LINDE CRYOGENICS
TECHNICAL SPECIFICATION L1610/LR1630

Standard Helium Liquefier/ Refrigerator L1610/LR1630

Linde Cryogenics

Liquefaction capacity: up to 70 l/h at 4.4 K
Refrigeration capacity: up to 218 W at 4.6 K

Linde continues the long tradition of dependable and affordable helium systems with production of the Model 1400-1600 series of helium systems. Capacities depend upon liquid nitrogen (LN_2) pre-cooling and on the chosen size of compressor. All standard cold boxes are equipped with a LN_2 pre-cooling capability, which provides a significant increase in capacity.

The liquefaction and refrigeration process is based upon a modified Claude cycle with two rugged gas piston expanders. The system is controlled by a state of the art PLC based control system. Significant system parameters are measured by digital instruments.

A purifier is integrated in the cold box to enable the liquefier to accept recovered helium contaminated with up to 10% of air and moisture impurities. Initial purification down to 1% impurity level is achieved by air condensation, the remaining air is then frozen out. Regeneration of the freeze-out purifier is fully automatic. The cooling for the purification is generated by the helium cycle, so no external cryogens are required.

The LR1630 refrigerator is based on the L1610 liquefier design using the same standard components and offering the same features. Differences are only marginal. For example, the purifier is not required, dual 80K adsorber beds are added, and the control system is modified for the operational needs.

Piston Expanders

The piston expanders have been improved over the years with better bearings and connecting rods. The load motor and alternator combination has been replaced with a single VFD motor. The resistor banks are reduced in size and mounted on the coldbox cabinet. These improvements have significantly increased reliability.

Standard Scope of Supply

The standard helium liquefier or refrigerator is composed of:

- Vacuum insulated cold box, with integrated automatic purifier and a transfer line connection to/from the storage dewar (L1610) or with female bayonet connections to/from a load and a transfer line connection to/from the storage dewar (LR1630)
- Control panel with operator interface integral to the cold box cabinet
- Finned tube and shell heat exchangers with LN_2 pre-cooling function
- Two gas piston expanders
- Oil injected recycle compressor, water cooled
- Oil removal system / gas management valves
- Coaxial transfer line from liquefier to dewar

Options

- Pure helium gas buffer
- Cryogenic adsorber, portable
- Line drier
- LHe storage dewar and transfer line
- Standard installation kit
- Helium gas recovery system
- Spare parts & maintenance kits
- Maintenance contract

Standard Control System Supply

- Automation Direct PLC with Direct Soft software
- Panelmate touch screen operator panel with function keys and text display
- Control cabinet, integral to the cold box cabinet, communicating via Ethernet

Options

- Data acquisition, remote monitoring, and control system on laptop computer
- Process visualization with dynamic color graphic display
- Trend recording
- Display of control loop status and process variables

Model L1610 Liquefaction Performance (Liters/Hour)

50Hz	60Hz	50Hz	60Hz	
Without LN_2 precooling	Without LN_2 precooling	With LN_2 precooling	With LN_2 precooling	Compressor
-	-	-	-	RSS
17	20	40	49	RS
20	21	49	57	RSX

Model LR1630 - 4.6K Refrigeration (Watts)

50Hz	60Hz	50Hz	60Hz	
Without LN_2 precooling	Without LN_2 precooling	With LN_2 precooling	With LN_2 precooling	Compressor
-	-	-	-	RSS
64	76	110	129	RS
76	86	129	151	RSX

Model L1610/LR1630 Main Dimensions

Description	L x W x H (m)	Weight (kg)
Model L1610 Helium Liquefier	1.476 x 1.274 x 1.803	953
Model LR1630 Helium Refrigerator	1.476 x 1.274 x 1.803	953
Compressor - RSS	1.450 x 1.250 x 1.420	1100
Compressor - RS & RSX	1.450 x 1.350 x 1.480	1135

Linde Cryogenics
A Division of Linde Process Plants, Inc.
6100 South Yale, Suite 1200
Tulsa, Oklahoma 74136 USA
Phone: (918) 477-1200 Fax: (918) 477-1107
www.LPPUSA.com

V1.0-06/06