

In its continuing quest for safety, Engineered Controls International, Inc. publishes a series of Field Topics that provides useful information to the LP-Gas and Anhydrous Ammonia dealer concerning the use and misuse of RegO® Products LP-Gas and Anhydrous Ammonia equipment. **In addition, we publish Warning Bulletins covering many of the hazards involved in more detail. These bulletins can be found in our L-500 and L-102 catalogs.** The bulletins or field topics are not intended to conflict with federal, state, or local ordinances and regulations. These should be observed at all times.

For more information refer to NFPA 58 Liquefied Petroleum Gas Code, NFPA 54 National Fuel Gas Code, National Propane Gas Association Safety Handbook, RegO® Products LP-Gas Serviceman's Manual, L-500/L-102 RegO® Products catalogs, ANSI K61.1 Safety Requirements for Storage and Handling of Anhydrous Ammonia, local codes and ordinances.

LP-Gas Regulator Manifolds

When it has been determined that a particular model regulator is of inadequate capacity to handle an installation, the gas retailer commonly sets out to find another model that will. There is often an option that does not get consideration. That is the option of manifolding two regulators together to increase the overall vapor capacity. There are several advantages to doing this:

- ① **Cost** - It is typically less expensive to use two regulators that were part of a larger bulk shipment and therefore purchased at a savings.
- ② **Convenience** - There is a good chance that the regulators used in the manifold are already in stock at the retail location. Larger capacity regulators are almost never in stock at either the retail *or* distributor warehouses.
- ③ **Comfort** - Some uncertainty can arise when service personnel are asked to install complicated control lines or work with bulky, heavy regulators. There should be no additional training required to install or service equipment that is already handled everyday.
- ④ **Capacity** - By installing two regulators in a manifold, the new system capacity is usually more than that of a single, large regulator. This can allow the customers to add future gas load without the need to add any more equipment.
- ⑤ **Constant** - The flow of gas may never have to be interrupted as a result of regulator service requirements. In a properly installed manifold, the regulators can be isolated and serviced *without* turning off gas supply.

This bulletin provides information on the construction of a regulator manifold. **It is meant to supplement established company procedures. It should be used within the guidelines of NFPA 58 and any local codes and ordinances.**

I. First Stage Regulator Manifold Construction:

All threaded piping upstream of the first stage regulator must be schedule 80. All pipe fittings must be 250 PSI min.

For pipe and fitting specifications, see NFPA 58 (1998 edition 3-2.10).

Downstream of the first stage regulator, schedule 40 pipe and 125 PSI fittings are acceptable.

The shutoff valve immediately upstream of the regulator should be at least of the same size as the regulator inlet.

The fittings and shutoff valve downstream of the regulator should be at least of the same size as the regulator outlet. It is essential that these fittings are not smaller than the regulator outlet, this will act as a restriction, reducing regulator capacity.

Install the regulators with vents pointing down, be sure that the regulator manifold is adequately supported.

As the manifold is constructed, special care must be taken at fitting ⑤ (see illustration). This fitting must be large enough to handle the volume of gas created through both regulators. The inside area of fitting ⑤ must be at least as large as the added inside areas of each side of the manifold.

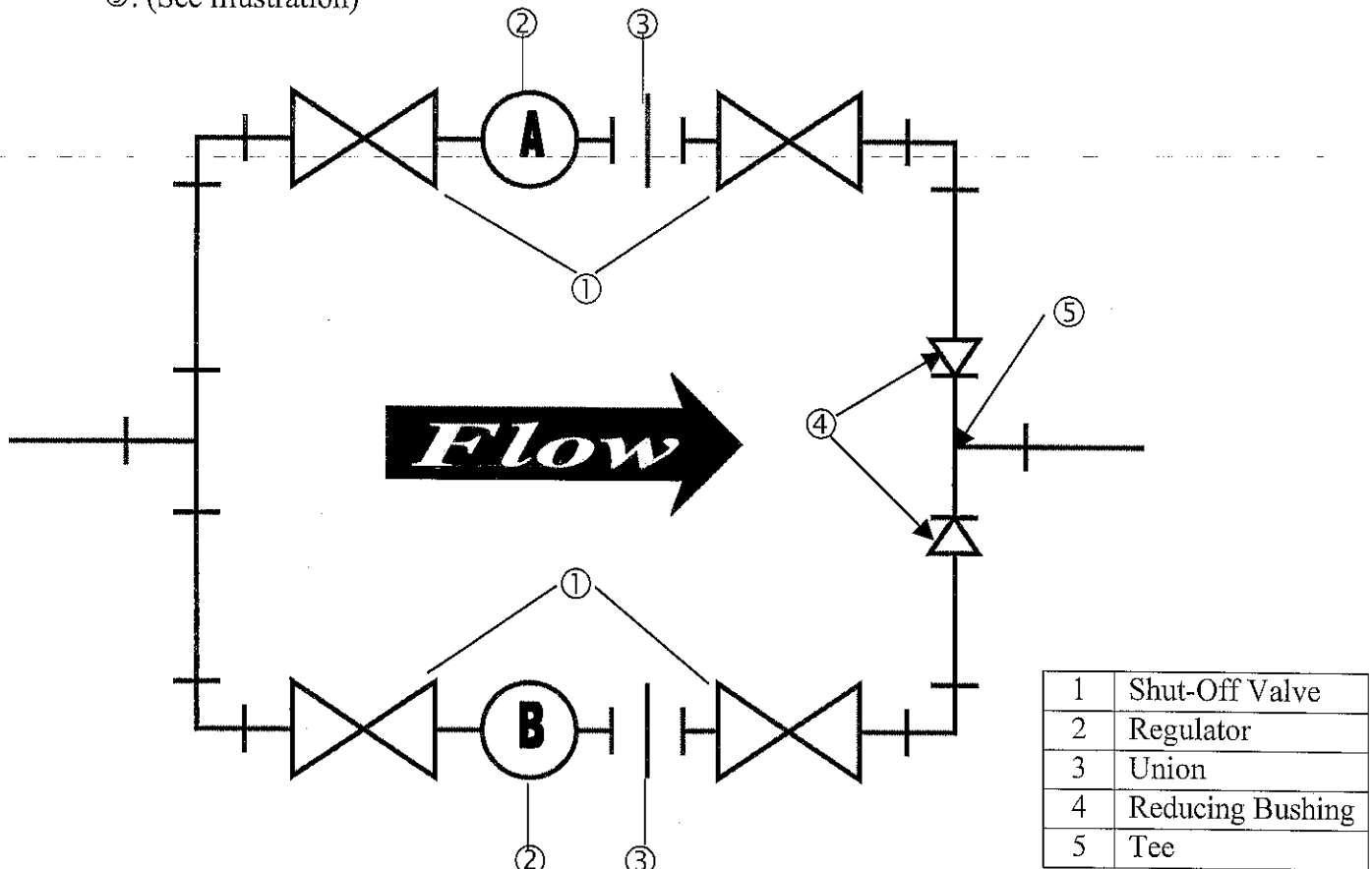
Example: Regulators are LV4403TR4, these regulators have 1/2" outlet size.
 From the chart, 1/2" sch. 40 pipe has an inside area of .304 in.²
 The fitting ⑤ must be at least $.304 + .304 = .608$ in.²
 The next larger size (from the chart) is 1" pipe. Inside area = .864 in.²
 1/2" x 1" bushings must be installed at ④, and a 1" tee is required at ⑤. The downstream pipe must be at least 1".

To determine the manifold capacity, add up the individual regulator capacities, then multiply that number by .9 → (Capacity of Regulator A + Capacity of Regulator B) X .9;
 (2,500,000 + 2,500,000) X .9 = 4,500,000 BTU.

II. Second Stage Regulator Manifold Construction:

The piping on both sides of the second stage regulators can be schedule 40. All pipefittings must be 125 PSI min.

Install the regulators with vents pointing down; be sure that the regulator manifold is adequately supported. Reference the above example for critical sizing information of fitting ⑤. (See illustration)



CHARACTERISTICS OF STEEL PIPE - SIZE, SCHEDULE

PIPE SIZE	OD	STANDARD PIPE - SCHEDULE 40					EXTRA STRONG PIPE - XS - SCHEDULE 80					PIPE SIZE
		WALL	ID	INT AREA	WT/FT	WALL	ID	INT AREA	WT/FT			
1/8	.405	.068	.269	.057	.245	.095	.215	.036	.314	1/8		
1/4	.540	.088	.364	.104	.425	.119	.302	.072	.535	1/4		
3/8	.675	.091	.493	.191	.567	.126	.423	.141	.738	3/8		
1/2	.840	.109	.622	.304	.852	.147	.546	.234	1.087	1/2		
3/4	1.050	.113	.824	.533	1.132	.154	.742	.433	1.473	3/4		
1"	1.315	.133	1.049	.864	1.679	.179	.957	.719	2.171	1"		
1-1/4	1.660	.140	1.380	1.495	2.273	.191	1.278	1.283	2.996	1-1/4		
1-1/2	1.900	.145	1.610	2.036	2.718	.200	1.500	1.767	3.631	1-1/2		
2	2.375	.154	2.067	3.356	3.653	.218	1.939	2.953	5.022	2		
2-1/2	2.875	.203	2.469	4.788	5.793	.276	2.323	4.238	7.661	2-1/2		
3	3.500	.216	3.068	7.393	7.576	.300	2.900	6.605	10.25	3		