Technical Specifications (In-Cash Procurement)

Technical Specification for Engineering Support on TF, Instrumentation and feeders

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RO: Foucher de Brandois Cecile
Read Access | RO, project administrator, LG: Admin Tokamak, LG: Magnet external, AD: Division - Magnet
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Technical Specification for Engineering Support on TF, Instrumentation and feeders

This technical specification describes Engineering Work support for the Toroidal Field coils, the Instrumentation of Coils and Feeders for the TF section of the Magnet Division and includes the preparation of Technical Procedures, technical support during calls for tender and management of design changes follow-up on side of the IO premises.

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1 Abstract

The primary purpose of the contract is to cover the need for Engineering Work in the Magnet Division related to the Toroidal Field Coils winding packs, their terminal region area and the high voltage instrumentation on Feeders in order to guarantee the completeness of open issues on the TF terminal region and their instrumentation components according to the technical, quality and schedule requirements.

The secondary purpose is to provide support and review offers from contractors related to the procedures of TF coil integration into their structure.

1.1 Background

Toroidal Field coils are equipped with terminal box housing all Double pancakes joints, terminal electrical joints, the helium piping distribution, the protection resistors, high voltage cables components required in the Magnet Systems for safety, investment protection, protection actions and system monitoring in order to contribute to the reliable operation of the ITER toroidal field coils machine.

The items to be assessed related to the ITER Toroidal Field coils region of terminal box are listed below:

- Terminal and double pancakes electrical joints insulation system
- Voltage taps for quench detection and their protection resistances,
- Co-wound tapes around the superconducting cables with their connecting leads
- Temperature sensors onto Helium pipes
- Insulating Breaks;
- Outer TF terminal region structure
- In Gap filling between case and winding pack

The procurement for the TF Magnet and terminal region is entirely budgeted In kind through 1.1.P1A.EU.01 and 1.1.P1A.JA.01 procurement arrangements. All sensors, instrumentation high voltage cables, are procured directly by the ITER Organization to the DAs for integration according to the signed PAs in compliance with the official schedules.

2 Scope

The scope of the work is divided into different tasks as described below.

2.1 Main Tasks related to the TF coils

These tasks shall represent 60% of the Contractor's working time.

a) Preparation of the update of assembly procedures in collaboration with IO that describes how to integrate and install the different components into the terminal box region, starting from the winding pack insertion into its case.

b) Follow up and general revision of IO drawings in the area of the TF terminal outputs with respect to feasibility in the construction of the coils and/o fittings inside the tokamak. Analysis of consistency with the problems of instrumentation wires and feeders connections.

c) Participation and assessment of procedures on high voltage tests, leak testing, Paschen tests of Double pancakes and Winding Packs that are needed in relation with the winding packs acceptance.
d) Drawings, specifications and procedures for realization of the terminal electrical connections between coils and feeders (placement, soldering, supports, electrical isolation)
   Preparation and / or review of specification for materials whose procurement is competence of ITER IO (instrumentation, insulators, protection resistors )
e) Review of the proposal of the prototype for magnetic measurements of the TF WP current center line and its final supporting system,
f) Participation and Review of the WP insertion into the TF case structure and the gap filling procedures
g) Implementation of some technical features Design changes on TFC CAD models (IO or DAs) in collaboration with a designer.

2.2 Main tasks: Instrumentation procurement support

These tasks shall represent 30% of the contractor’s working time.
a) Assessment on the insulation of the wires exiting the coil ground insulation.
b) Assessment on the associated insulation of the voltage tap wires (for both the jacket and He pipe taps).
c) Review of the mock ups for the connection between wires and HV cables.
d) Review of the reparation procedure of the HV cables.
e) Collaborating on the definition of cryogenic fuse development and associated insulation.

2.3 Tasks related to Feeders supports

This task shall represent 10% of the Contractor’s working time.
a) Assessment of alternative design to feeder joints which currently implies soldering of the joint boxes between feeder sections or feeder-to-coil terminal connection during the assembly of the TOKAMAK. Due to the orientation of the joint boxes and space limitations, soldering method is complicated. The purpose of this sub-task is to create an alternative design of the low resistive (< 2 nOhm) feeder lap joints using indium non-soldered interface between the joint boxes.

3 Work Description

The different versions of the documents shall be tracked in order to have full traceability. Should drawings or models be required, the contractor shall be responsible for providing the input to and liaising with the ITER Design Office to perform the corresponding actions.

3.1 Main TF coils related Tasks

The deliverables corresponding to the Tasks in section 2.1 shall be prepared according to the quality standards of the ITER project and using the corresponding templates. The status of the tasks shall be submitted to the contract manager for official monthly review.

3.2 Instrumentation Tasks

The deliverables corresponding to the documents listed in section 2.2 shall be prepared according to the quality standards of the ITER project and using the corresponding templates. They shall be submitted in IDM for official review by the IO.

3.3 Engineering Support on feeders

The deliverable corresponds to the design of the pressed joints (as an alternative to the baseline soldered joints) in the magnet feeders, the installation procedure to be developed including tooling
for mechanical clamping the joint boxes with the copper shims in between them, clamp tightening procedure, and joint disassembly scenario for the repair.

4 Estimated Duration

The duration of the services shall be 240 days with a first phase of 6 months (120 days), ideally starting in February 2013, that will be committed at the signature of the contract. The second phase is optional and will be subject to first phase evaluation and assessment of the IO need in order to extend these services for an additional period (120 days).

An activity summary report will be sent on a monthly basis to IO.

5 List of deliverables and due dates

5.1 Meeting schedule

Monthly meetings are foreseen to monitor the work performed, which require on-site presence. In addition, it is expected the Contractor participation for meetings with involved IO resources related with the scope of the work.

5.2 Deliverables

For tasks 2.1, which are a continuous activity, monthly reports shall be delivered to describe the progresses made.

In the frame of task 2.2, individual reports shall be prepared on the insulation system of cables, wires, on the connection between wires and cables.

In the frame of task 2.3, individual report shall be prepared on the feeder alternative joint design and assembly / disassembly procedure.

6 Acceptance Criteria

After delivery, the IO shall have two calendar weeks to accept the documents/reports mentioned in Section 2 and 5. After this delay, and in the absence of any comment from the IO, these documents shall be deemed accepted by the IO.

7 Payment schedule / Cost and delivery time breakdown

The payments shall be granted following this approximated schedule upon approval of at least 6 progress reports: Payment will be subject to monthly timesheets.

Monthly payments are foreseen after delivery of the corresponding reports as specified above.

8 Experience

In terms of qualification and experience, the contractor shall:

- Have at least 15 years’ experience in manufacture of superconducting, magnets electrical engineering applications related to problems associated with high voltage, insulation systems, cryogenics and vacuum systems;

- Have more than 10 years experience in insulation manufacture of magnets, vacuum pressure impregnation techniques
- Have a broad knowledge and practical experience of high voltage testing, including the implementation of Paschen test on magnets
- Have more than 15 years experience with industrial manufacture plans and processes within SC magnet fabrication projects
- Be familiar with large structure magnet design manufacturing;
- Be proficient in English to communicate and write technical reports and specifications in English.

Other requirements:
- The staff working on this contract shall be available full time and deployed on the IO site in St Paul-lez-Durance, France.

9 Work conditions
The staff working on this contract shall be available full time and be based at IO site in St Paul-lez-Durance, France.

10 Timetable

The tentative timetable is as follows:
Call for Expertise January 2013
Contract Award February 2013

11 Candidature
Participation is open to all individuals, companies or consortia which are legally registered in one or more of the ITER Member States. A consortium may be either a permanent, legally-established grouping or a grouping which has been constituted informally for a specific tender procedure. All members of a consortium (i.e. the leader and all other members) are jointly and severally liable to the ITER Organization.

The consortium groupings shall be presented at the tender submission stage. The consortium cannot be modified later without the approval of the ITER Organization.