



# Integral Two-Stage (Twin) Regulator Installation

Form# 1002  
Rev A

## Introduction

Pressure regulators are the heart of any LP-Gas vapor service system. When selected, sized and installed properly, they can provide many years of reliable service. The integral two-stage regulator, or “Twin”, however, has additional installation requirements not found in systems with separate first and second stage regulators. With two stages of regulation in a single unit, a twin stage regulator has two vent openings that must be addressed. It also produces all of the “refrigeration effect” of gas expanding from tank pressure to appliance pressure in one unit. Changes in weather patterns, especially below average temperatures and above average precipitation, can further complicate matters.

This guidance is offered to help clarify the specific installation requirements of integral two-stage regulators. It is intended to help minimize field issues, such as freeze-ups, that can occur due to extreme weather or installation practices.

MEC also offers several other publications intended to aid in the proper selection and installation of pressure regulators, including:

- **Form # 950** – The Installation and Operating Instructions that are provided with every 1100, 1200 and 1600 series Excela-Flow regulator
- **Form # 1000** – The LP Gas Service Reference Guide (Service Handbook)
- **Form # 1001** – The Reference on Freezing Regulators

## Regulator Type and Size

Selecting the proper regulator type and size for a given application will significantly improve the performance and reliability of the LP-Gas system. A system with separate first stage (tank pressure in, 10 psi out) and second stage (10 psi in, 11 inches WC out) regulators does have distinct advantages over a system using an integral two-stage regulator, including:

- Better low temperature performance and reliability
- More tolerant of snow, rain and humidity
- Less likely to freeze due to moisture
- Higher flow capacity that can accommodate future demand
- Smaller line size between tank and dwelling
- Shorter runs of appliance pressure (inches WC) piping

As a general rule, MEC strongly recommends using at least two separate stages of regulation for most applications.

However, there are instances where an integral two-stage (tank pressure in, 11 inch WC out) regulator is desirable. In a moderate climate, where freezing temperatures, precipitation and humidity are minimal and demand is moderate, integral two-stage regulators may be used successfully.

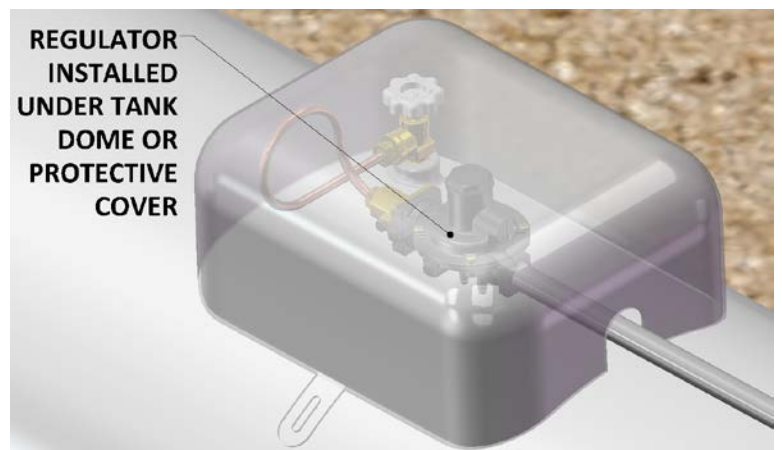
## Regulator Installation

How any regulator is installed can significantly impact its performance and reliability. Of course, all LP-Gas regulators must be installed and maintained according to the requirements of **NFPA 58, the “Liquefied Petroleum Gas Code”** or other applicable regulations recognized in your jurisdiction.

To meet the requirement in NFPA 58 (2017), section 6.10.1.4, that:

*“All regulators for outdoor installations shall be designed, installed, or protected so their operation will not be affected by the elements (freezing rain, sleet, snow, ice, mud, or debris).”*

MEC recommends that, whenever possible, regulators be installed under the tank dome or provided with a suitable cover, as shown in Figure 1.



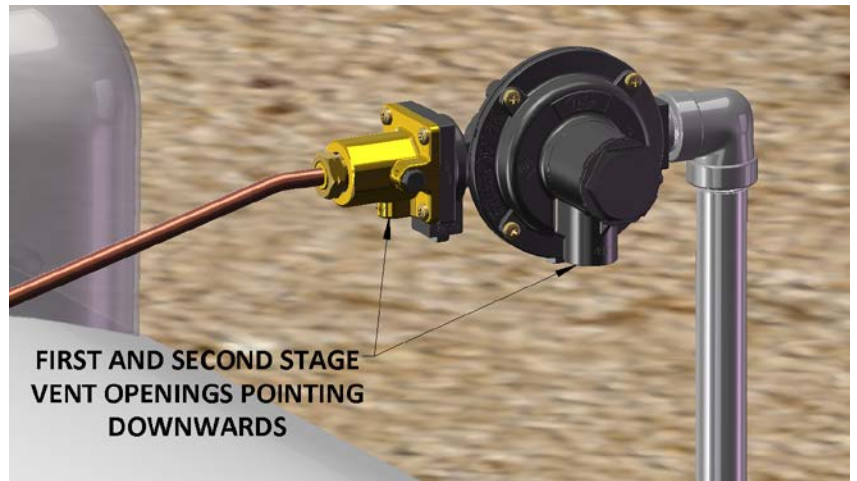
**Figure 1**

The relief vents on all MEC MEGR-1100, 1200 and 1600 series Excelsa-Flo regulators incorporate an integral drip-lip designed to prevent operation from being affected by the elements when installed with the relief vent opening pointing vertically downward. Since NFPA 58 (2017), section 6.10.1.4 (A) allows: *“This protection (from the elements) shall be permitted to be integral with the regulator.”*, installation in a compartment or with a suitable cover is not required when installed with all vent openings pointing vertically downward.

To meet the requirement in NFPA 58 (2017), section 6.26.4.2 (A) that:

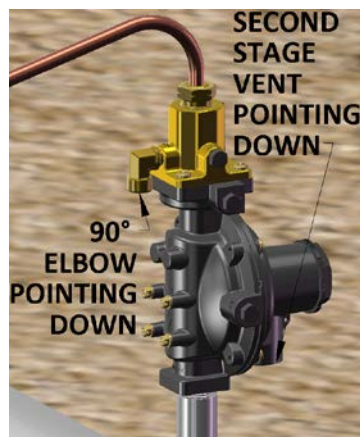
*“Regulators shall be installed with the pressure relief vent opening pointing vertically downward to allow for drainage of moisture collected on the diaphragm of the regulator.”*

MEC recommends that whenever an integral two-stage regulator can't be installed under a tank dome or suitable cover, that it be an XB configuration and oriented with both the first and second stage vents pointing vertically downward, as shown in Figure 2.

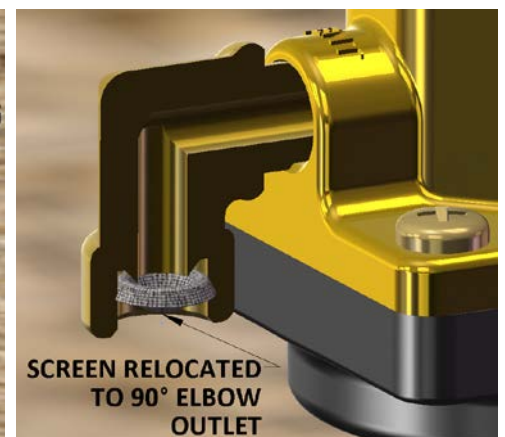


**Figure 2**

When a standard integral two stage regulator (second stage vent over outlet) is to be installed vertically, an ME2130 90° elbow, or other suitable fitting, must be installed in the first stage vent to direct it's opening downward, as shown in Figure 3A. Of course, the second stage vent must be installed pointing vertically downward, also. To keep debris out, the vent screen must be relocated to the outlet of the elbow as shown in Figure 3B.



**Figure 3A**



**Figure 3B**

## **Marshall Excelsior Company**

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