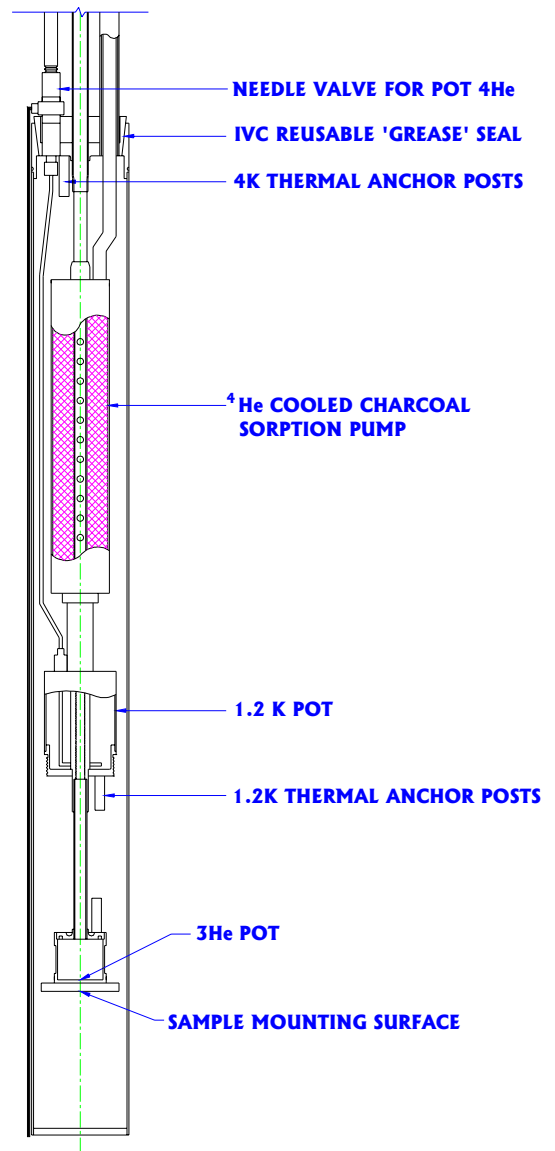


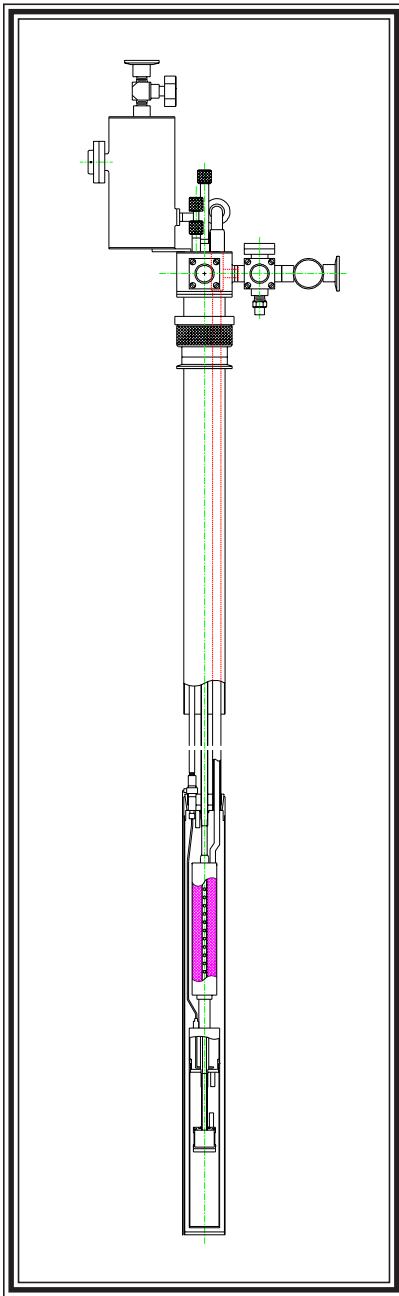
CRYO

3He Cryostats

The basic principle of a He-3 cryostat is to condense He-3 gas by bringing it in contact with a pumped He-4 reservoir. Low temperatures below 300mK are then generated by reducing the vapor pressure on top of the liquid He-3 using an internal sorption pump. The following 7-steps demonstrate the simplicity of the physics.

1. Helium 3 gas is desorbed by heating the charcoal.
2. He-4 is introduced into the 1.2K POT through the NEEDLE VALVE. Pumping on this He-4 reduces its temperature to approximately 1.2K.
3. He-3 gas in contact with the cold 1.2K POT condenses, collecting in the 3He POT.
4. Low temperatures below 300mK are then generated by reducing the vapor pressure of the collected liquid He-3 by using the built-in SORPTION PUMP. The 'sorb' pump is turned-on by shutting the heater off - cooling the charcoal.
5. Samples mounted on the SAMPLE MOUNTING SURFACE are cooled by the liquid in the 3He POT.
6. The He-3 is pumped on by the sorb until it evaporates completely (one-shot).
7. Turn the heater back on to warm the charcoal and start the process over.





Model **SVAC-HE3** Variable Temperature ³He Cryostat (sample in vacuum):

- Established in 1984, CRYO has manufactured “performance by design” ³He systems for more than 15 years
- 0.27K to 80K operating temperature range (300K optional)
- **270mK typical base temperature**
- 40 hours hold time at base temperature (no-load)
- **1.50" diameter copper sample mount**
- Quick access ‘grease’ seal
- Internal sorption pump, sub-cooled for highest pumping speed
- ³He storage tank with gas charge permanently sealed
- ⁴He 1K condensing pot
- ³He pot with external sample mounting provision
- Heaters installed on cryopump and sample mount
- Cernox temperature sensor installed on charcoal sorption pump
- RuO₂ (ruthenium oxide) temperature sensor installed on ⁴He 1K pot
- RuO₂ temperature sensor installed on sample mount
- Twisted pairs wires installed for User
- Convenient easy-to-use flex circuits for wire thermal anchoring
- Non magnetic construction, optional superconducting magnet
- Safety pressure reliefs
- Line of sight access to liquid ³He
- Convenient sliding seal interface

The model **SVAC-HE3** insert is designed for sample in vacuum applications. The sample is attached at the bottom outside of the He-3 pot, inside a vacuum chamber. Sample access is through a quick access tapered grease seal and quick and easy at room temperature. The grease hardens (freezes) when cooled forming a strong tight vacuum seal. The system design minimizes the heat leak to the He-3 pot resulting in lowest temperatures - with extreme reliability, a simple to operate single-shot ³He refrigerator.

Cooling the charcoal to lower sub cooled temperatures while combining with the latest advances in sorption pump technology provides lower base temperature, increase cooling power and reduced liquid helium consumption.

^3He Refrigerators

CRYO

www.cryoindustries.com
603-621-9957

^3He cryostats are not complicated but operate on a **simple principle**. A reservoir ('pot') of ^4He is pumped on, reducing the temperature. The ^4He is in contact with a cold surface. When this cold surface temperature falls below the condensing temperature of the ^3He gas, it condenses! The liquid ^3He drips down and collects at bottom (^3He pot). Low temperatures below 300mK are then generated by reducing the vapor pressure of the liquid ^3He by pumping with a built-in sorption pump. Cooling the 'sorb' creates a 'cryopump'. The ^3He is pumped on until it evaporates completely (one-shot). Warming the cryopump releases the adsorbed ^3He gas; starting the condensing cycle over. Recycling time is typically 30 minutes.



The model **SVAC-HE3** insert is designed for sample in vacuum applications. The sample is attached at the bottom outside of the ^3He pot, inside a vacuum chamber. Sample access is through a quick access tapered grease seal. Sample access is quick and easy at room temperature. The grease hardens (freezes) when cooled forming a strong tight vacuum seal. The system design minimizes the heat leak to the ^3He pot resulting in lowest temperatures - with extreme reliability, a simple to operate single-shot ^3He refrigerator.

Cooling the charcoal to lower temperature while combining with the latest advances in sorption pump technology provides lower base temperature, increase cooling power and reduced helium consumption.

Model **SVAC-HE3** Variable Temperature ^3He Cryostat (sample in vacuum):

- 0.27K to 80K operating temperature range (300K optional)
- **270mK base temperature**
- 50 hours hold time at base temperature
- **1.50" diameter copper sample mount**
- Internal sorption pump, sub-cooled for lowest temperatures
- ^3He storage tank
- ^4He 1K condensing pot
- ^3He pot with external sample mounting provision
- Copper 'T' sample holder with electrical pins
- Heaters installed on cryopump and sample mount
- RuO₂ (ruthenium oxide) temperature sensor installed on ^4He 1K pot (R1K)
- RuO₂ temperature sensor installed on charcoal sorption pump (R10K)
- Calibrated RuO₂ temperature sensor installed on sample mount (R1K)
- (5) phosphor bronze twisted pairs wired from 10-pin connector to sample mount for customer use
- ^4He 1K pot pumping port, sorption flow pumping port
- Safety pressure relief