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

VATTERFLY ELASTOMER SEAL LIFE TEST

GPB ENGINEERING PROCEDURE

P0741 Rev -A

August 15, 2000

PREPARED _____ _____

A. Halevy , GMA Engineer Date

APPROVED _____ _____

R.Singley RE Vatterfly Date

APPROVED _____ _____

D. Ross, Quality Assurance Date

APPROVED _____ _____

B. Muhlfelder, Hardware Manager Date

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1. GENERAL DESCRIPTION

This procedure describes the elastomer cycle life test. This test will be done on the 2.5" manual valve with the new vulcanized butyl type sealing plate. This valve will go through room temperature leak test, the thermo-vac procedure without opening and closing. The valve then will be gone through 500 cycles of full open/close followed by a room temperature leak test. The valve and it's sealing plate are not a flight hardware. This test will qualify also the 6" valve by similarity.

2. TEST INFORMATION

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

2.1 **CLEANLINESS,**
Clean room not needed.

2.2 ESD precautions

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 A. Halevy. And Spectra gases people.

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

Leak test P0723

MIL-STD-1540C

PLSE-12

3.2 Test Equipment

Equipment	Model and Serial Number	Calibration
Thermally control vacuum chamber		
Leak detector		
2.5” manual valve with vulcanized butyl sealing plate		
Standard leak		
2 calibrated thermocouples	T type	
Multi layer insulator blanket		

4. VIRGIN SEAL LEAK TEST

4. **Started on**: _____

4.1 Notify QA & ONR 24 hours prior to start of operation.

4.2 Place the manual valve shipping plate on a Class 100 laminar flow table.

4.3 Run the virgin sealing plate leak test per P0723

5. THERMO-VAC TEST

5.1 Place the valve in the Thermally control vacuum chamber.

5.2 Attach the thermocouples per sketch 1.

5.3 Cover the valve with the MLI.

5.4 Evacuate the chamber.

5.5 Program the controller to :

5.5.1 Go to 40 $^{0}_{C}$ at 5^{0}_{C} per minute. Record time and temperature on table 1.

5.5.2 Soak for 6 hours. Record time and temperature on table 1.

5.5.3 Go to -85^{0}_{C} at 5^{0}_{C} per minute.(will keep our temperature on the valve body at -68^{0}_{C}). Record time and temperature on table 1.

5.5.4 Soak for 7 hours.(the temperature will stabilize after about an hour and the actual soaking time in the low temperature will be 6 hours) . Record time and temperature on table 1.

5.5.5 Bring the chamber to room conditions.

5.6Remove the valve from the thermo-vac chamber.

Table 1

Time (every 15 minutes)	Set point	Actual temp. on cold plate	Valve body temp.	Seal plate temp.	Pressure	remarks

6. VALVE CYCLE

6.1 Operate the valve 500 times full cycle at room temperature. Record each fifth cycle in table 2

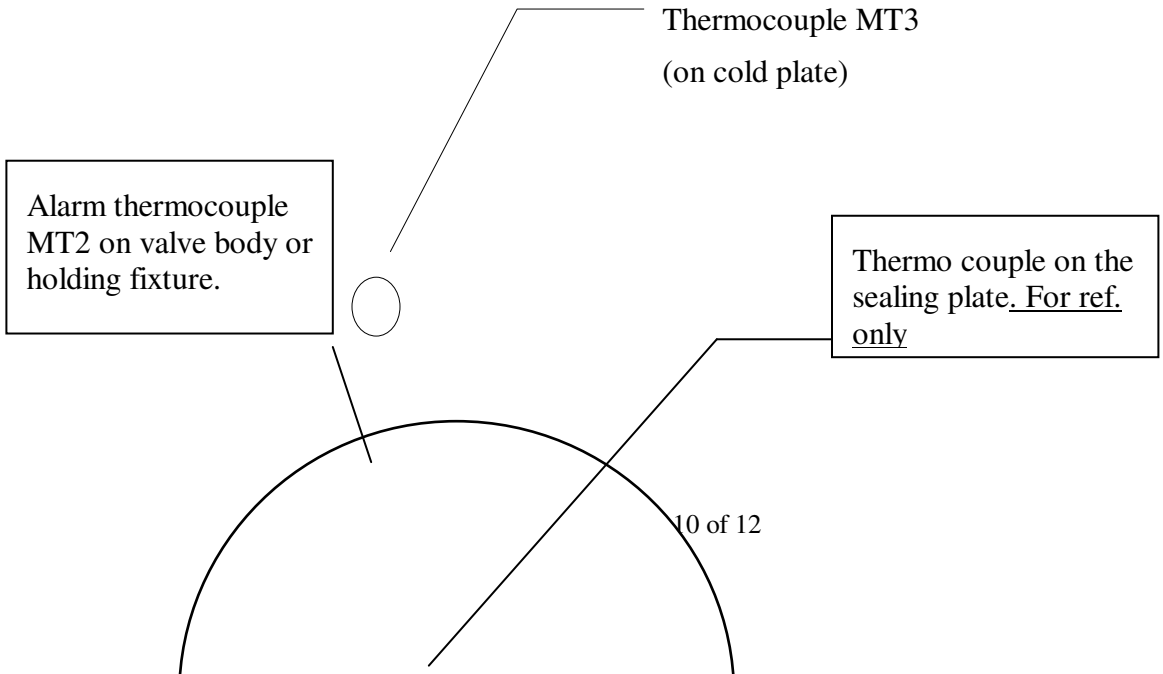
Table 2

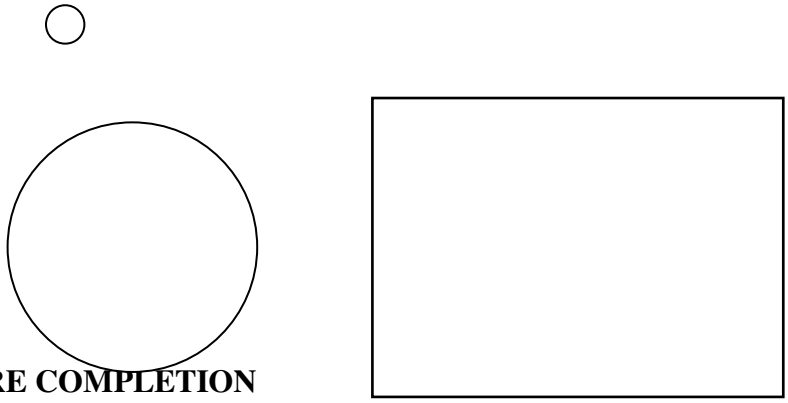
7. FINAL LEAK TEST

7.1 Run the final sealing plate leak test per P0723

7.2 Pass criteria should be better than $2*10^{-6}$ Sccs helium for 60 minutes.

Sketch 1





8. PROCEDURE COMPLETION

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

Done by:

_____ date: _____
A. Halevy, GMA Engineer

_____ date: _____
Q.A representative

Discrepancies if any:

Approved: _____ date: _____
R. Singley RE Vatterfly

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

9. DATA BASE ENTRY

The following data shall be entered into the GP-B Data base:

- Name, number and revision of this procedure
- Date of successful completion of procedure.
- Part numbers and serial numbers of Vatterfly valve and their components