



**Framework Service Contract
Engineering Support to the ITER Organization for the ITER Tokamak Complex
Detritiation System (TC-DS)**

Call for Nomination

1 Purpose

The purpose of this Framework Service Contract is to provide engineering support to the ITER Organization (IO) for the procurement of the ITER Tokamak Complex Detritiation System (TC-DS).

Two Lots of work are anticipated under this Framework Service Contract:

- Lot 1: Support for the preparation, tendering and execution of the TC-DS Design and Fabricate (D&F) Contract(s)
- Lot 2: General Technical support

2 Background

ITER is a joint international research and development project that aims to demonstrate the scientific and technical feasibility of fusion power. The fusion reactor will operate with tritium plasmas. The radiological hazards of tritium must be controlled, and TC-DS is the primary safety system at ITER for the control of these hazards. ITER is a nuclear licenced site; therefore the TC-DS must meet the requirements of French nuclear legislation and regulations.

TC-DS is a chemical plant of medium scale, with many interfacing systems, and an extensive and complex piping network serving about 150 clients. It uses well-established process equipment (catalytic reactors, gas-liquid contactors), deployed in this specialised application.

TC-DS comprises 16 catalytic reactors, 8 scrubber columns and 8 blowers organised into 8 separate modules, each with a capacity of 1400 Nm³/hr. The modules are connected to the client systems via approximately 11km of piping, in sizes ranging from DN50 to DN400, including approximately 1000 valves and 1200 instruments. Further technical data is provided in the Appendix.

The IO is planning to issue a call for tender for the Design & Fabricate (D&F) Contract(s) for TC-DS, which shall include:

- 1) Detailed design of TC-DS,
- 2) Fabrication of TC-DS, and
- 3) Delivery of TC-DS to the ITER site.

Under this Engineering Support Framework Service Contract, the selected Contractor will be required to provide support to the IO for the successful preparation and execution of the D&F Contract.

The tentative schedule of the TC-DS project is as follows:

- Preparation and tendering phase for the D&F Contract(s): Q1 2019 – Q2 2020
- Execution of the D&F Contract(s): From Q3 2020

3 Scope

The scope of work under this Framework Service Contract is divided into two Lots:

Lot 1: Support for the preparation, tendering and execution of the TC-DS D&F Contract(s)

The scope of work under this Lot will be as follows:

- 1 Support the production of D&F Contract Technical Specification**
 - To support the IO to define the process and milestones to guide the writing of the D&F Contract Technical Specification
 - To support the IO to produce the Technical Specification
- 2 Support the development of the TC-DS contracting strategy**
 - To support development of the overall contracting strategy for procurement of TC-DS
 - To propose the appropriate contract management approaches for execution of the D&F contract (e.g. by using schemes such as options, termination, hold points, incentives, penalties, work monitoring and reporting)
- 3 Support the Call for Tender for the D&F Contract**
 - To review and assess the TC-DS design documentation package which will be sent to tenderers. To assess its completeness and identify where documents are missing or insufficient to enable tenderers to accurately estimate and tender for D&F activities. This will include providing examples of best practices where appropriate.
 - To provide expert reports to evaluate the tenders during the evaluation stage of the Call for Tender, including technical compliance, adequacy of the proposed methodology, level of costs in comparison with the industry common practice, and schedule.
- 4 Contribute to D&F contractor performance monitoring**
 - To assess the performance of the selected D&F Contractor. Assessments include monitoring of requirements completion by the D&F contractor; ongoing capability assessments of the D&F Contractor organization; impact on the D&F Contract by potential changes in IO technical requirements; review of regular contractor progress reports; participation in meetings with the D&F Contractor; providing advice and highlighting any issues to the IO RO; review the D&F Contractor deviation requests, assistance with resolution of Non Conformance Reports.
- 5 Support and Work as member of the D&F contract preparation and execution team**
 - To support and work as part of the IO D&F team, attend project meetings and perform general tasks in support of the D&F project, such as market surveys, information collection and organization, report preparation, document review, discussions with other relevant parties involved in D&F project, and other tasks.

Lot 2: General Technical Support

The Contractor shall provide engineering support and perform technical tasks in support of the TC-DS project. This may include preparation of technical deliverables, performing design calculations and analysis and preparing operation and maintenance plans. The tasks may fall into the full range of relevant disciplines including mechanical, structural, instrumentation, control, electrical, and process engineering.

4 Required Experience and Skills

The required experience and skills are as follows:

Lot 1:

- Proven experience in chemical plant design and fabrication at the scale and complexity of TC-DS
- Experience working with Engineering Procurement Construction (EPC) contractors, for example in an Owner's Engineer role
- Experience with the tasks described under Lot 1 in Section 3.

Lot 2:

- Proven experience in chemical, mechanical, structural, electrical, instrumentation and control engineering
- Capacity to perform a range of technical activities with just a few examples being preparation and review of process, mechanical and electrical analysis deliverables such as calculations, equipment specifications and design documentation including mechanical, process and electrical drawings and diagrams.

Detailed criteria shall be provided during Pre-Qualification stage.

5 Duration of Contract

Lot 1: 2 years (with option to extend up to another 2 years).

Lot 2: 4 years

6 Schedule

The tentative timetable for setting up the services contract is as follows:

- | | |
|-----------------------------------|---------------|
| - Call for nomination | April 2018 |
| - Call for pre-qualification (PQ) | May 2018 |
| - Call for tender (CFT) | August 2018 |
| - Award of the contract | November 2018 |
| - Contract signature | December 2018 |

7 Candidature

Participation is open to all legal entities established in an ITER Member State. Entities can participate either individually or in a consortium. A legal entity cannot participate individually or as a consortium partner in more than one application or tender. A consortium may be 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 pre-qualification stage. The tenderer's composition cannot be modified without the approval of the ITER Organization after the pre-qualification. Legal entities belonging to the same legal grouping are allowed to participate separately if they are able to demonstrate independent technical and financial capacities. Candidates (individual or consortium) must comply with the selection criteria. The IO reserves the right to disregard duplicated reference projects and may exclude such legal entities from the pre-qualification procedure.

Appendix: Tokamak Complex Detritiation System Technical Data

Provisional Main Component List

Component	Material / Type	Dimensions / Capacity	Qty
Recombiner units	SS 304L fully welded, containing 400 - 600kg catalyst	1.5m(h) x 1.4m(dia)	16
Scrubber Columns	SS 304L w/ structured packing	11m(h) x 0.67m(dia)	8
Blowers	SS 304L; centrifugal type	1.2m(l) x 1.5m(w) x 1.6m(h)	8
Filter sets	Flame arrestor	0.4m(l) x 0.3m(dia)	10
	Pre-filter	0.6m(l) x 0.6m(w) x 0.05m(h)	10
	Glass fibre HEPA	0.6m(l) x 0.3m(w) x 0.03m(h)	7
	Metallic fibre HEPA	0.4m(l) x 0.35m(dia)	21
Heat Exchangers (water-air)	SS 304L; Finned tube	1.3m(l) x 1.5m(w) x 1.5m(h)	19
Heat Exchangers (air-air)	SS 304L; Finned tube	3.2m(l) x 1.3m(w) x 1.4m(h)	10
Water pumps	SS 304L; Centrifugal	36 l/hr	16
Water feed tanks	SS304L	0.9m(l) x 0.6m(dia)	8
Transmitters	SS304L; Pressure, temperature, level, vibration, gas detectors		1200
Isolation valves	SS 304L	DN50 – DN400	950
Control valves	SS 304L	DN50 – DN300	79
Piping	SS304L Sch10S	DN25-DN100	7000m
	SS304L Sch10S	DN150- DN400	4500m

Operating Parameters

Inlet fluid composition	Air or inert gas contaminated with tritiated hydrogen isotopes, hydrocarbons and water.		
Inlet flowrate (per module)	100 – 1400 Nm ³ /hr		
Operating pressure range	-20 to 2 kPag		
Operating temperatures	Recombiner units: 180 - 500°C	Scrubber columns: 7 - 25°C	Other equipment: ambient temperature
Duty factor	Operational 24/7		
Detritiation factor	Normally >99%		

Module Configuration

- 2 x Normal modules, permanent operation
- 6 x Standby modules, arranged in two trains each of three modules

Codes & Classification

- Piping to ASME B31.3 Cat. M
- Process vessels to ASME VIII
- Compliance with applicable EU directives (PED, LV Equipment, Machinery, EMC, etc.)
- Nuclear safety class design, qualification and fabrication.

Appearance

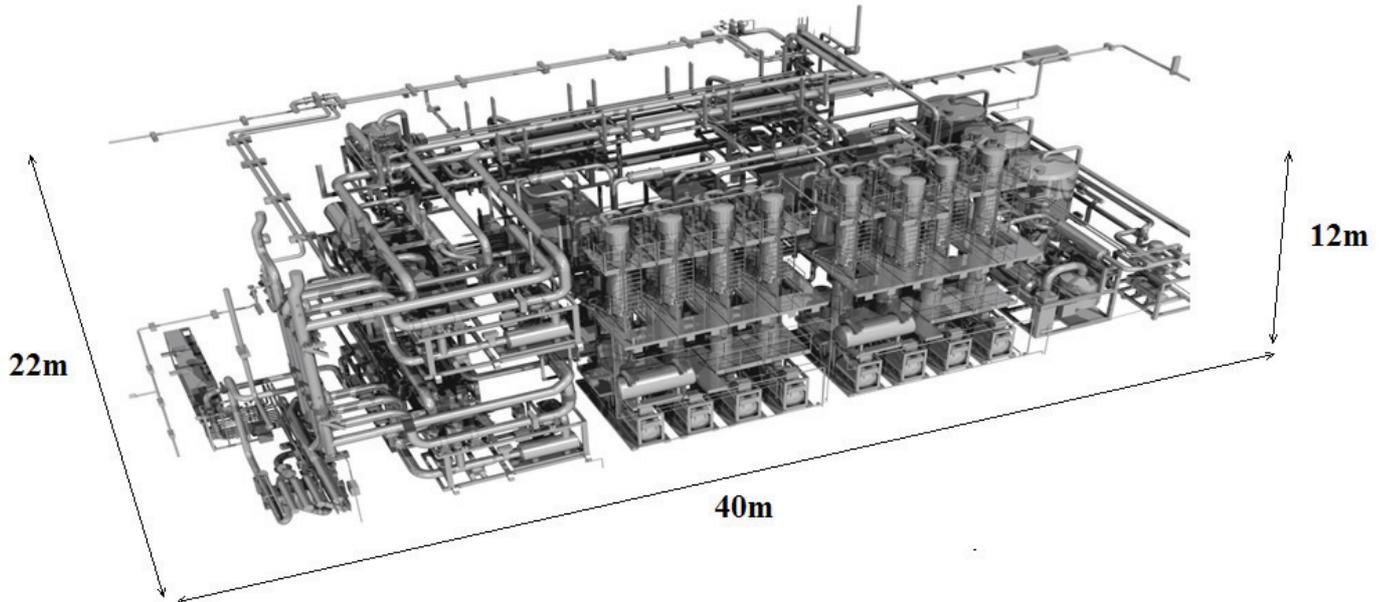


Figure 1 - TC-DS processing modules and piping in Building 14

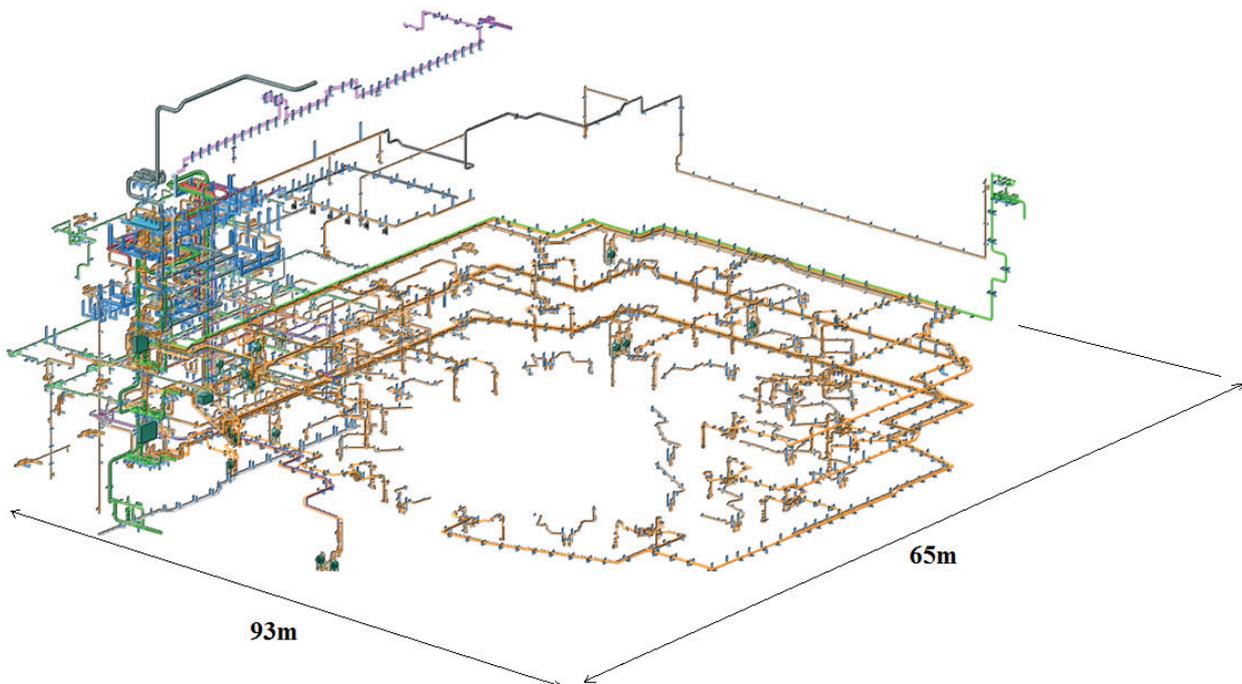


Figure 2 - Complete TC-DS piping system in Buildings 11 & 14