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Technical Specifications (In-Cash Procurement)

Provision of Welding and NDT Engineer Services - Technical Specification

This technical specification provides requirements for supplier of Welding & NDT Engineer services to be procured to the ITER Organization under a dedicated Service Contract.

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1 Preamble

ITER is a joint international research and development project that aims to demonstrate the scientific and technical feasibility of fusion power. The partners in the project - the ITER Parties - are the People's Republic of China, the European Union (represented by EURATOM), India, the Republic of Korea, Japan, the Russian Federation and the USA.

The programmatic goal of ITER is "to demonstrate the scientific and technological feasibility of fusion power for peaceful purposes".

ITER facility is classified as Basic Nuclear Installation (Installation Nucléaire de Base (INB)) in accordance with French Regulation.

In accordance with the ITER agreement, the procurement of the major components of the ITER facility is mostly provided "in-kind" by the ITER Parties via established Domestic Agencies (DA), which place contracts with companies for the fabrication and the supply the equipment. ITER facility is under construction in Cadarache, S^{t} Paul lez Durance, France.

The Divertor is an internal component of the reactor, located at the bottom of the Vacuum Vessel and submitted to intense magnetic and heat loads. It is composed of 54 Cassette Assemblies that each comprise a Cassette Body, an Inner Vertical Target, a Dome and an Outer Vertical Target. These sub-components are pressure vessels operating in a vacuum environment and as such they are designed, manufactured and tested according to high-level standards.

The manufacturing of the Blanket and Divertor Components is performed via In-Kind Procurement Arrangements (PAs) signed with the European, Korean, Japanese and Russian Domestic Agencies (DAs). As part of the prototyping and series production of the components, the ITER Organization (IO) shall ensure Quality monitoring by witnessing critical operations, reviewing and approving manufacturing documentation, in particular welding and Non-Destructive Testing (NDT) engineering documentation and associated manufacturing reports.

Since the Blanket and Divertor PAs are in the Series Production, the Technical Responsible Officers (TROs) need continuous support of a welding engineer to ensure follow-up of the components' procurement by supervising and reporting on the critical welding and NDT activities, including qualification of welding procedures as well as reviewing of manufacturing documentation related to welding and NDT.

Some activities are performed under direct contracts, as well as for the Tritium Breeding Blanket, with similar support required.

In addition, the duty of a welding engineer comprises supporting the TROs in issuing technical specifications where the scope includes welding and NDT as well as assessing feasibility of the welding design, notably design changes which may arise during fabrication or re-work as a result of Non-Conformities.

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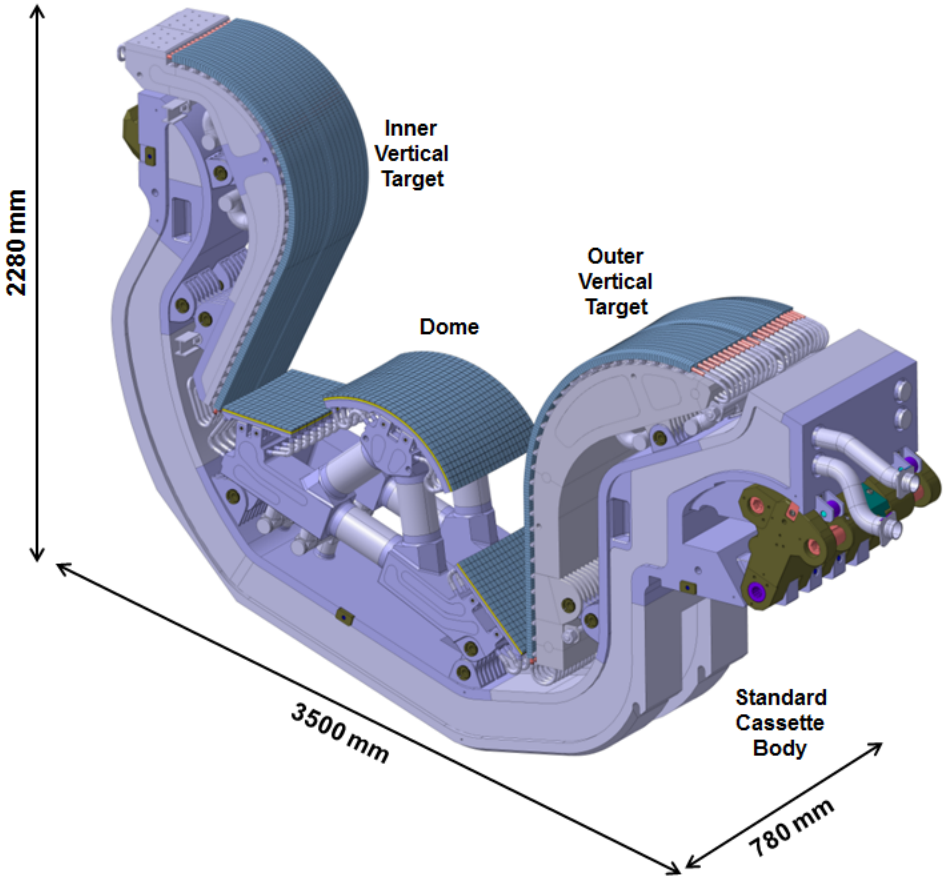

Figure 1: 3D view of a Divertor Cassette Assembly

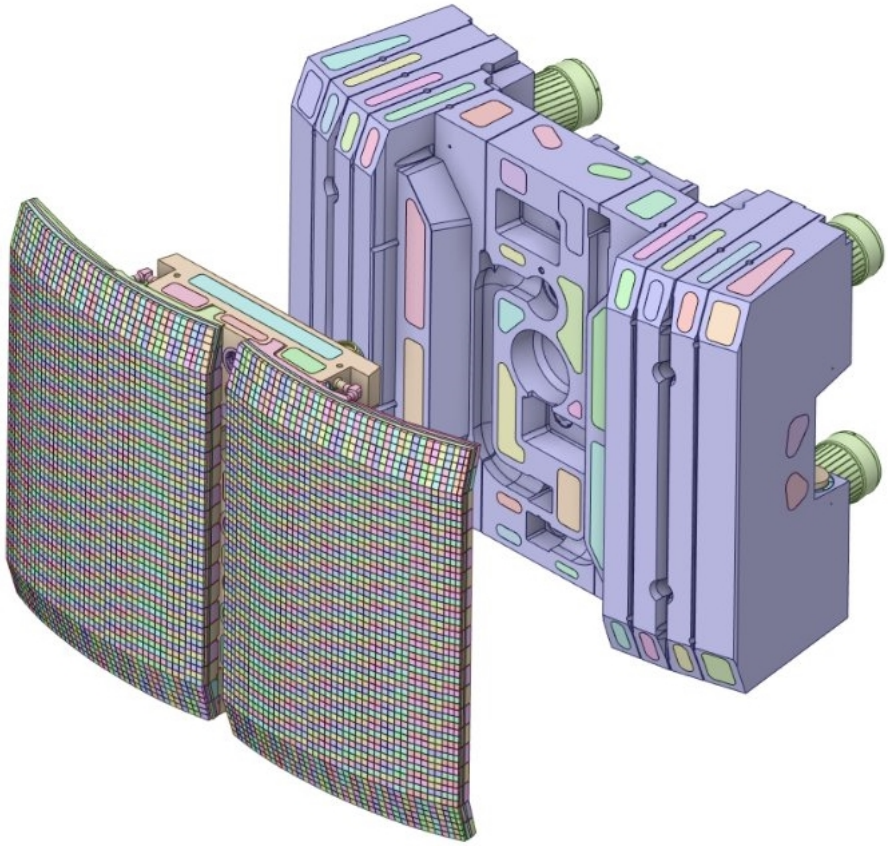

Figure 2: 3D view of a Blanket Shield Block and first Wall Panel

The Blanket and Divertor Components are internal components, and as such operate in very harsh and challenging environment. They are designed, manufactured and tested as per stringent standards. They are classified Quality Class 1, Alignment and Metrology Class 1 and Vacuum Quality Class 1.

The scope of this Technical Specification is to detail the technical requirements and major duties pertaining to execution of the job as a welding engineer in support to procurement of Divertor Components.

This Technical Specification is to be read in combination with the General Management Specification for Service and Supply (GM3S) – [Ref 1] that constitutes a full part of the technical requirements.

In case of conflict, the content of the Technical Specification supersedes the content of Ref [1].

2 Purpose

This technical specification provides requirements for supplier of Welding & NDT Engineer services to be procured to the ITER Organization under a dedicated Service Contract.

It specifies minimum requirements applicable to Contractor providing required services in supervising and reporting on the critical welding and NDT activities, assisting TROs in assessing feasibility of the welding design as well as reviewing of manufacturing documentation related to Welding and NDT.

3 Acronyms & Definitions

3.1 Acronyms

The following acronyms below are provided for information.

Abbreviation	Description
GM3S	General Management Specification for Service and Supply
IO	ITER Organization
TRO	Technical Responsible Officer
IDM	ITER Documentation Management
NCR	Non-Conformance Report
NDE	Non-Destructive Examination
NDT	Non-Destructive Testing

3.2 Definitions

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

Supervision: Quality Control duties performed by the provider that will involve the checking, evaluating, witnessing, monitoring, validating, verification, review, reporting, or a combination of any of these activities, to determine and document conformance with given process and product requirements. It could include also other activities as may be decided for monitoring quality of supply (e.g. kick off/ manufacturing readiness meeting, follow up NCR, etc.).

Supplier: Any entity that provides goods or services to the ITER Organization or a Domestic Agency.

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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 UID	Version
1	General Management Specification for Service and Supply (GM3S)	82MXQK	Latest approved version
2	Order dated & February 2012 relating to general technical regulation applicable to INB-EN	7M2YKF	
3	Quality Requirements for IO Performers	22MFG4	
4	Procedure for Management of Nonconformities	22F53X	
5	Mission Report Form	SZ3WG5	
6	Working Instruction for Processing Site Observation	AKGU8E	
7	Inspection Report Template	TVUQWY	
8	Template SITE OBSERVATION REPORT	BFJ4HV	

4.2 Applicable Codes and Standards

This is the responsibility of the contractor to procure the relevant Codes and Standards applicable to that scope of work.

Ref	Title	Doc Ref.	Version
CS1	Quality Management System	ISO 9001	2015

5 Scope of Work

5.1 Support to TROs in reviewing the welding and NDT documentation

Typically, this duty requires reviewing manufacturing welding and NDT documentation to ensure compliance of processes and components with IO Project and Contractual requirements. Documentation is issued by the Supplying DAs in the frame of dedicated Procurement Arrangement and submitted to IO for approval or acceptance.

Essentially, the documents subject to review include:

- Welding and NDT processes qualification, e.g. Welding Data Package, UT qualification programs
- Welding manufacturing documentation, i.e. Welding and Inspection Plans, Welding Maps etc.
- NDT Procedures
- Welding Procedure Qualification Records
- Welding consumables certificates
- Deviation Requests and Non-Conformities related to execution of welds and/or NDT
- Welding records, e.g. books and welding logs
- Factory Acceptance Test Reports, e.g. Hydraulic Pressure Test
- Final Welding Documentation

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Review of additional manufacturing documents may be required depending on manufacturing activities.

The principal construction code used as a reference for manufacturing of In-Vessel components is EN 13445 and 13480 for the Blanket Manifolds. Besides, follow-up of inspection and testing requires familiarity with respective EN codes and standards.

5.2 Support to TROs in assessing feasibility of welding design and preparation of technical specifications

This duty requires support to TROs in assessing feasibility of welding design following the eventual manufacturing changes as a part of optimization in a course of fabrication. Some changes may also arise due to Non-Conformities occurred during fabrication process.

Additionally, support to TROs in preparing technical specifications for IO R&D contracts may be required when some new joining or/and NDT solutions/techniques are to be validated and qualified prior to its implementation.

Assessment of Welding and NDT related Deviation Requests. Assessment of the design change or/and new technique requires technical study and impact assessment in order to identify potential safety, quality or technical issues. Along with that, the assessment requires ensuring inspectability of the proposed solution, its compliance with the code and standards, as well as the Project requirements.

5.3 Support to TROs in follow-up and witnessing the critical manufacturing activities

This duty requires performing monitoring and/or witnessing of critical manufacturing activities such as welding processes and NDT procedures qualification, execution and examination of production welds in support to TROs or on his behalf.

Monitoring of the activities is aimed to ensure that processes or/and components conform the component technical specifications and drawings, requirements of norms and standards as well as the Project requirements.

The key-activities related to this duty are:

- Witnessing a Welding Procedure Specification qualification and review of associated WPQR
- Witnessing NDT qualifications, notably Ultrasonic Testing qualification
- Participating/witness the Manufacturing and Inspection Plan control points related to execution of critical production welds and/or associated NDT
- Checking validity of personnel qualifications as may be applicable (NDE personnel, welders, etc.)
- Participating/witness of weld repairs and their examination following occurrence of a Non-Conformity
- Witnessing during welding of Production Test Coupons

5.4 Reporting of activities

Following the daily follow-up of various tasks, the appointed welding engineer shall develop and maintain a document allowing prompt reporting of the work performed. Format of reporting shall be elaborated and validated by the IO Project Leader prior to its implementation. Submission frequency is specified in Section 10.

Besides, the appointed welding engineer is expected to provide reports following the duties performed within the tasks described in Section 5 of the present specification.

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Typically, this includes, but is not limited to:

- Study report (in free format) upon request of a TRO following executing of weld design assessment
- Mission reports (as per IO template) following execution of task described in the Section 5.3
- Site Observation Reports (IO SOR template) in case any Non-Conformity found during the inspections and/or supervision. IO TRO and QA RO shall be informed immediately and an SOR shall be issued no later than 1 working day upon detecting a Non-Conformity.
- Welding and NDT Monthly Report in which the current critical issues and their associated progress are described. This report shall be presented by the Welding and NDT Engineer during a meeting on a monthly basis.
- Documentation Report shall include all document reviewed during the period, providing details about the action and comments if any.

6 Service Duration

The duration of the Service Contract will be two (2) years firm with three (3) optional periods of one (1) year each.

7 Personnel Qualification

- Qualification of an International Welding Engineer is required. International Welding Technologist could be accepted if compensated by sufficient demonstrated experience.
- Experience in conducting NDT inspections (expired certification can be reasonably accepted). A certification UT level 2 would be beneficial.
- Proficiency in UT (Ultrasonic Testing), RT (Radiographic Testing), PT (Penetrant Testing), and VT (Visual Testing) techniques.
- Experience in follow-up of pressure vessels manufacturing is highly advantageous
- Experience in the fusion technologies and/or Ultra High Vacuum (UHV) applications and/or nuclear devices would be highly advantageous.
- Familiarity with EN 13445 code. Familiarity with other construction codes such as RCC MR and ASME would be advantageous.
- Familiarity with EN standards used for qualification of welding processes, primarily TIG and EB processes.
- Familiarity with EN standards used for inspection and testing of components.
- Proficiency in written and spoken English (intermediate level i.e. B1 or above).
- Good command of the Microsoft Office package.

8 Location for Scope of Work Execution

The principal duty station is ITER Site, Cadarache.

Some tasks within the scope of this contract require execution of duties off-site, e.g. at the Supplier's premises. Missions could be requested on-call basis for punctual inspection (half day, one or more full days) for fixed duration of time. Mission request needs to be sent to the IO TRO for approval with detailed description of the work to be done and estimated cost (especially for air tickets). Reimbursement is based on actual cost.

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9 IO Documents

No input is expected from IO.

10 List of deliverables and due dates

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.

A minimum, but not limited to, list of documents is available hereafter with associated due dates:

Document	Description	Expected Date
Mission Report	See Section 5.4	One week maximum after the mission
Documentation Report	See Section 5.4	Every Month
Welding and NDT Monthly Report	See Section 5.4	Every Month

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

11 Quality Assurance requirements

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

12 Safety requirements

Section 5.1 OHS of [Ref 1] GM3S applies. No specific safety requirements as per Section 5.3 of [Ref 1] GM3S related to PIC and/or PIA and/or PE/NPE components apply.

12.1 Nuclear class Safety

N/A

12.2 Seismic class

N/A

13 Special Management requirements

Requirement for [Ref 1] GM3S Section 6 applies in full.

13.1 Contract Gates

N/A

13.2 Work Monitoring

Appointed personnel shall review documentation within the time defined in the IO IDM system. The review time might be shortened upon demand of a TRO for the tasks which require priority.

IO reserves rights to employ a KPI to assess the personnel performance, e.g. “average time to review”.

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Where the achieved KPI over a reporting period is not in line with the target value, IO reserves rights to request a replacement of personnel.

13.3 Meeting Schedule

Appointed welding engineer shall attend Project bi-weekly meetings on a regular meeting.

Appointed welding engineer shall attend Procurement Arrangement or Contract Progress Meetings upon request of a TRO.

Appointed Welding and NDT Engineer shall attend Technical and Progress Meetings with the Suppliers upon request of a TRO.

Appointed welding engineer shall attend internal technical meetings upon request of a TRO or/and Project Leader.

13.4 CAD design requirements

N/A

13.5 Personal Protection Equipment

Welding and NDT Engineer shall have their own set of Personal Protection Equipment in case on-site inspections or/and witnessing at the Suppliers' premises.

14 Appendices

N/A