

Regulator Selection

Materials

General Gas Use

General purpose regulators commonly have elastomeric diaphragms and are most often used in conjunction with packed valves. These regulators are typically forged brass but may be stainless steel depending on the corrosivity of the gas. Performance is satisfactory where slight contamination or diffusion from an elastomeric diaphragm is not important. Brass regulators with stainless steel diaphragms prevent air diffusion and adsorption of gases on the diaphragm. This is particularly important with low concentration mixtures of hydrocarbons where the trace component may be adsorbed on the elastomeric diaphragm. Regulators with Buna-N or neoprene diaphragms are not suitable for GC analysis that can be affected by the diffusion of atmospheric oxygen through the elastomer diaphragm or the outgassing of monomers and dimers from the elastomer.

High-Purity Gas Service

Specialty gases can be effectively delivered by regulators that are classified as high-purity or ultra-high-purity. High-purity regulators are typically made of brass and have stainless steel diaphragms. Ultra-high-purity regulators are typically constructed of brass or stainless steel bar stock with convoluted stainless steel diaphragms having metal-to-metal sealing without using backup O-Rings. Ultra-high-purity regulators used with highly corrosive gases typically have stainless steel diaphragms mechanically linked to the poppet assembly to provide additional sealing integrity.

A high-purity regulator equipped with a stainless steel diaphragm does not outgas organic materials. It also prevents the diffusion of atmospheric oxygen into the carrier gas whereas Buna-N and neoprene diaphragms are permeable to oxygen.

Operating Delivery Pressure Range

Determining the proper delivery pressure can be confusing. It is important to determine two application requirements: the gas pressure that is needed and the maximum pressure that the system may require (these two pressures may be the same). Then, select the regulator's delivery pressure ranges so the desired pressures are between 5 and 90% of the regulator's delivery range. A regulator's performance is at its best within this range.

Regulator Placement (Cylinder or Line)

Specialty gas regulator applications are divided into two types. The first is where the regulator is fastened to a gas cylinder using a Compressed Gas Association (CGA) fitting. The second application is where a regulator is located in a gas line, providing a means to further reduce the line pressure. A line regulator is identified by having the inlet and outlet opposite of each other with a single gauge in the 12 o'clock position to indicate the reduced pressure.

Maintenance Schedule

Regulator maintenance is an important part of maximizing your system's performance and extending the service life of your regulator. Adherence will minimize downtime and enhance safety in your work area.

Service Noncorrosive or corrosive. See the Regulator Selection Guide to help you select the correct regulator for your application.

Leak Check With the regulator under pressure, check all connections using Snoop[®]. Shut down the gas source if you detect a leak, reduce atmospheric pressure and tighten or redo the connection. If you are using toxic or corrosive gases, you must purge the connection first with an inert gas. Then retest.

Creep Test Regulator creep is a phenomenon in which delivery pressure rises above the setpoint and occurs two ways: 1) changes to the motion of the regulator springs when gas flow is stopped, and 2) foreign material becomes lodged between the poppet and seat preventing tight shutoff.

Inert Purge In order to maintain cylinder integrity and obtain optimum performance, ALL regulators should be purged. For best results, utilize dilution purging – where alternating pressurizing and depressurizing the regulator with purge gas helps eliminate internal dead pockets that tend to hold contaminants.

Overhaul Remove all regulators from service periodically and return them to Air Liquide for inspection and overhaul.

Replacement Once the life expectancy of a regulator has been exceeded, it should be replaced to protect against unexpected failure.

Contact Air Liquide for more information on purging methods and regulator maintenance.

Regulator Selection Guide

Regulator Model Series	Gas Service										Materials						Inlet Pressure					
	Type			Properties							Body				Diaphragm		Maximum Inlet Range					
	General Purpose	High-Purity	Ultra-High-Purity	Inert	Flammable	Oxidant	Toxic	Noncorrosive	Corrosive	Reactive	Brass	Stainless Steel	Aluminum	Other	Stainless Steel	Elastomer/Plastic	0 – 6000 psig	0 – 3000 psig	0 – 1000 psig	0 – 500 psig	0 – 400 psig	0 – 250 psig
14		•		•	•	•		•			•				•			•				
14A-165		•		•	•	•		•			•				•			•				•
14DFR	•			•	•	•		•			•				•	•						
19VOC			•	•	•	•	•	•	•	•		•			•			•				
20B	•			•	•	•		•			•							•				
23A	•			•	•	•		•					•			•						•
23S	•			•	•			•				•				•						•
24	•			•	•	•		•			•					•				•		
27	•			•	•			•			•								•			
38	•			•	•			•	•			•							•			
202	•			•	•	•		•			•					•		•				
202-510A	•			•	•			•			•					•				•		
205		•		•	•	•		•			•				•			•				
206B		•		•	•	•		•			•				•			•				
206S		•		•	•	•		•	•			•			•			•				
208B		•		•	•	•		•			•							•				
208S		•		•	•	•	•	•	•	•		•						•				
209	•			•	•	•		•			•					•		•				
211		•		•	•	•		•			•				•			•				
213			•	•	•	•		•	•			•			•			•				
215			•	•	•	•		•	•			•			•			•				
216B		•		•	•	•		•			•				•			•				
216S		•		•	•	•	•	•	•	•		•			•			•				
217			•	•	•	•	•	•	•	•		•			•			•				
220S		•		•	•	•		•				•			•			•				
226		•		•	•	•		•	•				•		•				•			
228B		•		•	•	•		•			•				•			•				
228S		•		•	•	•	•	•	•	•		•			•			•				
229B	•			•	•	•		•			•							•				
242	•	•		•	•	•		•			•					•				•		
247A80	•			•	•	•		•			•		•					•			•	
261	•			•	•	•		•			•		•			•		•				•
262	•			•	•	•		•			•					•						•
318			•	•	•	•		•			•				•			•				
500	•			•	•	•		•			•					•		•				
720	•			•	•	•		•			•			•		•		•				•
730	•			•	•	•		•						•		•		•				
750B		•		•	•	•		•			•				•			•				
750S		•		•	•	•		•	•			•			•			•				
2172			•	•	•	•	•	•	•	•		•			•			•				
2700B/10B			•	•	•	•		•			•				•			•				
2700S/10S			•	•	•	•		•	•			•			•			•				
2800B		•		•	•	•		•			•				•							•
2800S		•		•	•	•		•	•			•			•							•
2900B		•		•	•	•		•			•						•					
2900S		•		•	•	•	•	•	•	•		•					•					
3300			•	•	•	•		•			•				•			•				

Most regulators offered are approved for oxygen service as per CGA 4.1 "Cleaning Equipment for Oxygen Service."

Regulator Model Series	Delivery Pressure							Pressure Reduction Design					Regulator Type					Gauges			Page No. or Online	
	Maximum Outlet Range																					
	0 – 30 psig	31 – 75 psig	76 – 150 psig	151 – 250 psig	251 – 500 psig	501 – 1000 psig	1001+ psig	Diaphragm	Piston	Preset	Adjustable	Single-Stage	Two-Stage	Cylinder	In-Line	Back Pressure	Lecture Bottle	SCOTTY™	Inlet	Outlet		Outlet Valve
14	•	•	•					•	•		•		•	•			•		•	•	○	275
14A-165	•							•	•		•		•	•				•	•	•	○	296
14DFR									•						•			•	•			275
19VOC		•						•			•	•		•					•			277
20B	•	•	•					•			•	•					•		•	•	•	294
23A	•	•	•	•				•			•	•			•				○	○		278
23S	•	•	•	•				•			•	•			•				○	○		278
24	•	•						•			•	•		•	•			•	•		○	297
27		•							•	•		•		•				•	•		▲	298
38		•							•	•		•		•				•	•		▲	298
202	•	•	•	•				•			•	•		•	•				•	•	•	268
202-510A	•							•			•	•		•					•	•	•	280
205	•	•	•	•				•			•	•		•	•				•	•	•	269
206B	•	•	•					•			•	•		•	•				•	•	○	291
206S	•	•	•					•			•	•		•	•				•	•	○	291
208B			•	•	•	•	•		•		•	•		•	•				•	•	•	281
208S			•	•	•	•	•		•		•	•		•	•				•	•	•	281
209	•	•	•	•				•			•		•	•					•	•	•	268
211	•	•	•	•				•			•	•		•					•	•	•	269
213	•	•	•	•	•			•			•	•		•	•				•	•	•	271
215	•	•	•	•	•			•			•	•		•					•	•	•	271
216B	•	•	•					•			•		•	•	•		•		•	•	○	291
216S	•	•	•					•			•		•	•	•		•		•	•	○	291
217	•	•	•					•			•	•		•	•				•	•	•	272
220S	•	•	•					•			•	•		•			•		•	•	○	295
226	•	•	•					•			•	•		•	•			•	▲	▲		299
228B	•	•	•	•				•			•	•		•	•				•	•		282
228S	•	•	•	•				•			•	•		•	•				•	•		282
229			•	•	•	•	•		•		•	•		•	•				•	•		283
242	•							•		•		•		•					•			300
247A80	•								•	•		•		•				•	•			285
261		•						•			•	•		•				•	•			301
262	•							•			•	•		•				•				301
318	•	•	•		•			•			•	•		•	•				•	•	•	270
500				•	•				•		•	•			•					•		292
720	•							•			•	•			•					•	•	286
730	•							•			•	•			•					•	•	287
750B	•							•			•		•	•					•	•	○	288
750S	•							•			•		•	•					•	•	○	288
2172	•	•	•					•			•		•	•					•	•	•	272
2700B/10B	•	•	•	•	•			•			•	•			•					•		274
2700S/10S	•	•	•	•	•			•			•	•			•					•		274
2800B	•	•	•	•				•			•	•				•						289
2800S	•	•	•	•				•			•	•				•						289
2900B					•	•	•		•		•	•		•	•				•	•	•	290
2900S					•	•	•		•		•	•		•	•				•	•	•	290
3300	•	•	•	•	•			•			•		•	•	•				•	•	•	270

○ Optional feature ▲ Comes with or without