

Technical Specifications (In-Cash Procurement)

Technical Specification for I&C engineering support for the procurement of electrical, instrumentations, control and software development of TCWS First Plasma System

The purpose of this document is to provide the technical specification for I&C engineering support for the First Plasma TCWS system

Table of Contents

Contents

1. Purpose.....	2
2. Scope.....	2
2.1. Overview	2
3. Definitions	4
4. References.....	4
5. Duration	5
6. Work Location	5
7. Responsibilities.....	5
7.1. IO Responsibilities	5
7.2. Contractor Responsibilities	5
8. List of Deliverables and Due Dates	7
9. Deliverables Acceptance Criteria	8
10. Specific Requirements and Conditions	8
11. Work Monitoring / Meeting Schedule	10
11.1. Kick-off Meeting.....	10
11.2. Progress Reporting	10
12. Quality Assurance (QA) Requirements	10
13. CAD Design Requirements.....	11
14. Safety Requirements	11

1. Purpose

This Specification is for the services of a Senior and Junior Electrical and Instrumentation & Controls Engineers to provide engineering support to the ITER Organization for the procurement of electrical, instrumentation, controls and software components for the First Plasma ITER Tokamak Cooling Water System.

2. Scope

2.1. Overview

The ITER Organization (IO) is actively preparing for the procurement of 1st Plasma TCWS electrical, instrumentation, controls and software components as defined per the document LGA-2019-A-42 Arrangement 4.

The subject of the Arrangement is for the IO to procure, manufacture and test the TCWS First Plasma electrical, instrumentation, control components and the software for the Vacuum Vessel Primary Heat Transfer System (VV PHTS), Draining (DR), Drying (DY) as well as first Plasma scope of IBED Primary Heat Transfer System (IBED PHTS) systems for the USIPO.

A Senior and a junior Electrical and I & C Engineer will assist the IO with the management of the required design updates, will support in drafting the technical specifications, will support the TRO (Technical Responsible Officer) in the tenders preparation, will provide support to answer manufacturers' and vendors' inquiries and clarify any questions during tendering. The senior and junior engineers will also provide support in the manufacturing contracts.

The IO is required to develop and prepare the engineering packages for Tender and delivery that define and describe the corresponding scope of work to be provided by the Senior Electrical and junior I & C Engineer.

TCWS requires engineering support to assist with all aspects of the preparation for procurement.

This includes:

- The updating of the electrical and I & C 1st Plasma design documentation to incorporate additions and modifications to the design since FDR.
- Assistance to the TRO in the preparation of the technical specifications required for motor control systems, instrumentation, I & C cubicles and control system software.
- Assisting the TRO (Technical Responsible Officer) and PRO (Procurement Responsible Officer) in market surveys and recommendation of manufacturers and vendors
- Providing expertise during technical evaluation of the procurement bids

- Providing support to answer manufacturers' and vendors' inquiries and clarify any questions regarding the scope of supply.
- To define, schedule, oversee and evaluate FATs as required.
- To maintain and update the project procurement schedule.
- Technical support for procurement planning.
- To review documents and drawings received for manufacturing approval, providing comments and constructive criticism in writing.
- To participate in Design Reviews on the specific written request of the TRO preparing and submitting comments as necessary.
- The oversight and support of manufacturing activities, including the assessment of alternative designs and design optimizations;

All work shall be output and recorded as Deliverables, comprising documents submitted by the Contractor for IO approval, the format agreed based on information availability and the specific purpose/scope of the Deliverable requested.

In the event that sufficient input information is not available, or as a consequence of re-prioritization of scope, substitution of Deliverables may be agreed; with any changes regarding content, timing, or format of Deliverables being recorded on Monthly Progress Meeting minutes, signed by both the Contractor Responsible (C-R) and the IO Task Responsible Officer (TRO) or delegated Responsible Officer (RO).

3. Definitions

Abbreviation	Definition
C-R	Contractor Responsible Officer
CAD	Computer Aided Design
CHWS	Chilled Water System
CCWS	Component Cooling Water System(s)
CMA	Construction Manager as Agent
CODAC	Control, Data Access and Communication
DA	Domestic Agency
DCIF	Design Collaboration Implementation Form
DO	Design Office (IO)
DR	Draining System
DY	Drying System
EWP	Engineering Work Package
H & CD	Heating and Current Drive
I & C	Instrumentation and Controls
I2P	Instruction to Proceed
IDM	ITER Document Management (system)
IO	ITER Organization
PBS	Plant Breakdown Structure
PRO	Procurement Responsible Officer
QA	Quality Assurance
RO	Responsible Officer (IO)
SQEP	Suitably Qualified and Experienced Personnel
TCWS	Tokamak Cooling Water System
TRO	Task Responsible Officer (IO)
VV PHTS	Vacuum Vessel Primary Heat Transfer System
WBS	Work Breakdown Structure

For a complete list of ITER abbreviations see: [ITER Abbreviations \(2MU6W5\)](#).

4. References

- [1] [Internal Regulations \(27WDZW v2.2\)](#)
- [2] [In-Cash Procurement Technical and Management Documentation Exchange and Storage Working Instruction \(G8UMB3 v3.0\)](#)
- [3] [ITER Procurement Quality Requirements \(22MFG4 v5.0\)](#)
- [4] [Requirements for Producing a Quality Plan \(22MFMW v4.0\)](#)
- [5] [Quality Assurance for ITER Safety Codes Procedure \(258LKL v2.2\)](#)

5. Duration

The duration shall be for 12 months (a maximum of 220 working days) from the starting date, defined by the Contract.

6. Work Location

The Contractor's personnel can provide support to the IO from a remote location. The Contractor's personnel can be located off site. If the personnel is located off site, cost associated to any request from IO for presence on IO site shall be the responsibility of the IO.

In regard to the tasks to be performed, please refer to Section 2.1 and Section 8.

7. Responsibilities

7.1. IO Responsibilities

The IO shall appoint a TRO for the Contract, who will be the point of contact for all technical matters, and a Procurement Responsible Officer (PRO) for all contractual and commercial matters. The TRO shall organize a Monthly Meeting with the Contractor on work performed. The contractor shall participate in this meeting remotely.

In addition, IO shall provide:

- Access to IDM and other software required to fulfil specified functions;
- Access to requirements documents, presentations and other information explaining installation concepts on which current schedules are based (where available).
- Access to IO design and design review information and reports as available/requested.
- Any input information needed by the Contractor for the production of the various Deliverables.
- The IO shall assume the cost for any required travel to the ITER site (if personnel is not located at ITER site) or to manufacturing or vendor facilities by the contractor personal.

7.2. Contractor Responsibilities

The Contractor shall:

- Appoint a TRO for the Contract, who will be the point of contact for all technical matters, and a C-R for all matters related to this Contract.
- Appoint an operational point of contact for the management of the Deliverables.

- Provide suitably experienced and trained Engineers to complete all aspects of Deliverables and associated documentation.
- Strictly implement the IO procedures, instructions and use IO templates, where provided.
- Organize work in an efficient way according to the workload and monthly commitments and objectives.
- Report to the TRO any issues during the performance of the Contract which require IO intervention or decision including potential delays in the submission of Deliverables;
- Provide monthly reports, minutes of meetings, records of decisions and other Deliverables as required in section 8.
- Contractor's personnel shall be bound by the rules and regulations governing the IO ethics, safety and security (see ref [2] - Internal Regulations (27WDZW v2.2)).

8. List of Deliverables and Due Dates

The deliverables for this task are:

- Minutes of monthly progress meetings, to be submitted 2 days after the monthly progress meeting. The kick-off meeting shall be considered as the first monthly progress meeting.
- Monthly reports describing the work done on activities mentioned in 2.1 and 7.2 or alternatives as agreed in advance in writing by TRO.

The monthly report shall:

- Be submitted monthly, starting one month after the kick-off of the contract.
- Summarize the activities completed in the month concerned including:

Deliverable Ref.	Deliverable Description	Due Date
D1	Quality Plan (if applicable) Minutes of kick-off meeting Monthly report including links to the deliverables completed in the previous month.	T0 + 1
D2	Minutes of monthly progress meeting. Monthly report including links to the deliverables completed in the previous month.	T0 + 2
D3	Minutes of monthly progress meeting. Monthly report including links to the deliverables completed in the previous month.	T0 + 3
D4	Minutes of monthly progress meeting. Monthly report including links to the deliverables completed in the previous month.	T0 + 4
D5	Minutes of monthly progress meeting. Monthly report including links to the deliverables completed in the previous month.	T0 + 5
D6	Minutes of monthly progress meeting. Monthly report including links to the deliverables completed in the previous month.	T0 + 6
D6	Minutes of monthly progress meeting. Monthly report including links to the deliverables completed in the previous month.	T0 + 7
D8	Minutes of monthly progress meeting. Monthly report including links to the deliverables completed in the previous month.	T0 + 8
D9	Minutes of monthly progress meeting. Monthly report including links to the deliverables completed in the previous month.	T0 + 9
D10	Minutes of monthly progress meeting. Monthly report including links to the deliverables completed in the previous month.	T0 + 10

D11	Minutes of monthly progress meeting. Monthly report including links to the deliverables completed in the previous month.	T0 + 11
D12	Minutes of monthly progress meeting. Monthly report including links to the deliverables completed in the previous month.	T0 + 12

9. Deliverables Acceptance Criteria

Deliverables shall be submitted in accordance with [3] [In-Cash Procurement Technical and Management Documentation Exchange and Storage Working Instruction \(G8UMB3 v3.0\)](#)

The following criteria shall be the basis of the acceptance of the successful accomplishment of the work:

- **Delivery Date Criteria**

On-time delivery of Deliverables according to the dates provisionally defined in Section 8.

- **Report and Document Review Criteria**

Reports and Deliverables shall be stored in the ITER Organization's document management system, IDM, by the Contractor for acceptance. A named ITER Organization's TRO is the Approver of the delivered documents. The Approver can nominate or delegate one or more Reviewers(s) in the area of the Deliverable's expertise. The Reviewer(s) may ask for modifications to be made to the report in which case the Contractor must submit a new version.

The acceptance by the Approver is an acceptance criterion for completion of a Deliverable.

10. Specific Requirements and Conditions

The work will require one senior and one junior qualified Engineer with suitable proven technical skills commensurate with the work scope of this Specification. It is the responsibility of the Contractor to ensure that work is performed by Suitably Qualified and Experienced Personnel (SQEP) and the suitability of Contractor resources shall be demonstrated by the Contractor in any proposals.

The following general requirements are applicable:

- The working language of the project is English, and all contributors are expected to be able to communicate clearly and effectively – both orally and in writing;
- Experience in international projects.

- Proficient command of the Microsoft Office packages.
- Experience in Tender package compilation and procurement.
- Prior knowledge of and experience on the ITER project.

The following specific requirements apply for the Engineers to be provided:

Senior Electrical and I&C Engineer

- Bachelor's degree in Electrical Engineering.
- At least 20 years of experience in the design, specification, software development, procurement, installation and commissioning of PLC, DCS and HMI control systems, instrumentation, motor control systems and power distribution for water cooling systems, nuclear plants, manufacturing facilities, utilities, steel mills, air pollution control installations and OEM equipment.
- At least 20 years of professional experience in preparing technical specifications and documentation associated with procurement, tendering and contract administration for complex construction contracts.
- Experience with the ITER project, its procedures, document management system, etc.
- Successful execution of multiple water cooling system projects.
- A strong technical background in electrical and mechanical engineering with effective problem solving and negotiation skills.
- Proven ability to identify improvements, resolve issues, and produce clear documentation.
- Experience on the TCWS design and in particular with the electrical and I&C part will be considered as a plus.

Junior I&C Engineer

- Bachelor's degree in Electrical Engineering.
- Over five (5) years of experience in the design and specification of PLC, DCS and HMI control systems and instrumentation.
- Proven ability to identify improvements, resolve issues, and produce clear documentation.
- Experience with water cooling systems.

11. Work Monitoring / Meeting Schedule

11.1. Kick-off Meeting

A Kick-off Meeting shall be arranged by the TRO approximately one week after the commencement of the Contract for the purpose of confirming background documentation, plans, schedules, and design data defining the work. All of the resources appointed at that time, plus the C-R (if separate), shall be required to attend. Attendance may be over a remote connection.

The record of Kick-off Meeting minutes shall be submitted by the Contractor as a Deliverable.

11.2. Progress Reporting

Personnel in charge of preparing the Deliverables will be expected to attend Monthly Progress Meetings (can be done remotely).

Monthly Progress Meetings will be arranged by the TRO.

The main purpose of the Progress Meetings between the ITER Organization/CST Department and the Contractor is to:

- Review the completed activities and assess the progress made;
- Permit fast and consensual resolution of unexpected problems;
- Agree to the specific tasks and corresponding deliverables to be completed in the month ahead;
- Review the technical issues and opportunities
- Clarify misinterpretations and prevent misconceptions of the technical specifications.

Monthly reports shall be submitted by the Contractor for IO approval. Monthly Reports are to include a break-down of Deliverables, Contractor activities and actual / potential issues.

The record of Progress Meeting minutes shall be submitted by the Contractor as Deliverables.

12. Quality Assurance (QA) Requirements

The organization conducting these activities should have an ITER approved QA Program or an ISO 9001 accredited quality system. Alternatively the contractor may opt to follow the IO QA processes. In this case, the requirement to prepare a Quality Plan is not applicable. Specific training shall be provided by IO.

The general requirements are detailed in [4] [ITER Procurement Quality Requirements \(22MFG4 v5.0\)](#).

Prior to commencement of the Contract, a Quality Plan (where applicable) must be submitted for IO approval giving evidence of the above and describing the organisation for the Contract. The skill and experience of workers involved in the

study; any anticipated sub-contractors; and giving details of who will be the independent checker of the activities, if required - see [5] [Requirements for Producing a Quality Plan \(22MFMW v4.0\)](#).

Documentation developed as the result of this Contract shall be retained by the Contractor for a minimum of 5 years and then may be discarded at the direction of the IO. The use of computer software to perform a safety basis activity such as analysis and/or modelling, etc. shall be reviewed and approved by the IO prior to its use, in accordance with [6] [Quality Assurance for ITER Safety Codes Procedure \(258LKL v2.2\)](#).

13. CAD Design Requirements

The Contractor shall ensure that all designs, CAD data and drawings delivered to IO comply with the [7] [Procedure for the Usage of the ITER CAD Manual \(2F6FTX v1.1\)](#), and with the [8] [Procedure for the CAD management plan \(2DWU2M v2.0\)](#).

14. Safety Requirements

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

For Protection Important Components (PIC) 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 cases, the Suppliers and Sub-contractors 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) – refer [11] [Order dated 7 February 2012 relating to the general technical regulations applicable to INB - EN \(7M2YKF\)](#).
- 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.