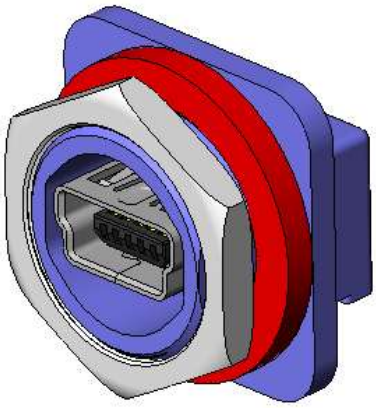
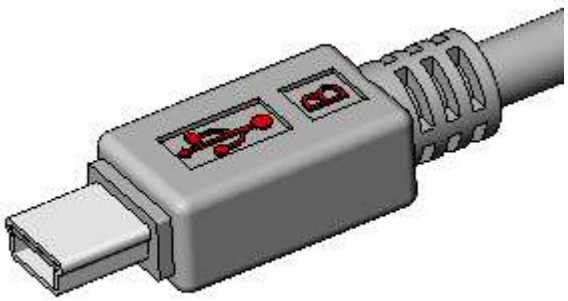
Project Number: Design Verification Test	Tracking Code: TC1002—3030_Report_Rev_1		
Requested by: Brandon Harpenau	Date: 2/20/2014	Product Rev: 2	
Part #: SPM-05-S-B-RA-PF / USBC-MA-MB-B-S-S-1-R	Lot #: 1	Tech: Troy Cook Tony Wagoner Aaron McKim	Eng: Eric Mings Mark Shireman
Part description: Sealed Port Mini USB			Qty to test: 65
Test Start: 01/07/2010	Test Completed: 4/2/2010		





Design Verification Test Report

PART DESCRIPTION

SPM-05-S-B-RA-PF / USBC-MA-MB-B-S-S-1-R

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 Verification Test. 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 TLWI-0001.
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) Re-Flow Time/Temp: See accompanying profile.
10) Samtec Test PCBs used: PCB-102177-TST / PCB-102186-TST / PCB-102190-TST

FLOWCHARTS

Gas Tight

TEST STEP	GROUP A 32 Points
01	LLCR-1
02	Gas Tight
03	LLCR-2

Gas Tight = EIA-364-36A

LLCR = EIA-364-23, LLCR

use Keithley 580 in the dry circuit mode, 10 mA Max

IR & DWV

TEST STEP	GROUP A1 2 Mated Sets Break Down - Pin to Pin	GROUP A2 2 Unmated of Part # Being Tested Break Down - Pin to Pin	GROUP A3 2 Unmated of Mating Part # Break Down - Pin to Pin	GROUP B 2 Mated Sets Pin to Pin
01	DWV/Break Down Voltage	DWV/Break Down Voltage	DWV/Break Down Voltage	IR & DWV at test voltage (on both mated sets and on each connector unmated)
02				Thermal Aging (both sets unmated)
03				IR & DWV at test voltage (on both mated sets and on each connector unmated)
04				Cyclic Humidity (both sets unmated)
05				IR & DWV at test voltage (on both mated sets and on each connector unmated)

*** - DWV on group B to be performed at Test Voltage**

DWV test voltage is equal to 75% of the lowest break down voltage from group A1, A2 or A3

Thermal Aging = EIA-364-17, Test Condition 4 (105 °C)

Time Condition 'B' (250 hours)

Humidity = EIA-364-31, Test Condition B (240 Hours)

and Method III (+25° C to +65° C @ 90%RH to 98% RH)

ambient pre-condition and delete steps 7a and 7b

IR = EIA-364-21

DWV = EIA-364-20, Test Condition 1

Mating/Unmating/Gaps/Normal Force/Deflection Force

TEST STEP	GROUP A 10 Boards	GROUP B1 Individual Contacts (8-10 min)	GROUP B2 Individual Contacts (8-10 min)
01	Contact Gaps	Setup Approve	Setup Approve
02	Mating / Unmating	Normal Force	Thermal Aging (Mated)
03	Data Review	Data Review	Normal Force
04	100 Cycles		
05	Mating / Unmating		
06	900 Cycles (1000 total)		
07	Mating / Unmating		
08	1000 Cycles (2000 total)		
09	Mating / Unmating		
10	1000 Cycles (3000 total)		
11	Mating / Unmating		
12	1000 Cycles (4000 total)		
13	Mating / Unmating		
14	1000 Cycles (5000 total)		
15	Mating / Unmating		
16	Contact Gaps		
17	Data Review		
18	Thermal Aging (Mated)		
19	Mating / Unmating		
20	Contact Gaps		
21	Data Review		
22	Humidity (Mated)		
23	Contact Gaps		
24	Mating / Unmating		

Thermal Aging = EIA-364-17, Test Condition 4 (105 °C)
Time Condition 'B' (250 hours)
Humidity = EIA-364-31, Test Condition B (240 Hours)
and Method III (+25 °C to +65 °C @ 90%RH to 98% RH)
ambient pre-condition and delete steps 7a and 7b
Mating/Un-Mating Forces = EIA-364-13
Normal Force = EIA-364-04
(Perpendicular) displacement Force = 12.7 mm/min +/- 6 mm/min
Spec is 50 N @ 1 mm displacement
Contact Gaps/Height - No standard method. Usually measured optically

Durability/Thermal Age/Cyclic Humidity

TEST STEP	GROUP A1 32 Points 1000 Cycles	GROUP A2 32 Points 5000 Cycles
01	LLCR-1	LLCR-1
02	1000 Cycles	5000 Cycles
03	Clean Mating Interface	Clean Mating Interface
04	LLCR-2	LLCR-2
05	Thermal Age (Mated and undisturbed)	
06	LLCR-3	
07	Cyclic Humidity (Mated and undisturbed)	
08	LLCR-4	

Thermal Aging = EIA-364-17, Test Condition 4, 105 deg C;
Time Condition 'B' (250 hours)
Humidity =EIA-364-31, Test Condition B (240 Hours)
and Method III (+25 ° C to +65 ° C @ 90%RH to 98% RH)
ambient pre-condition and delete steps 7a and 7b
LLCR = EIA-364-23, LLCR
use Keithley 580 in the dry circuit mode, 10 mA Max

Current Carrying Capacity

TEST STEP	GROUP A 3 Mated Assemblies 1 CONTACT POWERED	GROUP B 3 Mated Assemblies 2 CONTACTS POWERED	GROUP C 3 Mated Assemblies 3 CONTACTS POWERED	GROUP E 3 Mated Assemblies ALL CONTACTS POWERED
01	CCC	CCC	CCC	CCC

(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
CCC, Temp rise = EIA-364-70

IP67 & IP66 Testing w/o Mate

TEST STEP	GROUP A1 9 Conenctors SPM-05-S-B-RA-PF	GROUP A2 9 Connectors SPM-05-S-B-RA-PF	GROUP B1 9 Connectors SPM-05-S-B-RA-PF	GROUP C1 6 Connectors SPM-05-S-B-RA-PF
01	Dust Test	Dust Test w/ DCSPM-01	Submersion Water Test	Stream of Water Test
02	Check for Dust	Check for Dust	Check for Water	Check for Water

Dust/Water Testing = Per CEI/IEC 60529 Code IP67
Dust/Water Testing = Per CEI/IEC 60529 Code IP66
***Torque spec on DCN-1532-32 shoud be 2.5 in-lb min.**

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 4 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.

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.

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 three temperature points are reported:
    a. Ambient
    b. 80^{o} C
    c. 95^{o} C
    d. 115^{o} C
8) Typically, neighboring contacts (in close proximity to maximize heat build up) 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.

CONTACT GAPS:

1) Gaps above the surrounding plastic surface were measured before and after stressing the contacts (e.g. thermal aging, mechanical cycling, etc.).
2) Typically, all contacts on the connector are measured.

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.

NORMAL FORCE (FOR CONTACTS TESTED IN THE HOUSING):

1) Reference document: EIA-364-04, *Normal Force Test Procedure for Electrical Connectors*.
2) The contacts shall be tested in the connector housing.
3) If necessary, a "window" shall be made in the connector body to allow a probe to engage and deflect the contact at the same attitude and distance (plus 0.05 mm [0.002"]) as would occur in actual use.
4) The connector housing shall be placed in a holding fixture that does not interfere with or otherwise influence the contact force or deflection.
5) 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 5.0 µm (0.0002").
6) The nominal deflection rate shall be 5 mm (0.2")/minute.
7) Unless otherwise noted a minimum of five contacts shall be tested.
8) The force/deflection characteristic to load and unload each contact shall be repeated five times.
9) The system shall utilize the TC^2 software in order to acquire and record the test data.
10) The permanent set of each contact shall be measured within the TC^2 software.
11) 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.

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 (500 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 5000 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).

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 +2000 mOhms: ---------- Unstable
    f. >+2000 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 +2000 mOhms: ---------- Unstable
    f. >+2000 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.

SUPPLEMENTAL TESTS

WATER TESTING:

1) Reference document: CEI/IEC 60529 Code IP66 and IP67
2) Torque requirements for testing:
    a. DCN-1532-32: 2.5 Inch/Lb Min.
    b. Machine Screw Torque to Fixture: 15.0 Inch/Lb Min.

DUST TESTING:

1) Reference document: CEI/IEC 60529 Code IP67
2) Torque requirements for testing:
    a. DCN-1532-32: 2.5 Inch/Lb Min.
    b. Machine Screw Torque to Fixture: 15.0 Inch/Lb Min.

RESULTS

Temperature Rise, CCC at a 20% de-rating

- **CCC for a 30°C Temperature Rise ----------2.9A per contact with 1 contact powered**
- **CCC for a 30°C Temperature Rise ----------2.5A per contact with 2 adjacent contacts powered**
- **CCC for a 30°C Temperature Rise ----------2.1A per contact with 3 adjacent contacts powered**
- **CCC for a 30°C Temperature Rise ----------1.9A per contact with all (4) adjacent contacts powered**

Contact Gaps

- **Initial**
  - **Min ---------- 0.301 mm**
  - **Max ---------- 0.422 mm**
- **After 100 Cycles**
  - **Min ---------- 0.292 mm**
  - **Max ---------- 0.370 mm**
- **Thermal**
  - **Min ---------- 0.202 mm**
  - **Max ---------- 0.372 mm**
- **Humidity**
  - **Min ---------- 0.194 mm**
  - **Max ---------- 0.374 mm**

Mating – Unmating Forces

- **Initial**
  - **Mating**
    - **Min ---------- 2.45 Lbs**
    - **Max---------- 4.32 Lbs**
  - **Unmating**
    - **Min ---------- 2.47 Lbs**
    - **Max---------- 3.73 Lbs**
- **After 100 Cycles**
  - **Mating**
    - **Min ---------- 5.59 Lbs**
    - **Max---------- 9.98 Lbs**
  - **Unmating**
    - **Min ---------- 5.04 Lbs**
    - **Max---------- 8.75 Lbs**
- **After 1000 Cycles**
  - **Mating**
    - **Min ---------- 1.75 Lbs**
    - **Max---------- 6.16 Lbs**
  - **Unmating**
    - **Min ---------- 1.33 Lbs**
    - **Max---------- 3.30 Lbs**
- **After 2000 Cycles**
  - **Mating**
    - **Min ---------- 0.53 Lbs**
    - **Max---------- 1.64 Lbs**
  - **Unmating**
    - **Min ---------- 0.43 Lbs**
    - **Max---------- 1.37 Lbs**
- **After 3000 Cycles**
  - **Mating**
    - **Min ---------- 1.25 Lbs**
    - **Max---------- 3.81 Lbs**
  - **Unmating**
    - **Min ---------- 0.99 Lbs**
    - **Max---------- 1.63 Lbs**
- **After 4000 Cycles**
  - **Mating**
    - **Min ---------- 0.49 Lbs**
    - **Max---------- 1.03 Lbs**
  - **Unmating**
    - **Min ---------- 0.34 Lbs**
    - **Max---------- 0.89 Lbs**
- **After 5000 Cycles**
  - **Mating**
    - **Min ---------- 0.61 Lbs**
    - **Max---------- 1.49 Lbs**
  - **Unmating**
    - **Min ---------- 0.51 Lbs**
    - **Max---------- 1.45 Lbs**

- **Thermal**
  - **Mating**
    - **Min ---------- 0.46 Lbs**
    - **Max---------- 2.31 Lbs**
  - **Unmating**
    - **Min ---------- 0.45 Lbs**
    - **Max---------- 1.42 Lbs**
- **Humidity**
  - **Mating**
    - **Min ---------- 0.43 Lbs**
    - **Max---------- 2.88 Lbs**
  - **Unmating**
    - **Min ---------- 0.22 Lbs**
    - **Max---------- 2.09 Lbs**

Normal Force at 0.012" deflection

- **Initial**
  - **Min----------54.70 g Set ----- 0.0000"**
  - **Max ----------78.80 g Set ----- 0.0003"**
- **Thermal**
  - **Min----------51.80 g**
  - **Max ----------69.90 g**

Insulation Resistance minimums, IR

- **Initial**
  - **Mated---------- 25,000 Meg Ω ---------- Pass**
  - **Unmated ---------- 25,000 Meg Ω ---------- Pass**
- **Thermal**
  - **Mated----------100,000 Meg Ω ---------- Pass**
  - **Unmated ---------- 25,000 Meg Ω ---------- Pass**
- **Humidity**
  - **Mated----------100,000 Meg Ω ---------- Pass**
  - **Unmated ----------100,000 Meg Ω ---------- Pass**

Dielectric Withstanding Voltage minimums, DWV

- **Minimums**
  - **Breakdown Voltage----------760 VAC**
  - **Test Voltage ----------570 VAC**
  - **Working Voltage ----------190 VAC**
- **Initial DWV ----------Passed**
- **Thermal DWV----------Passed**
- **Humidity DWV----------Passed**

LLCR Durability (32 LLCR test points) – 1000 Cycles

- **Initial ---------- 47.4 mOhms Max**
- **Durability, 1000 Cycles**
  - **<= +5.0 mOhms ---------- 26 Points ---------- Stable**
  - **+5.1 to +10.0 mOhms ---------- 5 Points ---------- Minor**
  - **+10.1 to +15.0 mOhms ---------- 1 Points ---------- Acceptable**
  - **+15.1 to +50.0 mOhms ---------- 0 Points ---------- Marginal**
  - **+50.1 to +2000 mOhms ---------- 0 Points ---------- Unstable**
  - **>+2000 mOhms ---------- 0 Points ---------- Open Failure**
- **Thermal**
  - **<= +5.0 mOhms ---------- 27 Points ---------- Stable**
  - **+5.1 to +10.0 mOhms ---------- 4 Points ---------- Minor**
  - **+10.1 to +15.0 mOhms ---------- 1 Points ---------- Acceptable**
  - **+15.1 to +50.0 mOhms ---------- 0 Points ---------- Marginal**
  - **+50.1 to +2000 mOhms ---------- 0 Points ---------- Unstable**
  - **>+2000 mOhms ---------- 0 Points ---------- Open Failure**
- **Humidity**
  - **<= +5.0 mOhms ---------- 29 Points ---------- Stable**
  - **+5.1 to +10.0 mOhms ---------- 3 Points ---------- Minor**
  - **+10.1 to +15.0 mOhms ---------- 0 Points ---------- Acceptable**
  - **+15.1 to +50.0 mOhms ---------- 0 Points ---------- Marginal**
  - **+50.1 to +2000 mOhms ---------- 0 Points ---------- Unstable**
  - **>+2000 mOhms ---------- 0 Points ---------- Open Failure**

LLCR Durability (32 LLCR test points) – 5000 Cycles

- **Initial ---------- 43.8 mOhms Max**
- **Durability, 1000 Cycles**
  - **<= +5.0 mOhms ---------- 31 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 +2000 mOhms ---------- 0 Points ---------- Unstable**
  - **>+2000 mOhms ---------- 0 Points ---------- Open Failure**

LLCR Gas Tight (32 LLCR test points)

- **Initial ---------- 45.8 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 +2000 mOhms ---------- 0 Points ---------- Unstable**
  - **>+2000 mOhms ---------- 0 Points ---------- Open Failure**

SUPPLEMENTAL TESTING

IP66 & IP67 Testing w/o Mate (Water & Dust)

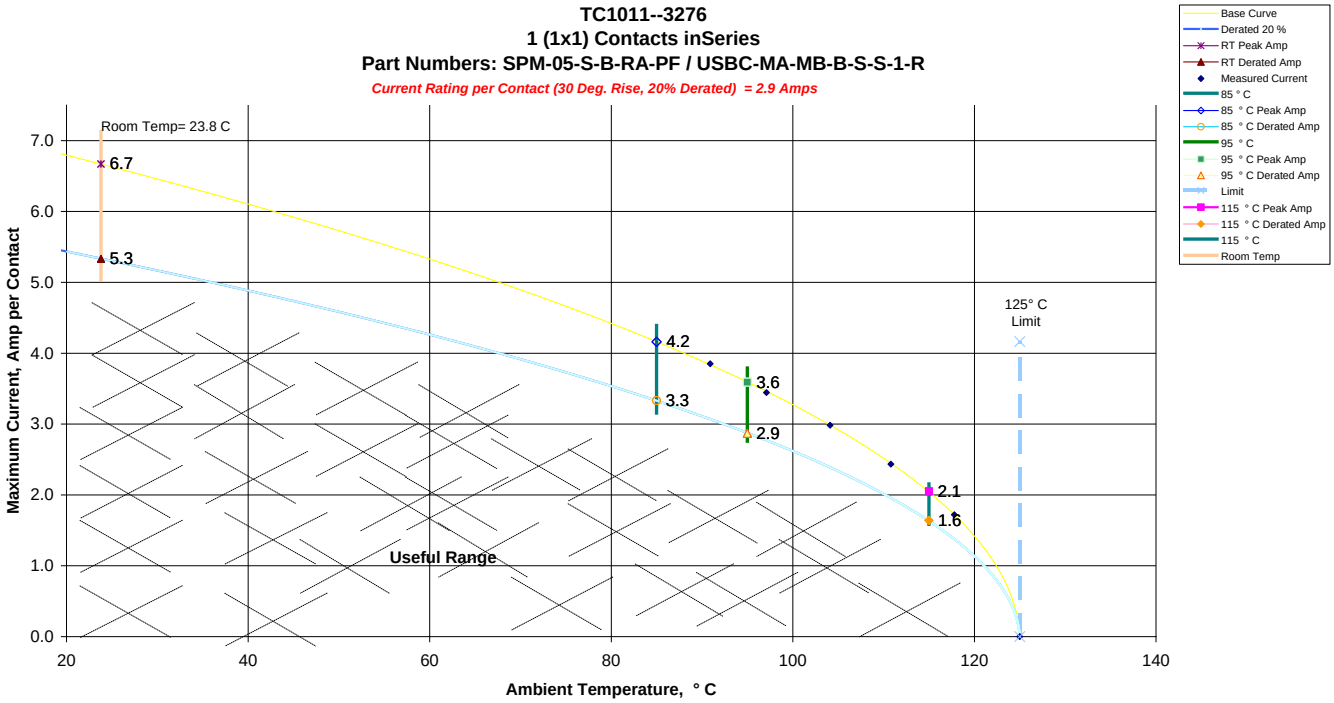
	Initial (Before Exposure)	After Exposure
Water	No Water Present	No Water Present
Dust	No Dust Present	No Dust Present

DATA SUMMARIES

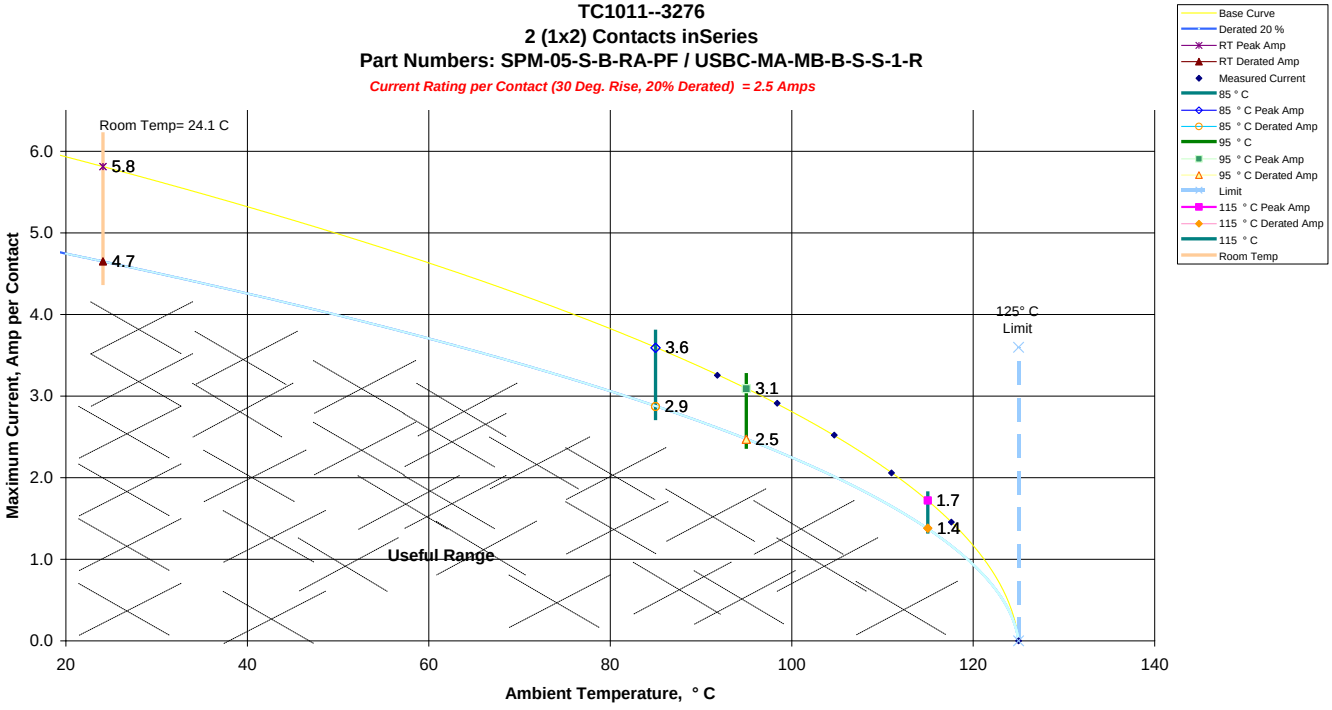
TEMPERATURE RISE (Current Carrying Capacity, CCC):

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:

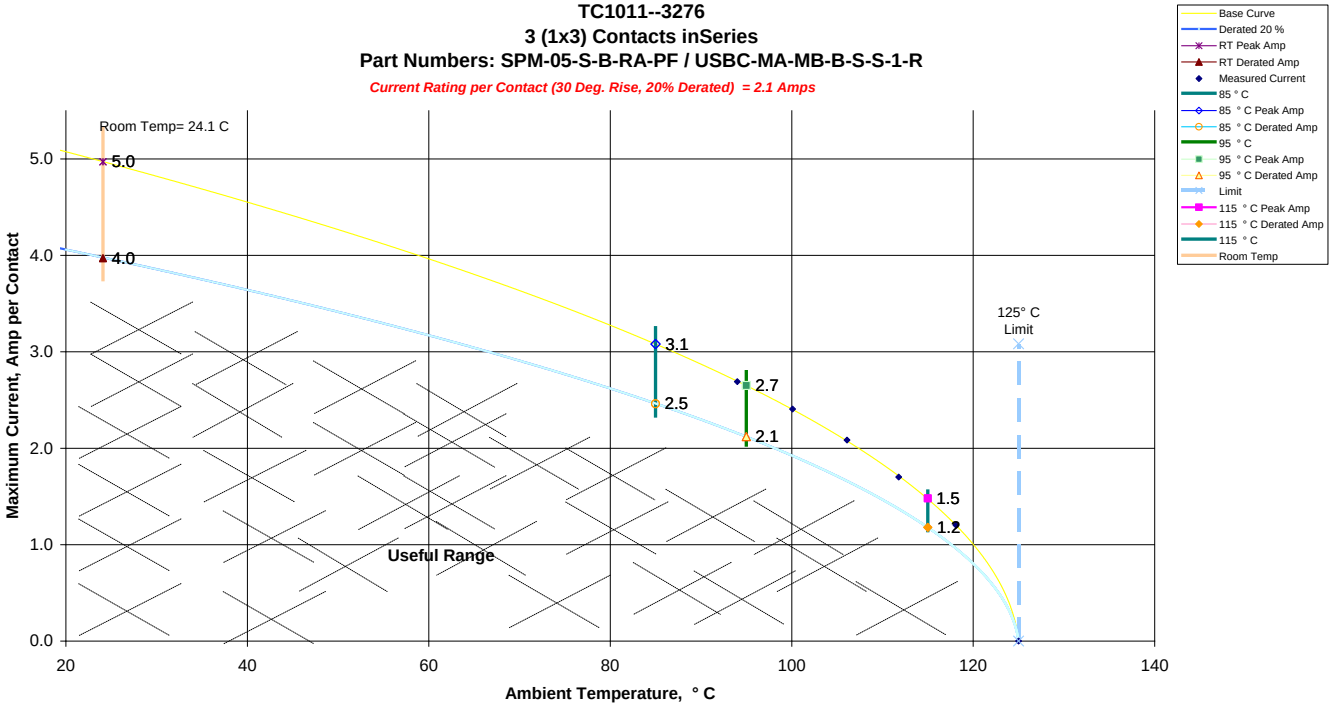
    a. Linear configuration with 1 conductors/contacts powered



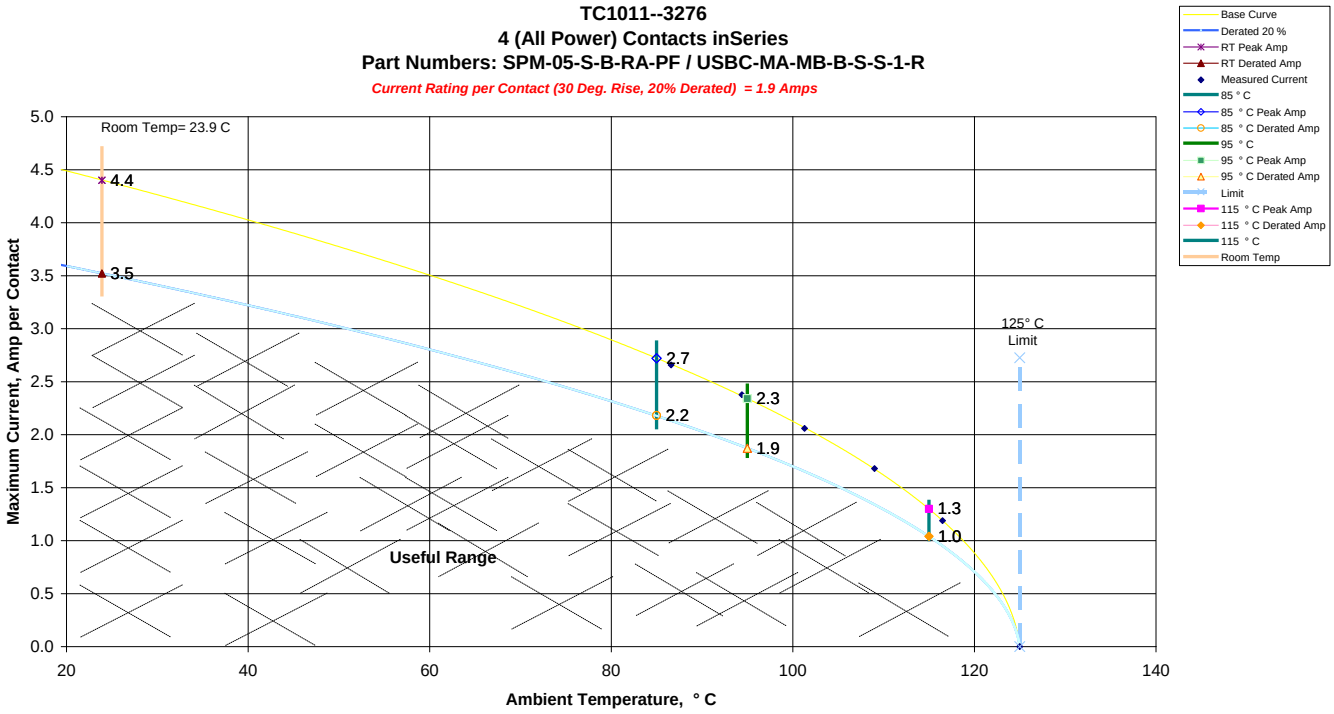
b. Linear configuration with 2 adjacent conductors/contacts powered



c. Linear configuration with 3 adjacent conductors/contacts powered



d. Linear configuration with all (4) adjacent conductors/contacts powered



CONTACT GAPS:

Initial		After 5000 Cycles		After Thermal		After Humidity	
Units:	mm	Units:	mm	Units:	mm	Units:	mm
Minimum	0.301	***Minimum***	0.292	***Minimum***	0.202	***Minimum***	0.194
Maximum	0.422	***Maximum***	0.370	***Maximum***	0.372	***Maximum***	0.374
Average	0.367	***Average***	0.343	***Average***	0.294	***Average***	0.302
St. Dev.	0.0284	***St. Dev.***	0.0201	***St. Dev.***	0.0482	***St. Dev.***	0.0494
Count	50	***Count***	50	***Count***	50	***Count***	50

MATING/UNMATING:

	Initial				After 100 Cycles			
	Mating		**Unmating**		**Mating**		**Unmating**	
	Newtons	Force (Lbs)	Newtons	Force (Lbs)	Newtons	Force (Lbs)	Newtons	Force (Lbs)
Minimum	10.88	2.45	10.98	2.47	24.86	5.59	22.40	5.04
Maximum	19.20	4.32	16.61	3.73	44.40	9.98	38.90	8.75
Average	16.49	**3.71**	13.26	**2.98**	31.53	**7.09**	29.36	**6.60**
St Dev	2.61	0.59	1.68	0.38	6.17	1.39	5.49	1.23
Count	10	10	10	10	10	10	10	10

	After 1000 Cycles				After 2000 Cycles			
	Mating		**Unmating**		**Mating**		**Unmating**	
	Newtons	Force (Lbs)	Newtons	Force (Lbs)	Newtons	Force (Lbs)	Newtons	Force (Lbs)
Minimum	7.80	1.75	5.93	1.33	2.38	0.53	1.93	0.43
Maximum	27.39	6.16	14.68	3.30	7.30	1.64	6.10	1.37
Average	17.22	**3.87**	9.34	**2.10**	4.47	**1.01**	3.23	**0.73**
St Dev	5.85	1.32	2.49	0.56	1.53	0.34	1.29	0.29
Count	10	10	10	10	10	10	10	10

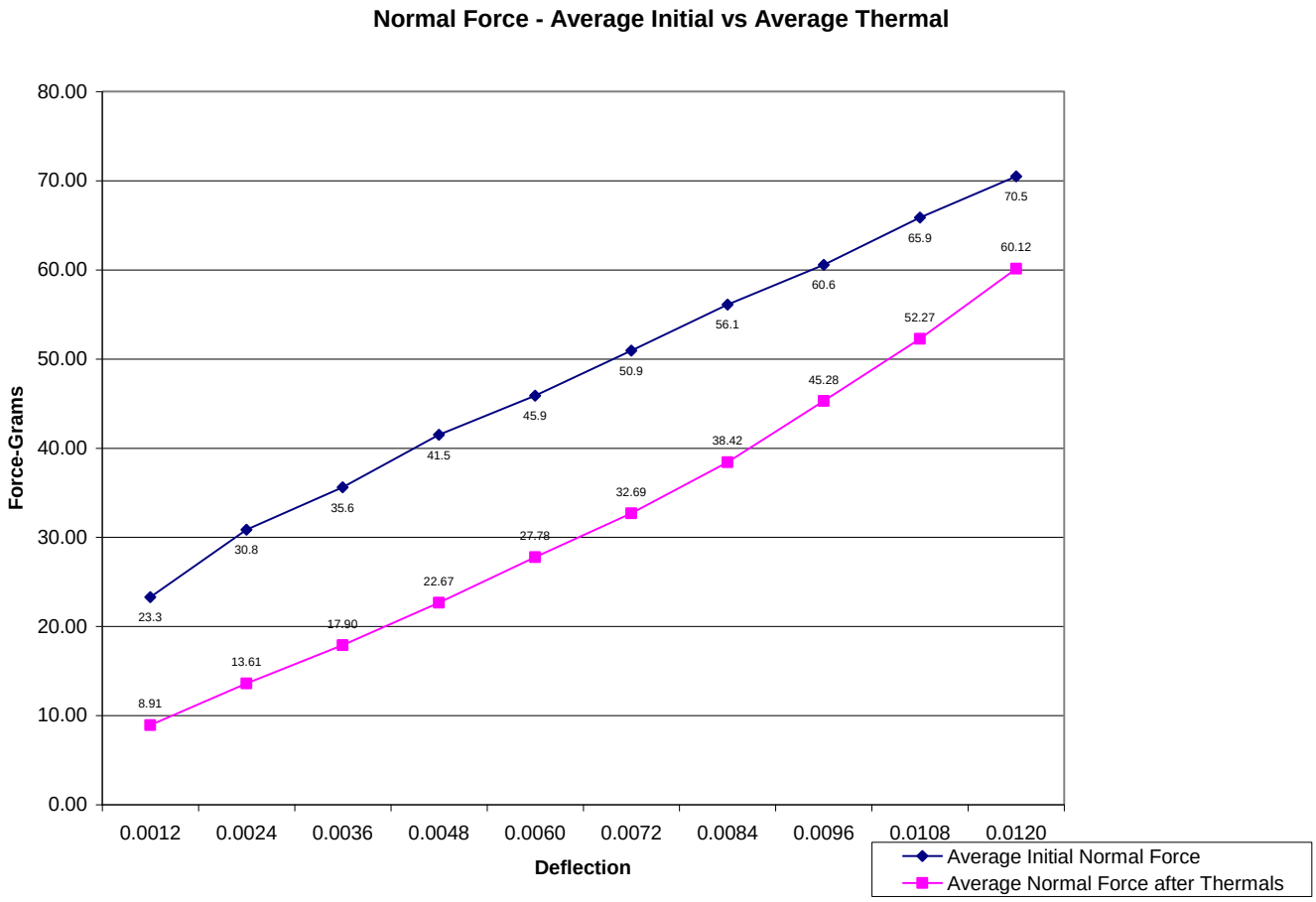
	After 3000 Cycles				After 4000 Cycles			
	Mating		**Unmating**		**Mating**		**Unmating**	
	Newtons	Force (Lbs)	Newtons	Force (Lbs)	Newtons	Force (Lbs)	Newtons	Force (Lbs)
Minimum	5.54	1.25	4.38	0.99	2.20	0.49	1.53	0.34
Maximum	16.95	3.81	7.25	1.63	4.59	1.03	3.94	0.89
Average	10.57	**2.38**	6.36	**1.43**	3.23	**0.73**	2.41	**0.54**
St Dev	3.38	0.76	0.94	0.21	0.73	0.16	0.77	0.17
Count	10	10	10	10	10	10	10	10

	After 5000 Cycles				After Thermals			
	Mating		**Unmating**		**Mating**		**Unmating**	
	Newtons	Force (Lbs)	Newtons	Force (Lbs)	Newtons	Force (Lbs)	Newtons	Force (Lbs)
Minimum	2.72	0.61	2.29	0.51	2.07	0.46	1.98	0.45
Maximum	6.61	1.49	6.46	1.45	10.25	2.31	6.31	1.42
Average	4.24	**0.95**	3.87	**0.87**	4.43	**1.00**	3.35	**0.75**
St Dev	1.39	0.31	1.35	0.30	2.41	0.54	1.40	0.31
Count	10	10	10	10	10	10	10	10

	After Humidity			
	Mating		**Unmating**	
	Newtons	Force (Lbs)	Newtons	Force (Lbs)
Minimum	1.91	0.43	0.96	0.22
Maximum	12.82	2.88	9.30	2.09
Average	4.29	**0.96**	3.08	**0.69**
St Dev	3.15	0.71	2.32	0.52
Count	10	10	10	10

NORMAL FORCE (FOR CONTACTS TESTED IN THE HOUSING):

1) Calibrated force gauges are used along with computer controlled positioning equipment.
2) For Normal force 8-10 measurements are taken and the averages reported.



Initial	Deflections in inches Forces in Grams										
	0.0012	**0.0024**	**0.0036**	**0.0048**	**0.0060**	**0.0072**	**0.0084**	**0.0096**	**0.0108**	**0.0120**	***SET***
Averages	23.29	30.84	35.62	41.51	45.89	50.94	56.11	60.57	65.85	70.49	0.0002
Min	3.30	6.90	9.80	15.70	22.20	28.90	35.40	41.50	48.70	54.70	0.0000
Max	34.90	45.00	51.00	57.00	58.80	62.50	68.00	71.10	77.00	78.80	0.0003
St. Dev	11.066	13.483	14.224	13.958	12.363	11.280	10.317	8.904	7.883	6.673	0.0001
Count	10	10	10	10	10	10	10	10	10	10	10

After Thermals	Deflections in inches Forces in Grams										
	0.0012	**0.0024**	**0.0036**	**0.0048**	**0.0060**	**0.0072**	**0.0084**	**0.0096**	**0.0108**	**0.0120**	***SET***
Averages	8.91	13.61	17.90	22.67	27.78	32.69	38.42	45.28	52.27	60.12	0.0004
Min	3.10	7.00	11.70	15.90	21.60	27.70	33.80	39.70	44.90	51.80	0.0000
Max	18.10	22.70	27.70	27.10	32.80	39.70	46.90	54.50	61.30	69.00	0.0017
St. Dev	5.261	5.420	5.337	4.294	3.261	3.839	4.465	5.369	6.167	7.168	0.0006
Count	9	9	9	9	9	9	9	9	9	9	9

INSULATION RESISTANCE (IR):

	Pin to Pin		
	Mated	Unmated	Unmated
Minimum	**SPM/USBC**	**SPM**	**USBC**
Initial	25000	25000	100000
Thermal	100000	100000	25000
Humidity	100000	100000	100000

DIELECTRIC WITHSTANDING VOLTAGE (DWV):

Voltage Rating Summary	
Minimum	**SPM/USBC**
Break Down Voltage	760
Test Voltage	570
Working Voltage	190

Pin to Pin	
Initial Test Voltage	Passed
After Thermal Test Voltage	Passed
After Humidity Test Voltage	Passed

LLCR (1000 Cycles):

1) A total of 32 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 +2000 mOhms ---------- Unstable
   f. >+2000 mOhms:---------- Open Failure

	28 AWG			
Date	1/14/2010	1/15/2010	1/26/2010	2/12/2010
Room Temp C	22	23.3	22	19.8
RH	22%	26%	42%	22%
Name	Troy Cook	Troy Cook	Troy Cook	Troy Cook
mOhm values	**Actual Initial**	**Delta 1000 Cycles**	**Delta Thermal**	**Delta Humidity**
Average	41.9	-3.2	-2.9	-2.1
St. Dev.	3.8	3.4	3.4	2.7
Min	36.2	-10.8	-10.2	-8.0
Max	47.4	0.8	1.2	1.4
Count	16	16	16	16

	24 AWG			
Date	1/14/2010	1/15/2010	1/26/2010	2/12/2010
Room Temp C	22	23.3	22	19.8
RH	22%	26%	42%	22%
Name	Troy Cook	Troy Cook	Troy Cook	Troy Cook
mOhm values	**Actual Initial**	**Delta 1000 Cycles**	**Delta Thermal**	**Delta Humidity**
Average	31.7	-1.3	-1.3	-1.0
St. Dev.	3.0	2.0	2.5	2.7
Min	27.4	-6.7	-5.3	-5.8
Max	36.7	2.3	3.3	3.4
Count	16	16	16	16

LLCR (5000 Cycles):

1) A total of 32 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 +2000 mOhms ---------- Unstable
    f. >+2000 mOhms:---------- Open Failure

	28 AWG	
Date	1/14/2010	1/15/2010
Room Temp C	22	23.3
RH	22%	26%
Name	Troy Cook	Troy Cook
mOhm values	**Actual Initial**	**Delta 5000 Cycles**
Average	41.4	-0.7
St. Dev.	1.9	3.0
Min	37.6	-9.2
Max	43.8	3.3
Count	16	16

	24 AWG	
Date	1/14/2010	1/15/2010
Room Temp C	22	23.3
RH	22%	26%
Name	Troy Cook	Troy Cook
mOhm values	**Actual Initial**	**Delta 5000 Cycles**
Average	31.9	-0.9
St. Dev.	1.8	1.7
Min	28.2	-4.4
Max	34.7	1.4
Count	16	16

GAS TIGHT:

1) A total of 32 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 +2000 mOhms: ---------- Unstable
   f. >+2000 mOhms:---------- Open Failure

28 AWG		
Date	1/14/2010	1/15/2010
Room Temp C	22	23.2
RH	23%	25%
Name	Troy Cook	Troy Cook
mOhm values	**Actual Initial**	**Delta Gas Tight**
Average	41.0	-0.2
St. Dev.	2.2	0.4
Min	37.5	-1.0
Max	45.8	0.4
Count	16	16

24 AWG		
Date	1/14/2010	1/15/2010
Room Temp C	22	23.2
RH	23%	25%
Name	Troy Cook	Troy Cook
mOhm values	**Actual Initial**	**Delta Gas Tight**
Average	31.5	-0.2
St. Dev.	1.8	0.5
Min	28.6	-1.5
Max	35.2	0.6
Count	16	16

SUPPLEMENTAL TESTS

IP66 & IP67 Testing w/o Mate (Water & Dust)

Dust Test	
SPM-05-S-B-RA-PF	
Visual Inspection after Dust Test (10X Magnification)	
Sample #	**Visual Inspection**
1	Passed
2	Passed
3	Passed
4	Passed
5	Passed
6	Passed
7	Passed
8	Passed
9	Passed

Dust Test	
SPM-05-S-B-RA-PF with dust cover	
Visual Inspection after Dust Test (10X Magnification)	
Sample #	**Visual Inspection**
1	Passed
2	Passed
3	Passed
4	Passed
5	Passed
6	Passed
7	Passed
8	Passed
9	Passed

1 Meter Submersion Water Test	
SPM-05-S-B-RA-PF	
Visual Inspection after Dust Test (10X Magnification)	
Sample #	**Visual Inspection**
1	Passed
2	Passed
3	Passed
4	Passed
5	Passed
6	Passed
7	Passed
8	Passed
9	Passed

Stream of Water Test	
SPM-05-S-B-RA-PF	
Visual Inspection after Dust Test (10X Magnification)	
Sample #	**Visual Inspection**
1	Passed
2	Passed
3	Passed
4	Passed
5	Passed
6	Passed

DATA

CONTACT GAPS:

Initial										
Units: mm										
Pos.#	**B1**	**B2**	**B3**	**B4**	**B5**	**B6**	**B7**	**B8**	**B9**	**B10**
1	0.382	0.301	0.372	0.422	0.352	0.396	0.313	0.361	0.367	0.364
2	0.379	0.322	0.401	0.416	0.377	0.395	0.324	0.363	0.375	0.369
3	0.362	0.335	0.379	0.408	0.354	0.392	0.316	0.351	0.357	0.356
4	0.369	0.347	0.392	0.408	0.361	0.409	0.322	0.363	0.374	0.367
5	0.371	0.340	0.378	0.406	0.364	0.390	0.313	0.365	0.368	0.362
After 5000 Cycles										
Units: mm										
Pos.#	**B1**	**B2**	**B3**	**B4**	**B5**	**B6**	**B7**	**B8**	**B9**	**B10**
1	0.367	0.298	0.344	0.343	0.347	0.366	0.304	0.351	0.292	0.349
2	0.367	0.317	0.358	0.341	0.370	0.353	0.315	0.348	0.341	0.355
3	0.356	0.329	0.342	0.345	0.347	0.353	0.307	0.338	0.339	0.339
4	0.360	0.321	0.363	0.343	0.352	0.363	0.311	0.340	0.365	0.357
5	0.370	0.319	0.359	0.349	0.355	0.356	0.301	0.354	0.354	0.345
After Thermal										
Units: mm										
Pos.#	**B1**	**B2**	**B3**	**B4**	**B5**	**B6**	**B7**	**B8**	**B9**	**B10**
1	0.288	0.340	0.328	0.358	0.326	0.358	0.354	0.252	0.340	0.366
2	0.260	0.248	0.342	0.304	0.268	0.308	0.332	0.252	0.274	0.290
3	0.232	0.244	0.306	0.346	0.304	0.282	0.328	0.212	0.280	0.300
4	0.210	0.224	0.322	0.356	0.314	0.282	0.348	0.202	0.266	0.264
5	0.218	0.224	0.290	0.368	0.334	0.300	0.372	0.212	0.290	0.282
After Humidity										
Units: mm										
Pos.#	**B1**	**B2**	**B3**	**B4**	**B5**	**B6**	**B7**	**B8**	**B9**	**B10**
1	0.367	0.298	0.344	0.343	0.347	0.366	0.304	0.351	0.292	0.349
2	0.367	0.317	0.358	0.341	0.370	0.353	0.315	0.348	0.341	0.355
3	0.356	0.329	0.342	0.345	0.347	0.353	0.307	0.338	0.339	0.339
4	0.360	0.321	0.363	0.343	0.352	0.363	0.311	0.340	0.365	0.357
5	0.370	0.319	0.359	0.349	0.355	0.356	0.301	0.354	0.354	0.345

MATING/UNMATING:

	Initial		After 100 Cycles		After 1000 Cycles		After 2000 Cycles		After 3000 Cycles	
Sample#	Mating	Unmating	Mating	Unmating	Mating	Unmating	Mating	Unmating	Mating	Unmating
1	4.09	2.47	9.98	5.04	1.75	1.33	1.24	0.79	3.43	1.44
2	4.26	2.81	5.59	5.94	4.65	2.64	0.86	0.50	2.11	1.40
3	3.31	2.90	6.87	8.75	2.46	1.71	0.97	0.66	1.79	1.54
4	4.13	3.73	6.92	7.40	3.46	1.79	1.64	0.97	3.81	1.58
5	4.32	3.31	8.17	7.33	6.16	2.23	0.84	1.37	1.25	0.99
6	4.11	3.15	8.11	6.01	5.49	3.30	0.86	0.63	2.06	1.34
7	3.50	3.10	6.12	6.40	3.64	1.91	1.47	0.89	2.39	1.63
8	3.40	3.02	7.51	5.79	4.10	2.11	0.94	0.55	2.67	1.60
9	2.45	2.48	5.69	8.08	3.27	2.27	0.53	0.47	2.01	1.18
10	3.52	2.83	5.93	5.25	3.73	1.70	0.70	0.43	2.24	1.60

	After 4000 Cycles		After 5000 Cycles		After Thermals		After Humidity	
Sample#	Mating	Unmating	Mating	Unmating	Mating	Unmating	Mating	Unmating
1	0.81	0.77	0.83	0.68	1.24	0.88	0.43	0.22
2	1.03	0.61	0.66	0.60	1.36	1.16	1.17	0.79
3	0.49	0.40	1.49	1.45	2.31	1.42	2.88	2.09
4	0.82	0.34	0.78	0.78	1.09	0.71	0.48	0.36
5	0.51	0.39	0.61	0.54	0.46	0.45	0.91	0.63
6	0.86	0.89	1.10	1.13	0.74	0.64	0.62	0.44
7	0.64	0.55	1.42	1.02	0.80	0.63	0.92	0.74
8	0.74	0.48	0.67	0.51	0.67	0.46	0.76	0.47
9	0.64	0.42	0.90	0.92	0.73	0.62	0.67	0.59
10	0.70	0.57	1.08	1.08	0.59	0.56	0.80	0.60

NORMAL FORCE (FOR CONTACTS TESTED IN THE HOUSING):

Initial — **Deflections in inches, Forces in Grams**

Sample #	0.0012	0.0024	0.0036	0.0048	0.0060	0.0072	0.0084	0.0096	0.0108	0.0120	*SET*
1	13.9	17.0	20.9	26.8	32.8	39.7	46.9	54.5	61.3	68.1	0.0001
2	3.3	6.9	9.8	15.7	22.2	28.9	35.4	41.5	48.7	54.7	0.0003
3	10.6	14.5	18.3	24.9	32.3	39.2	45.8	52.1	59.5	65.5	0.0001
4	18.4	27.3	35.2	41.7	48.3	53.7	59.2	63.4	67.2	71.5	0.0002
5	24.7	40.5	40.9	52.3	50.3	56.9	61.6	66.5	69.9	73.3	0.0003
6	31.6	37.4	42.2	48.0	49.8	50.8	54.7	59.9	66.5	73.3	0.0000
7	31.4	45.0	46.5	48.9	57.4	62.5	68.0	71.1	77.0	78.8	0.0001
8	33.5	39.0	47.7	49.2	52.3	56.9	61.3	65.1	68.3	72.5	0.0003
9	30.6	42.1	51.0	57.0	54.7	59.0	63.7	68.2	73.2	76.0	0.0003
10	34.9	38.7	43.7	50.6	58.8	61.8	64.5	63.4	66.9	71.2	0.0003

After Thermals — **Deflections in inches, Forces in Grams**

Sample #	0.0012	0.0024	0.0036	0.0048	0.0060	0.0072	0.0084	0.0096	0.0108	0.0120	*SET*
1	13.9	17.0	20.9	26.8	32.8	39.7	46.9	54.5	61.3	68.1	0.0001
2	4.2	7.7	11.7	15.9	21.6	27.7	35.6	43.2	52.0	59.5	0.0000
3	3.1	7.2	12.5	18.5	25.9	32.6	39.4	47.6	54.8	69.0	0.0003
5	3.6	7.0	12.4	18.9	26.0	32.8	40.2	48.9	58.3	65.9	0.0010
6	6.4	12.9	17.1	23.1	29.6	37.5	43.6	50.9	58.4	65.8	0.0017
7	18.1	22.7	27.7	27.1	30.9	30.8	35.3	41.9	46.8	51.8	0.0002
8	8.2	15.5	19.6	26.5	28.3	32.8	35.0	39.7	44.9	51.9	0.0000
9	13.5	17.5	22.4	26.5	28.3	31.6	36.0	41.1	47.8	53.2	0.0001
10	9.2	15.0	16.8	20.7	26.6	28.7	33.8	39.7	46.1	55.9	0.0000

INSULATION RESISTANCE (IR):

Initial Insulation Resistance
Measured In Meg Ohms

	Pin to Pin		
	Mated	Unmated	
	x	x	x
Sample#	SPM/USBC	SPM	USBC
1	50000	50000	100000
2	25000	25000	100000

Thermal Insulation Resistance
Measured In Meg Ohms

	Pin to Pin		
	Mated	Unmated	
	x	x	x
Sample#	SPM/USBC	SPM	USBC
1	100000	100000	25000
2	100000	100000	100000

Humidity Insulation Resistance
Measured In Meg Ohms

	Pin to Pin		
	Mated	Unmated	
	x	x	x
Sample#	SPM/USBC	SPM	USBC
1	100000	100000	100000
2	100000	100000	100000

DIELECTRIC WITHSTANDING VOLTAGE (DWV):

Initial Breakdown Voltage
Test Voltage *Until Breakdown Occurs*

	Pin to Pin		
	Mated	Unmated	
	x		
Sample#	SPM/USBC	SPM	USBC
1	860	760	1200
2	820	760	1100

Initial DWV
Test Voltage= 570

	Pin to Pin		
	Mated	Unmated	
Sample#	SPM/USBC	SPM	USBC
1	570	570	570
2	570	570	570

Thermal Test Voltage
Test Voltage= 570

	Pin to Pin		
	Mated	Unmated	
Sample#	SPM/USBC	SPM	USBC
1	570	570	570
2	570	570	570

Humidity Test Voltage
Test Voltage= 570

	Pin to Pin		
	Mated	Unmated	
Sample#	SPM/USBC	SPM	USBC
1	570	570	570
2	570	570	570

LLCR (1000 Cycles):

28 AWG

	mOhm values	Actual	Delta	Delta	Delta
Board	Position	Initial	1000 Cycles	Thermal	Humidity
1	P2	42.7	-1.3	0.9	1.0
1	P3	46.7	-5.3	-3.6	-2.9
1	P2	44.9	-8.3	-8.9	-8.0
1	P3	47.4	-10.8	-10.2	-3.7
1	P2	40.9	-3.5	-2.7	-2.7
1	P3	39.3	-0.7	1.2	0.5
1	P2	36.4	0.6	0.2	0.5
1	P3	38.1	-1.6	-0.9	-0.5
2	P2	46.3	-2.2	-5.2	-4.9
2	P3	47.3	-4.3	-6.2	-5.3
2	P2	42.6	-5.5	-2.6	-2.9
2	P3	42.8	-6.5	-2.3	-2.9
2	P2	39.0	-0.1	-1.5	1.4
2	P3	41.1	-1.4	-3.3	-2.6
2	P2	36.2	0.8	1.0	0.9
2	P3	38.8	-0.5	-1.9	-1.2

24 AWG

	mOhm values	Actual	Delta	Delta	Delta
Board	Position	Initial	1000 Cycles	Thermal	Humidity
1	P1	33.6	-1.5	2.9	3.3
1	P5	33.0	-1.9	3.3	3.4
1	P1	36.7	-6.7	-5.3	-5.8
1	P5	33.3	-2.4	-3.0	-0.5
1	P1	34.0	-4.3	-4.7	-4.8
1	P5	29.3	-0.9	0.4	0.3
1	P1	28.6	-0.9	-0.7	-0.6
1	P5	27.4	0.5	-0.4	0.6
2	P1	36.3	-0.5	-4.8	-5.0
2	P5	33.7	2.3	-0.8	-0.8
2	P1	33.2	-2.1	-2.9	-3.8
2	P5	32.4	-1.2	-1.9	-1.8
2	P1	29.8	-1.0	-0.6	-0.2
2	P5	29.8	-0.3	-1.9	-0.3
2	P1	28.5	0.1	-0.5	-0.8
2	P5	28.0	-0.3	0.4	0.1

LLCR (5000 Cycles):

28 AWG

	mOhm values	Actual	Delta
Board	Position	Initial	5000 Cycles
1	P2	42.7	1.4
1	P3	42.4	1.5
1	P2	43.0	-1.6
1	P3	42.4	-2.1
1	P2	42.9	0.1
1	P3	42.8	-9.2
1	P2	39.0	-2.3
1	P3	40.5	-2.5
2	P2	41.3	-0.1
2	P3	42.5	3.3
2	P2	41.9	-1.2
2	P3	43.8	-3.3
2	P2	42.4	2.6
2	P3	40.0	-0.7
2	P2	37.7	1.1
2	P3	37.6	1.1

24 AWG

	mOhm values	Actual	Delta
Board	Position	Initial	5000 Cycles
1	P1	33.7	0.5
1	P5	32.6	1.4
1	P1	32.7	-1.0
1	P5	32.8	-0.9
1	P1	32.7	-1.9
1	P5	33.0	-2.8
1	P1	31.4	-4.4
1	P5	30.5	-2.3
2	P1	33.5	-1.4
2	P5	32.6	0.4
2	P1	34.7	-3.2
2	P5	31.3	0.8
2	P1	32.6	-0.2
2	P5	30.0	-0.1
2	P1	28.2	0.7
2	P5	28.4	0.8

GAS TIGHT:

28 AWG

	mOhm values	Actual	Delta
Board	Position	Initial	Gas Tight
1	P2	41.5	0.2
1	P3	45.8	-1.0
1	P2	42.7	-0.4
1	P3	42.7	-0.7
1	P2	39.2	-0.3
1	P3	40.5	-0.3
1	P2	38.5	-0.2
1	P3	40.4	-1.0
2	P2	42.7	-0.2
2	P3	43.8	-0.3
2	P2	40.3	0.1
2	P3	41.4	0.3
2	P2	39.7	0.4
2	P3	40.1	-0.1
2	P2	37.5	-0.1
2	P3	38.6	0.0

24 AWG

	mOhm values	Actual	Delta
Board	Position	Initial	Gas Tight
1	P1	32.9	-0.4
1	P5	33.0	-1.0
1	P1	32.4	0.3
1	P5	31.2	-0.2
1	P1	30.4	0.3
1	P5	30.3	-0.2
1	P1	29.3	0.6
1	P5	31.6	-1.5
2	P1	34.1	-0.7
2	P5	35.2	-0.3
2	P1	32.2	0.1
2	P5	32.0	0.1
2	P1	31.0	0.3
2	P5	30.4	-0.1
2	P1	29.0	-0.5
2	P5	28.6	-0.1

EQUIPMENT AND CALIBRATION SCHEDULES

Equipment #: MO-11
Description: Switch/Multimeter
Manufacturer: Keithley
Model: 3706
Serial #: 120169
Accuracy: See Manual See Manual
… Last Cal: 08/21/2009, Next Cal: 08/21/2010

Equipment #: MV-05
Description: 6" x 6" Video Measuring Machine
Manufacturer: Micro-Vu
Model: M3010838
Serial #: V9344
Accuracy: See Manual
… Last Cal: 01/12/2010, Next Cal: 01/12/2011

Equipment #: MV-06
Description: 6" x 6" Video Measuring Machine
Manufacturer: Micro-Vu
Model: M3010898
Serial #: V9343
Accuracy: See Manual
… Last Cal: 01/12/2010, Next Cal: 01/12/2011

Equipment #: OV-5
Description: Forced Air Oven, 5 Cu. Ft., 120 V
Manufacturer: Sheldon Mfg.
Model: CE5F
Serial #: 02008008
Accuracy: +/- 5 deg. C
… Last Cal: 02/16/2010, Next Cal: 02/16/2011

Equipment #: HPM-01
Description: Hipot Megommeter
Manufacturer: Hipotronics
Model: H306B-A
Serial #: M9905004
Accuracy: 2 % Full Scale Accuracy
… Last Cal: 11/30/09, Next Cal: 11/30/10

Equipment #: THC-01
Description: Temperature/Humidity Chamber
Manufacturer: Thermotron
Model: SM-8-7800
Serial #: 30676
Accuracy: See Manual
… Last Cal: 02/16/2010, Next Cal: 08/16/2010

Equipment #: THC-04
Description: Temperature/Humidity Chamber
Manufacturer: Thermotron
Model: SM-8-3800
Serial #: 37782
Accuracy: See Manual See Manual
… Last Cal: 02/16/2010, Next Cal: 08/16/2010

Equipment #: TCT-03
Description: Dillon Quantrol TC2 Test Stand
Manufacturer: Dillon Quantrol
Model: TC2
Serial #: 02-1033-03
Accuracy: Speed Accuracy: +/- 5% of indicated speed; Displacement: +/- 5 micrometers.
… Last Cal: 5/7/2009, Next Cal: 5/7/2010

Equipment #: TCT-01
Description: Test Stand
Manufacturer: Chatillon
Model: TCD-1000
Serial #: 05 23 00 02
Accuracy: Speed Accuracy: +/-5% of max speed; Displacement: +/-.5% or +/-.005, whichever is greater.
… Last Cal: 8/14/09, Next Cal: 8/31/10

Equipment #: TCT-06
Description: Test Resources test stand
Manufacturer: Test Resources
Model:
Serial #:
Accuracy: Speed Accuracy: +/- 5% of indicated speed; Displacement: +/- 5 micrometers.
… Last Cal: 05/07/2009, Next Cal: 05/07/2010

Equipment #: TCT-05
Description: TCT-225 Frame with TLC Console
Manufacturer: Chatillon
Model: TCD-225-0200
Serial #: 120169
Accuracy: See Manual See Manual
… Last Cal: 11/19/2009, Next Cal: 11/19/2010

Equipment #: MO-04
Description: Multimeter /Data Acquisition System
Manufacturer: Keithley
Model: 2700
Serial #: 0798688
Accuracy: See Manual
… Last Cal: 04/30/10, Next Cal: 04/30/2011

Equipment #: RS-09
Description: Current Shunt
Manufacturer: Empro
Model: HA10050
Serial #: HA10050-1
Accuracy: +/- 0.25% of RDG
… Last Cal: 05/14/2009, Next Cal: 05/14/2010