## JT-60SA CRYOSTAT DESIGN AND ASSEMBLY

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The JT-60SA Project is a combined Project of the JA-EU Satellite Programme under the Broader Approach (BA) Programme and JAEA's Programme.

The JT-60SA cryostat is the vacuum chamber containing the tokamak machine. Its main functions are (1) to provide a high vacuum environment to avoid excessive thermal loads applied to the components at cryogenic temperature; (2) to be the gravity support for the vacuum vessel and superconducting magnets, transferring all their loads to the floor of the torus hall; (3) have ports for VV access, heating devices, maintenance, etc. A separate thermal shield, near and along the interior walls, limits the radiant heat to the coils.

The cryostat consists of a gravity support and a vessel body. The gravity support includes a double ring, a lower structure composed by 9 radial legs, an inner cylinder and two rings connected to the corresponding embedded ones in the torus hall. The vessel body is built by cylindrical sections connected by truncated-conical elements in the inclined ports regions. The top lid will be built with a toro-spherical shape shifted up 1 m to maximize the inner space for the assembly and maintenance of cryogenic devices, thermal shield panels and TF terminal joints.

Due to the transportation limits between the port of entry and the JAEA site, the cryostat components must be properly segmented. The cryostat vessel body will be composed of twelve lateral sectors, the top lid divided in two halves and the cryostat base in seven large parts.

The design loads considered are an internal pressure of 0 MPa (high vacuum) against the external pressure of 0.1 MPa for normal operation, and 0.12 MPa absolute internal pressure for accidental conditions, assuming the loss of helium and water leaks from cryogenic and coolant lines respectively routed through the cryostat. The load combination with dead weight, seismic loads, electromagnetic forces and thermal loads must be taken into account for the structural design.

Concerning the design/manufacture of the cryostat, the reference code to be used is ASME Code.

The paper summarizes the detailed design of the cryostat as well as the assembly procedure.