



29 November 2012, Barcelona

Fusion for Energy signs contract for the supply of the ITER Pre-Compression Rings

The contract for the supply of nine Pre-Compression Rings (PCRs), among which three spares, that will support the ITER machine's magnet system, has been signed between Fusion for Energy (F4E) and EADS CASA Espacio. The total budget of the contract is in the range of 12 million EUR and it is expected to run for approximately four years.

The key function of PCRs is to reduce the fatigue of the ITER machine's magnet structures from the powerful electro-magnetic forces and consequently prolong their operation from ten to over twenty years. The signature of the PCRS contract marks another European milestone that will deliver the largest composite structures ever built for operation in a cryogenic environment. The work will be carried out in a centre of excellence located in Spain, which has a proven track record in field of composites for space applications.

The function of PCRs in the ITER machine:

The ITER machine will operate with a system of superconducting magnets which relies on the Toroidal Field coils, the Central Solenoid, the Poloidal Field coils and the Correction coils (see ITER image).

Toroidal Field (TF) coils are "D" shaped coils whose core task in the ITER device is the confinement of plasma. PCRs are the keystones of the TF coils system and will be assembled to the top and bottom of TF coils in order to prevent them from deforming when the powerful magnetic field is created.

The size of the PCRs, their assembly and maintenance:

The basic design relies on 5 m diameter fibreglass composite rings with a cross section of about 300 mm x 300 mm at top and three at the bottom of the TF coil system. Three PCRs will be installed and loaded at the top and three at the bottom of the TF coil system and will apply a centripetal force equivalent to that of 3,000 tonnes on the top and bottom of each TF coil reducing their overall constraints.

In order to avoid the circulation of electrical currents and withstand high loads, the PCRs will be manufactured of fibreglass composite, where in every cross section nearly a billion of miniscule glass fibres will be glued together.

Their load will need to be maintained for the entire 20 years of ITER operation, while accommodating thermal shrinkages during cool-down/warm-up, cyclic forces, settlements and unexpected motions. Due to the limited access to carry out in-service inspection of the PCRs, in case there is a need for the replacement of the lower PCRs, it will be carried out by using one or more of three spare rings made available below the Tokamak in the cryostat.

Background information:

MEMO: Fusion for Energy signs contract for the supply of the ITER Pre-Compression Rings

Fusion for Energy

Fusion for Energy (F4E) is the European Union's organisation for Europe's contribution to ITER. One of the main tasks of F4E is to work together with European industry, SMEs and research organisations to develop and provide a wide range of high technology components together with engineering, maintenance and support services for the ITER project.

F4E supports fusion R&D initiatives through the Broader Approach Agreement signed with Japan and prepares for the construction of demonstration fusion reactors (DEMO).

F4E was created by a decision of the Council of the European Union as an independent legal entity and was established in April 2007 for a period of 35 years. Its offices are in Barcelona, Spain.

<http://www.fusionforenergy.europa.eu>

<http://www.youtube.com/user/fusionforenergy>

<http://twitter.com/fusionforenergy>

ITER

ITER is a first-of-a-kind global collaboration. It will be the world's largest experimental fusion facility and is designed to demonstrate the scientific and technological feasibility of fusion power.

Fusion is the process which powers the sun and the stars. When light atomic nuclei fuse together to form heavier ones, a large amount of energy is released. Fusion research is aimed at developing a safe, limitless and environmentally responsible energy source.

Europe will contribute almost half of the costs of its construction, while the other six Members to this joint international venture (China, Japan, India, the Republic of Korea, the Russian Federation and the USA), will contribute equally to the rest.

The site of the ITER project is in Cadarache, in the South of France.

<http://www.iter.org/>

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