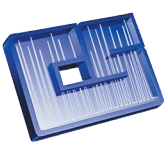
Restek GC Accessories

Gas Management

Supplies for GC Labs

- Gas Generators
- Pressure Regulators
- Tubing and Fittings
- Gas Purifiers

RESTEK Pure Chromatography www.restek.com



CHROMATOGRAPHIC SPECIALTIES INC.

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Gas Management for Your Lab

A clean gas stream is critical to the quality of your GC analysis and the reliability of your analytical results. Carrier gas must contain less than 1 ppm of oxygen, water vapor, and other trace contaminants for stable baselines on all detectors and to prevent column degradation, shortened column lifetime, and increased stationary phase bleed. Clean fuel gases and make-up gases are also essential for stable detector baselines. Your gas management system must deliver a high-purity gas stream from your source to your instrumentation without introducing contaminants. Restek offers the products you need to assure a clean, leak-free gas management system. If you need assistance in configuring your system, contact your Restek representative to discuss your application requirements.

Questions to consider when building your gas management system:

1. **What gases do you require and at what purity?**
2. **What flow rates and/or pressures are required?**
3. **Are you using gas generators or high-pressure cylinders?**
4. **What type of tubing and fittings are needed to build your system?**
5. **What type of gas purifiers should you install in your system?**

Once the components needed for your system are established, you will need to determine the most appropriate way to configure your gas management system. Figures 1 and 2 are typical configurations: Figure 1 illustrates a system that uses gas generators and Figure 2 shows a system configured for use with high-pressure cylinders.

Figure 1: Gas management system configuration using gas generators.

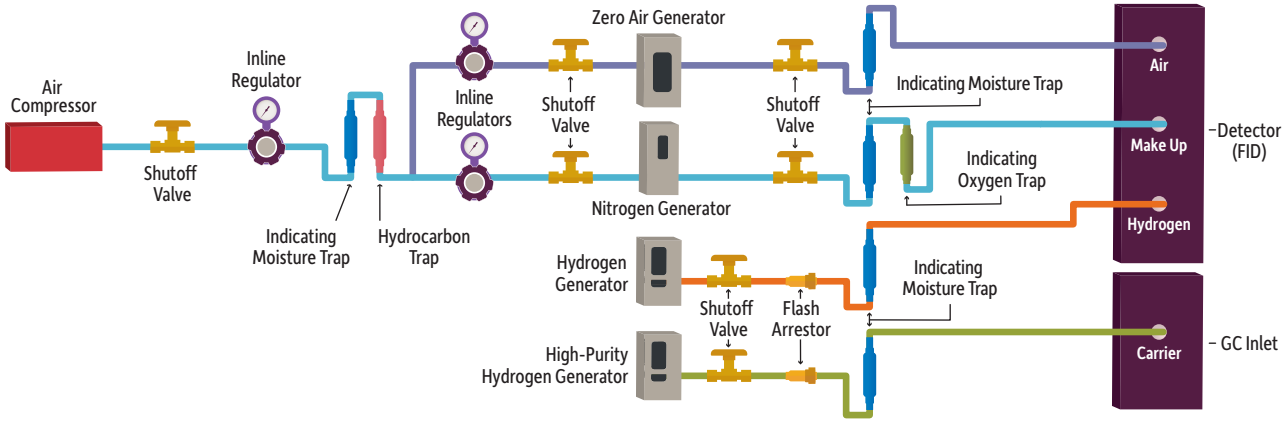
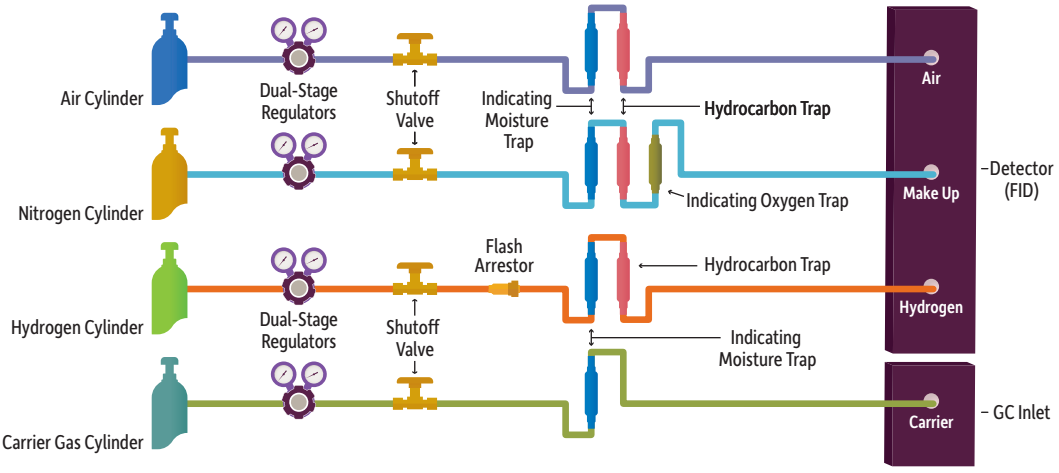


Figure 2: Gas management syster configuration using gas cylinders.



Gas Generators

Dependable gas supply • Consistent gas purity • Safe and economical

Gas generators eliminate the downtime, constant monitoring, and routine maintenance associated with using cylinders. Gas generators produce gas continuously and reliably, without the interruptions that can be experienced during cylinder changes or delays in delivery when using gas cylinders.

A pure and consistent gas supply is needed for reproducible analytical results, but gas purity can vary from cylinder to cylinder in a way that is difficult to control. Dirty or rusted cylinders can also introduce contaminants and particulates into your gas stream. Gas generators eliminate these problems by continuously generating clean and pure gas.

Gas generators are a safe, compact, and virtually maintenance-free source of high-purity gas. Routine maintenance is minimal and since generators don't store gas at high pressures, they are not as hazardous as gas cylinders. Gas generators can be placed in your lab in close proximity to your instruments, eliminating the need for a remote, isolated storage area. Depending on your specific analytical flow requirements, most gas generators can supply gas to multiple GCs in your lab.

Gas generators are typically less expensive than gas cylinders in the long term. Gas generators offer an unlimited source of high-purity gas, which is available on demand. Cylinders appear to be less expensive initially but, if used continuously, have a significant replacement and resupply cost.

Hydrogen Gas Generators

Hydrogen gas generators produce hydrogen through the electrolysis of water. For operation, these generators require an electrical outlet and a source of deionized water. Restek offers a number of Parker Balston hydrogen generators that can produce flow rates from 100 mL/minute up to 1,300 mL/minute at maximum pressures of 175 psig.

FID Gas Stations

FID gas stations combine a hydrogen generator and zero air generator into one unit. Parker Balston FID gas stations provide both ultra-high purity grade hydrogen gas and zero air for flame ionization detectors. Different models are available and can supply fuel gases for up to six FIDs.

Zero Air Gas Generators

High-purity air is essential as a fuel gas for flame ionization detectors (FID) in order to produce stable, low-level baselines. Zero air gas generators from Parker Balston can turn in-house compressed air into ultra-pure air with less than 0.1 ppm hydrocarbon levels. Varying models are available with flow rates from 1,000 mL/minute up to 30,000 mL/minute at pressures ranging from 40 to 125 psig.

Nitrogen Gas Generators

Nitrogen gas generators produce pure nitrogen from compressed air. Parker Balston nitrogen gas generators produce ultra-pure nitrogen for use as GC carrier gases, make-up gases, and low-flow sample concentrators. Models are available to supply nitrogen at flows from 1 to 75 liters per minute.

Need help selecting a gas generator?

Contact your local Restek representative or our Technical Service group at **support@restek.com** or **1-814-353-1300, ext. 4**.

HYDROGEN GAS GENERATORS

Safer alternative to high-pressure gas cylinders!

- Dimensions: 17.12" x 13.46" x 17.95"
- 59 lb dry weight

Parker Balston PEM Hydrogen Generators

- Proton exchange membrane (PEM) cell eliminates the need for liquid electrolytes.
- Reliably generate 99.9999% pure hydrogen—for better chromatography.
- Eliminates high-pressure cylinders—greater convenience and improved lab safety.
- Compact unit, requiring only one square foot of bench space.
- Quick and easy to service and maintain; unique display lighting changes color for easy status checks and water level indication.
- Comes with a set of universal power adapters for U.S., European, and Asian plug types.
- Automatic safety feature shuts the generator down if a hydrogen leak is detected.
- Warranty: one year from date of purchase on system and two years from date of purchase on cell life.

Specifications

Purity: 99.9999% pure hydrogen
Delivery Pressure: 5-100 psig ± 0.5 psig (69-689 kPa ± 7kPa)
Outlet Port: 1/8" compression
Electrical Requirements: 100-230 VAC/50-60 Hz
Physical Dimensions: 17.12" h x 13.46" w x 17.95" d (43.48 x 34.19 x 45.6 cm)
Shipping Weight: 59 lb (27 kg) dry

Description	Model #	Capacity	qty.	cat.#
Hydrogen Generator	H2PEM-100	100 cc/min	ea.	23065
Hydrogen Generator	H2PEM-165	165 cc/min	ea.	23066
Hydrogen Generator	H2PEM-260	260 cc/min	ea.	23067
Hydrogen Generator	H2PEM-510	510 cc/min	ea.	23068

Parker Balston H2PEMPD Hydrogen Generators

- Proton exchange membrane (PEM) cell eliminates the need for liquid electrolytes.
- Maintenance-free palladium purifier removes oxygen to <0.01 ppm and moisture to <1.0 ppm.
- Produces continuous supply of 99.99999+% pure hydrogen gas.
- Does not require downstream gas filters.
- Maximum outlet pressures of 100 or 175 psig (690 or 1,200 kPa).
- Automatic safety feature shuts the generator down if a hydrogen leak is detected.
- Compact unit, requires only one square foot of bench space.
- Warranty: one year from date of purchase on system and three years from date of purchase on cell life.

Specifications:

Purity: 99.99999+% pure hydrogen
Outlet Port: 1/4" compression
Electrical Requirements: 100 to 230 VAC, 50/60Hz
Physical Dimensions: 17.1" h x 13.5" w x 21" d
Shipping Weight: 60 lb

Description	Model #	Capacity	Delivery Pressure	qty.	cat.#
Hydrogen Generator	H2PEMPD-510	510 cc/min	100 psig	ea.	22144
Hydrogen Generator	H2PEMPD-510	510 cc/min	175 psig	ea.	22145
Hydrogen Generator	H2PEMPD-650	650 cc/min	100 psig	ea.	22146
Hydrogen Generator	H2PEMPD-650	650 cc/min	175 psig	ea.	22147
Hydrogen Generator	H2PEMPD-850	850 cc/min	100 psig	ea.	22148
Hydrogen Generator	H2PEMPD-850	850 cc/min	175 psig	ea.	22149
Hydrogen Generator	H2PEMPD-1100	1,100 cc/min	100 psig	ea.	22150
Hydrogen Generator	H2PEMPD-1100	1,100 cc/min	175 psig	ea.	22151
Hydrogen Generator	H2PEMPD-1300	1,300 cc/min	100 psig	ea.	22152
Hydrogen Generator	H2PEMPD-1300	1,300 cc/min	175 psig	ea.	22153

ZERO AIR GAS GENERATORS

Parker Balston Zero Air Generators

- Turn in-house compressed air into ultra-pure air (<0.1 ppm total hydrocarbons).
- Remove hydrocarbons to less than 0.1 ppm by catalytic oxidation.
- Operate at 40–125 psi (276–862 kPa).
- Typical payback is less than one year, based on cylinder costs.
- Install easily and take up little bench space*.
- Maintenance kits include a one-year supply of prefilters and final filter.

Description	Model #	Capacity	qty.	cat. #
Zero Air Generator	75-83NA	1,000 cc/min	ea.	20684
Zero Air Generator	HPZA-3500	3,500 cc/min	ea.	20680
Zero Air Generator	HPZA-7000	7,000 cc/min	ea.	20681
Zero Air Generator	HPZA-18000	18,000 cc/min	ea.	20682
Zero Air Generator	HPZA-30000	30,000 cc/min	ea.	20683

*Parker Model 75-83NA (Restek cat.# 20684) is a wall-mount model, and its dimensions are 12" w x 10" h x 3" d.

International power cords are available.
Contact Customer Service to order.

FID GAS STATIONS

Parker Balston Model FID-1000 and FID-2500 Gas Stations

- Single unit produces UHP zero air from house compressed air and 99.9995% pure hydrogen from deionized water.
- Ideal for supplying up to 5-6 FIDs.
- Eliminates inconvenient and dangerous gas cylinders.
- Silent operation, minimal operator attention required.
- 12-month warranty from date of purchase.

Specifications - FID Gas Stations:

Hydrogen Purity: 99.9995%
Zero Air Purity: < 0.1 ppm total hydrocarbons as methane
Max. Hydrogen Flow Rate: FID-1000: 90 cc/min, FID-2500: 250 cc/min
Max. Zero Air Flow Rate: FID-1000: 1000 cc/min, FID-2500: 2500 cc/min
Power: 120 VAC/amp, 60 Hz, 480 watts

Hydrogen Outlet Pressure: 60 psig (414 kPa)
Zero Air Outlet Pressure: 40-125 psig* (276-862 kPa)
Inlet Connection: 1/4" NPT (female)
Outlet: 1/8" compression
Dimensions: 16.5" h x 10.5" w x 17" d (42 cm x 27 cm x 43 cm)
Weight: 53 lb (24 kg)

Description	Model #	qty.	cat. #
Gas Station	Model FID-1000 (ideal for 1-2 FIDs)	ea.	20177
Gas Station	Model FID-2500 (ideal for 5-6 FIDs)	ea.	24913

*Zero air inlet requires minimum of 40 psig (276 kPa) compressed air pressure.
Filters should be changed every year; resin and desiccant cartridges can be replaced every 2 years.

Produce zero air and pure hydrogen from one unit!

NITROGEN GAS GENERATORS

Parker Balston Nitrogen Gas Generators

- Produces ultra-pure nitrogen (up to 99.9999%).
- Requires only a compressed air source and 110 volt AC power.
- Typical applications include GC carrier gas, make-up gas, and low-flow sample concentrators.
- Maintenance kits include replacement filters.
- 12-month warranty from date of purchase.

Description	Model #	qty.	cat.#
Nitrogen Generator	UHPN2-1100 (ultra-high purity zero grade)	ea.	20697

Gas Cylinder Accessories

When using high-pressure gas cylinders, there are a number of accessories that should be used in order to safely handle and install cylinders in your gas management system.

Handling Gas Cylinders

When using high-pressure gas cylinders, there are a number of accessories that should be used in order to safely handle and install cylinders in your gas management system. Dropped gas cylinders are very dangerous and can become flying projectiles if the cylinder valve is damaged. A cylinder holder will safely secure your cylinder to a wall in your lab, preventing it from accidentally toppling over and discharging its contents.

Manifolds and Switchover Systems

High-purity automatic switchover systems provide a continuous supply of high-purity gas to your gas management system. Continuous gas supply is achieved by setting the two regulators at slightly different pressures and discharging one side of the system at a time. This allows for the replacement of a depleted gas cylinder without interrupting the gas supply.

21333

21321

21334

21347

Description	qty.	cat.#
Wall Mounted Cylinder Holders		
Cylinder Holder, Wall Mounted, Single	ea.	21333
Cylinder Holder, Wall Mounted, Double	ea.	23400
Cylinder Holder, Wall Mounted, Triple	ea.	23401
Cylinder Holder, Wall Mounted, Quadruple	ea.	23402
Tools		
Cylinder Valve Wrench	ea.	21321
Universal Cylinder Wrench	ea.	21322
Flexible Stainless Steel Hose, 1/4" Female NPT, 36"	ea.	21339
Flexible Stainless Steel Hose, 1/4" Female NPT, 18"	ea.	21340
Flash Arrestors		
Hydrogen Flashback Arrestor, Brass Body, 1/4" Female NPT	ea.	21334
Protocol Wall Mounts for Gas Regulators*		
Chrome-Plated Brass, CGA 580 (N_2, He, Ar)	ea.	21347
Chrome-Plated Brass, CGA 350 (H_2, P_5)	ea.	21348
Chrome-Plated Brass, CGA 590 (Air)	ea.	21349
Stainless Steel, CGA 580 (N_2, He, Ar)	ea.	21327

*Pressure regulator not included. Order separately.

Pressure Regulators

The job of a pressure regulator is simple: it reduces the pressure of a gas source to a safe working pressure. However, there are many variables that need to be considered when choosing a pressure regulator. Does your application require a stainless steel or brass regulator? Do you need a single or dual stage regulator? What type of gas are you regulating and what is the desired delivery pressure? Your choice in a pressure regulator will depend on your application and where the regulator will be placed in your gas management system.

Ultra-High Purity Regulators

Restek offers ultra-high purity (UHP) pressure regulators in chrome-plated brass and stainless steel bodies. Both are ideal for applications requiring gas purities of 99.995% or greater, such as those used in carrier and fuel gas supplies. These pressure regulators are made from cold drawn bar stock, which results in smooth, reduced internal dead-volumes, making them ideal for high-purity applications. In situations where corrosive gases are used or where the regulator is in a corrosive environment, stainless steel bodies are required.

Dual-Stage Pressure Regulators

A dual-stage pressure regulator provides more precise pressure control by reducing the gas source pressure to the desired delivery pressure in two steps. They are recommended for supplying gas where constant delivery pressure is critical, especially if your gas source is a high-pressure cylinder. As the cylinder gas is used, the inlet pressure to the regulator from the cylinder decreases. A dual-stage regulator compensates for the decrease and maintains a constant delivery pressure; whereas, a single-stage regulator does not.

Single-Stage Pressure Regulators

A single-stage pressure regulator reduces the pressure of the gas source to the desired delivery pressure in one step. It does not provide the precise control of delivery pressure that can be achieved with a dual-stage pressure regulator. Single-stage pressure regulators should be used for applications where you can monitor and regulate the pressure downstream.

In-Line Regulators

Line regulators are single-stage pressure regulators that are used to provide point-of-use pressure monitoring and control. These pressure regulators are installed directly into gas lines, immediately before your instrumentation, to ensure the appropriate gas pressure is being delivered to your instrument. A dual-stage or single-stage pressure regulator should always be installed upstream of the in-line regulator to ensure adequate pressure control.

Pressure Regulator Connections

Restek ultra-high purity pressure regulators come with a variety of different connection fittings for attachment to different high-pressure gas cylinders. In the United States, Compressed Gas Association (CGA) fittings are used and designed for different gas service. In the European Union, German Institute for Standardization (DIN) fittings are used to make these connections, and British Standard (BS) fittings are used in the United Kingdom. Table I indicates the appropriate fitting for each type of gas typically used in setting up your gas management system.

Table I: Choose fittings for your pressure regulator based on gas type.

	CGA	DIN 477	BS341
Helium	580	#6	#3
Hydrogen	350	#1	#4
Nitrogen	580	#10	#3
Air	590	#9	#3
Argon	580	#6	#3
P5 (Argon:Methane)	350	#1	#4

Need help selecting a pressure regulator?

Contact your local Restek representative or our Technical Service group at **support@restek.com** or **1-814-353-1300, ext. 4**.

ULTRA-HIGH PURITY (UHP) BRASS BODY GAS REGULATORS

21667

All regulators are rated to 3,000 psig (20,684 kPa) maximum inlet pressure.
Inlet gauge: 0 to 4,000 psig (0–27,579 kPa)
Outlet assembly: 316L stainless steel diaphragm valve, 1/4" tube fitting

Dual-Stage Ultra-High Purity Chrome-Plated Brass Gas Regulators

- Oxidation-resistant, chrome-plated.
- Most stable outlet pressure control.
- Secondary pressure regulation not needed.
- Most widely used regulator.

Fitting	Outlet Pressure	Outlet Gauge	qty.	cat.#
CGA 580 (N_2, He, Ar)	0 to 150 psig (0–1,034 kPa)	30", 0 to 200 psig (0–1,379 kPa)	ea.	21667
CGA 350 (H_2, P_5)	0 to 150 psig (0–1,034 kPa)	30", 0 to 200 psig (0–1,379 kPa)	ea.	21668
CGA 590 (Air)	0 to 150 psig (0–1,034 kPa)	30", 0 to 200 psig (0–1,379 kPa)	ea.	21669
DIN 477 #1 (H_2)	0 to 10 bar (0–150 psig)	30", 0 to 14 bar (0–200 psig)	ea.	22369
DIN 477 #6 (He, Ar)	0 to 10 bar (0–150 psig)	30", 0 to 14 bar (0–200 psig)	ea.	22368
DIN 477 #9 (Air)	0 to 10 bar (0–150 psig)	30", 0 to 14 bar (0–200 psig)	ea.	22370
DIN 477 #10 (N_2)	0 to 10 bar (0–150 psig)	30", 0 to 14 bar (0–200 psig)	ea.	22371
BS 341 #3 (He, Ar, Air, N_2)	0 to 10 bar (0–150 psig)	30", 0 to 14 bar (0–200 psig)	ea.	22136
BS 341 #4 (H_2)	0 to 10 bar (0–150 psig)	30", 0 to 14 bar (0–200 psig)	ea.	22137

Note: CGA fittings are for U.S. use; DIN fittings are for European use; BS fittings are for use in the UK.

20647

Single-Stage Ultra-High Purity Chrome-Plated Brass Gas Regulators

- Oxidation-resistant, chrome-plated.
- Use when there is secondary pressure regulation downstream.
- Identical gas purity protection as with dual-stage gas regulators.

Fitting	Outlet Pressure	Outlet Gauge	qty.	cat.#
CGA 580 (N_2, He, Ar)	0 to 150 psig (0–1,034 kPa)	30", 0 to 200 psig (0–1,379 kPa)	ea.	20646
CGA 350 (H_2, P_5)	0 to 150 psig (0–1,034 kPa)	30", 0 to 200 psig (0–1,379 kPa)	ea.	20647
CGA 590 (Air)	0 to 150 psig (0–1,034 kPa)	30", 0 to 200 psig (0–1,379 kPa)	ea.	20648
DIN 477 #1 (H_2)	0 to 10 bar (0–150 psig)	30", 0 to 14 bar (0–200 psig)	ea.	22373
DIN 477 #6 (He, Ar)	0 to 10 bar (0–150 psig)	30", 0 to 14 bar (0–200 psig)	ea.	22372
DIN 477 #9 (Air)	0 to 10 bar (0–150 psig)	30", 0 to 14 bar (0–200 psig)	ea.	22374
DIN 477 #10 (N_2)	0 to 10 bar (0–150 psig)	30", 0 to 14 bar (0–200 psig)	ea.	22375
BS 341 #3 (He, Ar, Air, N_2)	0 to 10 bar (0–150 psig)	30", 0 to 14 bar (0–200 psig)	ea.	22138
BS 341 #4 (H_2)	0 to 10 bar (0–150 psig)	30", 0 to 14 bar (0–200 psig)	ea.	22139

Note: CGA fittings are for U.S. use; DIN fittings are for European use; BS fittings are for use in the UK.

PRESSURE REGULATOR CONNECTIONS

20668580

Switching pressure: 200 psig/170 psig (1,379/1,172 kPa)
Inlet connections: flexible SS pigtails (36")
Line regulator: 0 to 150 psig (0–1,034 kPa)

Automatic Switchover System for Noncorrosive Gases

High-purity automatic switchover systems provide a continuous supply of high-purity gas to the laboratory, process, or instrument to allow you to replace a depleted gas source without interruption in the gas supply. Continuous gas supply is achieved by setting the two regulators at slightly different pressures and discharging one side of the system at a time. These models include flexible, all-stainless-steel pigtails with armor casing. The CGA connection on each pigtail has a check valve in the gland to prevent contamination and minimize purging requirements.

Brass Automatic Switchover System with Line Regulator	qty.	cat.#
CGA 580 (N_2, He, Ar)	ea.	20668580
CGA 350 (H_2, P_5)	ea.	20668350
CGA 590 (Air)	ea.	20668590
Stainless Steel Automatic Switchover System with Line Regulator	**qty.**	**cat.#**
CGA 580 (N_2, He, Ar)	ea.	21593580

ULTRA-HIGH PURITY (UHP) STAINLESS STEEL BODY GAS REGULATORS

Dual-Stage Ultra-High Purity Stainless Steel Gas Regulators

- Most stable outlet pressure control.
- Secondary pressure regulation not needed.

Fitting	Outlet Pressure	Outlet Gauge	qty.	cat.#
CGA 580 (N_2, He, Ar)	0 to 150 psig (0–1,034 kPa)	30", 0 to 200 psig (0–1,379 kPa)	ea.	20662
CGA 350 (H_2, P_5)	0 to 150 psig (0–1,034 kPa)	30", 0 to 200 psig (0–1,379 kPa)	ea.	20663
CGA 590 (Air)	0 to 150 psig (0–1,034 kPa)	30", 0 to 200 psig (0–1,379 kPa)	ea.	20664
DIN 477 #1 (H_2)	0 to 10 bar (0–150 psig)	30", 0 to 14 bar (0–200 psig)	ea.	22377
DIN 477 #6 (He, Ar)	0 to 10 bar (0–150 psig)	30", 0 to 14 bar (0–200 psig)	ea.	22376
DIN 477 #9 (Air)	0 to 10 bar (0–150 psig)	30", 0 to 14 bar (0–200 psig)	ea.	22378
DIN 477 #10 (N_2)	0 to 10 bar (0–150 psig)	30", 0 to 14 bar (0–200 psig)	ea.	22379
BS 341 #3 (He, Ar, Air, N_2)	0 to 10 bar (0–150 psig)	30", 0 to 14 bar (0–200 psig)	ea.	22140
BS 341 #4 (H_2)	0 to 10 bar (0–150 psig)	30", 0 to 14 bar (0–200 psig)	ea.	22141

Note: CGA fittings are for U.S. use; DIN fittings are for European use; BS fittings are for use in the UK.

20663

All regulators are rated to 3,000 psig (20,684 kPa) maximum inlet pressure.

Inlet gauge: 0 to 4,000 psig (0–27,579 kPa)

Outlet assembly: 316L stainless steel diaphragm valve, 1/4" tube fitting

Single-Stage Ultra-High Purity Stainless Steel Gas Regulators

- Use when there is secondary pressure regulation downstream.
- Identical gas purity protection as with dual-stage gas regulators.

Fitting	Outlet Pressure	Outlet Gauge	qty.	cat.#
CGA 580 (N_2, He, Ar)	0 to 150 psig (0–1,034 kPa)	30", 0 to 200 psig (0–1,379 kPa)	ea.	20665
CGA 350 (H_2, P_5)	0 to 150 psig (0–1,034 kPa)	30", 0 to 200 psig (0–1,379 kPa)	ea.	20666
CGA 590 (Air)	0 to 150 psig (0–1,034 kPa)	30", 0 to 200 psig (0–1,379 kPa)	ea.	20667
DIN 477 #6 (He, Ar)	0 to 10 bar (0–150 psig)	30", 0 to 14 bar (0–200 psig)	ea.	22380
DIN 477 #1 (H_2)	0 to 10 bar (0–150 psig)	30", 0 to 14 bar (0–200 psig)	ea.	22445
DIN 477 #9 (Air)	0 to 10 bar (0–150 psig)	30", 0 to 14 bar (0–200 psig)	ea.	22446
DIN 477 #10 (N_2)	0 to 10 bar (0–150 psig)	30", 0 to 14 bar (0–200 psig)	ea.	22447
BS 341 #3 (He, Ar, Air, N_2)	0 to 10 bar (0–150 psig)	30", 0 to 14 bar (0–200 psig)	ea.	22142
BS 341 #4 (H_2)	0 to 10 bar (0–150 psig)	30", 0 to 14 bar (0–200 psig)	ea.	22143

Note: CGA fittings are for U.S. use; DIN fittings are for European use; BS fittings are for use in the UK.

20665

IN-LINE GAS REGULATORS

Ultra-High Purity Chrome-Plated Brass Line Gas Regulator

- Oxidation-resistant, chrome-plated.
- Use where you need to reduce the line pressure by 20 psig (138 kPa) or more.
- Same purity protection as high-pressure cylinder regulators.

Fitting	Outlet Pressure	Outlet Gauge	qty.	cat.#
1/4" female NPT ports*	0 to 50 psig (0–345 kPa)	30", 0 to 100 psig (0–689 kPa)	ea.	21666
1/4" female NPT ports*	0 to 150 psig (0–1,034 kPa)	30", 0 to 200 psig (0–1,379 kPa)	ea.	22452

*Order appropriate male connector, pipe-to-tube fittings.

21666

Inlet connections: 1/4" FPT

Outlet assembly: 1/4" FPT port

Tubing and Fittings

Precleaned Tubing from Restek

The integrity of a gas management system can be compromised by using tubing that has not been precleaned. Residual dirt, machine oil, and polycyclic aromatic hydrocarbons from the manufacturing process often found in different types of tubing will lead to problems later on. Restek uses proprietary cleaning methods to preclean copper and stainless steel tubing for plumbing your gas management system.

Tubing

Restek offers both stainless steel and copper tubing precleaned and ready to use. The best choice for plumbing your gas management system is stainless steel tubing, which should always be used for hydrogen gas lines. Type 304 stainless steel tubing is the most commonly used variety. Copper tubing is also available and is the most economical choice for plumbing your gas management system.

Fittings

When assembling your gas management system, all of your connections should be metal-to-metal connections. This ensures a leak-free connection, which is important for preventing contaminants from entering the gas stream. O-rings, gaskets, and sealing reagents should be avoided when plumbing your system to avoid contamination of the tubing and gas chromatograph. Swagelok compression fittings are ideal for making your connections, and both stainless steel and brass fittings are offered in ¼", ⅛", and 1/16" sizes.

Setting Gas Flows and Checking for Leaks

Once your gas management system is assembled, it should be checked for leaks. Leaks allow moisture, oxygen, and other airborne contaminants to enter your system, as well as accelerating the consumption your gas supply. Detecting leaks with soap-based liquids should be avoided as they can contaminate your gas stream and gas chromatograph. The Restek electronic leak detector is the ideal accessory for inspecting your gas management system for leaks. The Restek leak detector can be used to determine if your system is leaking helium, hydrogen, argon, nitrogen, and carbon dioxide.

Once you have determined that your system is leak-free, you can set your gas flows with the Restek ProFLOW 6000 electronic flowmeter. This flowmeter measures flow from 0.5 mL/min up to 500 mL/min with an accuracy of ± 2% or ± 0.2 mL/min, whichever is greater. The ProFLOW 6000 flowmeter is even Ex rated so that it can be used to measure flow rates of flammable gases, such as hydrogen.

Need help selecting tubing and fittings?

Contact your local Restek representative or our Technical Service group at **support@restek.com** or **1-814-353-1300, ext. 4**.

PRE-CLEANED TUBING FROM RESTEK

Rinsed and Cleaned 304 Stainless Steel Tubing

- Use for providing carrier, fuel, make-up, or auxiliary gases to laboratory instruments.
- Proprietary cleaning process used to remove residual organics.

		Length							
		6 Feet	10 Feet	15 Feet	20 Feet	25 Feet	50 Feet	100 Feet	>100 Feet
ID (in.)	OD (in.)	cat.#	cat.#	cat.#	cat.#	cat.#	cat.#	cat.#	cat.#*
0.01"	1/16"	29000	29001	29002	29003	21500	29004	29005	21502
0.02"	1/16"	29006	29007	29008	29009	21503	29010	29011	21505
0.03"	1/16"	29012	29013	29014	29015	21506	29017	29018	21508
0.04"	1/16"	29019	29020	29021	29022	21509	29023	29024	21511
0.085"	1/8"	29025	29026	29027	29028	21512	29029	29030	21514
0.21"	1/4"	29031	29032	29033	29034	21515	29035	29036	21517

*Pricing is on a per foot basis. Maximum continuous lengths are: 2,000 ft (1/16" OD), 1,500 ft (1/8" OD), and 750 ft (1/4" OD). The availability of long lengths is subject to inventory constraints. Lead times may vary depending on the continuous length needed. Please inquire before ordering.

Cleaned Copper Tubing

- Use for plumbing GC systems.
- Proprietary cleaning process used to remove residual organics.

ID	OD	Wall	Max Operating Pressure	qty.	cat.#
0.065"	1/8"	0.030"	2,800 psig	50 ft	22628
0.190"	1/4"	0.030"	1,000 psig	50 ft	22629

FITTINGS

Swagelok Fittings (Brass & Stainless Steel)

		Brass			316 Grade Stainless Steel		
Fitting Type	Size	Swagelok #	qty.	cat.#	Swagelok #	qty.	cat.#
Nut & Ferrule Set	1/16"	—	10-pk.	23109	—	2-pk.	23159
	1/8"	—	20-pk.	23110	—	5-pk.	23160
	1/4"	—	20-pk.	23111	—	5-pk.	23161
Union	1/16"	B-100-6	3-pk.	23115	SS-100-6	ea.	23165
	1/8"	B-200-6	5-pk.	23116	SS-200-6	2-pk.	23166
	1/4"	B-400-6	5-pk.	23117	SS-400-6	2-pk.	23167
Tee	1/16"	B-100-3	2-pk.	23121	SS-100-3	ea.	23171
	1/8"	B-200-3	2-pk.	23122	SS-200-3	ea.	23172
	1/4"	B-400-3	2-pk.	23123	SS-400-3	ea.	23173

Shutoff Gas Valves (Swagelok)

	1/8" Brass	1/4" Brass	1/8" Stainless Steel	1/4" Stainless Steel
Valve Type	cat.#	cat.#	cat.#	cat.#
Toggle Valve	23142	23143	23198	23199
Ball Valve	23144	23145	23200	23201
Ball Valve, 3-Way	23219	23220	23217	23218
Plug Valve	23146	23147	23202	23203

Note: Restek strongly recommends using a filter between plug valves and the instrument. The filter will capture any potential volatile components released from the lubricant used in the valve.

Leak Detector Specifications

Detectable Gases: Helium, nitrogen, argon, carbon dioxide, hydrogen
Battery: Rechargeable lithium ion internal battery pack (12 hours normal operation)
Operating Temperature Range: 32–120 °F (0–48 °C)
Humidity Range: 0–97%
Warranty: One year
Certifications: CE, Ex, Japan
Compliance: WEEE, RoHS, China RoHS 2

Limits of Detection

These gases can be detected with the Restek electronic leak detector at the following leak rates:

Minimum Detectable Gas Limits and Indicating LED Color:

Helium, 1.0 x 10^{-5}, red LED	Argon, 1.0 x 10^{-4}, yellow LED
Hydrogen*, 1.0 x 10^{-5}, red LED	Carbon dioxide, 1.0 x 10^{-4}, yellow LED
Nitrogen, 1.4 x 10^{-3}, yellow LED	

Gas detection limits measured in atm cc/sec.

CHECKING FOR LEAKS

Restek Electronic Leak Detector Don't let a small leak turn into a costly repair—protect your analytical column by using a Restek leak detector.

Features & benefits include:

- Audible tone indicates the severity of a leak.
- Redesigned circuitry offers 12 hours of operation between charges.
- Detects a broad range of gases; Ex rated for use with hydrogen and other explosive gases.*
- Ergonomic, handheld design.
- Rugged side grips for added durability.
- Handy probe storage for cleanliness and convenience.
- Automatic shutoff.
- A convenient carrying and storage case.
- Easy-to-clean probe assembly.
- A universal charger set (U.S., European, UK, and Australian plugs included).

Backed by a one-year warranty, the Restek leak detector is the industry standard for performance and affordability in handheld leak detectors.

Description	qty.	cat.#
Leak Detector with Hard-Sided Carrying Case and Universal Charger Set (U.S., UK, European, Australian)	ea.	22655
Small Probe Adaptor for Leak Detector	ea.	22658
Dynamic Duo Combo Pack (Restek Leak Detector and ProFLOW 6000 Flowmeter)	kit	22654
Soft-Sided Storage Case for Leak Detector or ProFLOW 6000 Flowmeter	ea.	22657
Car Charger/Adaptor	ea.	22652
Universal AC Power Adaptor	ea.	22653

Avoid using liquid leak detectors on a GC! Liquids can be drawn into the system and/or into the leak detector.

*Caution: The Restek electronic leak detector is designed to detect trace amounts of hydrogen in a noncombustible environment. It is NOT designed for determining leaks in a combustible environment. A combustible gas detector should be used for determining combustible gas leaks under any condition. When using it to detect hydrogen, the Restek electronic leak detector may only be used for determining trace amounts in a GC environment.

Flowmeter Specifications:

Type of Flowmeter: Volumetric
Battery: 2-AA
Operating Temp. Range: 32–120 °F (0–48 °C)
Warranty: One year
Certifications: CE, Ex
Compliance: WEEE, RoHS 2, China RoHS 2

SETTING GAS FLOWS

Restek ProFLOW 6000 Electronic Flowmeter

State-of-the-art features include:

- Measures volumetric flow for gases across a range of 0.5–500 mL/min.
- NIST traceable calibration.
- Ex rating (electrical apparatus for explosive gas atmospheres) for hydrogen and related gas types.
- Accuracy of ± 2% of flow reading or ± 0.2 mL/min, whichever is greater.
- Over-range warning indicator.
- Auto shutoff feature.
- Use as a benchtop or handheld unit.
- Ergonomic design and side grips for comfort.
- Measures most gas types.*
- Convenient carrying/storage case included.
- Uses two AA batteries (included).
- Data output via USB port.
- One-year warranty.
- Recalibration service available.

Description	qty.	cat.#
Restek ProFLOW 6000 Electronic Flowmeter with Hard-Sided Carrying Case	ea.	22656
Soft-Sided Storage Case for Leak Detector or ProFLOW 6000 Flowmeter	ea.	22657

*The flowmeter is designed to measure clean, dry, noncorrosive gases.
Patented

Gas Purifiers

Gas purification is essential in your gas management system. Carrier gases must contain less than 1 ppm of oxygen, water vapor, or any other trace contaminant to prevent column degradation, shortened column lifetime, and increased stationary phase bleed. Contaminants cause ghost peaks to appear during temperature programming and degrade the quality of analytical data. The expense of using high-purity gases in combination with carrier gas purifiers will be offset by longer column lifetime and less instrument maintenance along with better instrument sensitivity. Gas purifiers are available for specific types of contamination (moisture, hydrocarbon, or oxygen) or as a combination of filters that provides broader protection. These purifiers can be installed in-line or using a quick-install baseplate system.

Moisture Removal

Moisture in carrier gas lines will prematurely degrade oxygen and hydrocarbon traps and increase detector noise (particularly with ECDs). As a precaution, you should install a moisture trap before the hydrocarbon and oxygen traps on all carrier gas lines. Moisture traps should also be installed on fuel gas lines, especially if using a gas generator.

Hydrocarbon Removal

Use a hydrocarbon trap if your gas has a potential source of hydrocarbon contaminants (e.g., an oil pump in an air compressor) or if you suspect you are observing carrier gas ghost peaks. Install the hydrocarbon trap after the moisture trap to prevent moisture from degrading the hydrocarbon-trapping ability of the activated carbon in the hydrocarbon trap.

Oxygen Removal

Oxygen is a GC column killer and can enter the system at any connection that is leaking. Because oxygen can enter a gas line at any fitting, the oxygen trap should be the last connection before the gas line enters the chromatograph. Oxygen traps are essential for carrier gas supply (unless using a high-purity hydrogen generator), optional for fuel gas supplies, and should never be used in air gas lines.

Leak Checking

To prevent column degradation, increase column lifetime, and decrease stationary phase bleed, carrier gas supply lines need to be leak-free to prevent the introduction of oxygen. This can be monitored by frequently leak checking all carrier gas system connections using the Restek electronic leak detector.

Rely on Restek for Gas Management

An effective gas management system is essential to obtaining accurate, reliable GC results. Restek offers the products and expertise to help you set up and maintain the right system for your lab. Whether you use gas generators or freestanding cylinders, we have the equipment you need to ensure a reliable, high-purity gas stream to your GC instruments.

Need help selecting a gas purifier?

Contact your local Restek representative or our Technical Service group at **support@restek.com** or **1-814-353-1300, ext. 4**.

SUPER-CLEAN BASEPLATE GAS FILTERS

22019

All traps measure:
10 5/8" x 1 3/4"
(27 x 4.4 cm)

Each single-position baseplate unit measures:
4" x 4" x 1 7/8" (10.2 x 10.2 x 4.8 cm)
Each 2-position baseplate unit measures:
8" x 4" x 1 7/8" (20.3 x 10.2 x 4.8 cm)
Each 3-position baseplate unit measures:
12" x 4" x 1 7/8" (30.5 x 10.2 x 4.8 cm)
Standard baseplate inlet/outlet fittings accept 1/8" tubing.
To adapt to 1/4" tubing, order 1/8" to 1/4" tube end reducers.

22026

22025

Restek Super Clean Gas Filter Kits

- High-purity output ensures 99.9999% pure gas (at max. flow of 2 L/min).
- Designed for easy, hassle-free cartridge changes.
- Glass inside to prevent diffusion; polycarbonate housing outside for safety.

Description	qty.	cat.#
Carrier Gas Cleaning Kit Includes: Mounting Baseplate; 1/8" Inlet/Outlet Fittings; and Oxygen/Moisture/Hydrocarbon Triple Gas Filter	kit	22019
Fuel Gas Purification Kit Includes: Mounting Baseplate, 1/8" Inlet/Outlet Fittings, and Hydrocarbon/Moisture Fuel Gas Filter	kit	22021
Gas Filter Bundle Kit Includes: Triple Gas Filter (1), (cat.# 22020); and Fuel Gas Filters (2), (cat.# 22022)	kit	22031
Super Clean Gas Filter Kit, 1/4" Brass Includes: Replacement CO_2, Sulfur, Moisture Filter, Baseplate with 1/4" Brass Fittings	kit	23844
Super Clean Gas Filter Kit, 1/8" Brass Includes: Replacement CO_2, Sulfur, Moisture Filter, Baseplate with 1/8" Brass Fittings	kit	23845
Super Clean Gas Filter Kit, 1/4" SS Includes: Replacement CO_2, Sulfur, Moisture Filter, Baseplate with 1/4" SS Fittings	kit	23846
Super Clean Gas Filter Kit, 1/8" SS Includes: Replacement CO_2, Sulfur, Moisture Filter, Baseplate with 1/8" SS Fittings	kit	23847
Helium-Specific Carrier Gas Cleaning Kit Includes: Mounting Baseplate; 1/8" Inlet/Outlet Fittings; and Oxygen/Moisture/Hydrocarbon Helium-Specific Filter	kit	21983
Gas Filters and Replacement Traps		
Ultra-High Capacity Hydrocarbon Filter	ea.	22030
Ultra-High Capacity Moisture Filter	ea.	22028
Ultra-High Capacity Oxygen Filter	ea.	22029
Replacement Triple Gas Filter (removes oxygen, moisture, and hydrocarbons)	ea.	22020
Replacement Fuel Gas Filter (removes moisture and hydrocarbons)	ea.	22022
Replacement Helium-Specific Gas Filter (removes oxygen, moisture, and hydrocarbons)	ea.	21982
Replacement CO_2, Sulfur, Moisture Filter (Ideal for TOC analyzers and zero air generators.)	ea.	23843

Restek Filter Baseplates

- End fittings available in brass or stainless steel.
- Baseplates fit all stand alone Super Clean gas filters offered.

	Brass		Stainless Steel	
Description	qty.	cat.#	qty.	cat.#
Filter Baseplate, Single-Position	ea.	22025	ea.	22344
Filter Baseplate, 2-Position	ea.	22026	ea.	22345
Filter Baseplate, 3-Position	ea.	22027	ea.	22346

IN-LINE SUPER-CLEAN PURIFICATION GAS TRAPS

Click-On traps measure:
8 1/2" x 1 1/4" (21.6 x 3.2 cm)

Restek Click-On In-Line Super Clean Gas Traps and Connector Kits

- High-purity output ensures 99.9999% pure gas.
- Click-On fittings for easy, leak-tight cartridge changes; brass or stainless steel, 1/4" or 1/8".
- Triple gas trap is ideal for purifying carrier gas—it contains oxygen, moisture, and hydrocarbon scrubbers in one cartridge.
- Fuel gas trap is ideal for purifying flame ionization detector (FID) fuel gases, removing both moisture and hydrocarbons.
- Helium-specific triple gas trap is ideal for GC-MS—it contains oxygen, moisture, and hydrocarbon scrubbers in one cartridge.

Description	qty.	cat.#
Carrier Gas Purification Kit		
Includes: 1/8" SS connectors (2) and oxygen/moisture/hydrocarbon triple trap (1)	kit	22456
Includes: 1/8" brass connectors (2) and oxygen/moisture/hydrocarbon triple trap (1)	kit	22457
Includes: 1/4" SS connectors (2) and oxygen/moisture/hydrocarbon triple trap (1)	kit	22458
Includes: 1/4" brass connectors (2) and oxygen/moisture/hydrocarbon triple trap (1)	kit	22459
Fuel Gas Purification Kit		
Includes: 1/8" SS connectors (4) and hydrocarbon/moisture traps (2)	kit	22460
Includes: 1/8" brass connectors (4) and hydrocarbon/moisture traps (2)	kit	22461
Includes: 1/4" SS connectors (4) and hydrocarbon/moisture traps (2)	kit	22462
Includes: 1/4" brass connectors (4) and hydrocarbon/moisture traps (2)	kit	22463

IN-LINE GAS TRAPS

Indicating Oxygen Trap

- Indicator changes from light green to grey as oxygen is trapped.
- Heavy-walled glass body, protected by polycarbonate sleeve, prevents oxygen and water infusion.
- Prepurged for fast stabilization.
- 100 psi (689 kPa) maximum operating pressure.
- Reduces oxygen to 0.1 ppm.
- 10 µm frits at inlet and outlet.
- Optimal flow rate: < 150 mL/min.

Description	Fittings	qty.	cat.#
Indicating Oxygen Trap	1/8" Brass	ea.	22010
Indicating Oxygen Trap	1/4" Brass	ea.	22011

Dimensions:
10" x 1 1/4" (25.4 x 3.2 cm)

Indicating Moisture Trap

- Reduces water to less than 10 ppb; indicator changes from yellowish-green to blue at 5% relative humidity.
- Prepurged for fast stabilization.
- Reduces noise from high-sensitivity detectors.
- Heavy-walled glass body prevents oxygen and water infusion.
- 10 µm frit prevents microparticulate damage to needle valves and flow controllers.
- Maximum operating pressure: 100 psi (689 kPa).

Description	Fittings	qty.	cat.#
Indicating Moisture Trap	1/8" Brass	ea.	22014
Indicating Moisture Trap	1/4" Brass	ea.	22015

Dimensions: 13" x 2" (33 x 5.1 cm)
Moisture capacity: 6 g of water
Maximum flow: 1 L/min

High-Capacity Oxygen Trap

- Removes up to 135 ml of oxygen or 2 g of water.
- Long life—typically purifies more than 480 cu ft of inert gas.
- Reduces oxygen to 15 ppb.
- Maximum operating pressure: 250 psi (1,724 kPa).
- Flow: 3 L/min @ 32 psi (221 kPa).

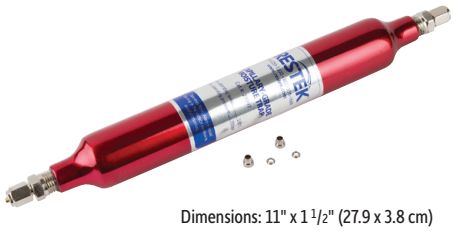
Description	Fittings	qty.	cat.#
High-Capacity Oxygen Trap	1/8" Nickel-Plated Brass	ea.	20601
High-Capacity Oxygen Trap	1/4" Nickel-Plated Brass	ea.	20600

Dimensions:
11" x 1 1/2" (27.9 x 3.8 cm)

High-Capacity Moisture Trap

- Purged with ultra-high-purity helium; ready to use with any carrier gas including hydrogen.
- Reduces water to less than 15 ppb.
- Maximum operating pressure: 250 psi (1,724 kPa).
- Maximum flow: 1.25 L/min.

Description	Fittings	qty.	cat.#
High-Capacity Moisture Trap	1/8" Nickel-Plated Brass	ea.	21997
High-Capacity Moisture Trap	1/4" Nickel-Plated Brass	ea.	20638

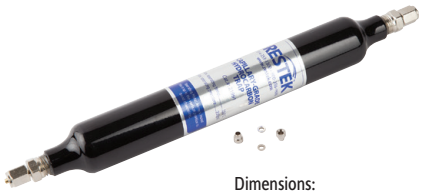


Dimensions: 11" x 1 1/2" (27.9 x 3.8 cm)
Moisture capacity: 16 g of water

Capillary-Grade Hydrocarbon Trap

- Packed with an extremely high surface area, baked coconut shell–based activated carbon.
- Purged with ultra-high-purity helium; ready to use with any carrier gas including hydrogen.
- Reduces organics to 0.1 ppm (assuming 100 ppm input).
- Maximum operating pressure: 250 psi (1,724 kPa).

Description	Fittings	qty.	cat.#
Capillary-Grade Hydrocarbon Trap	1/8" Nickel-Plated Brass	ea.	21991
Capillary-Grade Hydrocarbon Trap	1/4" Nickel-Plated Brass	ea.	21992



Dimensions:
11" x 1 1/2" (27.9 x 3.8 cm)

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