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Technical Specifications (In-Cash Procurement)

IDFI Protection Covers - Technical Summary

This document provides a technical summary of the scope of work and contract plan for the IDFI Protection Covers procurement.

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1 Purpose

The ITER Organization (IO) intends to issue a Restricted Tender procedure for the In-Vessel Protection Covers final design, manufacturing, testing and delivery to the ITER Site, part of the In-Vessel Assembly Project.

The information and technical details provided in the present document are preliminary with the purpose to assess the interest and capabilities of potential candidates for this scope of works.

2 The ITER Project

The ITER Organization (IO) is a joint international research and development project for which the initial construction activities are underway. The seven members of the IO are: the European Union (represented by Fusion for Energy (F4E)), Japan, the People's Republic of China, India, the Republic of Korea, the Russian Federation and the USA.

The project aims to demonstrate the scientific and technological feasibility of fusion power for peaceful purposes and to gain necessary data for the design, construction and operation of the first electricity-producing fusion plant. It will also test a number of key technologies, including the heating, control, diagnostic and remote maintenance that will be needed for a full-scale fusion power station.

The ITER site is in the Bouchés du Rhône department of France. It includes the Headquarters of the IO and a construction worksite. The construction of the facility is on-going. Further information is available on the IO website: http://www.iter.org.

2.1 ITER In-Vessel Assembly

The ITER In-Vessel Assembly is split into three installation scopes:

1) In-Vessel Diagnostic, Fuelling & Instrumentation (**IDFI**) – which covers the installation of VV, Blanket and Divertor instrumentations, all in-vessel diagnostics, blanket electrical earth straps, Fueling systems, In-Service inspection;
2) In-Vessel Coils, Blankets and Divertor (**ICBD**) – which covers the installation of In-vessel coils & feeders (except VS winding), IVC joints, Blanket system (including manifolds), Divertor; and
3) Port plug and Support structure installations (**PSI**) – which covers the installation of In-port rails & dog legs, Port Cell Rails Diagnostic and Heating Port Plugs, Diagnostic Racks, VV Sealing Flanges, Primary Closure Plates and Duct liner.

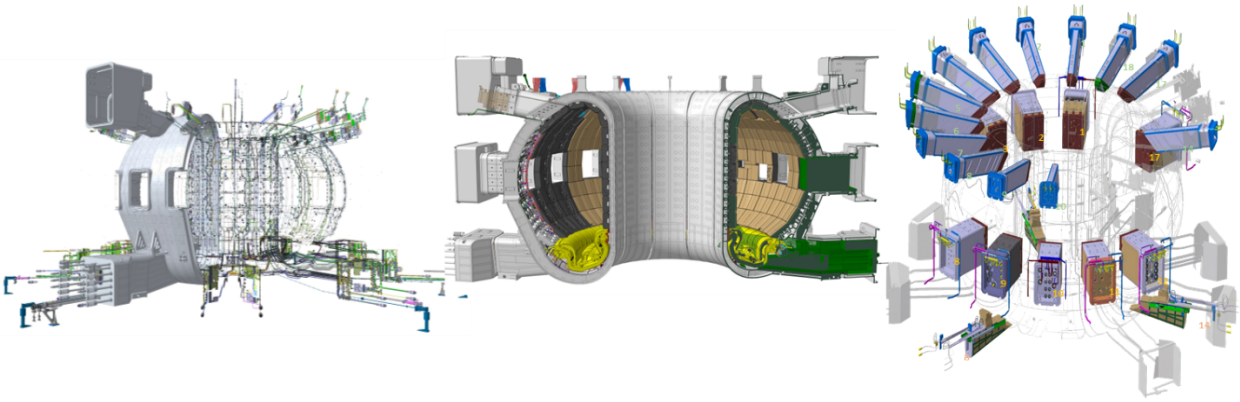

Figure 1. Visualization of the three In-Vessel Assembly scopes. From left to right: IDFI, ICBD and PSI.

2.2 IDFI Installation Scope

The installation scope for In-Vessel Diagnostics, Fuelling & Instrumentation (IDFI) covers the deployment of cables, sensors, and pipe-based systems used for the monitoring and control of plasma parameters.

During the initial installation phase (Phase 1, referred to as "sector-level installation"), various diagnostic components must be installed on the inner shell of each ITER Vacuum Vessel (VV) sector. This occurs prior to the welding of VV sectors to form the complete Tokamak torus. Once the VV sectors and ports are welded together, the remaining IDFI components can be installed—specifically within the sector field joint areas and the upper and lower ports—completing Phase 2 of the installation. A visual representation of both installation phases is provided in Figure 2.

Due to the use of heavy machinery during VV sector welding and the inherent fragility of certain in-vessel diagnostic components, rigid Protection Covers are required. These covers are essential to prevent irreversible damage and to ensure the continued integrity of the installed IDFI systems.

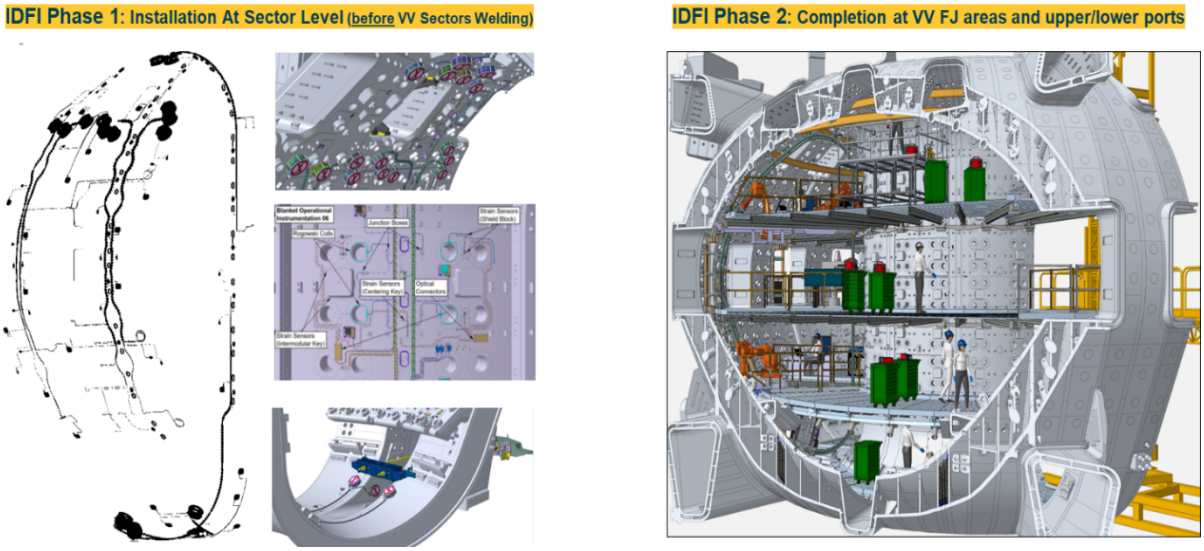

Figure 2. Visual description of IDFI Installation phases.

3 Scope of Works

3.1 Protection Covers

The present description only applies to In-Vessel Diagnostic, Fueling & Instrumentation (IDFI) scope.

The IO will provide a conceptual design as input for carrying out the scope of works. The Contractor will be required to finalize all design aspects (including material choice) considering efficient manufacturing solutions, assembly and installation means.

The scope of works consists in the final design, manufacturing, and the delivery of the Protection Covers to the ITER Organization (IO) Site. These covers are to be installed on each Vacuum Vessel (VV) sector, providing protection for in-vessel diagnostics and instrumentation.

It is estimated that approximately 350 Protection Covers will be required under this procurement. This quantity is indicative and may be subject to change during the detailed design phase.

The scope of works under this Procurement includes, but is not limited to:

- Final design, manufacturing and testing of purpose-built Protection Covers and associated fastening features;
- Procurement of raw materials and custom machining of all manufactured components;
- Provision of all consumables, tools, and accessories required to complete the scope;
- Execution of the work in compliance with the approved Project schedule;
- Preparation and submission of detailed technical documentation, including as-built drawings.

All works shall be performed entirely off-site at the Contractor's facilities. The final products shall be delivered to the IO Site in one or more batches, to be defined in the delivery schedule.

The technical competence and experience of the Contractor will be critical to the achievement of the required quality and adherence to schedule. Subcontracting is permitted within predefined limits, which will be specified during the tender phase. In such cases, the Contractor or Consortium shall identify responsible personnel for each subcontracted activity to ensure proper technical oversight and control.

Note: Installation of the Protection Covers at the ITER site is **not** included in the scope of this Procurement.

3.2 Summary of the requirements

The Protection Covers are not intended to serve as structural components but rather as physical barriers to safeguard the diagnostics and instrumentation installed beneath them. Their primary function is to prevent damage caused by falling objects, impacts from machinery, or mishandling of assembly tools.

All Protection Covers shall be fully dismountable and reusable.

The Protection Covers are designed as rigid plates to ensure that no irreversible damage occurs to components installed on the ITER VV inner shell. A conceptual representation of the

Protection Covers is shown in Figure 3. Their integration into the ITER VV is illustrated in Figures 4 and 5 to provide context and aid in visualization.

They shall be designed and manufactured for manual handling by one, or at most two, operators. Accordingly, their weight and dimensions shall be defined with appropriate consideration for ergonomic and operational safety aspects.

Protection Covers may be fabricated using metallic alloys and/or high-strength polymers (including engineering-grade plastics). Manufacturing methods are not limited to conventional fabrication techniques (e.g., casting, milling) and may also include advanced processes such as additive manufacturing (e.g., 3D printing), provided they meet the required mechanical and dimensional specifications.

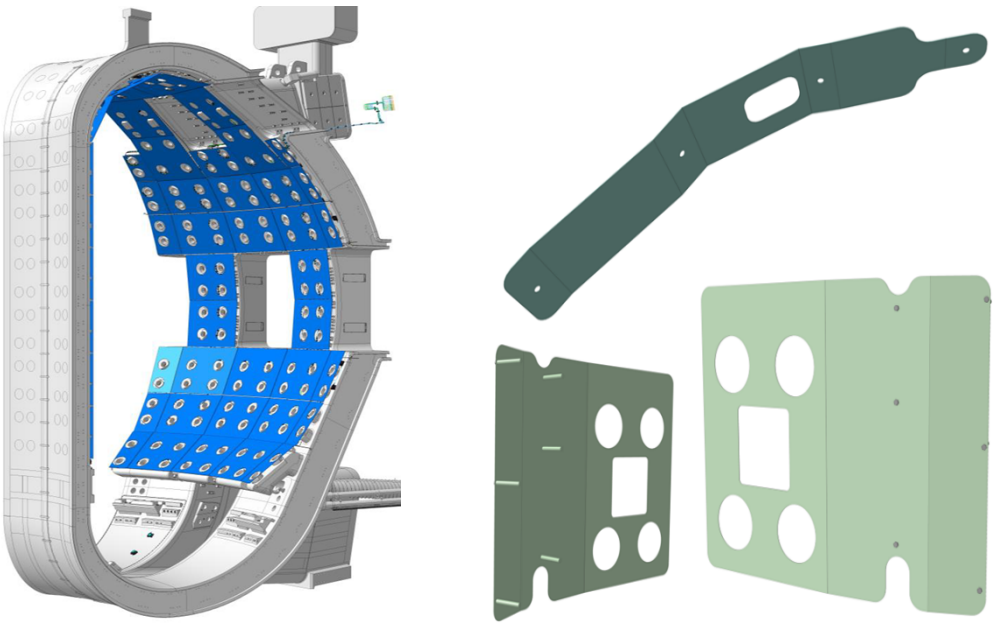

Figure 3. Conceptual design of the protection covers for the in-vessel diagnostics (this image serves only as example).

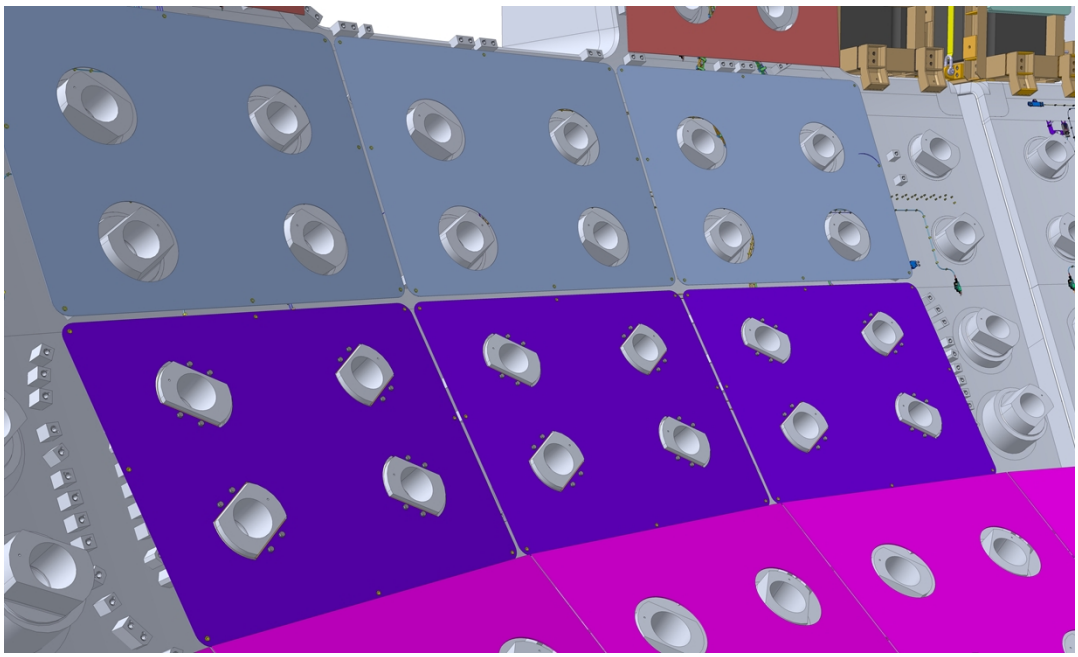

Figure 4. View of outboard Protection Covers together.

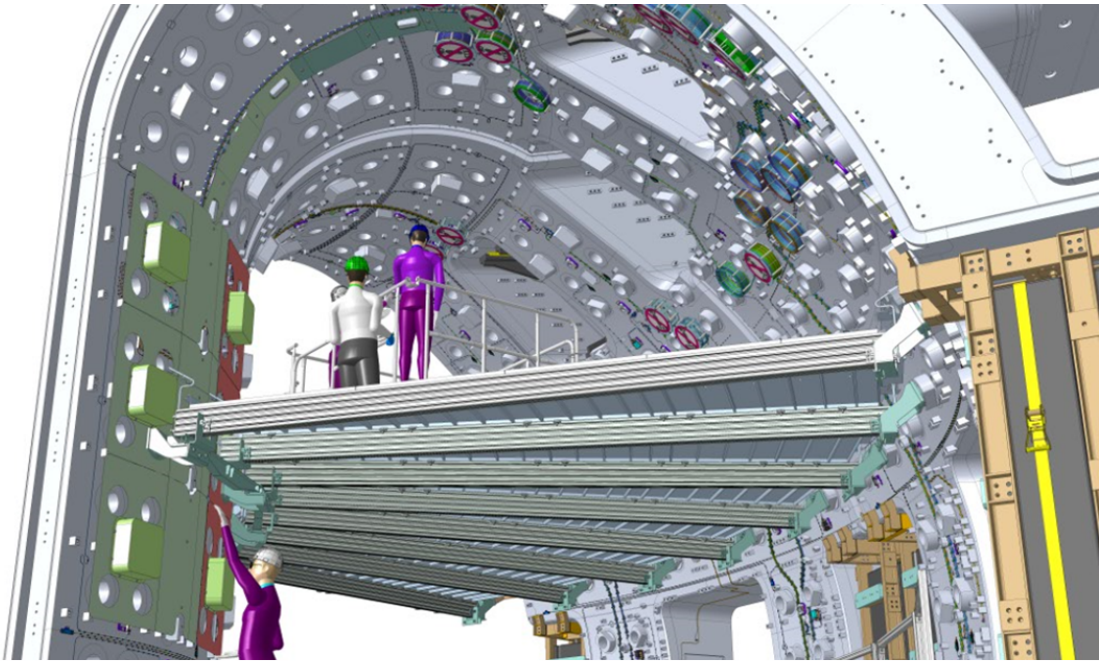

Figure 5. View of inboard and overhead Protection Covers.

4 Expected contract and main activities duration

This Contract will cover all the activities described above and is foreseen to start before the end of 2025.

The Contractor shall demonstrate proven experience and capability in industrial manufacturing, precision machining, and project and contract management. The Contractor is expected to ensure adherence to schedule, cost, and quality objectives throughout the execution of the contract.

The Contractor shall comply with all technical instructions and contractual requirements during the execution of the work and shall implement a robust quality management system.

The targeted duration for the completion of this scope of works is 9 months.

The following milestones are tentatively proposed:

#	Milestone	Target date
1	Final Design Review	Q4 – 2025
2	Manufacturing Readiness Review	Q1 – 2026
3	Delivery of Final Products	Q3 – 2026

Note: dates and milestones may change and are provided in this document as tentative.

5 Eligibility

Participation is open to all legal persons participating either individually or in a grouping (consortium) which is established in an ITER Member State:

- European Union
- Republic of India,
- Japan,
- People's Republic of China,
- Republic of Korea,
- Russian Federation,
- United States of America.

The ITER Organization may decide to broaden the eligibility to other countries as deemed appropriate.

A legal person cannot participate individually or as a consortium partner in more than one application or tender. A consortium may be a permanent, legally established grouping or a grouping, which has been constituted informally for a specific tender procedure. All members of a consortium (i.e. the leader and all other members) are jointly and severally liable to the ITER Organization. The consortium cannot be modified later without the approval of the ITER Organization.

Legal entities belonging to the same legal grouping are allowed to participate separately if they can demonstrate independent technical and financial capacities. Bidders' (individual or consortium) must comply with the selection criteria. IO reserves the right to disregard duplicated references and may exclude such legal entities from the tender procedure.