



Carbon Dioxide Cartridges For Hand Portable Fire Extinguishers

Carbon Dioxide Cartridges

Each ANSUL hand portable cartridge-operated fire extinguisher is provided with a small cartridge of compressed gas which furnishes the pressure to expel the dry chemical agent. Most of these cartridges are charged with liquid carbon dioxide, but some nitrogen cartridges are used in extreme low temperature environments.

ANSUL cartridges are manufactured, tested and assembled according to U.S. Department of Transportation regulations. The smaller carbon dioxide cartridges which are exempted from certain D.O.T. regulations (cartridges installed in 5 and 10 lb extinguishers) are designed, manufactured and tested in accordance with the requirements of Underwriters Laboratories, Inc.

Rupture Pressure

Every DOT-3E-1800 cylinder is designed to withstand rupture up to a minimum of 6000 psi (413.70 bar), see chart on page 2. One cartridge of every 500 manufactured must be hydrostatically tested to determine rupture pressure. Reports of these tests must be given to the Department of Transportation. Every ANSUL cartridge is also subjected to hydrostatic test at 4500 psi (310.28 bar) and pneumatic leakage at 1800 psi (124.11 bar). Because ANSUL cartridges are designed to meet and exceed minimum rupture pressure, a large safety factor between charged pressure (850 psi at 70 °F) (58.61 bar at 21 °C) and minimum rupture pressure (6000 psi (413.70 bar)) is created, see chart on page 2.

Each cartridge is closed and sealed by a threaded plug containing a frangible disc with carefully controlled material integrity, thickness, and diameter so that it will rupture at pressures between 4050 psi and 4500 psi (279.25 bar and 310.28 bar) according to D.O.T. requirements. This creates an additional safety factor of at least 1500 psi (103.43 bar) between disc rupture pressure (4050 psi to 4500 psi (279.25 bar to 310.28 bar)) and minimum cylinder rupture pressure (6000 psi (413.70 bar)), see chart on page 2.

Specially designed safety shipping caps should always be utilized on the cartridges whenever they are not installed onto a system or extinguisher. These safety shipping caps protect the threads and seal surfaces to help ensure safe pressure venting of the cartridge should it be exposed to excessive temperatures.

Filling and Pressures

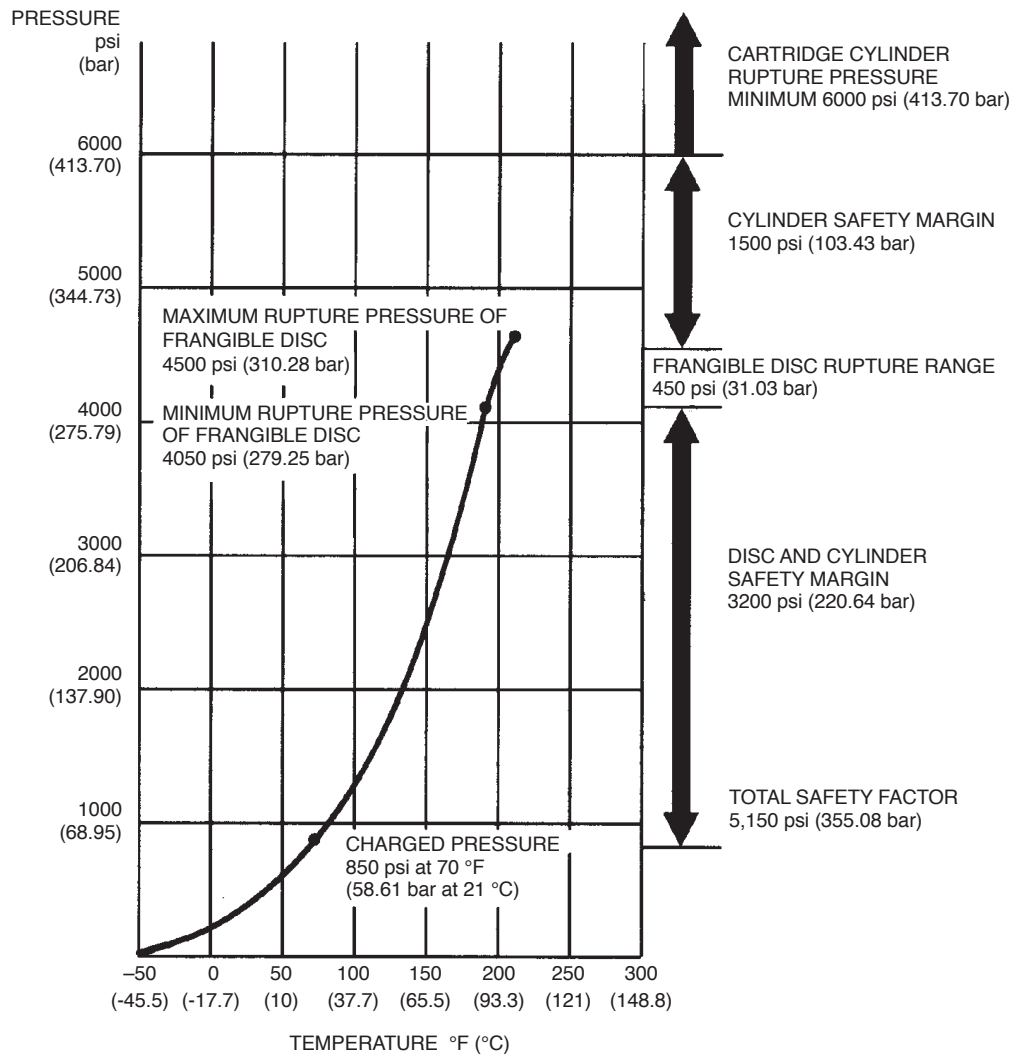
The weight of carbon dioxide placed in the cartridge is not allowed to exceed 68% of the weight of water the cartridge would hold (68% fill density). At this density the carbon dioxide is under a pressure of approximately 850 psi at 70 °F (58.61 bar at 21 °C) and about 4200 psi at 200 °F (289.59 bar at 93 °C), see chart on page 2.

The cartridge filling process is closely controlled to reduce the possibility of the cartridge being over-filled. Each cartridge is also tested for leakage by immersion in a hot water bath for four hours. This test will detect a leak rate of 1/4 oz. in 127 years. The temperature in the water bath is also high enough to rupture the safety disc in an over-filled cartridge. A final weighing ensures against shipping of overfilled or empty cartridges.

ANSUL Fire Extinguisher Quality

By insisting on the highest manufacturing standards and quality testing procedures, Johnson Controls assures the extinguisher cartridges are accurately filled, safe and reliable. Non-ANSUL cartridges should never be used in ANSUL extinguishers. Refer to Technical Bulletin, Replacement Components and Service (Form No. F-8922, latest revision).

Temperature – Pressure Relationships in Carbon Dioxide Cartridges (For 5, 10, 20, and 30 lb. capacity ANSUL Fire Extinguishers)



Note: The converted values in this document are provided for dimensional reference only and do not reflect an actual measurement.

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