

# MQXFAP1 Test Readiness Review

## Goal & Charge

MQXFAP1 is the first prototype of the MQXFA magnets to be used in Q1 and Q3 for the High Luminosity LHC. MQXFAP1 has slightly shorter coils than nominal (4 m instead of 4.2 m magnetic length), whereas the supporting structure has nominal length. One coil has 1<sup>st</sup> generation cable and x-section design. All other coils have the final cable and x-section design.

The main goal of MQXFAP1 test is to demonstrate that MQXFA magnets can meet “quench performance” requirements (i.e. reach ultimate current, and show good training memory), and that they can be protected in HL-LHC operating conditions. Field quality requirements will be target of subsequent prototypes and/or re-assemblies.

Before this review MQXFAP1 was cooled down to 2 K, and energized up to the first quench at 15.5 kA. The test was interrupted because of a ruptured burst disk leading to a complete thermal cycle in order to perform the necessary repairs.

The goal of this review is to assess test facility readiness to re-start MQXFAP1 test, and to confirm the test goals and plan for the next cycle.

The committee is requested to answer the following questions:

1. Is the cryogenic system, and in particular the recovery line, adequate for the MQXFAP1 test?
2. Are the detection and protection systems adequate for the MQXFAP1 test up to ultimate current?
3. Is the DAQ system for strain gauges operational and adequate for the goals of this test?
4. The original test plan had two phases: the 1<sup>st</sup> phase, without CLIQ, aimed at training up to ultimate current; the 2<sup>nd</sup> phase, with CLIQ, aimed at exploring higher than ultimate current, and demonstrating quench protection in operating conditions. Is this still a good plan, or do you recommend a different one?
5. Is the test plan reasonable for achieving test goals? Is it sufficiently detailed and clear to avoid un-necessary risks?
6. Is there any other comment or recommendation to assure a successful MQXFAP1 test?

**Committee:** G. Chlachidze (chairperson), H. Bajas, S. Feher, E. Ravaioli.

**Date and Time:** Part I - September 26, 2017; Part II - TBD

**Location/Connection:** Video-link by Zoom, info by email.

**Link to talks:** <https://indico.fnal.gov/conferenceDisplay.py?confId=15372>