

Title: SPECIFICATION FOR STAINLESS STEEL VESSEL HEADS

**SPECIFICATION FOR
STAINLESS STEEL VESSEL HEADS
FOR
LIGO VACUUM EQUIPMENT**

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and
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Information contained in this specification and its attachments is proprietary in nature and shall be kept confidential. It shall be used only as required to respond to the specification requirements, and shall not be disclosed to any other party.

REV	LTR.	BY-DATE	APPD. DATE	DESCRIPTION OF CHANGE
2		<i>REC, 4/8/96</i>	<i>D.M.W.</i>	<i>ADDED DELIVERY SCHEDULE DEO# 0115</i>
1		<i>REC, 12/28/95</i>	<i>D.M.W.</i>	<i>REVISED SECT. 3.7 & 8.1 DEO# 0037.</i>
0		<i>D.M.W.</i>		<i>ISSUE PER DEO 0021 (MAT'L. PROCUREMENT)</i>

PROCESS SYSTEMS INTERNATIONAL, INC.				SPECIFICATION	
INITIAL APPROVALS	PREPARED	DATE	APPROVED	DATE	Number <i>A V049-2-039</i>
	<i>REC</i>	<i>11/21/95</i>	<i>REC</i>	<i>11/27/95</i>	LIGO-E950119-02-V
					Rev. <i>2</i>

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Attachment A LIGO Quality Assurance Requirements
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1.0 SCOPE

This specification covers the minimum technical requirements for the materials, fabrication, inspection, testing, preparation for shipping, shipment and delivery of the heads to be used for manufacturing ultra-high vacuum boundary equipment.

All attachments are incorporated herein by reference and made a part of this specification.

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2.0 SCHEDULE

2.1 Head delivery shall be as follows:

<u>ITEM NO.</u>	<u>PART NO.</u>	<u>LD.</u>	<u>QTY.</u>	<u>DELIVERY SITE</u>	<u>DATE</u>
1	V049M001-1	104.5	6	PSI, Westborough	15 July 1996
2	V049M001-1	104.5	6	PSI, Westborough	1 Nov. 1996
3	V049M001-1	104.5	3	PSI, Westborough	1 Feb. 1997
4	V049M010-1	104.5	6	PSI, Westborough	15 July 1996
5	V049M010-1	104.5	6	PSI, Westborough	1 Nov. 1996
6	V049M010-1	104.5	3	PSI, Westborough	1 Feb. 1997
7	V049M132-1	84.25	12	PSI, Westborough	15 July 1996
8	V049M132-1	84.25	12	PSI, Westborough	1 Nov. 1996
9	V049M132-1	84.25	12	PSI, Westborough	1 Feb. 1997
10.	V049M002-1	60.5	10	PSI, Westborough	15 July 1996
11	V049M002-1	60.5	10	PSI, Westborough	1 Nov. 1996
12	V049M002-1	60.5	6	PSI, Westborough	1 Feb. 1997
13	V049M138-1	80.0	6	PSI, Westborough	15 July 1996
14	V049M138-1	80.0	6	PSI, Westborough	1 Nov. 1996
15	V049M138-1	80.0	6	PSI, Westborough	1 Feb. 1997
16	V049M138-1	80.0	6	PSI, Westborough	15 Apr. 1997

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3.0 MATERIAL REQUIREMENTS

3.1 This material shall conform to the requirements of ASME Specification SA-240 Type 304L with the additional supplementary requirements described in this specification. The material used shall be hot rolled, annealed and pickled. If the material is supplied dual certified to grade 304/304L, this will be acceptable to PSI.

3.2 Applicable Codes

3.2.1 ASME Boiler & Pressure Vessel Code, Section II, "Materials", the 1992 Edition through the 1994 Addenda.

3.2.2 ASTM A-480, "Standard Specification for General Requirements for Flat-Roll Stainless and Heat-Resisting Steel Plate, Sheet, and Strip".

3.2.3 ASTM A-700, "Standard Packages for Packaging, Marking, and Loading Methods for Steel Products for Domestic Shipment".

3.3 Any apparent conflicts between the requirements given herein and the applicable ASME Specification shall be brought to the attention of PSI for clarification.

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4.0 MANUFACTURE

4.1 Thickness Tolerance

The heads shall be furnished in the minimum thickness(es) specified in the purchase order.

4.2 Circumference Tolerance $\pm 1/8''$

4.3 Out-of-Round Tolerance $\pm 1/4''$ for 105 in. I.D. Heads, $\pm 1/8''$ for 30.5 in. I.D. to 84.5 in. heads.

4.4 Heads to be square trimmed by manufacturer to a flatness tolerance of $\pm 1/8''$.

4.5 Heads to be manufactured without center holes. Welding not permitted.

4.6 Surface Finish.

Cold rolled and pickled surface finish is acceptable.

4.7 No grinding with abrasive wheels, cloth or stones is permitted after final cleaning. No iron, carbon steel or other contaminants (such as grease, oil, hydrocarbons) to come in contact with the heads after the pickle process. Machining fluids shall be water soluble and free of oil and sulfur.

4.8 Cleanliness

The heads are intended for use in a high vacuum application. Potential hydrocarbon contamination shall be eliminated. Also, the material shall be wrapped and covered at all times the material is not being processed to minimize possible exposure to contaminants. Heads to be covered with polyethylene sheet for shipment.

5.0 MATERIAL TESTING

5.1 2" x 2" material coupons must be supplied to PSI for approval prior to release for shipment. The coupons are to be cut from the same heat number, lot and thickness of material to be supplied.

6.0 INSPECTION/WITNESS

6.1 The purchaser shall have the right to witness all manufacturing processes.

6.2 The purchaser shall be informed 5 working days before the head material is formed.

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7.0 REJECTIONS AND REPAIR OF DEFECTS

7.1 No weld splices or repair welding is permitted to the material or formed heads.

8.0 IDENTIFICATION

8.1 Identification of the material shall be maintained through all manufacturing processes.

8.2 If material identity of the heads is lost, they shall be requalified by making all tests that were required for the material or as indicated in this specification.

8.3 Marking the finished heads with marking fluids, die stamps, and/or electro-etching is not permitted. A vibratory tool with a minimum tip radius of .005" is acceptable for marking the outside only of the finished materials. All other marking methods must be approved by the purchaser prior to use. All heads shall be marked in the straight flange area 2" up from the edge.

9.0 DOCUMENTATION

9.1 The Certified Material Test Report (CMTR) shall be provided to the purchaser with the shipment of the material and available for review during inspection visits prior to shipment.

9.2 A record of the material thickness for each head is required. Thickness shall be measured and recorded at both the knuckle and the center of the head.

10.0 PACKAGING, STORING AND SHIPPING

10.1 The material shall be packaged for shipment as described in ASTM A700-94, Sections 12.4.9 and 12.4.10 with the additional supplementary requirements as described herein.

10.2 The head material shall be wrapped in waterproof polyethylene and covered with a tarp immediately after all steel processing operations have been completed to minimize contamination. The material shall remain packaged and covered until it is necessary to remove the covering and packaging material for further processing.

10.3 The heads shall be shipped as specified in the purchase order.

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11.0 NON-ESCORT PRIVILEGES AND INSPECTION RIGHT

Non-escort privileges for Buyer, Owner, Government and Owner representatives to all areas of the facilities where the work is being performed shall be arranged. This will include access to fabrication, assembly, cleaning and test areas for the purpose of monitoring activities.

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