

**Technical Specifications (In-Cash Procurement)****Technical Summary for Framework Contract to Supply  
Vacuum Engineering Support to the ITER Vacuum  
Section**

This Technical Summary details the requirements for a Framework Contract to supply Technician/Engineering Support to the ITER Vacuum Section.

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# 1 Purpose

The purpose of this Technical Summary is to define the elements of a Framework Contract to supply resources to the ITER vacuum section. This document defines the experience/qualification profile of the personnel required, the mechanism by which tasks are placed with the Contractor and the expected overall duration of the Framework Contract/s.

# 2 Introduction

ITER will be the largest and most complex vacuum system yet to be built. Situated in Southern France, adjacent to the French CEA Cadarache site, ITER is designed to study the fusion reaction between the hydrogen isotopes tritium and deuterium.

As the project moves from design to construction, there is a requirement for additional external support in the areas of;

- Construction definition/documentation;
- Vacuum qualification (leak testing) of components/systems;
- Vacuum engineering (mechanical design of vacuum systems including vacuum pipework);
- Instrumentation and Control (vacuum systems specific).

# 3 Scope

Under the scope of this Framework Contract, suitably experienced personnel shall be made available to the ITER Organisation (IO) to provide technical services. The procurement of these services is split into two separate lots. Tenderers may bid on one or both lots. Therefore one or two contracts may be awarded.

The scope of the required technician/engineering support for the two lots is described below:

## 3.1 Lot 1 – Vacuum Technician/Engineering Support

### 3.1.1 *Vacuum Technician Support:*

- Design of test fixtures and fittings required for validation of leak testing procedures;
- Analysis of designs with respect to vacuum acceptance testing;
- Analysis of ITER system design(s) with respect to installation leak testing;
- Development of pressure / leak testing procedures;
- Practical validation performance of pressure / leak test procedures;
- Vacuum testing support (at IO and external supplier's premises);
- Preparation of vacuum test equipment;
- Preparation of construction documentation (e.g. detailed Engineering Work Packages, Assembly Sequences, Line & Equipment Lists etc.)

### 3.1.2 *Vacuum Engineering Support:*

- Perform design of vacuum systems (e.g. vacuum pipework systems);

- Prepare technical specifications for the procurement of vacuum components/ systems.
- Produce and manage Engineering Work Packages, example activities include:
  - System Descriptions & Scope Statements
  - 3D Drawings
  - 2D Assembly and Layout Drawings
  - Process Flow Diagrams
  - Bills of Materials
  - Component Take-off Lists
  - Installation Technical Specifications

### **3.2 Lot 2 – Instrumentation & Control Technician/Engineering Support**

#### **3.2.1 *Instrumentation & Control Technician Support:***

- Design and assembly of local Instrumentation & Control (I&C) systems required for vacuum equipment testing/validation;
- Preparation and operation of vacuum instrumentation test equipment/setup;
- Development of testing procedures for vacuum I&C equipment and systems;
- Development of installation procedures for vacuum I&C equipment and systems;
- Vacuum I&C testing support (at IO and external supplier's premises);
- Preparation and/or review of I&C construction documentation (e.g. detailed Engineering Work Packages, Assembly Sequences, Equipment Lists, termination schedules, etc.)

#### **3.2.2 *Instrumentation & Control Engineering Support:***

- Design of local I&C systems required for vacuum equipment testing/validation;
- Development of simple software applications (mostly PLC based) for local I&C testing/validation;
- Support design and review of vacuum system I&C;
- Development of testing procedures for vacuum I&C equipment and systems;
- Development of installation procedures for vacuum I&C equipment and systems;
- Preparation and/or review of I&C construction documentation (e.g. detailed Engineering Work Packages, Assembly Sequences, Equipment Lists, termination schedules, etc.)

## **4 Required Skills and Experience**

The required skills/experience for each type of resource required are outlined below:

#### **Vacuum Technician Support:**

- Certified to COFREND level 2/3 or equivalent;

- At least 5 years practical experience in leak detection, developing procedures, tools and performing tests;
- Mechanical technician experience would be considered advantageous (for example, assembly, operation and maintenance of static mechanical and/or rotating equipment);
- Good command of English (written and spoken).

Vacuum Engineering Support:

- At least 5 years experience in the design, specification and procurement of vacuum components/systems, including systems of vacuum pipework;
- CAD (CATIA/Enovia) experience would be considered as advantageous;
- Strong working knowledge and application of relevant design codes (e.g. ASME BPVC, EN13445) would be considered advantageous;
- Good command of English (written and spoken).

Instrumentation & Control Technician Support:

- French Electrical certification;
- Good knowledge of Low voltage directives, as well as general electrical and I&C standards;
- At least 5 years experience in assembly and commissioning of I&C controls systems (including cabling, PLC, electrical distribution);
- Experience in Siemens S7 PLC series would be considered as advantageous;
- Experience in vacuum technologies and related equipment would be considered as advantageous;
- Good command of English (written and spoken).

Instrumentation & Control Engineering Support:

- French Electrical certification;
- At least 5 years experience in the design, specification and procurement of I&C controls (including cabling, PLC, electrical distribution);
- Good knowledge of Low voltage directives, general electrical/EMC norms and I&C standards (such as IEC 61508, 61511, 61513);
- Experience in Siemens S7 PLC series would be considered as advantageous;
- Experience in vacuum technologies and related equipment would be considered as advantageous;
- CAD (CATIA/Enovia) experience would be considered as advantageous;
- IGE-XAO SEE systems experience would be considered as advantageous (SEE Systems Design, SEE Electrical Expert);
- Proficient level in Microsoft office tools (excel, word);
- Good command of English (written and spoken).

## 5 Deliverables

The implementation details of deliverables and priorities of the studies will be agreed between the Contact Persons under each separate Task Order. No element of work or activity shall begin without the prior written notification by the IO in the form of a Task Order.

It is expected that the resource required to fulfill the Task Orders will be equivalent to 3 to 4 Full Time Equivalent (FTE) / year at the ITER site. However, The IO shall be under no obligation to place Task Orders summing up to this estimate.

Task Orders shall be assigned Work Units (WU) according to the types outlined in the tables below. The price of 1 Work Unit shall be the price of the resource type for 1 day (= 8 hours).

*Table 1 - Work Unit Breakdown – Lot 1*

LOT 1	Work Unit Type	Resource Type	Deliverable Description	Work Unit Duration
	Vac_Tech_EU	Vacuum technician	See 3.1.1	1 day = 8 hours
	Vac_Tech_nonEU	Vacuum technician	Vacuum testing performed in IO member state outside of EU	1 day = 8 hours
	Vac_Eng	Vacuum engineer	See 3.1.2	1 day = 8 hours

*Table 2 - Work Unit Breakdown - Lot 2*

LOT 2	Work Unit Type	Resource Type	Deliverable Description	Work Unit Duration
	I&C_Tech	I&C technician	See 3.2.1	1 day = 8 hours
	I&C_Eng	I&C engineer	See 3.2.2	1 day = 8 hours

## 6 Responsibilities

### 6.1 IO

IO is responsible for clearly defining each Task Order, including a description of the deliverables and estimate of the number of work units required to complete them.

### 6.2 Contractor

The Contractor is responsible for providing resources (that meet the required skills and experience defined in Section 4) to achieve the scope and schedule described in the Task Orders.

## 7 Work Location

In order to fulfill the requirements of this Framework Contract it is expected that the Contractor's staff will be based local to ITER and will work at the ITER site, Cadarache, France. For vacuum technicians, some travel to perform tasks at ITER members sites<sup>1</sup> is to be expected.

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<sup>1</sup> India, Korea, Russia, USA, European Union, China

## 8 Contract Duration and Timetable

The contract shall last for 4 years from the date of award, with options to extend yearly twice.

## 9 Quality Assurance (QA) requirement

The Contractor should have ISO 9001 accredited quality system. Otherwise the Contractor shall have QA Program approved by the IO. The general requirements are detailed in [ITER Procurement Quality Requirements \(ITER\\_D\\_22MFG4\)](#).

Prior to commencement of the work, a Quality Plan which complies with [Procurement Requirements for Producing a Quality Plan \(ITER\\_D\\_22MFMW\)](#) shall be submitted to IO for approval with evidence of the above. The Contractor's Quality Plan shall describe the organisation for tasks; roles and responsibilities of workers involved in; any anticipated sub-contractors; and giving details of who are the independent checkers of the activities.

Where any deviation is requested or non-conformity has happened from the Technical Specification, Contractors Deviations and Non Conformities the [ITER Requirements Regarding Contractors Deviations and Non Conformities \(ITER\\_D\\_22F53X\)](#) shall be followed.

Documentation developed as the result of this task shall be retained by the Contractor of the task for a minimum of 5 years and then may be discarded at the direction of the IO.

IO will monitor implementation of the Contract's Quality Plan. Where necessary, IO will assess the adequacy and effectiveness of the quality system specified in the Quality Plan through surveillance or audit. Where condition adverse to quality is found during monitoring, IO may request to the Contractor to take corrective action.

## 10 Safety requirements

ITER is a Nuclear Facility identified in France by the number-INB-174 ("Installation Nucléaire de Base").

For Protection Important Components and in particular Safety Important Class components (SIC), the French Nuclear Regulation must be observed, in application of the Article 14 of the ITER Agreement.

In such case the Suppliers and Subcontractors must be informed that:

- The Order 7th February 2012 applies to all the components important for the protection (PIC) and the activities important for the protection (PIA).
- The compliance with the INB-order must be demonstrated in the chain of external contractors.
- In application of article II.2.5.4 of the Order 7th February 2012, contracted activities for supervision purposes are also subject to a supervision done by the Nuclear Operator.

For the Protection Important Components, structures and systems of the nuclear facility, and Protection Important Activities the contractor shall ensure that a specific management system is implemented for his own activities and for the activities done by any Supplier and Subcontractor following the requirements of the Order 7th February 2012 (Please refer to [ITER\\_D\\_4EUQFL - Overall supervision plan of external interveners chain for Protection Important Components, Structures and Systems and Protection Important Activities](#)).