11T New Task Force – Team 2 – QA QC
Deliverable 3 – REACTION
Outcome MEETING#3 May-26, 2021

R. Principe, on behalf of the team
https://indico.cern.ch/event/1038110/
Deliverable 3 - Reaction

Team Chair
TE-MSC-LMF: R. Principe

Team Members presents:
TE-MSC-CMI: F. Savary;
TE-MSC-LMF: B. Arias, R. Berthet, N. Bourcey, O. Housiaux, S. Luzieux;
TE-MSC-SMT: F. Lackner, A. Musso;
EN-MME: D. Perini.

Also present:
EN-MME: S. Sgobba, B. Bulat.
Discussed subjects

1. Introduction
   - Feed-back from TEAM2 MEETING 2 on CURING

2. The Reaction process, including
   - Applicable documentation and evolutions 11T and QXFB
   - Components
   - Tooling 11T and QXFB
   - Differences in the 11T and QXFB production strategy
   - Non conformities during production 11T and QXFB
   - Adopted mitigations on tooling following NCR - 11T
   - Adopted mitigations on procedure following NCR - 11T
   - Adopted mitigations following NCR - QXFB
   - Conclusion

3. Team 2 schedule
Outcomes after analysis of production data

Analysis of the VAMAS reacted with the coil in the furnace:

• No correlation between temperature discrepancies and the $I_c$ degradation.
• No correlation between temperature discrepancies and the Estimated RRR.
• No correlation with the defected coils GE09, GE13, GE15 and GE17.

The results of the CERN verification samples analysed to accept the bare cable before winding by TE-MSC-SCD show no correlation as well (see backup slides).
Outcomes after cold tests inspections

Cracks on the first turn after the winding keys on both sides on all coils:

• Inner layer

• Outer layer
Outcomes after cold tests inspections

During the reaction process the winding keys are moving (< 3mm) in the coils. The procedure indicates that the keys need to be carefully slid back into their right position.

Additional glass fiber could be added in the gap before this operation.
Future proposed improvements

- Regarding the 5 NCR on the tooling and the 6 NCR on coils because of the tooling (11 out of 18 NCR, 60%), the management of the tooling could be improved (preventive and corrective maintenance, dry runs...) for all tooling used within the 11T project and beyond, and a dedicated resource is deemed necessary for this purpose.

- The empty spaces between the winding keys and the cable could be filled with fiberglass before sliding the keys back into their right position on both layers.

- The movements of the coil during reaction remain unknown. Additional monitoring would help to gather more information and have a better insight of the behavior of the conductor at that stage.

- The coil is still under stress after the heat treatment before the opening of the fixture. The magnitude of the stress could be estimated to make sure it does not damage the coil.

- In case of doubt, how could we leave spaces for the coil to “breathe” inside the fixture? Knowing that this space should be small enough to prevent the coil from “inflating” radially.
## New proposed schedule TEAM2

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<th>Deliverable</th>
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<td>Winding</td>
<td>Fabrication and control procedures, components, tooling, acceptance criteria and NC</td>
<td>Report and proposal for a new released production and control doc</td>
<td>05.05.2021</td>
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<td>Curing</td>
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<td>Reaction</td>
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<td>Impregnation</td>
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<td>MQXF coil pack and assembly</td>
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<td>Diagnostics, statistics and improvement axes</td>
<td>Statistics, review of NC by families, learned lessons, proposals.</td>
<td>Note</td>
<td>30.06.2021</td>
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Note: 30.06.2021
Thank you