

Diaphragm Valve Procedures

Recommended Opening Procedure

On most diaphragm valve designs, the hand-wheel travels about 1¼ turns from full open to close. Upon opening you will feel a resistance for approximately one turn, at which point all or most of the resistance will disappear. At this point, the upper stem has traveled upward so as to lose contact with the diaphragms. The valve should be full open at this point, but you should avoid backseating the upper stem. This will avoid confusion as to whether the valve is open or closed.

A slight difference is experienced with tied diaphragm valves. In these valves the upper stem is mechanically connected to the diaphragm. Because of this, there is no loss of contact and therefore no free spinning of the upper stem. Aside from the more restricted feel of the valve, the valve should still be fully open but not backseated, avoiding confusion as to whether the valve is open or closed.

Recommended Closing Procedure

Generally, diaphragm valves are difficult to close. The reason for this difficulty lies in the design. When the valve is opened, full cylinder pressure is exerted on the diaphragms. The diaphragms have a surface area approaching one square inch and the pressure on this large surface area makes it difficult to push the diaphragms down. When closing the valve against cylinder pressure, about 60% of the closing force goes toward pushing the diaphragms down, while only 40% of the force is transmitted to the seat. Therefore, when a pressurized diaphragm valve is closed to the recommended 10 ft/lb and the valve outlet is depressurized, the closing force on the seat is only 4 ft/lb. Most diaphragm valves are either weeping through at this point or just barely closed. Because of this design quirk, it is necessary to use a double close on these valves. This procedure requires the operator to close the valve as tightly as possible by hand (gloved hands are recommended), then vent the pressure in the valve outlet and reclose the valve immediately. This is commonly referred to as double-closing. Never use wrenches or similar devices to operate the valve, as internal damage to the valve may result.

For more information on cylinder valves, and their design and use, call the Airgas Technical Information Center at **1-877-ASG-4-GAS**.