

# Collimator Design Meetings

## Minutes of the meeting 71 (01/09/2005)

**Present:** Aberle, Assmann, Bertarelli, Chamizo, C. Magnier, Mayer, Perret

**Minutes # 70:** no comments were given

### COOLING CIRCUIT LAYOUT

1. Catherine presented the layout of the on-collimator cooling circuit (manifolds, connections, hoses etc.) for the 4 possible orientations. No major reserves were given. The design is basically accepted. For details see [T0082554PL\\_90deg.pdf](#), [T0082555PL\\_45deg.pdf](#), [T0082556PL\\_135deg.pdf](#), [T0082557PL\\_ID.pdf](#)
2. For what concerns the collimator arrangement for the connection to the main water supply line, the present favourite configuration foresees the two collimators (for TCS, 1 phase I plus 1 phase II) for each main supply line connection. This arrangement doesn't require the installation of expensive (and possibly non radiation-hard) flow adjusting devices (e.g. Eletta). The flow adjustment will be made via calibrated diaphragms. During the early phases of commissioning, the actual flow for each collimator pair will be measured by a mobile flow-meter. The calibration of the diaphragms will then be made accordingly.
3. Since it is possible that some phase II collimators will have to evacuate very high heat loads and therefore require a high flow rate and given that the envisaged pipe connections do not allow a flow rate in excess of 50 l/min per collimator pair, it is suggested that direct connections to the DN100 supply line should be made atop of phase II collimators particularly heated. The list of most critical phase II collimators shall be supplied (Ralph?).

### ELECTRONIC EQUIPMENT

1. The order for most electrical equipment (i.e. cables, connectors etc.) has been issued. A preseries of several components is due to arrive in week 36. Roger reminded that for the plug-in connectors, a system preventing wrong-mounting is mandatory (**urgent action** Roberto)
2. For the LVDT, in consideration of delivery time, initial orders will be for a standard, non full radiation-hard version ( $\varnothing 12\text{mm}$ ). (to be confirmed by Roberto ...)
3. Manfred informed as well that the torque of the preseries motors has been measured. In spite of the nominal torque (3,5Nm) only 2,2÷2.7 Nm have been measured. The same measure should be urgently done also on the 1,5 Nm prototype motors.

### WATER PLUG-IN

1. The requests for prototype and series quotations have been sent out. An answer from the supplier is shortly due.

### COLLIMATOR SUPPORT

1. In view of the space budget, it is decided that the base support for phase I will be adopted also for phase II.
2. All the components for the top part of the support (down to the plug-in) were machined and are available for assembly. The lower part will be available by mid-September.
3. The assembly of the 3<sup>rd</sup> collimator plus the sliding tables is foreseen for week 36. Mechanical tests are due to start by mid-September.
4. According to Roger the manufacturing of the base supports (to be handled by M. Polini TS/MME) once launched should be completed in 2 months.

### MEASUREMENTS ON TT40 PROTOTYPE

1. metrology measures on the two blocs of the TT40 prototype showed a permanent deflection (bending) in the range of 200÷300  $\mu\text{m}$ . After disassembly, it was found that both the C/C and graphite jaws remained flat, while the deflection was entirely due to the plastic bending of the metal support.

In depth analyses have been immediately launched. According to Alessandro, the plastic deformation is due to a thermal shock wave exceeding the compressive elastic limit of the Cu-OFE 3mm plate, causing

its “shortening”. This “theory” was proved correct by a series of numerical analyses (in transient coupled thermo-mechanical elasto-plastic domain). Details may be found in the attached presentation ([CDM050901\\_CUPLATEPLASTANALYSIS.PDF](#))

## **ACTION LIST to be followed up:**

Play between motor spindle and jaw	#34	Roger
Updated calculation on beam optics during transients	#49	Ralph
New heating tests for pre-series collimator blocs	#67	Sergio & Alessandro
Strategy for external cooling system	#70	Oliver