

Headline

First stages of EU production for TF strand and TF cabling & jacketing



Cross-section of first full-size NbTi strand made from the billet produced by FEC



Samples extracted from ICAS internal Cu dummy, aiming at production machines tuning

Since the start of 2011 the work has been dedicated to the consolidation of the production conditions for both the toroidal field coil strand and the toroidal field coil cabling & jacketing suppliers for F4E.

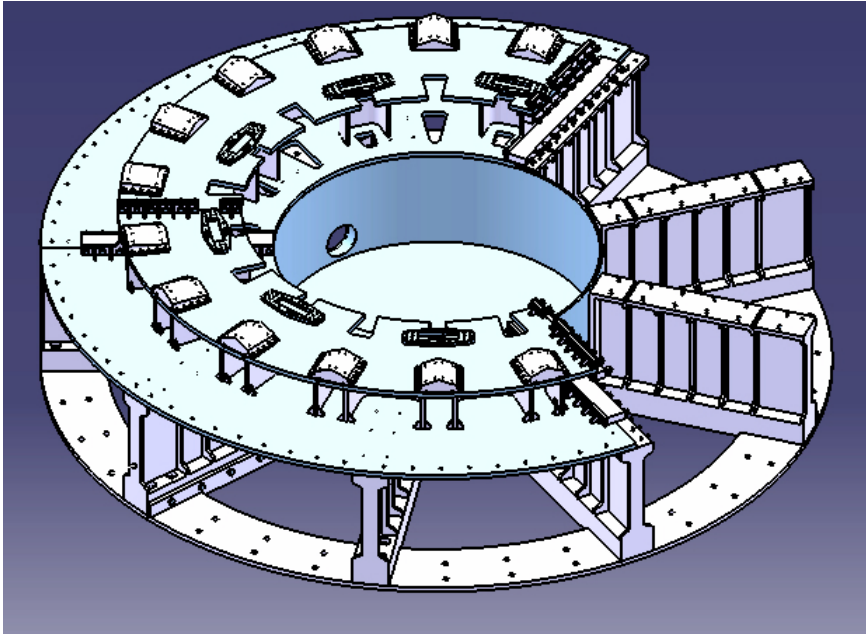
For the toroidal field coil strand, after a pre-production phase aiming at optimising the strand performance, the final strand design was agreed between Furukawa Electric (FEC) and F4E. The production of the first full-size billet and strand drawn from it (see the figure above) followed rapidly, and extensive tests were performed in early August at FEC and CEA/ENEA. As a result the performance of the first strand samples delivered were found to be fully compliant with the specification, showing in particular an operation current-sharing temperature > 6.2 K and thus securing a good temperature margin for the toroidal field coils. This allowed FEC to start the NbTi mass production stage. With regard to Cu strand production, 1500 km were produced so far, following a routine process.

For the toroidal field coil cabling & jacketing, ICAS is near to having all production tooling installed and operational (only some of the jacketing equipment still remains to be installed, and all cabling machines are available). Pre-production cabling activities took place in the summer with the production of a 100 m long copper dummy and a 200 m long 'segregated triplet' (2 NbTi+1 Cu). The geometrical features were found to be satisfactory for both lengths and led to the F4E approval of all quality documents, allowing ICAS to enter the production qualification phase.

In conclusion, the first stages of pre-production were successfully passed by both the F4E toroidal field coil conductor suppliers. The toroidal field coil strand is now heading to the mass production stage.

News

Fabrication of cryostat base progressing well



The fabrication of the cryostat base for the JT-60SA Project is progressing well. After an unpredictable delay to the start of fabrication due to a change of manufacturer, the company IDESA relaunched the fabrication at the beginning of March 2011. The cryostat base is approximately 11.95 m in diameter and 2.84 m in height, with a total weight of 250 t.

All the SS304 material needed for the fabrication had arrived in Spain by late May, delivered by Outokumpu. The company VEROT has already cut, by waterjet, all the parts for the fabrication. The company ITEMAT is responsible for carrying out the machining (beveling) of the pieces to be assembled and is progressing adequately. IDESA, after a short delay on the start, is now working hard on the assembly and welding of the U beams that belong to the lower structure. After the welding of all the sectors forming the cryostat base, the company Asturfeito will undertake its machining, final assembly and dimensional control.



Welding of cryostat base radial legs



Element of cryostat base double ring sector cut



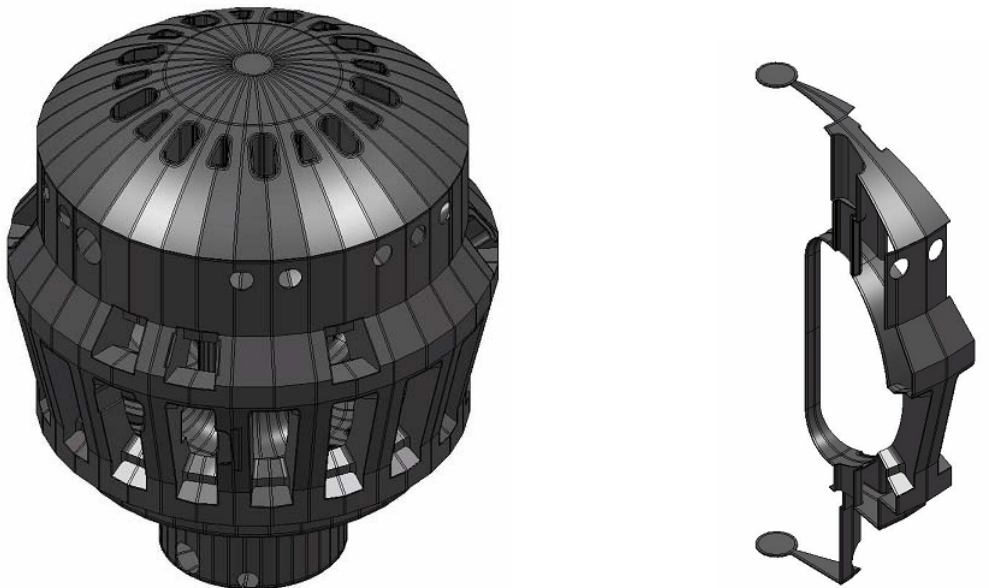
Left: Full penetration welding performed by submerged arc welding process in a side plate of the first U beam profile of the cryostat base lower structure
Right: Submerged arc welding machine and first U beam profile of the cryostat base lower structure

News

Trial 10° sector of vacuum vessel thermal shield completed



Fabrication of the trial 10° sector of the vacuum vessel thermal shield (VVTS), 6.8 m in length, was started, following the finalization of its design. The inside and outside of the VVTS were fabricated and were put together using the insulation joints, shown in the above picture. Its deviation from nominal dimensions was 5.2 mm at most, smaller than the required tolerance of 10 mm. The trial VVTS therefore met the required specification successfully.



Complete assembly of vacuum vessel thermal shield and cryostat thermal shield, and one sector

The thermal shields are necessary to reduce the cryogenic load on the superconducting magnets, at 4.5K. The cryostat (CTS), port (PTS) and vacuum vessel thermal shields (VVTS) surround the magnet system and shield it from radiation from the respective warm components of the cryostat, ports, and the vacuum vessel. The thermal shields are normally cooled at 80K.

The VVTS shape is a close fit to the gap between TF Coils and VV. It is divided electrically in 18 segments in the toroidal direction and 2 segments in the poloidal direction to avoid eddy currents during normal operation and plasma transients such as disruptions. For assembly the VVTS has 18 mechanical joints which are designed to prevent any direct line of sight between the vacuum vessel and the magnet. The VVTS will also shield the magnet gravity supports.

The VVTS consists of two 3 mm thick stainless steel panels reinforced by edge frames and cooling pipes. The VVTS is a self-supporting design and its weight is externally supported on the TF coils by using each horizontal port. The twin walls have coolant channels, running poloidally from top to bottom and cooled with gaseous He at 80K, with a pitch of about 100mm between adjacent pipes.

News

Disassembly: upper support structure stored in storage building



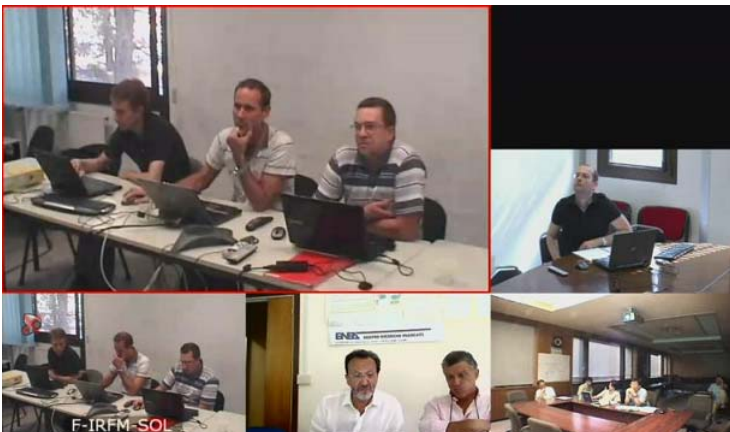
Disassembled upper support structure stored in storage building

Seven-eighths of the upper support structure has been disassembled and removed by August, and the rest will be done in September. Three-eighths of the removed structure has already been stored upside down in the JT-60 Storage Building at the JAEA Naka site.

Seven welded lower parts of the toroidal field coils out of nine have been cut, and only six ports of the vacuum vessel out of 80 are left to be cut. As for the vacuum vessel itself, cutting of some sections has been started to allow removal of the toroidal field coils. The removed toroidal field coils will be re-assembled on the upper support structure in the Storage Building.

Meetings

Design Review Meetings



7th Design Review Meeting on Superconducting Magnet Power Supply

The 7th Design Review Meeting (DRM) on the superconducting magnet power supply of JT-60SA was held by videoconference on 15 September with attendance of 13 experts from Germany (Fusion for Energy), Italy (ENEA), France (CEA) and Japan (Naka Fusion Institute). The operational requirements for of the poloidal field coil current and the status of technical specification for call for tender were discussed.

Another Design Review Meeting on the toroidal field coil tests was also held by videoconference on 6 September, and 14

experts in total attended the meeting remotely from Germany (F4E), France (CEA), Italy (ENEA), Belgium (SCK-CEN) and Japan (Naka Fusion Institute). The draft of the Procurement Arrangement for the setup of a cryogenic test facility and performance of tests of the toroidal field coils was discussed, and an agreement was achieved on it between the EU and JA Home Teams.

Meetings

International conferences held in September



10th International Symposium on Fusion Nuclear Technology in Portland, Oregon

The 10th International Symposium on Fusion Nuclear Technology was held in Portland, USA from 12 to 16 September to exchange technical information on all aspects of fusion nuclear technology including the status of ITER and Broader Approach activities, and design, development and procurement of the components for ITER. The Project Manager of the JA Home Team, Y. Kamada, gave an invited talk entitled "The Status of the JT-60SA Project and its Research Plan".

From 12 to 16 September, the 22nd International Conference on Magnet Technology was held in Marseille, France. This conference is for the wide range of magnet technology covering fusion, accelerator, high magnetic field and nuclear magnetic resonance etc. Fourteen papers in total were presented by members of the EU and JA Home Teams of the JT-60SA project, and a dedicated session for JT-60SA was also arranged at the conference.

Visits

PL visit to Garching office and ITER



At the ITER site tour, with the Poloidal Field Coils Winding Facility in the background

In September, following his visit to the EU Home Team headquarters in Garching, Germany to coordinate the work programme and procurement schedule etc. for the coming year, the Project Leader, S. Ishida, visited Agence ITER France and the ITER Organization in Cadarache for the first time in three years. He met with the Director of Agence ITER France, J. Pamela, and the Director-General of the ITER Organization, O. Motojima, and exchanged information and opinions regarding the current status of JT-60SA and ITER.

The Project Leader joined the ITER site tour with other visitors after the meetings at the ITER, and received a detailed explanation on the current construction status. "It was really impressive to see their steady progress" he said. "At the end of 2008, on my last visit, they were preparing the land for construction. Now they are actually building their headquarters, the Poloidal Field Coils Winding Facility, which is over 200 m in length, and the Seismic Isolation Pit basement for the Tokamak Complex, which is placed on the ground excavated down to 17 m."

Calendar

October 2-7, 2011

36th International Conference on Infrared, Millimeter, and Terahertz Waves (IRMMW-THz)
Houston, USA

October 25, 2011

9th Meeting of the BA Steering Committee (SC-9)
Lausanne, Switzerland

November 1-4, 2011/09/29

8th General Scientific Assembly of the Asia Plasma and Fusion Association (APFA2011)
Guilin, China

December 6-7, 2011

13th Technical Coordination Meeting (TCM-13)
Karlsruhe, Germany

March 28, 2012

10th Meeting of the STP Project Committee (PC-10)

April 18-19, 2012

14th Technical Coordination Meeting (TCM-14)
Naka, Japan

Contact Us

The JT-60SA Newsletter is released monthly by the JT-60SA Project Team.
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For more information please visit the website: <http://www.jt60sa.org/>