Standard helium liquefier/refrigerator L280/LR280

The newly developed, fully automatic computer controlled L-Series offers a wide range of liquefaction and refrigeration capacities, depending on liquid nitrogen (LN_2) pre-cooling and on the chosen size of compressor. All standard coldboxes are equipped with a LN_2 pre-cooling facility, which allows a significant increase in capacity. The L280/LR280 therefore provides a high degree of flexibility to meet your requirements today and in the future.

The liquefaction and refrigeration process is based on a Claude cycle with dynamically balanced gas bearing turbo expanders. The new TED turbines are based on our proven TGL turbine technology and have been developed further to ensure maximum efficiency and reliability.

A purifier is integrated into the coldbox to enable the liquefier to accept recovered helium, which can contain up to 10% air impurities. Initial purification down to a 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 LR140 refrigerator is based on the L280 design using the same standard components and offering the same features. Differences are only marginal, for example the purifier is not required and the control system is tailored to operational needs.

TED turbo expander

The enhanced Linde TED gas bearing turbo expander is a small, single-stage centripetal turbine, braked by a direct coupled single-stage centrifugal compressor. The turbine uses dynamic gas bearings operating at ambient temperature. The TED turbo expander is even more reliable in operation and requires no scheduled maintenance due to special design features.

Standard scope of supply

The standard helium liquefier/refrigerator comprises:

- → Vacuum insulated coldbox, either with integrated automatic purifier (L280) or transfer line connection to/from the cryostat (LR280)
- → Control cabinet with operator panel, removable from the coldbox
- → Aluminium plate-fin heat exchangers with LN_2 pre-cooling facility
- → Two TED turbo expanders with dynamic gas bearing
- → Oil injected recycle compressor, air or water cooled
- → Oil removal system / gas management panel
- → Coaxial transfer line from liquefier to dewar (only L280)

Options

- → Pure helium gas buffer
- → Line drier
- → LHe storage dewar and decant line
- → Standard installation kit
- → Recovery system
- → Spare parts
- → Maintenance contract

Standard control system supply

- → Siemens S7-300
- → OP270 operator panel with function keys and text display
- → Control cabinet, removable from the coldbox, communicating via Profibus

Options

- → Remote Monitoring and Control System (RMCS) on personal computer
- → Process visualisation with dynamic colour graphic display
- → Trend recording
- → Display of control loop status and process variables

Technical specification L280/LR280

L280 liquefaction performance at ≤ 4.4 K

without LN_2 pre-cooling	with LN_2 pre-cooling	compressor/power rating
100 l/h	200 l/h	DSDX305/160 kW
112 l/h	225 l/h	ESD375/200 kW
145 l/h	290 l/h	ESD445/250 kW

LR280 refrigeration performance at ≤ 4.4 K

without LN_2 pre-cooling	with LN_2 pre-cooling	compressor/power rating
445 Watt	560 Watt	DSDX305/160 kW
510 Watt	640 Watt	ESD375/200 kW
640 Watt	900 Watt	ESD445/250 kW

L280/LR280 main dimensions

Description	L x W x H [m]	Weight [kg]
Coldbox	2.0 x 1.6 x 2.6	2500
Control cabinet	0.8 x 0.4 x 1.9	110
Compressor DSDX type	2.8 x 2.0 x 2.2	4500
Compressor ESD type	3.2 x 2.1 x 2.4	5100
Oil removal system and gas management panel	1.6 x 1.3 x 2.4	500 (including filling)

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