



**Specification No. 203-HJT-9004 R0**

# **Specification for the MERIT Mercury-Jet Experiment Titanium Target Module Components**

**April 10, 2006**

**SPECIFICATION FOR THE HIGH POWER MERCURY-JET EXPERIMENT  
TITANIUM TARGET MODULE COMPONENTS**

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## 1.0 Scope

This procurement specification is issued on behalf of Oak Ridge National Laboratory (ORNL), hereafter referred to as the Company. It is a “build-to-print” procurement and contains the requirements for the fabrication and assembly of the titanium alloy components consisting of

- 1) Downstream Primary Beam Window,
- 2) Hg Supply Assembly, and
- 3) Downstream & Upstream Secondary Beam Windows

These assemblies provide a portion of the primary and secondary containments for the Mercury Intense Target (MERIT) system. MERIT will be used to perform tests at ORNL, MIT’s Plasma Science and Fusion Center, and CERN in Switzerland.

Acceptance tests at the Seller’s site shall consist of checking certain critical dimensions, and verifying the leak-tightness of the containment structures. Upon completion of the acceptance tests, the equipment shall be delivered to ORNL in Oak Ridge, TN.

*It is pointed out that although this equipment is for a mercury-based target experiment, the Seller will not deal with nor handle mercury in any way; furthermore, the components shown on drawings 203-HJT-0610 and 203-HJT-0710 that are not specifically listed below, are not part of this procurement; they are shown for reference only.*

### **Under the provisions of this subcontract the Seller shall provide the following:**

#### **1. Downstream Beam Window (Drawing 203-HJT-0616)**

- Machined part per drawing. Material provided by others. No spares required.

#### **2. Hg Supply Assembly (Drawing 203-HJT-0620)**

- One complete assembly per drawing. Material provided by others.
- Partial fabrication for two (2) spare Hg Supply Assemblies as shown in 203-HJT-0620. Material provided by others. Minor changes to the nozzle flange (203-HJT-0622) nozzle position and/or angle, rigid tubing (203-HJT-0623), and the flow reducer (203-HJT-0624) may be required based on system testing, so final machining and welding will not be required for these spares.
  - Spare 203-HJT-0622 will include flange mounting holes (10), notch, blind hole near top of flange, and machined recess
  - Spare 203-HJT-0623 item 1 will be fabricated (extra length for item 1), items 2&3 loose, items 3&4 fabricated and welded as shown
  - Spare 203-HJT-0624 will include raw stock only with extra length
  - All spare components to be anodized with initial complete assembly

**3. Downstream Double Beam Window (Drawing 203-HJT-0706)**

- Fully assembled and tested components shown in the drawing package with the exception of item 2. Material for item 1 will be provided by others. No spares required.

**4. Upstream Double Beam Window (Drawing 203-HJT-0712)**

- a. Fully assembled and tested components shown in the drawing package with the exception of item 2. Material for item 1 will be provided by others. No spares required.

**5. Furnish the Company with as-built drawings or drawing mark-ups for any fabrication deviations that were approved by the Company.**

The attachment to this specification contains the drawings referenced above. The drawings, in addition to specifying dimensions, also specify component materials, commercially available procurements, and field notes that refer to welding and inspections, and material certifications.

Since the components listed above will be used during MERIT testing in high magnetic fields, all materials are to be non-magnetic. Any deviation from the materials listed in the drawings must be approved by the Company.

## **2.0 Applicable Codes and Standards**

- Welding per ASME Section IX; code stamping is not required. Inspection and testing per drawings.

## **3.0 Inspection and Testing**

As part of the Company's quality assurance program, the Company shall have the right to inspect the Seller's facility or any sub-tier Seller facility that the Company determines necessary to ensure that quality objectives are met. Source surveillance by the Company representative shall in no way relieve the Seller of the responsibility to furnish acceptable items.

### **3.1 Acceptance Testing**

The Company shall have the right to witness final functional testing and inspection of the equipment at the Seller's site. Such testing shall be specified by the Seller to ensure full compliance of the equipment with the requirements of this specification. The requirement for witnessed-tests and inspections are at the Company's discretion upon notification by the Seller that the work has been completed. Acceptance tests shall take place at the Seller's site using the actual components, equipment, and materials that will be delivered to the Company.

Final acceptance tests of the primary containment assemblies shall include checking several critical dimensions and verifying the leak-tightness of the double windows (203-HJT-0706 and -0712). The leak tests shall be done as indicated below:

- The window chambers shall be pressurized to 10 psig, and a soap bubble test shall be applied to the welded joints to verify leak tightness.

### **3.2 Seller's Responsibilities**

The Seller shall notify the Company ten (10) working days prior to the start of tests and inspections that are designated above. The Company at its discretion shall have representatives witness the performance tests. In addition, the Seller shall supply the Company with material certifications as specified on certain drawings in the attached drawing package.

## **4.0 Quality Assurance**

### **4.1 Non-Conforming Items**

The Company expects to receive equipment items, components, materials, and documentation that conform to all codes, standards, specifications, and procedures in the Agreement. The Seller may use its own nonconformance program to identify, report, and recommend disposition of all non-conforming items, but disposition that would leave any remaining nonconformity must be submitted to the Company for approval. A nonconformity request should identify the affected item(s) by name and serial number (if applicable), citing the drawing/specification number and revision number containing the specific requirement that has not been met. The Seller or the Seller's supplier may attach a description of the cause, and a corrective action plan and schedule if pertinent.

*Note:* The issuance and acceptance of such a request does not limit or affect the warranty provision of the Agreement. Such a request shall not establish a precedent or obligation to accept existing or future items not conforming to all provisions of the Agreement.

### **4.2 Seller's Requested Deviations**

The Seller may propose deviations from the specifications, drawings, or other technical requirements of this procurement. Where time is a consideration, the Seller may communicate the proposed deviations or changes directly to the Company's principal engineer or technical lead with a copy to the Company's buyer. The engineer or technical lead will evaluate the technical aspects and recommend to the buyer, who will communicate acceptance or disapproval to the Seller. The request should identify the affected items, drawing/specification number and revision number, a description of the proposed deviation, and the justification for it.

### **4.3 As-Built Drawings**

The Seller shall note any changes to the drawings due to errors or missing information, or changes to the components due to Company approved deviations, and provide the Company with a copy of the marked-up drawings.

### **5.0 Schedule**

The primary containment fabrications and acceptance testing shall be completed 6 weeks after subcontract award. Delivery to ORNL shall take place immediately thereafter.