TECHNICAL DATA

ALUHEX thermal powers range from a few hundred Watts up to 100 kW.

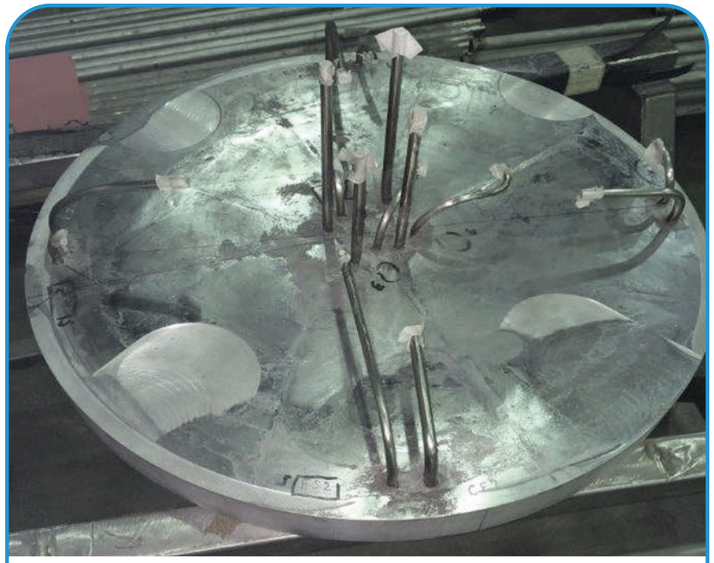
- Temperature range of -270 to + 400°C
- Standard thermal insulation or vacuum insulation
- Thermal cycles are programmable for transient and steady states
- Electropolished inner tube surfaces suited for electronic and pharmaceutical industries
- If required, choice of chemically resistant materials for tubes
- Specific inserts for cryogenic circuits
- Use of fluids at pressures up to 1000 bar
- Intrinsically safe circuits in case of leak (nuclear applications)
- **ALUHEX** units meet all applicable European standards

The thermal concept of **ALUHEX** integrates cold and heat sources in a single unit.

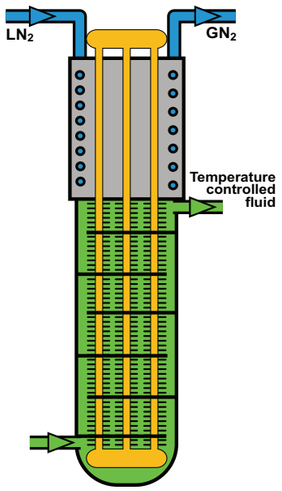
As a result a single temperature controller acts on either the cold or the heat source or both.

This feature makes the **ALUHEX** a multi-purpose thermal solution for all industries such as:

- Aeronautical and space
- Electronic component manufacturing
- Chemical and pharmaceutical
- Food processing
- Material thermal treatment
- Nuclear centres
- Research



Rear face of a circular **ALUHEX** unit during aluminum machining. Finished unit is used inside a vacuum chamber as a thermally controlled table for satellite specimen.
Operating range is -180 to +200°C
Cold source: LN_2 - Heat source: pressurized GN_2 up to 300°C



In this example a **ALUHEX** unit has been combined with **thermosyphon heat pipes.** This importantly improves the usable heat exchanging surface of the aluminum block. The system is capable of cooling, condensation and crystallisation of vapors.

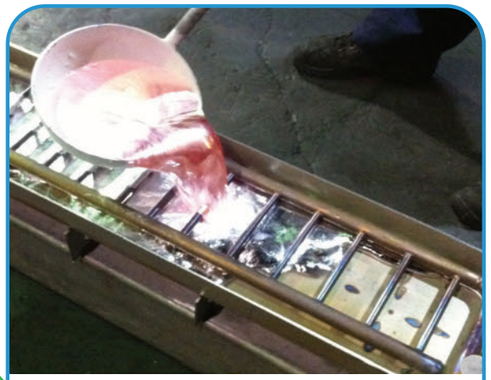
The green sign for Economical Solutions for equipment using LN2 indicates products developed by RLD Thermique - Ingénierie from Grenoble France.

Grenoble is known worldwide for high technology and innovative solutions. In addition to the local high manufacturing quality of industrial and scientific products the company RLD Thermique - Ingénierie has made it their trademark to optimize their designs for low LN2 consumption combining efficiency, reliability, low maintenance and longevity.

Over 40 years experience in designing and manufacturing key elements for major international projects guarantees high quality units optimized for their intended tasks.

For additional information see:

www.thermique-ingenierie.fr



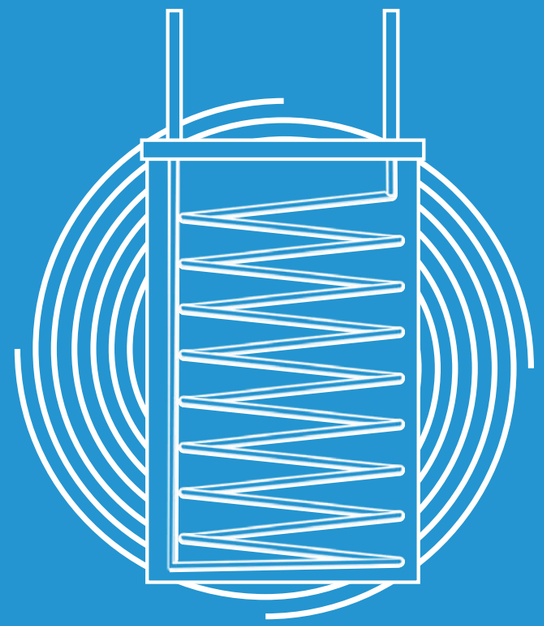
Casting of aluminum for a simple straight heat exchanger

RLD Thermique et Ingénierie

ravanat

ALUHEX

The new heat exchanger for fluids from -270°C to +400°C



-270°C **+400°C**

The **ALUHEX** (**ALU**minum **H**eat **EX**changer) units are designed by Thermique - Ingénierie RLD in Grenoble France.

The **ALUHEX** units are made of tubular circuits in cast high thermal conductivity aluminum.

This concept is extremely flexible in power, temperature and geometric configuration.

It allows to economically and easily obtain a wide range of precisely controlled temperatures for fluids and to maintain these temperatures.

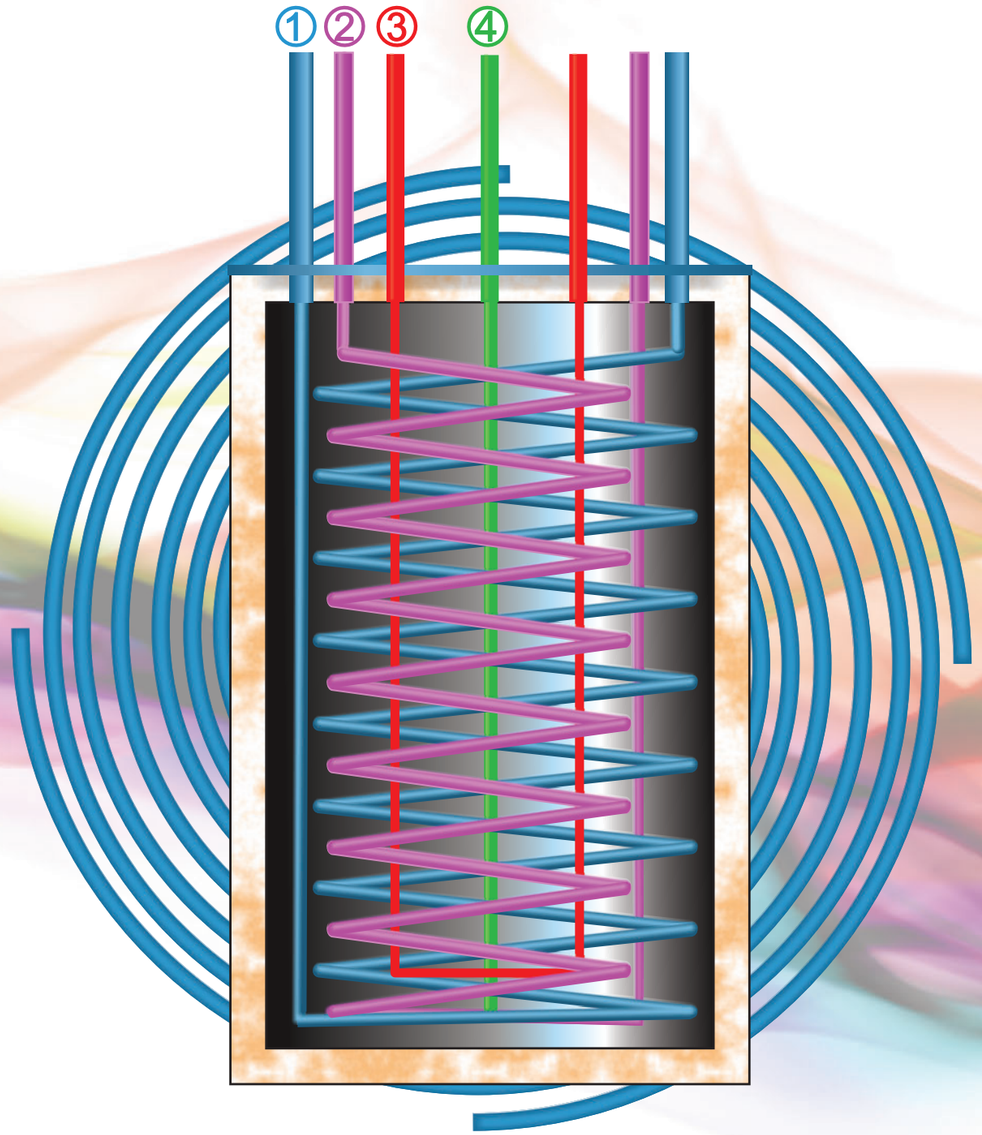
Additionally possible complex geometric configurations permit to adapt to most existing customer equipment.

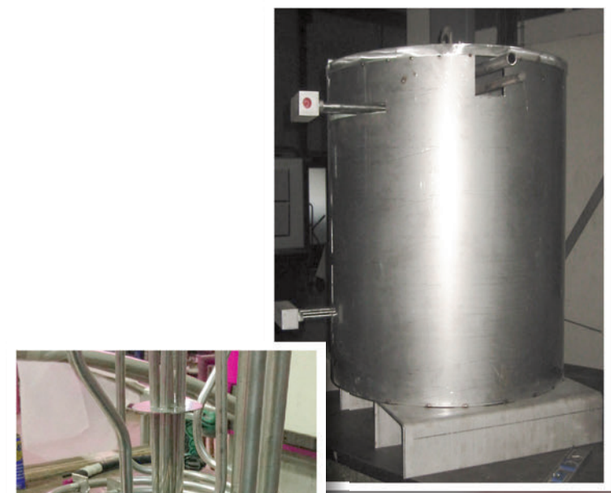
Cooling is ensured by circulating a fluid while heating is obtained by either a fluid or heating resistors.

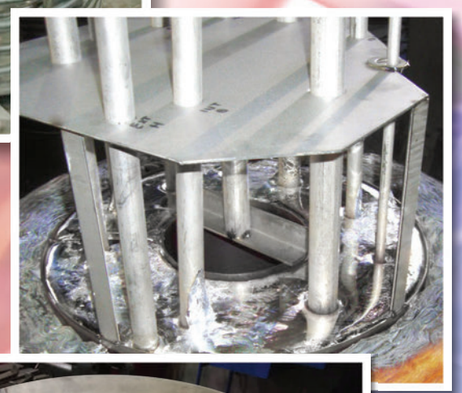
When using a cryogenic fluid, specially designed inserts highly improve heat transfer efficiency resulting in saving fluid consumption for same power output.

All **ALUHEX** units can be delivered with control panels and/or mechanical and electric interfaces ready to be integrated in an existing setup.

ALUHEX units meet all applicable European standards







OPERATING PRINCIPLE

The **ALUHEX** consists of a cast aluminum block with:

1. Heat exchanger coils fed with a cooling fluid
2. Heat exchanger coils through which the temperature controlled fluids are circulated
3. Heat exchanger circuits through which a heating fluid is circulated.
   Alternatively heating resistors can be fitted.
4. The temperature control loop