

Standard Helium Liquefier/ Refrigerator L1410/LR1430

Linde Cryogenics

Linde

Liquefaction capacity: up to 47 l/h at 4.4 K Refrigeration capacity: up to 114 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 (LN₂) pre-cooling and on the chosen size of compressor. All standard cold boxes are equipped with a LN₂ 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 cryogenics are required.

The LR1430 refrigerator is based on the L1410 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 cold box cabinet. These improvements have significantly increased reliability.

Standard Scope of Supply

The standard helium liquefier/refrigerator is composed of:

- Vacuum insulated cold box, with integrated automatic purifier and a transfer line connection to/from the storage dewar (L1410) or with female bayonet connections to/from a load and a transfer line connection to/from the storage dewar (LR1430)
- Control panel with operator interface integral to the cold box cabinet
- Finned tube and shell heat exchangers with LN₂ pre-cooling function
- Two gas piston expanders
- Oil injected recycle compressor, water cooled
- Oil removal system/gas management panel
- Coaxial transfer line from liquefier to dewar

Options

- Pure helium gas buffer
- Cryogenic adsorber, portable
- Line drier
- LHe storage dewar and decant line
- Standard installation kit
- Helium gas recovery system
- Spare parts and 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 L1410 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
8	10	16	20	RSS
17	17	39	47	RS
-	-	47	-	RSX

Model 1430 - 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
30	41	40	51	RSS
64	64	100	114	RS
-	-	114	-	RSX

Model 1410/1430 Main Dimensions

Description	L x W x H (m)	Weight (kg)
Model L1410 Helium Liquefier	1.270 x 1.067 x 1.700	818
Model LR1430 Helium Refrigerator	1.270 x 1.067 x 1.700	818
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 reserves the right to change the specifications without prior notice, especially to make revisions regarding design and technology, which improve the functionality; errors in description and illustration excepted.



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