Lake Shore CRYOTRONICS

environment by JANIS

Lab Cryogenic Product Overview

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The experience and the expertise to supply the system best suited for your cryogenic requirements

Founded in 1961, Janis Research quickly became one of the foremost suppliers of cryogenic equipment in the world. Janis' lab cryogenics business become part of Lake Shore Cryotronics in 2020 and is now known as *environment by Janis*. Our combination of expertise innovates, creates new products, and enhances existing ones as new applications requiring cryogenic equipment are developed.

Through the years, we have been continually dedicated to the design, fabrication, and delivery of the best systems and components in the industry. Using state-of-the-art CAD/CAM systems, we have developed the broadest range of cryogenic products in the business. With an installed base of thousands of systems and a staff of highly skilled scientists, we have the expertise to supply the system best suited to meet your cryogenic requirements.

We recognize that obtaining a cryogenic system represents a long-term commitment for most scientists; therefore, we are devoted to providing you with the highest level of quality and customer support. Just a few of the ways we accomplish this are:

- Sales and service are provided through a worldwide network of trained and knowledgeable representatives
- Experienced applications engineers are available to discuss your specific application and offer advice on the best cryostat configuration to meet your needs and budget
- A stable workforce draws on decades of combined service and applies this experience to the assembly of each cryogenic system
- Records on all systems, modifications, and design improvements are meticulously maintained for the reference of any future user
- Turnkey systems are supplied by offering a full line of cryogenic accessories
- Each system is fully integrated and tested before shipping

Our cryostats are available for a broad range of applications, with cooling provided by liquid nitrogen, liquid helium, or mechanical refrigerators. Each cooling mechanism has distinct advantages and preferred applications, and an engineer can assist in choosing the best cooling method for your application. Some of our key products include:

- Custom-engineered cryogenic solutions
- Superconducting magnet systems
- Continuous flow and reservoir cryostats, using liquid helium or liquid nitrogen
- 10 K, 4 K, and 1.5 K mechanical closed-cycle refrigerators (CCRs)
- Low-vibration pulse tube refrigerators

For the most detailed and up-to-date information on *environment by Janis* products (including specifications and key physical dimensions), please visit www.lakeshore.com.

Cryogen-free cryostats

Closed-cycle refrigerator (CCR) cryostats provide low temperature environments (as low as 1.5 K) without the need for liquid helium or nitrogen. As a result, these systems are simple to operate and inexpensive to maintain. CCR models are available in both sample-in-vacuum and sample-in-exchange-gas (top-loading) configurations.

SHI-950T-LT
1.5 K cryostat

1.5 K CCR cryostats

Top-loading helium exchange gas cryostat. Helium circulates through an independent loop to cool samples to temperatures as low as 1.5 K, allowing nearly unlimited operation. Optimized for two-loop precise temperature control, and available in optical or non-optical configurations. The optical version has four orthogonal sets of windows that can be used in either transmission or reflection geometry.

CCS-100
4 K cryostat

4 K CCR cryostats

These cryostats can be used as a direct replacement for liquid helium cooled systems. Depending upon the cost of liquid helium and hours of operation, typical annual cost savings can range from $20,000 to $60,000 and more. We offer many 4 K CCR systems, with cooling powers ranging from 0.2 to 2.0 W at 4.2 K. In addition to complete cold finger and exchange-gas-cooled cryostats, bare 4 K cryocoolers can be provided for use in cryostat shield cooling, helium recondensing, astronomical applications, and more.

CCS-XG
10 K cryostat

10 K CCR cryostats

Our CCR designs begin with cryocoolers supplied by several of the world's leading manufacturers of cryogenic refrigerators. We have designed and built CCR systems for an extremely broad range of applications including VSM, Mössbauer, matrix isolation, Hall measurements, microwave device cooling, detector cooling, x-ray and neutron diffraction, and many more. Temperature ranges are available from 7 K to 800 K.

LHe and LN_2 cryostats

Continuous-flow cryostats

SuperTran (ST) sample-in-vacuum and SuperTran-VP (STVP) sample-in-flowing-vapor systems are reliable and flexible tools for reaching low temperatures in the laboratory. These continuous-flow cryostats offer quick sample cooldown, compact designs, and maximum LHe efficiency. ST and some STVP systems can also be operated with LN_2 when lower temperatures are not required.

SuperTran sample-in-vacuum models cover <2 K to 800 K. In addition to general-purpose systems, we offer SuperTran systems designed for specific applications, including FTIR, ESR, UHV, Hall effect, microscopy, and more.

SuperTran-VP models provide sample-in-vapor cooling from 1.5 K to 300 K and higher, and include a top-loading sample probe. Rapid sample changes are possible, and samples with poor thermal characteristics (i.e., liquids and powders) or irregular shapes can be cooled easily. Application-specific models include NMR, ESR, and FTIR.

Reservoir cryostats

The SuperVariTemp cryostat has long been a recognized standard in research labs and institutes around the world. Key features include sample in dynamic helium gas, rapid sample exchange, long hold time, and excellent sample temperature stability.

Pourfill cryostats

The VPF sample-in-vacuum cryostat is an economical, variable-temperature liquid nitrogen-cooled system, with models covering the temperature range from 65 K to 800 K. VPF cryostats are simple to operate, and standard models offer *f* -1 optics. A compact tail extension is available for use with electromagnets, and a built-in sample manipulator can also be incorporated for use with FTIR spectrometers.

The VNF sample-in-flowing-vapor cryostat is ideal for liquid or powder samples, which are difficult to thermally anchor in a conventional cold finger cryostat. The top-loading sample positioner permits quick sample change without warming the cryostat. Like the VPF cryostat, the VNF can be equipped with compact tails for use with narrow gap magnets.

ST-100 cryostat

SVT-100 cryostat

VPF-100 cryostat

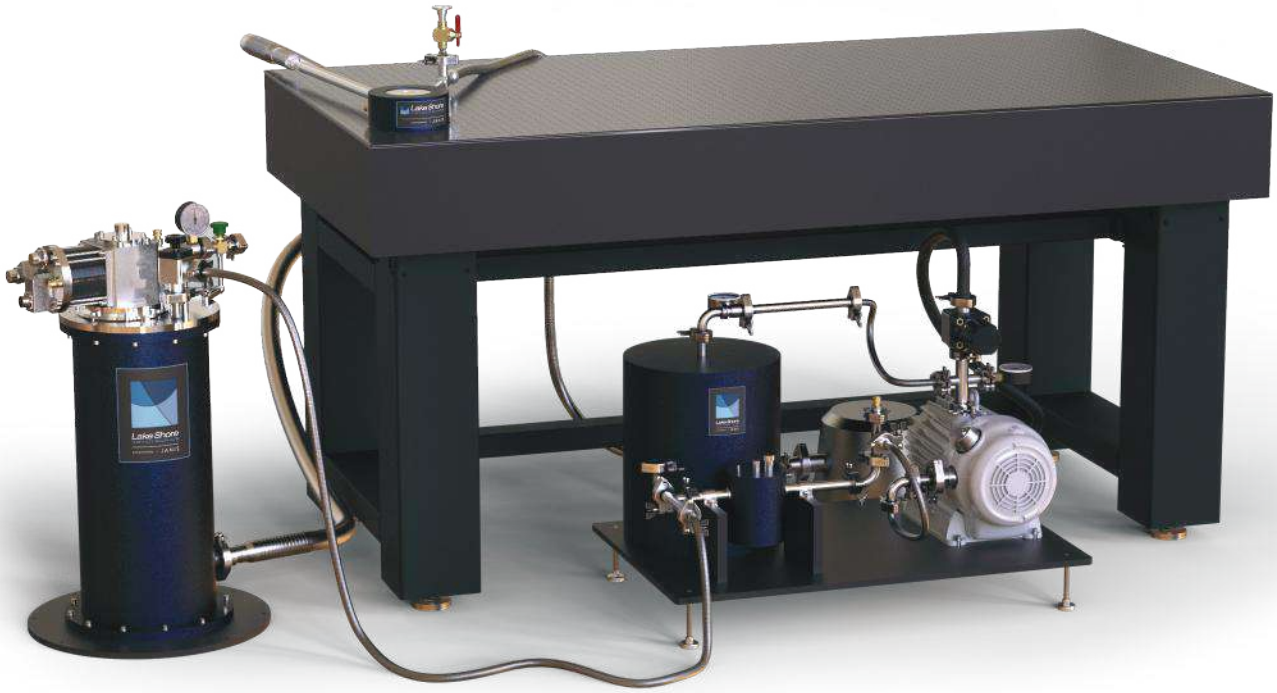
Recirculating gas coolers

RGC Series recirculating gas coolers run helium in a closed loop, making a continuous flow cryostat cryogen-free. Helium gas is cooled and liquefied by the RGC's cryocooler, and travels to the cryostat through a flexible vacuum-insulated transfer line. LHe cools the sample. The RGC captures the evaporated gas through the transfer line and reliquefies it, continuously recirculating the helium.

Samples can be changed without warming up the RGC, allowing fast turnaround times. When paired with a Lake Shore ST-500 Series cryostat, the combination is an ultra-stable cryogenic microscopy platform, cooling samples and devices to below 4 K without the use of liquid helium.

The RGC is compatible with Lake Shore ST and STVP cryostats, and can be used with some LHe cryostats from other vendors as well.

- All the flexibility and convenience of a continuous-flow cryostat without additional liquid helium
- Fast sample change without warming up the RGC cooler
- Excellent thermal performance
- Low vibration — vibration data available upon request
- Compatible with Lake Shore ST and STVP cryostats, and can be used with some LHe cryostats from other vendors as well



Superconducting magnet systems

These systems feature designs that fully integrate the cryostat, magnet, automatic temperature controller, and magnet power supply, complemented by a complete line of ancillary equipment. Our renowned SuperVariMag, OptiMag, and SuperOptiMag systems offer temperatures between 1.5 K and 325 K (with options to 475 K or higher) and can be supplied with or without optical access.

Magnet system designs include:

- Cryogen-free DryMag system with vertical, horizontal, or vector field configuration
- Standard top-loading systems with samples in helium vapor
- Systems for x-ray and gamma ray diffraction
- Room temperature (vertical and horizontal) bore systems

Custom cryogenic systems

From our earliest days, we have been committed to the design and supply of custom cryogenic systems to support the specialized needs of the low-temperature community. With in-house engineering analysis, computer-optimized designs, and comprehensive manufacturing capabilities, our experienced physicists and engineers are available to discuss your special requirements for nearly any type of cryogenic application. Typical examples of custom-engineered projects include:

- Ultra-high vacuum cryostats and superconducting magnet systems for scanning probe, atomic force, and scanning tunneling microscopes
- Ultra-low loss cryostats and continuous transfer systems for operation at very low (nanometer) vibration levels
- Cryogenic cold traps with single or multiple chambers for adsorption of noble gases from geological samples, or various oxygen isotopes from meteorites and polar ice caps
- Cryostats for neutron or x-ray beam lines

New and enhanced systems are continuously under active design and construction. Please contact us with your requirements.

Cryogenic lab accessories

Lake Shore stocks a full range of accessories and spare parts for all your cryogenic needs. We can supply a complete cryogenic system that is fully integrated and tested, thus avoiding compatibility problems when the system reaches your lab.

- Flexible helium transfer lines
- Continuous flow cryostat transfer lines
- Liquid helium storage Dewars and accessories
- Liquid nitrogen storage Dewars
- Mechanical pumping stations
- High vacuum pumping stations
- Temperature controllers
- LHe and LN_2 level indicators
- Cryostat accessories

Environment by Janis products are used in a large variety of applications:

Aerospace and astronomy
Angular resolution photoemission spectroscopy (ARPES)
Cryogenic gas trapping
Deep level transient spectroscopy (DLTS)
Diamond anvil cell studies
Electron spin resonance (ESR) spectroscopy
Fourier transform infrared (FTIR) spectroscopy
Hall studies
High-Tc
Ion source cooling
Large sample volume (4 K cryostats)
Large sample volume (10 K systems)
Magnetoresistivity
Material characterization
Material deposition
Matrix isolation
Microphotoluminescence
Micro-Raman spectroscopy
Micro-spectroscopy techniques
Microscopy
Mössbauer spectroscopy
Nanoscale technology
Narrow-gap magnet
Neutron scattering
NMR spectroscopy
Optoelectrics effect
Photoluminescence
Raman spectroscopy
Ultra-high vacuum (UHV)
Vibrating sample magnetometry (VSM)
Vibration-isolated systems
X-ray diffraction

www.lakeshore.com

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