

Title: SPECIFICATION FOR SMALL VACUUM VALVES

SPECIFICATION FOR  
SMALL VACUUM VALVES  
FOR  
LIGO VACUUM EQUIPMENT

Hanford, Washington  
and  
Livingston, Louisiana

PREPARED BY: Thomas M. Stern

PROCESS ENGINEER: Roberts Thom

QUALITY ASSURANCE: Alwin R. Bradford

TECHNICAL DIRECTOR: D. A. McW. Dennis

PROJECT MANAGER: Burke 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.

REV LTR.	BY-DATE	APPD. DATE	DESCRIPTION OF CHANGE
1	TMS 7-19-96	D. M. W.	REVISED FOR PURCHASE PER DEO 0224
0	TMS 2-29-96	D. M. W.	RELEASED FOR QUOTE PER DEO 0075

PROCESS SYSTEMS INTERNATIONAL, INC.				SPECIFICATION		
INITIAL APPROVALS	PREPARED	DATE	APPROVED	DATE	Number	Rev.
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## SPECIFICATION TABLE OF CONTENTS

- 1.0 Scope
- 2.0 Schedule
- 3.0 Design Requirements
- 4.0 Required Documentation
- 5.0 Shop Testing
- 6.0 Inspection

## 1.0 SCOPE

This specification covers the minimum requirements for the design, materials, fabrication, assembly, inspection, testing, preparation for shipping, shipment and delivery of small (1 1/2" and 2 1/2") high vacuum and ultra high vacuum angle valves for the LIGO vacuum system.

The specified equipment is for use as part of the Vacuum Equipment supplied for the Laser Interferometer Gravitational-Wave Observatory (LIGO). LIGO, which is operated by Caltech and MIT under an NSF grant, includes two sites (Hanford Reservation, near Richland, WA and Livingston, LA). Each site contains laser interferometers in an L shape with 4 km arms, a vacuum system for the sensitive interferometer components and optical beams, and other support facilities.

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## 2.0 SCHEDULE

2.1 Equipment delivery shall be as follows:

	<u>Quantity</u>	<u>Date</u>	<u>PSI Part No.</u>
1 1/2" High Vac	137	9/30/96	V049AVHV15
2 1/2" High Vac	70	9/30/96	V049AVHV25
1 1/2" Ultra High Vac	77	9/30/96	V049AVUV15
2 1/2" Ultra High Vac	26	9/30/96	V049AVUV25

2.2 All valves shall be delivered to Process Systems International, Inc. at 20 Walkup Drive, Westboro, Massachusetts, 01581.

2.3 Acceptances at the sites are expected to occur on a staggered basis, with final acceptance at Washington expected to occur about May 31, 1998, and about November 30, 1998 in Louisiana.

## 3.0 DESIGN REQUIREMENTS

3.1 Angle valves shall be 304L or 316L stainless steel (304 or 316 stainless steel is acceptable if the valves are unavailable in L grade SS).

3.2 End connections shall be CF flanges.

3.3 The valves shall have stainless steel metal bellows stem feedthroughs.

3.4 Neither the body leakage nor the seat leakage shall exceed  $1 \times 10^{-9}$  torr liters/sec of helium.

3.5 The valves shall be designed to seal in both directions.

3.6 The internal valve mechanisms shall be non-lubricated.

3.7 Valves shall be manually actuated by a handwheel.

3.8 Valves shall be bakeable to 150 C +/-20 C (170 C maximum).

3.9 The valves shall be cleaned in accordance with the Vendor's standard procedures applicable to the valve service.

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**4.0 REQUIRED DOCUMENTATION**

Engineering drawings shall be submitted for approval prior to fabrication. Manufacturer's standard QA reports shall be provided prior to shipment:

**5.0 SHOP TESTING**

Each valve shall be tested for leakage (using oil-free pumping equipment and leak detector) prior to shipment from the manufacturer

**6.0 INSPECTION**

The Vendor's standard inspections shall be performed. Also, each valve shall be inspected for cleanliness by black light prior to shipment. Valves shall be recleaned if any contamination is found.

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**ATTACHMENT "D"**

**TO**

**V049-2-178**

**SPECIFICATION FOR SMALL VACUUM VALVES**

**V049-2-059**

**ATTACHMENT**

Number:

**A V049-2-178**

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*file as: LIGO-E970137-01-V*

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PREPARED BY: Thomas M. Stern

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QUALITY ASSURANCE: Alan W. Beal

TECHNICAL DIRECTOR: D. O. McCall

PROJECT MANAGER: Burt Bayly

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PROCESS SYSTEMS INTERNATIONAL, INC.				SPECIFICATION		
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