W. W. Hansen Experimental Physics Laboratory

STANFORD UNIVERSITY

STANFORD, CALIFORNIA 94305 - 4085

GPB ENGINEERING PROCEDURE

LEAK TEST INVESTIGATION
OF
2.5" VATTERFLY VALVES
P0687 Rev. -
13June, 2000

PREPARED _____ _____

R. Stephenson, GMA Engineer Date

APPROVED _____ _____

G. Asher, GMA Manager Date

APPROVED _____ _____

D. Ross, Quality Assurance Date

APPROVED _____ _____

B. Muhlfelder, Hardware Manager Date

TABLE OF CONTENTS

1. SCOPE

This procedure describes the leak test of the 2.5 inch vatterfly valves after a problem was suspected during payload testing (see DR 296). The valves will be tested in the same condition as they were taken off the probe. Care should be taken not to disturb the sealing plate, so that the extent of the existing leak can be determined. The valves will NOT be cycled during this test.

2. TEST INFORMATION

- Proper care should be taken in handling the valves. Cleanliness must be preserved. Do not disturb the motorized mechanism or the sealing plate.
- Temperature: 15-30 ° C
- Humidity: not critical

2.2 Cleanliness

2.2.1 Normal lab environment when valves are capped and bagged

2.2.2 Class 1000 Clean room when valves are open to atmosphere (use clean bench)

2.3 ESD precautions

2.3.1 None required.

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

2.4 Personnel, QA, and Documentation

2.4.1 Personnel Integration and Test Director

2.4.2 The Integration and Test Director (ITD) shall be Gideon Asher 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 GMA Manager shall also sign off the completed "As-Built" procedure.

2.4.3 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 Gideon Asher, R Stephenson, and A. Halevy.

2.4.4 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 and Integration Manager's approval.

2.5 Red-line Authority

2.5.1 Authority to red-line (make minor changes during execution) this procedure is given solely to the ITD or his designate, or the GMA 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.

2.5.2 To conveniently record data directly into the procedure thus generating the "as-built" document, the procedure will be handled, if possible, in a paperless fashion until completed. A Laptop computer containing an electronic version of this procedure will be operated by the ITD or QA Representative and data shall be recorded by typing directly into the electronic file. Alternatively, an "As-Built" may be created after-the-fact from hand written notes in the approved procedure.

2.5.3 Following completion of the procedure and the creation of an edited electronic copy, a hard copy of the "As-Built" procedure shall be printed and ***signed off by all the designated parties*****.** It shall then be filed, including an electronic copy into the data base.

2.6.4 The electronic editing of this document shall be as follows:

- Data will be inserted into the document using normal font, i.e. non-bold, non-italic
- "Signatures" shall be designated by **BLACK CAPITAL BOLD LETTERS**.
- "Redlines" shall be in ***RED BOLD ITALICS*** to make them distinguishable in computer and on the hard copy printout.
- If available, digital pictures shall be inserted into the document where appropriate.

3. DOCUMENTS AND EQUIPMENT

3.1 Applicable Documents

Document number	Rev	Description
HFS 3179	B	Valve, Vacuum, 2.5”
210127-01	–	2.5 “ Vatterfly Valve,
210125	–	2.5” Pump Valve Cover
210124	–	2.5” Pump Valve Cover Seal Side

3.2 Test Equipment

Equipment	Model and Serial Number	Calibration
Helium Leak Detector	ASM 180 T	G142
Pressure Gage	PGT-45L-30v/30	99050
Lubricant	Braycote 601	N/A
Gaskets		

3.3 Flight Parts

Description	HFS Model	S/N	Comments
2.5 in. Vat Valve	3179		**Flight Unit**
2.5 in. Vat Valve	3179		**Flight Unit**
2.5 in. Vat Valve	3179		**Flight Unit**
2.5 in. Vat Valve	3179		**Flight Unit**

4 LEAK TEST OF 2.5" (#3179) VALVES

Started on: _____

4.1 Experiment Setup

4.1.1 QA Representative to attend testing on a spot check basis.

4.1.2 Testing will be done at Stanford. Assembly will be done on a class 100 clean bench.

4.1.3 Attach the pump valve covers to valve using Braycote grease, and gaskets.

4.1.4 Attach the probe side of valve to the leak detector port of the manifold and space side of the valve to the Helium/Evacuation port.

4.1.5 Evacuate both sides of the valve at the same time.

4.1.6 Close the manual valve to the space side of the vatterfly.

4.1.7 Measure the background leak rate.

4.1.8 Inject space side of valve with 1 ATM helium.

4.1.9 Record leak data in Table 1 every 30 sec for the first 5 minutes and every 5 minutes thereafter until equilibrium is reached or for 45 minutes. Record the data in Table 1 column 1.

4.1.10 Repeat steps 4.1.3 through 4.1.9 on the other three 2.5” valves and record data in table 1 columns 2-4.

Table 1.
2.5" Valve Leak Rates
(proceed until equilibrium leak rate occurs with permeation saturation)

	S/N:	S/N:	S/N:	S/N:
t_0 + (min)	Leak Rate (sccs)	Leak Rate (sccs)	Leak Rate (sccs)	Leak Rate (sccs)
Background	$\times 10^{-}$	$\times 10^{-}$	$\times 10^{-}$	$\times 10^{-}$
0.5	$\times 10^{-}$	$\times 10^{-}$	$\times 10^{-}$	$\times 10^{-}$
1.0	$\times 10^{-}$	$\times 10^{-}$	$\times 10^{-}$	$\times 10^{-}$
1.5	$\times 10^{-}$	$\times 10^{-}$	$\times 10^{-}$	$\times 10^{-}$
2.0	$\times 10^{-}$	$\times 10^{-}$	$\times 10^{-}$	$\times 10^{-}$
2.5	$\times 10^{-}$	$\times 10^{-}$	$\times 10^{-}$	$\times 10^{-}$
3.0	$\times 10^{-}$	$\times 10^{-}$	$\times 10^{-}$	$\times 10^{-}$
3.5	$\times 10^{-}$	$\times 10^{-}$	$\times 10^{-}$	$\times 10^{-}$
4.0	$\times 10^{-}$	$\times 10^{-}$	$\times 10^{-}$	$\times 10^{-}$
4.5	$\times 10^{-}$	$\times 10^{-}$	$\times 10^{-}$	$\times 10^{-}$
5.0	$\times 10^{-}$	$\times 10^{-}$	$\times 10^{-}$	$\times 10^{-}$
10.0	$\times 10^{-}$	$\times 10^{-}$	$\times 10^{-}$	$\times 10^{-}$
15.0	$\times 10^{-}$	$\times 10^{-}$	$\times 10^{-}$	$\times 10^{-}$
20.0	$\times 10^{-}$	$\times 10^{-}$	$\times 10^{-}$	$\times 10^{-}$
25.0	$\times 10^{-}$	$\times 10^{-}$	$\times 10^{-}$	$\times 10^{-}$
30.0	$\times 10^{-}$	$\times 10^{-}$	$\times 10^{-}$	$\times 10^{-}$
35.0	$\times 10^{-}$	$\times 10^{-}$	$\times 10^{-}$	$\times 10^{-}$
40.0	$\times 10^{-}$	$\times 10^{-}$	$\times 10^{-}$	$\times 10^{-}$
45.0	$\times 10^{-}$	$\times 10^{-}$	$\times 10^{-}$	$\times 10^{-}$

5 PROCEDURE COMPLETION

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

_____**RICK STEPHENSON**_____ date: _____
GMA Engineer

Discrepancies if any:

Approved: _____**GIDEON ASHER**_____ date: _____
GMA REE

Approved: _____**RUSS LEESE**_____ date: _____
QA Representative

Approved: _____**DORRENE ROSS**_____ date: _____
QA Manager

6. 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 Caging Units and their components