



PS-492

Process Specification – Packaging and Shipping 65678 PPPL NCSX Vacuum Vessel Sub Assembly

1. PURPOSE

This specification establishes the process parameters to ensure packaging and shipping performed on the NCSX SE120-002 Vacuum Vessel Sub Assembly is maintained within the guidelines required by PPPL product specification NCSX-CSPEC-121-02

2. SCOPE

This specification defines the minimum requirements for packaging and shipping of all NCSX VVSA sub-assemblies and components are properly packaged, protected, and identified to ensure safe and efficient transportation to, and receiving at PPPL. This document is a supplement to MTM Manufacturing Routing instructions.

3. DEFINITIONS

PPPL – Princeton Plasma Physics Laboratory
MTM – Major Tool & Machine, Inc.
NCSX – National Compact Stellarator Experiment
VVSA- Vacuum Vessel Sub Assembly
MIT – Manufacturing, Inspection, and Test plan (MTM Mfg. Routing)
IDC – MTM Inspection Data Checklist system
QAP – MTM Quality Assurance Planning system
NCR – Non-Conformance Report

4. REFERENCE DOCUMENTS

PPPL Product Specification NCSX-CSPEC-121-02
QA-SOP-01 Non-Conformance Control
MTM Mfg. Routing / Inspection Plan / Quality Assurance Plan 65678
PS483 – Cleanliness Control

5. PRODUCT SPECIFICATION NCSX-CSPEC-121-02-03 CORRELATION

- 5.1, 5.2, 5.3

6. INSTRUCTIONS

6.1. All components shall be packaged and skidded, and/or sealed to provide protection against contamination, deterioration and damage during shipment. All surfaces shall be protected from damage during shipping and handling.

6.1.1. The primary vessel will be attached via welded tabs (8 minimum) to its support fixture. The entire vessel and support fixture will be wrapped with plastic shrink covering. Access holes will be cut to allow the assembly to be secured to the shipping trailer.

6.1.2. The removed port extensions will be wrapped in plastic foam and nested into shipping boxes. One box for each half of the vessel. Each port extension sub-assy will be secured to the box to prevent movement during shipping. The protruding leak check tube will be oriented up when possible to prevent damage.

6.1.3. The Spacer sub-assy will be wrapped with plastic and shipped in a separate container. This container will hold the spacer, blank cover plates, and VV seals, and unused O-Rings.

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- 6.1.4. All components and shipping boxes will be covered with a tarp during shipping.
- 6.2. Each component will be assembled to the extent possible. All cover plates, bolts, seals, etc... will be temporarily installed (hand tight). Perishable seals (copper seals, o-rings, metal seals, etc...) that were consumed during preliminary assembly and vacuum testing at MTM will not be included with shipment.
- 6.3. Under no circumstance are the VVSA components to contact iron based materials during the packaging and shipping process. When required, a protective barrier (e.g. wood or polyethylene foam, etc...) is to be applied between the part and any strapping or banding used to secure it.
- 6.4. PPPL requires reasonable advance notice prior to shipment to confirm shipping method and route. MTM Quality Assurance is to advise the CFT when the components are released for shipping. The CFT will contact the PPPL technical representative Mike Viola.
- 6.5. Each shipping skid must be marked with the following:
- Major Tool & Machine, Inc.
 - PPPL Contract number: S005243-F
 - Component Name
 - Gross Weight
 - For sub-components and sub-assemblies, the assembly number to which they belong
- 6.6. Where possible, boxes are to be secured to the shipping skid
- 6.7. Special attention must be applied to the following:
- 6.7.1. The Vacuum Vessel must be secured to the trailer through the support fixture windows only. No straps or tie downs allowed over the vessel (before or after applying tarp).
- 6.7.2. Use extreme caution during shipping and handling not to damage machined and polished surfaces.

7. SHIP LOOSE LIST

- VVSA 120 DEGREE VESSEL
- PORT 4 SUB-ASSEMBLIES (TWO BOXES)
- REMOVED PORT EXTENSIONS (GROUPED BY VESSEL HALF IN TWO BOXES)
- SPACER SUB ASSEMBLY, VESSEL BLANK-OFF SUB-ASSEMBLIES, LOOSE VV SEAL STRIPS (COMBINED INTO ONE BOX)
- FOUR O-RINGS NOT REQUIRED FOR IN-PROCESS TESTING (2 EACH, SE120-004-45 & -46). THESE ITEMS WILL ALSO BE SHIPPED WITH THE SPACER SUB-ASSY. ALL REMAINING O-RINGS AND SEALS ARE CONSUMED BY IN-PROCESS TESTING.

8. QUALITY ASSURANCE / DOCUMENTATION

- 8.1. The MTM MIT will specify all in-process and final inspection documentation requirements. All quality documentation will be compiled electronically utilizing MTM's integrated IDC and QAP systems
- 8.1.1. At a minimum, the MTM MIT will require documentation for all contractual features and/or physical requirements (e.g. final component features / final material condition).

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- 8.1.2. To ensure compliance is maintained throughout the manufacturing process, interim / additional documentation requirements will be provided within the associated MTM IDC, and QAP system
- 8.1.3. When an IDC record, or QAP document is completed, reference to the specific area being tested will be clearly discernable. The record will include the following information (as applicable):
- MTM Work Order Number
 - Part Identification Number
 - Part Description
 - Part Serial Number
 - Date of Inspection
 - Gage Serial Number
 - Reference Standard Serial Number
 - Inspector Signature / Acknowledgement, Initials, or Stamp
- 8.1.4. For all MIT operation sequences that include this document as a task requisite, but do not specify physical inspection records or documentation, the electronic completion (“clocking out”) of each sequential manufacturing operation within the MTM (Visual Manufacturing®) routing confirms compliance to the applicable requirements. The MTM employee completing the electronic transaction (which completes and closes the operation sequence) personally acknowledges completeness and compliance to the routing instructions.
- 8.2. All un-authorized exceptions / out of tolerance conditions according to MTM MIT will be documented within the MTM Non-Conformance system per QA-SOP-01.

9. REVISION HISTORY

- DRAFT A: First Submittal. DMc. 28Apr2006
- Rev. B: Revised based on feedback received from PPPL. DMc. 28Apr2006
- Rev. C: Added ship loose O-rings to list. DMc. 01May2006