodilator indicated to improve oxygenation and reduce the need for extracorporeal membrane oxygenation in term and near-term (>34 weeks gestation) neonates with hypoxic respiratory failure associated with clinical or echocardiographic evidence of pulmonary hypertension in conjunction with ventilatory support and other appropriate agents.

NOXIVENT Gas Selected Safety Information

Contraindication: NOXIVENT is contraindicated in neonates dependent on right-to-left shunting of blood.

Rebound: Abrupt discontinuation of NOXIVENT may lead to worsening oxygenation and increasing pulmonary artery pressure.

Methemoglobinemia: Methemoglobin levels increase with the dose of NOXIVENT; it can take 8 hours or more before steady-state methemoglobin levels are attained. If methemoglobin levels do not resolve with decrease in dose or discontinuation of NOXIVENT, additional therapy may be warranted to treat methemoglobinemia.

Airway Injury from Nitrogen Dioxide: Monitor nitrogen dioxide (NO_2) levels. Nitrogen dioxide may cause airway inflammation and damage to lung tissue.

Heart Failure: In patients with pre-existing left ventricular dysfunction, NOXIVENT may increase pulmonary capillary wedge pressure leading to pulmonary edema.

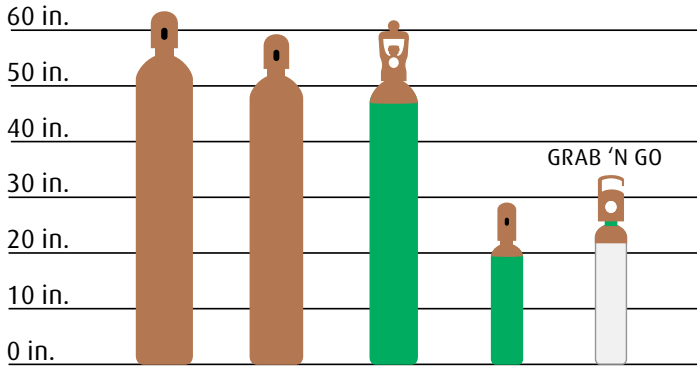
Adverse Reactions: The most common adverse reaction of NOXIVENT is hypotension.

Drug Interactions: Nitric oxide donor compounds may increase the risk of developing methemoglobinemia.

Administration: Use only with a calibrated NOxBOX®$_i$ delivery system operated by trained personnel. Only validated ventilator systems should be used in conjunction with NOXIVENT and NOxBOX$_i$. Monitor for PaO_2 and inspired NO_2 and methemoglobin during NOXIVENT administration.

Full prescribing information can be found in the appendix and at www.noxiventUS.com. NOxBOX$_i$ Nitric oxide delivery system is intended for use by healthcare professionals for the delivery and monitoring of a constant (use set) concentration of nitric oxide (NO) and the monitoring of NO_2 and O_2 in the inspiratory ventilator lines of a patient undergoing nitric oxide therapy (iNO). The NOxBOX$_i$ nitric oxide delivery system must only be used in accordance with the indications, contraindications, warnings, and precautions described in the nitric oxide drug packaging inserts and labelling (currently neonates). Refer to this material prior to use.

Heliox (Helium/Oxygen Mixtures)



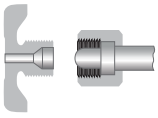
Cylinder Size	T	K	LCQ-K	G	AE
Size Code	430 230	430 230	431 -	420 210	412 -

Heliox is a mixture of helium and oxygen. The mixtures listed are typically prescribed for patients with severe dyspnea or upper airway obstruction.

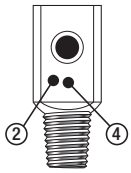
When combined with oxygen, helium reduces the density of the breathable mix. A 70/30 helium-oxygen mix is 2.3 times less dense than air and an 80/20 mixture is three times less. (See chart on the right.) Most frequently prescribed mixture concentrations are listed below. Custom mixtures available upon request.

Cylinder Specification

Gas	Density (kg/m³)	Viscosity (μP)
Air	1.20	183
100% oxygen	1.33	204
Heliox 70/30	0.52	199
Heliox 80/20	0.40	198



CGA Connection No. 280
Threaded outlet-type valves



CGA Connection No. 890
Post-type pin-indexed valves

Gas Percentage

20% oxygen
Balance helium

Product Specification

Product code	Cylinder size	Grade	Nominal contents	CGA	SDS	Regulators
MM HEOX20LCQ-K	K	USP	255 cu. ft.	280	P-18-2072-H	Valve integrated pressure regulator
MM HEOX20-G	G	USP	42 cu. ft.	280	P-18-0010	CON305-9391-280

Gas Percentage

30% oxygen
Balance helium

Product Specification

Product code	Cylinder size	Grade	Nominal contents	CGA	SDS	Regulators
MM HEOX30-K	K	USP	255 cu. ft.	280	P-18-0014	CON305-9392-280

Gas Percentage

20% oxygen
Balance helium

Product Specification

Product code	Cylinder size	Grade	Nominal contents	CGA	SDS	Regulators
MM HEOX20-AEGNG	AE	USP	25 cu. ft.	NR	P-18-2072-H	Valve integrated pressure regulator

GRAB 'N GO® Heliox (Helium/Oxygen Mixtures)

Portable gas delivery system (80% helium USP/20% oxygen USP gas mixture)

With their all-in-one design, Linde's line of GRAB 'N GO® gas delivery systems have helped users of medical oxygen USP and other medical gases simplify the use of portable cylinders. The GRAB 'N GO Heliox gas delivery system provides a portable means to respond to patient needs for this helium/oxygen blend.

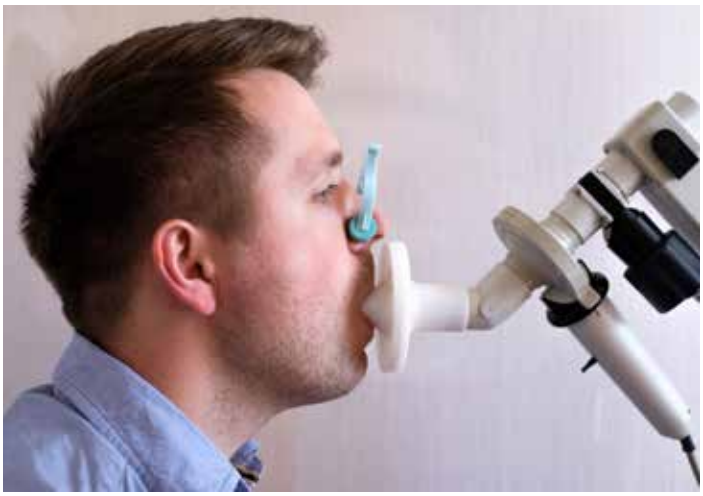
The increased ease of use makes a positive difference in the daily activities of healthcare professionals, allowing them to spend less time managing gases and more time focusing on patient needs. Linde is expanding the GRAB 'N GO gas delivery systems to now include availability of an 80% helium USP/20% oxygen USP gas mixture. Linde's GRAB 'N GO Heliox advanced gas delivery system for 80% helium/20% oxygen gas mixture provides the gas you need in a self-contained, easy-to-use package built for convenience and portability. The GRAB 'N GO system's design integrates a flowmeter-regulator with a lightweight aluminum cylinder. This design simplifies the use of 80% helium/20% oxygen gas mixture with your equipment and is therapy-ready.

The GRAB 'N GO Heliox system provides metered flow rates specifically calibrated for 80% helium/20% oxygen gas mixture, from 3-25 liters per minute, and a constant 50 psi connection to supply auxiliary equipment.

Features and Benefits

Features	Benefits
Convenience	
→ Integrated regulator	→ Eliminates the need for an inventory of regulators or wrenches
→ Single knob operation	→ Open and set flow with one knob
→ Snap-set flow meter	→ Flow adjustment control includes most frequently prescribed settings
→ 50 psi auxiliary outlet	→ Provides additional connection with ample space for ease of use
Safety	
→ Built-in relief valve	→ Close off flow and isolate relief valve in one operation
→ Aluminum and composite design	→ MR Conditional up to 3.0 Tesla MRI environments
→ Analog pressure gauge	→ Displays a continuous indicator of cylinder contents
→ Durable, protective shroud	→ Protects valve and regulator
Savings	
→ Integrated regulator	→ Eliminates the need for an inventory of regulators or wrenches

Lung Diffusion Mixtures



Typical Uses for These Mixtures Include the Calibration of Pulmonary Function Testing Equipment and Inhalation for Pulmonary Function Assessments

- → Lung Diffusion mixtures will be supplied as certified standards unless otherwise specified.
- → Primary standard grade can be supplied on request.
- → Most common mixtures are listed.
- → Custom mixtures are available upon request.

Gas Percentage

0.3% carbon monoxide
0.3% acetylene
0.3% methane
21% oxygen
Balance nitrogen

Specification

Product code	Cylinder size	Grade	Nominal contents	CGA	SDS	Regulators
LD AC2C-AE	AE	Certified	23 cu. ft.	973	P-4862	WESM1-973-PGB
LD AC2C-AT	AT	Certified	209 cu. ft.	500	P-4862	WESM1-500-PGB

Gas Percentage

0.3% carbon monoxide
0.3% methane
21% oxygen
Balance nitrogen

Specification

Product code	Cylinder size	Grade	Nominal contents	CGA	SDS	Regulators
LD ME1C-AE	AE	Certified	23 cu. ft.	973	P-18-9035-H	WESM1-973-PGB
LD ME1P-AT	AT	Primary	209 cu. ft.	973	P-18-9035-H	WESM1-500-PGB

Gas Percentage

0.3% carbon monoxide
0.5% neon
21% oxygen
Balance nitrogen

Specification

Product code	Cylinder size	Grade	Nominal contents	CGA	SDS	Regulators
LD NE1C-AE	AE	Certified	23 cu. ft.	973	P-18-10763	WESM1-973-PGB
LD NE1C-AT	AT	Certified	209 cu. ft.	500	P-18-10763	WESM1-500-PGB

Gas Percentage

0.3% carbon monoxide
10% helium
21% oxygen
Balance nitrogen

Specification

Product code	Cylinder size	Grade	Nominal contents	CGA	SDS	Regulators
LD CO1C-AE	AE	Certified	23 cu. ft.	973	P-18-9037	WESM1-973-PGB
LD CO1C-AT	AT	Certified	209 cu. ft.	500	P-18-9037	WESM1-500-PGB

For more information, please call
800 225 8247 or visit our website
www.lindedirect.com for easy downloads.

Medical and Specialty Gas Mixtures

Linde Gas Mixtures

Linde has been serving the healthcare industry for over 50 years. Our quality assurance programs ensure the preparation of MEDIPURE® medical gases and accurate mixtures for research, diagnostics, calibration and inhalation therapy applications. The products, classified by FDA as drug or devices, are produced in accordance with cGMPs.

Linde's medical gas mixtures are labeled to clearly identify the gas components. The cylinder contents should be verified before use by carefully reading the label. Appropriate regulator and gas delivery devices should be used. Adapters must never be used to connect to a medical gas cylinder.

- → Nitrogen NF
- → Carbon dioxide USP
- → Helium USP
- → Nitrous oxide USP
- → Oxygen USP
- → Carbon monoxide
- → Hydrogen
- → Methane
- → Neon

Linde can accommodate most customer requests and specialized needs. Typical cylinder styles available are K and ME. Contact your Linde representative for additional cylinder options available in your area.

Safe, Accurate, Consistent, Reliable — Every Time

Our sophisticated mixture software provides the latest in mixture technology for our customers.

Specifications

Mixture component concentration range	Certified and non-certified standards tolerances	Primary standards tolerances
100 ppm – 999 ppm, 0.1% – 50%	+/- 10% (relative), +/- 5% (relative)	+/- 5% (relative), +/- 2% (relative)

Blending Systems

Linde prepares mixtures using high precision gravimetric balances or volumetric manifolds. All balances, gauges and process instruments undergo specific periodic maintenance and calibration in accordance with Linde's proprietary process which conforms to FDA and cGMPs.

Documentation (Available Upon Request)

→ Certificate of Compliance (COC): a written guarantee that a product meets or exceeds the defined specifications.

→ Certificate of Analysis (COA): a document that reports the actual analytical test results for pure products or mixtures. Either single cylinder or batch analysis certification is available, and must be specified at the time of request.

Grade Specifications and Tolerances

→ Certified Standards: these mixtures are prepared by either gravimetric or volumetric (partial pressure) methods. These standards are analyzed against Linde Primary Laboratory Standards (PPLS).

→ Non-Certified Standards: these mixtures are prepared by the same methods and the same care used for Certified Standard Grade. Analyses are not reported.

→ Primary Standard: these are high accuracy mixtures prepared gravimetrically on an electronic high precision balance. These mixtures are analyzed against Linde PPLS and named to a gravimetrically generated concentration.

Biological Atmospheres Anaerobic Incubation

Mixtures Listed Below Are Provided for Anaerobic Incubator Atmospheres

- → These mixtures typically represent a significant savings vs. the purchase of mixtures in small or disposable cylinders.
- → Gas mixtures are available as certified standards.
- → Primary standard grade can be supplied on request.
- → Most common mixtures are listed.
- → Custom mixtures are available upon request.

Gas Percentage	Specification						
5% carbon dioxide	Product code	Cylinder size	Grade	Nominal contents	CGA	SDS	Regulators
5% hydrogen	BI NICDHYC1-K	K	Certified	211 cu. ft.	350	P-18-0289-NI-H	CON302-2331-350
Balance nitrogen	BI NICDHYC1-T	T	Certified	281 cu. ft.	350	P-18-0289-NI-H	CON302-2331-350

Gas Percentage	Specification						
5% carbon dioxide	Product code	Cylinder size	Grade	Nominal contents	CGA	SDS	Regulators
10% hydrogen	BI NICDHYC2-K	K	Certified	211 cu. ft.	350	P-18-2258-H	CON302-2331-350
Balance nitrogen	BI NICDHYC2-T	T	Certified	281 cu. ft.	350	P-18-2258-H	CON302-2331-350

Gas Percentage	Specification						
5% carbon dioxide	Product code	Cylinder size	Grade	Nominal contents	CGA	SDS	Regulators
Balance nitrogen	BI NICD5C-K	K	Certified	211 cu. ft.	500	P-18-0156-H	WESM1-500-PGB
	BI NICD5C-T	T	Certified	281 cu. ft.	500	P-18-0156-H	WESM1-500-PGB

Gas Percentage	Specification						
10% carbon dioxide	Product code	Cylinder size	Grade	Nominal contents	CGA	SDS	Regulators
10% hydrogen	BI NICDHYC3-K	K	Certified	211 cu. ft.	350	P-18-2258-H	CON302-2331-350
Balance nitrogen							

Gas Percentage	Specification						
10% carbon dioxide	Product code	Cylinder size	Grade	Nominal contents	CGA	SDS	Regulators
5% hydrogen	BI NICDHYC4-K	K	Certified	211 cu. ft.	350	P-18-0289-NI-H	CON302-2331-350
Balance nitrogen							

Biological Atmospheres Aerobic Incubation

Mixtures Listed Below Are Provided for Aerobic Incubator Atmospheres

- → These mixtures typically represent a significant savings vs. the purchase of mixtures in small or disposable cylinders.
- → Gas mixtures are available as certified standards.
- → Primary standard grade can be supplied on request.
- → Most common mixtures are listed.
- → Custom mixtures are available upon request.

Gas Percentage	Specification						
	Product code	Cylinder size	Grade	Nominal contents	CGA	SDS	Regulators
2.5% carbon dioxide	BI NICDOXC3-K	K	Certified	228 cu. ft.	500	P-18-2116-H-H	WESM1-500-PGB
21% oxygen							
Balance nitrogen							

Gas Percentage	Specification						
	Product code	Cylinder size	Grade	Nominal contents	CGA	SDS	Regulators
5% carbon dioxide	BI NICDOXC1-K	K	Certified	228 cu. ft.	500	P-4858	WESM1-500-PGB
5% oxygen	BI NICDOXC1-T	T	Certified	304 cu. ft.	500	P-4858	WESM1-500-PGB
Balance nitrogen							

Gas Percentage	Specification						
	Product code	Cylinder size	Grade	Nominal contents	CGA	SDS	Regulators
5% carbon dioxide	BI NICDOXC21-K	K	Certified	228 cu. ft.	500	P-4858	WESM1-500-PGB
10% oxygen							
Balance nitrogen							

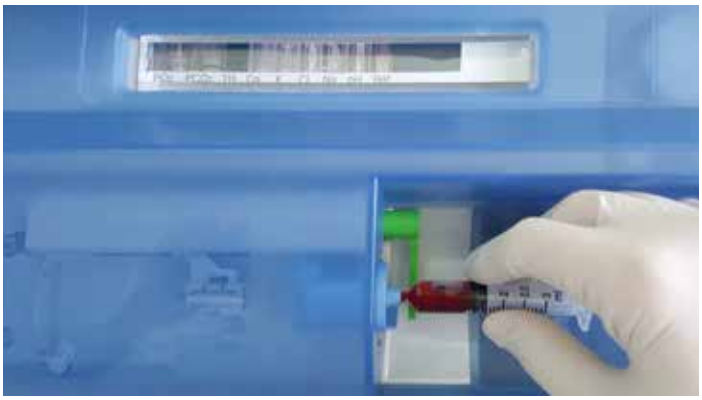
Gas Percentage	Specification						
	Product code	Cylinder size	Grade	Nominal contents	CGA	SDS	Regulators
5% carbon dioxide	BI NICDOXC4-K	K	Certified	228 cu. ft.	500	P-18-2116-H-H	WESM1-500-PGB
21% oxygen							
Balance nitrogen							

Gas Percentage	Specification						
	Product code	Cylinder size	Grade	Nominal contents	CGA	SDS	Regulators
5% carbon dioxide	BI OXCD5C-K	K	Certified	228 cu. ft.	500	P-18-0156-H	WESM1-500-PGB
Balance oxygen	BI OXCD5C-T	T	Certified	304 cu. ft.	500	P-18-0156-H	WESM1-500-PGB

Gas Percentage	Specification						
	Product code	Cylinder size	Grade	Nominal contents	CGA	SDS	Regulators
10% carbon dioxide	BI NICDOXC24-K	K	Certified	228 cu. ft.	500	P-18-2116-H-H	WESM1-500-PGB
21% oxygen							
Balance nitrogen							

Gas Percentage	Specification						
	Product code	Cylinder size	Grade	Nominal contents	CGA	SDS	Regulators
15% carbon dioxide	BI NICDOXC15-K	K	Certified	228 cu. ft.	500	P-18-2116-H-H	WESM1-500-PGB
21% oxygen							
Balance nitrogen							

Blood Gas Calibration



Typical Uses for These Mixtures Include the Calibration of Clinical, Transcutaneous and Tonometry Blood Gas Analyzers

- → Mixtures purchased in larger "K" and "T" size cylinders typically represent a significant savings vs. the purchase of mixtures in small or disposable cylinders.
- → Blood gas calibration mixtures will be supplied as certified standards unless otherwise specified.
- → Primary standard grade can be supplied on request.
- → Most common mixtures are listed.
- → Custom mixtures are available upon request.

Gas Percentage
3% carbon dioxide
4% oxygen
Balance nitrogen

Specification

Product code	Cylinder size	Grade	Nominal contents	CGA	SDS	Regulators
BG NICDOXC12-K	K	Certified	214 cu. ft.	500	P-4858	WESM1-500-PGB

Gas Percentage
4% carbon dioxide
16% oxygen
Balance nitrogen

Specification

Product code	Cylinder size	Grade	Nominal contents	CGA	SDS	Regulators
BG NICDOXC3-E	M-E	Certified	20 cu. ft.	973	P-4858	WESM1-973-PGB
BG NICDOXC3-K	K	Certified	214 cu. ft.	500	P-4858	WESM1-500-PGB
BG NICDOXP26-E	M-E	Primary	20 cu. ft.	973	P-4858	WESM1-973-PGB

Gas Percentage
5% carbon dioxide
5% oxygen
Balance nitrogen

Specification

Product code	Cylinder size	Grade	Nominal contents	CGA	SDS	Regulators
BG NICDOXC23-K	K	Certified	214 cu. ft.	500	P-4858	WESM1-500-PGB
BG NICDOXP1-K	K	Primary	214 cu. ft.	500	P-4858	WESM1-500-PGB

Gas Percentage
5% carbon dioxide
10% oxygen
Balance nitrogen

Specification

Product code	Cylinder size	Grade	Nominal contents	CGA	SDS	Regulators
BG NICDOXP3-K	K	Primary	214 cu. ft.	500	P-4858	WESM1-500-PGB

Gas Percentage
5% carbon dioxide
12% oxygen
Balance nitrogen

Specification

Product code	Cylinder size	Grade	Nominal contents	CGA	SDS	Regulators
BG NICDOXC4-E	M-E	Certified	20 cu. ft.	973	P-4858	WESM1-973-PGB
BG NICDOXC4-K	K	Certified	214 cu. ft.	500	P-4858	WESM1-500-PGB

Gas Percentage
5% carbon dioxide
20% oxygen
Balance nitrogen

Specification

Product code	Cylinder size	Grade	Nominal contents	CGA	SDS	Regulators
BG NICDOXC2-E	M-E	Certified	20 cu. ft.	973	P-18-2116-H-H	WESM1-973-PGB
BG NICDOXC2-K	K	Certified	214 cu. ft.	500	P-18-2116-H-H	WESM1-500-PGB
BG NICDOXP2-E	M-E	Primary	20 cu. ft.	973	P-18-2116-H-H	WESM1-973-PGB

Gas Percentage
5% carbon dioxide
Balance nitrogen

Specification						
Product code	Cylinder size	Grade	Nominal contents	CGA	SDS	Regulators
BG NICD5C-E	M-E	Certified	20 cu. ft.	973	P-18-0156-H	WESM1-973-PGB
BG NICD5C-K	K	Certified	20 cu. ft.	500	P-18-0156-H	WESM1-500-PGB

Gas Percentage
5% carbon dioxide
15% oxygen
Balance nitrogen

Specification						
Product code	Cylinder size	Grade	Nominal contents	CGA	SDS	Regulators
BG NICDOXC43-E	M-E	Certified	20 cu. ft.	973	P-4858	WESM1-973-PGB

Gas Percentage
10% carbon dioxide
21% oxygen
Balance nitrogen

Specification						
Product code	Cylinder size	Grade	Nominal contents	CGA	SDS	Regulators
BG NICDOXC10-E	M-E	Certified	20 cu. ft.	973	P-18-2116-H-H	WESM1-973-PGB

Gas Percentage
10% carbon dioxide
Balance nitrogen

Specification						
Product code	Cylinder size	Grade	Nominal contents	CGA	SDS	Regulators
BG NICD10C-E	M-E	Certified	20 cu. ft.	973	P-18-0156-H	WESM1-973-PGB
BG NICD10C-K	K	Certified	214 cu. ft.	500	P-18-0156-H	WESM1-500-PGB
BG NICD10P-E	M-E	Primary	20 cu. ft.	973	P-18-0156-H	WESM1-973-PGB

Gas Percentage
12% carbon dioxide
Balance nitrogen

Specification						
Product code	Cylinder size	Grade	Nominal contents	CGA	SDS	Regulators
BG NICD12C-E	M-E	Certified	20 cu. ft.	973	P-18-0156-H	WESM1-973-PGB

Gas Percentage
26% oxygen
Balance nitrogen

Specification						
Product code	Cylinder size	Grade	Nominal contents	CGA	SDS	Regulators
BG NIOX26C-E	M-E	Certified	20 cu. ft.	890	P-18-0434	WESM1-890-PGB
BG NIOX26C-K	K	Certified	214 cu. ft.	280	P-18-0434	WESM1-280-PGB

Gas Percentage
10% carbon dioxide
5% oxygen
Balance nitrogen

Specification						
Product code	Cylinder size	Grade	Nominal contents	CGA	SDS	Regulators
BG NICDOXC8-K	K	Certified	214 cu. ft.	500	P-4858	WESM1-500-PGB

Gas Percentage
9.5% carbon dioxide
14% oxygen
Balance nitrogen

Specification						
Product code	Cylinder size	Grade	Nominal contents	CGA	SDS	Regulators
BG NICDOXC69-E	M-E	Certified	20 cu. ft.	973	P-4858	WESM1-973-PGB

Gas Percentage
5% carbon dioxide
2.5% oxygen
Balance nitrogen

Specification						
Product code	Cylinder size	Grade	Nominal contents	CGA	SDS	Regulators
BG NICDOXP5-K	K	Certified	214 cu. ft.	500	P-4858	WESM1-500-PGB

Medical Laser

These Mixtures Are Offered for Use With Surgical Lasers

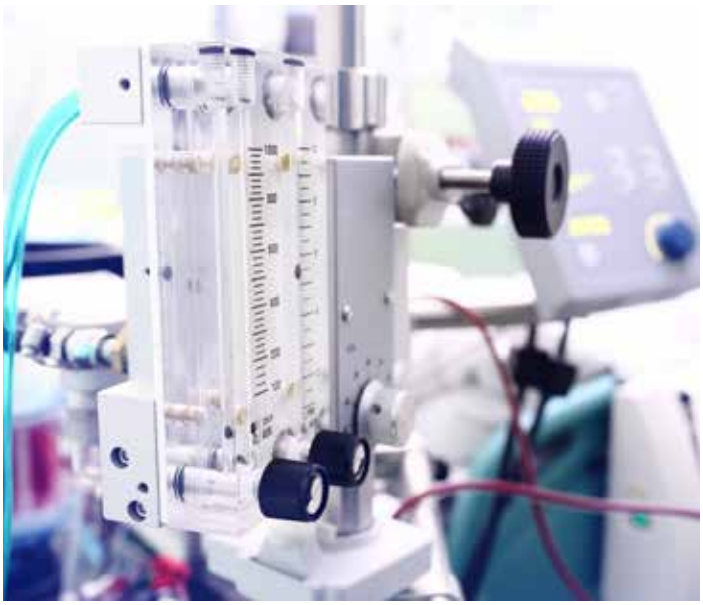
→ Gas mixtures are available as certified standards.
→ Non-certified standards are also available.
→ Most common mixtures are listed.
→ Custom mixtures available upon request.
→ Primary standard grade can be supplied on request.

Gas Percentage	Specification						
4.5% carbon dioxide	Product code	Cylinder size	Grade	Nominal contents	CGA	SDS	Regulators
13.5% nitrogen	ML HEC7-E	M-E	Certified	20 cu. ft.	973	P-4830	WESM1-973-PGB
Balance helium							

Gas Percentage	Specification						
5% carbon dioxide	Product code	Cylinder size	Grade	Nominal contents	CGA	SDS	Regulators
14% nitrogen	ML HEC20-E	M-E	Certified	20 cu. ft.	973	P-4830	WESM1-973-PGB
Balance helium							

Gas Percentage	Specification						
7% carbon dioxide	Product code	Cylinder size	Grade	Nominal contents	CGA	SDS	Regulators
14% nitrogen	ML HEC2-E	M-E	Certified	20 cu. ft.	973	P-4830	WESM1-973-PGB
Balance helium							

Medical Gas Mixtures



These Mixtures Are Offered for Research Diagnostics

→ Gas mixtures are available as certified standards.
→ Primary standard grade can be supplied on request.
→ Most common mixtures are listed.
→ Custom mixtures are available upon request.

Gas Percentage	Specification						
5% carbon dioxide	Product code	Cylinder size	Grade	Nominal contents	CGA	SDS	Regulators
Balance oxygen	MM OXCD5-E	M-E	Certified	23 cu. ft.	880	P-18-0551-H	WESM1-880-PG
	MM OXCD5-K	K	Certified	220 cu. ft.	280	P-18-0551-H	WESM1-280-PGB

Gas Percentage	Specification						
10% carbon dioxide	Product code	Cylinder size	Grade	Nominal contents	CGA	SDS	Regulators
Balance oxygen	MM OXCD10-K	K	USP	220 cu. ft.	500	P-18-0551-H	WESM1-500-PGB

Bulk Gases

Bulk Liquid Oxygen USP Storage Systems

Bulk Liquid Oxygen USP

Linde offers storage facilities and reserve supplies for its MEDIPURE® brand cryogenic liquid oxygen USP to meet current National Fire Protection Association (NFPA) standards. Bulk storage units and either liquid or high-pressure cylinder reserve supplies are sized specifically to your facility based on usage patterns and geography. Control equipment is maintenance friendly and designed to provide interruption-free service.

In addition to providing equipment to meet NFPA requirements, Linde's TRACKER™ remote inventory monitoring system can provide an around-the-clock link to our North American Logistics Center in Tonawanda, New York. TRACKER continuously monitors tank levels, automatically places your order for delivery, provides physical plant operations remote data access and can be integrated to your central monitoring system.

Stringent production, transport and handling procedures help ensure that Linde liquid oxygen USP meets or exceeds standards of the United States Pharmacopoeia, as delivered to the storage tank at the hospital.

The broad acceptance of bulk liquid storage systems stems from their reliability and compact design, making them particularly practical where hospital ground space is limited.

Linde's specially designed cryogenic storage tanks feature vacuum-insulated, double-wall construction to minimize evaporation losses.

When gaseous oxygen USP is needed, the liquid oxygen USP automatically converts to gaseous form as it flows through the vaporizer, an ambient air heat exchanger that does not require an external power source, before it enters the hospital's distribution pipeline. An integrated backup supply system automatically feeds gaseous oxygen USP to the pipeline if the regular oxygen USP supply is interrupted for any reason.

Bulk liquid oxygen USP storage systems are available in a variety of sizes. Before Linde recommends the most appropriate size for any given hospital, we carefully weigh a number of critical factors including: the bed capacity of the hospital, the hospital's geographic location, the existing rate and pattern of oxygen USP use, available installation space and accessibility of the site for transport deliveries.

Linde offers compact, custom-fit, cost-effective solutions for your bulk liquid oxygen USP requirements:

- → Automatic switching between vaporizer sections significantly reduces icing and puts less stress on the system.
- → Remote monitoring through Linde's Electronic Link TRACKER System continuously monitors your tank level and automatically places your order for delivery, for uninterrupted supply.
- → Group Purchasing Organization (GPO) benefits are available to members.
- → Proactive support with FDA regulatory compliance is available.

Basic Properties of Liquid Oxygen USP DOT Designation

Density	71.27 lbs. per cu. ft. at boiling point
Heat of vaporization	91.7 BTU per lbs.
Boiling point	-297.3 °F at 1 atmosphere
Freezing point	-361.8 °F at 1 atmosphere

Purity and Moisture Content of Bulk Liquid Oxygen USP

Minimum purity	99.0%

Specification

Primary tank size (gallons)	Reserve tank size (gallons)	Approximate cement pad size (length × width)
1500	120	24 ft. × 25 ft.
3000	500	25 ft. × 26 ft.
6000	1500	25 ft. × 26 ft.
9000	1500	27 ft. × 27 ft.
11000	3000	27 ft. × 34 ft.
13000	3000	27 ft. × 34 ft.

Tank Selection Table

- → Based on primary tank, reserve tank, vaporizer and medical cabinet.
- → Cement pad dimensions are for Zone 2 areas only. For other seismic zones, consult your Linde representative.
- → Configuration will vary by individual site and distance from plant.
- → Standard spill pad - 12 ft. × 10 ft.
- → Linde recommends a reserve tank with 24-hour capacity.

Your Electronic Link

TRACKER™ provides you with an around-the-clock link with Linde. By transmitting information electronically to our North American Logistics Center in Tonawanda, New York, through a remote telemetry unit, the TRACKER system:

- → Continuously monitors your tank level
- → Automatically places your order for delivery
- → Provides you with access to your product levels
- → Provides real-time data for inventory management
- → Can be integrated with your plant computer system

Uninterrupted Supply

Up-to-the minute tank level readings and automatic reordering via TRACKER coupled with Linde supply management is the answer for reliable gas supply.

Hyperbaric Oxygen Therapy

From Linde, medical bulk oxygen USP systems for hyperbaric oxygen therapy (HBOT):

- → Are you considering offering HBOT?
- → If you want hyperbaric oxygen capabilities, we can refer you to one of our select, hyperbaric service partners.
- → Before you install a chamber, we can evaluate the unit's impact on your current bulk oxygen system and recommend upgrade solutions to handle the volume increase in gas usage.
- → When usage of a chamber will require a dedicated bulk oxygen system, Linde can install a new oxygen system in your facility.

Cryogenic Products

Introduction to Cryogenic Products

Efficient & Effective Storage Systems

Cryobiology applications require thermally efficient storage systems. Linde's years of cryogenic experience provide the added assurance your system will be designed and installed to suit the application. From engineering and layout to system installation and startup, Linde can provide a single point of contact.

Security for Samples

The success for any liquid system starts at the point of use, or the application, and works its way back to the cryogenic liquid storage. The Linde team will conduct a total site survey to make sure all situations are considered for sample security.

- → Analyzing your current and future liquid and gas volume requirements will determine the most cost-effective mode(s) of supply, dewars, microbulk, bulk tank, membrane or high-pressure cylinders.
- → Facility layout and logistics will impact piping system decisions.
- → Mechanical freezers (energy, maintenance, life) vs. cryogenic storage.

MVE CryoCart

MVE CryoCarts are designed for the loading of biological samples into canes, boxes, racks or frames. When used as a portable workbench, the unit will provide a safe and controlled environment for your samples for up to eight hours with the lid open. MVE CryoCart is ideal for transporting large quantities of samples from one tank to another within the same facility.

Features

- → Temperature monitor with Type T thermocouple
- → Optional temperature monitor and LN_2 transfer hose connection with plumbing system (manual lever)

Specifications

	MVE CryoCart
Performance	
LN_2 capacity w/o inventory to top of platform L estimated	39.5
Unit Dimensions	
Overall length in. (mm)	54.46 (1408)
Overall width in. (mm)	20.16 (512)
Overall height in. (mm)	39.5 (1003)
Lift overall height in. (mm)	37.2 (944)
Inside length in. (mm)	41.0 (1041)
Inside width in. (mm)	13.2 (335)
Inside depth in. (mm)	15.4 (391)
Platform height in. (mm)	4.5 (114)
Footprint in. (mm)	17.6 × 51.7 (447 × 1313)
Weight empty lbs. (kg) est.	195 (88)
Weight w/LN_2 filled to top of platform lbs. (kg) estimated	266 (121)
Number of racks (15-2)	2

MVE HEco™ 800 Series Freezers

The MVE HEco™ Series is the next generation high-efficiency freezer from Chart BioMedical. With its unique shroud design, streamlined LN_2 plumbing, and vacuum jacketed transfer hose, the MVE HEco 800 Series freezers provide efficient use of LN_2, making them the most efficient vapor freezers available. These next generation high-efficiency freezers incorporate hinged work surfaces that fully enclose all electronics and plumbing to enhance overall safety and usability.

The technical and visual improvements create a more aesthetically pleasing freezer that offers greater functionality. As with all of MVE's cryogenic freezers, the MVE HEco 800 series freezers are available in three unique sizes and provide maximum storage density as well as the longest hold time and highest sample security in the industry.

Features

- → LN_2 efficiency
- → Fully enclosed wiring and plumbing
- → Vacuum jacketed transfer hose
- → Dry sample storage
- → -310 °F (-190 °C) top box temperature
- → Lowest liftover height
- → Single step standard
- → Optional double-tier step
- → Optional battery backup — ask about one part number to order HEco with battery backup installed!

Specifications

	MVE HECO 815P-190			MVE HECO 818P-190			MVE HECO 819P-190		
Maximum storage capacity									
1.2 & 2 ml vials (internally threaded)	15,600			18,200			19,500		
Quantity of large racks 100 cell boxes	12			12			12		
Quantity of mini racks 25 cell boxes	4			4			4		
Number of shelves per rack	12			14			15		
Performance									
LN_2 capacity at vapor platform L est.	62			55			55		
LN_2 capacity w/o Inventory L est.	360			403			446		
Unit dimensions									
Neck opening in. (mm)	12.5 (317)			12.5 (317)			12.5 (317)		
Usable internal height in. (mm)	26.5 (673)			30.7 (781)			34.5 (877)		
Inner diameter in. (mm)	28.8 (731)			28.8 (731)			28.8 (731)		
Overall height in. (mm)	49.5 (1257)			53.9 (1370)			57.70 (1465)		
Liftover height in. (mm)	40 (1016)			43.8 (1115)			47.63 (1209)		
Door width requirement* in. (mm)	32.0 (813)			32.0 (813)			32.0 (813)		
Door width requirement, with handles* in. (mm)	33.2 (843)			33.2 (843)			33.2 (843)		
Weight empty** lbs. (kg)	475 (215)			495 (225)			515 (234)		
Weight liquid full** lbs. (kg) estimated	1134 (514)			1168 (530)			1340 (608)		
Blood bag capacities	Total bags	Bags/ frame	No. frames	Total bags	Bags/ frame	No. frames	Total bags	Bags/ frame	No. frames
791 OS/U medsep (25 ml)	1,224	6	204	1428	7	204	1,836	9	204
4R9951 (50 ml)	768	6	128	896	7	128	1,024	8	128
4R9953 (250 ml)	416	4	104	416	4	104	520	5	104
4R9955 (500 ml)	304	4	76	304	4	76	380	5	76
DF200 (200 ml)	236	4	59	236	4	59	295	5	59
DF700 (700 ml)	132	3	44	176	4	44	220	5	44

* Minimum width required for vessel to pass through opening. Footprint may vary. Contact Tech Service for detailed drawings.

** Without inventory

MVE HEco™ 1500 Series Freezers

The MVE HEco™ 1500 Series freezers provide efficient use of LN_2, making them the most efficient vapor freezers available. These next generation high-efficiency freezers incorporate a hinged work surface that fully encloses all electronics and plumbing to enhance overall safety and usability. The technical and visual improvements combine to create a more aesthetically pleasing freezer that offers greater functionality.

As with all of MVE's cryogenic freezers, the MVE HEco 1500 Series freezers are available in three unique sizes and provide maximum storage density as well as the longest hold time and highest sample security in the industry.

Features

- → LN_2 efficiency
- → Fully enclosed wiring and plumbing
- → Vacuum jacketed transfer hose
- → Dry sample storage
- → -310 °F (-190 °C) top box temperature
- → Lowest liftover height
- → Two-tier folding step
- → Optional battery backup — ask about one part number to order HEco with battery backup installed!

Specifications

	MVE HECO 1536P-190			MVE HECO 1539P-190			MVE HECO 1542R-190		
Maximum storage capacity									
1.2 & 2 ml vials (internally threaded)	36,400			39,200			42,000		
Quantity of large racks 100 cell boxes	24			24			26		
Quantity of mini racks 25 cell boxes	16			16			16		
Number of shelves per rack	13			14			14		
Performance									
LN_2 capacity at vapor platform L est.	133			133			133		
LN_2 capacity w/o inventory L est.	756			797			797		
Unit dimensions									
Neck opening in. (mm)	17.4 (442)			17.4 (442)			17.4 (442)		
Usable internal height in. (mm)	28.7 (730)			30.2 (767)			30.8 (782)		
Inner diameter in. (mm)	38.5 (978)			38.5 (978)			38.5 (978)		
Overall height in. (mm)	54.7 (1389)			56.8 (1442)			56.8 (1442)		
Liftover height in. (mm)	37.3 (947)			39.4 (999)			39.4 (999)		
Door width requirement* in. (mm)	42.0 (1067)			42.0 (1067)			42.0 (1067)		
Door width requirement, with handles* in. (mm)	43.3 (1099)			43.3 (1099)			43.3 (1099)		
Weight empty** lbs. (kg)	700 (318)			700 (318)			700 (318)		
Weight liquid full** lbs. (kg) estimated	2000 (907)			2100 (953)			2100 (953)		
Blood bag capacities	Total bags	Bags/ frame	No. frames	Total bags	Bags/ frame	No. frames	Total bags	Bags/ frame	No. frames
791 OS/U medsep (25 ml)	2,905	7	415	3,320	8***	415	3,184	8***	398
4R9951 (50 ml)	1,488	6	248	1,736	7	24	1,687	7	241
4R9953 (250 ml)	812	4	203	812	4	203	768	4	192
4R9955 (500 ml)	608	4	152	608	4	152	576	4	144
DF200 (200 ml)	496	4	124	496	4	124	488	4	122
DF700 (700 ml)	256	4	64	256	4	64	264	4	66

* Minimum width required for vessel to pass through opening. Footprint may vary. Contact Tech Service for detailed drawings.

** Without inventory.

*** Between usable height and clearance. Please refer to specifications.

MVE HEco™ 1800 Series Freezers

The MVE HEco™ 1800 Series freezers provide efficient use of LN_2, making them the most efficient vapor freezers available. When an LN_2 fill is initiated, the redesigned plumbing system optimizes the LN_2 flow and reduces transfer loss, increasing efficiency and LN_2 cost savings. The 1800 series provides options for greater storage in one freezer. These next generation high-efficiency freezers incorporate hinged work surfaces that fully enclose all electronics and plumbing to enhance overall safety and usability. The technical and visual improvements provide a more aesthetically pleasing freezer while offering greater functionality. As with all of MVE's cryogenic freezers, the MVE HEco 1800 Series freezers provide maximum storage density as well as the longest hold time and highest sample security in the industry.

Features

- → LN_2 efficiency
- → Fully enclosed wiring and plumbing
- → Vacuum jacketed transfer hose
- → Dry sample storage
- → -310 °F (-190 °C) top box temperature
- → Lowest liftover height
- → Two-tier folding step
- → Optional battery backup — ask about one part number to order HEco with battery backup installed!

Specifications

	MVE HECO 1879P-190			MVE HECO 1881R-190			MVE HECO 1892P-190			MVE HECO 1894R-190		
Maximum storage capacity												
1.2 & 2 ml vials (internally threaded)	79,950			81,900			92,250			94,500		
Quantity of large racks 100 cell boxes	54			60			54			60		
Quantity of mini racks 25 cell boxes	30			12			30			12		
Number of shelves per rack	13			13			15			15		
Performance												
LN_2 capacity at vapor platform L est.	292			305			282			300		
LN_2 capacity w/o inventory L est.	1,516			1,521			1,737			1,732		
Unit dimensions												
Neck opening in. (mm)	25 (635)			25 (635)			25 (635)			25 (635)		
Usable internal height in. (mm)	29.5 (749)			29.2 (741)			34.5 (876)			34.2 (868)		
Inner diameter in. (mm)	56.0 (1422)			54.8 (1391)			56.0 (1422)			54.7 (1389)		
Overall height in. (mm)	63.7 (1618)			61.3 (1556)			68.6 (1742)			68.6 (1742)		
Liftover height in. (mm)	38.8 (985)			38.8 (985)			44.0 (1118)			44.0 (1118)		
Door width requirement* in. (mm)	60.0 (1524)			60.0 (1524)			60.0 (1524)			60.0 (1524)		
Weight empty lbs. (kg)	1721 (781)			1721 (781)			1721 (781)			1721 (781)		
Weight liquid full** lbs. (kg) estimated	4830 (2191)			4830 (2191)			4875 (2211)			4875 (2211)		
Blood bag capacities	Total bags	Bags/ frame	No. frames	Total bags	Bags/ frame	No. frames	Total bags	Bags/ frame	No. frames	Total bags	Bags/ frame	No. frames
791 OS/U (25 ml)	5,866	7	838	5,628	7	804	6,704	8	838	6,432	8	804
4R9951 (50 ml)	2,952	6	492	2,940	6	490	3,936	8	492	3,920	8	490
4R9953 (250 ml)	1,584	4	396	1,608	4	402	1,980	5	396	2,010	5	402
4R9955 (500 ml)	1,104	4	276	1,240	4	310	1,380	5	276	1,550	5	310
DF200 (200 ml)	960	4	240	984	4	246	1,200	5	240	1,230	5	246
DF700 (700 ml)	504	4	126	544	4	136	630	5	126	680	5	136

Two-year standard warranty & five-year vacuum warranty

*Minimum width required for vessel to pass through opening. Footprint may vary. Contact Tech Service for detailed drawings.

** Without inventory

Cryogenic Storage Freezers

Features

- → Durable, tamper-proof lid design
- → Easy maintenance lid design
- → Superior strength, lightweight aluminum construction
- → High-strength neck tube reduces liquid nitrogen loss
- → Locking tab
- → Color-coded canister/lid numbering system
- → M128, Spider design — for easy retrieval and insertion of product canisters
- → Insulation — MVE's advanced insulation system provides maximum thermal performance
- → Five-year vacuum warranty

Specification

									Canister/container			0.5 cc straw cap.		2 ml vial cap.	
Part number	Model	Cap	NER (L)	Duration (days)	Neck opening (in.)	Overall height (in.)	Outside diameter (in.)	Weight full (lbs.)	Nbr	Ht. (in.)	Dia. (in.)	/Cane	/Bulk	/Cane	/Rack
MVE10719924	XC 47/11-6	47.4	0.39	76	5.00	26.5	20.00	120.40	6	11	4.00	4500	6216	1320	N/A
MVE10743027	XC 34/18	34.8	0.18	123	3.50	26.5	18.20	96.00	6	11	2.81	2100	3000	630	N/A
MVE13346449	XC 47/11-6SQ	47.4	0.39	76	2.18	26.5	20.00	120.40	6	11	4.00	N/A	N/A	N/A	N/A
MVE9918069	XC 33/22	33.4	0.14	154	2.75	26.0	18.20	94.00	6	11	2.22	1260	1764	360	N/A
MVE9918449	XC 32/8	32	0.35	57	3.81	21.5	18.20	87.00	6	11	2.02	2520	3960	855	N/A
MVE9918539	XC 22/5	22.4	0.35	40	3.81	22.0	14.50	66.00	6	11	3.09	2400	3666	810	N/A

Dewars

Features

- → Easy maintenance lid design
- → High-strength neck tube reduces liquid nitrogen loss
- → Advanced chemical vacuum retention system — designed for superior vacuum performance over the life of the product
- → Superior strength, lightweight aluminum construction
- → Insulation — MVE's advanced insulation system provides maximum thermal performance
- → Five-year vacuum warranty

Specifications

Part number	Model	Net capacity (L)	Static evaporation rate (L/day)	Neck opening (in.)	Overall height (in.)	Outside diameter (in.)	Internal diameter (in.)	Weight empty (lbs.)	Weight full (lbs.)
MVE9922219	LAB4	4	0.19	1.4	16.8	7.3	5.5	6	13
MVE9918079	LAB5	5	0.15	2.2	18.2	8.8	6.5	8	17
MVE10740281	LAB 10	10	0.18	2.2	21.5	10.3	8.3	13	31
MVE13492631	LAB 20	21	0.18	2.0	24.7	14.5	11.4	19	56
MVE9918099	LAB 30	32	0.22	2.5	24.1	17.0	14.0	27	84
MVE9918109	LAB 50	50	0.49	2.5	30.7	17.0	14.0	34	123

Handheld Cryo Freezing Devices

Linde delivers MEDIPURE® liquid nitrogenfrom one of the largest branch networks in the United States. A local branch means you don't have to worry about running out of liquid nitrogen. And if you forget to re-order, our local professional team can arrange delivery to your door quickly.

Linde's MEDIPURE products are produced in facilities registered with the FDA, in accordance with cGMPs. Our liquid nitrogen NF is certified to NF monograph and meets the requirements of CGA standards. To further augment our full range of cryogenic liquid products, we offer the CRYOGUN™ and Mini-CRYOGUN™ from Brymill Cryogun Systems, a world leader in the design and manufacture of handheld cryogenic equipment.

Some of the features of the CRYOGUN and Mini-CRYOGUN include:

- → Manufacturer's three-year warranty covers parts and labor
- → Fully autoclavable
- → Patented relief valve and pressure release system designed to reduce pressure build-up in the flask
- → A Delrin collar insulating user's hand from the cover
- → All units fitted with new Delrin collar for extra stability
- → Each unit supplied one A, one B, one D and two C apertures and the 20 g bent spray
- → Comprehensive range of sprays and probes available

Specifications

Part number	Description
BRYB-700	CRYOGUN, capacity 16 oz (500 ml), static holding time 20-24 hrs, includes CD-ROM — the complete guide to cryogenic techniques
BRYB-800	Mini-CRYOGUN, capacity 10 oz (300 ml), static holding time 10-12 hrs, includes CD-ROM — the complete guide to cryogenic techniques
BRY605M	Safety gloves, medium, for cryogenic use
NREF300	Lightweight face shield

Special Applications

General Considerations for Hyperbaric Oxygen Supply

Compliance

Hyperbaric Oxygen Therapy (HBOT) equipment consists of one or more pressurized hyperbaric chamber and an oxygen (USP) supply used for medical treatments performed at ambient pressures above normal atmospheric pressure.

Facilities that perform HBOT must comply with medical gas codes published by the NFPA, including NFPA 99, NFPA 55, and NFPA 101 as well as medical gas standards published by the CGA including CGA M-1, CGA P-2, CGA G-4, and CGA C-7.1. Review the medical gas codes and standards related to HBOT compliance before designing, installing, or adding additional hyperbaric oxygen chambers to a facility.

Typical Gas-Source Supply Scenarios

Scenario #1 – Category 3 Hyperbaric Care with a stand-alone bulk oxygen system

Installation of a stand-alone dedicated bulk oxygen system to supply a HBOT facility:

1. Codes and standards require a minimum oxygen reserve supply of 15 minutes in addition to the primary oxygen supply.
2. Warning systems are permitted to be a single master/area panel design. The alarm panel will be located in the room housing the hyperbaric chambers.
3. An Emergency Oxygen Supply Connection (EOSC) is not required.

Scenario #2 - Category 1 or 2 Hyperbaric Care with a stand-alone bulk oxygen system

Installation of a stand-alone dedicated bulk oxygen to supply a hyperbaric oxygen treatment facility:

1. Codes and standards require a minimum oxygen reserve supply of one day's (i.e., 8 hrs) average supply in addition to the main tank primary oxygen supply.
2. Warning systems are permitted to be a single master/area panel design. The alarm panel will be located in the room housing the hyperbaric chambers.
3. EOSC is not required.

Scenario #3 - Category 1, 2 or 3 hyperbaric care tied into an existing hospital's oxygen supply system

Installation of a dedicated hyperbaric oxygen piped distribution line tied into the healthcare facility's bulk oxygen system to supply Hyperbaric Oxygen Treatment (HBOT) chambers:

1. Codes and standards require the bulk oxygen supply to be designed for healthcare facility Category 1.
2. The dedicated pipeline from the hospital facility's existing oxygen supply source to the hyperbaric chambers requires a supply pressure of 60-75 psig (chamber manufacturer oxygen supply pressures recommendations vary). A separately controlled auxiliary dual-line regulator module (separate from the hospital's 50-55 psig regulator module) with individual alarms is required.
3. Both the hospital facility's main oxygen source of supply and the reserve oxygen source of supply must be evaluated to ensure they are properly designed and sized for the additional oxygen volume required for the hyperbaric chambers, without jeopardizing the existing pressure and flow requirements of oxygen to the hospital patients, and the minimum one day's (i.e., 24 hrs) reserve supply required by NFPA 99, NFPA 55 & CGA M-1.

Other Typical Gas-Related Issues To Be Aware of

Other relevant medical-gas-related codes and standards to be considered include NFPA 99 Chapter 14 and NFPA 55, with particular reference to the following:

- → Downstream of the hyperbaric room's zone shutoff valve(s), and inside the chamber room, oxygen in-line shut-off valves must be installed.
- → Storage and handling of medical gases must meet the applicable NFPA 99 Chapter 5 and Chapter 11 requirements.
- → All installations, equipment, and testing must meet NFPA 99 Chapter 5 requirements.
- → The bulk oxygen supply system installation must meet NFPA 55 requirements.
- → Medical air, if used for chamber patient air breaks, must meet NFPA 99 Chapter 5 and Chapter 11 requirements.

NFPA 55 Requirements:

- → The bulk oxygen supply system must conform to installation siting requirements.
- → All equipment must be designed and cleaned for oxygen service.
- → All bulk oxygen supply installations, equipment, and testing must meet NFPA 55 requirements.

Planning

If you are planning to install or modify a hyperbaric oxygen facility, call your Linde representative early in the process. Linde offers consultation, site survey and system assessments to help round-out your planning to include all medical gases and related equipment. The information contained herein is not intended to summarize all of the risk or codes associated with the installation of a hyperbaric oxygen facility.

Liquid Helium and Cryofill Services for MRI Systems

Linde MRI Helium Cryofill Services

Linde is a global leading helium supplier and service provider to healthcare and medical industry, having many years of experience the performing the most reliable liquid helium transfill services to various MRI systems.

Linde's experienced and professional cryofill technicians, trained by the global OEMs, deliver the required liquid and gas helium along with the special cryofill tools and equipment via our cryofill vehicles and perform the MRI helium transfill services at your location, on-time and safely.

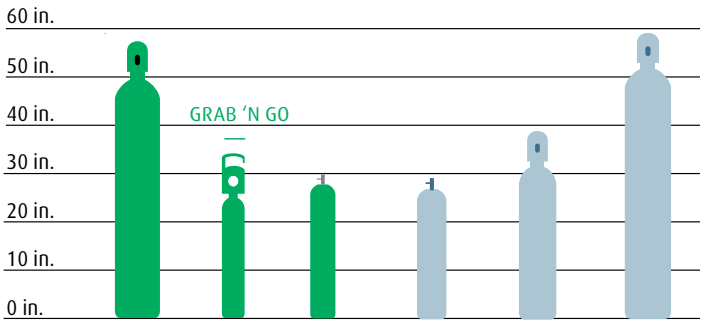
Linde can schedule your cryogen deliveries and transfills whether you have one or multiple locations. The service is available 24 hours a day, seven days a week — all backed by Linde's years of experience supplying hospitals, MRI operators and others in the medical community.

Cylinder Specifications

Product code	Cylinder size	Nominal contents	Press (psig) at 70 °F	CGA connection
HE LT60	CMSH-60L	60 L	1	Coupling for 3/8 in. or 1/2 in. transfer tube
HE LT100	CMSH-100 L	100 L	1	Coupling for 3/8 in. or 1/2 in. transfer tube
HE LT250	CMSH-250 L	250 L	1	Coupling for 5/8 in. or 3/4 in. transfer tube
HE LT350	CMSH-350 L	350 L	1	Coupling for 5/8 in. or 3/4 in. transfer tube
HE LT500	CMSH-500 L	500 L	1	Coupling for 5/8 in. or 3/4 in. transfer tube
HE 6.0MR-VT	T	291 cu. ft.	2000	CGA580

Physicians and Dentists

High-Pressure Cylinder Size Chart:



Cylinder Size	M-K	M-E	M-E	M-E	M-Q	M-K
Size code	430	411	410	410	410	430
CGA comm.	540	N/R	870	910	326	326
Contents						

Medical Gases for Primary Care

Linde delivers MEDIPURE® Oxygen USP and Nitrous Oxide USP to physicians and dentists from one of the largest branch networks across the country. A local branch means you don't have to worry about running out of product. And if you forget to re-order, our local professional team can arrange delivery to your door quickly.

MEDIPURE means assurance for you that Linde's medical gases are produced in facilities registered with the FDA and packaged to meet CGA standards.

With GRAB 'N GO®, you don't have to buy or maintain a regulator to provide oxygen in an emergency. With Linde's GRAB 'N GO vision oxygen delivery system, the regulator is pre-attached to make it less complicated to use in an emergency. This single integrated unit provides oxygen USP with both a regulator and contents gauge built right onto the cylinder. You don't have to find a wrench and attach a regulator to the oxygen cylinder prior to use. One-knob operation makes GRAB 'N GO systems easy to use. Straightforward multimedia training material is available for your staff.

Oxygen and Nitrous Oxide Cylinder Data

Product code	Cylinder size	Description
OX M-AEGNGVISION	M-E	GRAB 'N GO® oxygen, 25 cu. ft.
OX M-E	M-E	ME oxygen cylinder, 25 cu. ft.
OX M-K	K	K oxygen cylinder, 249 cu. ft.
NS M-E	M-E	ME nitrous oxide cylinder, 6.4 lbs.
NS M-Q	Q	Q nitrous oxide cylinder, 20 lbs.
NS M-50	K	Nitrous oxide cylinder, 50 lbs.
NS M-64	K	Nitrous oxide cylinder, 64 lbs.

Cryogenic Products for Primary Care

Cryogenic Products

Linde delivers MEDIPURE® liquid nitrogen to physicians' offices from one of the largest branch networks across the country. A local branch means you don't have to worry about running out of product. And if you forget to re-order, our local professional team can arrange delivery to your door quickly.

Our liquid nitrogen NF grade is certified to the National Formulary (NF) monograph.

For cryogenic storage, MVE-brand high-efficiency, super-insulated dewars are the most convenient, economical way to store and dispense liquid nitrogen. They can be fitted with pour spouts or pressurized dispensing devices to aid in the transfer of liquid.

Liquid Nitrogen Dewars

Part number	Description
MVE10740281	LAB 10 Dewar
MVE13492631	LAB 20 Dewar
MVE9918099	LAB 30 Dewar

Dewar Accessories

Part number	Description
MVE9711589	LAB 10 dipper
MVE10668101	LAB 10 discharge device
MVE9720729	LAB 10 pour spout
MVE9711619	LAB 20 dipper
MVE9711909	LAB 20 pour spout
MVE10667802	LAB 20 discharge device
MVE9711679	LAB 30 swivel dipper
MVE 10668004	LAB 30 discharge device
MVE9711929	LAB 30 pour spout
PRXUF21-IN3	Transfer hose, 3 ft.
MVE10615885	Phase separator
MVE9717129	Cryo gloves, large
MVE10464394	Cryo apron
NREF400	Standard faceshield
CRESS110	Safety glasses

Cryo apron

Face shields

Cryo gloves

Phase separators

Accessories for Physicians and Dentists

Linde offers a wide range of gas handling equipment such as oxygen regulators, wrenches, cylinder carts, wall-mounting brackets and resuscitators to help you handle your medical gases safely and efficiently.

From our extensive line of medical-gas-related products, we have listed some of the popular items typically ordered for physician and dental offices. Linde is a leading national supplier of medical gases and equipment. For items not shown, please contact us.

Order these and other products by calling your local branch or 1-800-225-8247, or order online at https://lindedirect.com.

Hose assemblies

Oxygen regulators

Cylinder carts

Swivel connector, nut & nipple for regulator

Wall brackets

Wrenches

Products Specifications

Part number	Description
WESM1-870-15FG	Oxygen regulator, adjustable 2-15 L/min for M-E size cyl
WESM1-540-15FG	Oxygen regulator, adjustable 2-15 L/min for K size cyl
WESMCW-3PC	Plastic wrench, ME size cyl with chain
WESM24-45P	Swivel connector, nut and nipple for regulator
WESPX1000	Nasal cannula with tubing (7 ft.)
WESC4OX-036FNNFNN	Hose assembly, oxygen, 3 ft., DISS female by DISS female ends
WESC4OX-048FNNFNN	Hose Assembly, Oxygen, 4 ft., DISS Female by DISS female ends
WESC4NI-036FNNFNN	Hose assembly, nitrous oxide, 3 ft., DISS female by DISS female ends
WESC4NI-048FNNFNN	Hose assembly, nitrous oxide, 4 ft., DISS female by DISS female ends

Dry Ice

Here at Linde, everything we do is focused on helping you do business more effectively. We offer a full range of atmospheric, process, industrial and specialty gases, as well as dry ice and other products for a wide range of processes that impact our lives every day.

What is Dry Ice?

Dry ice is solid carbon dioxide (CO_2) made by reducing the pressure and temperature of liquid CO_2 to the point at which it is converted to a solid form — snow. The dry ice is then compressed under high pressure to form rice, pellets and blocks — which are frequently cut into sized slices. Non-flammable, non-toxic and extremely cold, (-109 °F/ -78.5 °C), dry ice, a highly-effective refrigerant, is used in dry ice blasting, a non-abrasive way to clean industrial equipment, and is used in additional specialized applications.

Commercial Applications

More than 80 years of experience and research have enabled the technicians and engineers at Linde to transform dry ice from the simple commercial refrigerant first used in the 1920s to forms that can be used for multiple applications in a variety of industries. To help ensure your ongoing success, our technicians and experts remain available after the sale to help troubleshoot process challenges.

Applications

- → Food processing & storage
- → Healthcare
- → Pharmaceutical & biotech
- → Medical products
- → Metallurgy
- → Construction
- → Blast cleaning
- → Research
- → Shipping
- → Indoor agriculture

Dry Ice Products

Dry Ice Pellets

A convenient alternative to solid block dry ice, dry ice pellets are smaller and easier to use. This form provides increased surface coverage, efficiency in handling, and uniform temperature distribution, when spread properly.

→ Dry ice blasting rice: 1/8 in. diameter
→ Dry ice regular nuggets: 5/8 in. diameter

Dry Ice Slices

Dry ice slices are smaller portions of block dry ice and can be cut to fit specialized equipment or process needs.

→ 10 in. × 10 in. × 2 in. slice
→ 10 in. × 5 in. × 2 in. slice
→ 5 in. × 5 in. × 2 in. slice
→ 5 in. × 5 in. × 1 in. airport slice

Dry Ice Blocks

Dry ice blocks are typically used to refrigerate or freeze items for extended periods of time. Praxair offers dry ice blocks in the following weights that can be cut to size for your operations.

→ Full block: 10 in. × 10 in. × 10 in.
→ 1/2 block: 10 in. × 10 in. × 5 in.
→ 1/4 block: 5 in. × 5 in. × 10 in.

Dry Ice Products

THERMOSAFE™ Model HR27P Durable Transport

Made with high-impact polyethylene, Model HR27P features a one-piece, molded construction with specially formulated foam-in-place urethane insulation and an optional drain plug.

Specifications

External dimensions	48 in. L × 43 in. W × 40.5 in. H
Internal dimensions	41 in. L × 37 in. W × 29 in. H
Approximate tare weight	188 lbs.
Recommended payload	1650 lbs.
Recommended stacking	2 units high (empty only)
Internal capacity	27 cu. ft. (without lid)

THERMOSAFE™ Model HR11P3-LC Durable Transport

Ideal for food distribution, dairy and frozen novelty distribution, this model features a one-piece, seamless construction, made of high-impact polyethylene with specially formulated foam-in-place urethane insulation.

Specifications

External dimensions	43 in. L × 27.5 in. W × 40 in. H
Internal dimensions	36.5 in. L × 21 in. W × 24 in. H
Approximate tare weight	188 lbs.
Recommended payload	1650 lbs.
Recommended stacking	2 units high (empty only)
Internal capacity	11 cu. ft. (without lid)

Services

Site Gas Management Services

Site Gas Management Services

→ Right size cylinder inventory
→ Supplemental oxygen readily available throughout the hospital
→ Reduced burden on hospital staff
→ Reduced costs associated with lost and broken equipment
→ Daily access to site technical advice
→ Enhanced space utilization
→ Consumption tracking
→ Integrated emergency/disaster logistics planning

The Site Gas Program will provide a single point of contact for all your gases-related needs. From ensuring your gases are delivered where you need them when you need them, our onsite personnel take care of inventory management, ordering/re-orders, performance metrics and joint planning.

Linde onsite managers deliver point of care, set appropriate min/max inventory levels, eliminate obsolete stock, track cylinders, and provide equipment solutions. We streamline the order to payment process; simplifying the ordering and billing process, reduce accounts payable handling, and reduce payment costs and cycle times.

We help ensure your facility meets regulatory requirements including FDA, NFPA, OSHA, TPP and The Joint Commission (TJC). We will work with your facility to define and establish cost savings targets, end-user satisfaction levels and metrics based on error-free billing, on-time delivery, ease of ordering, productivity improvements, improvement in patient care and overall satisfaction.

For further information, and your no-obligation facility assessment, contact your Linde representative today.

Linde's Employee On-Site at Your Facility

Linde's Site Gas Services Program is designed for larger hospitals, and includes the services of a Linde employee on-site. The program can be tailored to provide solutions in the following areas:

→ Asset management
→ Equipment services
→ Transaction processing
→ Safety, regulatory & environmental compliance
→ Performance monitoring
→ Maintain par levels
→ Refocusing clinical employees to patient care
→ Ordering and billing process simplification

Design Build Solutions

Full-service design, project management, and installation of cryogenicvfluid and compressed gas distribution systems

Services/Applications

- → Field consulting
- → Concept planning
- → Design & engineering
- → Project management
- → Budgeting
- → Concrete & civil work
- → Vehicular protection
- → Fencing & screening
- → MEP installations
- → Permitting
- → Commissioning

Linde installs hundreds of cryogenic tanks, gas distribution piping systems, and related gas application technologies for the industrial, healthcare and specialty gases markets each year. You can depend upon the experience, expertise of our design, installation, project management and engineering teams as Linde designs and installs a reliable and safe gas supply system, tailored to your specific process needs.

Project Management

Our knowledgeable and skilled Construction Project Managers are ultimately responsible for the successful installation of your new gas supply system. They are dedicated to managing all phases of your project — from the moment design begins until the installation is complete — and to see it is completed on time and on budget.

Design

Linde's Design-Build Project Delivery System includes planning, design and construction under one single source.

Installation and Construction

Once the design is approved, Linde will procure and install all source and pipeline equipment. Linde is uniquely qualified to offer a total system solution, from gas source supply through distribution to the point of use. As a distributor for major manufacturers, we sell and service virtually all brands and models.

Our design-build approach reduces your administrative burden and frees your staff to focus on your core business. We coordinate with inspectors, electricians, plumbers and other subcontractors to ensure that your project is completed on time, within budget and done right.

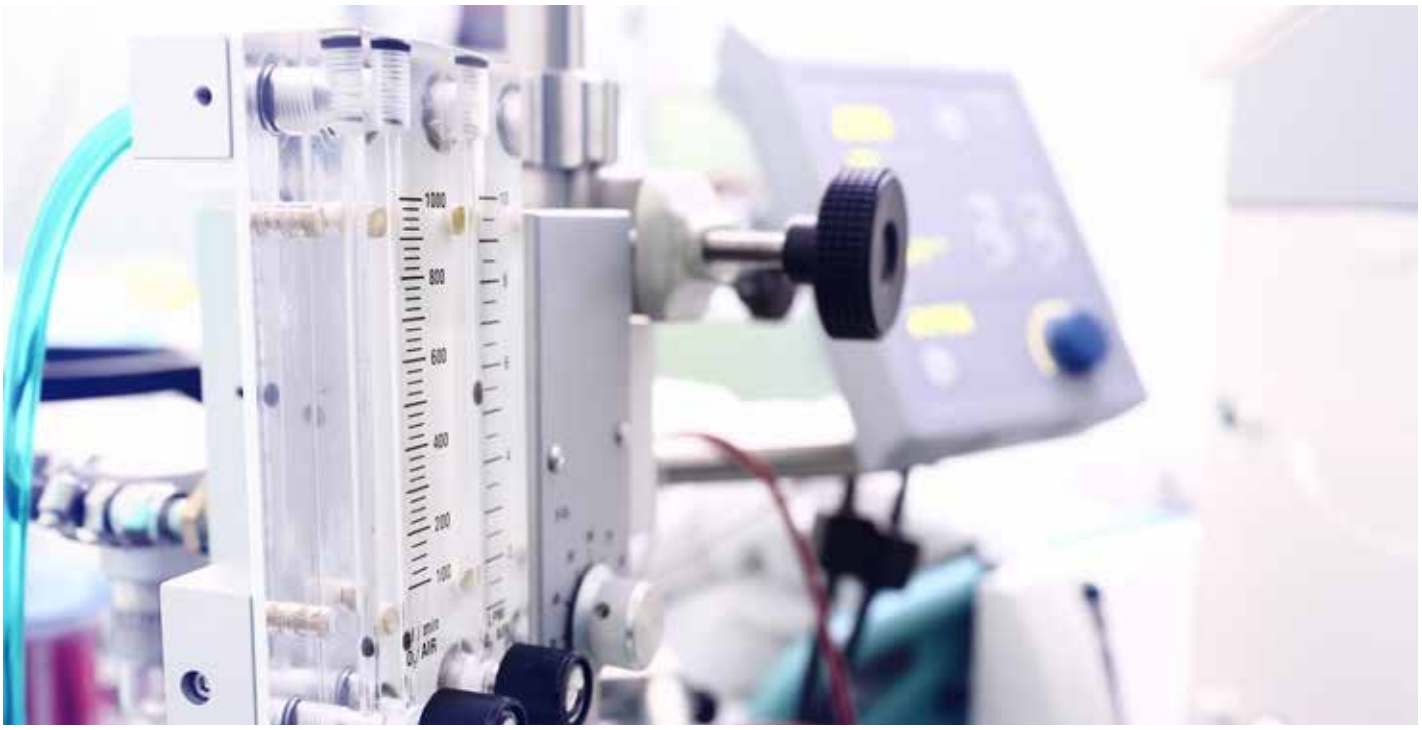
Shutdown Management

Before bringing your new system online, plans must be made for a safe, reliable back-up gas supply to ensure ongoing productivity. Linde will provide an interim gas supply during shutdown periods. Our program includes a needs analysis to assess equipment requirements, gas usage and supply. In addition, we coordinate with appropriate departments within your facility so all requirements are addressed, including shutdowns and system tie-ins where the Linde technician witnesses and verifies the tie-in. The result: less stress and greater peace of mind during gas shutdowns.

Code Review

Linde can inspect new or existing source equipment and distribution systems to assess code compliance. We can also evaluate your gas demand and recommend equipment changes or upgrades that can improve performance, prevent run outs, and lower the total cost of gas supply.

Maintenance Program for Medical Piping Systems



Linde offers a comprehensive program for medical gas pipeline systems in your facility that includes periodic testing, preventive maintenance, repairs, verification, utility system audits, decontamination services, engineering services, education and training.

Periodic Inspections

Periodic inspections are designed to help you meet NFPA 99 compliance requirements, and TJC's Environment of Care Medical Gas Utility and Equipment Standards. Our testing and documentation services provide you with a periodic assessment of the operational performance of your medical gas or systems and compare your current system status with applicable regulatory standards. In addition, we can provide you with a documented corrective action assessment, follow-up testing requirements, as well as information for future improvement planning and risk assessment.

When systems are in compliance, your potential exposure and operating costs are reduced, operational reliability is enhanced and employees and patients are protected. Our comprehensive compliance-testing program includes:

- → Complete evaluation of sources, alarms, valves, outlets and a medical gas analysis
- → Computer generated test reports
- → Summary of findings
- → Cost-effective recommendations

Preventative Maintenance

Linde's Preventative Maintenance and Repairs (PMR) program reduces potential downtime and overall costs, and may extend the life of your medical gas equipment. Manufacturer recommendations and maintenance standards are followed during maintenance services and while conducting repairs.

Our program is designed to identify and correct potential problems before they happen. Linde will provide required maintenance and repairs for medical gas equipment including:

- → Medical air compressors & accessories
- → Medical vacuum pumps
- → Outlets
- → Valves
- → Alarms
- → Manifolds
- → Bulk source equipment

Engineering Services

Not having up-to-date drawings could be a major problem when you need to renovate, relocate, or upgrade your system. Using CAD/CAM software, our engineers can:

- → Recreate an accurate schematic (2D) or isometric (3D) drawings identifying locations of existing gas systems including source equipment, piping location and sizing, sensors, alarms, valves, outlets and gauges
- → Provide you with descriptive labeling for all the controls and valves shown on your schematics

Education and Training

- → Brazing certification – Our brazing certification course qualifies your personnel to do your own installations on smaller projects.
- → Medical gas in-service training – Our in-service training teaches your personnel to perform preventive maintenance.
- → Inspector training – Our inspector training enables your personnel to supervise subcontractors.
- → Medical gas emergency preparedness – We provide emergency preparedness training for nurses and other personnel working with oxygen and other medical gases.

Medical Gas Compliance Services

Every medical facility must have a reliable supply of pure medical gases. Many facilities face the challenge of using complex systems comprising old and new technology. Linde's comprehensive compliance services can help you in your efforts towards medical gas system compliance with NFPA 99 and 55, TJC and other regulations essential to safe operation.

Linde offers a complete range of medical gas and vacuum systems services, including:

- → System evaluations, periodic inspections, regulatory verification & certifications
- → Preventative maintenance, system repairs & equipment upgrades

Services

- → Our technicians can install major brands and perform repairs on most components of the medical pipeline system.
- → Medical gas components are adjusted and calibrated to NFPA and OEM specifications.

Utility System Audits Include

- → Periodic systems evaluations
- → Purity and concentration testing
- → Particulate analysis

Utility System Audits Include

Purging is required for new systems. Existing piping sometimes requires purging to remove contaminants that get trapped in the system. Linde can solve this problem with wash and purge services:

- → The system is flushed to remove particulates, standing water, oil, and gaseous contaminants.
- → Our decontamination program meets NFPA and CGA standards.

- → New installations & temporary emergency supply systems
- → Laboratory medical gas analysis
- → CAD & documentation services
- → Credentialed medical gas verifiers
- → Emergency response 24/7
- → Extensive research and development
- → Affiliated with or member of:
  - –American Association of Respiratory Care (AARC)
  - –American Society of Healthcare Engineering (ASHE)
  - –American Society of Safety Engineers (ASSE)
  - –Compressed Gas Association (CGA)
  - –Medical Gas Professional Healthcare Organization (MGPHO)
  - –National Fire Protection Association (NFPA)

Environmental Monitoring Services

Linde Healthcare offers you a full line of testing services to help you measure, monitor, and control employee exposure to hazardous vapors and indoor air quality throughout your facility — ensuring compliance with OSHA, TJC, DHHS, CAP, NIOSH, and ACGIH regulations.

Onsite Monitoring for Hazardous Chemical Vapors Including

→ Nitrous oxide and halogenated agents in anesthetizing areas
→ Ethylene oxide and glutaraldehyde in the central sterile department and other points of use
→ Formaldehyde, xylene, toluene, and other OSHA Z Table chemicals in the laboratory area

Our surveys measure Time Weighted Average, Short-Term Exposure Levels, and Peak Exposure Levels. We also supply dosimeters, capable of detecting over 100 OSHA-regulated chemicals, for monitoring between inspections. Our assessment provides information on safe levels in accordance with OSHA requirements and documentation required for TJC surveys.We assist you on corrective action required, and offer suggestions on how to reduce employee exposure to hazardous vapors in the workplace.

Indoor Air Quality including Sick Building Syndrome

Onsite audits for all areas where indoor air quality is likely to be suspect for pollutants such as:

→ Moisture and bacteria
→ Volatile and semi-volatile organic compounds
→ Carbon dioxide and carbon monoxide
→ Formaldehyde

Our technicians are familiar with OSHA and NIOSH standards. If there is a problem, they can pinpoint its source, offer solutions, and suggest corrective measures.

Isolation Room Testing

→ Negative/positive pressure testing
→ Isolation room flow rates are tested and documented in accordance with the CDC and the DHHS recommendations. Linde keeps written record of every inspection for 30 years as required by OSHA.

Linde Advantage

Backed by one of the largest industrial and specialty gas companies in North and South America, Linde Healthcare puts their experience and expertise to work for you. Our medical gas specialists offer a range of products and services to help measure, monitor and control employee exposure to hazardous vapors by providing the following:

→ In-house expertise in compressed gases
→ Safety station inspections
→ On-call for analysis outside of normal business hours
→ Available 24-hour turnaround
→ Gas chromatography using remote sampling to identify a wider range of potential contaminants
→ NIST-traceable instrument calibration gases
→ Accurate, consistent, reliable results... every time
→ Dosimeter badges and testing

Medical Gas and Vacuum Equipment

Sales

All new and retrofit equipment is in compliant with NFPA 99, CGA, AHA, TJC, and OSHA requirements. Our full line of equipment includes:

Linde offers a large variety of medical gas and vacuum system equipment including central supply source equipment, pipeline distribution equipment and secondary equipment.

- → Central Supply Source Equipment – Medical gas bulk, medical microbulk, medical vacuum pumps, medical air compressors and medical gas manifolds.
- → Medical Gas Pipeline Equipment – Alarms/sensors, valves, outlets/inlets, emergency oxygen supply connections, retro-fit equipment.
- → Medical Gas & Vacuum Secondary Equipment – Medical gas flow meters, medical gas hoses, medical gas fittings adaptor, couplers, and vacuum regulators

Linde sources medical gas and vacuum equipment from (but not limited to) the following suppliers: Beacon Meades, Western Enterprises, Amico, Tri-Tech Medical Inc., Powerex, Precision Medical, Bay Corporation, and Allied.

Services

- → Our technicians are trained to service most makes and models of medical gas pipeline equipment.
- → Local technicians provide fast and efficient service for inspections and repairs.
- → We provide temporary sources of gas and vacuum supply during shutdown periods.
- → During construction, we coordinate with inspectors, electricians, plumbers, and other subcontractors.
- → We provide a comprehensive analytical testing service program.
- → We offer certification for both new and existing systems.

Linde Advantage

- → A reliable source for all makes and models
- → Single-source equipment and service provider expedites and simplifies your procurement process
- → In-house expertise in compressed gases
- → Accurate, consistent, reliable results... every time

- → **Source Equipment:** air compressors, vacuum pumps, manifolds, dryers, filters, dewpoint/CO monitors

- → **Alarm Systems:** area and master alarms, remote changeover alarms, computer interface software

- → **Valves:** zone valve box assemblies, in-line valves

- → **Outlets:** medical gas outlets
- → **Repair Kits:** complete assemblies, conversion kits, rebuild kits
- → **Pipeline Equipment:** clean and bagged fittings, pipe ID labels

Analytical Services

Linde offers you a comprehensive analytical testing service program. Our experienced team of professionals in the Analytical Service Group is available to answer your questions through our 24-hour emergency response system, which includes on-call chemists.

We provide a 24-hour turnaround on gas analysis including:

- → Oxygen (trace nitrogen levels)
- → Nitrogen (trace oxygen levels)
- → Nitrous oxide (trace nitrogen and oxygen levels). Trace analysis of the variable gases such as carbon dioxide, carbon monoxide, methane, and total volatile hydrocarbons (TVHC)
- → Liquid hydrocarbons (oil mist) in air
- → Particulate quantifications
- → Halogenated hydrocarbons

Analytes are identified and quantified at levels from percent (%) to parts per million (ppm). In addition, we quantify and identify unexpected contaminants in your medical gas piping.
Such analyses include:

- → Elemental analysis
- → Melting point determination
- → Metallurgical analysis
- → Metals characterization
- → Particle size determination
- → Particulate quantifications
- → Bacterial and fungi determination

Several commercial cleaning agents for oxygen service are available, some of which are halogenated solvents containing hydrocarbons. If you use these solvents for cleaning your medical piping, we offer two test methods to check for trace contaminants of halogenated hydrocarbons in the system after it has been cleaned and then flushed, usually with nitrogen:

- → Onsite detector tubes: These are usually calibrated for a particular chemical or chemicals.
- → Gas chromatography: Using our remote sampling system, we can test samples in our lab on a gas chromatograph which can specifically identify a wider range of potential contaminants at parts per billion (ppb) levels, well below the regulatory limit of 2 parts per million. Contact our chemists for details.

Note: Not all services are available in all regions of the United States.

Emergency Preparedness Products

Emergency Preparedness Products

GRAB 'N GO® Vision

MEDIPURE® Oxygen LC

Emergency preparedness plans include oxygen supply and are a top priority for healthcare facilities. It is important to have backup supply options prior to an unexpected event occurring that interrupts medical gas supply.

Linde has real world, real-time emergency response experience to help you develop your oxygen emergency preparedness plan. We offer oxygen and related products in addition to consulting services that can help enhance the security of your supply. Linde can also assist and offer several product options to address different levels of response from immediate to short-term. These solutions include:

Backup Supply of Oxygen

USP: GRAB 'N GO Vision
Part number: OX M-AEGNGVISION

Features:
→ Integrated regulator
→ Single knob operation
→ Snap-set flow meter
→ 50 psi auxiliary outlet

MEDIPURE® Oxygen LC
Part number: OX M-LCK
When an E size cylinder is not enough, but portability is still required, Linde's Oxygen MEDIPURE® LC delivers. The system is therapy-ready or can be used with ventilation devices.

Liquid Dewar for Patient Delivery

→ For use with Linde multi-patient delivery system
→ 77 VGL (450L & 265L) available with the Linde system. Additional ~596 230L & 1500L industrials that can be converted
→ Setup works for patients on 4 LPM or less
→ Microbulk can be filled on site. Microbulk team has been notified and requested to be ready to deploy and offer technical assistance.

Patient Delivery Equipment

Portable Emergency Oxygen manifolds delivers up to eight patients per manifold and Portable Zone Restoration, high-pressure oxygen cylinder and cart combination.

Features

→ Used for mass casualty, EMS, and triage situations
→ Oxygen delivery for up to eight patients
→ Flowmeters are individually controlled
→ Eight easy-to-read click-style flowmeters from 0-25 LPM
→ Pressure gauge on manifold
→ Standard DISS 1240 inlet and a 100 psi relief valve safety feature
→ Lightweight and compact durable aluminum construction

Cylinder Storage Carts and Racks

For use with backup oxygen cylinder supply.

Specifications

Part no.	ANT6400
Description	40 cyl. D; E stand
Dimension	Weight: 67 in. Height: 20 in. Width: 25 in. Depth: 40 in.

Specifications

Part no.	ANT6120
Description	12 cyl. D; E rack
Dimension	Weight: 19 in. Height: 19.5 in. Width: 22 in. Depth: 15 in.

Specifications

Part no.	ANT6124
Description	12 cyl. D; E cart / 2 wheels / 2 casters
Dimension	Weight: 44 in. Height: 42 in. Width: 22 in. Depth: 20 in.

Specifications

Part no.	ANT6214
Description	Dual cyl K, H; T cart retractable back
Dimension	Weight: 41 in. Height: 46 in. Width: 25 in. Depth: 14 in.

Regulators and Gas Handling Equipment

Regulators for Oxygen Therapy

Adjustable regulators with flow gauge

Regulator Features

- → Single-stage adjustable flow range
- → Durable neoprene diaphragm
- → Internal reseating relief valve protects against overpressurization
- → Maximum inlet pressure 3000 psig (20700 kPa)
- → Sintered filter for additional safety and to extend regulator life
- → 2 in. diameter gauges
- → Standard DISS 1240 outlet connection and plastic swivel hose barb
- → 6-year warranty

Specification

Gas	Part number	Flow range	Connector type
Oxygen	WESM1-540-15FG	2 - 15 LPM	CGA 540 nut and nipple
	WESM1-540-8FG	1 - 8 LPM	CGA 540 nut and nipple
	WESM1-870-15FG	2 - 15 LPM	CGA 870 yoke

Linde is proud to feature Western Medica branded products. For over 40 years, Western has been developing and supplying equipment for the control, storage, and transmission of high-pressure gases to various markets. Western products are designed and manufactured to provide unparalleled technical accuracy and performance for the most demanding applications. The information contained herein is offered for use by technically qualified personnel at their discretion and risk without warranty of any kind.

Preset Regulator with Pressure Gauge

Regulator Features

- → Single-stage 50 psig (345 kPa) preset delivery pressure
- → Internal reseating relief valve protects against overpressurization
- → Maximum inlet pressure 3000 psig (20700 kPa)
- → Sintered filter for additional safety and to extend regulator life
- → 2 in. diameter gauges
- → Standard DISS outlet connection
- → 6-year warranty

Specification

Gas	Part number	Flow range	Connector type
Carbon dioxide	WESM1-320-P	50 psig	CGA 320 nut and nipple
Medical air	WESM1-346-P	50 psig	CGA 346 nut and nipple
Nitrogen	WESM1-326-P	50 psig	CGA 326 nut and nipple
Nitrous oxide	WESM1-540-P	50 psig	CGA 540 nut and nipple

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Regulators for Medical Gases

Adjustable regulators with pressure gauge

Regulator Features

→ Single-stage adjustable delivery pressure to 100 psig (690 kPa)
→ Internal reseating relief valve protects against overpressurization
→ Maximum inlet pressure 3000 psig (20700 kPa)
→ Sintered filter for additional safety and to extend regulator life
→ 2 in. diameter gauges
→ Standard gas-specific DISS outlet connection
→ 6-year warranty

Specification

Gas	Part number	Flow range	Connector type
Carbon dioxide	WESM1-320-PG	0-100 psig	CGA 320 nut and nipple
	WESM1-940-PG	0-100 psig	CGA 940 yoke
Medical air	WESM1-346-PG	0-100 psig	CGA 346 nut and nipple
	WESM1-950-PG	0-100 psig	CGA 950 yoke
Nitrogen	WESM1-580-PG	0-100 psig	CGA 580 nut and nipple
	WESM1-960-PG	0-100 psig	CGA 960 yoke
Nitrous oxide	WESM1-326-PG	0-100 psig	CGA 326 nut and nipple
	WESM1-910-PG	0-100 psig	CGA 910 yoke
Oxygen	WESM1-540-PG	0-100 psig	CGA 540 nut and nipple
	WESM1-870-PG	0-100 psig	CGA 870 yoke

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Regulators for Oxygen Therapy

Compact click-style regulator, aluminum body

Regulator Features

- → Single-stage adjustable flow range
- → Click-in flow control
- → Maximum inlet pressure 3000 psig (20700 kPa)
- → Sintered filter for additional safety and to extend regulator life
- → 1-1/2 in. diameter contents gauge
- → Hose barb outlet
- → 2-year warranty

Specification

Gas	Part number	Flow range	Connector type
Oxygen	WESOPA-820	0.25 - 15 LPM	CGA 870 yoke
	WESOPA-810	1/64 - 2 LPM	CGA 870 yoke
	WESOPA-840	1/2 - 8 LPM	CGA 870 yoke
	WESOPA-850	0.25 - 25 LPM	CGA 870 yoke
	WESOPA-510	1/64 - 2 LPM	CGA 540
	WESOPA-520	1/4 - 15 LPM	CGA 540
	WESOPA-540	1/2 - 8 LPM	CGA 540

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Regulators for Medical Gas Mixtures

Gas mixtures adjustable gas mixture regulator for use with K, T and portable E size cylinders

Regulator Features

- → Single-stage with needle valve, adjustable delivery pressure to 50 psig (345 kPa)
- → Chrome-plated brass body with all brass, high-pressure chamber
- → Blood gas applications — adjusts to accurate bubble rate with needle valve
- → Dual-scale pressure gauge: psig and kPa
- → Hose barb fitting for included 1/8 in. ID hose
- → Sintered filter for additional safety and to extend regulator life
- → 2 in. diameter gauges
- → 6-year warranty

Specification

Gas	Part number	Delivery range	Connector type
Carbon dioxide and oxygen mixtures (CO_2 not over 7.0%)	WESM1-280-PGB	0-50 psig	CGA 280 nut and nipple
Carbon dioxide and oxygen mixtures (CO_2 over 7.0%)	WESM1-500-PGB	0-50 psig	CGA 500 nut and nipple
	WESM1-973-PGB	0-50 psig	CGA 973 yoke
Carbon dioxide, oxygen and nitrogen mixtures	WESM1-500-PGB	0-50 psig	CGA 500 nut and nipple
	WESM1-973-PGB	0-50 psig	CGA 973 yoke
Lung diffusion mixtures	WESM1-500-PGB	0-50 psig	CGA 500 nut and nipple
	WESM1-973-PGB	0-50 psig	CGA 973 yoke
Nitrogen and oxygen mixtures (O_2 over 23.5%)	WESM1-280-PGB	0-50 psig	CGA 280 nut and nipple
Nitrous oxide and oxygen mixtures (N_2O 47.5% to 52.5%)	WESM1-280-PGB	0-50 psig	CGA 280 nut and nipple
Nonflammable, noncorrosive diagnostic and medically related gas mixtures	WESM1-500-PGB	0-50 psig	CGA 500 nut and nipple
	WESM1-973-PGB	0-50 psig	CGA 973 yoke
Xenon and oxygen mixtures (O_2 over 20.0%)	WESM1-280-PGB	0-50 psig	CGA 280 nut and nipple

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Regulator for Helium/Oxygen Mixtures

Chrome Plated Brass Body

- → Single-stage adjustable flow range
- → 2 in. diameter gauges
- → PTFE seat
- → 1/4 in. hose barb outlet fitting
- → Chrome-plated brass bar stock body
- → Stainless steel diaphragm
- → Custom calibrated
- → Maximum inlet pressure 3000 psig (20700 kPa/210 BAR)
- → 10 micron sintered bronze filter

Specification

Gas	Part number	Delivery pressure	Connector type
Helium 70% USP / Oxygen 30% USP	CON305-9392-280	0-15 LPM	CGA 280 nut and nipple
	CON305-9392-890	0-15 LPM	CGA 890 yoke
Helium 80% USP / Oxygen 20% USP	CON305-9391-280	0-15 LPM	CGA 280 nut and nipple
	CON305-9391-890	0-15 LPM	CGA 890 yoke

Linde is proud to feature medical regulators manufactured by CONCOA Products. The information contained herein is offered for use by technically qualified personnel at their discretion and risk without warranty of any kind.

Regulator for Flammable, Anaerobic Gas Mixtures

Chrome-Plated Brass Body

- → Single-stage adjustable flow range
- → 2 in. diameter gauges
- → PTFE seat
- → Diaphragm valve 1/4 in. MPT outlet assembly
- → Chrome-plated brass bar stock body
- → Stainless steel diaphragm
- → Custom calibrated
- → Maximum inlet pressure 3000 psig / 20700 kPa
- → 10 micron sintered bronze filter

Specification

Gas	Part number	Delivery pressure	Connector type
Carbon dioxide, hydrogen and nitrogen mixtures (CO_2 not over 10%, H_2 not over 10%, balance N_2)	CON302-2331-350	0 - 50 psig	CGA 350 nut and nipple

Linde is proud to feature medical regulators manufactured by CONCOA Products. The information contained herein is offered for use by technically qualified personnel at their discretion and risk without warranty of any kind.

MRI-Compatible Medical Gases and Equipment

GRAB 'N GO® Vision | Oxygen (CGA 870) | Air (CGA 950) | Nitrous Oxide (CGA 910)

Everything in your Magnetic Resonance Imaging (MRI) room has to be carefully managed — including your medical gases and related equipment. Linde can help you with your MRI-related gas needs by providing specially prepared oxygen cylinders, carts and regulators. Even specially prepared medical nitrous oxide and medical air cylinders are available for MRI.

Specification

Part number	Description
ANT6105MRI	D/E style cylinder cart for MRI use
NMR-870-15FM	Medical oxygen regulator, 2-15 LPM, CGA 870, for MRI use
OX M-AEGNGVISION	GRAB 'N GO® AE alum. cylinder, oxygen (Regulator included)

Medical Oxygen, Air, and Nitrous Oxide Cylinders

Order AE size cylinders for medical-grade oxygen, air, and nitrous oxide. Aluminum cylinders are fitted with valves rated MRI conditional to 3 Tesla.

Oxygen Regulator

The regulator features adjustable flow rates for 0-15 LPM. It is fabricated from solid brass, and fitted with special gauges and accessories — for use in MRI environments.

Cylinder Carts

Convenient single and dual cylinder carts permit easy transport of cylinders from storage to the MRI room — and help protect the cylinder and regulator while in use.

GRAB 'N GO® Oxygen System

The Linde GRAB 'N GO® Oxygen System is certified MRI conditional to 3 Tesla, when located outside the MR bore. The system includes an integrated regulator, so there are no parts to assemble.

Hose Assemblies

- → Designed for gas distribution in centralized areas of hospitals, dental clinics and veterinary facilities
- → Available in many different styles and combinations made to customer specifications
- → All hoses are color coded and conductive
- → All hose assemblies are 100% tested under simulated field conditions
- → DISS Female connection available with a handtight style, color-coded knurled nut for easy tightening
- → DISS Male connection available with check valve
- → Oxygen, carbon dioxide, medical air and nitrous oxide assembled to a working pressure of 50 psig; nitrogen to 180 psig
- → All hoses are 1/4 inch ID, except vacuum which is 5/16 inch ID

Specifications

Gas	Part number	Length (ft.)	Description
Carbon dioxide	WESC4CO-600BLKBLK	50	Bulk hose
Medical air	WESC4AI-072FNNCHF	6	DISS F by chemetron F
	WESC4AI-072FNNOHF	6	DISS F by ohmeda F
	WESC4AI-120FNNCHF	10	DISS F by chemetron F
	WESC4AI-120FHTFHT	10	DISS F hand tight by DISS F hand tight
	WESC4AI-120FNNCHM	10	DISS F by chemetron M
	WESC4AI-120FHHOHM	10	DISS F by ohmeda M
	WESMH4-16C	300	Bulk hose
Nitrogen	WESC4NI-072FNNSHF	6	DISS F by schrader F
	WESC4NI-120FNNSHF	10	DISS F by schrader F
	WESC4NI-120MBASHF	10	DISS M by schrader F
	WESC4NI-120FNNMP4 (1/4 in. NPT male)	10	DISS F by 1/4 in. NPT
	WESMH4-12C	300	Bulk hose

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DISS Hand Tight Nut

Ohmeda-style Adapter

Chemetron-style Adapter

Specifications

Gas	Part number	Length (ft.)	Description
Nitrous oxide	WESC4N2-036FNNFNN	3	DISS F by DISS F
	WESC4N2-048FNNFNN	4	DISS F by DISS F
	WESC4N2-072FNNCHF	6	DISS F by chemetron F
	WESC4N2-072FNNOHF	6	DISS F by ohmeda F
	WESC4N2-120FNNFNN	10	DISS F by DISS F
	WESC4N2-120FNNOHF	10	DISS F by ohmeda F
	WESC4N2-120FNNOHM	10	DISS F by ohmeda M
	WESMH4-04C	300	Bulk hose
Oxygen	WESC4OX-036FNNFNN	3	DISS F by DISS F
	WESC4OX-048FNNFNN	4	DISS F by DISS F
	WESC4OX-072FNNOHF	6	DISS F by ohmeda F
	WESC4OX-072FNNCHF	6	DISS F by chemetron F
	WESC4OX-120FNNFNN	10	DISS F by DISS F
	WESC4OX-120FNNMBA	10	DISS F by DISS M
	WESC4OX-120FHTFHT (handtight both ends)	10	DISS F by DISS F, hand-tight nut and nipple
	C4OX-120FNNCHF	10	DISS F by chemetron F
	WESC4OX-120FNNOHM	10	DISS F by ohmeda M
	WESC4OX-600BLKBLK	50	Bulk hose
Vacuum	WESC5SU-072FNNOHF	6	DISS F by ohmeda F
	WESC5SU-072FNNCHF	6	DISS F by chemetron F
	WESC5SU-120FNNFNN	10	DISS F by DISS F
	WESC5SU-120FNNOHF	10	DISS F by ohmeda F
	WESC5SU-120MBACHM	10	DISS M by chemetron M
	WESMH5-22C (300 foot reel)	250	Bulk hose

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Cylinder Storage Cabinets

Three Reasons to Call Linde Today

→ Cylinder storage cabinets designed to help meet current NFPA 99 standards
→ Your Linde representative is available to provide free consultation to help with compliance issues
→ Product availability

When storing ME or K size cylinders (300-3,000 cubic feet), your facility must comply with NFPA 99 Standards for Health Care Facilities. Section 11.3.5.3 of the standard requires either 20 feet of separation from combustible material, 5 feet of separation with fire sprinklers or a lockable cabinet with a minimum half-hour fire rating. During recent inspections, TJC has made the storage of medical gases an area of its focus.

Storage cabinets from Linde make compliance easy. To help comply with NFPA99, maximize the utilization of available space at nursing stations and minimize the costs of remedial construction, hospitals and other healthcare facilities choose fire-lined cylinder storage cabinets from Linde. These insulated cabinets are available for safe and convenient storage of medical gas cylinders in either an upright or horizontal position. They are designed to accept the popular Linde GRAB 'N GO® cylinders, small cylinders with post-type valves and large K, H and T size cylinders.

Vertical Storage Cabinets

Part number	Description	Weight (lbs.)	Height (in.)	Width (in.)	Depth (in.)
SRLMG109FL	Manual door style cabinet for 9-12 ME, MD, GRAB 'N GO® cylinders	199	44	23	18
SRLMG309FL	Self-closing door style cabinet for 9-12 ME, MD, GRAB 'N GO cylinders	209	46	23	18
SRLMG121FL	Manual door style cabinet for 21-24 ME, MD, GRAB 'N GO cylinders	308	44	43	18
SRLMG321FL	Self-closing door style cabinet for 21-24 ME, MD, GRAB 'N GO cylinders	323	46	43	18
SRLMG106HFL	Manual door style cabinet for 6-9 S, K, T cylinders	436	65	34	34
SRLMG306HFL	Self-closing door style cabinet for 6-9 S, K, T cylinders	458	67	34	34
SRLMG109HFL	Manual door style cabinet for 9-12 S, K, T cylinders	520	65	43	34
SRLMG309HFL	Self-closing door style cabinet for 9-12 S, K, T cylinders	550	67	43	34

Horizontal Storage Cabinets

Part number	Description	Weight (lbs.)	Height (in.)	Width (in.)	Depth (in.)
ELSPA8FRS	Self-closing door style cabinet for 8 ME, MD, GRAB 'N GO cylinders	458	25	34	40
ELSPA12FR1	Manual door style cabinet for 12 ME, MD, GRAB 'N GO cylinders	541	32	34	40
ELSPA12FR1S	Self-closing door style cabinet for 12 ME, MD, GRAB 'N GO cylinders	567	34	34	40
ELSPA16FR1	Manual door style cabinet for 16 ME, MD, GRAB 'N GO cylinders	649	41	34	40
ELSPA16FR1S	Self-closing door style cabinets for 16 ME, MD, GRAB 'N GO cylinders	675	43	34	40
ELSPA20FR1	Manual door style cabinet for 20 ME, MD, GRAB 'N GO cylinders	762	50	34	40
ELSPA20FR1S	Self-closing door style cabinet for 20 ME, MD, GRAB 'N GO cylinders	788	52	34	40

Optional (specify when ordering)

Part Number	Description
CA18-31/34	Caster assembly, two rigid, two swivel, locking casters, adds 4 in. in height to cabinet
ELSCA18-SG	Caster assembly, two rigid, two swivel, locking casters, 30 lbs.

Accessories

Accessories for High-Pressure Cylinders


6105


6246


6124


6060


6400


LR50-SD


6120

D/E Cylinder Carts

Part number	Description	Weight (lbs.)	Height (in.)	Width (in.)	Depth (in.)
ANT6105	Single cyl. D & E cart / 6 in. wheels	7	41	12	10
ANT6205	Dual cyl. D & E cart	8	41	14	10
ANT6103-4	Single cyl. Cart / 4 casters	10	41	20	20
ANT6040-PC	4 cyl. D & E stand / plug-in casters	14	23	10.5	12.5
ANT6060-PC	6 cyl. D & E stand / plug-in casters	17	23	15	12.5
ANT6120-PC	12 cyl. D & E rack / plug-in casters	23	23	22	15
ANT6064	6 cyl. D & E cart / 2 wheels / 2 casters	33	42	18	15
ANT6124	12 cyl. D & E cart / 2 wheels / 2 casters	44	42	22	20
ANT6246	24 cyl D & E cart / 6 in. casters	75	45	21.5	31.5
ANT6406	40 cyl D & E cart / 6 in. casters	128	45	25.25	46.5
ANTLC25-4	25 cyl. D & E layered cart	105	47	27	32
ANTLC50-4	50 cyl. D & E layered cart	190	73	27	32

D/E Cylinder Racks and Stands

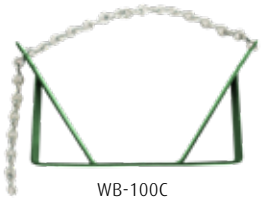
Part number	Description	Weight (lbs.)	Height (in.)	Width (in.)	Depth (in.)
ANT610CS	Single cyl. D & E stand	4	6	9	9
ANT6040	4 cyl. D & E stand	20	19.5	10.5	12
ANT6060	6 cyl. D & E stand	13	19.5	15	12
ANT6120	12 cyl. D & E rack	19	19.5	22	15
ANT6240	24 cyl. D & E stand	34	19.5	32	20
ANT6400	40 cyl. D & E stand	67	20	25	40
ANTLR25-SD	25 cyl. D & E rack / solid door	102	40	27	32
ANTLR50-SD	50 cyl. D & E rack / solid door	204	66	27	32

6110

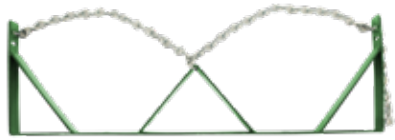
6114

6214

610F-E



WB-100C



WB-200C

High-Pressure Cylinder Carts and Stands

Part number	Description	Weight (lbs.)	Height (in.)	Width (in.)	Depth (in.)
ANT6110	Single cyl. cart / 10 in. solid wheels	23	48	15	14
ANT6114	Single cyl. cart / retractable back	30	46	15	14
ANT6210	Dual cyl. K, H & T cart / 10 in. solid wheels	31	48	25	14
ANT6214	Dual cyl. K, H & T cart / retractable back	41	46	25	14
ANT610F-E	Large single cyl. stand / adjustable band	14	12	18	18
ANT610FW-E	Large single cyl. cart / adjustable band	24	12	18	18
MCR-400	4 cyl. modular rack	41	30	29	21.5
MCR-600	6 cyl. modular rack	43	30	29	31.5
MCR-800	8 cyl. modular rack	55	30	29	41.5

High-Pressure Cylinder Brackets and Wall Mounts

Part number	Description	Weight (lbs.)	Height (in.)	Width (in.)	Depth (in.)
ANTWB-100C	Single cyl. wall bracket / chain	3	1.5	11	6
ANTWB-200C	Dual cyl. wall bracket / chain	5	1.5	22	7
ANTBM-100C	Single cyl. bench mount / chain	4	1.5	11	8
ANT610WM	Single cyl. standard small wall mount	4	14	5	5

Accessories for Cryogenic Containers

Cryo Gloves

- → Safety gloves for cryogenic use
- → Protects hands when handling cryogenic liquids
- → Elbow length available for extra protection

Cylinder Bases

Part number	Description
MVE9717119	Cryoglove, midarm, medium
MVE9717129	Cryoglove, midarm, large
MVE9717139	Cryoglove, midarm, extra large
MVE9717149	Cryoglove, elbow length, medium
MVE9717159	Cryoglove, elbow length, large
MVE9717169	Cryoglove, elbow length, extra large
MVE10464394	Cryo apron

Phase Separators

- → For dispensing liquid with less splashing
- → For use in non-pressurized environments

Phase Separators

Part number	Description
MVE10615869	Phase separator, 1-5/8 in. diameter, 4 in. long
MVE10615877	Phase separator, 1-5/16 in. diameter, 3 in. long
MVE10615885	Phase separator, 1-11/16 in. diameter, 1-1/2 in. long

Faceshields, Safety Glasses

- → For cryogenic use
- → Provides extra wrap around
- → Windows form a shield from dust and debris

Faceshields, Safety Glasses

Part number	Description
NREF300	Faceshield, lightweight
NREF400	Headgear with 4 in. crown ratchet
CRESS110	Clear safety glasses

Liquid Transfer Hoses

- → Close pitch stainless steel corrugated bore
- → Highly flexible for cryogenic applications
- → ISO 10380 certified for bend cycle life
- → 1160 psi working pressure
- → 6104 psi burst pressure
- → Custom lengths available on request

Liquid Transfer Hoses

Part number	Description
PRSUF21-IN3	Inert service, 3 ft., CGA295 each end
PRSUF21-IN6	Inert service, 6 ft., CGA295 each end
PRSUF21-OX3	Oxygen service, 3 ft., CGA440 each end
PRSUF21-OX6	Oxygen service, 6 ft., CGA440 each end

Cool Reach and Dippers

- → Designed for easy retrieval of samples
- → Dippers assist in transfer of liquid nitrogen

Cool Reach and Dippers

Part number	Description
MVE13051579	Cryoclaw
MVE9711589	Dipper, 18 in. handle, for 10 liter dewar
MVE9711619	Dipper, 19 in. handle, for 20 liter dewar
MVE9711679	Swivel dipper
MVE10668101	Lab 10 manual discharge device
MVE13464867	Lab 20 manual discharge device
MVE10668004	Lab 30 manual discharge device

Safety Information

Safety Guide

Compressed gas cylinders

Linde Healthcare Services

You will find Linde products and services to be a valuable addition to your business. When we first deliver product to your location, our representative briefs your staff on the operation of the cylinder system and provides important safety information. We strongly urge you to review this information and make it available to your employees. All members of your staff should read the cylinder labels and the Safety Data Sheets (SDS) for the products used at your location. Only persons trained in compressed gas safety should handle cylinders. Cylinders should never be used for any purpose other than their intended service. Please instruct your staff not to tamper with or attempt to adjust any of the system components.

If you encounter any difficulties with your gas supply, please contact your Linde representative. Compressed gases are available in cylinders of various sizes depending on your application requirements and product consumption. The cylinders are heavy and should be moved only on specially designed cylinder carts. When handling cylinders, always wear the personal protective equipment recommended in the product SDS.

Compressed Gases

Cylinder contents are under high pressure (typically over 2000 psi, 13790 kPa), so always use the appropriate pressure-regulating device for product withdrawal. A pressure-relief device protects the cylinders from overpressure.

Government regulations require that all compressed gas cylinders be secured when in storage or use. Your Linde representative can recommend a system for securing your cylinders. When a cylinder is not in use or is empty, make sure the valve is closed, and the protective cap or collar, if provided, is in place. To avoid potential exposure in the unlikely event of a system leak, store and use compressed gases only in well-ventilated areas. Immediately report any evidence of a system leak. Do not store oxidizing gases near oil, grease, or combustion materials.

Refer to the product SDS for additional important safety information.

A Manageable System

Compressed gas cylinders used in healthcare are manageable systems. Follow these tips to ensure that product is available when you need it:

- → Use separate storage areas for full and empty cylinders
- → Practice first-in, first-out use to avoid aging the inventory
- → Inspect cylinder for missing caps, tags, medical lot numbers, labels, and dust-cap
- → Do not use cylinders with evidence of physical damage, leaks, surface contamination, or tampering. Do not attempt any cylinder repairs; report the condition to Linde
- → Establish minimum and maximum inventory levels that reflect cylinder use and demand cycles
- → Use the "Full", "Empty," and "In Use" tags supplied with the medical gas cylinders
- → Restrict access to cylinder storage areas

Important Note

Many local ordinances regulate the storage and handling of compressed gas cylinders. Persons responsible for storing and handling cylinders should become familiar with all applicable regulatory requirements.

Cylinder Safety Rules

Cylinder Safety Do's

- → DO read the product SDS, caution labels, and equipment guides before use.
- → DO store and use compressed gas cylinders in a cool, dry, well-ventilated area.
- → DO keep cylinders upright and secure them against being knocked over.
- → DO use recommended carts or systems for moving cylinder.
- → DO keep cylinder valves closed and caps or protection devices in place when cylinders are not in use or are empty.

Cylinder Safety Don'ts

- → NEVER attempt to transfer gas from one container to another.
- → DO NOT lift a cylinder by its cap or valve.
- → DO NOT tamper with, deface, or alter cylinder markings or labels.
- → DO NOT inhale gas contents directly from cylinder (RxOnly).
- → DO NOT place cylinders where they might become part of an electrical circuit.
- → DO NOT use cylinders as rollers or supports.

Safety Guide

Compressed gas cylinders

Moving Cylinders and Containers

Cylinders and containers must always be moved carefully. Mishandling that results in a damaged valve or ruptured cylinder can expose personnel to the hazards associated with these gases. In addition, most gas cylinders are heavy and bulky. A cylinder striking someone or pinching a finger, toe, or other extremity is a common cause of injury. For these reasons, all cylinder handlers must always wear certain minimum personal protective equipment prescribed by OSHA.

→ Gloves to protect hands against common pinching injuries.
→ Safety glasses to protect eyes against injuries associated with pressure release
→ Safety shoes with metatarsal supports to protect against foot injuries from falling cylinders

Before moving the cylinder to the storage area or point of use or before returning the cylinder to the supplier, ensure the following:

→ The outlet valve is fully closed.
→ The outlet valve dust plug or pressure cap is on tight for cylinders equipped with these protection devices.
→ The valve protection cap is properly secured in place on cylinders with neck threads (where supplied). Note: Valve caps must always be in place while moving or transporting cylinders or when they are in storage.

While Moving Full or Empty Cylinders

→ Always use carts or hand trucks designed for this purpose.
→ Never drop cylinders or allow them to strike each other violently.
→ Never lift cylinders by the cap or with a lifting magnet.
→ After moving a cylinder to its point of use, secure the cylinder in place. Use cylinder stands, clamps, or other securing devices recommended by your supplier.

Storing Cylinders and Containers

Storage of compressed gas cylinders and cryogenic liquid cylinders is governed by codes of the National Fire Protection Association (NFPA). Local codes may also apply. Know and obey codes governing storage at your location.

Safe Practices

In general, store cylinders so they can't be easily toppled over. Remember, danger exists not only from accidental release of gas by cylinders damaged in a fall but also from their striking someone and causing injury. Store cylinders upright in compact groups, interlocking them so that each cylinder physically contacts those around it. Do not stand cylinders loosely or in a haphazard manner. A single cylinder that topples over can create a domino effect causing other cylinders to fall. Single cylinders should be secured in place or on a cylinder cart so they can't be easily knocked over. Keep stored cylinders out of high traffic areas. Do not store them near the edges of platforms. Avoid storage in areas where there are activities that could damage or contaminate the cylinders. Electric arc welding can destroy the integrity of cylinder metal if a welder carelessly strikes an arc on a cylinder. Overhead hoists can drip oil or grease on cylinders, contaminating them. Never store cylinders with flammable materials.

Opening and Closing Valves

Observing a few simple rules when opening and closing valves can prevent damage to valves and equipment and add years of useful service life to the valves. Linde supplies a new gasket/washer with each cylinder equipped with a post-style valve to ensure a gas-tight connection with the gas regulating device. The gasket provided is designed for single-use and must be discarded every time a regulator or cylinder is changed. When changing the regulator or cylinder in a post-style valve, remove the dust cover and never use more than one gasket to provide the gas-tight seal. Always refer to the manufacturer's instructions for attaching the regulator to the cylinder. The proper way to open any cylinder valve is to first "crack" the valve (open the cylinder valve momentarily and then close it), then open it slowly by turning the handle or stem counterclockwise. This allows equipment to gradually adjust to full pressure. Stop turning as soon as there is any resistance. Turning the valve handle or stem too far in the open position can jam the stem causing damage and leaks and preventing later closure. Likewise, overtightening when closing a valve can damage or permanently distort the seat and result in leakage.

Receiving Cylinders – External Inspection

Personnel responsible for receiving cylinders should perform an external inspection on all packages before moving them to the point of use or to the storage area. Basic guidelines for performing this inspection are as follows:

Read the cylinder labels to be sure that the gas is what you ordered and that you understand the hazards associated with the product. Remember, the label is the only means of identifying the product in the cylinder. Never identify the product by the color of the cylinder. A secondary check of contents may be made by using the CGA connection on the valve.

Check the TC/DOT cylinder markings to be sure you understand the pressures contained in the cylinders. Thoroughly inspect the cylinders for any obvious damage. The cylinder surface should be clean and free from defects such as cuts, gouges, burns and obvious dents. Such damage could weaken the cylinder metal, creating a danger of failure, or it could make the cylinder unstable and more likely to tip over. Make sure the cylinder stands steady on its base and does not wobble.

Cylinders with neck threads should have a cap in place over the valve. Remove the cap by hand. Never use a screwdriver, crowbar, or other leverage device to remove the cap. You could accidentally open the valve or damage it.

Check the cylinder valve to be sure it is not bent or damaged. A damaged valve could leak or fail, or it might not make a tight connection when the cylinder is placed into use. Make sure the valve is free from dirt and oil, which could contaminate the gas. Dirt particles propelled in a high velocity gas stream could cause a spark, igniting a flammable gas. Oil and grease can react with oxygen and other oxidizers, causing an explosion.

If any cylinder is received with missing or unreadable labels and markings; visible damage; an unstable base; a missing cap; or a bent, damaged, or dirty valve, do not use the cylinder. Contact your supplier and ask for instructions.

Testing for Leaks

After completing the external inspection, proceed as follows:

→ Test the cylinder valve for leaks using the leak test method approved by your employer. If you detect leakage, follow the employer's procedures for handling leaking cylinders. Note: It is normal for cryogenic liquid cylinders to vent through their relief valves to relieve excess pressure buildup due to heat leak. This venting is not a leak.
→ If no leak is detected, secure the cylinder valve cap in place before moving the cylinder to the point of use or to the storage area.

Technical Data

Safety data sheets are available on www.lindedirect.com.

Cylinder Valve Connections

Threaded outlet-type large cylinder valve.
For T, K, S, and Q style cylinders.

Post-type pin-indexed small cylinder valve.
For E and D style cylinders.

Linde follows the CGA V-1, CGA Standard for compressed gas cylinder valve outlet and inlet connections used on medical compressed gases.

The CGA has established a standard detailing dimensions for the manufacture of cylinder valve inlet and outlet connections, designed to minimize the possibility of misconnections. Although the main purpose in standardizing cylinder valves is to prevent non-compatible gas interconnection, relying on the valve outlet as the sole method of preventing such an interconnection is not advisable. The primary means of identifying cylinder contents must be by means of the chemical name or commercially accepted name, legibly indicated on the cylinder.

Post-Type Pin-Indexed Yoke Valves

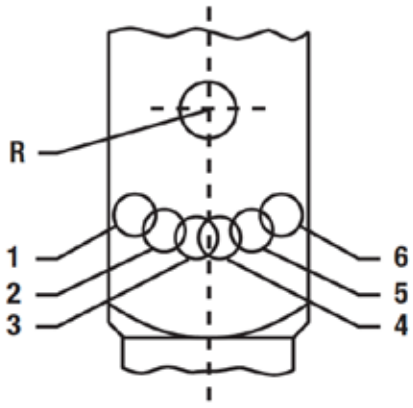
Post-type pin-indexed yoke valves for medical gases are designed such that pins in the yoke and corresponding mating holes in the valve body preclude unintended connections. Post-type pin-indexed valves require a yoke fitting that compresses a single washer against the flat valve face to ensure a gas-tight seal. The yoke is equipped with two pins (except CGA 965) that fit into corresponding recesses located on the valve face, minimizing the possibility for error since both parts must match to make an connection. Never remove pins from yoke fittings.

Linde supplies a new gasket/washer with each cylinder equipped with a post-type valve to ensure a gas-tight connection with the gas-regulating device.

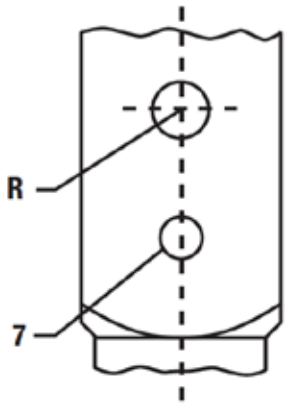
The gasket provided is designed for single-use and must be discarded every time a regulator or cylinder is changed. When changing the regulator or cylinder, remove the dust cover, “crack” the cylinder valve (open the cylinder valve momentarily and then close it), and never use more than one gasket to provide the gas-tight seal. Always refer to the manufacturer’s instructions for attaching the regulator to the cylinder.

Yoke-style valve

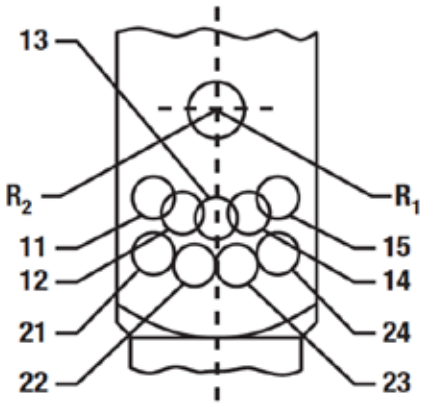
Pin-Index Hole Locations for Post-type Cylinder Valves



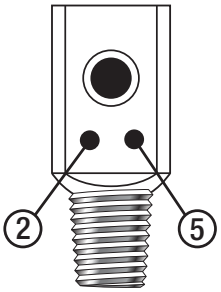
SINGLE ROW



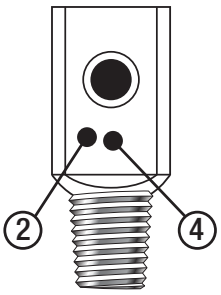
SINGLE PIN



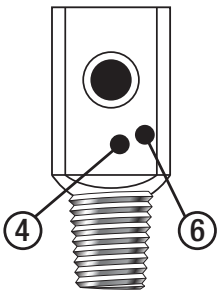
DOUBLE ROW



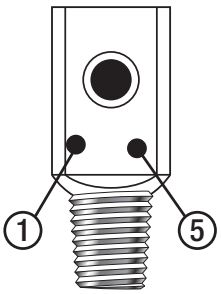
CGA Connection No. 870
Flush Outlet Yoke Connection
Oxygen



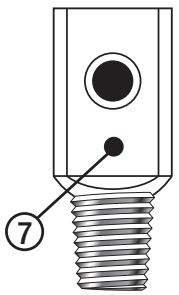
CGA Connection No. 890
Medical Cylinder Yoke Connection
Helium-Oxygen Mixtures (He ≤ 80.0%)
Xenon-Oxygen Mixtures (Xe ≤ 80.0%)
Oxygen-Nitrogen Mixtures (O_2 > 23.5%)



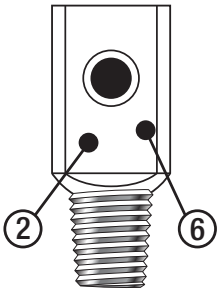
CGA Connection No. 930
Medical Cylinder Yoke Connection
Helium
Helium-Oxygen Mixtures (He > 80.0%)



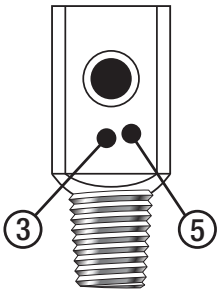
CGA Connection No. 950
Medical Cylinder Yoke Connection
Air



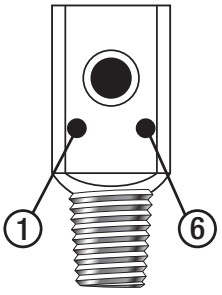
CGA Connection No. 965
Medical Cylinder Yoke Connection
Nitrous Oxide-Oxygen Mixtures
(N_2O 47.5 to 52.5%)



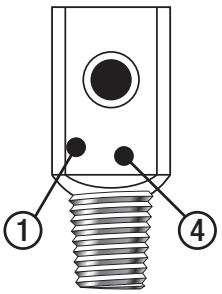
CGA Connection No. 880
Medical Cylinder Yoke Connection
Carbon Dioxide-Oxygen Mixtures
(CO_2 ≤ 7.0%)



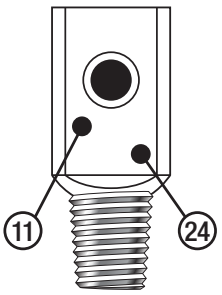
CGA Connection No. 910
Medical Cylinder Yoke Connection
Nitrous Oxide



CGA Connection No. 940
Medical Cylinder Yoke Connection
Carbon Dioxide
Carbon Dioxide-Oxygen Mixtures
(CO_2 > 7.0%)

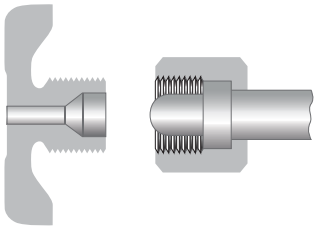


CGA Connection No. 960
Medical Cylinder Yoke Connection
Nitrogen



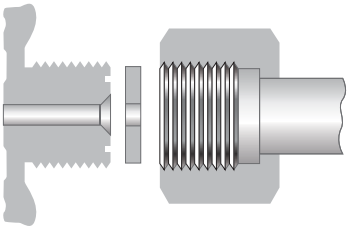
CGA Connection No. 973
Medical Cylinder Yoke Connection
Carbon Dioxide-Oxygen-Nitrogen Mixtures
Lung Diffusion Mixtures
Nonflammable, Noncorrosive Diagnostic and
Medically Related Gas Mixtures

Threaded Outlet-Type Valve with Handwheels



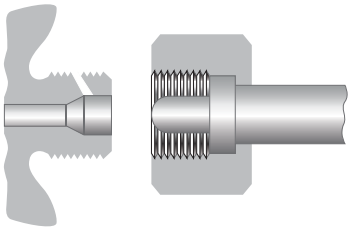
CGA CONNECTION NO. 280

CGA Connection No. 280
.745-14NGO-RH-EXT
Carbon Dioxide-Oxygen Mixtures (CO_2 ≤ 7.0%)
Oxygen-Nitrogen Mixtures (O_2 > 23.5%)
Oxygen-Nitrous Oxide Mixtures (N_2O 47.5 to 52.5%)
Helium-Oxygen Mixtures (He ≤ 80%)
Xenon-Oxygen Mixtures (Xe ≤ 80%)



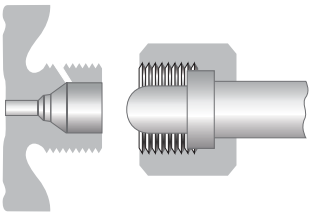
CGA CONNECTION NO. 320

CGA Connection No. 320
.825-14NGO-RH-EXT (Flat Nipple)
Carbon Dioxide



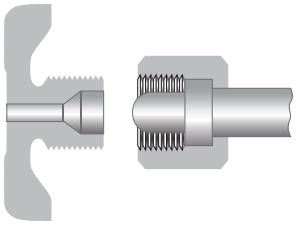
CGA CONNECTION NO. 326

CGA Connection No. 326
(Formerly 1320)
.825-14NGO-RH-EXT
(Small Round Nipple)
Nitrous Oxide



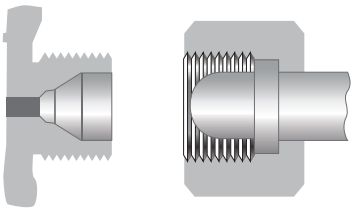
CGA CONNECTION NO. 346

CGA Connection No. 346
.825-14NGO-RH-EXT
(Large Round Nipple)
Air



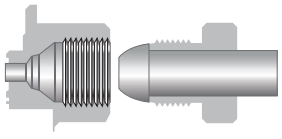
CGA CONNECTION NO. 500

CGA Connection No. 500
.885-14NGO-RH-INT (Bullet Nipple)
Carbon Dioxide-Oxygen Mixtures (CO_2> 7.0%)
Helium-Oxygen Mixtures (He > 80.0%)
Lung Diffusion Mixtures
Nonflammable, Non-corrosive Diagnostic and Medically Related Gas Mixtures



CGA CONNECTION NO. 540

CGA Connection No. 540
.903-14NGO-RH-EXT
Oxygen



CGA CONNECTION NO. 580

CGA Connection NO. 580
.965-14NGO-RH-INT
Helium
Nitrogen
Xenon

Cylinder Sizes and Color Chart

Medical Air,
USP Grade
CGA 346 and CGA 950 (E and D sizes only)

Carbon Dioxide (CO_2),
USP Grade
CGA 320 and CGA 940 (E and D sizes only)

Helium (He),
USP Grade
CGA 580 and CGA 930 (E and D sizes only)

Nitrogen (N_2),
NF Grade
CGA 580 and CGA 960 (E and D sizes only)

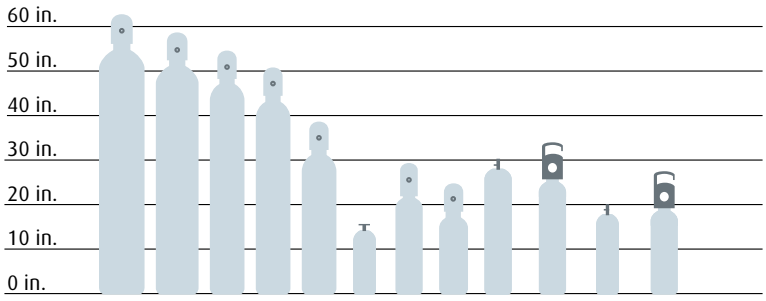
Nitrous Oxide (N_2O),
USP Grade
CGA 326 and CGA 910 (E and D sizes only)

Oxygen (O_2),
USP Grade
CGA 540 and CGA 870 (E and D sizes only)

Specialty Gas Mixtures
Various CGAs

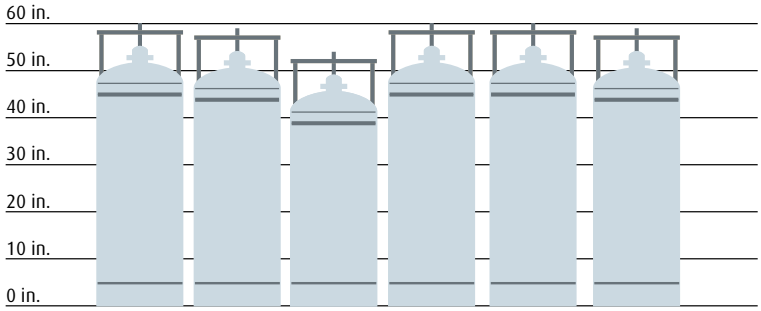
Caution:
Do not use cylinder color to identify gases. Always read labels to identify contents. CGA connection may be used as a secondary check of contents.

High-Pressure Cylinders



Cylinder Size	T	K	S	M/ DEY	Q	R	G	F	E/ ME	ME VIPR	D/ MD	MD VIPR
Size Code	430 230	430 230	430 230	430 230	410 210	410 210	410 210	410 210	410 210	411	410 210	411

Cryogenic Containers

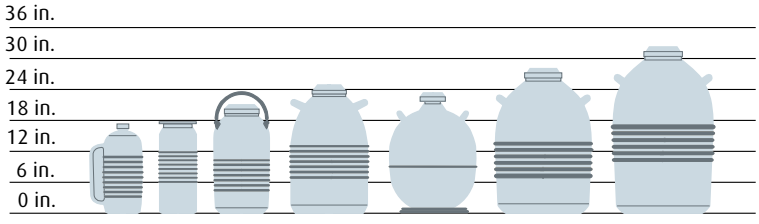


Cylinder Size	HP-180 (GP-55)	HP-160 (GP-55)	LS-160	CD-170	LS-180	XL-230/240
Size Code	471 271/274	471 271/274	471 271	471 271	471 271	472 272

Specification

Products	Gas (use)	Liquid
Nitrogen – Cryogenic Liquid	CGA 580	CGA 295
Oxygen – Cryogenic Liquid	CGA 540	CGA 440
Carbon Dioxide – Refrigerated Liquid	CGA 320	CGA 622
Nitrous Dioxide – Refrigerated Liquid	CGA 326	CGA 326

LD Series Dewars



Dewar Size	LD4	LD5	LD10	LD25	Classic 25	LD35	LD50

Appendix

NOxBOX®i Nitric Oxide Delivery System Indication

NOxBOX®i Nitric Oxide Delivery System

The NOxBOXi Nitric Oxide Delivery System is intended for use by healthcare professionals for the delivery and monitoring of a constant (user set) concentration of nitric oxide (NO) and the monitoring of NO_2 and O_2 in the inspiratory ventilator lines of a patient undergoing inhaled nitric oxide therapy (iNO).
The NOxBOXi Nitric Oxide Delivery System includes:

- → The NOxBOXi, head unit, which delivers NO gas while in the intelligent delivery mode.
- → Continuous monitoring and alarms for NO, O_2, and NO_2.
- → The integrated NOxMixer, which provides a backup NO delivery capability that is intended to deliver a continuous flow of NO, mixed with O_2, for iNO therapy and provides a continuous treatment option during transit and transfer conditions within hospitals.

The NOxBOXi Nitric Oxide Delivery System must only be used in accordance with the indications, contraindications, warnings, precautions, and other information and conditions of use described in the nitric oxide drug prescribing information and labeling (currently neonates). Refer to this material prior to use.

Important Delivery Device Considerations

Prior to use, health professionals at neonatal units that administer NOXIVENT® (nitric oxide) gas, for inhalation should be properly trained and familiar with the instructions for use of the NOxBOXi Nitric Oxide Delivery System. This product must be checked and calibrated in-line with the service schedule recommendations. A product found to be faulty must not be used. Any parts or accessories that are broken, damaged, missing, obviously worn, distorted, or contaminated should be replaced immediately. In the event of a product required repair or replacement, contact Linde customer service at (833) 669-8368 (NOXIVENT).

Only validated ventilator systems should be used in conjunction with NOXIVENT (nitric oxide) gas and the NOxBOXi delivery device. Refer to the Technical Guide for a full list of currently validated ventilators. Ensure that the NOxBOXi delivery device is kept plugged in at all times and keep available a backup battery power supply and an independent reserve nitric oxide delivery system to address power and system failures.

The NOxBOXi system is MR unsafe and should not used in the MRI suite. The NOxBOXi system is not intended for use in the vicinity of electrosurgical or diathermy devices.

To avoid serious injury, pay attention to all precautionary labels that are attached to the equipment, cylinders, containers, and boxes before startup. Do not remove or obscure any label.

The product user bears sole responsibility for any malfunction that results from improper use, faulty maintenance, improper repair, damage, or unauthorized alteration by any source not authorized to do so by Linde or NOxBOX Ltd.

NOXIVENT™ Prescribing Information

Highlights Of Prescribing Information

These highlights do not include all the information needed to use NOXIVENT™ safely and effectively. See full prescribing information for NOXIVENT™.
NOXIVENT™ (nitric oxide) gas, for inhalation
Initial U.S. Approval: 1999

Indications And Usage
Noxivent™ is a vasodilator indicated to improve oxygenation and reduce the need for extracorporeal membrane oxygenation in term and near-term (>34 weeks gestation) neonates with hypoxic respiratory failure associated with clinical or echocardiographic evidence of pulmonary hypertension in conjunction with ventilatory support and other appropriate agents.

Dosage And Administration
The recommended dose is 20 ppm, maintained for up to 14 days or until the underlying oxygen desaturation has resolved (2.1).
Doses greater than 20 ppm are not recommended (2.1, 5.2).
Administration:
Avoid abrupt discontinuation (2.2, 5.1).

Dosage Forms And Strengths
Noxivent™ (nitric oxide) is a gas available in 100 ppm and 800 ppm concentrations (3).

Contraindications
Neonates dependent on right-to-left shunting of blood (4).

Warnings and Precautions
Rebound: Abrupt discontinuation of Noxivent™ may lead to worsening oxygenation and increasing pulmonary artery pressure (5.1).

Methemoglobinemia: Methemoglobin increases with the dose of nitric oxide; following discontinuation or reduction of nitric oxide, methemoglobin levels return to baseline over a period of hours (5.2).

Elevated NO_2 Levels: Monitor NO_2 levels (5.3).
Heart Failure: In patients with pre-existing left ventricular dysfunction, NOXIVENT™ may increase pulmonary capillary wedge pressure leading to pulmonary edema (5.4).

Adverse Reactions
The most common adverse reaction is hypotension. (6).
To report SUSPECTED ADVERSE REACTIONS, contact Linde Inc. at 1-800-772-9247 and www.linde.com or FDA at 1-800-FDA-1088 or www.fda.gov/medwatch.

Drug Interactions
Nitric oxide donor compounds may increase the risk of developing methemoglobinemia (7).

Full Prescribing Information: Contents*

* Sections or subsections omitted from the full prescribing information are not listed.

Full Prescribing Information

1. Indications and usage
NOXIVENT is indicated to improve oxygenation and reduce the need for extracorporeal membrane oxygenation in term and near-term (>34 weeks gestation) neonates with hypoxic respiratory failure associated with clinical or echocardiographic evidence of pulmonary hypertension in conjunction with ventilatory support and other appropriate agents.

2. Dosage and administration

2.1 Dosage
Term and near-term neonates with hypoxic respiratory failure
The recommended dose of NOXIVENT is 20 ppm. Maintain treatment up to 14 days or until the underlying oxygen desaturation has resolved, and the neonate is ready to be weaned from NOXIVENT™ therapy.

Doses greater than 20 ppm are not recommended (see Warnings and Precautions [5.2]).

2.2 Administration
Nitric Oxide Delivery Systems
Nitric Oxide must be administered using a calibrated FDA-cleared Nitric Oxide Delivery System (NODS). There are various FDA-cleared NODS; refer to the NODS labeling to determine which NODS to use with this drug product and for needed information on training and technical support for users of this drug product with the NODS.
Do not use Noxivent with Inomax DSIR Plus and DSIR Plus MRI NODS.

Do not use Noxivent in the MRI suite.
Keep available a backup battery power supply and an independent reserve nitric oxide delivery system to address power and system failures.

Monitoring
Measure methemoglobin within 4-8 hours after initiation of treatment with NOXIVENT and periodically throughout treatment [see Warnings and Precautions (5.2)].
Monitor for PaO_2 and inspired NO_2 during Noxivent™ administration [see Warnings and Precautions (5.3)].

Weaning and Discontinuation
Avoid abrupt discontinuation of NOXIVENT (see Warnings and Precautions [5.1]).
To wean Noxivent™, downtitrate in several steps, pausing several hours at each step to monitor for hypoxemia.

3. Dosage forms and strengths
NOXIVENT (nitric oxide) gas is available in 100 ppm and 800 ppm concentrations.

4. Contraindications
NOXIVENT is contraindicated in neonates dependent on right-to-left shunting of blood.

5. Warnings and precautions

5.1 Rebound pulmonary hypertension syndrome following abrupt discontinuation
Wean from NOXIVENT (see Dosage and Administration [2.2]). Abrupt discontinuation of Noxivent may lead to worsening oxygenation and increasing pulmonary artery pressure, i.e., Rebound Pulmonary Hypertension Syndrome. Signs and symptoms of Rebound Pulmonary Hypertension Syndrome include hypoxemia, systemic hypotension, bradycardia, and decreased cardiac output. If Rebound Pulmonary Hypertension occurs, reinstate NOXIVENT therapy immediately.

5.2 Hypoxemia from methemoglobinemia
Nitric oxide combines with hemoglobin to form methemoglobin, which does not transport oxygen. Methemoglobin levels increase with the dose of NOXIVENT™; it can take 8 hours or more before steady-state methemoglobin levels are attained. Monitor methemoglobin and adjust the dose of NOXIVENT to optimize oxygenation.

If methemoglobin levels do not resolve with decrease in dose or discontinuation of NOXIVENT, additional therapy may be warranted to treat methemoglobinemia (see Overdosage [10]).

5.3 Airway injury from nitrogen dioxide
Nitrogen dioxide (NO_2) forms in gas mixtures containing NO and O_2.Nitrogen dioxide may cause airway inflammation and damage to lung tissues.

If there is an unexpected change in NO_2 concentration, or if the NO_2 concentration reaches 3 ppm when measured in the breathing circuit, then the delivery system should be assessed in accordance with the Nitric Oxide Delivery System O&M Manual troubleshooting section, and the NO_2 analyzer should be recalibrated. The dose of NOXIVENT™ and/or FiO_2 should be adjusted as appropriate.

5.4 Worsening heart failure
Patients with left ventricular dysfunction treated with NOXIVENT may experience pulmonary edema, increased pulmonary capillary wedge pressure, worsening of left ventricular dysfunction, systemic hypotension, bradycardia and cardiac arrest. Discontinue NOXIVENT while providing symptomatic care.

6. Adverse reactions
The following adverse reactions are discussed elsewhere in the label:
Hypoxemia (see Warnings and Precautions [5.2])
Worsening Heart Failure (see Warnings and Precautions [5.4])

6.1 Clinical trials experience
Because clinical trials are conducted under widely varying conditions, adverse reaction rates observed in the clinical trials of a drug cannot be directly compared to rates in the clinical trials of another drug and may not reflect the rates observed in practice. The adverse reaction information from the clinical studies does, however, provide a basis for identifying the adverse events that appear to be related to drug use and for approximating rates.

Controlled studies have included 325 patients on nitric oxide doses of 5 to 80 ppm and 251 patients on placebo. Total mortality in the pooled trials was 11% on placebo and 9% on nitric oxide, a result adequate to exclude nitric oxide mortality being more than 40% worse than placebo.

In both the Neonatal Inhaled Nitric Oxide Study (NINOS) and CINRGI studies, the duration of hospitalization was similar in nitric oxide and placebo-treated groups.

From all controlled studies, at least 6 months of follow-up is available for 278 patients who received nitric oxide and 212 patients who received placebo. Among these patients, there was no evidence of an adverse effect of treatment on the need for rehospitalization, special medical services, pulmonary disease, or neurological sequelae. In the NINOS study, treatment groups were similar with respect to the incidence and severity of intracranial hemorrhage, Grade IV hemorrhage, periventricular leukomalacia, cerebral infarction, seizures requiring anticonvulsant therapy, pulmonary hemorrhage, or gastrointestinal hemorrhage.

In CINRGI, the only adverse reaction (>2% higher incidence on nitric oxide than on placebo) was hypotension (14% vs. 11%).

6.2 Post-marketing experience
Post-marketing reports of accidental exposure to nitric oxide for inhalation in hospital staff has been associated with chest discomfort, dizziness, dry throat, dyspnea, and headache.

7. Drug interactions

7.1 Nitric oxide donor agents
Nitric oxide donor agents such as prilocaine, sodium nitroprusside and nitroglycerine may increase the risk of developing methemoglobinemia.

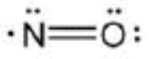
8. Use in specific populations

8.4 Pediatric use
The safety and efficacy of nitric oxide for inhalation has been demonstrated in term and near- term neonates with hypoxic respiratory failure associated with evidence of pulmonary hypertension (see Clinical Studies [14.1]). Additional studies conducted in premature neonates for the prevention of bronchopulmonary dysplasia have not demonstrated substantial evidence of efficacy (see Clinical Studies [14.3]). No information about its effectiveness in other age populations is available.

8.5 Geriatric use
Nitric oxide is not indicated for use in the adult population.

10. Overdosage
Overdosage with NOXIVENT is manifest by elevations in methemoglobin and pulmonary toxicities associated with inspired NO_2. Elevated NO_2 may cause acute lung injury. Elevations in methemoglobin reduce the oxygen delivery capacity of the circulation. In clinical studies, NO_2 levels >3 ppm or methemoglobin levels >7% were treated by reducing the dose of, or discontinuing, nitric oxide. Methemoglobinemia that does not resolve after reduction or discontinuation of therapy can be treated with intravenous vitamin C, intravenous methylene blue, or blood transfusion, based upon the clinical situation.

11. Description
NOXIVENT (nitric oxide gas) is a drug administered by inhalation. Nitric oxide, the active substance in NOXIVENT, is a pulmonary vasodilator. NOXIVENT is a gaseous blend of nitric oxide and nitrogen (0.08% and 99.92%, respectively for 800 ppm; 0.01% and 99.99%, respectively for 100 ppm). NOXIVENT is supplied in aluminum cylinders as a compressed gas under high pressure (2000 pounds per square inch gauge [psig]).
The structural formula of nitric oxide (NO) is shown below:



12. Clinical pharmacology

12.1 Mechanism of action
Nitric oxide relaxes vascular smooth muscle by binding to the heme moiety of cytosolic guanylate cyclase, activating guanylate cyclase and increasing intracellular levels of cyclic guanosine 3′,5′-monophosphate, which then leads to vasodilation. When inhaled, nitric oxide selectively dilates the pulmonary vasculature, and because of efficient scavenging by hemoglobin, has minimal effect on the systemic vasculature.

NOXIVENT appears to increase the partial pressure of arterial oxygen (PaO_2) by dilating pulmonary vessels in better ventilated areas of the lung, redistributing pulmonary blood flow away from lung regions with low ventilation/perfusion (V/Q) ratios toward regions with normal ratios.

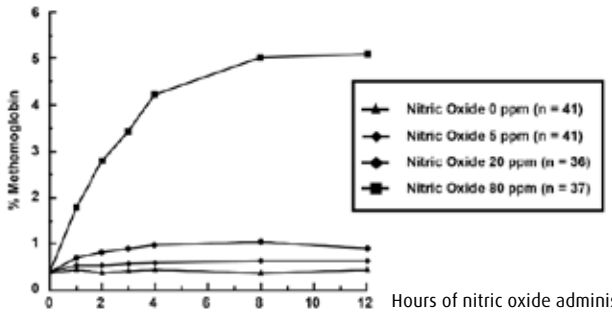
12.2 Pharmacodynamics
Effects on Pulmonary Vascular Tone in Persistent pulmonary hypertension (PPHN) of the newborn occurs as a primary developmental defect or as a condition secondary to other diseases such as meconium aspiration syndrome (MAS), pneumonia, sepsis, hyaline membrane disease, congenital diaphragmatic hernia (CDH), and pulmonary hypoplasia. In these states, pulmonary vascular resistance (PVR) is high, which results in hypoxemia secondary to right-to-left shunting of blood through the patent ductus arteriosus and foramen ovale. In neonates with PPHN, Noxivent™ improves oxygenation (as indicated by significant increases in PaO_2).

12.3 Pharmacokinetics
The pharmacokinetics of nitric oxide has been studied in adults.

Absorption and Distribution
Nitric oxide is absorbed systemically after inhalation. Most of it traverses the pulmonary capillary bed where it combines with hemoglobin that is 60% to 100% oxygen-saturated. At this level of oxygen saturation, nitric oxide combines predominantly with oxyhemoglobin to produce methemoglobin and nitrate. At low oxygen saturation, nitric oxide can combine with deoxyhemoglobin to transiently form nitrosylhemoglobin, which is converted to nitrogen oxides and methemoglobin upon exposure to oxygen. Within the pulmonary system, nitric oxide can combine with oxygen and water to produce nitrogen dioxide and nitrite, respectively, which interact with oxyhemoglobin to produce methemoglobin and nitrate. Thus, the end products of nitric oxide that enter the systemic circulation are predominantly methemoglobin and nitrate.

Metabolism
Methemoglobin disposition has been investigated as a function of time and nitric oxide exposure concentration in neonates with respiratory failure. The methemoglobin (MetHb) concentration-time profiles during the first 12 hours of exposure to 0, 5, 20, and 80 ppm nitric oxide are shown in Figure 1.

Figure 1: methemoglobin concentration-time profiles neonates inhaling 0, 5, 20, or 80 ppm nitric oxide



Methemoglobin concentrations increased during the first 8 hours of nitric oxide exposure. The mean methemoglobin level remained below 1% in the placebo

group and in the 5 ppm and 20 ppm nitric oxide groups but reached approximately 5% in the 80 ppm nitric oxide group. Methemoglobin levels >7% were attained only in patients receiving 80 ppm, where they comprised 35% of the group. The average time to reach peak methemoglobin was 10 ± 9 (SD) hours (median, 8 hours) in these 13 patients, but one patient did not exceed 7% until 40 hours.

Elimination
Nitrate has been identified as the predominant nitric oxide metabolite excreted in the urine, accounting for >70% of the nitric oxide dose inhaled. Nitrate is cleared from the plasma by the kidney at rates approaching the rate of glomerular filtration.

13. Nonclinical toxicology

13.1 Carcinogenesis, mutagenesis, impairment of fertility
No evidence of a carcinogenic effect was apparent, at inhalation exposures up to the recommended dose (20 ppm), in rats for 20 hr/day for up to two years. Higher exposures have not been investigated. Nitric oxide has demonstrated genotoxicity in Salmonella (Ames Test), human lymphocytes, and after in vivo exposure in rats. There are no animal or human studies to evaluate nitric oxide for effects on fertility.

14. Clinical studies

14.1 Treatment of hypoxic respiratory failure (HRF)
The efficacy of nitric oxide has been investigated in term and near-term newborns with hypoxic respiratory failure resulting from a variety of etiologies. Inhalation of nitric oxide reduces the oxygenation index (OI= mean airway pressure in cm H_2O × fraction of inspired oxygen concentration [FiO_2]x 100 divided by systemic arterial concentration in mm Hg [PaO_2]) and increases PaO_2 (see Clinical Pharmacology [12.1]).

NINOS Study
The Neonatal Inhaled Nitric Oxide Study (NINOS) was a double-blind, randomized, placebo-controlled, multicenter trial in 235 neonates with hypoxic respiratory failure. The objective of the study was to determine whether inhaled nitric oxide would reduce the occurrence of death and/or initiation of extracorporeal membrane oxygenation (ECMO) in a prospectively defined cohort of term or near-term neonates with hypoxic respiratory failure unresponsive to conventional therapy. Hypoxic respiratory failure was caused by meconium aspiration syndrome (MAS; 49%), pneumonia/sepsis (21%), idiopathic primary pulmonary hypertension of the newborn (PPHN; 17%), or respiratory distress syndrome (RDS; 11%). Infants ≤14 days of age (mean, 1.7 days) with a mean PaO_2 of 46 mm Hg and a mean oxygenation index (OI) of 43 cm H_2O / mm Hg were initially randomized to receive 100% O_2 with (n=114) or without (n=121) 20 ppm nitric oxide for up to 14 days. Response to study drug was defined as a change from baseline in PaO_2 30 minutes after starting treatment (full response = >20 mm Hg, partial = 10–20 mm Hg, no response = <10 mm Hg). Neonates with a less than full response were evaluated for a response to 80 ppm or control gas. The primary results from the NINOS study are presented in Table 1.

Table 1: Summary of Clinical Results from NINOS Study

	Control (n=121)	NO (n=114)	P value
Death or ECMO*,†	77 (64%)	52 (46%)	0.006
Death	20 (17%)	16 (14%)	0.60
ECMO	66 (55%)	44 (39%)	0.014

* Extracorporeal membrane oxygenation
† Death or need for ECMO was the study's primary end point

Although the incidence of death by 120 days of age was similar in both groups (NO, 14%; control, 17%), significantly fewer infants in the nitric oxide group required ECMO compared with controls (39% vs. 55%, p = 0.014). The combined incidence of death and/or initiation of ECMO showed a significant advantage for the nitric oxide treated group (46% vs. 64%, p = 0.006). The nitric oxide group also had significantly greater increases in PaO_2 and greater decreases in the OI and the alveolar-arterial oxygen gradient than the control group (p<0.001 for all parameters).

Significantly more patients had at least a partial response to the initial administration of study drug in the nitric oxide group (66%) than the control group (26%, p<0.001). Of the 125 infants who did not respond to 20 ppm nitric oxide or control, similar percentages of NO-treated (18%) and control (20%) patients had at least a partial response to 80 ppm nitric oxide for inhalation or control drug, suggesting a lack of additional benefit for the higher dose of nitric oxide. No infant had study drug discontinued for toxicity. Inhaled nitric oxide had no detectable effect on mortality. The adverse events collected in the NINOS trial occurred at similar incidence rates in both treatment groups (see Adverse Reactions [6.1]). Follow-up exams were performed at 18–24 months for the infants enrolled in this trial. In the infants with available follow-up, the two treatment groups were similar with respect to their mental, motor, audiologic, or neurologic evaluations.

CINRGI Study
This study was a double-blind, randomized, placebo-controlled, multicenter trial of 186 term and near-term neonates with pulmonary hypertension and hypoxic respiratory failure. The primary objective of the study was to determine whether nitric oxide would reduce the receipt of ECMO in these patients. Hypoxic respiratory failure was caused by MAS (35%), idiopathic PPHN (30%), pneumonia/sepsis (24%), or RDS (8%). Patients with a mean PaO_2 of 54 mm Hg and a mean OI of 44 cm H_2O/ mm Hg were randomly assigned to receive either 20 ppm nitric oxide (n=97) or nitrogen gas (placebo; n=89) in addition to their ventilatory support. Patients who exhibited a PaO_2 >60 mm Hg and a pH < 7.55 were weaned to 5 ppm nitric oxide or placebo. The primary results from the CINRGI study are presented in Table 2.

Table 2: Summary of Clinical Results from CINRGI Study

	Placebo	Nitric oxide	P value
Death or ECMO*,†	51/89 (57%)	30/97 (31%)	<0.001
EC Death MO	5/89 (6%)	3/97 (3%)	0.48

* Extracorporeal membrane oxygenation
† ECMO was the primary end point of this study

Significantly fewer neonates in the nitric oxide group required ECMO compared to the control group (31% vs. 57%, p<0.001). While the number of deaths were similar in both groups (nitric oxide, 3%; placebo, 6%), the combined incidence of death and/or receipt of ECMO was decreased in the nitric oxide group (33% vs. 58%, p<0.001). In addition, the nitric oxide group had significantly improved oxygenation as measured by PaO_2, OI, and alveolar-arterial gradient (p<0.001 for all parameters). Of the 97 patients treated with nitric oxide, 2 (2%) were withdrawn from study drug due to methemoglobin levels >4%. The frequency and number of adverse events reported were similar in the two study groups (see Adverse Reactions [6.1]).

In clinical trials, reduction in the need for ECMO has not been demonstrated with the use of inhaled nitric oxide in neonates with congenital diaphragmatic hernia (CDH).

14.2 Ineffective in adult respiratory distress syndrome (ARDS)
In a randomized, double-blind, parallel, multicenter study, 385 patients with adult respiratory distress syndrome (ARDS) associated with pneumonia (46%), surgery (33%), multiple trauma (26%), aspiration (23%), pulmonary contusion (18%), and other causes, with PaO2/FiO2 <250 mm Hg despite optimal oxygenation and ventilation, received placebo (n=193) or nitric oxide (n=192), 5 ppm, for 4 hours to 28 days or until weaned because of improvements in oxygenation. Despite acute improvements in oxygenation, there was no effect of nitric oxide on the primary endpoint of days alive and off ventilator support. These results were consistent with outcome data from a smaller dose ranging study of nitric oxide (1.25 to 80 ppm). Noxivent™ is not indicated for use in ARDS.

14.3 Ineffective in prevention of bronchopulmonary dysplasia (BPD)
The safety and efficacy of nitric oxide for the prevention of chronic lung disease (bronchopulmonary dysplasia, [BPD]) in neonates ≤ 34 weeks gestational age requiring respiratory support has been studied in four large, multi-center, double-blind, placebo-controlled clinical trials in a total of 2,600 preterm infants. Of these, 1,290 received placebo, and 1,310 received inhaled nitric oxide at doses ranging from 5-20 ppm, for treatment periods of 7-24 days duration. The primary endpoint for these studies was alive and without BPD at 36 weeks postmenstrual age (PMA). The need for supplemental oxygen at 36 weeks PMA served as a surrogate endpoint for the presence of BPD. Overall, efficacy for the prevention of bronchopulmonary dysplasia in preterm infants was not established. There were no meaningful differences between treatment groups with regard to overall deaths, methemoglobin levels, or adverse events commonly observed in premature infants, including intraventricular hemorrhage, patent ductus arteriosus, pulmonary hemorrhage, and retinopathy of prematurity.

The use of nitric oxide for prevention of BPD in preterm neonates ≤ 34 weeks gestational age is not recommended.

16. How Supplied/Storage And Handling
Noxivent™ (nitric oxide) is available in the following sizes:
Size AD: Portable aluminum cylinders containing 362 liters at STP of nitric oxide gas in 800 ppm concentration in nitrogen (delivered volume 323 liters) (NDC 59579-102-02)
Size AQ: Aluminum cylinders containing 2154 liters at STP of nitric oxide gas in 800 ppm concentration in nitrogen (delivered volume 2082 liters) (NDC 59579-102-01)
Size AD: Portable aluminum cylinders containing 362 liters at STP of nitric oxide gas in 100 ppm concentration in nitrogen (delivered volume 323 liters) (NDC 59579-101-02)
Size AQ: Aluminum cylinders containing 2154 liters at STP of nitric oxide gas in 100 ppm concentration in nitrogen (delivered volume 2082 liters) (NDC 59579-101-01)

Store at 25°C (77°F) with excursions permitted between 15-30°C (59-86°F) (see USP Controlled Room Temperature).

All regulations concerning handling of pressure vessels must be followed.

Protect the cylinders from shocks, falls, oxidizing and flammable materials, moisture, and sources of heat or ignition.

Use of Noxivent cylinders in the MRI suite may create a projectile hazard.

Occupational Exposure
The exposure limit set by the Occupational Safety and Health Administration (OSHA) for nitric oxide is 25 ppm, and for NO_2 the limit is 5 ppm.

MDI-7003 (Rev. 02)

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Living Healthcare