Details on foreseen in-house and Russian contribution for BPM

HL-LHC WP13
Beam Instrumentation

D. Gudkov, G. Schneider, M. Krupa

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Introduction

- BE-BI is working closely with HL-LHC Project office to identify necessary processes and documentation for CERN-BINP collaboration in alignment with HL-LHC Quality Plan.

- BE-BI is working closely with EN-MME, TE-MSC, EN-SMM and TE-VSC to finalize design of interfaces and integration.

- BE-BI is working together with CERN Main Workshop to elaborate optimized manufacturing processes to achieve the best quality of BPM components.
BPM Design Overview
Identification of work for BINP and CERN

- Assembly of the BPMs will be performed at CERN
- Manufacturing of tungsten absorbers is a part of large order placed by TE-VSC
- All the raw materials will be purchased by CERN and shipped to BINP
- All fasteners will be purchased by CERN (no need to have them in BINP as assembly will be done here)
- Commercial components (electrical feedthroughs, CF gaskets, RF springs, electrical contacts) will be purchased by CERN
- All machining work will be done by BINP
- Electron-beam welding of transitions will be done by BINP
- Copper coating of bodies will be done by BINP
- Amorphous carbon coating → to be decided as a result of manufacturing study phase
Identification of work for BINP and CERN

Dmitry Gudkov, BE-BI-ML
Identification of work for BINP and CERN

LHCBPMQSTZB0001

Subassemblies

- Assembly of LHCBPMQSTZB0001
- Assembly of LHCBPMQSTZB0004
- Assembly of LHCBPMQSTZB0005

Commercial components

- Electrode
- Insert
- Absorber
- Spring block
- Spring block A
- Spring block B

Parts

- Round transition
- Cooling tube
- Thermal bridge
- Electrical contact
- Electrical feedthrough

HiLumi HL-LHC Project

Dmitry Gudkov, BE-BI-ML
Documentation Status

- Engineering Specification readiness ~30%
- BOM readiness ~90% – EDMS 2314930
- MIP: components selected, plan to work together with main workshop to finalize MIP
- Manufacturing and QA procedures: will be finalized after Manufacturing study phase is complete
- Drawings: readiness ~80%
- Items and Assets (MTF): HL P.O. will start creating them CW5..6
Documentation
Future actions

- BINP should have access to MTF (1 person should be managing BINP quality documentation) → Dmitry or someone from BINP workshop?

- This person should be trained on using MTF: HL-LHC P.O. provides such a training

- MIP, Spec. and drawings will be sent to BINP for the manufacturing processes validation. In case BINP want to change MIP or drawings, these changes should be validated by CERN before manufacturing can start

- We should be able to resolve all the possible MIP issues during the visit in May-June 2020

- BINP can create their own drawings based on CERN drawings, however the quality control will be performed based on CERN drawings
Conclusions

- The planning of manufacturing phase has already started (on CERN side):
  - Scope (work breakdown structure, including logistics tasks)
  - Quality documentation

- We can start planning communications with BINP to organize manufacturing in Russia

- We should talk with groups having recent experience with BINP to get lessons learned during the collaboration (BE-ABP?)
Questions

- How should we organize (..and do we need to?..) the reporting for the EVM (in-kind and CERN tasks)?

- When would be the best time for visit, and who should go to Novosibirsk workshop? → May-June 2020?
Thank you!
Questions?
backup
Manufacturing Process Design (BPM Body) for Engineering specs.

- Rough Machining
- Annealing
- Fine machining
- UHV cleaning
- Gold flash
- Copper coating
- Amorphous Carbon Coating

Part LHCBMQST_B0009

TIG Welding Machine
Welding electrodes

Assembly LHCBMQST_B0002

Adjustment tool CF16 seals ref. S.C.E.M.

Assembly LHCBMQSTZB0001

- Mechanical Assembly
- Adjustment of electrodes
Manufacturing Process Design (BPM Body) for Engineering specs.

Body (type B) manufacturing and inspection flowchart