

Eco Electrical Systems

1000 h Salt Fog Test per IEC 62217:2012



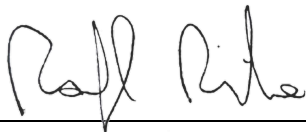
REPORT OF PERFORMANCE

CLIENT / MANUFACTURER	Eco Electrical Systems 7365 Rocky Flats Ct. Reno, NV United States 89502
TEST OBJECT	Wildlife Cover for 27 kV Bushings CAT No: BC-1-FR Rated Voltage: 27 kV Wildlife Cover for 27 kV Cutouts CAT No: ECC-UHC-FR Rated Voltage: 27 kV
TESTED BY	Powertech Labs Inc. 12388 - 88 th Ave, Surrey, BC Canada V3W 7R7 www.powertechlabs.com
DATE RECEIVED	2026-01-23
TEST DATE(S)	2026-03-02 to 2026-04-14
TEST SPECIFICATION	IEC 62217:2012, Clause 9.3.3

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1 INTRODUCTION

At the request of Eco Electrical Systems, three wildlife bushing covers and three wildlife cutout covers were tested in accordance with IEC 62217:2012, clause 9.3.3. This report summarizes the results of the test performed. The purpose of the test was to verify if the test object complies with the requirements of the standard. No witnesses were present during testing.

2 TEST OBJECT INFORMATION

2.1 Test Specimen

The test object is identified based on client information as follows:

Design A:

Manufacturer: Eco Electrical Systems
Type: Wildlife Cutout Cover
CAT No: ECC-UHC-FR
Rated Voltage: 27 kV

Design B:

Manufacturer: Eco Electrical Systems
Type: Wildlife Bushing Cover
CAT No: BC-1-FR
Rated Voltage: 27 kV

The drawings of the test objects can be found in Appendix B.

2.2 Support Equipment for the Test Specimens

Cutouts:

Manufacturer: Eaton
Type: Interchangeable Fuse Cutout
CAT No: S9DAR0A
Rated Voltage: 27 kV

Bushings:

Manufacturer: Celeco Prolec
Type: Ceramic bushing
CAT No: 20504023R
Rated Voltage: 27 kV

3 GENERAL INFORMATION

3.1 Purpose

The purpose of the test was to verify if the test object complies with the requirements of the standard.

3.2 Witnesses

There were no client witnesses during the test.

3.3 Tests Performed

IEC 62217:2012 Clause 9.3.3 – Tracking and erosion test – 1000 h salt fog test

4 TRACKING AND EROSION TEST - 1000 H SALT FOG TEST

General Information:

Standard: IEC 62217:2012, Clause 9.3.3
Test Date: 2026-03-02 to 2026-04-14
Test Leader: Rafael Ristow

Environmental Conditions:

Ambient temperature $20 \pm 5^{\circ}\text{C}$

Test Conditions:

Required duration of test: 1000 h
Actual duration of the test: 1022 h
Test Voltage: 15.6 kVrms
NaCl Content of Water: 2.0 kg/m³
Precipitation rate (required): 1.5 to 2.0 mL/hr
Precipitation rate (measured): 1.59 mL/hr

Samples:

Table 1 – List of samples

Sample Number (see Figure 1)	Type
4373-B1	Bushing cover
4373-B2	Bushing cover
4373-B3	Bushing cover
4373-A1	Cutout cover
4373-A2	Cutout cover
4373-A3	Cutout cover

The samples were mounted (see Figure 1) and placed in a salt fog chamber with dimensional and sprayer characteristics in accordance with the requirements of IEC 62217:2012, Clause 9.3.3. The cutouts were positioned in the back of the chamber. Appendix C shows the photos of the test setup with the samples in the salt fog chamber.

The spacing of the samples on the support equipment and between the walls, floor, and ceiling of the chamber was greater than 400 mm.

The test was paused weekly for less than 1 hour for inspection, when photographs of the test samples were taken and routine maintenance of the test chamber was performed. The test log can be found in Appendix A.

Requirements:

The requirements from IEEE 1656-2010 are the total aging period is 1000 h. In the event of a flashover during aging, two attempts will be made to restore voltage. If it is not possible to resume the aging process, the sample is removed from the test apparatus. Premature removal from the aging process constitutes a failure.

Also, adapted from IEC 62217-2012, the test is regarded as passed if the test specimens:

1. No tracking occurs,
2. For composite insulators: erosion depth is less than 3 mm,
3. No shed, housing or interface is punctured.

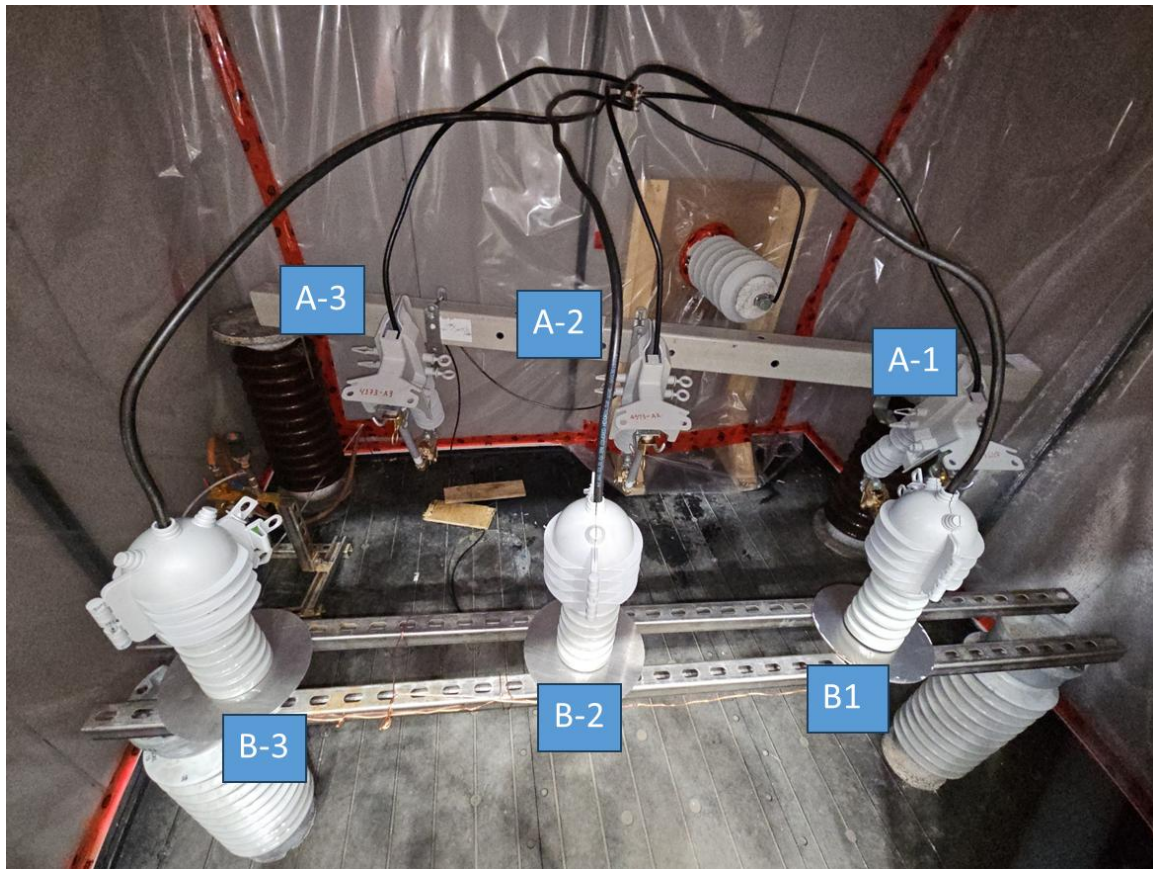


Figure 1 – Layout and Numbering

Evaluation and Results:

Table 2 presents the test results and observations that were made at the end of the test, along with figures that illustrate the evaluation. Appendix C shows the photos of the samples after testing.

Table 2 – Test Results and Evaluation of the Samples after Testing

Sample number	Type	Evaluation	Figures	Result
A-1	Cutout cover	No measurable amounts of tracking or erosion, and no sheds, housing, or interfaces were punctured.	Figure 10	PASS
A-2	Cutout cover	No measurable amounts of tracking or erosion, and no sheds, housing, or interfaces were punctured.	Figure 11	PASS
A-3	Cutout cover	No measurable amounts of tracking or erosion, and no sheds, housing, or interfaces were punctured.	Figure 12	PASS
B-1	Bushing cover	No measurable amounts of tracking or erosion, and no sheds, housing, or interfaces were punctured.	Figure 6	PASS
B-2	Bushing cover	No measurable amounts of tracking or erosion, and no sheds, housing, or interfaces were punctured. The topmost inner edge of the bushing cover showed a black stain created from the tracking and erosion of the high voltage conductor contained within, however no tracking or erosion were noted on the sample itself.	Figure 7, Figure 8	PASS
B-3	Bushing cover	No measurable amounts of tracking or erosion, and no sheds, housing, or interfaces were punctured.	Figure 9	PASS

APPENDIX A Tracking and Erosion Test - 1000 H Salt Fog Test Log

Table 3 – Salt Fog Test Log

Elapsed Test Time (h)	Activity	Observations
0	Started the test on March 02, 2026	None
21	Protection tripped the contactor due to an installation issue with the oil container under the support equipment for Sample B-2	5h 20min of paused test
163	Visual inspection and maintenance (17 min)	None
330	Visual inspection and maintenance (29 min)	None
427	Shutdown (40 min) to prepare backup power supply due to a planned outage	None
493	Visual inspection, maintenance and removal of backup power supply (79 min)	None
660	Visual inspection and maintenance (39 min)	None
850	Visual inspection and maintenance (30 min)	None
1022	Test completed on April 14, 2026	See Table 2

APPENDIX B MANUFACTURER'S DRAWINGS AND PHOTOS



Figure 2 - Drawing of Design A (Cutout cover)

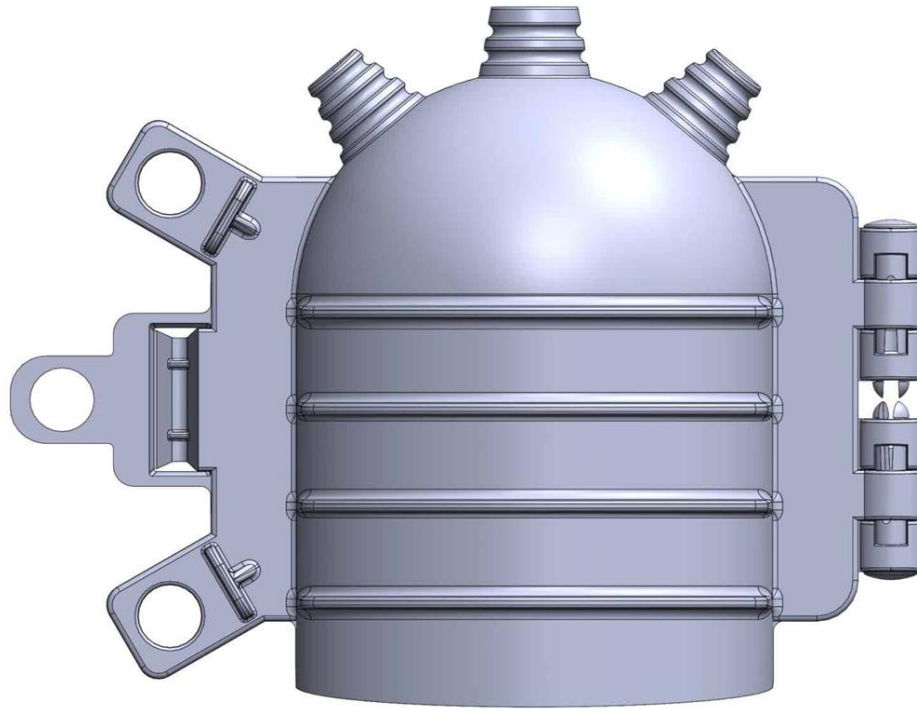


Figure 3 - Drawing of Design B (Bushing cover)

APPENDIX C Photographs of the Test Object

Please refer to Figure 1 for reference of numbering and position of samples.

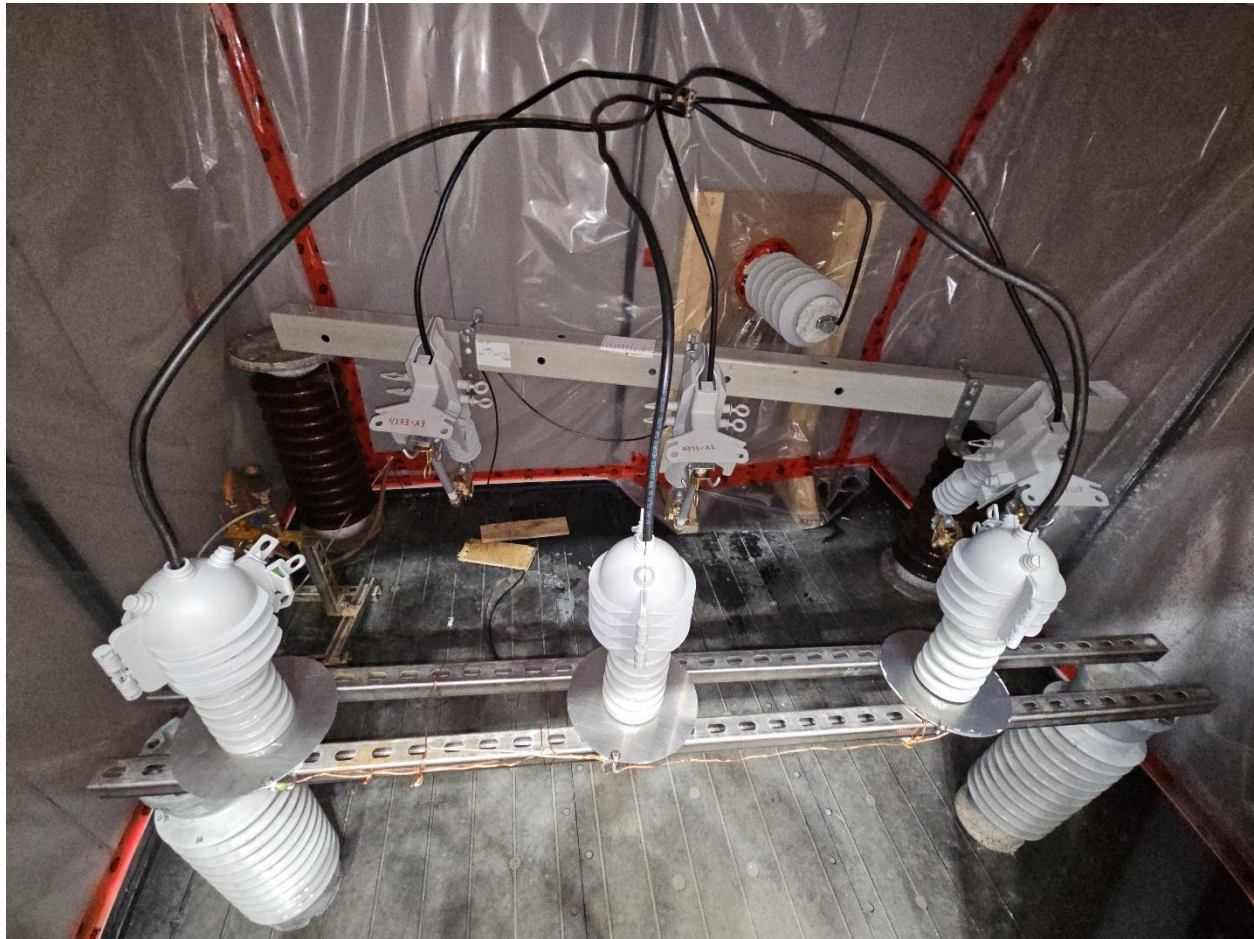


Figure 4 – Samples setup in the salt fog chamber
(Note: the oil containers under the bushings are shown in Figure 5)



Figure 5 –Detail of the oil containers for the bushings



Figure 6 – Sample B-1 after the test.



Figure 7 – Sample B-2 after the test.



Figure 8 – Detail of stain in Sample B-2 (left), where no tracking or measurable erosion were present, and cable that eroded (right) causing the black stain on the sample.

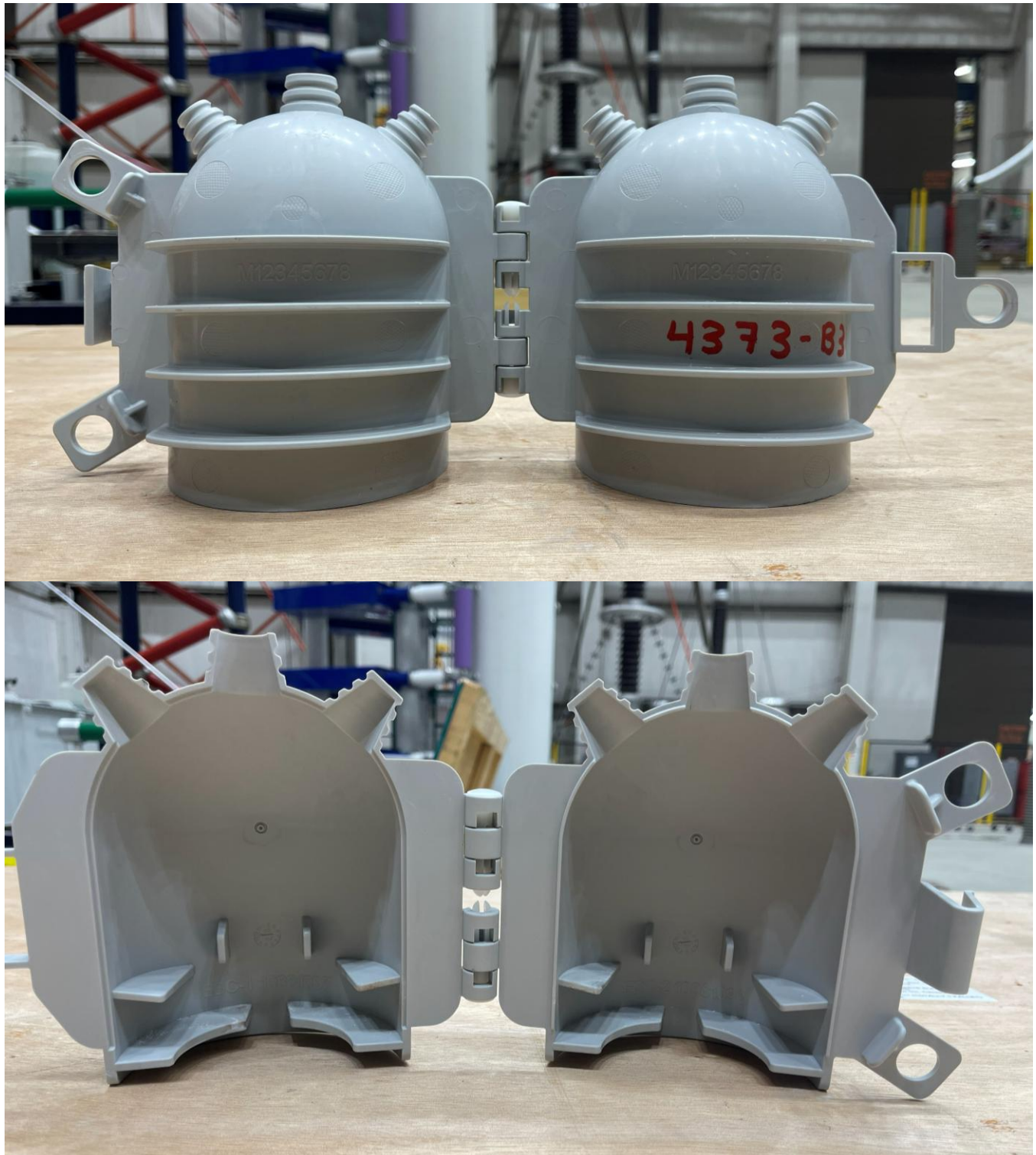


Figure 9 – Sample B-3 after the test.

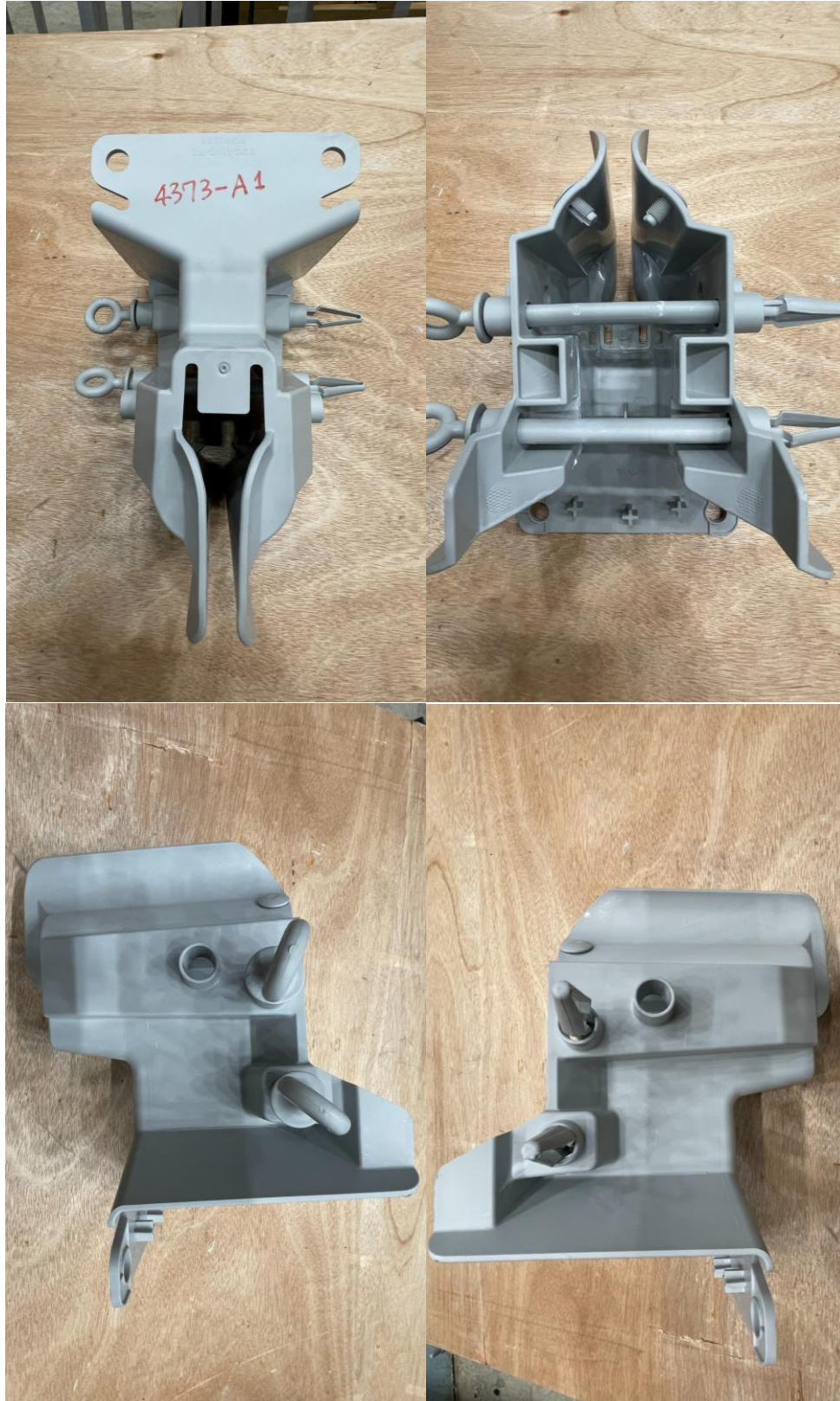


Figure 10 – Sample A-1 after the test.

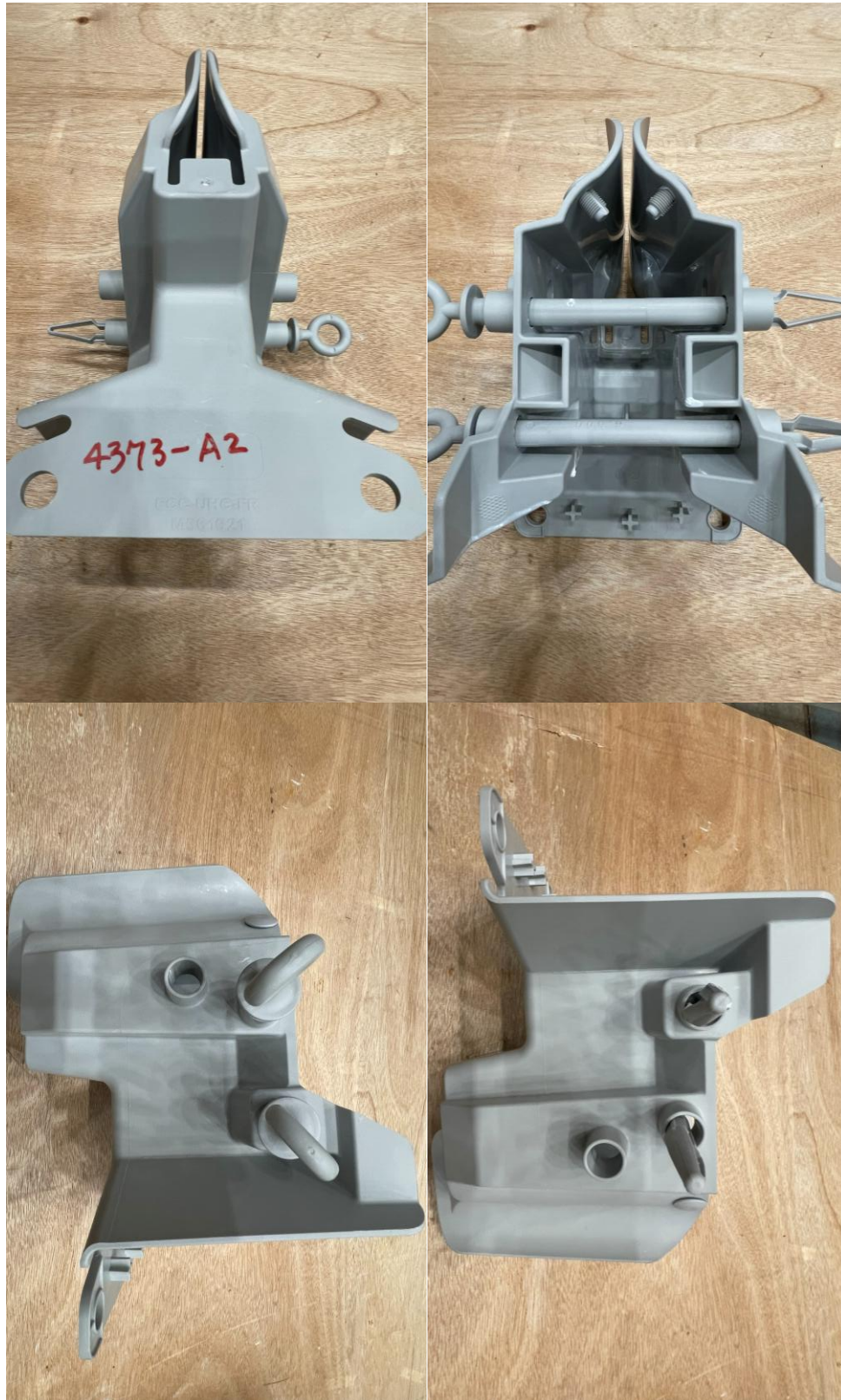


Figure 11 – Sample A-2 after the test.



Figure 12 – Sample A-3 after the test.

APPENDIX D EQUIPMENT CALIBRATION

Description	Manufacturer	Model	Powertech ID	Calibration Due
Voltage Divider	Phenix	DVD100	35656	2026-11-20
Voltmeter	Fluke	289	32121	2026-11-05
Data logger	Keysight	DAQ970A	36706	2026-10-06
Conductivity Meter	Oakton	CON150	34601	2026-07-02