

THE DRIFT TUBE WELDING ASSEMBLY FOR THE LINAC4 DRIFT TUBE LINAC AT CERN

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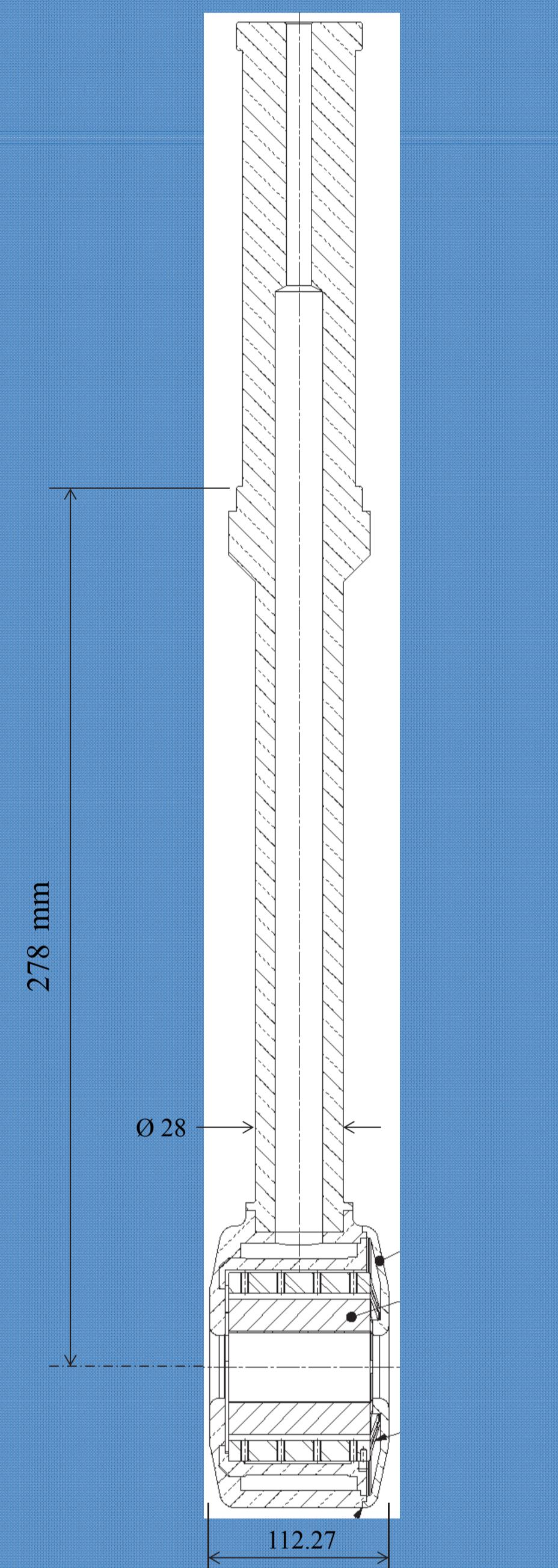
Completed Drift Tube

The fabrication of the Linac4 Drift Tube Linac (DTL) required the welding assembly of 108 drift tubes (DT) which has been undertaken at the CERN workshop. The design of the DTL is particular in that it was purposely simplified to avoid any position adjustment mechanism for drift tubes in the tank. In consequence, drift tubes have been designed with tight tolerances and parts have been assembled with an optimised welding procedure. Two re-machining stages have been introduced in order to compensate for welding distortions.

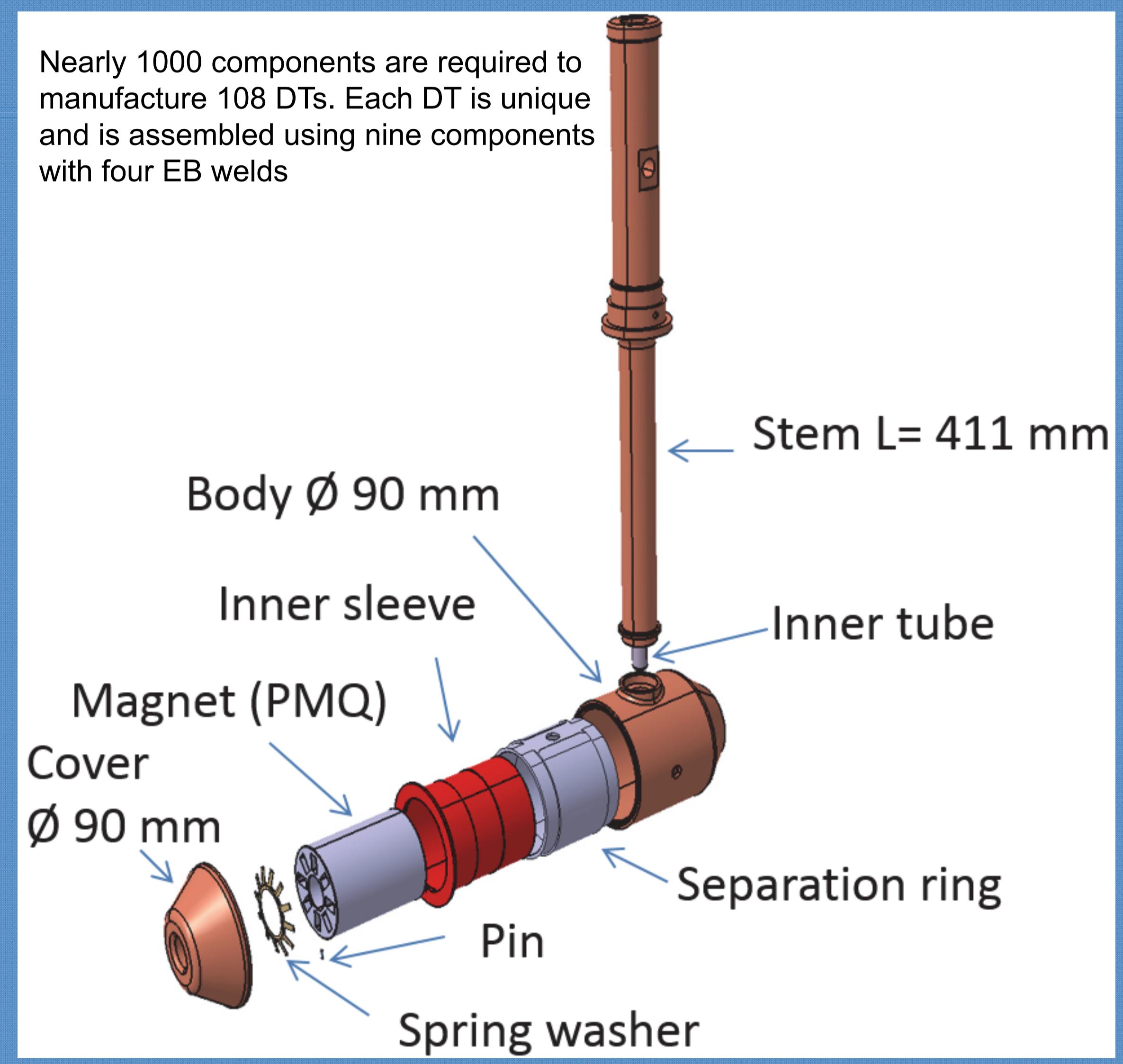
Electron Beam Welding



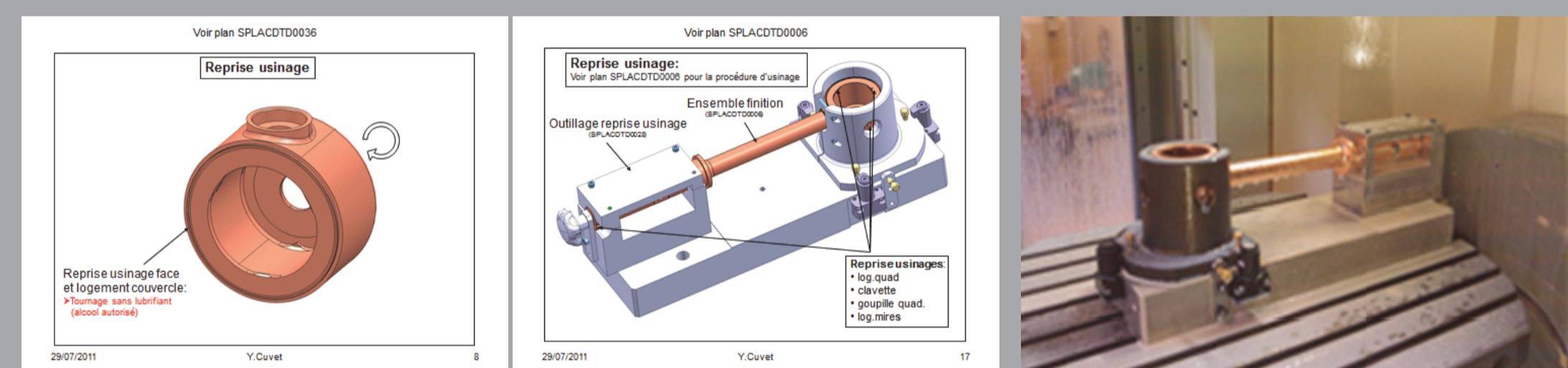
The first stage concerns the assembly of the water circuit inside the drift tube body. Two leak tight welds of 2 mm depth are required.



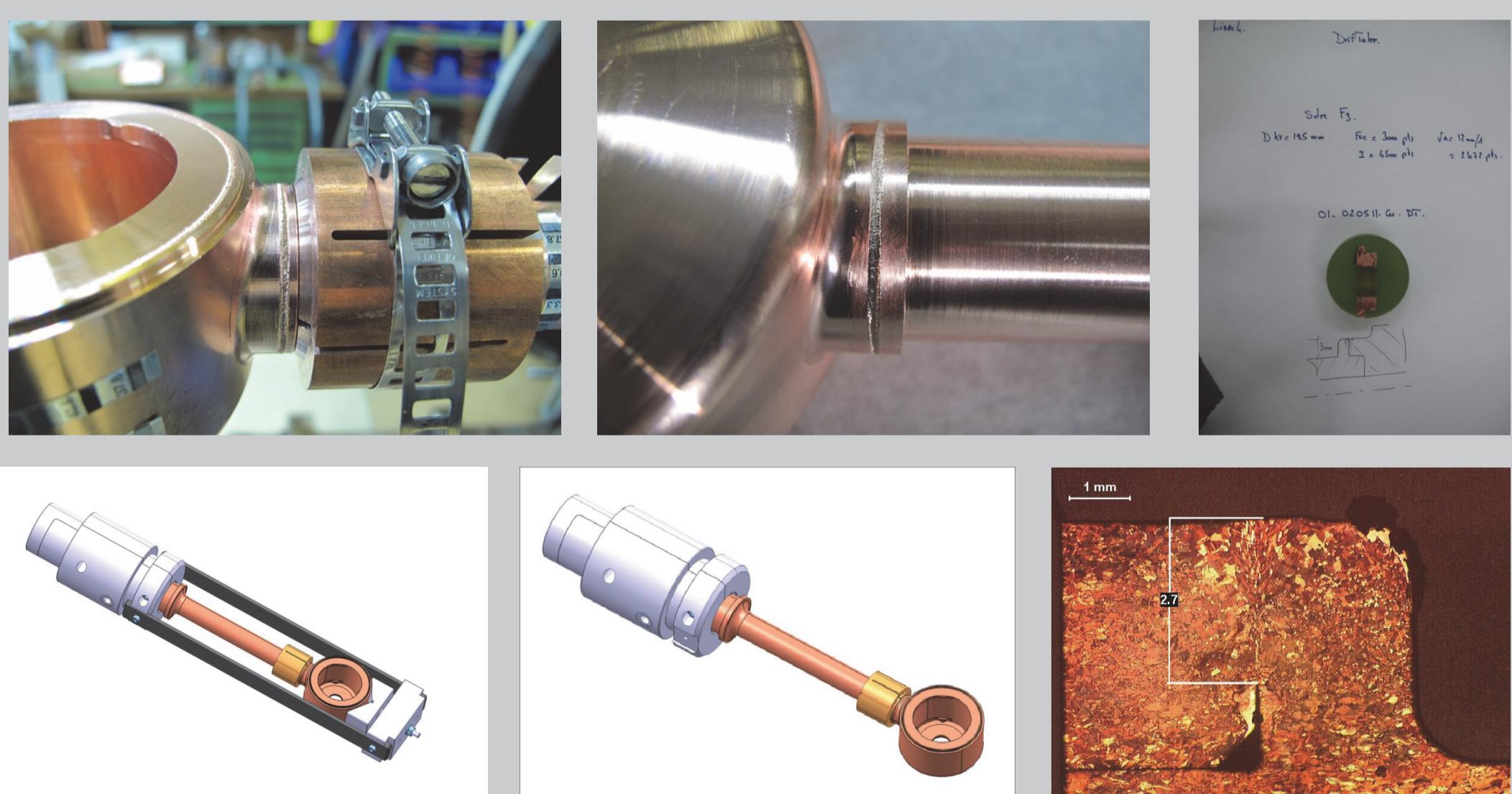
Nearly 1000 components are required to manufacture 108 DTs. Each DT is unique and is assembled using nine components with four EB welds



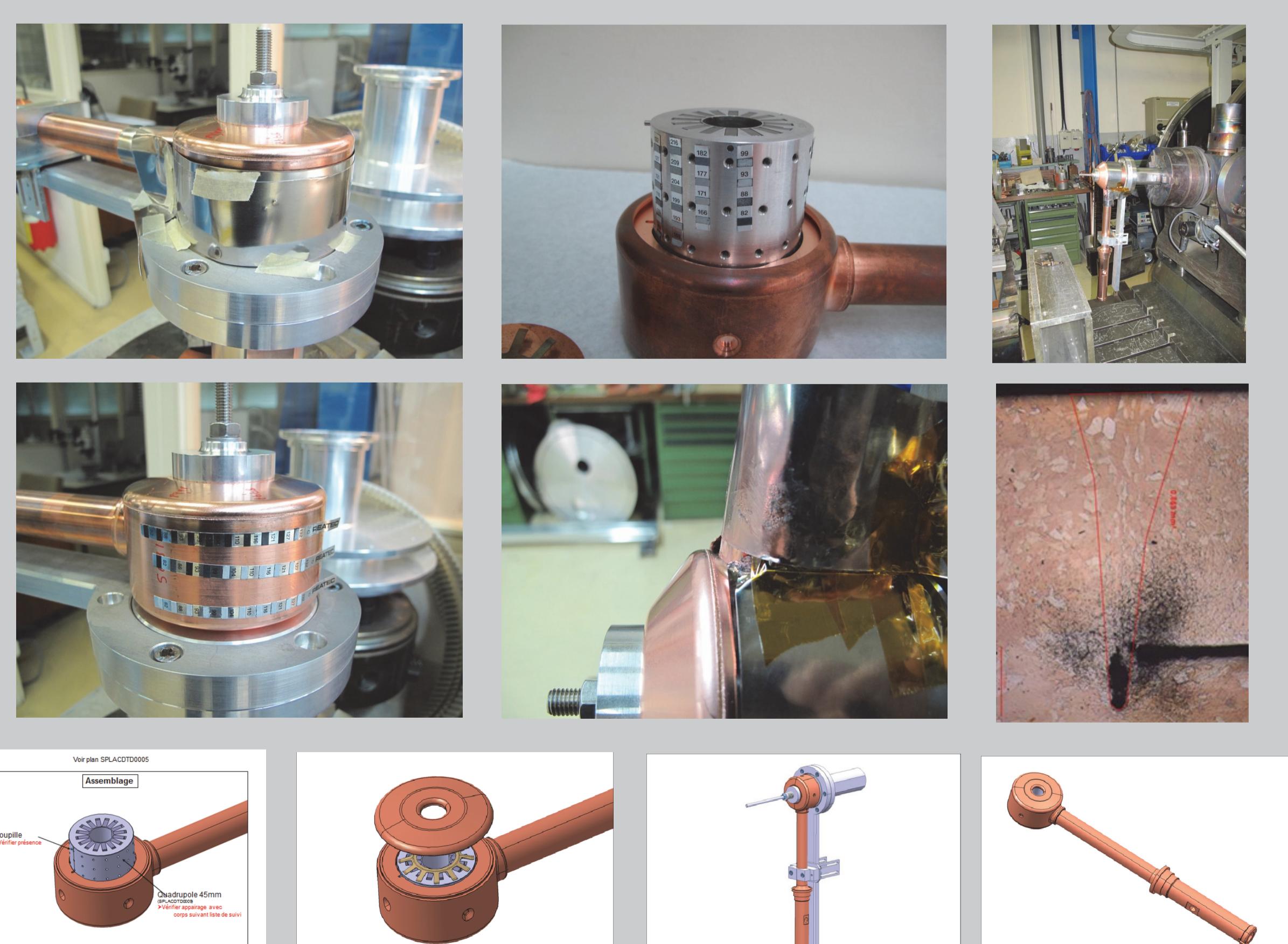
Machining



The second and final re-machining stage is the milling of the PMQ housing with respect to the upper portion of the stem with a precision of 50 µm. This re-machining operation is of fundamental importance as it ensures the precise positioning of the DT inside the cavity without the possibility of future adjustments.



The second stage concerns the assembly of the stem to the body. To ensure the required perpendicularity between the axis of the drift tube and the stem of ± 1 mrad, a specific tooling fixture is used to hold and position the two elements.



The third and final stage concerns the assembly of the cover to the body, carried out after the insertion of the PMQ.

Metrology

During the manufacturing and assembly phases, 29 geometrical tolerances were inspected for each body.

