



**Report of the
MQXFA17b
Structure & Shim Review**

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US HL-LHC Accelerator Upgrade Project

**Report of the MQXFA17b Structure & Shim
Review**

August 27th 2024

- Peter Wanderer, chairperson (BNL)
- Mike Anerella, (BNL)
- Rodger Bossert, (FNAL)
- Susana Izquierdo Bermudez (CERN)



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1. Goal and scope

The HL-LHC AUP project is starting the assembly of MQXFA17b quadrupole magnet. This is the reassembly of MQXFA17 that did not meet requirements during vertical test. It will be the first magnet to be fabricated following the revision of the MQXFA Production Specification [1] for the use of tapered load shims to prevent MQXFA17 issue.

If MQXFA17b meets MQXFA requirements [2] it will be used in a Q1/Q3 cryo-assembly to be installed in the HL-LHC.

MQXFA17b is going to use two MQXFA17 coils (152 and 237) and two new coils: 158 that was presented at the MQXFA12b Coils Acceptance Review [3], and 242 that was presented at the MQXFA17 and 13b Coils Acceptance Review [4].

Discrepancy or Non-Conformity Reports are generated whenever a component does not meet specifications [5].

The goal of this review is to evaluate MQXFA17b structure and its discrepancies/non-conformities after MQXFA17 test, and the proposed shim plan including tapered load shims.

Committee

Peter Wanderer, chairperson (BNL)

Mike Anerella, (BNL)

Rodger Bossert, (FNAL)

Susana Izquierdo Bermudez (CERN)

Date and Time

August 27, 2024. Start time is 7:00/9:00/10:00/16:00 (LBNL/FNAL/BNL/CERN)

Location/Connection

Video-link by Zoom, info by email.

Link to agenda with talks and other documents

<https://indico.fnal.gov/event/65913/>



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2. Review Charges responses

The committee is requested to answer the following questions:

- Have all recommendations from previous reviews [6] been adequately addressed?
Yes.
- Have discrepancies and non-conformities of MQXFA17b structure after MQXFA17 test been adequately documented and processed?
Yes. The MQXFA17 NCRs had been adequately documented and processed. The few MQXFA17b NCR's have been documented and plans made to remediate them.
- If there are major/critical non-conformities, have they been adequately documented and processed?
Yes. The MQXFA17 major non-conformities (overheating the splice, failure to meet operating current requirements) have been documented and processed. There are no major non-conformities in MQXFA17b.
- Are the proposed shims adequate for allowing MQXFA17b to meet MQXFA requirements [2]?
Yes. The calculation of the shims for MQXFA17b used the newly-written procedures that are based on the calculation of shims for MQXFA18.
- Do you have any comment or recommendation regarding the revisions to the MQXFA Production Specification [1] for the use of Tapered Load Shims?
Yes. The revisions accurately capture the revisions that incorporate the use of Tapered Load shims.
- Do you have any other comment or recommendation to assure MQXFA17b is going to meet requirements?
No.

3. Comments

- The introductory talk very nicely listed each of the recommendations and the steps taken to implement them.
- Consider starting with 0.050 mm shims instead of 0.100 mm shims.

4. Recommendations

Proceed with the assembly of MQXFA17b.



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5. References

- 1) *MQXFA Series Magnet Production Specification*, US-HiLumi-doc-4009.
- 2) *MQXFA Functional Requirements Specification*, US-HiLumi-doc-36.
- 3) *MQXFA12b Coils Acceptance Review*, US-HiLumi-doc-4972.
- 4) *MQXFA17 and 13b Coils Acceptance Review*, US-HiLumi-doc-4937.
- 5) *Handling of Discrepancies and Nonconformances*, US-HiLumi-doc-2484.
- 6) *MQXFA18 Structure and Shims Review*, US-HiLumi-doc-5153.