

Quantum technology

QUANTUMPURE CS™

HELIUM RECOVERY SYSTEM
FOR COLD SPRAY PROCESSES

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Quantum Technology Corp.

QUANTUM TECHNOLOGY CORP.

Quantum Technology Corporation is a global leader applications for industrial gases.

For over 35 years, our products have offered solutions for the separation, purification and liquefaction of industrial gases.

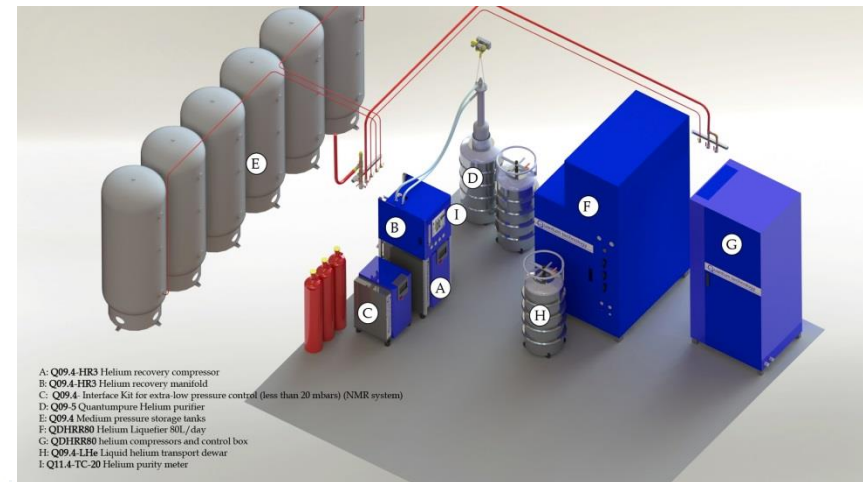
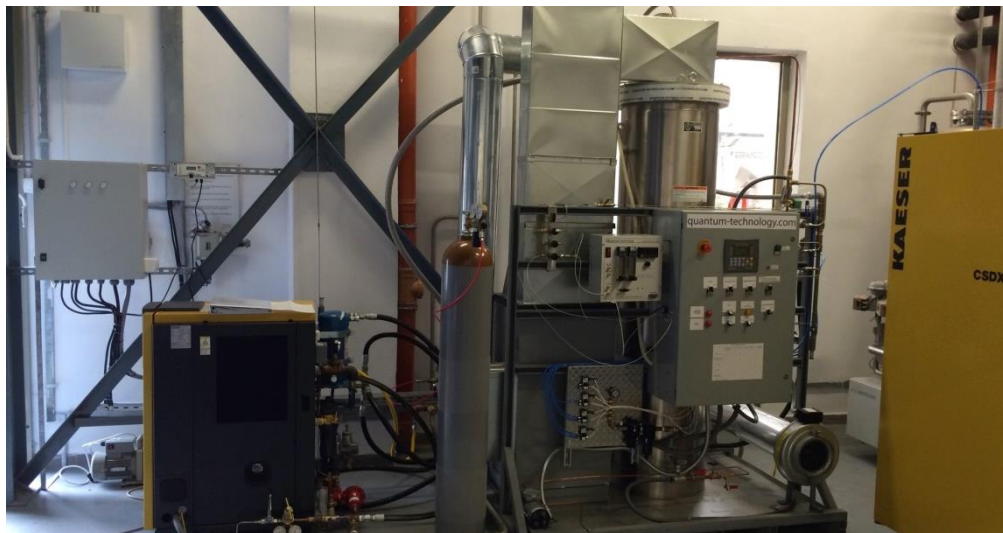
We specialize in helium systems:

- Scientific helium recovery, purification and liquefaction systems
- Industrial helium recovery and purification systems
- Helium Production Plants – Quantum is the only helium producer in Canada



Scientific Cryogenic Systems

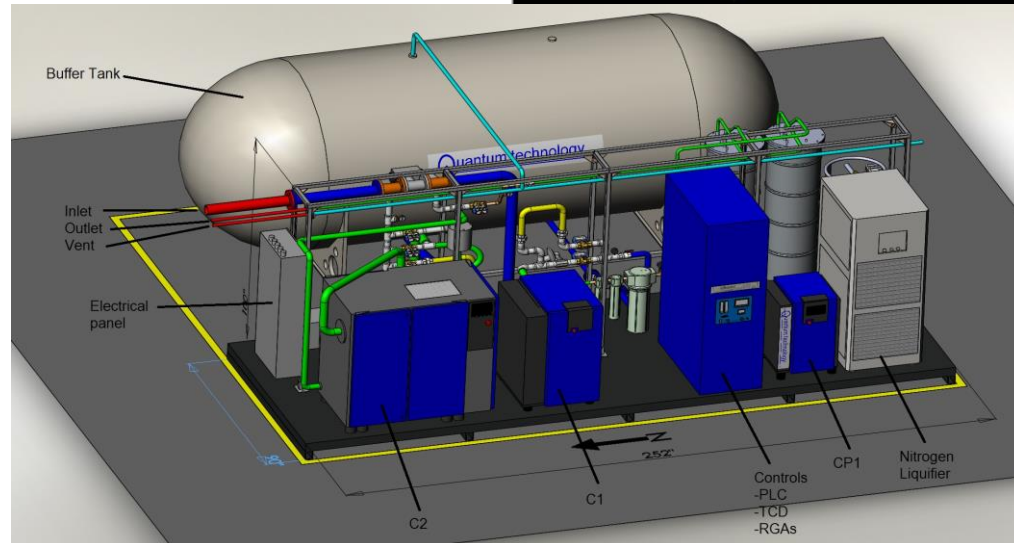
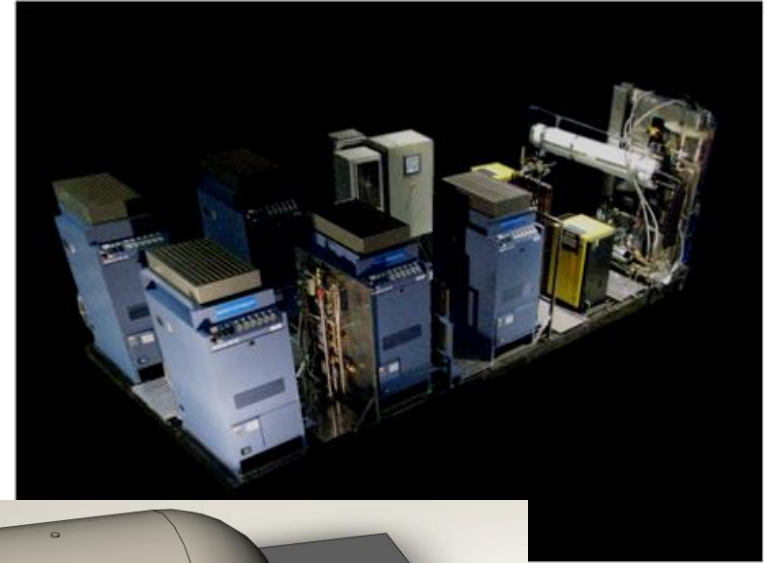
- Top Universities/R&D Centers in the World
- Systems ranging from 1 - 1000 liters/day LHe
- Widest range of liquefaction, purification, recovery systems in the market
 - Largest small-scale liquefiers (80 liters/day)
 - 'All Metal Systems'



A: Q09.4-HR3 Helium recovery compressor
B: Q09.4-HR3 Helium recovery manifold
C: Q09.4 Interface Kit for extra low pressure control (less than 20 mbars) (NMR system)
D: Q09.5 Quantumpure Helium purifier
E: Q09.4 Medium pressure storage tanks
F: QDHR80 Helium Liquefier 80L/day
G: QDHR80 Helium compressors and control box
H: Q09.4-LHe Liquid helium transport dewar
I: Q11.4-TC-20 Helium purity meter

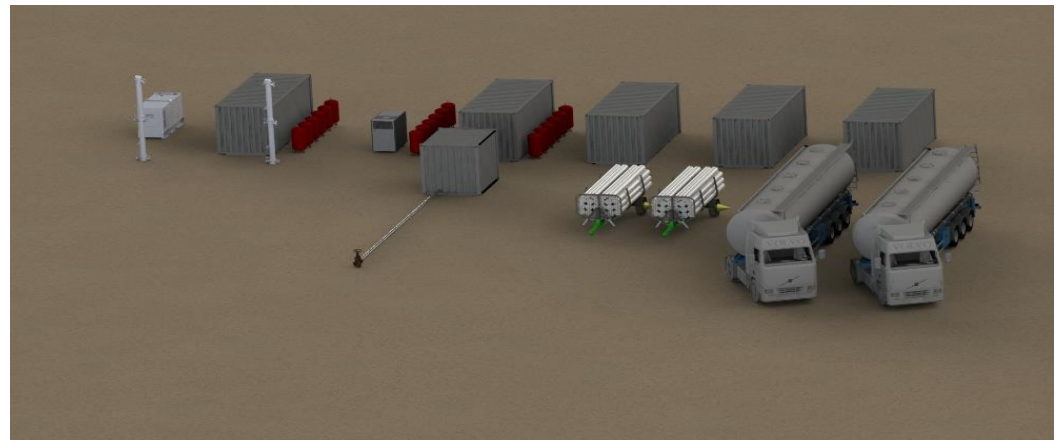
Industrial Recovery/Purification Systems

- Wide range of applications
- Wide range of sizes
- Wide range of purity outputs



Helium Production Plants

- Canadian production plant
- He sales in North America
- Developing new plants

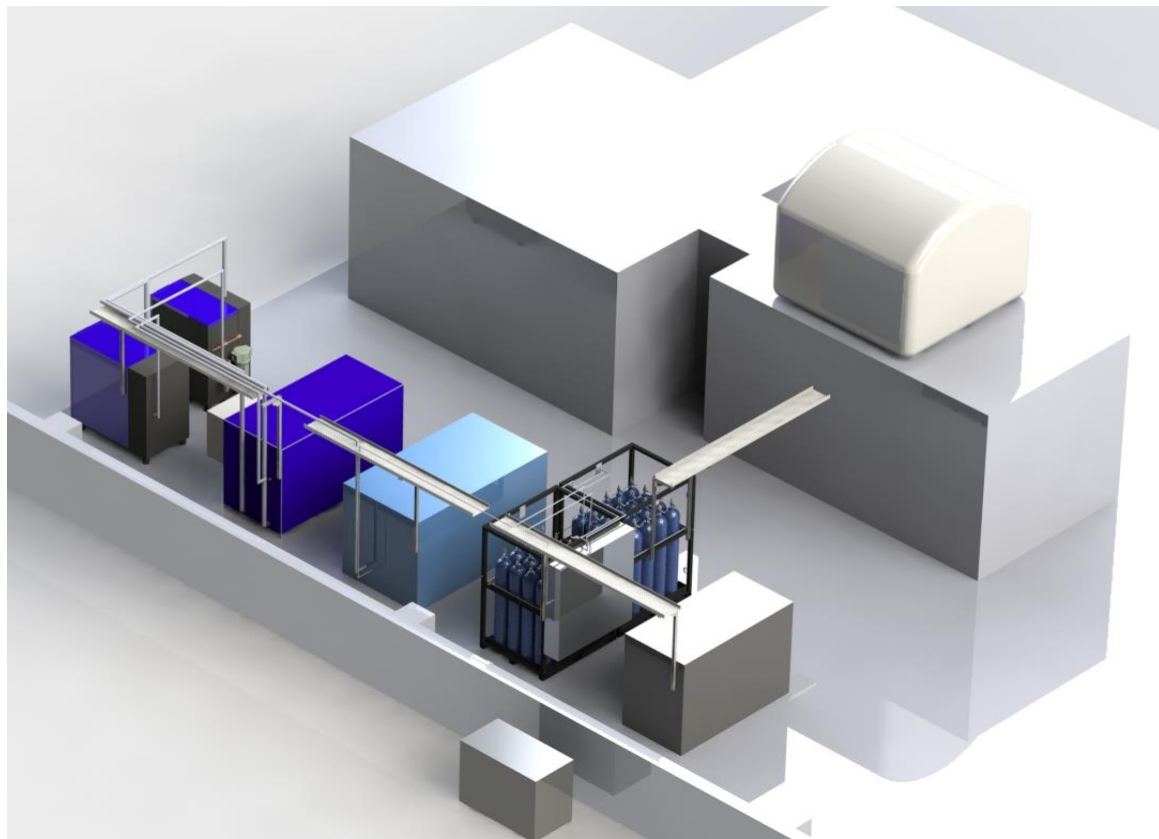


Helium Recovery for Cold Spray Processes

Cold Spray processes are widely used in industry.

One notable (and avoidable) challenge: cost of Helium.

Quantumpure CS™ is a helium recovery system designed to capture and reuse helium that would otherwise be lost in cold-spray operations.



Helium Recovery in Cold Spray Applications

Overall features:

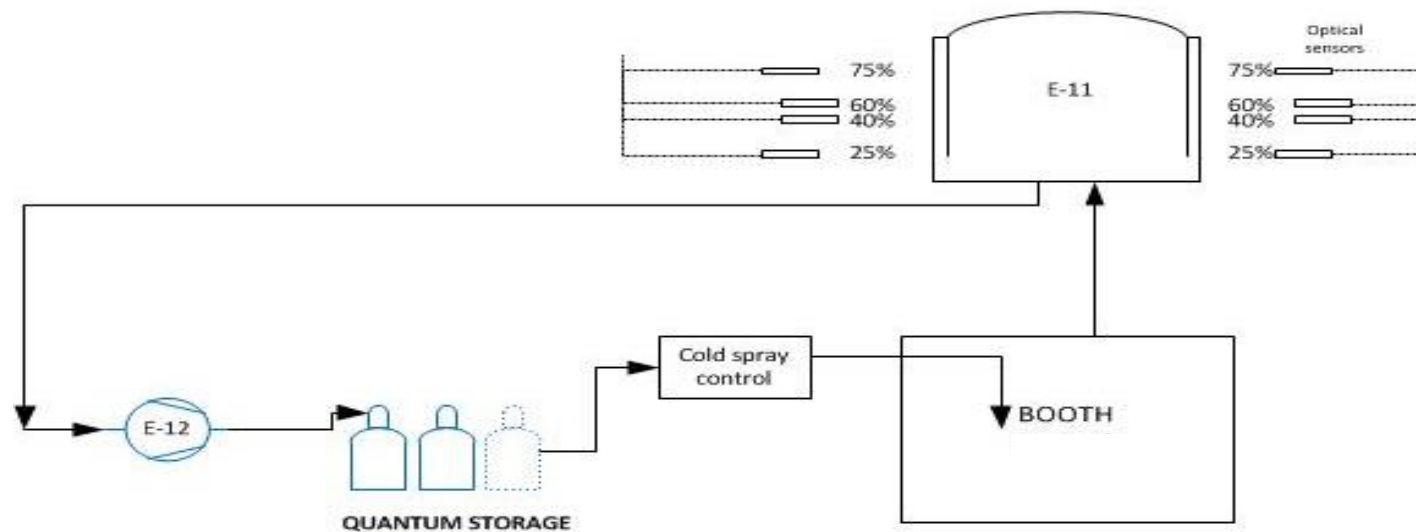
- Flowrates of 0.5 – 4 m³/min (20 – 150 scfm);
- Pressures to 100 bar (1500 PSI);
- Purities of output Helium >95+%;
- Fully automated system with high recovery rate;
- Wide range of input purities from 0% to 100%.

Given the significantly different systems, ‘one size fits all’ does not work – a more customized approach is necessary.



RECOVER AND STORE

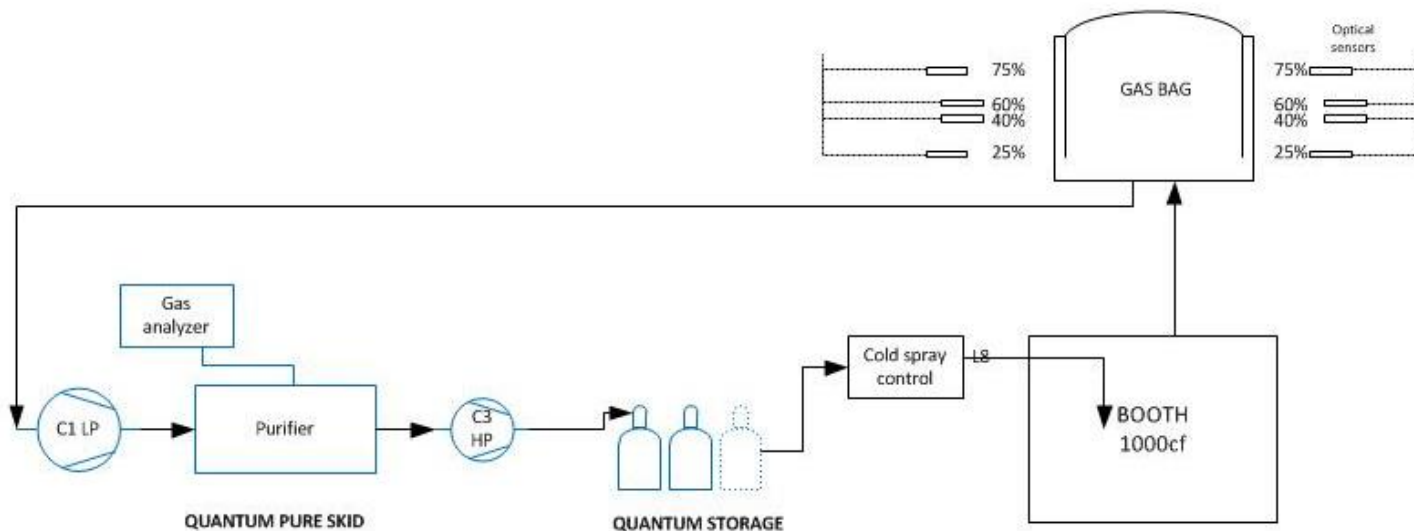
The Quantumpure CS™ System is able to capture helium from the spray booth at purity above 95% for re-use and it is either resprayed immediately, or placed into Quantum storage.



RECOVER, PURIFY AND STORE

The Quantumpure CS™ System captures helium from the spray booth and purifies to above 95%. Based on the purity of helium recycled, it is either re-used immediately, or placed into a purification loop.

The system target was to achieve an average 85% recovery, the Quantumpure CS™ System actually reaches over 90% average helium recovery rate.



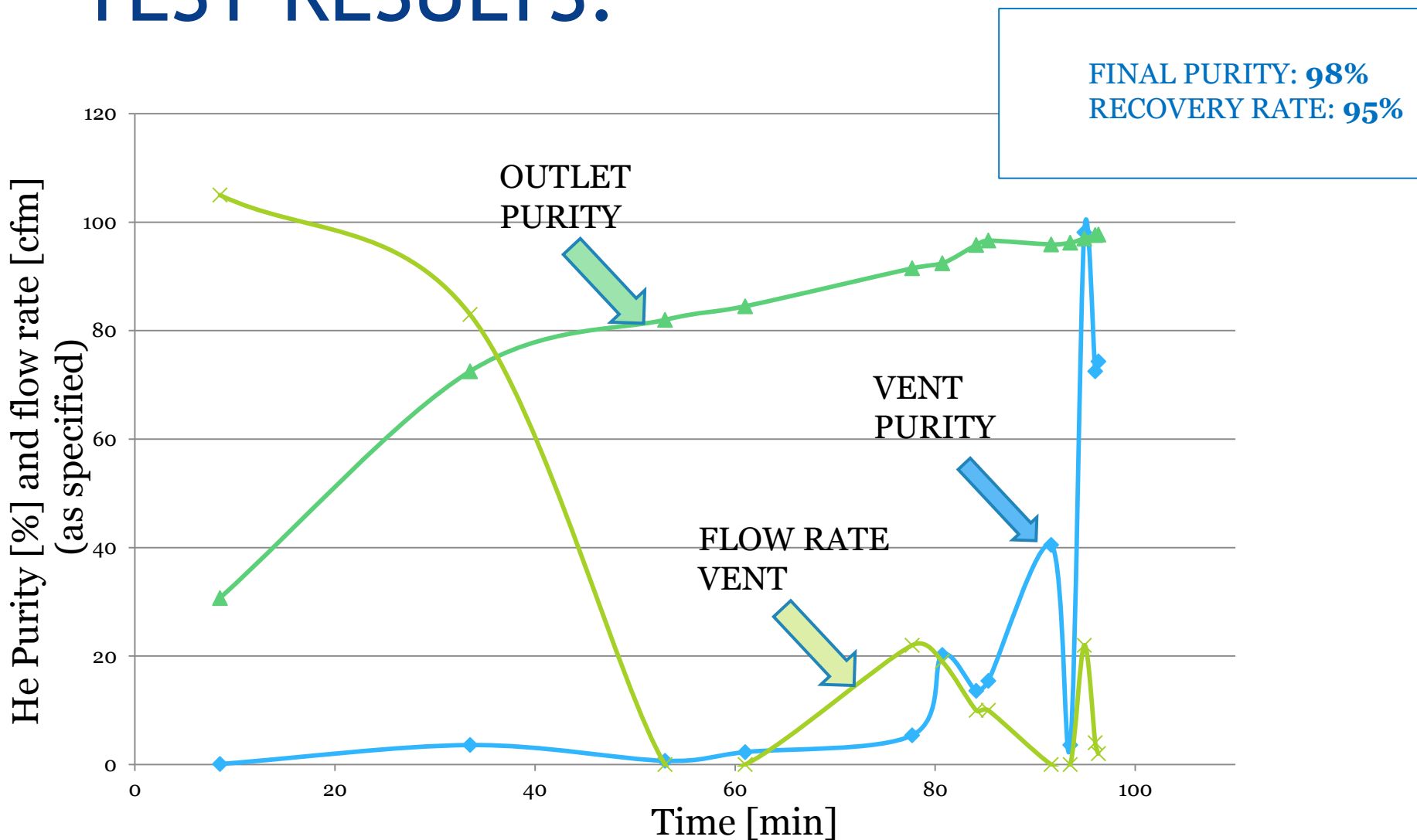
QUANTUMPURE CS™ Project

- Quantum recently finalized a Helium recovery and purification system in collaboration with
 - UTRC,
 - MOOG,
 - US Army Research Laboratory,
 - Worcester Polytechnic Institute,
 - VRC,
 - ESP and
 - H.F. Webster.

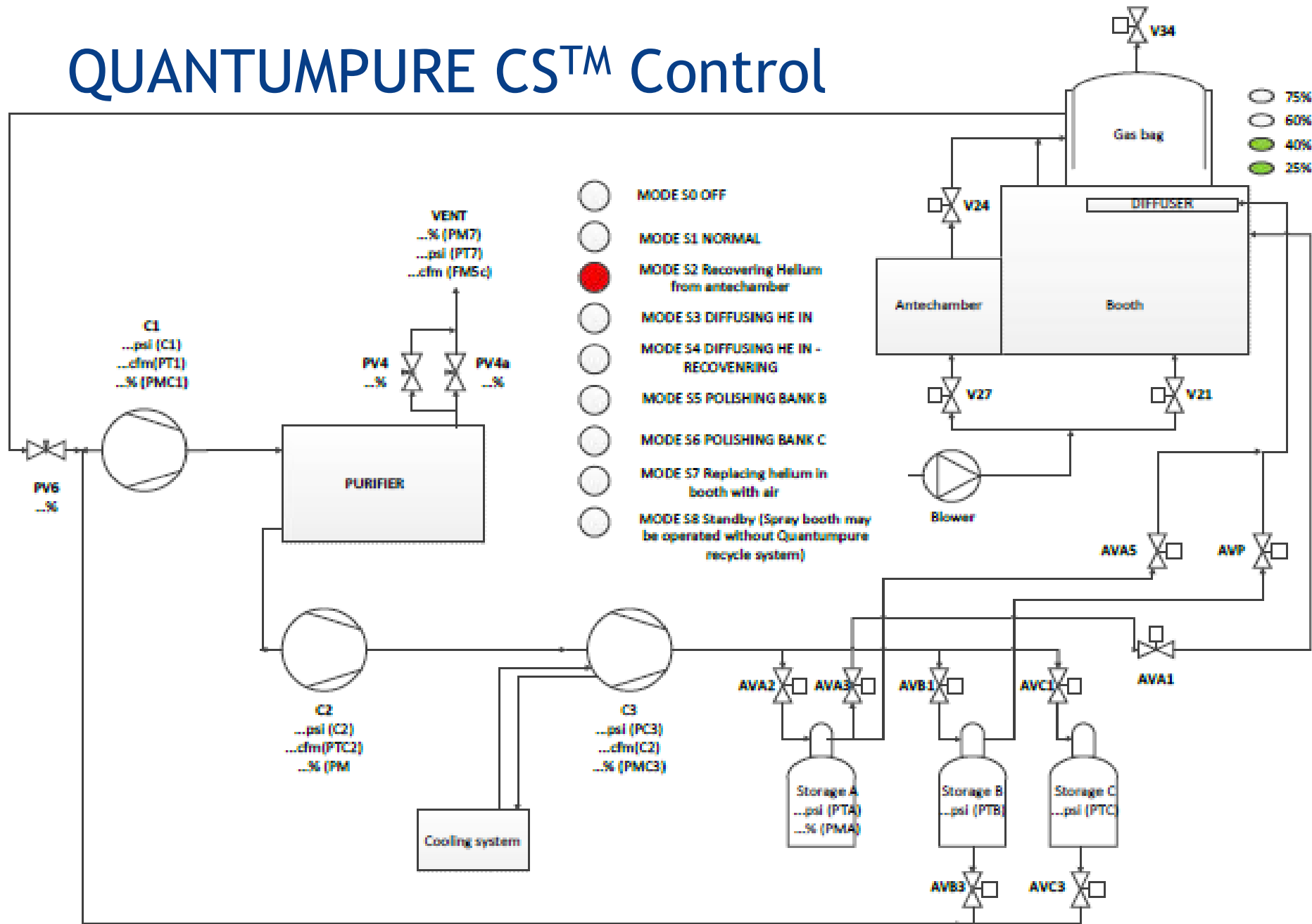
QUANTUMPURE CS™ Project

- Characteristics:
 - Flowrate: 100-130 cfm
 - Pressure; 1500 PSI
 - Initial purity: 3% Helium
 - Final purity: 98% Helium
 - Amount of helium saved in a year of normal operation: ~85-90%

TEST RESULTS:



QUANTUMPURE CS™ Control



Economics of the Process

- Amount of Helium saved in one year: ~2 MMcf
- Value of Helium saved in one year: \$800K
@\$0.4/cf
- Total investment: <\$500k
- Operating expenses: ~\$50k
- Return on Investment in ~ one year

Conclusions:

- Quantum is experienced in helium systems;
- Together with prestigious partners, Quantum has developed QUANTUMPURE CS™ technology to recover Helium from cold spray processes;
- Technology is in the process of commissioning at MOOG site;
- Technology is expected to be highly economical;
- Technology is available, standalone as well as with integrated cold spray and motion system from VRC.

Thank you!

For more info:

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