**外部委託業者の募集**

References: IO/MS-Ⅱ/25/AJI

**“Supply, Construction and Installation of Large Thermal Cycling and Baking Furnace for the Port Integration Facility (PIF)”**

（ポート統合設備のための大規模熱サイクルと焼成炉の供給、建設と据え付けの市場調査）

IO 締め切り 2025 年 12 月 4 日(木)

**〇前文**

本技術仕様書は、技術要件の完全な一部を構成する「サービスおよび供給のための一般管理仕様書（GM3S）[1]」と併せて読む必要があります。

GM3S は技術要件の不可欠な一部を構成します。

**〇はじめに**

本技術仕様書は、大型金属部品および構造物（計測ポートプラグ、計測遮蔽モジュール、ポートプラグ構造など）を対象とした大規模な熱サイクルおよびベーキング炉の設計、運用、性能要件を定義します。これらの部品は計測システムの統合に不可欠であり、運用中に超高真空（UHV）条件を満たす必要があります。そのため、熱サイクルおよびベーキングは洗浄工程の一部として実施され、ホットヘリウム漏れ試験の除去を補う手段となります。

これらの部品の製造は世界中の複数のサプライヤーおよび国内機関に分散されています。現行の製造仕様には熱ベーキングサイクルの要件が含まれていますが、メーカーは必要なサイズと技術的能力を備えた施設へのアクセスに大きな課題があると一貫して報告しています。各サプライヤーサイトに同様の大規模設備を設置することは、非効率的で高コスト、かつ物流的に複雑です。

これらの制約に対応するため、代替アプローチが提案されています。製造時に熱サイクルを要求する代わりに、納入時により厳格な洗浄および表面仕上げ基準を適用します。さらに、ポート統合施設での組立時にすべての部品に対して熱サイクルおよびベーキングを実施するための集中施設を提供します。この解決策により、処理の一貫性が確保され、資源の重複が削減され、UHV 要件への適合が保証されます。

本文書は、この集中型熱サイクルおよびベーキングシステムの建設、設置、試運転に関する技術的、機能的、設計要件を規定します。容量、温度制御、安全対策、運用手順、既存の組立ワークフローとの統合に関する詳細を含みます。

**〇作業範囲**

本セクションは、参照[1]で定義された契約実行要件に加え、サービスの具体的な作業範囲を定義します。作業範囲には、ステンレス鋼製の大型金属部品を処理するための産業用熱サイクル炉の設計、製造、供給、設置、および試運転が含まれます。

炉は、制御された雰囲気条件下で低温熱サイクル操作を実施でき、作業領域全体にわたって正確かつ均一な温度分布を提供する能力を備えていなければなりません。
システムは、安全性、性能、エネルギー効率に関するすべての適用可能な欧州連合（EU）規制および標準に準拠する必要があります。

## 1 供給される装置

炉は、大型金属部品の熱サイクルに適した、水平型・電気加熱式・雰囲気制御チャンバー炉でなければなりません。
炉には、床置きの可動式積載プラットフォームを備え、プラットフォームは縦方向にスライドできる設計とし、天井クレーンによる積み込み・積み下ろしを容易にします。このプラットフォームは重量物に対応し、運転中の安定性と再現性のある位置決めを確保する必要があります。
炉のチャンバーは気密構造とし、空気中および不活性ガス（アルゴン）雰囲気下での運転を可能にする設計とします。設計は、最適な温度均一性、信頼性のある制御、大型金属部品（最大重量50トン）の安全な取り扱いを保証する必要があります。
装置はモジュール設計とし、容易に保守でき、連続的な産業運転に対応できる準備が整っていることが求められます。
主要な寸法および機能パラメータ：

- 有効内部寸法：6.0 m（長さ）× 3.0 m（幅）× 3.5 m（高さ）
- 最大積載能力（スライディングプラットフォーム上）：50メートルトン
- 最大運転温度：250 ℃
- 最大昇温速度：5 ℃/時間
- 最大制御冷却速度：5 ℃/時間
- 温度均一性：±2 ℃（EN ISO 23693またはAMS 2750 Class 2相当で検証）
- 雰囲気：空気または不活性アルゴン
- 運用場所：欧州連合領域

## 2 炉の構造

炉の構造は、繰り返しの熱サイクルに適した高品質な材料で製作されるものとします。内部チャンバーはステンレス鋼304または316で構成し、プロセス条件下での酸化および腐食に対する耐性を確保します。

断熱材は、EN 14303に準拠した多層高性能セラミックファイバーおよび微孔質断熱材で構成し、熱損失を最小化し、安定した熱条件を維持できる設計とします。外装は塗装炭素鋼またはステンレス鋼パネル製とし、EN ISO 13732-1に従って外表面温度を制限するために適切な換気を施します。

炉には、耐熱シールおよび機械式ロック機構を備えた気密構造の垂直開閉式ドアを設けます。ドアシステムには、運転中または炉がアルゴン雰囲気下にある場合に開放を防止するインターロックを含める必要があります。

スライディング式積載プラットフォームは、精密研磨されたレールまたはローラー上を移動し、適切な構造

補強により定格荷重を完全に支持できるものとします。プラットフォームの動作は滑らかで制御されたものであり、手動補助またはモーター駆動とし、機械式ストッパー、安全ロック、位置表示器を備えます。設計は、運転中にプラットフォームと炉本体の間で気密シールを確保することが求められます。

**3 設置、試運転、およびトレーニング**

サプライヤーは、炉の納入、設置、位置合わせ、および試運転を、顧客サイト（ITER機構敷地内の建物55にあるポート統合施設）で実施する責任を負います。

現地受入試験（SAT）には、温度均一性の検証、雰囲気システムの機能試験、およびEN 746-1に準拠した安全システムの完全な検証が含まれます。

オペレーターおよび保守担当者向けのトレーニングは英語で実施し、運転、安全性、トラブルシューティングに関する理論および実技指導を含むものとします。トレーニング資料は印刷版および電子版で提供されます。

**○ 文書、成果物および支払いスケジュール**

サプライヤーは、以下を含む英語の完全な文書セットを提供するものとします：

- 一般配置図および組立図
- 電気、空気圧、ガスの回路図
- 操作および保守マニュアル
- 熱電対およびコントローラーの校正証明書
- 温度均一性および気密性試験報告書
- CE適合宣言および適合証明書
- 推奨予備部品リストおよび予防保全計画

すべての文書は、EN ISO 82079-1（使用説明書の作成）に準拠する必要があります。

サプライヤーは、関連する支払いマイルストーンを含む以下のプロジェクトスケジュールを遵守するものとします。すべての支払いは、対応する成果物の完了およびIOによる正式な受け入れ後に行われます。

**フェーズ別成果物の説明、目標完了時期、支払い割合、受け入れ基準**

| フェーズ | 成果物の説明 | 目標完了時期 | 支払い（契約額%） | 受け入れ基準 |
|---|---|---|---|---|
| 1 | 詳細設計、一般配置図、制御アーキテクチャ、購入者承認用文書 | T0 + 2か月 | 10% | 設計文書の承認 |
| 2 | 主要部品（加熱要素、断熱材、制御システム、ガスシステム）の調達および製造開始 | T0 + 4か月 | 20% | 材料適合性確認の検査報告 |
| 3 | 炉の製作完了および工場受入試験（FAT） | T0 + 6か月 | 35% | FAT報告書の承認 |

| フェーズ | 成果物の説明 | 目標完了時期 | 支払い（契約額%） | 受け入れ基準 |
|---|---|---|---|---|
| 4 | 現場への納入および設置完了（機械、電気、制御システム） | T0 + 7 か月 | 15% | 外観検査および設置チェックリストの承認 |
| 5 | 現地受入試験（SAT）、校正、均一性および雰囲気試験を含む完全運転の実演 | T0 + 7 か月 | 15% | SAT報告書の署名および承認 |
| 6 | 最終文書、トレーニング完了、保証開始 | T0 + 8 か月 | 5% | 全文書およびトレーニング証明書の納品 |

(*) T0 = 契約開始日（単位：か月）

サプライヤーは、上記に基づき、GM3S参照[1]付録IIにあるテンプレートを使用して文書スケジュールを作成することが求められます。

**（以下詳細は技術仕様書を参照ください）**

【※　詳しくは添付の英語版技術仕様書「**Technical Specification of Furnace for Thermal Cycling and Atmospheric Baking of Big Diagnostic Port Plug Components in the ITER Port Integration Facility**」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: 7 November 2025

Ref: IO/MS-II/25/AJI

**Subject: Letter of Invitation for Supply, Construction and Installation of Large Thermal Cycling and Baking Furnace for the 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 Large Thermal Cycling and Baking Furnace for the 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 will follow.

china
eu
india
japan
korea
russia
usa

Please note that this is not a Call for Nomination.

You will find enclosed the Technical Summary 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 4 December 2025**, to the following email address **amankumar.joshi@iter.org, and chloe.perret@iter.org**.

Thanks in advance for your co-operation.

Yours faithfully,

Andrew Brown
Section Leader, Procurement Operational Delivery Section
Procurement Division

IDM UID
F6TCBB

VERSION CREATED ON / VERSION / STATUS
22 Oct 2025 / 1.1 / Approved

EXTERNAL REFERENCE / VERSION

**Technical Specifications (In-Cash Procurement)**

# Technical Specification of Furnace for Thermal Cycling and Atmospheric Baking of Big Diagnostic Port Plug Components in the ITER Port Integration Facility

Technical Specification of Furnace for Thermal Cycling and Atmospheric Baking of Big Diagnostic Port Plug Components in the ITER Port Integration Facility

# Technical Specification of Furnace for Thermal Cycling and Atmospheric Baking of Big Diagnostic Port Plug Components in the ITER Port Integration Facility

## Table of Contents

# 1 Preamble

This Technical Specification must be read in conjunction with the General Management Specification for Service and Supply (GM3S) – [Ref 1], which forms an integral part of the technical requirements.

# 2 Introduction

This technical specification defines the design, operational, and performance requirements for a large-scale thermal cycling and baking furnace intended for big metallic components and structures of the Diagnostic Port Plugs (Diagnostic Shielding Modules, Port Plug Structures, etc…). These components are critical for the integration of diagnostic systems and must comply with ultra-high vacuum (UHV) conditions during operation. To achieve this, thermal cycling and baking are implemented as part of the cleaning process, serving as a compensatory measure for the removal of hot helium leak testing.

The manufacturing of these components is distributed across multiple suppliers and domestic agencies worldwide. Current fabrication specifications include the requirement for thermal baking cycles; however, manufacturers consistently report significant challenges in accessing facilities with the necessary size and technical capabilities to perform these processes. Establishing similar large-scale installations at each supplier site would be inefficient, costly, and logistically complex.

To address these constraints, an alternative approach is proposed. Instead of requiring thermal cycling at the point of manufacture, stricter standards for cleaning and surface finishing will be enforced upon delivery. Furthermore, a centralized facility will be provided to perform thermal cycling and baking for all components during their assembly at the Port Integration Facility. This solution ensures uniformity in processing, reduces multiplication of resources, and guarantees compliance with UHV requirements.

This document specifies the technical, functional, and design requirements for the construction, installation, and commissioning of this centralized thermal cycling and baking system. It includes details on capacity, temperature control, safety measures, operational procedures, and integration with existing assembly workflows.

# 3 Acronyms & Definitions

## 3.1 Acronyms

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

| Abbreviation | Description |
|---|---|
| CAD | Computer Assisted Design |
| CRO | Contract Responsible Officer |
| DA | Domestic Agency |
| FAT | Factory Acceptance Tests |
| GM3S | General Management Specification for Service and Supply |
| HMI | Human-Machine Interface |
| IO | ITER Organization |
| PIA | Protection Important Activity |

| | |
|---|---|
| PIC | Protection Important Component |
| PID | Proportional-Integral-Derivative |
| PLC | Programmable Logic Control |
| QA | Quality Assurance |
| QC | Quality Control |
| SAT | Site Acceptance Tests |
| UHV | Ultra-High Vacuum |

### 3.2 Definitions

**Contractor:** shall mean an economic operator who have signed the Contract in which this document is referenced.

Other definitions can be examined in the section 2.1 of the GM3S Ref [1] and may be required to ensure proper understanding of the document.

## 4 Applicable Documents & Codes and standards

### 4.1 Applicable Documents

It 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 Procurement Quality Requirements | 22MFG4 | 5.1 |
| 3 | Procurement Requirements for Producing a Quality Plan | 22MFMW | 4.0 |
| 4 | Software qualification policy | KTU8HH | 2.0 |
| 5 | Procedure for ITER CAD Data Exchanges | 2NCULZ | 4.2 |
| 6 | ITER Vacuum Handbook | 2EZ9UM | 2.5 |

### 4.2 Applicable Codes and Standards

The thermal cycling and baking cycle parameters shall be fully aligned with the requirements specified in the ITER Vacuum Handbook and its appendices and attachments - Ref [6]. All operational settings, including temperature ranges, ramp rates, and hold times (described in this Technical Specification), must comply with the standards outlined in the handbook to ensure consistency, safety, and compatibility with ITER vacuum system specifications.

In addition, the furnace shall conform to the following European Directives and Standards:

- 2006/42/EC – Machinery Directive
- 2014/35/EU – Low Voltage Directive
- 2014/30/EU – Electromagnetic Compatibility Directive
- 2014/68/EU – Pressure Equipment Directive (for gas circuits)
- EN 746-1, EN 746-2, and EN 746-3 – Industrial Thermoprocessing Equipment Safety Standards
- EN 60204-1 – Safety of Electrical Equipment of Machines
- EN ISO 12100 – Machinery Safety – Risk Assessment
- Ecodesign Directive (2009/125/EC)
- Other specific European and ISO Standards pointing to the different technical aspects of the equipment and mentioned in the sections hereafter.

## 5 Scope of Work

This section defines the specific scope of work for the service, in addition to the contract execution requirement as defined in Ref [1].

The scope includes the design, manufacture, supply, installation, and commissioning of an industrial thermal cycling furnace intended for the treatment of large metallic components made of stainless steel.

The furnace shall be capable of performing low-temperature thermal cycling operations under controlled atmosphere conditions, providing precise and uniform temperature distribution across the entire working volume. The system shall comply with all applicable European Union regulations and standards concerning safety, performance, and energy efficiency.

### 5.1 Equipment to be Supplied

The furnace shall be a horizontal, electrically heated, atmosphere-controlled chamber furnace suitable for the thermal cycling of large metallic parts.

It shall include a movable floor-mounted loading platform, designed to slide longitudinally for convenient loading and unloading by overhead crane. The platform shall be designed to accommodate heavy loads and ensure stable, repeatable positioning during operation.

The furnace chamber shall be gas-tight and constructed to allow operation both in air and under an inert argon atmosphere. The design shall ensure optimal temperature uniformity, reliable control, and safe handling of large metallic parts weighing up to fifty tonnes.

The equipment shall be of modular design, easily maintainable, and prepared for continuous industrial operation.

Main dimensional and functional parameters:

- Useful internal dimensions: 6.0 m (L) × 3.0 m (W) × 3.5 m (H)
- Maximum load capacity (on sliding platform): 50 metric tons
- Maximum operating temperature: 250 °C
- Maximum heating rate: 5 °C/hour
- Maximum controlled cooling rate: 5 °C/hour

- Temperature uniformity: ±2 °C (verified according to EN ISO 23693 or AMS 2750 Class 2 equivalent)
- Atmosphere: Air or inert argon
- Location of operation: European Union territory

## 5.2 Furnace Construction

The furnace structure shall be fabricated from high-quality materials suitable for repeated thermal cycling. The internal chamber shall be constructed from stainless steel grade 304 or 316, ensuring resistance to oxidation and corrosion under process conditions.

Thermal insulation shall be composed of multi-layer, high-performance ceramic fiber and microporous insulation materials compliant with EN 14303, designed to minimize heat loss and maintain stable thermal conditions. The outer casing shall be made of painted carbon steel or stainless-steel panels, adequately ventilated to limit external surface temperatures in accordance with EN ISO 13732-1.

The furnace shall include a hermetically sealed door, operated vertically, with heat-resistant seals and mechanical locking mechanisms. The door system shall include interlocks preventing it from being opened during operation or when the furnace is under argon atmosphere.

The sliding loading platform shall move along precision-ground rails or rollers and shall be capable of supporting the full rated load with appropriate structural reinforcement. The platform movement shall be smooth and controlled, either manually assisted or motor-driven, and provided with mechanical stops, safety locks, and position indicators. The design shall ensure gas-tight sealing between the platform and the furnace body during operation.

### 5.2.1 Heating and Temperature Control

The furnace shall be heated by electrical resistance elements made of nickel-chromium (NiCr) or equivalent high-temperature alloys conforming to EN 60115-1. Heating elements shall be distributed symmetrically within the furnace walls and ceiling to provide homogeneous temperature distribution throughout the working chamber.

The heating system shall be divided into independently controlled zones to achieve the required temperature uniformity. Each zone shall be equipped with a separate thermocouple and power regulation circuit.

Temperature control shall be achieved using Proportional-Integral-Derivative (PID) controllers integrated in a programmable logic control (PLC) system.

The furnace shall maintain a maximum temperature deviation of ±5 °C from the setpoint across the usable volume. Control accuracy shall be demonstrated by means of a uniformity test in accordance with EN 60584-1 (thermocouples) and EN ISO 23693 (temperature uniformity survey).

The furnace shall operate safely and reproducibly within the following limits:

- Maximum working temperature: 250 °C
- Maximum heating rate: 5 °C/hour

- Maximum controlled cooling rate: 5 °C/hour
- Temperature uniformity: ±2 °C across entire load volume

### 5.2.2 Cooling System

Controlled cooling shall be achieved by natural or forced convection, depending on the selected configuration. For forced convection, the furnace shall incorporate circulation fans constructed from high-temperature-resistant alloys and designed to operate under both air and argon atmospheres.

The control system shall regulate fan speed and airflow direction to ensure homogenous cooling and compliance with the specified cooling rate of up to 5 °C/hour. Cooling sequences shall be programmable and automatically managed through the main control system.

### 5.2.3 Atmosphere Control System

The furnace shall be designed to operate under a controlled atmosphere, allowing complete purging of air and replacement with argon gas to reduce oxygen content inside the chamber.

The system shall include gas inlet and exhaust manifolds, valves, pressure regulators, and safety devices designed in accordance with EN ISO 14113 (industrial gas systems) and EN 746-3 (industrial thermoprocessing equipment safety).

The purge process shall be automated, with adjustable flow and pressure parameters. Continuous monitoring of oxygen concentration shall be provided by an oxygen sensor complying with EN 50104, ensuring safe operation. Automatic interlocks shall halt heating if the oxygen concentration exceeds allowable limits.

All piping, valves, and fittings shall be of stainless-steel construction suitable for argon service, with connections designed to minimize leakage and ensure long-term reliability.

### 5.2.4 Control and Automation

The furnace shall be equipped with a PLC-based control system integrated with a touchscreen human–machine interface (HMI). The control system shall allow programming, execution, and monitoring of complex thermal cycles consisting of multiple heating, holding, and cooling stages.

The system shall provide real-time monitoring and recording of all critical process parameters including temperature, atmosphere composition, gas flow rates, and safety alarms. Data logging shall be continuous, with automatic storage in electronic format for traceability, in compliance with EN ISO 9001:2015 quality management requirements.

The HMI shall permit:

- Creation and storage of user-defined thermal cycle recipes
- Real-time graphical visualization of temperature curves and system status
- Alarm display and acknowledgment
- Password-protected access levels for operator, supervisor, and maintenance personnel

Data shall be exportable in CSV or PDF format and accessible via Ethernet or OPC-UA for integration with the plant’s supervisory control system.

### 5.2.5 Safety, Certification and Compliance

The furnace shall conform to the following European Directives and Standards:

- 2006/42/EC – Machinery Directive
- 2014/35/EU – Low Voltage Directive
- 2014/30/EU – Electromagnetic Compatibility Directive
- 2014/68/EU – Pressure Equipment Directive (for gas circuits)
- EN 746-1, EN 746-2, and EN 746-3 – Industrial Thermoprocessing Equipment Safety Standards
- EN 60204-1 – Safety of Electrical Equipment of Machines
- EN ISO 12100 – Machinery Safety – Risk Assessment

The equipment shall be CE marked and supplied with a Declaration of Conformity.

Safety features shall include overtemperature protection, emergency stop buttons, door interlocks, gas safety valves, and audible and visual alarms. An oxygen monitoring and alarm system shall ensure safe argon operation. The system shall include emergency venting to prevent overpressure in the chamber.

### 5.2.6 Energy Efficiency

The furnace design shall prioritize energy efficiency in accordance with the Ecodesign Directive (2009/125/EC). Insulation materials and heating control systems shall minimize energy losses and optimize heat recovery.

The supplier shall provide evidence of energy performance, including thermal losses and power consumption data under typical operating conditions, verified according to EN 746-2.

## 5.3 Installation, Commissioning, and Training

The supplier shall be responsible for delivery, installation, alignment, and commissioning of the furnace at the customer’s site: Port Integration Facility in the Building 55 of the ITER Organization premises.

Site acceptance testing (SAT) shall include verification of temperature uniformity, functional testing of the atmosphere system, and full safety system validation in accordance with EN 746-1.

Operator and maintenance training shall be conducted in English and include both theoretical and practical instruction on operation, safety, and troubleshooting. Training materials shall be provided in printed and electronic formats.

# 6 Documentation, Deliverables and Payments Schedule

The supplier shall provide a complete set of documentation in English, including:

- General arrangement and assembly drawings
- Electrical, pneumatic, and gas schematics

- Operation and maintenance manuals
- Calibration certificates for thermocouples and controllers
- Temperature uniformity and gas tightness test reports
- CE Declaration of Conformity and compliance certificates
- Recommended spare parts list and preventive maintenance plan

All documentation shall conform to **EN ISO 82079-1** (Preparation of Instructions for Use).

The supplier shall adhere to the following project schedule, including associated payment milestones. All payments shall be made upon completion of the corresponding deliverable and formal acceptance by the IO.

| Phase | Description of the Deliverable | Target Completion | Payment (% Contract Value) | Acceptance Criteria |
|---|---|---|---|---|
| **1** | Detailed engineering design, general arrangement drawings, control architecture, and documentation for purchaser approval | T0 + 2 months | 10% | Approval of design documents |
| **2** | Procurement of main components (heating elements, insulation materials, control system, gas systems) and start of manufacturing | T0 + 4 months | 20% | Inspection report confirming materials compliance |
| **3** | Completion of furnace fabrication and internal Factory Acceptance Test (FAT) | T0 + 6 months | 35% | FAT report approved |
| **4** | Delivery to site and completion of installation (mechanical, electrical, and control systems) | T0 + 7 months | 15% | Visual inspection and installation checklist approved |
| **5** | Site Acceptance Test (SAT), calibration, and demonstration of full operation including uniformity and atmosphere tests | T0 + 7 months | 15% | SAT report signed and approved |
| **6** | Final documentation, training completion, and warranty activation | T0 + 8 months | 5% | Delivery of all documents and training certificate |

(*) T0 = Commencement Date of the contract; X in months.

Supplier is requested to prepare their document schedule based on the above and using the template available in the GM3S Ref [1] appendix II.

## 7 Quality Assurance requirements

The Quality class under this contract is 2, Ref [1] GM3S section 7 applies in line with the defined Quality Class. 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 Ref [2].

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 Ref [3].

Documentation developed as the result of this task shall be retained by the performer of the task or the DA organization for a minimum of 5 years and then may be discarded at the direction of the IO. The use of computer software to perform a safety basis task activity such as analysis and/or modelling, etc. shall be reviewed and approved by the IO prior to its use, in accordance with Software qualification policy Ref [4].

## 8 Safety requirements

The scope under this contract does not cover for PIC and/or PIA.

## 9 Specific General Management requirements

Requirement for Ref [1] GM3S section 6 applies completed/amended with the below specific requirements.

### 9.1 CAD design requirements

This contract does not imply CAD activities. Contractor may receive CAD data for information purpose only from IO-TRO following rules and guidelines given in Ref [5].

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-II/25/AJI

## Supply, Construction and Installation of Large Thermal Cycling and Baking Furnace for the Port Integration Facility (PIF)

***Firms interested in participating to 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 04 December2025.***

***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** | | | | |

## *Questionnaire*

### 2. *Supply Capability – Checklist*

Please confirm your capability to design, manufacture, supply, and install each of the following systems and subsystems required for the ITER PIF Furnace:

### *2.1 Furnace Chamber and Structure*

- Design and fabrication of a horizontal, atmosphere-controlled furnace with internal dimensions approx. 6.0 m × 3.0 m × 3.5 m.
- Load capacity = 50 metric tons on a movable loading platform.
- Chamber is suitable for operation in air and argon atmosphere with gas-tight sealing.

**YES** ☐ **NO** ☐

Please provide overview and/or any complementary information:

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### *2.2 Heating System and Temperature Control*

- Electrically heated furnace with distributed resistance elements (NiCr or equivalent).
- Independent multi-zone PID control (PLC-based) achieving ± 5 °C temperature uniformity.
- Maximum operating temperature 250 °C, with heating/cooling rates up to 5 °C/h.

**YES** ☐ **NO** ☐

Please provide overview and/or any complementary information:

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### *2.3 Cooling System*

- Controlled cooling via natural or forced convection.
- Regulation of fan speed and airflow under both air and argon atmospheres.

**YES** ☐ **NO** ☐

Please provide overview and/or any complementary information:

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### *2.4 Atmosphere Control System*

- Automated purging and inert gas replacement (argon).

- Gas manifolds, pressure regulation, oxygen monitoring (< 0.1 %), and safety interlocks per EN 746-3.

Please provide overview and/or any complementary information:

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### *2.5 Control and Automation*

- PLC + HMI system with recipe programming, real-time monitoring, and full data logging.
- Remote data export (Ethernet/OPC-UA) and alarm management.

**YES** ☐ **NO** ☐

Please provide overview and/or any complementary information:

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### *2.6 Safety and Compliance*

- Conformity with CE marking and directives: 2006/42/EC, 2014/35/EU, 2014/30/EU, 2014/68/EU.
- Compliance with EN 746-1/2/3, EN 60204-1, EN ISO 12100.
- Overtemperature protection, door interlocks, gas safety valves, emergency stop.

**YES** ☐ **NO** ☐

Please provide overview and/or any complementary information:

.....

.....

### *2.7 Energy Efficiency and Certification*

- Proven low heat loss and insulation performance.

**YES** ☐ **NO** ☐

Please provide an overview and/or any complementary information:

.....

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.....

## 3. *Technical Capabilities and Certifications*

***Does your company or your partners have the following experience and documentation:***

### *3.1. Relevant Experience:*

Please describe previous projects involving large industrial furnaces (> 20 t), atmosphere-controlled or vacuum-compatible.

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### *3.2. Quality System and Certifications:*

Please indicate whether your company holds ISO 9001, EN ISO 3834, or equivalent certifications.

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### *3.3. Documentation and Traceability:*

Ability to provide complete documentation (drawings, operation & maintenance manuals, calibration certificates, CE Declaration, temperature uniformity survey, etc.).

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### *3.4. Maintenance and Service:*

Availability of post-delivery maintenance, calibration, and service support (local or remote

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## 4. Additional Technical and Commercial Questions

### *4.1. On-Site Installation and Commissioning:*

Capability to perform **installation, alignment, and commissioning** at ITER site (Cadarache, France).

Please provide overview and/or any complementary information:

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### *4.2.* Training and Documentation

Provision of operator and maintenance **training** (in English).

**YES** ☐ **NO** ☐

Please provide overview and/or any complementary information:

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***4.3. Warranty and After-Sales Service:***

*Does your company provide standard warranty periods and service arrangements.*

**YES** ☐ **NO** ☐

Please provide overview and/or any complementary information:

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***4.4. Execution Schedule:***

Estimated completion time from **Purchase Order (PO)** to full **Site Acceptance Test (SAT)** completion.

Please provide overview and/or any complementary information:

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***4.5.Subcontracting:***

List of potential subcontractors (if any) and scope of subcontracted activities.

Please provide overview and/or any complementary information:

.....

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***4.6. Consortium***

*Is your company open to set up a consortium with companies from other countries to cover the full scope of work described in the Technical Summary?*

**YES** ☐ **NO** ☐

Please provide overview and/or any complementary information:

.....

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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 by the potential suppliers to segregate the costs related to row material procurement, manufacturing, contract management and transportation.***

| **Equipment** | **Materials cost €** | **Manufacturing & Fabrication cost €** | **Contract Management cost €** | **Transportation cost €** | ***Control & Automation System €*** | ***Installation & Comm cost €*** | **Total Cost €** |
|---|---|---|---|---|---|---|---|
| Large Thermal Cycling and Baking Furnace for PIF | | | | | | | |

*Note: These estimates are for market survey purposes only and are non-binding.*

***All prices shall be in Euros (€) net of all duties and taxes. As an international organization the ITER Organization is exempt from all taxes and duties. The Supply shall be delivered on the basis of DAP Incoterms 2020, Saint Paul les Durance, France.***

## *5. Please indicate any other information that may be relevant for this Market Survey.*

Please provide any other relevant information, including:

- References from similar large furnace projects,
- Technical advantages or patented solutions,
- Availability of test facilities for FAT,
- Estimated lead times for key components (heating elements, insulation, gas systems

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Signature: COMPANY STAMP

Name: .....

Position: .....

Tel: .....

Date: .....