

Press Release

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A MULTINATIONAL SUCCESS: ITER SUPERCONDUCTOR PRODUCTION NEARS COMPLETION

SAINT-PAUL-LEZ-DURANCE, France (17 September 2015). The single largest superconductor procurement in industrial history is drawing to a successful close. An eight-year campaign to produce the superconductors for ITER's powerful magnet systems is in its final stages, with nearly 70 percent of the conductor unit lengths accepted by the ITER Organization. Six ITER Members—China, Europe, Japan, Korea, Russia and the United States—have been responsible for the production of 200 kilometres (2,800 metric tons) of cable-in-conduit conductors, worth an estimated EUR 610 million.

china Without superconductivity, the pursuit of fusion energy would be impossible. Superconductors consume less power and are cheaper to operate than conventional counterparts, while carrying higher current and producing stronger magnetic fields.

eu

india

japan In ITER an array of superconducting magnet systems, with a combined stored magnetic energy of 51 Gigajoules (GJ), will produce the magnetic fields that will initiate, confine, shape and control the plasma at temperatures reaching 170 million C°.

korea

russia The building blocks of the magnet system are high-performance, internally cooled superconductors called CICC (cable-in-conduit) conductors, made up of bundled superconducting and copper strands that are cabled together and contained in a structural steel jacket. ITER's extraordinary technical requirements and the sheer amount of material required—200 kilometres, equivalent to 2,800 metric tons—resulted in a worldwide collaborative procurement effort involving ITER Members China, Europe, Japan, Korea, Russia and the United States.

usa

Beginning in 2007, the ITER Organization pioneered a global procurement strategy to establish the processes and systems to ensure the standardization of conductor production and testing around the world. Eleven conductor Procurement Arrangements were signed with the ITER Domestic Agencies between 2007 and 2009—each one defining technical and quality control requirements such as the qualification of suppliers, the qualification of manufacturing processes, control points at critical manufacturing steps, and the testing of representative full-size conductor samples.

Production has been underway since 2008, with painstaking oversight by the ITER Organization and the Domestic Agencies. Outside reference laboratories have contributed their expertise, performing third-party verification on critical acceptance tests. For the most technically challenging raw material—the niobium-tin (Nb₃Sn) superconducting strands used in ITER's toroidal field and central solenoid magnet systems—500 metric tons (more than 100,000 km) of strand were produced by nine suppliers. This large-scale industrial effort demanded a ramp-up of global production capacity from 15 metric tons/year to 100 metric tons/year, as well as the introduction of three new strand suppliers.



To date, nearly 70 percent of the produced conductor unit lengths have been accepted by the ITER Organization.

At a ceremony on 17 September 2015, a plaque was unveiled in the ITER Headquarters at Saint-Paul-lez-Durance, France to acknowledge the contribution of many different partners in the success of the ITER's longest-lead procurement campaign. "The 11 conductor Procurement Arrangements have posed many technical and management challenges, but they have also been an amazing human adventure," says Arnaud Devred, ITER head of Superconductor Systems & Auxiliaries. "I credit many people—past and present—for the success of the ITER conductor effort."

Magnet Division head Neil Mitchell, who has stewarded the development of the ITER conductors since 1992, agreed: "It is inspiring to see the ITER conductors as a reality after a development program that goes back over 30 years, with ITER partners working as a team to master the complex technologies involved."

ITER Director-General Bernard Bigot emphasized the project's multi-faceted nature: "This milestone is remarkable on several levels. Economically, we have injected EUR 610 million into industrial companies and laboratories around the world, which have now gained invaluable expertise that can be applied in other critical fields such as medical imaging, energy, and transportation. Technologically, we have used the latest materials science while pushing production to unprecedented levels. But perhaps the greatest achievement is reflected in the successful multinational collaboration on design attributes, production standards, quality assurance measures and testing protocols for a project of this technical complexity. We will continue to build on this success."

The next stage in the fabrication of ITER magnets is the integration of the superconductors into the final coil assemblies.

BACKGROUND TO THE PRESS RELEASE

ITER—designed to demonstrate the scientific and technological feasibility of fusion power— will be the world's largest experimental fusion facility. Fusion is the process that 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, abundant and environmentally responsible energy source.

ITER is also a first-of-a-kind global collaboration. Europe will contribute almost half of the costs of its construction, while the other six Members to this joint international venture (China, India, Japan, the Republic of Korea, the Russian Federation and the USA), will contribute equally to the rest. The ITER Project is under construction in Saint-Paul-lez-Durance, in the south of France.

For more information on the ITER Project, visit: <http://www.iter.org/>