

WP5.2 Technical Meeting - BI updates

Joël DARICOU (SY-BI-BP)

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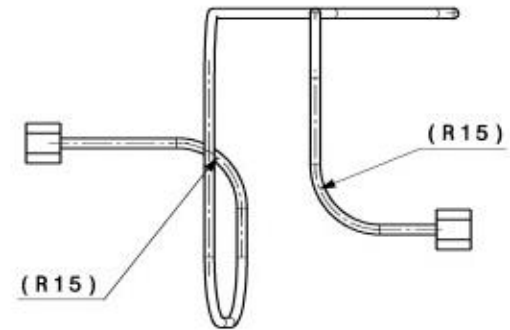


Update of cables for prototypes after bending

SiO₂ coaxial cables inside the collimator UHV tank:

- All the 8 cables, with 8 different configurations, for the two collimators prototypes have been successfully bent by BI.
- No issues were found during the procedure.
- The cables will be now cleaned and then UHV tested.

(cleaning ongoing, UHV tests to be scheduled)



Cable bending procedure for LS3

- ✓ SiO₂ cables were received from TMS in a straight configuration with only a critical bend near the connector. See the drawing LHCTCSPMT0040.
- ✓ The cables have been cleaned and successfully UHV tested by VSC.
- ✓ The cables are now stored and ready to be bent.
- ❑ The cables will be bent by BI complying with different configurations required for each collimator type.
- ❑ The cables will be cleaned and UHV tested (again).
- ❑ A further visual inspection and electrical test will be performed before handing them over to STI.



BPM pick-up buttons technical specifications

■ Technical specifications:

- Material: stainless steel or preferably titanium (max grade 2);
- Insulation/spacer: Al₂O₃ or glass or aluminium nitride which has better thermal conductivity;
- Connector: SMA 50 Ohms;
- Frequency Range: DC to 4 GHz;
- Voltage standing wave ratio: 1.02:1 max to 2GHz;
- Insulation resistance: >10⁸ ohms;
- Voltage breakdown: 500 V;
- No UHV tightness requirement;
- Machining and cleaning compatible with UHV;
- Operational temp: +20°C to +70°C;
- Bakeout temperature: 300 °C sustained for 24 hours. The design of the supply must allow a minimum of 60 baking cycles over the 20 years of operation of the LHC;
- Gamma radiation dose : >20MGy integrated over the lifetime (20 years);
- Mechanical cycling without contact failure: > 100 cycles.

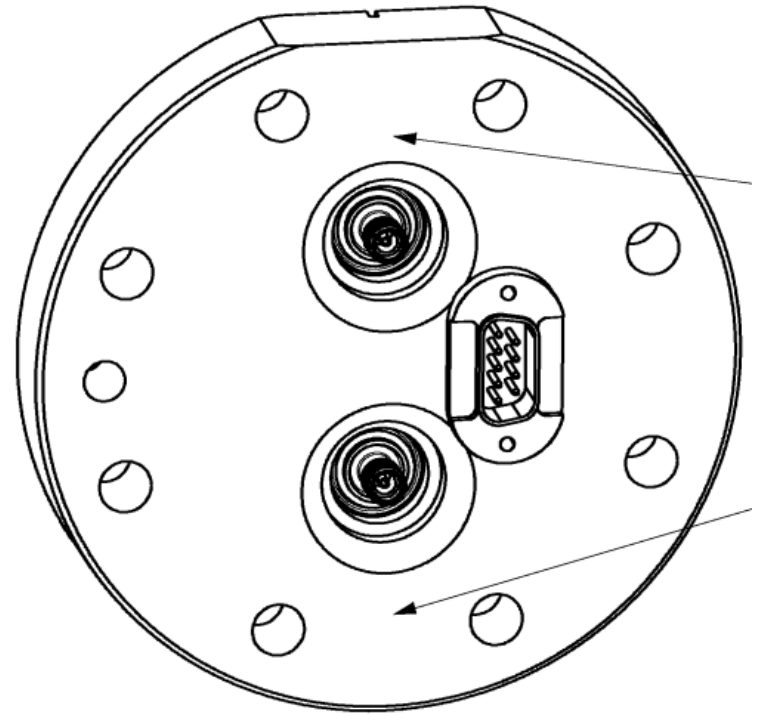


Material choice for the BPM pick-ups

- The technical specifications are being written for launching the price inquiry (foreseen in 2022).
- Stainless Steel or Ti grade 2?
 - **Stainless Steel** (BI standard choice):
 - Easier to machine, less expensive, more suppliers available;
 - Same material as used in the previously installed collimators;
 - **Ti Grade 2:**
 - More expensive (+18% for the full production based on a previous price inquiry);
 - This material choice limits the number of companies to manufacture this exotic material;
 - To be considered only if stainless steel is deemed not suitable for high rise temperatures ($>450^{\circ}\text{C}$) – **outside of BI expertise, additional input required.**
- **Material choice will be based on feedback if the BPM-equipped collimators will be installed in “hot spots” – decision required before launching price enquiry!**

New flange assembly for prototypes

- The 4 + 1 spare flange assemblies for the prototype collimators are being machined by the CERN main workshop.
- Expected for end of February 2022.
- A UHV test is foreseen to validate this new design.
- Electrical tests and visual inspections will be carried out in BI.

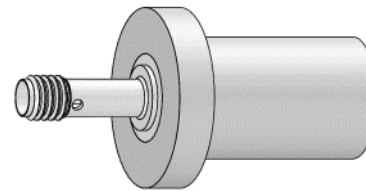
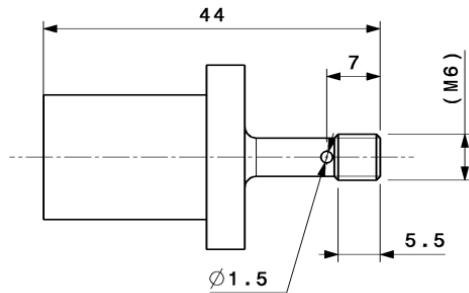




BPM pick-up buttons types

The SPARES are included (10%)

- 140 for the TCXPM, TCLP and TCTPXH/V ([LHCTCLIA0267](#))



- 20 for the TCLPX ([LHCTCLPX_0031](#))

