

Technical Specifications (In-Cash Procurement)

Common Engineering Support for Equatorial Port #08 and #17 with Disruption Mitigation System

CFE: -

This technical specification is to perform common engineering support tasks induced by Disruption Mitigation System (DMS) impact on Equatorial Port (EP) #08 and EP#17. The purpose is to support the development and integration of EP#08 and EP#17 with DMS, by fulfilling the tasks below: To support DMS and diagnostic tenants integration in EP#8 and #17; To support port integration team in technical documentation production including assembly and construction documentation packages.

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1 Purpose

This technical specification is to perform common engineering support tasks induced by Disruption Mitigation System (DMS) impact on Equatorial Port (EP) #08 and EP#17. The purpose is to support the development and integration of EP#08 and EP#17 with DMS, by fulfilling the tasks below:

- To support DMS and diagnostic tenants integration in EP#8 and #17;
- To support port integration team in technical documentation production including assembly and construction documentation packages.

2 Scope

The work is to support port integration team in the production of technical documents for Equatorial Ports with DMS.

3 Definitions

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

Acronym	Meaning
ALARA	As Low As Reasonably Achievable
CAD	Computer Aided Design
CPD	Construction Process Descriptions
CWP	Construction Work Package
EWP	Engineering Work Package
HoF	Human Organizational Factor
HFE	Human Factors and Ergonomics
DDD	System Design Description Document
DET	Data Exchange Transfer
DFW	Diagnostic First Wall
DIR	Design Integration Review
DSM	Diagnostic Shielding Module
FDR	Final Design Review
EP	Equatorial port
FDR	Final Design Review
FP	First Plasma
HIRA	Hazard Identification and Risk Assessment
ORE	Occupational Radiation Exposure
PCSS	Port Cell Support Structure
PDR	Preliminary Design Review
PFPO-1	Pre-Fusion Plasma Operation 1
PP	Port Plug
ISS	Interspace Support Structure
SDDR	Shutdown Dose Rate
SIC	Structural Integrity Component
RO	Responsible Officer
PIA	Protection Important Activity

4 References

- [1] [ITER_D_E6CNFY](#) –55.Q8 System Design Description for Equatorial Port #08.
- [2] 55.QH System Design Description for Equatorial Port #17
- [3] ITER_D_WYX9XK – s-SRD 55.Q8
- [4] ITER_D_WYWY88 – s-SRD 55.QH
- [5] ITER_D_NPEVB6 Defined requirements for PBS 55 - Diagnostics
- [6] ITER_D_RZJ4LM– PBS-55 Document Production Plan
- [7] Safe Access for Maintainability [ITER_D_RUGWUK](#)
- [8] Quality Assurance for ITER Safety Codes ([ITER_D_258LKL](#))
- [9] ITER_D_QUK6LF - ITER Human & Organizational Factors Policy
- [10] ITER_D_2MU6W5 ITER Abbreviations
- [11] ITER_D_KTU8HH Software Qualification Policy
- [12] ITER_D_2EXFXU - Sign-Off Authority for Project Documents

5 Estimated Duration

The overall duration of this work is 12 months (60% off-site and 40% on-site).

6 Work description

Port integration common engineering support comprises

- Follow up on DMS and diagnostics mechanical integration in EP#8 and #17;
- support of re-integration of diagnostic systems caused by DMS development;
- preparation of technical documentation and presentations for design and integration reviews.

The scope of the work is limited by EP#08 (Fig.1) and EP#17. It comprises Port Plug (PP), closure plate, Interspace and Port Cell areas of both ports.

6.1 Introduction

EP #08 is partially First Plasma (FP) system. The FP EP#08 configuration includes the Interspace Support Structure (ISS), Port Cell Support Structure (PCSS) and all necessary services (cables, gas, vacuum). In FP configuration, only two diagnostics tenant systems will be installed. After the FP operation EP#08 will be upgraded to Pre-Fusion Plasma Operation-1 (PFPO-1) configuration, which includes fully assembled and tested PP and fully assembled ISS and PCSS. This configuration is planned to remain until ITER decommissioning. More details on EP#08 system including list of tenants can be found in the respective Design Description Document, [1]. The second system, EP#17 is for PFPO-1; similar to EP#08, it is supposed to be operational until ITER decommissioning. Details on EP#17 are in [2].

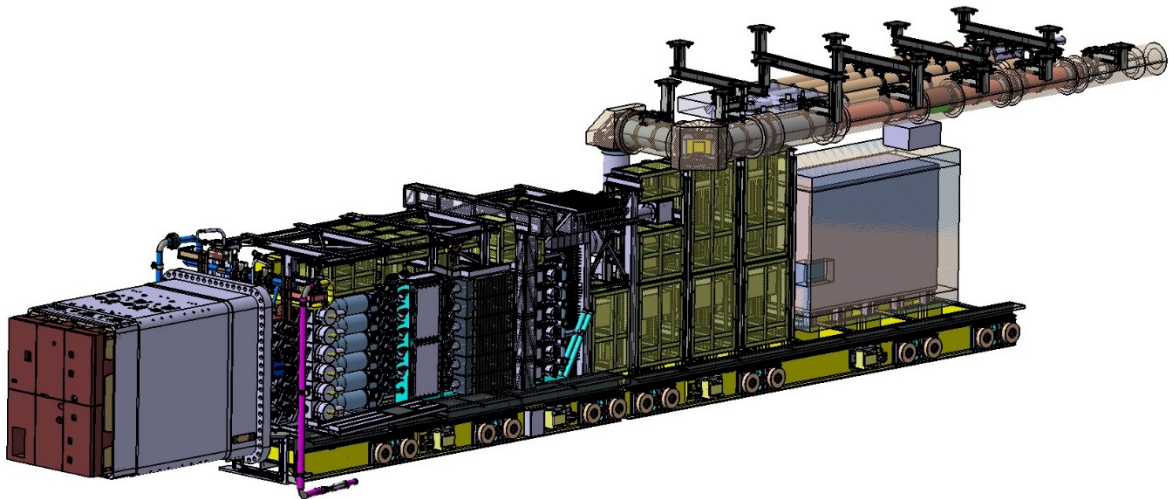


Figure 1. Equatorial Port #08 integrated at FDR-1 level (2021 Q3).

6.2 Common engineering support

The objective is to continuously support integration of the IO ports with DMS. The list of main activities expected to be performed is

- To support DMS and diagnostic tenants integration in EP#8 and #17;
- To support port integration Responsible Officer (RO) to follow up DMS and diagnostic tenant development progress by means of organization of progress meetings, preparation of the agenda and minutes, presentations, etc;
- To support port integration RO and port integration mechanical engineers to provide electrical, gas and liquid services to DMS;
- To support port integration RO in preparation and review of the technical documentation related to DMS and diagnostic tenants port integration using PLM and IDM if appropriate;
- To response to DMS and tenants requests timely by liaising with port integration mechanical engineers, core CAD team, interface engineers and port integration RO;
- To follow up port integration progress and support in preparation of the port Model Approval Meetings (MAM).
- To support port integration RO in organization and closure of the design reviews, namely PDR closure for EP#17, FDRs for EP#08 and its closure;
- To support port integration RO in Occupational Radiation Exposure (ORE) assessment tasks for ports with DMS;
- To contribute into Construction Process Descriptions of Equatorial Ports with DMS;
- Follow up thermal and structural analysis assessments;
- Support of maintenance operations development in the ISS and PCSS areas including area in between closure plate and ISS;
- Support of the development of human occupational factor analysis;

The integration of EP#08 and EP#17 shall comply with 55.Q8 and 55.QH requirements ([3], [4]), which includes defined requirements [5]. In order to give a view, some of general requirements (but not limited to) are listed below:

The integrated port shall demonstrate structural integrity.

The integration solutions shall be acceptable to tenant systems.

The integrated port and its systems shall meet RH requirements.

The integrated port and its systems shall comply with inspection and maintenance requirements.

The integrated port shall demonstrate ALARA neutron leakage.

The integrated port shall demonstrate ALARA SDDR in the port cell area.

The port systems shall be integrated taking into account results of human organizational factor and ergonomics assessment.

6.3 Engineering documentation

Some of the engineering documents (but not limited to) expected to be updated/prepared is below

- Update of System Design Description document (DDD);
- Update functional analysis reports;
- Support in updating of the interface documentation, namely Interface Control Documents (ICD) and Interface Sheets (IS);
- Prepare system classification documents;
- Support in preparation of ORE calculation notes;
- Support in creation of Engineering and Construction Work Packages (EWP, CWP);
- Support in creation of Construction Process Descriptions (CPD);
- Support in creation of assembly related documents and work packages;
- Preparation of presentations for design reviews and design integration reviews (DIR);
- Other documents as per DPP [6];
- Support in preparation of HOP for the integrated ports design reviews.

7 Responsibilities

7.1 Contractor's obligations

The Contractor shall ensure that he complies with the provisions of the Framework Contract in particular with the following:

- The Contractor shall guaranty that all input information provided to perform the task remain property of IO and shall not be used for any other activity than the one specified in this specification.
- The Contractor shall be in charge of the training & coaching of all its resources.
- The contractor shall provide an organization suitable to perform the work as described in this specification;
- The contractor shall work in accordance with the QA plan approved by IO;
- The contractor shall perform the activities accordingly to this specification taking into account all relevant additional documents and IO processes into account (hand books, export control, intellectual properties, ...); The Contractor shall be responsible to

produce and manage, using the ITER software platform, all the documents listed in chapter 11.

- The Contractor shall provide to the IO representative full access to its work premises and related documentation, to permit to follow up the progress of the work

Prior to the start of work on each activity, the Contractor shall review the input technical information provided to it by IO for completeness and consistency, and shall advise the IO representative of any deficiencies it may find. The contractor shall not be responsible for errors in the input technical information which could not be reasonably detected during such review; duration of this review will be agreed between Contractor and IO representative and will have no impact on the delivery schedule.

7.2 Obligations of the ITER Organization

The ITER Organization shall make available all data and information necessary to perform the activities specified in the present document.

- IO procedures required to achieve the activities according to ITER quality and safety rules;
- Information on diagnostic design and requirements for the development of the window assembly design.

The ITER Organization shall give the possibility to the contractor to review documents on the ITER documents database (IDM).

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. For delays of more than two weeks in making them available, the Contractor shall advise IO representative of the potential impact on the delivery of the Work Packages, to agree and define all the correction actions to take in place.

8 List of deliverables and due dates

N°	Target date (months)	Deliverable description
D1	T0+4	Preparation of interface documents (interface sheets, interface control documents) and engineering justification documentation (where interfaces are design drivers) for Equatorial Ports with DMS. Upload them in the IDM for review and approval. Prepare and follow up Input Package (List of Documents) for Design Reviews of Equatorial Ports with DMS. Prepare EWP and CWP related documents. Prepare relevant presentations for the Design Reviews to be held in 2022 Q1 and Q2.
D2	T0+8	Preparation of advanced interface documents (interface sheets, interface control documents) for Equatorial Ports with DMS in preparation for the Port Integration Design Reviews to be held in 2022 Q3 and Q4. Prepare relevant presentations for the Design Reviews. Prepare assembly documentation (scope document, storage and preservation document, list of the drawings, etc) as per request. Prepare ORE calculation technical notes for Equatorial Port #08 ports

		with DMS. Contribute into creation of CPDs for Equatorial Ports with DMS. Upload them in the IDM for review, follow-up and approval.
D3	T0+12	Prepare minutes of the progress meetings with DMS and diagnostic tenants and upload them in IDM. Update documents from Design Review input package as per reviewer's comment. Prepare ORE calculation technical notes for Equatorial Port #17 with DMS. Preparation of advanced interface documents (interface sheets, interface control documents) for Equatorial Ports with DMS for the Port Integration Design Reviews to be held in 2023 Q1. Prepare CPDs for Equatorial Ports with DMS. Upload them in IDM for review and approval.

9 Acceptance Criteria

The reports submitted via IDM will be always reviewed by technical experts of PBS55 nominated by the IO-TRO and by other relevant IO experts where applicable. Revision can be delegated upon consideration of the respective nominees. The reviewers and approver of the technical documents shall be coherent with [12].

The memos submitted via IDM by the Contractor are for general information. No revision nor approval processes are required.

10 Specific requirements and conditions

The Contractor shall have and maintain the necessary equipment and licenses to run the software tools required to carry out the tasks and produce the deliverables in accordance with the tools adopted by the IO. The Contractor shall ensure that experts are adequately supported and equipped. It shall ensure that there is sufficient administrative, secretarial and interpreting provision to enable experts to concentrate on their primary responsibilities.

The official language of the ITER project is English. Therefore, all input and output documentation relevant to this Contract shall be in English. The Contractor shall ensure that all the professionals in charge of the Contract have an adequate knowledge of English, to allow easy communication and adequate drafting of technical documentation. This requirement also applies to the Contractor's staff working at the ITER site or participating in meetings with the ITER Organization.

The work described here is a Protection Important Activity (PIA). As such, it must be independently reviewed by the supplier and records of the revision must be produced.

In addition, the following skills are necessary for the success of the activity:

- Experience in mechanical integration of sophisticated equipment and integration coordination activity
- Experience in nuclear engineering design (equipment to be maintained, maintenance tools, handling)
- Experience to integrate the system in the environment when HOF and ergonomics play an important role
- Experience in assembly processes and their description
- Experience in writing and reviewing of CPDs
- Experience in Remote Handling/ maintenance

- Ability to produce technical documentation
- Experience in application of French Nuclear Safety regulations
- Experience in interface management (ICD, IS)
- Schematics definition
- Design organization.

Contractor's personnel visiting the ITER site will be bound by the rules and regulations governing safety and security.

11 Work Monitoring / Meeting Schedule

The work will be started by a dedicated kick-off meeting (KOM) at ITER premises and managed by means of Progress Meetings. It is expected that Progress Meetings will be held biweekly at ITER premises.

The main purpose of the Progress Meetings is to allow the ITER Organization/Diagnostics Division and the Contractor Technical Responsible Officers to:

- Allow early detection and correction of issues that may cause delays;
- Review the completed and planned activities and assess the progress made;
- Permit fast and consensual resolution of unexpected problems;
- Clarify doubts and prevent misinterpretations of the specifications.

The ITER Organization and/or the Contractor may request additional meetings to address specific issues to be resolved.

The Contractor will work predominantly on IO site in order to accelerate the common understanding of the context and focus the effort towards the needed direction. The Contractor shall be present at ITER premises for the PDRs of EP#17 and FDR of EP#08.

12 Delivery time breakdown

T0 is the date of the kick-off meeting.

The DIR and PDR for the EP#17 are scheduled for Q4 2020.

The DIR and FDR for the EP#08 are planned for Q4 2020 and Q1 2021 respectively.

13 Quality Assurance (QA) requirements

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

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 [8]).

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 task activity such as analysis and/or modelling, etc shall be reviewed and approved by the IO prior to its use, it should fulfil IO document on Software Qualification Policy [11].

14 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 (ITER_D_7M2YKF).

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.

This task is a PIA.

“The supplier must comply with the all requirements expressed in “Provisions for implementation of the generic safety requirements by the external actors/intervenors” (ITER_D_SBSTBM)”.