



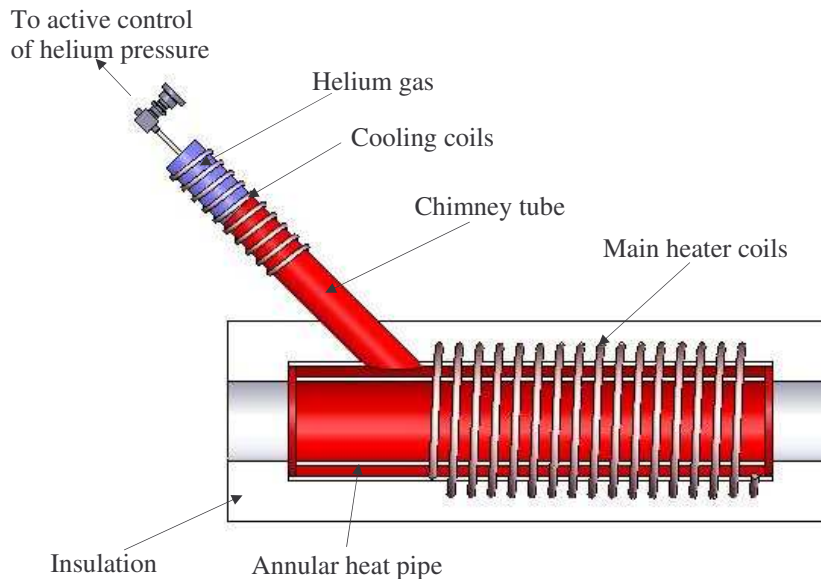
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ADVANCED COOLING TECHNOLOGIES, INC.

Innovations in Action

PRESSURE CONTROLLED HEAT PIPE FURNACES

A typical PCHP furnace consists of four major components that can be physically detached from each other: (1) Annular Heat Pipe; (2) Tube Furnace; (3) Control Cabinet with Electronics and Pressure Monitoring System (not shown); and (4) Computer (not shown).



Principle of Operation:

Unlike a conventional heat pipe that is hermetically sealed, the vapor space of the annular heat pipe in a PCHP furnace is connected to a helium gas reservoir. The control system for the helium pressure consists of a pressure transducer, a helium supply and a vacuum pump. The pressure is maintained constant by admitting or removing helium. The power input to the furnace is controlled by a temperature controller whose set point is coupled to the pressure control system. Data collection and commands are performed by a computer equipped with special software. Constant helium pressure translates into constant vapor pressure and temperature inside the heat pipe. Spatial temperature uniformity of better than 10mK has been measured.

Applications:

- Isothermal Processing of Materials
- Thermophysical Properties Characterization
- Temperature Calibration

Specifications:

- Temperature Range: 200 – 1,100°C
- Set Point Stability: $\pm 0.01^\circ\text{C}$
- Temp. Uniformity: $\pm 0.01^\circ\text{C}/30\text{ cm}$
- Orientation: Horizontal and Vertical
- Heat Pipe Fluid: Water, Cs, K, Na

Design Advantages:

- Precision temp. control to 1,100°C+
- High product yield
- Turnkey computer controls
- Programmable temperature history
- Precise materials processing