

# TEST REPORT

**CTK Co., Ltd.**

5 Dongbu-ro, 221beon-gil, Cheoin-gu, Yongin-si  
Gyeonggi-do, Republic of Korea  
Tel: +82-31-339-9970  
Fax: +82-31-624-9501

REPORT No.:  
CTK-2025-01914  
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**1. Applicant**

- Name : Hanwha Vision Co., Ltd
- Address : 6 Pangyo-ro 319Beon-gil, Bundang-gu, Seongnam-si,  
Gyeonggi-do, 13488 KOREA
- Date of Receipt : May. 20, 2025

**2. Manufacturer**

- Name : Hanwha Vision Co., Ltd

**3. Use of Report :**

For submission to customer

**4. Test sample / Model :**

NETWORK CAMERA / PNO-A9082R

**5. Date(s) of test :**

Jun. 23, 2025 ~ Jun. 27, 2025

**6. Test Standard (Method) used :**

NEMA TS 2-2013 2.2.7.3 Test C ~ 2.2.7.8 Test H,  
NEMA TS 2.2.8, NEMA TS 2.2.9

**7. Testing Environment :**

Temperature: (25 ±10) °C, Humidity: (50 ±25) % R.H.  
Pressure: (96 ±10) kPa

**8. Test Results :**

Refer to the test results

**9. Location of Test :**

☒ Permanent Testing Lab ☐ On Site Testing  
(5 Dongbu-ro 221beon-gil, Cheoin-gu, Yongin-si, Gyeonggi-do, Republic of Korea)

The results shown in this test report refer only to the sample(s) tested unless otherwise stated. This report cannot be reproduced or copied without the written consent of CTK.

|          |                               |                              |
|----------|-------------------------------|------------------------------|
| Approval | Tested by                     | Technical Manager            |
|          | Name: KyuNam Park (Signature) | Name: HoHyun Lee (Signature) |

Remark. This report is not related to KOLAS accreditation and relevant regulation.

Jul. 22, 2025

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## 1. Testing laboratory

### 1.1 Testing laboratory information

|                |                                                                      |
|----------------|----------------------------------------------------------------------|
| Lab. Name      | CTK Co., Ltd.                                                        |
| Representative | Young Joseph Seungwon                                                |
| Address        | 113, Yejik-ro, Cheoin-gu, Yongin-si, Gyeonggi-do Republic of Korea   |
| Tel.           | +82-31-339-9970                                                      |
| Fax.           | +82-31-624-9501                                                      |
| E-Mail         | <a href="mailto:all.youngin@element.com">all.youngin@element.com</a> |
| Website        | <a href="http://www.elementkorea.kr">www.elementkorea.kr</a>         |

### 1.2 Testing laboratory accreditation status

| Country       | Classification | Accreditation Number | Logo |
|---------------|----------------|----------------------|------|
| International | KOLAS          | TESTING<br>NO. KT119 |      |

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## 2. Product description and equipment information

### 2.1 Product description

| Product Name   | Model Name | Quantity | Comment |
|----------------|------------|----------|---------|
| NETWORK CAMERA | PNO-A9082R | 1 EA     | –       |

### 2.2 Equipment information

| Testing equipment              | Model Name | Manufacturer | Manufacturing Number | Calibration Date |
|--------------------------------|------------|--------------|----------------------|------------------|
| Temperature & Humidity Chamber | C4-340     | Weisstechnik | 54260023190010       | Feb 6, 2026      |
| VIBRATION TESTING SYSTEM       | LT1010     | FAMTECH      | D2012335             | N/A              |
| Acceleration sensor            | 8703A250M5 | KISTLER      | 5830236              | Jan. 16, 2026    |
| Acceleration sensor            | 8703A250M5 | KISTLER      | 5722241              | Jan. 16, 2026    |



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## 2.3 Pre-test product images

### 2.3.1 Test sample



Top



Bottom



Front



Rear



Left side



Right side



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## 2.4 Testing equipment images

### 2.4.1 Test equipment



Temperature & Humidity Chamber



VIBRATION TESTING SYSTEM



8703A250M5



8703A250M5



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### 3. NEMA TS 2-2013 2.2.7.3 Test C ~ 2.2.7.8 Test H

#### 3.1 Test date and environmental conditions

3.1.1 Test date: Jun. 23, 2025 ~ Jun. 25, 2025

3.1.2 Measured Environmental Conditions

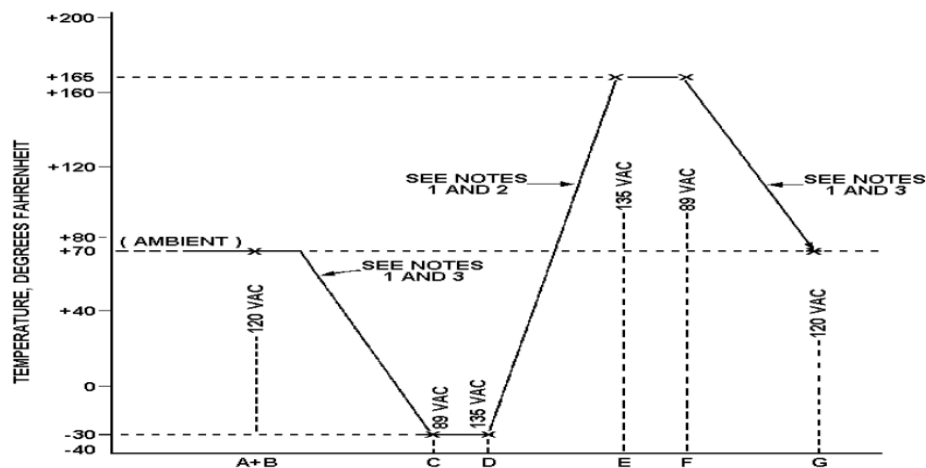
| Item        | Temperature (°C) | Humidity (% R.H.) | Pressure (kPa) |
|-------------|------------------|-------------------|----------------|
| Measurement | 23.1             | 53.7              | 94.1           |

#### 3.2 Test conditions and methods

- 3.2.1 2.2.7.3 Test C: - 34 °C, 89 Vac, 10 h (Check interim operation after 5 h and operation check after 10h)
- 3.2.2 2.2.7.4 Test D: - 34 °C, 135 Vac, 1 h (Operating state)
- 3.2.3 2.2.7.5 Test E: 74 °C, 18 %, 135 Vac, 15 h (Operating state)
- 3.2.4 2.2.7.6 Test F: 74 °C, 18 %, 89 Vac (Operation check after 2.2.7.5 Test E)
- 3.2.5 2.2.7.7 Test G: (21 ±6) °C, 120 Vac (Operating state)
- 3.2.6 2.2.7.8 Test H: Check for mechanical damage

#### 3.2.7 Test Methods

- Evaluations Criteria :
  - Check for mechanical damage before and after testing
- Test methods





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### 3.3 Testing images

#### 3.3.1 Evidence of test setting



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**3.4 Test Result**

## 3.4.1 Test result table

| Evaluation Criteria                |        | Test Results | Comment |
|------------------------------------|--------|--------------|---------|
| 2.2.7.3 Test C ~<br>2.2.7.8 Test H | Before | Normal       | -       |
|                                    | After  | Normal       | -       |



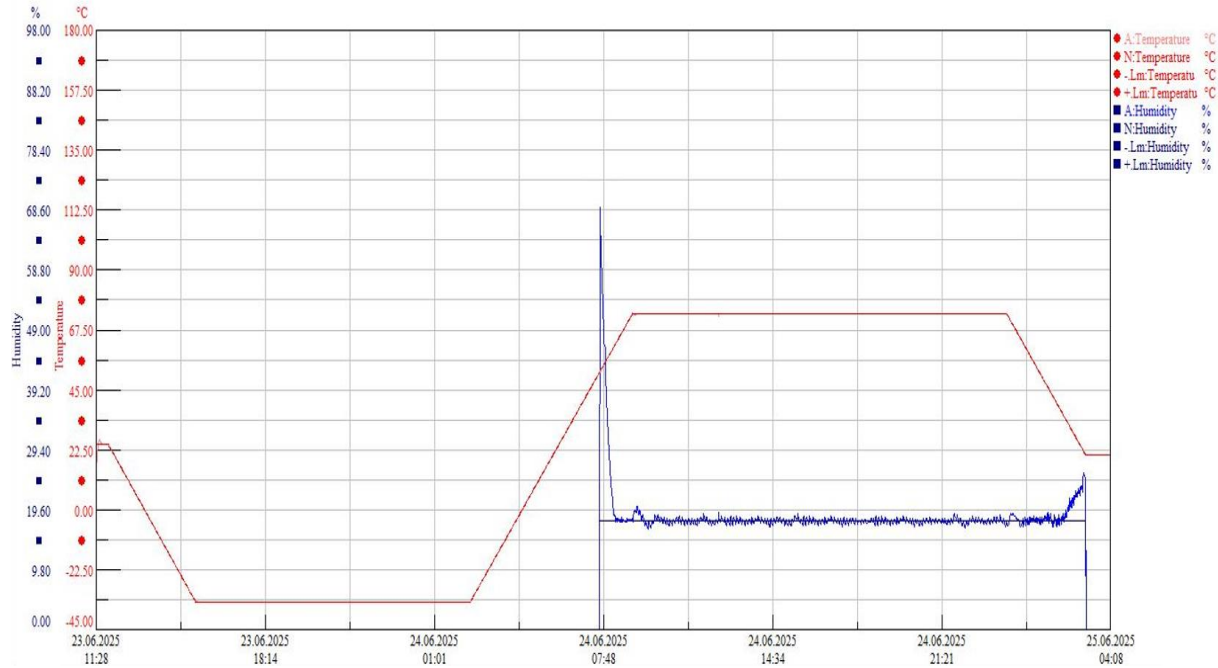
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### 3.5 Test Data

#### 3.5.1 Test data and graph



Temperature Data



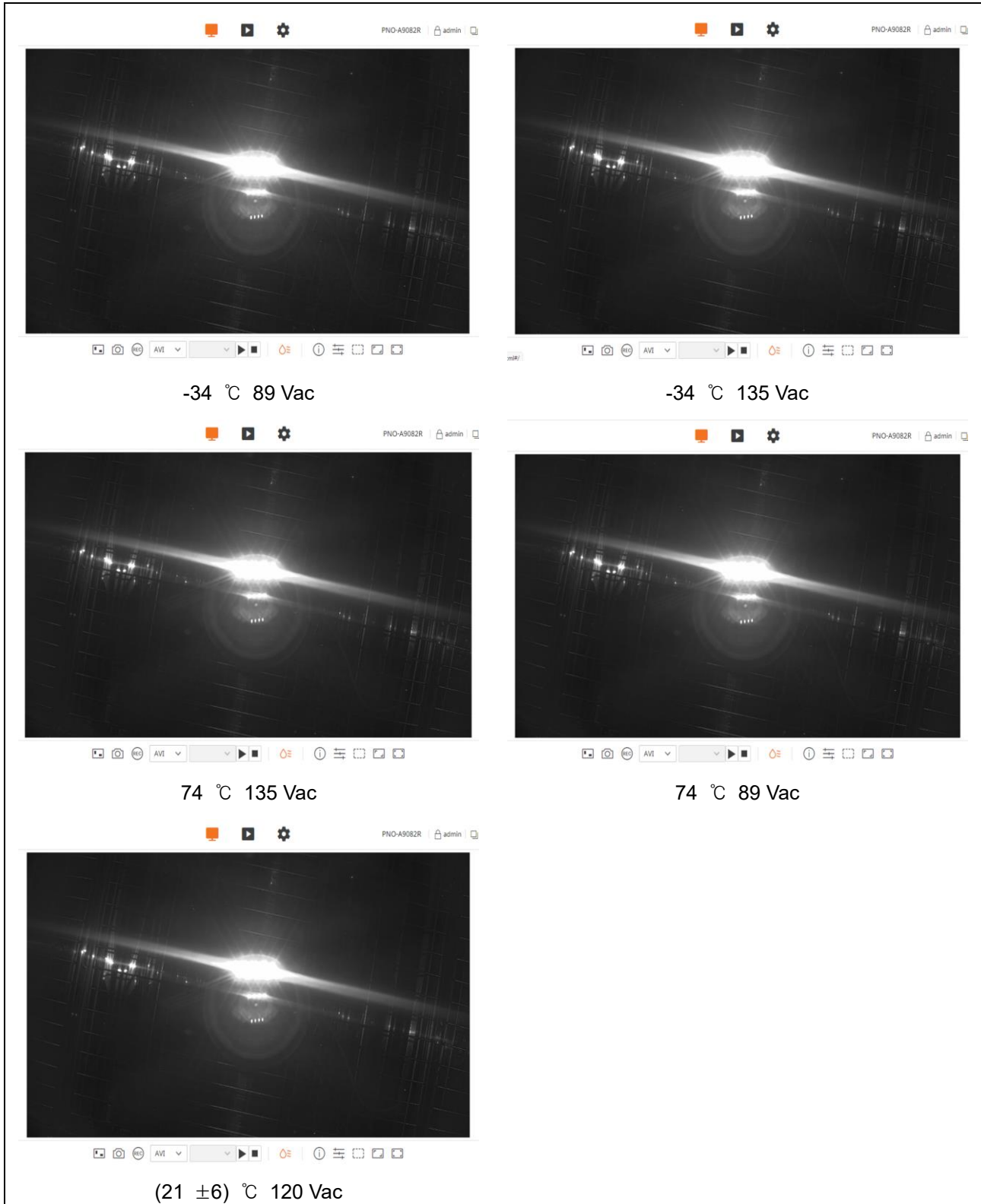
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### 3.6 Test sample operation images

#### 3.6.1 Test sample operation and function



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## 4. Resonant search, Endurance Test [NEMA TS 2-2013 2.2.8]

### 4.1 Test date and environmental conditions

4.1.1 Test date: Jun. 24, 2025 ~ Jun. 27, 2025

4.1.2 Measured Environmental Conditions

| Item        | Temperature (°C) | Humidity (% R.H.) | Pressure (kPa) |
|-------------|------------------|-------------------|----------------|
| Measurement | 22.5             | 48.6              | 96.7           |

### 4.2 Test conditions and methods

#### 4.2.1 Resonant search [NEMA TS 2-2013 2.2.8.3]

- Sample status : unpackaged / not in operation
- Applied waveform : Sine
- Frequency(Hz) : 5 ~ 30
- Double amplitude displacement (inch) : 0.015
- Sweep rate(Sweep/min) : 12.5
- Applicable axis : X, Y, Z
- Test time(h) : 12.5
- Evaluation items
  - Check for mechanical damage before and after testing
- Test methods
  - With the test unit securely fastened to the test table, set the test table for a double amplitude displacement of 0.015 inch.
  - Cycle the test table over a search range from 5 to 30 Hz and back within a period of 12.5 minutes.
  - Conduct the resonant frequency search in each of the three mutually perpendicular planes.
  - Note and record the resonant frequency determined from each plane.
    - ◆ In the event of more than one resonant frequency in a given plane, record the most severe a. resonance.
    - ◆ b. If resonant frequencies appear equally severe, record each resonant frequency.
    - ◆ c. If no resonant frequency occurs for a given plane within the prescribed range, 30 Hz shall be recorded.

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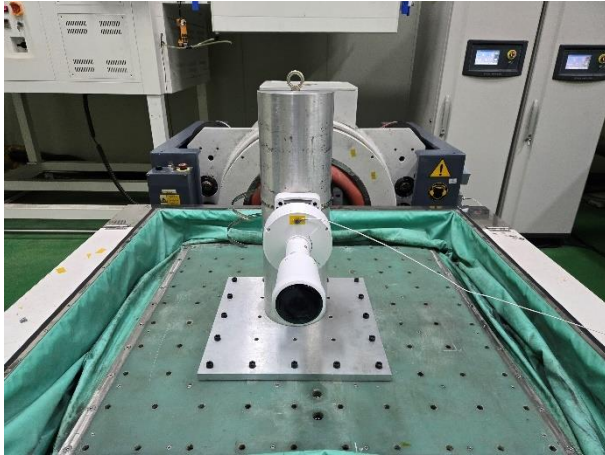
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**4.2.2 Endurance Test[NEMA TS 2-2013 2.2.8.4]**

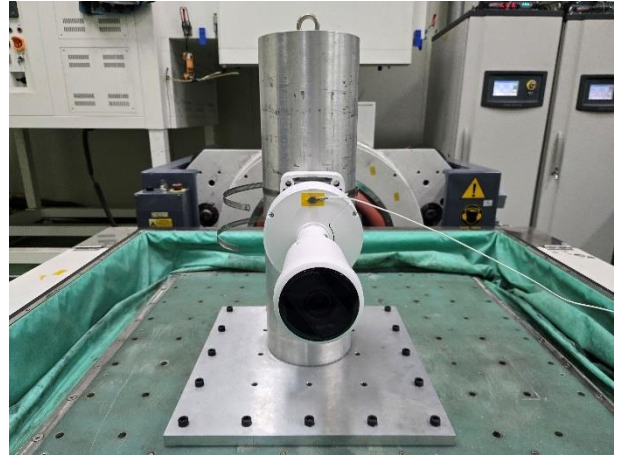
- Sample status : unpackaged / not in operation
- Applied waveform : Sine
- Frequency(Hz) : 30 or 3.2.2 Test results
- Acceleration(G) : 0.5
- Applicable axis : X, Y, Z
- Test time(h) : All 3(Each axis 1)
- Evaluation items
  - Check for mechanical damage before and after testing
- Test methods
  - Vibrate the test unit in each plane at its resonant frequency for a period of 1 hour at an amplitude resulting in 0.5 g acceleration. (test profile)
  - When more than one resonant frequency has been recorded in accordance with Section 1.2 Item 4, the test period of 1 hour shall be divided equally between the resonant frequencies.
  - The total time of the endurance test shall be limited to 3 hours, 1 hour in each of three mutually perpendicular planes.

### 4.3 Testing images

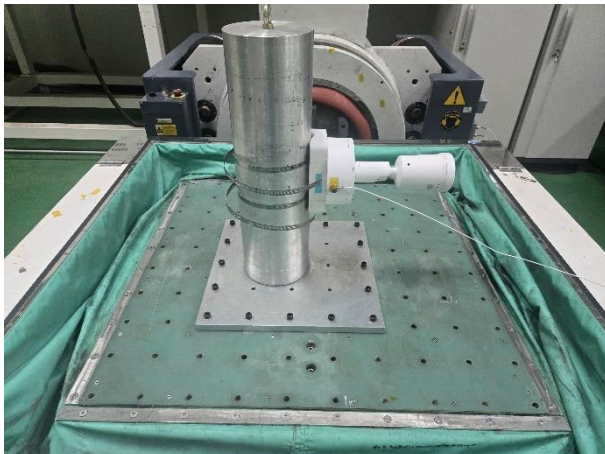
#### 4.3.1 Evidence of test setting (NEMA TS 2-2013 2.2.8)



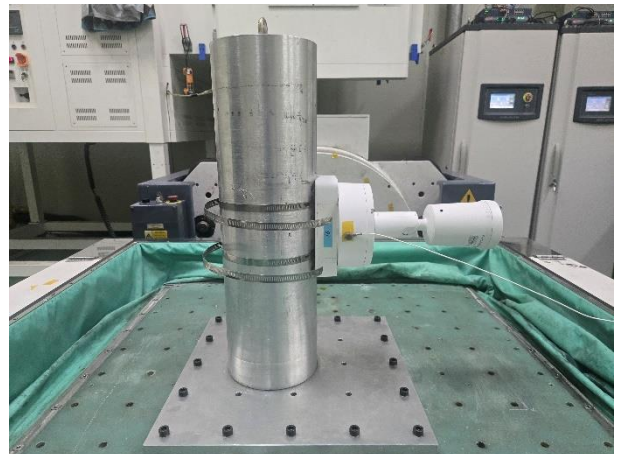
X axis\_1



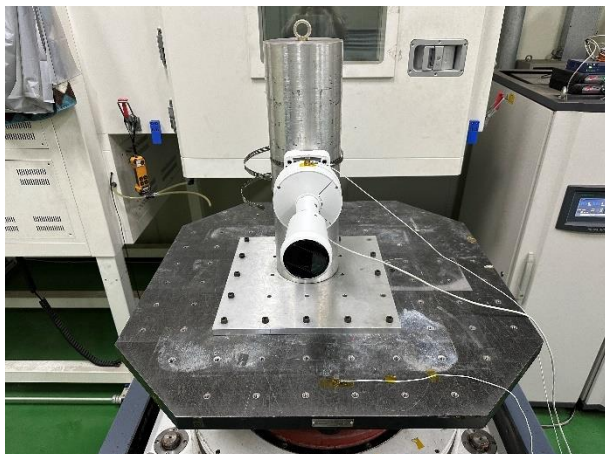
X axis\_2



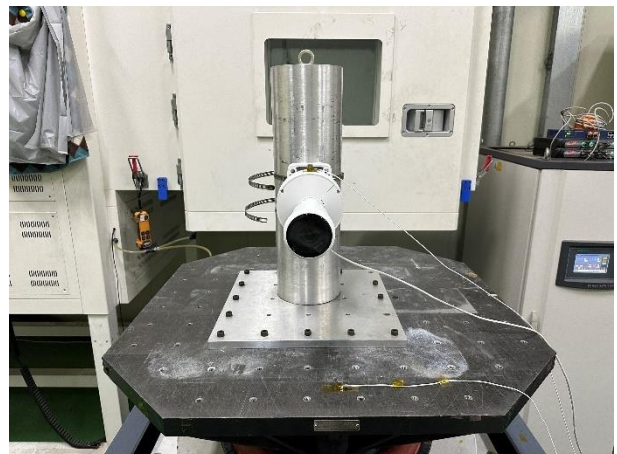
Y axis\_1



Y axis\_2



Z axis\_1



Z axis\_2

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**4.4 Test Result**

## 4.4.1 Test result table

| Evaluation Criteria  |        | Test Results | Comment |
|----------------------|--------|--------------|---------|
| Resonant search Test | Before | Normal       |         |
|                      | After  | Normal       |         |
| Endurance Test       | Before | Normal       |         |
|                      | After  | Normal       |         |



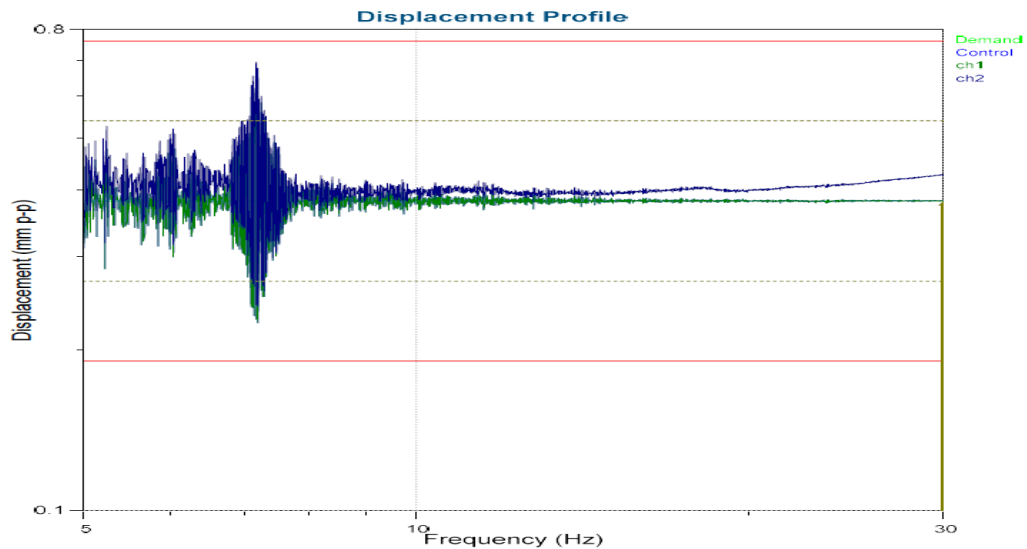
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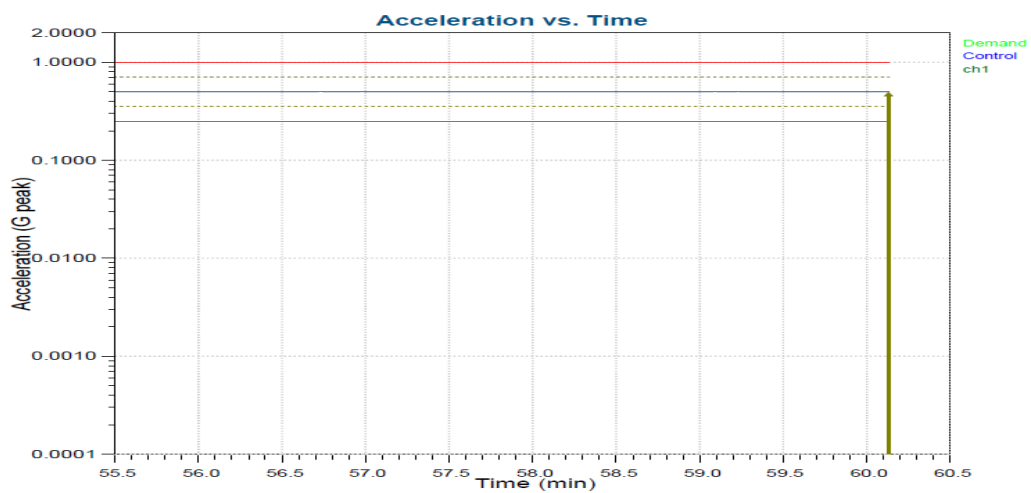
### 4.5 Test Data

#### 4.5.1 Test Data X Axis



6 24, 2025 15:30:4 Level 1) 100 % Output: 0 Volts peak NEMA TS-2 2.2.8 - search.  
Demand: 0.381 mm Level Time: 0:12:3 Frequency: 30 Hz  
Control: 0.0004021 mm Total Time: 0:12:4 End of Sweep Test

#### Resonant search Test ( X Axis )



6 24, 2025 16:32:10 Level 1) 100 % Output: 0 Volts peak 한화비전 공진 L  
Demand: 0.5 G Level Time: 1:00:00 Frequency: 30 Hz  
Control: 0.0005915 G Total Time: 1:00:08 End of Timed Test

#### Endurance Test ( X Axis )

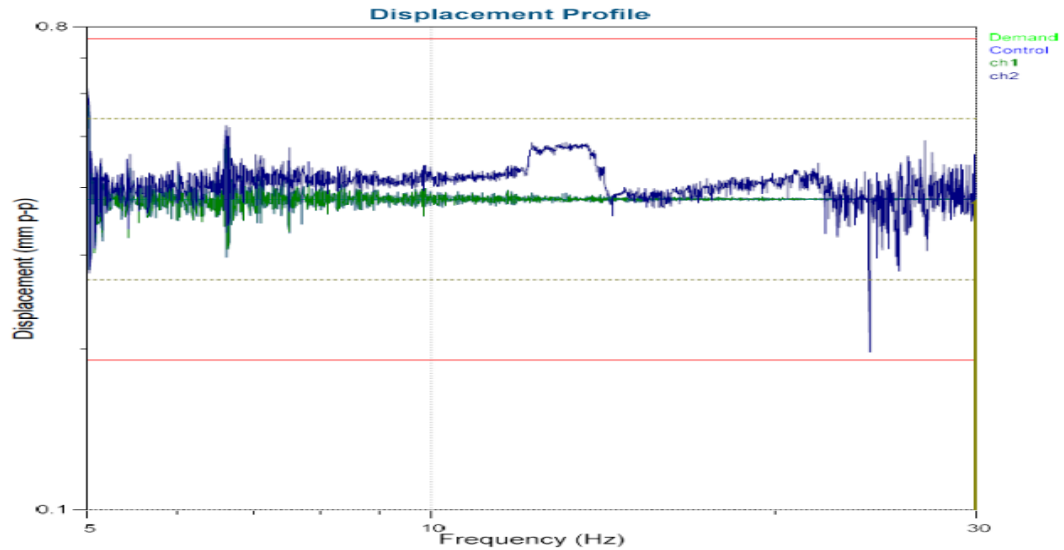


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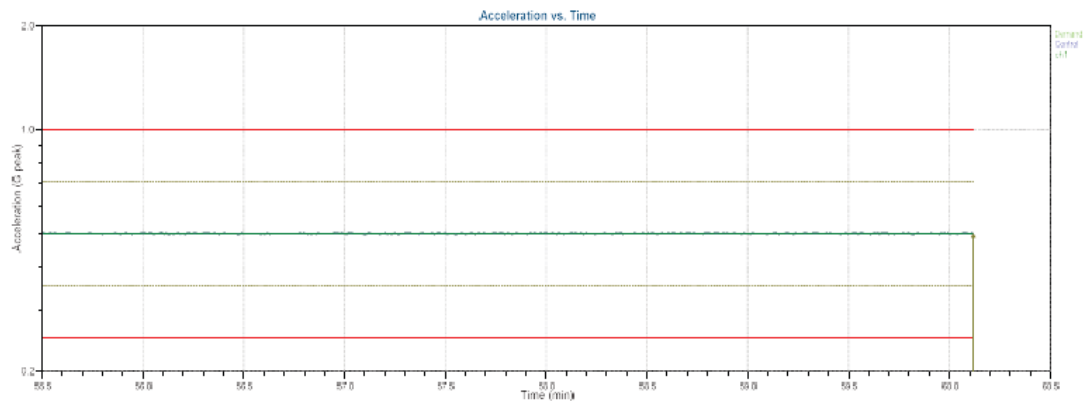
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### 4.5.2 Test Data Y Axis



6/24, 2025 17:31:51 Level 1) 100 % Output: 0 Volts peak NEMA TS-2 2.2.8 - search.  
Demand: 0.381 mm Level Time: 0:12:3 Frequency: 30 Hz  
Control: 9.495e-05 mm Total Time: 0:12:3 End of Sweep Test

### Resonant search Test ( Y Axis )



6/24, 2025 18:32:15 Level 1) 100 % Output: 0.06299 Volts peak한 화비전 공진  
Demand: 0.5 G Level Time: 1:00:00 Frequency: 30 Hz  
Control: 0.4998 G Total Time: 1:00:07 End of Timed Test

### Endurance Test ( Y Axis )

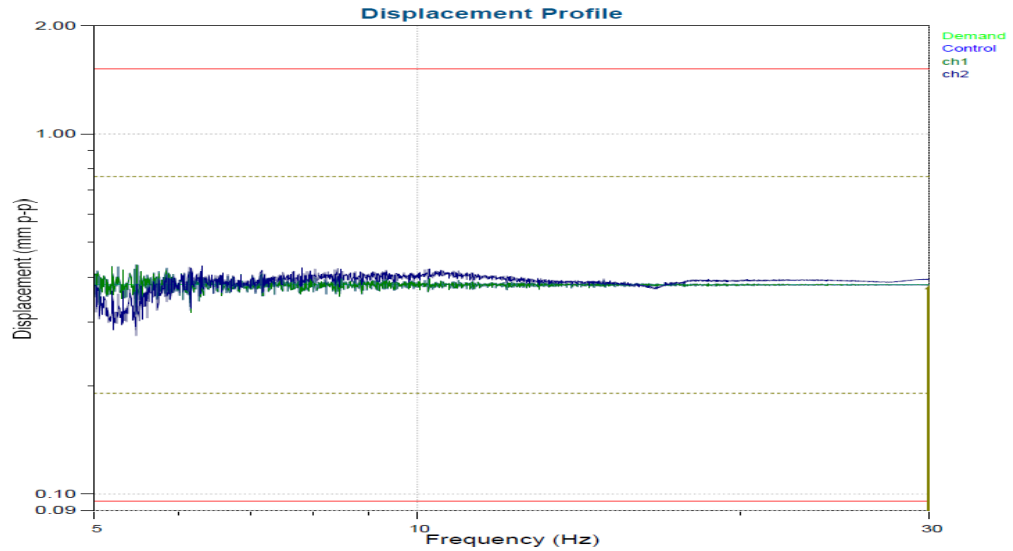


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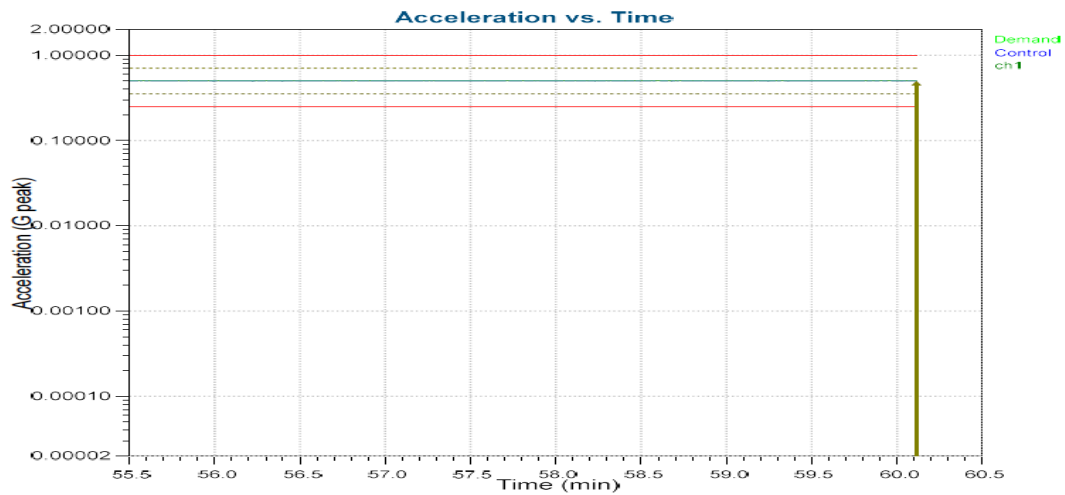
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### 4.5.3 Test Data Z Axis



6/26, 2025 17:36:46 Level 1) 100 % Output: 0 Volts peak NEMA TS-2 2.2.8 - search.  
Demand: 0.381 mm Level Time: 0:12:30 Frequency: 30 Hz  
Control: 0.0001212 mm Total Time: 0:12:36 End of Sweep Test

### Resonant search Test ( Z Axis )



6/26, 2025 18:37:23 Level 1) 100 % Output: 0 Volts peak 한화비전 공진 L  
Demand: 0.5 G Level Time: 1:00:00 Frequency: 30 Hz  
Control: 0.0002852 G Total Time: 1:00:07 End of Timed Test

### Endurance Test ( Z Axis )

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## 5. Shock(impact) Test [NEMA TS 2-2013 2.2.9]

### 5.1 Test date and environmental conditions

5.1.1 Test date: Jun. 24, 2025 ~ Jun. 27, 2025

5.1.2 Measured Environmental Conditions

| Item        | Temperature (°C) | Humidity (% R.H.) | Pressure (kPa) |
|-------------|------------------|-------------------|----------------|
| Measurement | 22.5             | 48.6              | 96.7           |

### 5.2 Test conditions and methods

5.2.1 Sample status: unpackaged / not in operation

5.2.2 Applied waveform: Half sine

5.2.3 Acceleration(G): 10 G

5.2.4 Nominal duration (ms): 11

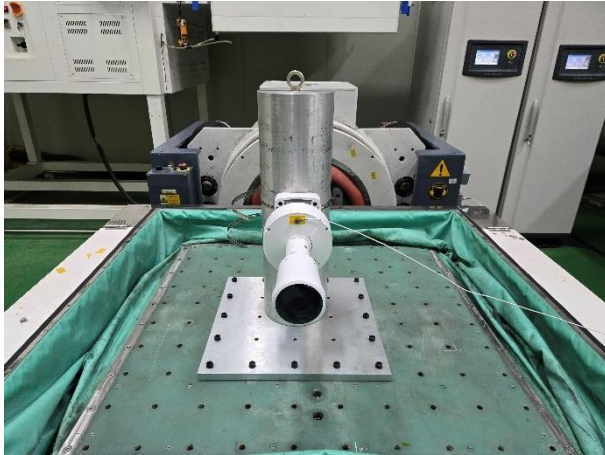
5.2.5 Applicable axis : X, Y, Z

5.2.6 Number of impacts: 1 per direction (total 6)

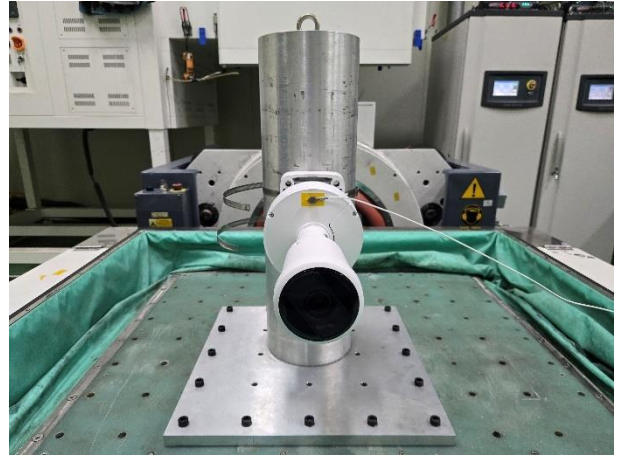
5.2.7 Evaluation items: Check for mechanical damage before and after testing

## 5.3 Testing images

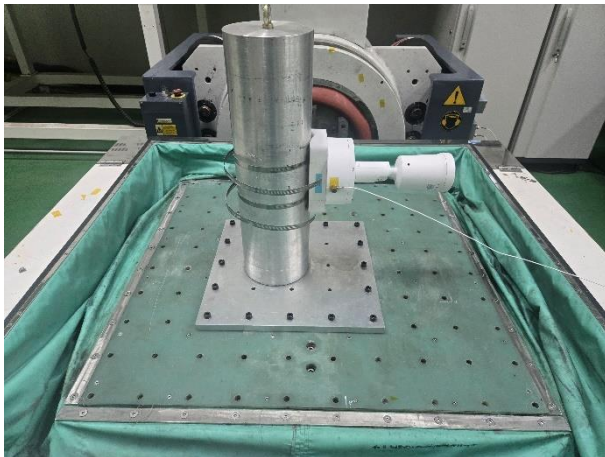
### 5.3.1 Evidence of test setting (NEMA TS 2-2013 2.2.9)



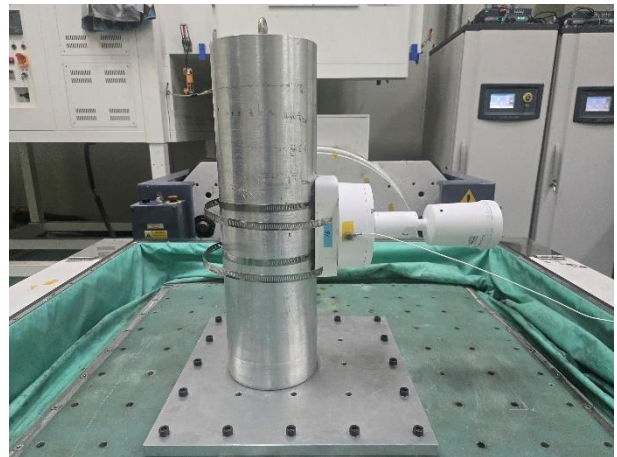
X axis\_1



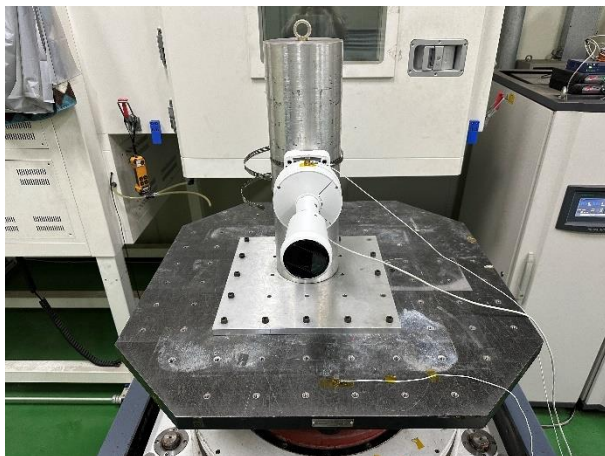
X axis\_2



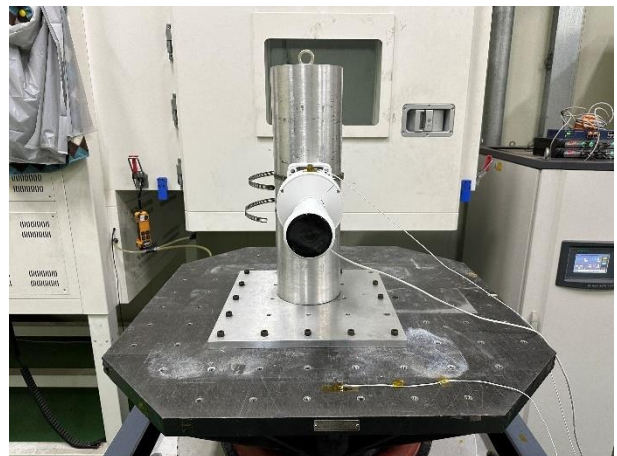
Y axis\_1



Y axis\_2



Z axis\_1



Z axis\_2

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**5.4 Test Result**

## 5.4.1 Test result table

| Evaluation Criteria   |        | Test Results | Comment |
|-----------------------|--------|--------------|---------|
| Shock(impact)<br>Test | Before | Normal       |         |
|                       | After  | Normal       |         |



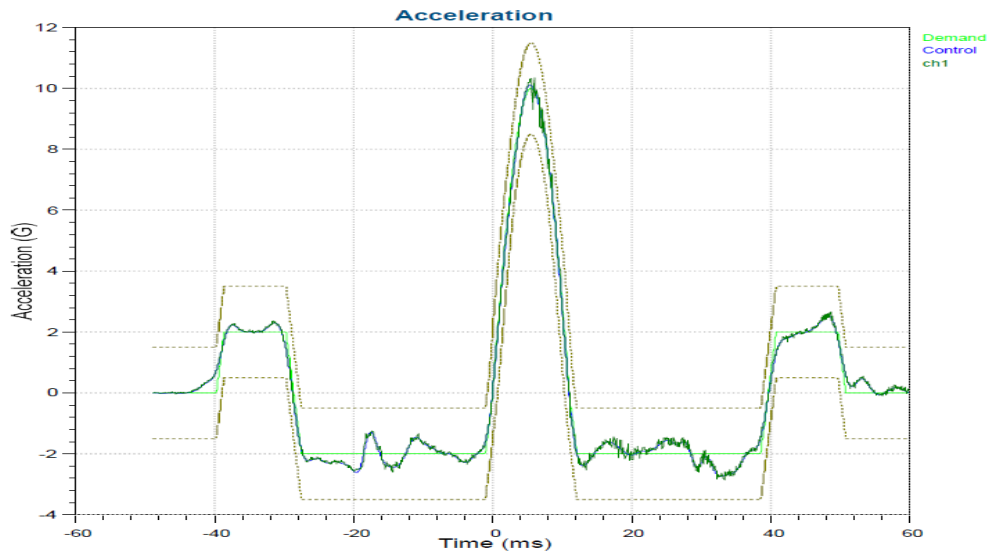
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## 5.5 Test Data

### 5.5.1 Test Data X Axis

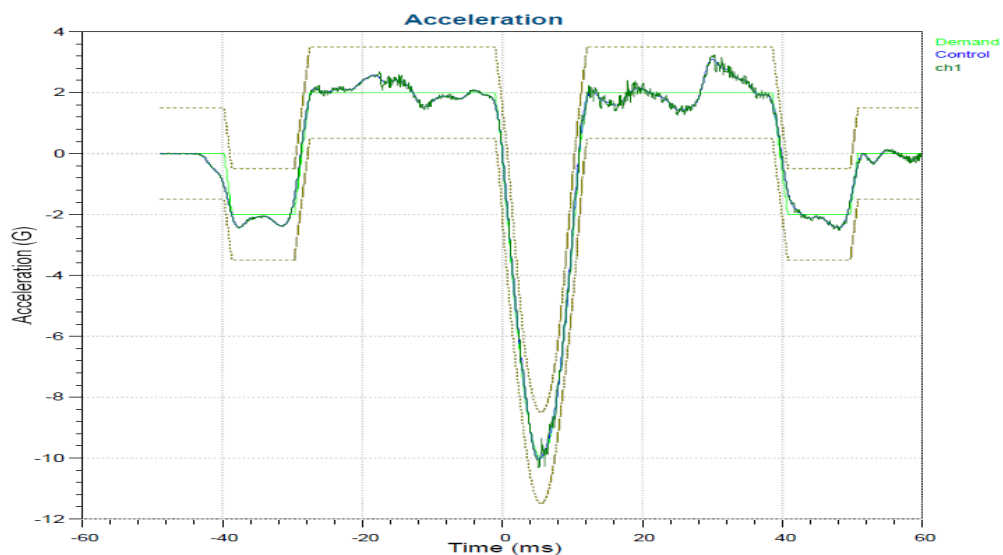


6 24, 2025 16:33:15 Level 1) 100 % Output: 0.743 Volts peak 2025-05-02 NEMA TS-2 2.2.5

Demand: 10 G

Control: 10.11 G Pulse: 1 of 1 Running

X+



6 24, 2025 16:33:24 Level 2) 100 % Output: 0.7412 Volts peak 2025-05-02 NEMA TS-2 2.2.5

Demand: 10 G

Control: 10.03 G Pulse: 1 of 1 End of Test

X-

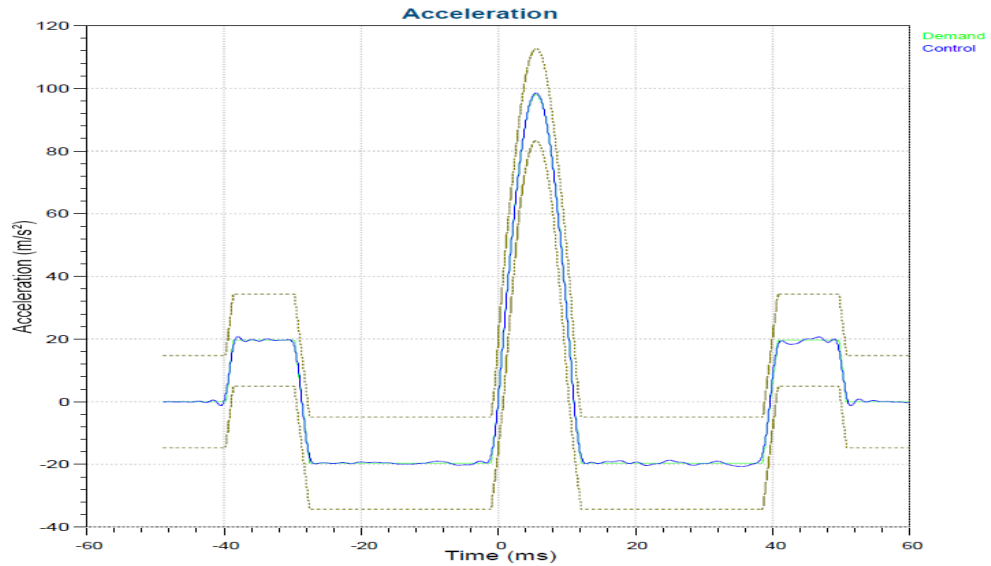


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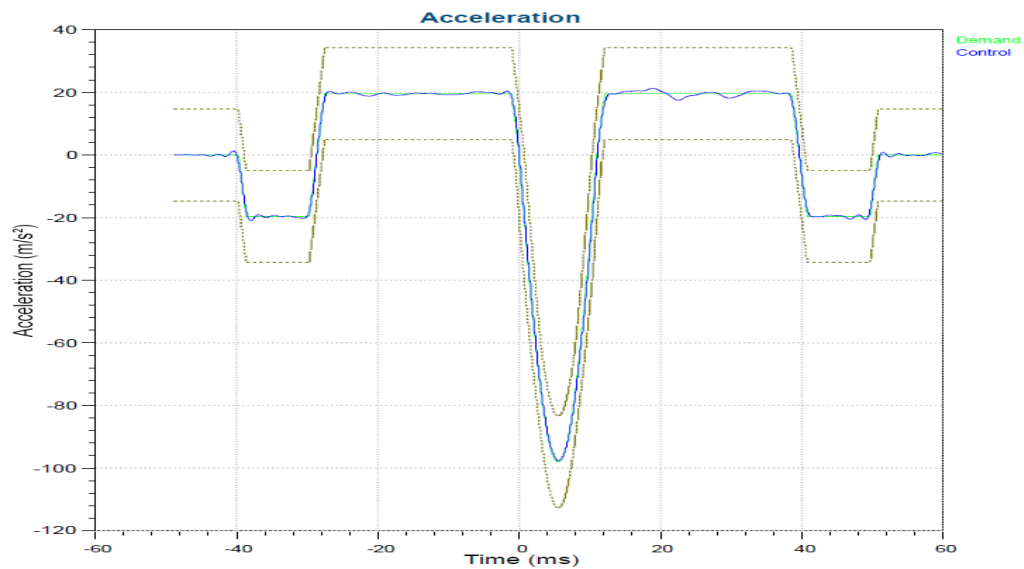
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### 5.5.2 Test Data Y Axis



6/24, 2025 17:32:26 Level 1) 100 % Output: 0.6908 Volts peak 2025-05-02 NEMA TS-2 2.2.5  
Demand: 98.07 m/s<sup>2</sup>  
Control: 98.55 m/s<sup>2</sup> Pulse: 1 of 1 Running

Y+



6/24, 2025 17:32:17 Level 2) 100 % Output: 0.6911 Volts peak 2025-05-02 NEMA TS-2 2.2.5  
Demand: 98.07 m/s<sup>2</sup>  
Control: 97.65 m/s<sup>2</sup> Pulse: 1 of 1 End of Test

Y-

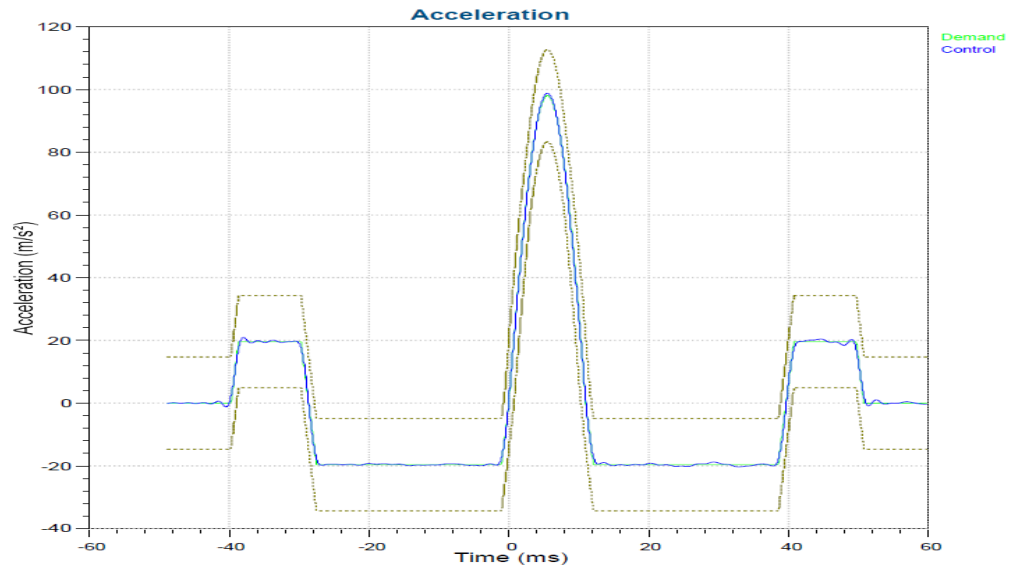


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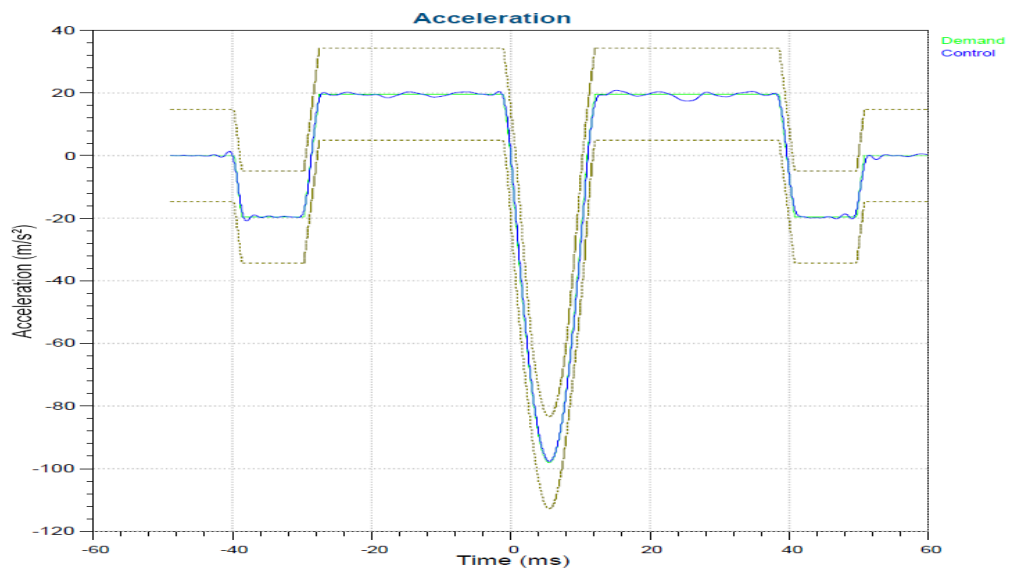
REPORT No.:  
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### 5.5.3 Test Data Z Axis



6 27, 2025 09:13:06 Level 1) 100 % Output: 0.6882 Volts peak 2025-05-02 NEMA TS-2 2.2.5  
Demand: 98.07 m/s<sup>2</sup>  
Control: 98.83 m/s<sup>2</sup> Pulse: 1 of 1 Running

Z+



6 27, 2025 09:12:53 Level 2) 100 % Output: 0.6883 Volts peak 2025-05-02 NEMA TS-2 2.2.5  
Demand: 98.07 m/s<sup>2</sup>  
Control: 97.71 m/s<sup>2</sup> Pulse: 1 of 1 End of Test

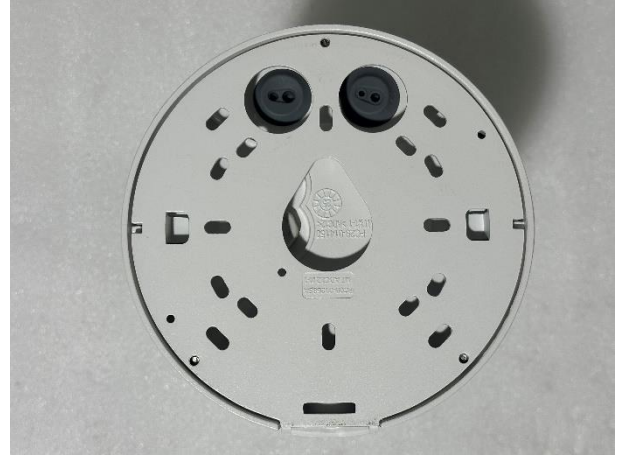
Z-

## 5.6 Post-test product images

### 5.6.1 Test sample



Top



Bottom



Front



Rear



Left side



Right side

- End -