

**MIL-DTL-901E SHOCK TEST REPORT OF THE
VARISTAR SPRING ISOLATED CABINET
PERFORMED ON THE
DECK SIMULATING SHOCK MACHINE (DSSM)**

Purchase Order Number: 709877OS

Issue Date: 06 April 2023

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Warwick, Rhode Island 02886

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SIGNATURES

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Date: _____

REVISIONS

Revision	Reason for Revision	Date
Rev.00	Initial Release	04 April 2023
Rev.01	Correct EUT weight in Table 1 and 2	06 April 2023

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1.0 INTRODUCTION

1.1 Purpose

This test report documents the requirements, responsibilities, and actions accomplished by the Rustburg Division of NTS Technical Systems during the Deck Simulating Shock Machine (DSSM) shock test 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 Shock Risk Mitigation Testing for Research and Development (R&D) purposes.

1.3 Scope

This report describes the activities performed during the pretest period, the fixture and machinery installation on the DSSM, instrumentation setup, physical inspections, and reporting.

1.4 Objective

The objective of this test was to perform Shock Risk Mitigation testing on the EUT in accordance with MIL-DTL-901E, Class II, Vertical Axis Specified requirements for a near-miss explosion.

2.0 APPLICABLE DOCUMENTS

2.1 Military Documents

MIL-DTL-901E “Detail Specification Shock Tests, H.I. (High Impact) Shipboard Machinery, Equipment and Systems, Requirements for”, dated 20 June 2017

2.2 Commercial Documents

NTS Test Procedure No. TP-PH00005037 “MIL-DTL-901E Medium Weight Deck Simulating Shock Test Procedure of the Varistar Spring Isolated Cabinet” Rev.01, dated 30 March 2023. (Attachment C)

3.0 ITEM 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	1,565.00 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 Shock Grade

Grade A

4.2 Equipment Class

Class II

4.3 Shock Test Type

Type A

4.4 Test Category

Medium Weight Deck Simulating Shock Testing (MWDSST)

4.5 Mounting Location

Deck

4.6 Mounting Plane Aboard Ship

Base and Back

4.7 Mounting Orientation Aboard Ship

Vertical Axis Specified

4.8 Shock Test Acceptance Criteria

This test was conducted for Shock Risk Mitigation/Research and Development purposes only. For Qualification testing, the EUT would be required to be operational and meet MIL-DTL-901E requirements for Grade A and/or Grade B items. The EUT will be considered to have passed/failed the shock test series by meeting the criteria for Grade A items, described in MIL-DTL-901E Section 3.1.10.1, and summarized below:

- No portion of the test item, which may be considered a hazard to personnel or other Grade A systems, breaks or comes adrift.
- Minor physical damage to the tested items, such as small cracks; minor yielding of structure, out-of-tolerance clearances, and similar damage shall not be cause for shock test disapproval unless such damage causes unacceptable impairment of equipment

performance, results in a hazard to personnel or other Grade A systems or causes/results in substantially shortened equipment useful life.

- Tested item shall not demonstrate a potential for fire hazards. Any evidence of electrical short, release of flame, smoke or sparks shall be cause for failure.
- The equipment continues to perform its principal function, without physical damage or excessive leakage, during and following each shot. The proper operation of the test item will be verified by successfully completing the operational test procedures.
- The EUT must successfully complete all operational verification tests in accordance with customer's operational report.

In the event evidence of physical or operational damage is noted, Schroff, Inc. shall direct one of the following actions after consultation with the shipbuilder and Navy representatives:

- Note conditions and continue testing if the damage is not functional or is not a hazard to personnel.
- Make a temporary fix and continue testing.
- Make a permanent fix. Remove the equipment item and temporarily postpone testing until the unit is repaired or modified.
- Discontinue testing operations.
- Customer will be responsible for notifying the Program Office at each company and resolving any instances of damage, modification, or repair.
- Photograph any indications of damage, and if testing is continued photograph the same location after test for post-event comparison.

Mounting fasteners may be tightened to compensate for seating of mating surfaces after the first shot only. When the acceptance criteria are violated after completion of a drop series during medium weight deck simulating shock testing of the item, and corrective design modifications are made, drops of the maximum drop height for those series must be repeated. For medium weight deck simulating shock testing, the maximum drop height in each direction and each frequency must be repeated in the retest for each operating condition.

4.9 Method of Mounting

A test fixture fabricated in accordance with NTS Drawing No. PH00005037 was used to interface the EUT with the DSSM for both the Shipboard and Rotated axis (Photographs 1 and 2, respectively). 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 attached to the DSSM cage using Qty. twelve (12) 1-8 Grade 5 Hex Head Bolts, flat and lock washers.



Photograph 1: EUT on DSSM for the Shipboard Axis



Photograph 2: EUT on DSSM for the Rotated Axis

4.10 Mode of Operation

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

5.0 TEST METHOD

5.1 Test Facility

The MWDSST was conducted at the Rustburg Division of NTS Technical Systems. This test facility is approved for testing in accordance with NAVSEA Letter 9072 Ser 05P/301 dated 21 SEP 2018.

5.2 Test Series

The test series was conducted in accordance with MIL-DTL-901E and NTS Test Procedure TP-PH00005057-DSSM Rev.01 (Attachment C) using the DSSM located at the facilities of NTS Technical Systems in Rustburg, VA.

5.3 Exceptions to MIL-DTL-901E

None.

5.4 DSSM-Borne Weight

Equipment Installed	Weight in Pounds
EUT	1,565.00
Test Fixture	2,271.00
Total Weight on the DSSM	3,836.00

Table 2: DSSM-Borne Weight

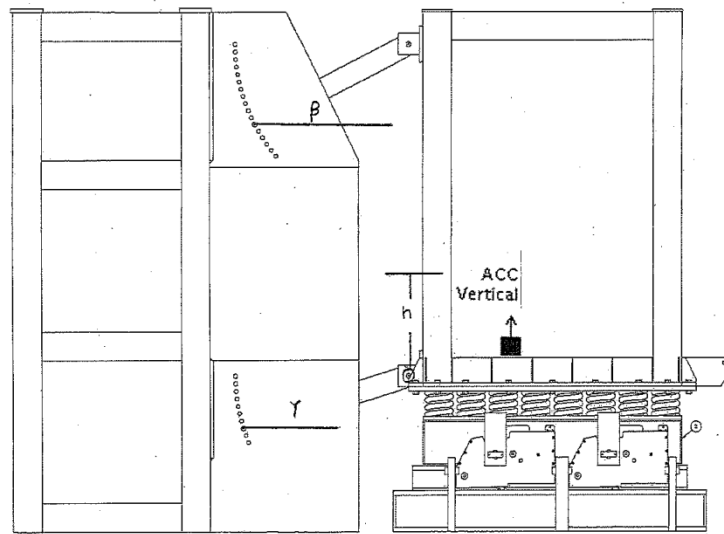


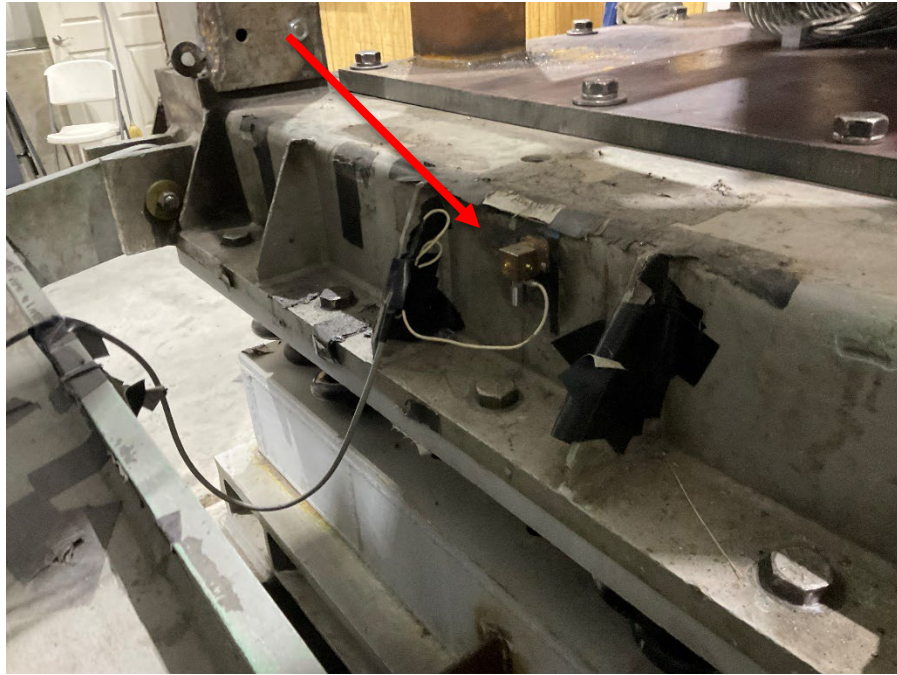
Figure 1: DSSM Setup

5.5 Test Instrumentation

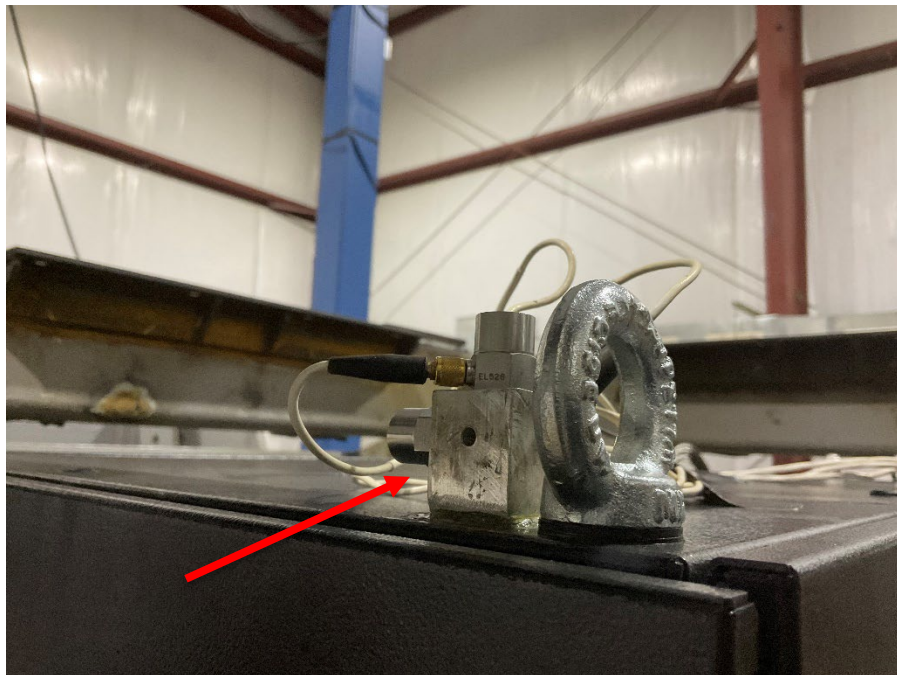
One (1) input (relative to the machine orientation), three (3) response accelerometers (ACC), were used during the test series to monitor the shock response of the DSSM and the EUT. Instrumentation locations are listed in Table 3. Time-history traces for each sensor are included as Attachment A. Test instrumentation locations are shown in Photographs 3 and 4. In addition a video was taken of each drop. All test and measurement equipment used was calibrated in accordance with ISO-IEC 17025. One 3” clay cone was installed under each base isolator to gauge isolator excursion.

Sensor ID	Serial #	Sensitivity	Gauge Range	Sensor Location	Calibration Due Date
ACC101V	17801	0.436	2000	DSSM Input	4/5/2023
ACC201V	EL526	0.356	2000	Top Right Front Corner	7/29/2023
ACC202FB	EL557	0.361	2000	Top Right Front Corner	7/29/2023
ACC203SS	EL561	0.394	2000	Top Right Front Corner	7/29/2023

Table 3: Test Instrumentation Locations



Photograph 3: ACC101V Location



Photograph 4: ACC201V, ACC202FB, ACC203SS Location

6.0 TEST RESULTS

6.1 Test Schedule

The schedule of conducted tests is shown in Table 4.

Drop No.	Date	Time	Drop Ht. (In.)	Spring Tray Configuration	Measured Frequency	Orientation
1	04 April 2023	10:04	7	14 Hz (30 Springs)	13.1	Shipboard
2	04 April 2023	10:13	9.5	14 Hz (30 Springs)	13.1	Shipboard
3	04 April 2023	10:21	13	14 Hz (30 Springs)	13.1	Shipboard
4	04 April 2023	10:31	13	14 Hz (30 Springs)	13.1	Rotated

Table 4: Test Schedule

6.2 Survey Findings Prior to Testing

Pre-test inspections were conducted by NTS and Schroff, Inc. personnel. No deficiencies or discrepancies were noted at the pre-test inspection. Testing of the EUT commenced.

6.2.1 *Survey Findings after Drop 1, 04 April 2023*

6.2.1.1 Action: NTS and Schroff, Inc. personnel inspected the EUT for physical deficiencies and personnel hazards.

Observation: There were no visible physical deficiencies and/or personnel hazards noted.

Resolution: None required.

6.2.1.2 Action: No operational or functional testing was required. The EUT's exterior and interior was inspected by NTS and Schroff, Inc. personnel for any damage or distortion.

Observation: No deficiencies or discrepancies were noted.

Resolution: None required.

6.2.2 *Survey Findings after Drop 2, 04 April 2023*

6.2.2.1 **Action:** NTS and Schroff, Inc. personnel inspected the EUT for physical deficiencies and personnel hazards.

Observation: There were no visible physical deficiencies and/or personnel hazards noted.

Resolution: None required.

6.2.2.2 **Action:** No operational or functional testing was required. The EUT's exterior and interior was inspected by NTS and Schroff, Inc. personnel for any damage or distortion.

Observation: No deficiencies or discrepancies were noted.

Resolution: None required.

6.2.3 *Survey Findings after Drop 3, 04 April 2023*

6.2.3.1 **Action:** NTS and Schroff, Inc. personnel inspected the EUT for physical deficiencies and personnel hazards.

Observation: There were no visible physical deficiencies and/or personnel hazards noted.

Resolution: None required.

6.2.3.2 **Action:** No operational or functional testing was required. The EUT's exterior and interior was inspected by NTS and Schroff, Inc. personnel for any damage or distortion.

Observation: No deficiencies or discrepancies were noted with the EUT. It was noted the Rear Base Isolators appeared to have bottomed out. (See Photograph 5)

Resolution: None required.

6.2.4.2 **Action:** Vertical Axis Specified shock qualification requires that the EUT be rotated 90° from its Shipboard installation to Rotated installation.

Resolution: NTS personnel rotated the Test Assembly from the Shipboard installation, to the Rotated Installation.



Photograph 5: Crushed Clay Cone – Right Rear Base Isolator

6.2.4 Survey Findings after Drop 4, 04 April 2023

6.2.4.1 Action: NTS and Schroff, Inc. personnel inspected the EUT for physical deficiencies and personnel hazards.

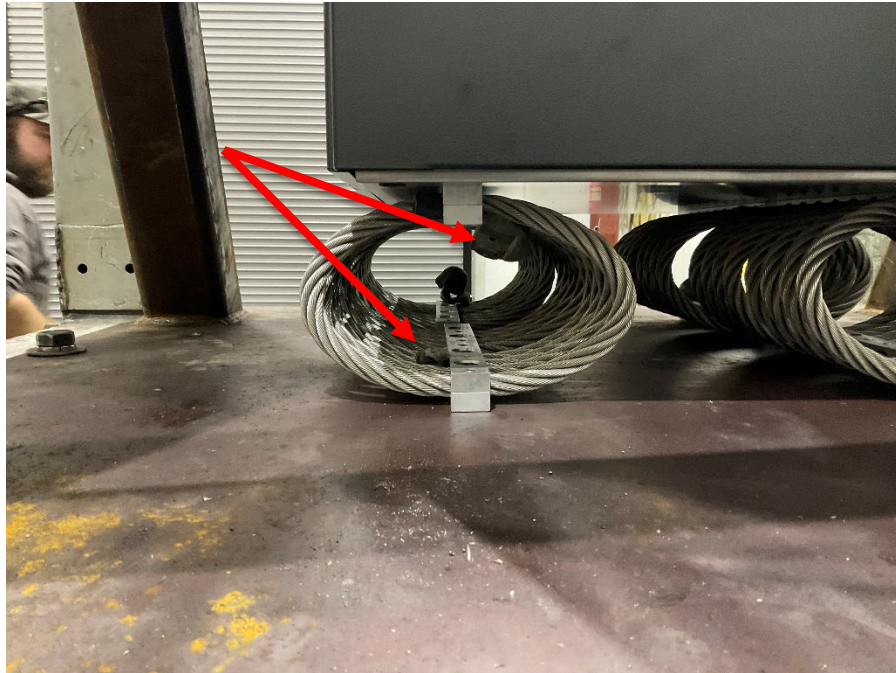
Observation: There were no visible physical deficiencies and/or personnel hazards noted.

Resolution: None required.

6.2.4.2 Action: No operational or functional testing was required. The EUT's exterior and interior was inspected by NTS and Schroff, Inc. personnel for any damage or distortion.

Observation: No deficiencies or discrepancies were noted with the EUT. It was noted the Rear Base Isolators appeared to have bottomed out. (See Photograph 6)

Resolution: None required, testing concluded.



Photograph 6: Crushed Clay Cone – Right Rear Base Isolator

7.0 POST-TEST ACTIONS/REQUIREMENTS

Upon completion of the DSSM drop test series, the EUT was removed from the DSSM and prepared for shipping as directed by Schroff, Inc.

8.0 PERSONNEL PRESENT

Table 5 lists the personnel present during the DSSM shock test of the EUT.

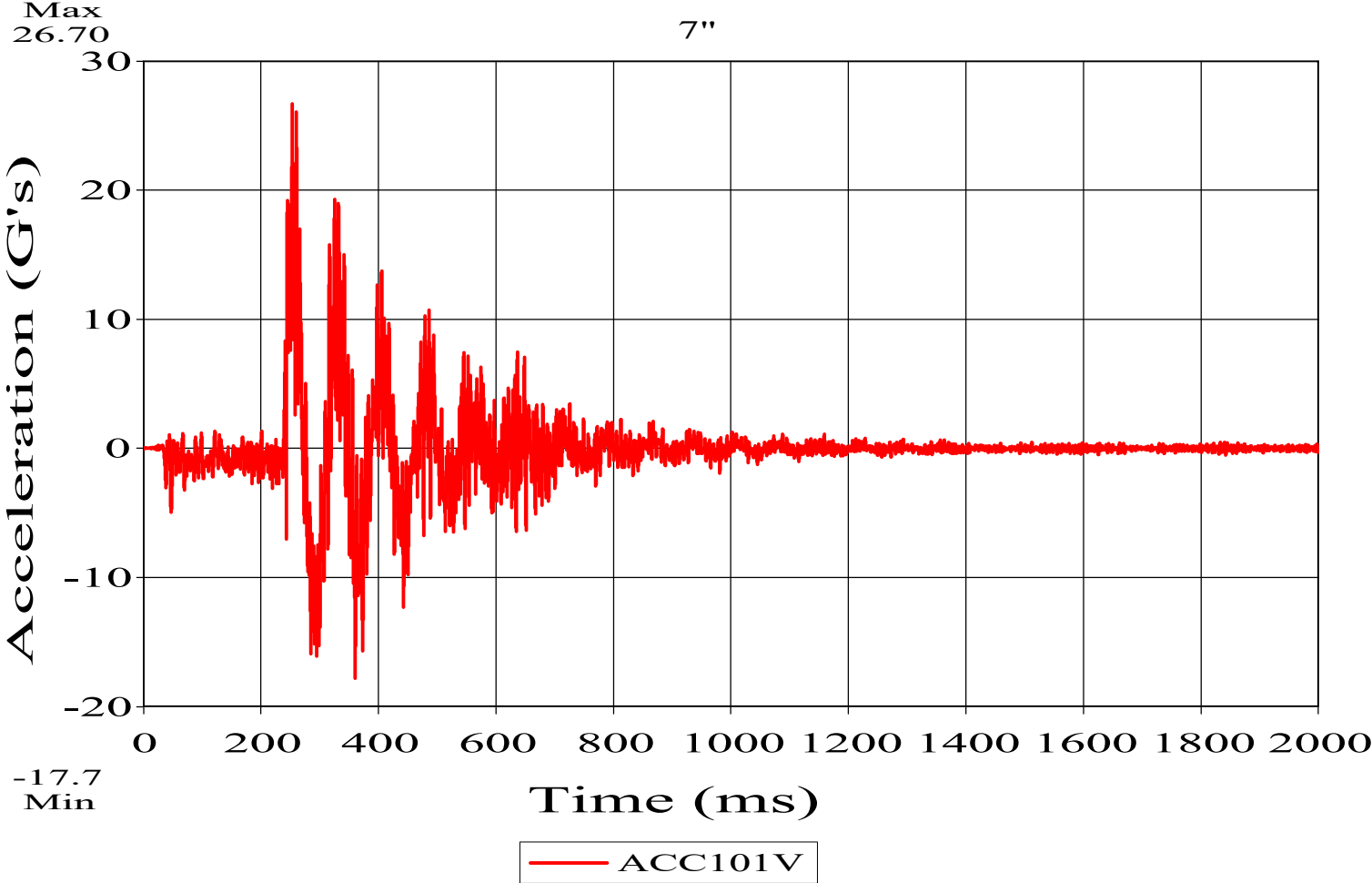
Table 5: Personnel Present

Inspector	Representing	Drop No(s).
Mathew Tarney	Schroff, Inc.	1, 2, 3, 4
Marcus Martin	NTS	1, 2, 3, 4
Tristan Shaner	NTS	1, 2, 3, 4
Kevin Gray	NTS	1, 2, 3, 4
Patrick Brinkley	NTS	1, 2, 3, 4

Attachment A:
Time-History Traces

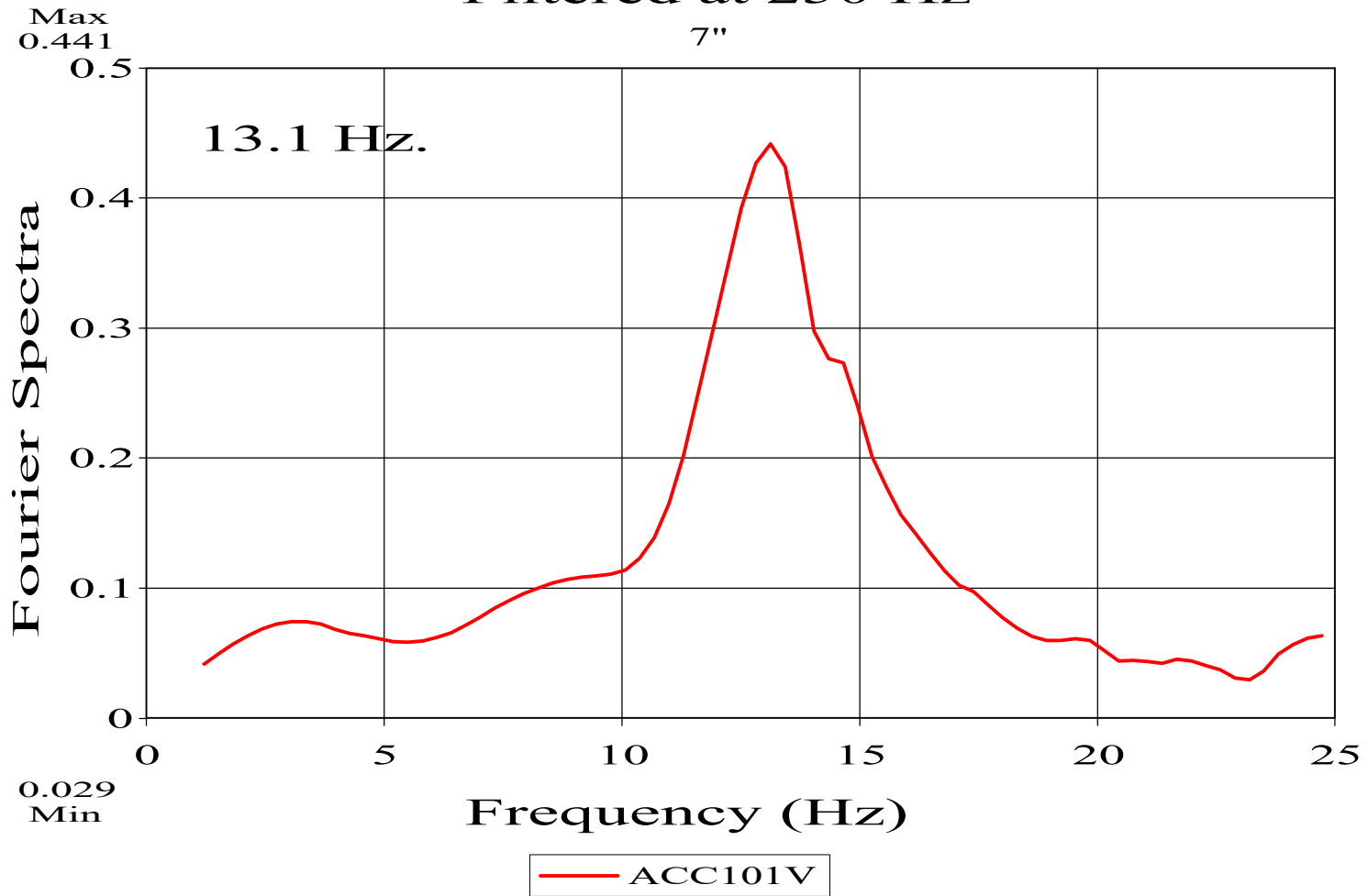
PH00005037_Schroff_Drop 1_14Hz

Filtered at 250 Hz



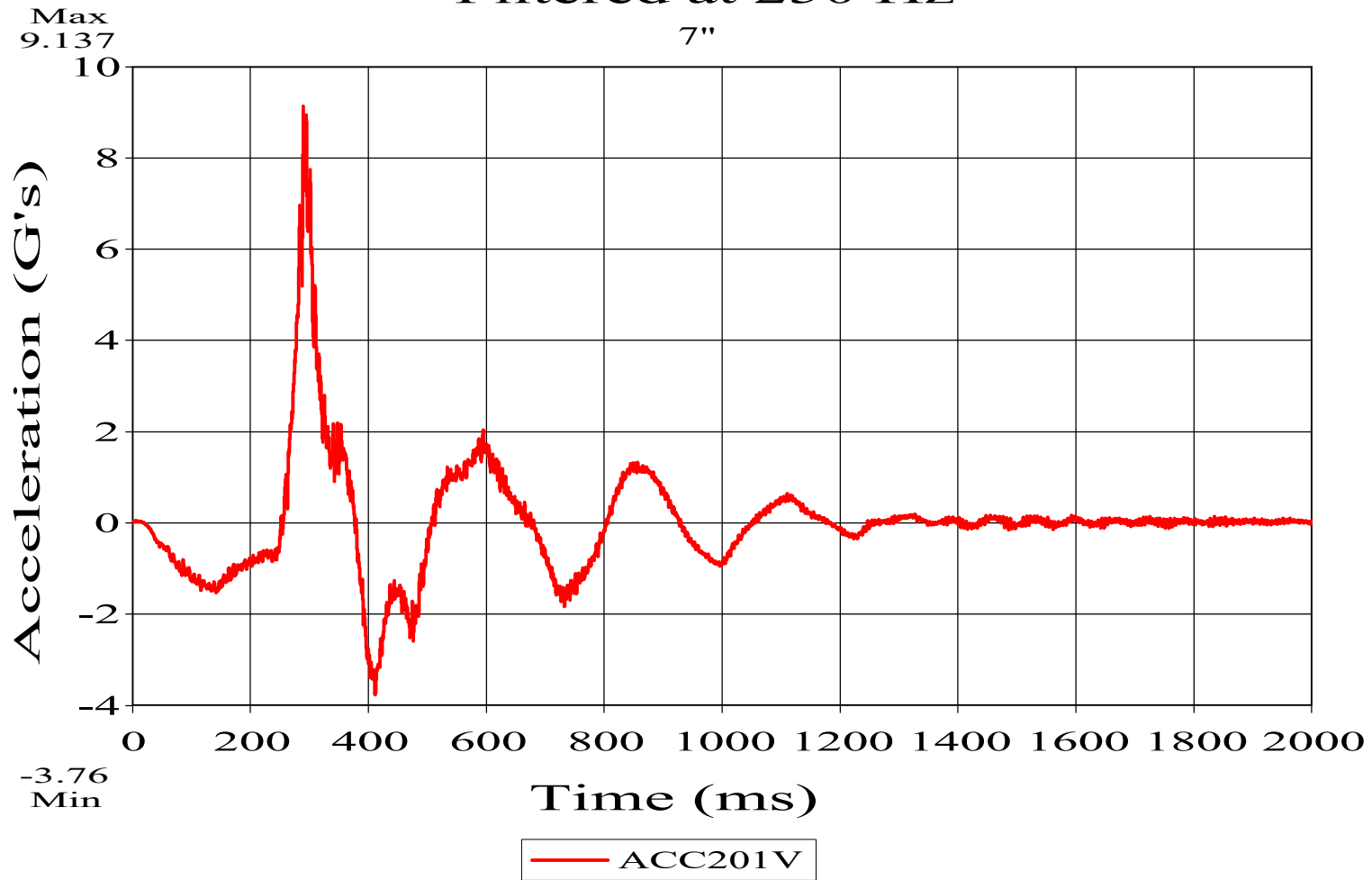
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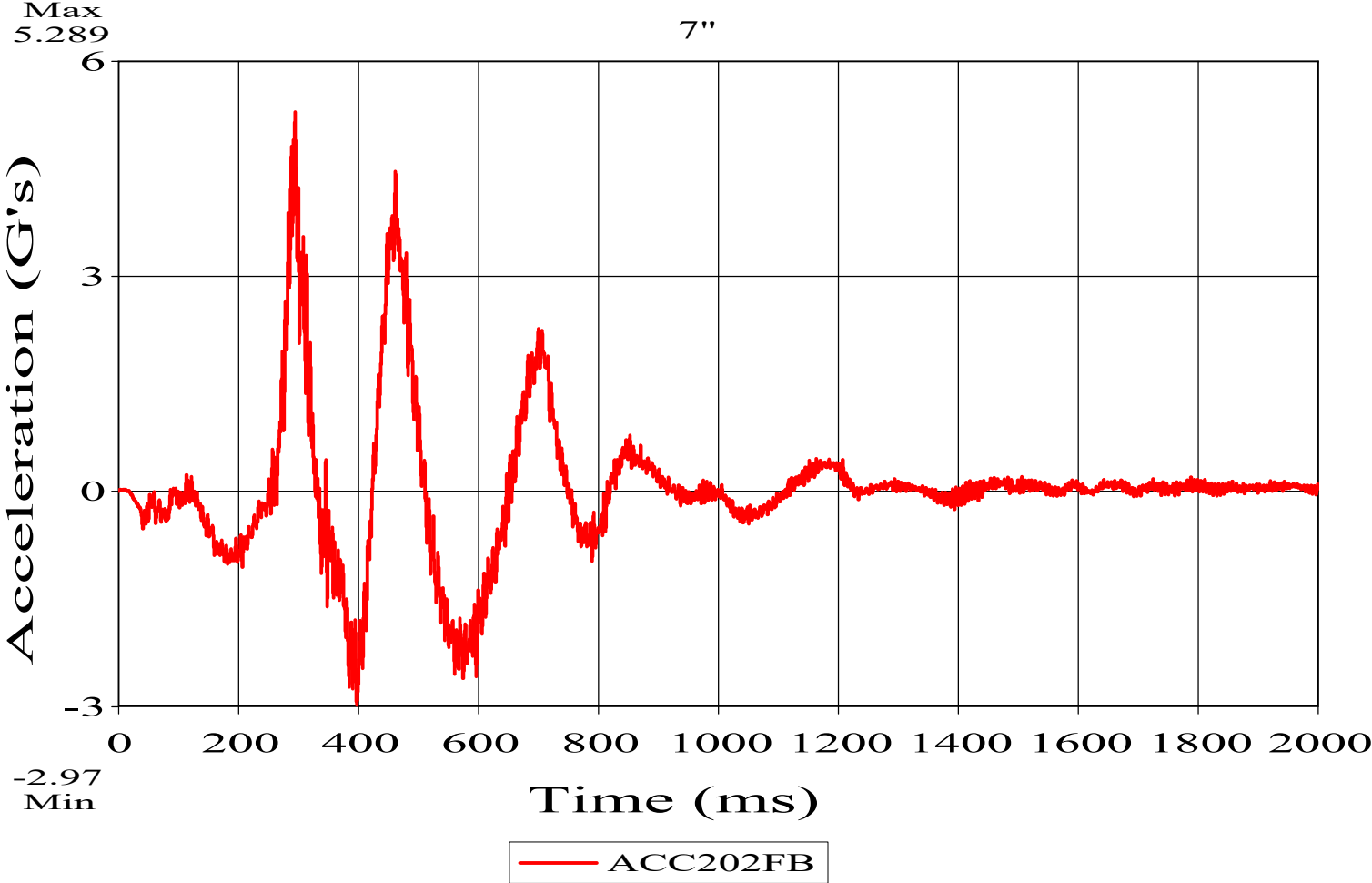
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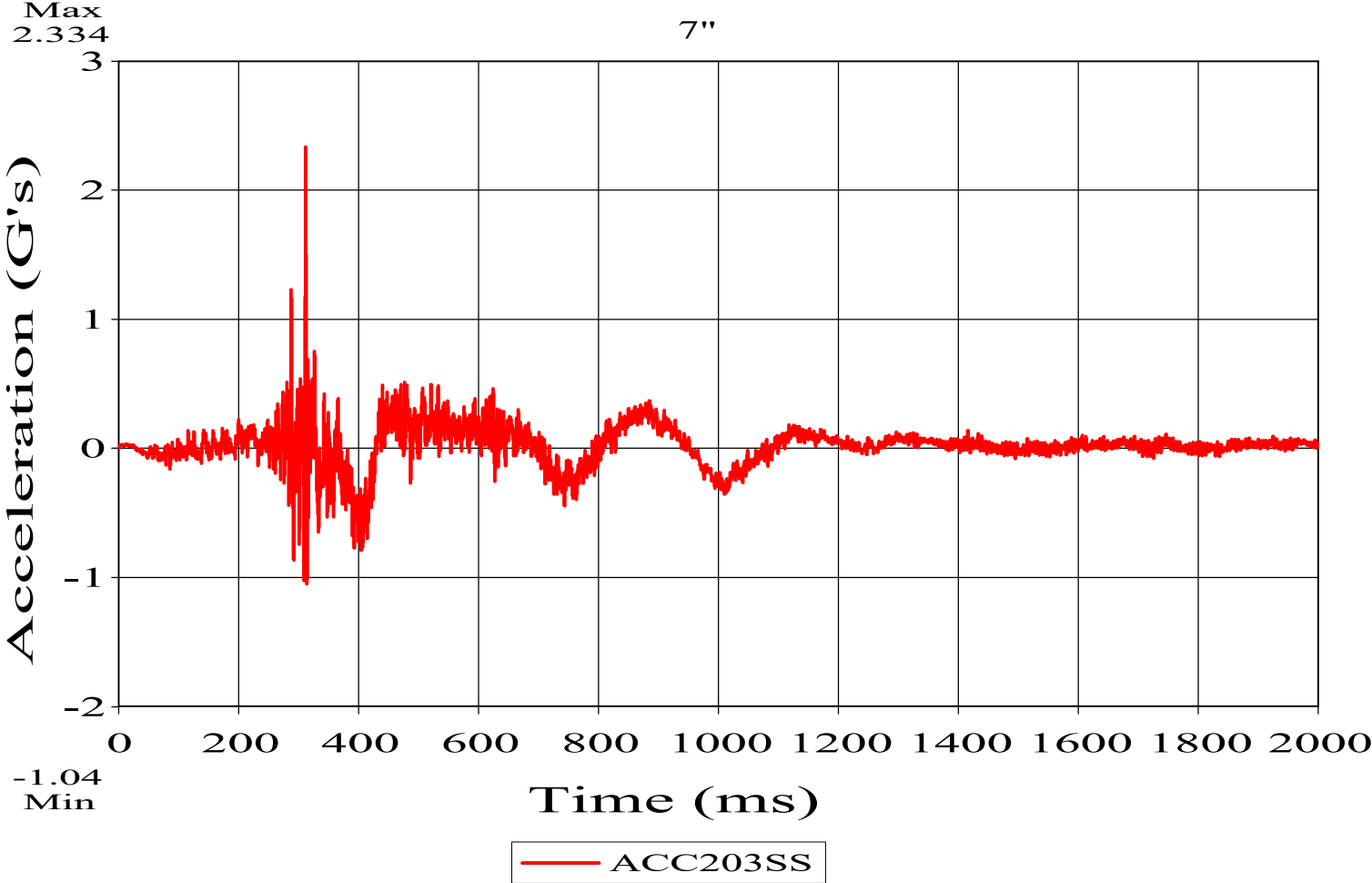
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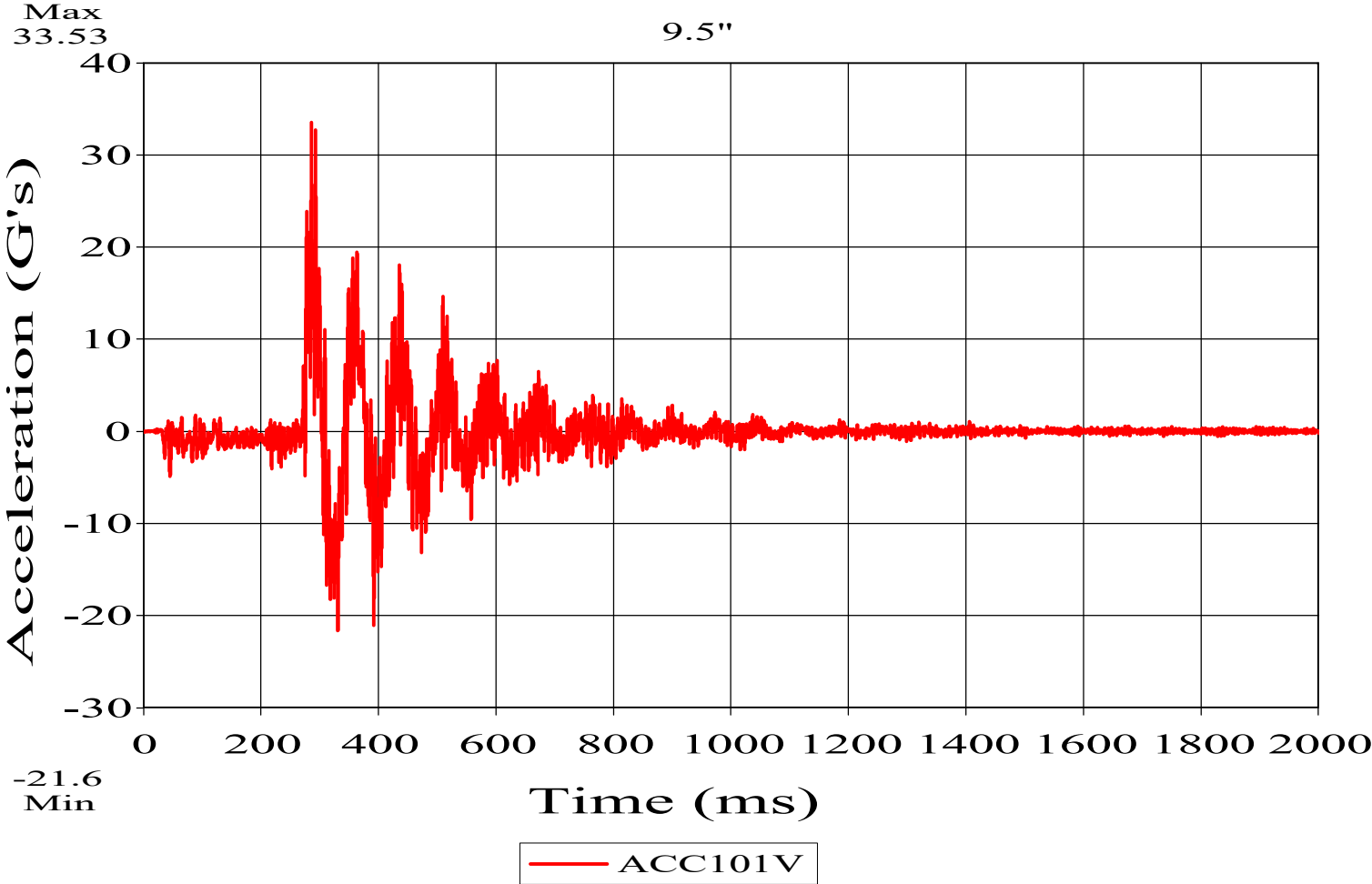
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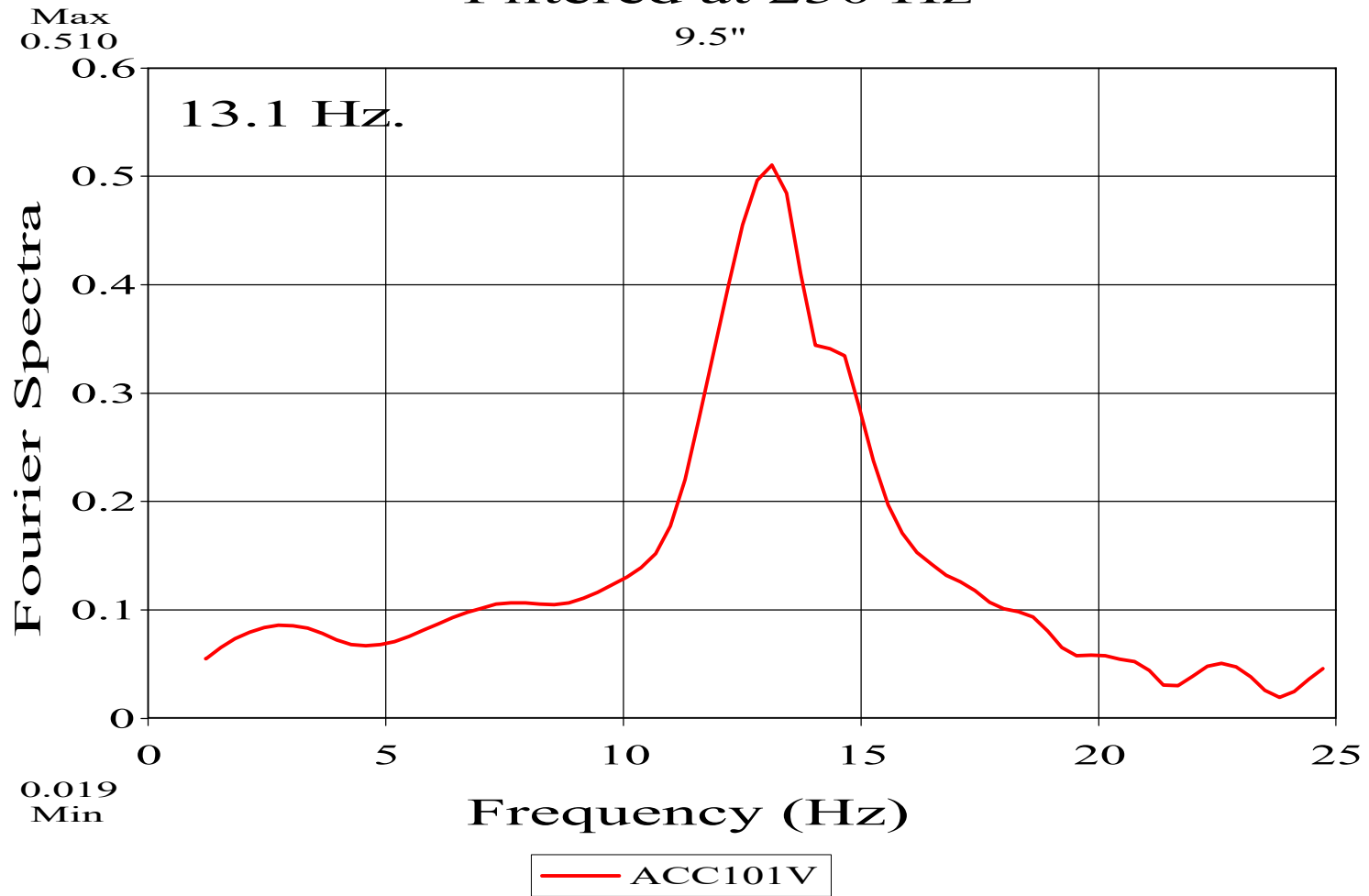
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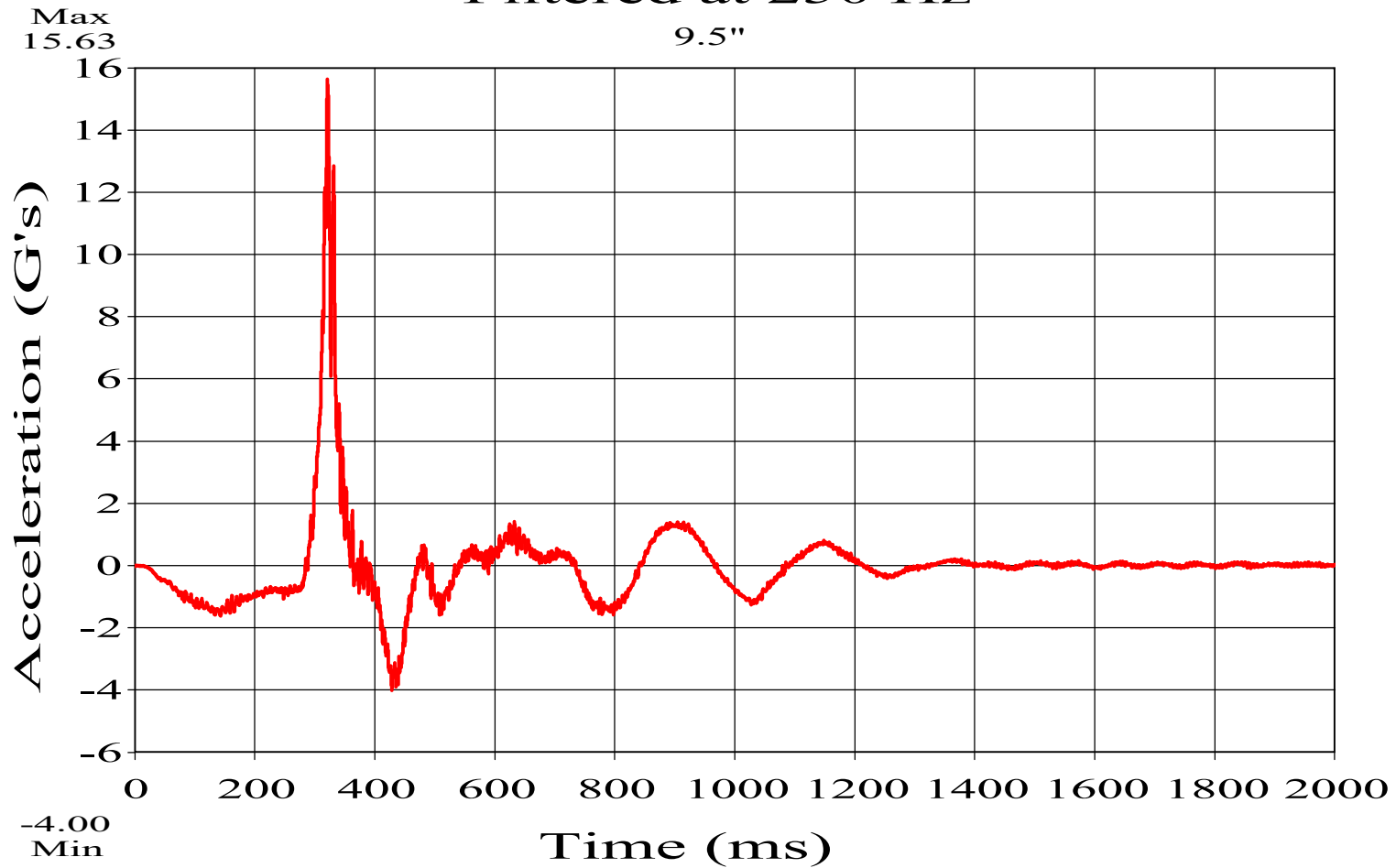
PH00005037_Schroff_Drop 2_14Hz

Filtered at 250 Hz



PH00005037_Schroff_Drop 2_14Hz

Filtered at 250 Hz

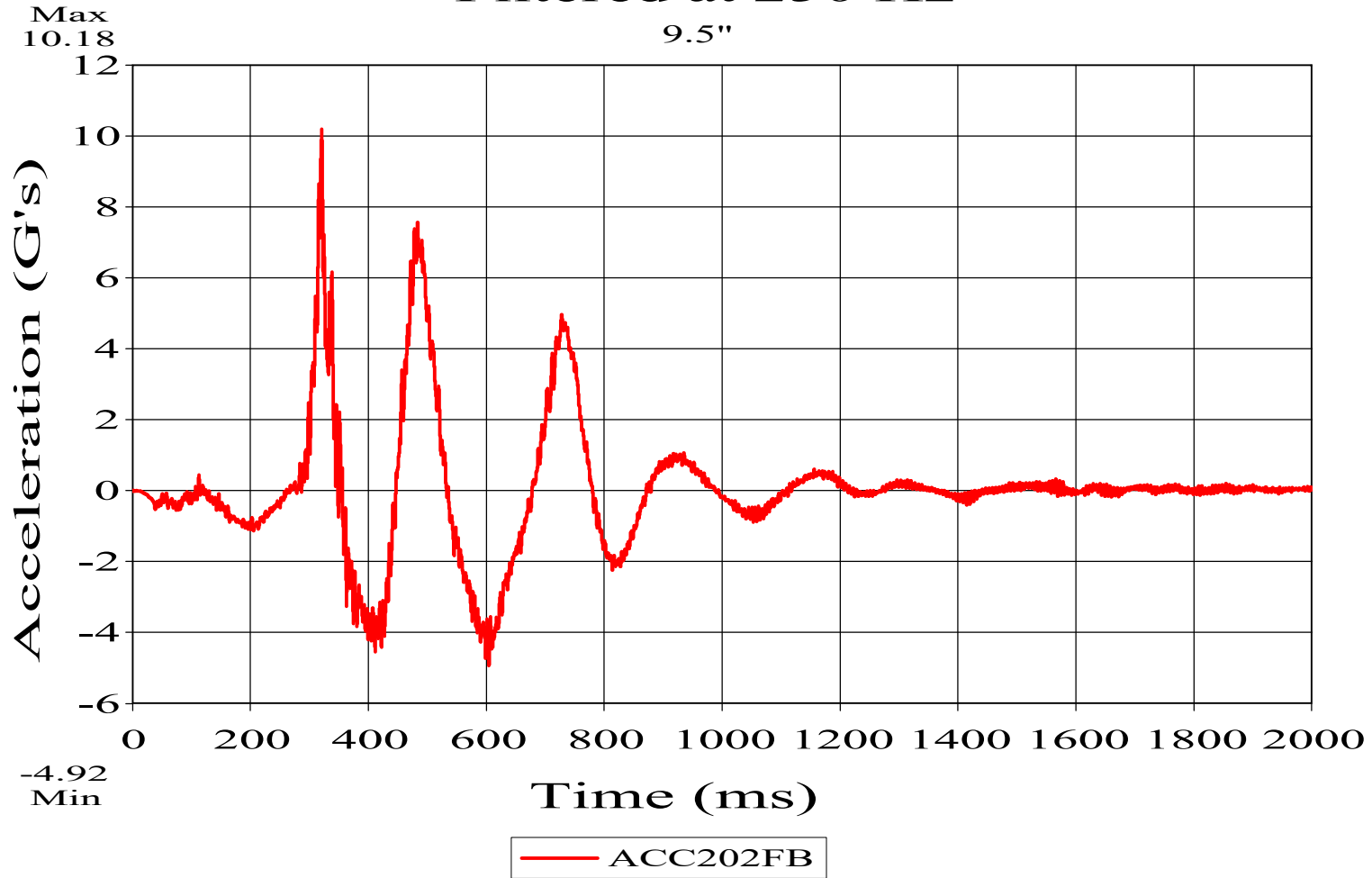


-4.00
Min

Time (ms)

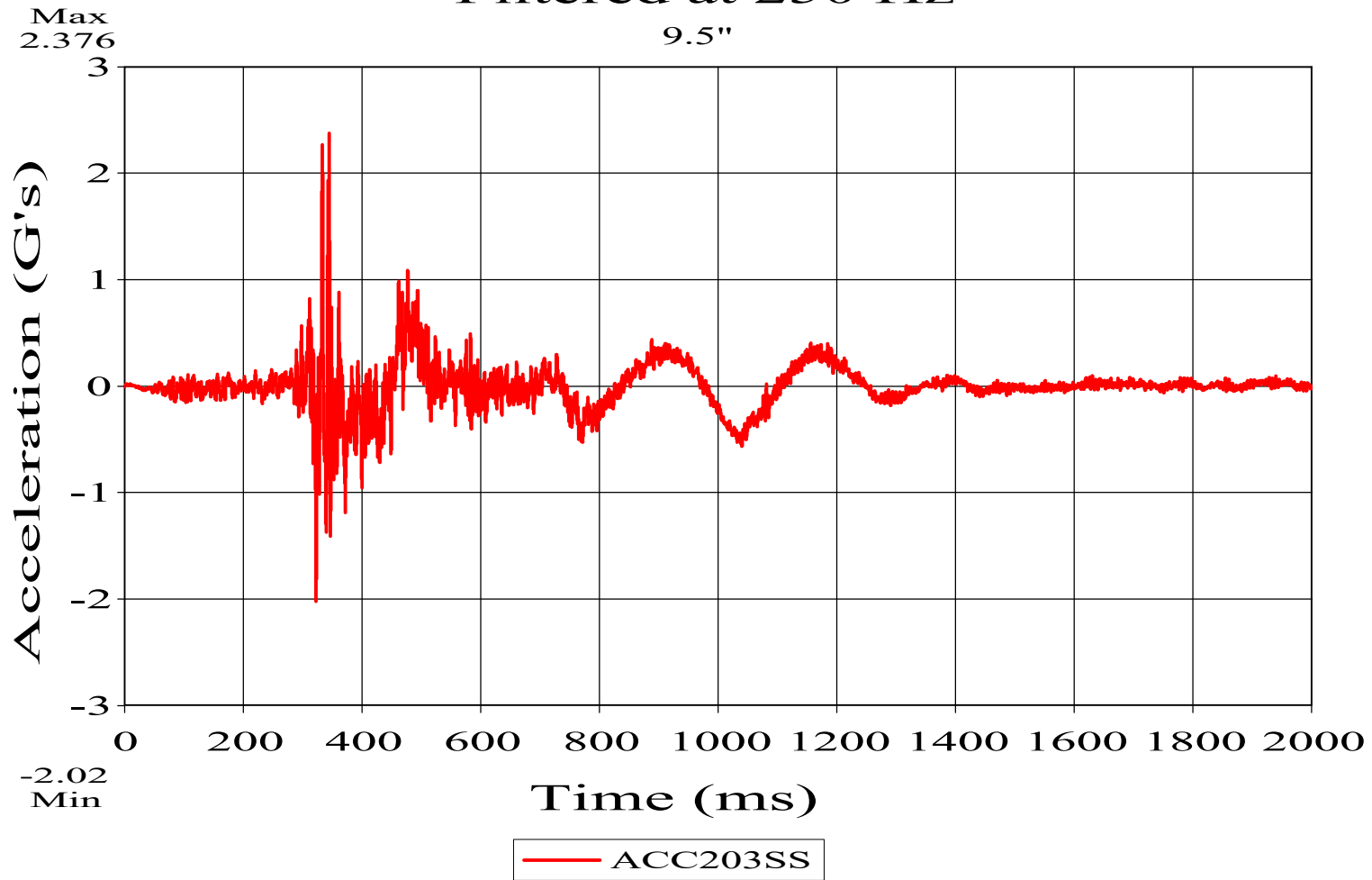
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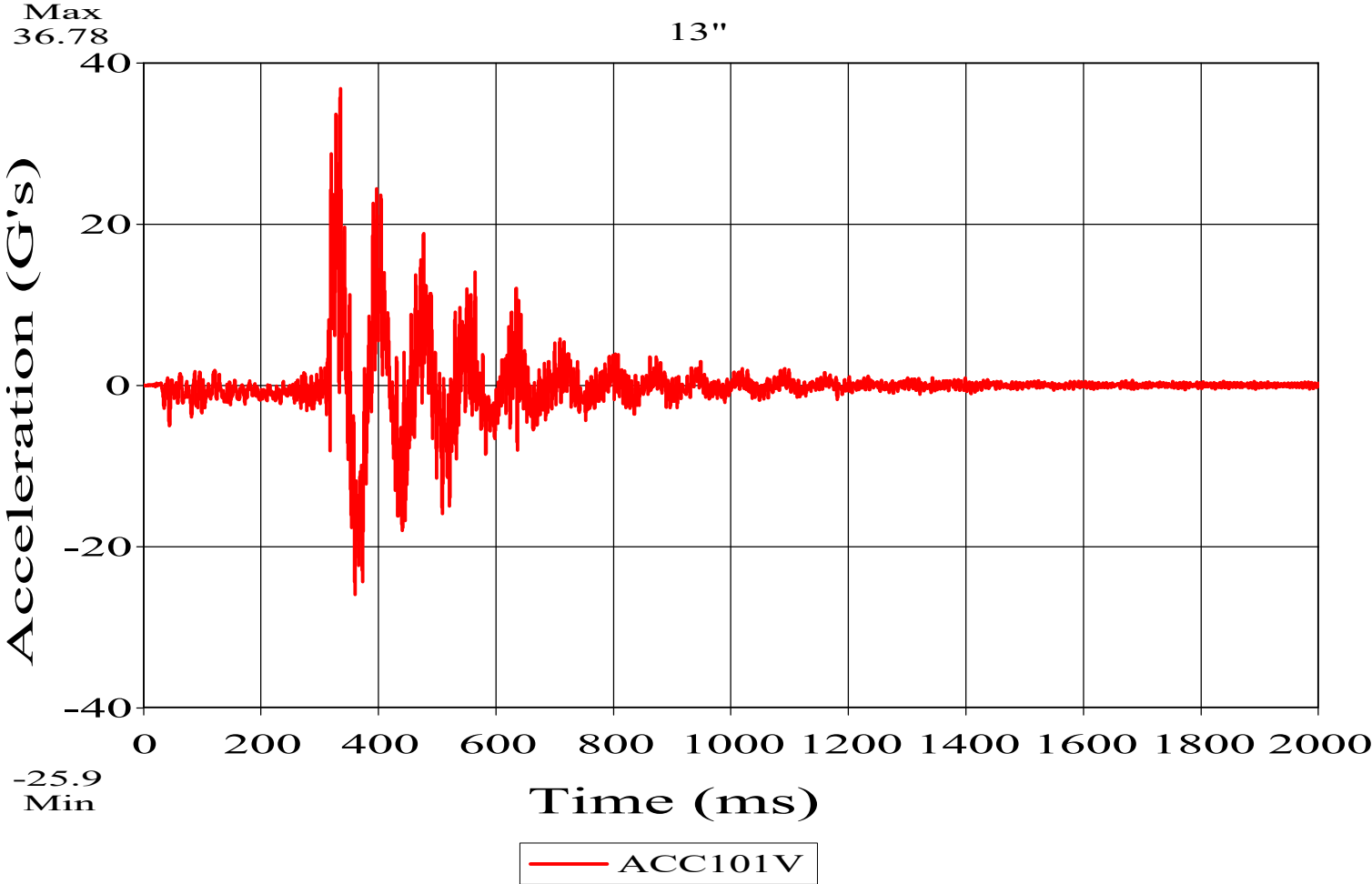
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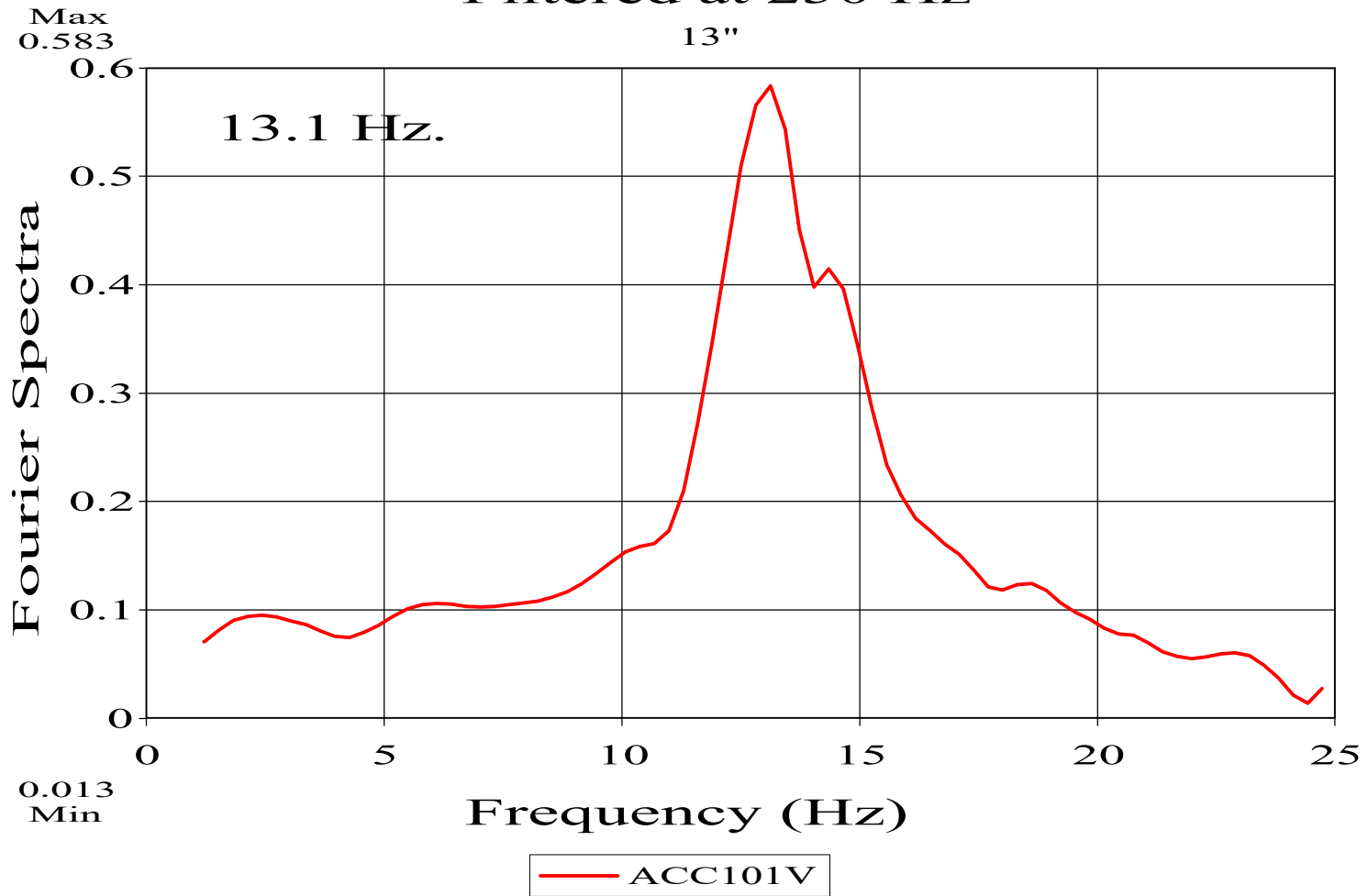
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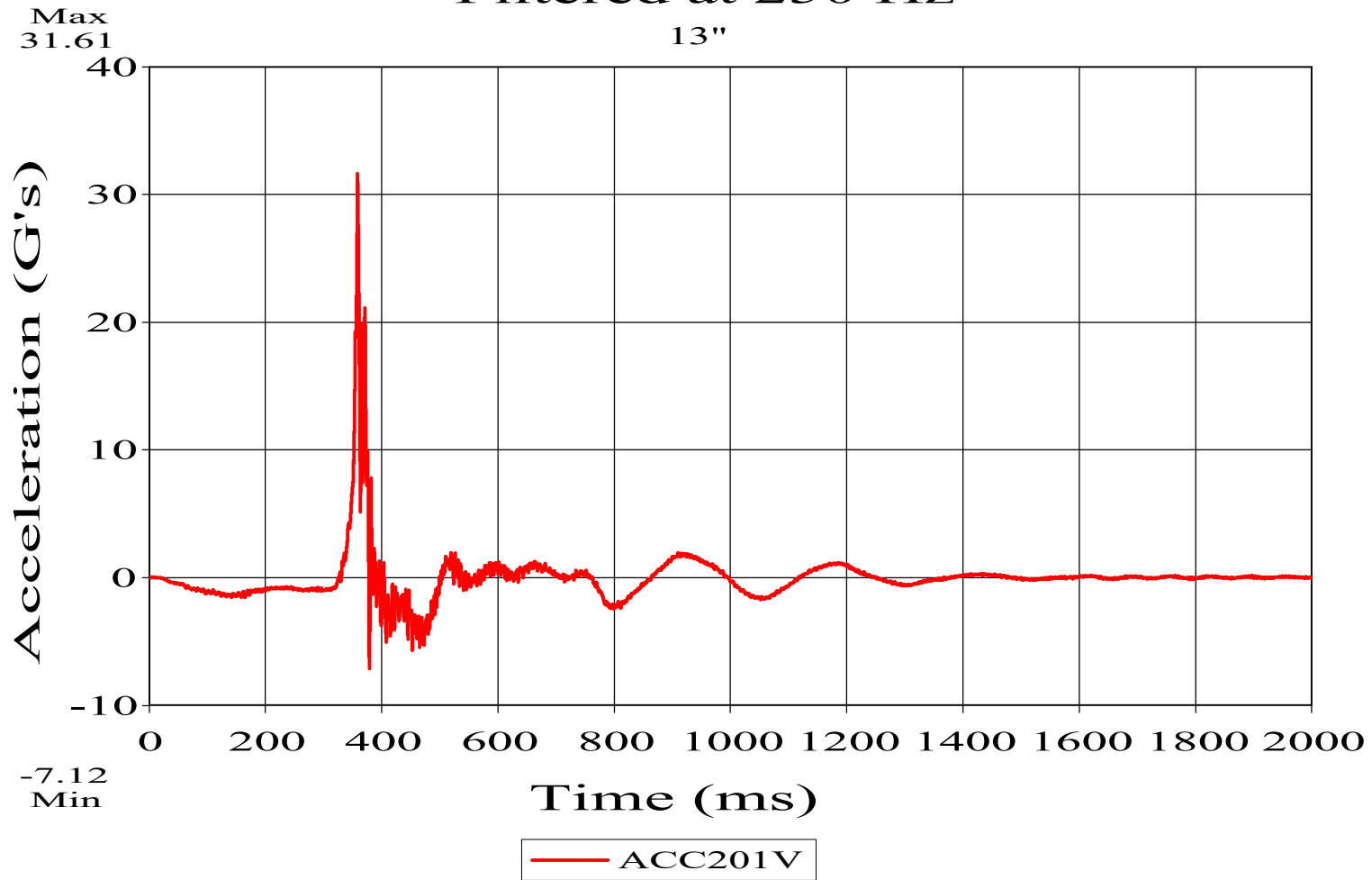
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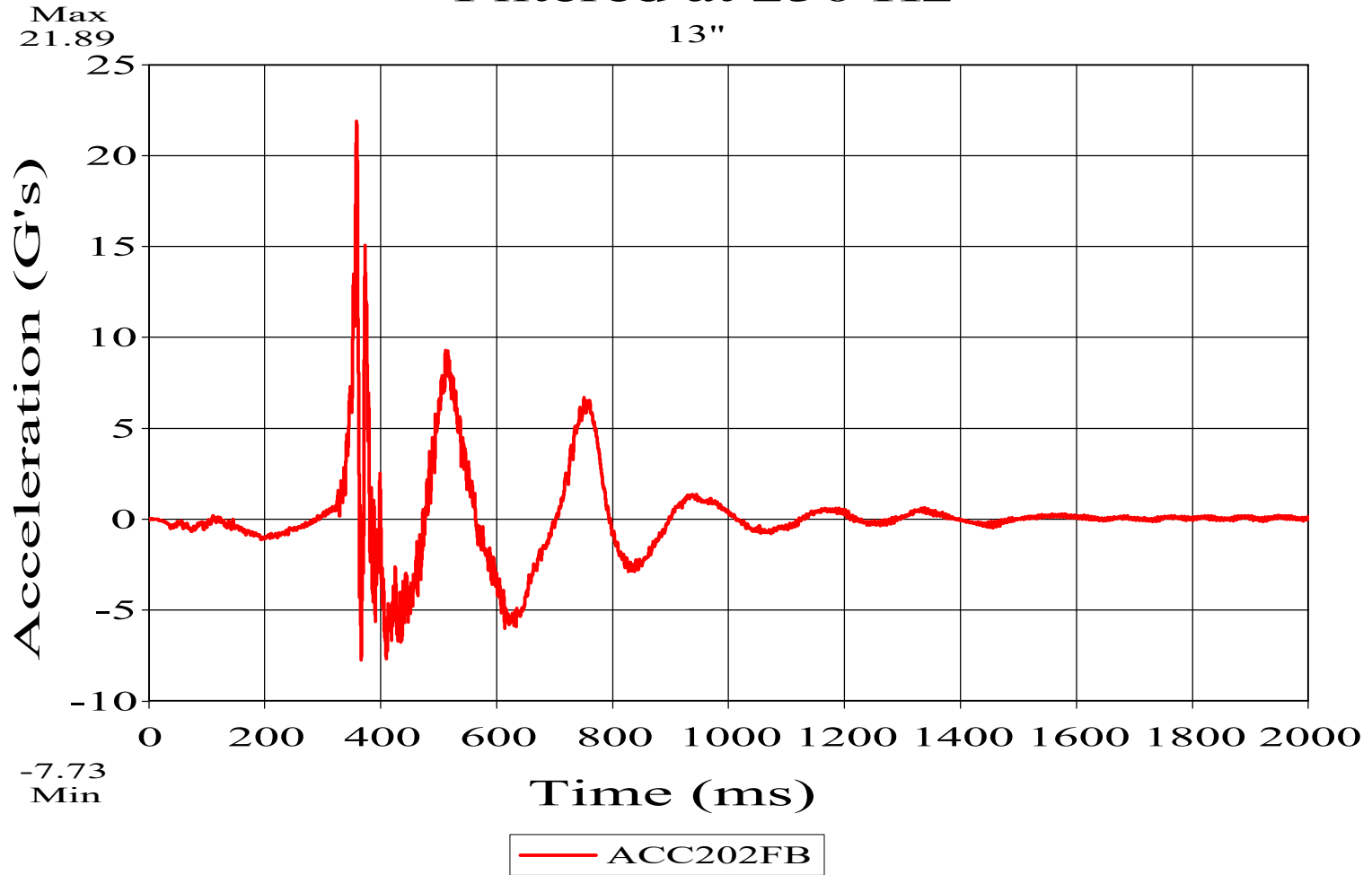
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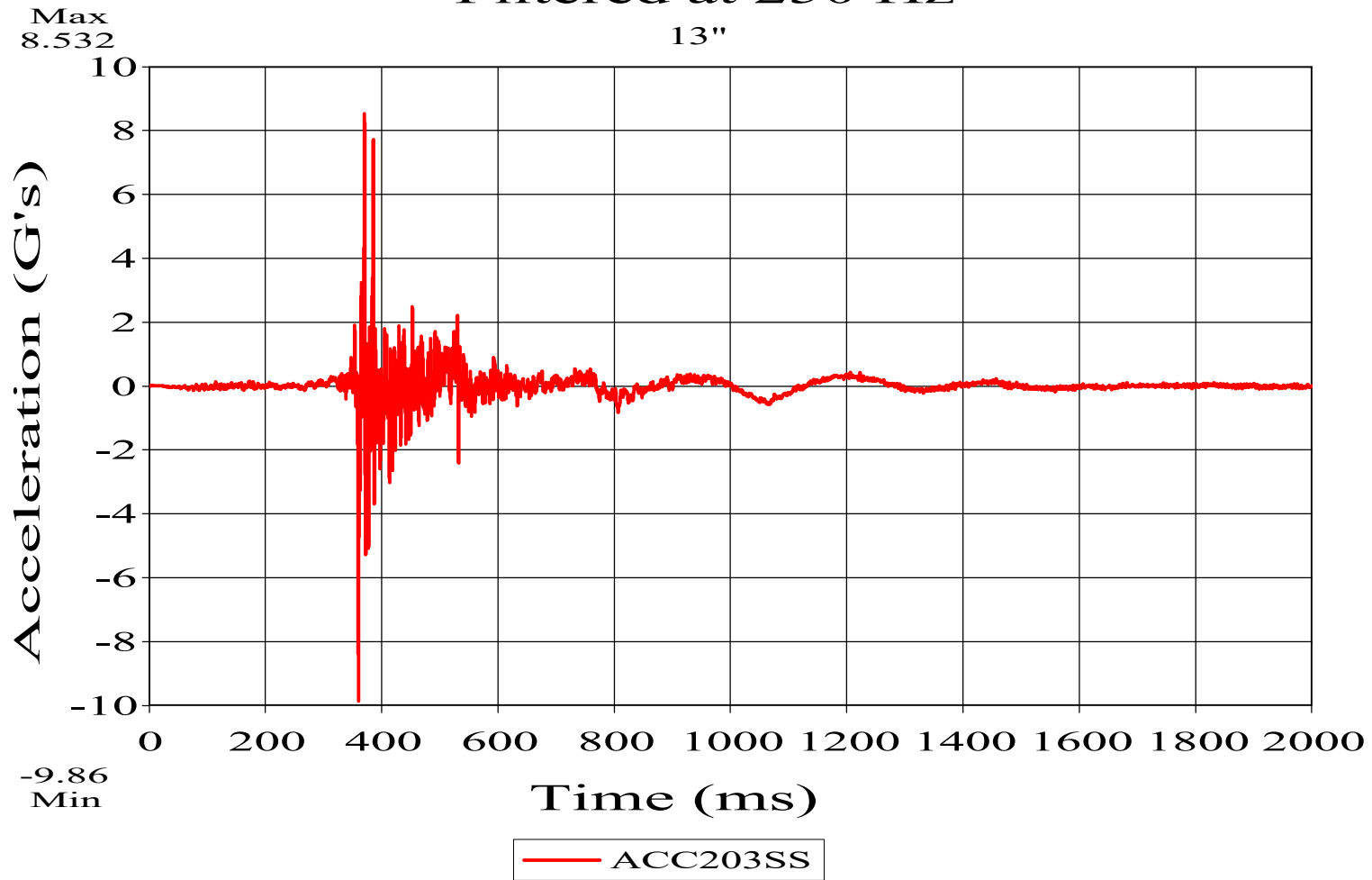
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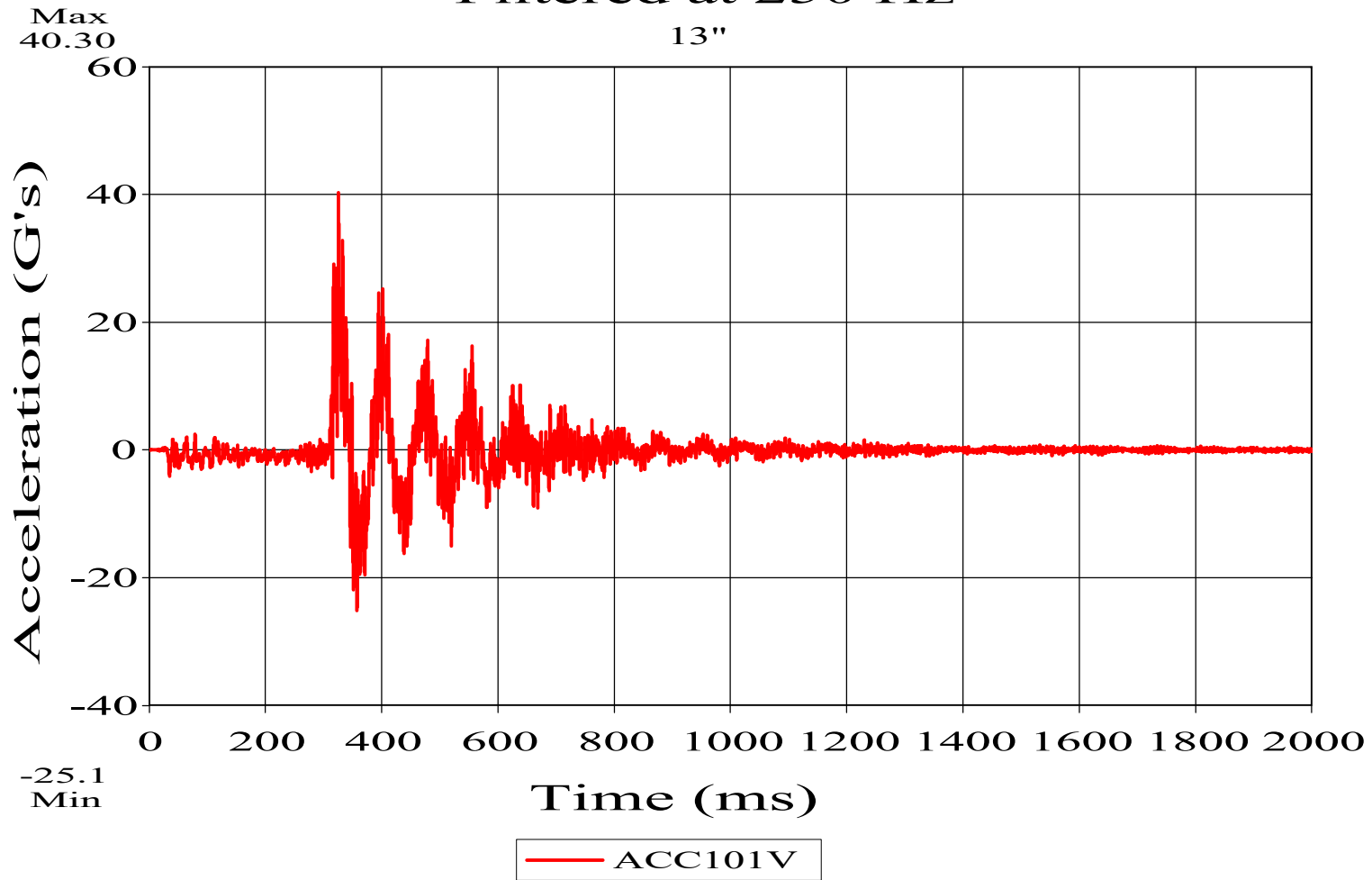
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Filtered at 250 Hz



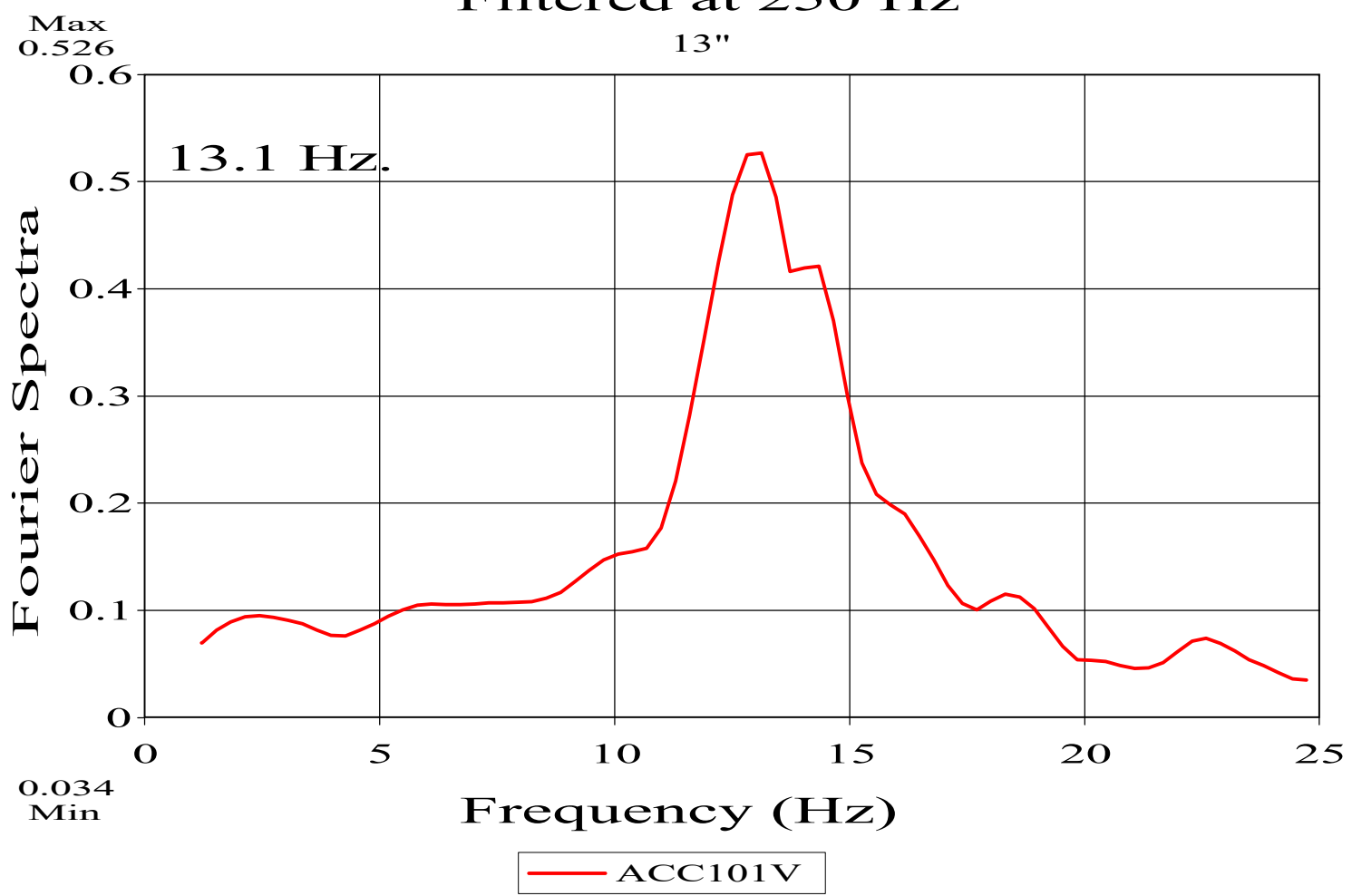
PH00005037_Schroff_Drop 4_14Hz

Filtered at 250 Hz



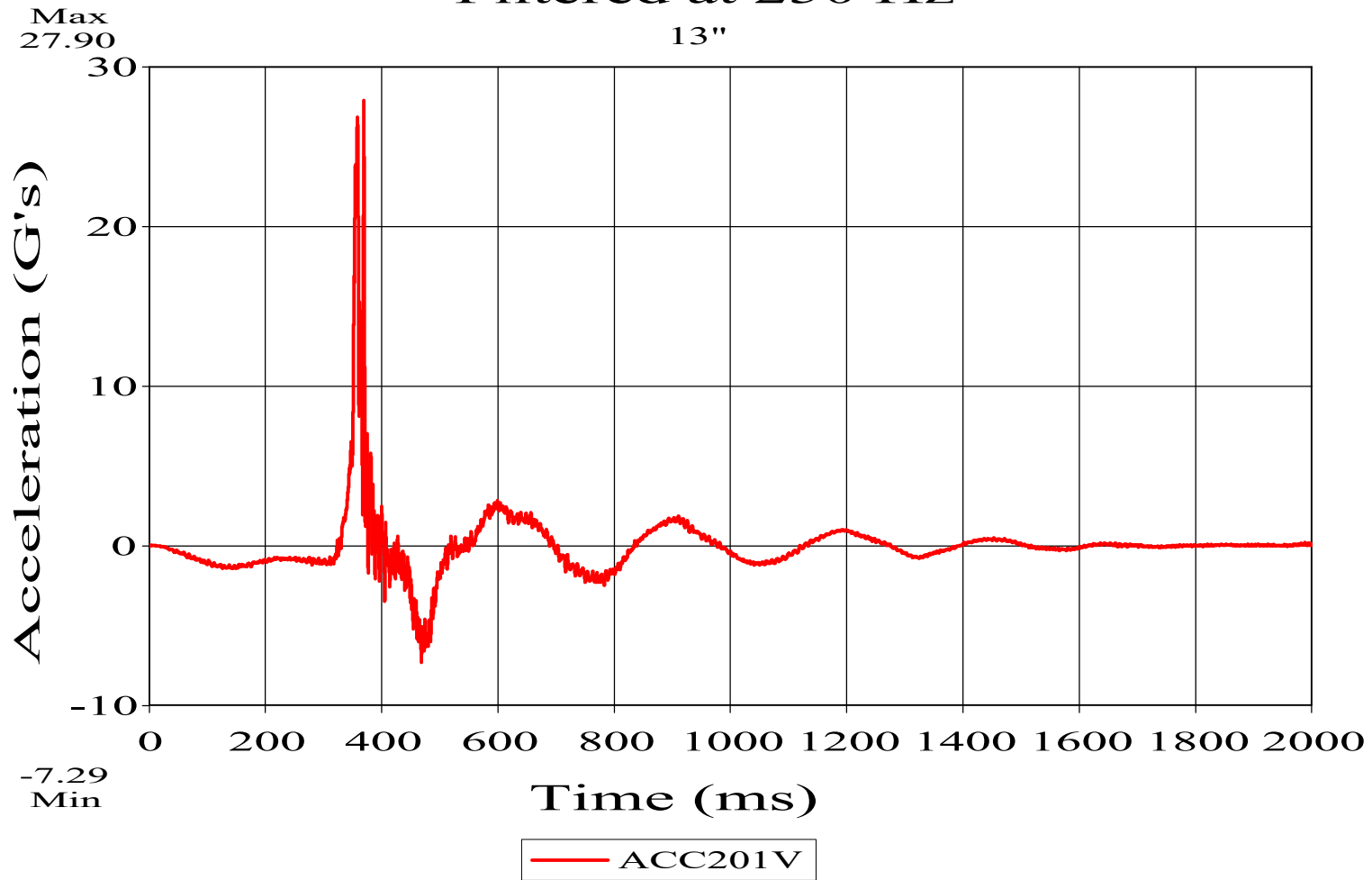
PH00005037_Schroff_Drop 4_14Hz

Filtered at 250 Hz



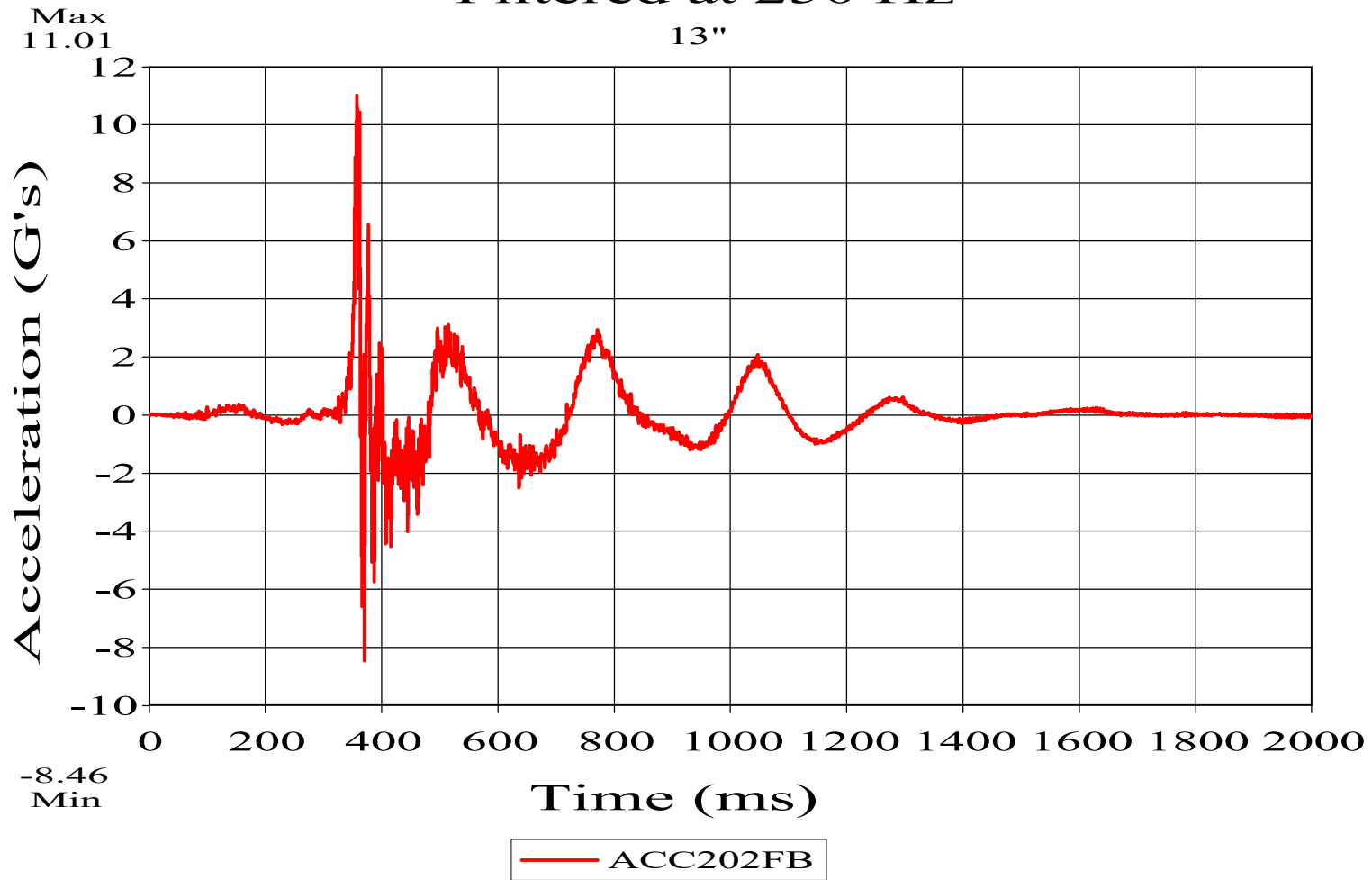
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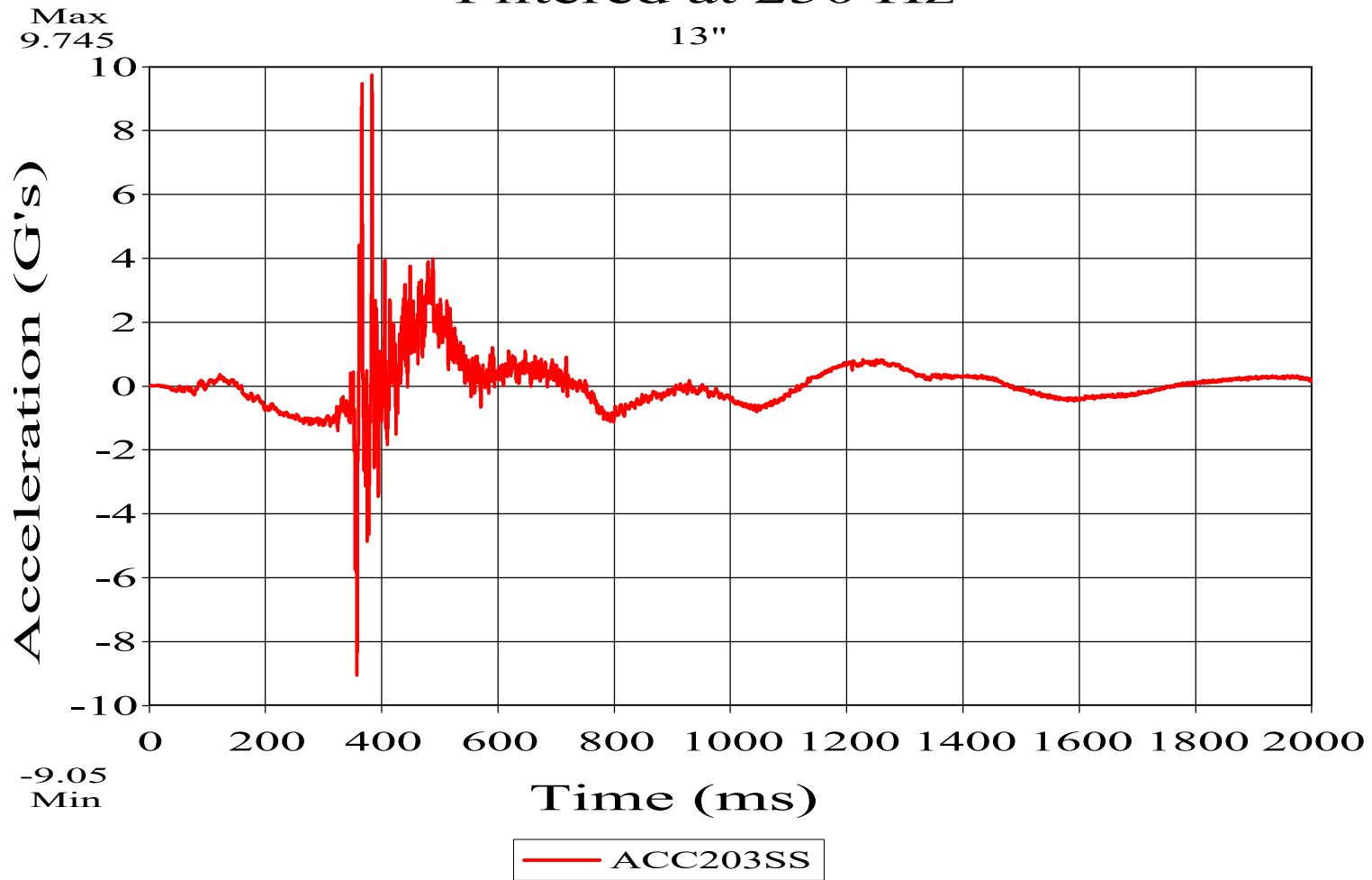
PH00005037_Schroff_Drop 4_14Hz

Filtered at 250 Hz



PH00005037_Schroff_Drop 4_14Hz

Filtered at 250 Hz



Attachment B:

NTS Test Log

DSSM TEST INSPECTION FORM

PR NUMBER: PH00005037	DROP/TEST NO: 1
CUSTOMER: Schroff	DROP HEIGHT: (INCHES) 7 SPRING COUNT: 30
EQUIPMENT: V SIC	DSSM FREQ: 14 Hz MEASURED FREQ: 13.1
DATE/TIME: 4/4/2023 10:04 am	ARM ANGLES: 7.5 & 20
PAGE NUMBER: 1 of 4	ORIENTATION: Shipboard
PRE-DROP INSPECTION NOTES:	
No deficiencies or discrepancies noted.	
POST-DROP PHYSICAL OBSERVATIONS:	
No deficiencies or discrepancies noted.	
RESOLUTIONS (IF APPLICABLE):	
N/A	
POST-DROP OPERATIONAL OBSERVATIONS:	
N/A	
RESOLUTIONS (IF APPLICABLE):	
N/A	
MISC. NOTES:	
N/A	
PM/TECHNICIAN: KG, TS	

DSSM TEST INSPECTION FORM

PR NUMBER: PH00005037	DROP/TEST NO: 2	
CUSTOMER: Schroff	DROP HEIGHT: (INCHES) 9.5	SPRING COUNT: 30
EQUIPMENT: V SIC	DSSM FREQ: 14 Hz	MEASURED FREQ: 13.1
DATE/TIME: 4/4/2023 10:13 am	ARM ANGLES: 7.5 & 20	
PAGE NUMBER: 2 of 4	ORIENTATION: Shipboard	
PRE-DROP INSPECTION NOTES:		
No deficiencies or discrepancies noted.		
POST-DROP PHYSICAL OBSERVATIONS:		
No deficiencies or discrepancies noted.		
RESOLUTIONS (IF APPLICABLE):		
N/A		
POST-DROP OPERATIONAL OBSERVATIONS:		
N/A		
RESOLUTIONS (IF APPLICABLE):		
N/A		
MISC. NOTES:		
N/A		
PM/TECHNICIAN: KG, TS		

DSSM TEST INSPECTION FORM

PR NUMBER: PH00005037	DROP/TEST NO: 3
CUSTOMER: Schroff	DROP HEIGHT: (INCHES) 13 SPRING COUNT: 30
EQUIPMENT: V SIC	DSSM FREQ: 14 Hz MEASURED FREQ: 13.1
DATE/TIME: 4/4/2023 10:21 am	ARM ANGLES: 7.5 & 20
PAGE NUMBER: 3 of 4	ORIENTATION: Shipboard
PRE-DROP INSPECTION NOTES:	
No deficiencies or discrepancies noted.	
POST-DROP PHYSICAL OBSERVATIONS:	
No deficiencies or discrepancies noted with EUT, rear base isolators appeared to have bottomed out.	
RESOLUTIONS (IF APPLICABLE):	
N/A	
POST-DROP OPERATIONAL OBSERVATIONS:	
N/A	
RESOLUTIONS (IF APPLICABLE):	
N/A	
MISC. NOTES:	
N/A	
PM/TECHNICIAN: KG, TS	

DSSM TEST INSPECTION FORM

PR NUMBER: PH00005037	DROP/TEST NO: 4
CUSTOMER: Schroff	DROP HEIGHT: (INCHES) 13 SPRING COUNT: 30
EQUIPMENT: V SIC	DSSM FREQ: 14 Hz MEASURED FREQ: 13.1
DATE/TIME: 4/4/2023 10:31 am	ARM ANGLES: 7.5 & 20
PAGE NUMBER: 4 of 4	ORIENTATION: Rotated
PRE-DROP INSPECTION NOTES:	
No deficiencies or discrepancies noted.	
POST-DROP PHYSICAL OBSERVATIONS:	
No deficiencies or discrepancies noted with EUT, rear base isolators appeared to have bottomed out.	
RESOLUTIONS (IF APPLICABLE):	
N/A	
POST-DROP OPERATIONAL OBSERVATIONS:	
N/A	
RESOLUTIONS (IF APPLICABLE):	
N/A	
MISC. NOTES:	
N/A	
PM/TECHNICIAN: KG, TS	

Attachment C:
NTS Test Procedure

MIL-DTL-901E MEDIUM WEIGHT DECK SIMULATING

SHOCK TEST PROCEDURE OF THE

VARISTAR SPRING ISOLATED CABINET

Purchase Order Number: 709877OS

Issue Date: 30 March 2023

Prepared for: **Schroff, Inc.**
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Warwick, Rhode Island 02886

Prepared by: **NTS Technical Systems**
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Approved by: _____ Date: _____
Schroff, Inc. Representative

REVISIONS

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Rev.00 Rev.01	Draft Release Final Release – Correct Table 2 Spring Count	02 February 2023 30 March 2023

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- Attachment B: Schroff EUT Drawing

1.0 INTRODUCTION

1.1 Purpose

The purpose of this document is to provide the formal procedures to be used during the Deck Simulating Shock Machine (DSSM) shock 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 Shock 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 Deck Simulating Shock Machine (DSSM), actual test operations, instrumentation setup, physical inspections, and reporting.

1.4 Objective

The objective of this test is to perform Shock Risk Mitigation testing on the EUT in accordance with MIL-DTL-901E, Class II, Vertical Axis Specified requirements for a near-miss explosion.

2.0 APPLICABLE DOCUMENTS

2.1 Military Documents

MIL-DTL-901E “Detail Specification Shock Tests, H.I. (High Impact) Shipboard Machinery, Equipment and Systems, Requirements for”, dated 20 June 2017

2.2 Commercial Documents

NTS Drawing No. PH00005037 “DSSM 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 ITEM 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

3.2 DSSM-Borne Weight

EUT 1,014.13 Pounds
 Test Fixture 2,271.00 Pounds

Total Weight Borne by DSSM Cage 3,285.13 Pounds

4.0 TEST REQUIREMENTS

4.1 Shock Grade

Test for Shock Risk Mitigation only – Grade A/B Requirements do not apply.

4.2 Equipment Class

Class II

4.3 Shock Test Type

Type A

4.4 Test Category

Medium Weight Deck Simulating

4.5 Mounting Location

Deck

4.6 Mounting Plane Aboard Ship

Base and Back

4.7 Mounting Orientation Aboard Ship

Vertical Axis Specified

4.8 Shock Test Acceptance Criteria

This test will be conducted for Shock Risk Mitigation/Research and Development purposes only. For Qualification testing, the EUT would be required to be operational and meet MIL-DTL-901E requirements for Grade A and/or Grade B items. The EUT will be considered to have passed/failed the shock test series by meeting the criteria for Grade A items, described in MIL-DTL-901E Section 3.1.10.1, and summarized below:

- No portion of the test item, which may be considered a hazard to personnel or other Grade A systems, breaks or comes adrift.
- Minor physical damage to the tested items, such as small cracks; minor yielding of structure, out-of-tolerance clearances, and similar damage shall not be cause for shock test disapproval unless such damage causes unacceptable impairment of equipment

performance, results in a hazard to personnel or other Grade A systems, or causes/results in substantially shortened equipment useful life.

- Tested item shall not demonstrate a potential for fire hazards. Any evidence of electrical short, release of flame, smoke or sparks shall be cause for failure.
- The equipment continues to perform its principal function, without physical damage or excessive leakage, during and following each shot. The proper operation of the test item will be verified by successfully completing the operational test procedures.
- The EUT must successfully complete all operational verification tests in accordance with customer's operational report.

In the event that evidence of physical or operational damage is noted, Schroff, Inc. shall direct one of the following actions after consultation with the shipbuilder and Navy representatives:

- Note conditions and continue testing if the damage is not functional or is not a hazard to personnel.
- Make a temporary fix and continue testing.
- Make a permanent fix. Remove the equipment item and temporarily postpone testing until the unit is repaired or modified.
- Discontinue testing operations.
- Customer will be responsible for notifying the Program Office at each company and resolving any instances of damage, modification or repair.
- Photograph any indications of damage, and if testing is continued photograph the same location after test for post-event comparison.

Mounting fasteners may be tightened to compensate for seating of mating surfaces after the first shot only. When the acceptance criteria are violated after completion of a drop series during medium weight deck simulating shock testing of the item, and corrective design modifications are made, drops of the maximum drop height for those series must be repeated. For medium weight deck simulating shock testing, the maximum drop height in each direction and each frequency must be repeated in the retest for each operating condition.

4.9 Method of Mounting

A NTS designed test fixture (Attachment A) will be utilized the interface the EUT with the DSSM. The EUT will attach to its test fixtures 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 will attach to the DSSM using twelve (12) 1”-8 Hex Head Bolts and twelve (12) Flat Washers.

4.10 Mode of Operation

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

5.0 TEST METHOD

5.1 Test Facility

Medium weight deck simulating shock testing will be performed by the Rustburg Division of National Technical Systems (NTS). This test facility is approved for testing in accordance with NAVSEA Letter 907, Ser 05P/301 dated 21 September 2018.

5.2 DSSM Test Series

The test series will be conducted in accordance with MIL-DTL-901E Section 3.1.8.4.2.1. Table XVI “DSSM test schedule of class II, class I/II, and class III deck mounted equipment installed on surface ships except carriers”, was used to determine the DSSM Spring Tray Configurations. Table 2 shows the planned test schedule and test parameters.

Drop No.	Drop Height (in)	EUT Orientation	DSSM Spring Tray Configuration (Nominal Spring Tray Frequency)	Gamma (deg)	Beta (deg)
1	7	Shipboard	Figure 25 (30 Springs)	7.5	20
2	9.5	Shipboard	Figure 25 (30 Springs)	7.5	20
3	13	Shipboard	Figure 25 (30 Springs)	7.5	20
4	13	Rotated	Figure 25 (30 Springs)	7.5	20

Table 2: Test Schedule

5.3 DSSM Setup Description

The test parameters used to set the DSSM are the upper swing arm angle β , the lower swing arm angle γ , and the drop height h as shown in Figure 1. The angle β controls the rotational input velocity, the angle γ controls the Athwartship input velocity, and the drop height h controls the vertical velocity.

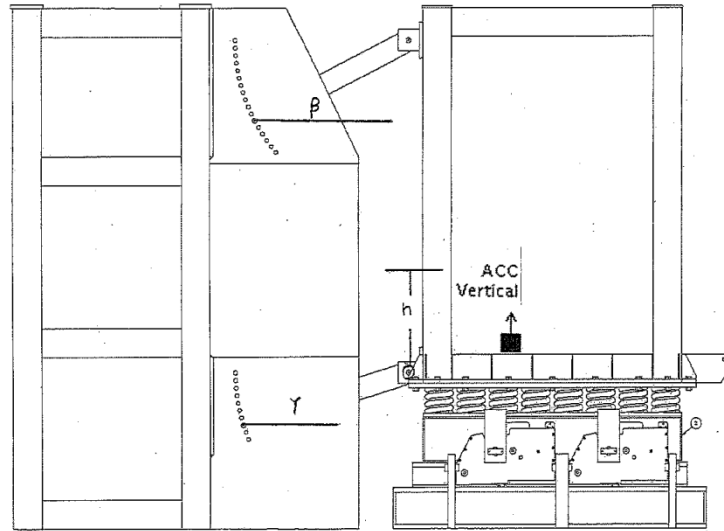


Figure 1: DSSM Setup

5.4 Test Instrumentation

One (1) input (relative to the machine orientation) accelerometer (ACC) three (3) response accelerometers will be installed on the DSSM and the EUT during the test series to verify proper test geometries and response of the EUT. One video record in Windows Media Player format will be taken of each drop. All test and measurement equipment used will be calibrated in accordance with ISO/IEC 17025. The number of instrumentation channels and/or locations may be revised at time of test upon the discretion of test engineers and customer representatives. Table 3 lists instrumentation locations.

Gauge	Orientation	Location
ACC101V*	Vertical	Back, Center line of DSSM Cage
ACC201V	Vertical	Top Right Front Corner
ACC202FB	Front-to-Back	Top Right Front Corner
ACC203SS	Side-to-Side	Top Right Front Corner

Table 3: Instrumentation Locations

*input (relative to the machine orientation)

6.0 TEST ACTIONS/REQUIREMENTS

6.1 Inspection Documentation

The following visual inspections and operational tests are to be made by NTS and Schroff, Inc. representatives.

6.1.1 *Prior to Drop No. 1*

- Conduct a thorough visual examination of the test item 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 subsequent testing.
 - Electrical Hazards
- Tighten all mounting hardware to correct tightness.
- Photograph the equipment, as necessary, to establish a pre-test condition.
- Record results of visual inspections for insertion into final test report. Results of the preceding inspections shall serve as the base line for establishing the condition of the equipment during and after the shock test series.

6.1.2 *After Each Drop*

- Conduct a visual inspection of the equipment for physical damage, specifically:
 - Broken, loose, or deformed parts
 - Cracked welds
 - Other evidence of physical damage
 - Any condition that could endanger equipment or personnel during subsequent testing.
- Tighten exposed fasteners, as necessary, only to compensate for loosening due to seat-in after Drop No. 1 in accordance with MIL-DTL-901E, Section 3.1.8.8. Subsequent drops will proceed with the fasteners in the “as found” condition. Excessive loosening or yielding will be recorded during the test and may, depending on degree, be considered a violation of shock test acceptance criteria.

- Photograph noted deficiencies.
- Record results of visual inspections for insertion into final test report.

6.2 Test Photographs

Photographs will be taken to document the following:

- Overall equipment installation and arrangement on the DSSM
- Discrepancies or indication of damage prior to testing.
- Damage that occurs as a result of testing.
- Modifications/repairs made during the course of the test series.

Photographs of any instances of damage/modification will be included in the shock test report.

7.0 TEST CONDUCT ACTIONS/REQUIREMENTS

7.1 Modifications, Shock Hardening, and Repeat Testing

Any shock hardening actions, after any test event, shall be documented and photographed. Repeat testing, if required, will be performed in order to meet the intent of Paragraph 3.1.11 of MIL-DTL-901E.

In cases where shock test damage in violation of acceptance criteria is not discovered until post-test teardown, selection of high impact test shots are to be repeated, and procedures for such tests shall be approved by the acceptance authority prior to performing the repeat tests. The on-site Test Team shall evaluate the physical inspection results following each drop. In the event where evidence of physical damage is noted, the on-site representative will direct one of the following actions:

- Note condition and continue testing if the damage is not of a functional or hazardous nature.
- Make a temporary fix.
- Make a permanent fix. Remove the equipment item from the DSSM and temporarily postpone testing while the unit is repaired or modified.

8.0 POST-TEST ACTIONS/REQUIREMENTS

8.1 Disposition of Shock Test Items

Once the EUT is removed from the test fixture, Schroff, Inc. will inspect the EUT in accordance with MIL-DTL-901E Section 3.1.9.2. The post-test inspection results will be included in the final report.

After the post-test inspection, the equipment will be prepared for return shipment to Schroff, Inc.

8.2 Test Report

NTS will provide a shock test report in accordance with MIL-DTL-901E. The report will include comments, photographs and drawings as may be needed to define and document areas and details of damage, impact on mission capability, report, or modifications.

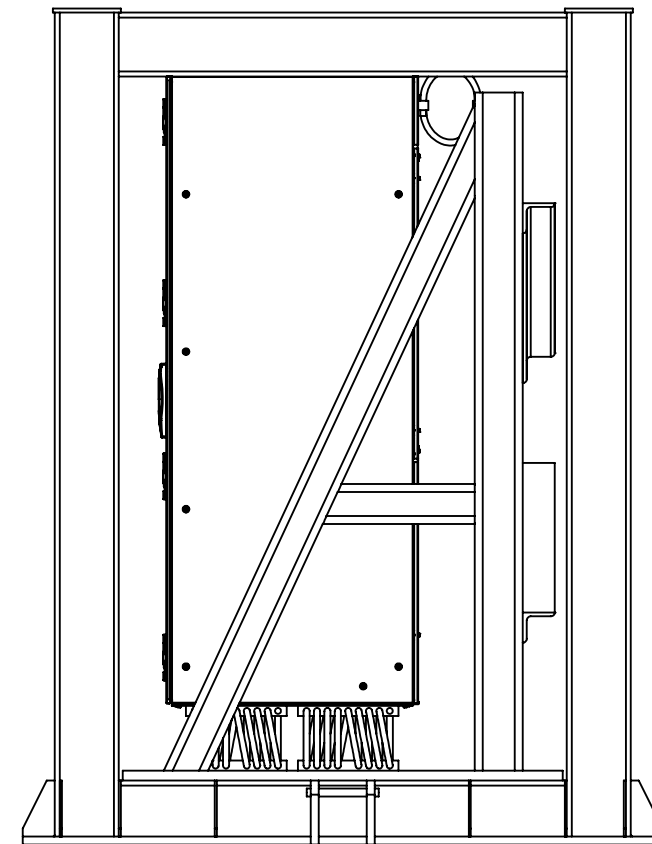
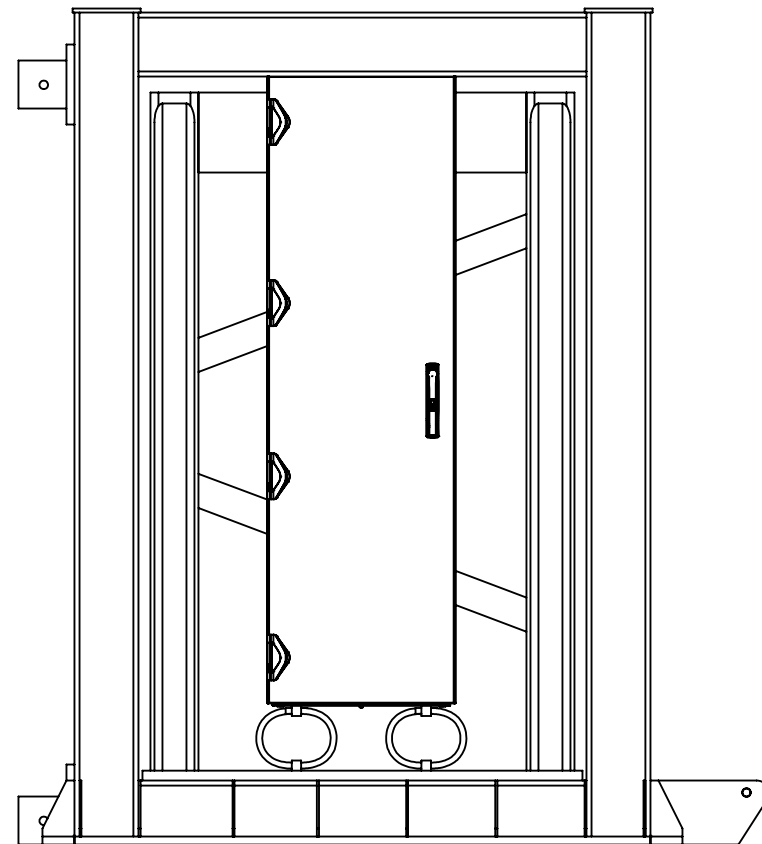
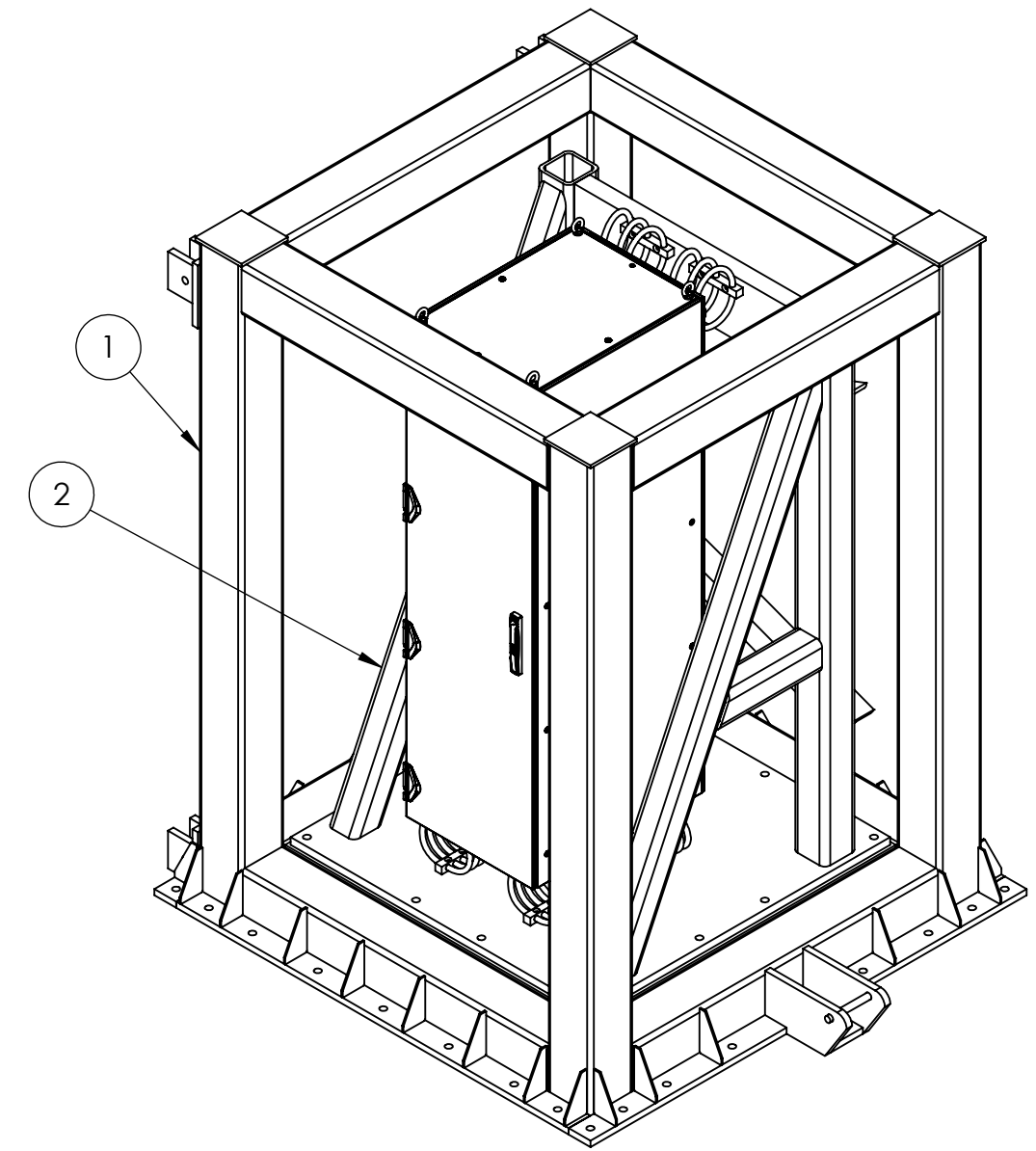
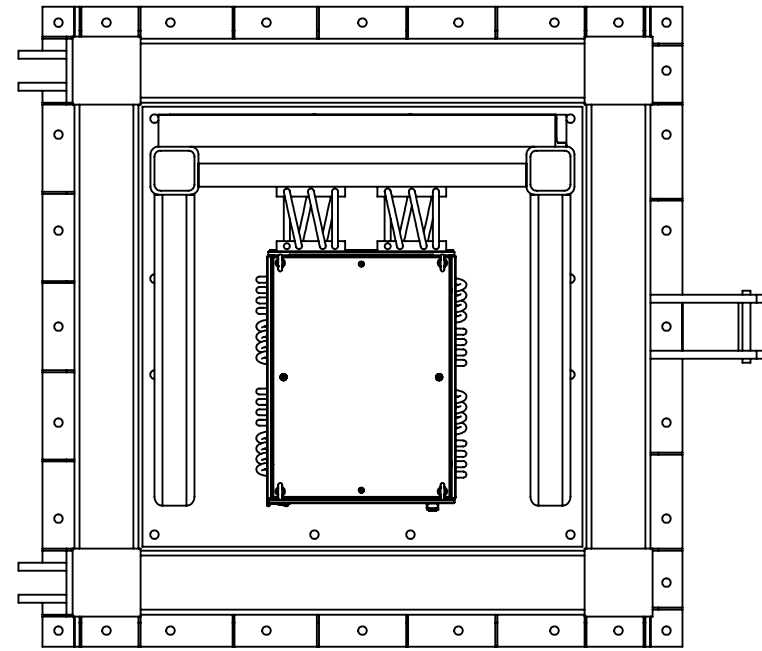
The report will address any modifications, if required, of the test items accomplished by the test facility prior to and subsequent to each test drop. The report will be prepared within 30 working days following the completion of the test series.

Attachment A:

NTS Test Fixture Drawing

ITEM NO.	QTY.	PART NO.	MATERIAL	DESCRIPTION	SPEC.	WEIGHT
1	1	DSSM GEN 2 CAGE ASSY	Varies	Existing Structure	N/A	N/A
2	1	VAR Cabinet Test Assembly	Varies	See Sheet 3	N/A	3285

Note:
Item 2 will attach to item 1 using the following hardware:
Qty. Twelve (12) 1"-8 Hex Head Bolts
Qty. Twelve (12) 1" Flat Washers



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

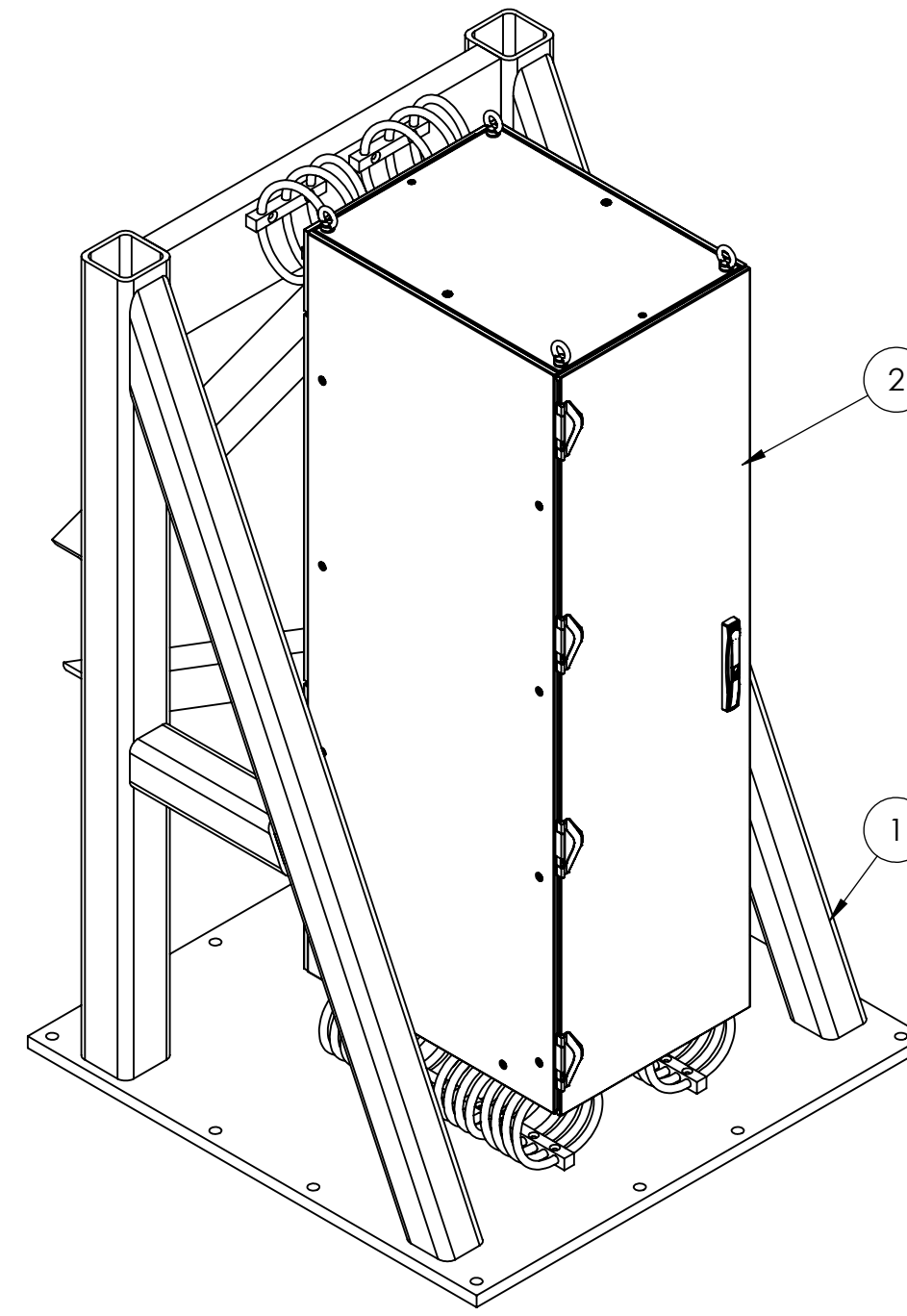
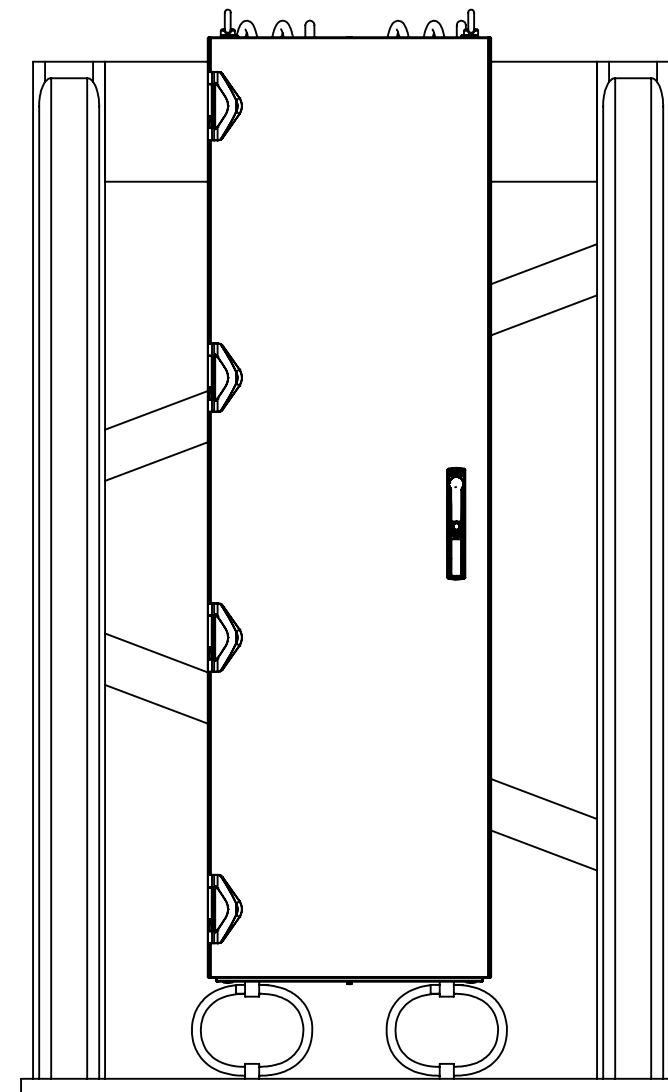
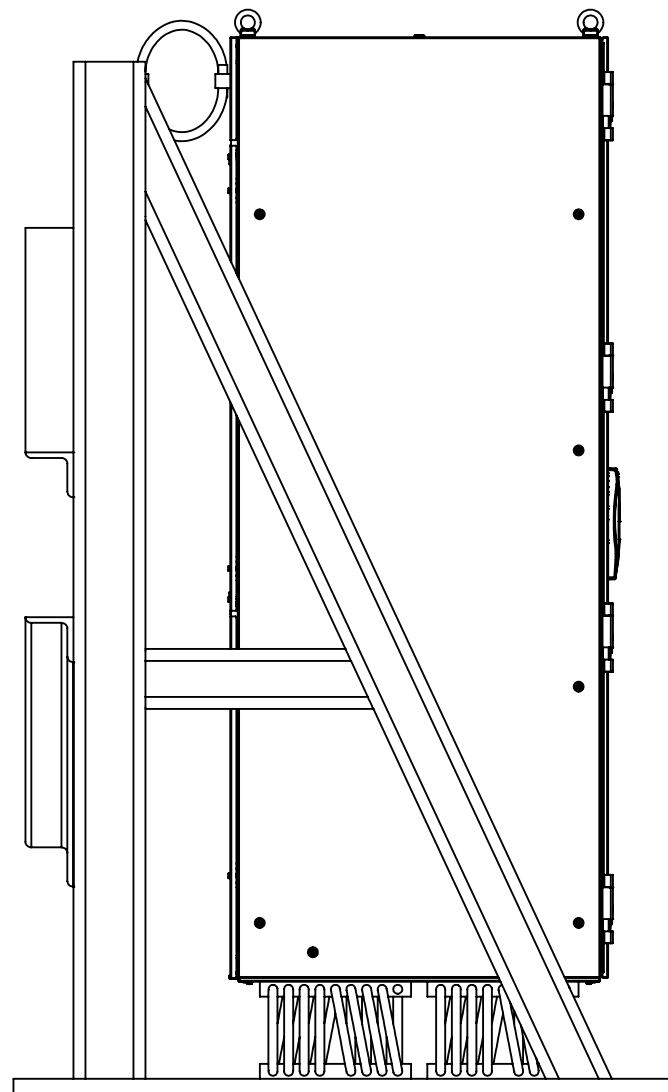
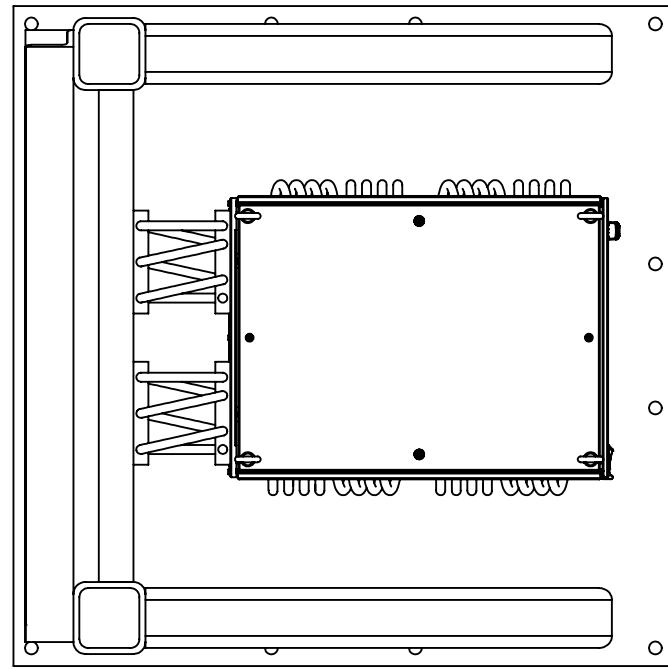
**NATIONAL TECHNICAL SYSTEM
RUSTBURG DIVISION**

NTS

PROPRIETARY INFORMATION

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

NO.	REV	QTY	REVISION	DATE	NAME
DES.	01-Feb-23	WRK	MATERIAL NA	None	Rotated Orientation
DRAWN	01-Feb-23	WRK	FINISH FINISH	SCALE	DESCRIPTION
CHECK			STOCK DIM		PART NO.
CHECK					DRAW. NO. PH00005037
DRAWING SHEET SIZE	C				SHEET 2/6



Note:
Item 2 will attach to item 1 using the following hardware:

Back Mounting
Qty. Four (4) 1/2"-13 UNC Grade 5 Hex Head Bolts
Qty. Four (4) 1/2"-13 UNC Grade 5 Self-Locking Nuts
Qty. Four (4) 1/2" Flat Washers

Bottom Mounting
Qty. Sixteen (16) 3/8"-16 UNC Grade 5 Hex Head Bolts
Qty. Sixteen (16) 3/8" Lock Washer
Qty. Sixteen (16) 3/8" Flat Washers

ITEM NO.	QTY.	PART NO.	MATERIAL	DESCRIPTION	SPEC.	WEIGHT
1	1	VAR Cabinet Test Fixture	Steel	See Sheet 4	Varies	2271
2	1	VAR Cabinet	Varies	Customer Supplied	N/A	1014

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

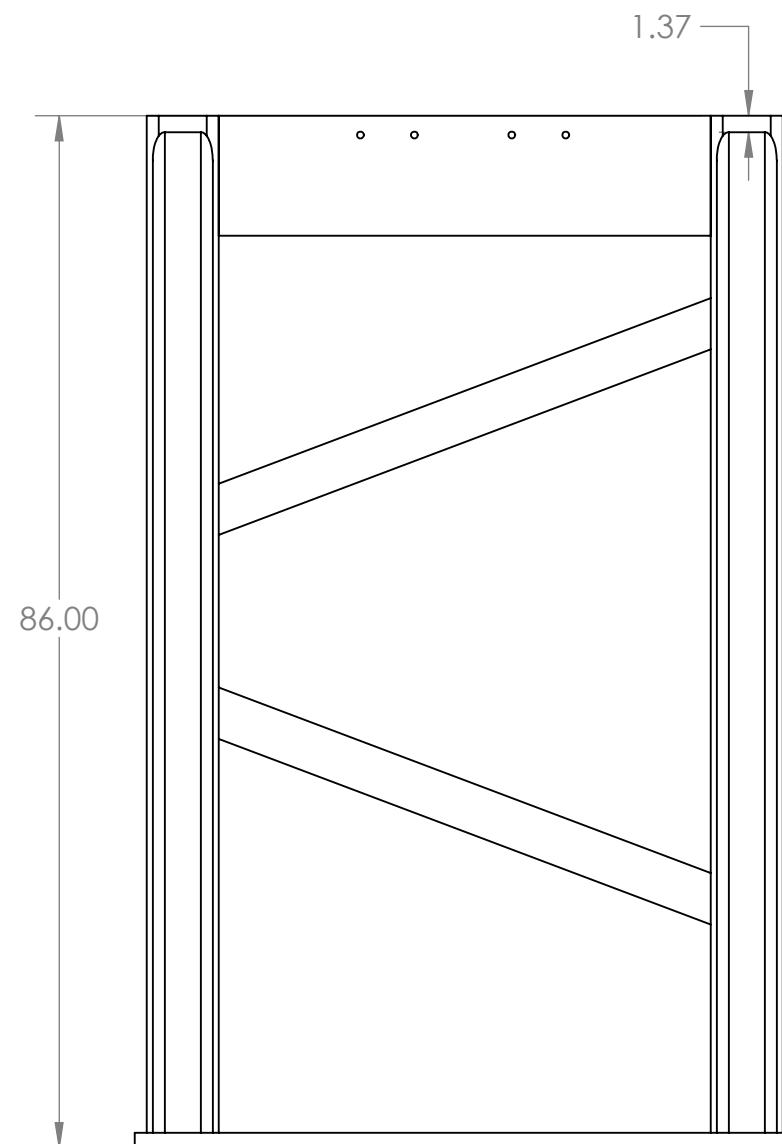
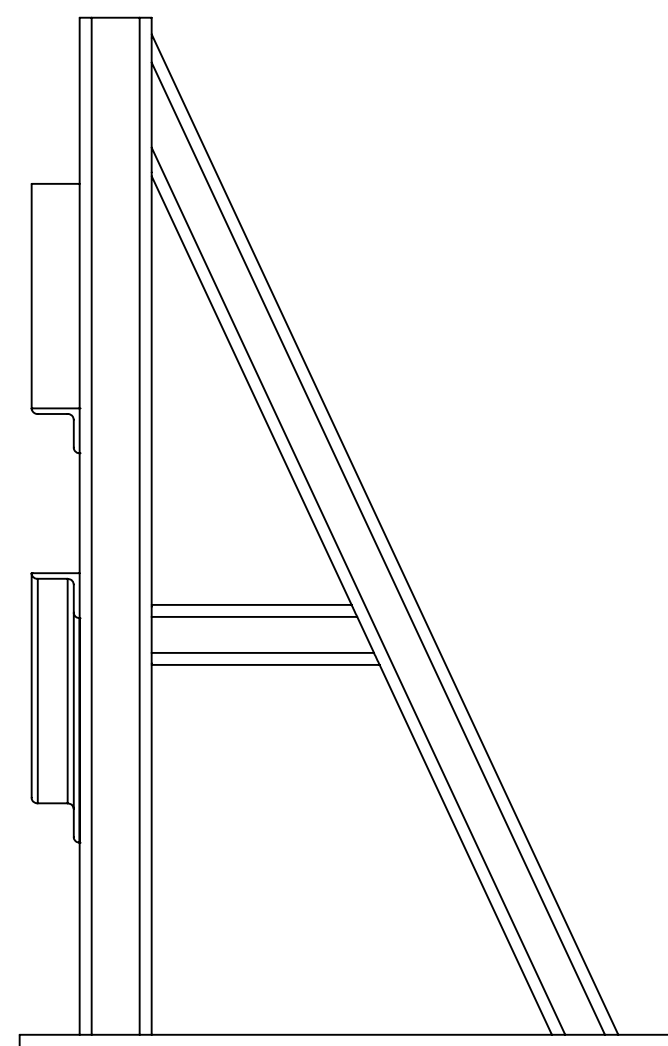
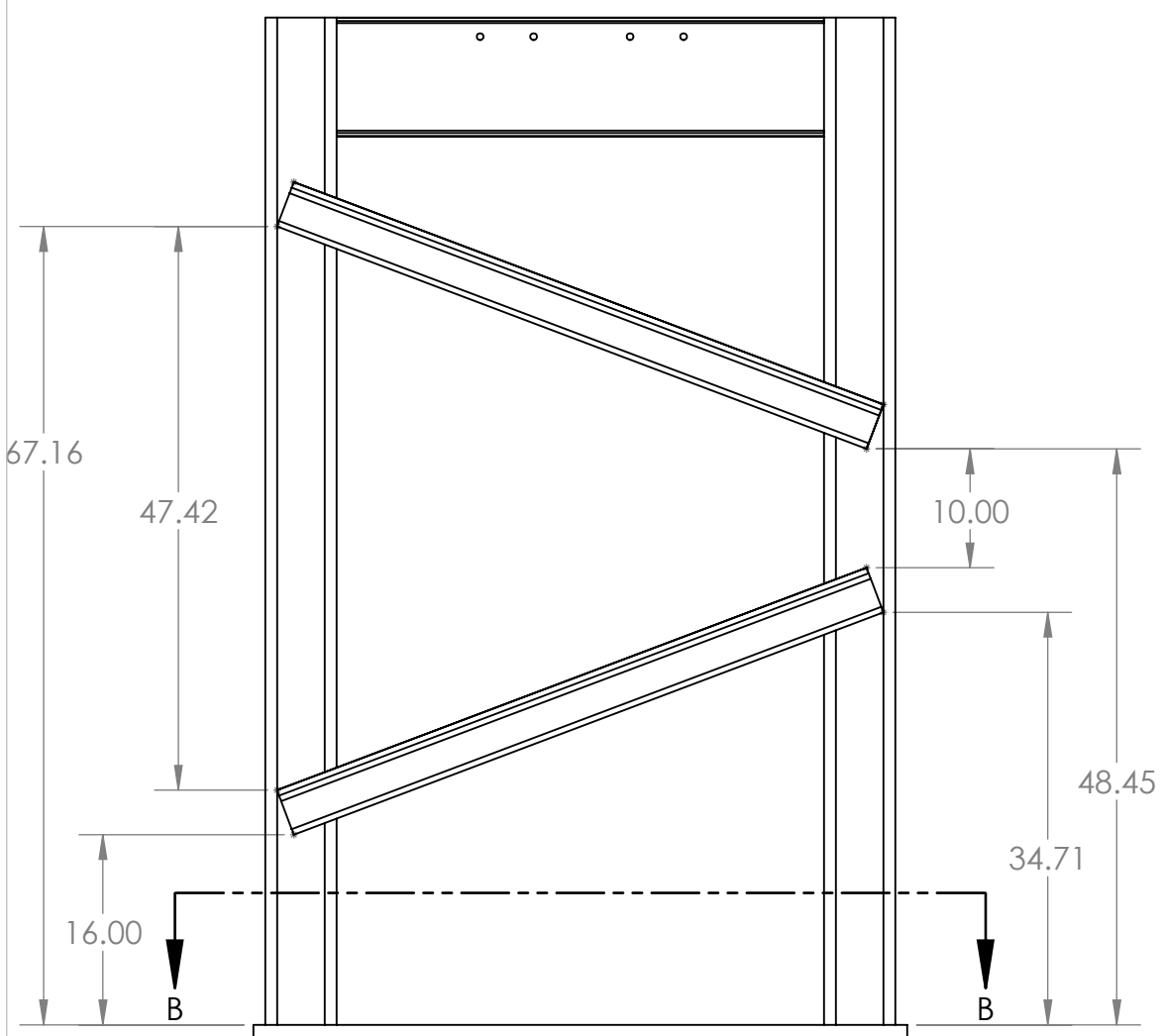
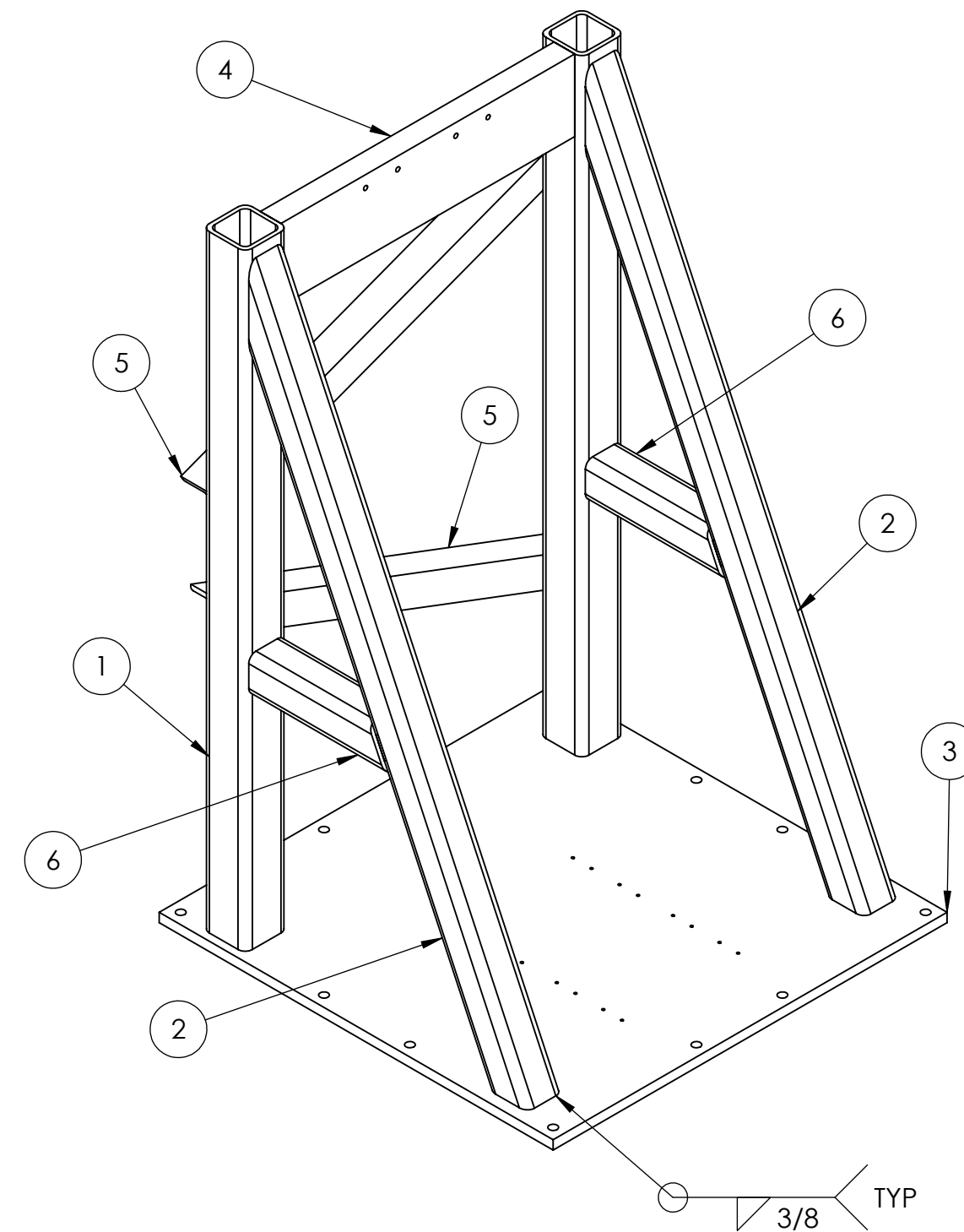
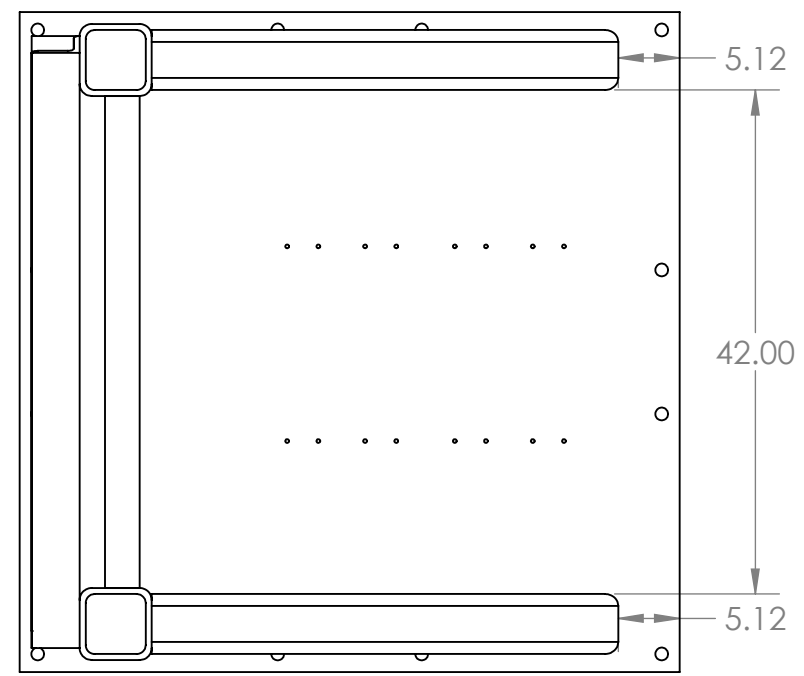
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RUSTBURG DIVISION**

NTS

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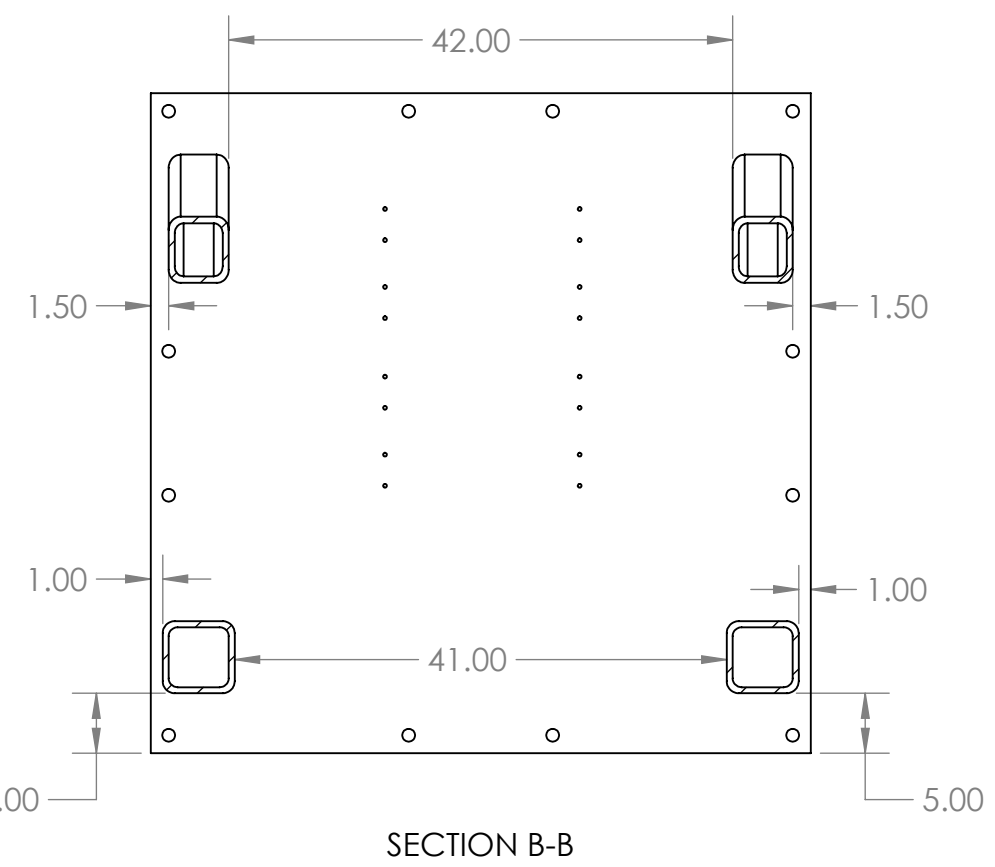
3915 Sunnymead Rd. Rustburg, VA 24588
PHONE (434) 846-0244 * FAX (434) 846-2197

NO.	REV	QTY	REVISION		DATE	NAME
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CHECK			FINISH		PART NO.	
CHECK			STOCK DIM		DRAW. NO. PH00005037	
DRAWING SHEET SIZE			C	STOCK DIM.		SHEET 3/6



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

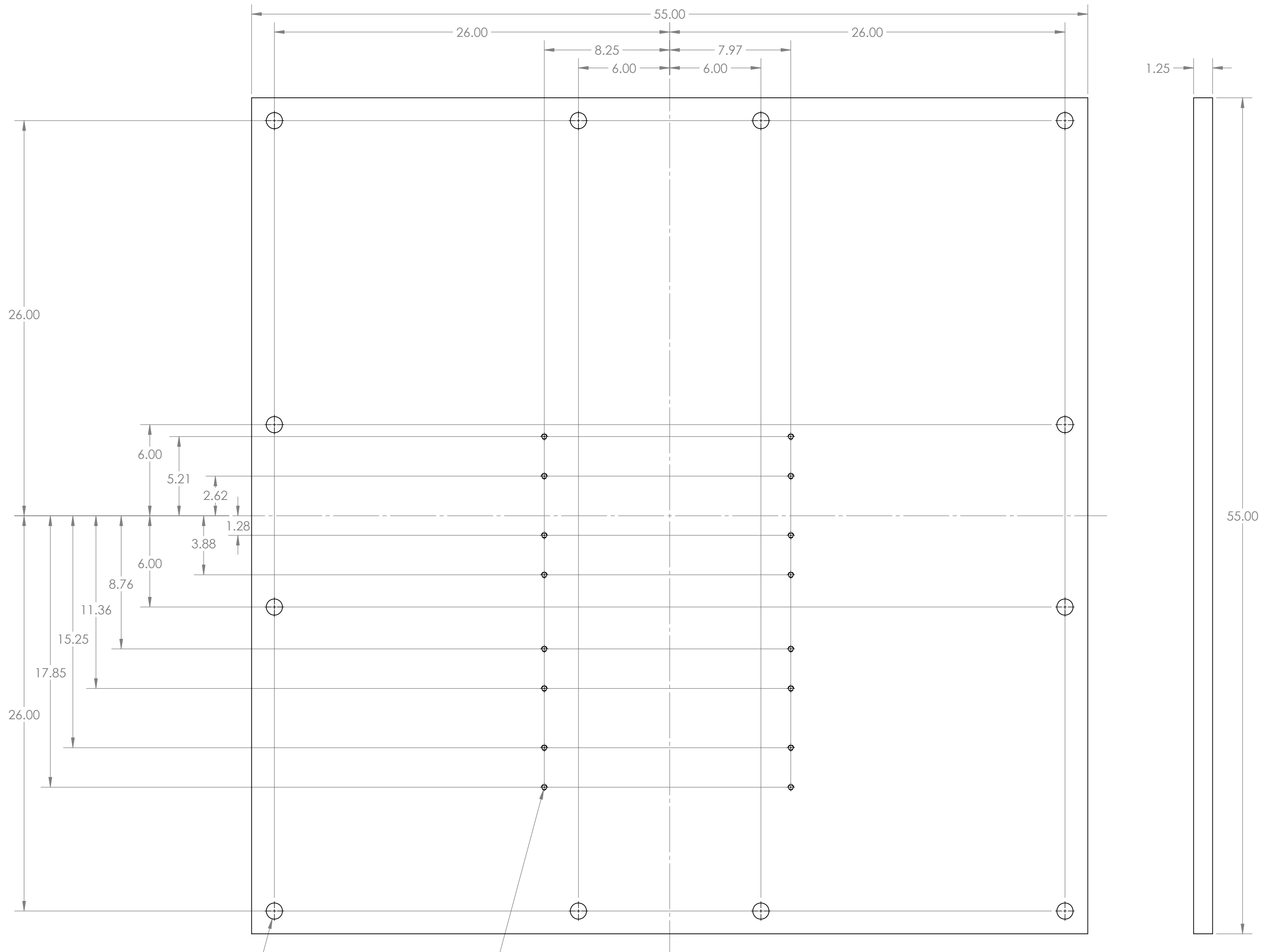
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3915 Sunnymede Rd. Rustburg, VA 24588
 PHONE (434) 846-0244 * FAX (434) 846-2197

NO.	REV	QTY	REVISION	DATE	NAME
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CHECK			FINISH		
CHECK			STOCK DIM		
DRAWING SHEET SIZE			C	VAR Cabinet Test Fixture	
			SCALE	PART NO.	
				PH00005037	
				DRAW. NO.	
				4/6	



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

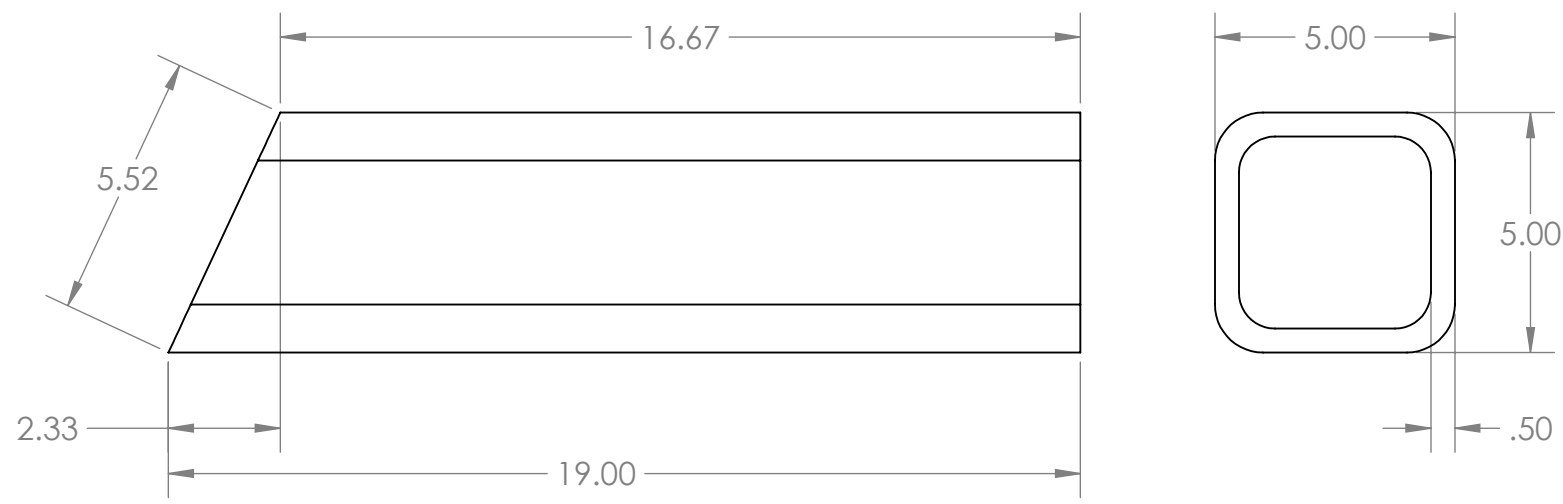
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NTS

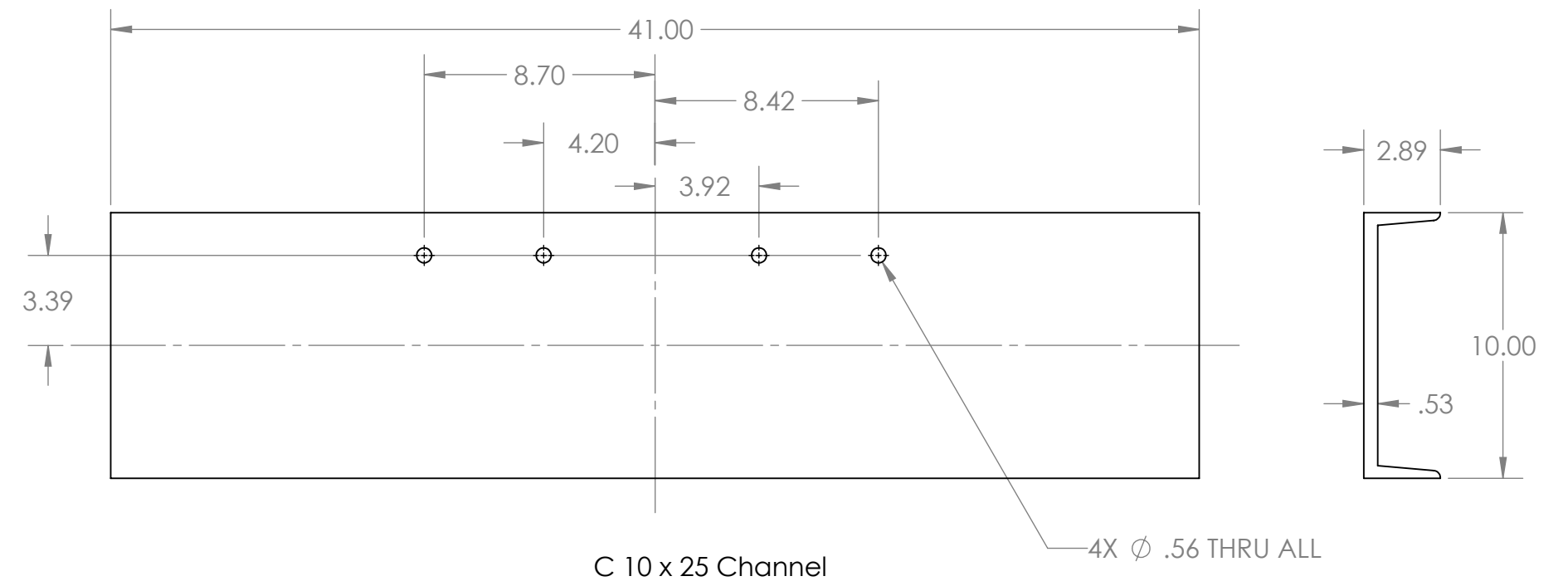
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PHONE (434) 846-0244 * FAX (434) 846-2197

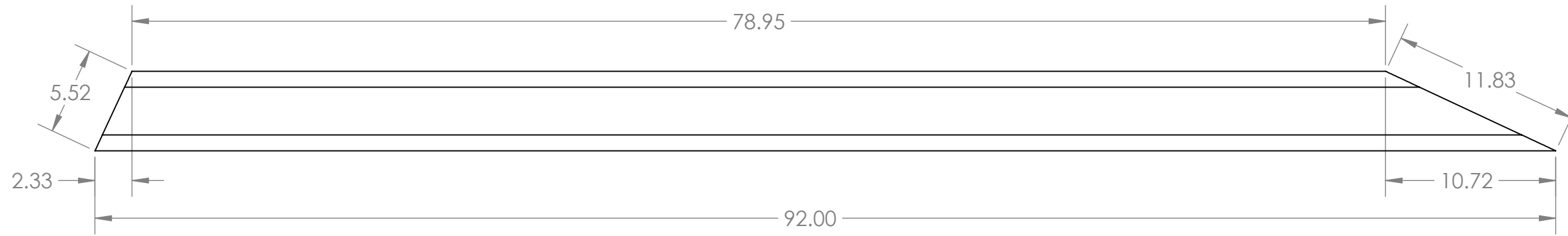
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CHECK						PH00005037
DRAWING SHEET SIZE	C					DRAW. NO.
						5/6



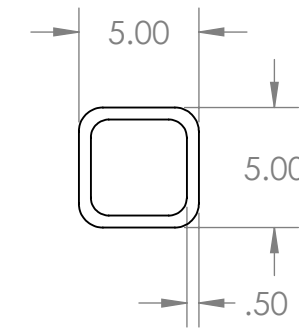
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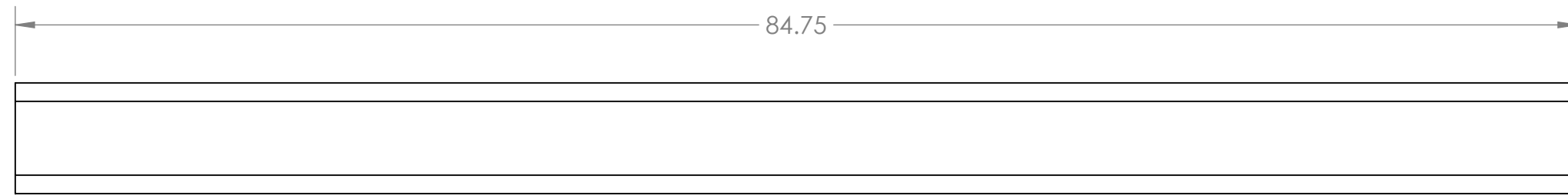
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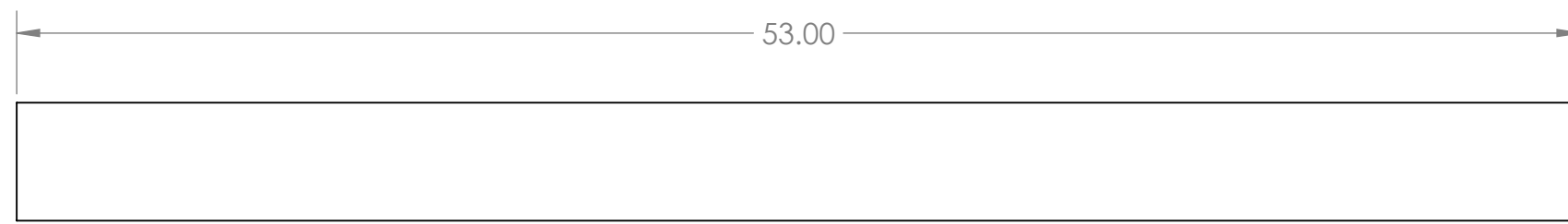
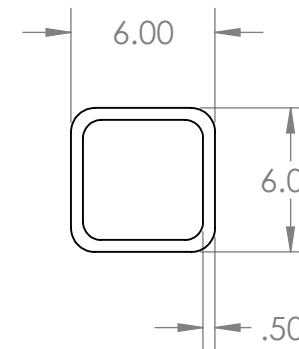
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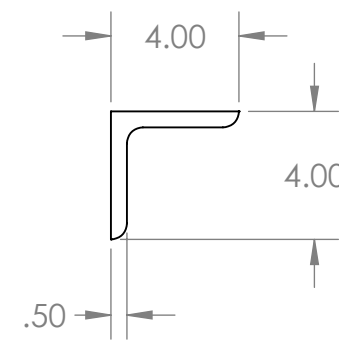
Note:
Template all mounting holes
from equipment as a guide.



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

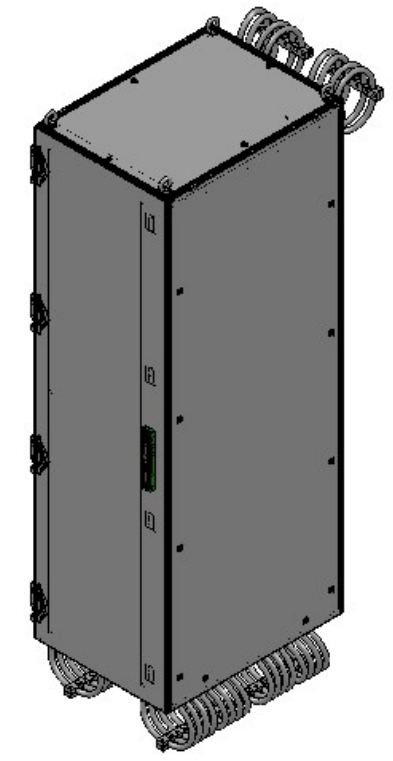
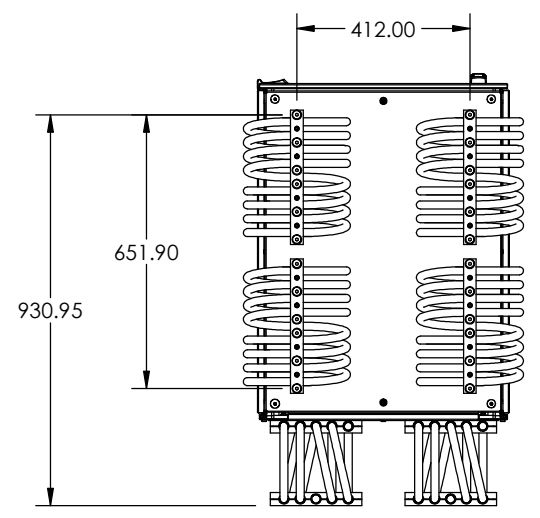
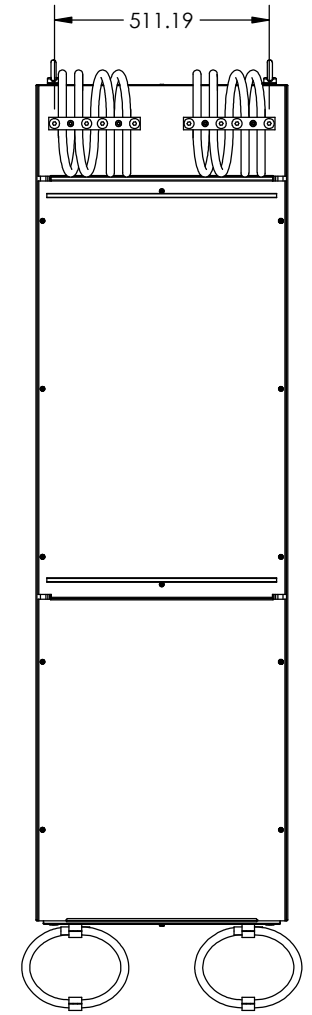
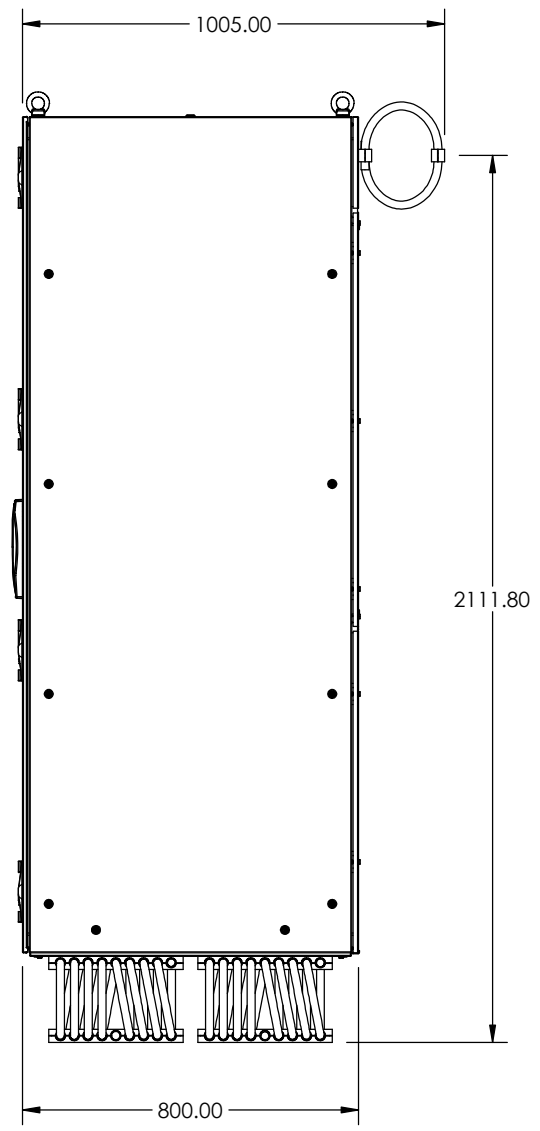
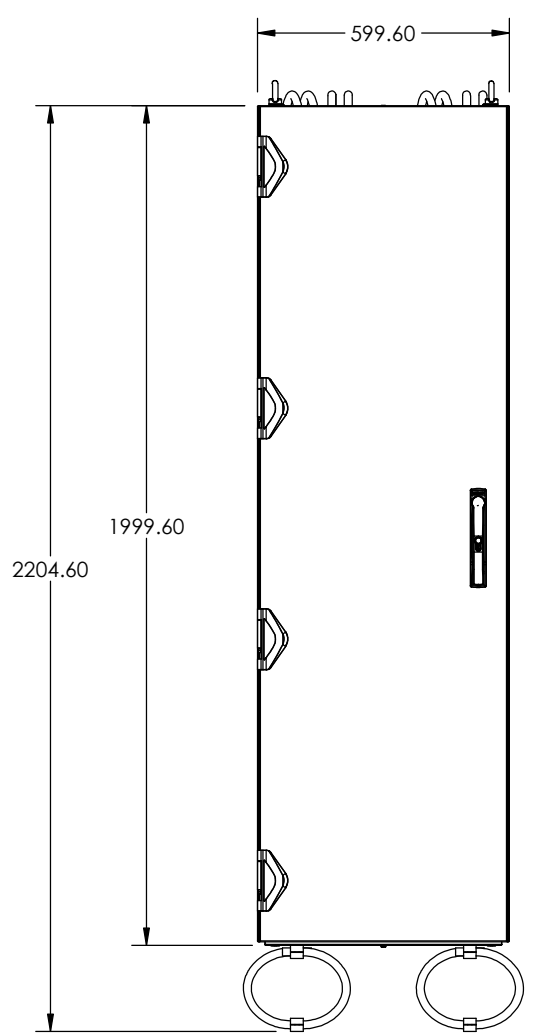
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CHECK			STOCK DIM		
DRAWING SHEET SIZE			C	VAR Test Fixture Components	
			STOCK DIM.	PART NO.	PH00005037
				DRAW. NO.	6/6

Attachment B:

Schroff EUT Drawing

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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

DESIGN AUTHORITY
WARWICK

COSMETIC APPEARANCE
MAX CLASS
MIN CLASS

MATERIAL SEE NOTES
FINISH SEE NOTES

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

SOLIDWORKS