

STANFORD UNIVERSITY
W.W. HANSEN EXPERIMENTAL PHYSICS LABORATORY
GRAVITY PROBE B, RELATIVITY GYROSCOPE EXPERIMENT
STANFORD, CALIFORNIA 94305-4085

**THERMOVAC TESTING OF 2.5” AND 6”
VATTERFLY VALVES
GPB ENGINEERING PROCEDURE
P0731 Rev-B**

September 27, 2000

PREPARED _____

A. Halevy, GMA Engineer

_____ Date

APPROVED _____

R. Singley, Vatterfly Valve REE

_____ Date

APPROVED _____

D. Ross, Quality Assurance

_____ Date

APPROVED _____

B. Muhlfelder, Payload Technical Manager Date

Rev Level	Comments/notes	Date	Revised By
-	First release of this test procedure	9-Aug-00	-
A	ECO 1202	18-Sept-00	R. Singley
B	ECO 1207, incorporate redlines from last test.	27-Sept-00	D. M. Ross

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GENERAL DESCRIPTION

This procedure describes the thermovac test of the 2.5" and 6" Vatterfly valves. This test should be performed to assure valve functioning after sealing plate replacement to vulcanized butyl.

2. TEST INFORMATION

- Proper care should be taken in handling components, and their cleanliness must be preserved.
- Temperature: Room temperature
- Humidity: not critical

2.2 Cleanliness

2.2.1 Normal lab environment when components are double bagged.

2.2.2 The thermo-vac chamber is not a clean area, we have to treat the valves carefully and keep the area clean.

2.3 ESD precautions

2.3.1 None required.

ONR representative, and QA to be notified 24 hours prior to beginning this procedure

SU QA _____ time & date ONR _____ time & date

2.4 Personnel, QA, and Documentation

2.4.1 Personnel Integration and Test Director

The Integration and Test Director (ITD) shall be Aharon Halevy or an alternate that he shall designate. The ITD has overall responsibility for the implementation of this procedure and shall sign off the completed procedure and relevant sections within it. The Vatterfly valve REE shall also sign off the completed "As-Built" procedure.

Integration Engineers and other personnel. All engineers and technicians participating in this procedure shall work under the direction of the ITD who shall determine personnel that are qualified to participate in this procedure. Participants in this procedure are to be C. Warren or R. Stephenson and A. Halevy.

The test shall be conducted on a formal basis to approved and released procedures. The QA program office shall be notified of the start of this procedure. A Quality Assurance Representative, designated by D. Ross shall be present during the procedure (if deemed necessary) and shall review any discrepancies noted and approve their disposition. Upon completion of this procedure, the QA Manager, D. Ross or her designate, shall certify their concurrence that the effort was performed and accomplished in accordance with the prescribed instructions by signing and dating in the designated place(s) in this document. Discrepancies will be recorded in a D-log or as a DR per Quality Plan P0108. If a re-test of any or all of the hardware is necessary, the ITD will determine the appropriate changes in the procedure, with the QA Manager's approval.

2.5 Red-line Authority

Authority to red-line (make minor changes during execution) this procedure is given solely to the ITD or his designate, or the Vatterfly Valve Manager, and shall be approved by QA. Additionally, approval by the Hardware Manager shall be required, if in the judgment of the ITD or QA Representative, experiment functionality may be affected.

3. DOCUMENTS AND EQUIPMENT

3.1 Applicable Documents

Howden drawing #3179

PLSE-12

Mil-STD-1540C

3.2 Test Equipment

Equipment	Model and Serial Number	Calibration
Thermally controlled vacuum chamber		
thermocouples		
Control box	Box #1 & #2	
Isopropanol		
Clean wipes		
Clean air bottle		

3.3 HARDWARE PARTS TO BE TESTED

2.5" VALVE	6" VALVE
#0001	#0001
#0002	#0002
#0003	#0003
#0004	-----
#0005	-----

3.3 CONNECTOR SAVERS

Use connector savers when connecting Control Box cable to Vatterfly Valve. If a connector saver is not available record the mating and de-mating of flight connectors.

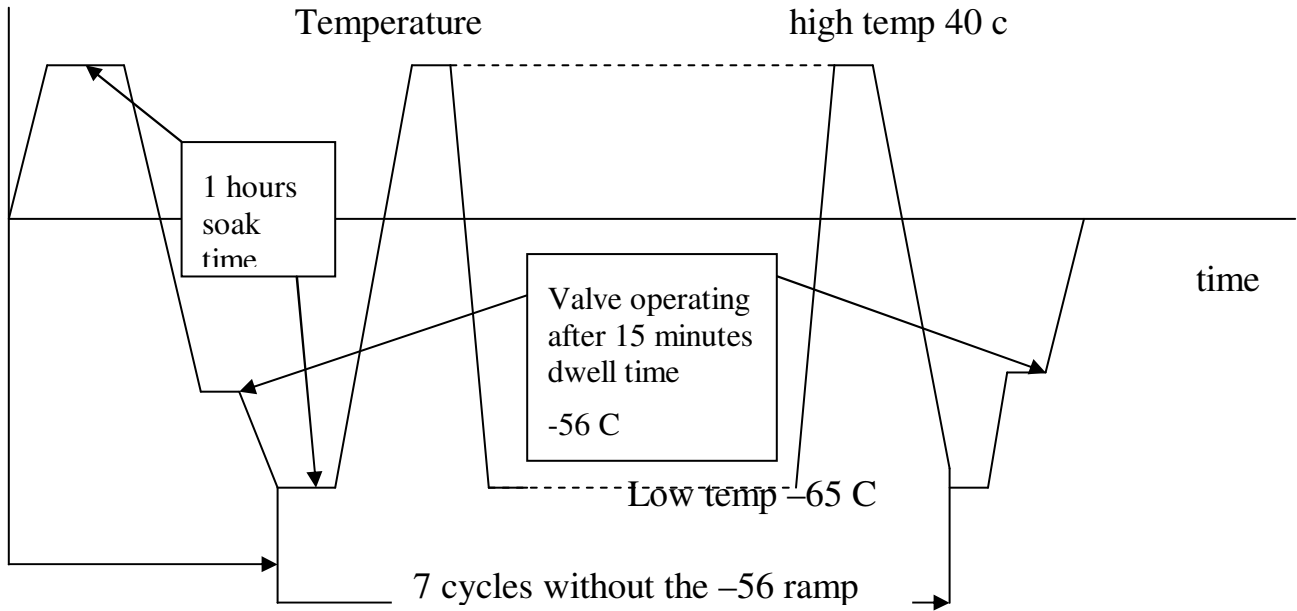
4. THERMOVAC TEST.

Started on: _____

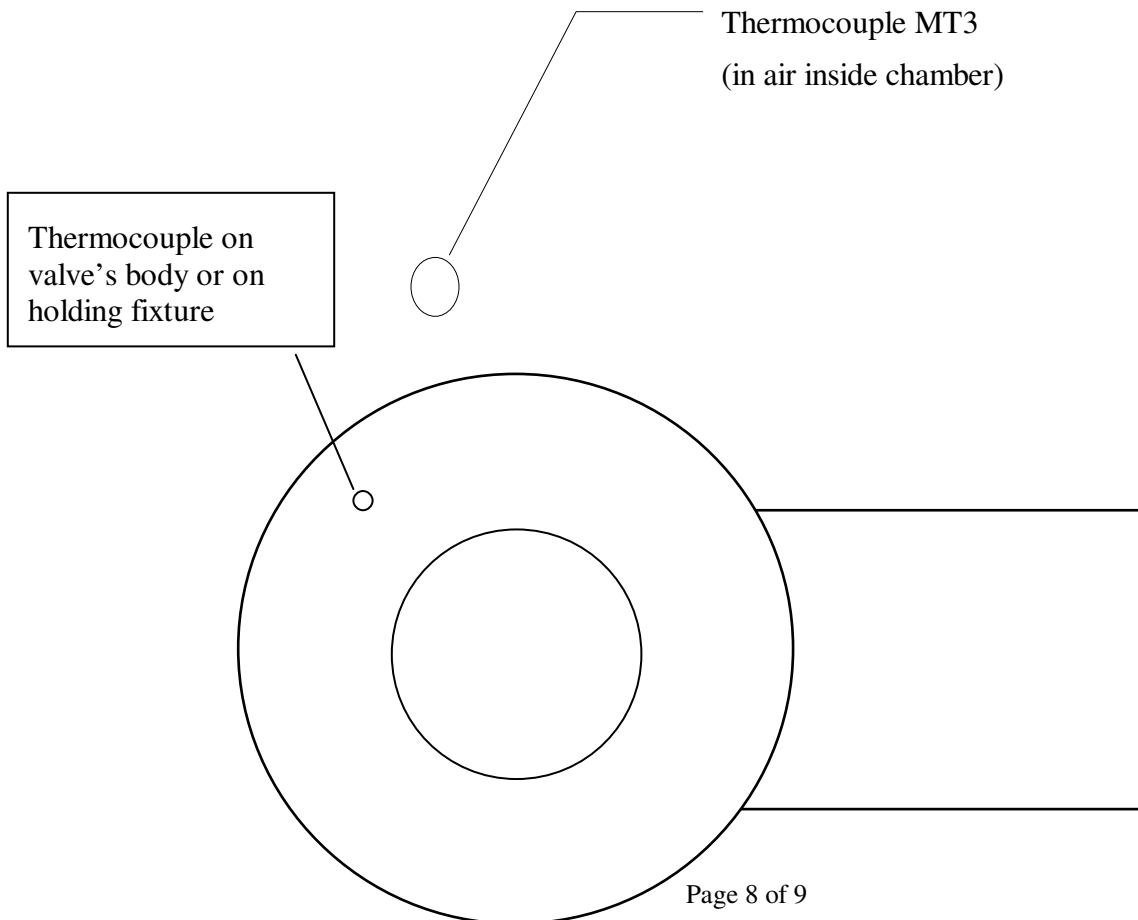
- 4.1 Notify QA & ONR 24 hours prior to start of operation.
- 4.2 Place valve in the Thermally controlled vacuum chamber, verify the valve is in the closed position.
- 4.3 Attach 2 thermocouples per sketch #1.
- 4.4 Attach control box, use fit through connector saver. Record the Control Box number and the serial number of the valve the Control Box is connected to in table below.
- 4.5 Evacuate chamber to 1×10^{-5} Torr.
- 4.6 Heat up the valve to 40 centigrade at a rate of 3-5 deg c/minute. The temperature on the valve body should be 40+/-5
- 4.7 Verify valve temperature is 40+/-5 degrees C.
- 4.8 Begin cooling down to -56+/-5 centigrade at a rate of 3-5 deg c/minute.
- 4.9 Wait 15 minutes in -56+/-5 centigrade (measured on valve's body).
- 4.10 Operate the valve, once for each motor, at -56+/-5 centigrade full cycle, record temperature and 'Pass' or 'Fail' in table below.
- 4.11 Continue to cool the valve to -65 +0/-5 centigrade.
- 4.12 Soak for one hour in that temperature.
- 4.13 Repeat paragraphs 4.6 to 4.7, 4.11 and 4.12 seven times using the programmed computer and attach printed copies of cycles to this procedure.
- 4.14 At the end of the 7 cycles heat to -56+/-5 centigrade wait 15 minutes.
- 4.15 Operate the valve, once for each motor, at -56+/-5 centigrade full cycle, record temperature and 'Pass' or 'Fail' in table below.
- 4.16 Turn off vacuum chamber, vent and remove the valve.
- 4.17 Data stored in File: _____

Table of Operations

Valve S/N & Control Box No.	Motor	Position	Actual Temp.	First Cycle	Actual Temp.	Last Cycle
	Motor 1	Open				
	Motor 1	Close				
	Motor 2	Open				
	Motor 2	Close				
	Motor 1	Open				
	Motor 1	Close				
	Motor 2	Open				
	Motor 2	Close				



Sketch 1



5. PROCEDURE COMPLETION

Note: Attach copy of computer printout displaying thermal cycles.

The results obtained in the performance of this procedure are acceptable:

Done by:

_____ date: _____
A. Halevy, Vatterfly Engineer

_____ date: _____
Q.A representative

Discrepancies if any:

Approved: _____ date: _____
R. Singley Vatterfly Valve REE

Approved: _____ date: _____
D. Ross, QA Manager