

CRYOCOOL-LG

Liquid Generation Nitrogen Dewars with Integral Gas Stream and Liquid Withdrawal

CRYO has combined the reliability of our liquid nitrogen system with the convenience of Cryogen Generation to produce a reliable Cryo generation system that keeps going and going and going even if the refrigerator stops.

**NEW
TECHNOLOGY**

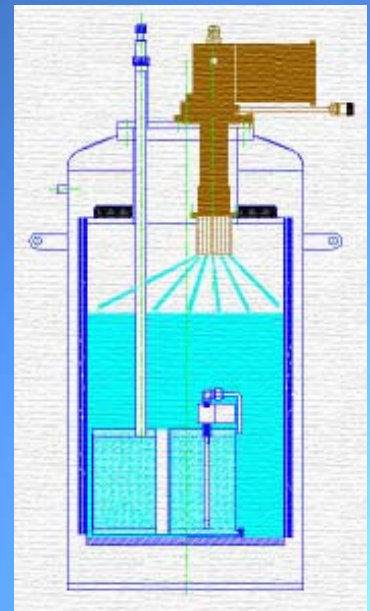
The **LG10 and LG20** eliminate nitrogen deliveries, handling, storage, transport, transfer, inventory, availability and so on. Space saving single-unit design supplies both gas stream cooling and liquid nitrogen for lab use! Liquid nitrogen is made directly in the dewar - a safe way to handle cryogens. The built-in gas generator provides single phase gas stream cooling through a supplied vacuum insulated transfer line. Never-ice technology eliminates icing and shield gas at the transfer line outlet. Liquid nitrogen can be withdrawn for lab use by simply turning the faucet handle.

Xtra Generation: This new technology makes liquid nitrogen from the air for a cold gas stream and produces extra for tray, robotic sample changers or external cooling - a Generation ahead of the competition.

A New Level of Performance and Reliability

with applications in:

Crystallography, superconducting NMR & MRI, EPR, biochemistry & cryosurgery, semiconductor fabrication, EDS-SEM, EDXRF, MS GC-MS.





Never-ice Technology - No shield gas needed - ever - Ice free (inside and out)

The Nozzle

The *never-ice* warm tip maintains an ice-free environment at low temperatures - ad infinitum. **The transfer line and nozzle remain clean of frost and contaminants; samples analyzed do not collect ice!**

The Liquid Generator (LG)

Nitrogen gas is extracted from the air and liquefied in the dewar. Only an air compressor is needed. The liquid nitrogen is used for gas stream cooling. Excess nitrogen can be withdrawn at the turn of the spigot handle, located at the top of the dewar. The LG10 makes 10 liters per day extra for liquid withdrawal. The LG20 makes 20 liters per day for liquid withdrawal. Simultaneously, a cold gas stream of 5 - 6 gas liters per minute is maintained for crystal cooling.

The refrigerator operates on the Gifford-McMahon (GM) gas expansion cycle. A compressor circulates helium gas in a closed loop to and from the refrigerator. This compressed gas is cooled by expansion, providing the cooling needed for liquid generation.

Principle of Operation

The *Cryocool* delivers a controlled constant flow of nitrogen gas to the nozzle exit. The flow rate is continuously variable. Samples held in the gas stream are maintained at stable controlled temperatures. An **unlimited ice-free** duration is available for experimentation.

A nitrogen gas inner generator chamber is immersed in the outer liquid nitrogen reservoir. Nitrogen gas is created in this chamber by using an electrical heater. This nitrogen gas passes into the transfer line and is delivered to the nozzle. The rate of gas flow is directly proportional to the heat generated by the heater. The User has total exact flow control - simply turn the heater power up for more flow, down for less. A heater in the nozzle provides for fine adjustment of the gas stream temperature.

The Cryocool provides a laminar flow ice-free environment and is very easy-to-use. Set the flow rate and cooling begins. The Cryocool controller automatically holds the setpoint temperature. The *never-ice* tip thermostatically de-ices the nozzle while maintaining laminar flow. No shield gas is needed. The cost, complexity and need to control shield gas is eliminated. The tip and crystal stay frost free - even in the most humid environment.

The inner nitrogen gas generator region is separated from the main reservoir that is filled with liquid nitrogen. The liquid nitrogen in the outer reservoir is created by condensing nitrogen gas using the closed cycle refrigerator. Refill and liquid generation are automatic and are done while maintaining the gas stream. Liquid can be withdrawn for lab use without affecting the cold gas stream.

The refrigerator is removable from the top of the dewar, making service easy to do. While the refrigerator is removed, the system is fully functional as a stand alone liquid nitrogen cooler - similar to our superior and reliable CRYOCOOL-LN2.

