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C1Or1B-01: The ESS Test and Instruments Cryoplant –First test results and operation experiences

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The European Spallation Source (ESS) is a neutron-scattering facility being built with extensive international collaboration in Lund, Sweden. The world's most powerful linear proton accelerator shoots protons against a rotating tungsten target where neutrons are knocked off ("spallate") and are guided to the neutron instrument suites. Three cryogenic plants and a vast cryogenic distribution system serve the cooling needs of the superconducting RF cavities in the accelerator, the cold hydrogen moderators in the target, a cryomodule test stand and the sample environments for neutron instruments. The project's demand of schedule and economic feasibility requires a high degree of parallel work for installation and commissioning of the cryogenic and auxiliary systems.
The first of the three plants, the Test and Instrumentation Cryoplant (TICP) has been installed, commissioned and acceptance tested in 2018 by Air Liquide Advanced Technologies. The plant consist not only of a standard compressor system and coldbox but also of a process vacuum system for 2K operation, internal and external helium purifiers, liquid helium tank, filling and boil of station and a helium recovery system. It is heavily integrated in the overall cryogenic installations at ESS. The paper describes some project challenges, acceptance test results and first operation experience. The current status of the ESS cryogenic system and lessons learned are addressed as well.

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