Medium Weight Shock and Vibration Test Report
on
6 x 5 150 HP Fire Pump
for
Sims Pump Valve Company
Hoboken, NJ

NU LABORATORIES, INC.
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06 July 2006

Prepared By	Checked By	Approved By
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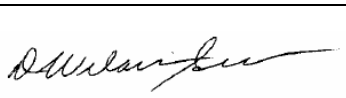	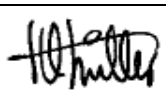	
06 July 2006	06 July 2006	06 July 2006

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1. PURPOSE OF TEST

The purpose of this test was to demonstrate that the 6 x 5 150 HP Fire Pump attached to the composite base, hereinafter referred to as the "Pump," complied with the requirements of MIL-S-901D for a Grade A, Class I, Type A, nine (9) blow medium weight shock test and the requirements of MIL-STD-167-1 when subjected to vibration through the frequency range of 4 Hz through 50 Hz in each of the three (3) major axes.

2. MANUFACTURER

Sims Pump Valve Company, Inc.
1314 Park Avenue
Hoboken, NJ 07030

3. MANUFACTURER'S TYPE OR MODEL NO.

6 x 5 150 HP Fire Pump
Composite Base: M/N NB16969
Serial No.: —1

4. SPECIFICATIONS

4.1 MILITARY

MIL-S-901D (NAVY) Military Specification, Shock Tests, H.I. (High Impact); Shipboard Machinery, Equipment and Systems, Requirements for, dated 17 March 1989

MIL-STD-167-1 (SHIPS) Military Standards Mechanical Vibrations of Shipboard Equipment, dated 19 June 1987

4.2 SIMS PUMP VALVE COMPANY, INC.

Purchase Order Number: 4926

5. NUMBER OF ITEMS TESTED

One (1)

6. SECURITY CLASSIFICATION OF ITEMS

Unclassified

7. DATE TESTING COMPLETED

23 June 2006

8. TEST CONDUCTED BY

NU Laboratories, Inc.
312 Old Allerton Road
Annandale, NJ 08801
(NAVY Certified Shock Test Facility by NAVSEAINST 9491.1C)

9. TEST WITNESSES

Vladimir Spektor, Sims Pump representative
John Kozel, Sims Pump representative
Robert Coseano, NSWCCD representative
Paul Hinkel, NAVICP representative

10. DISPOSITION OF TEST ITEM

The Pump was returned to Sims Pump Company, Inc.

11. ABSTRACT

The Pump was subjected to a total of nine (9) medium weight shock blows in accordance with the referenced test specifications. Visual inspections, performed after each shock blow, revealed no obvious physical damage, loss in pressure, or leakage. Refer to Section 12 for details.

The Pump was subjected to vibration through the frequency range of 4 Hz to 50 Hz in each of the three (3) major axes. Visual inspections, performed after each, major axis of vibration, revealed no obvious physical damage, loss in pressure, or leakage. Refer to Section 13 for details.

12. MEDIUM WEIGHT SHOCK TEST DESCRIPTION

12.1 ACCEPTANCE CRITERIA

The Pump shall be considered to have failed the shock test if any portion of the equipment comes adrift or otherwise becomes a hazard to personnel, or equipment is not able to perform its Grade A specified function due to performance degradation in accordance with MIL-S-901D Section 3.1.10.1.

12.2 TEST SETUP

Upon receipt a visual inspection performed on the Pump revealed no obvious physical damage or discrepancy.

The Pump was weighed using a portable platform scale and the weight was recorded in the test log. The weight of the Pump was 2918 pounds.

The Pump was attached to a 60″ x 60″ x 1” steel plate using eight (8) 7/8”-8 Grade 5 bolts torqued to 150 lbs-ft. The entire assembly was then secured to fixture Figure 13 of MIL-S-901D on the medium weight shock machine orientated in the first major axis of test. A 157 pound dummy mass was attached to the suction side of the Pump using twelve (12) 5/8”-11 studs torqued to 80 lbs-ft. A 116 pound dummy mass was attached to the discharge side of the Pump using eight (8) 5/8”-11 bolts torqued to 80 lbs-ft. The total weight on the anvil table was 5229 pounds. Refer to Table 1 for the medium weight shock test weights and Figure 1 for photographs of the test setup.

Table 1: Medium Weight Shock Test Weights

Pump	**2918 lbs.**
60″ x 60″ x 1” Steel Plate	**1027 lbs.**
Dummy Mass - Suction	**157 lbs.**
Dummy Mass - Discharge	**116 lbs.**
Mounting Bolts	**16 lbs.**
Three (3) Full Rails	**450 lbs.**
Twelve (12) Rail Shoes	**102 lbs.**
Nine (9) T-Blocks	**54 lbs.**
Nine (9) Spacers	**9 lbs.**
Figure 13	**380 lbs.**
Figure 16	**1470 lbs.**
Total Weight Fixture Figure 13	**5229 lbs.**
Total Weight Fixture Figure 16	**6319 lbs.**

12.3 TEST CONDITIONS

Throughout the shock test the Pump was monitored for any leaks or loss in pressure

Observations were made by Sims Pump, NSWC, NAVICP, and NU Laboratories, Inc. representatives.

During blows marked as “**CONDITION A**” the Pump was flooded with water, energized with 440 VAC, three (3) phase, 60 Hz power and operating with the discharge pressure adjusted to 150 psig.

During blows marked as “**CONDITION B**” the Pump flooded with water, and de-energized.

12.4 BLOW #1 - "CONDITION A"

12.4.1 Conditions: Vertical Axis, 2.5' hammer height, Group #I, 3.0" anvil table travel, Figure 13 of the referenced specifications.

12.4.2 Observations: A post-blow visual inspection revealed no obvious physical damage. No leakage or loss in pressure was reported.

12.4.3 Action: Testing was continued.

12.5 BLOW #2 - "CONDITION B"

12.5.1 Conditions: Vertical Axis, 5.0' hammer height, Group #II, 3.0" anvil table travel, Figure 13 of the referenced specifications.

12.5.2 Observations: A post-blow visual inspection revealed no obvious physical damage. No leakage or loss in pressure was reported.

12.5.3 Action: Testing was continued

12.6 BLOW #3 - "CONDITION A"

12.6.1 Conditions: Vertical Axis, 5.0' hammer height, Group #III, 1.5" anvil table travel, Figure 13 of the referenced specifications.

12.6.2 Observations: A post-blow visual inspection revealed no obvious physical damage. No leakage or loss in pressure was reported.

12.6.3 Action: Testing was continued.

The entire assembly was then removed from fixture Figure 13 of MIL-S-901D, and reattached to fixture Figure 16 of MIL-S-901D of the referenced specifications, orientated with the side of the Pump facing down. The total weight on the anvil table was 6319 pounds. Refer to Figure 1 for a photograph of the test setup and Table 1 for a breakdown of the test weights.

12.7 BLOW #4 - "CONDITION A"

12.7.1 Conditions: 30° Side Down, 3.0' hammer height, Group #I, 3.0" anvil table travel, Figure 16 of the referenced specifications.

12.7.2 Observations: A post-blow visual inspection revealed no obvious physical damage. No leakage or loss in pressure was reported.

12.7.3 Action: Testing was continued.

12.8 BLOW #5 - "CONDITION B"

12.8.1 Conditions: 30° Side Down, 5.5' hammer height, Group #II, 3.0" anvil table travel, Figure 16 of the referenced specifications.

12.8.2 Observations: A post-blow visual inspection revealed no obvious physical damage. No leakage or loss in pressure was reported.

12.8.3 Action: Testing was continued.

12.9 BLOW #6 - "CONDITION A"

12.9.1 Conditions: 30° Side Down, 5.5' hammer height, Group #III, 1.5″ anvil table travel, Figure 16 of the referenced specifications.

12.9.2 Observations: A post-blow visual inspection revealed no obvious physical damage. No leakage or loss in pressure was reported.

12.9.3 Action: Testing was continued.

The entire assembly was removed from fixture Figure 16 of MIL-S-901D, rotated 90° and reattached to MIL-S-901D Figure 16 with the Pump facing down. Refer to Figure 1. The total weight on the anvil table remained at 6319 pounds.

12.10 BLOW #7 - "CONDITION A"

12.10.1 Conditions: 30° Front Down, 3.0' hammer height, Group #I, 3.0" anvil table travel, Figure 16 of the referenced specifications.
12.10.2 Observations: A post-blow visual inspection revealed no obvious physical damage. No leakage or loss in pressure was reported.
12.10.3 Action: Testing was continued.

12.11 BLOW #8 - "CONDITION B"

12.11.1 Conditions: 30° Front Down, 5.5' hammer height, Group #II, 3.0" anvil table travel, Figure 16 of the referenced specifications.
12.11.2 Observations: A post-blow visual inspection revealed no obvious physical damage. No leakage or loss in pressure was reported.
12.11.3 Action: Testing was continued

12.12 BLOW #9 - "CONDITION A"

12.12.1 Conditions: 30° Front Down, 5.5' hammer height, Group #III, 1.5" anvil table travel, Figure 16 of the referenced specifications.
12.12.2 Observations: A post-blow visual inspection revealed no obvious physical damage. No leakage or loss in pressure was reported.
12.12.3 Action: Testing was continued.

Refer to the Factory Test Records, Figure 2, and the Shock Acceptance Form, Figure 3, for additional information.

13. VIBRATION TEST DESCRIPTION

13.1 TEST SETUP

Upon completion of the shock test the Pump assembly was removed from Figure 16 of MIL-S-901D and attached to the vibration machine. Refer to Figure 4 for photographs of the test setups.

One (1) accelerometer was attached to the plate and one (1) accelerometer was attached to the Pump, orientated in the direction of vibration, to aid in the detection of response prominences.

13.2 TEST CONDITIONS

The Pump was subjected to vibration in each of the three (3) major axes in "**CONDITION A**"; the Pump was flooded with water, energized with 440 VAC, three (3) phase, 60 Hz power and operating with the discharge pressure adjusted to 150 psig.

13.3 FIRST MAJOR AXIS OF VIBRATION (END TO END AXIS)

13.3.1 Exploratory Vibration

The Pump, was vibrated from 4 Hz through 50 Hz with a vibration input of 0.020 ± 0.004 inches (double amplitude) to determine response prominences and from 34 Hz through 50 Hz with a vibration input of 0.006 + 0.000/-0.002 (double amplitude) to determine response prominences. The change in frequency was made in discrete intervals of 1 Hz and the vibration was maintained at each frequency for approximately 15 seconds. Response prominences were noted at 48 Hz through 50 Hz.

The table input vibration levels and the accelerometer output vibration levels at each frequency were recorded on the Vibration Test Data Sheets.

13.3.2 Variable Frequency Vibration

The Pump was vibrated from 4 Hz to 50 Hz with input amplitudes as shown in Table 2. The change in frequency was made in discrete intervals of 1 Hz and the vibration was maintained at each frequency for a period of five (5) minutes. No obvious physical damage, leakage or loss in pressure was noted.

The table input vibration levels and the accelerometer output vibration levels at each frequency were recorded on the Vibration Test Data Sheets.

Table 2: Variable Frequency Test Amplitudes

FREQUENCY (Hz)	INPUT INCHES (DOUBLE AMPLITUDE)
4 – 15 Hz	0.060 ± 0.012
16 – 25 Hz	0.040 ± 0.008
26 – 33 Hz	0.020 ± 0.004
34 – 40 Hz	0.010 ± 0.002
41 – 50 Hz	0.006 + 0.000 -0.002

13.3.3 Endurance Vibration

The endurance vibration was performed at the frequency of 50 Hz for a period of two (2) hours. Upon the completion of the two (2) hour dwell an inspection was performed which revealed no obvious physical damage, leakage or loss in pressure.

The frequency, table input vibration levels, accelerometer output vibration levels and the duration of dwell were recorded on the Vibration Test Data Sheets.

13.4 SECOND MAJOR AXIS OF VIBRATION (VERTICAL AXIS)

13.4.1 Exploratory Vibration

The Pump was vibrated from 4 Hz through 33 Hz with a vibration input of 0.020 ± 0.004 inches (double amplitude) to determine response prominences and from 34 Hz through 50 Hz with a vibration input of 0.006 + 0.000/-0.002 (double amplitude) to determine response prominences. . The change in frequency was made in discrete intervals of 1 Hz and the vibration was maintained at each frequency for approximately 15 seconds. No response prominences were noted.

The table input vibration levels and the accelerometer output vibration levels at each frequency were recorded on the Vibration Test Data Sheets.

13.4.2 Variable Frequency Vibration

The Pump was vibrated from 4 Hz to 50 Hz with input amplitudes as shown in Table 2. The change in frequency was made in discrete intervals of 1 Hz and the vibration was maintained at each frequency for a period of five (5) minutes. No obvious physical damage, leakage or loss in pressure was noted.

The table input vibration levels and the accelerometer output vibration levels at each frequency were recorded on the Vibration Test Data Sheets.

13.4.3 Endurance Vibration

Since no response prominences were noted, the endurance vibration was performed at the specified upper frequency of 50 Hz for a period of two (2) hours. Upon the completion of the two (2) hour dwell an inspection was performed which revealed no obvious physical damage, leakage or loss in pressure.

The frequency, table input vibration levels, accelerometer output vibration levels and the duration of dwell were recorded on the Vibration Test Data Sheets.

13.5 THIRD MAJOR AXIS OF VIBRATION (SIDE TO SIDE AXIS)

13.5.1 Exploratory Vibration

The Pump was vibrated from 4 Hz through 33 Hz with a vibration input of 0.020 ± 0.004 inches (double amplitude) to determine response prominences and from 34 Hz through 50 Hz with a vibration input of 0.006 + 0.000/-0.002 (double amplitude) to determine response prominences. . The change in frequency was made in discrete intervals of 1 Hz and the vibration was maintained at each frequency for approximately 15 seconds. No response prominences were noted.

The table input vibration levels and the accelerometer output vibration levels at each frequency were recorded on the Vibration Test Data Sheets.

13.5.2 Variable Frequency Vibration

The Pump was vibrated from 4 Hz to 50 Hz with input amplitudes as shown in Table 2. The change in frequency was made in discrete intervals of 1 Hz and the vibration was maintained at each frequency for a period of five (5) minutes. No obvious physical damage, leakage or loss in pressure was noted.

The table input vibration levels and the accelerometer output vibration levels at each frequency were recorded on the Vibration Test Data Sheets.

13.5.3 Endurance Vibration

Since no response prominences were noted the endurance vibration was performed at the specified upper frequency of 50 Hz for a period of two (2) hours. Upon the completion of the two (2) hour dwell an inspection was performed which revealed no obvious physical damage, leakage or loss in pressure.

The frequency, table input vibration levels, accelerometer output vibration levels and the duration of dwell were recorded on the Vibration Test Data Sheets. Refer to the Vibration Test Data Sheets, Figures 5 through 7, for additional information.

Upon completion of the vibration test visual inspection performed revealed no obvious physical damage or discrepancy.

Vertical Axis

30° Side Down

30° Pump Down

Shock Test Setup Photographs
Figure 1

FACTORY TEST RECORD: CLASS HI SHOCK

DATE	23 June 2006
TEST #	10522.1
1. ITEM NAME OF EQUIPMENT SHOCK-TESTED	6 x 5 150 HP Fire Pump attached to composite base
2. RATING (KW, VOLTS, GPM, CFM, ETC.)	

3. MAJOR PARTS

		ADDRESS	GOV DWG NO	IDENTIFYING #
PUMP, ETC.	Tested For: Sims Pump Valve Company, Inc.	1314 Park Avenue Hoboken, NJ 07030		
MOTOR, ETC.	MANUFACTURER:			
STARTER, ETC.	MANUFACTURER:			
4. CONTRACT NO.	CONTRACTOR:	ADDRESS:		

5. TYPE OF SHOCK TEST ☒ ASSEMBLY ☐ SUB-ASSEMBLY ☐ PART

6. TOTAL WEIGHT OF ASSEMBLY TESTED: 2918 lbs.	WEIGHT OF INDIVIDUAL MAJOR PARTS	MOTOR: LBS.	STARTER: LBS.

7. WEIGHT CLASSIFICATION OF ITEM ☐ LIGHT ☒ MEDIUM

8. APPLICABLE MOUNTING FIGURE IN SPECIFICATION MIL-S-901 ☐ FIX 4A, FIG 5 ☐ FIX 4C, FIG 8 ☒ FIG 13 ☒ FIG 16 ☐ FIG 10-2 ☐ OTHER

9. FOR LIGHTWEIGHT ITEMS

FIRST CONDITION				SECOND CONDITION			
BLOW	DROP	AXIS	DAMAGE INCURRED	BLOW	DROP	AXIS	DAMAGE INCURRED

ITEMS SUBJECT TO ABOVE TWO CONDITIONS WERE SAME ☐ DIFFERENT☐

REMARKS

10. FOR MEDIUM-WEIGHT ITEMS

Fig. 13				Fig. 16			
BLOWS	GRP #	HAMMER DROP	DAMAGE INCURRED	BLOWS	GRP #	HAMMER DROP	DAMAGE INCURRED
1	I	2.5'	No damage noted	4	I	3'	No damage noted
2	II	5'	No damage noted	5	II	5.5'	No damage noted
3	III	5'	No damage noted	6	III	5.5'	No damage noted
				7	I	3'	No damage noted
				8	II	5.5'	No damage noted
				9	III	5.5'	No damage noted

TOTAL WEIGHT ON ANVIL TABLE: Fig 13 -5229 lbs., Fig 16 – 6319 lbs.	REMARKS	
TEST LABORATORY: NU Laboratories, Inc.	ADDRESS: 312 Old Allerton Road, Annandale, NJ 08801	TEST ENGINEER: [signature]

Factory Test Record
Figure 2

MIL-S-901D: SHOCK ACCEPTANCE FORM

1. The item identified below has met the requirements of Military Specification MIL-S-901, based upon:
   - ☒ Shock testing of the item identified below
   - ❑ Previous shock testing of an item similar to the item identified below (shock test extension)
   - ❑ Previous shock testing of an item identical to the item identified below (shock test extension)
2. Item (Nomenclature) Pump
3. Item (Description) 6 x 5 150 HP Fire Pump attached to composite base
4. Tested For Sims Pump Valve Company, Inc.
5. M/N NB16969 6. Size/Capacity _____
7. Serial Number —1 8. Revision and Date -
9. Military Specification MIL-S-901D
10. Ship _____ 11. Service _____
12. Contract No. _____
13. Shock Test Facility NU Laboratories, Inc.
14. Report No. 10522.1
15. Previous Shock test approval reference (if this form conveys shock test Extension approval) _____

16.	Test Category	☐ Lightweight	☒ Medium weight	☐ Heavyweight	
17.	Shock Grade	☒ A	☐ B		
18.	Equipment Class	☒ I	☐ II	☐ III	
19.	Shock Test Type	☒ A	☐ B	☐ C	
20.	Mounting Location	☒ Deck	☐ Hull	☐ Shell	☐ Wetted-Surface

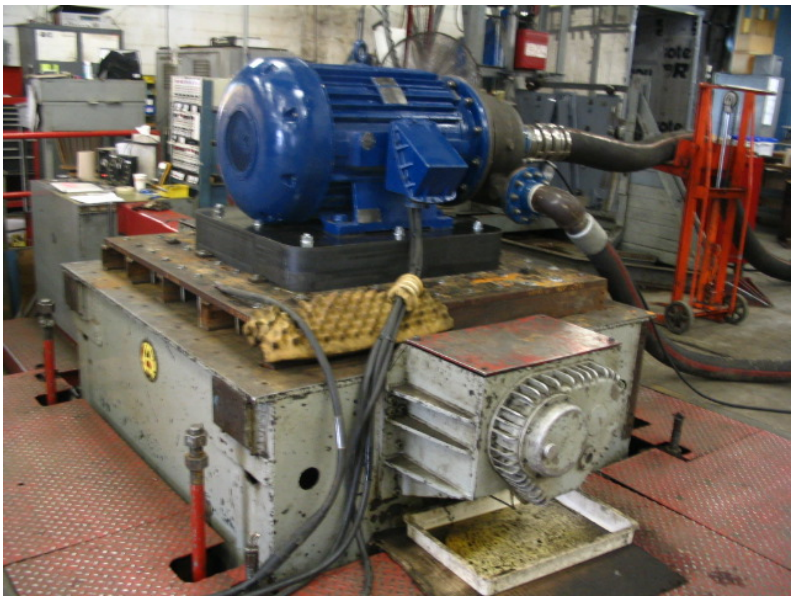
21. Shipboard mounting plane represented during shock test:

☒ Base	☐ Front or Face	☐ Back
☐ Top	☐ Combination	☐ Other ____

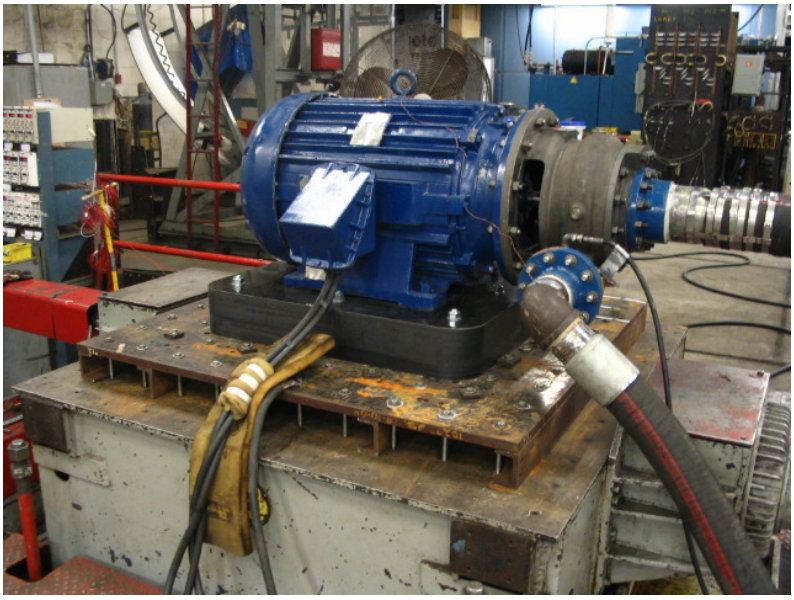
22. Mounting orientation of item relative to ship's fore-and-aft axis (for medium weight and heavyweight test items only): Unrestricted
23. Approval Limitations: _____
24. Approved. _____

Authorized Signature	Approval Activity	Date
		23 June 2006

Shock Acceptance Form
Figure 3

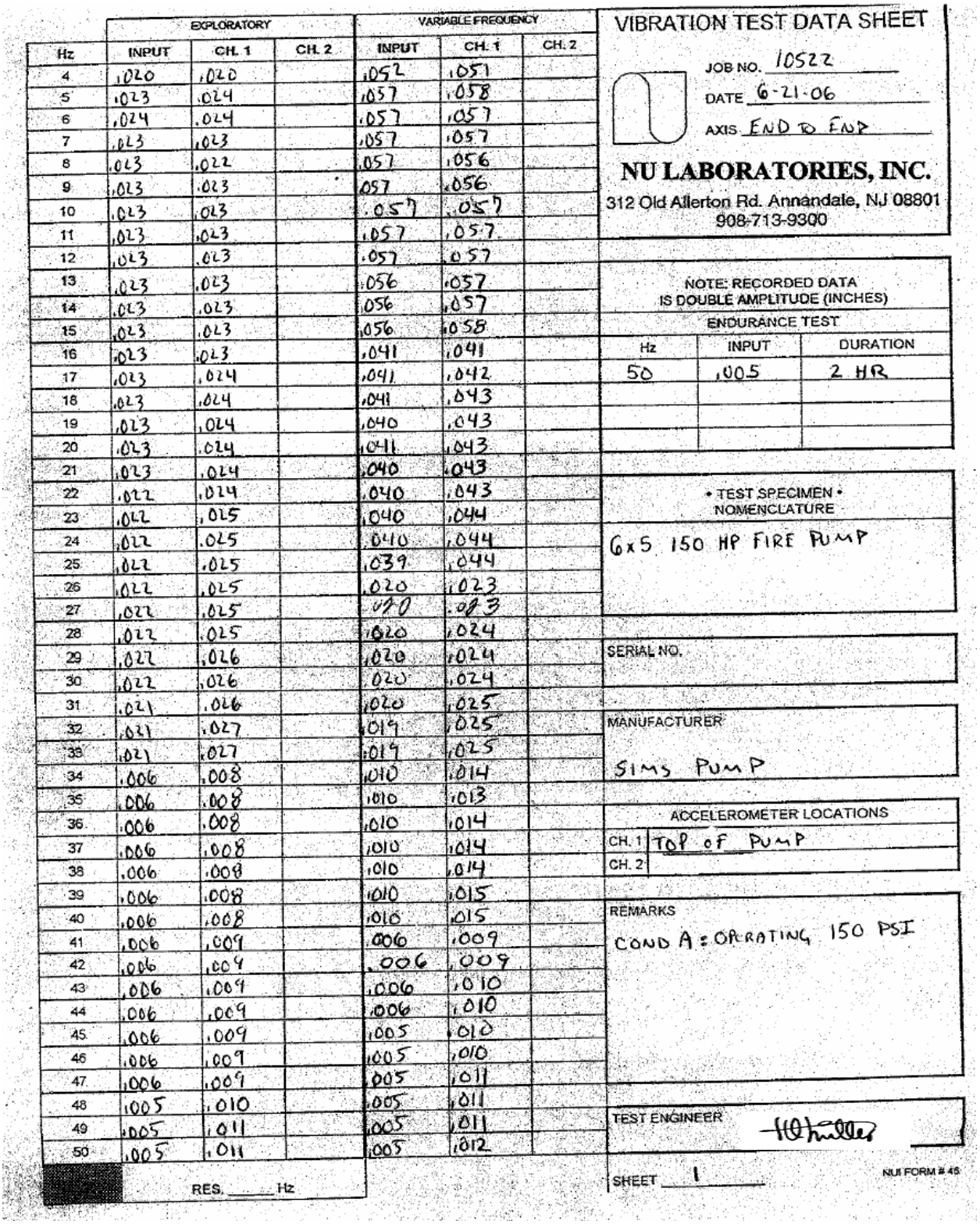


End to End and Vertical Axes



Side to Side Axis

Vibration Test Setup
Figure 4



Hz	EXPLORATORY INPUT	EXPLORATORY CH. 1	EXPLORATORY CH. 2	VARIABLE FREQUENCY INPUT	VARIABLE FREQUENCY CH. 1	VARIABLE FREQUENCY CH. 2
4	.020	.020		.052	.051	
5	.023	.024		.057	.058	
6	.024	.024		.057	.057	
7	.023	.023		.057	.057	
8	.023	.022		.057	.056	
9	.023	.023		.057	.056	
10	.023	.023		.057	.057	
11	.023	.023		.057	.057	
12	.023	.023		.057	.057	
13	.023	.023		.056	.057	
14	.023	.023		.056	.057	
15	.023	.023		.056	.058	
16	.023	.023		.041	.041	
17	.023	.024		.041	.042	
18	.023	.024		.041	.043	
19	.023	.024		.040	.043	
20	.023	.024		.041	.043	
21	.023	.024		.040	.043	
22	.022	.024		.040	.043	
23	.022	.025		.040	.044	
24	.022	.025		.040	.044	
25	.022	.025		.039	.044	
26	.022	.025		.020	.023	
27	.022	.025		.020	.023	
28	.022	.025		.020	.024	
29	.022	.026		.020	.024	
30	.022	.026		.020	.024	
31	.021	.026		.020	.025	
32	.021	.027		.019	.025	
33	.021	.027		.019	.025	
34	.006	.008		.010	.014	
35	.006	.008		.010	.013	
36	.006	.008		.010	.014	
37	.006	.008		.010	.014	
38	.006	.008		.010	.014	
39	.006	.008		.010	.015	
40	.006	.008		.010	.015	
41	.006	.009		.006	.009	
42	.006	.009		.006	.009	
43	.006	.009		.006	.010	
44	.006	.009		.006	.010	
45	.006	.009		.005	.010	
46	.006	.009		.005	.010	
47	.006	.009		.005	.011	
48	.005	.010		.005	.011	
49	.005	.011		.005	.011	
50	.005	.011		.005	.012	

RES. _____ Hz

VIBRATION TEST DATA SHEET

JOB NO. 10522

DATE 6-21-06

AXIS END TO END

NU LABORATORIES, INC.

312 Old Allerton Rd. Annandale, NJ 08801
908-713-9300

NOTE: RECORDED DATA IS DOUBLE AMPLITUDE (INCHES)

ENDURANCE TEST

Hz	INPUT	DURATION
50	.005	2 HR

• TEST SPECIMEN • NOMENCLATURE

6x5 150 HP FIRE PUMP

SERIAL NO.

MANUFACTURER

SIMS PUMP

ACCELEROMETER LOCATIONS

CH. 1 TOP OF PUMP

CH. 2

REMARKS

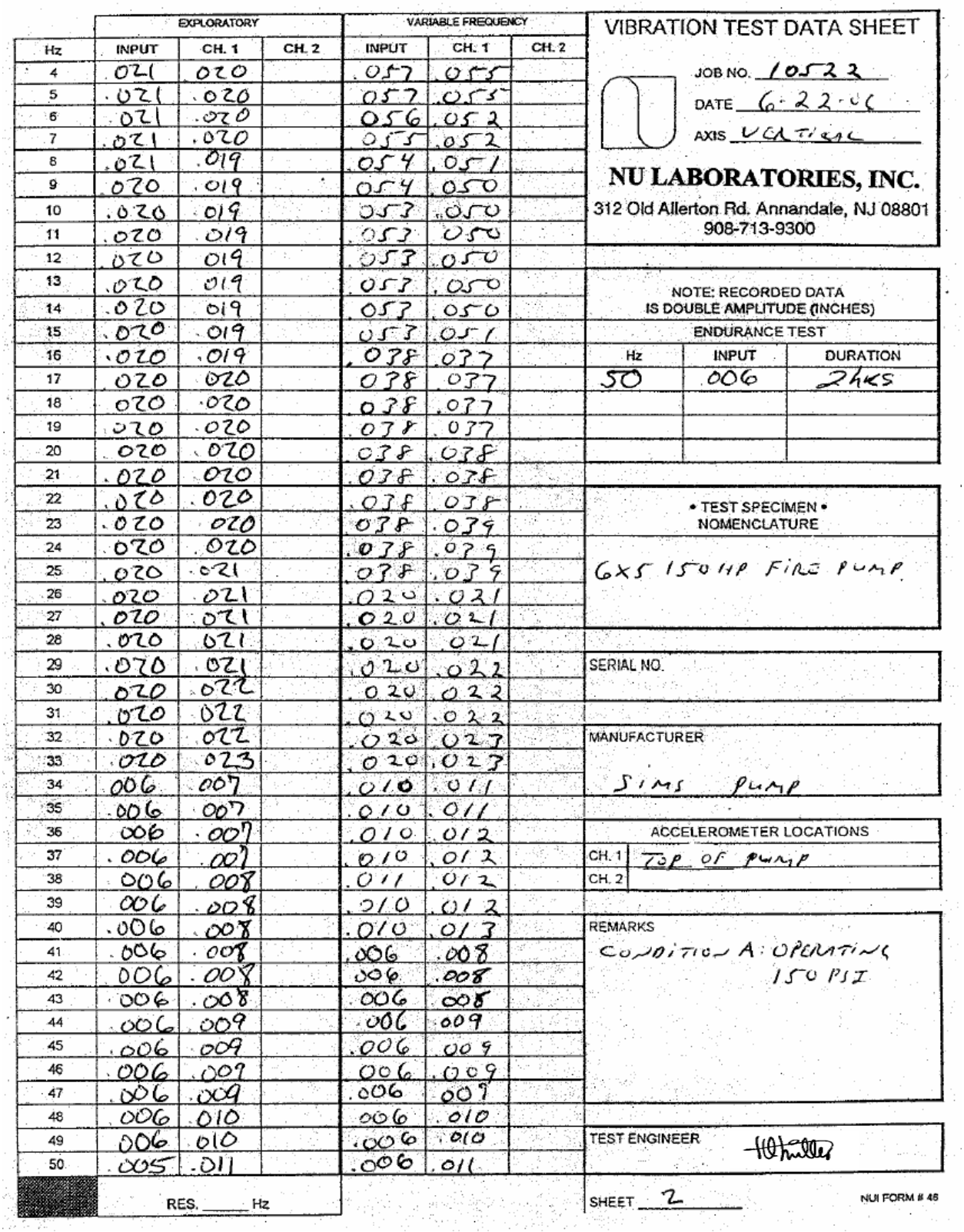
COND A: OPRATING 150 PSI

TEST ENGINEER

SHEET 1

NUI FORM # 45

Vibration Test Data Sheet
Figure 5



	EXPLORATORY			VARIABLE FREQUENCY		
Hz	INPUT	CH. 1	CH. 2	INPUT	CH. 1	CH. 2
4	.021	.020		.057	.055	
5	.021	.020		.057	.055	
6	.021	.020		.056	.052	
7	.021	.020		.055	.052	
8	.021	.019		.054	.051	
9	.020	.019		.054	.050	
10	.020	.019		.053	.050	
11	.020	.019		.053	.050	
12	.020	.019		.053	.050	
13	.020	.019		.053	.050	
14	.020	.019		.053	.050	
15	.020	.019		.053	.051	
16	.020	.019		.038	.037	
17	.020	.020		.038	.037	
18	.020	.020		.038	.037	
19	.020	.020		.038	.037	
20	.020	.020		.038	.038	
21	.020	.020		.038	.038	
22	.020	.020		.038	.038	
23	.020	.020		.038	.039	
24	.020	.020		.038	.039	
25	.020	.021		.038	.039	
26	.020	.021		.020	.021	
27	.020	.021		.020	.021	
28	.020	.021		.020	.021	
29	.020	.021		.020	.022	
30	.020	.022		.020	.022	
31	.020	.022		.020	.022	
32	.020	.022		.020	.023	
33	.020	.023		.020	.023	
34	.006	.007		.010	.011	
35	.006	.007		.010	.011	
36	.006	.007		.010	.012	
37	.006	.007		.010	.012	
38	.006	.008		.011	.012	
39	.006	.008		.010	.012	
40	.006	.008		.010	.013	
41	.006	.008		.006	.008	
42	.006	.008		.006	.008	
43	.006	.008		.006	.008	
44	.006	.009		.006	.009	
45	.006	.009		.006	.009	
46	.006	.009		.006	.009	
47	.006	.009		.006	.009	
48	.006	.010		.006	.010	
49	.006	.010		.006	.010	
50	.005	.011		.006	.011	

RES. _____ Hz

VIBRATION TEST DATA SHEET

JOB NO. 10522

DATE 6-22-06

AXIS VERTICAL

NU LABORATORIES, INC.

312 Old Allerton Rd. Annandale, NJ 08801
908-713-9300

NOTE: RECORDED DATA IS DOUBLE AMPLITUDE (INCHES)

ENDURANCE TEST

Hz	INPUT	DURATION
50	006	2HRS

• TEST SPECIMEN • NOMENCLATURE

6X5 150 HP FIRE PUMP

SERIAL NO.

MANUFACTURER

SIMS PUMP

ACCELEROMETER LOCATIONS

CH. 1 TOP OF PUMP

CH. 2

REMARKS

CONDITION A: OPERATING 150 PSI

TEST ENGINEER

SHEET 2

NUI FORM # 45

Vibration Test Data Sheet
Figure 6

	EXPLORATORY			VARIABLE FREQUENCY		
Hz	INPUT	CH. 1	CH. 2	INPUT	CH. 1	CH. 2
4	.018	.019		.065	.065	
5	.019	.019		.065	.065	
6	.020	.020		.065	.066	
7	.020	.020		.065	.066	
8	.020	.020		.065	.065	
9	.020	.020		.065	.064	
10	.020	.020		.065	.065	
11	.020	.020		.065	.065	
12	.020	.020		.065	.065	
13	.020	.020		.064	.065	
14	.020	.020		.064	.066	
15	.020	.020		.064	.066	
16	.020	.021		.039	.041	
17	.020	.021		.039	.041	
18	.020	.021		.039	.041	
19	.020	.021		.039	.042	
20	.020	.021		.039	.042	
21	.020	.021		.039	.042	
22	.020	.022		.038	.042	
23	.020	.022		.038	.043	
24	.020	.022		.038	.043	
25	.020	.022		.038	.044	
26	.020	.022		.019	.022	
27	.019	.023		.019	.022	
28	.019	.023		.019	.022	
29	.019	.023		.019	.023	
30	.019	.024		.019	.023	
31	.019	.024		.019	.023	
32	.019	.024		.018	.024	
33	.019	.025		.018	.024	
34	.005	.007		.010	.014	
35	.005	.007		.010	.014	
36	.005	.007		.010	.014	
37	.005	.007		.010	.014	
38	.005	.007		.010	.015	
39	.005	.007		.010	.016	
40	.005	.008		.010	.015	
41	.005	.008		.006	.010	
42	.005	.008		.006	.010	
43	.005	.008		.006	.010	
44	.005	.008		.006	.011	
45	.005	.008		.006	.011	
46	.005	.009		.006	.011	
47	.005	.009		.006	.011	
48	.005	.009		.006	.012	
49	.005	.009		.006	.012	
50	.005	.009		.006	.012	

RES. _____ Hz

VIBRATION TEST DATA SHEET

JOB NO. 10522

DATE 6-23-06

AXIS SIDE TO SIDE

NU LABORATORIES, INC.

312 Old Allerton Rd. Annandale, NJ 08801
908-713-9300

NOTE: RECORDED DATA IS DOUBLE AMPLITUDE (INCHES)

ENDURANCE TEST

Hz	INPUT	DURATION
50	.006	2 HR

• TEST SPECIMEN • NOMENCLATURE

6x5 150 HP FIRE PUMP

SERIAL NO.

MANUFACTURER

SIMS PUMP

ACCELEROMETER LOCATIONS

CH. 1 TOP OF PUMP

CH. 2

REMARKS

CONDI A Operating 150 PSI

TEST ENGINEER

SHEET 3

NUI FORM # 45

Vibration Test Data Sheet
Figure 7

LIST OF APPARATUS

DESCRIPTION	MANUFACTURER	MODEL NO.	SERIAL NO.	CAL DATE	DUE DATE
Medium Weight Shock Machine	New England Trawler	10-T-3351-C	N/A	Functional	
Digital Scale	Industrial Commercial	TI-500SSB-5K	5D1901100001E	09/21/05	09/21/06
Pressure Gauge	Span	4109566	MC001705	09/23/05	09/23/06
Vibration Machine	LAB	72-5000	51401	Functional	
1 Hour Timer	GraLab	300	300-87061543	04/25/06	04/25/07
Mutimeter	Fluke	87	48001437	01/04/06	01/04/07
Charge Amplifier	Trig Tek	203M	224	08/25/05	08/25/06
Charge Amplifier	Trig Tek	203M	218	08/25/05	08/25/06
Accelerometer	Endevco	2221D	EY62	01/31/06	01/31/07
Accelerometer	Endevco	2221D	EY60	01/31/06	01/31/07

All calibrations are traceable to the National Institute of Standards and Technology. Procedures satisfy the requirements set forth in MIL-STD-45662 or ANSI/NCSL Z540-1. Calibration records are on file at NU Laboratories, Inc.

All weights and scales are traceable to the State of NJ Office of Weights and Measures (NJSA 51:1-61; 75; NJAC 13:47E-1.2)