

Minutes of the meeting ACR-RF to prepare Chamonix talk 04/Jan/2005

Present:

- ACR: U. Wagner, S. Claudet (L. Serio excused)
- RF: E. Ciapala, P. Maesen, R. Losito

1) Data as defined in the “LHC Design report”

- a) Heat loads
 - b) Pressure levels
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a) Heat loads:

- The value of 250W (static + dynamic) was confirmed as a measured value at 5 MV/m
- The value of 950W is the maximum expected including contingency for higher fields such as 8.2 MV/m or conditioning
- The liquefaction load was not clearly expressed. From the values indicated on the P&I diagram, one can expect 32 l/min (≈ 0.1 g/s) as maximum value.
- It is not intended to compensate the RF loads via electrical heaters (as done at LEP), as the transients will occur over the 20 minutes of energy ramping.
- It is possible to cool-down from any cold source temperature, provided the flow is limited

b) Pressure levels:

- Control value is to be established at 1350 mbar, with a tolerance of ± 15 mbar.
- The 4 modules can be controlled independently
- The RF will be turned down (beam dump) at 1400 mbar
- There should be a way to prevent back pressure from line D
- the Maximum Allowed Working Pressure is at 2 bar abs, and safety systems are being verified.

Open points:

- Automatic closing of return valves and flow restriction against back pressure
 - Sizing of safety systems and corresponding evacuation of gas
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2. Process & Instrumentation diagram

What concerns the ACS modules can be found in CDD under: LHCACSGA0006

What concerns the QRL for concerned sectors: LHCLSQR_0041 and LHCLSQR_0042

Open points:

- Sizing of supply and return valves
- Global Process and Flow diagram showing all cold and warm connections

3. Lay-out and integration studies

The reference models and studies are handled by Yvon Muttoni (TS/IC)

Open points:

- Routing of an evacuation pipe towards UX45 large volume
- Installing and removing ACS modules is delicate due to present altitude of the QRL extension

4. Scheduling and conditioning

The reference should be the presentation (LHC-A-HCP-0001.pdf) by Olivier Brunner for the LHC Hardware Commissioning working group, with complementary information leading to:

- 6 months commissioning after installation
- 1 week conditioning after possible annual shut-down
- May-be 1 to 2 hours after a stop, provided temperature kept below 50K

5. Discussion

The system as it is needs to be finalized (control valves, safety system, warm piping,...)

Principles concerning cold and warm connections of “low pressure” systems such as DFBs, cavities,... should be compared and standardized when appropriate

The main fear remains back pressure from line D when its pressure is above 2 bar during cool-down, warm-up or sector quench.

With what is known so far, a dedicated refrigerator would only make sense if cooling capacity was limited, like it could be the case for ultimate beams.