

## Technical Specifications (In-Cash Procurement)

# Mechanical engineering for diagnostics in buildings

CFE for:

The objective of this engineering contract is to provide the mechanical engineering expertise for design and engineering justification of distributed diagnostic systems located in different areas in tokamak buildings. The designs have to be justified and agreed between all involved stakeholders, and then documented.

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## 1 Purpose

The objective of this engineering contract is to provide the mechanical engineering expertise for design and engineering justification of distributed diagnostic systems located in different areas in tokamak buildings. The designs have to be justified and agreed between all involved stakeholders, and then documented.

## 2 Scope

The work involves the support the ITER Diagnostic Team in the mechanical engineering expertise for design and engineering justification of distributed diagnostic systems located in different areas in tokamak buildings.

Many diagnostics in PBS 55 shall be integrated into buildings infrastructure, which hold these diagnostics in place. The diagnostic systems have to be supported and connected to the services to ensure functionality. At the same time, integration of distributed diagnostic systems shall be coherent with other ITER systems. Also, 3D and 2D mechanical design and integration shall ensure their accessibility and maintainability. The designs have to be justified and agreed between all involved stakeholders, and then documented.

## 3 Definitions

IO: ITER Organization

DA: Domestic Agency

FDR: Final Design Review

SRD: System Requirements Document

S-SRD: Sub-System Requirements Document

IO-TRO: ITER Organization technical Responsible Officer

ICD: Interface Control Document

IS: Interface Sheet

PA: Procurement Arrangement

PBS: Plant Breakdown Structure

PDR: Preliminary Design Review

PR: Project Requirements

For a complete list of ITER abbreviations see: [ITER Abbreviations \(ITER\\_D\\_2MU6W5\)](#).

## 4 References

Links inserted in text.

## 5 Estimated Duration

The duration shall be for 12 months from the starting date of the contract. Services are to be provided either at 40% time at the IO work site and 60% near site. No provisions for travel to DAs or industrial partners are necessary.

## 6 Work Description

The work involves technical expertise in mechanical engineering for design and engineering justification of distributed diagnostic systems located in different areas in tokamak buildings. The diagnostic projects are in the various design development phase but the designs of their supports in buildings are a priority in the project, especially those for the First Plasma or captive.

The 3D drawings, 2D detailed and as-built drawings shall also be prepared for manufacturing activities of diagnostic supports located in ITER buildings.

Mechanical engineering/ CAD design services are required to prepare for all related Design Reviews scheduled in 2022 and 2023 with respect to mechanical designs in CAD, EWPs, CPDs, BOIs and manufacturing/ detailed drawings for diagnostic systems integrated in the buildings.

## 7 Responsibilities

### 7.1 Contractor's Responsibilities

In order to successfully perform the tasks in this Technical Specification, the Contractor shall:

- Strictly implement the IO procedures, instructions and use templates;
- Provide experienced and trained resources to perform the tasks;
- Contractor's personnel shall possess the qualifications, professional competence and experience to carry out services in accordance with IO rules and procedures;
- Contractor's personnel shall be bound by the rules and regulations governing the IO ethics, safety and security IO rules.

### 7.2 IO's Responsibilities

The IO shall:

- IO shall assign one technical IO representative (TRO), to work as the Contractor interface for the contract;
- The TRO will work directly with contractor staff to define and clarify work;
- The TRO will assess the performance and quality of the work;
- The TRO shall be responsible for checking the deliverables against requirements, schedule the processes;
- IO shall make available to the Contractor all technical data and documents which the Contractor requires to carry out its obligations pursuant to this specification in a timely manner. Generally, data will be available in IDM for documentation and ENOVIA for CAD models. Contractor personnel will be given access as required to these databases.

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## 8 List of Deliverables and due dates

The main deliverables are provided in the Table below.

D #	Description	Due Dates
D01	Provide mechanical engineering/ CAD design support, as well as production of 2D detailed drawings for the PDR and FDR preparation scheduled in Q3-2022 of the IO diagnostics located in buildings, including keeping track of related documentation to be produced for these Design Reviews. This includes organization of meetings, interfacing with ROs and sending reminder notes to follow up on Chits.	T0 + 1 months
D02	Provide mechanical engineering/ CAD design support, as well as production of 2D detailed drawings for the PDR and FDR preparation scheduled in Q4-2022 of the IO diagnostics located in buildings, including keeping track of related documentation to be produced for these Design Reviews. This includes organization of meetings, interfacing with ROs and sending reminder notes to follow up on Chits.	T0 + 4 months
D03	Provide mechanical engineering/ CAD design support, as well as production of 2D detailed drawings for the PDR and FDR preparation scheduled in Q1-2023 of the IO diagnostics located in buildings, including keeping track of related documentation to be produced for these Design Reviews. This includes organization of meetings, interfacing with ROs and sending reminder notes to follow up on Chits.	T0 + 7 months
D04	Provide mechanical engineering/ CAD design support, as well as production of 2D detailed drawings for the PDR and FDR preparation scheduled in Q2-2023 of the IO diagnostics located in buildings, including keeping track of related documentation to be produced for these Design Reviews. This includes organization of meetings, interfacing with ROs and sending reminder notes to follow up on Chits.	T0 + 10 months
D05	Provide mechanical engineering/ CAD design support, as well as production of 2D detailed drawings for the PDR and FDR preparation scheduled in Q3-2023 of the IO diagnostics located in buildings, including keeping track of related documentation to be produced for these Design Reviews. This includes organization of meetings, interfacing with ROs and sending reminder notes to follow up on Chits.	T0 + 12 months

## 9 Acceptance Criteria

The deliverables will be posted in the Contractor's dedicated folder in IDM, and the acceptance by the IO will be recorded by their approval by the designated IO TRO. These criteria shall be the basis of acceptance by IO following the successful completion of the services. These will be in the form of reports as indicated in Section 8, Table of deliverables.

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## 10 Specific requirements and conditions

- Experience in 3D mechanical design using ENOVIA/ CATIA v5;
- Experience relevant to all techniques in deliverables list;
- Experience in creation and interpretation of 2D detailed, as-built and manufacturing drawings;
- Monitoring and reporting of status of projects;
- Generation of technical and administrative documents;
- Communication with international local and remote teams in context of nuclear fusion; research or similarly complex research and engineering environment;
- Organization, taking minutes and action tracking of international meetings;
- Understanding of 2D schematics like P&ID, SLD etc.

## 11 Work Monitoring / Meeting Schedule

Work is monitored through quarterly reports (see List of Deliverables section) and at monthly project meetings for each of the four projects.

## 12 Delivery time breakdown

See Section 8 “List Deliverables section and due dates”.

## 13 Quality Assurance (QA) requirements

The organisation conducting these activities should have an ITER approved QA Program or an ISO 9001 accredited quality system.

The general requirements are detailed in [ITER Procurement Quality Requirements \(ITER\\_D\\_22MFG4\)](#).

Prior to commencement of the task, a Quality Plan must be submitted for IO approval giving evidence of the above and describing the organisation for this task; the skill of workers involved in the study; any anticipated sub-contractors; and giving details of who will be the independent checker of the activities (see [Procurement Requirements for Producing a Quality Plan \(ITER\\_D\\_22MFMW\)](#)).

Documentation developed as the result of this task shall be retained by the performer of the task or the DA organization 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 task activity such as analysis and/or modelling, etc. shall be reviewed and approved by the IO prior to its use, in accordance with [Software qualification policy \(ITER\\_D\\_KTU8HH\)](#).

## 14 CAD Design Requirements (if applicable)

For the contracts where CAD design tasks are involved, the following shall apply:

The Supplier shall provide a Design Plan to be approved by the IO. Such plan shall identify all design activities and design deliverables to be provided by the Contractor as part of the contract.

The Supplier shall ensure that all designs, CAD data and drawings delivered to IO comply with the Procedure for the Usage of the ITER CAD Manual ([2F6FTX](#)), and with the Procedure for the Management of CAD Work & CAD Data (Models and Drawings [2DWU2M](#)).

The reference scheme is for the Supplier to work in a fully synchronous manner on the ITER CAD platform (see detailed information about synchronous collaboration in the ITER [GNJX6A](#) - Specification for CAD data production in ITER Contracts.). This implies the usage

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of the CAD software versions as indicated in CAD Manual 07 - CAD Fact Sheet ([249WUL](#)) and the connection to one of the ITER project CAD data-bases. Any deviation against this requirement shall be defined in a Design Collaboration Implementation Form (DCIF) prepared and approved by DO and included in the call-for-tender package. Any cost or labour resulting from a deviation or non-conformance of the Supplier with regards to the CAD collaboration requirement shall be incurred by the Supplier.

## 15 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 ([PRELIMINARY ANALYSIS OF THE IMPACT OF THE INB ORDER - 7TH FEBRUARY 2012 \(AW6JSB v1.0\)](#)).

Compliance with flowed down defined requirements in [SRD-55 \(Diagnostics\) from DOORS \(28B39L v5.5\)](#) is mandatory.

This task is PIA.