

Application Release

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CO₂ Systems

The increased interest in the use of carbon dioxide as a refrigerant in recent years has raised questions regarding the application of various valves and components in these refrigeration systems. Systems can be designed in many different configurations including direct expansion, secondary fluids, circulation with pumps or any combination of these, and operation may include pressures and temperatures above the critical point for CO₂, known as transcritical applications. The most common designs for current commercial refrigeration applications are hybrid systems that operate at subcritical level, and do not require special designs for components like controls and valves.

Mueller ball valves have been successfully used in various subcritical CO₂ systems throughout the world for many years; however, the successful application of the valves is dependent on proper installation and operating guidelines. All valves have a nominal rating of 700 psig/48 bar working pressure, and operating temperatures of -40°F to 300°F/-40°C to 140°C. While these values indicate typical safe operating parameters, valves are actually designed with a safety factor and are tested to burst pressures in excess of 2500 psig/172 bar. Additionally, Mueller valves feature a unique stem design that is installed inside the valve body during the manufacturing process, assuring the stem will not dislodge from the valve in the event of high pressures.

Internally, each valve has two distinct seal sets that assure proper operation: stem seals and ball seals. The stem seals are in the neck of the valve, and have been designed to work with system lubricants to assure a tight fit between surfaces, eliminating the potential for any media to escape to the atmosphere. Ball seals are located on either side of the ball, and are designed to assure positive circuit isolation when the valve is closed, while minimizing valve operational torques. The unique natures of the Mueller ball seal material and physical design characteristics assure proper operation in CO₂ applications without the need for additional valve modifications.

For specific application questions or assistance with product selections, please contact your local Mueller Refrigeration sales representative or authorized dealer.