

Title: SPECIFICATION FOR ACCEPTANCE TEST PROCEDURE FOR TURBO PUMP SYSTEMS

ACCEPTANCE TEST PROCEDURE FOR THE
TURBOMOLECULAR PUMP SYSTEMS
LIGO VACUUM EQUIPMENT

Hanford, Washington and Livingston, Louisiana

JOB NO. V59049

PREPARED BY:

S. Meter

QUALITY ASSURANCE:

Alan L. Brubaker

TECHNICAL DIRECTOR:

D. A. McWilliams

PROJECT MANAGER:

Bruce Bagby

REV LTR	BY-DATE	APPD. DATE	DESCRIPTION OF CHANGE		
0	SM 5/1/96	REB 5/2/96	INITIAL RELEASE UED 0157		
PROCESS SYSTEMS INTERNATIONAL, INC.			SPECIFICATION		
INITIAL APPROVALS	PREPARED	DATE	Approved DATE	Number: V049-2-105 A	Rev. 0
	SM	5/1/96	REB 5/2/96	LIGO-E960172-00-V	

5.0 FACTORY TEST

5.1 Procedure Main Turbomolecular Pump Sets

5.1.1 Speed Test

The Main turbomolecular pump systems are speed tested in accordance with American Vacuum Society AVS 4.1; Recommended procedure for measuring pumping speeds as revised in October 1986. The speed test is performed across the normal working range of the turbomolecular pump, from 1×10^{-6} torr to 1×10^{-3} torr.

The minimum required pumping speed at the inlet port of the Main Turbo pump is 1400 l/s N₂ at an inlet pressure of 1×10^{-3} torr.

Throughput

The minimum required backing pump throughput is 5 torr-l/s with a backing pressure of 1 torr.

Duty

The Main Turbo Pump sets are designed for continuous duty service at full load and will pump down a 2000 cubic meter volume from 1 torr to 10^{-6} torr without overheating.

5.1.2 Functional Test

Besides the manufacturer's standard operating and safety shutdown features the following additional feature has been incorporated

- a. The turbo pump cannot be started or will shutdown at a backing pressure higher than a preset value.
- b. Emergency stop button on the backing pump electrical interface box and main control box.
- c. Backing pump motor winding overtemp shutdown
- d. Backing pump shut down on N2 seal gas low flow
- c. Backing pump motor starter overload
- d. Foreline safety valve closes on backing pump shutdown or turbo pump shutdown/failure.

SPECIFICATION

Number: V049-2-105

A

Rev.0

5.2 Auxiliary Turbomolecular Pump Sets

5.2.1 Speed Test

The Auxiliary turbomolecular pump systems are speed tested in accordance with American Vacuum Society AVS 4.1; Recommended procedure for measuring pumping speeds as revised in October 1986. The speed test is performed across the normal working range of the turbomolecular pump, from 1×10^{-6} torr to 1×10^{-3} torr.

The minimum required pumping speed at the inlet port of the Auxiliary Turbo pump is 50 l/s N₂ at an inlet pressure of 1×10^{-3} torr. The Auxiliary Turbo pump set will be speed tested per AVS 4.1 procedure.

5.1.2 Functional Test

Besides the manufacturer's standard operating and safety shutdown features the following additional feature has been incorporated.

- a. The inlet valve to the turbopump will fail closed on power loss or turbo failure and the inlet side of the turbo will be vented. (Process side is isolated and will remain under vacuum by closing of the automatic inlet valve)

6.0 FIELD TEST

6.1 Procedure Main Turbomolecular Pump Sets

The main turbomolecular pump equipment will have already been accepted by LIGO at the point of manufacture as part of the beam tube deliverables, and will be used for beam tube pumpdown service.

After installation of the main turbomolecular system into the building, a functional checkout will be carried out prior to use, to determine the operating status and mechanical condition of the pumping systems.

6.2 Auxiliary Turbomolecular Pump Sets

A functional checkout will be carried out prior to use, during installation of the vacuum envelope.

SPECIFICATION	
Number: V049-2-105 A	Rev.0