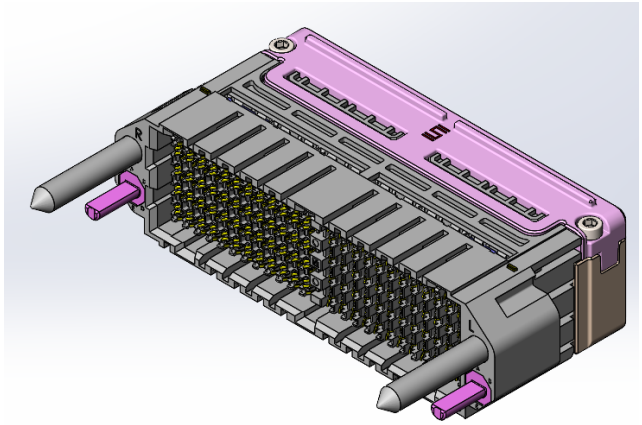
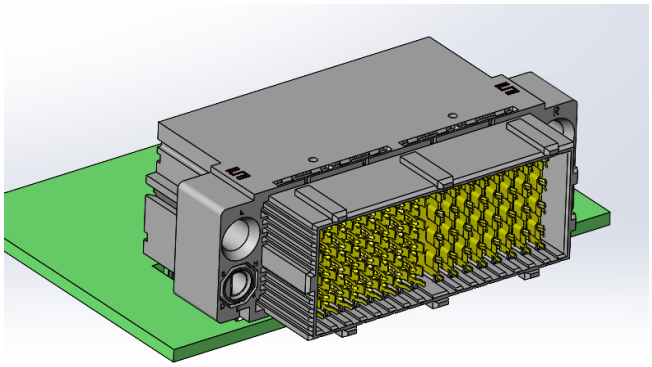
| | |
|---|---|
| Project: Design Qualification Test Report | Tracking Code: CR-1169107_Report_Rev_1 |
| Requested by: Tyler Lang | Date: 7/9/2025 |
| Part #: NVCF-DP-16-V-3-XX-X-X-X-X-1/ NVBM-DP-16-RA-S-2-X-X | |
| Part description: NVCF / NVBM | Tech: Tony Wagoner |
| Test Start: 1/10/2025 | Test Completed: 4/15/2025 |





**DESIGN QUALIFICATION TEST REPORT**

**NVCF / NVBM**
**NVCF-DP-16-V-3-XX-X-X-X-X-1/ NVBM-DP-16-RA-S-2-X-X**

## REVISION HISTORY

| DATA | REV.NUM. | DESCRIPTION | ENG |
|---|---|---|---|
| **5/12/2025** | **1** | **Initial test** | **PC** |

## CERTIFICATION

All instruments and measuring equipment were calibrated to National Institute for Standards and Technology (NIST) traceable standards according to IS0 10012-l and ANSI/NCSL 2540-1, as applicable.



### SCOPE

To perform the following tests: Design Qualification test. Please see test plan.

### APPLICABLE DOCUMENTS

Standards: EIA Publication 364

### TEST SAMPLES AND PREPARATION

1) All materials were manufactured in accordance with the applicable product specification.
2) All test samples were identified and encoded to maintain traceability throughout the test sequences.
3) After soldering, the parts to be used for LLCR and DWV/IR testing were cleaned according to CO-SC-WI-3029.
4) Either an automated cleaning procedure or an ultrasonic cleaning procedure may be used.
5) The automated procedure is used with aqueous compatible soldering materials.
6) Parts not intended for testing LLCR and DWV/IR are visually inspected and cleaned if necessary.
7) Any additional preparation will be noted in the individual test sequences.
8) Solder Information: Lead Free
9) Samtec Test PCBs used: PCB-114020-TST-XX/PCB-114021-TST-XX/PCB-113995-TST-XX / PCB-114030-TST-XX.

# FLOWCHARTS

## Gas Tight

Group 1
NVCF-DP-16-V-3-XX-X-X-X-X-1
NVBM-DP-16-RA-S-2-X-X
8 Assemblies

*Note: HDR with 6" Cable w/ End 2 PCB*

*Note: 100% LLCR*

| Step | Description |
|---|---|
| 1. | LLCR (2) |
| 2. | Gas Tight (1) |
| 3. | LLCR (2)<br>Max Delta = 15 mOhm |

(1) Gas Tight = EIA-364-36

(2) LLCR = EIA-364-23
Open Circuit Voltage = 20 mV Max
Test Current = 100 mA Max

## Thermal Aging

Group 1
NVCF-DP-16-V-3-XX-X-X-X-X-1
NVBM-DP-16-RA-S-2-X-X
8 Assemblies

*Note: HDR with 6" Cable w/ End 2 PCB*
*Note: 100% LLCR*

| Step | Description |
|---|---|
| 1. | Contact Gaps |
| 2. | Mating/Unmating Force (2) |
| 3. | LLCR (1) |
| 4. | Thermal Age (3) |
| 5. | LLCR (1)<br>Max Delta = 15 mOhm |
| 6. | Mating/Unmating Force (2) |
| 7. | Contact Gaps |

(1) LLCR = EIA-364-23
Open Circuit Voltage = 20 mV Max
Test Current = 100 mA Max

(2) Mating/Unmating Force = EIA-364-13

(3) Thermal Age = EIA-364-17
Test Condition = 4 (105°C)
Time Condition = B (250 Hours)

## FLOWCHARTS Continued

# Mating/Unmating/Durability

Group 1
NVCF-DP-16-V-3-XX-X-X-X-X-1
NVBM-DP-16-RA-S-2-X-X
8 Assemblies

*Note: HDR with 6" Cable w/ End 2 PCB*
*Note: 100% LLCR*

| Step | Description |
|---|---|
| 1. | Contact Gaps |
| 2. | LLCR (2) |
| 3. | Mating/Unmating Force (3) |
| 4. | Cycles<br>Quantity = 25 Cycles |
| 5. | Mating/Unmating Force (3) |
| 6. | Cycles<br>Quantity = 25 Cycles |
| 7. | Mating/Unmating Force (3) |
| 8. | Cycles<br>Quantity = 25 Cycles |
| 9. | Mating/Unmating Force (3) |
| 10. | Cycles<br>Quantity = 25 Cycles |
| 11. | Mating/Unmating Force (3) |
| 12. | Contact Gaps |
| 13. | LLCR (2)<br>Max Delta = 15 mOhm |
| 14. | Thermal Shock (4) - Non Standard |
| 15. | LLCR (2)<br>Max Delta = 15 mOhm |
| 16. | Humidity (1) |
| 17. | LLCR (2)<br>Max Delta = 15 mOhm |
| 18. | Mating/Unmating Force (3) |

(1) Humidity = EIA-364-31
Test Condition = B (240 Hours)
Test Method = III (+25°C to +65°C @ 90% RH to 98% RH)
Test Exceptions: ambient pre-condition and delete steps 7a and 7b

(2) LLCR = EIA-364-23
Open Circuit Voltage = 20 mV Max
Test Current = 100 mA Max

(3) Mating/Unmating Force = EIA-364-13

(4) Thermal Shock = Other
Exposure Time at Temperature Extremes =1/2 Hour
Method A, Test Condition = I (-40°C to +85°C)
Test Duration = A-3 (100 Cycles)
Cable Rating

## FLOWCHARTS Continued

# IR/DWV

*Note: 12" Double Ended Cable*

*Note: DWV = 450V Test Voltage*

*Note: IR = 100V Test Voltage*

***Pin-to-Pin***

Group 1

NVCF-DP-16-V-3-XX-X-X-X-X-1

NVBM-DP-16-RA-S-2-X-X

2 Assemblies

| Step | Description |
|---|---|
| 1. | IR (3) - Non Standard |
| 2. | DWV at Test Voltage(1) Test Voltage = 450 V |
| 3. | Thermal Shock (4) - Non Standard |
| 4. | IR (3) - Non Standard |
| 5. | DWV at Test Voltage(1) Test Voltage = 450 V |
| 6. | Humidity (2) |
| 7. | IR (3) - Non Standard |
| 8. | DWV at Test Voltage(1) Test Voltage = 450 V |

***Row-to-Row***

Group 2

NVCF-DP-16-V-3-XX-X-X-X-X-1

NVBM-DP-16-RA-S-2-X-X

2 Assemblies

| Step | Description |
|---|---|
| 1. | IR (3) - Non Standard |
| 2. | DWV at Test Voltage(1) Test Voltage = 450 V |
| 3. | Thermal Shock (4) - Non Standard |
| 4. | IR (3) - Non Standard |
| 5. | DWV at Test Voltage(1) Test Voltage = 450 V |
| 6. | Humidity (2) |
| 7. | IR (3) - Non Standard |
| 8. | DWV at Test Voltage(1) Test Voltage = 450 V |

***Pin-to-Ground***

Group 3

NVCF-DP-16-V-3-XX-X-X-X-X-1

NVBM-DP-16-RA-S-2-X-X

2 Assemblies

| Step | Description |
|---|---|
| 1. | IR (3) - Non Standard |
| 2. | DWV at Test Voltage(1) Test Voltage = 450 V |
| 3. | Thermal Shock (4) - Non Standard |
| 4. | IR (3) - Non Standard |
| 5. | DWV at Test Voltage(1) Test Voltage = 450 V |
| 6. | Humidity (2) |
| 7. | IR (3) - Non Standard |
| 8. | DWV at Test Voltage(1) Test Voltage = 450 V |

(1) DWV at Test Voltage = EIA-364-20
Test Condition = 1 (Sea Level)
DWV test voltage is equal to 75% of the lowest breakdown voltage
Test voltage applied for 60 seconds

(2) Humidity = EIA-364-31
Test Condition = B (240 Hours)
Test Method = III (+25°C to +65°C @ 90% RH to 98% RH)
Test Exceptions: ambient pre-condition and delete steps 7a and 7b

(3) IR = Other
Test Condition = 100 Vdc, 2 Minutes Max

(4) Thermal Shock = Other
Exposure Time at Temperature Extremes =1/2 Hour
Method A, Test Condition = I (-40°C to +85°C)
Test Duration = A-3 (100 Cycles)
Cable Rating

## FLOWCHARTS Continued

## Current Carrying Capacity

| Group 1 | Group 2 |
|---|---|
| NVCF-DP-16-V-3-XX-X-X-X-X-1 | NVCF-DP-16-V-3-XX-X-X-X-X-1 |
| NVBM-DP-16-RA-S-2-X-X | NVBM-DP-16-RA-S-2-X-X |
| 1 Pins Powered | 8 Pins Powered |
| Signal | Power |
| *Note: 12" Double Ended Cable* | *Note: 12" Double Ended Cable* |

| Step | Description | Step | Description |
|---|---|---|---|
| 1. | CCC (1)<br>Rows = 1<br>Number of Positions = 1<br>*Note: Center of connector location* | 1. | CCC (1)<br>Rows = 8<br>Number of Positions = 1<br>*Note: All signal pins combined carry supply while all grounds on that wafer carry return* |

(1) CCC = EIA-364-70
Method 2, Temperature Rise Versus Current Curve
(TIN PLATING) - Tabulate calculated current at RT,65°C, 75°C and 95°C after derating 20% and based on 105°C
(GOLD PLATING) - Tabulate calculated current at RT,85°C, 95°C and 115°C after derating 20% and based on 125°C

## Mechanical Shock/Random Vibration/LLCR

| Group 1 | Group 2 |
|---|---|
| NVCF-DP-16-V-3-XX-X-X-X-X-1 | NVCF-DP-16-V-3-XX-X-X-X-X-1 |
| NVBM-DP-16-RA-S-2-X-X | NVBM-DP-16-RA-S-2-X-X |
| 8 Assemblies | 8 Assemblies |
| | MIL-STD-810G_CHG-1 |
| *Note: HDR 12" Cable w/ End 2 PCB* | *Note: HDR 12" Cable w/ End 2 PCB* |
| *Note: 100% LLCR* | *Note: 100% LLCR* |

| Step | Description | Step | Description |
|---|---|---|---|
| 1. | LLCR (1) | 1. | LLCR (1) |
| 2. | Mechanical Shock (2) | 2. | Mechanical Shock (2) |
| 3. | Random Vibration (3) | 3. | Random Vibration (4) - Non Standard |
| 4. | LLCR (1)<br>Max Delta = 15 mOhm | 4. | LLCR (1)<br>Max Delta = 15 mOhm |

(1) LLCR = EIA-364-23
Open Circuit Voltage = 20 mV Max
Test Current = 100 mA Max

(2) Mechanical Shock = EIA-364-27
Test Condition = C (100 G Peak, 6 milliseconds, Half Sine)
Number of Shocks = 3 Per Direction, Per Axis, 18 Total

(3) Random Vibration = EIA-364-28
Condition = VB (7.56 gRMS Average, 2 Hours/Axis)

(4) Random Vibration = Other
MIL-STD-810G_CHG-1; Method = 514.7, Annex C, Category 4 (Common Carrier); 1hr per axis

**FLOWCHARTS Continued**

## Mechanical Shock/Random Vibration/Event Detection

Group 1
NVCF-DP-16-V-3-XX-X-X-X-X-1
NVBM-DP-16-RA-S-2-X-X
60 Points

*Note: 12" Double Ended Cable*

| Step | Description |
|---|---|
| 1. | Nanosecond Event Detection (Mechanical Shock) (1) |
| 2. | Nanosecond Event Detection (Random Vibration) (2) |

(1) Nanosecond Event Detection (Mechanical Shock)
Use EIA-364-87 for Nanosecond Event Detection:
Test Condition = F (50 nanoseconds at 10 ohms)
Use EIA-364-27 for Mechanical Shock:
Test Condition = C (100 G Peak, 6 milliseconds, Half Sine)
Number of Shocks = 3 Per Direction, Per Axis, 18 Total

(2) Nanosecond Event Detection (Random Vibration)
Use EIA-364-87 for Nanosecond Event Detection:
Test Condition = F (50 nanoseconds at 10 ohms)
Use EIA-364-28 for Random Vibration:
Condition = VB (7.56 gRMS Average, 2 Hours/Axis)

## Cable Pull

Group 1
NVCF-DP-16-V-3-XX-X-X-X-X-1
NVBM-DP-16-RA-S-2-X-X
5 Assemblies
0 Degrees
*Note: 16" Double Ended Cable*

| Step | Description |
|---|---|
| 1. | Cable Pull (1) |

Group 2
NVCF-DP-16-V-3-XX-X-X-X-X-1
NVBM-DP-16-RA-S-2-X-X
5 Assemblies
90 Degrees - Lateral
*Note: 16" Double Ended Cable*

| Step | Description |
|---|---|
| 1. | Cable Pull (1) |

Group 3
NVCF-DP-16-V-3-XX-X-X-X-X-1
NVBM-DP-16-RA-S-2-X-X
5 Assemblies
90 Degrees - Transverse
*Note: 16" Double Ended Cable*

| Step | Description |
|---|---|
| 1. | Cable Pull (1) |

(1) Cable Pull = EIA-364-38
Measure and Record Force Required to Failure
Failure = Discontinuity >1 microsecond at 10 ohms

## FLOWCHARTS Continued

### Cable Flex

*Note: Use Different Samples for Each Group*

| Group 1 | Group 2 |
|---|---|
| NVCF-DP-16-V-3-XX-X-X-X-X-1 | NVCF-DP-16-V-3-XX-X-X-X-X-1 |
| NVBM-DP-16-RA-S-2-X-X | NVBM-DP-16-RA-S-2-X-X |
| 8 Assemblies | 8 Assemblies |
| Circular Cable (Lateral) | Circular Cable (Transverse) |
| *Note: Use DWV Breakdown from IR/DWV Sequence* | *Note: Use DWV Breakdown from IR/DWV Sequence* |
| *Note: 16" Double Ended Cable* | *Note: 16" Double Ended Cable* |
| *Note: Use Mandrel 1.25"* | *Note: Use Mandrel 3.75"* |

| Step | Description | Step | Description |
|---|---|---|---|
| 1. | IR (3) | 1. | IR (3) |
| 2. | DWV at Test Voltage(2) | 2. | DWV at Test Voltage(2) |
| 3. | Cable Flex (1) | 3. | Cable Flex (1) |
| 4. | Visual Inspection | 4. | Visual Inspection |
| 5. | IR (3) | 5. | IR (3) |
| 6. | DWV at Test Voltage(2) | 6. | DWV at Test Voltage(2) |

(1) Cable Flex = EIA-364-41
- Circular Jacket Cable - to be tested 90° each direction (180° total)
- Flat Cable - to be tested 70° each direction (140° total)
- Monitor continuity during flex testing
- Failure = Discontinuity >1 microsecond at 10 ohms

(2) DWV at Test Voltage = EIA-364-20
- Test Condition = 1 (Sea Level)
- DWV test voltage is equal to 75% of the lowest breakdown voltage
- Test voltage applied for 60 seconds

(3) IR = EIA-364-21
- Test Condition = 500 Vdc, 2 Minutes Max

## ATTRIBUTE DEFINITIONS

The following is a brief, simplified description of attributes.

**THERMAL:**

1) EIA-364-17, *Temperature Life with or without Electrical Load Test Procedure for Electrical Connectors.*
2) Test Condition at 105° C.
3) Test Time Condition B for 250 hours.
4) All test samples are pre-conditioned at ambient.
5) All test samples are exposed to environmental stressing in the mated condition.

**THERMAL SHOCK:**

1) EIA-364-32, *Thermal Shock (Temperature Cycling) Test Procedure for Electrical Connectors.*
2) Test Condition I: -40°C to +85°C
3) Test Time: ½ hour dwell at each temperature extreme
4) Number of Cycles: 100
5) All test samples are pre-conditioned at ambient.
6) All test samples are exposed to environmental stressing in the mated condition.

**HUMIDITY:**

1) Reference document: EIA-364-31, *Humidity Test Procedure for Electrical Connectors.*
2) Test Condition B, 240 Hours.
3) Method III, +25° C to + 65° C, 90% to 98% Relative Humidity excluding sub-cycles 7a and 7b.
4) All samples are pre-conditioned at ambient.
5) All test samples are exposed to environmental stressing in the mated condition.

**MECHANICAL SHOCK (Specified Pulse):**

1) Reference document: EIA-364-27, *Mechanical Shock Test Procedure for Electrical Connectors*
2) Test Condition G
3) Peak Value: 100 G
4) Duration: 6 Milliseconds
5) Wave Form: Sawtooth
6) Velocity: 12.3 ft/s
7) Number of Shocks: 3 Shocks / Direction, 3 Axis (18 Total)

**VIBRATION:**

1) Reference document: EIA-364-28, *Vibration Test Procedure for Electrical Connectors*
2) Test Condition V, Letter B
3) Power Spectral Density: 0.10 $G^2$ / Hz
4) G 'RMS': 7.56
5) Frequency: 50 to 2000 Hz
6) Duration: 2.0 Hours per axis (3 axis total)

**VIBRATION:**

1) MIL-STD-810G_CHG-1; Method = 514.7, Annex C, Category 4 (Common Carrier); 1hr per axis

**NANOSECOND-EVENT DETECTION:**

1) Reference document: EIA-364-87, *Nanosecond-Event Detection for Electrical Connectors*
2) Prior to test, the samples were characterized to assure the low nanosecond event being monitored will trigger the detector.
3) After characterization it was determined the test samples could be monitored for 50 nanosecond events

**MATING/UNMATING:**

1) Reference document: EIA-364-13, *Mating and Unmating Forces Test Procedure for Electrical Connectors*.
2) The full insertion position was to within 0.003" to 0.004" of the plug bottoming out in the receptacle to prevent damage to the system under test.
3) One of the mating parts is secured to a floating X-Y table to prevent damage during cycling.

## ATTRIBUTE DEFINITIONS Continued

The following is a brief, simplified description of attributes

### TEMPERATURE RISE (Current Carrying Capacity, CCC):

1) EIA-364-70, *Temperature Rise versus Current Test Procedure for Electrical Connectors and Sockets*.
2) When current passes through a contact, the temperature of the contact increases as a result of $I^2R$ (resistive) heating.
3) The number of contacts being investigated plays a significant part in power dissipation and therefore temperature rise.
4) The size of the temperature probe can affect the measured temperature.
5) Copper traces on PC boards will contribute to temperature rise:
    a. Self-heating (resistive)
    b. Reduction in heat sink capacity affecting the heated contacts
6) A de-rating curve, usually 20%, is calculated.
7) Calculated de-rated currents at four temperature points are reported:
    a. Ambient
    b. $85^o$ C
    c. $95^o$ C
    d. $115^o$ C
8) Typically, neighboring contacts (in close proximity to maximize heat buildup) are energized.
9) The thermocouple (or temperature measuring probe) will be positioned at a location to sense the maximum temperature in the vicinity of the heat generation area.
10) A computer program, *TR 803.exe*, ensures accurate stability for data acquisition.
11) Hook-up wire cross section is larger than the cross section of any connector leads/PC board traces, jumpers, etc.
12) Hook-up wire length is longer than the minimum specified in the referencing standard.

### LLCR:

1) EIA-364-23, *Low Level Contact Resistance Test Procedure for Electrical Connectors and Sockets*.
2) A computer program, *LLCR 221.exe*, ensures repeatability for data acquisition.
3) The following guidelines are used to categorize the changes in LLCR as a result from stressing
    a. <= +5.0 mOhms: ----------Stable
    b. +5.1 to +10.0 mOhms:----------Minor
    c. +10.1 to +15.0 mOhms: ----------Acceptable
    d. +15.1 to +50.0 mOhms: ----------Marginal
    e. +50.1 to +1000 mOhms: ----------Unstable
    f. >+1000 mOhms:----------Open Failure

## ATTRIBUTE DEFINITIONS Continued

The following is a brief, simplified description of attributes

### GAS TIGHT:

To provide method for evaluating the ability of the contacting surfaces in preventing penetration of harsh vapors which might lead to oxide formation that may degrade the electrical performance of the contact system.

1) EIA-364-23, *Low Level Contact Resistance Test Procedure for Electrical Connectors and Sockets*.
2) A computer program, *LLCR 221.exe*, ensures repeatability for data acquisition.
3) The following guidelines are used to categorize the changes in LLCR as a result from stressing
    a. <= +5.0 mOhms:----------Stable
    b. +5.1 to +10.0 mOhms:----------Minor
    c. +10.1 to +15.0 mOhms: ----------Acceptable
    d. +15.1 to +50.0 mOhms: ----------Marginal
    e. +50.1 to +1000 mOhms:----------Unstable
    f. >+1000 mOhms:----------Open Failure

4) Procedure:
    a. Reference document: EIA-364-36, *Test Procedure for Determination of Gas-Tight Characteristics for Electrical Connectors, Sockets and/or Contact Systems.*
    b. Test Conditions:
        i. Class II--- Mated pairs of contacts assembled to their plastic housings.
        ii. Reagent grade Nitric Acid shall be used of sufficient volume to saturate the test chamber
        iii. The ratio of the volume of the test chamber to the surface area of the acid shall be 10:1.
        iv. The chamber shall be saturated with the vapor for at least 15 minutes before samples are added.
        v. Exposure time, 55 to 65 minutes.
        vi. The samples shall be no closer to the chamber walls than 1 inches and no closer to the surface of the acid than 3 inches.
        vii. The samples shall be dried after exposure for a minimum of 1 hour.
        viii. Drying temperature $50^{o}$ C
        ix. The final LLCR shall be conducted within 1 hour after drying.

### INSULATION RESISTANCE (IR):

To determine the resistance of insulation materials to leakage of current through or on the surface of these materials when a DC potential is applied.

1) PROCEDURE:
    a. Reference document: EIA-364-21, *Insulation Resistance Test Procedure for Electrical Connectors*.
    b. Test Conditions:
        i. Between Adjacent Contacts or Signal-to-Ground
        ii. Electrification Time 2.0 minutes
        iii. Test Voltage (100 VDC) corresponds to calibration settings for measuring resistances.
2) MEASUREMENTS:
3) When the specified test voltage is applied (VDC), the insulation resistance shall not be less than 1000 megohms.

## ATTRIBUTE DEFINITIONS Continued

The following is a brief, simplified description of attributes

### DIELECTRIC WITHSTANDING VOLTAGE (DWV):

To determine if the sockets can operate at its rated voltage and withstand momentary over potentials due to switching, surges, and other similar phenomenon. Separate samples are used to evaluate the effect of environmental stresses so not to influence the readings from arcing that occurs during the measurement process.

1) PROCEDURE:
    a. Reference document: EIA-364-20, *Withstanding Voltage Test Procedure for Electrical Connectors*.
    b. Test Conditions:
        i. Between Adjacent Contacts or Signal-to-Ground
        ii. Barometric Test Condition 1
        iii. Rate of Application 500 V/Sec
        iv. Test Voltage (VAC) until breakdown occurs
2) MEASUREMENTS/CALCULATIONS
    a. The breakdown voltage shall be measured and recorded.
    b. The dielectric withstanding voltage shall be recorded as 75% of the minimum breakdown voltage.
    c. The working voltage shall be recorded as one-third (1/3) of the dielectric withstanding voltage (one-fourth of the breakdown voltage).

## ATTRIBUTE DEFINITIONS Continued

The following is a brief, simplified description of attributes

### CABLE PULL:

1) Secure cable near center and pull on connector
    a. At 0°, in-line with cable
    b. At 90°, in-line with cable

Fig. 1
0° Connector pull

Fig. 2
90° Connector pull-Lateral

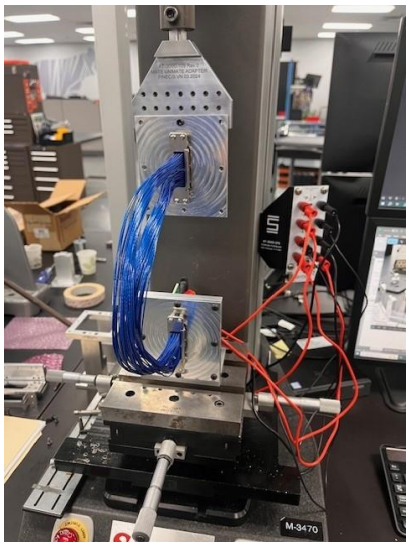


Fig. 3
90° Connector pull- Transverse

### CABLE Flex:

1) Oscillate and monitor electrical continuity for open circuit indication.
    a. ± 90°Flex Mode, bend up to 100 cycles. load on 16 oz.

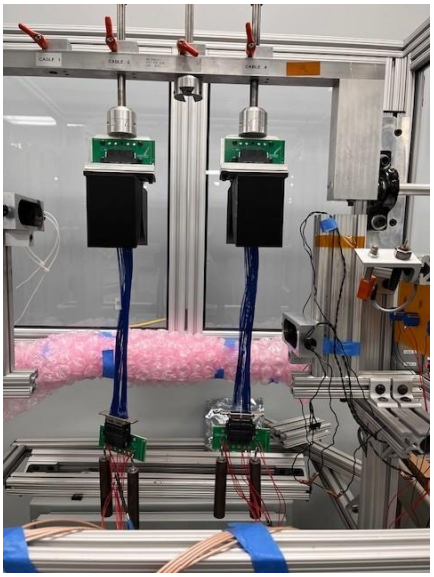


Fig. 4- Cable Flex-Lateral

Fig. 5- Cable Flex- Transverse

# RESULTS

## Temperature Rise, CCC at a 20% de-rating

- **CCC for a 30°C Temperature Rise----------1.5 A per contact with 1 contact (1 x 1) powered (Single contact rating limited by the cable type)**
- **CCC for a 30°C Temperature Rise----------9.0 A (1.1 Amps per Signal Pin) with All contacts (8x1) powered**

## Mating – Unmating Forces

**Thermal Aging Group**

- **Initial**
  - **Mating**
    - **Min ---------- 9.66 lbs**
    - **Max---------- 9.97 lbs**
  - **Unmating**
    - **Min ---------- 6.98 lbs**
    - **Max---------- 8.50 lbs**
- **After Thermal**
  - **Mating**
    - **Min ---------- 6.25 lbs**
    - **Max---------- 7.70 lbs**
  - **Unmating**
    - **Min ---------- 5.88 lbs**
    - **Max---------- 6.76 lbs**

## RESULTS Continued

### Mating/Unmating Durability Group

- **Initial**
  - **Mating**
    - **Min ---------- 9.00 lbs**
    - **Max----------10.01 lbs**
  - **Unmating**
    - **Min ---------- 6.61 lbs**
    - **Max---------- 7.50 lbs**
- **After 25 Cycles**
  - **Mating**
    - **Min ---------- 9.30 lbs**
    - **Max----------10.31 lbs**
  - **Unmating**
    - **Min ---------- 7.58 lbs**
    - **Max---------- 8.17 lbs**
- **After 50 Cycles**
  - **Mating**
    - **Min ---------- 9.81 lbs**
    - **Max----------10.77 lbs**
  - **Unmating**
    - **Min ---------- 8.05 lbs**
    - **Max---------- 8.62 lbs**
- **After 75 Cycles**
  - **Mating**
    - **Min ----------10.18 lbs**
    - **Max----------11.26 lbs**
  - **Unmating**
    - **Min ---------- 8.34 lbs**
    - **Max---------- 8.88 lbs**
- **After 100 Cycles**
  - **Mating**
    - **Min ----------10.59 lbs**
    - **Max----------11.86 lbs**
  - **Unmating**
    - **Min ---------- 8.69 lbs**
    - **Max---------- 9.24 lbs**
- **After Humidity**
  - **Mating**
    - **Min ---------- 7.12 lbs**
    - **Max---------- 7.54 lbs**
  - **Unmating**
    - **Min ---------- 6.01 lbs**
    - **Max---------- 6.32 lbs**

## RESULTS Continued

### Cable Pull Force

#### 0° Pull

- **Min ---------- 273.00 lbs**
- **Max---------- 317.80 lbs**

#### 90° Pull- Lateral

- **Min ---------- 395.80 lbs**
- **Max---------- 445.10 lbs**

#### 90° Pull- Transverse

- **Min ---------- 219.50 lbs**
- **Max---------- 222.10 lbs**

### Insulation Resistance minimums, IR

**Pin to Pin**

- **Initial**
  - **Mated---------- 9000 Meg Ω ---------- Passed**
  - **Unmated ---------- 9000 Meg Ω ---------- Passed**
- **Thermal Shock**
  - **Mated---------- 9000 Meg Ω ---------- Passed**
  - **Unmated ---------- 9000 Meg Ω ---------- Passed**
- **Humidity**
  - **Mated---------- 2060 Meg Ω ---------- Passed**
  - **Unmated ---------- 3400 Meg Ω ---------- Passed**

**Row to Row**

- **Initial**
  - **Mated---------- 9000 Meg Ω ---------- Passed**
  - **Unmated ---------- 9000 Meg Ω ---------- Passed**
- **Thermal Shock**
  - **Mated---------- 9000 Meg Ω ---------- Passed**
  - **Unmated ---------- 9000 Meg Ω ---------- Passed**
- **Humidity**
  - **Mated---------- 9000 Meg Ω ---------- Passed**
  - **Unmated ---------- 9000 Meg Ω ---------- Passed**

**Pin to Ground**

- **Initial**
  - **Mated---------- 9000 Meg Ω ---------- Passed**
  - **Unmated ---------- 9000 Meg Ω ---------- Passed**
- **Thermal Shock**
  - **Mated---------- 9000 Meg Ω ---------- Passed**
  - **Unmated ---------- 9000 Meg Ω ---------- Passed**
- **Humidity**
  - **Mated---------- 9000 Meg Ω ---------- Passed**
  - **Unmated ---------- 1200 Meg Ω ---------- Passed**

## RESULTS Continued

### Dielectric Withstanding Voltage minimums, DWV

- **Minimums**
  - **Breakdown Voltage ----------600 VAC**
  - **Test Voltage ----------450 VAC**
  - **Working Voltage ----------150 VAC**

**Pin to Pin**

- **Initial DWV ----------Passed**
- **Thermal DWV----------Passed**
- **Humidity DWV----------Passed**

**Row to Row**

- **Initial DWV ----------Passed**
- **Thermal DWV----------Passed**
- **Humidity DWV----------Passed**

**Pin to Ground**

- **Initial DWV ----------Passed**
- **Thermal DWV----------Passed**
- **Humidity DWV----------Passed**

### Cable Flex:

### Lateral

#### Insulation Resistance minimums, IR

**Pin to Pin**

- **Initial**
  - **Mated----------45000 Meg Ω ---------- Passed**
- **After 100 flex cycles**
  - **Mated----------45000 Meg Ω ---------- Passed**

**Row to Row**

- **Initial**
  - **Mated----------45000 Meg Ω ---------- Passed**
- **After 100 flex cycles**
  - **Mated----------45000 Meg Ω ---------- Passed**

**Pin To Ground**

- **Initial**
  - **Mated----------45000 Meg Ω ---------- Passed**
- **After 100 flex cycles**
  - **Mated----------45000 Meg Ω ---------- Passed**

#### Dielectric Withstanding Voltage minimums, DWV

- **Test Voltage ----------450 VAC**

**Pin to Pin**

- **Initial DWV ----------Passed**
- **After 100 Flex cycles DWV ----------Passed**

**Row to Row**

- **Initial DWV ----------Passed**
- **After 100 Flex cycles DWV ----------Passed**

**Pin To Ground**

- **Initial DWV ----------Passed**
- **After 100 Flex cycles DWV ----------Passed**

## RESULTS Continued

### Transverse

**Pin to Pin**

- **Initial**
  - **Mated ---------- 45000 Meg Ω ---------- Passed**
- **After 100 flex cycles**
  - **Mated ---------- 45000 Meg Ω ---------- Passed**

**Row to Row**

- **Initial**
  - **Mated ---------- 45000 Meg Ω ---------- Passed**
- **After 100 flex cycles**
  - **Mated ---------- 45000 Meg Ω ---------- Passed**

**Pin To Ground**

- **Initial**
  - **Mated ---------- 45000 Meg Ω ---------- Passed**
- **After 100 flex cycles**
  - **Mated ---------- 45000 Meg Ω ---------- Passed**

### Dielectric Withstanding Voltage minimums, DWV

- **Test Voltage ---------- 450 VAC**

**Pin to Pin**

- **Initial DWV ---------- Passed**
- **After 100 Flex cycles DWV ---------- Passed**

**Row to Row**

- **Initial DWV ---------- Passed**
- **After 100 Flex cycles DWV ---------- Passed**

**Pin To Ground**

- **Initial DWV ---------- Passed**
- **After 100 Flex cycles DWV ---------- Passed**

## RESULTS Continued

### LLCR Gas Tight (1152 LLCR test points)

**Signal Pin**

- **Initial ---------- 189.25 mOhms Max**

**Ground Pin**

- **Initial ---------- 12.14 mOhms Max**
- **Gas-Tight**
  - **<= +5.0 mOhms ---------- 1151 Points ---------- Stable**
  - **+5.1 to +10.0 mOhms ---------- 1 Points ---------- Minor**
  - **+10.1 to +15.0 mOhms ---------- 0 Points ---------- Acceptable**
  - **+15.1 to +50.0 mOhms ---------- 0 Points ---------- Marginal**
  - **+50.1 to +1000 mOhms ---------- 0 Points ---------- Unstable**
  - **>+1000 mOhms ---------- 0 Points ---------- Open Failure**

### LLCR Thermal Aging (576 LLCR test points)

**Signal Pin**

- **Initial ---------- 180.09 mOhms Max**

**Ground Pin**

- **Initial ---------- 16.99 mOhms Max**
- **Thermal Aging**
  - **<= +5.0 mOhms ---------- 456 Points ---------- Stable**
  - **+5.1 to +10.0 mOhms ---------- 118 Points ---------- Minor**
  - **+10.1 to +15.0 mOhms ---------- 2 Points ---------- Acceptable**
  - **+15.1 to +50.0 mOhms ---------- 0 Points ---------- Marginal**
  - **+50.1 to +1000 mOhms ---------- 0 Points ---------- Unstable**
  - **>+1000 mOhms ---------- 0 Points ---------- Open Failure**

### LLCR Durability (576 LLCR test points)

**Signal Pin**

- **Initial ---------- 179.72 mOhms Max**

**Ground Pin**

- **Initial ---------- 12.76 mOhms Max**
- **Durability, 100 Cycles**
  - **<= +5.0 mOhms ---------- 576 Points ---------- Stable**
  - **+5.1 to +10.0 mOhms ---------- 0 Points ---------- Minor**
  - **+10.1 to +15.0 mOhms ---------- 0 Points ---------- Acceptable**
  - **+15.1 to +50.0 mOhms ---------- 0 Points ---------- Marginal**
  - **+50.1 to +1000 mOhms ---------- 0 Points ---------- Unstable**
  - **>+1000 mOhms ---------- 0 Points ---------- Open Failure**
- **Thermal**
  - **<= +5.0 mOhms ---------- 576 Points ---------- Stable**
  - **+5.1 to +10.0 mOhms ---------- 0 Points ---------- Minor**
  - **+10.1 to +15.0 mOhms ---------- 0 Points ---------- Acceptable**
  - **+15.1 to +50.0 mOhms ---------- 0 Points ---------- Marginal**
  - **+50.1 to +1000 mOhms ---------- 0 Points ---------- Unstable**
  - **>+1000 mOhms ---------- 0 Points ---------- Open Failure**
- **Humidity**
  - **<= +5.0 mOhms ---------- 576 Points ---------- Stable**
  - **+5.1 to +10.0 mOhms ---------- 0 Points ---------- Minor**
  - **+10.1 to +15.0 mOhms ---------- 0 Points ---------- Acceptable**
  - **+15.1 to +50.0 mOhms ---------- 0 Points ---------- Marginal**
  - **+50.1 to +1000 mOhms ---------- 0 Points ---------- Unstable**
  - **>+1000 mOhms ---------- 0 Points ---------- Open Failure**

## RESULTS Continued

### LLCR Shock & Vibration (576 LLCR test points)

**Group 1**

**Signal Pin**

- **Initial ---------- 331.61 mOhms Max**

**Ground Pin**

- **Initial ---------- 17.20 mOhms Max**
- **Shock &Vibration**
  - **<= +5.0 mOhms ---------- 559 Points ---------- Stable**
  - **+5.1 to +10.0 mOhms ---------- 17 Points ---------- Minor**
  - **+10.1 to +15.0 mOhms ---------- 0 Points ---------- Acceptable**
  - **+15.1 to +50.0 mOhms ---------- 0 Points ---------- Marginal**
  - **+50.1 to +1000 mOhms ---------- 0 Points ---------- Unstable**
  - **>+1000 mOhms ---------- 0 Points ---------- Open Failure**

**Group 2 (MIL-STD-810G)**

**Signal Pin**

- **Initial ---------- 327.49 mOhms Max**

**Ground Pin**

- **Initial ---------- 16.93 mOhms Max**
- **Shock &Vibration**
  - **<= +5.0 mOhms ---------- 576 Points ---------- Stable**
  - **+5.1 to +10.0 mOhms ---------- 0 Points ---------- Minor**
  - **+10.1 to +15.0 mOhms ---------- 0 Points ---------- Acceptable**
  - **+15.1 to +50.0 mOhms ---------- 0 Points ---------- Marginal**
  - **+50.1 to +1000 mOhms ---------- 0 Points ---------- Unstable**
  - **>+1000 mOhms ---------- 0 Points ---------- Open Failure**

### Mechanical Shock & Random Vibration:

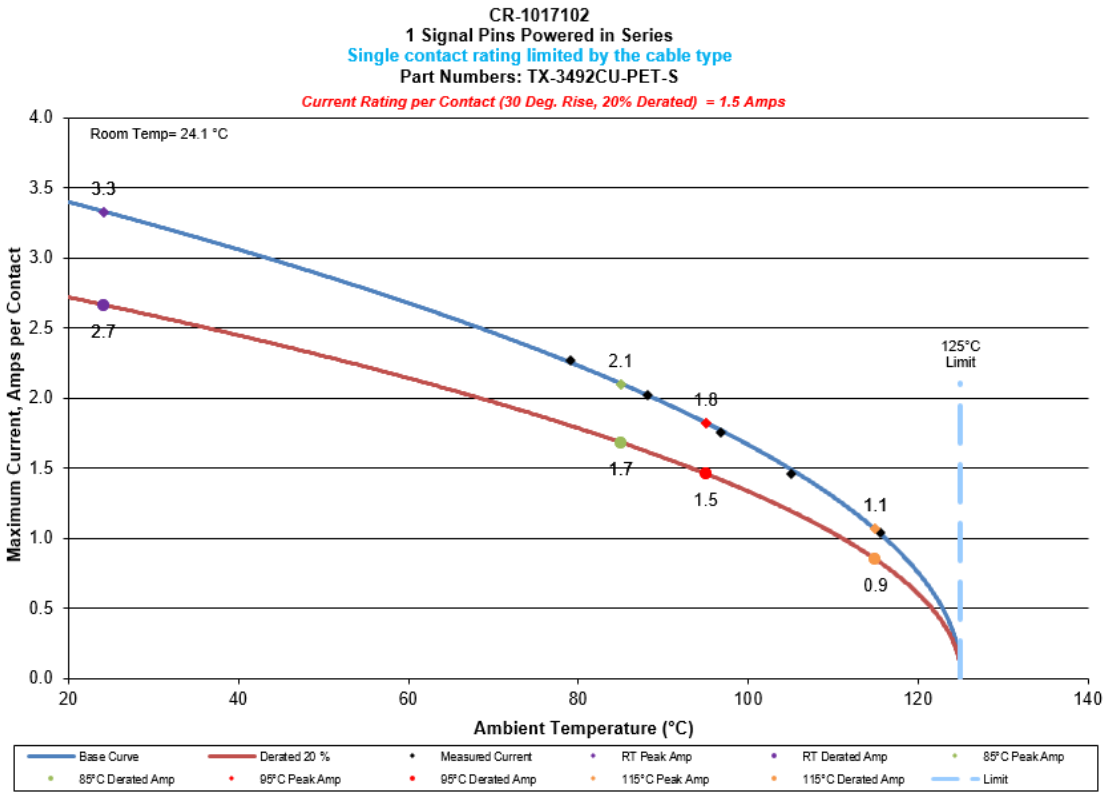
- **Shock**
  - **No Damage ---------- ---------- Pass**
  - **50 Nanoseconds ---------- ---------- Pass**
- **Vibration**
  - **No Damage ---------- ---------- Pass**
  - **50 Nanoseconds ---------- ---------- Pass**

## DATA SUMMARIES

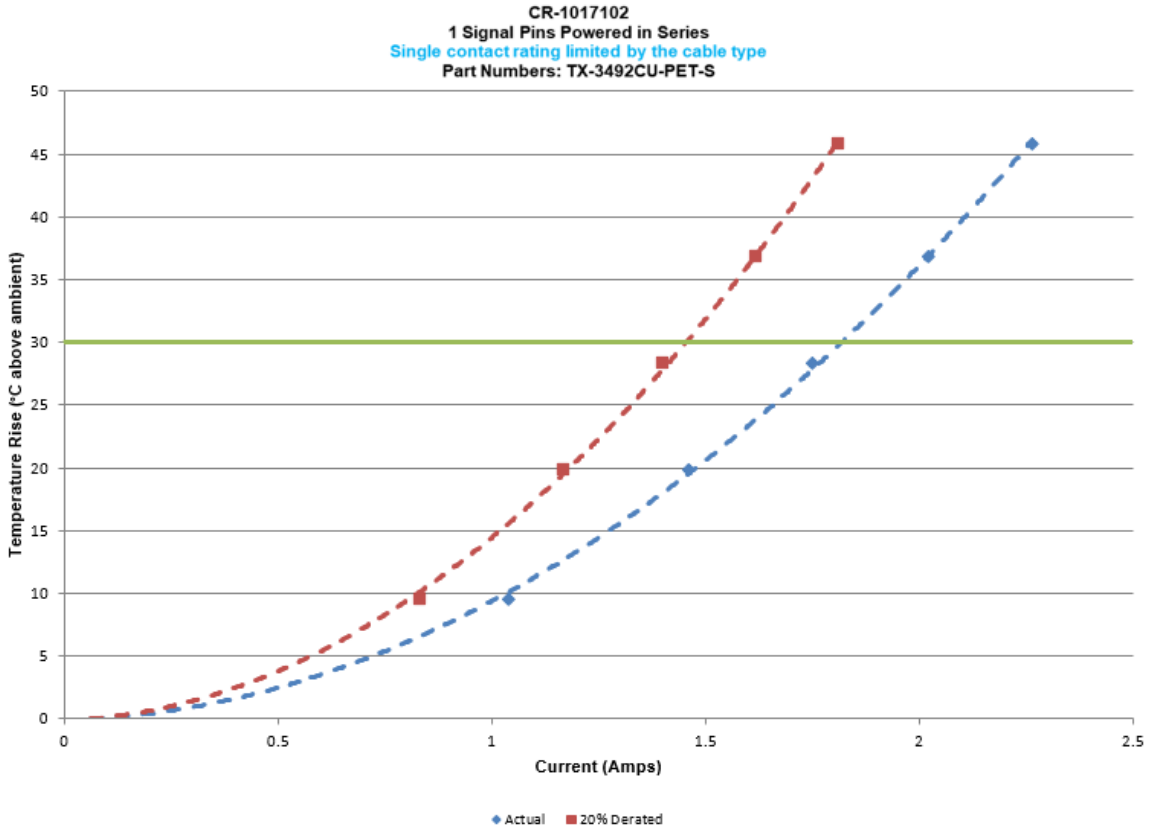
### TEMPERATURE RISE (Current Carrying Capacity, CCC):

1) High quality thermocouples whose temperature slopes track one another were used for temperature monitoring.
2) The thermocouples were placed at a location to sense the maximum temperature generated during testing.
3) Temperature readings recorded are those for which three successive readings, 15 minutes apart, differ less than 1° C (computer controlled data acquisition).
4) Adjacent contacts were powered:

    a. Linear configuration with 1 adjacent conductors/contacts powered

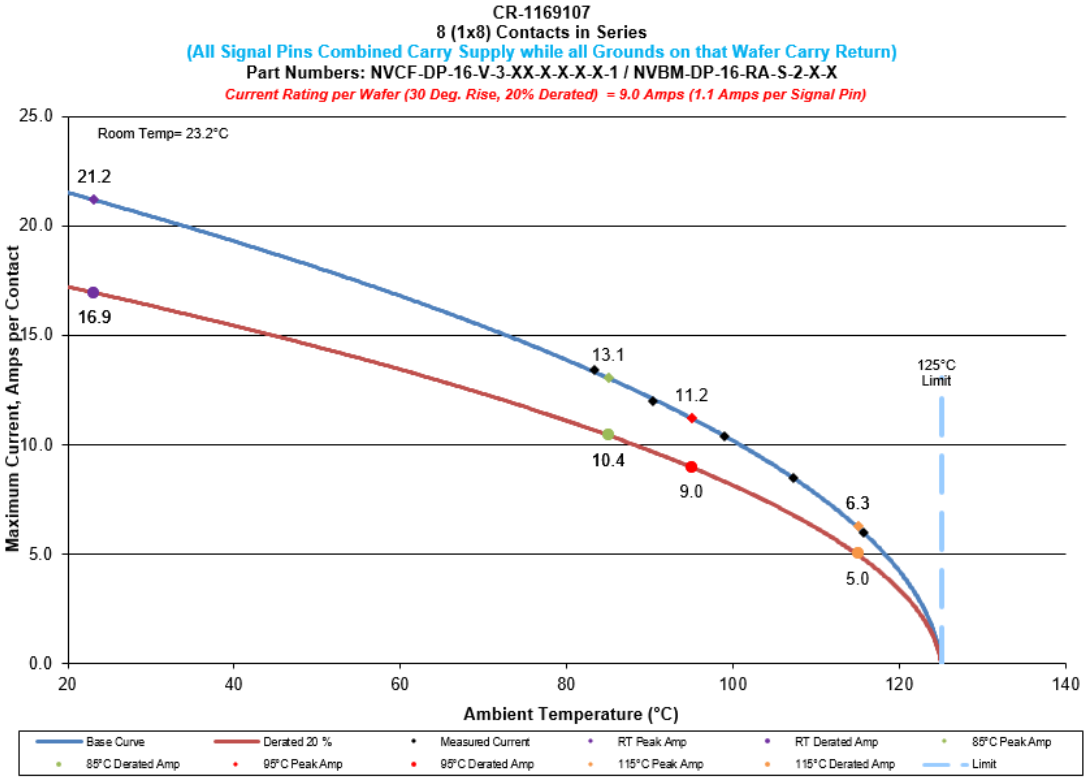


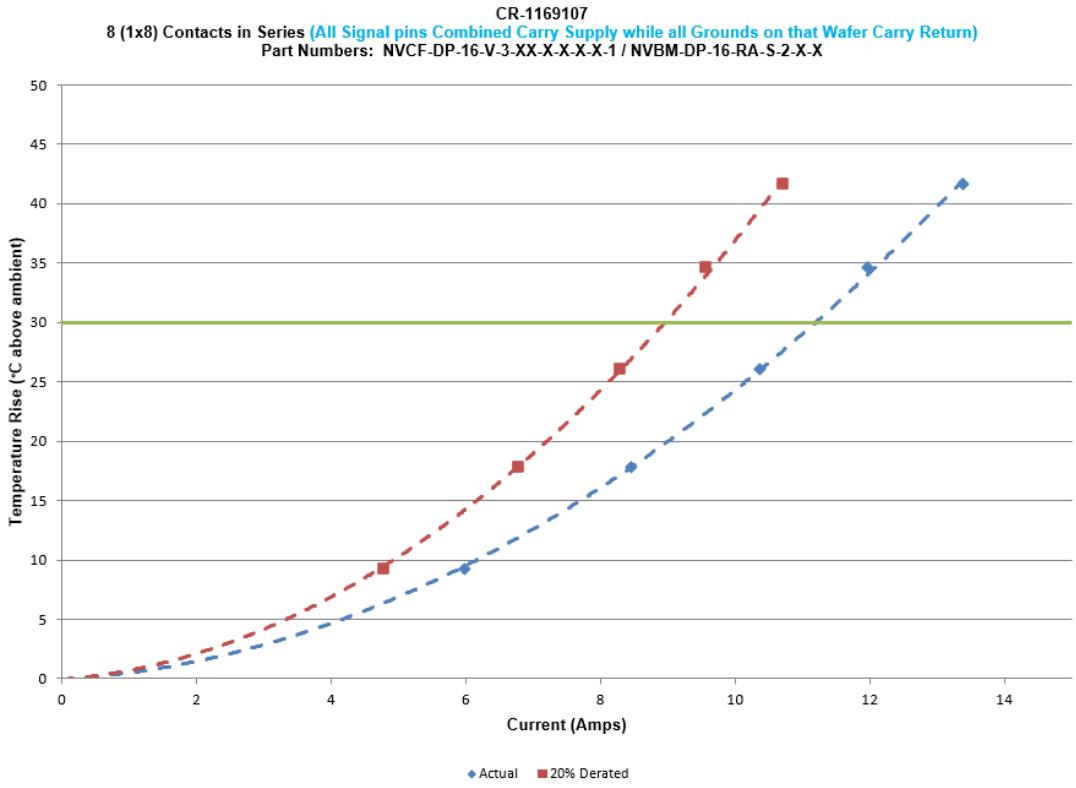
## DATA SUMMARIES Continued



## DATA SUMMARIES Continued

b. Linear configuration with 8 adjacent conductors/contacts powered



## DATA SUMMARIES Continued

## MATING/UNMATING:

**Thermal Aging Group**

| | Initial | | | | After Thermals | | | |
|---|---|---|---|---|---|---|---|---|
| | **Mating** | | **Unmating** | | **Mating** | | **Unmating** | |
| | Newtons | Force (Lbs) | Newtons | Force (Lbs) | Newtons | Force (Lbs) | Newtons | Force (Lbs) |
| Minimum | 42.97 | 9.66 | 31.05 | 6.98 | 27.80 | 6.25 | 26.15 | 5.88 |
| Maximum | 44.35 | 9.97 | 37.81 | 8.50 | 34.25 | 7.70 | 30.07 | 6.76 |
| **Average** | 43.60 | **9.80** | 33.63 | **7.56** | 30.55 | **6.87** | 27.64 | **6.22** |
| St Dev | 0.59 | 0.13 | 3.04 | 0.68 | 2.77 | 0.62 | 1.69 | 0.38 |
| Count | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 |

**Mating/Unmating Durability Group**

| | Initial | | | | 25 Cycles | | | |
|---|---|---|---|---|---|---|---|---|
| | **Mating** | | **Unmating** | | **Mating** | | **Unmating** | |
| | Newtons | Force (Lbs) | Newtons | Force (Lbs) | Newtons | Force (Lbs) | Newtons | Force (Lbs) |
| Minimum | 40.03 | 9.00 | 29.40 | 6.61 | 41.37 | 9.30 | 33.72 | 7.58 |
| Maximum | 44.52 | 10.01 | 33.36 | 7.50 | 45.86 | 10.31 | 36.34 | 8.17 |
| **Average** | 41.69 | **9.37** | 30.92 | **6.95** | 44.06 | **9.91** | 34.81 | **7.83** |
| St Dev | 2.02 | 0.45 | 1.70 | 0.38 | 1.91 | 0.43 | 1.10 | 0.25 |
| Count | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 |
| | 50 Cycles | | | | 75 Cycles | | | |
| | **Mating** | | **Unmating** | | **Mating** | | **Unmating** | |
| | Newtons | Force (Lbs) | Newtons | Force (Lbs) | Newtons | Force (Lbs) | Newtons | Force (Lbs) |
| Minimum | 43.63 | 9.81 | 35.81 | 8.05 | 45.28 | 10.18 | 37.10 | 8.34 |
| Maximum | 47.90 | 10.77 | 38.34 | 8.62 | 50.08 | 11.26 | 39.50 | 8.88 |
| **Average** | 46.16 | **10.38** | 37.05 | **8.33** | 48.09 | **10.81** | 38.59 | **8.68** |
| St Dev | 1.80 | 0.41 | 1.05 | 0.24 | 2.16 | 0.49 | 1.08 | 0.24 |
| Count | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 |
| | 100 Cycles | | | | After Humidity | | | |
| | **Mating** | | **Unmating** | | **Mating** | | **Unmating** | |
| | Newtons | Force (Lbs) | Newtons | Force (Lbs) | Newtons | Force (Lbs) | Newtons | Force (Lbs) |
| Minimum | 47.10 | 10.59 | 38.65 | 8.69 | 31.67 | 7.12 | 26.73 | 6.01 |
| Maximum | 52.75 | 11.86 | 41.10 | 9.24 | 33.54 | 7.54 | 28.11 | 6.32 |
| **Average** | 50.27 | **11.30** | 39.97 | **8.99** | 32.67 | **7.35** | 27.50 | **6.18** |
| St Dev | 2.39 | 0.54 | 1.17 | 0.26 | 0.77 | 0.17 | 0.60 | 0.13 |
| Count | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 |

## DATA SUMMARIES Continued

### INSULATION RESISTANCE (IR):

| | Pin to Pin | | |
|---|---|---|---|
| | Mated | Unmated | Unmated |
| Minimum | **NVCF/NVBM** | **NVCF** | **NVBM** |
| **Initial** | 9000 | Not Tested | 9000 |
| **Thermal** | 9000 | Not Tested | 9000 |
| **Humidity** | 2060 | Not Tested | 3400 |

| | Pin to Ground | | |
|---|---|---|---|
| | Mated | Unmated | Unmated |
| Minimum | **NVCF/NVBM** | **NVCF** | **NVBM** |
| **Initial** | 9000 | Not Tested | 9000 |
| **Thermal** | 9000 | Not Tested | 9000 |
| **Humidity** | 9000 | Not Tested | 1200 |

| | Row to Row | | |
|---|---|---|---|
| | Mated | Unmated | Unmated |
| Minimum | **NVCF/NVBM** | **NVCF** | **NVBM** |
| **Initial** | 9000 | Not Tested | 9000 |
| **Thermal** | 9000 | Not Tested | 9000 |
| **Humidity** | 9000 | Not Tested | 9000 |

### DIELECTRIC WITHSTANDING VOLTAGE (DWV):

| Voltage Rating Summary | |
|---|---|
| **Minimum** | **NVCF/NVBM** |
| **Break Down Voltage** | 600 |
| **Test Voltage** | 450 |
| **Working Voltage** | 150 |

| Pin to Pin | |
|---|---|
| **Initial Test Voltage** | Passed |
| **After Thermal Test Voltage** | Passed |
| **After Humidity Test Voltage** | Passed |

| Row to Row | |
|---|---|
| **Initial Test Voltage** | Passed |
| **After Thermal Test Voltage** | Passed |
| **After Humidity Test Voltage** | Passed |

| Pin to Ground | |
|---|---|
| **Initial Test Voltage** | Passed |
| **After Thermal Test Voltage** | Passed |
| **After Humidity Test Voltage** | Passed |

## DATA SUMMARIES Continued

**Cable Pull Force:**

**0° Pull**

| | Force (lbs) |
|---|---|
| Minimum | **273.00** |
| Maximum | 317.80 |
| Average | 298.42 |

**90° Pull Lateral**

| | Force (lbs) |
|---|---|
| Minimum | **395.30** |
| Maximum | 445.10 |
| Average | 416.90 |

**90° Pull Transverse**

| | Force (lbs) |
|---|---|
| Minimum | **219.50** |
| Maximum | 222.10 |
| Average | 221.18 |

## DATA SUMMARIES Continued

### Cable Flex:

**Lateral**

**Insulation Resistance minimums, IR**

| Voltage Rating Summary | |
|---|---|
| Minimum | |
| Test Voltage | 450 |

| Pin to Pin | |
|---|---|
| Initial Test Voltage | Passed |
| After 100 Flex Cycles Test Voltage | Passed |

| Row to Row | |
|---|---|
| Initial Test Voltage | Passed |
| After 100 Flex Cycles Test Voltage | Passed |

| Pin to Ground | |
|---|---|
| Initial Test Voltage | Passed |
| After 100 Flex Cycles Test Voltage | Passed |

**Dielectric Withstanding Voltage minimums, DWV**

| Voltage Rating Summary | |
|---|---|
| Minimum | |
| Test Voltage | 450 |

| Pin to Pin | |
|---|---|
| Initial Test Voltage | Passed |
| After 100 Flex Cycles Test Voltage | Passed |

| Row to Row | |
|---|---|
| Initial Test Voltage | Passed |
| After 100 Flex Cycles Test Voltage | Passed |

| Pin to Ground | |
|---|---|
| Initial Test Voltage | Passed |
| After 100 Flex Cycles Test Voltage | Passed |

## DATA SUMMARIES Continued

**Transverse**

**Insulation Resistance minimums, IR**

| Voltage Rating Summary | |
|---|---|
| **Minimum** | |
| **Test Voltage** | 450 |

| Pin to Pin | |
|---|---|
| **Initial Test Voltage** | Passed |
| **After 100 Flex Cycles Test Voltage** | Passed |

| Row to Row | |
|---|---|
| **Initial Test Voltage** | Passed |
| **After 100 Flex Cycles Test Voltage** | Passed |

| Pin to Ground | |
|---|---|
| **Initial Test Voltage** | Passed |
| **After 100 Flex Cycles Test Voltage** | Passed |

**Dielectric Withstanding Voltage minimums, DWV**

| Voltage Rating Summary | |
|---|---|
| **Minimum** | |
| **Test Voltage** | 450 |

| Pin to Pin | |
|---|---|
| **Initial Test Voltage** | Passed |
| **After 100 Flex Cycles Test Voltage** | Passed |

| Row to Row | |
|---|---|
| **Initial Test Voltage** | Passed |
| **After 100 Flex Cycles Test Voltage** | Passed |

| Pin to Ground | |
|---|---|
| **Initial Test Voltage** | Passed |
| **After 100 Flex Cycles Test Voltage** | Passed |

## DATA SUMMARIES Continued

### LLCR Durability:

1) A total of 576 points were measured.
2) EIA-364-23, *Low Level Contact Resistance Test Procedure for Electrical Connectors and Sockets.*
3) A computer program, *LLCR 221.exe*, ensures repeatability for data acquisition.
4) The following guidelines are used to categorize the changes in LLCR as a result from stressing.
   a. <= +5.0 mOhms: ----------Stable
   b. +5.1 to +10.0 mOhms: ----------Minor
   c. +10.1 to +15.0 mOhms:----------Acceptable
   d. +15.1 to +50.0 mOhms:----------Marginal
   e. +50.1 to +1000 mOhms----------Unstable
   f. >+1000 mOhms:----------Open Failure

| LLCR Measurement Summaries by Pin Type | | | | |
|---|---|---|---|---|
| Date | 3/14/2025 | 3/25/2025 | 4/4/2025 | 4/14/2025 |
| Room Temp (Deg C) | 22 | 22 | 22 | 22 |
| Rel Humidity (%) | 40 | 38 | 48 | 46 |
| Technician | Tony Wagoner | Samuel Cecil | Tony Wagoner | Samuel Cecil |
| **mOhm values** | Actual **Initial** | **Delta Cycles** | **Delta Therm Shck** | **Delta Humidity** |
| **Pin Type: Signal 1** | | | | |
| Average | 170.27 | 0.71 | 0.62 | 0.77 |
| St. Dev. | 50.2 | 0.56 | 0.61 | 0.61 |
| Min | 159.16 | 0.01 | 0 | 0.01 |
| Max | 179.72 | 3.89 | 4.27 | 4.43 |
| Summary Count | 512 | 512 | 512 | 512 |
| Total Count | 512 | 512 | 512 | 512 |
| **Pin Type: GND 1** | | | | |
| Average | 10.97 | 0.42 | 0.66 | 0.6 |
| St. Dev. | 0.97 | 0.28 | 0.41 | 0.44 |
| Min | 9.63 | 0.01 | 0.05 | 0.02 |
| Max | 12.76 | 1.14 | 1.5 | 1.61 |
| Summary Count | 64 | 64 | 64 | 64 |
| Total Count | 64 | 64 | 64 | 64 |

| LLCR Delta Count by Category | | | | | | |
|---|---|---|---|---|---|---|
| | **Stable** | **Minor** | **Acceptable** | **Marginal** | **Unstable** | **Open** |
| **mOhms** | **<=5** | **>5 & <=10** | **>10 & <=15** | **>15 & <=50** | **>50 & <=1000** | **>1000** |
| **Cycles** | **576** | **0** | **0** | **0** | **0** | **0** |
| **Therm Shck** | **576** | **0** | **0** | **0** | **0** | **0** |
| **Humidity** | **576** | **0** | **0** | **0** | **0** | **0** |

## DATA SUMMARIES Continued

### LLCR Thermal Aging:

1) A total of 576 points were measured.
2) EIA-364-23, *Low Level Contact Resistance Test Procedure for Electrical Connectors and Sockets.*
3) A computer program, *LLCR 221.exe*, ensures repeatability for data acquisition.
4) The following guidelines are used to categorize the changes in LLCR as a result from stressing.
   a. <= +5.0 mOhms: ----------Stable
   b. +5.1 to +10.0 mOhms:----------Minor
   c. +10.1 to +15.0 mOhms: ----------Acceptable
   d. +15.1 to +50.0 mOhms: ----------Marginal
   e. +50.1 to +1000 mOhms: ----------Unstable
   f. >+1000 mOhms:----------Open Failure

| LLCR Measurement Summaries by Pin Type | | |
|---|---|---|
| Date | 3/15/2025 | 4/1/2025 |
| Room Temp (Deg C) | 22 | 22 |
| Rel Humidity (%) | 40 | 39 |
| Technician | Tony Wagoner | Samuel Cecil |
| **mOhm values** | Actual | **Delta** |
| | **Initial** | **Thermal** |
| **Pin Type: Signal 1** | | |
| Average | 170.5 | 3.07 |
| St. Dev. | 4.87 | 2.68 |
| Min | 161.12 | 0.01 |
| Max | 180.09 | 13.9 |
| Summary Count | 512 | 512 |
| Total Count | 512 | 512 |
| **Pin Type: GND 1** | | |
| Average | 11.29 | 1.09 |
| St. Dev. | 1.42 | 1.27 |
| Min | 9.39 | 0.04 |
| Max | 16.99 | 8.32 |
| Summary Count | 64 | 64 |
| Total Count | 64 | 64 |

| LLCR Delta Count by Category | | | | | | |
|---|---|---|---|---|---|---|
| | **Stable** | **Minor** | **Acceptable** | **Marginal** | **Unstable** | **Open** |
| **mOhms** | **<=5** | **>5 & <=10** | **>10 & <=15** | **>15 & <=50** | **>50 & <=1000** | **>1000** |
| **Thermal** | **456** | **118** | **2** | **0** | **0** | **0** |

## DATA SUMMARIES Continued

### LLCR Gas Tight:

1) A total of 1152 points were measured.
2) EIA-364-23, *Low Level Contact Resistance Test Procedure for Electrical Connectors and Sockets.*
3) A computer program, *LLCR 221.exe*, ensures repeatability for data acquisition.
4) The following guidelines are used to categorize the changes in LLCR as a result from stressing.
   a. <= +5.0 mOhms: ----------Stable
   b. +5.1 to +10.0 mOhms: ----------Minor
   c. +10.1 to +15.0 mOhms:----------Acceptable
   d. +15.1 to +50.0 mOhms:----------Marginal
   e. +50.1 to +1000 mOhms: ----------Unstable
   f. >+1000 mOhms:----------Open Failure

| LLCR Measurement Summaries by Pin Type | | | | |
|---|---|---|---|---|
| Date | 1/22/2025 | 1/23/2025 | | |
| Room Temp (Deg C) | 21 | 22 | | |
| Rel Humidity (%) | 36 | 35 | | |
| Technician | Brian Stemle | Brian Stemle | | |
| **mOhm values** | Actual | **Delta** | | |
| | **Initial** | **Acid Vapor** | | |
| **Pin Type: Signal 1** | | | | |
| Average | 173.06 | 0.73 | | |
| St. Dev. | 7.81 | 0.66 | | |
| Min | 152.93 | 0 | | |
| Max | 189.25 | 5.19 | | |
| Summary Count | 1024 | 1024 | | |
| Total Count | 1024 | 1024 | | |
| **Pin Type: GND 1** | | | | |
| Average | 10.76 | 0.24 | | |
| St. Dev. | 0.94 | 0.13 | | |
| Min | 9.59 | 0 | | |
| Max | 12.14 | 0.7 | | |
| Summary Count | 128 | 128 | | |
| Total Count | 128 | 128 | | |

| LLCR Delta Count by Category | | | | | | |
|---|---|---|---|---|---|---|
| | **Stable** | **Minor** | **Acceptable** | **Marginal** | **Unstable** | **Open** |
| **mOhms** | **<=5** | **>5 & <=10** | **>10 & <=15** | **>15 & <=50** | **>50 & <=1000** | **>1000** |
| **Acid Vapor** | **1151** | **1** | **0** | **0** | **0** | **0** |

## DATA SUMMARIES Continued

### LLCR Shock &Vibration:

1). A total of 576 points were measured.
2). EIA-364-23, *Low Level Contact Resistance Test Procedure for Electrical Connectors and Sockets.*
3). The following guidelines are used to categorize the changes in LLCR as a result from stressing.
   a. <= +5.0 mOhms: ----------Stable
   b. +5.1 to +10.0 mOhms: ----------Minor
   c. +10.1 to +15.0 mOhms: ----------Acceptable
   d. +15.1 to +50.0 mOhms: ----------Marginal
   e. +50.1 to +1000 mOhms ----------Unstable
   f. >+1000 mOhms: ----------Open Failure

### Group 1

| LLCR Measurement Summaries by Pin Type | | | | |
|---|---|---|---|---|
| Date | 4/1/2025 | 4/3/2025 | | |
| Room Temp (Deg C) | 22 | 22 | | |
| Rel Humidity (%) | 37 | 54 | | |
| Technician | Samuel Cecil | Sean Britt | | |
| **mOhm values** | Actual | **Delta** | | |
| | **Initial** | **Shock-Vib** | | |
| **Pin Type: Signal 1** | | | | |
| Average | 318.75 | 1.39 | | |
| St. Dev. | 5.94 | 1.25 | | |
| Min | 305.08 | 0 | | |
| Max | 331.61 | 7.93 | | |
| Summary Count | 512 | 512 | | |
| Total Count | 512 | 512 | | |
| **Pin Type: GND 1** | | | | |
| Average | 15.41 | 0.2 | | |
| St. Dev. | 1.08 | 0.14 | | |
| Min | 13.62 | 0 | | |
| Max | 17.2 | 0.53 | | |
| Summary Count | 64 | 64 | | |
| Total Count | 64 | 64 | | |

| LLCR Delta Count by Category | | | | | | |
|---|---|---|---|---|---|---|
| | **Stable** | **Minor** | **Acceptable** | **Marginal** | **Unstable** | **Open** |
| **mOhms** | **<=5** | **>5 & <=10** | **>10 & <=15** | **>15 & <=50** | **>50 & <=1000** | **>1000** |
| **Shock-Vib** | **559** | **17** | **0** | **0** | **0** | **0** |

## DATA SUMMARIES Continued

### Group 2(MIL-STD-810G)

| | LLCR Measurement Summaries by Pin Type | | | |
|---|---|---|---|---|
| Date | 4/1/2025 | 4/4/2025 | | |
| Room Temp (Deg C) | 22 | 22 | | |
| Rel Humidity (%) | 37 | 48 | | |
| Technician | Samuel Cecil | Samuel Cecil | | |
| **mOhm values** | Actual | **Delta** | | |
| | **Initial** | **Shock-Vib** | | |
| | **Pin Type: Signal 1** | | | |
| Average | 313.99 | 0.76 | | |
| St. Dev. | 5.76 | 0.48 | | |
| Min | 301.44 | 0.01 | | |
| Max | 327.49 | 2.54 | | |
| Summary Count | 512 | 512 | | |
| Total Count | 512 | 512 | | |
| | **Pin Type: GND 1** | | | |
| Average | 14.91 | 0.27 | | |
| St. Dev. | 1.04 | 0.29 | | |
| Min | 13.28 | 0 | | |
| Max | 16.93 | 1.19 | | |
| Summary Count | 64 | 64 | | |
| Total Count | 64 | 64 | | |

| LLCR Delta Count by Category | | | | | | |
|---|---|---|---|---|---|---|
| | **Stable** | **Minor** | **Acceptable** | **Marginal** | **Unstable** | **Open** |
| **mOhms** | **<=5** | **>5 & <=10** | **>10 & <=15** | **>15 & <=50** | **>50 & <=1000** | **>1000** |
| **Shock-Vib** | **576** | **0** | **0** | **0** | **0** | **0** |

### Nanosecond Event Detection:

| Shock and Vibration Event Detection Summary | |
|---|---|
| Contacts tested | 60 |
| Test Condition | C, 100g's, 6ms, Half-Sine |
| Shock Events | 0 |
| Test Condition | V-B, 7.56 rms g |
| Vibration Events | 0 |
| Total Events | 0 |

## EQUIPMENT AND CALIBRATION SCHEDULES

**Equipment #:** TCT-04
**Description:** Dillon Quantrol TC21 25-1000 mm/min series test stand
**Manufacturer:** Dillon Quantrol
**Model:** TC2 I series test stand
**Serial #:** 04-1041-04
**Accuracy:** Speed Accuracy: +/- 5% of indicated speed; Speed Accuracy: +/- 5% of indicated speed;
… Last Cal: 05/29/2024, Next Cal: 05/29/2025

**Equipment #:** MO-11
**Description:** Switch/Multimeter
**Manufacturer:** Keithley
**Model:** 3706
**Serial #:** 120169
**Accuracy:** See Manual
… Last Cal: 09/11/2024, Next Cal: 09/11/2025

**Equipment #:** TSC-01
**Description:** Vertical Thermal Shock Chamber
**Manufacturer:** Cincinnati Sub Zero
**Model:** VTS-3-6-6-SC/AC
**Serial #:** 10-VT14993
**Accuracy:** See Manual
… Last Cal: 06/30/2024, Next Cal: 06/30/2025

**Equipment #:** THC-05
**Description:** Temperature/Humidity Chamber (Chamber Room)
**Manufacturer:** Thermotron
**Model:** SM-8-3800
**Serial #:** 05 23 00 02
**Accuracy:** See Manual
… Last Cal: 11/14/2024, Next Cal: 05/31/2025

**Equipment #:** HPT-01
**Description:** Hipot Safety Tester
**Manufacturer:** Vitrek
**Model:** V73
**Serial #:** 019808
**Accuracy:**
… Last Cal: 05/15/2024, Next Cal: 05/15/2025

**Equipment #:** SVC-01
**Description:** Shock & Vibration Table
**Manufacturer:** Data Physics
**Model:** LE-DSA-10-20K
**Serial #:** 10037
**Accuracy:** See Manual
… Last Cal: 11/31/2024, Next Cal: 11/31/2025

## EQUIPMENT AND CALIBRATION SCHEDULES

**Equipment #:** ACLM-01
**Description:** Accelerometer
**Manufacturer:** PCB Piezotronics
**Model:** 352C03
**Serial #:** 115819
**Accuracy:** See Manual
… Last Cal: 07/09/2024, Next Cal: 07/09/2025

**Equipment #:** ED-03
**Description:** Event Detector
**Manufacturer:** Analysis Tech
**Model:** 32EHD
**Serial #:** 1100604
**Accuracy:** See Manual
… Last Cal: 06/04/2024, Next Cal: 06/04/2025