22 May 2014, Barcelona

Europe to equip the biggest cryoplant in the world

A major technological deal has been reached between Fusion for Energy, the EU organisation responsible for Europe's contribution to ITER, and Air Liquide, gas technology global leader, in order to equip the world's biggest cryoplant that will cool down the ITER machine to temperatures as low as -269˚ C. The works will be completed in five years and the budget foreseen is in the range of 65 million EUR. The contract covers the engineering, procurement, installation and testing of the facility and auxiliary systems.
Professor Henrik Bindslev, Director of Fusion for Energy, explained that "thanks to ITER, the frontiers of science and technology are pushed further and Europe's industry is becoming more competitive. To be part of the biggest international energy project means being confident enough to put your expertise to the test and brave enough to take it a step further". Cristiano Tortelli, Vice-President, Global Air Liquide E&C Solutions, commented: **"**Our participation to ITER is driven by technological innovation, underpinned by the recognition our of expertise and in line with our committment to invest in tomorrow's energy mix."

What is the function of the cryoplant?
Think of the cryoplant as ITER's massive fridge that will produce and distribute the cooling power in the machine through different networks. The most advanced cryogenic technologies will be deployed to generate extremely low tempratures needed for the ITER magnets, thermal shields and cryopumps. For example, the magnets will be cooled with super critical helium to reach a superconducting state at 4,5 K, close to absolute zero, in order to confine the hot plasma.

What is the European contribution to ITER's cryoplant?
Europe will provide the Liquid Nitrogen Plant and and auxiliary systems that will cool down, process, store, transfer and recover the cryogenic fluids of the machine. Two nitrogen refrigetarors will be manufactured along with two 80 K helium loop boxes, warm and cold helium storage tanks, dryers, heaters and the helium purification system. The high performance requirements will be underpinned by high safety standards and a sophisticated operational system.

What are the main elements of the Liquid Nitrogen Plant and auxiliary systems?
Two nitrogen refregirators with a cooling power of 1 200 kW at 80K will cool down ITER's Liquid Helium Plant and the 80K helium loop boxes. In addtion, they will supply the purification system, quench tanks, heaters and dryers with nitrogen in liquid or gaseous form.
The two 80K helium loops will cool down the thermal shields of the cryostat, vacuum vessel, and regenerate the cryopumps. It is estimated that 8 kg of helium per second will be processed.
A helium purification system is planned to recover and clean helium gas from any impurities. The largest components are two quench tanks that each weigh 160 tonnes and meaure 37m by 4.4 m.

Background material

Interview with Xavier Vigor, Head of Air Liquide Advanced Business & Technology (AB&T), explaining their contribution to the ITER project: http://bit.ly/1qUd9uy

MEMO: Europe will equip ITER with the biggest cryoplant in the world.

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
http://www.flickr.com/photos/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. It is expected to produce a significant amount of fusion power (500 MW) for about seven minutes.
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 parties 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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