S-##### System Description

The Liquid Carbon Dioxide Beverage systems include, the Liquid Carbon Dioxide Storage Vessel -or LCDSV (tank) and associated sub-system circuits - Liquid CO2 fill circuit, and Pressure relief / vent line circuit. The LCDSV s are vacuum insulated pressure vessels, constructed of stainless steel, with Super Insulation wrapping between the inner pressure vessel and the outer vacuum jacket. (See Figure ….) These Pressure vessels are typically designed for a Maximum Allowable Working Pressure (MAWP) of either 300 psig or 283 psig. The LCDSV come equipped with a ASME/NB certified "UV" Primary Relief Valve (PRV) set at or below the MAWP of the vessel. Additionally as recommended by CGA S-1.3, (PRESSURE RELIEF DEVICE STANDARDS PART 3 - STATIONARY STORAGE CONTAINERS FOR COMPRESSED GASES) a secondary relief valve may be installed. This secondary relief valve is beyond the scope of ASME Section VII, Division 1 and is not required to be ASME/NB stamped and certified. This additional PRV is typically rated no higher than 1.5 times the vessel MAWP.

Operating conditions of in the system, components, and inner pressure vessel can vary between cause temperatures and pressures to range from 90 psig (-56° F) to and 300 psig (+2°F). Below about 60 psig in the tank, liquid CO2 begins changing to solid phase (dry ice). If the tank becomes completely depressurized to 0 psig, temperatures inside the tank could reach -109°F (solid dry ice). When liquid CO2 turns to solid dry ice in a completely depressurized tank, all CO2 gas flow in the system ceases and the tank becomes nonfunctional. See the attached CO2 Phase Diagram figure Figure 4.6.xxxS3.2xxx, showing the typical operating range of these systems. Components external to the LCDSV inner tank pressure vessel may encounter temperatures and pressures between 90 psig, (-56°F) and 300 psig (+2°F). Typical operating pressures and temperatures vary in each of the associated sub-system circuits.

See Table 4.6.xxxS3.2xxx.

Figure #xxx Carbon Dioxide Phase Diagram

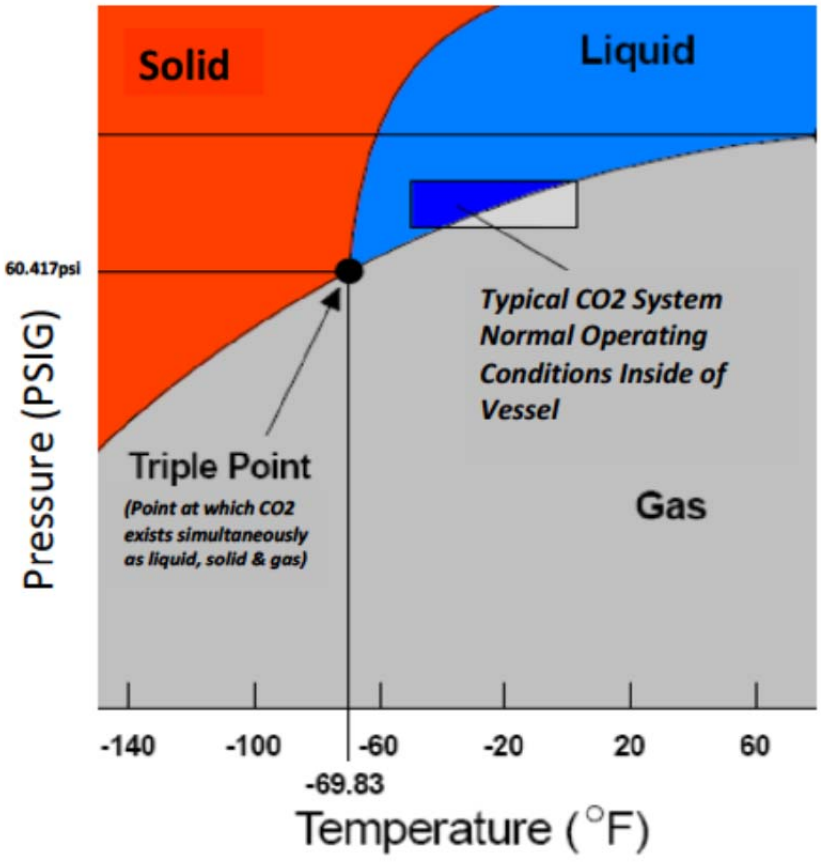

Table S#.xxx Typical Operating Pressures & Temperatures of the LCDSV System

System Component	Operating Pressure	Operating Temperature
Storage Vessel (tank internal conditions)	90 - 300 psig	-56°F to +2° F
Liquid CO2 Fill Line	150 - 300 psig	-34°F to +2° F
Pressure Relief **Gas** Vent Line	0 - 120 psig	ambient to -50° F