外部委託業者の募集

References: IO/MS/25/AJI

"Market Survey for Supply, Construction and installation of Clean Assembly Area (ISO Class 8 Cleanroom) for in-vessel Port Integration Facility (PIF)"

（容器内ポート統合施設（PIF）のための組み立てクリーンエリア（クラス 8）の供給、建設と設置の市場調査）

IO 締め切り 2025 年 5 月 14 日(水)

〇はじめに

ITER（イーター）

ポート統合施設（PIF）は、計測ポート部品の統合専用の組立ホール（55 号館内）です。B55 の PIF は、据え付け前に、超高真空下で動作する炉内機器である計測シールドモジュール（DSM）とポートプラグ（PP）を、管理された環境で組み立てるための作業スペースを提供します。その機能を果たすため、炉内 PIF には、一般的な工業組立エリアと分離されたクリーンエリアの両方が含まれます。クリーンエリアの役割は、真空にさらされる部品の最終組立および取り扱いが、厳格な汚染管理下で行われるようにし、炉内機器に必要な高い清浄度基準を維持することです。このクリーンゾーンは、組立中に、部品（テナントを含む）内部の DSM/PP の敏感な表面に、粒子状または分子状の汚染物質が付着するのを防ぎ、それによって、それらが後に動作しなければならない超高真空（UHV）条件を保護します。

図 1：B55 の炉内機器用ポート統合施設（PIF）の全体レイアウト。分離されたクリーンエリア（青）と一般的な（非クリーン）組立エリアを示しています。
（詳細は英文技術仕様書を参照下さい）

炉内機器用のクリーンエリアは、PIF 内の完全に囲まれたゾーンであり、そこでは、水平（EQ）ポートプラグと上部ポートプラグの両方について、周囲の作業スペースから分離された、管理された清浄度条件下で、DSM と PP の最終組立が行われます。この分離により、一般エリアで粉塵や汚染が発生する可能性のある活動が、重要なクリーン組立作業に影響を与えないことが保証されます。

クリーンエリアは、PIF の非クリーンゾーンと連携して、組立ワークフローをサポートします。大型ポート部品および計測サブアセンブリは、PIF の一般的な（非クリーン）エリアで最初に受け入れられ、仮組立を行うことができます。ここでは、標準的な工業的条件が適用されます。微量の汚染に敏感でない製造または取り付け作業は、この開放的な作業環境で行われます。受入および予備的な仮組立作業が完了し、部品が最終統合の準備ができたとき（または汚染管理された方法で取り扱う必要がある場合)、それらはクリーンエリアに移送されます。要約すると、PIF のクリーンエリアは、最終組立および統合のためのクリーンルーム環境を提供し、非クリーンエリアは準備および補助作業に対応します。この配置により、（メインホールで重作業を行うことで）効率が最大化され、次のステップでの真空部品の清浄度が保護されます。

大型ポートプラグ構造と計測部品は、最初に一般的な作業エリアに移送され、そこで開梱、検査、および組立の準備が行われます。溶接や仮組立などの作業はクリーンゾーンの外で行われますが、部品の清浄度を維持するために適切な注意を払って実施されます。このアプローチは、部品が後でクリーンエリアに移送される際の広範な洗浄手順の必要性を回避することを目的としています。これらの予備作業が完了し、部品が最終的なクリーン組立の準備が整うと、洗浄され、ポートプラグへの統合のために隣接するクリーンエリアに移動されます。この 2 段階のアプローチ（非クリーンエリアでの仮組立、クリーンエリアでの最終組立）により、最終製品の効率と高い清浄度の両方が保証されます。

○ 目的

この技術仕様書の目的は、B55 炉内 PIF 内に設置されるクリーン組立エリアの要件、設計、および組立基準を定義することです。この文書は、水平（EQ）および上部（UPP）ポートプラグ両方の DSM および PP 部品の組立をサポートするために、クリーンエリアが満たすべき機能目標、環境条件、および技術仕様を規定します。最終的な目標は、汚染のリスクを最小限に抑え、炉内部品の該当する清浄度基準への完全な準拠を保証する、管理されたクリーンルーム環境を確立することです。

この TS は、PIF が最高品質の ITER ポートプラグアセンブリを提供するという役割を完全に果たすことができるように、クリーンエリアの設計、建設、および検証を導きます。主な目標には、スペースが超クリーン組立作業に適していること、重量物取り扱い（クレーン、工具）と互換性があること、および清浄度と環境制御を維持するために必要なインフラストラクチャ（HVAC、エアロックなど）が備わっていることを保証することが含まれます。これらの要件を明確に述べることにより、TS は調達、検証、そして最終的には PIF クリーンエリアの試運転の成功のための基礎を提供します。

PIF 炉内クリーンエリアのレイアウトと構造は、図 1 に示すように、EQ DSM 用 3 ライン、UPP DSM 用 1 ライン、DSM-to-PP 挿入および EQ ポートプラグ組立ライン 1 ライン、DSM-to-PP 挿入および UPP ポートプラグ組立ライン 1 ラインを含む組立ライン構成と互換性があるものとします。

クリーンエリアは、ゾーンのおおよその寸法を示す図 2 に示すように、2 つの異なる天井高で設計されるものとします。一般的なクリーンエリアは、約 40 m x 15 m の表面積を覆い、クリアランス高は 6 m とします。このエリア内には、高さ 9.0 m の約 13 m x 10 m の専用の高クリアランスゾーンが含まれるものとします。

この高クリアランスゾーンには、ポートプラグへの DSM の垂直挿入を実行できる、クリーンルーム対応のガントリークレーンが装備されるものとします。EQ PP-DSM アセンブリには完全な垂直挿入が必要であり、UPP アセンブリの場合、PP への DSM の垂直挿入は部分的であり、最初の水平方向の予備挿入ステップに従うものとします。高クリアランスゾーン内での作業に必要なクリーンルーム対応ガントリークレーンは、別の技術仕様書で扱われており、したがってこの文書の範囲外です。

図 2 - 炉内 PIF のクリーンエリアの概略図と主な寸法。
（詳細は英文技術仕様書を参照下さい）

ポートプラグ構造や DSM などの大型で重量のある部品の輸送は、この TS の範囲に含まれない、プラットフォーム式の輸送ベースに取り付けられた、カスタム設計の吊り上げおよび取り扱いツールで構成される専用の取り扱いシステムを使用して行うものとします。これらのプラットフォームは、重量物の移動用に設計され、クリーンルームでの使用が承認された、互換性のある牽引ヘッド（タグボート）と結合されるものとします。このプラットフォームに取り付けられたカスタムツールとクリーンルーム対応タグボートのシステムにより、特定の作業専用となる天井ガントリークレーンに頼ることなく、クリーンエリア内での部品の内部移動が可能になります。特に、ガントリークレーンは、地上ベースのシステムでは実行できない重要な組立ステップである、DSM のポートプラグへの垂直挿入中にのみ使用されます。

この輸送構成は、高い移動性を提供し、粒子発生を最小限に抑え、クリーンルームの運用上の制約との互換性を保証します。図 3 は、同様のプラットフォームおよびタグボートベースの輸送システムを使用した部品移送作業の例を示しています。

図 3：プラットフォームベースに取り付けられ、クリーンルーム対応のトラクターヘッドで牽引されるカスタムハンドリングツールを使用した重量物移送システムの例。
（詳細は英文技術仕様書を参照下さい）

〇供給の範囲
本技術仕様書は、ポート統合施設（PIF）内の炉内クリーン組立エリアの設計、供給、建設、および完全な構成を対象としており、炉内機器の ITER 規格に適合した組立に必要なすべての関連システム、機器インターフェース、および環境制御対策を含みます。

供給範囲には、以下の要素が含まれます。

- クリーンルームの建設とレイアウト: 分離されたクリーンエリアの設計および建築的実施。これには、構造壁、天井、床、および内部機能ゾーンが含まれます。寸法上の制約（約 40 m × 15 m のフットプリント）、二重天井高（6 m と 9 m）の包含、および一般的な作業エリアからの物理的な分離が含まれます。壁の固定も含まれます。
- クリーンルームの環境制御: ISO 14644-1 クラス 8 の空気質、ならびに RCC-MR レベル I および ITER VQC-1 の真空清浄度要件への準拠を維持するための HVAC および空気ろ過システムの導入。これには、HEPA フィルター、エアフロー制御（該当する場合は層流）、温度および湿度調整、ならびに陽圧カスケード管理が含まれます。
- 汚染管理機能: クリーンエリアで使用されるすべての材料、表面、備品、および仕上げは、真空適合性、低アウトガス性、および非発塵性である必要があります。ガウン着用の手順、

クリーンルーム承認済みの消耗品、および清掃設備（例：ワイプステーション、真空ポート）が実装されるものとします。設計は、日常業務中の清浄度基準の持続的な遵守を可能にする必要があります。

- ゾーニング構成とアクセス制御: ハイベイ（約 9 m）とローベイ（約 6 m）は、同じクリーンルームに統合された 2 つのゾーンです。クリーンルームには、人員と材料用のエアロックシステムが含まれている必要があります。クリーンエリアへのアクセスは、更衣室と除染エリアを備えた相互接続されたエアロックによって厳密に管理されるものとします。材料と人員の流れは、一方向の清浄度勾配を維持する必要があります。
- 取り扱いと輸送の互換性: クリーンエリアは、専用のプラットフォームに取り付けられた取り扱いシステムを使用した大型部品（例：DSM およびポートプラグ）の移動に対応できる必要があります。
- ユーティリティとサービスの統合: 電気コンセント、データポート、圧縮空気ライン、専用の真空または清掃ポイントなど、クリーンルーム運用に固有のサービスの設置。すべてのユーティリティ貫通部は、クリーンルームエンベロープの完全性を維持するものとします。ユーティリティとサービスの詳細については、このドキュメントのセクション 5.4 および 5.5 を参照してください。
- 資格認定と検証: 契約者は、必要なシステムの第三者による法的検査を含む完全な検証計画を提出し、必要なすべての試運転テスト（例：粒子数、エアフロー、差圧、温度/湿度安定性）を実行し、クリーンルームが指定された性能基準を満たしていることを証明する認証を提供する必要があります。受け入れ基準については、セクション 5.2、5.6、および ISO 14644-4:2022 - クリーンルームおよび関連する管理環境 - 第 4 部：設計、建設およびスタートアップ：材料、エアフローの概念、および検証を含む、クリーンルームの設計および建設原則を規定する一般的な規則を参照してください。
- ドキュメントと引き渡し: 完全な設計ドキュメント、「竣工図」、材料証明書、操作マニュアル、検証レポート、および最終的な引き渡しドキュメントは、契約成果物の一部として提供されるものとします。

供給範囲外: 本仕様書は以下を対象としていません。

- クリーンエリアで使用されるガントリークレーンの設計または供給（別途 TS を参照）。
- DSM/PP 統合の詳細な組立手順または治工具（他の文書で扱われます）。
- クリーンルームエンベロープに関連しない一般的な建屋インフラストラクチャ（ただし、インターフェースが必要な場合を除く。たとえば、建屋サービスからクリーンルームへの接続、または建屋のガントリークレーンシステムとのインターフェース）。PIF の非クリーンエリア（初期組立および準備に使用）は、コンテキストのために言及されていますが、ここで定義されているクリーンルーム建設要件の範囲外です。
- 以下のツールは、この技術仕様書の範囲には含まれていませんが、クリーンな作業エリアの包括的な説明を提供するために、ドキュメント内で言及されています：輸送プラットフォー

ム、吊り上げおよび取り扱いツール、および部品移動用の牽引ヘッド。

要約すると、この TS は、設計から試運転および引き渡しまで、炉内機器の高精度で汚染管理された統合に適した、PIF 内の完全に運用可能なクリーン組立エリアを提供するために必要なすべての要件を定義します。

（以下詳細は英文技術仕様書を参照下さい）

〇作業実施場所

本技術仕様書で対象となるすべての作業は、フランス南部、サン・ポール・レ・デュランスにあるITERサイト内の、ポート統合施設（PIF）、55号館の敷地内で実施されるものとします。

クリーン組立エリアは、ITER機構が提供する最新の土木レイアウト図面で定義されている、炉内PIFの指定された内部区画に建設および統合されます。契約者は、ITERサイト管理およびエンジニアリングチームと連携して、施設全体の運用、建屋の制約、およびロジスティクス計画との整合性を確保するものとします。

サイト固有の条件は次のとおりです。

- ITERサイトへの管理されたアクセス（バッジ、セキュリティクリアランス、就業時間など）。
- ITERサイトの安全規則および環境保護ポリシーの遵守。
- 他の進行中の建設および設置活動との連携。
- 適用されるフランスおよびヨーロッパの建設規制および規範の遵守。
- 契約者は、サイトで完了するすべての準備作業、設置、試運転、および引き渡し活動について責任を負います。オフサイトでのプレハブまたはテストは、トレーサビリティおよび品質保証の要件が満たされていることを条件として、ITERの承認を得て許可される場合があります。
- ロジスティクス計画、機器および材料の輸送、ならびにサイト納入スケジュールは、事前にITERによってレビューおよび承認されるものとします。一時的な保管エリアは、特定の調整手配の下でPIF内に利用可能になる場合があります。

〇成果物とスケジュールのマイルストーン

本技術仕様書で定義されたすべての作業およびドキュメントの納期は、ITERによって別途承認されない限り、キックオフミーティング（T0）から6ヶ月を超えないものとします。

（以下詳細は英文技術仕様書を参照下さい）

【※　詳しくは添付の英語版技術仕様書「Annex I　TS clean area PIF」をご参照ください。】

ITER 公式ウェブ　http://www.iter.org/org/team/adm/proc/overview からもアクセスが可能です。

「核融合エネルギー研究開発部門」の HP：　http://www.fusion.qst.go.jp/ITER/index.html では ITER 機構からの各募集（IO 職員募集、IO 外部委託、IO エキスパート募集）を逐次更新しています。ぜひご確認ください。

イーター国際核融合エネルギー機構からの外部委託
に関心ある企業及び研究機関の募集について

＜ITER 機構から参加極へのレター＞

以下に、外部委託の概要と要求事項が示されています。参加極には、提案された業務に要求される能力を有し、入札すべきと考える企業及び研究機関の連絡先の情報を ITER 機構へ伝えることが求められています。このため、本研究・業務に関心を持たれる企業及び研究機関におかれましては、応募書類の提出要領にしたがって連絡先情報をご提出下さい。

china eu india japan korea russia usa
Route de Vinon-sur-Verdon - CS 90 046 - 13067 St Paul Lez Durance Cedex - France

To: Potential Candidates

Date: 30 April 2025

Ref: IO/MS/25/AJI

Subject: Letter of Invitation for the Supply, Construction and installation of Clean Assembly Area (ISO Class 8 Cleanroom) for in-vessel Port Integration Facility (PIF)

Dear Madam/Sir,

The ITER Organization (IO) has launched a Market Survey/Request for Information (RFI) and requests information from companies having the interest, knowledge and capacity related to: **Supply, Construction and installation of Clean Assembly Area (ISO Class 8 Cleanroom) for in-vessel Port Integration Facility (PIF).**

The main purpose of this RFI is to evaluate the market situation and to identify candidate suppliers having the potential capabilities to respond to the IO solicitation process that may follow.

china
eu
india
japan
korea
russia
usa

Please note that this is not a Call for Nomination.

You will find enclosed the Technical Description related to this Market Survey/RFI (Annex I).

With this letter, we invite all potential companies, institutions or entities from ITER Member States to participate to this Market Survey/RFI through the questionnaire (Annex II).

We kindly invite the Domestic Agencies to publish this Market Survey/RFI on their websites or through other advertising methods, which will help to retrieve the requested information from a maximum of potential candidates.

Please return a completed questionnaire, **no later than 14th May 2025**, to the following email address **Amankumar.Joshi@iter.org, and Chloe.Perret@iter.org**.

Thanks in advance for your co-operation.

Yours faithfully,

Takakazu Kimura
Section Leader, Procurement Project Support

Contact: Aman Kumar JOSHI - Procurement Division - Tel. +33 4 42 17 49 01– E-mail: amankumar.joshi@iter.org

Table of Contents

1 Preamble

The ITER Port Integration Facility (PIF) is a dedicated assembly hall (located in Building 55) for the integration of diagnostic port components. PIF in B55 will provide the workspace to assemble Diagnostic Shield Modules (DSMs) and Port Plugs (PPs) – which are in-vessel components operating under ultra-high vacuum – in a controlled environment before their installation. To fulfill its function, the in vessel PIF includes both a general industrial assembly area and a **segregated clean area**. The clean area's role is to ensure that final assembly and handling of vacuum-bound components occur under strict contamination control, maintaining the high cleanliness standards required for in-vessel equipment. This clean zone prevents particulate or molecular contamination from reaching sensitive surfaces of DSMs/PPs inside components (including tenants) during assembly, thereby safeguarding the ultrahigh vacuum (UHV) conditions they must later operate in.

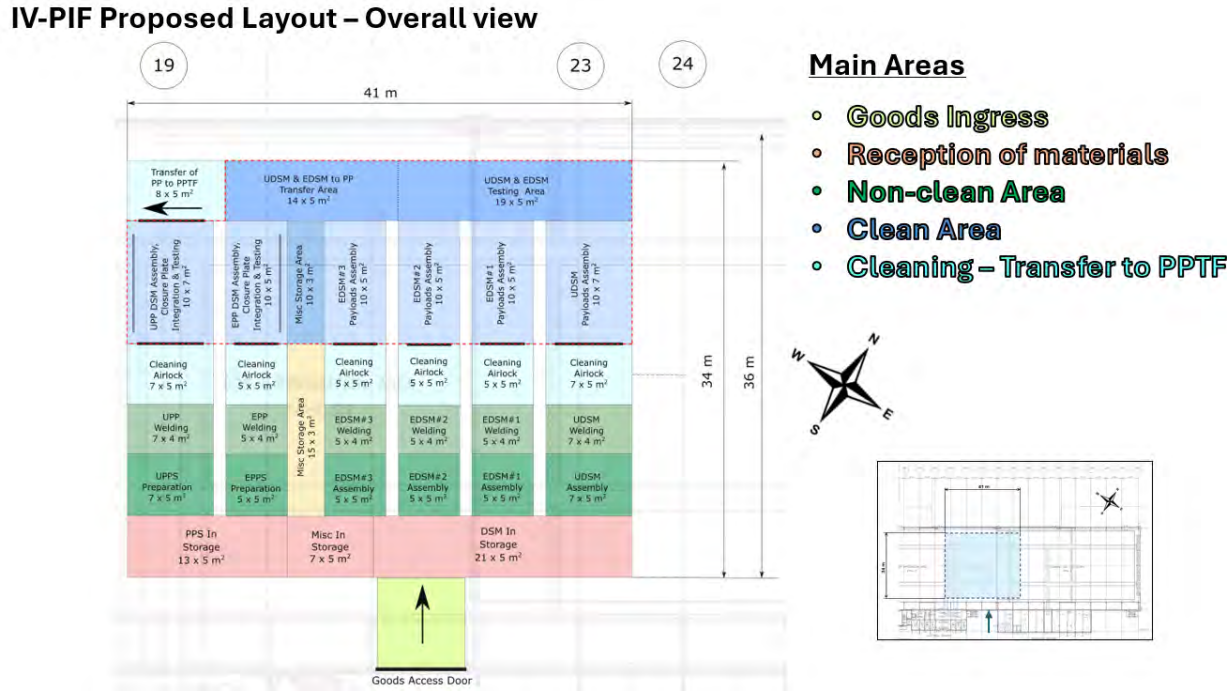

Figure 1: Overall layout of the Port Integration Facility (PIF) for in vessel components in B55, illustrating the segregated clean area (blue) versus general (non-clean) assembly areas.

The clean area for in vessel components is a fully enclosed zone within the PIF where final DSM and PP assembly is performed, for both IO EQ and Upper Port Plugs, under controlled cleanliness conditions, separated from the surrounding workshop space. This segregation ensures that any activities generating dust or contamination in the general area do not affect the critical clean assembly operations.

The clean area works in tandem with the PIF's non-clean zones to support the assembly workflow. Large port components and diagnostic sub-assemblies can be initially received and pre-assembled in the general (non-clean) area of the PIF, where standard industrial conditions apply. Fabrication or fitting tasks that are not sensitive to trace contamination are carried out in this open workshop environment. Once reception and preliminary preassembly tasks are complete and components are ready for final integration (or once they must be handled in a contamination-controlled manner), they are transferred into the clean area. In summary, the PIF's clean area

provides a *cleanroom environment* for the final stages of assembly and integration, while the non-clean area accommodates preparatory and ancillary operations. This arrangement maximizes efficiency (by performing heavy work in the main hall) while still protecting the cleanliness of vacuum components in next steps.

The large port plug structures and diagnostic components are first transferred to the general workshop area, where they are unpacked, inspected, and prepared for assembly. Although activities such as welding and pre-assembly are performed outside the clean zone, they will be carried out with appropriate care to preserve the cleanliness of the components. This approach aims to avoid the need for extensive cleaning procedures when the components are later transferred into the clean area. Once these preliminary operations are finished and the component is ready for final clean assembly, it will be cleaned and moved into the adjacent clean area for integration into the port plug. This two-stage approach (pre-assembly in non-clean area, final assembly in clean area) ensures both efficiency and high cleanliness for the end product.

2 Purpose

The purpose of this Technical Specification is to define the requirements, design and assembly criteria for the clean assembly area located within the B55 In-Vessel PIF. This document sets forth the functional objectives, environmental conditions, and engineering specifications that the clean area must fulfil to support the assembly of DSM and PP components for both the Equatorial (EQ) and Upper (UPP) port plugs.

The ultimate goal is to establish a controlled cleanroom environment that minimizes the risk of contamination and ensures full compliance with applicable cleanliness standards for in-vessel component.

This TS will guide the design, construction, and validation of the clean area so that it fully enables the PIF's role in delivering ITER port plug assemblies of the highest quality. Key objectives include ensuring the space is fit for ultra-clean assembly operations, compatible with heavy component handling (cranes, tools), and furnished with the necessary infrastructure (HVAC, airlocks, etc.) to maintain cleanliness and environmental control. By clearly stating these requirements, the TS provides a basis for procurement, verification, and ultimately the successful commissioning of the PIF clean area.

The layout and structure of the PIF In-Vessel Clean Area shall be compatible with the assembly line configuration, which includes: three assembly lines for EQ DSMs, one assembly line for UPP DSMs, one DSM-to-PP insertion and EQ port plug assembly line, and one DSM-to-PP insertion and UPP port plug assembly line, as illustrated in Figure 1.

The clean area shall be designed with two distinct ceiling heights, as shown in Figure 2, which presents the approximate dimensions of the zone. The general clean area shall cover a surface of approximately 40 m × 15 m with a clear height of 6 m. Within this area, a dedicated high-clearance zone measuring approximately 13 m × 10 m with a height of 9.0 m shall be included.

This high-clearance zone shall be equipped with a cleanroom-compatible gantry crane, capable of performing the vertical insertion of the DSMs into the Port Plugs. Full vertical insertion shall be required for the EQ PP-DSM assemblies, while for the UPP assemblies, the vertical insertion of the DSM into PPs shall be partial and follow an initial horizontal pre-insertion step. The

cleanroom-compatible gantry crane required for operations within the high-clearance zone is covered by a separate Technical Specification and is therefore outside the scope of this document.

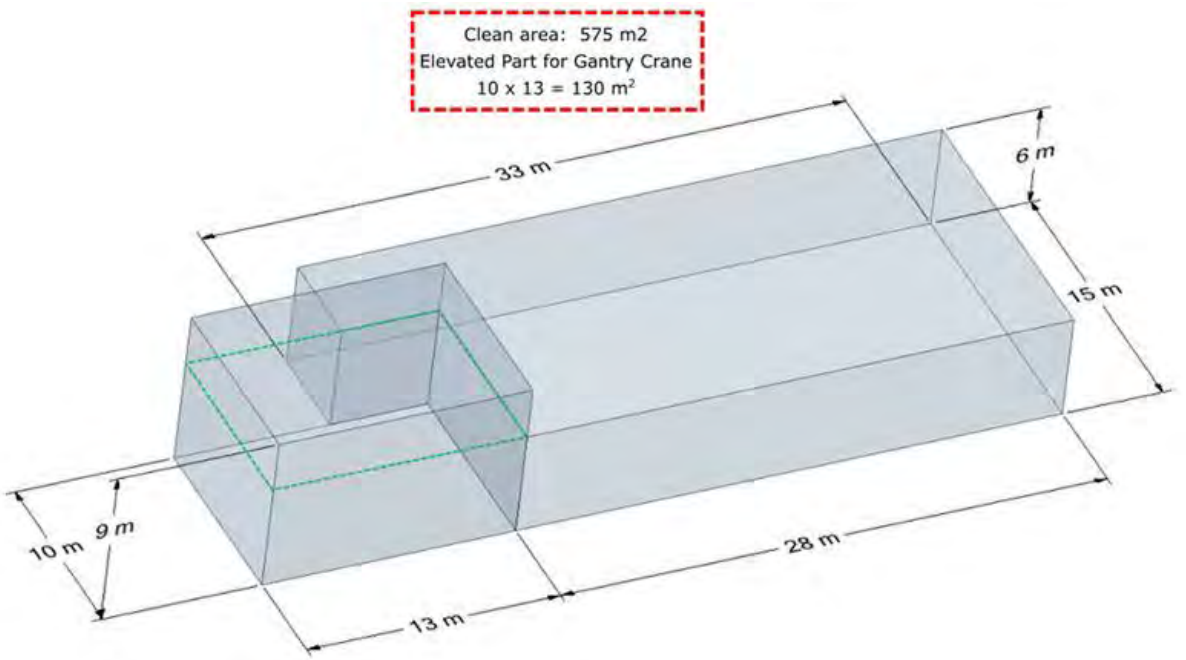

Figure 2 – Scheme and main dimensions for clean area in in vessel PIF.

The transport of large and heavy components, such as Port Plug structures and DSMs, shall be carried out using dedicated handling systems composed of custom-designed lifting and handling tools, not included in the scope of this TS, mounted on platform-style transport bases. These platforms shall be coupled with compatible towing heads (tugs) designed for the movement of heavy loads and approved for cleanroom use. This system of platform-mounted custom tools and cleanroom-compatible tugs allows the internal transfer of components within the clean area without relying on overhead gantry cranes, which will be reserved exclusively for specific operations. In particular, the gantry crane will only be used during the vertical insertion of the DSMs into the port plugs — a critical assembly step that cannot be performed by ground-based systems.

This transport configuration offers high mobility, minimizes particle generation, and ensures compatibility with cleanroom operational constraints. Figure 3 illustrates examples of component transfer operations using similar platform and tug-based transport systems.

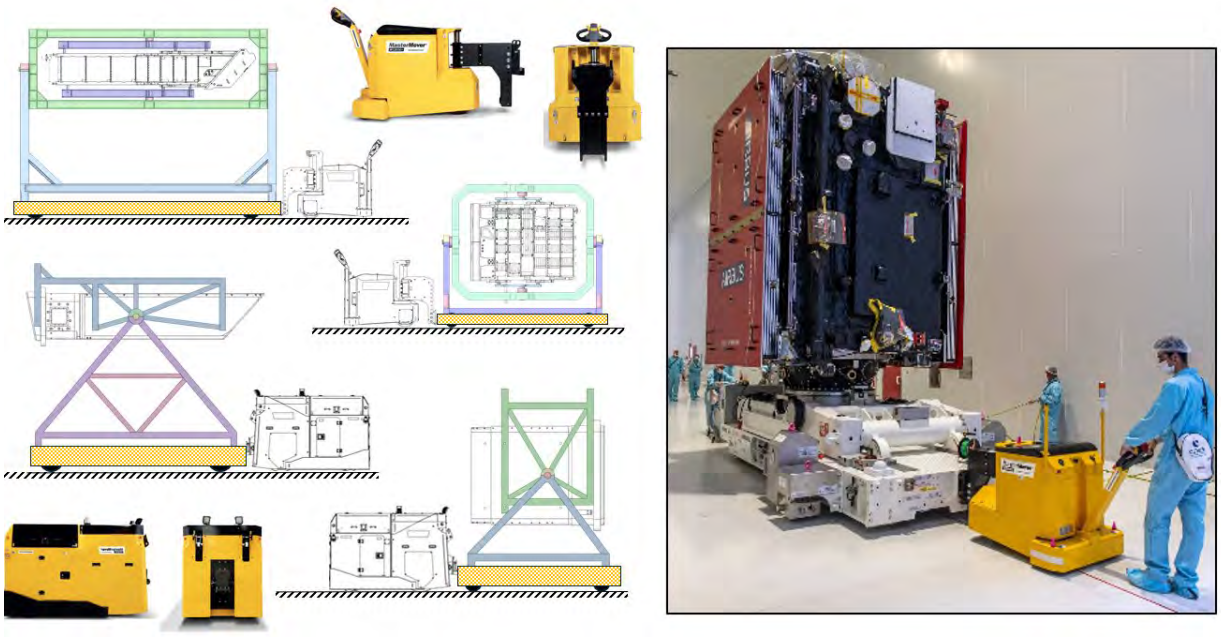

Figure 3: Examples of heavy component transfer systems using custom handling tools mounted on platform bases and towed by cleanroom-compatible tractor heads.

3 Acronyms & Definitions

3.1 Acronyms

The following acronyms are the main one relevant to this document.

Abbreviation	Description
CRO	Contract Responsible Officer
DA	Domestic Agency
DFW	Diagnostic First Wall
DSM	Diagnostics Shielding Module
EPP	Equatorial Port Plug
GM3S	General Management Specification for Service and Supply
IDM	ITER Document Management System
IO	ITER Organization
IVH	ITER Vacuum Handbook
MD	Manufacturing Dossier
PE/NPE	Pressure Equipment / Nuclear Pressure Equipment
PIA	Protection Important Activity
PIC	Protection Important Component
PIF	Port Integration Facility
PP	Port Plug
PPS	Product Procurement Specification

PPTF	Port Plug Test Facility
PRO	Procurement Responsible Officer
RH	Remote Handling
TO	Task Order
UPP	Upper Port Plug

3.2 Definitions

Client: ITER Organization, referred to as IO in the rest of this document.

Contractor: shall mean an economic operator who have signed the Contract in which this document is referenced. In this document as well as in the mandatory Appendixes and Annexures referred here, the names Contractor and Supplier are used interchangeably.

In-Vessel Components: This term is used in this specification for indicating all the components, sub-assemblies and provision for services (electrical, gas and cooling water) that constitute the Integrated Diagnostic Port Plug Assembly, other than Interspace and Port Cell Support structures and their associated components *(that are called as Ex-vessel components)*

Integrated Diagnostic Port Plug Assembly: This assembly mainly consists of Diagnostic Shield Modules (DSM) with provision for shielding (Shielding blocks, Shielding Trays and Stainless-Steel **backfilling** and associated attachments) housing associated diagnostic tenant systems and Service Systems (electrical, cooling water and gas) connections with provisions for required layouts. This DSM is contained in the Customised Port Plug Structure and attached to the Diagnostic First Walls.

Machine: The term "Machine" is used to describe the ITER Tokamak Machine where the final installation of these deliverables will be done.

Assembly: The term "Assembly" is used to describe the assembly activities of the components (mainly mechanical) of the deliverables planned by the Contractor. These activities are not in the scope of this contract.

IDM ID: This is the IDM document number referred.

Clean Area (or Clean Zone): A designated working environment within the PIF with controlled levels of contamination, defined by ISO standards and further specified by RCC-MR RF 6241 (Level I) and IHV VQC-1 classification. Operations in this area require equipment, processes, and materials that minimize particle generation and are certified for clean room use.

Clean area Gantry Crane: A rail-mounted, double-girder crane system designed to operate within the clean area of the in-vessel PIF. It provides vertical lifting and horizontal travel for DSM and PP components, complying with strict dimensional and cleanliness requirements defined in this document.

4 Applicable Documents & Codes and standards

4.1 Applicable Documents

This is the responsibility of the Contractor to identify and request for any documents that would not have been transmitted by IO, including the below list of reference documents.

This Technical Specification takes precedence over the referenced documents. In case of conflicting information, this is the responsibility of the Contractor to seek clarification from IO.

Upon notification of any revision of the applicable document transmitted officially to the Contractor, the Contractor shall advise within 4 weeks of any impact on the execution of the contract. Without any response after this period, no impact will be considered.

Ref	Title	IDM Doc ID	Version
1	General Management Specification for Service and Supply (GM3S)	82MXQK	1.4
2	ITER Vacuum handbook	EZ9UM	2.5
3	ITER Vacuum Handbook Attachment 2 - Cleanliness Requirements Relating to the Assembly of Vacuum Equipment	MBXPP3	1.7

4.2 Applicable Codes and Standards

The applicable Codes and Standards governing the design and construction of the clean assembly area are outlined below.

Given that the equipment assembled in this area is intended for installation inside the ITER Tokamak, all relevant requirements from the ITER Vacuum Handbook [2], including those concerning permitted materials, cleanliness levels, and contamination control procedures, shall be strictly followed to prevent risks to the vacuum integrity of in-vessel components.

In particular, the clean assembly area shall comply with the following standards:

- ISO 14644-1:2015 – Cleanrooms and associated controlled environments – Part 1: Classification of air cleanliness by particle concentration: This standard defines the required air cleanliness level (ISO Class 8 minimum) and the methodology for particle count testing and cleanroom validation.
- ISO 14644-4:2022 – Cleanrooms and associated controlled environments – Part 4: Design, construction and start-up: Specifies the design and construction principles for cleanrooms, including materials, airflow concepts, and verification.
- RCC-MR RF 6241 (Level I Cleanliness Requirements): This section of French nuclear construction code defines the cleanliness requirements for components operating under ultrahigh vacuum conditions.
- ITER Vacuum Quality Classification (VQC-1): Cleanroom components and processes must meet the most stringent vacuum cleanliness classification (VQC-1), suitable for in-vessel hardware.

The contractor shall also ensure full compliance with the following European Union directives and regulations, as applicable:

- Machinery Directive (2006/42/EC): Ensures mechanical safety of any integrated systems or equipment installed in the clean area.
- Work Equipment Directive (89/655/EEC): Establishes minimum safety requirements for use of work equipment by workers.
- Electromagnetic Compatibility Directive (2014/30/EU): Applies if electronic devices or control panels are present in the clean area systems.
- EC Documentation: Includes the preparation and submission of a Technical File and EC Declaration of Conformity for applicable equipment.

All design, construction, and material selections shall reflect the most current revisions of these codes at the time of execution. Any deviation from the standards listed above must be approved in writing by the ITER Organization.

5 Scope of Supply

This Technical Specification covers the **design, supply, construction, and full configuration** of the in vessel clean assembly area within the Port Integration Facility (PIF), including all associated systems, equipment interfaces, and environmental control measures required to meet ITER standards for the assembly of in-vessel components.

The scope of supply includes, the following elements:

- **Cleanroom Construction and Layout**: Design and architectural execution of the segregated clean area, including structural walls, ceilings, floors, and internal functional zones. This includes dimensional constraints (approx. 40 m × 15 m footprint), the inclusion of dual ceiling height regimes (6 m and 9 m), and physical segregation from the general workshop area. Wall fixation are included also.
- **Cleanroom Environmental Control**: Implementation of HVAC and air filtration systems to maintain ISO 14644-1 Class 8 air quality, as well as compliance with RCC-MR Level I and ITER VQC-1 vacuum cleanliness requirements. This includes HEPA filtration, airflow control (laminar flow where applicable), temperature and humidity regulation, and positive pressure cascade management.
- **Contamination Control Features**: All materials, surfaces, fixtures, and finishes used in the clean area must be vacuum-compatible, low-outgassing, and non-shedding. Gowning protocols, cleanroom-approved consumables, and cleaning provisions (e.g. wipe stations, vacuum ports) are to be implemented. The design must enable sustained compliance with cleanliness standards during routine operations.
- **Zonal Configuration and Access Control**: High bay (≈9 m) and low bay (≈6 m) are two zones integrated into the same clean room. The clean room must include airlock systems for personnel and materials. Access to the clean area must be strictly controlled by interconnected airlocks, with changing and decontamination areas. The flow of materials and personnel must maintain a unidirectional cleanliness gradient.
- **Handling and Transport Compatibility**: The clean area must accommodate the movement of large components (e.g., DSMs and Port Plugs) using dedicated platform-mounted handling systems.
- **Utilities and Services Integration**: Installation of services specific to cleanroom operations, including electrical outlets, data ports, compressed air lines and dedicated vacuum or cleaning points. All utility penetrations shall preserve the cleanroom envelope integrity. Please review sections 5.4 and 5.5 of this document for more details of utilities and services.

- **Qualification and Validation**: The contractor shall deliver a complete validation plan, including a 3rd party legal inspection for required systems, execute all necessary commissioning tests (e.g., particle counts, airflow, pressure differential, temperature/humidity stability), and provide certification that the cleanroom meets the specified performance criteria. For acceptance criteria, please review sections 5.2, 5.6 and general rules of ISO 14644-4:2022 – Cleanrooms and associated controlled environments – Part 4: Design, construction and start-up: Specifies the design and

construction principles for cleanrooms, including materials, airflow concepts, and verification.

- **Documentation and Handover**: Complete design documentation, "as-built" drawings, materials certifications, operational manuals, validation reports, and final handover documentation shall be provided as part of the contract deliverables.

Out of Scope: This specification does **not** cover:

- The design or supply of the gantry crane used in the clean area (see separate TS).
- The detailed assembly procedures or tooling for DSM/PP integration (addressed in other documents).
- General building infrastructure unrelated to the cleanroom envelope (except where interface is necessary, for example, building services connections to the cleanroom, or the interface with the building's gantry crane system). The non-clean areas of the PIF (used for initial assembly and staging) are mentioned for context but are outside the scope of the cleanroom construction requirements defined here.
- The following tools are not included within the scope of this technical specification, but are mentioned in the document in order to provide a comprehensive explanation of the clean working areas: transport platforms, lifting and handling tools, and towing heads for component movement.

In summary, this TS defines the full set of requirements necessary to deliver a fully operational clean assembly area within the PIF, suitable for high-precision and contamination-controlled integration of in-vessel components, from design through commissioning and handover.

The main technical characteristics of supply is structured in the following subsections:

5.1 Cleanroom Zoning and Layout

The clean assembly area is represented in Figure 2. The layout includes:

-A high-bay zone with approximately 9 m internal height, intended for operations requiring overhead crane access, such as DSM-to-PP integration.

-A lower-height zone of approximately 6 m, designed for sub-assembly, tenants installation, staging, and ancillary operations not requiring vertical lifting.

This dual-height configuration supports optimal space utilization. Both zones are within the same cleanroom envelope and conform to the same environmental specifications.

5.2 Environmental and Cleanliness Requirements.

The clean area must maintain ISO 14644-1 Class 8 cleanliness or better at all times. In addition, all surfaces, equipment, materials, and operations within the clean area must comply with ITER Vacuum Quality Classification VQC-1 and RCC-MR RF 6241 Level I requirements, which apply to components used in ultrahigh vacuum environments.

- **Environmental Control:** The cleanroom must maintain temperature at 20°C ±2°C and relative humidity below 70%. The clean area shall be equipped with HEPA filters of class H13 or higher (EN 1822), providing at least 99.95% efficiency at 0.3 μm. Use of H14 filters is permitted and encouraged for additional performance margin. In auxiliary areas (e.g. personnel airlocks), lower-class filters (H11 or H12) may be acceptable provided ISO 8 cleanliness is maintained at all times.
- **Materials and Surfaces:** Walls, ceilings, and floors must be made from non-porous, non-shedding, and low-outgassing materials. Stainless steel (316L), anodized aluminum,

and epoxy-coated surfaces are preferred. Flooring must be antistatic and resistant to cleanroom chemicals.

- **Air Quality:** Air entering the clean area must contain no more than 5 x 10^6 particles/m^3 for particle size >0.5 μm. All HVAC systems shall ensure uniform flow, eliminate stagnant zones, and prevent contamination transfer.
- **Lighting:** LED lighting shall be optimized for low particle emission and minimal heat load, with sufficient illumination for precision work.
- **Daily Monitoring**: Environmental conditions and airborne particulate counts must be monitored daily and recorded. Corrective action shall be taken if values exceed defined thresholds.
- **Segregation and Containment:** Clean assembly area shall be completely segregated from non lean areas of PIF by using sealed, airtight partitions. Areas for DSM and PP assembly must be enclosed and isolated using dedicated airlocks.
- **Prohibited Materials:** Lead, zinc, carbon steel, PVC, plasticizers, VOC-emitting lubricants, and non-approved adhesives are not permitted. Only ITER-approved vacuum-compatible materials may be used inside the clean area.
- **Cleanliness Protocols:** Personnel shall follow strict gowning and cleanliness protocols, including clean gloves, garments, and overshoes. Equipment entering the clean area must be clean, grease-free, and wiped down. Reusable tools must remain in the cleanroom, and single-use tools shall be new and cleaned before use.
- **Sub-Zoning and Isolation**: The cleanroom will be subdivided into multiple zones based on assembly line functions. Each zone must independently meet ISO Class 8 / VQC-1 requirements. Contaminated subzones can be isolated and decontaminated without affecting the rest of the cleanroom.
- **ITM Cleaning Zone:** A dedicated cleaning zone within the cleanroom shall be provided for localized decontamination in case contamination is detected during assembly. It shall include solvent dispensers, vacuum lines, and appropriate containment for contaminated waste.

5.3 Handling and Internal Transport Compatibility

To minimize overhead crane operations inside the clean area, the handling of large components (e.g., Port Plugs and DSMs) shall be performed using custom lifting and handling tools mounted on platform-style transport bases. These platforms will be connected to cleanroom-compatible tractor heads (tugs), capable of moving heavy assemblies within the clean area while maintaining cleanliness. The procurement of these platforms is included in the scope of another future contract; their explanation is included here for illustrative purposes only, to illustrate the functionality of the clean area zones.

The clean area layout and infrastructure shall permit the unobstructed passage of these transported volumes throughout the clean zone and along the designated assembly lines. Therefore, the floor must be uniform, smooth, sealed, and antistatic, with no steps, gaps, or irregularities that would impede the movement of platforms or compromise cleanroom performance.

Each transport platform must be constructed using cleanroom-compatible materials and fitted with cleanable wheels. A dedicated area, should de defined at entrance of clean area. Wheels shall be cleaned prior to entering the clean zone. Only in exceptional operations—specifically

the vertical insertion of DSMs into the PPs—will the cleanroom-compatible gantry crane be used, as described in a separate Technical Specification.

The design must account for smooth internal circulation of components, ensuring that the clean area can support the full handling workflow without compromising contamination control. Figure 3 (referenced in the original document) provides representative examples of platform-based movement systems.

All routes, including entry and exit paths to and from airlocks, shall accommodate these volumes, and turning radii, clearance zones, and load transfer points must be integrated into the layout design.

5.4 Access Control and Airlock Interfaces

To ensure strict environmental isolation, access to the clean area shall be controlled through dedicated airlock systems that separate the cleanroom environment from rest of PIF non clean areas. These airlocks shall be designed to maintain pressure cascade, prevent contamination inflow, and enable safe transition for personnel and materials.

Personnel Airlocks (PALs): Each personnel entry point shall be equipped with an interlocked double-door airlock system. These PALs shall include gowning areas, tacky mats, glove dispensers, and optional air showers. Full gowning procedures must be implemented, including coveralls, gloves, overshoes, and head coverings.

Material Airlocks (MALs): Material entry points shall include high-clearance airlocks (minimum 2 m wide × 3 m high) fitted with interlock systems and ventilation for purge cycles. These airlocks will include cleaning and inspection zones, wipe-down stations, and cleanroom-compatible doors with airtight seals.

Airlock Design Requirements:

- Both PALs and MALs must have smooth, non-porous, and cleanable surfaces.
- Interior finishes shall be resistant to frequent cleaning and compatible with cleanroom protocols.
- Doors must include gaskets and interlocks to prevent simultaneous opening.
- Monitoring devices shall indicate pressure differentials and door status.
- Flow Management and One-Way Movement: The layout must ensure unidirectional flow, preventing re-entry of personnel or materials from clean to unclean areas. This applies to tool returns and de-gowning processes.

Segregation by Activity: Personnel and material access shall be routed through separate airlocks to avoid cross-contamination. The location and number of airlocks shall be coordinated with the assembly line layout and cleanroom subzones.

Airlock Integration supporting systems:

Airlocks must be integrated with the HVAC and BMS to maintain pressurization hierarchy.

Emergency exits from the clean area shall preserve integrity and include cleanable, sealed construction.

All airlock operations and protocols must align with ITER access and safety standards. The design shall allow for simultaneous operation of multiple airlocks without compromising the cleanliness class of the assembly area.

5.5 Utilities and Equipment Interfaces

The clean assembly area shall be fully equipped with the required utility interfaces to support the handling, assembly, inspection, and integration operations of in-vessel components under cleanroom conditions. All systems shall comply with the standards applicable in France for industrial facilities, as well as the cleanliness and safety requirements of ISO 14644-1 Class 8 environments and the ITER Vacuum Quality Classification (VQC-1).

Utilities shall include electrical power (single-phase and three-phase), data connectivity, and compressed air. All utility penetrations and interfaces must preserve the integrity of the cleanroom envelope and be validated as compatible with ISO 8 operation.

5.5.1Compressed Air Supply

The cleanroom shall be equipped with a localized compressed air network for use with pneumatic tools, purge systems, and cleaning tasks. The system shall deliver clean, dry air suitable for use around ultra-high vacuum components.

- Air Quality Requirements:
- Compliant with ISO 8573-1:2010 Class 1.4.1:
    - Particles: ≤ 0.1 µm
    - Dew point: ≤ –20 °C
    - Oil: ≤ 0.01 mg/m³
- Design Parameters:
- Flowrate: 1.2 Nm³/min
- Operating pressure: 6 bar (±0.5 bar)
- Distribution and Installation:
- Piping: Stainless steel AISI 316L or clean aluminum.
- Outlets: 6 quick-connect points:
    - 2 in Testing & Assembly zones
    - 2 in DSM integration zones
    - 1 in UDSM/EDSM transfer area
    - 1 in Cleaning Airlock corridor

Each outlet shall include:

- Regulator with gauge
- Non-return valve
- ISO B or C quick coupler
- Integration and Maintenance:
- Compressor and dryers shall be located outside the clean zone.
- Final filtration may occur at manifold entry or outlet point.
- Inline filters must be monitored and replaced per schedule.
- Filter change logs and inspection records shall be included in the Quality Dossier.

5.5.2 Electrical and Data Services:

The electrical infrastructure of the clean area shall be designed to support the functional needs of each designated zone, enabling the safe and efficient use of tools, inspection instruments, and

lifting systems. All installations shall be fully compatible with the standard industrial power supply in France (400/230 V – 50 Hz).

Electrical supply points shall be limited to the clean area zones only, as highlighted in blue in Figure 1 of this document. Rest of areas are out of the scope of this TS, so electrical outlets located in red, yellow, or green zones are out of the scope of this Technical Specification.

- Power Supply Configuration:
- 25 single-phase outlets (230 V / 16 A), type Schuko or industrial socket, IP55-rated.
- 7 three-phase outlets (400 V / 32 A), type IEC 60309 CEE-form socket, IP67-rated.
- All outlets shall be protected by appropriate RCDs and MCBs, and installed in accordance with the French NFC 15-100 electrical code.
- Distribution by Zone:

Zone	Single-phase (230V)	Three-phase (400V)	Notes
Transfer of PPs to PPF (8×5 m²)	1	0	Wall-mounted. For auxiliary tools and inspection.
UDSM & EDSM to PP Transfer Area (14×5 m²)	2	1	Free-standing tower.
UDSM & EDSM Testing Area (19×5 m²)	2	1	Central towers for instrumentation.
UPP DSM Assembly, Closure Plate Integration & Testing (10×7 m²)	2	1	Tower + wall outlet.
EPP DSM Assembly, Closure Plate Integration & Testing (10×5 m²)	2	1	Two towers on opposing sides.
Misc Storage Area (10×3 m²)	1	0	Low consumption, wall-mounted.
EDSM 3, 2, 1 Payload Assembly (10×5 m² each)	2 per zone	0	Wall-mounted.
UDSM 2 Payload Assembly (10×7 m²)	2	0	Shared tower with adjacent zone.
Cleaning Airlocks (2 × 7×5 m², 4 × 5×5 m²)	3 total	0	One outlet per two airlocks.

Infrastructure Types:

- Wall-mounted enclosures (IP65, 316L stainless steel or equivalent).
- Free-standing utility towers (H ≈ 1.6 m) with:
  - 2 × 230 V sockets
  - 1 × 400 V socket (where applicable)
  - Optional RJ45 or compressed air point
  - Labeled circuits and grounded metal frame

- Data Connectivity:
- 6 RJ45 (Cat 6 or higher) Ethernet ports distributed across strategic zones.
- Cleanroom-rated cable trays and fully sealed conduits must be used.
- Safety and Identification:
- Visual circuit ID and LED indicators for three-phase sockets.
- All penetrations shall be sealed and certified for ISO 8 operation.

must support various assembly tools and instrumentation, with redundant circuits in critical areas.

- Data and monitoring ports (e.g. Ethernet, fiber optics) shall be integrated at designated workstations.

5.5.3 Vacuum and Cleaning Utilities:

Central vacuum lines or local HEPA vacuum units shall be provided for component and floor cleaning. Wipe-down stations equipped with cleanroom-approved solvents and accessories shall be strategically located.

5.5.4 Demineralized Water Supply:

If required, DI water outlets for auxiliary cleaning stations shall meet ultra-pure standards (resistivity ~18 MΩ·cm). DI piping shall be of vacuum-compatible materials (e.g., PVDF or stainless steel) and properly sealed. If unused, water systems shall be excluded to avoid contamination risks.

5.5.5 Lighting and Ergonomic Systems:

LED lighting shall be installed to ensure adequate and uniform illumination (>500 lux at work surfaces).

Lighting fixtures must be cleanroom-rated and low-outgassing.

5.5.6 Tool and Equipment Compatibility:

All workstations, carts, and fixtures must be constructed from low-outgassing, corrosion-resistant, cleanroom-grade materials.

Mobile equipment must include cleanable wheels and be wiped down prior to entering the clean area.

All utility penetrations into the clean zone must be fully sealed, and all cabling and conduit must be enclosed and easily cleanable. The entire system shall be documented in as-built layouts, with provisions for future expansion or service without impacting cleanliness performance.

5.6 Validation and Documentation

All systems and installations forming part of the clean assembly area shall undergo a thorough validation process to verify compliance with the specified functional, cleanliness, and environmental requirements. The contractor shall develop and implement a comprehensive validation plan addressing the following aspects:

Performance Qualification:

ISO Class 8 certification under “at-rest” and “operational” conditions, including airborne particulate counts, pressure gradients, temperature, and humidity.

Verification of airflow patterns and air change rates using calibrated instruments.

Surface Cleanliness Verification:

Surfaces shall be tested using approved wipe or swab sampling methods to ensure compatibility with UHV standards.

Equipment and structural finishes shall be inspected visually and via particulate contamination testing.

Utility Validation:

Compressed air and DI water systems must be validated against RF 6450 and ISO 8573-1 Class 1.4.1 criteria.

DI water, if used, shall meet ultra-pure standards (resistivity ~18 MΩ·cm) to avoid introducing ionic or particulate contamination.

Documentation Deliverables:

- PQA, PRE and PPSP
- Validation plan and protocol documents
- Commissioning reports including test results and pass/fail criteria
- Equipment notice
- 3rd party legal inspection reports
- Certificates of conformity and calibration for all measurement equipment
- Non-conformance reports (NCRs), corrective actions, and retest results

Maintenance and Inspection Logs:

Baseline condition records for environmental and utility systems

Procedures for periodic revalidation (e.g., annual particle counts, pressure checks)

All validation activities must be witnessed, reviewed, or audited by ITER Organization personnel or their designated inspectors. Final acceptance will be subject to successful demonstration of compliance with all specifications outlined in this document and referenced standards.

5.7 Materials and Durability

All construction and installation materials used in the clean assembly area must meet ITER's strict requirements for low particle generation, vacuum compatibility, and long-term durability in a clean environment. The following criteria apply:

Surface Characteristics:

All materials shall have smooth, non-porous, non-shedding surfaces to minimize particulate accumulation.

Corners, joints, and penetrations must be sealed to prevent dust traps and facilitate cleaning.

Permitted Materials:

Preferred materials include 316L stainless steel, anodized aluminum, cleanroom-grade epoxy coatings, and vacuum-compatible plastics.

All finishes must be chemically resistant to cleaning agents and show no signs of degradation under repeated cleaning cycles.

Cleanroom wall panels and ceilings must be constructed from laminated, non-outgassing materials with resistance to abrasion.

Prohibited Materials:

Use of zinc, carbon steel, PVC, and materials containing plasticizers is strictly forbidden.

No organic materials, greases, or adhesives may be introduced unless certified for vacuum use.

Mechanical and Chemical Durability:

Flooring shall be antistatic and resistant to chemical exposure, scratches, and wear caused by mobile equipment.

Structural materials must retain their mechanical properties under the operating conditions of the clean area (temperature, humidity, load).

Documentation Requirements:

Material data sheets, conformity certificates, and cleaning/bake-out histories shall be provided for all elements installed in the clean area.

ITER reserves the right to audit materials prior to installation and reject any that do not comply with current cleanliness or durability standards.

The overall construction must ensure that the cleanroom remains operational with minimal maintenance for a service life exceeding 10 years, subject to routine cleaning and minor refurbishment cycles

5.8 Commissioning Guidelines

The commissioning phase is essential to verify that all systems and the environment of the clean assembly area meet ITER's performance, safety, and cleanliness requirements. The contractor shall execute a structured commissioning plan that includes the following:

- **Pre-Operational Checks**:
  - Inspection of completed works and conformity with technical drawings.
  - Verification that all components and finishes meet cleanroom specifications.
- **Initial Cleaning and Preparation**:
  - Full surface cleaning of the clean area following cleanroom protocols.
  - Installation and integrity verification of all final HEPA filters.
- **Functional and Environmental Testing**:
  - Measurement of airborne particle counts, temperature, humidity, and pressure stability.
  - Validation of airflow directionality, velocity, and turbulence control.
  - Verification of cleanroom segregation and pressure cascade across airlocks.
- **Utility System Commissioning**:
  - Confirmation that utility systems (compressed air, DI water, power, lighting) operate within defined tolerances and meet purity specifications.
  - Testing of alarm systems, monitoring sensors, and data logging devices.
- **Dry Runs and Workflow Simulation**:
  - Execution of simulated component transfers and assembly processes.
  - Functional checks of lifting tools, transport platforms, and cleanroom tugs.
- **Documentation Requirements**:
  - A full commissioning report, including procedures, data records, and test results.
  - Summary of detected non-conformities and implemented corrective actions.
- **ITER Review and Approval**:
  - All commissioning steps are subject to ITER review and formal sign-off.
  - Final acceptance of the clean area will occur only upon documented approval of the commissioning report.

The commissioning plan must be aligned with the validation strategy and must not compromise the environmental integrity of the clean area at any stage.

5.9 Maintenance and Serviceability

The clean assembly area shall be designed to support routine maintenance, cleaning operations, and service interventions without compromising cleanliness standards or workflow continuity. The following criteria shall be fulfilled:

- **Accessible Infrastructure**:
  - All utility systems (HVAC, lighting, compressed air, DI water) shall be accessible from outside the clean zone, ideally via the accessible ceiling zone or dedicated technical corridors.
  - Filter units, lights, and sensors shall be replaceable without opening the clean envelope.
- **Service Zones and Maintenance Areas**:
  - A walkable ceiling zone or technical mezzanine shall be provided for inspection and maintenance access.
  - Service hatches, panels, and maintenance platforms shall be incorporated where required.
- **Surface Cleaning Protocols**:
  - All surfaces shall be compatible with regular cleaning cycles using approved detergents or solvents.
  - Maintenance equipment and cleaning tools shall be dedicated to the cleanroom or cleaned before use.
- **Preventive Maintenance Plan**:
  - The supplier shall provide a preventive maintenance schedule for all installed systems and components.
  - The plan shall include filter replacement intervals, HVAC inspections, lighting tests, and airlock mechanism checks.
- **Downtime Minimization**:
  - The layout shall allow partial shutdown or isolation of sub-zones for maintenance, without affecting the entire cleanroom.
  - Key operations (e.g., airlock cleaning, filter swap) must be executable with minimal disruption.
- **Spare Parts and Consumables**:
  - The supplier shall deliver a recommended spare parts list and maintenance kit.
  - Consumables (e.g., HEPA filters, gaskets, lights) must be replaceable with minimal disassembly.

These provisions shall ensure that the clean assembly area maintains consistent operational performance, supports rapid intervention when needed, and remains compliant with ITER standards for years of service.

5.10 Warranty

The contractor shall provide a comprehensive warranty for all works, systems, components, and materials delivered under this specification. The warranty shall ensure that the clean assembly area remains fully operational and compliant with all specified requirements throughout the warranty period. The following conditions apply:

- Warranty Period: A minimum warranty period of 24 months from the date of provisional acceptance by the ITER Organization, unless otherwise agreed in writing.
- Coverage: The warranty shall cover all defects in materials, workmanship, equipment performance, and system integration. It shall include all costs associated with corrective actions, including labor, materials, transport, and on-site interventions.

- Response Time: The contractor shall respond promptly to any failure or defect notification. A preliminary diagnosis shall be provided within 48 hours of notification, and corrective actions initiated within five (5) working days, unless otherwise approved by ITER.
- Corrective Measures: All defective elements shall be repaired or replaced with equivalent or improved items. Repairs shall restore full compliance with the original design requirements without compromising the cleanroom environment.
- Post-Warranty Support: The contractor shall indicate the availability of spare parts and technical support beyond the warranty period and shall include options for service contracts or extended warranty agreements if requested by ITER.
- Documentation: The contractor shall provide a complete warranty dossier, including terms and conditions, contact details for warranty support, and a procedure for initiating claims.

The ITER Organization reserves the right to perform audits and inspections during the warranty period to verify compliance and monitor the performance of the delivered systems.

6 Location for Scope of Work Execution

All works covered under this Technical Specification shall be executed on the ITER site, located in Saint-Paul-lez-Durance, southern France, within the premises of the Port Integration Facility (PIF), Building 55.

The clean assembly area will be constructed and integrated into a designated internal section of the in vessel PIF, as defined by the latest civil layout drawings provided by the ITER Organization. The contractor shall coordinate with ITER site management and engineering teams to ensure alignment with overall facility operations, building constraints, and logistical planning.

Site-specific conditions include:

- Controlled access to the ITER site (badging, security clearance, working hours, etc.).
- Compliance with ITER site safety rules and environmental protection policies.
- Coordination with other ongoing construction and installation activities.
- Adherence to applicable French and European construction regulations and codes.
- The contractor is responsible for all preparatory work, installation, commissioning, and handover activities to be completed on site. Off-site prefabrication or testing may be permitted subject to ITER approval, provided traceability and quality assurance requirements are met.
- Logistics plans, transport of equipment and materials, as well as site delivery schedules, shall be reviewed and approved by ITER in advance. Temporary staging areas may be made available within the PIF under specific coordination arrangements.

7 Deliverables and Schedule Milestones

The delivery period for all works and documentation defined in this Technical Specification shall not exceed **6 months** from the kick-off meeting (T0), unless otherwise approved by ITER.

All technical documentation must be submitted for review and approval by ITER prior to physical delivery of systems or materials. The final delivery shall only be accepted after successful commissioning and validation as outlined in Section 5.7.

7.1 List of deliverable documentation

The Supplier shall provide IO with the documents and data required in the application of this Technical Specification, the GM3S Ref [1] and any other requirement derived from the application of the contract.

The minimum list of documentation, but not limited to, that are required within the expected timing:

Category	Document Type	Further Description **	Expected Timing (T0+x) *
Documentation	General Documentation and Dossier	Technical files, material certificates, conformity and safety documentation PQA, PRE and PPSP	T0 + 4 weeks
Design Documentation	As-built Drawings and Schematics	Final 2D layouts, P&IDs, cleanroom zoning and utility interfaces	T0 + 2 months
Validation Protocols	Commissioning Plan and Validation Reports	Testing plans, ISO Class 8 certification, particle counts, airflow validation	T0 + 5 months
Training	Training Materials and Records	Training program for ITER personnel, attendance records	T0 + 5.5 months

(*) T0 = Kick-off Meeting Date of the contract; in 1 month.

(**) The deliverable includes the delivery of the item (gantry) at IO premises along with the approved supply Dossier which shall at minimum all documents cited in this Technical Specification.

8 Quality Assurance requirements

The Quality class under this contract is QC-1, [2] GM3S section 8 applies in line with the defined Quality Class.

9 Evaluation Requirements

The contractor must demonstrate adequate experience and technical capability to undertake the design and delivery of cleanroom infrastructure for nuclear or high-tech industrial environments. To that end, tentatively, the following requirements are expected. The detailed evaluation criteria will be defined when the ITER Organization decides to launch the tendering process:

Relevant Experience: The contractor shall provide references for at least two (2) projects involving the design and installation of clean environments, large-scale industrial assembly areas, or heavy-load handling infrastructure.

Quality Certifications: The contractor must hold valid quality certifications such as ISO 9001 or equivalent standards relevant to industrial design, cleanroom construction, or manufacturing.

Competence of Key Personnel: Key personnel involved in design, installation, and commissioning shall have documented experience and qualifications aligned with the project scope and complexity.

Compliance with ITER Requirements: The contractor shall demonstrate understanding and readiness to apply ITER-specific technical, safety, and quality standards throughout project execution.

NOTE: The contractor remains responsible for identifying and proposing solutions to any additional requirements or regulatory adjustments that may arise during the course of the project. Such modifications shall be subject to formal review and approval by ITER Organization.

10 Safety requirements

The scope under this contract does not cover for PIC and/or PIA nor PE/NPE components, [2] GM3S section 5.3 applies.

11 Special Management requirements

Requirement [1] GM3S section 6 applies in full.

china eu india japan korea russia usa
Route de Vinon-sur-Verdon - CS 90 046 - 13067 St Paul Lez Durance Cedex - France

MARKET SURVEY/ REQUEST FOR INFORMATION (RFI)

REF. IO/MS/25/AJI

Supply, Construction and installation of Clean Assembly Area (ISO Class 8 Cleanroom) for in-vessel Port Integration Facility (PIF) at ITER site (Cadarache-France).

Firms interested in participating in this market survey shall return a completed questionnaire to the following email address amankumar.joshi@iter.org, and chloe.perret@iter.org , no later than 14-05-2024.

Please note that this is not a Call for Nomination request. At this moment, the ITER Organization (IO) is preparing a procurement strategy for this project.

1. General information about the Company / Institute compiling the questionnaire

china
eu
india
japan
korea
russia
usa

Company Name: …….
Adress: …….

Persons to be contacted:

Contact person	*Name + Title*	*Email address*	*Telephone*
Commercial:			+
Technical :			+

Main activities

Main activities	*Description*
1.	
2.	
3.	
…….	

Turnover

Contact person	*Turnover 2022*	*Turnover 2023*	*Turnover 2024*	*Number of employees*
All activities				

2. *Questionnaire*

2.1 Supply Capability – Checklist

2.1.1. Cleanroom Structural Envelope: Construction of walls, ceilings, and floors achieving ISO 14644-1 Class 8 cleanliness standards, including:

- ***High-clearance zone: Approx. 13 m x 10 m with 9 m internal height.***
- ***General clean area: Approx. 40 m x 15 m with 6 m internal height.***

Please confirm your ability to execute both height zones with the required dimensions?

YES ☐ **NO** ☐

2.1.2. Are you familiar and confirm your ability to work with HVAC System: High-performance HVAC with HEPA filtration (H13/H14 filters) and positive pressure control?

YES ☐ **NO** ☐

2.1.3. Are you familiar and confirm your ability to work with Access Control (Airlocks): Personnel Air Locks (PALs) and Material Air Locks (MALs) with pressure cascade? management..

YES ☐ **NO** ☐

2.1.4. Are you familiar and confirm your ability to work with Utility Integration: Compressed air, electrical power, data connectivity with cleanroom compatibility?

YES ☐ **NO** ☐

2.1.5. Are you familiar and confirm your ability to work with Cleanroom Validation: Cleanroom validation and certification to ISO 14644-1 Class 8?

YES ☐ **NO** ☐

2.1.6. Are you familiar and confirm your ability to work with UHV-Compatible Materials: Use of low-outgassing, non-shedding, vacuum-compatible materials?

YES ☐ **NO** ☐

Please provide overview and/or any complementary information:

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2.2 *Technical Capabilities and Certifications*

2.2.1. ***Does your company have Relevant Experience: Experience in cleanroom construction or high-purity environments (please describe relevant projects)?***

YES ☐ **NO** ☐

2.2.2. ***Does your company have certification for Quality and Certifications: ISO 9001 or other applicable certifications?***

YES ☐ **NO** ☐

2.2.3. ***Does your company have the ability to provide the full technical documentation (manuals, certificates, validation reports)?***

YES ☐ **NO** ☐

2.2.4. ***Does your company have the capability for Maintenance Support: Availability of maintenance and post-delivery service support?***

YES ☐ **NO** ☐

Please provide overview and/or any complementary information:

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2.3 Additional Technical and Commercial Questions

2.3.1. On-Site Commissioning: Does your company have the ability to perform installation, commissioning, and validation at ITER site?

YES ☐ **NO** ☐

2.3.2. Does your company provide Warranty and After-Sales Service: Provided directly or via third parties?

YES ☐ **NO** ☐

2.3.3. Execution Schedule: Estimated completion time from Purchase Order (PO) issuance to full installation and validation?

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2.3.4. Subcontracting: Indicate any work packages to be executed by subcontractors.

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Please provide an overview and/or any complementary information:

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3. Please indicate any other information that may be relevant for this Market Survey.

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4. *Cost Estimation*

Please provide your non-binding cost estimation according to Technical Description in the following format. It is requested from the potential suppliers to segregate the costs related to row material procurement, manufacturing, contract management and transportation.

Equipment	Materials cost €	Manufacturing cost/Fabrication €	Contract Management cost/Engineering €	Transportation costs €	Installation & Commissioning cost €	Total Cost €
Supply, Construction and installation of Clean Assembly Area (ISO Class 8 Cleanroom) for in vessel Port Integration Facility (PIF)						

Note: All the companies who participate in this questionnaire are requested to submit the cost estimation as non-binding basis. The target uncertainty of the estimation should be within +/-15%. The information will help the IO to estimate the approximately level of the market prices.

Please indicate your budgetary price in Euros (€) net of all duties and taxes. As an international organization the ITER Organization is exempt from all taxes and duties. For the delivery, please consider DAP Incoterms 2020, Saint Paul les Durance, France.

5. *Additional Comments*

Please provide any other relevant information, including references from similar projects, available documentation, technical advantages, or other elements to support your offer.

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Signature: COMPANY STAMP

Name: .....

Position: .....

Tel: .....

Date: .....