



# ENGINEERING TECHNICAL SUPPORT FOR THE ITER TOKAMAK DIRECTORATE

## Call for Nominations

### **Purpose**

The purpose of this contract is to provide engineering, technical and analysis support for the development of the design of ITER Tokamak components as well as in support of their construction.

### **Background**

ITER (“The way” in Latin) is a next generation fusion tokamak designed “to demonstrate the scientific and technological feasibility of fusion energy for peaceful purposes”. With a long lifespan over than 30 years, it is intended that ITER will be a single step between the current set of fusion experiment and DEMO, a fusion power plant designed to demonstrate safe and reliable, commercial electricity production.

The ITER Organization consists of 7 Parties, acting through the Domestic Agencies (CN, EU, IN, JA, KO, RF, US) each of them will have a role in supplying most of the systems. The ITER Organization has the overall responsibility for the design and operation of the machine.

The Tokamak is the part of the ITER machine closest to the thermonuclear plasma and includes:

- The Toroidal Field Coils
- The Poloidal Field Coils
- The Central Solenoid and Correction Coils
- The Vacuum Vessel and Vacuum Vessel Ports
- The Thermal Shield
- The Cryostat
- The Vacuum Vessel Pressure Suppression System
- The Blanket System
- The Divertor

The large electro-magnetic forces to which the magnet structures, the vacuum vessel and the in-vessel components are subjected, lead to high stresses and displacements. In addition to the electromagnetic loads, these components are submitted to thermal stresses and displacements, and seismic events. Furthermore the ITER machine is designed to operate in a cycling mode, during which eventual fatigue effects and damage to the structures must be surveyed.

## Scope of work

The engineering services to be provided are:

- Design and fabrication studies of the Magnet System;
- Design and fabrication studies of the Vacuum Vessel and Vacuum Vessel Ports;
- Design and fabrication studies of the Thermal Shields;
- Design and fabrication studies the Cryostat and VVPSS (Vacuum Vessel Pressure Suppression System));
- Design and fabrication studies of the Blanket System;
- Design and fabrication studies of the Divertor.

The Supplier shall be able to provide the following professional competences:

- General Mechanical Engineering
- Electromagnetic, Thermal and Mechanical Structural Engineering (with specialization in Structural Assessment according to codes)
- Weld and Braze Technology
- Materials and Materials Testing Technology
- Non-Destructive Examination Methods and Standards
- CAD (Specialized in Mechanical Engineering).

During the tendering process the Supplier will have to provide evidence of:

- *QA system*: The Tenderer shall have and maintain a valid ISO 9000 certification and shall have the duty to verify and document the equivalent quality level of all its subcontractors and consultants.
- *Professional Software*: The Tenderer shall provide a list of the professional software available and used, e.g. for structural (static, dynamic, seismic), thermal and thermo-mechanical analyses, electromagnetic analyses, CATIA V5 CAD software etc.

## Award of Framework Contracts

Multiple framework agreements are contemplated, in order to provide the full range of services required. It is not expected that a single company will have the full capability required for all areas of work, and as such, companies are encouraged to tailor their proposed support in areas relating to their specific skills and interests. Suitable teaming arrangements for multiple companies are also encouraged, where appropriate, to enhance the offering of the tenderer.

General information on the scope and design of the ITER Reactor is described in the ITER.org website, and should be used for the purpose of identifying the general aspects of the design and the type of work to be performed in this Contract.

It is contemplated that the ITER Organization will award framework contracts for an initial period of two years, and may extend contract options for one additional year as required to complete the necessary engineering work.

The framework Agreements will be implemented by means of Task Orders, intended as a self-standing engineering design activity. Each Task Order shall be signed by the Contactor and the ITER Organization.

In order to allow the Tenderer to evaluate its capability to provide the engineering services subject of the present contract, it is specified that the overall estimate is for an average request of 35 professionals per year, including CAD designers support (total 70 ppy support over a 2 year period).

Typically, the provided professional and CAD designers are expected to spend a substantial fraction of their time or the entire period of a Task Order at the ITER Site of Cadarache, France. The Supplier is expected to respond flexibly and timely as soon as he receives the request of a Task Order.

The language used at ITER is English. A fluent professional level is required (spoken and written English)

## **Candidature**

Candidature is open to all companies participating either individually or in a grouping (consortium) which is established in an ITER Member State. A consortium may be a permanent, legally-established grouping or a grouping, which has been constituted informally for a specific tender procedure. All members of a consortium (i.e. the leader and all other members) are jointly and severally liable to the ITER Organization.

The consortium groupings shall be presented at the tender submission stage. The consortium cannot be modified later without the approval of the ITER Organization.