

**SPECIFICATION FOR
STAINLESS STEEL FLANGE FORGINGS
FOR
LIGO VACUUM EQUIPMENT**

Hanford, Washington
and
Livingston, Louisiana

PREPARED BY: D. Curtis *D. Curtis*

STRUCTURAL ENGINEER: R. O. Wirth *R. O. Wirth*

QUALITY ASSURANCE: A. R. Bradbrook *A. R. Bradbrook*

TECHNICAL DIRECTOR: D. A. McWilliam *D. A. McWilliam*

PROJECT MANAGER: Buchel Bayly *Buchel Bayly*

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.

NOV 28 1995

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REV LTR.	BY-DATE	APPD. DATE	DESCRIPTION OF CHANGE
PROCESS SYSTEMS INTERNATIONAL, INC.			SPECIFICATION
INITIAL APPROVALS	PREPARED DATE	APPROVED DATE	Number V049-2-040 Rev. <u>0</u>
	<i>REC. 11/21/95</i>	<i>REC 11/27/95</i>	

Title

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 Summary

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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 flange forgings to be used for manufacturing ultra high vacuum boundary equipment.

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

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.

2.0 MATERIAL REQUIREMENTS

2.1 This material shall conform to the requirements of ASME Specification SA-182 Grade F Type 304L as given in the ASME Code 1992 Edition through 1994 Addenda with the additional supplementary requirements described in this specification.

2.2 Applicable Codes

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

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

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

3.0 MANUFACTURE**3.1 Thickness Tolerance**

The forgings shall be rough machined to the thickness(es) specified in the purchase order.

3.2 ID/OD Tolerance

The forgings shall be furnished in the diameters and tolerances specified in the purchase order.

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Title**SPECIFICATION FOR STAINLESS STEEL FLANGE FORGINGS****3.3 Flatness Tolerance**

The machined forgings shall be flat to $\pm 1/16$ across the diameter.

3.4 Surface Finish

The surface finish of the forgings shall be 125 RMS on four sides.

3.5 Chemistry and Mechanical Properties

The material shall meet the chemistry and mechanical requirements as specified in SA 182 Grade F, 304L material specification.

3.6 No grinding with abrasive wheels, cloths or stones is permitted. No iron carbon steel or other contaminants (such as grease, oil or hydrocarbons) to come in contact with the forging after the cleaning process. Machining fluids shall be water soluble and free of oil and sulfur.**3.7 Cleanliness**

The forgings 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. The forgings shall be steam cleaned prior to shipment.

4.0 MATERIAL TESTING**4.1 2" x 2" material coupons for each heat of material, 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.****5.0 INSPECTION/WITNESS****5.1 The purchaser shall have the right to witness all manufacturing processes.****5.2 The purchaser shall be informed 5 working days before the forging material is formed.****6.0 REJECTIONS AND REPAIR OF DEFECTS****6.1 No weld splices or repair welding is permitted to the material and forgings.**

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7.0 IDENTIFICATION

- 7.1 Identification of the material shall be maintained through all manufacturing processes.
- 7.2 If material identity is lost, the forging shall be requalified by making all tests that were required for the material or as indicated in this specification.
- 7.3 Marking the finished materials 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.

8.0 DOCUMENTATION

- 8.1 The Certified Material Test Report (CMTR) shall be provided to the purchaser a minimum of 48 hours prior to shipment of the material.
- 8.2 A record of the material thickness for each flange forging is required.

9.0 PACKAGING, STORING AND SHIPPING

- 9.1 The forging 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.
- 9.2 The material shall be cleaned and wrapped in polyethylene prior to shipment. The material shall be shipped as specified in the purchase order.

10.0 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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ATTACHMENT "A"
LIGO QUALITY ASSURANCE REQUIREMENTS SUMMARY

LIGO VACUUM EQUIPMENT	VENDOR: V59049					JOB NO.: V59049
EQUIPMENT: Flange Forgings	VENDOR ENG. OFFICE:					DWG. NO.:
PSI P.O. NO:	VENDOR FACTORY:					SPECNO: V049-2-040
TESTING INSPECTION AND DOCUMENTATION RECORD	Submittal After P.O.	Witnessed by PSI	Approval by PSI	Copies Req'd for PSI Files	Record in Mfr's File	Remarks: Inspector: Date:
MILESTONE SCHEDULE			X	2	X	
VENDOR Q.A. PLAN			X	2	X	
CLEANING PROCEDURE			X	2	X	
PREP FOR SHIPMENT PROCEDURE			X	2	X	
WELDING PROCEDURES						
ASSEMBLY DRAWINGS						
DESIGN REVIEW						
CERTIFIED MATERIAL TEST REPORTS			X	2	X	
IN-PROCESS INSPECTIONS		X		2	X	
OPERATION & MAINTENANCE MANUALS						
SHOP TEST PLAN						
SHOP TEST (WITH REPORT)						
SHOP DIMENSIONAL INSPECTION		X		2	X	