

IDM UID
7JF2H8

VERSION CREATED ON / VERSION / STATUS
24 Apr 2019 / 1.3 / Approved

EXTERNAL REFERENCE / VERSION

Technical Specifications (In-Cash Procurement)

Fusion Diagnostics Optical and Optoelectronics Engineering Consultancy for 55.GL In Vessel Lighting

This document describes technical needs of Fusion Diagnostics Optical Design Consultancy, in support of the following ITER diagnostic system:

- In Vessel Lighting, PBS 55.GL;

**Fusion Diagnostics Optical and Optoelectronics
Engineering Consultancy for 55.GL In Vessel
Lighting**

Technical Specifications

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1 Purpose

This document describes technical needs of **Fusion Diagnostics Optical Design Consultancy**, in support of the following ITER diagnostic system:

- In Vessel Lighting, PBS 55.GL;

2 Scope

The services are for the ITER project, currently under construction in France. This device will study the potential of controlled nuclear fusion to provide energy for mankind. In order to study the behaviour of this device, a set of monitoring systems (referred to as Diagnostics) is required. These Diagnostics will provide the information required to understand the performance of the device. The work described below is related to the support to the specification, design and analysis of diagnostics in the field of optics, optomechanics and optoelectronics. This will include the feasibility study, analysis and specifications of the optical, optomechanical and optoelectronic components to achieve the requirements of 55.GL.

3 Definitions

For a complete list of ITER abbreviations see: [ITER Abbreviations \(ITER_D_2MU6W5\)](#).

4 References

References are inserted throughout the text.

5 Duration

The duration shall be for a period of 12 months. One day per week is expected to be worked on-site.

6 Work Description

The tasks to be performed within this contract fall within the following categories:

- Perform feasibility studies and analysis in the fields of optics, optomechanics and optoelectronics for diagnostics;
- Develop specifications in the fields of optics, optomechanics and optoelectronics for diagnostics;
- Support definition of interfaces and diagrams;
- Provide cost estimations of optical, optomechanical and optoelectronic systems for diagnostics;
- Provide design in the fields of optics, optomechanics and optoelectronics for diagnostics;

The support above shall be provided for the following ITER Diagnostics:

- In Vessel Lighting, PBS 55.GL;

The ITER Organization (IO) may request the Contractor to support other Diagnostics systems.

The support to these Diagnostics in the categories listed above will be reported through monthly progress reports listed in Section 7.

7 List of deliverables and due dates

	Deliverable Title	Due Dates
D01	55.GL- report on optoelectronic calculations for G1 and GA, Mechanical design specification for integration with G1, support to the creation of the Interfacesheets and ICDs with 55.GA, EP 3, 9 , 17, UP 2, 8, 11, 14 ,17;	T ₀ + 1m
D02	55.GL- report on the optical design for G1 and GA, Mechanical design specification for integration with GA; support to the creation of interfacesheets and ICDs with PBS 44 and 45.	T ₀ + 2m
D03	55.GL - Technical Description for the system components / subassemblies; Participation in interface review for CDR	T ₀ + 3m
D04	55.GL - Design Description Document (DDD)	T ₀ + 4m
D05	55.GL- Report on the mechanical design (for integration in both 55.G1 and 55.GA diagnostics optical paths) and 55.GL - I&C concept inputs	T ₀ + 5m
D06	55.GL - I&C concept and 55.GLR&D reports (based on LIGHTTOOLS simulation results)	T ₀ + 6m
D07	55.GL design development plan , 55.GL Risk analysis and 55.GL readiness assessment	T ₀ + 7m
D08	55.GL - On Site Assembly Plan" and 55.GL-On site Testing and Commissioning Plan; Support of organization CDR	T ₀ + 8m
D09	55.GL - Chit resolution Plan	T ₀ + 9m
D10	55.GL - Participation in closure of CAT 1 chits (optoelectronics part and specification of other CAT1 chit work)	T ₀ + 10m
D11	55.GL - Preparation for mock-up	T ₀ + 11m
D12	55.GL - Update of documentation after CDR	T ₀ + 12m

8 Responsibilities

8.1 Contractor's Responsibilities

In order to successfully perform the tasks in these Technical Specifications, the Contractor shall:

- Strictly implement the IO procedures, instructions and use templates;
- Provide experienced and trained resources to perform the tasks;
- Contractor's personnel shall possess the qualifications, professional competence and experience to carry out services in accordance with IO rules and procedures;
- Contractor's personnel shall be bound by the rules and regulations governing the IO ethics, safety and security IO rules.

8.2 IO's Responsibilities

The IO shall

- Nominate the Responsible Officer (RO) to manage the Contract;
- Provide offices at IO premises;

9 Acceptance Criteria

The deliverables will be posted in the Contractor's dedicated folder in IDM, and the acceptance by the IO will be recorded by their approval by the designated IO RO. These criteria shall be the basis of acceptance by IO following the successful completion of the services. These will be in the form of reports as indicated in section 7, Table of deliverables.

10 Specific requirements and conditions

- Minimum 10 years' experience in optics and optoelectronics;
- Minimum 5 years' experience with optical systems in the field of nuclear installations comparable to ITER;
- Minimum 5 years' experience with diagnostic systems comparable to those of ITER;
- Minimum 5 years' experience with plasma or high energy physics devices;
- Minimum 5 years' experience with the technical follow-up of CAD activities;
- Minimum 5 years' experience in project management
- Minimum 5 years' experience with system diagrams
- Experience with vacuum-compatible materials and processes would be an advantage;

Services are to be provided predominantly at the IO work site. Travel to the DA or other sites may be required to carry out the work.

11 Work Monitoring and Control Points

The work will be managed by means of Progress Meetings and through the formal exchange of documents and transmitted by emails which provide detailed progress. Work progress will be monitored through Deliverable documents. Progress Meetings will be called by the ITER Organization or the Contract TRO. They will be held as needed and at least once per month.

12 Delivery Time Breakdown

See Section 7 "List Deliverables section and due dates". Interim payments will be made upon satisfactory completion and IO approval of deliverable reports uploaded onto IDM and upon submission of a valid invoice.

13 Quality Assurance (QA) requirement

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 \(ITER_D_22MFG4\)](#).

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 \(ITER_D_22MFMW\)](#)).

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 \(ITER_D_258LKL\)](#).

14 CAD Design Requirements (if applicable)

For the contracts where CAD design tasks are involved, the following shall apply:

The Supplier shall provide a Design Plan to be approved by the IO. Such plan shall identify all design activities and design deliverables to be provided by the Contractor as part of the contract.

The Supplier shall ensure that all designs, CAD data and drawings delivered to IO comply with the Procedure for the Usage of the ITER CAD Manual ([2F6FTX](#)), and with the Procedure for the Management of CAD Work & CAD Data (Models and Drawings [2DWU2M](#)).

The reference scheme is for the Supplier to work in a fully synchronous manner on the ITER CAD platform (see detailed information about synchronous collaboration in the ITER [GNJX6A](#) - Specification for CAD data production in ITER Contracts.). This implies the usage of the CAD software versions as indicated in CAD Manual 07 - CAD Fact Sheet ([249WUL](#)) and the connection to one of the ITER project CAD data-bases. Any deviation against this requirement shall be defined in a Design Collaboration Implementation Form (DCIF) prepared and approved by DO and included in the call-for-tender package. Any cost or labour resulting from a deviation or non-conformance of the Supplier with regards to the CAD collaboration requirement shall be incurred by the Supplier.

15 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 Suppliers 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.

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 Supplier and Subcontractor following the requirements of the Order 7th February 2012 ([PRELIMINARY ANALYSIS OF THE IMPACT OF THE INB ORDER - 7TH FEBRUARY 2012 \(AW6JSB v1.0\)](#)).

Compliance with [Defined requirements for PBS 55 - Diagnostics \(NPEVB6 v1.3\)](#) or its flowed down requirements in [SRD-55 \(Diagnostics\) from DOORS \(28B39L v5.2\)](#) is mandatory.