



UHV multipurpose test rig for the ITER Project

Summary Technical Specifications



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1 Introduction

ITER will be the largest and most complex vacuum system yet to be built. Situated in Southern France, the ITER facility is designed to study the fusion reaction between the hydrogen isotopes tritium and deuterium.

A standalone vacuum test rig is required to qualify systems and components for use on ITER the machine.

In order to qualify the systems and components it is necessary to operate them in vacuum conditions (pressure and temperature) close to the ITER vacuum operating conditions for extended periods of time.

The types of tests to be performed are, for example: vacuum instrumentation qualification, vacuum pump trials, qualification of vacuum test procedures, outgassing measurements, and vacuum conditioning of components.

2 Purpose

The purpose of this contract is the supply of an instrumented multipurpose vacuum test rig for the ITER vacuum laboratory.

3 Description of the system

To perform its duties, the test rig shall include a welded bake-able stainless steel cylindrical vacuum vessel equipped with a set of CF flanged ports of standard sizes. The access to the vessel shall be by entry doors at the ends of the cylindrical chamber.

The equipment shall be fitted with a dry pumping system capable of achieving an ultimate vacuum in the chamber of 10^{-6} Pa at room temperature. The vacuum vessel shall be instrumented for the measurement of total pressure and residual gas composition (full range gauging to measure from atmosphere to 10^{-7} Pa and Residual Gas Analyser). The system shall be bake-able up to 250 °C and as such, shall be fitted with electrical baking system including feedback temperature control and thermal insulation. The supply shall also extend to associated all-metal valves and standard ancillary vacuum components required to perform the tests outlined above.

The system shall be mounted on a rigid, stable and compact metallic frame. It must have lockable wheels which allow the chamber to be moved without any damage leading to a loss of performance of the equipment through vibration due to movement across laboratory floor surfaces.

4 Responsibilities

4.1 Design

The manufacturer shall be responsible for the detailed design of the following:

- vacuum chamber
- vacuum system including instrumentation
- Bake-out system

4.2 Fabrication and assembly

The manufacturer shall be responsible for the manufacture of the vacuum vessel and support frame.

The manufacture shall be responsible for the integration of the vacuum and bake out systems to the vacuum chamber to form the completed assembly.

5 Vacuum chamber design

Vacuum chamber design is summarized in the following sections.

5.1 Chamber dimensions

The main body (cylindrical section not including end flanges or ports) of the vacuum chamber shall have the dimension as specified in Table 1.

Dimension	Value (mm)	Tolerance (mm)
Length	2000	± 10 mm
Diameter	800	

Table 1 Main chamber cylindrical section dimensions

5.2 Port configuration

The integration of the required ports with vacuum chamber shall be in compliance with the layout described in the 3D model Figure 1.



Figure 1 Vacuum chamber side and top view

6 Experience

The potential supplier should have proven experience in the supply of same scale UHV fully instrumented test rig for a vacuum laboratory

7 Schedule

Action	Tentative date(s)
Call for nomination	July 2013
Pre-Qualification	September 2013
Call for tender	October 2013
Tender submission	November 2013
Contract Award	December 2013
Delivery	April 2014

8 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 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 prior 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 references and may exclude such legal entities from the pre-qualification procedure.