

# Job Title: Mechanical Engineer IO0078

Requisition ID **6828** - Posted - (France, 13067 St Paul Lez Durance Cedex) - **Engineering of Systems - New Posting**

The ITER Organization brings together people from all over the world to be part of a thrilling human adventure in southern France—building the ITER Tokamak. We require the best people in every domain.

We offer challenging full-time assignments in a wide range of areas and encourage applications from candidates with all levels of experience, from recent graduates to experienced professionals. Applications from under-represented ITER Members and from female candidates are strongly encouraged as the ITER Organization supports diversity and gender equality in the workplace.

ITER Organization (IO) is an Equal Opportunity/Inclusive organization committed to diversity in the workplace, with diversity and Inclusiveness being one of the ITER Values.

As IO attracts and retains people coming from a vast array of different backgrounds and cultures, bias and exclusion cannot be tolerated. IO believes it is our diverse perspectives and backgrounds that gives unique strength and value to the ITER mission, regardless of race, member nation, gender, religion, status, sexual orientation, or disability - all are welcome and respected at ITER.

Our working environment is truly multi-cultural, with 29 different nationalities represented among staff. The ITER Organization Code of Conduct gives guidance in matters of professional ethics to all staff and serves as a reference for the public with regards to the standards of conduct that third parties are entitled to expect when dealing with the ITER Organization.

The south of France is blessed with a very privileged living environment and a mild and sunny climate. The ITER Project is based in Saint Paul-lez-Durance, located between the southern Alps and the Mediterranean Sea—an area offering every conceivable sporting, leisure, and cultural opportunity.

To see why ITER is a great place to work, please look at this video

**Application deadline:** 29/01/2023

**Domain:** Engineering Domain

**Department:** Engineering Design Department

**Division:** Heating & Current Drive Division

**Section:** Ion Cyclotron Section

**Group:** Not applicable

**Job Family:** Engineering

**Job Role:** Engineer – 3

**Job Grade:** P3

**Language requirements:** Fluent in English (written & spoken)

**Contract duration:** Up to 5 years

## **Purpose**

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As a Mechanical Engineer, you will be responsible for the integration of the transmission line components for the Ion Cyclotron (IC) system in the RF Building, Assembly Hall, Tokamak Building and specific components related to the integration of IC systems such as building penetrations, nuclear shielding or specific auxiliaries. Your tasks will include the management of design and procurement of IO Bioshield and support the procuring Domestic Agency (DA) on the design finalization and preparation of technical specifications for external contracts. The post will also support the installation and metrology follow up, system requirements and subsequent oversight of the activities leading to installation, commissioning, testing and operation of the IC system.

## **Background**

The IC system will be used at ITER for Heating and Current Drive (H&CD) in a number of plasma operating scenarios, providing 20MW of power to the plasma by means of two antenna installed in the equatorial ports. There is a possibility of potential upgrade for an additional 20MW (40MW in total) of delivered power. This system aims to increase the energy content in the plasma to assist fusion operation and control internal plasma parameters. The IC H&CD system consists of two broadband equatorial port plug antennas, their pre-matching and matching systems, transmission lines, Radio Frequency (RF) Sources and High Voltage Power Supplies. The RF sources include 18 amplifier chains and 9 combiners, which together constitute 9 sources that can provide each up to 3MW for 3000 seconds in a frequency range of 40-55MHz to a matched load. The transmission lines and matching system are designed and procured by the US Domestic Agency and will be installed by the IO in the RF, Assembly, Tokamak and Hot Cell buildings. It is a large network with around 1100 m of 300 mm diameter rigid coaxial lines and approximately 300 90° elbows. The layout in the RF building allows interconnecting the RF sources with the 8 main transmission lines, the 2 power dummy loads and the test line connected to the Port Plug Test Facility in the Hot Cell Facility.

### **Key Duties, Scope, and Level of Accountability**

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- Manages the design, procurement, installation and commissioning activities related to IC Resonance Heating (ICRH) Bioshield;
- Represents the IC Section as a Mechanical Engineer for the integration of IC transmission line system in the tokamak building, assembly hall, RF building and hot cell building; Assists the DA with the design finalization (building penetrations, nuclear shielding or specific auxiliaries as needed) and oversight during the manufacturing.
- Provides the assistance to the development of the mechanical design (especially 3D modeling) for the transmission line and perform the detailed integration studies;
- Documents the design requirements, load specifications, safety functions, requirements propagation and verification, and quality plans as required;
- Provides technical assistance to Technical Responsible Officer (TRO) to monitor the final design development and prototype tests of the IC transmission line components;
- Manages the interface with the site metrology, defining the alignment and monitoring requirements associated with the transmission line supports and components;
- Prepares the necessary documentation to support the installation of the ICRH transmission line components
- Provides technical assistance to TRO for planning and supporting the installation of the transmission line with the relevant interfaces providing inputs to an integrated schedule to support the overall installation plans in the different buildings
- Provides technical assistance to TRO to prepare the necessary testing and commissioning plans and contributes to the operation and maintenance plans for the IC transmission line;
- Co-ordinates the IC transverse activities impacting the transmission line scope design and specifically required components, in collaboration with the relevant internal and external stakeholders;
- May be required to work outside ITER Organization reference working hours, including nights, week-ends and public holidays.

### **Measure of Effectiveness**

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- Effectively manages the design, procurement, installation and commissioning activities related to IC subsystems (ancillary systems, transmission line and ex-vessel components) to meet the defined quality, cost and schedule;
- Effectively manages the design, procurement, installation and commissioning activities related to ICRH Bioshield;
- Ensures design compliance of the IC transmission line system with ITER project requirements, other interfacing ITER systems and internal interfaces among the different IC subsystems;
- Provides all necessary support for an efficient development of the transverse function systems related to the IC system integration and operation;

- Maintains properly the systems after delivery, implementing additional required control and protection functions, and accurately updating the documentation accordingly;
- Maintains effective communication with the interfacing teams within ITER, Domestic Agencies and with external contractors.

## Experience & Profile

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- **Professional Experience:**
  - Minimum 8 years' experience in mechanical engineering for designing, procuring and installing complex mechanical system(s) within complex international environments or projects.
- **Education:**
  - Master equivalent in Mechanical Engineering or other relevant discipline;
  - The required education degree may be substituted by extensive professional experience involving similar work responsibilities and/or additional training certificates in relevant domains.
- **Language requirements:**
  - Fluent in English (written and spoken).
- **Other requirements:**
  - For staff expected to perform on-call, shift hours, or other work outside ITER Organization reference working hours, including nights, weekends, and public holidays, the possession of a driving license valid in France is required. No commuting vehicle will be provided by the ITER Organization.
- **Technical competencies and demonstrated experience in:**
  - **Interface Management (identifying, resolving and maintaining technical and functional interfaces):**
    - In the technical integration of complex mechanical systems;
    - Ensuring design compliance of complex mechanical systems with other interfacing systems.
  - **Design (create technical designs based on project requirements):**
    - Familiarity with CAD models (for example: CATIA V5);
    - Designing as per codes and standards (for example: RCC-MR, SDC-IC, ASME, EN, ASTM);
    - Manufacturing as per codes and standards (for example: RCC-MR, SDC-IC, ASME, EN, ASTM) is an advantage;
    - Developing complex systems with nuclear safety functions is an advantage;
    - Review of Finite Element Analysis is an advantage.
  - **Specialized domains of work and technical expertise (Complex Mechanical Systems):**
    - Mechanical engineering of complex systems in relevant areas (such as thermal-mechanical applications, cooling, tolerance analysis, assembly);
    - IC components development programs is an advantage;
    - Design and procurement of Bioshield is an advantage.
  - **Procurement & Project Management:**
    - Management of procurement/contracts for mechanical components, including the ability to project costs and resources for technical projects.

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### *The following important information shall apply to all jobs at ITER Organization:*

- Maintains a strong commitment to the implementation and perpetuation of the ITER Safety Program, ITER Values (Trust; Loyalty; Integrity; Excellence; Team mind set; Diversity and Inclusiveness) and Code of Conduct;
- ITER Core Technical Competencies (Knowledge of these competencies may be acquired through on-board training at basic understanding level for all ITER staff members) :

1) Nuclear Safety, Environment, Radioprotection and Pressured Equipment

2) Occupational Health, Safety & Security

3) Quality Assurance Processes

- ITER Core Behavioral Competencies :

1) **Collaborate**: Ability to facilitate dialogue with a wide variety of contributors and stakeholders

2) **Communicate Effectively**: Ability to adjust communication content and style to deliver messages to work effectively in a multi-cultural environment

3) **Drive Results**: Ability to persist in the face of challenges to meet deadlines with high standards

4) **Manage Complexity**: Ability to analyze multiple and diverse sources of information to understand problems accurately before moving to proposals

5) **Instill Trust**: Ability to apply high standards of team mindset, trust, excellence, loyalty and integrity

- Implements the technical control of the Protection Important Activities, as well as their propagation to the entire supply chain;
- May be requested to work on beryllium-containing components. In this case, you will be required to follow the established ITER Beryllium Management Program for working safely with beryllium. Training and support will be provided by the ITER Organization;
- May be requested to be part of any of the project/construction teams and to perform other duties in support of the project;
- Informs the IO Director-General, Domain Head, or Department/Office Head of any important and urgent issues that cannot be handled by line management and that may jeopardize the achievement of the Project's objectives.