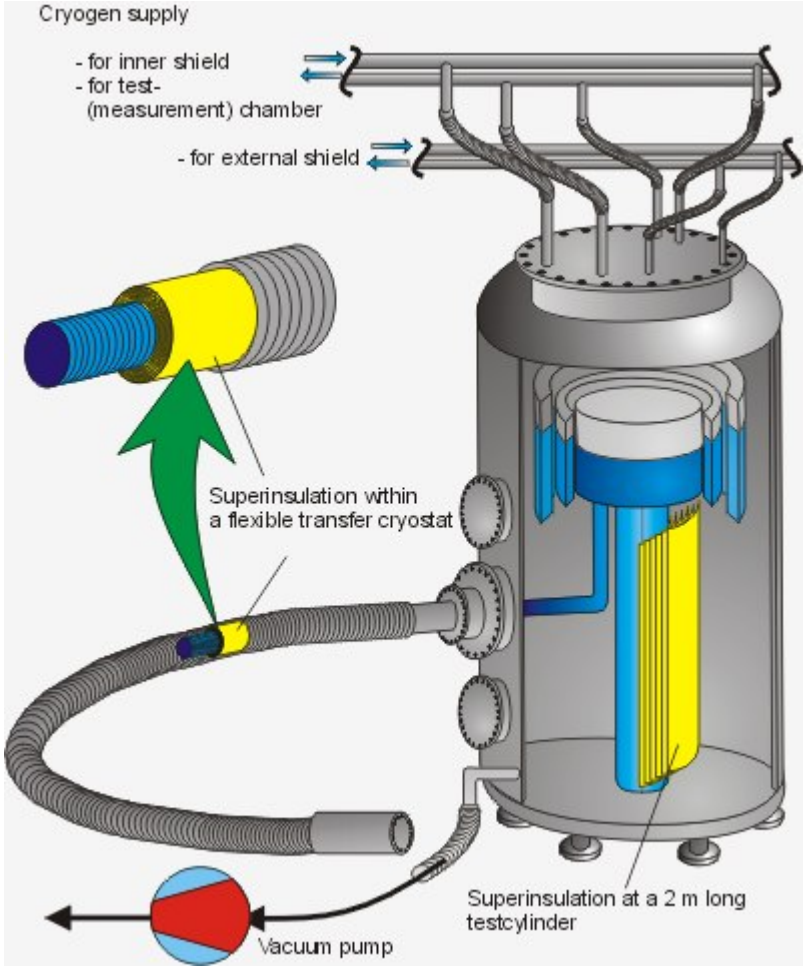
Thermal Insulation Test Facility THISTA

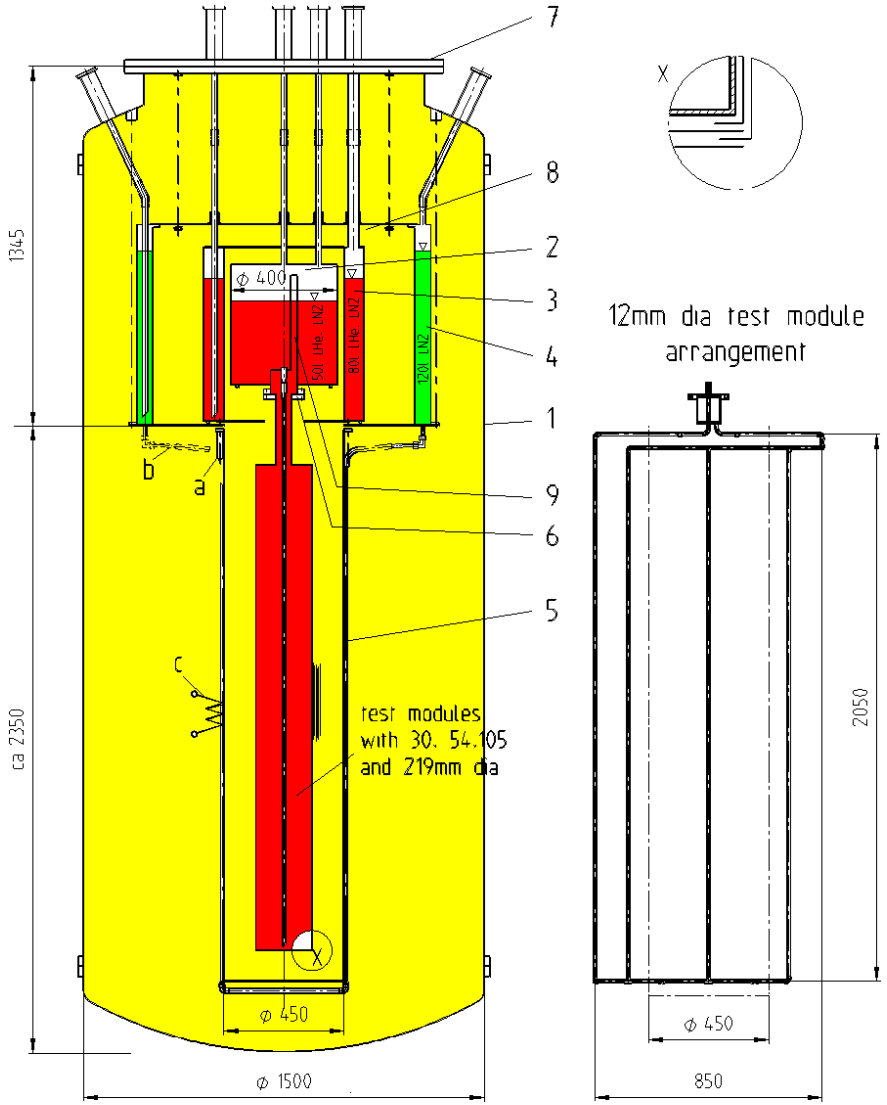
For the investigation of thermal insulation in cryostats and in cryogenic transferlines, the Thermal Insulation Test Facility THISTA is available. Its test chamber allows the examination of models with a diameter of up to 1.3m and a height of up to 2m.

The possibility to use LN2 or LHe allows experiments in between room temperature and higher and temperatures down to 4K. The measurement principle is calorimetric and the models are either cooled directly or by cooling chanels and the thermosyphon effect.

The heat flux penetrating the insulation material is transported to the surface of the boiling cryogen by convection in the cryogen bath. The amount of evaporated cryogen depends upon the size of the test object and the quality of the insulation material. The flux of evaporated cryogen is measured at the cryostat outlet. When determining the insulation quality, the gas storage effect and the losses of the facility are taken into account.

The data aquisition, the data storage and the data visualisation are handled by a temperature measurement system for C, CGI and PT-sensors comprising a PC.
The facility has so far been mainly used for the investigation of superinsulation techniques for flat, cylindrical and three dimensional test surfaces with sizes ranging from 0.2 up to 8m².





1 vacuumtank 2 test (measurement) chamber 3 intermediate guard chamber
4 external LN2 guard 5 guard shield 6 multiinterface flange 7 cryostat lid
8 support plate 9 sintered element

a, b, c guard schield thermally insulated, LN2-cooled, heated

Reference:

http://hikwww4.fzk.de/itp/kryo/kryotechnische_entwicklungen/e_index.html