

Metrology activities for the Installation and Test of the MITICA Beam Line Components Box and survey of the SPIDER Beam Source accelerator

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The Beam Line Components (BLC) Box is a Feedthrough box connected by a pipe to a DN200 flange of the Beam Line Vessel of MITICA (Megavolt ITER Injector & Concept Advancement, prototype of the neutral injector of ITER installed at the Neutral Beam Test Facility of Padua). The signals coming from the inside of the MITICA vessel will pass through the connection pipe and then, through 8 DN300 feedthroughs, will allow the signals to be transferred to the outside. Before mounting the BLC Box in the MITICA bunker, the base plate with anchoring was placed on the pit of the bunker and two lateral support angles were welded to the pillars of the vessel support structure. These components have been fixed referring them to the DN 200 flange, based only on the metrological measurements made and without having the possibility to verify their correct position before assembly. This was possible thanks to the processing of the surveys carried out with the Leica AT403 laser tracker, first on site, with the measurement of the overall dimensions in the future assembly area in the MITICA bunker and subsequently at the manufacturer Factory of the BLC Box by measuring all its interfaces. In addition, to comply with the vacuum compatibility requirements, the entire system was tested by searching for leaks in Helium, with the Hood method. The work presented also reports the metrological measurements made on the accelerator grids of the SPIDER Beam Source, after its removal from the vacuum chamber, to determine the relative position of the accelerator after the damage found to the ceramic insulators and before long shut down phase of SPIDER. The surveys, made with laser trackers (with 0.05 mm accuracy), show how the frame supporting the Extraction and Grounded Grids has moved without permanent deformations.