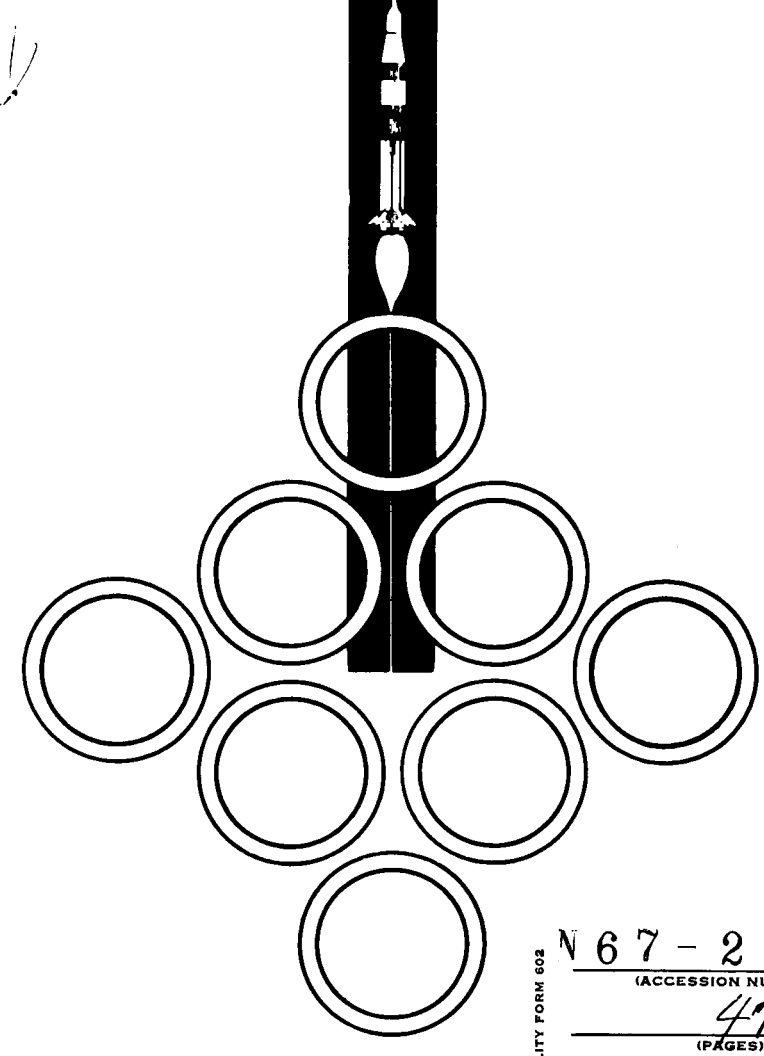

ENGINEERING DEPARTMENT

TECHNICAL REPORT

TR-RE-CCSD-FO-1071-3

September 15, 1966

SATURN IB PROGRAM

TEST REPORT FOR

DUO-CHECK VALVE, 2-INCH

Mission Valve and Pump Company Part Number 15BVFCC1C

NASA Drawing Number 75M04406 PCV-2

SPACE DIVISION CHRYSLER CORPORATION

TEST REPORT
FOR
DUO-CHECK VALVE, 2-INCH
Mission Valve and Pump Company Part Number 15BVFCC1C

NASA Drawing Number 75M04406 PCV-2

ABSTRACT

This report presents the results of tests performed on one sample of the Duo-Check Valve 75M04406 PCV-2. The following tests were performed:

1. Receiving Inspection
2. Proof Pressure
3. Functional
4. Flow
5. Surge
6. Life Cycle
7. Burst

The specimen performance was in accordance with the specification requirements of NASA drawing 75M04406 PCV-2 throughout the test program.

It was noted during functional testing that some seat leakage occurred below 15 psig. Seat leakage at 10 psig was one drop per minute. However, since the valve was designed for use above 50 psig, the low pressure seat leakage is not considered detrimental.

TEST REPORT

FOR

DUO-CHECK VALVE, 2-INCH

Mission Valve and Pump Company Part Number 15BVFCC1C

NASA Drawing Number 75M04406 PCV-2

September 15, 1966

CHRYSLER CORPORATION SPACE DIVISION - NEW ORLEANS, LOUISIANA

FOREWORD

The tests reported herein were conducted for the John F. Kennedy Space Center by Chrysler Corporation Space Division (CCSD), New Orleans, Louisiana. This document was prepared by CCSD under contract NAS8-4016, Part VII, CWO 271620.

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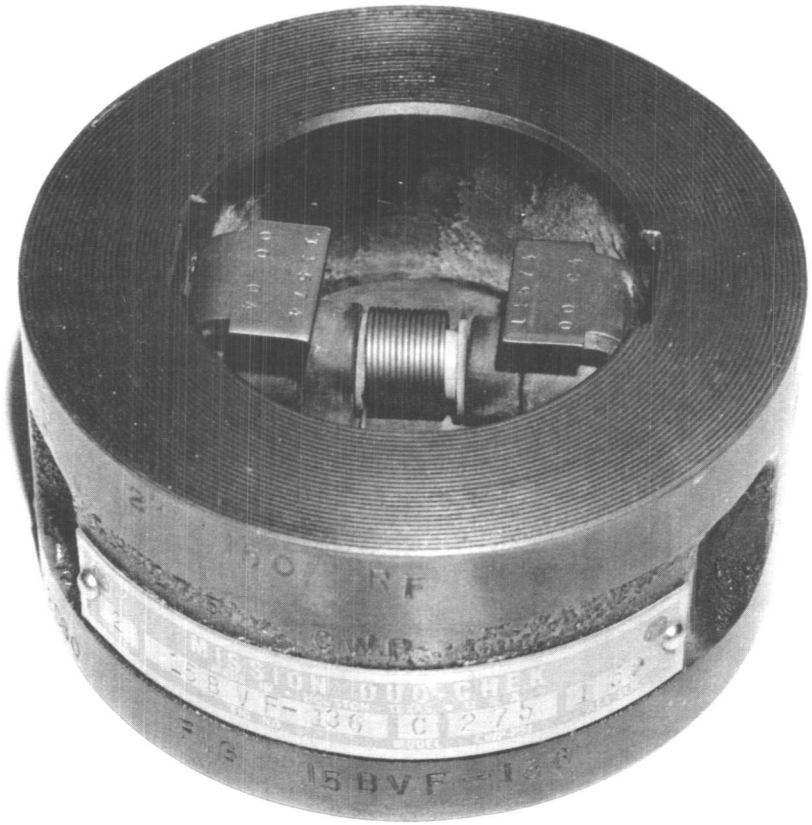


Two-Inch Duo-Check Valve 75MO4406 PCV-2

CHECK SHEET

FOR

DUO-CHECK VALVE, 2-INCH

MANUFACTURER: Mission Valve and Pump Company
MANUFACTURER'S PART NUMBER: 15BVFCC1C
NASA PART NUMBER: 75M04406 PCV-2
TESTING AGENCY: Chrysler Corporation Space Division, New Orleans, Louisiana
AUTHORIZING AGENCY: NASA KSC

I. FUNCTIONAL REQUIREMENTS

A.	OPERATING MEDIUM:	75% H_2O and 25% glycol by volume
B.	OPERATING PRESSURE:	50 psig (minimum)
C.	PROOF PRESSURE:	225 psig
D.	BURST PRESSURE:	600 psig (minimum)
E.	VALVE CAPACITY (C_v):	49.4 at 100 gpm (determined by test)
F.	PRESSURE DROP:	10.5 feet of H_2O maximum at a flow of 100 gpm of water at 60°F
G.	CRACKING PRESSURE:	0.2 inch of H_2O (determined by test)

II. CONSTRUCTION

A.	BODY MATERIAL:	Aluminum and bronze
B.	PLATE MATERIAL:	Aluminum and bronze
C.	SEAL MATERIAL:	Viton A
D.	STOP MATERIAL:	316 stainless steel
E.	END CONNECTIONS:	150 lb ASA raised face
F.	SPRING MATERIAL:	Inconel
G.	RETAINER PIN MATERIAL:	316 stainless steel

III. ENVIRONMENTAL REQUIREMENTS

A.	OPERATING TEMPERATURE:	-40°F to +400°F

IV. LOCATION AND USE: Used as a unidirectional flow valve in the environmental control system at John F. Kennedy Space Center Launch Complexes 34 and 37B.

TEST SUMMARY

DUO-CHECK VALVE

75MO4406 PCV-2

Environment	Units	Operational Boundary	Test Objective	Test Results	Remarks
Proof Pressure Test	1	225 psig	Check for leakage and distortion	Satisfactory	No leakage or distortion
Functional Test	1	150 psig	Determine cracking and reseating press. Check seat leakage	Satisfactory	Cracking Press.: 0.2 in. H_2O Reseating Press.: 0.1 in. H_2O Zero leakage
Flow Test	1	5.5 psi ΔP maximum at 100 gpm	Determine C_v and ΔP at 100 gpm	Satisfactory	C_v: 49.4 ΔP: 4.1 psi
Surge Test	1	0 to 50 psig with 100 milliseconds 100 cycles	Determine if specimen operation is impaired by surge	Satisfactory	Test completed
Life Cycle Test	1	0 to 50 to 0 psig 1000 cycles	Determine if specimen operation is impaired by cycling	Satisfactory	Test completed
Burst Test	1	600 psig	Check for leakage and distortion.	Satisfactory	No leakage or distortion

SECTION I

INTRODUCTION

1.1 SCOPE

This report presents the results of tests that were performed to determine if check valve 75M04406 PCV-2 meets the operational requirements for John F. Kennedy Space Center Launch Complexes 34 and 37B. A summary of the test results is presented on page viii.

1.2 ITEM DESCRIPTION

1.2.1 One specimen of check valve 75M04406 PCV-2 was tested. The valve is a 2-inch, unidirectional flow valve which is used in the environmental control system.

1.2.2 The valve is cylindrical in shape, measures 2 inches from face to face, and has raised-face flanges which are 4-1/8 inches in diameter. During normal operation, the valve is opened by the flow of an H_2O-glycol solution and is closed by a spring.

1.3 APPLICABLE DOCUMENTS

The following documents contain the test requirements for check valve 75M04406 PCV-2.

a. KSC-STD-164(D), dated September 17, 1964, Standard Environmental Test Methods for Ground Support Equipment Installations at Cape Kennedy

b. NASA Drawing 75M04406 PCV-2

c. Cleaning Standard MSFC-STD-164 (D)

d. Test Plan CCSD-FO-1071-1F

SECTION II

RECEIVING INSPECTION

2.1 TEST REQUIREMENTS

The specimen shall be visually and dimensionally inspected for conformance with the applicable specifications prior to testing.

2.2 TEST PROCEDURE

A visual and dimensional inspection of the specimen was performed to determine compliance with NASA drawing 75M04406 PCV-2 and the applicable vendor drawing to the extent possible without disassembly of the test specimen. At the same time the test specimen was also inspected for poor workmanship and manufacturing defects.

2.3 TEST RESULTS

The specimen complied with NASA drawing 75M04406 PCV-2. No evidence of poor workmanship or manufacturing defects was observed.

2.4 TEST DATA

The data presented in tables 2-1 and 2-2 were recorded during the inspection.

Table 2-1. Specimen Nomenclature

Name:	Mission Duo-Check Valve
Size:	2
Figure No:	15 BVF-136
Model:	C
Plate No:	A 11311 C-13-1C

Table 2-2. Specimen Dimensions

Length:	2.0 inches
Outside Diameter:	4.125 inches

SECTION III

PROOF PRESSURE TEST

3.1 TEST REQUIREMENTS

The valve shall be pressurized with H_2O to a proof pressure of 225 psig. This pressure shall be maintained for 5 minutes and the valve shall be checked for leakage and distortion.

3.2 TEST PROCEDURE

3.2.1 The test specimen was installed as shown in figures 3-1* and 3-2 utilizing the equipment listed in table 3-1.

3.2.2 It was determined that all connections were tight, gages were installed and operating properly, and all valves were closed.

3.2.3 Hand valves 2 and 3 were opened.

3.2.4 Hand pump 5 was operated to pump H_2O through the specimen for 1 minute.

3.2.5 Valve 2 was closed and the inlet and outlet ports of the specimen were pressurized simultaneously until a pressure of 225 psig was indicated on gage 4. This procedure was maintained for 5 minutes and the specimen was checked for leakage. The pressure was vented and the specimen was checked for distortion. All data were recorded.

3.3 TEST RESULTS

The test specimen did not leak, and there was no evidence of distortion.

3.4 TEST DATA

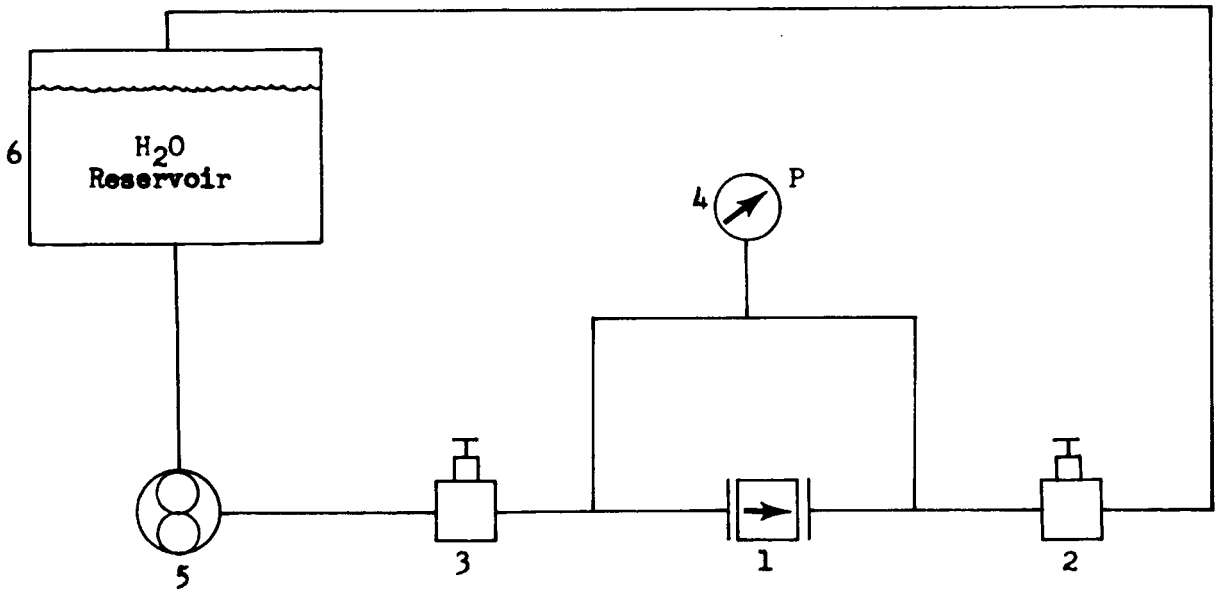
The data presented in table 3-2 were recorded during the test.

Table 3-1. Proof Pressure and Burst Test Equipment List

Item No.	Item	Manufacturer	Model/ Part No.	Serial No.	Remarks
1	Test Specimen	Mission Valve and Pump Company	15BVFCC1C	--	2-inch check valve
2	Vent Valve	Robbins Valve Co.	SSKA250-4T	--	1/4-inch
3	Hand Valve	Pressure Products Ind.	V-110-30	--	1/4-inch
4	Pressure Gage	Marsh Instrument Co.	--	95-1145-B	0-to 500-psig ±0.1% FS accuracy; Cal date 7-1-66
5	Hand Pump	Pressure Products Ind.	--	K750	
6	H_2O Reservoir	Pressure Products Ind.	--	--	

Table 3-2. Proof Pressure Test

Pressure	225 psig for 5 minutes
Leakage	Zero
Distortion	None



Note: All lines 1/4 inch.
Refer to table 3-1 for item identification.

Figure 3-1. Proof Pressure and Burst Test Schematic

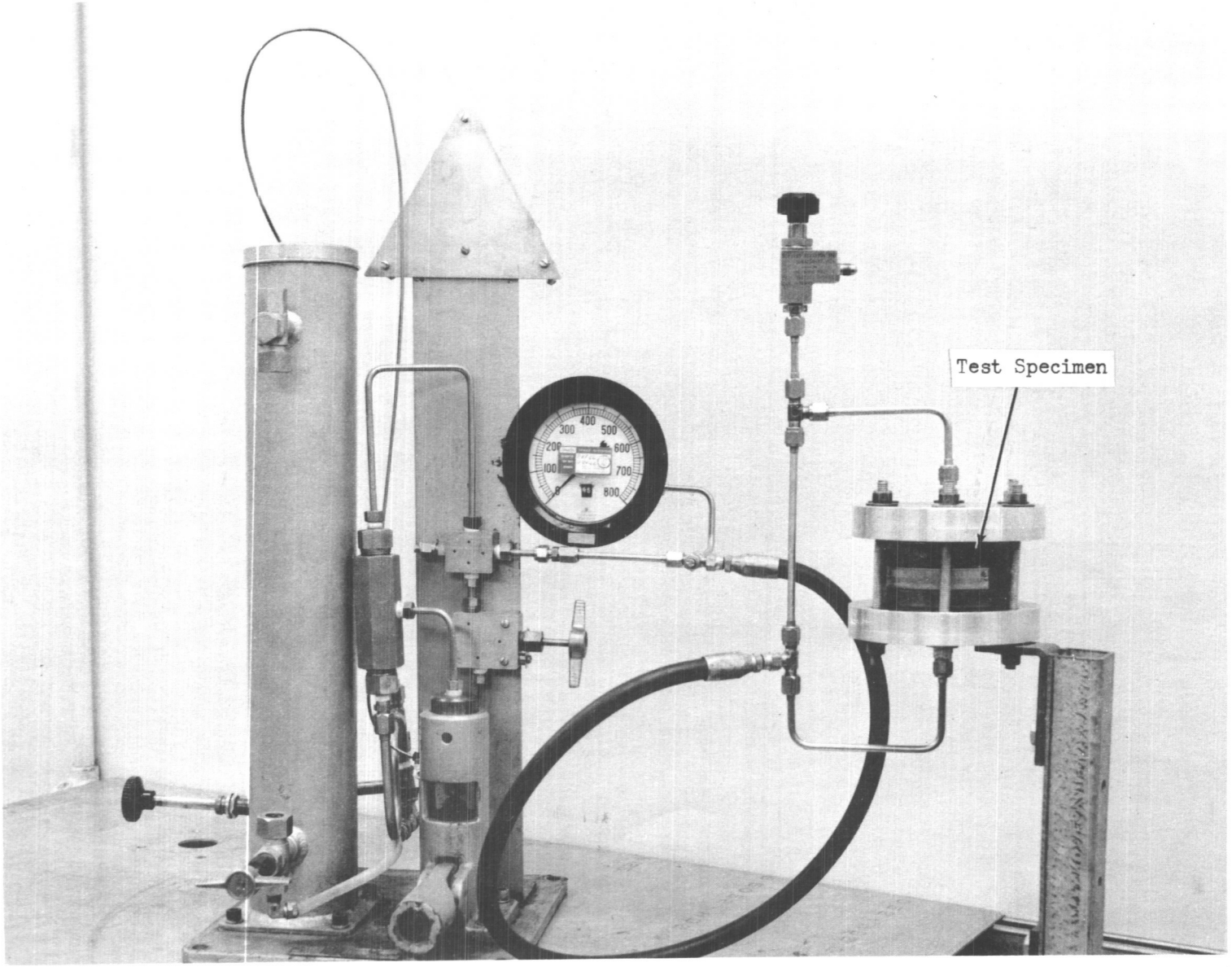


Figure 3-2. Proof Pressure and Burst Test Setup

SECTION IV

FUNCTIONAL TEST

4.1 TEST REQUIREMENTS

4.1.1 A functional test shall be conducted to determine specimen cracking pressure, reseating pressure, and leakage.

4.1.2 Using H_2O as the pressure medium, pressurize the valve at the specimen inlet port. The cracking and reseating pressures shall then be determined. This procedure shall be repeated as often as necessary to obtain consistent data.

4.1.3 Using H_2O as the pressure medium, pressurize the specimen to 150 psig at the outlet port and record the leakage.

4.2 TEST PROCEDURE

4.2.1 The test specimen was installed as shown in figures 4-1 and 4-3 utilizing the equipment listed in table 4-1.

4.2.2 It was determined that all connections were tight, all gages were installed and operating properly, and all valves were closed.

4.2.3 Valve 3 was opened and H_2O was allowed to flow into manometer 7 and through the specimen into manometer 6. Valve 3 was closed.

4.2.4 Valves 4 and 5 were slowly opened and closed as necessary to adjust the H_2O level in the manometers to equal height. Valves 4 and 5 were closed.

4.2.5 The scale on manometer 7 was adjusted until the H_2O level reading was zero.

4.2.6 Valve 3 was slowly opened while manometers 6 and 7 were monitored. At the moment the H_2O level started to rise in manometer 6, the H_2O level on manometer 7 was read. This was the cracking pressure. Valve 3 was closed.

4.2.7 Valve 4 was opened. The H_2O level in manometer 6 was allowed to drop until H_2O from manometer 7 started flowing through the specimen. Valve 4 was closed.

4.2.8 When the H_2O level stopped falling in manometer 7, the difference in the two H_2O levels was read. This was the reseating pressure.

4.2.9 The specimen was installed as shown in figure 4-2 utilizing the equipment listed in table 4-2.

4.2.10 Using hand pump 3, the outlet port of the specimen was slowly pressurized to 150 psig. The leakage of the specimen was recorded using graduated cylinder 4 to collect the discharge. All test data were recorded.

4.3 TESTS RESULTS

4.3.1 Cracking pressure was 0.20 inch of H_2O and reseating pressure was 0.10 inch of H_2O. A small amount of leakage across the seat was noted during this test.

4.3.2 During the initial pressurization of the specimen outlet port to 150 psig for 5 minutes, no leakage was observed. The outlet port pressure was then reduced and maintained for 5 minutes at pressures of 75, 15, 12.5, and 10 psig. Leakage across the seat at 12.5 psig was one drop per 3 minutes. Leakage at 10 psig was one drop per minute.

4.4 TEST DATA

The data presented in tables 4-3 and 4-4 were recorded during the initial functional test.

Table 4-1. Functional Test Equipment List (Cracking and Reseating)

Item No.	Item	Manufacturer	Model/ Part No.	Serial No.	Remarks
1	Specimen	Mission Valve and Pump Company	15BVFCC1C	—	2-inch check valve
2	H_2O Reservoir	CCSD	—	—	
3	Hand Valve	Pressure Products Ind.	V-110-30	—	1/4-inch
4	Hand Valve	Robbins Valve Co.	SSKA250-4T	—	1/4-inch
5	Hand Valve	Robbins Valve Co.	SSKA250-4T	—	1/4-inch
6	Manometer	CCSD	—	—	8-inch
7	Manometer	CCSD	—	—	8-inch

Table 4-2. Functional Test Equipment List (Leakage)

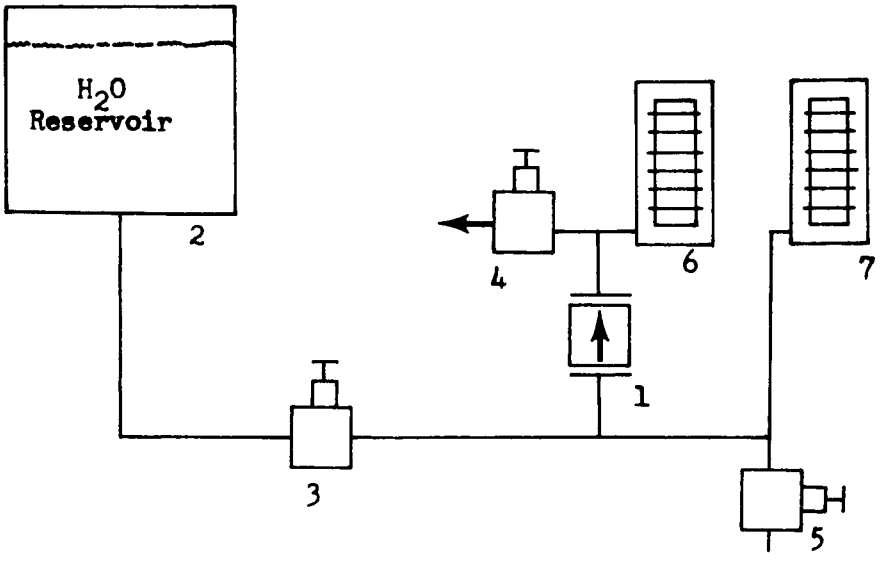
Item No.	Item	Manufacturer	Model/ Part No.	Serial No.	Remarks
1	Specimen	Mission Valve and Pump Company	15BVFCC1C		2-inch check valve
2	Pressure Gage	Marsh Instrument Co.	NASA 08 113	106-1037-B	0-to 300-psig ±0.1% FS accuracy; cal date 7-12-66
3	Hand Pump	Pressure Products Ind.	—	K750	
4	Graduated Cylinder	—	—	—	
5	Vent Valve	Robbins Valve Co.	SSKA250-4T	—	1/4-inch

Table 4-3. Cracking and Reseating Pressures

Run No.	Cracking Pressure (inches of H_2O)	Reseating Pressure (inches of H_2O)
1	0.20	0.09
2	0.21	0.10
3	0.20	0.09
4	0.19	0.08
5	0.22	0.11
6	0.20	0.09
7	0.22	0.12
8	0.21	0.08

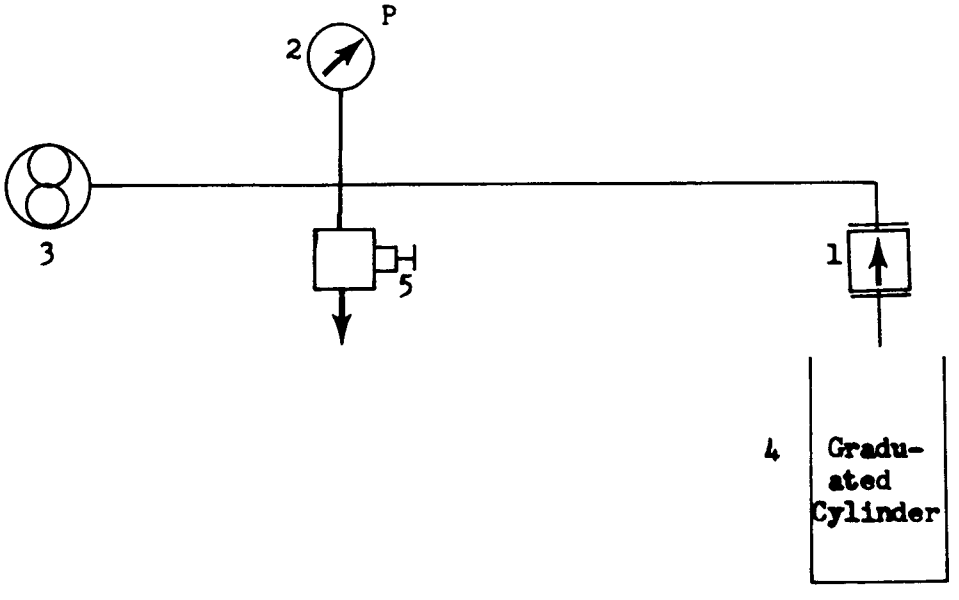
Table 4-4. Seat Leakage

Pressure (psig)	Leakage (drops/minute)
150	0
75	0
15	0
12.5	0.3
10	1



Note: All lines 1/4 inch.
Refer to table 4-1 for item identification.

Figure 4-1. Functional Test Schematic (Cracking and Reseating)



Note: All lines 1/4 inch.
Refer to table 4-2 for item identification

Figure 4-2. Functional Test Schematic (Leakage)

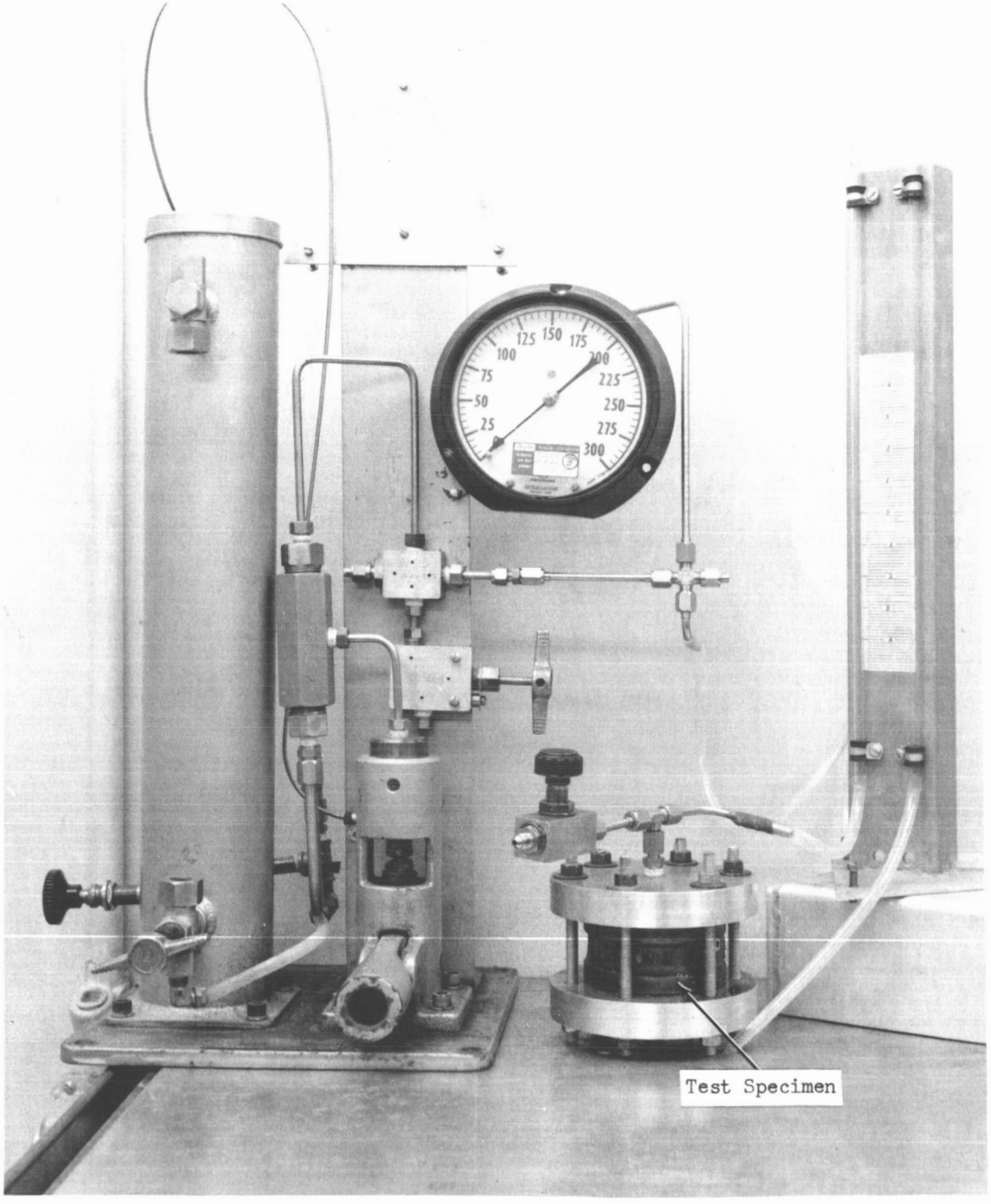


Figure 4-3. Functional Test Setup (Cracking and Reseating)

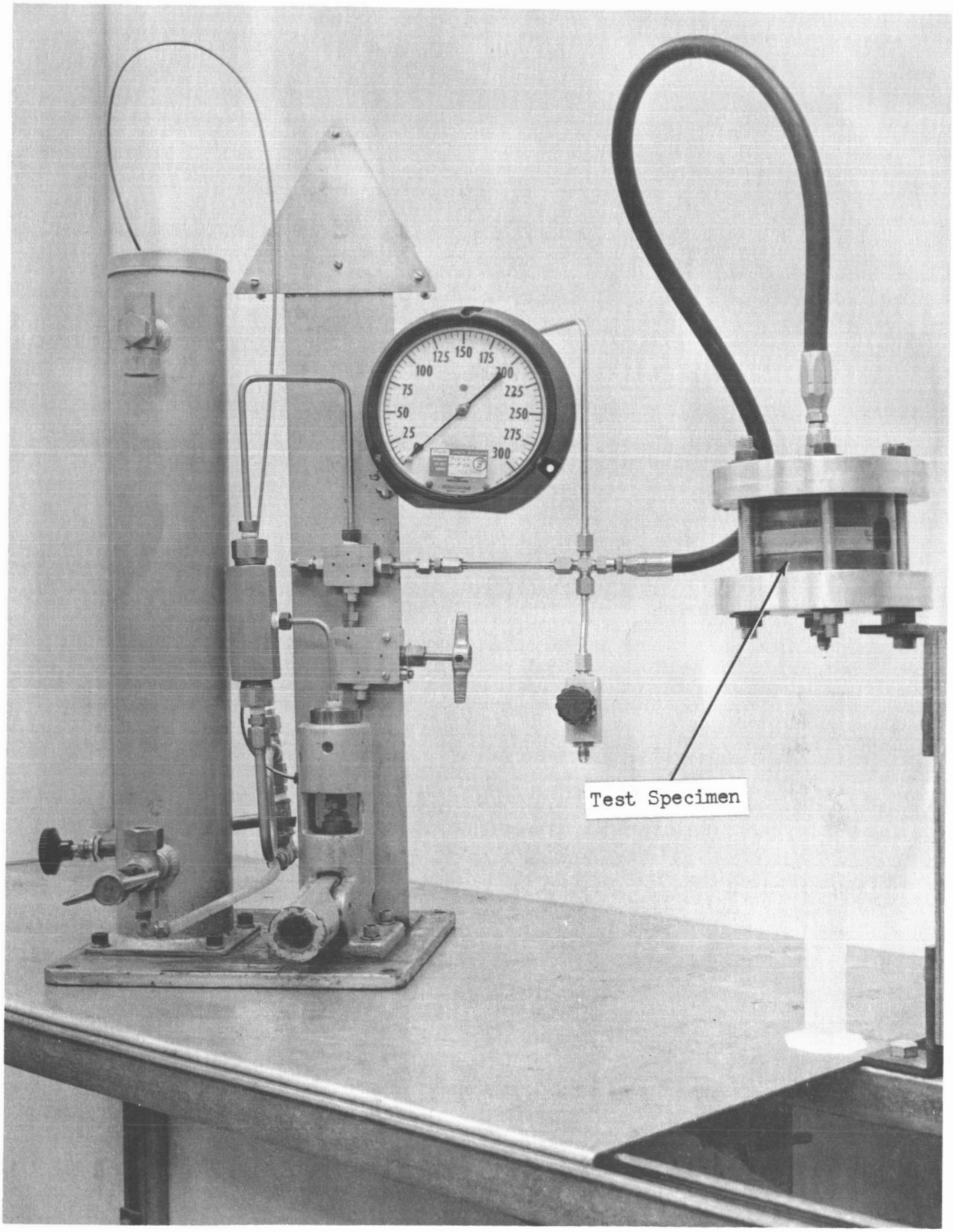


Figure 4-4. Functional Test Setup (Leakage)

SECTION V

FLOW TEST

5.1 TEST REQUIREMENTS

5.1.1 A flow test shall be performed on the valve using H_2O (60°F) at a flow rate of 100 gpm. The pressure drop through the valve shall not exceed 10.5 feet of H_2O (5.5 psia).

5.1.2 The valve capacity (Cv) shall be determined from the test data.

5.2 TEST PROCEDURE

5.2.1 The specimen was installed as shown in figures 5-1 and 5-2 utilizing the equipment listed in table 5-1.

5.2.2 It was determined that all connections were tight, all gages were installed and operating properly, and all valves were closed.

5.2.3 Valve 3 was opened and pump 6 started to circulate the H_2O.

5.2.4 Valve 8 was opened and adjusted until a flow rate of 96.0 gpm was indicated on flowmeter 9. Pressure drop across the specimen and line loss were read from gages 4, 7, and 11. The pressures were recorded at flow rates from 39.0 to 152.0 gpm. H_2O temperature throughout the test was 62°F.

5.3 TEST RESULTS

5.3.1 The pressure drop through the specimen at 100 gpm was 4.1 psi. The valve capacity (C_v) at 100 gpm was 49.4.

5.3.2 The pressure drop of 4.1 psi at 100 gpm was well below the maximum allowable of 5.5 psi, indicating satisfactory test results.

5.4 TEST DATA

The data recorded during the test are presented in table 5-2. Pressure drop versus flow rate is presented graphically in figure 5-3. The valve capacity was calculated as follows:

$$C_v = Q\sqrt{\frac{G_f}{\Delta P}}$$

where:

C_v = Valve capacity coefficient
Q = Flow (gpm)
G_f = Specific gravity of the fluid
ΔP = Differential Pressure across the specimen

Sample calculation:

$$C_v = 100\sqrt{\frac{1.00}{4.1}} = 49.4$$

Table 5-1. Flow Test Equipment List

Item No.	Item	Manufacturer	Model/ Part No.	Serial No.	Remarks
1	Specimen	Mission Valve and Pump Company	15BVFCC1C	--	2-inch check valve
2	Differential Pressure Gage	Industrial Instrument Corp.		106-1114-B	Cal. date 10/11/66
3	Hand Valve	Williams	127	--	2-inch
4	Pressure Gage	Heise	--	012450	0-to 100-psig ±0.1% FS accuracy Cal. date 12/8/66
5	Thermocouple and Pyrometer	West Co.	--	95-1513-B	±2°F accuracy Cal. date 10-5-66
6	Motor Driven Pump	Floway	12DKH-4	--	
7	Pressure Gage	Heise	--	014228	0-to 100-psig ±0.1% FS accuracy Cal. date 11/18/66
8	Flow Control Valve	Williams	127	--	2-inch
9	Flowmeter	CCSD	--	--	Orifice
10	H_2O Reservoir	--	--	--	
11	Pressure Gage	Heise	--	014227	0-to 100-psig ±0.1% FS accuracy Cal. date 10/26/66

Table 5-2. Flow Test Data

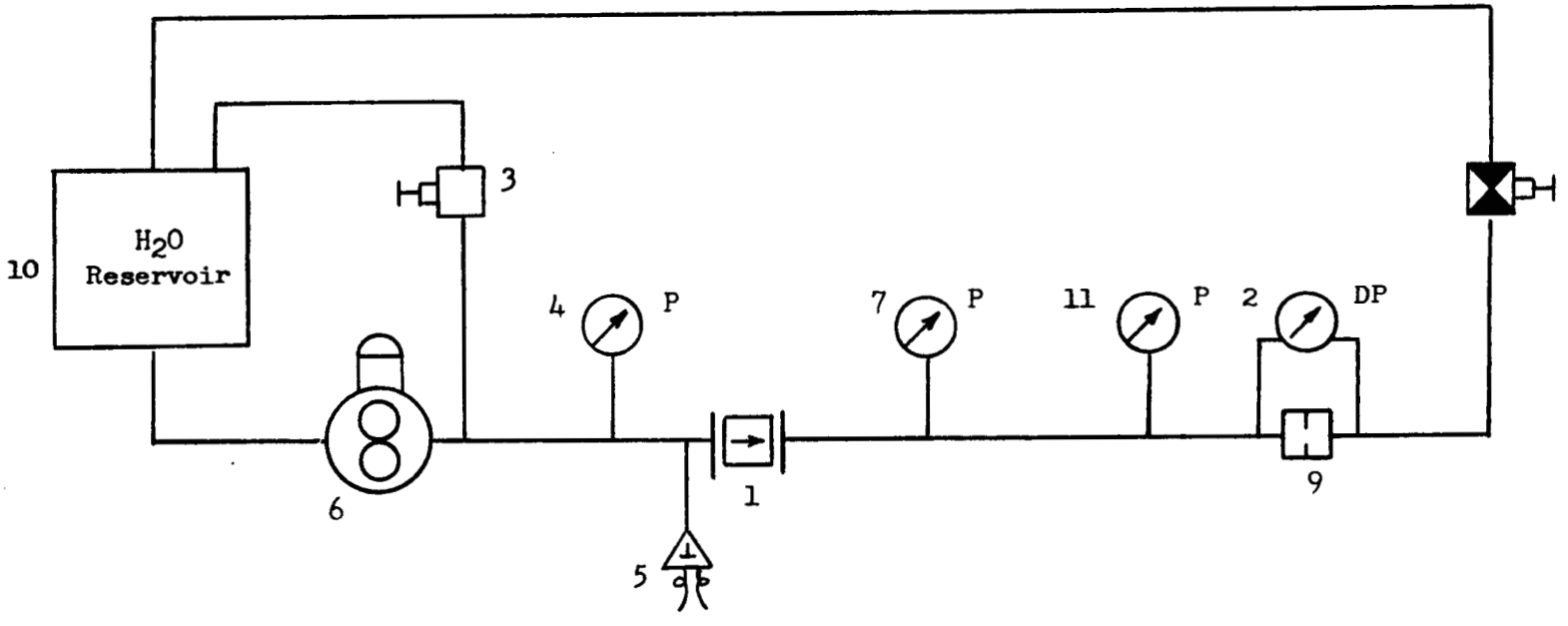
Flow (gpm)	Specimen Pressure (psig)		Tare (psi)	ΔP (psi)	Media Temperature (°F)
	Upstream	Downstream			
39	89.6	88.7	0.4	0.5	62
55	89.4	87.6	0.4	1.4	62
68	88.6	86.4	0.4	1.8	62
79	88.2	85.3	0.4	2.5	62
88	88.0	84.1	0.6	3.3	62
96	87.5	83.1	0.5	3.9	62
107	87.0	81.4	0.6	5.1	62
124	86.1	78.8	0.7	6.6	62
138	85.4	76.5	0.8	8.1	62
152	84.5	73.9	0.9	9.7	62
138	85.6	76.6	0.7	8.3	62
124	86.2	78.7	0.5	7.0	62
107	86.6	81.6	0.4	4.8	62
96	87.5	83.2	0.5	3.8	62
88	87.7	84.0	0.3	3.4	62
79	88.2	85.2	0.4	2.6	62
68	88.8	86.5	0.4	1.9	62
55	89.1	87.5	0.4	1.2	62
39	89.6	88.5	0.4	0.7	62

Table 5-3. Cracking and Reseating Pressures (Post-Flow Test Values)

Run No.	Cracking Pressure (inches of H_2O)	Reseating Pressure (inches of H_2O)
1	0.21	0.10
2	0.20	0.10
3	0.20	0.09
4	0.20	0.10
5	0.21	0.11

Table 5-4. Seat Leakage (Post-Flow Test Values)

Pressure (psig)	Leakage (drops/minute)
150	0
75	0



NOTE: Refer to table 5-1 for item identification.
All lines 2 inches.

Figure 5-1. Flow Test Schematic

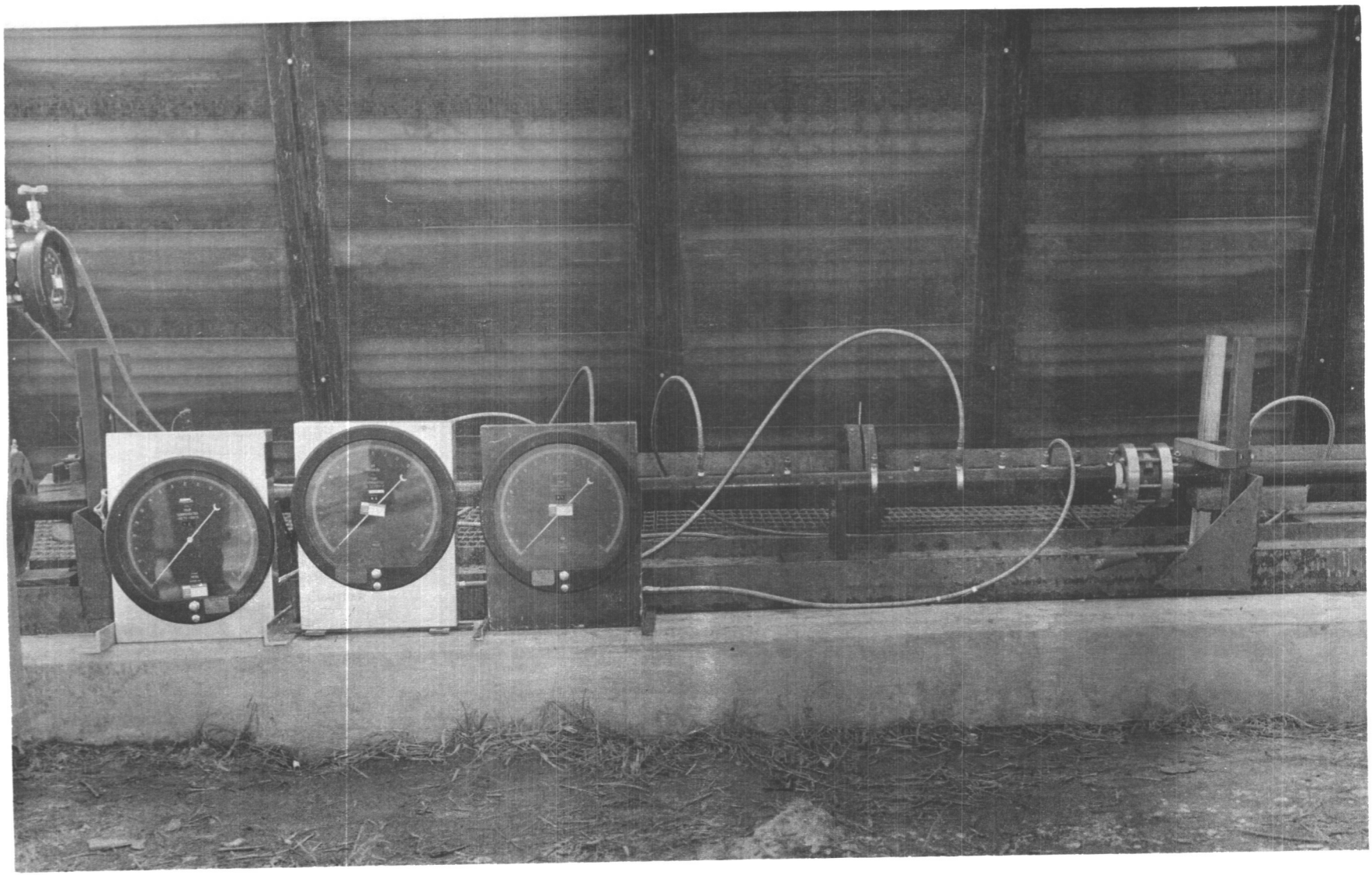


Figure 5-2. Flow Test Setup

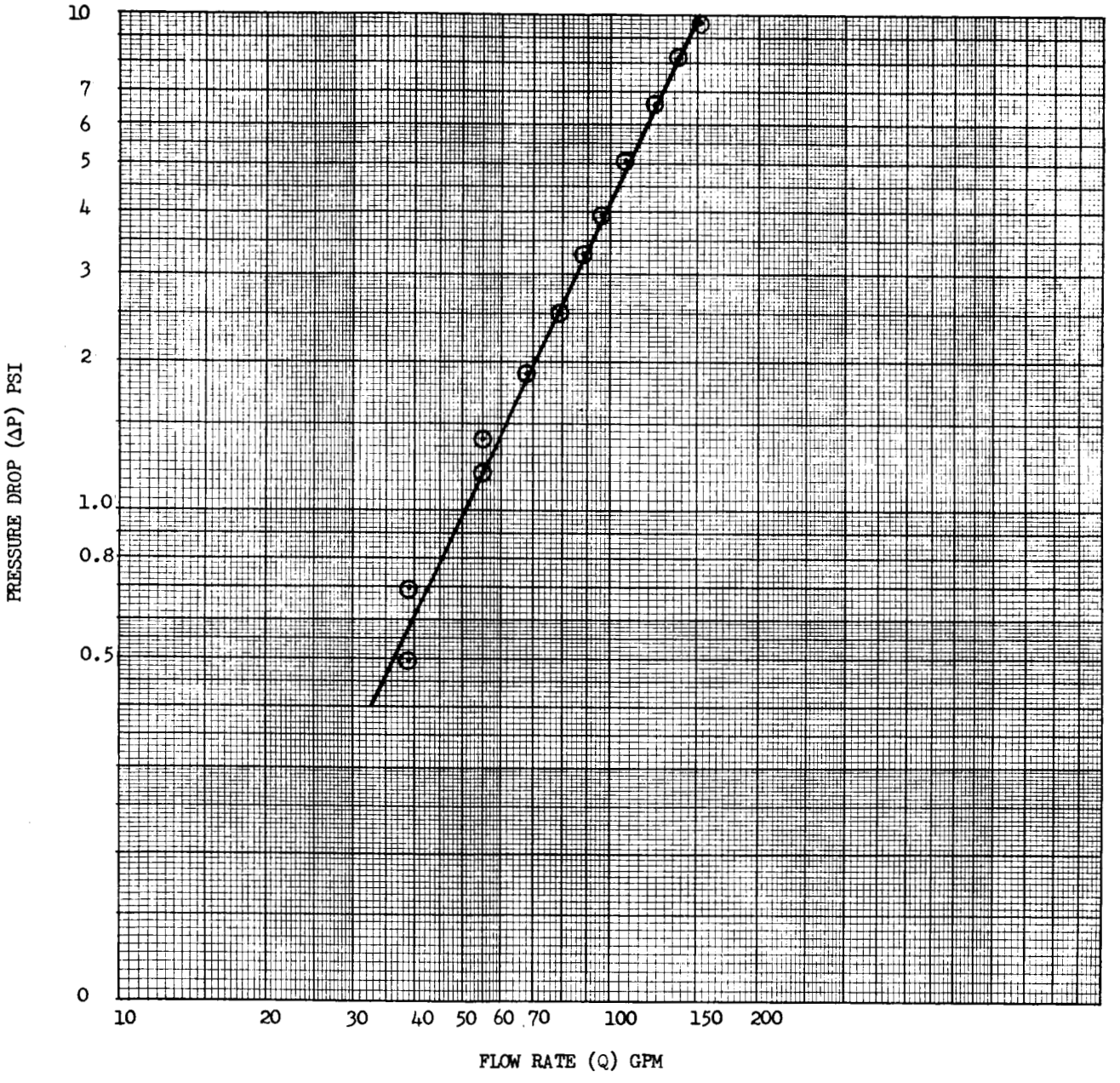


Figure 5-3. Pressure Drop Versus Flow Rate

SECTION VI

SURGE TEST

6.1 TEST REQUIREMENTS

Using H_2O as the pressure medium, pressurize the specimen from zero to 50 psig within 100 milliseconds in the direction of the flow. The specimen shall be subjected to 100 cycles.

6.2 TEST PROCEDURE

6.2.1 The surge test setup was assembled as shown in figures 6-1 and 6-2 utilizing the equipment listed in table 6-1.

6.2.2 It was determined that all connections were tight, all gages were installed and operating properly, and all valves were closed.

6.2.3 Reservoir 13 was pressurized with GN_2 to 60 psig as indicated on gage 7.

6.2.4 Flow control valve 2 was opened, solenoid valve 4 was actuated, valve 5 was opened, and valve 3 was adjusted to supply 50 psig as indicated on gage 6.

6.2.5 Timer 10 was adjusted and cycling of solenoid valve 4 was begun. Flow control valves 2 and 3 were adjusted to obtain the required surge pressure of zero to 50 psig within 100 milliseconds as indicated by transducer 9.

6.2.6 After the required surge waveform was established, the specimen was subjected to 100 cycles as indicated by counter 11. Hand valve 5 was closed and the surge history was recorded on oscillograph 8. All test data were recorded.

6.3 TEST RESULTS

6.3.1 A zero-to 50-psig pressure surge was accomplished in 70 milliseconds, which was within the specified maximum of 100 milliseconds.

6.3.2 The specimen was successfully subjected to 100 surge cycles.

6.4 TEST DATA

6.4.1 A typical surge wave form as recorded during the test is presented in figure 6-3.

6.4.2 Functional test data taken after the surge test are presented in table 6-2 and 6-3.

Table 6-1. Surge and Life Cycle Test Equipment List

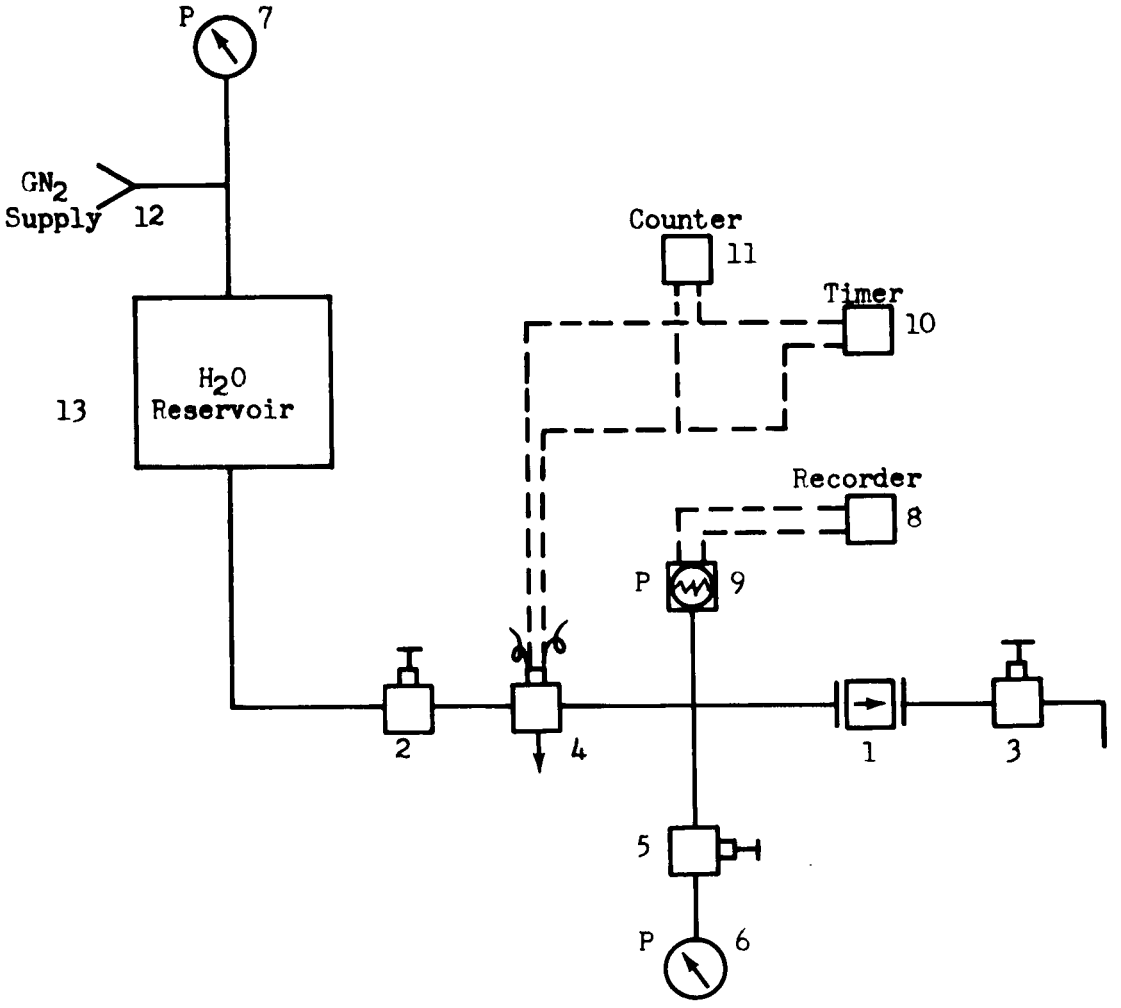
Item No.	Item	Manufacturer	Model/ Part No.	Serial No.	Remarks
1	Specimen	Mission Valve and Pump Company	15BVFCC1C		2-inch check valve
2	Flow Control Valve	Robbins Aviation Co.	SSKA250-4T	—	1/4-inch
3	Flow Control Valve	Robbins Aviation Co.	SSKA250-4T	—	1/4-inch
4	Solenoid Valve	Marotta Valve Corp.	—	190	Normally open, 3-way
5	Hand Valve	Marsh Instrument Co.		1936	1/4-inch
6	Pressure Gage	Marsh Instrument Co.	NASA 08 113	95-1225-B	0-to 100-psig ±0.5% FS accuracy; cal date 7-7-66
7	Pressure Gage	Marsh Instrument Co.	NASA 08 113	95-1611-B	0-to 100-psig ±0.5% FS accuracy; cal date 7-27-66
8	Recorder	CEC	NASA 08 113	017887	Oscillograph
9	Pressure Transducer	CEC	2443	—	0-to 100-psia cal date 8-1-66
10	Timer	CG Wilson and Co.	—	—	cam-operated
11	Counter	Durant Mfg. Co.	—	664	4-digit
12	GN_2 Supply	Laboratory Source	—	—	
13	H_2O Reservoir	CCSD	—	—	

Table 6-2. Cracking and Reseating Pressures (Post-Surge Test Values)

Run No.	Cracking Pressure (inches of H_2O)	Reseating Pressure (inches of H_2O)
1	0.20	0.10
2	0.20	0.09
3	0.21	0.10
4	0.20	0.10
5	0.21	0.10

Table 6-3. Seat Leakage (Post-Surge Test Values)

Pressure (psig)	Leakage (drops/minute)
150	0
75	0



Note: All lines 1/4 inch.
Refer to table 6-1 for item identification.

Figure 6-1. Surge and Life Cycle Test Schematic

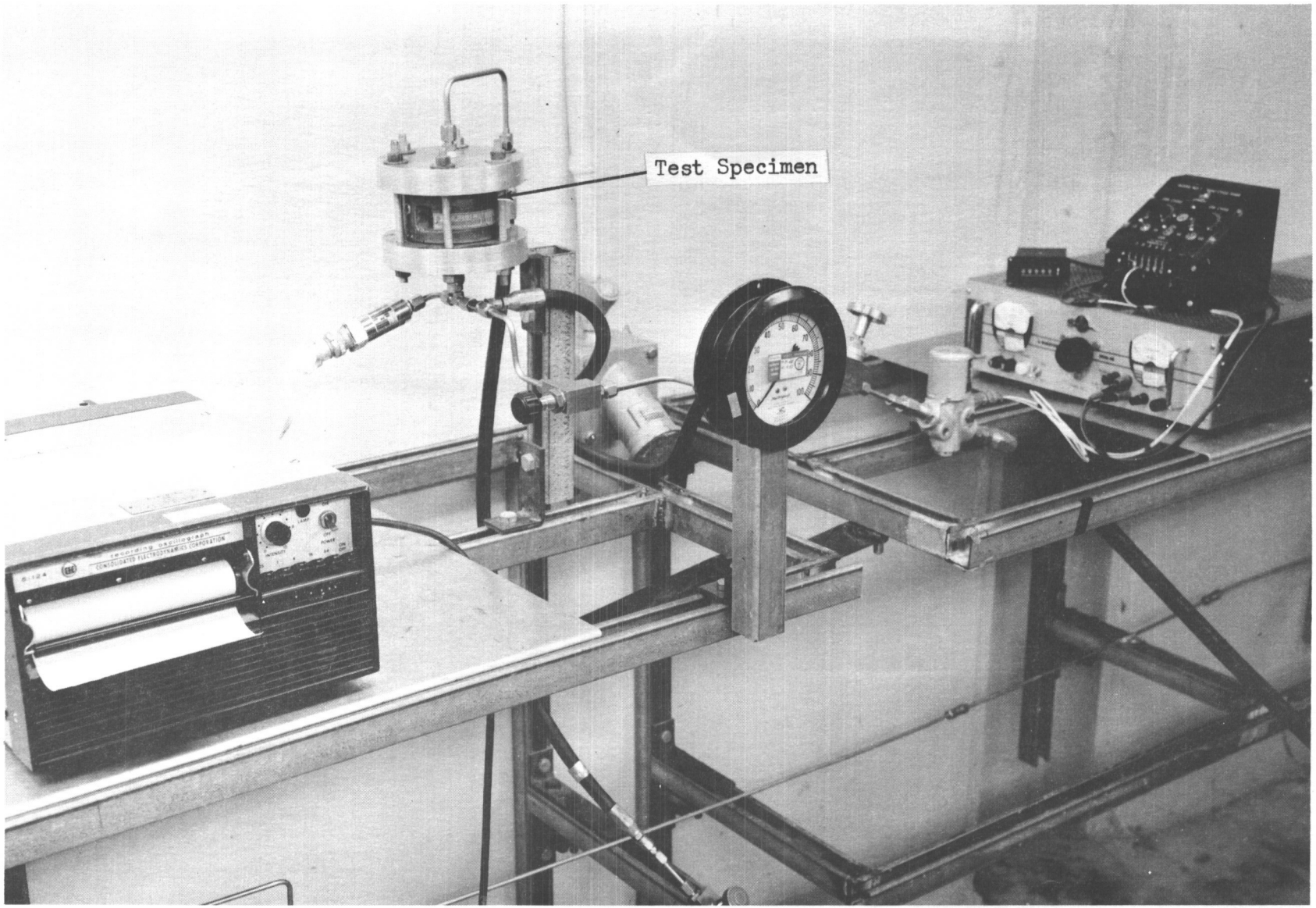


Figure 6-2. Surge Test Setup

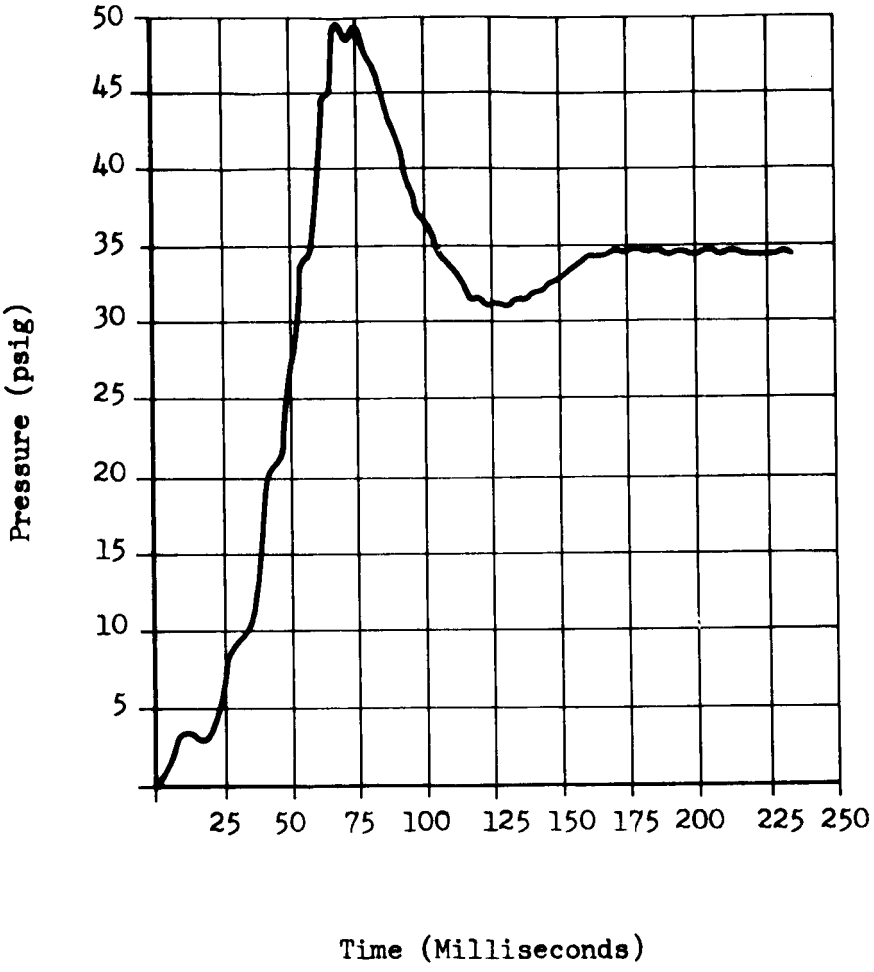


Figure 6-3. Typical Surge Waveform

SECTION VII

LIFE CYCLE TEST

7.1 TEST REQUIREMENTS

7.1.1 Using H_2O as the pressure medium, slowly pressurize the specimen at the inlet port from zero to 50 psig and then back to zero. This shall constitute one cycle; 1000 cycles shall be performed.

7.1.2 A functional test shall be performed after 50, 100, 500, and 1000 cycles.

7.2 TEST PROCEDURE

7.2.1 The life cycle test setup was assembled as shown in figures 6-1 and 6-2 utilizing the equipment listed in table 6-1.

7.2.2 It was determined that all connections were tight, all gages were installed and operating properly, and all valves were closed.

7.2.3 Reservoir 13 was pressurized with GN_2 to 60 psig as indicated on gage 7.

7.2.4 Flow control valve 2 was opened, solenoid valve 4 was actuated, valve 5 was opened, and flow control valve 3 was adjusted to supply 50 psig as indicated on gage 6.

7.2.5 Timer 10 was adjusted and cycling of solenoid valve 4 was begun. Flow control valves 2 and 3 were adjusted to pressurize the specimen slowly from zero to 50 psig and back to zero as indicated by transducer 9.

7.2.6 After the required wave form was established, the specimen was subjected to 1000 cycles as indicated by counter 11. Hand valve 5 was closed and the surge history was recorded on oscillograph 8.

7.2.7 A functional test was performed after 50, 100, 500, and 1000 cycles. All test data were recorded.

7.3 TEST RESULTS

7.3.1 A zero-to 50- to zero-psig pressure cycle was established in 14 seconds.

7.3.2 The test results were considered satisfactory.

7.4 TEST DATA

A typical pressure cycle was recorded during the test and is presented in figure 7-1. Functional test data are presented in tables 7-1 through 7-8.

Table 7-1. Cracking and Reseating Pressures (After 50 Cycles)

Run No.	Cracking Pressure (inches of H_2O)	Reseating Pressure (inches of H_2O)
1	0.20	0.09
2	0.19	0.10
3	0.18	0.10
4	0.19	0.09
5	0.19	0.11
6	0.20	0.10

Table 7-2. Seat Leakage (After 50 Cycles)

Pressure (psig)	Leakage (drops/minute)
150	0
75	0

Table 7-3. Cracking and Reseating Pressures (After 100 Cycles)

Run No.	Cracking Pressure (inches of H_2O)	Reseating Pressure (inches of H_2O)
1	0.19	0.10
2	0.20	0.10
3	0.19	0.11
4	0.19	0.09
5	0.19	0.10
6	0.20	0.10

Table 7-4. Seat Leakage (After 100 Cycles)

Pressure (psig)	Leakage (drops/minute)
150	0
75	0

Table 7-5. Cracking and Reseating Pressures (After 500 Cycles)

Run No.	Cracking Pressure (inches of H_2O)	Reseating Pressure (inches of H_2O)
1	0.20	0.10
2	0.20	0.10
3	0.21	0.09
4	0.22	0.10
5	0.20	0.10
6	0.20	0.10

Table 7-6. Seat Leakage (After 500 Cycles)

Pressure (psig)	Leakage (drops/minute)
150	0
75	0

Table 7-7. Cracking and Reseating Pressures (After 1000 Cycles)

Run No.	Cracking Pressure (inches of H_2O)	Reseating Pressure (inches of H_2O)
1	0.21	0.10
2	0.21	0.09
3	0.20	0.10
4	0.21	0.10
5	0.21	0.10
6	0.20	0.09

Table 7-8. Seat Leakage (After 1000 Cycles)

Pressure (psig)	Leakage (drops/minute)
150	0
75	0

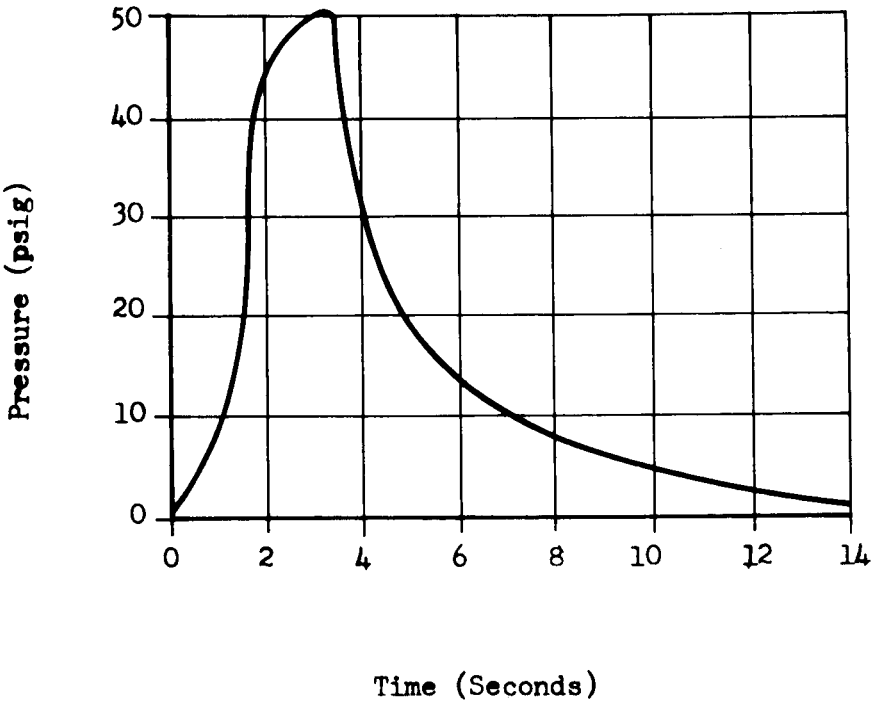


Figure 7-1. Typical Pressure Cycle Waveform

SECTION VIII

BURST TEST

8.1 TEST REQUIREMENTS

The valve shall be pressurized with H_2O to 600 psig. This pressure shall be maintained for 5 minutes and the valve checked for leakage and distortion.

8.2 TEST PROCEDURE

8.2.1 The test specimen was installed as shown in figures 3-1 and 3-2 utilizing the equipment listed in table 3-1.

8.2.2 It was determined that all connections were tight, gages were installed and operating properly, and that all valves were closed.

8.2.3 Hand valves 2 and 3 were opened, and hand pump 5 was operated to direct H_2O through the specimen for 1 minute.

8.2.4 Valve 2 was closed and the inlet and outlet ports of the specimen were pressurized simultaneously until a pressure of 600 psig was indicated on gage 4. This pressure was maintained for 5 minutes and the spcimen was checked for leakage. The pressure was vented and the specimen was checked for distortion. All test data were recorded.

8.3 TEST RESULTS

8.3.1 No visible leakage or distortion occurred.

8.3.2 Functional test data taken immediately after the burst pressure test were satisfactory.

8.4 TEST DATA

Functional test data taken after the burst pressure test are presented in tables 8-1 and 8-2.

Table 8-1. Cracking and Reseating Pressures (Post-Burst Test Values)

Run No.	Cracking Pressure (inches of H_2O)	Reseat Pressure (inches of H_2O)
1	0.20	0.10
2	0.20	0.09
3	0.20	0.10
4	0.21	0.10
5	0.21	0.09

Table 8-2. Seat Leakage (Post-Burst Test Values)

Pressure (psig)	Leakage (drops/minute)
150	0
75	0

APPROVAL

TEST REPORT

FOR

DUO-CHECK VALVE, 2-INCH

Mission Valve and Pump Company Part Number 15BVFCC1C

NASA Drawing Number 75M04406 PCV-2

SUBMITTED BY:

Donald R. Hardwick

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