

Introduction to Gas Pressure Regulators



Mike Zezzo
Mid-Atlantic States
Sales Representative
9+ years of service!

**General Purpose or Analytical?**

General-purpose gas regulators usually are best suited for applications involving gases that are less than 99.995% pure: pneumatically-actuated valves and autosamplers, blanketing, inert atmospheres, and any other application not directly integrated with analytical data production. General purpose gas regulators have nylon-reinforced neoprene diaphragms that provide very good pressure control but are prone to air and moisture diffusion and hydrocarbon off-gassing.

Analytical regulators are recommended for applications in which maintaining the purity of a gas or mixture is the overriding concern, i.e., for applications requiring gases that are greater than 99.995% pure. They are commonly used in analytical labs. Analytical regulators have stainless steel diaphragms for pressure control. Stainless steel is not subject to the diffusion and off-gassing associated with neoprene diaphragms, and is easily purged of atmospheric contaminants when put into service.

Dual- or Single-Stage?

Dual-stage gas regulators reduce the source pressure to outlet pressure in two steps. The first stage reduces the inlet pressure to about three times the maximum working pressure. Outlet pressure gas regulation is controlled by the second stage and is set through the use of an adjusting knob. This two-step gas regulation is highly recommended for services requiring a near constant delivery pressure as the source pressure decays, including chromatographic analyses.

Single-stage gas regulators perform the same function as dual-stage gas regulators, but in a single step-down from source pressure to outlet pressure. For this reason, the outlet pressure cannot be as accurately maintained as the source pressure decays. We highly recommend that single-stage gas regulators be used only in circumstances in which the operator can monitor and adjust the regulator as needed, when the regulator is supplied with a nearly constant source pressure, or when additional pressure regulation is supplied downstream.

Brass or Stainless Steel?

Analytical gas regulators made from brass bar stock provide optimum performance for most analytical applications. Brass provides excellent strength and cleanliness and the machined bar stock design has less dead volume than forged-body gas regulators, making purging of atmospheric contaminants faster and more assured.

Gas regulators with stainless steel bodies were designed for delivering corrosive gases that would be incompatible with brass. With the advent of semiconductor manufacturing and high sensitivity analytical techniques, stainless steel also has proven to be a better surface for removing "sticky" atmospheric contaminants that interfere with detectors downstream. Unless these gas regulators are used in an all-stainless-steel system that incorporates welded tubing and special fittings, and in which rigorous cleaning and proper gas management are practiced, the extra expense relative to brass is not justified.

Overview of Restek's Chrome-Plated Brass and Stainless Steel Body Ultra-High-Purity Gas Regulators

These regulators feature metal-to-metal seals throughout for long-term leak-tightness, and a metal diaphragm outlet valve ensures gas purity. Each regulator is helium leak-test-certifiable to 1x10⁻⁸scc/sec. and is fully assembled and tested for your convenience. 100psig maximum delivery pressure supports EPC operation. Maximum inlet pressure is 3000psig. Chrome-plated brass bar stock construction minimizes dead volume. Stainless steel construction is more easily purged of atmospheric contaminants, and is more resistant to attack from dry corrosive gases.

Ultra-High-Purity Brass Body Gas Regulators

These regulators are the best choice when using ultra-high-purity carrier gas for sensitive GC applications using MS, PID, HID, or ECD detection methods. They feature reduced internal dead-volume, relative to stainless steel bodies. The stainless steel gas regulator diaphragm minimizes nonmetal parts, to help ensure ultra-high gas purity, and the metal valve diaphragm ensures leak-free shut-off. Oxidation-resistant chrome plating maintains a like-new appearance.

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

- Oxidation-resistant, chrome-plated.
- Most stable outlet pressure control throughout the life of a high-pressure gas cylinder.
- Secondary pressure regulation not needed.
- Most widely used regulator.
- Less internal volume than stainless steel gas regulators.



Outlet pressure: 0 to 100psig (0-689kPa)
 Outlet gauge: 30" – 0 to 200psig (0-1379kPa)
 Inlet gauge: 0 to 4000psig (0-27,579kPa)
 Outlet assembly: diaphragm valve, 1/4" tube fitting

Fitting	qty.	cat.#
CGA 580 (N ₂ , He, Ar)	ea.	21667
CGA 350 (H ₂ , P ₂)	ea.	21668
CGA 590 (Air)	ea.	21669

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 our dual-stage gas regulators.



Outlet pressure: 0 to 100psig (0-689kPa)
 Outlet gauge: 30" – 0 to 200psig (0-1379kPa)
 Inlet gauge: 0 to 4000psig (0-27,579kPa)
 Outlet assembly: diaphragm valve, 1/4" tube fitting

Fitting	qty.	cat.#
CGA 580 (N ₂ , He, Ar)	ea.	20646
CGA 350 (H ₂ , P ₂)	ea.	20647
CGA 590 (Air)	ea.	20648

Ultra-High-Purity Chrome-Plated Brass Line Gas Regulator

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

Inlet connections: 1/4" FPT
 Outlet assembly: 1/4" FPT port



Fitting	Outlet Gauge	Outlet Pressure	qty.	cat.#
1/4" female NPT ports*	30" - 0 to 100psig (0-689kPa)	0-50psig (0-345kPa)	ea.	21666
1/4" female NPT ports*	30" - 0 to 200psig (0-1379kPa)	0-100psig (0-689kPa)	ea.	22452

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

Male Connector, Pipe-to-Tube Fittings

Fitting Type	Size (inches)	Parker #	Similar to Swagelok®	Brass		Stainless Steel	
				qty.	cat.#	qty.	cat.#
Male Connector	1/8" to 1/4" NPT	4 MSC 4N	400-1-4	10-pk.	21842	2-pk.	21942
Male Connector	1/8" to 1/4" NPT	2 MSC 4N	200-1-4	10-pk.	21844	2-pk.	21944
Tube End Reducer	1/4" tube to 1/8"	4 TUR 2	200-R-4	5-pk.	21834	2-pk.	21934



male connector



tube end reducer

HROMalytic Chromatography Products '08
 Australian Distributors **ECH**nology
 www.chromtech.net.au E-mail : info@chromtech.net.au Tel : +61 3 9762 2034 Fax : +61 3 9761 1169



Ultra-High-Purity Stainless Steel Body Gas Regulators

These regulators are the standard for ultra-high-purity and corrosion-resistant pressure regulation. They are more easily purged of atmospheric components, compared to brass gas regulators, making them ideal for the most demanding applications. Gas regulation performance is equal to our brass body gas regulators. For use in all-stainless steel systems where welded tubing and special fittings are used, and rigorous cleaning and proper gas management are practiced.

**Dual-Stage Ultra-High-Purity Stainless Steel Gas Regulators**

- Most stable outlet pressure control throughout the life of a high-pressure gas cylinder.
- Secondary pressure regulation not needed.

Outlet pressure: 0 to 100psig (0-689kPa)
 Outlet gauge: 30" – 0 to 200psig (0-1379kPa)
 Inlet gauge: 0 to 4000psig (0-27,579kPa)
 Outlet assembly: diaphragm valve, 1/4" tube fitting

Fitting	qty.	cat.#
CGA 580 (N ₂ , He, Ar)	ea.	20662
CGA 350 (H ₂ , P ₂)	ea.	20663
CGA 590 (Air)	ea.	20664

Single-Stage Ultra-High-Purity Stainless Steel Gas Regulators

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

Outlet pressure: 0 to 100psig (0-689kPa)
 Outlet gauge: 30" – 0 to 200psig (0-1379kPa)
 Inlet gauge: 0 to 4000psig (0-27,579kPa)
 Outlet assembly: diaphragm valve, 1/4" tube fitting

Fitting	qty.	cat.#
CGA 580 (N ₂ , He, Ar)	ea.	20665
CGA 350 (H ₂ , P ₂)	ea.	20666
CGA 590 (Air)	ea.	20667

**Critical Purity Automatic Switchover System for Noncorrosive Service**

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 supply of gas. Continuous supply is achieved by setting the two regulators at slightly different pressures, to discharge one side of the system at a time. These models include flexible, all-stainless-steel pigtailed with armor casing. The CGA connection on each pigtail has a check valve in the gland to prevent contamination and minimize purging requirements.

**Switching pressure:**

200psig/170psig
(1379/1172kPa)

Inlet connections:

flexible SS pigtailed (36")

Line regulator:

0 to 100psig (0-689kPa)

Brass Automatic Switchover System with Line Regulator	qty.	cat.#
CGA 580 (N ₂ , He, Ar)	ea.	20668580
CGA 350 (H ₂ , P ₂)	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
CGA 350 (H ₂ , P ₂)	ea.	21593350
CGA 590 (Air)	ea.	21593590

Protocol Station

The protocol station is designed for convenient wall mounting of high-purity gas regulators. Wall mounting provides ease of use, prevents gas regulator damage, and improves safety. Either chrome-plated brass or 316 stainless steel option is complete with a 3-foot, flexible, all-stainless-steel pigtail with armor casing. The CGA connection on the pigtail has an integral check valve in the gland to prevent contamination during cylinder changeout.



Chrome-Plated Brass Protocol Station*	qty.	cat.#
CGA 580 (N ₂ , He, Ar)	ea.	21347
CGA 350 (H ₂ , P ₂)	ea.	21348
CGA 590 (Air)	ea.	21349
Stainless Steel Protocol Station*	qty.	cat.#
CGA 580 (N ₂ , He, Ar)	ea.	21327
CGA 350 (H ₂ , P ₂)	ea.	21328
CGA 590 (Air)	ea.	21329

*Pressure regulator not included. Order separately.