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C1Po1D-04: Integration of a new Cryogenic Liquefier into the IB-1 Cryogenic Test Facility

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The increase over the last years of the testing activities related to superconducting quantum materials, SRF cavities for the PIP-II and the LCLS-II projects, as well as superconducting magnets for the HL-LHC project and Fusion research activities, has required the addition of a new Helium cryogenic plant into the existing IB-1 Industrial Cryogenic Test Facility. The new cryogenic plant is composed of a cryogenic liquefier (Cold Box) able to provide up to 340 L/h, a 4kL Dewar and two Mycom compressors providing up to 120 g/s. AL-AT (Air Liquide Advanced Technologies) has taken part of this project by designing and manufacturing the cryogenic liquefier. This new cryogenic plant is connected through a cryogenic distribution system to a 10 kL Dewar, which is part of the existing cryogenic test facility, itself composed of another Cold Box and a Sullair compressor. The new cryogenic plant has two main operating modes: one allows to transfer liquid helium at 1.7 bar between the two Dewars, the other allows to transfer supercritical Helium at 2 bar or more between the new Cold Box and the 10 kL Dewar. The entire industrial cryogenic facility is handled by a common Inventory Control System, composed of three regulatory valves, and 9 tanks giving a total buffer volume of more than 1000 m³. This paper presents the technical features of the new Helium cryogenic plant, as well as the main results of the liquefier commissioning phase and details of the helium transfer between the two dewars, making the connection between the cryogenic plants at the IB-1 Industrial Cryogenic Test Facility.

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