National Technical Systems Test Report for Environmental Testing of the Ohmmeter with Intrinsic Fail-Safe Features

Prepared For
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Performed By
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Revision History

Rev.	Description	Issue Date
0	Initial Release	02/10/2022

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1.0 Introduction

This document presents the test procedures used and the results obtained during the performance of an Environmental (ENV) test program. The test program was conducted to assess the ability of the specified Equipment Under Test (EUT) to successfully satisfy the requirements listed in Section 2.0.

2.0 References

The following references listed below form a part of this document to the extent specified herein.

- Test Specification: Military Standard No. MIL-STD-810; G; Method 511.5, Procedure I
- Valhalla Scientific, Inc. Purchase Order(s) 1028, dated 01/14/2022
- National Technical Systems (NTS) Quote(s) OP0605333, dated 01/12/2022
- ISO/IEC 17025:2017(E) *General Requirements for the Competence of Testing and Calibration Laboratories*, dated 11/1/2017

3.0 Product Selection and Description

Valhalla Scientific, Inc. selected and provided the test sample(s) to be used as the Equipment Under Test. Details below:

Table 3.0-1: Product Identification - Equipment Under Test (EUT)

Item	Qty.	Name/Description	Part Number	Serial Number
1	1	Ohmmeter with Intrinsic Fail-Safe Features	4314Ki	67-XXXX

3.1 Received EUT Photographs

Unit ID

3.2 Security Classification

Non-classified

4.0 General Test Requirements

4.1 Test Equipment

The instrumentation used in the performance of these tests is periodically calibrated and standardized within manufacturer's rated accuracies and are traceable to the National Institute of Standards and Technology. The calibration procedures and practices are in accordance with ISO 17025:2017. Certification of calibration is on file subject to inspection by authorized personnel.

5.0 Test Descriptions and Results

Table 5.0-1: Summary of Test Information & Results

Section	Test	Specification	Test Facility	Test Date	Part #	Serial #	Test Result
5.1	Explosive Atmosphere	MIL-STD-810; G; Method 511.5, Procedure I	Fullerton	01/31/2022 - 02/02/2022	4314Ki	67-XXXX	No damage or main chamber detonation noted.

The decision rule for Test Results was based on the Test Specification used for testing.

5.1 Explosive Atmosphere

5.1.1 Test Procedure

MIL-STD-810; G; Method 511.5, Procedure I

5.1.2 Test Result

No damage or main chamber detonation noted as a result of the test.

5.1.3 Test Datasheets

Site TEMP:	70F	Site RH:	40.0%	Site BAROMETRIC PRESSURE:	1016.4	hPa

TEST DESCRIPTION

The Explosive Atmosphere Test was repeated at test altitudes of:

Test Altitude	Chamber Temp (ºC)	Specimen Temp (ºC)	Wall Temp (ºC)	Specimen Operation	Results
46,600	50	51	49	Non-op	Inject hexane
43,300	49	50	50	Operate On-off	Sample ok, unit ok
40,000	50	50	49	Operate On-off	Continue testing
36,700	51	51	50	Operate On-off	Sample ok, unit ok
6,600	50	50	50	Non-op	Inject hexane
3,300	51	50	50	Operate On-off	Sample ok, unit ok
152	51	51	50	Operate On-off	Sample ok, unit ok

REMARKS: No main chamber detonation. Unit On-off during the test

Post-test visual inspection: No anomalies observed

CALCULATION:

Chamber Volume (ft^3)	Pressure (PSIA)	Temperature (ºC)	Temperature (ºR)	Specific Gravity of Hexane @ 25°	Volume 95% Hexane (mL)
26.14	2.72	50.00	581.70	0.650	27.2ml
26.14	14.65	50.00	581.70	0.650	120ml

FORMULA:

Volume of 95% n-hexane (ml) =

$$(150.41)\left[\frac{(\text{net chamber vol } (ft^3)) \times (\text{chamber pressure (psia)})}{(\text{chamber temp (R)}) \times (\text{specific gravity of n-hexane})}\right]$$

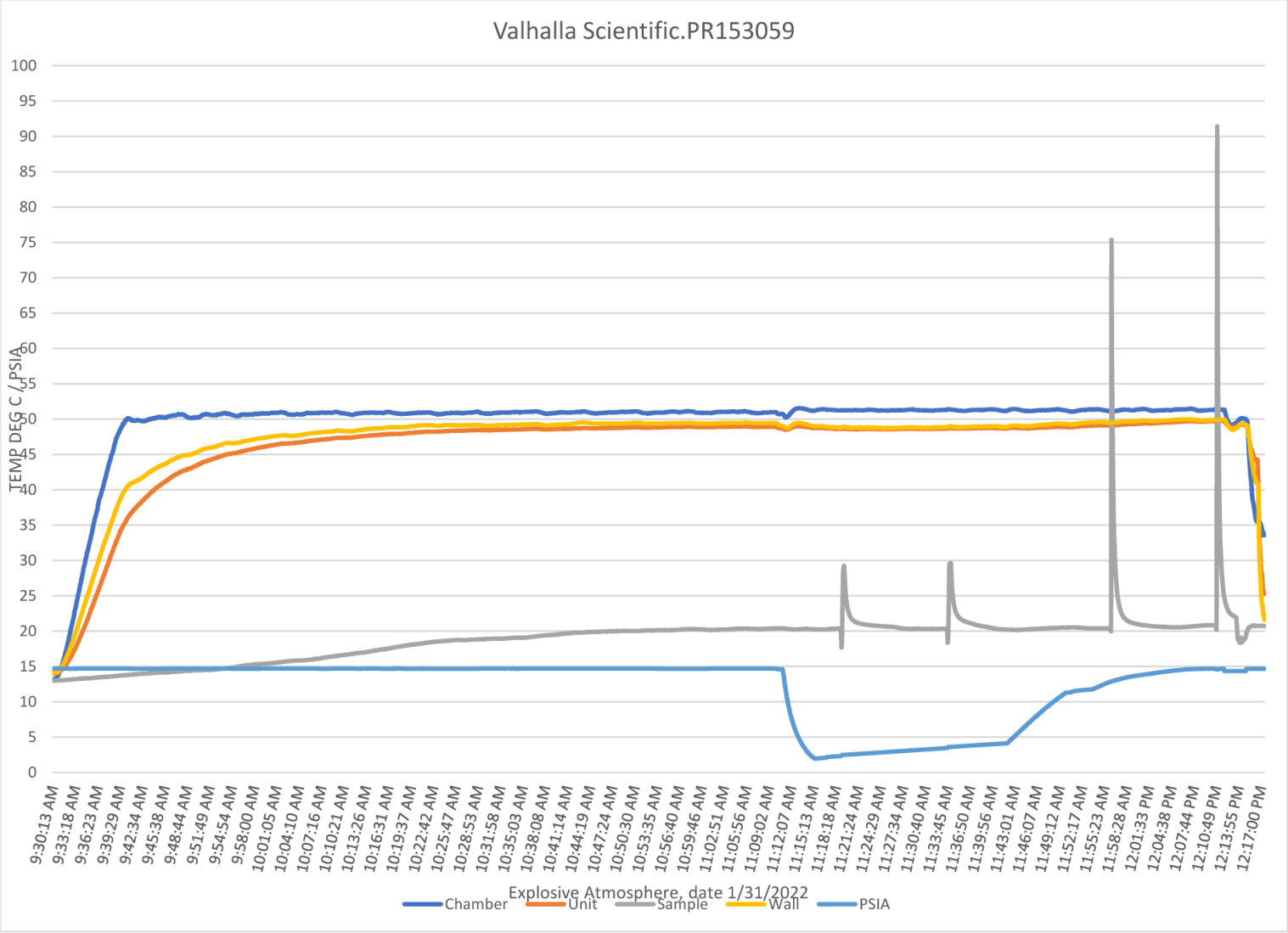
5.1.4 Test Photographs

Explosive Atmosphere UUT Set Up View 1

Explosive Atmosphere UUT Set Up View 2

NTS Explosive Atmosphere Chamber

5.1.5 Test Data



5.1.6 Test Equipment List

Table 5.1-1: Explosive Atmosphere Test Equipment List

Asset Number	Asset Type	Manufacturer	Model	Calibrated	Due
WC009512	Chamber (Explosive Atmosphere)	Harris Products	None	NCR	NCR
WC038041	Controller (Process)	Watlow	F4DH	NCR	NCR
WC056098	Transducer (Vacuum)	Omega Engineering	PX209-015A5V	01/26/2022	01/26/2023
WC074633	Meter (Hygrometer)	Unknown	T7511-2	07/17/2020	07/17/2022
WC077016	Meter (Data Logger)	Fluke	2635A	04/29/2021	04/29/2022

Calibration Abbreviations
CAL: Calibration
NCR: No Calibration Required

End of Test Report