Barcelona, 13 October 2010

Fusion for Energy signs contract for the vacuum vessel, ITER's biggest component.

Fusion for Energy (F4E) has signed a contract for the supply of seven sectors of the ITER vacuum vessel with the European consortium of AMW (Ansaldo Nucleare S.p.A, Mangiarotti S.p.A and Walter Tosto S.p.A). The contract, expected to run for 6 years and worth almost 300 million EUR, is the biggest single work package of Europe's contribution to ITER and is the largest component of the ITER device. The complexity of the vacuum vessel, its size, the amount of welding required and the degree of precision which is needed to build the component, brand this contract as one of the most important and technologically challenging of the ITER project. The in-wall shielding bolted inside the vessel's walls will be delivered by India and ports to be welded on the D-shape sectors will be manufactured by Russia and Korea, while the two other sectors of the vacuum vessel will be supplied by Korea.

What is the function of the vacuum vessel in the ITER device?
The ITER vacuum vessel is located inside the cryostat of the ITER device and its basic function is to operate as the chamber that hosts the fusion reaction. Within this torus-shaped vessel, plasma particles collide and release energy without touching any of its walls due to the process of magnetic confinement. The vacuum vessel is composed of nine sectors made of thick special grade stainless steel and each sector is 13 metres high, 6.5 metres wide and 6.3 metres deep. All of the sectors are similar and are built with double-walls containing the bolted- on shielded plates with a pressured inter-space which combine to attenuate the thermonuclear flux so as to avoid overheating of the super conducting coils.
The weight of each sector is approximately 500 tons and the weight of the entire component, when welded together, will reach an impressive total of 5000 tons which is equivalent to weight of the Eiffel Tower.

The ITER vacuum vessel will be twice as big and sixteen times heavier than any previous tokamak.
Its double-wall structure is designed to provide a high quality vacuum for the plasma as well as the first confinement barrier for tritium, forming an important part of safety of the ITER device. The vacuum vessel will operate at a temperature close to 100°C and at a nominal water pressure in the inter-space of 11 Atmospheres, equivalent to the underwater pressure at 110 metres. The heat of the ITER fusion reactions is removed by the water in the vessel's cooling loops, while the decay heat may also be removed by natural circulation.

The complex doughnut-shape container will be manufactured and put together in segments, following a significant amount of electron beam welding carried out in the largest vacuum chamber in Europe that will be required in order to manufacture them. The ports and segments have to be joined together with an unprecedented accuracy for this size of vessel. It is estimated that the total amount of welded joints

add up to approximately 14 km. Europe's proven track record in R&D with prototypes in ultrasonic testing inspection technology, weld distortion and analysis, including electron beam welding and its world class facilities in fabrication technology, were essential in undertaking the commitment to provide seven out of the nine sectors of the vacuum vessel.

Background information:

MEMO: Fusion for Energy signs contract for ITER vacuum vessel.

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

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/

For F4E media inquiries contact:

Aris Apollonatos + 34 93 3201833