

## Standard helium liquefier/refrigerator L70/LR70.



The newly developed, fully automatic computer controlled L-Series offers a wide range of liquefaction and refrigeration capacities, depending on liquid nitrogen (LN<sub>2</sub>) pre-cooling and on the chosen size of compressor. All standard coldboxes are equipped with a LN<sub>2</sub> pre-cooling facility, which allows a significant increase in capacity. The L70/LR70 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 cryogenes are required.

The LR70 refrigerator is based on the L70 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 (L70) or transfer line connection to/from the cryostat (LR70)
  - Control cabinet with operator panel, removable from the coldbox
  - Aluminium plate-fin heat exchangers with LN<sub>2</sub> 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 L70)

**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 L70/LR70****L70 liquefaction performance at ≤ 4.4 K\***

without LN <sub>2</sub> pre-cooling	with LN <sub>2</sub> pre-cooling	compressor/power rating
20 l/h	40 l/h	CSD85/45 kW
27 l/h	55 l/h	CSD105/55 kW
35 l/h	70 l/h	CSD125/75 kW

**LR70 refrigeration performance at ≤ 4.4 K\***

without LN <sub>2</sub> pre-cooling	with LN <sub>2</sub> pre-cooling	compressor/power rating
please inquire	130 Watt	CSD85/45 kW
please inquire	160 Watt	CSD105/55 kW
130 Watt	190 Watt	CSD125/75 kW

\*expected performance

**L70/LR70 main dimensions**

Description	L x W x H [m]	Weight [kg]
Coldbox	1.5 x 1.2 x 2.6	1500
Control cabinet	0.8 x 0.4 x 1.9	110
Compressor CSD type	1.8 x 1.2 x 1.9	1400
Oil removal system and gas management panel	0.9 x 1.2 x 2.6	500 (including filling)

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