The Oxygen Issue

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CryoGas International

Reporting on the business and technologies driving today's global industrial gas industry

FEATURE ARTICLES

DEPARTMENTS

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Supply Chain — Tanks, Telemetry, E Cylinders and MODs

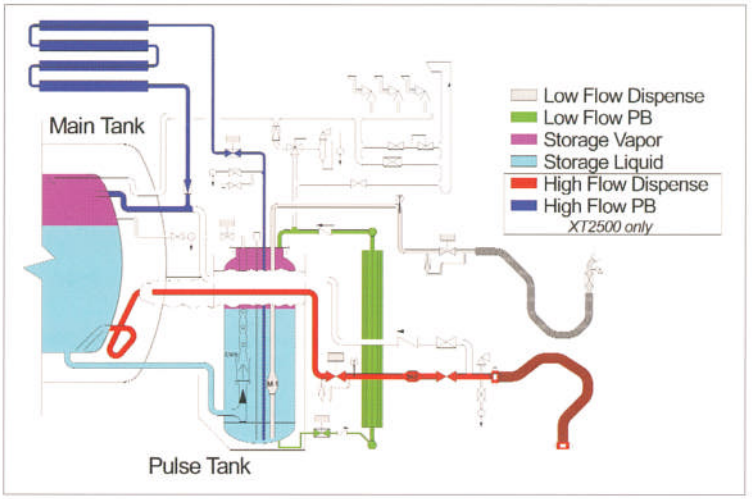
This month, CryoGas International *presents a special supply chain feature on innovations in equipment and systems that support tank design/build, management, repair and filling systems, particularly as they relate to oxygen — our topic of the month. The following profiles describe unique product offerings that support products and services within this critical part of the industrial gas supply chain.*

A SPECIAL *CRYOGAS INTERNATIONAL* REPORT

MICROBULK AND SMALL BULK DISTRIBUTION

As the MicroBulk market evolves into a globally accepted mode of gas delivery, there is a demand for an improved system, over the current external and submersed pump designs, to support it. The drivers are simple: the pump and its associated power distribution are too expensive and too costly to maintain where the economics can't support it. While the submersed pump is an order of magnitude better than an external pump in terms of cool down time, losses and maintenance costs, the submersed pump is limited to inert service. The new generation of the self-pressurized delivery systems developed by **Chart Industries** operates in inert as well as oxygen service — thus, they are the ideal delivery systems for expanding the MicroBulk oxygen market.

PT1000/XT2500 DISPENSE CIRCUITS



Pulse Tank Schematic. Courtesy of Chart Industries.

Chart's new pump-less alternative designs utilize the creative concept of adding a small vertical tank on the back end of the horizontal main tank. This additional smaller tank is known as the "pulse tank." It integrates directly with the main tank via a main liquid line and vent line — all encased in a common vacuum. The main tank operates at the typical road-relief pressure of 25.3 psig (1.7 barg), while the pulse tank operates at a higher pressure, 325 psig (22.4 barg). When the pressure in the pulse tank is less than the pressure in the main tank, low pressure liquid flows past a check valve into the pulse tank where it is held ready for dispense into a Perma-Cyl® storage vessel.

When the pulse tank is full (300 liters), the operator initializes the external pressure building circuit by opening a high flow automated valve. To expedite the pressure rise of the pulse tank, a large custom-engineered external vaporizer is employed. Because the tank is vertical (creating high head pressure), the cryogen easily flows into this vaporizer, quickly pressurizing the pulse tank at a rate of 100 psi/min (6.9 bar/min). Once at the preset delivery pressure of 100 psi (6.9 bar) over the receiving tank pressure is reached, the low saturated cryogen in the pulse tank is dispensed into the Perma-Cyl in 300 liter "pulses" at 40 gpm (150 lpm). If more "pulses" are required, the pulse tank is depressurized, refilled, pressurized and dispensed all within a seven minute cycle. Losses during depressurization of three to five percent are expected depending on receiving tank pressure, gas service and other delivery variables.

This self-pressurized system allows low pressure, quality cryogenic liquid to be delivered quickly to Perma-Cyl storage vessels with a sin-

The ORCA XT2500 is designed so liquid can be quickly dispensed from larger horizontal vessels.
Photo courtesy of Chart Industries.