

Cryogenic Test Equipment and Services

Square Test Dewar System (TD-s Model)

Range of services

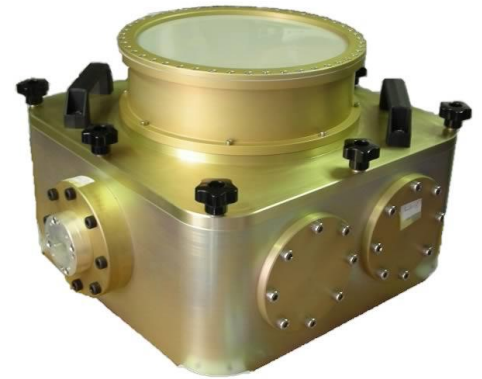
With over 15 years experience in cryogenic applications, Callisto is able to offer high precision and cost effective cryogenic test equipment and services, for a wide range of applications and sectors.

Callisto's Dewar (cryostat) designs serve the testing of RF, microwave, electrical and mechanical components at cryogenic temperatures down to 25 or 15 Kelvin (according to the Dewar model). Our Dewar solutions use a vacuum environment and closed loop (cryogen-free) mechanical coolers.

Examples of components requiring testing are listed below, spanning the radio-astronomy, earth observation satellite, air-borne imaging systems, medical imaging and computing sectors):

- Ultra-low noise RF LNAs, mixers, filters, connectors and components
- Superconductor (HTS or LTS) components
- Infra-red detector components
- On-board space craft instrument components (optical, radar and electrical)
- Any electrical or mechanical component destined for use in cryogenic assemblies (e.g. imaging and medical instruments).

Test Dewar TD-s Model



The re-configurable access ports include a large 200 mm vacuum window on the top plate made of Mylar and PTFE, ideal for IR direct signal reception (e.g. a satellite feed). The window and its extension tube can be removed and replaced by a metal blank plate with sealing ring.

Description (TD-s Model)

Callisto's TD-s Cryo Test System is based on a square format Dewar, using a GM type cryo-cooler and with up to 7 test connection ports for connections to the inner cold chamber.

These re-configurable access ports can either be for electrical RF connections, with the top window for direct microwave or optical signal inputs.

RF coaxial and/or waveguide test ports may be used depending on the application. Low thermal loss transmission lines are used inside the Dewar to ensure optimum thermal isolation.

The Dewar is equipped with internal thermometers linked to an external computer for logging purposes.

The computer and logger can also record analogue or digital parameters from the test bench, in case that the recording of measured parameters as a function of temperature is required.

The maximum component size which can be accommodated is defined by the cold plate enclosure size of 300mm x 300mm x 100mm.

Purchase options of either a complete Cryo Test System or a Cryo Test Service are detailed on the next page.

Key Features of the TD-s Test Dewar Model

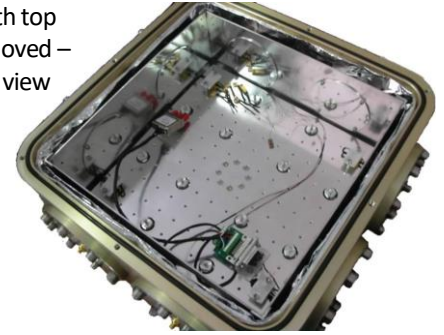
- 15K and/or 50K tests
- RF components (coaxial and/or waveguide), electronic components and small mechanical components testing
- Monitoring and Control software with Recording and display of measured parameters
- Tested component sizes up to 300mm x 300mm x 100mm.
- All included system: trolley incl. work table, electronic rack, PC, Safety system (watchdog) and M&C
- 220V mains requirements
- Customer must provide water cooling for the cryogenic compressor (air-cooled option available)
- Custom design on-demand

The specifications provided in this data sheet are preliminary and intended as a guide only. Callisto reserves the right to modify specifications without notice.

Test Dewar Specifications

Parameter	Specifications
Base Operation Temperature	1 st Stage < 50K, 2 nd Stage < 15 K unloaded
Test Enclosure Environment	Vacuum < 10 ⁻⁵ mbar
Dewar Material	Aluminium
Cold Plate Material	Aluminium
Cold Plate Dimensions	300 mm x 300 mm (width/length)
Cool Down and Warm-up Times	~4 hrs cool-down time, ~4 hrs warm-up time (using heating circuit)
Internal clear height above cold plate	100 mm (with optional extension tube (dia. 200mm) to give > 150 mm clearance)
Cooling Power	First Stage 8 Watts, Second Stage 6 Watts
Max. Test Duration	~10,000hrs – close cycle refrigerator (mean time between services)
Test Ports	Up to 7x ports of 80-200 mm for waveguide, coaxial RF, direct RF feeds or other types of connector.
Thermometry	Silicon Diode cryogenic thermometers on first and second stages.
External logging	Software for M&C and thermal cycle management running on MS Win. 7 Pro
Mass	45kg
Accessories	Support trolley

Dewar with top cover removed – cold plate view



Cryo Test System or Cryo Test Service Option

A complete Cryo Test System is available for purchase for clients' own in-house component testing. Modifications to the system design for specific requirements can be quoted for.

Alternative Procurement Options:

An alternative to buying the system, the Cryo Test Service offer includes the above described system (Dewar, cryo-cold head, cryo-compressor and vacuum pump), based at Callisto to run tests on behalf of the client (see Test Service box below).

Additional Test Dewar Models: TD-c

Callisto offers additional pre-designed or bespoke models of Test Dewars – the TD-c model is an example of a pre-designed circular format. Its key features are:

- Down to <30K tests
- RF, electronic, optical or mechanical components testing
- Recording of temperatures and components' measured parameters
- Tested component sizes up to 140mm x 160mm x 160mm
- Fast thermal cycle: Cool-down and back to warm (+60°C down to 50K, and back to +60°C) in < 1.5 hrs.



Test Service

Callisto's test service offer allows clients a flexible solution to evaluate the performance of components at cryo temperatures, priced on a per-test basis and thereby minimising capital expenditure. The comprehensive service includes:

- Test planning, feasibility assessment, evaluation of test requirements
- Provision of any necessary test jigs, adapters interface cables or transmission lines.
- Installation of components to be tested.
- Operation of cryogenic test Dewar and associated monitoring equipment.
- Conducting or assisting in running measurements on components.
- Vector network analyser, operating up to 40GHz.