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## Technical Specifications

# Expert Welding Support

### Abstract

This contract covers the provision of specialised welding support for the ITER Machine Assembly and Installation (MAI) Section.

<i>Approval Process</i>			
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## **1. Abstract**

This contract covers the provision of specialised welding support for the ITER Machine Assembly and Installation (MAI) Section. The scope of work will include the preparation of reports and technical specifications in connection with the call for tender for the assembly (welding) of the vacuum vessel, providing expert guidance in the selection of the assembly contractor and follow up of the contract. Also included is the provision of expertise and guidance on welding related matters as may be required by the Leader of the MAI section.

## **2. Background and Objective**

### **2.1 The ITER project**

The ITER project aims to demonstrate the scientific and technological feasibility of fusion power for peaceful purposes and to gain the knowledge necessary for the design of the next-stage device, DEMO, or the DEMONstration fusion power plant.

Receiving 50MW of input power, the ITER Machine is designed to produce 500 MW of fusion power for extended periods of time. This represents ten times more than the input power needed to keep the plasma at temperature. It will therefore be the first fusion experiment to produce net energy. It will also test a number of key technologies, including heating, control, and the diagnostics and remote maintenance that will be needed for DEMO.

Further information can be found on the ITER website (<http://www.iter.org>) and also at the web pages of the ITER Parties that can be accessed via the ITER website.

### **2.2 The ITER Organization**

ITER is a joint international research and development project for which initial construction activities have recently started.

The seven Members of the ITER Organization are the European Union (represented by EURATOM), Japan, The People's Republic of China, India, the Republic of Korea, the Russian Federation and the USA. ITER will be constructed in Europe, at Cadarache, in southern France, where the ITER Organization (IO) has its headquarters.

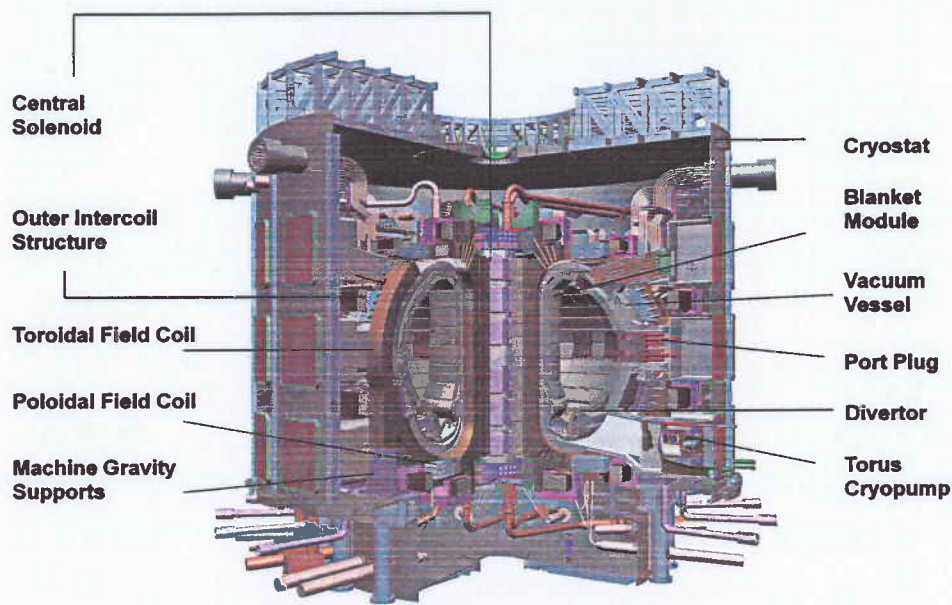
The Members of the ITER Organization will bear the cost of the project through its 10-year construction phase, and its 20-year operational phase before decommissioning. With respect to the construction of the ITER machine, most of the components will be contributed by the Members as in-kind contributions. The remaining investment will be via cash contributions from the members.

### **2.3 Machine Assembly and Installation section – The Mission**

The mission of the Machine Assembly and Installation section (MAI) is to assemble the ITER machine, to provide planning, oversight and to undertake the installation of plant systems. In detail, the MAI section is charged to:

- provide design direction and advice, and be responsible for the approval of all plant system designs from the aspect of assembly and installation,
- design assembly tools, write procedures and prepare schedules for the assembly of the machine,

- undertake the assembly of the machine,
- undertake the tokamak system installations, ensuring close coordination with the relevant Department and system Responsible Officers;
- define the integrated assembly and installation plan and approve plant system installation procedures and plans,
- define and implement a global alignment and metrology plan for ITER, including an appropriate site datum network,
- define and coordinate the implementation of an Integrated Logistics Support strategy for ITER to ensure lifecycle management of plant systems, components, spares and facilities: from design, through construction, operation and maintenance,
- co-ordinate the global transport, reception, handling and storage of plant system components, spares and tools.



**General view of the machine**

## 2.4 Objective of the Contract

The objective of this contract is to provide the MAI section with specialist welding support, in the form of a contract welding engineer (hereafter known as the welding engineer), to continue the effective preparation of the tender documentation for the Vacuum Vessel Assembly contract, to provide expertise and guidance throughout the tender process, in the selection of the Assembly Contractor, and to follow up the contract.

Under this contract the welding engineer will provide expertise and guidance on general welding matters. With reference to the Mission Statement contained in section 1.1.3 of this document, guidance could be required in support of any of the charges of the section, or in respect of any welding related matter required by the Leader of the MAI section.

### **3 Scope of Work**

The scope of work includes, but shall not necessarily be limited to:

- providing advice and expertise on any aspects of welding processes and equipment, and welding controls as required by the Leader of the Machine Assembly and Installation section;
- participation in the preparation, tendering and award of contracts with welding content (currently the Vacuum Vessel Assembly contract is in the preparation phase, and the welding engineer will be required to continue these preparation activities);
- follow-up (management) of the Vacuum Vessel Assembly contract;
- participation in the development of Assembly Strategies, Plans, and Procedures and ensure compliance of the associated welding activities comply with all applicable codes, standards and QA requirements;
- development of schedules and cost estimates for welding activities;
- the preparation, editing and review of documents in the English language, including documents in connection with manufacturing, construction, testing, codes and standards.

### **4 Estimated Duration**

The contract duration shall be for a period of 12 months, starting 3<sup>rd</sup> January 2011, and shall cover 220 working days, each of 8 hours minimum in accordance with the working practices of ITER.

### **5 Work Arrangements and Assignments**

The welding engineer's full-time presence at the ITER site is necessary for the effective performance of his duties.

Details of work to be performed by the welding engineer will be specified as needs arise by the Leader of the MAI section, or his authorized deputy.

Each work task will be individually specified in consultation with the contract welding engineer, and a deliverable date will be agreed.

### **6 List of deliverables and due dates**

Each package of work to be performed will be discussed with the welding engineer before its commencement, and a specification for the work package, schedule and form of deliverables agreed.

### **7 Acceptance Criteria**

All deliverables will be subject to the approval of the Leader of the MAI section, or his authorized deputy.

## 8 Work Monitoring / Meeting Schedule

Completion of work items will be confirmed by the Leader of the MAI section, or his authorized deputy. For longer tasks an interim monitoring point may be defined.

## 9 Required Qualifications and Experience

The contract welding engineer candidate shall have:

- **A university degree** in Mechanical Engineering or a related discipline, or combination of qualifications and experience.
- **Minimum of 20 years experience** in engineering of coded welding activities in relevant projects:
  - Nuclear fusion projects
  - Nuclear fission projects
  - Power generation
  - Pressure vessel manufacture
  - Ultra high vacuum systems and applications
  - Pipe work systems
  - Heavy engineering components
- Conversant with the French Pressure Vessel Code (RCC-MR (2007)).
- At minimum, a working knowledge and practical experience of remote handling relevant welding technologies, preferably in a fusion environment.
- Fluent in the English language, written and spoken.
- Membership of an internationally recognised welding institution.