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| Deviation Permit Request:  WP3 – Fiber-Optic Sensors on 2 coils of MQXFA08 and 2 coils of MQXFA09 | | | | | | | | |
| Description | | | | | | | | |
| Issuing entity | AUP | | | Date of Issue | | 2021-01-04 | | |
| Work Package | WP3 | | | Equipment | | HCLMQXFA001-FL000001 | | |
| Subject | Fiber-Optic Sensors on 2 coils of MQXFA08 and 2 coils of MQXFA09 | | | | | | | |
| MQXFA08 and MQXFA09 magnets will have FBG Fiber-Optic Sensors installed on two coils of each magnet. The main goal is to measure magnet pre-stress change caused by welding of the coldmass shell. In addition, these sensors will measure coil pre-stress during assembly and after cold test. This is a pilot plan and if it is successful other MQXFA coils may be instrumented likewise.  The FBG fiber-optic sensors are fabricated by HBM, following specs developed in collaboration with CERN MQXFB WPE (Susana Izquierdo Bermudez) and the Mechanical Measurement Lab (EN-MME) responsible (Michael Guinchard). Fiber diameter is 190 um and between FBG stations the fiber is protected by a polyimide tube with 500 um diameter. Each magnet will have one coil instrumented with an Ormocer-coated fiber with 6 FBG sensors, and one coil instrumented with a Polyimide-coated fiber with 7 FBG sensors. Fiber specs are shown below.  Custom Array with 6FBGs in Ormocer coated fiber  Lead-in: 1500mm, Ø1,1mm braided cable, FC-APC  Lead-out: 1500mm, Ø1,1mm braided cable, FC-APC  Polyimide protection tubes (1m length each) in between FBGs  cid:image001.png@01D6E35A.50DE3530  Custom Array with 7FBGs in polyimide coated fiber  Lead-in: 1500mm, Ø1,1mm braided cable, FC-APC  Lead-out: 1500mm, Ø1,1mm braided cable, FC-APC  Polyimide protection tubes (1m length each) in between FBGs.    One fiber will be installed on each coil inner surface per the attached marked-up print (or drawing). Both fiber ends will come out of the coil lead end. After the welding of the coldmass shell the fibers will be terminated as close as possible to the coil end. | | | | | | | | |
| Requestor | | Giorgio Ambrosio | | | WP Engineer | | Susana Bermudez | |
| PL/WPL Decision | | | | | | | | |
| Rejected | | | Accepted | | | | | Further information required |
| Description of remarks/observations or of required clarifications (whenever additional information is needed) | | | | | | | | |
| WP Leader | | Date | | | Project Leader  (if required) | | Date | |
| Name | | | Name | |