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Technical Specifications (In-Cash Procurement)

Summary Technical Specifications for Supply of TF Coil Frames

This summary technical specification provides high-level requirements for the supply of TF Coil Frames

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1 Terms and Definitions

Term	Acronym
Assembly Hall	AH
Centre of Gravity	COG
Self-Propelled Modular Transport	SPMT
Toroidal Field Coil	TFC

2 Introduction

The purpose of this document is to procure onsite transportation and storage frames for prepared TF Coils. Two frames are required + two other frames in option.

The concept of the flat design of the storage frame shall meet TFC handling in IO site requirements together with storage and preparation conditions for assembly of the Coils prior upending.

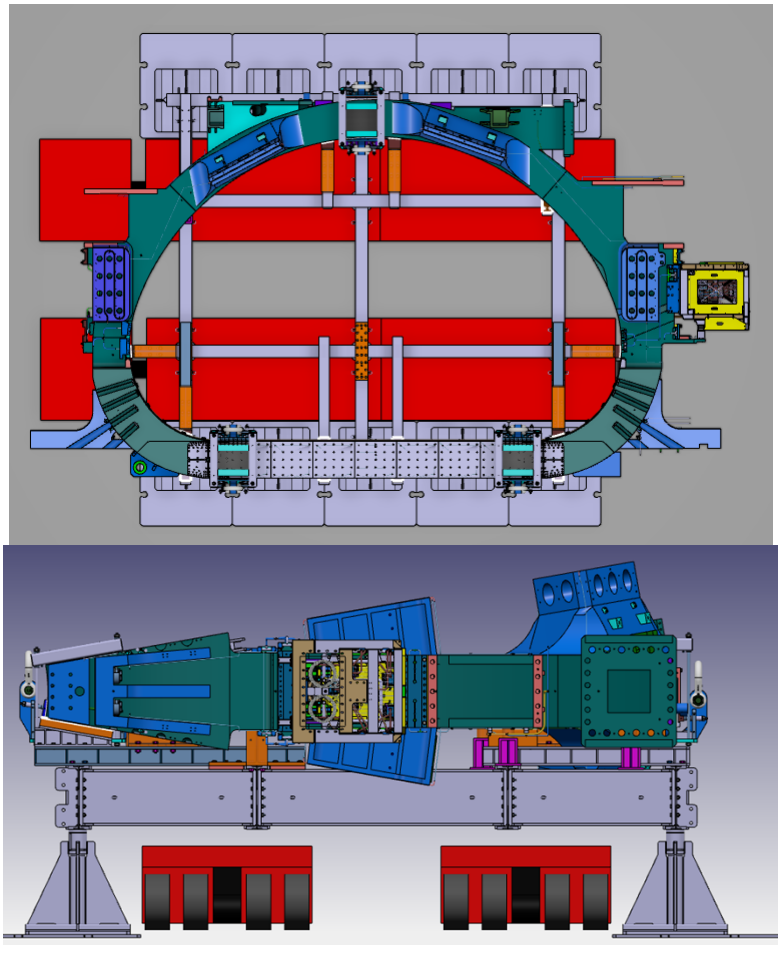

Fig 1. TFC on Storage Frame

3 TF Coils TSFR requirements

3.1 Design

The storage frames will be manufactured based on IO design [1][2].

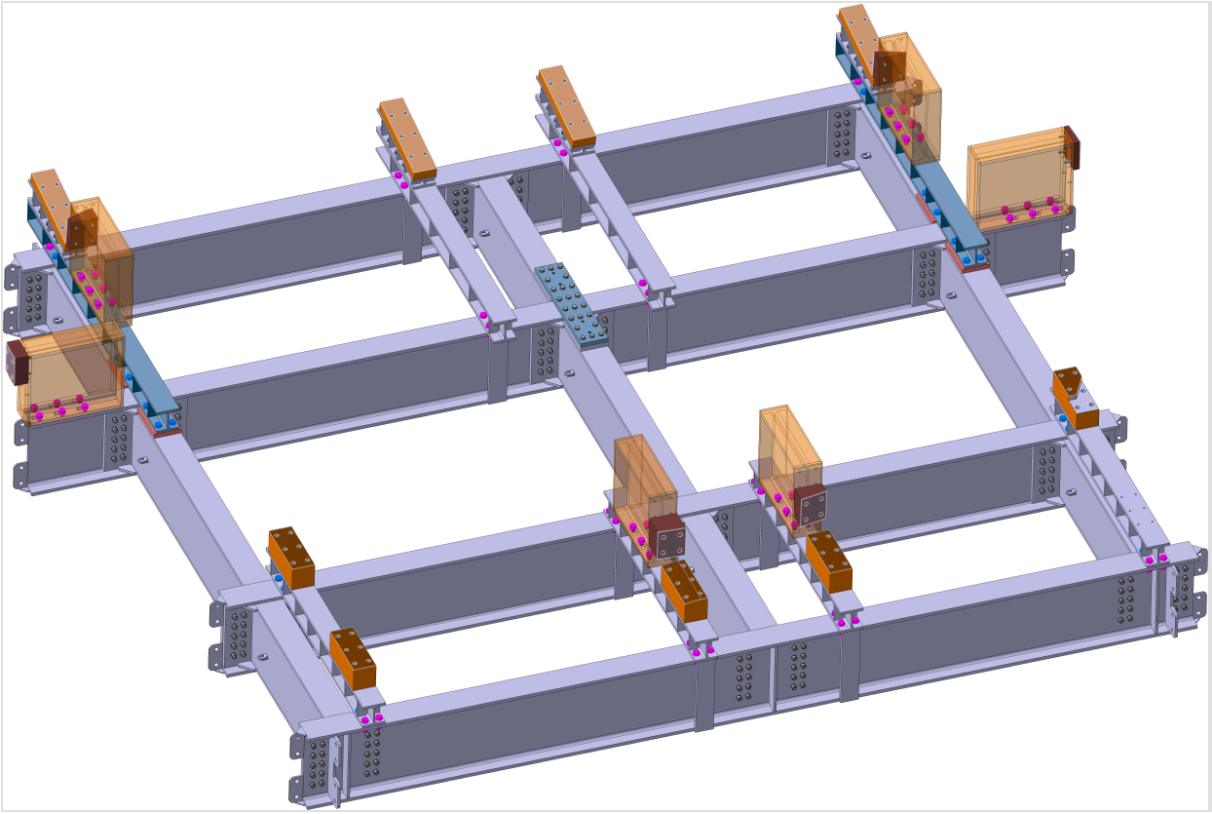

Fig 2. Storage Frame design

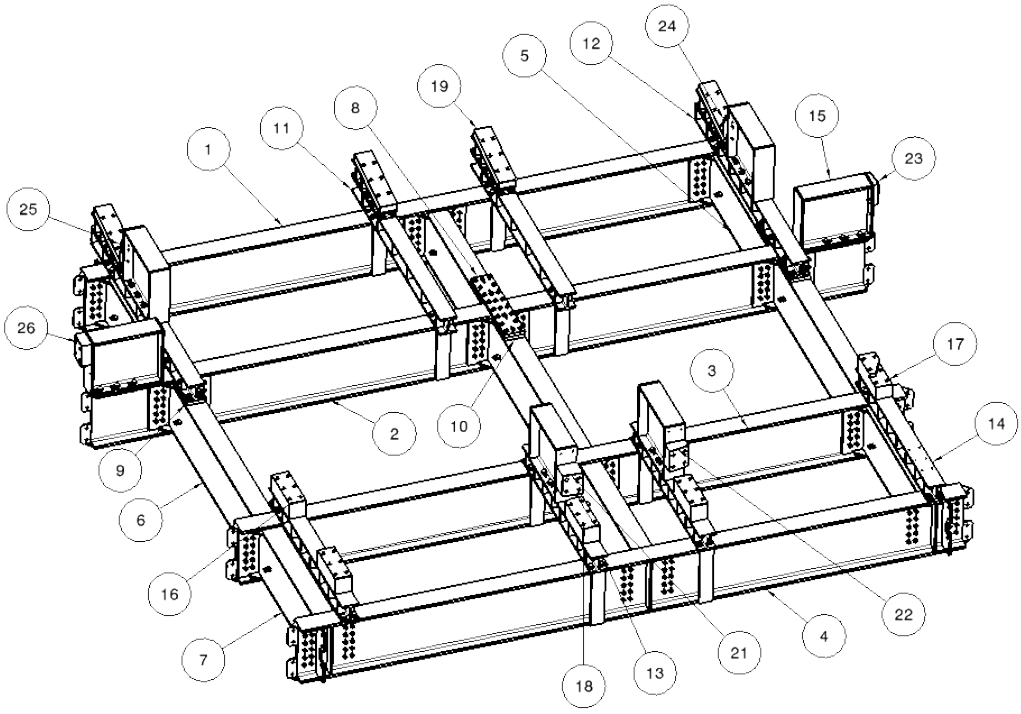

Fig 3. Storage Frame drawing

4 Technical Requirements

TF storage frame is an accessory supporting the TF Coil (~**330 T**) in horizontal position during transportation and storage on the ground.

The maximum overall dimension and the weight of the TF storage frame + TFC (Fig 1):

Width: **10m**; Length: **18m**; Height: **4.5m** Weight: **380 t**.

- In storage position TF storage frame is placed on the Ground Supports and if required on the Load Spreader plates distributing the load on the slab according its capacity.
- The structure of the TF storage frame is built by the commercial steel elements assembled by welding or bolted joints and compatible for application in all weather conditions of usage and storage.
- Special attention must be taken on weld joints to avoid any conflicts with fasteners, if necessary weld to be grinded locally to leave room for bolts
- Carbon steel elements must be protected by anticorrosion paint and avoid any direct contact with stainless steel structure of the TF Coils.

4.1 Lifting requirements

- Lifting of the TF storage frame (without TFC) should be done through the standard lifting interfaces on the Frame compatible with shackles, slings or any other similar commercial fixtures.
- The lifting lugs shall be tested (physically or by analysis) as applicable per the French regulation (French Order of the 1st or March 2004) or applicable code selected.

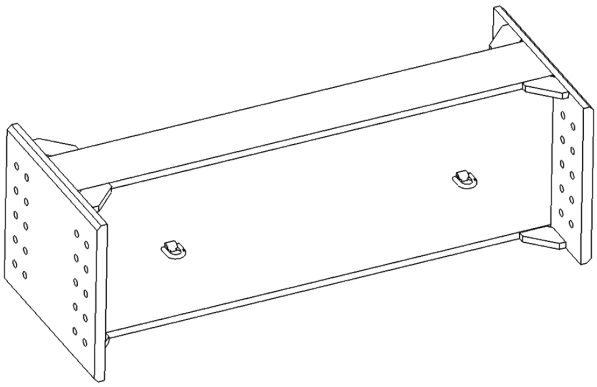

Fig 4. Example of lifting interface of H7 to H9 beams

4.2 Regulatory Requirements

4.2.1 Codes and standards

- EN 10204 type 3.1 - for material inspection documents;
- EN1993 (Eurocode 3) - for design of steel structures;
- EN 1090 – for manufacturing.
- In case if use of national standards other than mentioned above, manufacturer shall demonstrate in technical assessment note the equivalence to harmonized European standards [4][5].

5 Cleanliness

All debris, such as swarf, should be removed by physical means such as blowing out with a high pressure air line, observing normal safety precautions. Gross contamination, e.g. greases or cutting oils, etc., should be removed by washing

Packing of the Support Tool must include plastic bag protection to protect from dust and other pollution during transport.

6 Work Monitoring / Meeting Schedule

Monthly meetings shall be held between the Contractor and IO. The meetings will report work progress, raise any design/manufacturing issues, and resolve problems. The frequency of the meeting may be modified at the discretion of IO as the project progresses.

7 Delivery

7.1 Requirements for Labelling, Cleaning, Packaging, Handling, Shipment and Storage

7.1.1 Scope of application

The following generic requirements apply both for the shipment of equipment, etc. from the manufacture/assembly site to the ITER Site or to any intermediate site.

Suitable precautions shall be taken to avoid damage to the equipment.

The equipment shall be subject to control and inspection, as defined below.

7.1.2 Labelling and Traceability

All components and the main subcomponents shall be clearly marked in a permanent way and in a visible place with the IO official numbering system according to the document "ITER Numbering System for Components and Parts" [6]. A detailed 'IO component identification standard' together with printed label templates and RFID tagging standards will be provided by IO.

7.1.3 Packaging and Handling

Any special IO or regulatory transportation requirements shall be documented and provided to the Supplier prior to shipment.

Subsequent to the Factory Acceptance Test, the components shall be partially disassembled to the maximum size that can be shipped. All components requiring re-assembly at the ITER Site shall be clearly labelled and tagged.

The supplier shall design and supply appropriate packaging, adequate to prevent damage during shipping lifting and handling operations.

Each shipment shall be accompanied by a Delivery Report shall be prepared by the Supplier, stating as a minimum:

- The packing date;
- The full address of the place of delivery and the name of the person responsible to receive the package, as well as of the Supplier's name and full address;
- Release Note [9] including Material Safety Sheet;
- Packing List;
- The declaration of integrity of the package;
- The declaration of integrity of the components;
- Any additional relevant information on the status of the components.

The Delivery Report shall be signed by a representative of the IO and its Supplier. The signature by the IO of the Delivery Report prior to shipment represents a Hold Point (HP).

The Manufacturing Dossier is part of the List of Deliverables.

An example of Manufacturing Dossier is listed below:

- As-Built Drawings, Documents, and Data (with signatures)
- Contractor Release Note
- Quality Plan
- Testing Procedures, Specifications and Reports

- Material Control Reports, incl. Certificates, Inspections, Concessions etc..,
- Manufacturing Documentation, incl. Manufacturing procedures, Non-Destructive Testing (NDT) Procedures, Process specifications etc..,
- Records of approved Non-Conformances (NCR) and Deviation Requests (DR)
- Certificates of conformance
- Control Reports (Visual Examination, Non-Destructive Tests, Leak Tests, Certificates of Cleanliness, Pressure Test, Geometric measurements, etc.)
- Codes and Standards conformity certificates
- Completed Manufacturing & Inspection Plans
- Manuals and Instructions for the handling, assembly and maintenance of all SSCs, Tools and Equipment within the supply

7.1.4 Shipment, Transportation and Delivery to the ITER Site

The Contractor shall be responsible for the packaging and delivery of the components to IO.

8 Factory Acceptance Tests (FAT) and Site Acceptance Tests (SAT)

For the Factory acceptance test, the manufacturer shall assemble the frame and provide an assembly report.

For the Site acceptance test IO and the supplier should perform:

- Documentation checking
- Assembly
- Cleanliness checking

The Supplier shall bear the risk of loss or damages to the components during the execution of this Contract up to delivery, after inspection against any failure of the components during transport (for Supply Contracts) (Preliminary Acceptance), or up to Final Acceptance (for Integration Contracts). Any risk of loss or damage shall be transferred from the Supplier to the IO upon delivery (for Supply Contracts) or Final Acceptance (for Integration Contracts).

9 Acceptance Criteria

The Contractor shall submit all deliverables and input data to the IO for approval. IO shall review in IDM the documents within 2 weeks of receipt and promptly notify the Contractor if update is required. IO approval of deliverables shall be deemed as deliverable acceptance.

9.1 Final Acceptance

The components shall be handed over to the IO when they have been delivered in accordance with this Technical Specification and all related documentation have been

accepted by the IO, have satisfactorily passed the tests, or commissioning, as the case may be, and a Certificate of Final Acceptance has been issued (Final Acceptance). The Certificate of Final Acceptance shall be signed by both the IO and the Supplier, after the definitive acceptance of each component and its related documentation.

Ownership of the components shall be transferred from the Supplier to the IO upon Final Acceptance at the ITER Site. The transfer of ownership to the IO shall not relieve the Supplier of its obligations under this Contract in case of non-conformities of the components for the duration of the warranty period.

10 Delivery Schedule

The company shall develop a detailed schedule and a MIP (Manufacturing and Inspection Plan). A first issue of both documents will be provided at the tender stage and a consolidated version will be issued at the kick off meeting.

The deliverables and due dates are listed in Table 2:

Table 2: Deliverables

	Deliverables	*Due Time*
	Signature of the contract	T0
1	**Kick off Meeting** • Schedule	T1 (no later than 1 month after contract signature)
3	**MRR** (see note) • Presentation material for the MRR • Schedule for the manufacturing phase	T1 + 4 weeks
4	**Manufacturing and assembly of the components** (see note) • Manufacture dossier of the storage frame components • Non Conformity Request [14](if required) • Verification of the functionalities of the Tool: FAT	T1 + 18 weeks
5	**Delivery to IO site and unloading, with no damage** • Dis-assembly of the components, cleaning • Assembly procedure document Verification of the functionalities of the Tool: SAT	T1+20 Weeks

Note: All documents shall be delivered, stored in IO IDM and approved by IO

11 Quality Assurance (QA) requirements

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 (ITER_D_22MFG4). [11]

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 (see Procurement Requirements for Producing a Quality Plan (ITER_D_22MFMW) [12]).

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 Quality Assurance for ITER Safety Codes (ITER_D_258LKL).[13]

11.1 Quality class

Quality class of the equipment according to Quality Classification Determination [3]

	Factor type	Associated Risk	FQC	coefficient
F1QC	Functional and operational	Failure has no potential for loss of plasma operation or loss of data essential for machine operation.	3	1.5
F2QC	Environment, industrial safety and health	Failure has potential for: (1) minimal impact on the health and safety of the public or a worker, such as injury or illness requiring minor supportive treatment but not requiring hospitalization, or (2) a negligible impact on the environment.	3	1.5
F3QC	cost and schedule impacts	Failure has potential for a financial loss less than 500K Euro and no impact on construction schedule.	3	1.5
F4QC	compliance	Failure has potential for minor non-compliance with established management practices.	3	0.75
F5QC	other classifications	The SSC has other classifications: SR / seismic class 3 / vacuum class 3 / tritium class 3.	3	0.75
F6QC	design complexity	The design efforts is normal, it involves different disciplines and independent validation of the design.	2	0.5
F7QC	complexity of manufacturing	The product has critical characteristics and the fabrication requires normal processes, normal fabrication technologies and qualified personnel that are involved in manufacturing process.	2	0.5
			Quality class	3

12 Reference Documents

[1] CAD model: IO_FRAME_FOR_STORAGE_2023#3CLLL9 (XXXX)
[2] Drawing : IO_FRAME_FOR_STORAGE_2023 (XXXX)
[3] Quality Classification Determination (24VQES v4.1)
[4] Commission Notice — The Blue Guide on the implementation of EU products rules 2016 Section 4.1.3 CONFORMITY WITH THE ESSENTIAL REQUIREMENTS: OTHER POSSIBILITIES http://eur-lex.europa.eu/legal-content/EN/AUTO/?uri=uriserv:OJ.C_.2016.272.01.0001.01.ENG&toc=OJ:C:2016:272:FULL
[5] Guide to application of the Machinery Directive 2006/42/EC: §110 The presumption of conformity conferred by the application of harmonised standards §162 Harmonised standards and the state of the art http://ec.europa.eu/growth/sectors/mechanical-engineering/machinery_fr
[6] ITER Numbering System for Components and Parts (28QDBS v2.0)
[7] ITER CAD Manual (2F6FTX v1.1)
[8] PROCEDURE FOR THE CAD MANAGEMENT PLAN (2DWU2M v2.0)

[9] ITER Requirements Regarding Suppliers Release Note (ITER_D_22F52F)
[10] Requirements for Preparing and Implementing a Manufacturing and Inspection Plan (ITER_D_22MDZD)
[11] ITER Procurement Quality Requirements (ITER_D_22MFG4)
[12] Procurement Requirements for Producing a Quality Plan (ITER_D_22MFMW)
[13] Quality Assurance for ITER Safety Codes (ITER_D_258LKL)
[14] Requirements for DA / Supplier / SubSuppliers Deviations & Nonconformities (ITER_D_22F53X)
[15] TF Storage Frame calculation note (XXXX)