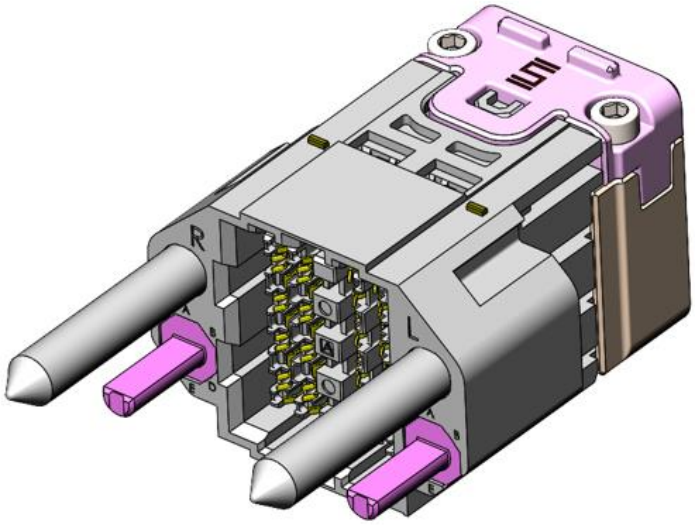
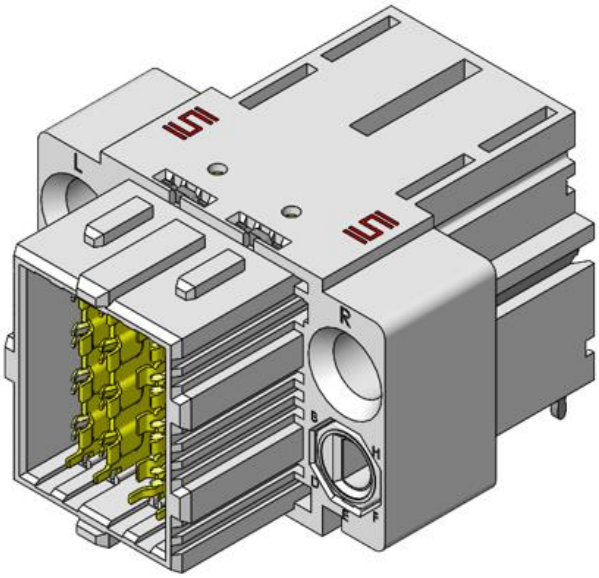
Project: Design Qualification Test Report	Tracking Code: CR-1236001_Report_Rev_1
Requested by: Tyler Lang	Date: 6/25/2025
Part #: NVCF-DP-04-V-3-XX-X-X-X-X-1 / NVBM-DP-04-RA-S-2-X-X	
Part description: NVCF/NVBM	Tech: Tony Wagoner
Test Start: 4/3/2025	Test Completed: 4/25/2025





DESIGN QUALIFICATION TEST REPORT

NVCF/NVBM
NVCF-DP-04-V-3-XX-X-X-X-X-1 / NVBM-DP-04-RA-S-2-X-X

REVISION HISTORY

DATA	REV.NUM.	DESCRIPTION	ENG
6/25/2025	**1**	**Initial test**	**KH**

CERTIFICATION

All instruments and measuring equipment were calculated 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 the 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-113954-TST-XX /PCB-113964-TST-XX/PCB-113990-TST-XX.

FLOWCHARTS

Gas Tight

Group 1
NVCF-DP-04-V-3-XX-X-X-X-X-1
NVBM-DP-04-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) 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

Normal Force

Group 1
NVCF-DP-04-V-3-XX-X-X-X-X-1
8 Contacts Minimum
Signal Without Thermals

Step	Description
1.	Contact Gaps
2.	Normal Force (1) Deflection = 0.0161 " Expected Force at Max Deflection = 94.6 g

Group 2
NVCF-DP-04-V-3-XX-X-X-X-X-1
8 Contacts Minimum
Ground Without Thermals

Step	Description
1.	Contact Gaps
2.	Normal Force (1) Deflection = 0.0145 " Expected Force at Max Deflection = 99 g

Group 3
NVCF-DP-04-V-3-XX-X-X-X-X-1
8 Contacts Minimum
MFBL Without Thermals

Step	Description
1.	Contact Gaps
2.	Normal Force (1) Deflection = 0.0244 " Expected Force at Max Deflection = 83.4 g

Group 4
NVCF-DP-04-V-3-XX-X-X-X-X-1
NVBM-DP-04-RA-S-2-X-X
8 Contacts Minimum
Signal With Thermals

Step	Description
1.	Contact Gaps
2.	Thermal Age (2)
3.	Contact Gaps
4.	Normal Force (1) Deflection = 0.0161 " Expected Force at Max Deflection = 94.6 g

Group 5
NVCF-DP-04-V-3-XX-X-X-X-X-1
NVBM-DP-04-RA-S-2-X-X
8 Contacts Minimum
Ground With Thermals

Step	Description
1.	Contact Gaps
2.	Thermal Age (2)
3.	Contact Gaps
4.	Normal Force (1) Deflection = 0.0145 " Expected Force at Max Deflection = 99 g

Group 6
NVCF-DP-04-V-3-XX-X-X-X-X-1
NVBM-DP-04-RA-S-2-X-X
8 Contacts Minimum
MFBL With Thermals

Step	Description
1.	Contact Gaps
2.	Thermal Age (2)
3.	Contact Gaps
4.	Normal Force (1) Deflection = 0.0244 " Expected Force at Max Deflection = 83.4 g

(1) Normal Force = EIA-364-04

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

FLOWCHARTS Continued

Thermal Aging

Group 1
NVCF-DP-04-V-3-XX-X-X-X-X-1
NVBM-DP-04-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) 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-04-V-3-XX-X-X-X-X-1
NVBM-DP-04-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 Quantity = 25 Cycles
5.	Mating/Unmating Force (3)
6.	Cycles Quantity = 25 Cycles
7.	Mating/Unmating Force (3)
8.	Cycles Quantity = 25 Cycles
9.	Mating/Unmating Force (3)
10.	Cycles Quantity = 25 Cycles
11.	Mating/Unmating Force (3)
12.	Contact Gaps
13.	LLCR (2) Max Delta = 15 mOhm
14.	Thermal Shock (4) - Non Standard
15.	LLCR (2) Max Delta = 15 mOhm
16.	Humidity (1)
17.	LLCR (2) 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-04-V-3-XX-X-X-X-X-1

NVBM-DP-04-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-04-V-3-XX-X-X-X-X-1

NVBM-DP-04-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-04-V-3-XX-X-X-X-X-1

NVBM-DP-04-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

Note: 12" Double Ended Cable

Group 1 NVCF-DP-04-V-3-XX-X-X-X-X-1 NVBM-DP-04-RA-S-2-X-X 1 Pins Powered Signal		Group 2 NVCF-DP-04-V-3-XX-X-X-X-X-1 NVBM-DP-04-RA-S-2-X-X 8 Pins Powered Power	
Step	**Description**	**Step**	**Description**
1.	CCC (1) Rows = 1 Number of Positions = 1 *Note: Center of connector location*	1.	CCC (1) Rows = 8 Number of Positions = 1 *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

FLOWCHARTS Continued

Mechanical Shock/Random Vibration/LLCR

Group 1
NVCF-DP-04-V-3-XX-X-X-X-X-1
NVBM-DP-04-RA-S-2-X-X
8 Assemblies

Note: HDR 12" Cable w/ End 2 PCB
Note: 100% LLCR

Step	Description
1.	LLCR (1)
2.	Mechanical Shock (2)
3.	Random Vibration (3)
4.	LLCR (1) Max Delta = 15 mOhm

Group 2
NVCF-DP-04-V-3-XX-X-X-X-X-1
NVBM-DP-04-RA-S-2-X-X
8 Assemblies
MIL-STD-810G_CHG-1

Note: HDR 12" Cable w/ End 2 PCB
Note: 100% LLCR

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

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(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

Mechanical Shock/Random Vibration/Event Detection

Group 1
NVCF-DP-04-V-3-XX-X-X-X-X-1
NVBM-DP-04-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)

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(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)

FLOWCHARTS Continued

Cable Pull

Group 1	Group 2	Group 3
NVCF-DP-04-V-3-XX-X-X-X-X-1	NVCF-DP-04-V-3-XX-X-X-X-X-1	NVCF-DP-04-V-3-XX-X-X-X-X-1
NVBM-DP-04-RA-S-2-X-X	NVBM-DP-04-RA-S-2-X-X	NVBM-DP-04-RA-S-2-X-X
5 Assemblies	5 Assemblies	5 Assemblies
0 Degrees	90 Degrees - Lateral	90 Degrees - Transverse
Note: 16" Double Ended Cable	*Note: 16" Double Ended Cable*	*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

Cable Flex

Note: Use Different Assemblies for Each Group

Group 1	Group 2
NVCF-DP-04-V-3-XX-X-X-X-X-1	NVCF-DP-04-V-3-XX-X-X-X-X-1
NVBM-DP-04-RA-S-2-X-X	NVBM-DP-04-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: Use 0.50" Mandrel	*Note: Use 1.50" Mandrel*
Note: Use 16" Double Ended Cable	*Note: Use 16" Double Ended Cable*

Step	Description
1.	IR (3)
2.	DWV at Test Voltage(2)
3.	Cable Flex (1)
4.	Visual Inspection
5.	IR (3)
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 stress in mated conditions.

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 stress in mated conditions.

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 stress in mated conditions.

MECHANICAL SHOCK (Specified Pulse):

1) Reference document: EIA-364-27, *Mechanical Shock Test Procedure for Electrical Connectors*
2) Test Condition C
3) Peak Value: 100 G
4) Duration: 6 Milliseconds
5) Wave Form: Half Sine
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: 0.04 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:

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 testing, the samples were characterized to ensure 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

ATTRIBUTE DEFINITIONS Continued

The following is a brief, simplified description of attributes.

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.

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 that leads/PC board traces, jumpers, etc.
12) Hook-up wire length is longer than the minimum specified in the referencing standard.

ATTRIBUTE DEFINITIONS Continued

The following is a brief, simplified description of attributes.

NORMAL FORCE (FOR CONTACTS TESTED OUTSIDE THE HOUSING):

1) Reference document: EIA-364-04, *Normal Force Test Procedure for Electrical Connectors*.
2) The contacts shall be tested in the loose state, *not* inserted in connector housing.
3) The contacts shall be prepared to allow access to the spring member at the same attitude and deflection level as would occur in actual use.
4) In the event that portions of the contact prevent insertion of the test probe and/or deflection of the spring member under evaluation, said material shall be removed leaving the appropriate contact surfaces exposed.
5) In the case of multi-tine contacts, each tine shall be tested independently on separate samples as required.
6) The connector housing shall be simulated, if required, in order to provide an accurate representation of the actual contact system performance.
7) A holding fixture shall be fashioned to allow the contact to be properly deflected.
8) Said holding fixture shall be mounted on a floating, adjustable, X-Y table on the base of the Dillon TC^2, computer controlled test stand with a deflection measurement system accuracy of 5 µm (0.0002”).
9) The probe shall be attached to a Dillon P/N 49761-0105, 5 N (1.1 Lb) load cell providing an accuracy of ± 0.2%.
10) The nominal deflection rate shall be 5 mm (0.2”)/minute.
11) Unless otherwise noted a minimum of five contacts shall be tested.
12) The force/deflection characteristic to load and unload each contact shall be repeated five times.
13) The system shall utilize the TC^2 software in order to acquire and record the test data.
14) The permanent set of each contact shall be measured within the TC^2 software.
15) The acquired data shall be graphed with the deflection data on the X-axis and the force data on the Y-axis and a print out will be stored with the Tracking Code paperwork.

ATTRIBUTE DEFINITIONS Continued

The following is a brief, simplified description of attributes.

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

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 housing.
        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 inche 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.

ATTRIBUTE DEFINITIONS Continued

The following is a brief, simplified description of attributes.

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.

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

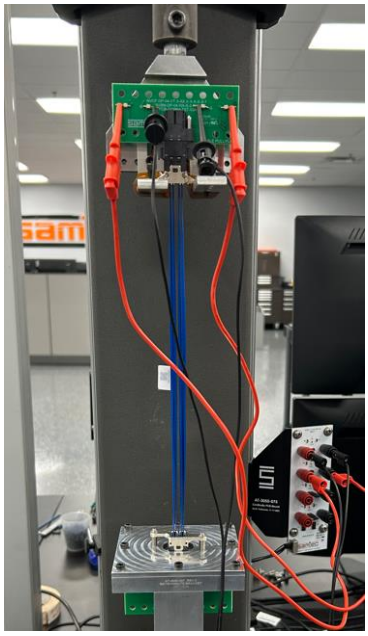


Fig. 1
0° Connector Pull.

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. ± 70°Flex Mode, bend up to 500 cycles. load on 12 oz.

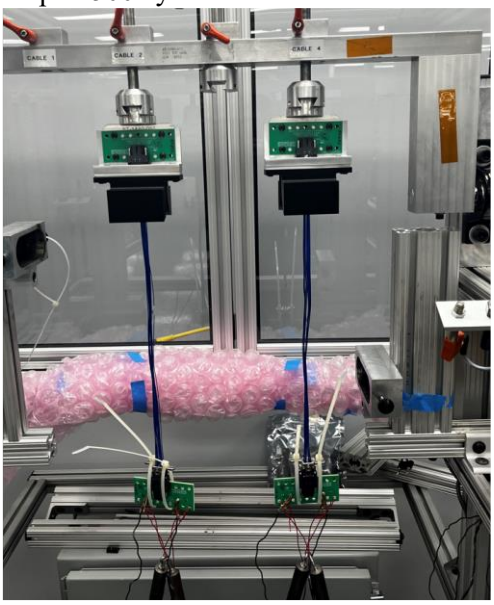


Fig. 4
(Setup picture)

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 per contact with 8 contacts (All Signal Pins Combined Carry Supply while all Grounds on that Wafer Carry Return) powered.**

Mating – Unmating Forces

Thermal Aging Group

- **Initial**
  - **Mating**
    - **Min ---------- 2.81 lbs**
    - **Max---------- 3.85 lbs**
  - **Unmating**
    - **Min ---------- 2.06 lbs**
    - **Max---------- 2.62 lbs**
- **After Thermal**
  - **Mating**
    - **Min ---------- 1.50 lbs**
    - **Max---------- 4.95 lbs**
  - **Unmating**
    - **Min ---------- 1.24 lbs**
    - **Max---------- 1.80 lbs**

RESULTS Continued

Mating/Unmating Durability Group

- **Initial**
  - **Mating**
    - **Min ---------- 2.61 lbs**
    - **Max---------- 3.07 lbs**
  - **Unmating**
    - **Min ---------- 2.04 lbs**
    - **Max---------- 2.38 lbs**
- **After 25 Cycles**
  - **Mating**
    - **Min ---------- 2.67 lbs**
    - **Max---------- 3.12 lbs**
  - **Unmating**
    - **Min ---------- 2.29 lbs**
    - **Max---------- 2.79 lbs**
- **After 50 Cycles**
  - **Mating**
    - **Min ---------- 2.77 lbs**
    - **Max---------- 3.22 lbs**
  - **Unmating**
    - **Min ---------- 2.27 lbs**
    - **Max---------- 2.88 lbs**
- **After 75 Cycles**
  - **Mating**
    - **Min ---------- 2.85 lbs**
    - **Max---------- 3.33 lbs**
  - **Unmating**
    - **Min ---------- 2.32 lbs**
    - **Max---------- 2.97 lbs**
- **After 100 Cycles**
  - **Mating**
    - **Min ---------- 2.98 lbs**
    - **Max---------- 3.42 lbs**
  - **Unmating**
    - **Min ---------- 2.42 lbs**
    - **Max---------- 3.01 lbs**
- **After Humidity**
  - **Mating**
    - **Min ---------- 1.57 lbs**
    - **Max---------- 2.00 lbs**
  - **Unmating**
    - **Min ---------- 1.43 lbs**
    - **Max---------- 1.70 lbs**

RESULTS Continued

Normal Force

Signal pin at 0.0161 inches deflection (Deflected as Signal Pairs)

- **Initial**
  - **Min ---------- 136.50 gf Set------ 0.0014 inch.**
  - **Max ---------- 159.50 gf Set------ 0.0020 inch.**
- **After Thermal**
  - **Min ----------87.00 gf Set------ 0.0029 inch.**
  - **Max ---------- 152.50 gf Set------ 0.0064 inch.**

Ground pin at 0.0145 inches deflection

- **Initial**
  - **Min ---------- 120.50 gf Set------ 0.0004 inch.**
  - **Max ---------- 130.30 gf Set------ 0.0009 inch.**
- **After Thermal**
  - **Min ----------83.40 gf Set------ 0.0018 inch.**
  - **Max ---------- 112.80 gf Set------ 0.0052 inch.**

MFBL at 0.0220 inches deflection

- **Initial**
  - **Min ---------- 123.60 gf Set------ 0.0008 inch.**
  - **Max ---------- 144.60 gf Set------ 0.0021 inch.**
- **After Thermal**
  - **Min ----------96.00 gf Set------ 0.0036 inch.**
  - **Max ---------- 130.60 gf Set------ 0.0072 inch.**

Cable Pull force:

- **0° Pull**
  - **Min ---------- 103.80 lbs**
  - **Max ---------- 125.60 lbs**
- **90° Pull-Lateral**
  - **Min ---------- 105.60 lbs**
  - **Max ---------- 121.90 lbs**
- **90° Pull-Transverse**
  - **Min ----------66.23 lbs**
  - **Max ---------- 125.40 lbs**

RESULTS Continued

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 ---------- 9000 Meg Ω ---------- Passed**
  - **Unmated ---------- 9000 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 ---------- 7500 Meg Ω ---------- Passed**
  - **Unmated ---------- 2760 Meg Ω ---------- Passed**

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**

RESULTS Continued

Cable Flex:

Insulation Resistance minimums, IR

Group 1-Lateral

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**

Group 2-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**

RESULTS Continued

Dielectric Withstanding Voltage minimums, DWV

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

Group 1-Lateral

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**

Group 2-Transverse

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 (256 signal and 32 ground LLCR test points)

Signal pin

- **Initial ---------- 179.89 mOhms Max**
- **Gas-Tight**
  - **<= +5.0 mOhms ---------- 246 Points ---------- Stable**
  - **+5.1 to +10.0 mOhms ---------- 9 Points ---------- Minor**
  - **+10.1 to +15.0 mOhms ---------- 1 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**

Ground pin

- **Initial ---------- 14.77 mOhms Max**
- **Gas-Tight**
  - **<= +5.0 mOhms ---------- 32 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**

LLCR Thermal Aging (256 signal and 32 ground LLCR test points)

Signal pin

- **Initial ---------- 180.58 mOhms Max**
- **Thermal Aging**
  - **<= +5.0 mOhms ---------- 235 Points ---------- Stable**
  - **+5.1 to +10.0 mOhms ---------- 21 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**

Ground pin

- **Initial ---------- 15.04 mOhms Max**
- **Thermal Aging**
  - **<= +5.0 mOhms ---------- 32 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 Durability (256 signal and 32 ground LLCR test points)

Signal pin

- **Initial ---------- 179.69 mOhms Max**
- **Durability, 100 Cycles**
  - **<= +5.0 mOhms ---------- 256 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 ---------- 254 Points ---------- Stable**
  - **+5.1 to +10.0 mOhms ---------- 2 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 ---------- 249 Points ---------- Stable**
  - **+5.1 to +10.0 mOhms ---------- 7 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**

Ground pin

- **Initial ---------- 15.08 mOhms Max**
- **Durability, 100 Cycles**
  - **<= +5.0 mOhms ---------- 32 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 ---------- 32 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 ---------- 32 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 (256 signal and 32 ground LLCR test points)

Group 1

Signal pin

- **Initial ----------377.88 mOhms Max**
- **Shock &Vibration**
  - **<= +5.0 mOhms----------255 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**

Ground pin

- **Initial ---------- 22.86 mOhms Max**
- **Shock &Vibration**
  - **<= +5.0 mOhms---------- 32 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**

Group 2 (MIL-STD-810G)

Signal pin

- **Initial ----------330.15 mOhms Max**
- **Shock &Vibration**
  - **<= +5.0 mOhms----------256 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**

Ground pin

- **Initial ---------- 22.39 mOhms Max**
- **Shock &Vibration**
  - **<= +5.0 mOhms---------- 32 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**

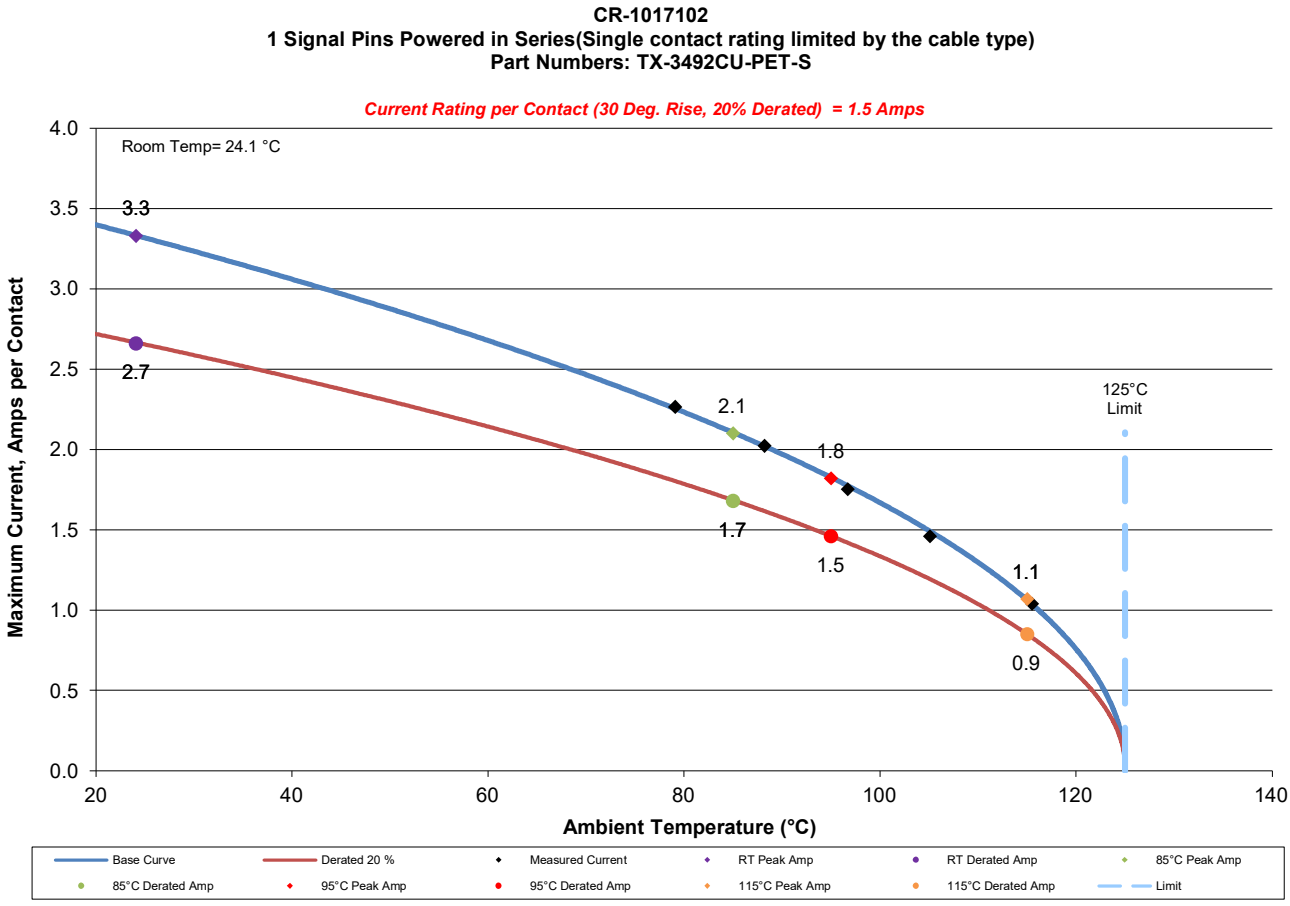
Mechanical Shock & Random Vibration:

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

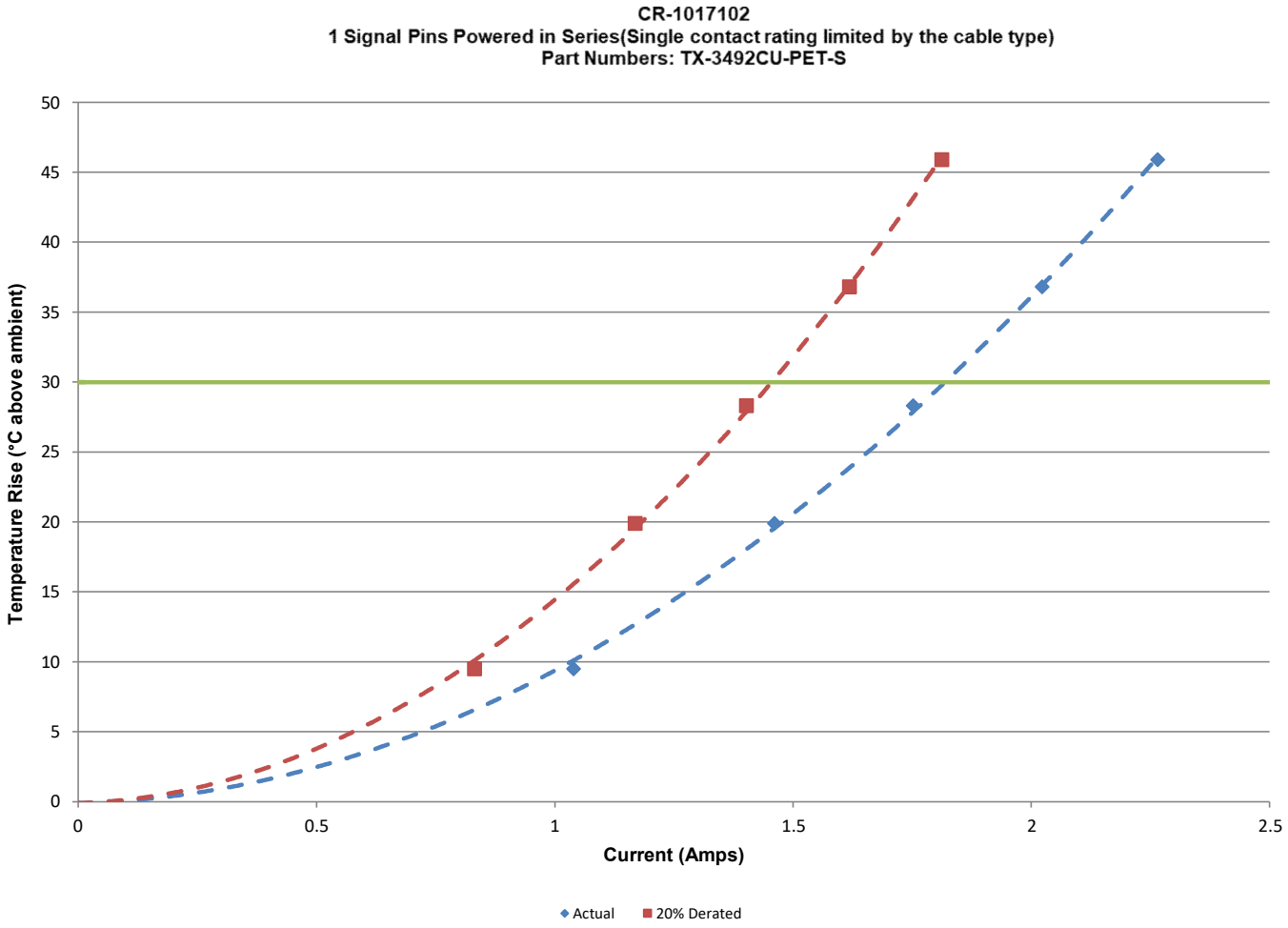
DATA SUMMARIES

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 conductors/contacts powered.

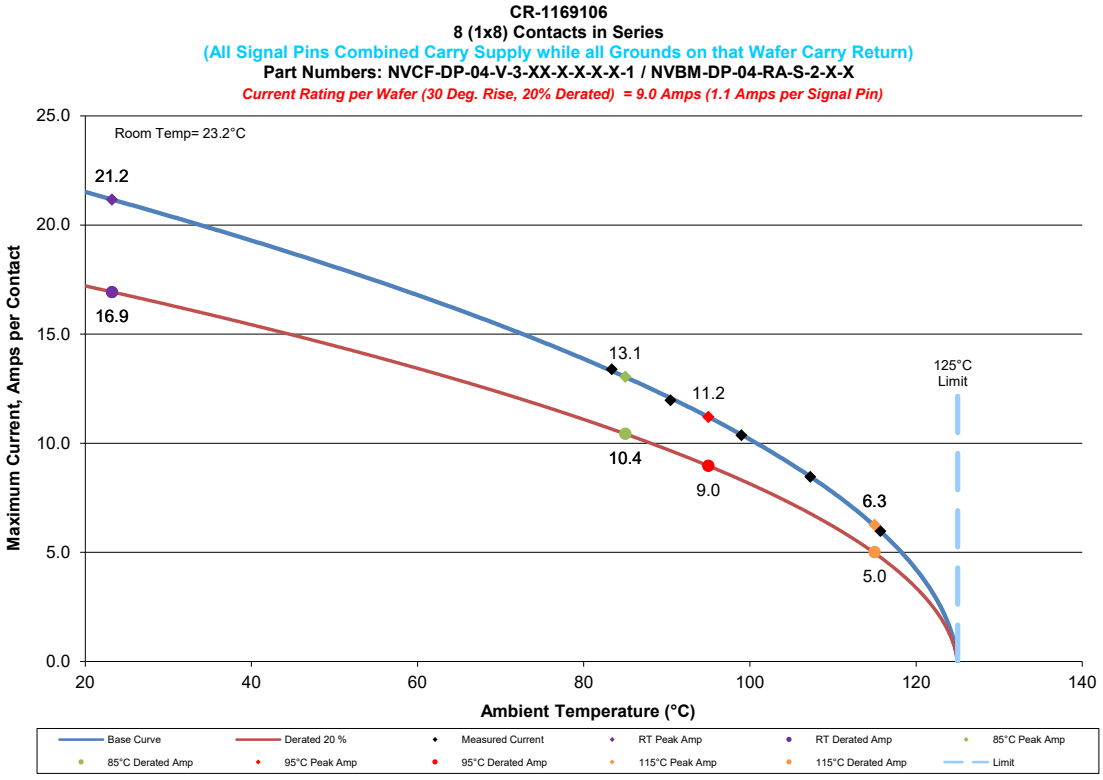


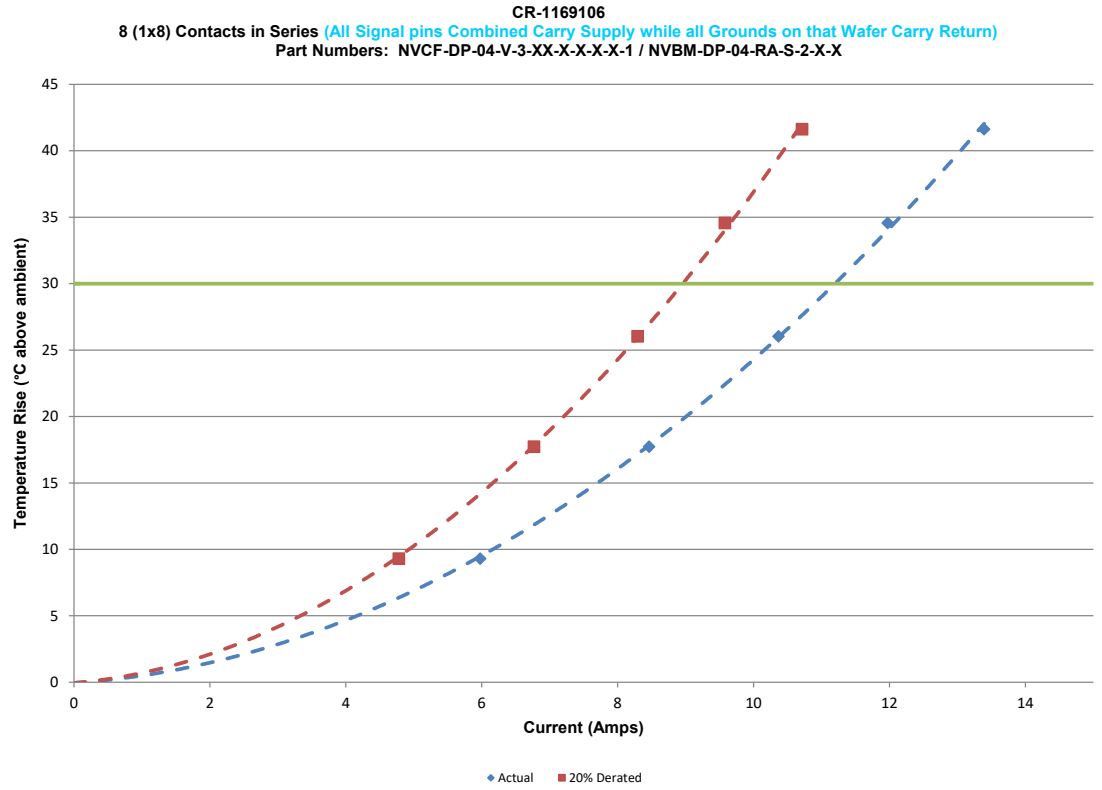
DATA SUMMARIES Continued



DATA SUMMARIES Continued

b. Linear configuration, all signal pins combined carry supply while all grounds on that wafer carry return.





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	12.50	2.81	9.16	2.06	6.67	1.50	5.52	1.24
Maximum	17.12	3.85	11.65	2.62	22.02	4.95	8.01	1.80
Average	14.27	**3.21**	10.26	**2.31**	10.80	**2.43**	6.49	**1.46**
St Dev	1.62	0.36	0.85	0.19	5.08	1.14	0.75	0.17
Count	8	8	8	8	8	8	8	8

Mating/Unmating Durability Group

	Initial				25 Cycles			
	Mating		**Unmating**		**Mating**		**Unmating**	
	Newtons	Force (Lbs)	Newtons	Force (Lbs)	Newtons	Force (Lbs)	Newtons	Force (Lbs)
Minimum	11.61	2.61	9.07	2.04	11.88	2.67	10.19	2.29
Maximum	13.66	3.07	10.59	2.38	13.88	3.12	12.41	2.79
Average	12.77	**2.87**	9.86	**2.22**	13.13	**2.95**	11.23	**2.53**
St Dev	0.86	0.19	0.47	0.11	0.75	0.17	0.83	0.19
Count	7	7	8	8	8	8	8	8
	50 Cycles				75 Cycles			
	Mating		**Unmating**		**Mating**		**Unmating**	
	Newtons	Force (Lbs)	Newtons	Force (Lbs)	Newtons	Force (Lbs)	Newtons	Force (Lbs)
Minimum	12.32	2.77	10.10	2.27	12.68	2.85	10.32	2.32
Maximum	14.33	3.22	12.81	2.88	14.81	3.33	13.21	2.97
Average	13.48	**3.03**	11.64	**2.62**	13.92	**3.13**	11.95	**2.69**
St Dev	0.76	0.17	0.96	0.22	0.81	0.18	1.01	0.23
Count	8	8	8	8	8	8	8	8
	100 Cycles				After Humidity			
	Mating		**Unmating**		**Mating**		**Unmating**	
	Newtons	Force (Lbs)	Newtons	Force (Lbs)	Newtons	Force (Lbs)	Newtons	Force (Lbs)
Minimum	13.26	2.98	10.76	2.42	6.98	1.57	6.36	1.43
Maximum	15.21	3.42	13.39	3.01	8.90	2.00	7.56	1.70
Average	14.37	**3.23**	12.31	**2.77**	7.83	**1.76**	6.83	**1.54**
St Dev	0.76	0.17	0.97	0.22	0.63	0.14	0.41	0.09
Count	8	8	8	8	8	8	8	8

DATA SUMMARIES Continued

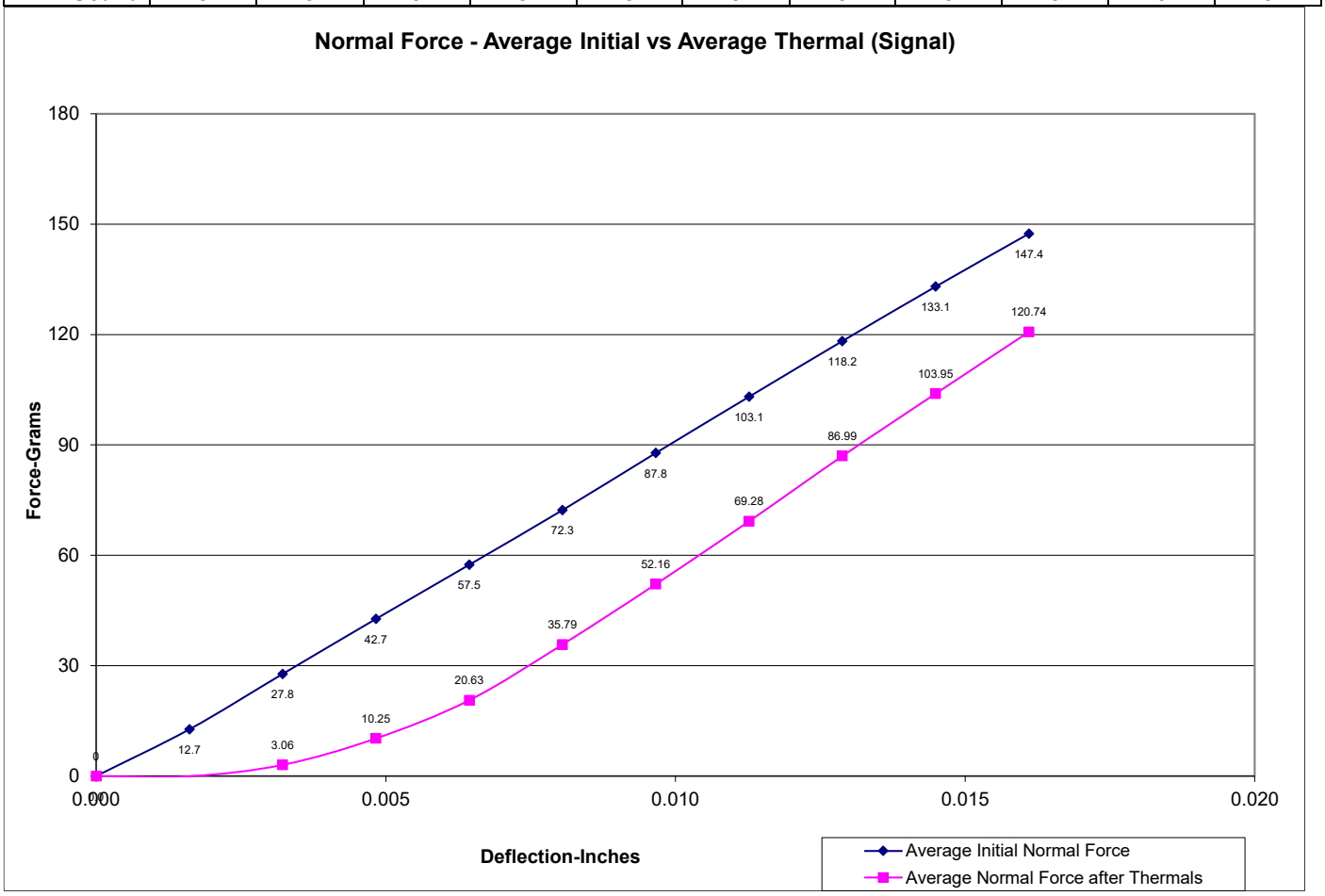
NORMAL FORCE (FOR CONTACTS TESTED OUTSIDE THE HOUSING):

1) Calibrated force gauges are used along with computer-controlled positioning equipment.
2) Typically, 8-10 readings are taken, and the averages reported.

Signal Pin

	Deflections in inches Forces in Grams										
Initial	**0.0016**	**0.0032**	**0.0048**	**0.0064**	**0.0081**	**0.0097**	**0.0113**	**0.0129**	**0.0145**	**0.0161**	***SET***
Averages	12.71	27.78	42.73	57.45	72.30	87.83	103.11	118.24	133.05	147.44	0.0017
Min	10.50	25.00	39.50	53.40	67.50	81.00	93.90	107.50	120.60	136.50	0.0014
Max	15.20	30.50	45.40	61.10	79.70	98.00	114.50	130.30	144.60	159.50	0.0020
St. Dev	1.768	1.999	2.231	2.882	4.099	6.006	7.681	8.661	8.913	8.844	0.0002
Count	8	8	8	8	8	8	8	8	8	8	8

After Thermals	Deflections in inches Forces in Grams										
	0.0016	**0.0032**	**0.0048**	**0.0064**	**0.0081**	**0.0097**	**0.0113**	**0.0129**	**0.0145**	**0.0161**	***SET***
Averages	-0.04	3.06	10.25	20.63	35.79	52.16	69.28	86.99	103.95	120.74	0.0046
Min	-0.10	-0.10	-0.10	1.40	14.10	27.50	41.20	54.90	70.40	87.00	0.0029
Max	0.00	10.80	25.80	41.50	61.50	83.30	103.20	121.30	137.20	152.50	0.0064
St. Dev	0.052	4.611	11.546	16.469	18.754	21.728	23.930	24.360	23.752	23.202	0.0014
Count	8	8	8	8	8	8	8	8	8	8	8

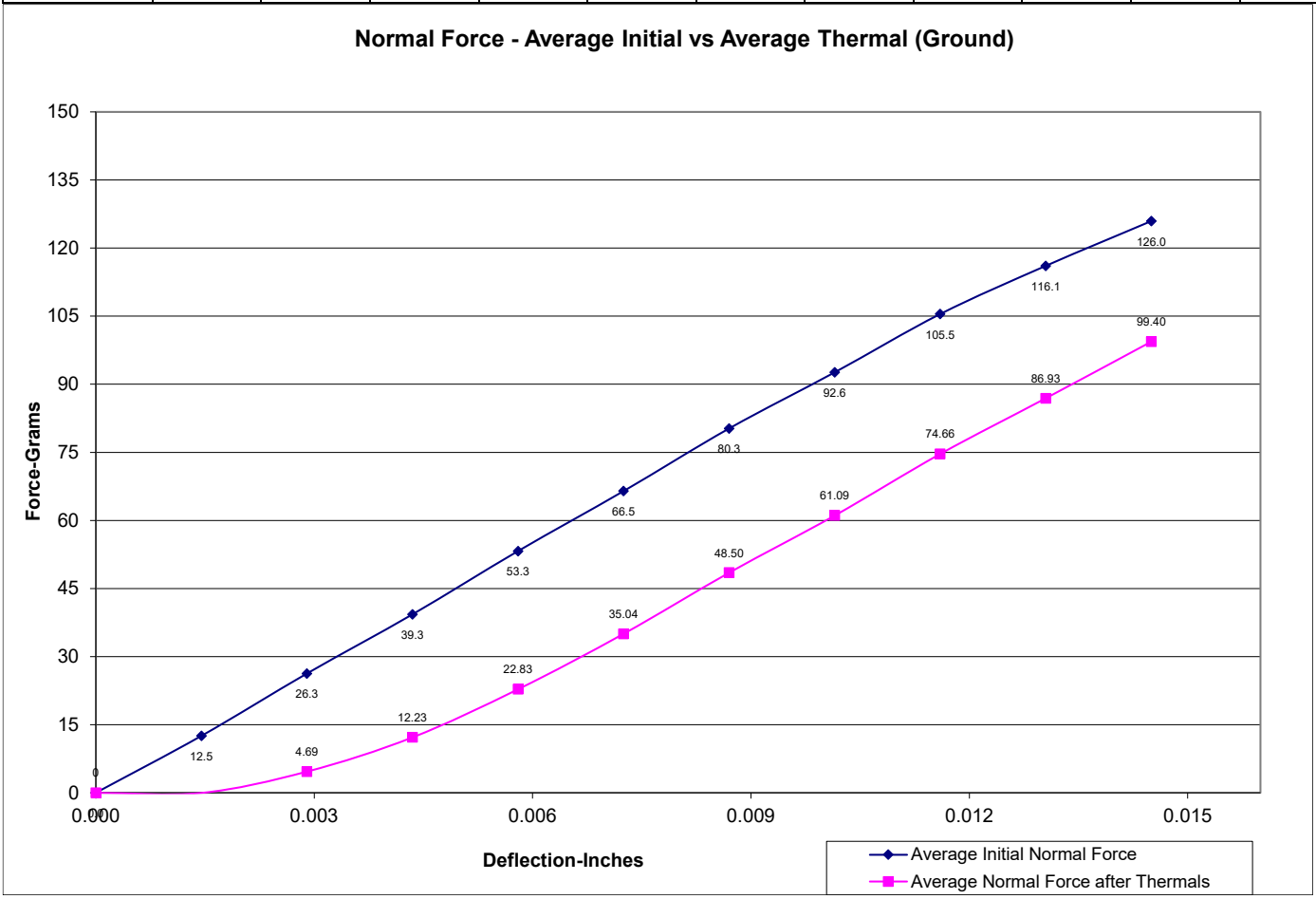


DATA SUMMARIES Continued

Ground Pin

Initial	Deflections in inches Forces in Grams										
	0.0015	**0.0029**	**0.0044**	**0.0058**	**0.0073**	**0.0087**	**0.0102**	**0.0116**	**0.0131**	**0.0145**	***SET***
Averages	12.54	26.28	39.31	53.25	66.46	80.26	92.63	105.48	116.09	125.95	0.0007
Min	12.20	25.60	38.00	52.30	65.40	78.70	90.10	101.70	111.30	120.50	0.0004
Max	13.00	27.20	40.60	54.70	68.20	81.70	95.00	108.80	119.80	130.30	0.0009
St. Dev	0.272	0.578	0.794	0.775	0.988	1.094	1.820	2.775	3.447	3.968	0.0002
Count	8	8	8	8	8	8	8	8	8	8	8

After Thermals	Deflections in inches Forces in Grams										
	0.0015	**0.0029**	**0.0044**	**0.0058**	**0.0073**	**0.0087**	**0.0102**	**0.0116**	**0.0131**	**0.0145**	***SET***
Averages	-0.01	4.69	12.23	22.83	35.04	48.50	61.09	74.66	86.93	99.40	0.0033
Min	-0.10	0.00	0.00	5.60	18.00	31.30	44.00	57.60	70.20	83.40	0.0018
Max	0.00	12.20	23.30	35.40	46.90	59.40	72.00	86.40	99.40	112.80	0.0052
St. Dev	0.035	4.646	10.381	13.021	12.915	12.781	12.810	12.658	12.305	11.667	0.0014
Count	8	8	8	8	8	8	8	8	8	8	8

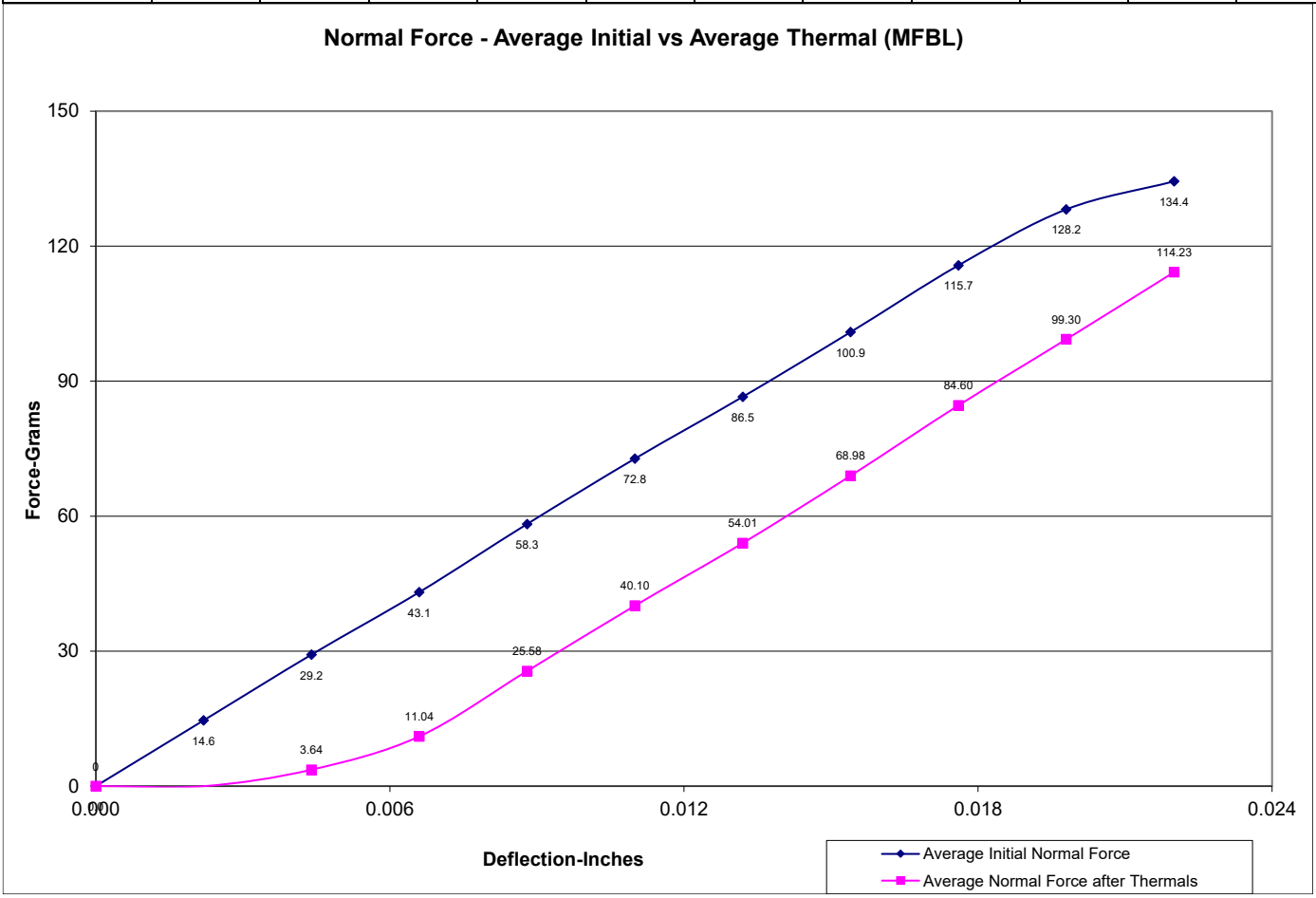


DATA SUMMARIES Continued

MFBL

Initial	Deflections in inches Forces in Grams										
	0.0022	**0.0044**	**0.0066**	**0.0088**	**0.0110**	**0.0132**	**0.0154**	**0.0176**	**0.0198**	**0.0220**	***SET***
Averages	14.61	29.23	43.10	58.25	72.78	86.51	100.89	115.71	128.15	134.39	0.0015
Min	14.00	28.30	41.50	56.20	70.10	83.20	97.40	111.60	123.80	123.60	0.0008
Max	15.20	30.40	44.50	60.30	75.50	89.50	104.60	120.00	133.00	144.60	0.0021
St. Dev	0.360	0.667	1.094	1.448	2.019	2.356	2.648	3.116	3.312	7.957	0.0004
Count	8	8	8	8	8	8	8	8	8	8	8

After Thermals	Deflections in inches Forces in Grams										
	0.0022	**0.0044**	**0.0066**	**0.0088**	**0.0110**	**0.0132**	**0.0154**	**0.0176**	**0.0198**	**0.0220**	***SET***
Averages	-0.03	3.64	11.04	25.58	40.10	54.01	68.98	84.60	99.30	114.23	0.0052
Min	-0.10	0.00	0.00	11.20	25.70	39.10	54.30	69.80	83.60	96.00	0.0036
Max	0.00	8.80	22.90	38.40	52.90	67.40	83.10	99.00	114.10	130.60	0.0072
St. Dev	0.046	4.050	11.042	11.922	11.961	12.104	12.319	12.594	12.871	14.198	0.0016
Count	8	8	8	8	8	8	8	8	8	8	8



DATA SUMMARIES Continued

Cable Pull Force:

0° Pull

	Force (lbs)
Minimum	**103.80**
Maximum	125.60
Average	119.20

90° Pull-Lateral

	Force (lbs)
Minimum	**105.60**
Maximum	121.90
Average	115.12

90° Pull-Transverse

	Force (lbs)
Minimum	**66.23**
Maximum	125.40
Average	112.23

DATA SUMMARIES Continued

INSULATION RESISTANCE (IR):

	Pin to Pin	
	Mated	Unmated
Minimum	**NVCF/NVBM**	**NVBM**
Initial	9000	9000
Thermal	9000	9000
Humidity	9000	9000

	Row to Row	
	Mated	Unmated
Minimum	**NVCF/NVBM**	**NVBM**
Initial	9000	9000
Thermal	9000	9000
Humidity	9000	9000

	Pin to Ground	
	Mated	Unmated
Minimum	**NVCF/NVBM**	**NVBM**
Initial	9000	9000
Thermal	9000	9000
Humidity	7500	2760

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 Flex:

Insulation Resistance minimums, IR

Group 1-Lateral

Pin to Pin	
Mated	
Minimum	
Initial	45000
After 100 Flex Cycles	45000

Row to Row	
Mated	
Minimum	
Initial	45000
After 100 Flex Cycles	45000

Pin to Ground	
Mated	
Minimum	
Initial	45000
After 100 Flex Cycles	45000

Group 2-Transverse

Pin to Pin	
Mated	
Minimum	
Initial	45000
After 100 Flex Cycles	45000

Row to Row	
Mated	
Minimum	
Initial	45000
After 100 Flex Cycles	45000

Pin to Ground	
Mated	
Minimum	
Initial	45000
After 100 Flex Cycles	45000

DATA SUMMARIES Continued

Dielectric Withstanding Voltage minimums, DWV

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

Group 1-Lateral

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

Group 2-Transverse

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 256 signals and 32 ground 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	2025/4/3	2025/4/9	2025/4/14	2025/4/25
Room Temp (Deg C)	23	22	22	22
Rel Humidity (%)	57	35	45	55
Technician	Tony Wagoner	Tony Wagoner	Richard Ison	Samuel Cecil
mOhm values	Actual **Initial**	**Delta 100 Cycles**	**Delta Therm Shck**	**Delta Humidity**
Pin Type: Signal 1				
Average	170.94	0.6	1.01	1.12
St. Dev.	4.85	0.49	0.96	1.4
Min	161.97	0	0.01	0
Max	179.69	2.7	6.2	9.06
Summary Count	256	256	256	256
Total Count	256	256	256	256
Pin Type: GND 1				
Average	14.27	0.19	0.4	0.57
St. Dev.	0.42	0.16	0.26	0.24
Min	13.47	0.01	0.02	0.07
Max	15.08	0.56	1.03	0.95
Summary Count	32	32	32	32
Total Count	32	32	32	32

LLCR Delta Count by Category						
	Stable	**Minor**	**Acceptable**	**Marginal**	**Unstable**	**Open**
mOhms	**<=5**	**>5 & <=10**	**>10 & <=15**	**>15 & <=50**	**>50 & <=1000**	**>1000**
100 Cycles	**288**	**0**	**0**	**0**	**0**	**0**
Therm Shck	**286**	**2**	**0**	**0**	**0**	**0**
Humidity	**281**	**7**	**0**	**0**	**0**	**0**

DATA SUMMARIES Continued

LLCR Thermal Aging:

1) A total of 256 signals and 32 ground 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	2025/4/3	2025/4/15
Room Temp (Deg C)	23	23
Rel Humidity (%)	57	38
Technician	Tony Wagoner	Tony Wagoner
mOhm values	Actual **Initial**	**Delta Thermal**
	Pin Type: Signal 1	
Average	170.78	2.1
St. Dev.	5.01	1.88
Min	160.9	0
Max	180.58	9.96
Summary Count	256	256
Total Count	256	256
	Pin Type: GND 1	
Average	14.13	0.68
St. Dev.	0.46	0.36
Min	13.3	0.06
Max	15.04	1.46
Summary Count	32	32
Total Count	32	32

LLCR Delta Count by Category						
	Stable	**Minor**	**Acceptable**	**Marginal**	**Unstable**	**Open**
mOhms	**<=5**	**>5 & <=10**	**>10 & <=15**	**>15 & <=50**	**>50 & <=1000**	**>1000**
Thermal	**267**	**21**	**0**	**0**	**0**	**0**

DATA SUMMARIES Continued

LLCR Gas Tight:

1) A total of 256 signals and 32 ground 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	2024/11/6	2024/11/20
Room Temp (Deg C)	22	22
Rel Humidity (%)	54	42
Technician	Richard Ison	Nicola Ansell
mOhm values	Actual **Initial**	**Delta Acid Vapor**
Pin Type: Signal 1		
Average	169.69	1.37
St. Dev.	5.85	1.48
Min	158.89	0.01
Max	179.89	12.02
Summary Count	256	256
Total Count	256	256
Pin Type: GND 1		
Average	14.09	0.32
St. Dev.	0.47	0.13
Min	13.05	0.04
Max	14.77	0.53
Summary Count	32	32
Total Count	32	32

LLCR Delta Count by Category						
	Stable	**Minor**	**Acceptable**	**Marginal**	**Unstable**	**Open**
mOhms	**<=5**	**>5 & <=10**	**>10 & <=15**	**>15 & <=50**	**>50 & <=1000**	**>1000**
Acid Vapor	**278**	**9**	**1**	**0**	**0**	**0**

DATA SUMMARIES Continued

LLCR Shock & Vibration:

1). A total of 256 signals and 32 ground 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	2025/4/3	2025/4/11
Room Temp (Deg C)	22	22
Rel Humidity (%)	53	38
Technician	Sean Britt	Samuel Cecil
mOhm values	Actual **Initial**	**Delta Shock-Vib**
	Pin Type: Signal 1	
Average	325.2	1.06
St. Dev.	15.62	0.91
Min	309.87	0.02
Max	377.88	5.86
Summary Count	256	256
Total Count	256	256
	Pin Type: GND 1	
Average	21.78	0.34
St. Dev.	0.54	0.32
Min	20.72	0.01
Max	22.86	1.2
Summary Count	32	32
Total Count	32	32

LLCR Delta Count by Category						
	Stable	**Minor**	**Acceptable**	**Marginal**	**Unstable**	**Open**
mOhms	**<=5**	**>5 & <=10**	**>10 & <=15**	**>15 & <=50**	**>50 & <=1000**	**>1000**
Shock-Vib	**287**	**1**	**0**	**0**	**0**	**0**

DATA SUMMARIES Continued

Group 2 (MIL-STD-810G)

	LLCR Measurement Summaries by Pin Type	
Date	2025/4/4	2025/4/9
Room Temp (Deg C)	22	22
Rel Humidity (%)	50	36
Technician	Samuel Cecil	Tony Wagoner
mOhm values	Actual **Initial**	**Delta Shock-Vib**
	Pin Type: Signal 1	
Average	320.56	0.63
St. Dev.	5.11	0.55
Min	310.35	0.01
Max	330.15	3.92
Summary Count	256	256
Total Count	256	256
	Pin Type: GND 1	
Average	21.61	0.43
St. Dev.	0.46	0.33
Min	20.62	0.02
Max	22.39	1.21
Summary Count	32	32
Total Count	32	32

LLCR Delta Count by Category						
	Stable	**Minor**	**Acceptable**	**Marginal**	**Unstable**	**Open**
mOhms	**<=5**	**>5 & <=10**	**>10 & <=15**	**>15 & <=50**	**>50 & <=1000**	**>1000**
Shock-Vib	**288**	**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: 11/14/2025

Equipment #: OV-05
Description: Forced Air Oven, 5 Cu. Ft., 120 V (Chamber Room)
Manufacturer: Sheldon Mfg.
Model: CE5F
Serial #: 02008008
Accuracy: +/- 5 deg. C
… Last Cal: 02/03/2025, Next Cal: 02/03/2026

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 AND CALIBRATION SCHEDULES

Equipment #: PS-02
Description: Power Supply
Manufacturer: Hewlett-Packer
Model: 6033A
Serial #: N/A
Accuracy: See Manual
… Last Cal: CALIBRATION NOT REQUIRED.

Equipment #: MO-04
Description: Multimeter /Data Acquisition System
Manufacturer: Keithley
Model: 2700
Serial #: 0798688
Accuracy: See Manual
… Last Cal: 09/11/2024, Next Cal: 09/11/2025

Equipment #: SVC-01
Description: Shock & Vibration Table
Manufacturer: Data Physics
Model: LE-DSA-10-20K
Serial #: 10037
Accuracy: See Manual
… Last Cal: 04/22/2024, Next Cal: 04/22/2025

Equipment #: ACLM-01
Description: Accelerometer
Manufacturer: PCB Piezotronics
Model: 352C03
Serial #: 115819
Accuracy: See Manual
… Last Cal: 07/18/2024, Next Cal: 07/18/2025

Equipment #: ED-03
Description: Event Detector
Manufacturer: Analysis Tech
Model: 32EHD
Serial #: 1100604
Accuracy: See Manual
… Last Cal: 10/31/2024, Next Cal: 10/31/2025