

MIL-STD-167-1A TYPE I ENVIRONMENTAL VIBRATION

TEST REPORT OF THE

VARISTAR SPRING ISOLATED CABINET

Purchase Order Number: 709877OS

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REVISIONS

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Rev.00 Rev.01	Initial Release Correct EUT weight in Table 1	04 April 2023 06 April 2023

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ATTACHMENTS

Attachment A: NTS Test Procedure

1.0 INTRODUCTION

1.1 Purpose

The purpose of this document is to provide a vibration test report for the Varistar Spring Isolated Cabinet, hereafter referred to as the Equipment Under Test (EUT), for Schroff, Inc.

1.2 Scope

This report describes the activities performed during the planning/pre-test period, equipment installation on the vibration table, actual test operations, physical inspections, operational tests, and reporting.

1.3 Objective

The objective of this test series was to perform Vibration Risk Mitigation testing of the EUT for Research and Development purposes, in accordance with MIL-STD-167-1A.

2.0 APPLICABLE DOCUMENTS

2.1 Military Specifications

MIL-STD-167-1A “Department of Defense Test Method Standard, Mechanical Vibrations of Shipboard Equipment (Type I – Environmental and Type II – Internally Excited),” dated 02 November 2005.

2.2 Commercial Documents

NTS Test Procedure No. TP-PH00005037-V “MIL-STD-167-1A Type I Environmental Vibration Test Procedure of the Varistar Spring Isolated Cabinet” Rev.00, dated 02 February 2023. (Attachment A)

2.3 Testing Authorization

Purchase Order Number: 709877OS

3.0 TEST ITEM

3.1 Varistar Spring Isolated Cabinet

Table 1 includes a description of the EUT.

Model Number	10630-049
Overall Dimensions	86.79”H x 23.60”W x 39.56”D (w/ Isolators)
Center of Gravity (relative to mounting pad)	Geometric Center
Weight	1,565.00 lbs. (w/ isolators)
Power	N/A
Shock Isolators	Base, Qty. (4) Societec/Vibroynamics Wire Rope Sway, Qty. (2) Societec/Vibroynamics Wire Rope

Table 1: EUT Description

4.0 TEST REQUIREMENTS

4.1 Test Facility

Testing was conducted at the NTS Technical Systems – Rustburg Facility, located at 3915 Sunnymead Road in Rustburg, VA.

4.2 Test Specifications

The EUT was mounted on the vibration table for the three-test series and was subjected to Type 1 vibration testing in accordance with MIL-STD-167-1A.

4.3 Test Equipment

Vibration Test Machine

Model No. RVH72-5000

Serial No. 466013

Manufactured by L.A.B. Corp.

4.4 Exploratory Vibration Test

The EUT was subjected to vibration at discrete frequency increments of 1 Hz from 4 to 25 Hz at a table amplitude of 0.010±0.002 inches single amplitude. Each integral frequency was maintained for a minimum of 15 seconds. The operator monitored, recorded data, and observed the EUT for visual or audible resonances.

4.5 Variable Frequency Test

The EUT was subjected to vibration at discrete frequency increments of 1 Hz from 4 to 25 Hz at the table amplitudes listed in Table 2. Each integral frequency was maintained for a minimum of 5 minutes.

Frequency Range (Hz)	Single Amplitude Displacement (inches)
4 to 15	0.030 ± 0.006
16 to 25	0.020 ± 0.004

Table 2: Amplitude Displacement

4.6 Endurance Vibration Test

Endurance test frequencies were selected from the candidate list of endurance test frequencies developed during exploratory and variable frequency testing. The EUT was vibrated for a total period of at least 2 hours at the frequency determined to most seriously affect the structural integrity of the equipment. Selection of endurance test frequencies was in accordance with Appendix A of MIL-STD-167-1A. In cases where there were multiple response prominence frequencies selected, the duration of vibration testing at each frequency was in accordance with Table II of MIL-STD-167-1A. The equipment was vibrated in accordance with the amplitudes identified in Table 2, above.

4.7 Mode of Operation

The EUT was not energized or operational during the test series.

5.0 VIBRATION TEST

5.1 Test Installation

The EUT was installed on an NTS test fixture constructed in accordance with NTS Drawing No. PH00005037. The test fixture was used to interface the EUT with the vibration table. The EUT attached to its test fixture using the following hardware: (Sway) quantity four (4) ½”-13 Grade 8 Flat Socket Head Bolts, four (4) ½”-13 Grade 8 Self-Locking Nuts, and four (4) ½” Flat Washers / (Base) quantity sixteen (16) 3/8”-16 Grade 8 Flat Socket Head Bolts. The test fixture was then bolted/clamped to the vibration table (See Photographs 1 and 2).

Photograph 1 shows the test fixture installed in the Vertical and Front-to-Back vibration orientations. Photograph 2 shows the test fixture rotated 90 degrees for the Side-to-Side vibration orientation.



Photograph 1: Front-to-Back and Vertical Orientation



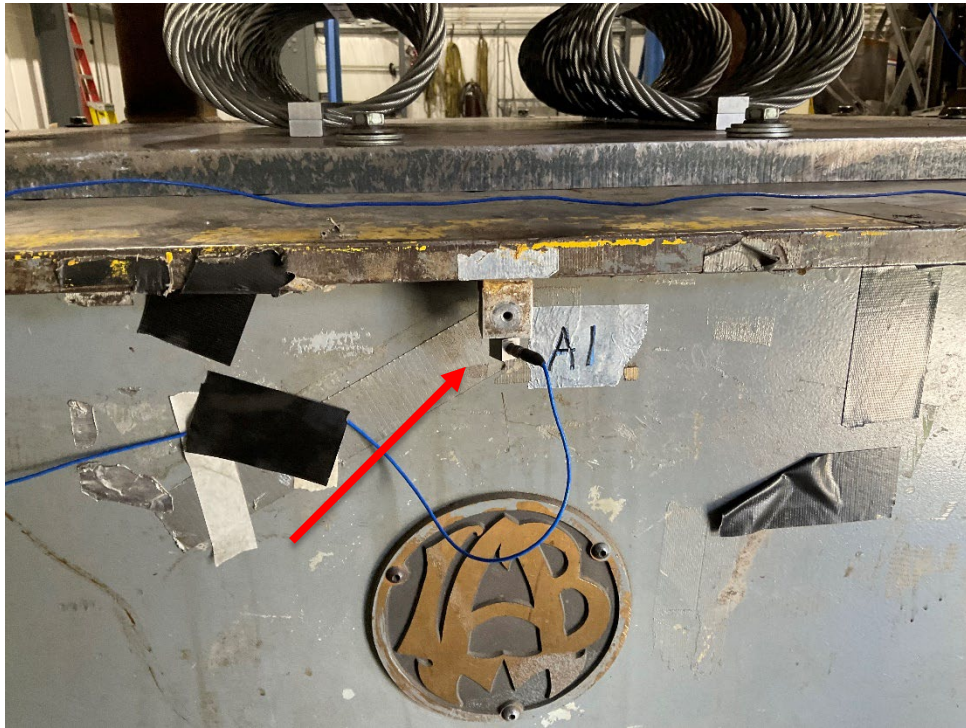
Photograph 2: Side-to-Side Orientation

5.2 Instrumentation

One accelerometer was located at the center of the vibration table to measure table amplitudes. One accelerometer was installed on the EUT to measure response and determine resonances. The locations of the sensors are listed in Table 3. Photographs 3-4 show the locations of the instrumentation.

Item	Orientation	Accelerometer Serial #	Sensitivity	Calibration Due Date	Location
A1	Direction of Excitation	12655	503.945 mV/g	6/20/2023	Table
A2	Direction of Excitation	49655	514.815 mV/g	6/20/2023	Top Right Front Corner

Table 3: Accelerometer Locations



Photograph 3: Location of A1



Photograph 4: Location of A2

5.3 Vertical Test

5.3.1 Vertical Exploratory Test

The vibration table was excited in the Vertical direction at discrete frequencies ranging from 4 to 25 Hz. No deficiencies or discrepancies were noted. Resonance was noted at 10 Hz. Results from the Exploratory Test are summarized in Table 4.

Table Input Frequency	Table Input Amplitude	Table Input Amplitude	Top Right Front Corner	Q of A2	Weight Setting
(Hertz)	A1 (Gs)	A1 (in)	A2 (Gs)		
4	0.017	0.011	0.019	1.069	1.25
5	0.025	0.010	0.028	1.125	
6	0.031	0.008	0.037	1.213	
7	0.044	0.009	0.058	1.310	
8	0.055	0.008	0.081	1.486	1.5
9	0.073	0.009	0.132	1.798	
10	0.086	0.008	0.235	2.720	1.75
11	0.124	0.010	0.307	2.476	1.25
12	0.156	0.011	0.270	1.731	1
13	0.158	0.009	0.249	1.576	
14	0.197	0.010	0.247	1.254	
15	0.190	0.008	0.205	1.079	
16	0.249	0.010	0.233	0.936	
17	0.254	0.009	0.203	0.799	
18	0.295	0.009	0.210	0.712	
19	0.315	0.009	0.198	0.629	
20	0.342	0.008	0.189	0.553	
21	0.373	0.008	0.183	0.491	
22	0.503	0.010	0.193	0.384	1.25
23	0.544	0.010	0.187	0.344	
24	0.530	0.009	0.168	0.317	
25	0.593	0.009	0.176	0.297	

Table 4: Vertical Exploratory Instrumentation Data

5.3.2 Vertical Variable Frequency Test

Single amplitude results from the Vertical Variable Frequency Test are summarized in Table 5. No deficiencies or discrepancies were noted. Resonance was noted at 8 Hz.

Table Input Frequency	Table Input Amplitude	Table Input Amplitude	Top Right Front Corner	Q of A2	Weight Setting
(Hertz)	A1 (Gs)	A1 (in)	A2 (Gs)		
4	0.049	0.030	0.052	1.065	3.75
5	0.069	0.027	0.077	1.125	
6	0.088	0.024	0.108	1.227	
7	0.121	0.024	0.171	1.413	
8	0.182	0.028	0.363	1.995	4.25
9	0.285	0.034	0.368	1.291	
10	0.359	0.035	0.344	0.958	
11	0.418	0.034	0.348	0.833	3.75
12	0.476	0.032	0.340	0.714	
13	0.554	0.032	0.332	0.599	
14	0.661	0.033	0.336	0.508	
15	0.694	0.030	0.305	0.439	
16	0.581	0.022	0.248	0.427	3
17	0.673	0.023	0.255	0.379	
18	0.668	0.020	0.247	0.370	2.5
19	0.735	0.020	0.249	0.339	
20	0.779	0.019	0.236	0.303	
21	0.896	0.020	0.245	0.273	
22	0.901	0.018	0.225	0.250	
23	0.980	0.018	0.223	0.228	
24	1.070	0.018	0.227	0.212	
25	1.120	0.018	0.218	0.195	

Table 5: Vertical Variable Instrumentation Data

5.3.3 Vertical Endurance Test

Since two resonances were noted during the Exploratory and Variable testing; Endurance testing was conducted at frequencies of 8 and 10 Hz for one hour each. No deficiencies or discrepancies were noted. Results from the Endurance Test are summarized in Table 6. Vertical testing dates and times are shown in Table 7.

Table Input Frequency	Table Input Amplitude	Table Input Amplitude	Top Right Front Corner	Q of A2	Weight Setting
(Hertz)	A1 (Gs)	A1 (in)	A2 (Gs)		
8	0.192	0.029	0.358	1.865	4.000
10	0.320	0.031	0.315	0.984	4.000

Table 6: Vertical Endurance Instrumentation Data

Testing Timeline				
Test	Start Time	Start Date	End Time	End Date
Exploratory	3:11:00 PM	28-Mar-23	4:00:00 PM	28-Mar-23
Variable	8:38:00 PM	29-Mar-23	10:52:00 AM	29-Mar-23
Endurance 8 Hz	10:59:00 AM	29-Mar-23	11:59:00 AM	29-Mar-23
Endurance 10 Hz	11:59:00 AM	29-Mar-23	12:59:00 PM	29-Mar-23

Table 7: Vertical Testing Dates and Times

5.4 Front-to-Back Test

5.4.1 Front-to-Back Exploratory Test

The vibration table was excited in the Front-to-Back direction at discrete frequencies ranging from 4 to 25 Hz. Resonance was noted at 12 Hz. No deficiencies or discrepancies were noted. Results from the Exploratory Test are summarized in Table 8.

Table Input Frequency	Table Input Amplitude	Table Input Amplitude	Top Right Front Corner	Q of A2	Weight Setting
(Hertz)	A1 (Gs)	A1 (in)	A2 (Gs)		
4	0.019	0.012	0.006	0.333	1.75
5	0.027	0.010	0.013	0.496	
6	0.034	0.009	0.030	0.880	
7	0.055	0.011	0.064	1.178	1.25
8	0.068	0.010	0.090	1.320	
9	0.094	0.011	0.132	1.407	
10	0.099	0.010	0.143	1.443	
11	0.129	0.010	0.199	1.543	
12	0.127	0.009	0.284	2.236	
13	0.176	0.010	0.312	1.773	
14	0.204	0.010	0.264	1.294	
15	0.222	0.010	0.211	0.950	
16	0.259	0.010	0.221	0.853	
17	0.272	0.009	0.201	0.739	
18	0.320	0.010	0.203	0.634	
19	0.345	0.009	0.183	0.530	
20	0.377	0.009	0.182	0.483	
21	0.400	0.009	0.167	0.418	
22	0.441	0.009	0.172	0.390	
23	0.441	0.008	0.149	0.338	
24	0.454	0.008	0.134	0.295	
25	0.520	0.008	0.138	0.265	

Table 8: Front-to-Back Exploratory Instrumentation Data

5.4.2 Front-to-Back Variable Frequency Test

Single amplitude results from the Front-to-Back Variable Frequency Test are summarized in Table 9. No deficiencies or discrepancies were noted. Resonance was noted at 9 Hz.

Table Input Frequency	Table Input Amplitude	Table Input Amplitude	Top Right Front Corner	Q of A2	Weight Setting
(Hertz)	A1 (Gs)	A1 (in)	A2 (Gs)		
4	0.040	0.024	0.015	0.365	3.75
5	0.063	0.025	0.042	0.672	4
6	0.116	0.032	0.129	1.112	
7	0.176	0.035	0.220	1.250	
8	0.194	0.030	0.269	1.387	
9	0.263	0.032	0.421	1.601	
10	0.313	0.031	0.425	1.358	
11	0.405	0.033	0.413	1.020	
12	0.471	0.032	0.334	0.709	
13	0.535	0.031	0.286	0.535	
14	0.627	0.031	0.266	0.424	
15	0.640	0.028	0.221	0.345	
16	0.627	0.024	0.229	0.365	3
17	0.623	0.021	0.234	0.376	
18	0.765	0.023	0.245	0.320	
19	0.834	0.023	0.212	0.254	
20	0.870	0.021	0.213	0.245	
21	0.980	0.022	0.203	0.207	
22	0.956	0.019	0.191	0.200	
23	1.130	0.021	0.197	0.174	
24	1.070	0.018	0.160	0.150	
25	1.220	0.019	0.167	0.137	

Table 9: Front-to-Back Variable Instrumentation Data

5.4.3 Front-to-Back Endurance Test

Since two resonances were noted during the Exploratory and Variable testing; Endurance testing was conducted at frequencies of 9 and 12 Hz for one hour each. No deficiencies or discrepancies were noted. Results from the Endurance Test are summarized in Table 10. Front-to-Back testing dates and times are shown in Table 11.

Table Input Frequency	Table Input Amplitude	Table Input Amplitude	Top Right Front Corner	Q of A2	Weight Setting
(Hertz)	A1 (Gs)	A1 (in)	A2 (Gs)		
9	0.207	0.025	0.311	1.502	4.000
12	0.357	0.024	0.317	0.888	4.000

Table 10: Front-to-Back Endurance Instrumentation Data

Testing Timeline				
Test	Start Time	Start Date	End Time	End Date
Exploratory	1:10:00 PM	29-Mar-23	1:43:00 PM	29-Mar-23
Variable	1:52:00 PM	29-Mar-23	3:48:00 AM	29-Mar-23
Endurance 9 Hz	8:12:00 AM	30-Mar-23	9:12:00 AM	30-Mar-23
Endurance 12 Hz	9:13:00 AM	30-Mar-23	10:13:00 AM	30-Mar-23

Table 11: Front-to-Back Testing Dates and Times

5.5 Side-to-Side Test

5.5.1 Side-to-Side Exploratory Test

The vibration table was excited in the Side-to-Side direction at discrete frequencies ranging from 4 to 25 Hz. Resonances were noted at 5 and 11 Hz. No deficiencies or discrepancies were noted. Results from the Exploratory Test are summarized in Table 12.

Table Input Frequency	Table Input Amplitude	Table Input Amplitude	Top Right Front Corner	Q of A2	Weight Setting
(Hertz)	A1 (Gs)	A1 (in)	A2 (Gs)		
4	0.018	0.011	0.021	1.150	1.75
5	0.027	0.011	0.147	5.404	1.25
6	0.039	0.010	0.146	3.792	
7	0.053	0.011	0.170	3.189	
8	0.059	0.009	0.165	2.797	
9	0.086	0.010	0.147	1.719	
10	0.093	0.009	0.140	1.505	
11	0.123	0.010	0.250	2.033	
12	0.148	0.010	0.233	1.574	
13	0.176	0.010	0.218	1.239	
14	0.181	0.009	0.182	1.006	
15	0.225	0.010	0.185	0.822	
16	0.253	0.010	0.179	0.708	
17	0.276	0.009	0.170	0.616	
18	0.289	0.009	0.155	0.536	
19	0.338	0.009	0.161	0.476	
20	0.369	0.009	0.155	0.420	
21	0.380	0.008	0.146	0.384	
22	0.406	0.008	0.142	0.350	
23	0.439	0.008	0.144	0.328	
24	0.541	0.009	0.158	0.292	1.5
25	0.548	0.009	0.160	0.292	

Table 12: Side-to-Side Exploratory Instrumentation Data

5.5.2 Side-to-Side Variable Frequency Test

Single amplitude results from the Side-to-Side Variable Frequency Test are summarized in Table 13. No deficiencies or discrepancies were noted. Resonance was noted at 5 Hz.

Table Input Frequency	Table Input Amplitude	Table Input Amplitude	Top Right Front Corner	Q of A2	Weight Setting
(Hertz)	A1 (Gs)	A1 (in)	A2 (Gs)		
4	0.039	0.024	0.084	2.119	4
5	0.084	0.033	0.251	3.002	
6	0.106	0.029	0.269	2.538	
7	0.161	0.032	0.273	1.696	
8	0.179	0.027	0.255	1.425	
9	0.261	0.032	0.349	1.337	
10	0.295	0.029	0.295	1.000	
11	0.396	0.032	0.299	0.755	
12	0.463	0.031	0.268	0.579	
13	0.519	0.030	0.242	0.466	
14	0.623	0.031	0.243	0.390	
15	0.644	0.028	0.217	0.337	
16	0.531	0.020	0.209	0.394	2.75
17	0.519	0.018	0.182	0.351	
18	0.632	0.019	0.200	0.316	
19	0.685	0.019	0.198	0.289	
20	0.739	0.018	0.197	0.267	
21	0.820	0.018	0.204	0.249	
22	1.050	0.021	0.220	0.210	3.25
23	1.030	0.019	0.208	0.202	
24	1.180	0.020	0.235	0.199	
25	1.150	0.018	0.237	0.206	

Table 13: Side-to-Side Variable Instrumentation Data

5.5.3 Side-to-Side Endurance Test

Since two resonances were noted during the Exploratory and Variable testing; Endurance testing was conducted at frequencies of 5 and 11 Hz for one hour each. No deficiencies or discrepancies were noted. Results from the Endurance Test are summarized in Table 14. Side-to-Side testing dates and times are shown in Table 15.

Table Input Frequency	Table Input Amplitude	Table Input Amplitude	Top Right Front Corner	Q of A2	Weight Setting
(Hertz)	A1 (Gs)	A1 (in)	A2 (Gs)		
5	0.085	0.033	0.262	3.079	4.000
11	0.397	0.032	0.308	0.776	4.000

Table 14: Side-to-Side Endurance Instrumentation Data

Testing Timeline				
Test	Start Time	Start Date	End Time	End Date
Exploratory	10:53:00 AM	30-Mar-23	11:23:00 AM	30-Mar-23
Variable	11:26:00 AM	30-Mar-23	1:30:00 PM	30-Mar-23
Endurance 5 Hz	1:34:00 PM	30-Mar-23	2:34:00 PM	30-Mar-23
Endurance 11 Hz	2:35:00 PM	30-Mar-23	3:34:00 PM	30-Mar-23

Table 15: Side-to-Side Testing Dates and Times

6.0 DISPOSITION OF MATERIALS

Following the vibration test, the EUT and Test Fixture were removed from the vibration table and prepared for shock testing.

7.0 PERSONNEL PRESENT

Table 16 outlines the personnel present during the vibration test.

Name	Representing
Marcus Martin	NTS
Kevin Gray	NTS
Tristan Shaner	NTS

Table 16: Personnel Present

Attachment A
NTS Test Procedure

MIL-STD-167-1A TYPE I ENVIRONMENTAL VIBRATION

TEST PROCEDURE OF THE

VARISTAR SPRING ISOLATED CABINET

Purchase Order Number: 7098770S

Issue Date: 03 February 2023

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1.0 INTRODUCTION

1.1 Purpose

The purpose of this document is to provide the formal procedure to be used during MIL-STD-167-1A Type I Environmental Vibration testing of the Varistar Spring Isolated Cabinet, herein referred to as the Equipment Under Test (EUT), for Schroff, Inc.

1.2 Background

The EUT is planned for installation on U.S. Navy ships and requires Vibration Risk Mitigation Testing for Research and Development (R&D) purposes.

1.3 Scope

This procedure describes the activities to be performed during the pre-test period, the fixture and equipment installation on the vibration test machine, actual test operations, instrumentation setup, physical inspections, operational tests, and reporting.

1.4 Objective

The objective of the test series is to perform Vibration Risk Mitigation testing of the EUT in accordance with MIL-STD-167-1A.

2.0 APPLICABLE DOCUMENTS

2.1 Military Documents

MIL-STD-167-1A “Department of Defense Test Method Standard, Mechanical Vibrations of Shipboard Equipment (Type I – Environmental and Type II – Internally Excited),” dated 02 November 2005.

2.2 Commercial Documents

NTS Drawing No. PH00005037 “Vibe Plan for Testing the VAR Cabinet for Schroff”, dated 01 February 2023. (Attachment A)

Schroff Inc, Drawing No. 10630-049 “VAR CP MIL 2000HX600WX800D” Rev. A, dated 15 November 2022. (Attachment B)

3.0 ITEMS TO BE TESTED

3.1 Varistar Spring Isolated Cabinet

Table 1 includes a description of the EUT.

Model Number	10630-049
Overall Dimensions	86.79”H x 23.60”W x 39.56”D (w/ Isolators)
Center of Gravity (relative to mounting pad)	Geometric Center
Weight	1,014.13 lbs. (w/ isolators)
Power	N/A
Shock Isolators	Base, Qty. (4) Societec/Vibroynamics Wire Rope Sway, Qty. (2) Societec/Vibroynamics Wire Rope

Table 1: EUT Description

4.0 TEST REQUIREMENTS

4.1 Pre-Test Requirements

The following inspections, preparations, and documentation will be accomplished by NTS and Schroff, Inc. representatives:

- A NTS test engineer will be responsible for the proper conduct of testing.
- Prior to testing and between tests, a thorough visual examination of the test item will be conducted to locate any of the following:
 - Broken, loose, or deformed parts.
 - Cracked welds.
 - Other evidence of physical damage.
 - Any condition that could endanger equipment or personnel during further testing.
- Tighten all mounting hardware to correct tightness.
- Photograph the equipment to establish the pre-test condition.
- Note completion and results of visual and operational examination for final test report.

4.2 Installation

A NTS designed test fixture (Attachment A) will be utilized the interface the EUT with the Vibration Table. The EUT will attach to its test fixture using the following hardware: (Sway) quantity four (4) ½”-13 Grade 5 Hex Head Bolts (length to be determined at time of installation), four (4) ½”-13 Grade 5 Self-Locking Nuts, and four (4) ½” Flat Washers / (Base) quantity sixteen (16) 3/8”-16 Grade 5 Hex Head Bolts, sixteen (16) 3/8” Split Lock Washers, and sixteen 3/8” Flat Washers.. The test fixture(s) will then be bolted/clamped to the vibration table.

4.3 Test Weights

EUT.....	1,014.13 Pounds
Test Fixture	2,271.00 Pounds
 Total Weight on Test Machine.....	3,285.13 Pounds

4.4 Test Facility

Tests will be conducted at the facilities of NTS located at 3915 Sunnymeade Road in Rustburg, VA.

4.5 Test Equipment

Vibration Test Machine

Model No. RVH72-5000

Serial No. 466013

Manufactured by L.A.B. Corp.

4.6 Test Instrumentation

One accelerometer will be installed on the vibration table in the direction of excitation to ensure correct input displacement in accordance with MIL-STD-167-1A.

One (1) additional accelerometer will be installed on the EUT. Accelerometer responses on the EUT will be compared to the input accelerometer to determine resonances. Results will be documented in the test report. All instrumentation utilized will be calibrated in accordance with ISO/IEC 17025.

Gauge	Orientation	Location
A1*	Direction of Excitation	Table Input
A2*	Direction of Excitation	Top Right Front Corner

Table 2: Instrumentation Locations

5.0 TEST PROCEDURE

The EUT will be tested in each of the three mutually perpendicular axes, one at a time. All tests in one axis will be accomplished before proceeding to testing in another axis.

5.1 Mode of Operation

The EUT will not be energized or operational during the test series.

5.2 Exploratory Vibration Test

Each EUT will be subjected to vibration at discrete frequency increments of 1 Hz from 4 to 25 Hz at a single amplitude of 0.010±0.002 inches single amplitude. Each integral frequency shall be maintained for a minimum of 15 seconds.

5.3 Variable Frequency Test

Each EUT will be subjected to vibration at discrete frequency increments of 1 Hz from 4 to 25 Hz at a table amplitude as listed in Table 4. Each integral frequency shall be maintained for a minimum of 5 minutes.

Table 3: Displacement of Vibration Table

Frequency Range (Hz)	Single Amplitude Displacement (inches)
4 to 15	0.030 ± 0.006
16 to 25	0.020 ± 0.004

5.4 Endurance Vibration Test

Endurance test frequencies will be selected from the candidate list of endurance test frequencies developed during exploratory and variable frequency testing. The EUT shall be vibrated for a total period of at least 2 hours at the frequency determined to most seriously affect the structural integrity of the equipment. Selection of endurance test frequencies will be in accordance with Appendix A of MIL-STD-167-1A. In cases where there are multiple response prominence frequencies selected, the duration of vibration testing at each frequency shall be in accordance with Table II of MIL-STD-167-1A. The equipment shall be vibrated in accordance with the amplitudes identified in Table 4, above.

5.5 Acceptance Criteria

This test will be conducted for Vibration Risk Mitigation/Research and Development purposes only. For Qualification testing, the EUT would be required to be operational and meet the acceptance criteria presented in Section 5.1.2 of MIL-STD -167-1A, the test item will be considered to have passed the Type I vibration test series based on the following criteria:

The equipment shall withstand the tests specified in Section 5 of this procedure without a major failure. A major failure can be classified as the following:

- Failure that causes non-operation or malfunction of the equipment for a long period of time.
- Conditions that present a hazard to personnel or other equipment.
- Repetitive loosening of hardware or installed components.

Minor damage or distortion will be permitted during the test providing such damage or distortion does not in any way impair the ability of the equipment to perform its principal function. (In general, minor failures are those which can be easily corrected without the use of special tools, and do not cause non-operation or malfunction of the equipment for a long period.)

The equipment shall continue to perform its principal function before and after the test, to include successful completion of pre- and post-vibration functional and operational testing without degradation of performance.

In the event damage is noted during Type I vibration testing, the authorized Schroff, Inc. representative will direct one of the following actions:

If the damage is minor, (i.e., does not violate acceptance criteria), then:

- (a) note the condition and continue testing, or
- (b) make a repair or modification, and then continue testing.

If the damage is major, (i.e., does violate acceptance criteria), then:

- (a) temporarily postpone testing while the failed unit is being modified or repaired. Once the unit has been modified or repaired, then start testing operations for that item all over. Or
- (b) discontinue all testing operations until a suitable re-qualification program is developed and approved.

Schroff, Inc. will be responsible for notifying the approval authority of any damage, modification, or repairs and for obtaining acceptance to continue testing without starting over following minor damage.

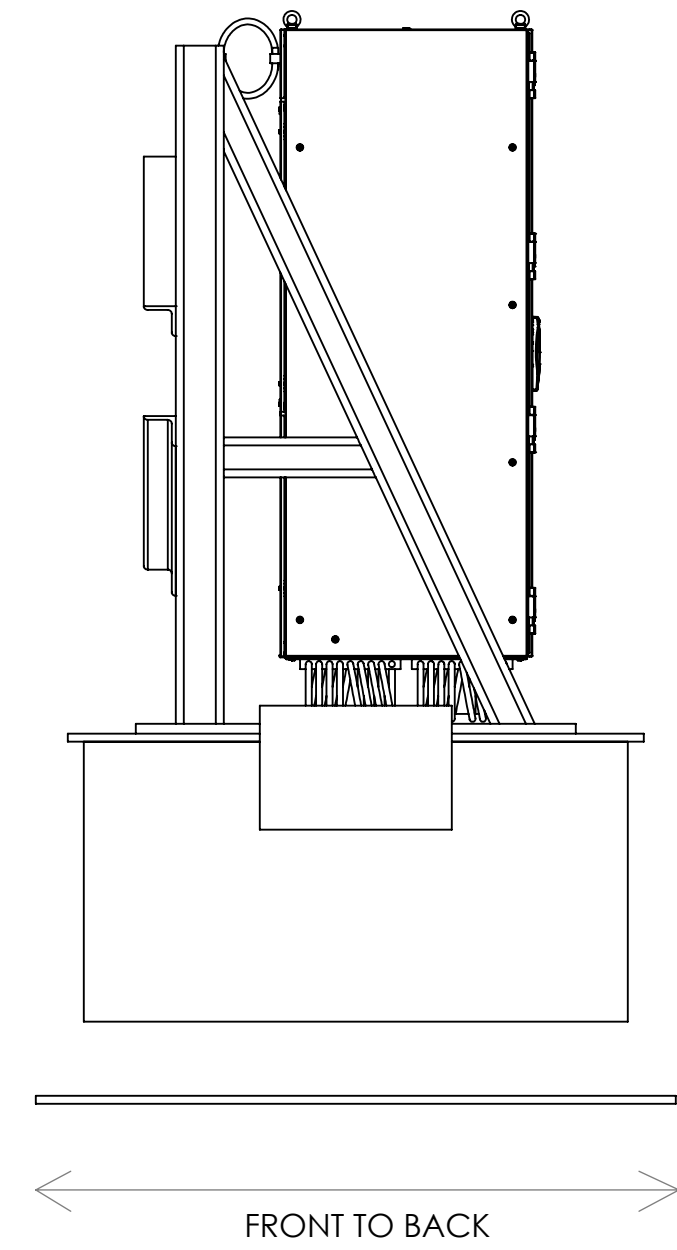
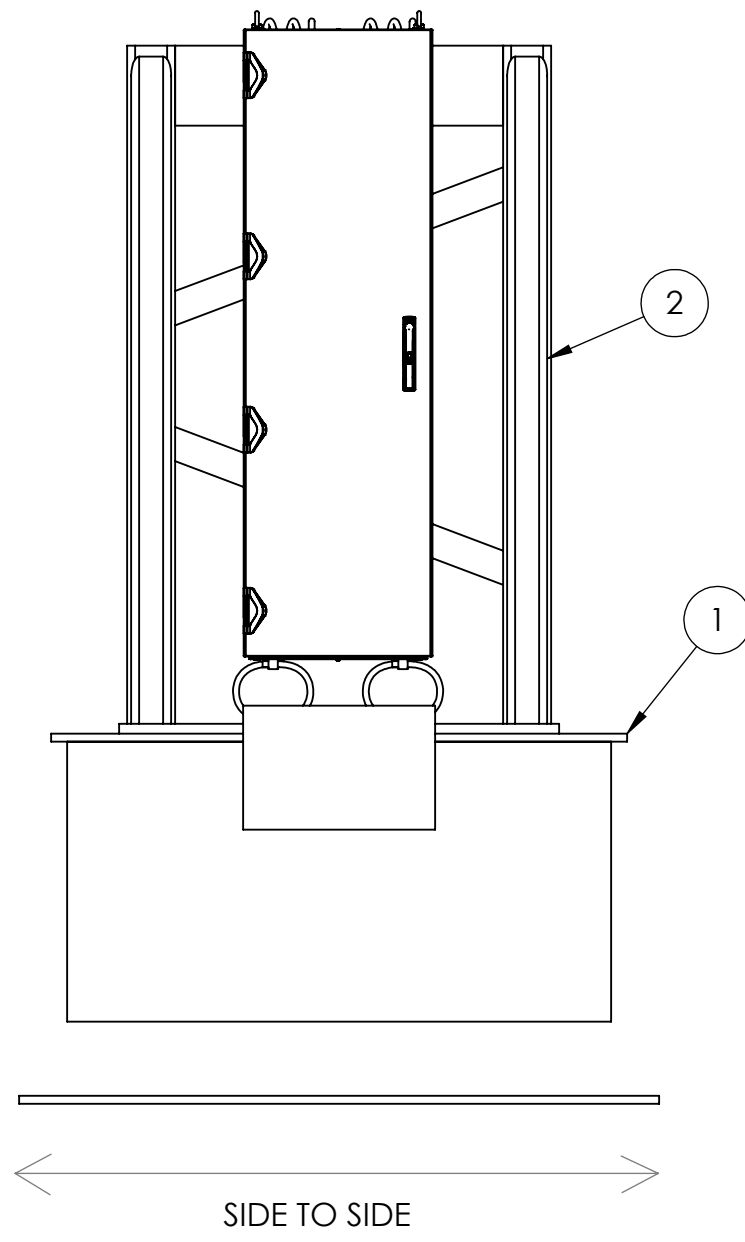
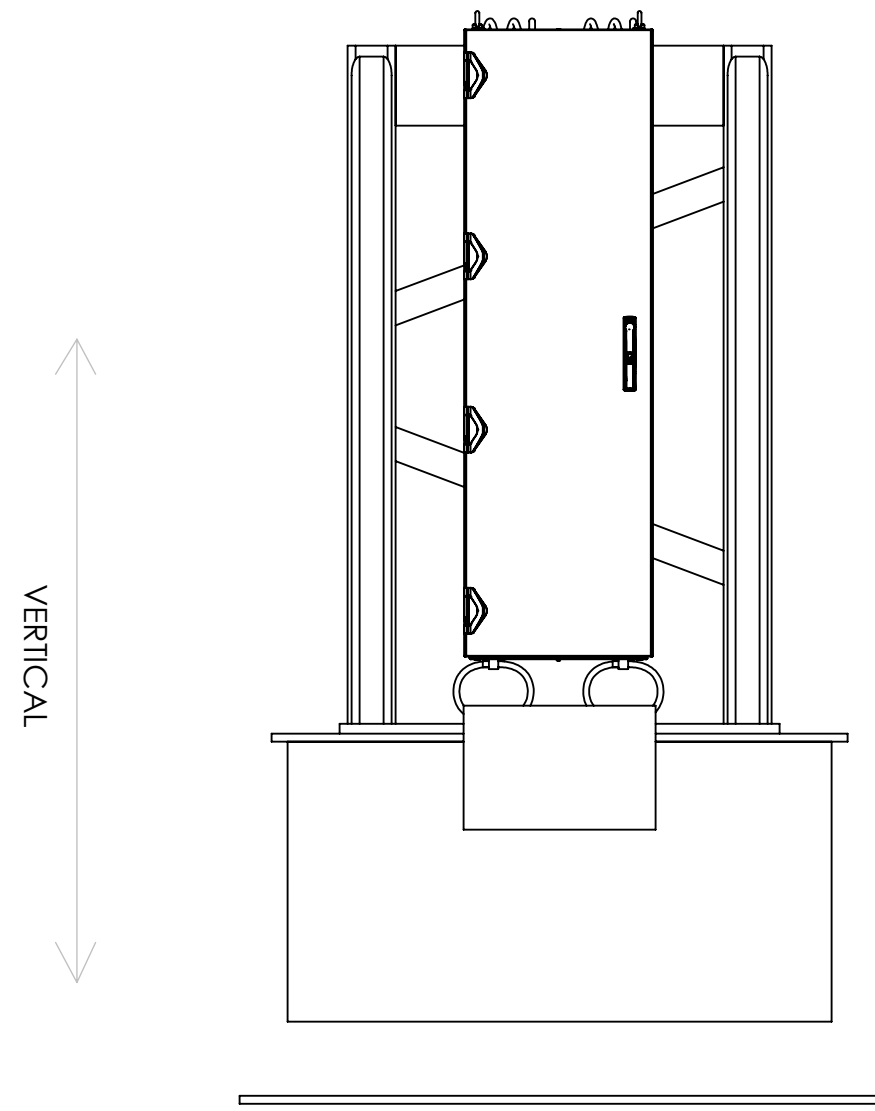
5.6 Disposition of Test Item

Upon completion of the vibration test and following all inspections, photography, and documentation, the EUT shall be removed from the vibration table and staged for follow on testing, as directed by Schroff, Inc.



5.7 Test Report

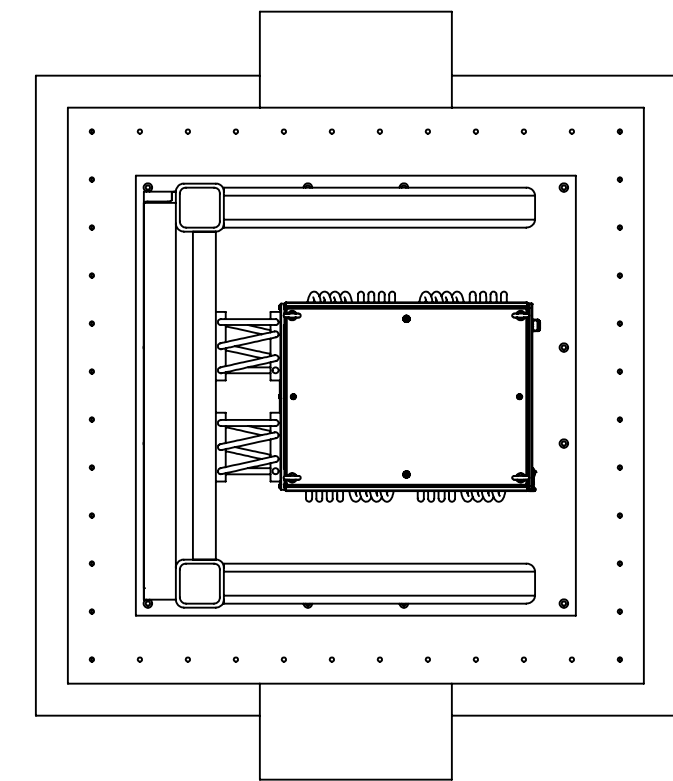
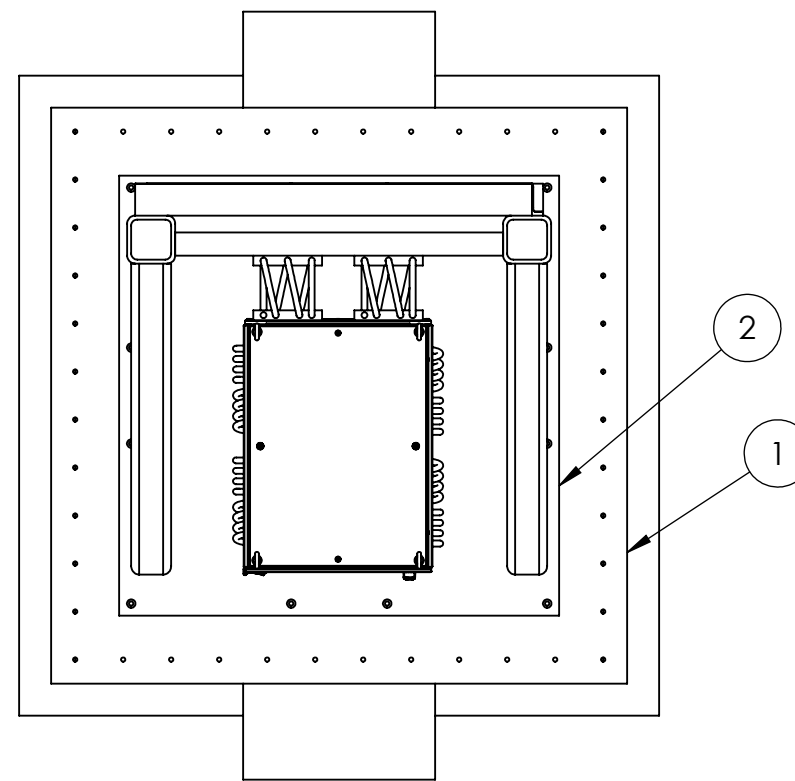
NTS will prepare and provide a digital copy of the vibration test report in accordance with MIL-STD-167-1A. The report will include completed data sheets, comments, photographs, and drawings as needed to define and document areas and details of damage, impact on mission capabilities, as well as needed repairs and modifications. The report will document any modification of the test item accomplished prior to and subsequent to each test. The report will be prepared within 30 working days following the completion of testing.

Attachment A:
NTS Test Fixture Drawing



GENERAL NOTES

- NO MATERIAL SUBSTITUTIONS MAY BE MADE WITHOUT PRIOR APPROVAL FROM NTS.
- FABRICATING FACILITY SHALL NOT DRILL MOUNTING BOLT HOLE(S) IN TEST FIXTURE FOUNDATION(S). NTS WILL TEMPLATE EXACT SIZE AND LOCATION OF MOUNTING BOLTS FROM EQUIPMENT RECEIVED AND DRILL MOUNTING BOLT HOLES AT TEST SITE
- TOP OF MOUNTING SURFACE OF ALL FOUNDATIONS TO BE INSTALLED PARALLEL TO INNER-BOTTOM OF FSP AND FLAT IN A HORIZONTAL PLANE WITHIN $\pm 1/8"$. TEST FACILITY TO USE SHIM STOCK TO ACHIEVE FINAL TOLERANCE.
- WHERE AN "ABOUT" DIMENSION IS CALLED OUT ON THIS DRAWING, EXACT DIMENSION SHALL BE DETERMINED BY FABRICATING FACILITY FROM A SHOP LAY-OUT.
- ALL SNIPES TO BE 1/2" X 1/2" UNLESS OTHERWISE NOTED.
- GRIND SMOOTH ALL SHARP CORNERS AND ROUGH EDGES THAT MAY CAUSE INJURIES TO PERSONNEL OR DAMAGE EQUIPMENT.
- UNLESS OTHERWISE NOTED, ALL WELDS SHOWN ARE TYPICAL FOR SIMILAR CONDITIONS. FILLET WELDS SHALL BE EXTENDED AROUND THE EDGES OF MEMBERS TO FORM CLOSED LOOPS.
- MOLDED LINE OF MATERIAL THICKNESS INDICATED, THUS  (MATERIAL CENTERED) OR  (MATERIAL ON ONE SIDE).
- FOR INTERPRETATION OF:
WELDING SYMBOLS, SEE MIL-STD-22D
ABBREVIATIONS, SEE MIL-STD-12D
DIMENSIONING & TOLERANCING, SEE ANSI Y14.5M-1992
- ADDITIONAL ABBREVIATIONS:



ITEM NO.	QTY.	PART NO.	MATERIAL	DESCRIPTION	SPEC.	WEIGHT
1	1	Vibration Table	Varies	Existing Structure	N/A	N/A
2	1	VAR Cabinet Test Assembly	Varies	See Sheet 2	N/A	3285

PROJECT # PH00005037 NOTES:

QTY_1_

1. DIMENSIONS APPLY AFTER FINISHING

3rd ANGLE PROJECTION
UNLESS OTHERWISE SPECIFIED
INTERPRET DRAW PER ANSI Y14.5
TOLERANCES
.XXX \pm .005
.XX \pm .01
.X \pm .03
\angle \pm .5°
125 ALL SURFACES
BREAK ALL SHARP EDGES

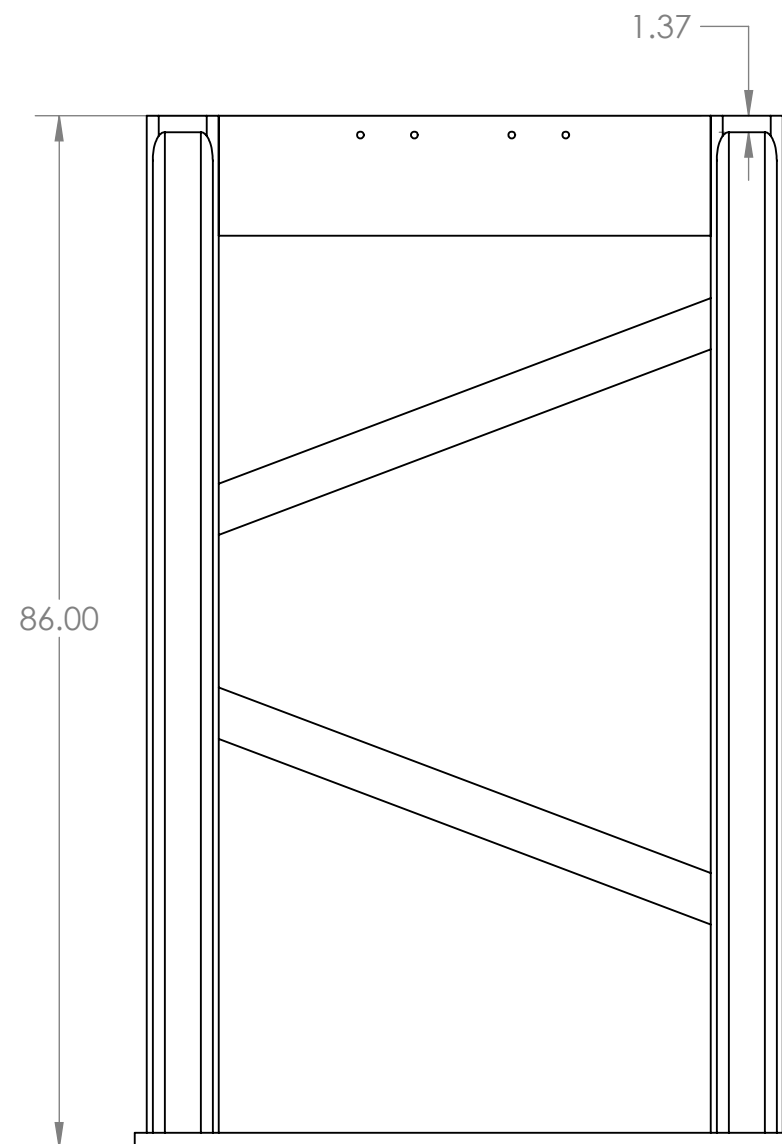
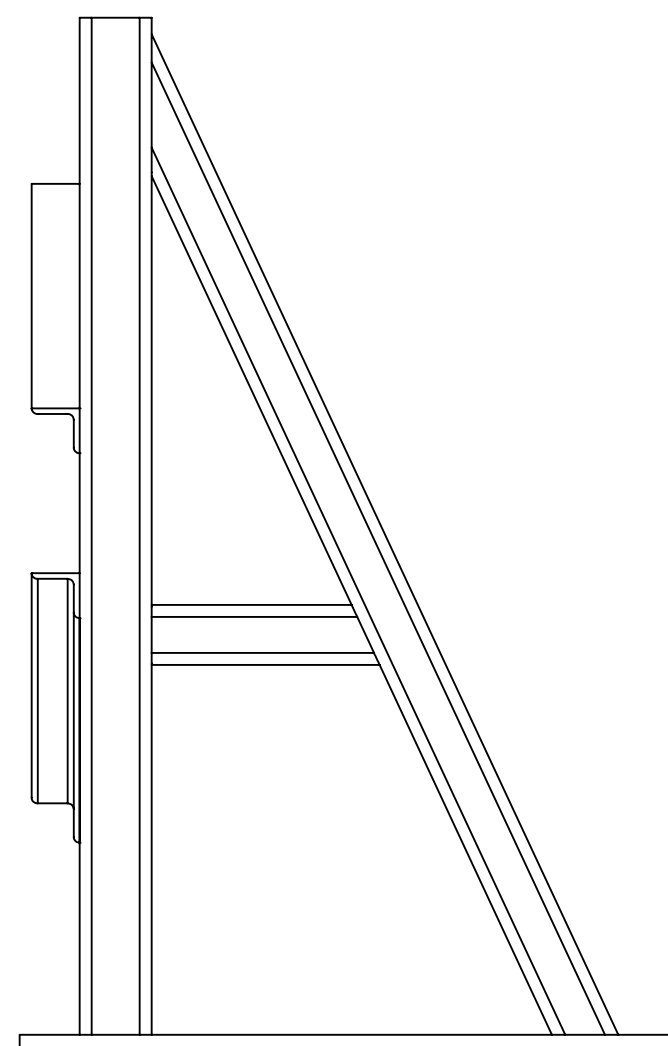
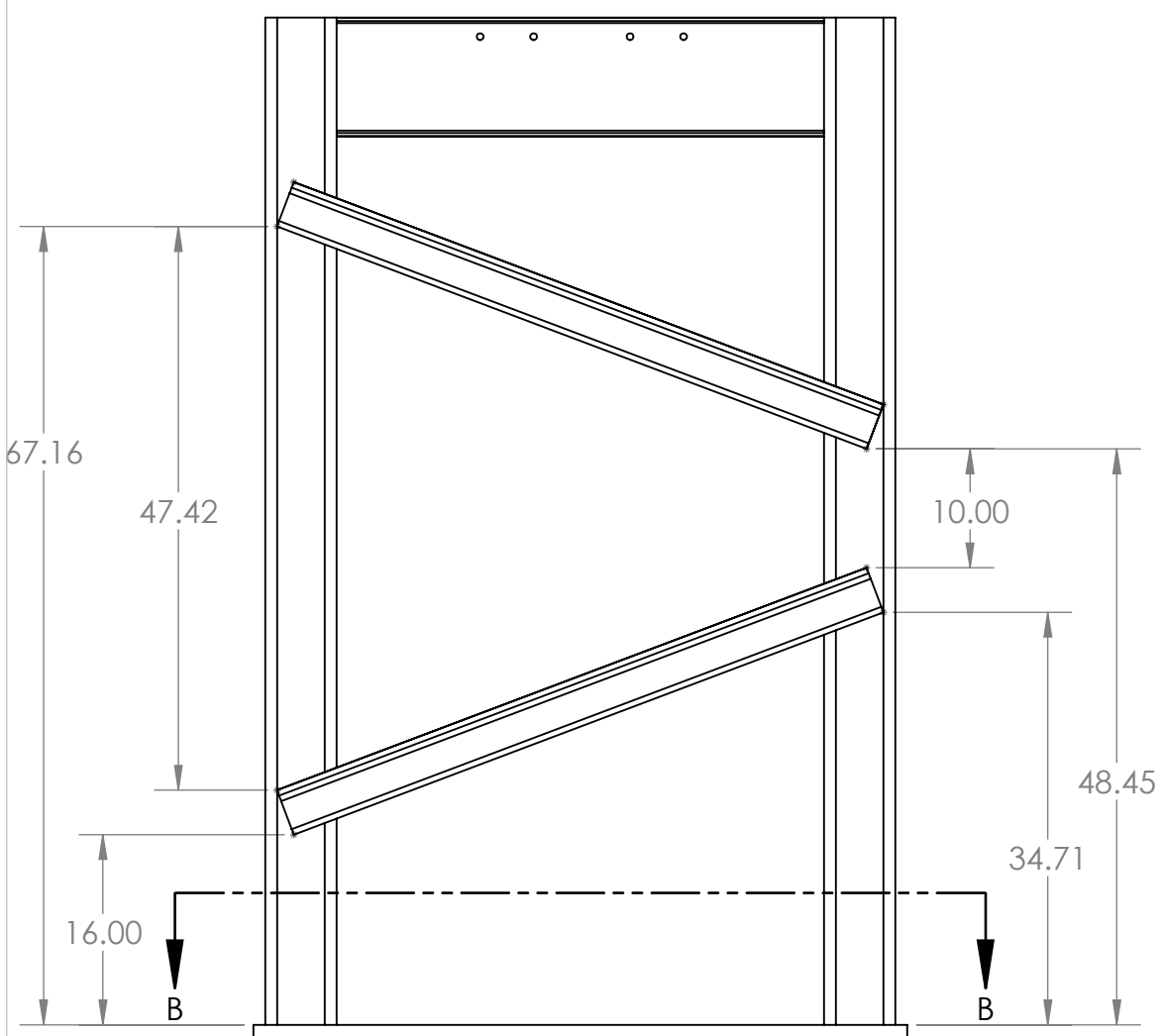
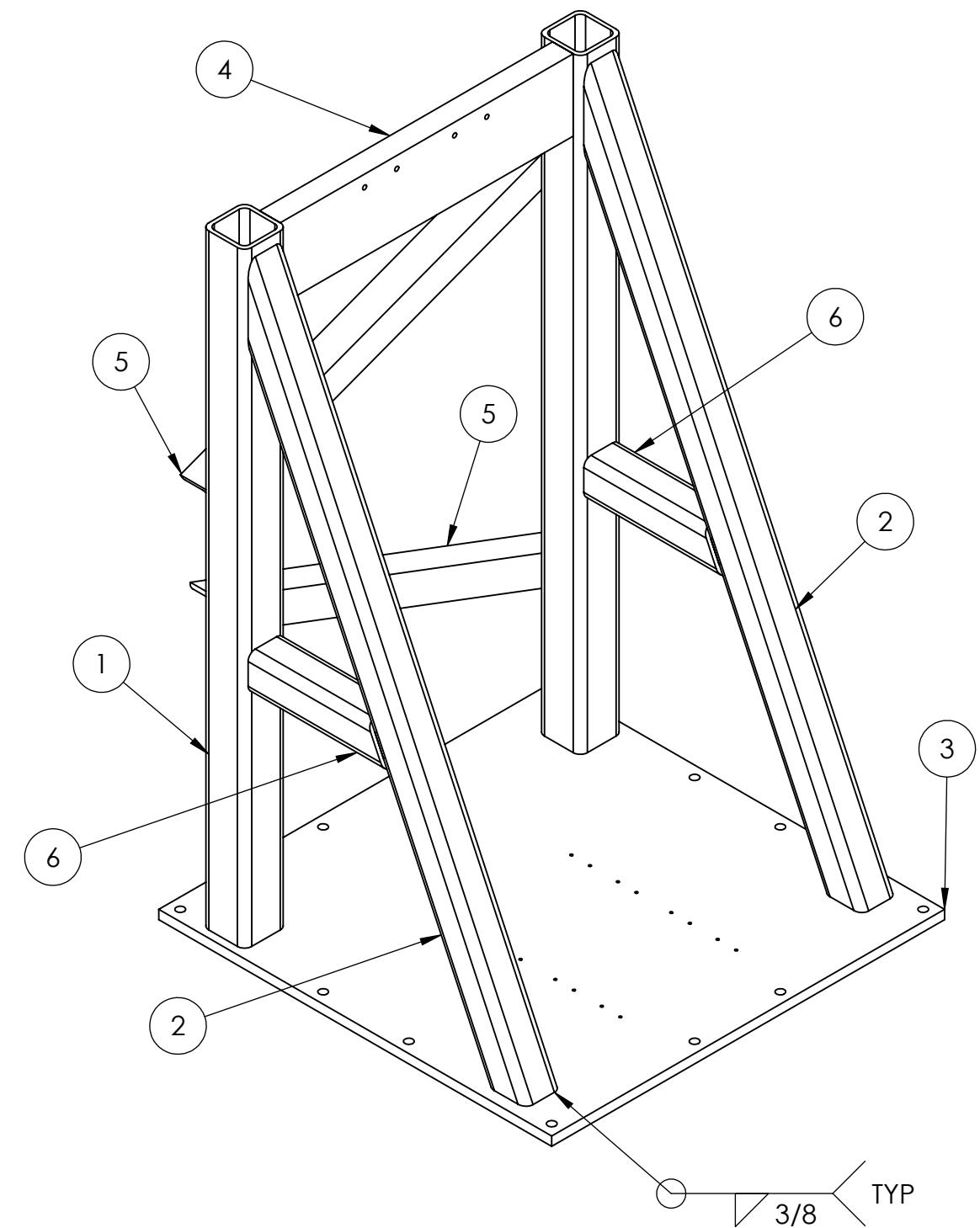
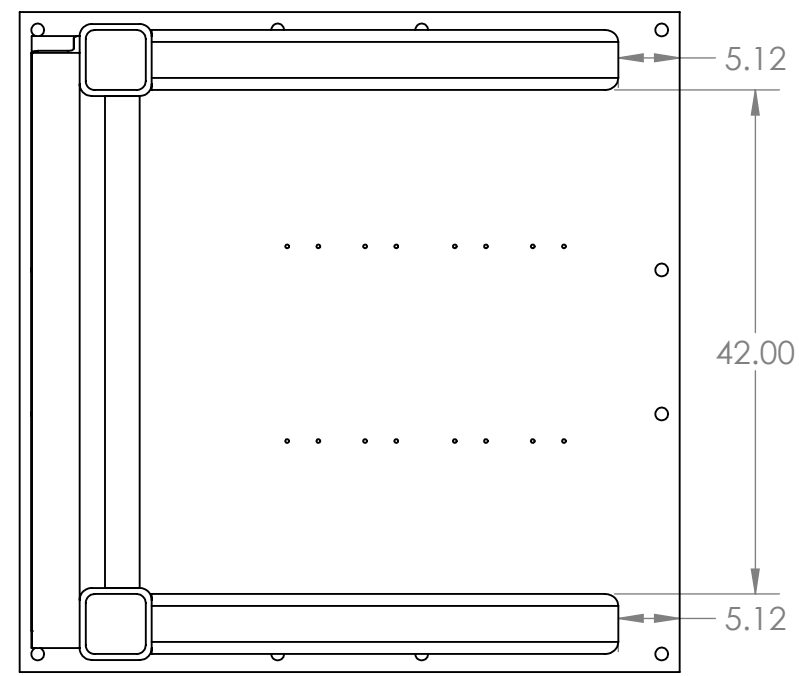
**NATIONAL TECHNICAL SYSTEM
RUSTBURG DIVISION**

NTS

PROPRIETARY INFORMATION

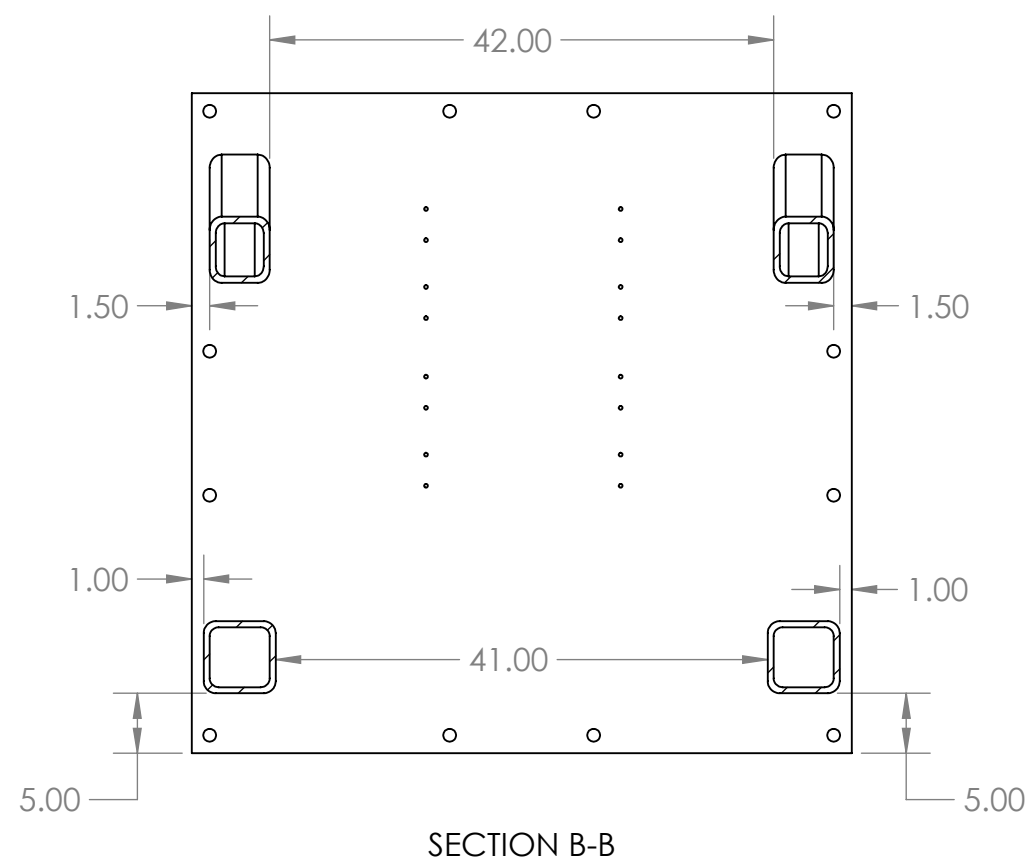
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PHONE (434) 846-0244 * FAX (434) 846-2197

NO.	REV	QTY	REVISION		DATE	NAME
DES.	01-Feb-23	WRK	MATERIAL	NA	None	VIBE Plan for Testing the VAR Cabinet for Schroff
DRAWN	01-Feb-23	WRK	FINISH	FINISH	SCALE	
CHECK			STOCK DIM.	STOCK DIM		PART NO.
CHECK						DRAW. NO.
DRAWING SHEET SIZE			C			PH00005037



ITEM NO.	QTY.	PART NO.	MATERIAL	DESCRIPTION	SPEC.	WEIGHT
1	2	Vertical Tubing	Steel	See Sheet 6	A500	508
2	2	Kicker Tubing	Steel	See Sheet 6	A500	416
3	1	55x55 BASE PLATE	Steel	See Sheet 5	A36	1068
4	1	C 10 x 25 Channel	Steel	See Sheet 6	A36	81
5	2	Angle	Steel	See Sheet 6	A36	111
6	2	Kicker Tubing Support	Steel	See Sheet 6	A500	87

PROJECT # PH00005037 NOTES:
 QTY_1_ 1. DIMENSIONS APPLY AFTER FINISHING



3rd ANGLE PROJECTION
 UNLESS OTHERWISE SPECIFIED
 INTERPRET DRAW PER ANSI Y14.5
 TOLERANCES
 .XXX ± .005
 .XX ± .01
 .X ± .03
 ± .5°
 125 / ALL SURFACES
 BREAK ALL SHARP EDGES

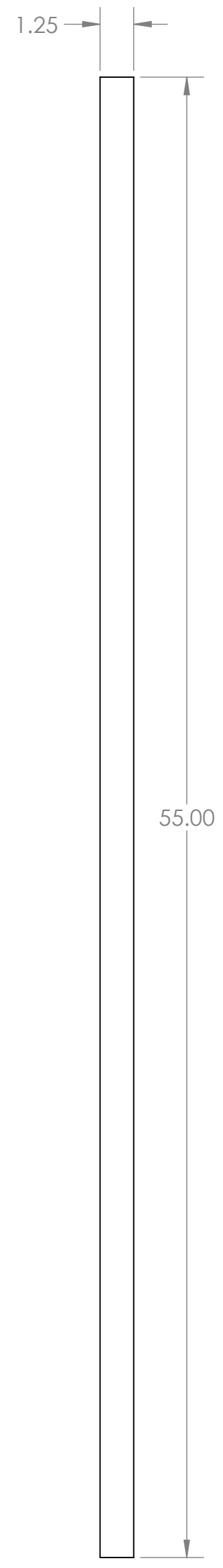
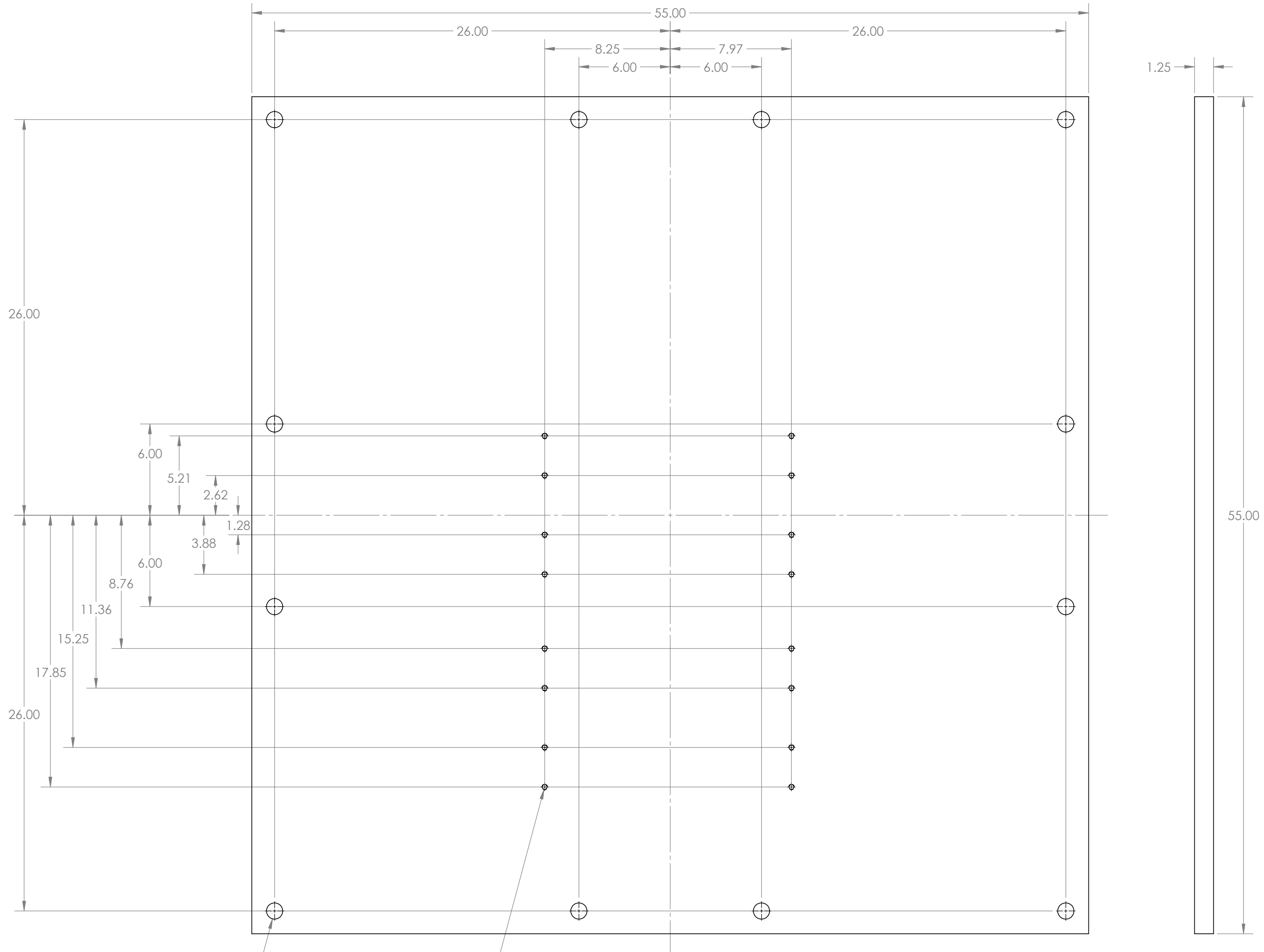
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 PHONE (434) 846-0244 * FAX (434) 846-2197

NO.	REV	QTY	REVISION	DATE	NAME
DES.	01-Feb-23	WRK	NA		
DRAWN	01-Feb-23	WRK	None		
CHECK			FINISH		
CHECK			STOCK DIM		
DRAWING SHEET SIZE			C		
			SCALE	DESCRIPTION	
				VAR Cabinet Test Fixture	
				PART NO.	
				PH00005037	
				DRAW. NO.	
				3/5 SHEET	



Note:
Template all mounting holes
from equipment as a guide.

12X ϕ 1.06 THRU ALL

16X ϕ .31 THRU ALL
3/8-16 UNC THRU ALL

PROJECT # PH00005037
QTY_1

NOTES:
1. DIMENSIONS APPLY AFTER FINISHING

3rd ANGLE PROJECTION

UNLESS OTHERWISE SPECIFIED

INTERPRET DRW PER ANSI Y14.5

TOLERANCES

.XXX \pm .005

.XX \pm .01

.X \pm .03

\angle \pm .5°

125 ALL SURFACES

BREAK ALL SHARP EDGES

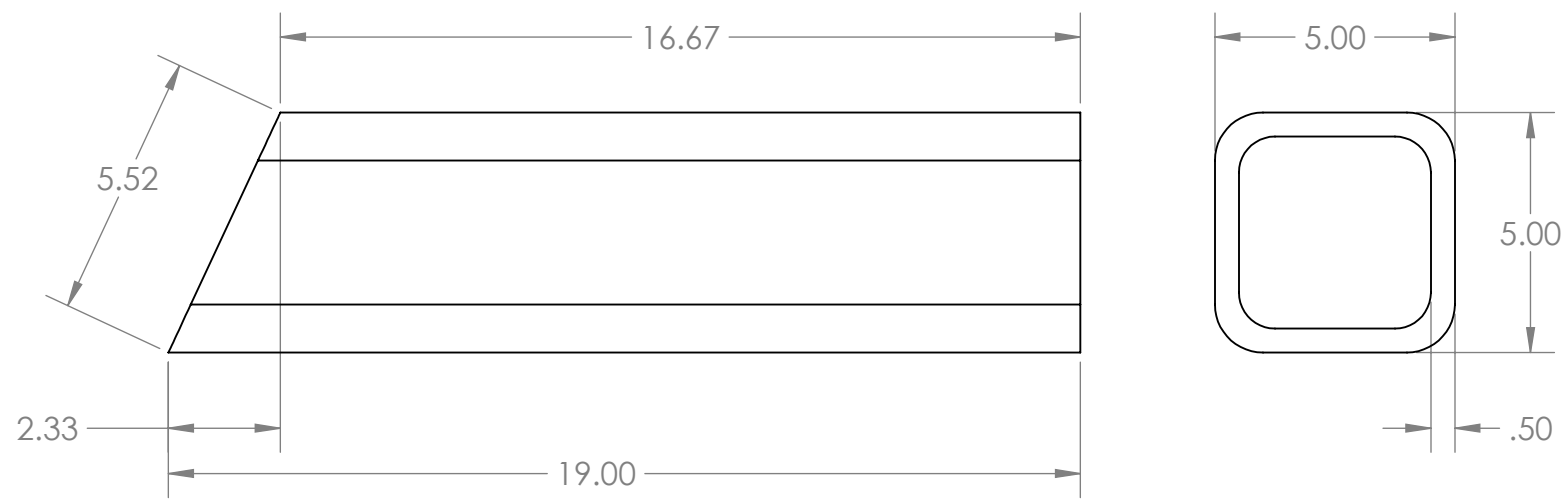
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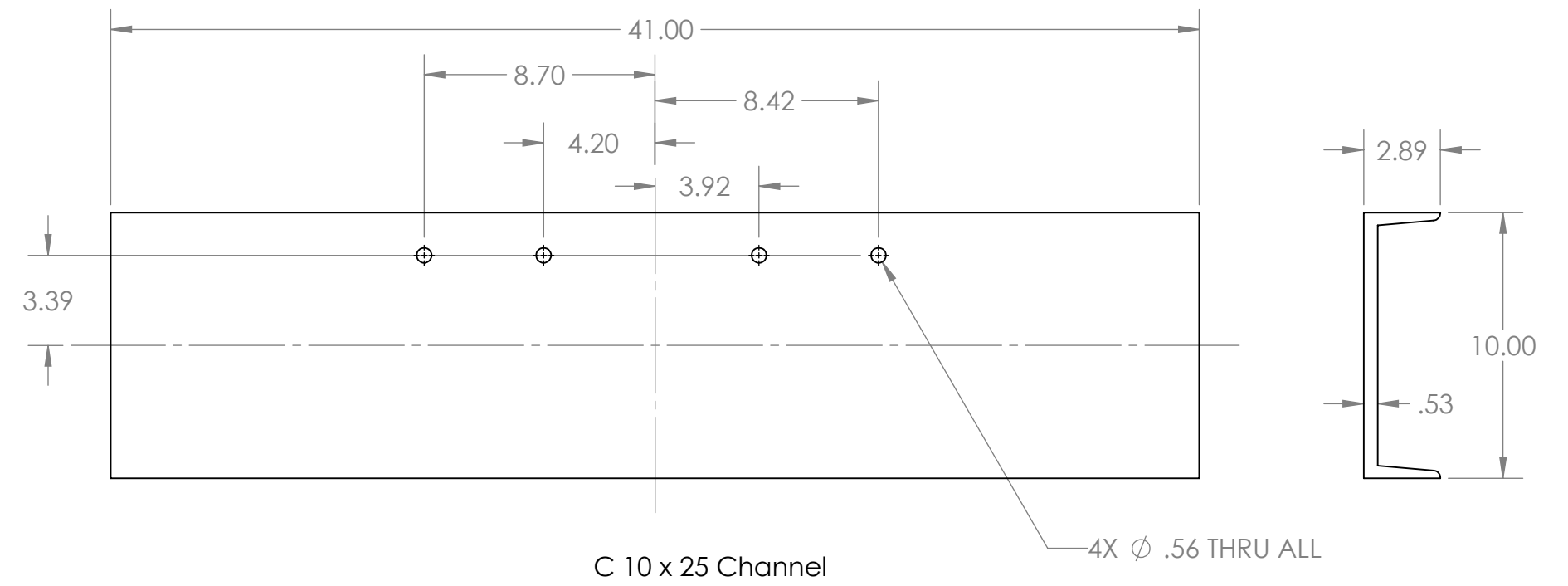
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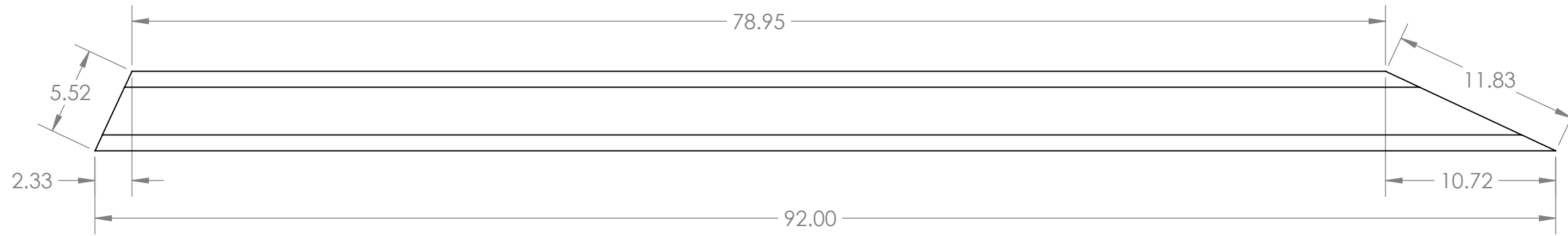
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DES.	01-Feb-23	WRK	NA	None	55x55 Base Plate
DRAWN	01-Feb-23	WRK	FINISH	SCALE	DESCRIPTION
CHECK			STOCK DIM		PART NO.
CHECK					DRAW. NO. PH00005037
DRAWING SHEET SIZE	C				SHEET 4/5



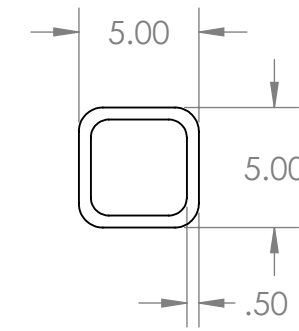
Kicker Tubing Support



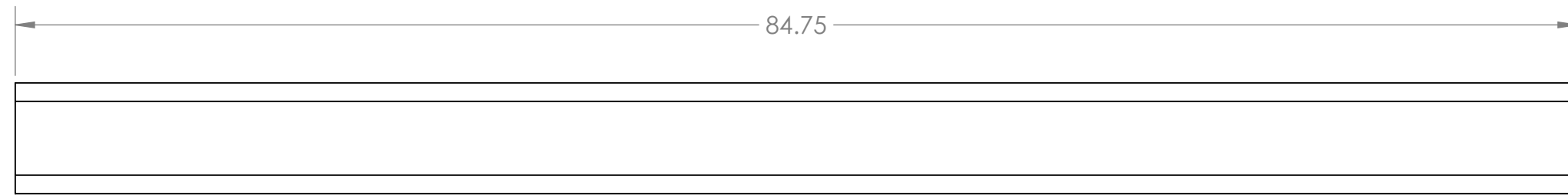
C 10 x 25 Channel



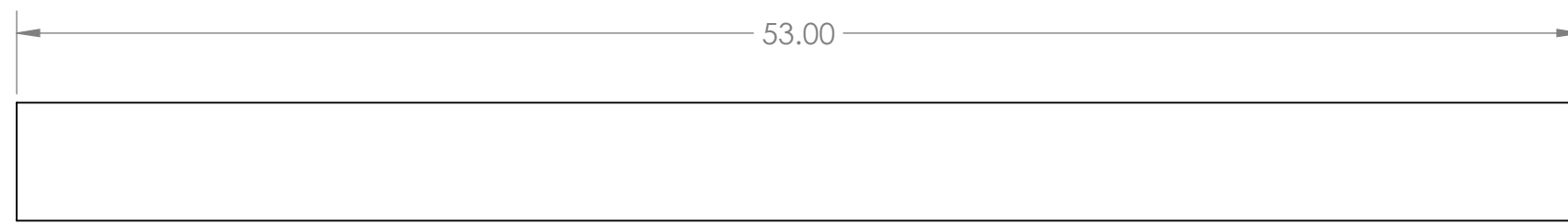
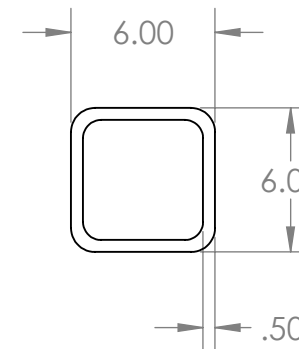
Kicker Tubing



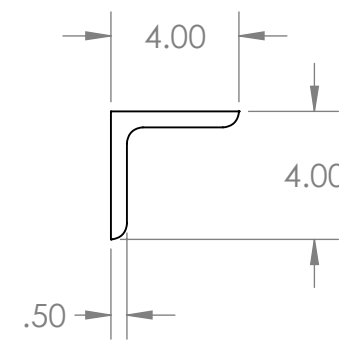
Note:
Template all mounting holes
from equipment as a guide.



Vertical Tubing



Angle



PROJECT # PH00005037
QTY_1

NOTES:
1. DIMENSIONS APPLY AFTER FINISHING

3rd ANGLE PROJECTION
UNLESS OTHERWISE SPECIFIED
INTERPRET DRAW PER ANSI Y14.5
TOLERANCES
.XXX ± .005
.XX ± .01
.X ± .03
∠ ± .5°
125 ALL SURFACES
BREAK ALL SHARP EDGES

NATIONAL TECHNICAL SYSTEM
RUSTBURG DIVISION

NTS

PROPRIETARY INFORMATION

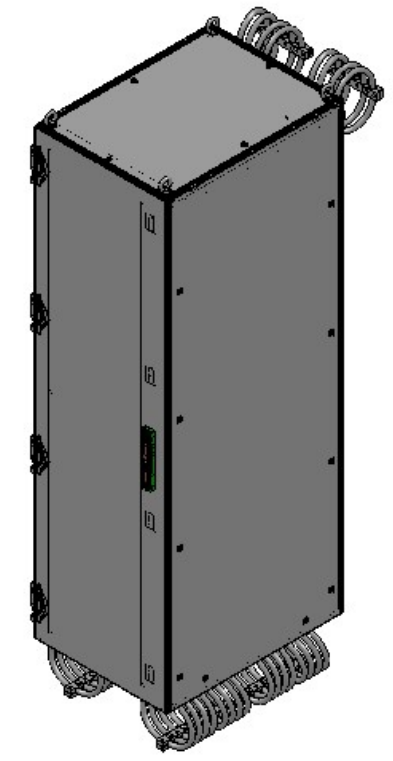
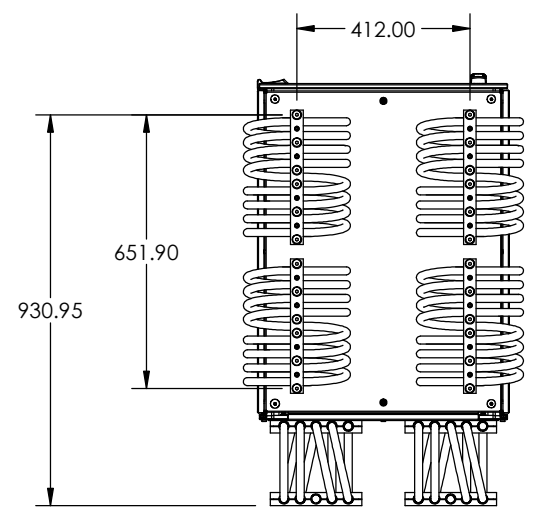
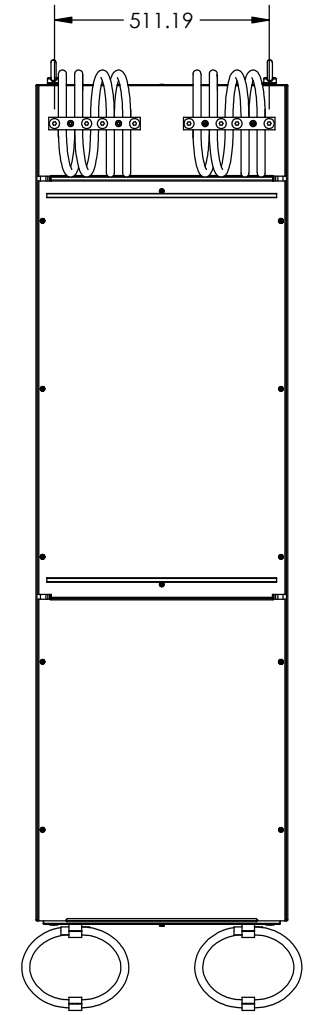
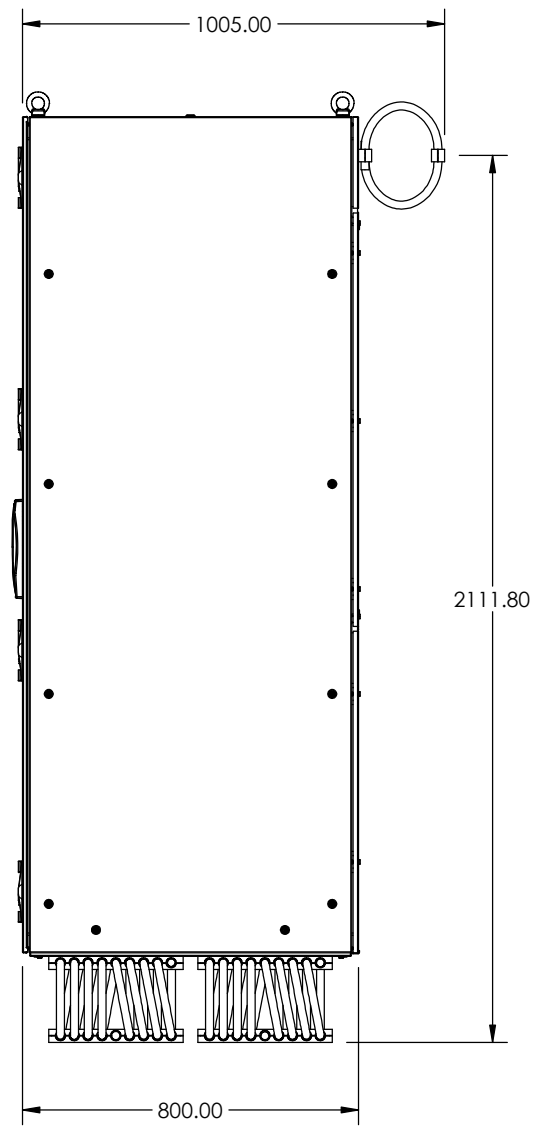
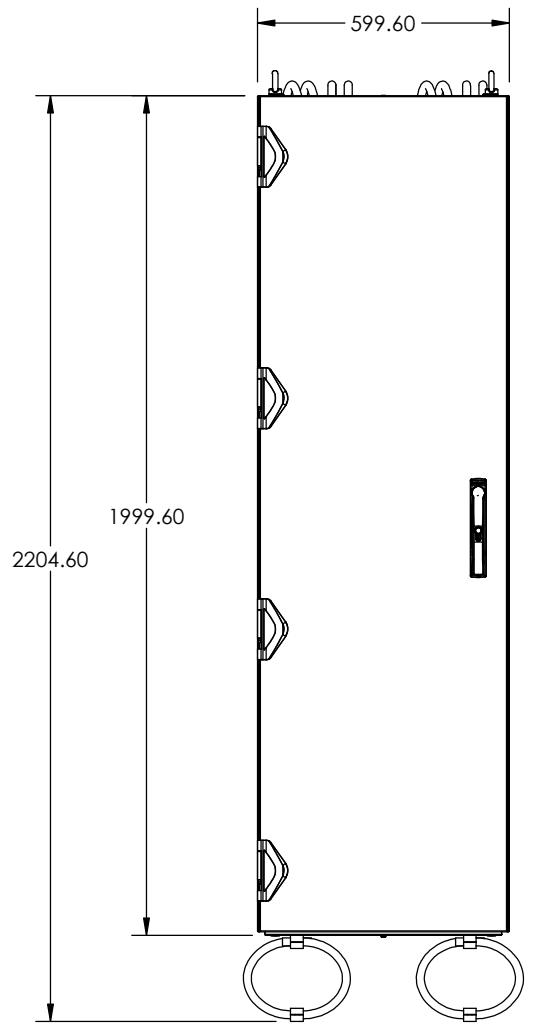
3915 Sunnymeade Rd. Rustburg, VA 24588
PHONE (434) 846-0244 * FAX (434) 846-2197

NO.	REV	QTY	REVISION	DATE	NAME
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CHECK			STOCK DIM		PART NO.
CHECK					DRAW. NO. PH00005037
DRAWING SHEET SIZE	C				SHEET 5/5

Attachment B:
Schroff EUT Drawing

THIS DOCUMENT CONTAINS PROPRIETARY INFORMATION WHICH MAY NOT BE DISCLOSED TO OTHERS, REPRODUCED OR USED WITHOUT AUTHORITY FROM THE PROPRIETOR.

REVISION HISTORY				
REV	DESCRIPTION	INC BY	DATE	APPROVED
-	-	S.Barrett	11/15/22	D.Fehr



TOLERANCE (UNLESS OTHERWISE SPECIFIED)					
DIMENSION SIZE = Xmm	0	0.0	0.00	0.000	
0.0 < X <= 10	±1	±0.4	±0.20	±0.100	
10 < X <= 100	±2	±0.5	±0.40	±0.200	
100 < X <= 600	±4	±0.7	±0.50	±0.300	
600 < X	±5	±1.0	±0.70	±0.400	

ALL DIMENSIONS mm[INCH]
THIRD ANGLE PROJECTION

COSMETIC APPEARANCE
MAX CLASS
MIN CLASS

APPROVALS		DATE
DESIGNED BY:	S.Barrett	11/15/22
DRAWN BY:	S.Barrett	11/15/22
CHECKED BY:	D.Fehr	11/15/22
RESPONSIBLE ENG:	S.Barrett	11/15/22
PROJECT/CUSTOMER		Schroff
FILE NAME	10630-049_WAR	

Schroff®

TITLE
**VAR CP MIL
2000HX600WX800D**

SIZE	CAGE CODE	DWG NO.	REV
D	62559	10630-049	A
SCALE	1:9	WEIGHT	N/A
SHEET		1 OF 1	

DO NOT SCALE DRAWING

DESIGN AUTHORITY
WARWICK

MATERIAL
SEE NOTES

FINISH
SEE NOTES

F
E
D
C
B
A

F
E
D
C
B
A