

Gas Delivery

Hydrogen Generators

domnick hunter Nitrox UHP Hydrogen Generators

domnick hunter hydrogen generators are a safe and economic alternative to high pressure gas cylinders. These generators deliver a continuous stream of 99.99999% pure hydrogen, suitable for use with any laboratory instrument requiring a supply of ultra high purity hydrogen, and ideal for carrier gas and fuel gas applications. domnick hunter hydrogen generators use a proprietary ion exchange membrane to produce ultra-high-purity hydrogen from laboratory grade deionized water, totally eliminating the need for caustic solution.

These generators are designed for total safety and highly reliable operation. Hydrogen is generated only on demand, at low pressure, and minimal volume is stored within the unit. A unique digital display gives system status and diagnostic capabilities not available on any other competitive hydrogen generator.

Two year parts and labor warranty from domnick hunter.



DESCRIPTION	CAT. NO.	PRICE
Nitrox UHP Model 20 ¹	27748-U	
Nitrox UHP Model 40 ¹	27749-U	
Nitrox UHP Model 60 ¹	27750-U	
Replacement Parts		
Deionizer Bags (pk. of 2)	27768-U	
Desiccant Cartridge	27769-U	

¹ CE approved.

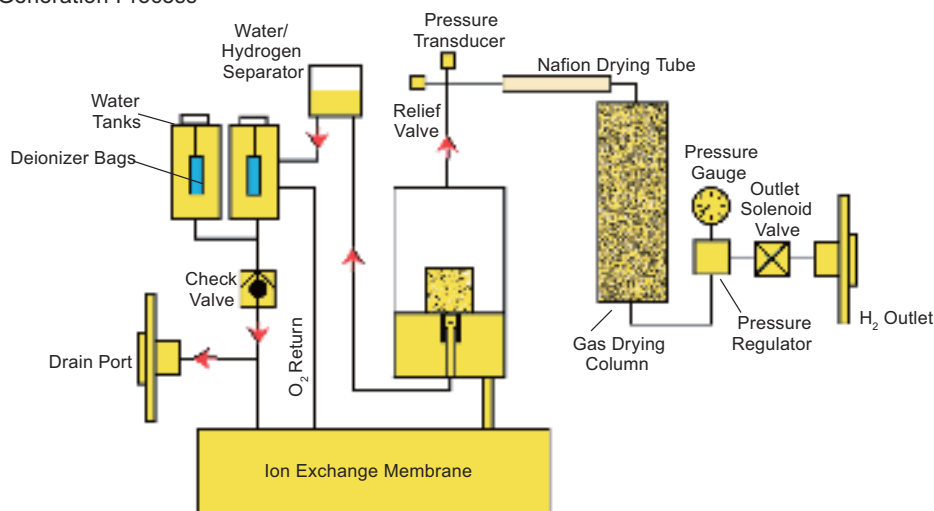
FEATURES

- 99.99999% pure hydrogen
- Remote start/stop and remote alarm
- Automatic leak detection
- Low water detection (audible alarm)
- Poor water quality detection (audible alarm)
- Integrated microprocessor control
- Meet CE, CSA, UL requirements

SPECIFICATIONS

Product Purity:	99.99999% pure hydrogen gas
Input Water Quantity:	deionized, >1 megohm per cm
Reservoir Capacity:	4 liters
Output Flow (cc/min):	Model 20: 160 Model 40: 250 Model 60: 500
Delivery Pressure:	0.1-90 psig
Outlet:	1/8" Swagelok
Power Requirements:	90-264VAC, 47-63 Hz (self-switching)
Dimensions:	27 x 14 x 14" (69 x 36 x 36cm)
Weight Dry:	78 lbs/35kg

Hydrogen Generation Process



G001205

Gas Delivery Hydrogen Generators



Indicating Drying Cartridge for Parker ChromGas Hydrogen Generators (1 1/2" OD x 8 7/38mm x 20.3cm)



Parker ChromGas 9000-Series Hydrogen Generators

Generate high-purity hydrogen, reliably and with complete safety.

Regulated low pressure (2-100psig) No caustic solutions

Minimal maintenance— Long-life solid polymer electrolyte

- CE approved
- UL listed
- CSA listed
- IEC 1010 certified
- Satisfies OSHA and NFPA requirements

Parker ChromGas hydrogen generators eliminate the hazards of high pressure cylinders and the dangers of alkaline electrolyte solutions.

Exclusive SPE Electrolyzer

The heart of every Parker ChromGas hydrogen generator is a proprietary SPE Electrolyzer cell. SPE Electrolyzers use a solid polymer electrolyte in the electrolyzing process, rather than a liquid electrolyte, eliminating the need for toxic liquids. The SPE technology has been refined to generate 99.9999+% pure hydrogen, using only deionized water. Contaminants are traces of nitrogen and methane.

Proven in more than 15,000 GC systems worldwide, SPE Electrolyzers also are extensively used in US Navy submarines and NASA supplemental fuel systems. This reliable, high quality hydrogen generation technology is being evaluated for fueling the Ultra Low Emission Vehicles and Zero Emission Vehicles (ULEV/ZEV) of the future.

Most important, these are the **ONLY** hydrogen generators certified for laboratory use by CSA, UL, and IEC 1010.

SPECIFICATIONS

Product Purity:	99.9999+% pure ³ hydrogen gas
Reservoir Capacity:	4 liters
Flow Range:	Model 9090: 0-90
(cc/min, STP)	Model 9150: 0-160
	Model 9200: 0-250
	Model 9400: 0-500
	Model 9800: 0-1200
Delivery Pressure:	0-90 psig; 0-100 psig for Model 9800
Outlet:	1/8" Compression Fitting
Power Requirements:	110VAC or 220VAC
Dimensions:	15 x 13 x 17" (H x W x D) ⁴ (37 x 33 x 44cm)
Weight Dry:	40lbs/18.1kg

MAINTENANCE REQUIREMENTS

Water Reservoir:	Refill as needed with deionized water (500,000 ohm/cm minimum)
Deionizer Bag:	Replace every 6 months, or whenever Change Water indicator is on
Desiccant Cartridge:	Recharge (dry) or replace when cartridge turns pink

One-Year Parts and Labor Warranty from Parker ChromGas

Parker ChromGas's in-house service specialists and worldwide service organization are equipped to handle any situation a ChromGas Series 9000 user might encounter.

DESCRIPTION	CAT. NO.	PRICE
Model 9090 ¹ , 110V ⁵	27773-U	
Model 9150 ¹ , 110V ⁵	27620-U	
Model 9200 ¹ , 110V ⁵	22751	
Model 9400 ¹ , 110V ⁵	22801	
Model 9800 ¹ , 110V ⁵	22835	
Replacement Parts		
Indicating Drying Cartridge ²	22837	
Deionizer Pack (box of 2)	22963	

¹ CE approved.

² Replaces desiccant cartridge discontinued by manufacturer.

³ 99.99997% pure for Model 9800.

⁴ 14.75 x 13 x 14" (37 x 33 x 36cm) for Model 9000.

⁵ When ordering, request 220V to receive 220V adapter with unit.

Gas Delivery

Pure Air Generators

domnick hunter Pure Air Generators

In Nitrox Pure Air Generators, a high performance desiccant removes moisture from compressed air. Two desiccant beds alternate between purification and regeneration modes, ensuring continuous operation to specified purity levels. High efficiency pre-desiccant and post-desiccant filtration ensures total air quality.

SPECIFICATIONS

Air Input Required:	Model 070: 85L/min Model 140: 171L/min Model 300: 366L/min
Min/Max Inlet Pressure:	4bar/60psig / 10.5bar/152psig
Air Output :	Model 070: 70L/min Model 140: 140L/min Model 300: 300L/min
(7bar/100psig inlet pressure)	
Output Air Quality	ISO 8573.1 Class 1.2.1 Dirt, Water, Oil
Dewpoint at 7bar:	-40°C (-40°F)
Non-Methane Hydrocarbons:	<0.01ppm
Connections:	1/4" BSP
Power Requirements:	110VAC, 50-60 Hz
Dimensions:	Model 070: 15 x 12 x 4" (38 x 31 x 10cm) Model 140: 18 x 12 x 4" (46 x 31 x 10cm) Model 300: 28 x 12 x 4" (71 x 31 x 10cm) (L x W x D)
Weight :	Model 070: 18lbs/8kg Model 140: 22lbs/10kg Model 300: 27lbs/12kg



27752-U

DESCRIPTION	CAT. NO.	PRICE
Model 070 ¹ , 110 volt	27751-U	
Model 140 ¹ , 110 volt	27752-U	
Model 300 ¹ , 110 volt	27753-U	
Model 070 ¹ , 220 volt	28351-U	
Model 140 ¹ , 220 volt	28352-U	
Model 300 ¹ , 220 volt	28353-U	
8000 Hour Service Kit (all models)	27771-U	

¹ CE approved.

Important Note: These units do not remove methane. Methane-free air requires a zero air generator.

Two year parts and labor warranty from domnick hunter.

Gas Delivery Pure Air Generators

domnick hunter CO₂-Removing Pure Air Generators

In Nitrox CO₂-removing purifiers, activated alumina removes both moisture and carbon dioxide. Two adsorbent beds alternate between purification and regeneration modes, ensuring continuous operation to specified purity levels. High efficiency pre-desiccant and post-desiccant filtration ensures total air quality. Model 015 CO₂ Removal Purifier can be used for TOC applications, Models 140, 280, and 850 are suitable for FTIR.

SPECIFICATIONS

Air Input Required:	Model 015: 4.0L/min Model 140: 26L/min Model 280: 51L/min Model 850: 155L/min
Min/Max Inlet Pressure:	4bar/60psig / 10.5bar/152psig
Air Output:	Model 015: 1.5L/min (7bar/100psig inlet pressure)
	Model 140: 14L/min Model 280: 28L/min Model 850: 85L/min
Output CO ₂ :	<1ppm
Non-Methane Hydrocarbons:	<0.003ppm
Particles:	<0.01µm
Dewpoint at 7bar:	-70°C (-100°F)
Connections:	1/4" BSP
Power Requirements:	110VAC, 50-60 Hz
Dimensions:	Model 015: 15 x 12 x 4" (38 x 31 x 10cm) Model 140: 18 x 12 x 4" (46 x 31 x 10cm) Model 280: 28 x 12 x 4" (71 x 31 x 10cm) Model 850: 40 x 17 x 6" (102 x 42 x 15cm) (L x W x D)
Weight:	Model 015: 18lbs/8kg Model 140: 22lbs/10kg Model 280: 27lbs/12kg Model 850: 80lbs/36kg



APPLICATIONS

- FTIR purge
- NMR
- Laser purging
- Rheometer supply

DESCRIPTION	CAT. NO.	PRICE
Model 015 ¹ , 110 volt	27754-U	
Model 140 ¹ , 110 volt	27755-U	
Model 280 ¹ , 110 volt	27756-U	
Model 850 ¹ , 110 volt	27757-U	
Model 015 ¹ , 220 volt	28354-U	
Model 140 ¹ , 220 volt	28355-U	
Model 280 ¹ , 220 volt	28356-U	
Model 850 ¹ , 220 volt	28357-U	
8000 Hour Service Kit for Models 015, 140, 280	27772-U	
8000 Hour Service Kit for Model 850	27771-U	

¹ CE approved.

Important Note: These units do not remove methane. Methane-free air requires a zero air generator.

Two year parts and labor warranty from domnick hunter.

Order: 1.800.325.3010 Technical Service: 1.800.359.3041 Web: www.sigma-aldrich.com/supelco

Gas
Chromatography

SUPELCO

Gas Delivery

Zero Air Generators

27759-U



domnick hunter
Zero Air Generators

- Low power usage
- Easy to wall mount

Nitrox Zero Air Generators employ a catalytic oxidation system to produce a continuous supply of air that is virtually free of hydrocarbons, including methane. After incoming compressed air is filtered to remove oil, water, and particles, it is passed over a heated platinum catalyst that converts methane and oxygen in the air to carbon dioxide and water. If the hydrocarbon content of the input air is less than 10ppm (as methane), the residual hydrocarbon concentration (as methane) is less than 0.1ppm. A high efficiency 0.01 micron filter downstream of the catalyst ensures further removal of particles from the product stream.

SPECIFICATIONS

Min/Max Inlet Pressure:	1.5bar/20psig / 8.5bar/125psig
Max Input Hydrocarbons:	10ppm (as methane)
Air Output:	Model 10: 1000cc/min Model 35: 3500cc/min
Output Hydrocarbons:	<0.1ppm (as methane)
Particles:	<0.01µm
Connections:	1/4" Swagelok
Power Requirements:	110VAC, 50-60 Hz, 100W
Dimensions:	12 x 9 x 17" (H x W x D) (31 x 23 x 43cm)
Weight:	19lbs/8.5kg

DESCRIPTION	CAT. NO.	PRICE
Model 10 ¹ , 110 volt	27758-U	
Model 35 ¹ , 110 volt	27759-U	
Model 10 ¹ , 220 volt	28358-U	
Model 35 ¹ , 220 volt	28359-U	
Filter Element, Inlet (8000 hours)	27774-U	
Filter Element, Outlet (8000 hours)	27775-U	

¹ CE approved.

Two year parts and labor warranty from domnick hunter.



Supelpure-HC Trap

If halocarbons or sulfur-containing compounds might be present in the source air, we recommend using a Supelpure-HC trap to avoid contaminating the catalyst in your zero air generator. Supelpure-HC traps contain activated charcoal (120cc) that adsorbs hydrocarbons and other contaminants from air, carrier gases, and hydrogen. The trap operates efficiently for approximately six months when total hydrocarbons in the incoming gas average 10ppm. Dimensions: 1 3/8" OD x 11 1/8" long, with fittings (35mm x 28.2cm).

DESCRIPTION	CAT. NO.	PRICE
1/8" fittings	22445-U	
1/4" fittings	22446	
Replacement charcoal, 400cc	22451	

Gas Delivery Zero Air Generators



Parker ChromGas Zero Air Generators

A hazard-free alternative to pressurized gas cylinders, require only house compressed air and a standard electrical outlet to produce ultra-high purity air. Reduce total hydrocarbons to less than 0.1ppm, stabilizing baselines and improving detection. Eliminate the need for cumbersome gas cylinders and expensive safety cabinets.

- CE approved
- UL listed
- CSA listed
- IEC 1010 certified

We recommend using a zero air generator with flame ionization detectors. The resulting noise reduction and improved baseline stability allow lower detection limits, increasing the sensitivity of your analyses.

These Parker ChromGas zero air generators produce ultra-high purity (UHP) air from a standard compressed air supply – at continuous flow rates up to 3500cc/min, at pressures up to 125psig, with less than 0.1ppm total hydrocarbons.

The Parker ChromGas system consists of three stages: a 0.5µm coalescing inlet filter removes particles, oil, and water; a heated catalyst removes hydrocarbons; and a 0.01µm cellulose fiber outlet filter removes residual particulate material from the product air stream. Maintenance is minimal – just clean the inlet and outlet filters every 6 months and change them every 2 years.

SPECIFICATIONS

Product Purity:	< 0.1ppm total hydrocarbons (as methane)
Inlet Air Pressure:	2-125psig
Delivery Pressure:	125psig
Outlet:	1/8" Compression Fitting
Pressure Drop at Max. Flow Rate:	5psig
Flow Rate Pressure:	
Stabilization Time:	<2 minutes
Max. Air Flow Rate:	Models 1000, 1001 1000cc/min (serves 2-3 FIDs) Models 3500, 3501 3500cc/min (serves 10-12 FIDs)
Dimensions:	Models 1000, 1001 9.75 x 5.75 x 12" (25 x 14.7 x 30.8cm) (H x W x D) Models 3500, 3501 12 x 6.75 x 15" (29.2 x 17.8 x 39.4cm)
Weight:	Models 1000, 1001 11lbs (5kg) Models 3500, 3501 20lbs/9.1kg

ELECTRICAL REQUIREMENTS

Models 1000, 3500 (110 VAC)	100-125VAC, 60Hz, 100W, 1.0A (1.5A fuse)
Models 1001, 3500 (220VAC)	200-250VAC, 50 Hz, 100W, 0.5A (0.8A fuse)

DESCRIPTION	CAT. NO.	PRICE
Model 1000 (110VAC) ¹	22824	
Model 3500 (110VAC) ¹	27625-U	
Model 1001 (220VAC) ¹	22830-U	
Model 3501 (220VAC) ¹	27626-U	
Replacement Filters		
Models 1000, 1001 ² inlet and outlet	22817	
Models 1000, 1001 ² inlet and outlet	27629-U	
Models 2500, 2501 ² outlet	22817	
Models 2500, 2501 ² , 3500, 3501 inlet	27627-U	
outlet	27629-U	

¹ CE approved.

² Serial no. up to 407840.

One-Year Parts and Labor Warranty from Parker ChromGas.

Gas Delivery

Nitrogen Generators

domnick hunter High-Purity Nitrogen Generators

These Nitrox nitrogen generators employ pressure swing adsorption technology to produce a continuous supply of high-purity nitrogen. An integral oil-free air compressor delivers filtered compressed air (7bar/101psig) to a bed of carbon molecular sieve, which selectively removes oxygen, water vapor, carbon dioxide, and hydrocarbons. The adsorbent bed alternates between purification and regeneration modes, ensuring product nitrogen meets specified purity levels. A storage reservoir ensures a continuous supply of nitrogen. For units without an air compressor, please inquire.

SPECIFICATIONS

Nitrogen Output:	Model 0751: 750cc/min Model 1501: 1500cc/min Model 3001: 3000cc/min
Output Pressure:	5bar/73psig
Output Oxygen:	<10ppm
Connections:	1/4" Swagelok or 1/8" Swagelok (Model 0751)
Power Requirements:	110VAC, 50-60 Hz, 250W (Model 0751) or 300W
Dimensions:	Model 0751: 33 x 14 x 14 1/4" (84 x 36 x 36cm) Model 1501: 33 x 14 x 26" (84 x 36 x 66cm) Model 3001: 33 x 14 x 26" (84 x 36 x 66cm) (H x W x D)
Weight:	Model 0751: 79lbs/36kg Model 1501: 176lbs/80kg Model 3001: 176lbs/80kg

DESCRIPTION	CAT. NO.	PRICE
Model 0751 ¹ , 110 volt	27760-U	
Model 1501 ¹ , 110 volt	27761-U	
Model 3001 ¹ , 110 volt	27762-U	
Model 0751 ¹ , 220 volt	28360-U	
Model 1501 ¹ , 220 volt	28361-U	
Model 3001 ¹ , 220 volt	28362-U	
4000 Hour Filter Kit (all units)	27778-U	

¹ CE approved.

Two year parts and labor warranty from domnick hunter.

domnick hunter Hydrocarbon-Free Nitrogen Generator

This Nitrox nitrogen generator employs pressure swing adsorption technology to produce a continuous supply of hydrocarbon-free nitrogen. An integral oil-free air compressor delivers filtered compressed air (7bar/101psig) to a bed of carbon molecular sieve, which selectively removes oxygen, water vapor, carbon dioxide, and hydrocarbons. A heated catalyst then reduces the hydrocarbons in the nitrogen stream to less than 0.1ppm (as methane). Two adsorbent beds alternate between purification and regeneration modes, ensuring a continuous supply of nitrogen at specified purity levels.

SPECIFICATIONS

Nitrogen Output:	1000cc/min
Typical Output Pressure:	5bar/73psig
Output Oxygen:	<10ppm
Output Hydrocarbons:	<0.1ppm (as methane)
Connections:	1/4" NPT
Power Requirements:	110VAC, 50-60 Hz, 350W
Dimensions:	33 x 14 x 18" (H x W x D) (84 x 36 x 46cm)
Weight:	101lbs/46kg

DESCRIPTION	CAT. NO.	PRICE
Model 1001 ¹	27765-U	
Model 1001 ¹ , 220 volt	28366-U	
4000 Hour Filter Kit	27778-U	

¹ CE approved.

Two year parts and labor warranty from domnick hunter.



27760-U

Gas Delivery Nitrogen Generators

domnick hunter LC/MS Nitrogen Generators

Compatible with APCI and ESI Interfaces.

Nitrox LCMS Nitrogen Generators are specially designed to meet the gas flow, purity, and pressure requirements of LC/MS. By providing a continuous supply of clean, dry, 99.5% pure nitrogen, they eliminate the need for expensive, hazardous, cumbersome, labor-intensive gas cylinders. Both models are compatible with atmospheric pressure chemical ionization (APCI) and electrospray ionization (ESI) interfaces.

These generators employ pressure swing adsorption technology to produce a continuous supply of high-purity nitrogen. An oil-free air compressor is integral to Model 12; use Model 18 with your current supply of oil-free compressed air. Either model delivers filtered compressed air (8.5bar/125psig) to a bed of carbon molecular sieve, which selectively removes oxygen and other contaminants. Two adsorbent beds alternate between purification and regeneration modes, ensuring a continuous supply of nitrogen at specified purity levels.

SPECIFICATIONS

Input Air Pressure:	Model 12: integral compressor Model 18: 8.5bar/125psig
Nitrogen Output:	Model 12: 12L/min Model 18: 18L/min
Output Pressure:	7bar/100psig
Output Oxygen:	<0.5%
Connections:	1/4" Swagelok
Power Requirements:	110VAC, 50-60 Hz, 550W (Model 12) or 50W (Model 18)
Dimensions:	Model 12: 33 x 14 x 27" (84 x 36 x 69cm) Model 18: 33 x 14 x 18" (84 x 36 x 46cm)
Weight:	Model 12: 190lbs/86kg Model 18: 165lbs/75kg

DESCRIPTION	CAT. NO.	PRICE
Model 12 ¹ , 110 volts	27766-U	
Model 18 ¹ , 110 volts	27767-U	
Model 12 ¹ , 220 volts	28367-U	
Model 18 ¹ , 220 volts	28368-U	
4000 Hour Filter Kit (both units)	27781-U	

¹CE approved.

Two year parts and labor warranty from domnick hunter.

domnick hunter Air/Nitrogen Generators

Ideal for a Crowded Laboratory!

Nitrox Air/Nitrogen Generators provide a continuous supply of clean, dry, high-purity nitrogen and clean, high-purity air.

These generators employ pressure swing adsorption technology to produce a continuous supply of high-purity gas. An oil-free air compressor delivers filtered compressed air (7bar/1015psig) to a bed of carbon molecular sieve, which selectively removes oxygen, water vapor, and other contaminants. The adsorbent bed alternates between purification and regeneration modes, ensuring product nitrogen meets specified purity levels. A storage reservoir ensures a continuous supply of nitrogen. Additionally, the compressed air is delivered to a bed of activated alumina, to remove water vapor and other contaminants. The adsorbent bed alternates between purification and regeneration modes, and a storage reservoir ensures a continuous supply of pure gas.

With integral Oil-Free Air Compressor

SPECIFICATIONS

Nitrogen Output:	Model 0601: 600cc/min Model 3001: 3000cc/min
Oxygen Content:	<10ppm
Pure Air Output:	Model 0601: 1500cc/min Model 3001: 3000cc/min
Output Air Quality	ISO 8573.1 Class 1.2.1 Dirt, Water, Oil
Output Pressure:	5bar/73psig
Connections:	1/8" Swagelok (Model 0601) or 1/4" Swagelok (Model 3001)
Power Requirements:	110VAC, 50-60 Hz, 250W (Model 0601) or 300W (Model 3001)
Dimensions:	Model 0601: 33 x 14 x 18" (84 x 36 x 46cm) Model 3001: 33 x 14 x 26" (84 x 36 x 66cm)
Weight:	Model 0601: 79lbs/36kg Model 3001: 187lbs/85kg

DESCRIPTION	CAT. NO.	PRICE
Model 0601 ¹ , 110 volts	27763-U	
Model 3001 ¹ , 110 volts	27764-U	
Model 0601 ¹ , 220 volts	28363-U	
Model 3001 ¹ , 220 volts	28364-U	
4000 Hour Filter Kit (both units)	27778-U	

¹ CE approved.

Two year parts and labor warranty from domnick hunter.

Gas
Chromatography

Order: 1.800.325.3010 Technical Service: 1.800.359.3041 Web: www.sigma-aldrich.com/supelco

SUPELCO

Gas Delivery Air Compressors

Jun-Air Oilless Air Compressors

Oilless, dry, clean – no potential source of contamination; quiet and vibrationless

- CE approved
- UL listed
- CSA listed
- IEC 1010 certified

More than 30 years of experience and product development keep Jun-Air the leader in compressor technology. These quiet, reliable compressors produce GC-quality compressed air. High efficient cooling enables you to run the compressor continuously. Models 2000-40MD and 600-25MD are housed in sound-reducing cabinets and incorporate an effluent filter/dryer to reduce water vapor.

27675-U



All models have a two-year warranty from Jun-Air.

SPECIFICATIONS FOR MODEL 2000-40MD

Displacement (0 bar): 150 L/min (5.3ft³/min)
 (4 bar): 100 L/min (3.5ft³/min)
 Maximum Pressure: 8 bar (120psi)
 Flow Rate (4 bar): 100L/minute
 Noise: 53 dB at 8 bar
 Dimensions:
 (H x W x D) 31 x 25 x 22 1/2" (79 x 63 x 57cm)
 Weight: 254lbs/115kg
 Electrical: 110VAC, 60Hz or 220VAC, 50Hz

OUTPUT OF JUN-AIR COMPRESSORS

(Values Approximate)

Model	Output (Liters/Min) at 0-8 bar								
	0	1	2	3	4	5	6	7	8 bar
2000-40MD ¹	175	132	120	112	105	99	94	90	86
600-25MD ²	42	42	39	39	36	34	31	28	27
200-1.5B ³	24	19	17	15	13	12	11	10	10

¹220VAC unit with dryer.

²110VAC unit with dryer.

³110VAC unit.

503762



Oil-free, low maintenance

SPECIFICATIONS FOR MODEL 600-25MD

Maximum Pressure: 8 bar (120psi)
 Flow Rate (4 bar): 42L/minute
 Noise: 48 dB at 8 bar
 Dimensions
 (H x W x D): 30.9 x 17.3 x 22.5" (78.5 x 44 x 57cm)
 Weight: 191lbs/86.5kg
 Electrical: 110VAC, 60Hz or 220VAC, 50Hz

DESCRIPTION	CAT. NO.	PRICE
MODEL 2000-40MD (100L/min at 4 bar) ^{1,2}		
110VAC	27675-U	
220VAC	22825	
MODEL 600-25MD (42L/min at 4 bar) ^{1,2}		
110VAC	503762	
MODEL 200-1.5B (14/24L/min at 4 bar) ^{1,2}		
110VAC	503746	
220VAC	503754	

INTAKE REPLACEMENT FILTER

for Model 2000-40MD	23153
for Model 600-25MD	503797

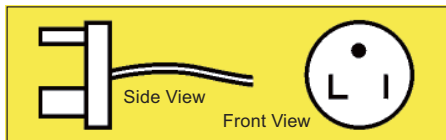
¹ CE approved.

² Two-week delivery.

³ Compressors require two filters.

HELPFUL HINTS

Note: 110 VAC Jun-Air compressors are fitted with a NEMA 20 Electrical plug.



G001221

503746



Compatible with Balston/Whatman & Packard Zero Air Generators, up to 24L/min; maintenance-free

SPECIFICATIONS FOR MODEL 200-1.5B

Maximum Pressure: 8 bar (120psi)
 Flow Rate (4 bar): 110VAC – 14L/minute, 220VAC – 24L/minute
 Noise: 60dB at 8 bar
 Dimensions
 (H x W x D): 12 x 15.4 x 12" (30.5 x 39 x 30.5cm)
 Weight: 33lbs/14.8kg
 Electrical: 110VAC, 60Hz or 220VAC, 50Hz

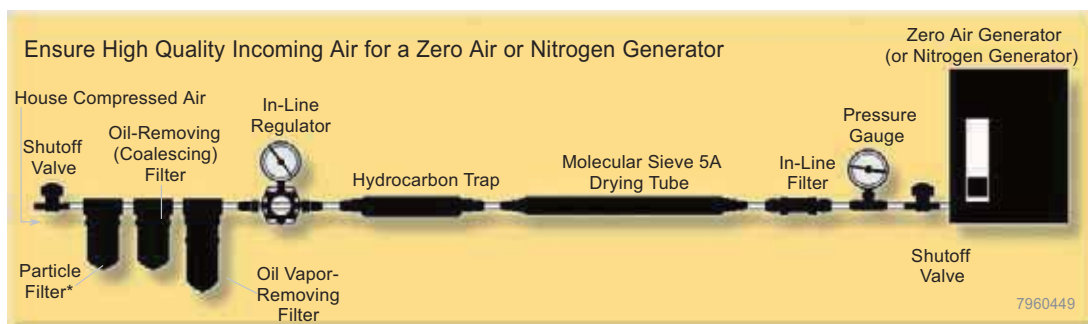
Order: 1.800.325.3010 Technical Service: 1.800.359.3041 Web: www.sigma-aldrich.com/supelco

Gas Delivery Particle and Oil Filters

Norgren Particle, Oil-Removing, and Oil Vapor-Removing Filters

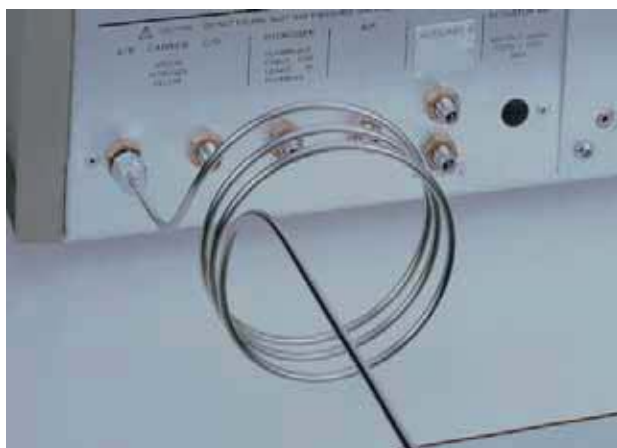
Eliminate compressor oil vapors and droplets from air lines. Airborne contaminants – dust, moisture, and organic pollutants – are drawn into an air system at the compressor intake. To these, the compressor can add oil vapors and aerosol droplets, plus sludge and other matter. These contaminants can significantly shorten the lifetimes of filtering devices in zero air generators, nitrogen generators, and other downstream instruments, and could affect the performance of the instruments themselves. The particle-, oil-, or oil vapor-removing filters described here will eliminate these contaminants from compressed air.

Norgren Particle Filters remove liquids and solid particles as small as 5 microns in diameter. One of these filters should be the initial filtering device downstream from the air compressor (see figure). Norgren Oil-Removing (Coalescing) Filters remove submicron solid particles and oil aerosols, down to 0.01 micron. At 21°C, from an inlet concentration of 8ppm, a maximum of 0.01ppm will remain in the filter. Norgren Oil Vapor-Removing Filters remove oil vapors. At 21°C, only 0.003ppm oil will remain in air leaving the filter, when it is used properly (the oil vapor-removing filter must be protected by an oil-removing filter). We recommend incorporating this three filter system in any compressed line serving sensitive, high-performance gas chromatography or other laboratory instruments.



* Note: If your compressed air system has no additional protection, Norgren suggests using a 40µm and a 5µm particle filter, to ensure maximum life from the filter elements in the oil filters.

DESCRIPTION	CAT. NO.	PRICE
Particle Filter, 40µm Element, 1/4" Female NPT	24990-U	
Particle Filter, 5µm Element, 1/4" Female NPT	24992	
Oil-Removing Filter, 1/4" Female NPT	24994	
Oil Vapor-Removing Filter, 3/8" Female NPT	24996	
Replacement Elements		
Filter Element/Repair Kit for 24990-U	24991	
Filter Element/Repair Kit for 24994	24995	
Replacement Element for 24996	24997	



HELPFUL HINTS

Although most of the plumbing in a gas chromatography system should be secured to a bench or wall, there should be some flexibility at the point of connection to the GC (and to gas generators, if you are using them). Roll about 3 feet/1 meter of the gas line into a coil 4-6 inches/10-15cm in diameter. This will allow some lateral and front-to-back movement of the unit when it is being serviced.

Gas Delivery

Gas Cylinder Accessories



Bench Mounted Bracket

Cat. No. 27642-U (one cylinder) and Cat. No. 27644-U (two cylinders) bench or table mount brackets firmly attach to tables or benches from 1/4" (0.6cm) to 1 7/8" (4.7cm) thick.

DESCRIPTION	CAT. NO.	PRICE
1 cylinder (3.5" to 14")	27642-U	
2 cylinders (3.5" to 14")	27644-U	



27640-U



27641-U



Wall Mounted Brackets

Cat. No. 27641-U mounts to any permanent vertical surface (fasteners not included), bracket adjusts to fit cylinders from 3.5" (8.9cm) to 14" (35.6cm) in diameter. 1.5" polypropylene strap with steel cinch buckle.

Cat. No. 27640-U will support up to 14" (35.6cm) diameter cylinder; Cat. No. 27643-U and Cat. No. 27645-U, respectively, will support two or three cylinders up to 12 3/8" (31.4cm). 1.5" polypropylene strap with steel cinch buckle. All units comply with Occupational Safety and Health Administration, National Fire Protection Agency, and Uniform Fire Code (UFC) standards. Assembly required.

DESCRIPTION	CAT. NO.	PRICE
1 cylinder (up to 14"/35.6cm)	27640-U	
1 cylinder (3.5"/8.9cm to 14"/35.6cm)	27641-U	
2 cylinders (up to 12 3/8"/31.4cm)	27643-U	
3 cylinders (up to 12 3/8"/31.4cm)	27645-U	

Portable Rack/Cart

Designed for safe transport and storage of gas cylinders. Cat. No. 27647-U has 3" swivel casters and will hold four 12" (30.4cm) diameter cylinders. 1.5" polypropylene straps with steel cinch buckles. Assembly required.

DESCRIPTION	CAT. NO.	PRICE
4 cylinders (up to 12"/30.4cm)	27647-U	



Stationary Racks

Cat. No. 27646-U supports four 12 3/8" (31.4cm) diameter cylinders, and has 1.5" polypropylene straps with steel cinch buckles. Cat. No. 27652-U holds two 12" (30.4cm) cylinders, mounts to a wall or to the floor (mounting fasteners not included). Cat. No. 27651-U floor stand holds a 3.5" (8.9cm) to 10" (25.4cm) cylinder through a combination of strap/cinch buckle and sliding support wedge. Assembly required.

DESCRIPTION	CAT. NO.	PRICE
1 cylinder (3.5"/8.9cm to 10"/25.4cm)	27651-U	
2 cylinders (up to 12"/30.4cm)	27652-U	
4 cylinders (up to 12 3/8"/31.4cm)	27646-U	

Cylinder Valve and Cap Wrench

This tool makes it easy to open a cylinder valve that is fitted with a hand wheel. It also is the proper, safe tool for removing cylinder caps.

DESCRIPTION	CAT. NO.	PRICE
Cylinder Valve and Cap Wrench	Z261866-1EA	



Hand Trucks

These industrial quality trucks make moving cylinders up to 12 inches in diameter safe, easy, and convenient. The one-cylinder models have 8" semi-pneumatic tires; the two-cylinder model has 10.5" fully pneumatic tires. Heavy-duty construction, rugged polypropylene straps with steel cinch buckles. All units are 47"/119cm tall. Assembled and ready to use.

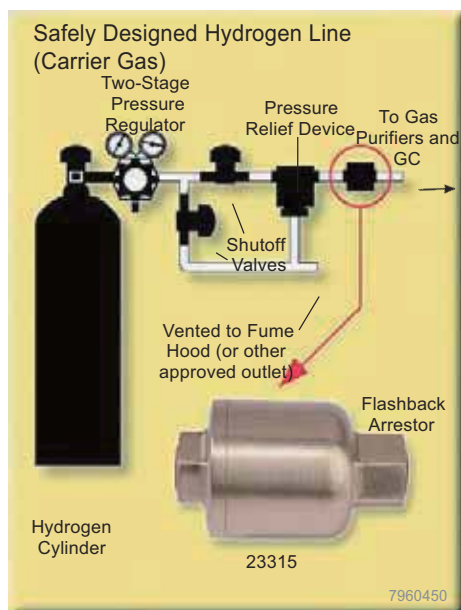
DESCRIPTION	CAT. NO.	PRICE
One-Cylinder Hand Truck	27653-U	
One-Cylinder Hand Truck*	27649-U	
Two-Cylinder Hand Truck*	27650-U	

* With Drop-Down Casters

Gas Delivery Gas Cylinder Accessories

Hydrogen Flash Arrestor

Install a flash arrestor in the line between a hydrogen cylinder and chromatograph (see figure), or use with a hydrogen generator. In event of a flashback, the flash arrestor diverts the flame into three feet (1m) of tubing, where the flame is extinguished and the heat is absorbed. The shock wave preceding the flashback closes and locks the arrestor's shutoff valve, eliminating gas feed. 1/4" female NPT connections; use to 50psig (3.5kg/cm²). Meets Occupational Safety and Health Administration (OSHA) and National Fire Protection Agency (NFPA) codes; Factory Mutual approved.



DESCRIPTION	CAT. NO.	PRICE
Brass	23315	
Stainless Steel	Z261858-1EA	

Connectors, Swagelok (Tube) to 1/4" NPT

SWAGELOK NO.	SIZE	CAT. NO.	PRICE
BRASS (PK. 2)			
200-1-4	1/8" tube	22066	
400-1-4	1/4" tube	21519	
810-1-4	1/2" tube	25818	
STAINLESS STEEL (EACH)			
200-1-4	1/8" tube	22067	
400-1-4	1/4" tube	22700-U	
810-1-4	1/2" tube	25830	

Check Valves

Attach a check valve to the outlet side of a regulator to prevent backflow of gas into the regulator and cylinder. 1/4" female NPT fittings. Maximum pressure: 3000psig.

CONSTRUCTION	O-RING	CAT. NO.	PRICE
Brass	Viton	Z146846-1EA	
Stainless Steel	EPR	Z146854-1EA	
Stainless Steel	neoprene	Z146862-1EA	
Stainless Steel	Viton	Z146870-1EA	

¹ Operating temperature range: Viton: -20°F to 400°F; EPR: -65°F to 300°F; neoprene: 80°F to 300°F.



Flexible Stainless Steel Hose

This infinitely flexible 30" (76cm) x 1/4" 316 stainless steel hose solves many routing problems. It enables you to change the direction of a line as needed, and as often as necessary. Tested to 3000psig (211kg/cm²) with helium. Connections are 1/8" Swagelok.

DESCRIPTION	CAT. NO.	PRICE
Flexible Stainless Steel Hose	22060-U	

Gas Chromatography

Order: 1.800.325.3010 Technical Service: 1.800.359.3041 Web: www.sigma-aldrich.com/supelco

Gas Delivery

Gas Cylinder Accessories



High-Purity, Automatic Changeover Panels

- Automatically switch from empty cylinder to full
- Stainless steel diaphragm suitable for GC carrier gas
- Wall-mount panel
- Diaphragm packless purge valves
- Hand-tight connectors

These Air Products automatic changeover panels provide a continuous, uninterrupted gas supply on installations where reserve cylinders are needed. The unit consists of two identical regulators, but one is set to deliver gas at a slightly higher pressure than the other. When the service cylinder is empty, the unit will automatically draw gas from the reserve cylinder, eliminating the need to shut down the system to replace the empty cylinder. The pressure gauges indicate which cylinder is in use and which cylinder is empty.

High-purity construction makes this system ideal for chromatography and laboratory gas applications. The system includes purge valves, allowing the purging of air trapped in the lines during cylinder change-out. All systems are shipped complete, with mounting panel, flexible pigtailed, isolation valves, and outlet shut-off valves.

Note: These units are not intended to allow the user to adjust outlet pressure. For final pressure control, use with an in-line regulator.

DESCRIPTION	CAT. NO.	PRICE
ACR 2 Cylinder, Brass Regulators with Purge		
CGA350 for H ₂ , Ar/CH ₄	503576	
CGA580 for He, N ₂ , Ar	503584	



Regulator Wall Brackets – Single-Station and Two-Station Manifolds

These manifolds are designed to provide a safe, reliable method to wall-mount a single-cylinder regulator, thus eliminating the need to handle the regulator during cylinder changes. The horizontal brackets are fabricated from type 304 stainless steel for long life, and are suitable for mounting to our single- or two-stage regulators (not provided). Complete with 30" stainless steel bellows, flexible pigtailed, and hand-tight CGA connectors – no need for a cylinder wrench.

DESCRIPTION	CAT. NO.	PRICE
SINGLE-STATION MANIFOLDS		
One pigtail on bracket with CGA connector		
CGA350 for H ₂ , Ar/CH ₄	503657	
CGA580 for He, N ₂ , Ar	503665	
CGA590 for Purified Air	503673	
TWO-STATION MANIFOLDS		
Two pigtailed on brackets with CGA connectors		
CGA350 for H ₂ , Ar/CH ₄	503703	
CGA580 for He, N ₂ , Ar	503711	
CGA590 for Purified Air	503738	

Gas Delivery Pressure Regulators

Pressure Regulation

Select a regulator based on your application and the type of gas you intend to use. Analysts often waste considerable time choosing the wrong regulator for a project.

Our high-purity and ultra-high purity regulators are ultrasonically cleaned to remove contaminants, and their internal parts are protected by 20µm sintered bronze filters. A preset safety relief valve is incorporated into every single-stage and two-stage regulator.

Pressure Regulator Types

In-line regulators

Adjust pressure at the point of use and are intended to be installed downstream of a cylinder regulator. The input pressure should not exceed 400psig for our in-line regulators; the output pressure varies with each regulator.

Single-stage regulators

Reduce cylinder pressure to line pressure in a single step. If a single-stage regulator is not used with a downstream in-line regulator, some pressure change can occur downstream as the cylinder pressure drops. The gauges show cylinder and output line pressure.

Two-stage regulators

Reduce cylinder pressure to line pressure in two steps. This enables the regulator to uniformly control the output pressure despite the decreasing input pressure from the cylinder. Consequently, an in-line regulator usually is not needed.

Application Considerations

General purpose regulators

For non-chromatographic applications, where simple pressure control is needed. Typical uses are non-corrosive plant, pilot plant, and maintenance shop applications. Our general purpose regulators feature nylon-reinforced, neoprene diaphragms for excellent performance and long life. These materials are not a barrier to oxygen and other gases, however, and we do not recommend these regulators for chromatographic applications.

High purity regulators

For chromatography and chemical applications. Our high purity regulators feature stainless steel diaphragms with captive Teflon gaskets and brass bar (nickel-plated) stock bodies, and are sealed to a helium leak rate of less than 2×10^{-9} cc/second.

CGA Connection 320 (for CO₂)



0.825" – 14NGO RH EXT. (Flat Nipple)

CGA-320

CGA Connection 346 (for compound air)



0.825" – 14NGO RH EXT. (Large Round Nipple)

713-1104

Ultra-high purity regulators

For high sensitivity chromatography and analytical lab applications. Our ultra-high purity regulators feature stainless steel diaphragms with metal-to-metal seals and brass bar (nickel-plated) stock bodies, and are sealed to a helium leak rate of less than 2×10^{-8} cc/second.

Cross-Purge Assembly with Diaphragm Valves

These assemblies incorporate a cross tee and two diaphragm valves attached to the regulator, to allow purging of air trapped in the line during cylinder installation. We recommend them for all applications requiring a high purity or ultra-high purity regulator. For more information, request publication 4110 Regulator Design and Operation.

Cylinder Connections

All our single-stage and two-stage regulators include cylinder connector fittings – Compressed Gas Association (CGA) fittings for regulators ordered in the US, or DIN fittings for regulators ordered in Europe and elsewhere. CGA fittings have a nut, a gland, and, if specified, a washer; DIN fittings have a gasket, a nut, and a gland. Gauges on regulators equipped with CGA fittings are calibrated in psi; gauges on regulators equipped with DIN fittings are calibrated in bar units. Other outlet connections from these regulators, and all fittings on general purpose single-stage and two-stage regulators, are 1/4" male NPT. All single-stage and two-stage regulators have outlet shut-off valves. All in-line regulators we offer include 1/8" Swagelok inlet and outlet fittings; some include mounting brackets.

CGA Connection 350 (for H₂)



0.825" – 14NGO LH EXT. (Round Nipple)

713-1108

CGA Connection 580 (for He, N₂, Ar)



0.965" – 14NGO RH EXT.

713-1107

CGA Connection 590 (for purified air)



0.965" – 14NGO LH EXT.

713-1109

Gas Delivery Pressure Regulators

High Purity and Ultra-High Purity Pressure Regulators

- Specially cleaned to eliminate halocarbon and hydrocarbon residues
- Filters in fitting and regulator body protect regulator from particles and pressure surges
- Easy-to-read 2 1/2"/6.3cm gauges (0-200psi or 0-14 bar)
- Leak tested and ready to use

SPECIFICATIONS

High Purity Regulators (in-line, single-stage, two-stage)

Body:	nickel-plated brass or brass
Diaphragm:	316 stainless steel
Diaphragm Seal:	captive Teflon gasket
Maximum Inlet Pressure (psig/bar):	In-Line: 400/27 Single-Stage: 3000/204 Two-Stage: 3000/204
Delivery Pressure (psig/bar):	0-100/0-7

Ultra-High Purity Regulators (in-line, single-stage, two-stage)

Body:	nickel-plated brass or brass
Diaphragm:	316 stainless steel
Diaphragm Seal:	metal-to-metal
Maximum Inlet Pressure (psig/bar):	In-Line: 400/27 Single-Stage: 3000/204 Two-Stage: 3000/204
Delivery Pressure (psig/bar):	0-100/0-7



APPLICATION/TYPE	FITTING	SINGLE-STAGE CAT. NO.	PRICE	TWO-STAGE CAT. NO.	PRICE
FOR He, N₂, Ar					
General Purpose endfitting = 1/4" male NPT	CGA 580	503436		503479	
High Purity no purge valves, endfitting = 1/4" male NPT	CGA 580	503355		503398	
purge valves, endfitting = 1/8" Swagelok	CGA 580	23876		23879	
purge valves, endfitting = 1/8" Swagelok	DIN 6	—	—	24972	
Ultra-High Purity					
no purge valves, endfitting = 1/4" compression, unplated brass	CGA 580	503312		503339	
purge valves, endfitting = 1/8" Swagelok	CGA 580	23870		23872	
FOR CO₂					
General Purpose endfitting = 1/4" male NPT	CGA 320	503460		503509	
FOR H₂, CH₄, AR/CH₄					
General Purpose endfitting = 1/4" male NPT	CGA 350	503444		503487	
High Purity no purge valves, endfitting = 1/4" male NPT	CGA 350	503363		503401	
purge valves, endfitting = 1/8" Swagelok	CGA 350	23877		23880-U	
purge valves, endfitting = 1/8" Swagelok	DIN 1	—	—	24974	
Ultra-High Purity					
no purge valves, endfitting = 1/4" compression, unplated brass	CGA 350	503320		503347	
purge valves, endfitting = 1/8" Swagelok	CGA 350	23871		23873	
FOR PURIFIED AIR					
General Purpose endfitting = 1/4" male NPT	CGA 590	503452		503495	
High Purity no purge valves, endfitting = 1/4" male NPT	CGA 590	503371		503428	
purge valves, endfitting = 1/8" Swagelok	CGA 590	23878		23881	
purge valves, endfitting = 1/8" Swagelok	DIN 13	—	—	24973	
FOR COMPOUND AIR⁴					
High Purity purge valves, endfitting = 1/8" Swagelok	CGA 346	—	—	23899	

¹ Gauges calibrated in psi on regulators with CGA fittings, in bar on regulators with DIN fittings.

² High purity regulators leak tested to 2×10^{-5} cc/second (helium); ultra-high purity regulators leak tested to 2×10^{-8} cc/second (helium).

³ Air purified to meet specifications for contaminants; no control of oxygen and nitrogen levels.

⁴ Pure oxygen and pure nitrogen blended to specific levels.

Order: 1.800.325.3010 Technical Service: 1.800.359.3041 Web: www.sigma-aldrich.com/supelco

Gas Delivery

Pressure Regulators, Shutoff Valves, Gauges



In-Line Regulators

Include 1/8" Swagelok fittings. Maximum inlet pressure of 400psi.

REGULATOR	CAT. NO.	PRICE
Economy, 0-60 psi (gauge and panel mount, brass fittings)	23831-U	
Economy, 0-60 psi (no gauge or panel mount, brass fittings)	23832-U	
Gauge for 23832-U, (0-60psi, 1/8" male NPT fitting)	23833-U	
Bracket and nut for 23832-U,	23834-U	
General Purpose, 0-50 psi (Air, H ₂ , N ₂ , Ar) (brass fittings)	23883	
High Purity (Air, H ₂ , N ₂ , Ar, He), 0-100 psi (stainless steel fittings)	23882	
Ultra High Purity (Air, H ₂ , N ₂ , Ar, He), 0-100 psi (stainless steel fittings)	23884	



Diaphragm Shutoff Valves

- Multiple metal diaphragms provide a permanent seal, prevent diffusion of air and water vapor into the gas flow
- Brass body, KEL-F seat

Grease-free, high integrity valves, leak tested to 10^{-10} cc/sec (helium). Maximum operating pressure: 2000psig (350kg/cm²) operating temperature range: -40°C to 93°C.

DESCRIPTION	CAT. NO.	PRICE
1/4" Male NPT x 1/4" Female NPT	23896	
1/4" Male NPT x 1/4" Male NPT	23897	



Pressure Gauges

2"/5cm, steel and copper alloy.

DESCRIPTION	CAT. NO.	PRICE
GAUGE WITH 1/8" TEE		
0-30psi	20469	
0-60psi	20470	
0-100psi	22423	
GAUGE WITH 1/8" NPT FITTING		
0-30psi	20393	
0-60psi	20394	



Complete Pressure Gauge Kit

2"/5cm gauge (0-100psi), NPT to Swagelok adapter, 18"/1/2m copper line, 1/8" tee, assembly and installation instructions.

DESCRIPTION	CAT. NO.	PRICE
Pressure Gauge Kit	20392	

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Gas Chromatography

SUPELCO

Gas Delivery Flow Control

Backpressure Regulation

Backpressure regulation is used in almost all modern gas chromatographs, to control column inlet pressure rather than outlet pressure. By updating your instrument with backpressure regulation, you can:

- Conserve carrier gas
- Set linear velocity more accurately
- Use hydrogen carrier gas more safely

The pressure regulators on this page are made by Porter Instrument Company, and are specifically designed for gas chromatograph use. They are suitable for panel mounting, and can be used to 160°F. All backpressure regulators on this page have brass Swagelok connectors and provide bubble-tight shutoff to 250psi (helium).



Porter Backpressure Regulator

Use of this regulator requires a low flow controller (Cat. No. 22834, below) with a 0-535cc/min flow element (Cat. No. 22839).

SPECIFICATIONS (MODEL 9000)	
Flow Capacity:	0-1000cc/min
Regulation Range:	0-100psig (0-7.0kg/cm ²)
Construction:	aluminum body & bonnet, Fairprene 5029A diaphragm, Viton valve seat

DESCRIPTION	CAT. NO.	PRICE
Model 9000 Backpressure Regulator	22811-U	



Porter Variable Constant Low Flow Controller

Use the VCD 1000 Variable Constant Low Flow Controller to maintain the flow of carrier gas, make-up gas, etc. to within ±0.3% of any rate from 0-110cc/min, regardless of pressure changes downstream. Optional flow elements maintain flow rates over lower (0-10cc/min) or wider (0-535cc/min) flow ranges.

SPECIFICATIONS (VCD 1000)	
Max. Operating Pressure:	250psig/17.6kg/cm ²
Pressure Drop Required:	≥15psi/1kg/cm ²
Control Accuracy:	±0.3% of instantaneous flow rate
Construction:	aluminum body & filter, Fairprene 5029A diaphragm, Buna-N O-rings, Viton valve seat

DESCRIPTION	CAT. NO.	PRICE
with 0-110cc/min Flow Element (Green)	22834	
Optional additional flow elements		
0-10cc/min element only (Blue)	22836	
0-535cc/min element only (Black)	22839	



Porter Model 4000 Miniature Pressure Regulator

Provides the same control and stability at lower pressures as the larger low flow regulator (Cat. No. 22816), but requires much less space – the 1 1/8 inch/2.9cm OD body fits into the smallest of instruments. Recommended for flows of 0-500cc/min. A 10psi pressure change will not change the outlet pressure by more than 0.05psi; from 2cc/min to 250cc/min, the outlet pressure will not change by more than 0.2psi.

SPECIFICATIONS (MINIATURE)	
Max. Operating Pressure:	250psig/17.6kg/cm ²
Flow Capacity:	0-15 liters/min (60psig helium supply, 15psig outlet)
Regulation Range:	0-60psig (0-4.2kg/cm ²)
Pressure Drop Required:	≥10psi/0.7kg/cm ²
Construction:	aluminum body & bonnet, stainless steel diaphragm

DESCRIPTION	CAT. NO.	PRICE
Miniature Pressure Regulator	22813-U	



Porter Low Flow Pressure Regulator

Precise pressure regulation at very low flows – particularly useful with 0.53mm ID capillary columns. Outlet pressure will not decrease more than 0.3psi over entire flow range. Regulation range: 0-100psig (0-7.0kg/cm²)

SPECIFICATIONS (LOW FLOW)	
Max. Operating Pressure:	250psig/17.6kg/cm ²
Pressure Drop Required:	≥10psi/0.7kg/cm ²
Control Accuracy:	less than 0.3psi decrease over total flow range
Construction:	aluminum body & bonnet, stainless steel diaphragm & filter, Buna-N O-rings, Viton valve seat

DESCRIPTION	CAT. NO.	PRICE
Model 8311 Low Flow Pressure Regulator	22816	

Order: 1.800.325.3010 Technical Service: 1.800.359.3041 Web: www.sigma-aldrich.com/supelco

Gas Delivery Flow Measurement



Supelco
Rotameters

Designed for accurate metering, these rotameters are excellent for chromatographic purposes. Each rotameter consists of a flow tube and four interchangeable floats. Standard flow tables (mL/min at STP) are included. The rotameter is easy to mount on any chromatograph, or you can install it on the optional tripod assembly. Available with or without needle valves.

FLOW RANGE (ML/MIN)	ROTAMETER LENGTH (MM)	G	FLOAT CAPACITY (ML/MIN AIR, STP)		
			S	ST	C
0-33	65	6	8	17	33
0-110	150	19	30	61	110
0-246	150	49	73	137	246
0-454	150	92	140	264	454

¹ G = glass, S = sapphire, St = stainless steel, C = Carboly

SPECIFICATIONS

Accuracy:	±2% full scale
Repeatability:	±0.25%
Max. Operating Pressure:	200psig (13.8 bar) / 14kg/cm ²
Max. Operating Temp.:	250°F/121°C
Useful Flow Range:	10:1 minimum (one float)

Order Swagelok connectors separately.

FLOW RANGE	CAT. NO.	PRICE
WITH NEEDLE VALVE		
0-33mL/min	23324	
0-110mL/min	23325	
0-246mL/min	23320-U	
0-454mL/min	23326	
WITHOUT NEEDLE VALVE		
0-33mL/min	503843	
0-110mL/min	503851	
0-454mL/min	503886	

Tripod Assembly

Cat. No. 23322 is for Supelco rotameters, Cat. Nos. 23320-U, 23324, 23325, 23326. Has leveling screws and a built-in level.

Cat. No. 22548 is for modular rotameters, Cat. Nos. 22549 and 22550-U.

DESCRIPTION	CAT. NO.	PRICE
for Supelco rotameters	23322	
for modular rotameters	22548	



Swagelok Connectors

Swagelok (A) to 1/8" NPT (B). Required for connecting all rotameters on this page to gas supply. Also available with 7µm frits – please inquire.

SWAGELOK NO.	SIZE	CAT. NO.	PRICE
BRASS (PK. 2)			
200-1-2	1/8" tube	22082	
400-1-2	1/4" tube	22083	
STAINLESS STEEL (EACH)			
200-1-2	1/8" tube	22084-U	
400-1-2	1/4" tube	22085-U	



Modular Rotameters

Low Flow Modular Rotameter Kit

Module 1:	glass float (6-60mL/min) stainless steel float (15-150mL/min)
Module 2:	sapphire float (11-110mL/min) Carboly float (30-300mL/min)

High Flow Modular Rotameter Kit

Module 1:	glass float (38-380mL/min) stainless steel float (84-840mL/min)
Module 2:	sapphire float (54-540mL/min) Carboly float (125-1250mL/min)

For rapid float changes. Modular assembly enables you to quickly change floats to monitor different flow rates. You never touch the float – simply interchange the entire tube/float module. Each kit contains two modules, with two floats to each module.

Readings are accurate to within ±2%. Conversion charts for air, Ar, CO₂, He, H₂, N₂, and O₂ are included. Order the tripod assembly (Cat. No. 22548) and Swagelok connectors separately.

DESCRIPTION	CAT. NO.	PRICE
Low Flow Rotameter Kit (6-300mL/min)	22549	
High Flow Rotameter Kit (38-1250mL/min)	22550-U	

Order: 1.800.325.3010 Technical Service: 1.800.359.3041 Web: www.sigma-aldrich.com/supelco

Gas
Chromatography

SUPELCO

Gas Delivery

Flow Measurement

Aalborg Low-Cost Mass Flowmeters

- $\pm 1.5\%$ accuracy, full scale, over ranges from 0-50mL/min to 0-10L/min
- Aluminum body for noncorrosive gases
- Tilttable display
- AC or rechargeable battery operation
- EN 55011 Class I, Class B; EN50082-1

Use these economical instruments to read gas mass flow rate for common GC gases – $_2\text{HHe}$, N_2 , CO_2 , air, and argon/methane mixtures – at inlet pressures up to 500psig. Each unit features a tilttable (more than 90°), LCD digital readout built into the top of the transducer. The readout module can easily be removed for remote readings.

The units can be powered with rechargeable batteries or with 110VAC or 220VAC current – choose the option you need.

Principal of Operation - The stream of metered gas is split proportionally. A small part of the flow is shunted through a straight capillary sensor tube, the balance of the gas flows through a laminar flow conduit. Heat flux is introduced at two sections of the capillary sensor tube by means of precision wound coils. As it flows, the gas carries heat from the coils upstream to the coils downstream. The resultant temperature differential is proportional to the change in resistance of the coils. Wheatstone bridges are used to monitor the instantaneous temperature of each of the coils. The closed loop control circuit detects and amplifies the temperature gradient and restores the temperature balance of the coils. The current required at any given time to maintain dynamic equilibrium is a function of the amount of heat carried by the gasses. An output signal of 0-5VDC or 4-20mA is generated, which indicates the mass molecular-based flow rate of the metered gas. Flow rates are unaffected by temperature or pressure variations within stated limits.



SPECIFICATIONS

Accuracy:	$\pm 1.5\%$, full scale
Repeatability:	$\pm 0.5\%$, full scale
Max. Pressure Drop:	up to 10 std. L/min
Gas Pressures:	500psig (34.5 bar) maximum 20psig (1.4 bar) optimum
Gas & Ambient Temp.:	32°F to 122°F (0 to 50°C)
Helium Leak Rate:	1×10^{-7} SCCS
Transducer Input:	+12VDC; 200mA
Fittings:	$1/4"$ NPT (other fittings available on request)

RELATED INFORMATION

Note: These flowmeters can be used with all common GC gases, but they are calibrated for helium. Refer to the manual for conversion factors for other gases. For calibration for other gases, please inquire. (Price will be the same.)

DESCRIPTION	CAT. NO.	PRICE
0-50mL/min	503894	
0-100mL/min	503908	
0-200mL/min	503916	
0-500mL/min	503924	
0-1L/min	503932	
0-5L/min	503940	
0-10L/min	503959	
Power Sources (one needed for each unit)		
Battery Kit with Charger, 110VAC	503266	
Battery Kit with Charger, 220VAC	503274	
Power Supply, 110VAC, 12VDC	503282	
Power Supply, 220VAC, 12VDC	503290	

¹ CE approved.

Order: 1.800.325.3010 Technical Service: 1.800.359.3041 Web: www.sigma-aldrich.com/supelco

Gas Delivery Flow Measurement



20414



20562

P000224

Bubble Flowmeters

Use these bubble flowmeters to check splitter or detector flow, or to calibrate personal pumps for accurate air sampling. Bubble meters are graduated in these increments: 10mL by 1mL; 25mL by 5mL; 50mL by 10mL; 100mL by 20mL; 500mL by 50mL; and the 1000mL by 100mL. The 500mL and 1000mL meters can be used to measure positive or negative flow.

Bubble meter kits include a squeeze bulb, 30" (3/4m) of 5/16" Tygon tubing, a collapsible stand, and a bottle of liquid soap solution.

DESCRIPTION	CAT. NO.	PRICE
BUBBLE METER KITS		
500mL Bubble Meter Kit	20414	
1000mL Bubble Meter Kit	20415	
BUBBLE METERS AND ACCESSORIES		
10mL Bubble Meter ¹	20562	
25mL Bubble Meter ¹	20431	
50mL Bubble Meter ¹	20432	
100mL Bubble Meter ¹	20433-U	
Replacement Magnetic Clamps for 10mL, 25mL, 50mL units (pk. of 6)	20595	
Replacement Squeeze Bulbs (pk. of 10)	23166	
500mL Bubble Meter	20427-U	
1000mL Bubble Meter	20428-U	
Snoop, 8 oz/475mL bottle	20434	

¹ Includes 2 magnetic clamps.

Capillary Column Bubble Meter

Accurately measure capillary column gas flow rate. This 0.5mL volume bubble meter will allow you to calculate true split ratio by measuring actual flow rate – even as small as 0.01mL/min. Graduated in 0.01mL increments.

Choice of easy installation setups: magnetic clamps or stand.

DESCRIPTION	CAT. NO.	PRICE
with stand	23771	
with magnetic clamps	23762-U	



23143

P000218

Humonics Veri-Flow 500 Electronic Flowmeter

- Calibrated for nitrogen, helium, hydrogen, air, 5% argon/methane (certificate supplied)
- Range of 5-500mL/min; accurate to within $\pm 2\%$ of reading or 0.25mL (whichever value is larger)
- Continuous readings in volume, linear velocity, or split ratio
- EPC compatible
- 9-pin RS 232 communication port for recording data
- Includes power adapter jack and recharger
- Only 4 x 5 x 3" (10 x 12.5 x 7.5cm)

The leaders in GC flow measurement technology have developed an outstanding instrument for analysts who want a simple, continuous-reading flowmeter for general GC applications.

The Veri-Flow 500 Electronic Flowmeter is multiple-point calibrated to NIST-certified volumetric standards for nitrogen, helium, hydrogen, air, and 5% argon/methane, for superior accuracy and to help you comply with ISO 9000, GLP, and other stringent quality control protocols. The display indicates flow in volume (mL/minute) or linear velocity (cm/second), or split ratio. Operation is pulse-free, unaffected by temperature or pressure changes, and the unit is fully compatible with electronic pressure control systems. Operates on internal rechargeable batteries. Very low power consumption and automatic shut-off.

DESCRIPTION	CAT. NO.	PRICE
110VAC ¹	23143	
110-220VAC, 50/60Hz ²	23142	

¹ CE approved

² Includes 110VAC USA, 220VAC European power cords and a universal charger



22754-U

23011

Digital Timers

LCD Digital Stopwatch Performs many functions: time of day, 1/100 second timing, split (lap) times, day, date and month, time in/time out, two finishing times, night light, 0.003% accuracy. Includes battery.

Digital Timer/Clock Countdown timer and stopwatch functions counts up or down from one second to 24 hours. Alarm sounds for 60 seconds and shuts off automatically. Unit clips onto your pocket. Includes a 1.5V battery.

DESCRIPTION	CAT. NO.	PRICE
LCD Digital Stopwatch	23011	
Digital Timer/Clock	22754-U	

Order: 1.800.351.3010 Technical Service: 1.800.359.3041 Web: www.supelco.com

Gas
Chromatography

SUPELCO

Gas Delivery Flow Measurement, Leak Detectors



Humonics Optiflow Flowmeters

- Four flow ranges available; accurate to within ± 2 or $\pm 3\%$ of any reading
- Portable – includes standard 9-volt battery
- Automatic power-off for extended battery life
- Field replaceable tubes
- Compatible with electronic pressure control

SPECIFICATIONS

Optiflow 420 Digital Flowmeter
Flow Range: 0.5-50mL/min
Accuracy: $\pm 3\%$ of any reading
Display: mL/min or linear velocity

Optiflow 570 Digital Flowmeter
Flow Range: 0.5-700mL/min
Accuracy: $\pm 2\%$ of any reading
Display: mL/min or split ratio

Optiflow 650 Digital Flowmeter
Flow Range: 5-5000mL/min
Accuracy: $\pm 2\%$ of any reading
Display: mL/min or split ratio

These high-precision instruments combine the simplicity and versatility of a bubble meter with the speed and accuracy of a microprocessor, providing you with a reliable means of measuring gas flow. Optiflow Digital Flowmeters automate the performance-proven bubble flowmeter "positive displacement" technique that works independent of the type, mass, or mixture of gases. They retain the key advantages of the bubble meter – simplicity and reliability – while improving accuracy and reproducibility, and providing certified performance.

The versatile units can be used with gases. And they feature an easy-to-read, accurate digital display, eliminating the need for tedious bubble watching, timing, and flow rate/time conversions. The bubble is visible for your observation.

Optiflow Digital Flowmeters help you comply with the quality protocols of the American Society for Quality Control, ISO 9000, and Good Laboratory Practice. Each unit is individually calibrated to the registered standards of the National Institute of Standards and Technology and comes with a certificate of calibration. A recalibration service is available.

DESCRIPTION	CAT. NO.	PRICE
Optiflow 420 Digital Flow Meter	22806	
Replacement Flow Tube	22779-U	
Optiflow 570 Digital Flow Meter	22741-U	
Replacement Flow Tube	22777	
Optiflow 650 Digital Flow Meter	22912	
Replacement Flow Tube	22778	

Humonics Liquid Flowmeters

- Easy set-up operation
- NIST traceable

Humonics digital liquid flowmeters replace the tedious and time-consuming glass burette and stopwatch traditionally used to measure flow rates – a microcomputer and infrared optics are used to track a rising volume of liquid within a tube of precision-bore glass. Absolute accuracy is established by comparing the performance of the instrument to an NIST-registered burette.

MODEL	FLOW RANGE (mL/min)	RESOLUTION	CALIBRATION POINTS
1000	0.100 - 1.999	0.001	1.5, 3, 5mL/min
	2.00 - 9.99	0.001	
	10.0 - 30.0	0.1	

DESCRIPTION	CAT. NO.	PRICE
Model 1000 Liquid Flowmeter, 110VAC	55090-U	
Model 1000 Liquid Flowmeter, 220VAC ¹	55093	

¹ CE approved



Snoop Liquid Leak Detector

Also useful in bubble meters.

DESCRIPTION	CAT. NO.	PRICE
Snoop, 8 oz./475mL bottle	20434	
Snoop, 1 gallon/3.8L bottle	20640-U	

Leak-Tec Leak Detector

Will not bubble on a heated part unless there is a leak. Use at temperatures up to 210°C.

DESCRIPTION	CAT. NO.	PRICE
Leak-Tec Leak Detector, 283g pressurized can	20566	

NOTE: We do not recommend using liquid leak detectors with capillary GC systems.

Gas Delivery Leak Detectors

GOW-MAC Gas Leak Detectors

Help you find leaks quickly – without risk of contaminating your GC system. Using liquids to detect gas leaks can be poor economy, especially in a capillary GC system. Even a small amount of liquid leak detector that seeps into a fitting, or through the septum, can damage your column or create baseline noise. GOW-MAC gas leak detectors easily and quickly pinpoint gas leaks too small to detect with soap solution.

GOW-MAC gas leak detectors operate on the same principle as thermal conductivity detector – they respond to any gas mixture that has a thermal conductivity value different from that of air. With an intrinsically high signal-to-noise ratio, amplification provides maximum usable sensitivity: helium leaks of 1.0×10^{-5} cc/sec and refrigerant leaks of 1.0×10^{-4} cc/sec are easily detected.

Easy to Operate GOW-MAC gas leak detectors can be operated with little or no training. Turn on, adjust the zero and probe for leaks. The probe is designed to reach difficult and confined locations. A HIGH/LOW switch permits you to control sensitivity for very small leaks.

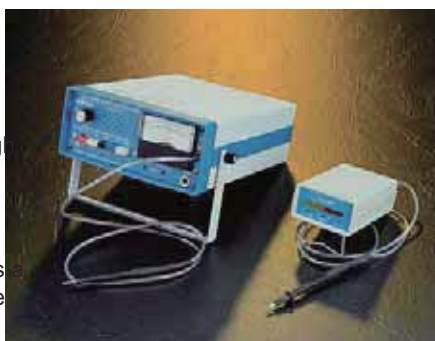
Deluxe and miniature models are available. Both models include rechargeable batteries and two sensitivity ranges.

Deluxe Detector: Model 21-250 -The Deluxe Model is a sturdy addition to your lab. Free your hands to work the probe and still have easy reference to the control panel by shifting the carrying handle to a stand position. An audible tone alerts you when the probe passes over a gas leak.

Miniature Detector: Model 21-050

The Mini Model is the smallest detector of its kind, offering all of the accuracy of the larger GOW-MAC model in a convenient, lightweight instrument. Visual LED bar graph shows you when the probe passes over a leak.

Both models have a 1-year warranty from GOW-MAC.



P000330

SPECIFICATIONS: DELUXE DETECTOR

Output:	Audio. Frequency changes with concentration; adjustable threshold and speaker volume.
Range:	High: x1; Low: x100
Dimensions:	10 3/4 x 8 1/4 x 3 5/8" (27 x 21 x 9cm) (excluding handle)
Weight:	9lb/4.1kg (shipping wt. : 12lb/5.4kg)
Power:	Rechargeable lead/acid gel battery, 8V, selectable 110/220VAC, 50/60 Hz

SPECIFICATIONS: MINIATURE DETECTOR

Output:	Visual LED bar graph alerts you to leaks
Range:	High: x1; Low: x100
Dimensions:	3 1/4 x 1 13/16 x 5 1/4" (8 x 4.5 x 13cm)
Weight:	465g without charger
Line Voltage:	Rechargeable Ni-Cd battery, 7.2V/800mA/hr; recharger included: 110VAC/60Hz or 220VAC/50Hz

SENSITIVITY OF GOW-MAC LEAK DETECTORS

Gas	cc/sec	feet ³ /year
Argon	1.0×10^{-4}	0.110
CO ₂	1.1×10^{-4}	0.123
Fluorocarbons	1.1×10^{-4}	0.123
Helium	1.0×10^{-5}	0.012
H ₂ /He (40:60)	1.0×10^{-5}	0.012
Refrigerants	1.0×10^{-4}	0.123

DESCRIPTION	CAT. NO.	PRICE
GOW-MAC Gas Leak Detectors		
Deluxe Model 21-250 ¹	22409	
Mini Detector: Model 21-050		
with 110VAC/60Hz recharger	22807	
with 220VAC/50Hz recharger ²	22808	
Carrying Case for Mini Detector	22809	

¹ Does not have a CE mark.

² CE approved.

NOTE: These GOW-MAC gas leak detectors are not intended for determining leaks of combustible gases. They are intended for nonspecific applications, to determine low level leaks of gases with thermal conductivity different from that of air. We recommend a combustible gas detector for monitoring combustible gases in possibly hazardous situations.

Gas Delivery

Gas Purifiers

How to Select Purifiers

Why use gas purifiers? Hydrocarbons in the carrier gas can lead to noisy baselines and irreproducible results. Moisture and oxygen can strip phase, creating excessive bleed, damaging the GC column and shortening lifetime. Purifiers help ensure the reliable and efficient performance of the GC instrument.

Our recommendation is to use individual purifiers to handle each of the typical contaminants. These contaminants (hydrocarbons, moisture and oxygen) are present in different impurity levels in the gases. Seldom do you find a purifier that has the quantities of each adsorbent to match the contaminants in your gases. It is better to use separate purifiers for each contaminant on a need basis.

Indicating Purifiers - These purifiers allow a continuous monitoring of the actual gas quality that reaches the GC instrument. They give an indication of a needed purifier change before an analytical problem is caused by insufficient gas purity. We strongly recommend these indicators to ensure a reliable delivery of pure carrier gas.

Moisture indicators (blue beads) - Most moisture purifiers that contain blue beads will show a color change at moisture levels above 50ppm. They can be regenerated under certain conditions.

Oxygen indicators - Purifiers such as the OMI line of purifiers indicate the presence of oxygen in your carrier gas. Oxygen indicators are designed for use primarily as an indicator. They are not designed for use as the main oxygen trap when purifying gases of low purity.

Special Purpose Purifiers - These purifiers are designed for specific applications.

GC/MS Purifiers - Purifiers such as the Supelco helium purifier and the UOP mat/sen are designed to produce high purity Helium carrier gas for use with GC/MS instruments. This results in greater sensitivity of the MS.

Carbon Dioxide Purifier - This purifier is used with techniques involving FTIR, IR, Total Organic Carbon (TOC) and other detectors sensitive to Carbon Dioxide (CO_2). We offer a purifier that removes CO_2 and shows a color change. The reaction of CO_2 with the absorbent forms moisture. We recommend the use of a moisture-removing purifier downstream of the CO_2 purifier.

More information is available in Supelco Bulletin 918 (T197918) on Selecting Purifiers for Gas Chromatography.

Gas Purifier Recommendations

HYDROCARBONS	MOISTURE	OXYGEN
CARRIER GAS (HELIUM, HYDROGEN OR NITROGEN)		
Single GC, Part time usage and low gas flows Supelcarb-HC 120 cc	Molecular Sieve 5A 200 cc	Supelpure-O 120 cc
GC usage and normal gas flows, up to 4 units Option 1: Supelcarb-HC 120 cc Option 2: Supelpure-HC 120 cc	High Capacity Gas Purifier ¹ & OMI-2 ^{1,4} Molecular Sieve 5A 200 cc	High Capacity Gas Purifier ¹ & OMI-2 ^{1,4} Supelpure-O 120 cc
Multiple GC usage, 5 and more units Option 1: Supelcarb-HC 750 cc Option 2: Supelcarb-HC 750 cc	High Capacity Gas Purifier ¹ & OMI-2 ^{1,4} Molecular Sieve 5A 750 cc	High Capacity Gas Purifier ¹ & OMI-2 ^{1,4} Supelpure-O 750 cc
GC/MS Usage Option 1: Supelco Helium Purifier ² Option 2: UOP mat/sen ³	Supelco Helium Purifier ² UOP mat/sen ³	Supelco Helium Purifier ² UOP mat/sen ³
AIR		
Single GC usage, up to 4 units Supelcarb-HC 120 cc	Molecular Sieve 5A 200 cc	
Multiple GC usage, 5 and more units Supelcarb-HC 750 cc	Molecular Sieve 5A 750 cc	
HYDROGEN (AS A FUEL GAS)		
GC usage and normal gas flows, up to 4 units Supelcarb-HC 120 cc		
Multiple GC Usage, 5 and more units Supelcarb-HC 750 cc		
¹ One needed per GC		
² Do not use with hydrogen		
³ Use with helium only		
⁴ Requires 4 ft. tubing between high-capacity gas purifier and OMI-2		

Gas Purifiers for Hydrocarbon Removal

NAME OF PURIFIER	CARRIER GASES PURIFIED	CONTAMINANTS REMOVED	PRODUCT DESCRIPTION	MAXIMUM FLOW & INLET PRESSURE (CC/MIN) (PSIG/BAR)	CAPACITY (GRAMS HC X 75%) ³	STATED LIFE (CYLINDERS) ¹
Supelcarb HC	He, H ₂ , N ₂ , Ar/CH ₄ , air	C3 and higher hydrocarbons	120cc tube	2000 250/17.2	18	16.5
			1/8" 24448 1/4" 24449	10,000 250/17.2	120	110
			750cc tube			
1/4" 24564 1/2" 24565						
Supelpure HC	He, H ₂ , N ₂ , Ar/CH ₄ , air	C4 and higher hydrocarbons	120cc tube	2000 250/17.2	9	8.0
			1/8" 22445-U 1/4" 22446	10,000 250/17.2	60	55.0
			750cc tube			
1/4" 24518 1/2" 24519						
UOP Inert Gas Purifier	He	O ₂ , H ₂ O, CO ₂ , CO halocarbons, hydrocarbons, sulfurs	364cc tube 1/8" 22680-U 1/4" 22681	500 250/17.2	7.5	6.9

Gas Purifiers for Moisture Removal

NAME OF PURIFIER	CARRIER GASES PURIFIED	CONTAMINANTS REMOVED	PRODUCT DESCRIPTION	MAXIMUM FLOW & INLET PRESSURE (CC/MIN) (PSIG/BAR)	CAPACITY (GRAMS H ₂ O X 75%) ³	STATED LIFE (CYLINDERS) ¹
Molecular Sieve 5A Trap	He, H ₂ , N ₂ , many others	H ₂ O	32cc tube ⁴	2000 250/17.2	15.6	68
			1/8" 20619 1/4" 20618	10,000 250/17.2	58.5 ⁶	253
			750cc tube			
1/4" 23991 1/2" 23992						
High Capacity Heated Purifier	He, N ₂ , Ar/CH ₄ not compatible with air, O ₂ , H ₂	O ₂ , H ₂ O, CO ₂ , CO	32cc tube ⁴ 1/8" 22396 1/4" 22398	1100 150/10.3	16.9	73
OMI	He, H ₂ , N ₂ , Ar/CH ₄ not compatible with air or O ₂	O ₂ , H ₂ O, CO ₂ , CO, NH ₃ , alkynes, halocarbons, halogens, hydrogen halides	OMI-2, 15cc tube ⁵	1000 150/10.3	0.2	0.8
			1/8" 23906	1000 150/10.3	1.3	5.8
			OMI-4, 90cc tube ⁵			
1/8" 23909						
GateKeeper	He, H ₂ , Ni ₂ , Ar not compatible with air or O ₂	O ₂ , H ₂ O, H ₂ , CO ₂ , CO, (removes H ₂ as a contaminant, also can purify H ₂ carrier gas)	35cc cartridge	1000 200/13.8	0.1	0.5
			24970	60,000 200/13.8	1.4	6.0
500cc cartridge	24971					
Supelpure-O	He, H ₂ , N ₂ , Ar/CH ₄ not compatible with air or O ₂	O ₂ , H ₂ O, CO ₂ , CO, NH ₃ , alcohols, alkanes, alkenes, amines, aromatics, diethylether, halogens, sulfurs	120cc tube	250 100/6.9	1.5	6.5
			1/8" 22449 1/4" 22450-U	10,000 250/17.2	10.2 ⁶	44.3
			750cc tube			
1/4" 503088 1/2" 503096						
UOP Inert Gas Purifier	He	O ₂ , H ₂ O, CO ₂ , CO, halocarbons, hydrocarbons, sulfurs	364cc tube 1/8" 22680-U 1/4" 22681	500 250/17.2	26.3	114

¹ Based on 9" X 51" cylinders (218 cubic feet) of carrier gas containing 50ppm of contaminants supplying 1 chromatograph with 2 capillary columns. Ask our supplier for specifications for the cylinders you use. To correct for other volumes of gas per cylinder, multiply Stated Life (cylinders) by the number of cubic feet in your cylinders, then divide by 218.

² Quantity of adsorbent material – dimensions of fitting – catalog number.

³ Expressed as medium weight (C8 – C20) hydrocarbons.

⁴ Heat required (tube must be installed in a specially designed heater).

⁵ Holder required.

⁶ At a flow rate of 1000cc/min.

Order: 1.800.325.3010 Technical Service: 1.800.359.3041 Web: www.sigma-aldrich.com/supelco

Gas Chromatography

Gas Delivery

Gas Purifiers

Gas Purifiers for Oxygen Removal

NAME OF PURIFIER	CARRIER GASES PURIFIED	CONTAMINANTS REMOVED	PRODUCT DESCRIPTION	MAXIMUM FLOW & INLET PRESSURE (CC/MIN) (PSIG/BAR)	CAPACITY (GRAMS O ₂ X 75%)	STATED LIFE (CYLINDERS) ¹
OMI	He, H ₂ , N ₂ , Ar/CH ₄ not compatible with air or O ₂	O ₂ , H ₂ O, CO ₂ , CO, NH ₃ , alkynes, halocarbons, halogens, hydrogen halides	OMI-2, 15cc tube ³ 1/8" 23906	1000 150/10.3	0.16	0.4
			OMI-4, 90cc tube ³ 1/8" 23909	1000 150/10.3	1.19	2.9
High Capacity Heated Purifier	He, N ₂ , Ar/CH ₄ not compatible with air, O ₂ , H ₂	O ₂ , H ₂ O, CO ₂ , CO	32cc tube ⁴ 1/8" 22396 1/4" 22398	1100 150/10.3	15.0	36.5
Supelpure-O	He, H ₂ , N ₂ , Ar/CH ₄ not compatible with air or O ₂	O ₂ , H ₂ O, CO ₂ , CO, NH ₃ , alcohols, alkanes, alkenes, amines, aromatics, diethylether, halogens, sulfurs	120cc tube 1/8" 22449 1/4" 22450-U	250 100/6.9	0.45	1.1
			750cc tube 1/4" 503088 1/2" 503096	10,000 250/17.2	2.4 ⁶	5.8
GateKeeper	He, H ₂ , N ₂ , Ar not compatible with air or O ₂	O ₂ , H ₂ O, H ₂ , CO ₂ , CO (removes H ₂ as a contaminant, also can purify H ₂ carrier gas)	35cc cartridge 24970	1000 200/13.8	0.77	1.9
			500cc cartridge 24971	60,000 200/13.8	9.56	23.3
Oxisorb	He, H ₂ , N ₂ , Ar/CH ₄	O ₂ , H ₂ O, CO ₂ , CO	52cc cartridge ³ 20631	5000 90/6.2	NA ⁵	1.0 ⁵
Oxiclear	He, H ₂ , N ₂ , Ar/CH ₄	O ₂ , H ₂ O, CO ₂ , CO	180cc cartridge 1/8" 22992 1/4" 22993	3000 250/17.2	NA ⁵	3.5 ⁵
UOP Inert Gas Purifier	He	O ₂ , H ₂ O, CO ₂ , CO, halocarbons, hydrocarbons, sulfurs	364cc tube 1/8" 22680-U 1/4" 22681	500 250/17.2	2.14	5.2

¹ Based on 9" X 51" cylinders (218 cubic feet) of carrier gas containing 50ppm of contaminants supplying 1 chromatograph with 2 capillary columns. Ask your supplier for specifications for the cylinders you use. To correct for other volumes of gas per cylinder, multiply Stated Life (cylinders) by the number of cubic feet in your cylinders, then divide by 218.

² Quantity of adsorbent material - dimensions of fitting - catalog number.

³ Holder required.

⁴ Heat required (tube must be installed in a specially designed heater).

⁵ Data for determining oxygen capacity was not available from the manufacturer. Stated life in cylinders in the manufacturer's recommendation.

⁶ At a flow rate of 1000cc/min.

Gas Delivery Gas Purifiers

OMI Indicating Purifiers

- Simultaneously remove water vapor, CO, CO₂, most sulfur compounds, most halogen compounds, alcohols, phenols to less than 10ppb
- Purify helium, hydrogen, nitrogen, argon-methane
- Color change indicates purifier exhaustion
- Glass body does not diffuse air or off-gas
- Ideal for Hall, ECD, GC/MS detection systems
- OMI-4 purifier protects multiple instruments (three times the capacity of OMI-2 tubes)

Irreversibly remove contaminants from carrier gas. Install an OMI purifier downstream from your primary gas purifying device, and tell at a glance whether or not oxygen and water vapor are being effectively eliminated from your system. The OMI purifier will provide point-of-use gas polishing and final visual assurance of gas quality before the gas enters the GC. OMI purifier tubes contain Nanochem resin, developed for the demanding gas purity needs of the semiconductor manufacturing industry. As little as 1ppm of oxygen or water will change the indicating resin from black to brown.

Spent tubes are easily replaced. Simply unscrew the end assembly from the tube holder and replace the tube. The design prevents air from entering the new tube during installation.

Note: For optimum performance, we do not recommend storing OMI tubes for longer than 6 months.

Protect Your Column from Many Carrier Gas Contaminants

CONTAMINANT	OMI PURIFIER	INDICATING DEVICES	NON-INDICATING OXYGEN TRAPS
Oxygen	Yes	Yes ¹	Yes ¹
Water	Yes	No	Maybe
Carbon monoxide	Yes	No	Maybe
Carbon dioxide	Yes	No	No
Alcohols/Phenols	Yes	No	No
Sulfur-containing compounds	Yes	No	No ²
Halogen-containing compounds	Yes	No	No ²

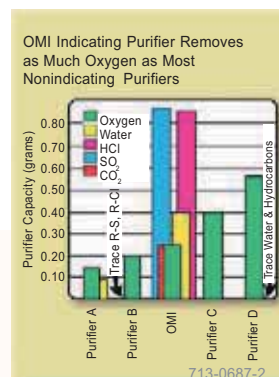
¹ If incoming oxygen level does not exceed 10ppm.

² Corrosive compounds may poison some of these devices.

DESCRIPTION	CAT. NO.	PRICE
OMI-2 Purifier Tube ³	23906	
OMI-2 Tube Holder, 1/8" fittings ³	23921	
Seal Kit for OMI-2 Tube Holder (includes 2 Teflon seals and tool)	23917	
OMI-4 Purifier Tube ³	23909	
OMI-4 Tube Holder, 1/8" fittings ³	23926	
OMI-1 Replacement Tube ⁴ (includes 2 ferrules)	23900-U	
3/8" Ferrules (pk. of 10)	22311	
1/4" to 1/8" Swagelok SS Reducer	21517	

³ First time users must order both purifier tube and corresponding holder. Holder is reusable.

⁴ Will not fit OMI-2 tube holder – use with OMI-1 installation kit only (kit no longer available).



DIMENSIONS OF OMI PURIFIERS

OMI-2	Tube: 6"/15.2cm x 5/8"/1.6cm OD
	Tube Holder: 10"/25.4cm x 1 1/2"/3.8cm OD
	Endfittings: 2 1/2"/6.4cm
OMI-4	Tube: 12"/30.5cm x 1"/2.5cm OD
	Tube Holder: 16"/40.6cm x 1 1/2"/3.8cm OD
	Endfittings: 2 1/2"/6.4cm

Order: 1.800.325.3010 Technical Service: 1.800.359.3041 Web: www.sigma-aldrich.com/supelco

Gas
Chromatography

SUPELCO

Gas Delivery Gas Purifiers

High Capacity Gas Purifier

No other purifier removes both oxygen and water in such large quantities. To reliably protect your GC columns and detectors from oxygen and water vapor damage, you should use a gas purifier specifically designed to ensure maximum gas purity. The Supelco High Capacity Gas Purifier tube is heated inside an oven, and oxygen and water react with the gettering material in the tube. Unlike purifiers which remove contaminants by adsorption, chemical reaction with the gettering material prevents these contaminants from returning to the gas stream — even when the temperature changes or as the material approaches saturation. The High Capacity Gas Purifier also removes carbon monoxide and carbon dioxide.

A single, replaceable High Capacity Gas Purifier tube can remove 14 liters of oxygen or 35 liters of water vapor (STP). It removes oxygen and water from at least 60 tanks of heavily contaminated gas — gas containing 100ppm of oxygen and/or water. It efficiently removes oxygen and water at gas flow rates up to 1100mL/minute, and you can use it with any common carrier gas except hydrogen.

The stainless steel converter tube is 10" x 1/2" OD. The split-sided heater is 10" long. An integral mounting bracket allows you to bolt the unit to a bench top or wall. The 90 watt power consumption makes the unit as economical to operate as a light bulb. Mount horizontally only.

2-year guarantee; elements guaranteed for 90 days.

DESCRIPTION	CAT. NO.	PRICE
HIGH CAPACITY GAS PURIFIER		
110VAC, 1/8" Fittings ¹	23800-U	
110VAC, 1/4" Fittings ¹	23802	
220VAC, 1/8" Fittings ¹	23801	
220VAC, 1/4" Fittings ¹	23803	
REPLACEMENT PURIFIER TUBES		
1/8" Fittings	22396	
1/4" Fittings	22398	
REPLACEMENT ELEMENTS		
Element for 110VAC Unit (2 required)	24975	
Top element for 220VAC Unit	24976	
Bottom element for 220VAC Unit	24977	

¹ CE approved.

² Modifications may be required on older purifiers.



P000329

SPECIFICATIONS

Oven with 1/4" or 1/8" Tube	
Height:	5 1/4"/13.3cm
Width (with shields):	14 1/2"/36.8cm
Depth:	6"/15.2cm
Tube (1/8" or 1/4")	
Diameter:	1/2"/12.7mm
Length:	10"/25.4cm
Max. Inlet Pressure:	150psi
Max. Flow Rate:	1100mL/min.
Operating Temp.:	580°C

Complete Pressure Gauge Kit

Use with our high capacity gas purifier, to indicate when the purifier tube should be replaced. Change purifier tube when pressure drop exceeds 10psi. 2"/5cm gauge (0-100psi), NPT to Swagelok adapter, 18"/1/2m of 1/8" copper line, 1/8" tee, installation instructions.

DESCRIPTION	CAT. NO.	PRICE
Pressure Gauge Kit	20392	

Order: 1.800.325.3010 Technical Service: 1.800.359.3041 Web: www.sigma-aldrich.com/supelco



P000356



20392

Gas Delivery Gas Purifiers



Supelcarb HC Hydrocarbon Traps

Remove organics from carrier gases, air, and hydrogen. We manufacture these traps in our own facilities, to ensure the cleanest material available and the best trapping ability per gram – Supelcarb HC adsorbent has twice the trapping ability of activated charcoal.

DESCRIPTION	CAT. NO.	PRICE
120cc, 1/8" Fittings	24448	
120cc, 1/4" Fittings	24449	
750cc, 1/4" Fittings	24564	
750cc, 1/2" Fittings	24565	
S-Trap, 1/8" Fittings	503134	
Supelcarb Refill, 300cc	24566	
Mounting Clip for 120cc Traps	23993	
Mounting Clip for 750cc Traps	24983	

Supelpure-HC Hydrocarbon Traps

Activated charcoal adsorbs hydrocarbons and other contaminants from carrier gases, air, and hydrogen. Operates efficiently for approximately six months when total hydrocarbons in the incoming gas average 10ppm.

DESCRIPTION	CAT. NO.	PRICE
120cc, 1/8" Fittings	22445-U	
120cc, 1/4" Fittings	22446	
750cc, 1/4" Fittings	24518	
750cc, 1/2" Fittings	24519	
S-Trap, 1/8" Fittings	503142	
Charcoal Refill for 400cc	22451	
Mounting Clip for 120cc Traps	23993	
Mounting Clip for 750cc Traps	24983	



Molecular Sieve 5A Water Vapor Traps

Remove water vapor and pump oils. Molecular Sieve 5A efficiently removes water and heavy hydrocarbons from compressed air, electrolytically produced hydrogen, house nitrogen, or other gases with high moisture or hydrocarbon content. 200cc traps are 26 1/4" x 1" (67 x 2.5cm), 750cc traps are 18 x 2 3/8" (45.7 x 6cm), S-trap is 1/2"/13mm OD x 5 9/16"/14.1cm wide x 7 1/2"/19cm long (total bed length: 19 3/4"/50.2cm) – the extended bed length ensures prolonged contact between the gas and the adsorbent and provides greater working capacity. Use the smaller traps with up to 5 GCs, the larger traps with 6-20 instruments.

DESCRIPTION	CAT. NO.	PRICE
200cc, 1/8" Fittings	20619	
200cc, 1/4" Fittings	20618	
750cc, 1/4" Fittings	23991	
750cc, 1/2" Fittings	23992	
S-Trap, 1/8" Fittings	503118	
Molecular Sieve 5A Refill, 1/2lb./0.22kg	20298	
Mounting Clip for 200cc Traps	503231	
Mounting Clip for 750cc Traps	24983	



Economy Water Vapor Traps

For air and actuator gases. These clear polycarbonate polymer tubes contain a mixture of Molecular Sieve 13X and Molecular Sieve 4A with indicating capability. Because some oxygen and water vapor will permeate through the polymer shell, these traps should not be used with carrier gases, but they are an excellent value for cleaning air and actuator gases to suitable purity. Dimensions: 2"/51mm OD x 17 1/2"/44.4cm long.

DESCRIPTION	CAT. NO.	PRICE
400cc, 1/8" Fittings	23987	
400cc, 1/4" Fittings	23988	
Molecular Sieve 13X/4A Refill, ~475cc	23989	
Mounting Clip for 400cc Traps	23990	

Gas Delivery

Gas Purifiers



Supelpure-O Oxygen/Water Trap

The Supelpure-O trap reduces oxygen to less than 0.5ppm when the level in the incoming gas does not exceed 10ppm. It can extract contaminating oxygen at 10ppm from at least three 300ft (8.5m³) cylinders. Because the oxygen-removing catalyst is coated on a molecular sieve, the trap also can remove significant amounts of water vapor (up to 1.5g for the 120cc trap; 10.2g for the 750cc trap).

DESCRIPTION	CAT. NO.	PRICE
SUPELPURE-O OXYGEN/WATER TRAP		
120cc, 1/8" Fittings	22449	
120cc, 1/4" Fittings	22450-U	
750cc, 1/4" Fittings	503088	
750cc, 1/2" Fittings	503096	
S-Trap, 1/8" Fittings	503126	
MOUNTING CLIP FOR SUPELPURE TRAPS		
for all 100cc Traps (each)	502936	
for all 120cc Traps (each)	23993	
for all 200cc Traps (each)	503231	
for all 250cc Traps (each)	23990	
for all 750cc Traps (each)	24983	

HELPFUL HINTS

Dimensions of Supelcarb and Supelpure Traps
 120cc Traps: 1 3/8" OD (35mm) x 11 1/8" long (28.2cm)
 750cc Traps: 2 5/16" OD (59mm) x 16 1/2" long (41.9cm)
 S-Traps: 1/2" OD (13mm) x 5 9/16" wide (14.1cm) x
 7 1/2" long (19cm) (total bed length: 19 3/4"/50.2cm)



Aeronex GateKeeper Purifiers

- Remove water, oxygen, CO₂, and H₂ in bulk inert gases to less than 1ppb, at ambient temperature
- Stainless steel face seal fittings, for maximum sealing capability

High capacity + highly effective contaminant reduction = low cost per liter of purified gas. Using a proven, patented technology GateKeeper purifiers reduce contaminants in inert specialty gases to sub parts per billion levels (<1ppb), creating 99.999999% pure gas from standard ultra high purity gas. In addition to being more effective than typical molecular sieve-type purifiers they last up to five times longer, providing a better return on your investment. The patented metallic purifying medium does not release trapped contaminants, and the units can be returned for recharging. The state of the art in inert gas purification.

SPECIFICATIONS

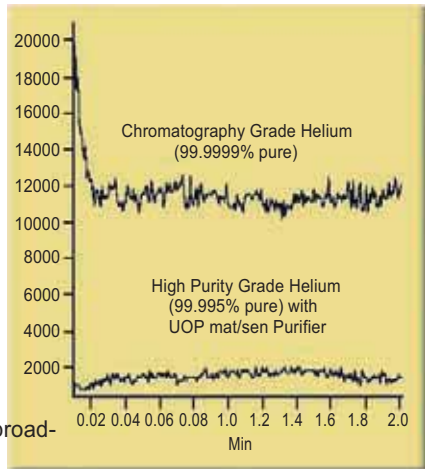
Construction:	Model 35K: 304 SST Model 400K: 304 SST Model 500K: 316L SST (internal electropolish)
Max. Inlet Pressure:	200psig (1380 kPa)
Maximum Flow:	Model 35K: 1 liter/min Model 400K: 3 liters/min Model 500K: 60 liters/min
Operating Temp.:	-40°C to 65°C
Dimensions:	Model 35K: 3.31" x 1.5" OD (8.4 x 3.8cm) Model 400K: 20.86" x 1.5" OD (52.4 x 3.8cm) Model 500K: 7.94" x 3.0" OD (20.2 x 7.6cm)
Pure Gas Delivered:	Model 35K: 40,000 liters (Estimated) Model 400K: 400,000 liters Model 500K: 650,000 liters

DESCRIPTION	CAT. NO.	PRICE
Model 35K, 1/4" Face Seal Fittings	24970	
Model 500K, 1/4" Face Seal Fittings	24971	
Model 400K with Compression Fittings 1/4" Fittings	502987	



Supelco Helium Purifier

- Removes water vapor, hydrocarbons, CO from helium
- Output gas is 99.99999% pure
- Cost per cubic foot of purified gas is 50% that for other broad-spectrum purifiers



This purifier incorporates multiple beds of highly effective, high UOP mat/sen Purifier

capacity adsorbent materials to remove oxygen, water vapor, hydrocarbons, carbon dioxide, and carbon monoxide from helium gas streams. The volumes of the various adsorbents in the Supelco helium purifier were determined through rigorous evaluations, to ensure that breakthrough of the five major contaminant types is as close to simultaneous as possible. Because you no longer have to replace a broad-spectrum purifier that has exhausted its capacity for one contaminant, but still has much of its capacity for other contaminants, you can reduce instrument down time and save money. Relative to separate traps for oxygen, water vapor, and hydrocarbons, combining these functions into one unit also reduces the potential for leaks at connections.

One purifier will easily purify the contents of 13 ~200 cylinders of 99.997% purity helium to a cumulative level of 100ppb of O₂, H₂O, CO₂, CO, and hydrocarbons, at flow rates up to 8 liters/minute – and comparative investigations indicate that a purifier will deliver this gas purity for virtually 50% of the cost per cubic foot of gas, compared to any competitor's broad-spectrum purifier.

Supelco helium purifiers are ideal for any GC or GC/MS application in which high purity helium is essential.

SPECIFICATIONS

Contaminant Capacity ¹ :	oxygen: 1.07L water vapor: 46g hydrocarbons ² : 20g
Contaminant Removal Efficiency:	total: <100ppb oxygen: <2ppb water vapor: <20ppb hydrocarbons ² : <30ppb CO ₂ : <20ppb CO: <20ppb
Output Gas Purity ³ :	99.99999%
Capacity:	>4000ft ³
Maximum Flow Rate:	8L/min
Maximum Pressure:	500psig
Maximum Temperature:	100°C

¹ At standard temperature and pressure.

² As methane.

³ 99.999% helium purified to 99.99999% helium, based on removal of 5 major contaminants.

- Produces better than 99.9999% gas when supplied with 99.995% pure gas
- Original equipment in Finnigan, Hewlett-Packard, and Varian mass spectrometers
- Also used in Leco, Perkin-Elmer, and Shimadzu equipment

Assures mass spectrometer-suitable baselines from high purity (99.995%) gas. One of the most important factors in ensuring very sensitive detection in GC/MS analyses is the signal to noise ratio. Mass spectrometer manufacturers recommend that the signal be at least three times as large as the background noise to assure statistical significance. These UOP mat/sen purifier modules dramatically reduce levels of most contaminants, including oxygen, water, and hydrocarbons, from many parts per million to levels below detection. They adsorb a wider variety of contaminants than many commonly used adsorptive materials.

UOP mat/sen guarantees these purifiers produce gases that are at least a factor of ten higher in purity than 99.9999% "chromatography grade" gas when the purifier is supplied with 99.995% "high purity" gas. The cost difference between the two grades of gas will pay for the cost of the purifier several times over during the operating life of the purifier.

SPECIFICATIONS

Length:	21"/53.3cm
Diameter:	1.5"/3.8cm
Maximum Inlet Pressure:	250psig/1724 kPa
Maximum Flow:	500mL/min
Pressure Drop:	<0.30 psig/2.1 kPa
¹ 120psig (827 kPa) inlet, 0 to 500mL/min	

DESCRIPTION	CAT. NO.	PRICE
1/8" Compression Fittings	22680-U	
1/4" Compression Fittings	22681	

DESCRIPTION	CAT. NO.	PRICE
1/8" Swagelok Stainless Steel Fittings	27600-U	
1/4" Swagelok Stainless Steel Fittings	27601-U	
Mounting Clip	24983	

Order: 1.800.325.3010 Technical Service: 1.800.355.1101

Gas Chromatography

Gas Delivery Gas Purifiers



P000333

Carbon Dioxide Traps

Designed to remove CO_2 from gases used in applications such as carbon-hydrogen determinations, analyses of respiratory gases, and especially in quantitative organic micro-analyses. The sodium hydroxide nonfibrous silicate trapping medium is universally accepted for its high absorptive capacity and indicating properties. Typically, this material will absorb 20-30% of its weight in carbon dioxide before replacement of the saturated material is required. As CO_2 absorbed, the greenish-brown material turns white because of the formation of sodium carbonate. A water vapor trap should be installed downstream from this unit to absorb water evolved in the absorption of carbonic gases.

The trap body is constructed of borosilicate glass. The trap is available in two sizes, and with 1/8" and 1/4" fittings. Fittings are nickel plated and have sintered stainless steel frits. Exercise extreme caution when refilling the trap, due to the caustic nature of the absorbent.

DIMENSIONS	
100cc traps:	1 3/4"/44mm OD x 12 3/4"/32.4cm long
250cc traps:	2"/51mm OD x 17 1/2"/44.4cm long

DESCRIPTION	CAT. NO.	PRICE
100cc, 1/8" Fittings	503185	
100cc, 1/4" Fittings	503193	
250cc, 1/8" Fittings	503207	
250cc, 1/4" Fittings	503215	
Absorbent Refill, 500cc	503223	
Mounting Clip for 100cc Traps	502936	
Mounting Clip for 250cc Traps	23990	

Purifiers For Less Demanding Applications

Gas purifiers listed below are economical, but cannot ensure output of chromatographic grade gas when impurity levels in the input gas exceed 10-15ppm.



P000334

Oxisorb Oxygen Scrubber reduces oxygen and water to less than 1ppm when incoming O_2 does not exceed 15ppm and H_2O does not exceed 10ppm. Use a new cartridge for each new cylinder of gas.

Dimensions: 2"/51mm OD (maximum) x 9 1/4" x 23.5cm long; replacement cartridge

DIMENSIONS	
Scrubber:	2"/51mm OD (maximum) x 9 1/4"/23.5cm long
Replacement Cartridge:	1 1/8"/29mm OD x 4 7/8"/12.4cm long

DESCRIPTION	CAT. NO.	PRICE
Oxisorb Oxygen Scrubber, 1/4" Fittings	20639-U	
Replacement Cartridge	20631	



P000232

Oxiclear Disposable Gas Purifier removes oxygen, trace water, and organic contaminants from three 300ft (8.5m³) cylinders of inert carrier gas. Output is less than 1ppm when incoming O_2 does not exceed 10ppm.

DIMENSIONS	
Purifier:	1 7/8"/48mm OD x 7 1/2"/19.0cm long

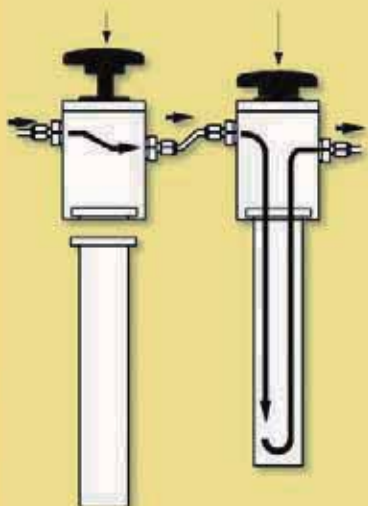
DESCRIPTION	CAT. NO.	PRICE
with 1/8" fittings	22992	
with 1/4" fittings	22993	

Order: 1.800.325.3010 Technical Service: 1.800.359.3041 Web: www.sigma-aldrich.com/supelco

Gas Delivery Gas Purifiers

Change Cartridges Without Interrupting Gas Flow

- Handle Up: Gas flows through filter head
 Handle Down: Cartridge seal broken, gas flows through purifier bed



796-0447

SPECIFICATIONS

3-Head QC+ Panel: 9 x 11 1/2 x 5" (23 x 29 x 13cm) (H x W x D)

4-Head QC+ Panel: 11 x 15 1/4 x 5" (28 x 39 x 13cm)

Max. Pressure: 125psig

Cartridge: 1 1/4"/32cm OD x 6 1/4"/15.9cm long*

* Cat. Nos. 503061 and 24567 are 6 3/4"/17.1cm long.



QC+ Point-of-Operation Panels

- Replace up to four cartridges in one minute without purge time

QC+ panels make cartridge replacement fast and easy. Rotate the valve handle(s) on the filter head(s) counterclockwise, to allow gas to pass through the head. Replace the cartridge, then rotate the valve handle clockwise, to puncture the seal on the new cartridge and restore gas flow through the purifier bed.

Replacement cartridges are designed to remove hydrocarbons, moisture and oxygen. The 3-Head QC+ Panel (P/N 23999) includes P/Ns 23997, 23996 and 23995. The 4-Head QC+ Panel (P/N 23998) includes P/Ns 23997, 23996, 23995 and 24987.

The SupelCarb cartridge (P/N 24567) has twice the capacity for hydrocarbons, relative to the activated charcoal in the standard hydrocarbon-removing cartridge.

The indicating water-removing cartridge (P/N 23996) contains a mixture of Molecular sieve 5A and Drierite. The color changes from blue to pink as the material becomes spent.

The indicating oxygen-removing cartridge (P/N 24987) contains a Manganese oxide. The color changes from green to brown as the material becomes spent.

DESCRIPTION	CAT. NO.	PRICE
3-Head QC+ Panel, 1/8" Fittings	23999	
4-Head QC+ Panel, 1/8" Fittings	23998	
Replacement Cartridges		
Hydrocarbon-Removing Cartridge (GC-3)	23997	
SupelCarb Cartridge	24567	
Water-Removing Cartridge (GC-2)	23996	
Indicating Water-Removing Cartridge (GC2-1)	503061	
Oxygen-Removing Cartridge (GC-1)	23995	
Indicating Oxygen-Removing Cartridge (GC-4)	24987	

Gas Delivery Tubing and Accessories

We offer more tubing choices. Our recommendations:

Premium Grade Stainless Steel Grade 304 tubing, specially cleaned to ensure inertness. We make all our stainless steel columns from this tubing.

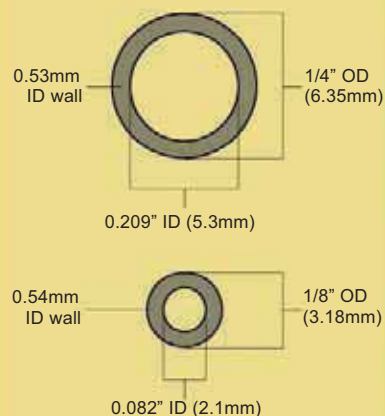
Fused Silica-Lined Stainless Steel The strength of stainless steel with the inertness of deactivated fused silica.

Cleaned Copper Solvent-washed to Supelco standards (ASTM B-280 plus Supelco cleaning), to remove residual hydrocarbons. Recommended for most GC plumbing applications.

DESCRIPTION (OD X ID; LENGTH)	CAT. NO.	PRICE
PREMIUM GRADE STAINLESS STEEL (304)		
1/8 x 0.085" (3.18 x 2.1mm); 50' Coil	20526-U	
1/4 x 0.209" (6.35 x 5.3mm); 50' Coil	20527	
1/16 x 0.010" (1.59 x 0.254mm); 100' Coil	20552	
1/16 x 0.030" (1.59 x 0.762mm); 100' Coil	20553	
Shorter Lengths, per foot		
FUSED SILICA-LINED STAINLESS STEEL		
1/16 x 0.01" (1.59 x 0.254mm); 25'	24951	
1/16 x 0.01" (1.59 x 0.254mm); 50'	24952	
1/16 x 0.01" (1.59 x 0.254mm); 100'	24953	
1/16 x 0.02" (1.59 x 0.508mm); 6'	24954	
1/16 x 0.02" (1.59 x 0.508mm); 25'	24955	
1/16 x 0.02" (1.59 x 0.508mm); 50'	24956	
1/16 x 0.02" (1.59 x 0.508mm); 100'	24957	
1/16 x 0.03" (1.59 x 0.762mm); 6'	24958	
1/16 x 0.03" (1.59 x 0.762mm); 25'	24959	
1/16 x 0.03" (1.59 x 0.762mm); 50'	24960	
1/16 x 0.03" (1.59 x 0.762mm); 100'	24961	
1/16 x 0.04" (1.59 x 1.016mm); 6'	24962	
1/16 x 0.04" (1.59 x 1.016mm); 25'	24963	
1/16 x 0.04" (1.59 x 1.016mm); 50'	24964	
1/8 x 0.085" (3.18 x 2.1mm); 6'	24965	
1/8 x 0.085" (3.18 x 2.1mm); 25'	24966	
1/8 x 0.085" (3.18 x 2.1mm); 50'	24967	
CLEANED COPPER (GC PLUMBING QUALITY; ASTM¹ B-280 PLUS SUPELCO CLEANING)		
1/8 x 0.065" (3.18 x 1.65mm); 50' Coil	20488	
1/4 x 0.190" (6.35 x 4.83mm); 50' Coil	20489	
Shorter Lengths, per foot		
GENERAL PURPOSE COPPER (ASTM B-280)		
1/8 x 0.065" (3.18 x 1.65mm); 50' Coil	20520-U	
1/4 x 0.190" (6.35 x 4.83mm); 50' Coil	20522	
Shorter Lengths, per foot		
SP-ALLOY (NICKEL ALLOY; FOR MAXIMUM INERTNESS)		
1/8 x 0.085" (3.18 x 2.1mm); 50' Coil	22709-U	
Shorter Lengths, per foot		
TEFLON (TFE) (MAX. TEMP.: 240°C)		
0.085 x 0.062" (2.1 x 1.58mm); 25' Coil	20531	
1/4 x 0.228" (6.35 x 5.8mm); 25' Coil	20533	
Shorter Lengths, per foot		
TEFLON (FEP) (MAX. TEMP.: 200°C)		
1/8 x 0.085" (3.18 x 2.1mm); 50' Coil	20532	
Shorter Lengths, per foot		

¹ American Society for Testing and Materials.

Stainless Steel Tubing Dimensions



713-0465



P000301

Gas Delivery Tubing and Accessories



SSI TC-20 Tubing Cutter

A zero dead volume connection is important for maximum chromatographic performance. Unswept volume, caused by a poor fit between tubing and the mating seat, can cause sample dispersion and unsatisfactory chromatographic results.

The SSI Model TC-20 tube cutter assures a zero dead volume connection. Because the tubing is held securely in a clamp vise on the vertical swing arm, a square cut is produced when the swing arm is lowered against the abrasive cutting wheel, which produces a finished end. No lubricant or cutting fluid is required. The unit, which is CE marked, will cut most common tubing used in chromatography. 1/16", 1/8", and 1/4" outside diameter tubing with inside diameters as small as 0.008" can be smooth-cut and dressed without distortion.

The precision ground dressing tool for the 1/16" OD tubing is included and is attached directly to the swing arm: it cannot be misplaced or lost. Dressing tools for all three diameters can be ordered separately.

DESCRIPTION	CAT. NO.	PRICE
SSI ELECTRIC STAINLESS STEEL TUBING CUTTER		
Voltage Selectable: 110/220 Volts 50-60 Hz, CE Approved	58539-U	
REPLACEMENT PARTS		
Cutting Wheels, TC-20 (pk. of 3)	58540-U	
Dressing Tool for 1/16" Tubing	58804	
Needle Insert for 1/16" Deburring Tool	58805	
ADDITIONAL PARTS		
Dressing Tool for 1/8" Tubing	58806	
Needle Insert for 1/8" Dressing Tool	58807	
Cutting Wheels, TC-10 (pk. of 3) ¹	58803	

¹ Replacement cutting wheels for SSI Model TC-10 tubing cutter. Will not fit Model TC-20.

Tubing Cutter for 1/16"
Stainless Steel Tubing



Low-cost tool cuts 1/16" stainless steel tubing without obstructing the bore. Easily cut 1/16" OD stainless steel tubing, then use the dressing tool to remove burrs from the cut end, to ensure a uniform flow of gas or liquid. Dressing tool kit includes dressing fixture, dressing tool, and file. Order tubing cutter and dressing tool kit separately.

DESCRIPTION	CAT. NO.	PRICE
Tubing Cutter for 1/16" SS Tubing	58692-U	
Cutting Wheels (pk. of 2)	22411	
Dressing Tool Kit	58691-U	

Tubing Cutters

The heavy duty tubing cutter is perfect for cutting 1/8" to 1 1/8" OD metal tubing. A spare cutting wheel is included.

The pocket-sized Imp tubing cutter is ideal for working in tight spaces.

DESCRIPTION	CAT. NO.	PRICE
Heavy Duty Tubing Cutter	20425-U	
Cutting Wheels (pk. of 3)	20626	
Imp Tubing Cutter	22410-U	
Cutting Wheels (pk. of 2)	22411	

Tubing Benders

The heavy duty benders easily bend aluminum, copper, or stainless steel tubing up to 180°, without kinking or splitting the tubing.

The three-in-one tool bends 1/8", 3/16", or 1/4" (3, 4, or 6mm) tubing of standard wall thickness.

DESCRIPTION	CAT. NO.	PRICE
Heavy Duty Bender for 1/8" OD Tubing	20422-U	
Heavy Duty Bender for 1/4" OD Tubing	20424-U	
Three-Size Tubing Bender	20857	

Tubing Reamer

Does a fine job of opening and rounding the tubing end after cutting.



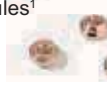










DESCRIPTION	CAT. NO.	PRICE
Tubing Reamer	20389	



Order: 1.800.325.3010 Technical Service: 1.800.359.3041 Web: www.sigma-aldrich.com/supelco

Gas Delivery Tubing Fittings

Swagelok fittings lead the tube connection field because they combine superior design principles with close manufacturing tolerances and rigid quality assurance programs. Since 1947, they have stood the test of time with unparalleled performance on the job. They have been used successfully on some of the most demanding applications in aerospace, chemical processing, oil refining, and clear research commercial fossil and nuclear power, laser technology, electronics, pulp and paper and many other industries.

FITTING	SWAGelok NO.	SIZE (IN.)	QTY.	BRASS		STAINLESS STEEL		
				CAT. NO.	PRICE	QTY.	CAT. NO.	PRICE
Nuts 	102-1	1/16	10	22021		2	22047	
	202-1	1/8	20	22011-U		5	22037	
	402-1	1/4	20	22000-U		5	22026	
Front Ferrules ¹ 	103-1	1/16	10	22022-U		2	22048-U	
	203-1	1/8	20	22012		5	22038	
	403-1	1/4	20	22001		5	22027	
Back Ferrules ¹ 	104-1	1/16	10	22023		2	22049-U	
	204-1	1/8	20	22013		5	22039	
	404-1	1/4	20	22002		5	22028	
	814-1	1/2	—	—	—	5	25825	
Nut, Front & Back Ferrule Sets 	100-S	1/16	10	22024		1	22050	
	200-S	1/8	10	22014		5	22040-U	
	400-S	1/4	10	22003		5	22029	
Port Connectors 	201-PC	1/8	2	22688		2	22689	
	401-PC	1/4	2	22690-U		—	—	—
	401-PC-2	1/4 to 1/8 reducer	2	22094-U		2	22095-U	
Caps (nuts & ferrules included) 	200-C	1/8	6	22018-U		—	—	—
	400-C	1/4	6	22008		2	22034	
Plugs 	100-P	1/16	3	22136-U		1	22137-U	
	200-P	1/8	6	22019-U		1	22045-U	
	400-P	1/4	6	22009		2	22035-U	
	810P	1/2	3	25814		1	25826	
Reducers 	100-R-2	1/16A x 1/8B	2	22017-U		1	22043	
	100-R-4	1/16A x 1/4B	2	22701		1	22702	
	200-R-4	1/8A x 1/4B	2	22006		1	22032	
	400-R-2	1/4A x 1/8B	2	21516		1	21517	
	400-R-8	1/4A x 1/2B	2	25815		1	25827	
Unions A 	100-6	1/16	1	22025		1	22051-U	
	200-6	1/8	2	22015		1	22041	
	400-6	1/4	2	22004		1	22030-U	
	810-6	1/2	2	25816		1	25828	
Reducing Unions 	200-6-1	1/8 x 1/16	2	22016		1	22042-U	
	300-6-2	3/16 x 1/8	2	22072		—	—	—
	400-6-1	1/4 x 1/16	2	22074		1	22075-U	
	400-6-2	1/4 x 1/8	2	22005		1	22031	
	400-6-3	1/4 x 3/16	—	—	—	1	22077-U	
	810-6-2	1/2 x 1/8	2	22714		—	—	—
Bored-Through Unions 	200-6BT	1/8 x 1/8	—	—	—	1	22088	
	400-6BT	1/4 x 1/4	1	21664		1	21518	
Bulkhead Unions for panel mounting 	100-61	1/16	1	21980-U		1	22665-U	
	200-61	1/8	1	21981-U		1	22666	
	400-61	1/4	1	21982-U		1	22667-U	
Zero-Dead Volume Unions 	I FO-6-GC	1/16	1	22053-U		1	22052	

¹ Teflon fittings for front and back ferrules are available. See chart on next page.

P000282, 283, 280, 297, 276, 281, 277, 279, 278, 294, 289, 295

Gas Delivery Tubing Fittings

FITTING	SWAGelok NO.	SIZE (IN.)	QTY.	BRASS		STAINLESS STEEL	
				CAT. NO.	PRICE	QTY.	CAT. NO.
Tees 	100-3	1/16	1	22132-U		1	22133-U
	200-3	1/8	1	22020-U		1	22046
	400-3	1/4	1	22010-U		1	22036
	810-3	1/2	1	25817		1	25829
Female Branch Tee 	200-3TTF	1/8NPT top 1/8 sides	1	22143-U		—	—
Union Crosses 	200-4	1/8	1	22684		—	—
	400-4	1/4	1	22686		—	—
Pipe Adapters 	4-TA-1-2	1/4A x 1/8B	2	22100-U		—	—
Connectors 	200-1-2	1/8A x 1/8B	2	22082		1	22084-U
	400-1-2	1/4A x 1/8B	2	22083		1	22085-U
	200-1-4	1/8A x 1/4B	2	22066		1	22067
	400-1-4	1/4A x 1/4B	2	21519		1	22700-U
	810-1-4	1/2A x 1/4B	2	25818		1	25830
Connectors 	200-7-2	1/8A x 1/8B	2	22703		—	—
	400-7-2	1/4A x 1/8B	2	22705-U		1	22706
	200-7-4	1/8A x 1/4B	2	21978-U		1	21979-U
	400-7-4	1/4A x 1/4B	2	22707		1	22708
	810-7-4	1/2A x 1/4B	2	25819		1	25831
90° Male Elbow 	200-2-2	1/8A x 1/8B	2	21970-U		1	21974
	200-2-4	1/8A x 1/4B	2	21971		—	—
	400-2-2	1/4A x 1/8B	2	21972		1	21976-U
	400-2-4	1/4A x 1/4B	2	21973		1	21977-U
Miniature Quick Connects Stem Assembly 	QM2-S-200	1/8	1	22710-U		1	22711-U
Miniature Quick Connects Body Assembly 	QM2-B-200	1/8	1	22712-U		1	22713

P000292, 290, 291, 296, 293, 288, 285, 286, 287

Teflon Fittings

	SWAGelok NO.	SIZE (IN.)	QTY.	CAT. NO.	PRICE
Front	103-1	1/16	5	22068	
Ferrules	203-1	1/8	10	22058	
	403-1	1/4	10	22054	
Back	104-1	1/16	5	22069	
Ferrules	204-1	1/8	10	22059	
	404-1	1/4	10	22055-U	

HELPFUL HINTS

When ordering, please specify the number of packages, not the number per package. For example: 1 package of 22021, not 10 or you might get 10 packages!

Order: 1.800.325.3010 Technical Support: 1.800.359.3041 Web: www.sigma-aldrich.com/supelco

Gas
Chromatography

SUPELCO

Gas Delivery Tubing Fittings

High Quality Whitey/Nupro Valves

VALVE	SIZE (IN.)	CAT NO.	BRASS PRICE	STAINLESS STEEL CAT. NO.	STAINLESS STEEL PRICE
Toggle Valve (quick acting)	1/8 straight	22699		22698	
	1/8 angle	22123-U		22124-U	
	1/4 straight	22697		—	—
	1/4 angle	22125-U		22126-U	
On/Off Throttling Valve	1/8	22138-U		22139-U	
	1/4	22140-U		22141-U	
	1/2	—	—	25832	
Fine Metering Valve for accurate regulation	1/8 straight	22116		22117	
	1/8 angle	22114		22115	
Vernier Handle for fine metering valve (Order valve separately)		22122			



Swagelok Fittings Kit

- Save more than 30%, compared to prices for individual items

A useful assortment of 1/8" and 1/4" brass fittings, packaged in a compartmented clear plastic storage box. Have the parts you need on hand when you need them, and save money as well.

The Swagelok Fittings Kit includes:

SWAGelok NO.	DESCRIPTION	QTY.
202-1	1/8" nut	20
402-1	1/4" nut	20
203-1	1/8" front ferrule	20
403-1	1/4" front ferrule	20
204-1	1/8" back ferrule	20
404-1	1/4" back ferrule	20
200-C	1/8" cap	6
400-C	1/4" cap	6
200-P	1/8" plug	6
400-P	1/4" plug	6
200-6	1/8" union	2
400-6	1/4" union	2
200-2	1/4" x 1/8" reducing union	2
200-3	1/8" tee	2
400-3	1/4" tee	2
200-R-4	Reducer 1/8" Swagelok x 1/4" tube	2
400-R-2	Reducer 1/4" Swagelok x 1/8" tube	2
MS-IG-200	1/8" inspection gauge	1
MS-IG-400	1/4" inspection gauge	1

DESCRIPTION	CAT. NO.	PRICE
Swagelok Fittings Kit	22668-U	

Gas Delivery

Inline Filters, Tube Fitting Accessories



Gas Line Filter

This 7 micron gas line filter removes dust and small particles that could otherwise foul the needle valve in your chromatograph.

DESCRIPTION	CAT. NO.	PRICE
For 1/8" Fittings	20620	
For 1/4" Fittings	20621	
For 1/2" Fittings	25833	
Replacement 7µm Filter		
Stainless Steel, 1/8"	25810-U	
Stainless Steel, 1/4"	25809	



"T"-Type Gas Line Filter

With 7µm sintered stainless steel frit.

DESCRIPTION	CAT. NO.	PRICE
1/8" Brass	25805	
1/4" Brass	25806	
1/8" Stainless Steel	25807	
1/4" Stainless Steel	25808	
Replacement 7µm Filter		
Stainless Steel	25809	



Gap Inspection Gauge

Ensures correct tightening of Swagelok fittings. Place in the gap between the fitting nut and body. The gauge will not fit if the Swagelok nut has been tightened sufficiently.

DESCRIPTION	CAT. NO.	PRICE
For 1/8" Fittings	21984-U	



Tee Wrench

Holds Swagelok fittings firmly and precisely. Made by Swagelok specifically for 1/4" Swagelok union tees and crosses, this wrench allows sure, easy gripping on the fitting body – even in cramped areas. Rugged alloy steel with no-slip vinyl sleeve.

DESCRIPTION	CAT. NO.	PRICE
Swagelok Tee Wrench, 1/4"	21983-U	



Universal Mounting Brackets

Hold your valve or restrictor firmly in place. Easy and convenient mounting.

DESCRIPTION	CAT. NO.	PRICE
Universal Mounting Brackets (pk. of 2)	22131-U	

Swagelok Manual

A leak-free system requires proper tubing, quality fittings, and skilled installation. The Swagelok Tube Fitter's Manual provides detailed instructions for tubing selection and proper installation of Swagelok fittings. It will help you avoid many installation problems and can easily save you its purchase price.

DESCRIPTION	CAT. NO.	PRICE
Swagelok Manual	22339	

Order: 1.800.325.3010 Technical Service: 1.800.359.3041 Web: www.sigma-aldrich.com/supelco

Gas Chromatography

GC Valves

Manual Sampling / Switching Valves

Column switching procedures make your GC system more versatile. Multiple port sampling and switching valves enable you to perform analyses that call for switching columns, reversing the elution sequence of sample components, or selecting between two columns to a single detector.

These valves also eliminate pressure surges and improve sample-to-sample reproducibility of peak separations.

Valco precision sampling and switching valves are low in dead volume and easily adapt to any type of tubing. Zero volume nuts and fittings enable you to make connections directly to the valve, minimizing dead volume for on-column injections. 303 stainless steel, with Teflon rotor.

Manual Sampling and Switching Valves

Zero volume nuts, mounting bracket, 3-inch handle included.

Corrosive resistant Hastelloy C valves are available as custom.

NO. VALVE PORTS	FITTINGS	CAT. NO.	PRICE
175°C MAXIMUM TEMPERATURE			
4	1/8"	22975	
6	1/16"	22976	
	1/8"	22977	
10	1/8"	22981	
300°C MAXIMUM TEMPERATURE			
4	1/16"	22941	
	1/8"	22914	
6	1/16"	22950	
	1/8"	22915	
8	1/8"	22916	

Sample Loops for Gas Sampling

303 stainless steel; zero volume nuts not included.

VALVE FITTING	LOOP VOLUME (cc)	CAT. NO.	PRICE
6-PORT			
1/16"	0.25	22628	
	0.5	22629	
	0.5	22633	
	1.0	22634	
1/8"	5.0	22635	
	10-PORT		
1/8"	0.5	22649	
	5.0	22651	

Shaft and Seal Assembly

For 175°C (max. temp.) 6-port valves

DESCRIPTION	CAT. NO.	PRICE
Shaft and Seal for 1/16" valves	22926	

¹ Shaft and seal assemblies for 4-, 8-, and 10-port, 175°C valves are available on request. Assemblies for 300°C valves are not available from Supelco – contact Valco Instruments.

Special Stainless Steel Adapter Fittings

For easy connection of the valve to the detector and injector through low dead volume fittings. Nuts and ferrules are included where needed. 303 stainless steel.

DESCRIPTION	CAT. NO.	PRICE
Zero Volume Union, 1/16" to 1/16"	22997-U	
Reducing Union, 1/8" to 1/16"	22999	
Zero Dead Volume External Reducer 1/16" tubing to 1/8" injector or detector fitting	22948	
Zero Dead Volume Internal Reducer 1/16" tubing to 1/8" valve port	22949	

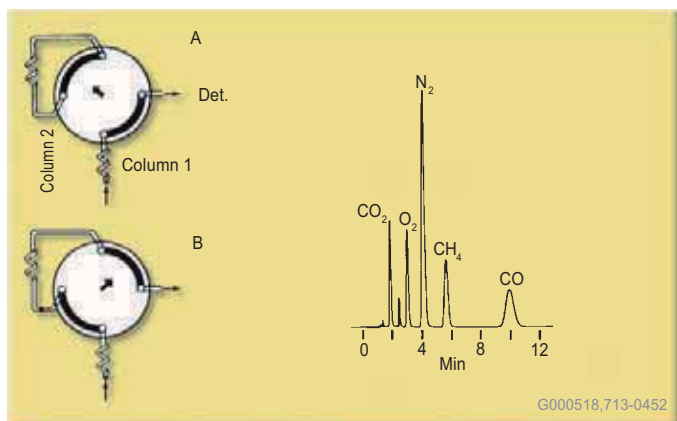
Recommended Spare Parts

Maintain a supply of spare nuts and ferrules. We also suggest having a spare shaft and seal assembly for each valve in use. An extension shaft for remote oven operation is included with each stand-off assembly.

DESCRIPTION	CAT. NO.	PRICE
Zero Volume Ferrules, 303 SS (pk. of 10)		
1/16"	22988	
1/8"	22989	
Zero Volume Nuts, 303 SS (pk. of 10)		
1/16"	22990-U	
1/8"	22991	
Stand-Off Assembly, 6"/15cm (for oven mounting a 4-, 6-, or 8-port valve)	22995-U	

GC Valves

Manual Sampling / Switching Valves

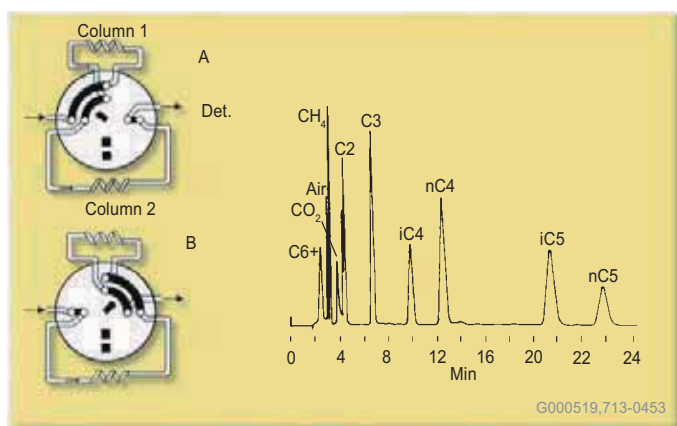


4-Port Valve Application

Isolate a column to prevent a compound, emerging from an upstream column, from being irreversibly adsorbed.

In the figure, CO₂ is separated from air in Column 1, and bypasses Column 2 when the valve is switched to position B. After the CO₂ is detected, the valve is switched back to position A and O₂, N₂, CH₄, and CO elute from Column 2 to the detector.

Column 1: 60/80 Chromosorb 102, 6' x 1/8" SS
Column 2: 60/80 Molecular Sieve 5A, 3' x 1/8" SS
Col. Temp.: 50°C, Sample: 1% mixture in H₂

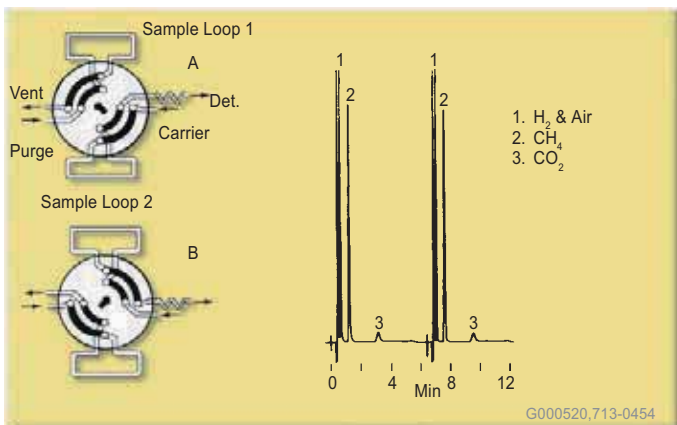


6-Port Valve Application

Foreflushing allows you to separate low molecular weight compounds. In the example shown, C1-C5 hydrocarbons are rapidly eluted from Column 1 onto Column 2 (position A).

When the valve is switched to position B, C6 and heavier compounds (which have moved slowly through Column 1) are eluted from Column 1 to the detector. C1-C5 hydrocarbons are eluted from Column 2 back onto Column 1, then to the detector.

30% DC-200 on 60/80 Chromosorb P AW,
2.5' x 1/8" SS (Column 1), 30' x 1/8" SS (Column 2)
Col. Temp.: 88°C

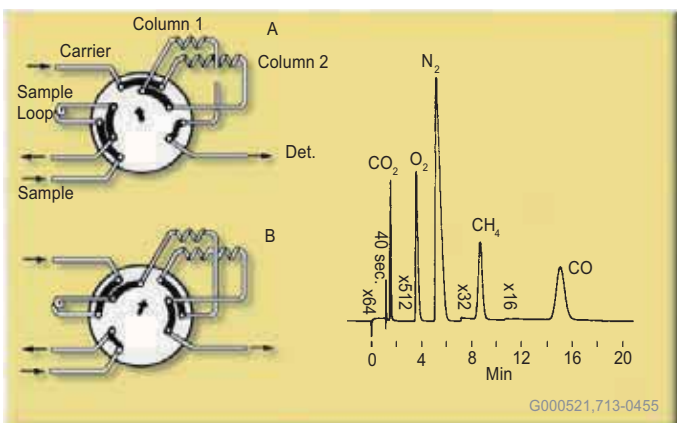


8-Port Valve Application

Select between two columns connected to a single detector requiring auxiliary gas for the second column.

The figure shows the 8-port sampling valve with two sample loops used for repetitive sample injections on one column.

Column: 60/80 Chromosorb 102, 5' x 1/8" SS
Col. Temp.: 40°C, Sample: 5% mixture in H₂



10-Port Valve Application

The figure illustrates the use of sequence reversal to monitor CO₂, CH₄, and CO in air.

The sample is injected onto Column 1 and held 40 seconds to allow the composite peak of air, CO, and CH₄ to pass onto Column 2. The valve is switched back to position A and the column sequence is reversed to allow CO to pass to the detector, followed by O₂, N₂, CH₄, and CO.

Column 1: 60/80 Chromosorb 102, 5' x 1/8" SS
Column 2: 60/80 Molecular Sieve 5A, 5' x 1/8" SS
Col. Temp.: 70°C, Sample: 1% mixture in air