

Call for Nomination

Technical Summary

Design and Qualification of the Rupture Disc Complete Assembly for the ITER Vacuum Vessel Pressure Suppression System

1. Purpose

The purpose of the contract is to execute design, manufacturing, test, qualification, package and shipping the rupture disc (RD) complete assembly to the ITER Organization (IO) in Saint Paul Lez Durance, France.

2. Background

ITER (“The Way” in Latin) is one of the most ambitious energy projects in the world today. 35 nations are collaborating to build the world’s largest Tokamak, a magnetic fusion device that has been designed to prove the feasibility of fusion as a large-scale and carbon-free source of energy based on the same principle that powers our Sun and stars.

For more information on the ITER project: <http://www.iter.org/>

The Vacuum Vessel Pressure Suppression System (VVPSS) of ITER Tokamak machine shall limit the Vacuum Vessel (VV) internal pressure, in the case of loss of coolant from the in-vessel components, to 0.15 MPa by opening the rupture discs to let the steam from the VV discharges to the VVPSS Suppression Tanks (VSTs), where it should condense.

The VV is connected to the VSTs by the relief line DN500. The relief line contains the RD complete assembly, upstream and downstream pipes. The main components of the RD complete assembly (see Fig. 1) are the double bellows, vacuum flange connections, the bellows compression tools and two RD modules installed in two separate lines connected in parallel. Each module has primary (RD1) and secondary (RD2) rupture discs connected in series. The interspace between a set of the RDs is evacuated and monitored for any leakages.

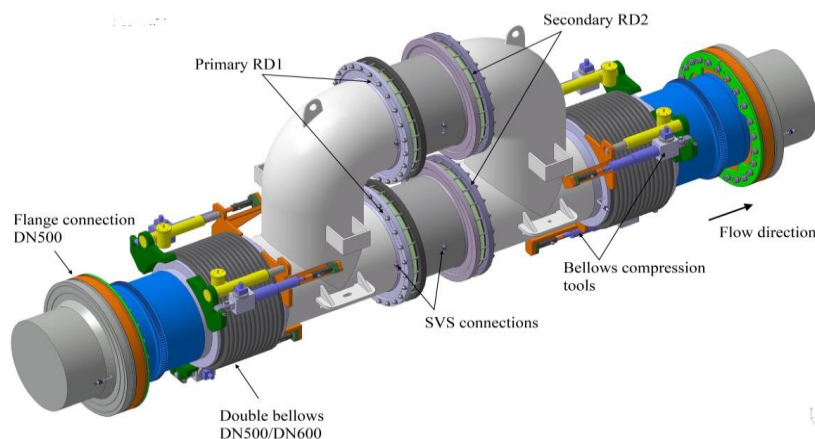


Figure 1. RD complete assembly

The RD complete assembly is designed for vacuum/pressure application. The below presents the parameters and requirements currently intended.

RD complete assembly design parameters

- Pressure process pipe: DN500
- Burst pressure of the primary RD1: 110 kPa±5 kPa
- Burst pressure of the secondary RD2: 30 kPa±7 kPa
- Max. design temperature: 300 °C
- Min. design temperature: 0°C
- Min. design pressure: vacuum (~1E-5 Pa)
- Max. Allowable Pressure, PS: 0.05 MPa-g, non-pressure equipment
- Max. design pressure of the process pressure boundary: 0.2 MPa-a

Design requirements

- No fragmentation of the RDs after the bursting
- RD seal shall be the welded seal
- Vacuum flange connections and the bellows compression tools shall be designed for Remote Handling maintenance
- The RD complete assembly shall comply with vacuum requirements stated in ITER Vacuum Handbook
- The process pressure boundary shall maintain the structural integrity at 0.2 MPa-a

Fabrication requirements

- The base material for the RD complete assembly is austenitic stainless steel.
- The lower-activated materials shall be selected
- All process pressure boundaries to air shall be full penetration welded

Qualification requirements

- Qualification of the RD complete assembly to fulfil the safety functions for the nuclear equipment.

Control

- A Producing and Inspection Plan (PIP) shall be prepared by the Contractor in line with ITER requirements.

3. Scope of work

The selected Contractor shall perform the following tasks:

- Design, fabrication and tests of the RD complete assembly components
- Design, manufacturing and performance tests of the RD modules with the RD1 and RD2 in series
- Design, stress calculations, manufacturing and performance tests of the RD complete assembly
- Qualification of the RD complete assembly as nuclear equipment
- Transfer the RD complete assembly documentation to ITER
- Packaging of the RD complete assembly
- Shipment of the RD complete assembly to ITER.

4. Timetable

The tentative timetable is as follows:

• Call for Nomination:	January 2018
• Pre-qualification	February 2018
• Call for Tender:	April 2018
• Contract Award:	June 2018
• Contract Signature:	July 2018
• Delivery of the RD complete assembly to ITER site:	June 2022
• Completion of Contract:	July 2022

This is given for information only and may be subjected to change.

5. Experience

The Contractor and its personnel shall demonstrate a technical and engineering capability and relevant experience in:

- Design, structural integrity analysis, fabrication, examination, quality control and testing of the RD complete assembly in line with ASME B&PV Section III Division 1 Subsection NB Class 1 Components
- Qualification of the mechanical equipment to fulfil the safety functions for the nuclear equipment in line with the requirements of RCC-E and IEC 60870/CEI 60780 as reference standards for qualification
- High vacuum technology
- Development of the mechanical components for Remote Handling (RH) maintenance.

The Contractor shall have ISO 9001 quality system accredited quality system in accordance with all the European standards, Design rules and French laws and decrees.

All Codes & Regulatory Requirements will be provided in the Call of Tender stage.

6. Nuclear and Quality Requirements

The ITER Organization is the nuclear operator of the ITER nuclear fusion facility (INB 174, (“Installation Nucléaire de Base”) under French nuclear law.

For Protection Important Components (Safety Important Class) (PIC/SIC), the French Nuclear Regulation must be observed, in application of the Article 14 of the ITER Agreement.

Therefore the Contractor and its subcontractors must comply with the following:

- The Order 7th February 2012 applies to all the PIC components and Protection Important Activity (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 surveillance done by the Nuclear Operator.

For the Protection Important Components, structures and systems of the nuclear facility, the Contractor shall ensure that a specific management system has to be implemented by any Contractor and its subcontractor working on Protection Important Activities, following the requirements of the Order 7th February 2012 and ITER Provisions for Implementation of the Generic Safety Requirements by the External Interveners.

The Contractor will have to provide an evidence of implemented Quality Assurance System required for design, manufacturing, testing, qualification and shipping of nuclear components.

The Quality requirements imposed by the French regulations will be detailed at the Call for Tender stage.

7. Candidature

Participation is open to all legal persons participating either individually or in a grouping (consortium) which is established in an ITER Member State. A legal person cannot participate individually or as a consortium partner in more than one application or tender of the same contract. 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 grouping shall be presented at the Pre-Qualification stage. The Candidate's composition cannot be modified without the approval of the ITER Organization after the Pre-Qualification.

Legal entities belonging to the same legal group 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.