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Technical Specifications (In-Cash Procurement)

Technical Summary for BOP-Group 1 Installation Works

Confidential - Tender process and approval of the document conditioned by MAC approval on Contract Strategy and PR approval

The BOP-Group 1 Installation Works covers:

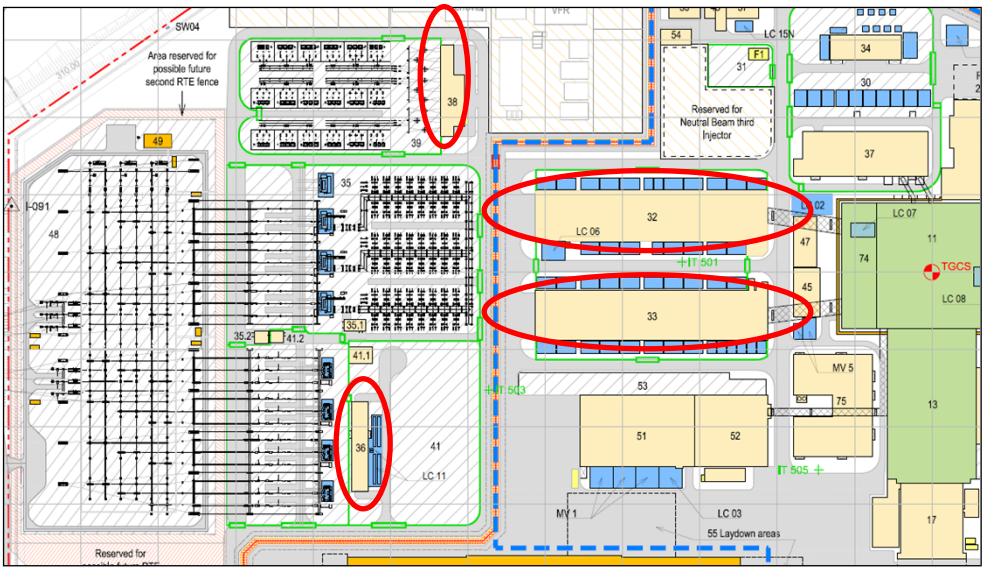
Building 32: Magnet power conversionBuilding 33: Magnet power conversionBuilding 36: Main alternating current distributionBuilding 38: Reactive power control

Technical Summary

Purpose

The purpose of this project is to provide mechanical and electrical plant installation works in the following Buildings on the ITER Site in Saint-Paul Lez Durance, France:

- Building 32 – Magnet Power Conversion Building 1,
- Building 33 – Magnet Power Conversion Building 2,
- Building 38 – Reactive Power Control Building
- Building 36 – Main Alternating Current Distribution Building



The installation activities will include:

Equipment	Building
Piping	32, 33, 38
Valves	32, 33, 38
Pumps	32, 33, 38
Pressurizer	32, 38
Cables	32, 33, 38,36
Cable Trays	32, 33, 38,36
Instrumentation	32, 33, 38,36
Motor Control Centres (MCC)	32, 33, 38
Control Cubicles	32, 33, 38,36
Steel Structures	32, 33, 38,36

Background

ITER is based on the 'Tokamak' concept of magnetic confinement, in which the plasma is contained in a doughnut-shaped vacuum vessel. The fuel - a mixture of Deuterium and Tritium, two isotopes of Hydrogen - is heated to temperatures in excess of 150 million °C, forming an hot plasma. Strong magnetic fields are used to keep the plasma away from the walls; these are produced by superconducting coils surrounding the vessel, and by an electrical current driven through the plasma.

ITER is a large research facility made of a combination of large conventional industrial equipment such as the cooling water system and challenging new high tech components such as diagnostics, superconductive magnets, etc. To ensure the future operation of all ITER subsystems a large amount of power and control cables will have to be designed, identified, routed and installed.

For more information on ITER Project please visit our web site www.iter.org.

Scope of Work

The installation works are to be performed in the following buildings:

- Building 32 – Magnet Power Conversion Building 1,
- Building 33 – Magnet Power Conversion Building 2
- Connecting pipes and cables between Buildings 32 and 33
- Building 38 – Reactive Power Control Building
- Building 36 – Main Alternating Current Distribution Building

All the equipment to be installed shall be free issued by the ITER Organization (IO) to the Contractor, except for the components listed in the column “to be procured” of the table in below in this Section -3 of this Technical Summary, which items shall be provided by the Contractor.

The preliminary bill of materials is given below and is divided into (a) equipment to be supplied and installed and (b) equipment for installation only. Also included in the scope are all the associated finishing works and the testing for mechanical and electrical completion of the installation:

Mechanical completion of the Structural, Mechanical & Piping includes, but is not limited to:

- Verification that the piping systems, mechanical equipment and their supporting structure are installed
- Non-destrutively examined
- Hydrostatically tests
- Flushed clean[SML1]

Electrical completion of installation, equipment includes, but is not limited to:

- Normal inspection of each cables, wiring & termination
- Normal inspection of cable and tray support, tray (fill), grounding, integrity.
- Check of stress core installation for MV & HV cable
- Check of bend radius of cables
- Tests of continuity and megger testing (insulation)

Mechanical Completion for instrumentation systems including validation of the instruments, valves and compared to the original design data to assure their (process flow) condition will be met by verifying, but is not limited to:

- All wiring check & verified
- Inspected for continuity & insulation
- Loop check for confirmation to the automatic system (with specific mock-up [SML2] on equipment)
- Hydraulic & pneumatic tubing will be cleaned[SML3] , flushed and pressure tested to assure that there are no leaks and that the cleanliness meets required quality

Description		Install	Procure
Cables			
Power < 16mm^2		2.8 km	
Power > 70 mm^2		0.05 km	
I&C < 16 cores		33.7 km	
I&C > 16 cores		5 km	
Fibre optic		8.5 km	
Cable Trays and Conduits			
Cable Trays		101 m	101 m
Supports for Cable Tray		40	40
Conduits		576 m	576 m
Instrumentation & Control (I&C) and Electrical Components			
Pressure Gauge		17	
Pressure Transmitter		13	
Temperature Gauge		24	
Temperature Transmitter		34	
Differential Pressure Switch		5	
Flow Transmitter		29	
Other Instrument Transmitters		6	
Valve Positioner, Position Switch, Open/Close Command		50	
MCC		3	1
Cubicles		21	16
Junction Box		4	2
Central I&C Network Panel		6	6
Horn, Bell, Alarm		36	
Public Address Loudspeaker		166	
Emergency Phones		22	
Instrument tubing (including fittings)		300 m	300 m
Instrument supports		60	60
DN	**Specification**	**Install**	**Procure**
Carbon Steel Piping and Line Components			
20	ASTM A53 Gr.B ANSI B36.10, SCH-STD, SMLS, PE	44	

DN	Specification	Install	Procure
25	ASTM A53 Gr.B ANSI B36.10, SCH-STD, SMLS, PE	88	
300	ASTM A358 GR. 304L CL1, EFW, ANSI B36.19, 9.53 THK. BE	14	
500	ASTM A53 Gr.B ANSI B36.10, SCH-STD, ERW, BE	4	
500	ASTM A672 Gr.B 60 CL-12 FROM ASTM A515 GR 60 PLATES, B.36.10, SCH-STD, BE	8	
600	ASTM A672 Gr. 60 B CL-12 PLATES, B63.10, SCH-STD, BE, 9.53 THK	2	
700	ASTM A672 Gr.B 60 CL-12 FROM ASTM A515 GR 60 PLATES, B.36.10, SCH-STD, BE	26	
750	ASTM A672 Gr.B 60 CL-12 FROM ASTM A515 GR 60 PLATES, B.36.10, SCH-STD, BE	13	
Elbow 90 DN 500	ASTM A234 Gr.WPB, Welded, ANSI B16.9, BW ENDS LR SCH- TO MATCH WITH PIPE THK	10	
Elbow 90 DN 700	ASTM A234 Gr.WPB, Welded, ANSI B16.9, BW ENDS LR SCH- TO MATCH WITH PIPE THK	4	
-	GATE VALVE DN20– 900#	7	
-	GATE VALVE DN25– 900#	4	
-	GATE VALVE DN50– 900#	6	
	BUTTERFLY VALVE DN300 -150 RF	2	
-	BUTTERFLY VALVE DN500 – 900#	4	
	GLOBE VALVE DN20 – 900#	2	
Stainless Steel Piping and Line Components			
20	ASTM A312 TP 304L, SMLS, ANSI B36.19, SCH-40S	77	
25	ASTM A312 TP 304L, SMLS, ANSI B36.19, SCH-40S	262	
40	ASTM A358 GR. 304L CL1, EFW, ANSI B36.19, 9.53THK pE	426	
50	ASTM A312 TP 304L, SMLS, ANSI B36.19, SCH-40S PE	891	
80	ASTM A312 TP 304L, SMLS, ANSI B36.19, SCH-40S PE	297	
100	ASTM A312 TP 304L, SMLS, ANSI B36.19, SCH-40S PE	163	
150	ASTM A312 TP 304L, SMLS, ANSI B36.19, SCH-40S PE	192	
200	ASTM A312 TP 304L, SMLS, ANSI B36.19, SCH-40S PE	1203	
200	ASTM A358 GR. 304L CL1, EFW, ANSI B36.19, 9.53THK BE	70	
250	ASTM A358 GR. 304L CL1, EFW, ANSI B36.19, 9.53THK BE	1103	
300	ASTM A358 GR. 304L CL1, EFW, ANSI B36.19, 9.53THK BE	10	
300	ASTM A312 TP 304L, SMLS, ANSI B36.19, SCH-40S	101	
350	ASTM A358 GR. 304L CL1, EFW, ANSI B36.19, 9.53THK BE	3	
DN	**Specification**	**Install**	**Procure**
450	ASTM A358 GR. 304L CL1, EFW, ANSI B36.19, 9.53THK BE	112	

500	ASTM A358 GR. 304L CL1, EFW, ANSI B36.19, 9.53THK BE	91	
600	ASTM A358 GR. 304L CL1, EFW, ANSI B36.19, 9.53THK BE	104	
700	ASTM A358 GR. 304L CL1, EFW, ANSI B36.19, 9.53THK BE	38	
750	ASTM A358 GR. 304L CL1, EFW, ANSI B36.19, 9.53THK BE	143	
-	GATE VALVE DN 20 - 900#	6	
-	GATE VALVE DN 25 - 900#	15	
-	GATE VALVE DN 50 - 900#	1	
-	GATE VALVE DN 20 - 800#	7	
-	GATE VALVE DN 25 - 800#	4	
-	GATE VALVE DN 50 - 800#	2	
-	GATE VALVE DN 100 - 150#	1	
-	GATE VALVE DN 500 - 150#	1	
-	BUTTERFLY VALVE DN 500 - 150#	4	
-	BUTTERFLY VALVE DN 600 - 150#	6	
-	BUTTERFLY VALVE DN 750 - 150#	1	
-	GLOBE VALVE DN200 – 150 RF	2	
-	GLOBE VALVE DN 50 - 900#	1	
-	GLOBE VALVE DN 100 - 800#	1	
-	CHECK VALVE DN 100 - 150#	1	
-	CHECK VALVE DN 600 - 150#	3	
-	GATE VALVE DN200 – 150 RF	3	
-	GATE VALVE DN80 – 900#	1	
-	GATE VALVE DN40 – 900#	5	
-	GATE VALVE DN25 – 900#	16	
-	GATE VALVE DN20 – 900#	9	
-	CHECK VALVE DN300 – 150 RF	2	
-	CHECK VALVE DN40 – 900#	1	
-	BUTTERFLY VALVE DN300 – 150 RF	6	
Mechanical Components			
Plate Type Heat Exchangers (Design Standard ASME Section VIII, Div-1, API662, PED/ESP) (4000 W x 1300 D x 2500 H 9000 kg weight) (2000 W x 1000 D x 2500 H 4500 kg weight)		2 1	
Horizontal Centrifugal Pumps (Design Standard API 610/ISO13709/ HIS) (3500 W x 1200D x 1200 H 6000 kg weight)		5	
Pressurizer (1400mm diameter 2200mm height 1400 kg weight) (1200 mm diameter 1500 mm height 1000 kg weight)		1 1	
Chemical Dosing System (3700 W x 5900 D x 2000 H 3500 kg weight)		1	
Water Polishing Unit (3100 W x 2700 D x 2100 H 2000 kg weight)		1	

For the above equipment, the contractor is responsible for providing and installing consumables and accessories, including:

- Terminals and Connections,
- Cable/Wiring Core Ferruling,
- Labels,
- Flexible Conduit,
- Cable Glands,
- Earthing and Bonding,
- Welding materials.

The Contractor shall be responsible for the following activities:

- Provide any required temporary works including, but not only, the means of protection and the tools needed to properly manage and perform the different stages of work in the buildings and on site,
- Perform the complete installation (including the thermal insulation and the final coating if necessary),
- If required provide scaffolding,
- Perform final installation tests (mechanical & electrical completion) and verifications,
- Issue all necessary documentation for the works, such as Quality Plan. Health and Safety plan, Workface planning (Installation sequence and Level 4 Schedule) and the List of documents to be issued for the execution of the works.
- Issue the As-Built documents,
- Provide support during commissioning phase with a minimum number of resources (as required).

All above mentioned site works shall be performed by the Contractor within ITER Site at Saint Paul-lez-Durance in France.

Note that the above information is preliminary only and later at the Call for Tender stage of the procurement there may be some changes to the scope.

Interfaces with other companies

There shall be other contractors working on the ITER site around the Buildings and also inside the Buildings involved in these installation activities.

To manage the coactivity and the Installation schedule IO is currently working with a Construction Management-as Agent (CMA). The CMA shall oversee these tasks on behalf of IO-CT :

- Project management,
- Site coordination (including permit to work)
- Material management,

- Work supervision, quality control, record keeping
- Management of installation Completion Activities.

The CMA acts as the Engineer for this Works Contract under the FIDIC "Red Book".

Timetable

The tentative timetable is as follows:

Issue of Pre-Qualification	March 2017
Invitation to Tender	March 2017
Tender Submission	April 2017
Contract Award	July 2017
Start of the Works	October 2017

The contract duration is estimated to be between 18 and 30 months for the whole of the installation works, including testing and preparation of the final documentation.

Nuclear and Quality Requirements

The ITER Organization is the nuclear operator of the ITER nuclear fusion facility (INB 174) under French nuclear law.

The Contractor shall install piping components in conformance with ASME B31.3-2010 Category M fluid [1] and appropriate ASTM standards and for part of the scope to comply with ESP and ESPN French regulations. The Contractor will have to provide an evidence of implemented Quality Assurance System required for installing of nuclear components and shall comply with the French Order of 7th February 2012 establishing the general rules for basic nuclear installations. The Quality requirements imposed by the ESP and ESPN regulations and the French Order of 7th February 2012 will be detailed at the Call for Tender stage.

No Protection Important Components related to Nuclear Safety **are to be installed** under this contract.