RLD
Thermique et Ingénierie

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Cost effective cryogenics
in industry and research

ECONOMICAL SOLUTIONS
LN2
RLD

Large industrial gas suppliers have heavily invested in energy and cost reduction for the manufacturing and distribution of cryogenic fluids. Nowadays liquefaction efficiency - relative to the ideal Carnot cycle - for large industrial air separation units, has reached an excellent 45%. This corresponds to specific liquefaction energies in the range of 0.6 kWh/Nm3 for oxygen, nitrogen or argon.
A large number of industrial cryogenic installations were designed and built. Thanks to widespread availability of cryogenic fluids these have become every day industrial utilities, not always used in an economical manner. Since energy resources are more and more scarce worldwide, eliminating any wasted energy is of utmost importance.

The sign for Economical Solutions for equipment using LN2 indicates products developed by

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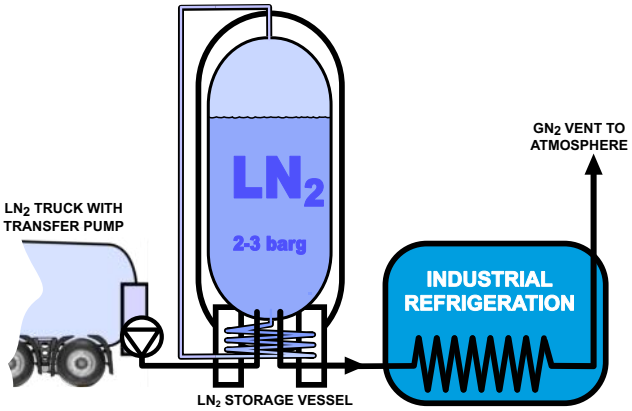
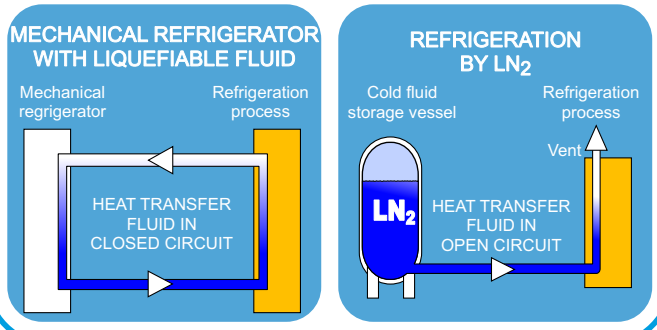
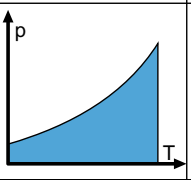
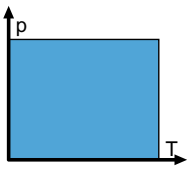
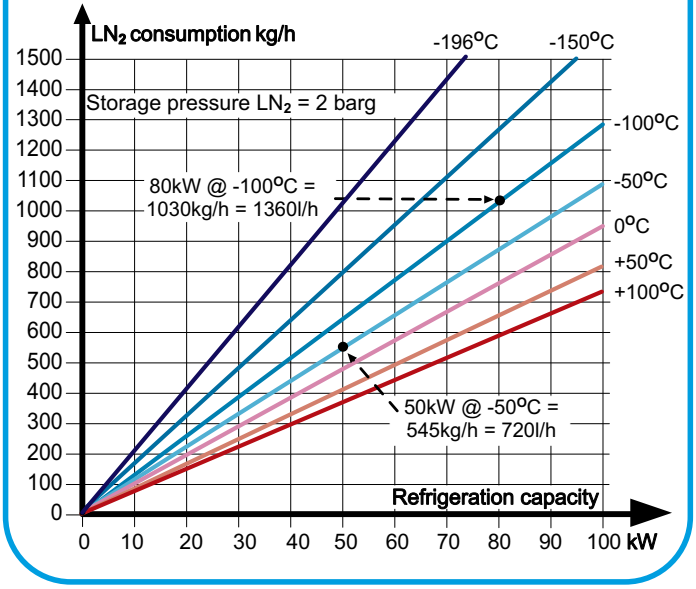
Nitrogen, Oxygen and Argon in liquid phase can be used as refrigerant. Of these three it is nitrogen that is the most commonly used.





	Classical refrigeration	Cryogenic refrigeration
Refrigeration in relation with power and temperature		
To obtain a working temperature of -80°C	difficult	easy
Investment	large	small
Daily operation	specially trained personnel	no special training required
Maintenance	labour intensive	low maintenance

When used in continuous operation LN_2 becomes competitive for temperatures lower than -50°C.
For batch operation LN_2 can be competitive up to -20°C specially when large refrigeration power is required.



RLD amongst other companies, has made it their goal to reduce LN_2 consumption in thermal processes. They have invested in development of new cryogenic components, thus dramatically economizing liquid nitrogen during the lifetime of installations using cryogenics.
RLD focuses on LN_2 applications requiring the use of a medium (gaseous, liquid or solid) for heat transfer between the LN_2/GN_2 and the process to be cooled.
The current world approach to energy transition must be applied to cryogenics, by reducing the specific consumption of the different processes.

The results of the RLD interpretation are the new designs of a number of main components used in cryogenic installations such as:

- Heat exchangers for LN_2 /heat transfer fluid.
  High thermal efficiency and low thermal inertia.
  Heat exchangers designed with newly developed RLD proprietary software.
- CRYOFLUID: Pump for heat transfer fluids.
- CRYOBLOW: Circulator for gaseous fluids.
- ALUHEX:Cast aluminium unit for static heat transfer without mechanical circulator.
  Configurations possible with or without heat pipes.
- LINOXAR: circulator pump for cryogenic liquids.
- CRYOWAVE: reduction of fossil fuel consumption using other natural resources.
- THERMAVAC: thermal vacuum chambers with newly designed shrouds and thermally controlled specimen table.

Long-time collaboration with specialized stainless steel boiler makers has proven successful in manufacturing a large variety of turn-key installations for space simulation, nuclear energy, fine chemical and electronic industries.

A simple cost-effective analysis shows:
When operating at -50°C, each used kW would consume 14,5 liters per hour.
Calculating with an average LN_2 cost of e.g. 0,15€ per liter, the extra cost involved will be 2,18€ per kW per hour.
Over a period of one week this results to approximately 365€, or **19.000€ per kW per year.**