

Technical Specifications (In-Cash Procurement)

Technical specification - FWC - Diagnostic Electrical Services Implementation (55.NE.V0, V0-EFT, C0, D0)

This document specifies the requirements for the framework contract “Diagnostic Electrical Services Implementation”. It defines the scope of the services to be provided, the execution and the deliverables associated. This is a framework contract, where each task order is a free self-standing activity with its own budget.

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1 Preamble

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 document specifies the requirements for the framework contract “Diagnostic Electrical Services Implementation”. It defines the scope of the services to be provided, the execution and the deliverables associated. This is a framework contract, where each task order is a free self-standing activity with its own budget.

3 Acronyms & Definitions

3.1 Acronyms

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

Abbreviation	Description
CRO	Contract Responsible Officer
GM3S	General Management Specification for Service and Supply
IO	ITER Organization
PRO	Procurement Responsible Officer
CRO	Contract Responsible Officer
DA	Domestic Agency
SSD	See System Design
IO	ITER Organization

3.2 Definitions

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

The Diagnostic Electrical Services provide signal and power transmission lines to link vital diagnostic sensors and instrumentation in the ITER Vacuum Vessel with their associated electronics and power supplies in the surrounding buildings.

This framework contract focusses on parts of the Diagnostic Electrical Services close to the ITER Vacuum Vessel, attached to its inner and outer surfaces (55.NE.V0, 55.NE.V0-EFT and 55.NE.C0) or attached to major machine components housed inside the Vacuum Vessel (55.NE.D0).

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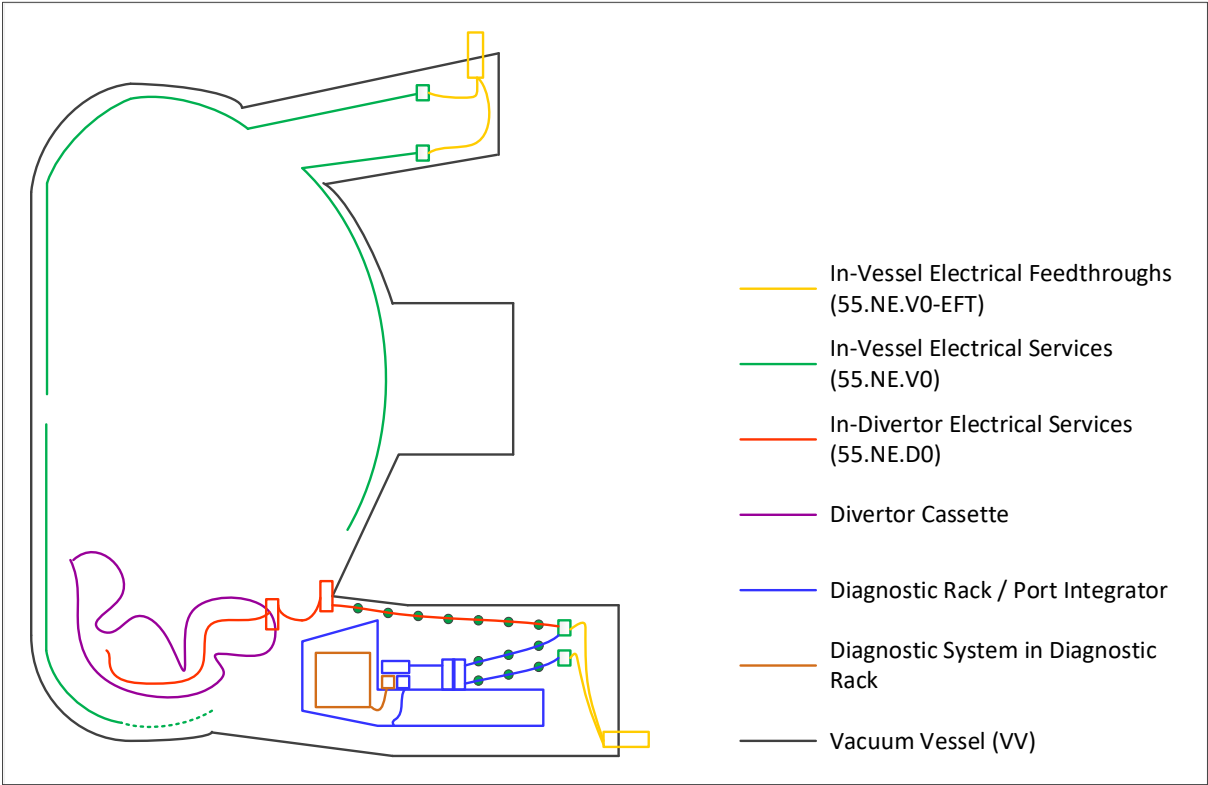


Figure 1 Schematic showing 55.NE.V0, 55.NE.V0-EFT and 55.NE.D0, and surrounding key systems

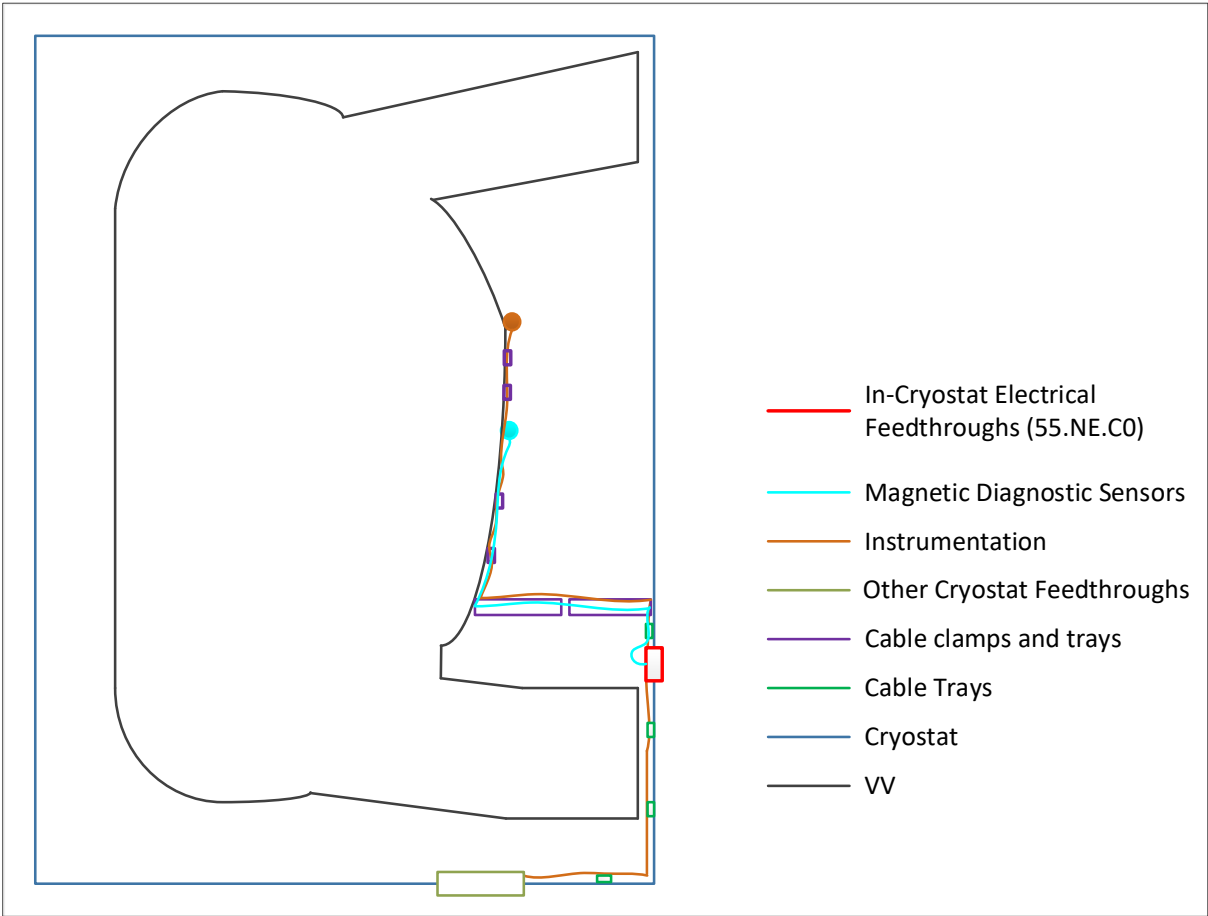


Figure 2 Schematic showing 55.NE.C0, and surrounding key systems

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The 55.NE.V0-EFT Electrical Feedthroughs form part of the boundary between the Ultra High Vacuum (UHV) in-vessel environment and the surrounding nuclear buildings. They are Protection Important Components (PIC), with the highest Safety Important Classification (SIC-1). These components are in the post-MRR phase, with the deliveries being performed by one of ITER's Domestic Agencies.

The 55.NE.D0 In-Divertor Electrical Services provide part of the signal chain between diagnostics mounted on the Divertor Cassettes (e.g. thermocouples, magnetic pick-up coils, etc.) and the Electrical Feedthroughs described above. The components include cables, clamps and junction boxes on the cassettes and complex plug and socket sockets, removed by remote handling robotic tools. These components are in the Final Design phase, with the design work being performed by one of ITER's Domestic Agencies.

The 55.NE.V0 In-Vessel Electrical Services provide part of the signal chain between diagnostics mounted on the Vacuum Vessel walls (e.g. thermocouples, magnetic pick-up coils, etc.) and the Electrical Feedthroughs described above. The components include cables, clamps and connection boxes for a variety of cable types and diameters.

The cabling and associated hardware (in-vessel clips, clamps and junction boxes) are currently being delivered through the contracts managed by one of ITER's Domestic Agencies. The remaining components (Lower Port and marshalling area clamps and in-port connectors) are in the MRR phase. The manufacturing is directly managed by the ITER Organization.

The 55.NE.C0 In-Cryostat Electrical Feedthroughs provide part of the signal chain between diagnostics mounted on the outside of the Vacuum Vessel (magnetic pick-up coils) and the cabling inside the surrounding buildings. These components are in the Preliminary Design phase, with the design work being performed by the ITER Organization.

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

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.

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5 Scope of Work

5.1 Details of expected output

The purpose of this framework contract is to provide specialist engineering expertise in order to successfully implement this key system, ensuring the final design, manufacturing, testing and installation activities are completed on time and to high levels of quality.

It is expected that task orders within this framework will also include testing activities, manufacturing of prototype and test items, and delivery of short series of items. if impractical to be executed through separate contracts.

In more detail for the different areas (note that these are indicative activities and not intended to cover all of the activities to be performed):

In-Vessel Electrical Services (55.NE.V0)

- Monitoring of manufacturing, including factory visits, review of tests and management of modifications.
- Preparation, execution and documentation of site acceptance tests (SAT).
- Preparation of installation specifications, procedures and drawings.
- Subsequent follow-up and oversight of installation of the components within this scope.
- Creation of as-installed documentation.
- Maintenance of design documentation.

In-Divertor Electrical Services (55.NE.D0)

- Review of design documents produced by Third Parties.
- Technical checking and independent verification of calculations produced by Third Parties.
- Attendance at Design Review meetings and associated follow-up meetings.
- Subsequent follow-up of tender(s), including responding to tenderer's questions.
- Monitoring of manufacturing, including factory visits, review of tests and management of modifications.
- Preparation, execution and documentation of site acceptance tests (SAT).
- Preparation of installation specifications, procedures and drawings.
- Subsequent follow-up and oversight of installation of the components within this scope.

In-Vessel Electrical Feedthroughs (55.NE.V0-EFT)

- Review of design documents produced by Third Parties.
- Technical checking and independent verification of calculations produced by Third Parties.
- Attendance at Manufacturing Readiness Reviews and associated follow-up meetings.
- Subsequent follow-up of tender(s), including responding to tenderer's questions.
- Monitoring of manufacturing, including factory visits, review of tests and management of modifications.
- Preparation, execution and documentation of site acceptance tests (SAT).
- Preparation of installation specifications, procedures and drawings.
- Subsequent follow-up and oversight of installation of the components within this scope.

In-Cryostat Electrical Feedthroughs (55.NE.C0)

- Finalisation of design documents, technical specifications, 3D CAD models and 2D drawings in order to launch the manufacturing tender.

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- Attendance and presentation at Design Review meetings and associated follow-up meetings.
- Subsequent follow-up of tender(s), including responding to tenderer's questions.
- Monitoring of manufacturing, including factory visits, review of tests and management of modifications.
- Preparation, execution and documentation of site acceptance tests (SAT).
- Preparation of installation specifications, procedures and drawings.
- Subsequent follow-up and oversight of installation of the components within this scope.

5.2 Indicative Work packages

The following activities are foreseen as indicative work packages. The indicative work packages are not task orders by themselves and only define the global span of work expected within the current Framework Contract. The work is to be performed predominantly off-site, with occasional visits.

- Production of detailed design documents, 3D CAD models, 2D diagrams and 2D drawings;
- Project management – scheduling, reporting of work, tracking of Deviation Requests and Non-Conformities;
- Interface and integration management in complex environment – ensuring 3D CAD models, 2D diagrams and interfacing documents are updated and consistent;;
- Design engineering (using CATIA V5);
- Review of design documents produced by Third Parties
- Review of analysis reports (including thermal, mechanical, electro-magnetic...);;
- Performing numerical analyses (only minor analyses expected)
- Technical checking and independent verification of calculations produced by Third Parties;
- Attendance at Design Review meetings and associated follow-up meetings;
- Design requirement tracking and compliance justification;
- Manufacture and test prototypes and tooling to support the development of installation procedures and qualification;
- Manufacture small, low number elements for application in the machine,
- Manufacturability assessment and manufacturing preparation;
- Procurement management and manufacturing contract follow-up, including site visits to suppliers;
- Realisation of acceptance tests;
- Installation tooling and procedure development (and manufacturing of prototype tooling);
- Installation oversight, monitoring and reporting;
- Review installation procedures produced by Third Parties;
- Provide oversight and follow-up of on-site installation resources;

6 IO Documents

No input is expected from IO

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7 List of deliverables and due dates

The implementation details of deliverables and priorities will be agreed between the Contact Persons under each separate Task Order. No element of work or activity shall begin without the prior written notification by the ITER Organization in the form of a “Task Order” signed by both Parties.

The deliverables will depend on the type of a task, but they shall be well defined before the start of the Task order in question and shall be based on the expertise requested in Section 5.2 of these Technical Specifications. The examples of the deliverables include, but are not limited to, the following items:

1. Reports or minutes of the kick-off meeting including list of all input information and requirements.
2. Progress reports containing:
 - a. Summaries of meetings and decisions,
 - b. Drafts of material to be used in final reports,
 - c. Issues that have arisen in the course of the work, along with suggested approaches to addressing these issues.
3. Deliverables of Task orders in the form of:
 - a. Report,
 - b. Technical note,
 - c. Calculation Note,
 - d. Any other relevant engineering documents.
4. Reports or minutes of the meeting for completion of the task order containing:
 - a. Deliverables acceptance statement,
 - b. Report on outstanding issues identified during Task Order execution, forward action plan,
 - c. Summary of the Task Order outcome.
5. Delivery on ITER site (or other agreed location) of prototypes and components manufactured under this contract.

8 Quality Assurance requirements

The Quality class under this contract is QC1, [Ref 1] GM3S section 8 applies in line with the defined Quality Class.

9 Safety requirements

ITER is a Nuclear Facility identified in France by the number-INB-174 (“Installation Nucléaire de Base”).

For Protection Important Components and in particular Safety Important Class components (SIC), the French Nuclear Regulation must be observed, in application of the Article 14 of the ITER Agreement.

In such case the Supplier and Subcontractors must be informed that:

- The Order 7th February 2012 applies to all the components important for the protection (PIC) and the activities important for the protection (PIA).
- The compliance with the INB-order must be demonstrated in the chain of external contractors.
- In application of article II.2.5.4 of the Order 7th February 2012, contracted activities for supervision purposes are also subject to a supervision done by the Nuclear Operator.

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For the Protection Important Components, structures and systems of the nuclear facility, and Protection Important Activities the contractor shall ensure that a specific management system is implemented for his own activities and for the activities done by any Contractor and Subcontractor following the requirements of the Order 7th February 2012 (ITER_D_7M2YKF).

NOTE: There are no Protection Important Activities (PIAs) within the scope of this work but there is monitoring/oversight of Third Parties working on PIC and/or performing PIAs related to the 55.NE.V0-EFT Feedthroughs. This monitoring/oversight is not itself a PIA.

10 Special Management requirements

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

10.1 Work Monitoring

The work on individual task orders shall be started by dedicated kick-off meetings and managed by means of Progress Meetings. It is expected that Progress Meetings will be held as frequently as required, generally bi-weekly, written progress reports are required monthly.

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

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

In addition to the Progress Meetings, if necessary, the ITER Organization and/or the Contractor may request additional meetings to address specific issues to be resolved.

It is expected that on occasion the Contractor will be required to make a presentation to Topical Technical Meetings either by videoconference or in person. If a presentation in person at an off-site meeting is required, the ITER Organization will reimburse travelling expenses.

For all Progress Meetings, a document (the Progress Meeting Report) describing tasks done, results obtained, blocking points and action items shall be written by the Contractor. Each report will be stored in the ITER IDM in order to ensure traceability of the work performed.

10.2 CAD design requirements

This contract requires for CAD activities, [Ref 1] GM3S section 6.2.2.2 applies.

10.3 Specific requirements and conditions

The Contractor's team shall cover all disciplines that may reasonably be required to carry out the Scope of Work. The following manpower profiles are expected to be required:

- Mechanical engineer (> 7 years' experience)
- Mechanical engineer (3 – 7 years' experience)
- Finite Element analyst (> 7 years' experience)
- Finite Element analyst (3 – 7 years' experience)
- CAD Designer (> 4 years' experience)
- Project Manager (> 5 years' experience)

It shall be noted that Contractor's personnel visiting the ITER site shall be bound by the rules and regulations governing safety and security.

The Contractor shall have and maintain the necessary equipment and licenses to run the software tools required to carry out the tasks and produce the deliverables in accordance with the tools

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adopted by the IO. This concerns in the first instance the CAD tools – if the contractor is providing CAD. The detailed requirements for CAD tools are indicated in section 14. The Contractor shall ensure that experts are adequately supported and equipped. The official language of the ITER project is English. Therefore all input and output documentation relevant to this Contract shall be in English. The Contractor shall ensure that all the professionals in charge of the Contract have an adequate knowledge of English, to allow easy communication and adequate drafting of technical documentation. This requirement also applies to the Contractor's staff working at the ITER site or participating in meetings with the ITER Organization.

Documentation developed shall be retained by the Contractor 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, it should fulfil IO document on calculation code for safety analysis.