

Technical Specifications (In-Cash Procurement)

Development of interfaces, mechanical design and compact EM shutter for 55.GE

CFE for:

This document describes technical needs in support of the Divertor Flow Monitor, PBS 55.GE. The system will be installed in Equatorial Port 8 and will measure the ELM bursts, L-H transition and plasma flows in the divertor.

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1 Purpose

This document describes technical needs in support of the Divertor Flow Monitor, PBS 55.GE. The system will be installed in Equatorial Port 8 and will measure the ELM bursts, L-H transition and plasma flows in the divertor.

2 Scope

This contract involves the development of the interfaces and the mechanical design of 55.GE, as well as the support to R&D of the EM shutter for 55.GE.

Part of this work is required due to integration of the Disruption Mitigation System (DMS) in equatorial port 8. The integration of the DMS required some changes of the opto-mechanical layout of 55.GE. This is associated with the update of the interfaces with the support structure of the diagnostic port. Additionally, the integration of the DMS reduced the volume available within the port. This prohibits the use of a 'standard' pneumatically driven diagnostic shutter (which features a rather large valve actuation system in the port cell) and requires new development of a more compact electro-magnetic shutter. In addition to work on interfaces and mechanical design, the contractor will support the coordination of the 55.GE EM shutter test program and will support the structural validation of 55.GE components.

The scope of the work is detailed further in Section 5.

3 Definitions

For a complete list of ITER abbreviations see: [ITER Abbreviations \(ITER_D_2MU6W5\)](#).

4 Duration

The duration shall be for 12 months. Services shall be provided 40% at the IO work site (if necessary, this can be revised in mutual agreement with the contractor during the execution of the contract, and the consequent amendment of the contract).

5 Work Description

The contractor shall perform the following tasks:

- (1) Develop further the mechanical interfaces of 55.GE;
- (2) Take lead role in the execution of the test program for the EM shutter and draw conclusions and recommendations for the 55.GE PDR;
- (3) Finalize the preliminary design of the mechanical components of 55.GE inside the port plug;
- (4) Coordinate the design justification (i.e. thermal, EM, structural) analyses for 55.GE
- (5) Support the Preliminary Design Review of 55.GE;
- (6) Support the closure of the 55.GE PDR and the preparation of the Final Design;
- (7) Support review of technical documents on IO IDM;
- (8) Support creation of Engineering Work Packages;

The progress on each of these tasks will be summarized in a Progress Report. Each progress report constitutes a deliverable (D1-D6) and will include a report on progress on one or more tasks.

This work involves many areas for which the Contractor will be requested to generate technical documents:

- Meeting notes for IO meetings called by interfacing systems and review bodies;
- Technical specifications for shutter tests and other prototyping activities;
- Interface sheets;
- Assembly procedures;
- Technical input documents and presentations for design review, interface review meetings, port integration meetings, etc.;
- Chit resolution reports from design reviews;

Where necessary, the contract shall collect the required input information by interacting proactively with IO staff and contractors.

6 Responsibilities

6.1 Contractor’s Responsibilities

In order to successfully perform the tasks in these Technical Specifications, 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.

6.2 IO’s Responsibilities

The IO shall:

- Nominate the Contract Responsible Officer (CRO) to manage the Contract;
- Organise regular meeting(s) on work performed;
- Provide offices at IO premises.

7 List of Deliverables and due dates

D1	Progress report #1 on tasks defined in section 5	T0 + 2 months
D2	Progress report #2 on tasks defined in section 5	T0 + 4 months

D3	Progress report #3 on tasks defined in section 5	T0 + 6 months
D4	Progress report #4 on tasks defined in section 5	T0 + 8 months
D5	Progress report #5 on tasks defined in section 5	T0 + 10 months
D6	Progress report #6 on tasks defined in section 5	T0 + 12 months

T0 represents the contract Kick-Off Meeting date.

8 Acceptance Criteria

These criteria shall be the basis of acceptance by IO following the successful completion of the services:

- The deliverables will be in the form of reports as indicated in section **Error! Reference source not found.** "List of Deliverables and due dates".
- The deliverables will be posted in the Contractor's dedicated folder in the ITER Organization's document management system IDM.
- The CRO for the contract is the Approver of the delivered documents.
- The CRO can ask modifications to the report in which case the Contractor must submit a new version.

The acceptance of the document by the Approver is the acceptance criterion.

9 Specific requirements and conditions

- The contractor shall be experienced in mechanical design of complex scientific instruments. It is also considered beneficial to have a good knowledge of optical transfer systems;
- The contractor shall have good knowledge of CATIA;
- The contractor shall have experience in electromagnetic actuation systems;
- The contractor shall have experience in preparation of technical document and engineering work packages;
- The contractor shall have experience with design justification (thermal, structural, etc.) using e.g. ANSYS or similar software;
- The contractor shall be able to work independently with minimum supervision to achieve the objectives and deliverables specified in this technical specification;

10 Work Monitoring / Meeting Schedule

The work will be managed by means of Progress Meetings and through the formal exchange of documents and transmitted by emails which provide detailed progress.

Progress Meetings will be called by the ITER Organization. They will be held as needed and at least bi-monthly, either on the IO site or via videoconference. External experts will be invited to discuss technical matters. Kick-Off Meeting will be organized by IO within two weeks from the contract signature.

11 Delivery time breakdown

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

12 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 [Quality Assurance for ITER Safety Codes \(ITER_D_258LKL\)](#).

13 CAD Design Requirements

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 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.

14 Safety requirements

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

Compliance with Defined requirements for PBS 55 - Diagnostics (NPEVB6 v2.0) or its flowed down requirements in SRD-55 (Diagnostics) from DOORS (28B39L v5.2) is mandatory.