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ITER – a “record performance” in machine assembly

The installation of the first vacuum vessel sector module, three weeks ahead of schedule, exceeds the targets defined by the 2024 Baseline

ST PAUL-LEZ-DURANCE, France (16 April 2025) – Hailed as a “record performance” by ITER Director-General Pietro Barabaschi, the installation on 10 April 2025, three weeks ahead of schedule, of a 1,350-tonne sector module in the tokamak assembly pit is a strong signal that the project is back on track.

As tall as a five-storey building and as heavy as four fully loaded jumbo jets, a sector module is a modular assembly of first-of-a-kind components procured by three different ITER Members: Korea or Europe for the vacuum vessel sector at the module’s core; Korea for the thermal panels that contribute to sector insulation; and Europe and/or Japan for the pair of toroidal field coils that complete the assembly.

china

eu

india

japan

korea

russia

usa

Sector module #7, which was installed three weeks ahead of schedule on 10 April, is the first of the nine “building blocks” that, once assembled and welded, will form the doughnut-shaped vacuum vessel where energy-generating fusion reactions will occur.

Lessons learned from the assembly and installation of a first module in May 2022 (later extracted for repair) enabled the ITER teams and contractors to execute this new operation in record time—both the assembly of sector module #7, which took 6 months and 10 days instead of 18 months formerly, effectively dividing the time by three—and the lifting, transfer and installation of the 1,350-tonne component, which was completed in one day.

The operation on Thursday 10 April concentrated most of the challenges ITER must face and overcome during the machine assembly phase. The size and weight of the module and its rigging, the tight clearances during the early and final phases of the transfer, the precision required when positioning the load at the bottom of the 30-metre-deep tokamak pit ... all contribute to the difficulty of the task.

While the operation depends on powerful and dependable tools and systems, its final success rests on the coordination between the different teams involved and the conjunction of expertise: ITER supervisors and assembly experts, lifting crews from Chinese contractor CNPE, construction management-as-agent personnel, support technicians from crane manufacturer REEL and crane pilots from Foselev.

With sector module #7 now installed and sector module #6 scheduled to follow in July, ITER has exceeded the performance targets defined by the 2024 Baseline. That new Baseline, approved as a working reference schedule by the ITER Council in June 2024, reduces assembly from four stages to two and keeps the project on track for the start of substantial research operations in 2034.



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 that serves as the scientific backbone behind the growth of a fusion industry. As the host, Europe contributes 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 United States), contribute equally for the remaining expenses. 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/>