

**CRYO** Industries of America, Inc.

# **Cryocool-LHe**

## **Gas Stream Cooler**



**CRYOCOOL-LHE featuring the lowest  
temperature in the industry:**

**4.5 K!**

# Cryocool-LHe

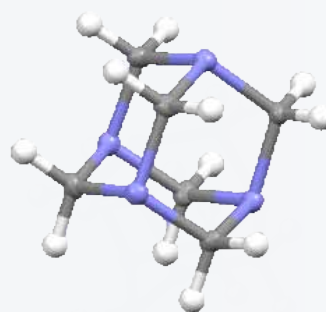
## Revolutionizing the Speed and Resolution of Data Collection for Crystallographers!

With the CRYOCOOL family of gas stream coolers Cryo has opened new frontiers in crystallography, allowing researchers to take advantage of a product family having the widest temperature range in the market, 4.5 K to 600 K.

CRYO's single-flow 'CRYOCOOL- LHE' provides a continuous stream of cold helium gas. Flow rate can be adjusted by an easy to use needle valve. 'Never-Ice' technology eliminates the need for shield gas.

Simple to operate – set the never-ice heater, insert the transfer line into the transport Dewar, open the needle valve, and the flow starts! Cool-down takes only a few minutes after liquid He flow starts. He flow can be completely stopped, saving He between data collection runs. Stable operation after restart can be attained in 20 minutes.

With lower temperatures you can now study crystals in a way not previously possible.



Hexamine at 10 K (LHe Cryocooler). The X-ray C-N bond length is the same as from neutron data.

### Some User's Notes:

"This system really works. We can easily collect data at temperatures as low as 4.5K. We have found that it is much harder for crystals to hold on to their secrets at these temperatures!"

"What is dramatic about 5 K is the wealth of finer details that become visible."



Ice-Free Sample at 8 K using Cryocool-LHe

### The CRYOCOOL-LHe can provide:

- Unobstructed access to the crystal for long time periods with minimal radiation damage
- Lowest possible atomic displacement parameters
- Higher resolution
- Lower background noise
- More effective flash cooling
- Better thermal interface
- Better quality crystals and longer lifetime
- The gas stream temperature can be maintained automatically with true PID temperature controller
- Heat exchanger with silicon diode temperature sensor is built into the nozzle of the cooler, providing feedback to the controller

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The sample (crystal) locates in the cold stream. No windows, tubes or crystal shielding are needed. The result is complete freedom of movement and maximum sensitivity. Elimination of shield gas reduces turbulence, allows lower temperatures, reduces operating costs, and makes for an easier to use system. Set-up is very simple. Crystal mounting can be learned in five minutes. The only maintenance needed is occasional re-evacuation of the transfer line.

With a base temperature of 4.5 K, the CRYOCOOL-LHE features the lowest temperature in the industry. 4.5 K and efficiency (1.0 liters/hr at 15 K, 2.2 liters/hr at 4.5 K), performance far better than any other commercially available helium gas stream cooler!



**TOP LEFT**

**Start**

ChA= nozzle (295.578K)

ChB= never ice tip



**10 minutes later**

ChA= nozzle (5.007K)

ChB= never ice tip



The Model 32B CRYO Controller automatically holds gas stream set point temperature . The never ice nozzle heater is also completely under automatic control.

## Cryocool-LHe Features:

- Low temperature of 4.5 K at five (5) mm from nozzle
- 10K at ten (10) mm
- 2.2 liters/hour liquid helium consumption at 4.5 K
- 2.0 liters/hour at 10 K, 1.0 liter/hour at 15 K
- Cooldown time about 10 minutes
- Variable temperature control, 4.5 K to 120 K
- Large nozzle diameter (7 mm)
- Flow control valve with ice filter
- 7 ft (2.1m) flexible length for easy handling and manipulation
- 54 inch (137cm) length storage dewar insert length
- Never ice 'warm-tip' (no shield gas needed - ever)
- Ice free nozzle without using shield gas!
- Never-ice tip completely under automatic control.
- X-Y-Z Axis Nozzle Support stand
- Precision nozzle adjustment
- Continuous gas stream and tip temperature monitor
- Automatic control of gas temperature
- Computer interfaces = USB, GPIB and RS-232