



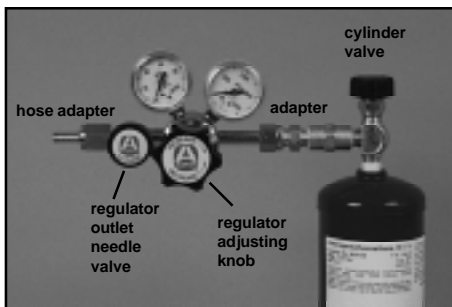
**Lecture bottle regulator specifications:**  
CGA 180 inlet connection  
Needle valve with 1/4 in. NPTM outlet  
Triple-inlet filters  
Maximum inlet pressure: 3000 psig  
Operating temperature: -40 to 140°F



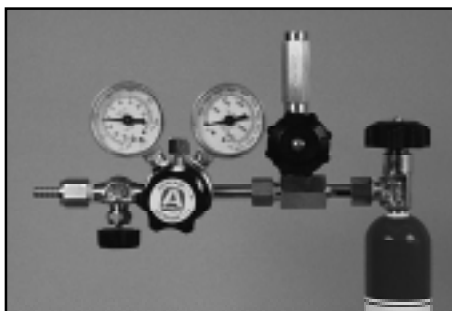
**Figure 1.**  
Chromeplated, brass body regulators for use with noncorrosive compressed gases and low pressure liquefied gases.



**Figure 2.**  
316 stainless steel body regulators for use with corrosive and high purity gases.



**Figure 3.** Typical regulator assembly needed for a low-pressure, flat-bottom cylinder. The special adapter can be clearly seen between the stainless steel regulator and the cylinder valve.



**Figure 4.** Use of the Aldrich T-purge assembly and Bonnet vent with corrosive or high-purity gases packaged in lecture bottles.

Aldrich lecture bottle and specialty gas regulators are designed for use with dry (anhydrous) gases at a normal operating temperature of 70°F (21°C) and maximum inlet pressure of 3000 psig. Certain gases will hydrolyze in the presence of moisture to form corrosive products that can impair regulator operation and cause failure. It is essential that system lines and regulators be purged with *dry* inert gas before and after use with corrosive gases.

**NOTE:** ALL OPERATIONS INVOLVING HAZARDOUS GASES MUST BE PERFORMED IN A CHEMICAL FUME HOOD. THE INFORMATION PROVIDED IN THIS BULLETIN SHOULD SERVE AS A GUIDE FOR THE SAFE OPERATION OF ALDRICH REGULATORS WITH SPECIALTY GASES.

## Regulator Selection

Recommended regulators and control valves for use with Aldrich gas products are specified in the entry for each gas listing in the chemical section of the Aldrich Catalog/Handbook and on the product label. Do not use Aldrich gas regulators on cylinders that exceed 3000 psig.

**Regulators for oxygen service should never be used with other gases.** This rule applies for all oxidizing gases. Cross contamination of internal parts may result in rapid oxidation and fire.

**Lecture bottle regulators** are lightweight and ultracompact (see Fig. 1 and 2). A special brass CGA cylinder adapter is included to connect regulators with a CGA 180 inlet to the 1/4 inch pipe threads on flat-bottom cylinders (Fig. 3).

## Regulator Installation

1. Inspect the regulator and cylinder valves for damage or contamination. Never use dirty or damaged equipment.
2. Secure the gas cylinder to prevent accidental tipping and valve damage. A lecture bottle stand is recommended for lecture bottle gases. A ring stand with suitable clamps will secure flat-bottom liquefied-gas cylinders.

### A. Corrosive gases

1. Install a T-purge assembly, Fig. 4. A CGA 180 Teflon® washer is required at the cylinder outlet valve connection.
2. Attach a stainless steel lecture bottle regulator to the outlet side of the T-purge assembly using a second CGA 180 Teflon washer.
3. Use a Bonnet vent connector to attach tubing to the regulator Bonnet vent. A bonnet vent tube safely routes gas to a chemical fume hood or suitable collection vessel should the regulator diaphragm rupture or fail. Use of the remote Bonnet vent tube is highly recommended for use with hazardous gases.
4. Connect the purge valve on the T-purge assembly to a source of dry, inert gas.
5. Attach the downstream side of the regulator to the reaction vessel or system. A line filter and check valve can be installed between the regulator and vessel. Use of a check valve will protect the regulator from back-pressure damage and back streaming of process gas.
6. Purge the regulator and system lines with dry inert gas. Check all connections for leaks before process gas is introduced.

### B. Noncorrosive gases

1. Attach the regulator to the cylinder outlet valve and tighten the regulator inlet nut securely. A CGA 180 Teflon washer is required at this connection.

**NOTE:** Liquefied gases are generally packaged in low-pressure cylinders with a 1/4-inch NPT outlet valve connection. Use the adapter provided to attach the regulator to the cylinder, Fig. 4. Wrap the cylinder outlet valve threads with Teflon tape prior to connecting the adapter to ensure a leak-free joint.

## Equipment used in this Bulletin

### Brass lecture bottle regulator (Figure 1)

Single stage, for use with noncorrosive gases. Compact, chromeplated brass body with CGA 180 inlet connection and needle valve with  $\frac{1}{4}$  in. NPTM outlet. Includes CGA adapter, Z14,730-3. Requires Teflon sealing washer, Z14,699-4. Maximum inlet pressure: 3000 psig. Operating temperature: -40 to 140°F.

Delivery pressure (psig)	Gauge (psig)	Cat. No.
0-100	0-150	Z14,670-6
0-15	0-30	Z14,671-4

### SS lecture bottle regulator (Figure 2)

Single stage, for use with most corrosive and halogenated gases and high-purity applications. 316 SS body and gauges with Teflon seals and inner friction sleeves. CGA 180 inlet connection and needle valve with  $\frac{1}{4}$  in. NPTM outlet. Includes CGA adapter, Z14,730-3. Requires Teflon sealing washer, Z14,699-4. Maximum inlet pressure: 3000 psig. Operating temperature: -40 to 140°F.  $\frac{1}{8}$  in. 27 NPTF remote bonnet-vent.

Delivery pressure (psig)	Gauge (psig)	Cat. No.
0-15	0-30	Z14,850-4
0-50	0-100	Z14,851-2

### Special brass cylinder adapter (Figure 3)

Used to attach Aldrich regulators to cylinders.  $\frac{1}{4}$  in. NPTF valve outlet and a 180M CGA. Z14,730-3

### Bonnet vent tube connector (Figure 4)

316 SS. Used to attach vent tube to remote vent fitting found on regulators.  $\frac{1}{8}$  in. NPTM.

Compression fitting	Cat. No.
$\frac{1}{4}$ in. o.d. tube	Z17,357-6
$\frac{1}{8}$ in. o.d. tube	Z17,358-4

### Check valve (Figures 6 & 8)

Max. pressure 3000 psig,  $\frac{1}{4}$  in. NPTF to  $\frac{1}{4}$  in. NPTF. Attaches to the outlet side of regulator to prevent back streaming of liquids and gases into regulator or cylinder.

Type	O-ring	Cat. No.
Brass	Viton®	Z14,684-6
SS	EPR	Z14,685-4
SS	neoprene	Z14,686-2
SS	Viton	Z14,687-0

### Hose adapter (Figure 3)

$\frac{1}{4}$  in. NPTF to  $\frac{1}{4}$  in. i.d. hose. Brass has serrated hose connector; SS has tapered hose connector.

Description	Cat. No.
Brass	Z14,681-1
SS	Z14,683-8

### T-purge valve, 316 SS (Figures 4 & 8)

Installs between lecture bottle and regulator to purge system (including regulator) of air, moisture, or process gas. Reduces corrosion problems caused by gas hydrolysis; extends service life of components. Dry system with inert gas before introducing corrosive gases and again immediately after use. CGA 180 inlet/outlet fittings. Requires Teflon sealing washer, Z14,699-4. 3000 psig service pressure. Diaphragm-seal purge valve with  $\frac{1}{4}$  in. NPTM inlet. Check valve at purge-inlet port to prevent backflow of gas. Z15,166-1

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## Regulator Operation

1. Close the regulator by turning the regulator adjusting knob off (counter clockwise). This must be done **before** the cylinder valve is opened.
2. With the regulator turned off (adjusting knob turned fully counter-clockwise) and the regulator outlet needle valve closed (clockwise), open the cylinder valve slowly (counter clockwise), allowing the pressure to rise gradually in the regulator. When the high pressure gauge indicates maximum pressure, open the cylinder valve fully.  
**CAUTION:** Always close the cylinder valve when leaving the system unattended.
3. Adjust the system pressure by turning the regulator adjusting knob clockwise until the desired pressure is indicated on the low-pressure gauge.
4. Carefully check all system connections for leaks.
5. Adjust the gas flow rate to the system by turning the regulator outlet needle valve (counter clockwise to open).

## Regulator Removal

1. Close the cylinder valve.
2. Vent or purge the process gas from the regulator and system. With the regulator outlet needle valve open (counter clockwise), turn the regulator adjusting knob clockwise to release any gas trapped in the regulator. If hazardous gas is present in the system, purge with dry, inert gas. Take appropriate measures to render the purged gas innocuous before venting the gas to the atmosphere.
3. Turn the regulator adjusting knob counter clockwise (off) as far as possible.
4. Disconnect the regulator (and purge assembly) and protect the inlet and outlet fittings from contamination or damage.
5. Replace the cylinder valve cap or plug.

## Cylinder & Regulator Assemblies



**Figure 5.** Installation without regulator, but with hose-barb adapter, for noncorrosive, liquefied gases packaged in low pressure flat-bottom cylinders.

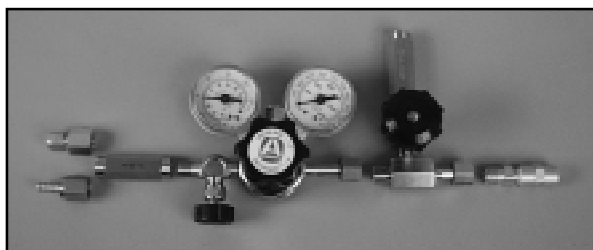


**Figure 6.** Use of a check valve on the outlet side of the regulator. This valve prevents cylinder suck back and back streaming of process gas, and protects the regulator from back pressure damage.



**Figure 7.** Use of a control valve, which meters the flow of gas packaged in the lecture bottles when pressure regulation is not required.

**WARNING:** Gas-control valves do not control pressure in a closed system. A relief valve should be used in such a system to prevent build-up of pressure, which could lead to an explosion, unless vented.



**Figure 8.** Optional gas-handling accessories. From left to right: tubing connectors (Swagelok® and hose-barb type), check valve, regulator, and T-purge assembly.



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