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C1Po2D-02: Approach to achieving 'Fast Cool-Down" for PIP-II High Beta SRF cavities during vertical tests at the UKRI-STFC Daresbury Laboratory

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PIP-II HB650 SRF cavities have a very ambitious performance specifications of achieving a Q factor of 3e+10. Each cavity must undergo vertical tests and demonstrate its performance before it can be qualified for assembly into a cryomodule. The vertical tests are conducted at 2 K, in very low residual magnetic field less than 0.5 uT. In order to expel magnetic field trapped inside the cavity it must be cooled at a very fast rate exceeding 20 K/min in the temperature range between 45 K and 4 K. This requires substantial modifications to the existing vertical test stand at Daresbury and to the associated cryogenic processes which must be tightly controlled. In this paper we describe the modifications to the system and processes developed to achieve the desired fast cool-down rates.

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