

# Advanced Assembly Technology of the Superconducting Coils in JT-60SA Tokamak

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The JT-60SA is a superconducting coil tokamak, which is the project combined with Japanese national project and Japan-EU Satellite Tokamak Programme. The coil system is composed of 18 Toroidal Field (TF) coils, 6 Equilibrium Field (EF) coils and Center Solenoid (CS). The size of the TF coil is 7.5 m high and 4.6 m width. EF coils structures have 12 m in the maximum diameter. These large components, which are over 10m size, must be assembled with high accuracy. In particular, tolerance of  $\pm 1$  mm is required for TF coil assembly. In order to achieve such high accuracy at large components assembly, the following techniques are used: 1) 3D CAD is used for the confirmation of the fabrication tolerances, the designed position and interference at the intermediate assembly route. 2) Laser tracker is used for the positioning of the large components to know three dimensional data and to confirm the data in 3D CAD quickly. 3) Special jigs are used for the positioning of the components. The assembly procedure for the coil system including the final sector of Vacuum Vessel (VV) and Thermal Shield (TS) is established considering the above technique.

The full-scale assembly of the JT-60SA started in 2013. In the actual assembly of the TF coil, all operation are proceeding successfully. This advanced technology can be also applied for the next machine, i.e. ITER.

## Country or International Organization

Japan

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