

Quantum technology

custom industrial gas solutions since 1981

Global industry leader in developing solutions for helium recovery, purification and liquefaction systems

Helium Recovery & Purification System for Cold Sprays

The development and deployment of cold spray applications has been affected by the recent helium shortage and associated availability and price. Helium, much lighter than nitrogen, is the ideal candidate for cold sprays, particularly when the process requires high-speed particles. The faster the particle is moving at the moment of impact, the stronger the bond to the base will be. Helium being the lightest, non-reactive element, needs less energy to be accelerated to high velocities, allowing for more energy to be transferred to the metal powder. The drawback to using helium is its price, around 5-10 times higher than that of nitrogen, (the price of Helium gas at roughly 0.5\$/cf, compared to that of nitrogen at around 0.05\$/cf). A cold spray operation performing 1 spray a day, (1-hour spray at 100 cfm) for 5 days a week equates to 30,000 cubic feet of Helium gas used each week. This represents a total cost of ~\$15,000/week on helium, or \$750,000/year – more than the cost of a Quantum Recovery & Purification system shown below.

Quantum Technology Corp. has developed a proprietary system capable to recapture and purify helium gas during cold spray operations. The system consists of a gas collection unit, in this case - a gas-bag situated in the vicinity of the cold spray booth. From there, the recovered gas is sent through a QuantumPure™ purifier, where it is cleaned to a purity greater than 98%. Once the gas has been cleaned to this level, it is stored

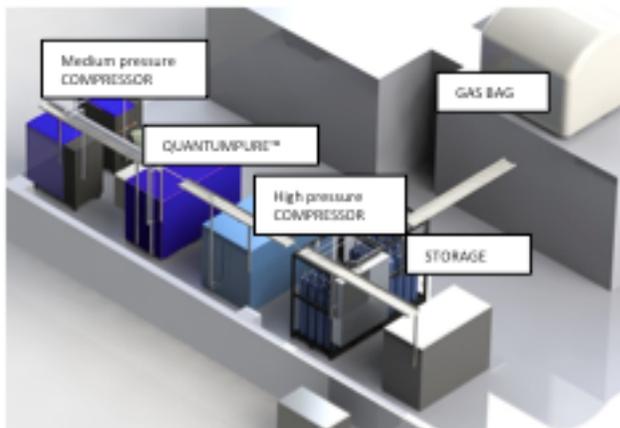
automatically in a dedicated storage bank, from where it supplies the cold spray.



Tests show that over the course of a 30-minute spray operation at a flow rate up to 130 cfm He gas, the Quantum system can recover up to 96% of the helium gas. Therefore the cost of helium can essentially be avoided. The high recovery rate makes the return on investment relatively fast (less than one year at the rates above).

The next generation in gas management for Cold Spray applications is currently under construction in Quantum shops. The patent-pending technology represents a **single gas management** system that allows the operator the choice of using helium, nitrogen or air at the “click of the button.” The system, which recycles helium and produces/recycles nitrogen as per customer requirements, removes the expensive, bulky liquid nitrogen storage and vaporization (with its high rental cost on top of the price of the product itself). This system will be in operation in the first half of 2017.

For more information regarding the Helium Recovery Systems and/or the integrated Gas Management System(s) please contact:



Quantum Technology Corp.

#4 – 38936 Queens Way
Squamish, BC V8B 0V2

PMB 183, 250 H Street
Blaine, WA 98230 USA

Tel: +1-888-271-9466 Fax: +1-888-711-5222

Email: quantum@quantum-technology.com

Web: <http://www.quantum-technology.com>