



NCSX PVVS FDR

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PPPL

July 1st, 2003



DEFINITION

- The PVVS is intended to be a prototypical slice of the production NCSX vacuum vessel. Because the NCSX vessel final shape is still undergoing modification to perfectly meet the envelope defined by the Plasma and the coil assembly, we have fixed the PVVS design based on the December '02 shape.



Purpose

- Use different techniques to fabricate the shape.
- Gain experience fabricating such a complex shape.
- Learn from this experience and develop criteria for the production vacuum vessel.



CAPABILITY to PROVE

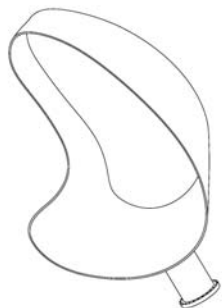
- Forming – achieve shape and determine springback
- Metrology – Fabricate a part to a PRO-E model which we can verify meets dimensional specifications.
- Heat treatment requirements
- Welding a port on – accuracy and vacuum weld quality
- Leak checking capability
- Cutting port off within 1" of shell - reattachable



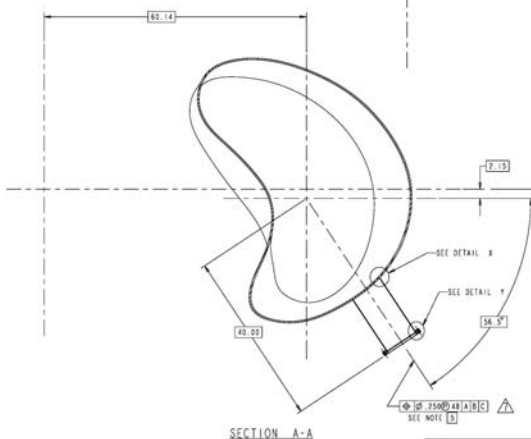
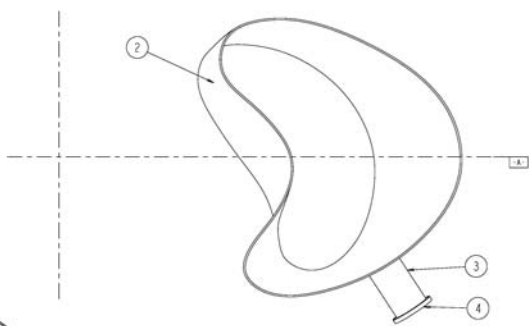
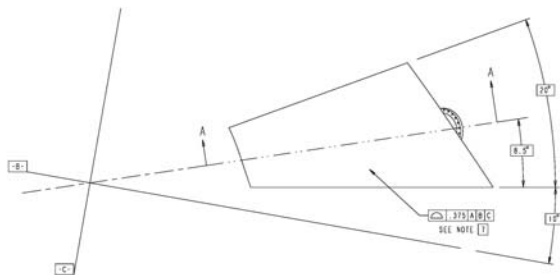
Documents

- Statement of Work
 - NCSX-SOW-121-01-XX
 - [NCSX-SOW-121-01-02 FDR Draft.doc](#)
- Specification
 - NCSX-CSPEC-121-01-XX
 - [NCSX-CSPEC-121-01-01 FDR Draft.doc](#)
- Drawings
 - SE121-001P
 - SE121-002P
 - SE121-003P
- Model

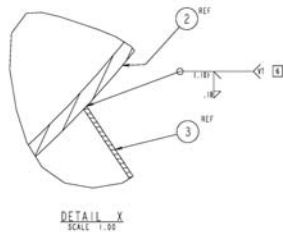
PRELIMINARY



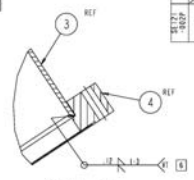
ISOMETRIC VIEW



SECTION A-A



DETAIL X
SCALE 1:50



DETAIL Y
SCALE 1:50

WELDING ENGINEER
APPROVED _____ DATE: _____

- NOTES:
1. DIMENSIONED DIMENSIONS AND TOLERANCES PER ANSI Y14.5M.
 2. DIMENSION ARE IN INCHES.
 3. REQUIREMENTS FOR FABRICATING THE VACUUM VESSEL PROTOTYPE ARE DEFINED IN THE DRAWINGS, MODEL, AND SPECIFICATION, NCSX-CSPFC-121-01-00 AND STATEMENT OF WORK, NCSX-SOW-121-01-01.
 4. CENTER OF VACUUM VESSEL PROTOTYPE IS DEFINED IN CAD MODELS/FILES SE121-001P.ASM, SE121-002P.ASM, AND SE121-003P.ASM.
 5. PROJECTED TOLERANCE ZONE STARTS AT INTERSECTION OF PORT AXIS AND VACUUM VESSEL OUTER SURFACE AND EXTENDS OUTWARD.
 6. WELDING PROCEDURES AND PERFORMANCE QUALIFICATIONS SHALL BE PERFORMED IN ACCORDANCE WITH THE REQUIREMENTS OF ASME CODE, SECTION IX. WELDS MAY BE MADE BY THE GTAW OR SMAW PROCESSES. WELDS USING SMAW PROCESSES ARE NOT PERMITTED. WELD INSPECTIONS SHALL BE PERFORMED IN ACCORDANCE WITH SPECIFICATION NCSX-CSPFC-121-01-00.
 7. PROFILE TOLERANCE ON OUTER VACUUM SURFACE IS BILATERAL, ±.0.01875 EITHER SIDE OF REFERENCE SURFACE.

AB	-3	WELD FILLER METAL	3
1	F1000000M4	FLANGE COMPAT 10 O.D.D. NON-ROTATABLE	4
2	-3	TUBE B O.D. 1/2 WALL	3
3	-2	PROTOTYPE VACUUM VESSEL SHELL	2
4	-2	PROTOTYPE VACUUM VESSEL SEGMENT PORT AND RIB WELDMENT	2
5	1	CASE IDENTIFYING NO	1
6	1	NOMENCLATURE OR DESCRIPTION	1
7	1	MATERIAL SPECIFICATION	1
8	1	PARTS LIST	1

QUALITY VERIFICATION

WELDING DOCUMENTS REVIEWED (SPECIFIC ITEM #)

WELDING PROCEDURE SPECIFICATION	X
WELDING WORKING INSTRUCTIONS	X
WELDING CHECKLIST	X
WELDING INSPECTION REPORT	X
WELDING MATERIAL CERTIFICATE	X
WELDING EQUIPMENT CERTIFICATE	X
WELDING OPERATOR CERTIFICATE	X
WELDING SUPERVISOR CERTIFICATE	X
WELDING INSPECTOR CERTIFICATE	X
WELDING MATERIAL SPECIFICATION	X
WELDING EQUIPMENT SPECIFICATION	X
WELDING OPERATOR SPECIFICATION	X
WELDING SUPERVISOR SPECIFICATION	X
WELDING INSPECTOR SPECIFICATION	X

THIS DRAWING PRODUCED ON PRO-ENGINEER

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NO.	REV.	DATE	BY	CHKD.	DESCRIPTION
1	1				

SCALE	NOTED	DATE	BY	CHKD.	DESCRIPTION

NATIONAL COMPACT STELLARATOR EXPERIMENT
PROTOTYPE VACUUM VESSEL SEGMENT
PORT WELDMENT

REVISION NO. 1-32-19201-2-2
WELDING LEVEL SE121-001P

Beware of the bumpy vessel

