# JT-60SA Newsletter



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## Manufacturing phase of **Cryostat Base launched**



**Cryostat Vessel Body** & Cryostat Base



11.95 m

The Cryostat Base (CB) completes the lower part of the cryostat vacuum enclosure and is designed to sustain the mechanical loads of the machine assembly and transfer them to the tokamak buildings foundations. The CB consists of: (a) two rings connected to those embedded in the ground floor of the tokamak building; (b) nine rigid radial legs; (c) a large double ring, where (d) eighteen toroidal field coil base supports and (e) nine vacuum vessel (VV) base supports are located, and (f) an internal cylindrical shell which completes the CB vacuum enclosure.

Due to the transportation limits, the CB must be segmented and finally assembled on-site. Therefore, the double ring as well as the base lower structure (radial legs + rings) is fabricated as three 120-degree assemblies to be bolted on-site. The internal cylindrical shell is instead delivered to site as a single piece.

After the signature of the PA for the CB, the manufacturing phase has been launched. The tendering process closed at the beginning of April resulting in several offers presented by Spanish companies for the supply of the CB. All the offers were evaluated after further discussions with the companies in order to clarify technical aspects and the technical assessments of the offers were carried out by CIEMAT (Centro de Investigaciones Energéticas, Medioambientales y Tecnológicas). The CB is going to be manufactured and delivered within 26 months from the start of the contract, and the CB will arrive in Japan before the end of 2012.

### Conceptual design of QPC studied & innovative solution worked out

The technical specification of the Quench Protection Circuits (QPC) for the Superconducting Magnets of JT-60SA was finalized and will be procured by the Italian National Research Council, acting through Consorzio RFX in Italy.

In case of quench or other major faults, the energy stored in the magnets has to be quickly discharged; this is done by transferring the circulating current into suitably rated resistors. Thirteen QPCs will be provided for JT-60SA by 2015, ten for the poloidal and three for the toroidal circuits, respectively rated to interrupt  $\pm 20$  and 25.7 kA dc and to sustain a re-applied voltage up to 5 and 2.8 kV.

The conceptual design of the QPCs was studied and an innovative solution, based on an advanced Hybrid Circuit Breaker, composed of a mechanical Bypass Switch (BPS) and a static interrupter, was worked out; an explosively actuated circuit breaker (pyrobreaker) connected in series represents the backup protection. This advanced design combines the benefits of the fast breaking and very low maintenance requirement of the static switches, while maintaining the advantage of the much lower power losses of the mechanical bypass in normal operation.

A simplified scheme of the JT-60SA Quench Protection Circuit and sequence of operation are shown at the right.





### Trial manufacturing of VV outboard completed



**Outside appearance** 



Inside appearance

Welding of the upper half of the 20 degree sector of the VV outboard was finished including three port stubs (upper vertical, upper oblique and horizontal ports). A press correction was performed for longitudinal welding distortion found near the upper vertical port stub. As a result, the dimensional divergence of the inner shell at the zenith was successfully reduced and met the specification.

### Welding of VV inboard straight sections finished





First series production of inboard straight sections

Welding of the first series production of inboard straight sections forming a 40-degree sector for the VV was successfully finished (10 degree x 4). A press correction is being carried out for these sections.

#### Meetings



The 7th Meeting of the BA Steering Committee (SC-7) was held on 28th April 2010 in Rokkasho, Japan, and an update of the Project Plan and the Annual report 2009 from the Satellite Tokamak Programme were approved by the Steering Committee.



From 18th to 21st May, K. Lackner and T. Bolzonella, members of the EU HT, had discussions regarding the JT-60SA Research Plan at Naka Fusion Institute, and they gave presentations on it to many members of the JA HT as well.

#### Calendar

May 24-28, 2010 <u>19th Int. Conf. on Plasma Surface Interactions in</u> <u>Controlled Fusion Devices</u> <u>San Diego, USA</u>

June 19-23, 2010 Int. Cryogenic Engineering Conf. 23 - Int. Cryogenic Materials Conf. 2010 Wroclaw, Poland

June 21-25, 2010 37th EPS Conf. on Plasma Physics, Dublin, Ireland

August 1-6, 2010 Applied Superconductivity Conf. Washington, D.C., USA

September 14-16, 2010 9th Technical Coordination Meeting Naka, Japan September 27-October 1, 2010 26th Symposium on Fusion Technology Oporto, Portugal

October 11-16, 2010 23rd IAEA Fusion Energy Conference Daejon, Republic of Korea

October 19, 2010 7th Meeting of the STP Project Committee Japan and EU (Remote)

### Local



Madrid goes wild each May in honour of the city's patron saint, San Isidro, with a traditional round of partying, feasting and dancing in the streets that goes on for about 10 days around the designated saint's day, 15 May. The city's streets are dominated by music, and each neighbourhood (barrio) chimes in with their own street party or traditional celebration. The city's squares become centres of performances of everything from flamenco to rock 'n roll, while spectators feast on traditional ice cream and doughnuts. San Isidro's fiesta also signals the start of the city's bullfighting season at the Plaza de Toros Monumental de Las Ventas.

Some love it, some hate it, but for the Spanish a Madrid Bullfight is the pinnacle of one of Spains greatest traditions! Perhaps the most internationally recognised celebration is that of the 30 days of "Toros" (bullfighting) celebrated in Madrids Las Ventas. The worlds best bullfighters converge on Madrid for 30 days of events ranging from "Novatos" (Youngsters) to demonstrations of the different styles practised in South America and southern France. Events start daily at 1900 in front of capacity crowds even on weekdays. The best bullfights are normally reserved for the weekend programme.

#### **Contact Us**

The JT-60SA Newsletter is released monthly by the JT-60SA Project Team. Suggestions and comments are welcome and can be sent to masayasu.sato@jt60sa.org.

For more information please visit the website: <u>http://www.jt60sa.org/</u>