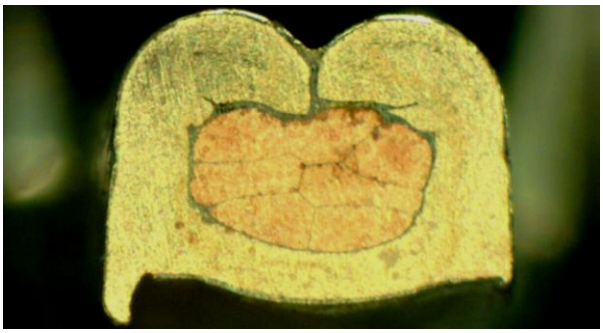
Project Number: Crimp Characterization Testing	Tracking Code: 192525		
Requested by: Bryon Saylor	Date: 4/27/2012	Product Rev:	
Part #: C-169-02-CRIMP-20-DWC	Lot #:	Tech: Troy Cook	Eng: Eric Mings
Part description: Individual Crimp Contacts with Wire Attached			Qty to test:
Test Start: 04/24/2012	Test Completed: 04/26/2012		

CRIMP HEIGHT CHARACTERIZATION SUMMARY REPORT



C-169-02-CRIMP-20-DWC
(PMSX Series)

REVISION HISTORY

DATE	REV. NUM.	DESCRIPTION	ENG
4/27/2012	1	Initial Issue	EM

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 characterize initial mechanical and electrical crimp performance vs. crimp height.

APPLICABLE DOCUMENTS

Standards: EIA Publication 364
USCAR2-5
USCAR FCLT

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) Test samples were not cleaned prior to testing.
4) Any additional preparation will be noted in the individual test sequences.
5) Two hundred and twenty (220) contacts with wires crimped were submitted for this evaluation. (see flow chart for sample distribution)

FLOWCHARTS

Wire Crimp Height Verification - LLCR / Pull Test

TEST STEP	GROUPS A1 - A11 10 Crimps
01	Visual Inspection
02	Measure crimp height via crimp micrometers
03	LLCR
04	Pull-out force

Crimp Manufacturing Instructions:

Cable length to be 6" minimum

Insulation crimp to not constrain jacket

Pull-out Force: EIA-364-38C

LLCR: EIA-364-23

20 mV Max, 100 mA Max

Use Keithley 580 or 3706 in 4 wire dry circuit mode

Wire Crimp Height Verification - Cross Section

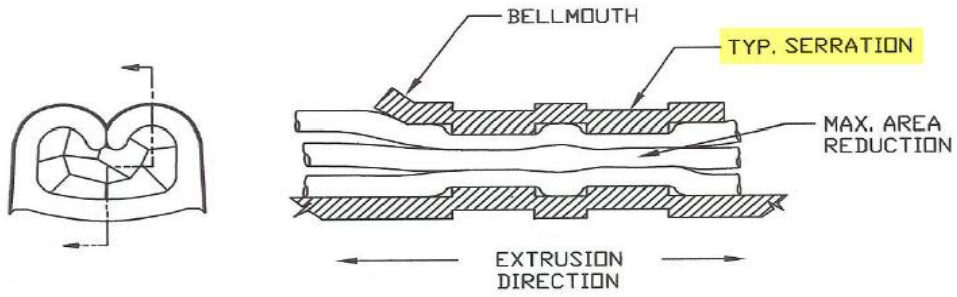
TEST STEP	GROUPS A1 - A11 3 Crimps
01	Visual Inspection
02	Measure crimp height via crimp micrometers
03	** Cross Section
04	Photos of Crimps
05	Count / Verify # of Strands
06	*** Examine for compliance with Pass/Fail criteria

Crimp Manufacturing Instructions:

Cable length to be 6" minimum

Insulation crimp to not constrain jacket

*** Cross section to be performed through the serration area shown below**



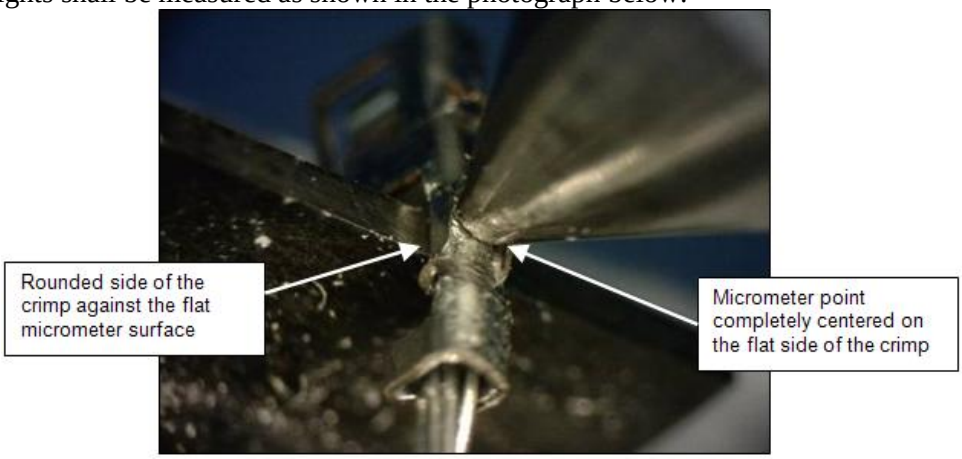
**** Examine for compliance with PASS/FAIL criteria: No broken/missed wires, voids, cracks in the contact material or other applicable defects shall be allowed.**

ATTRIBUTE DEFINITIONS

The following is a brief, simplified description of attributes.

CRIMP HEIGHT:

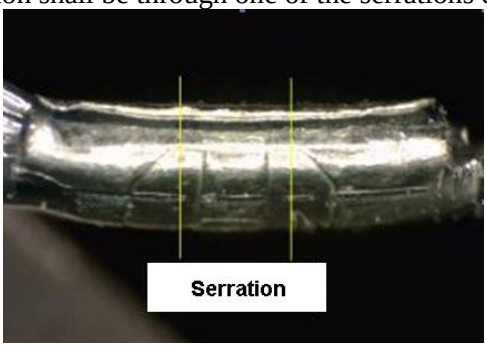
1) Crimp heights shall be measured as shown in the photograph below:



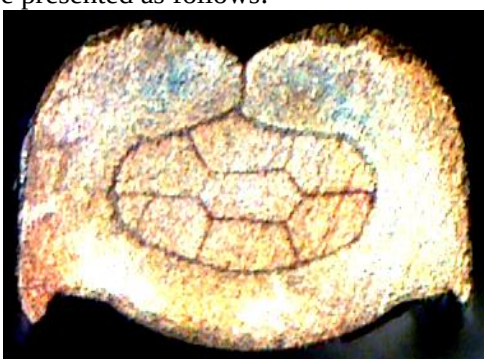
2) The crimp heights shall be measured on samples that have not been cross-sectioned. The above photograph was used to provide a clear view of the measurement point without the rest of the sample impeding the view.

CROSS-SECTION:

1) Contacts shall be cross-sectioned and polished without being potted.
2) The location of the cross-section shall be through one of the serrations designated in the below photograph.

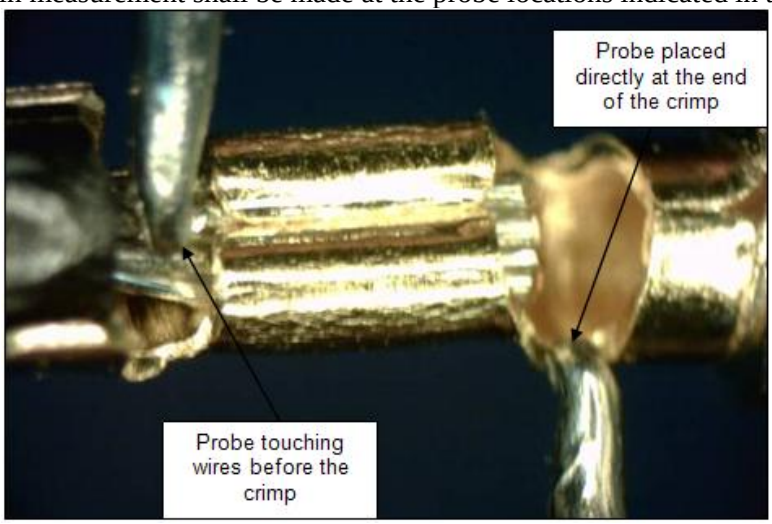


3) Polished crimp contact cross-sections shall be etched in a mild etchant to provide contrast for the microscopic examination.
4) Etched samples shall be examined under 40X magnification.
5) The final cross-section shall be presented as follows:



LOW LEVEL CONTACT RESISTANCE (LLCR):

1) The LLCR shall be measured and recorded in accordance with EIA-364-23A, *Low Level Contact Resistance Test Procedure for Electrical Connectors and Sockets*.
2) A four wire, Kelvin measurement shall be made at the probe locations indicated in the below photograph:



3) Test Conditions:
   a. Maximum Open Circuit Voltage: 20 mV
   b. Maximum Test Current: 100 mA

CRIMP PULL FORCE:

1) The test was performed in accordance with EIA-364-08B.
2) Secure contact near center and pull wire at 0°, in-line with contact.
3) The test stand speed shall be 25 ±6 mm.

EIA-364-08B defines the types of separation resulting from this test as follows:

1) Slip (pull out).
2) Conductor broken in crimp area (some or all).
3) Contact broke in crimp area (some or all).
4) Conductor broken outside crimp area.
5) Contact broken outside crimp area.

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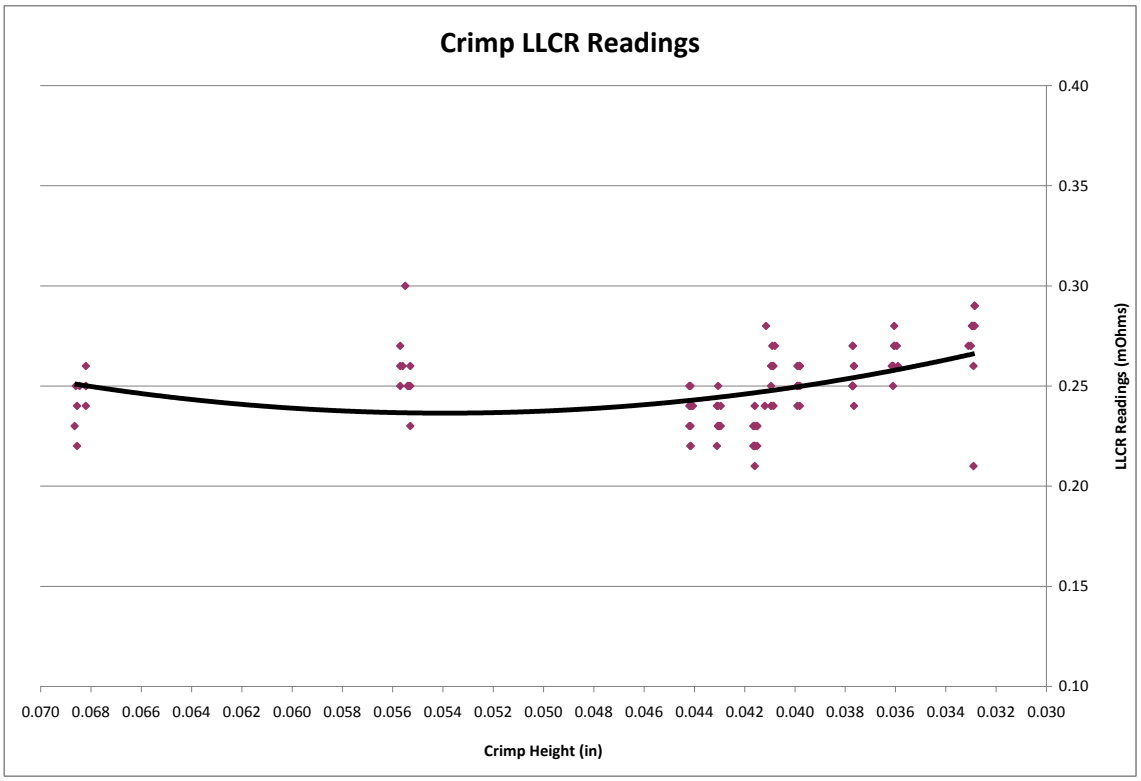
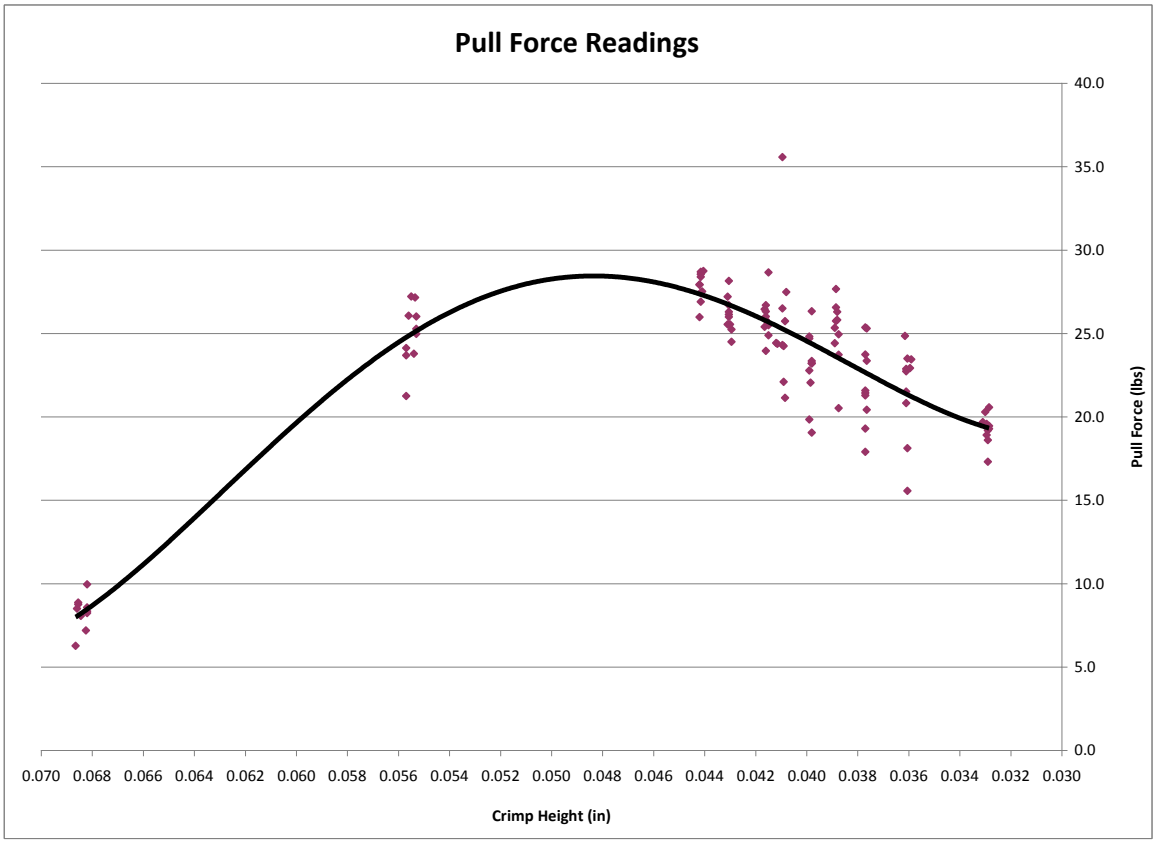
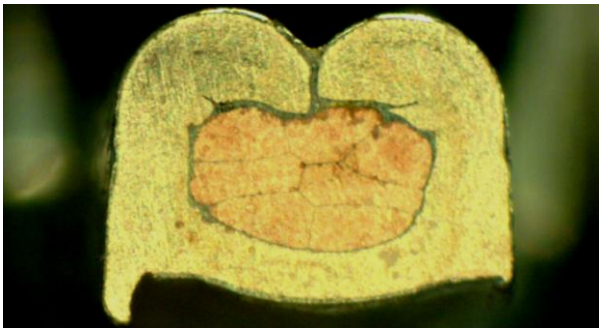
TEST RESULTS





CROSS-SECTION PHOTO:



Typical sample at nominal height

EQUIPMENT AND CALIBRATION SCHEDULES

Equipment #: MC-41
Description: Crimp Micrometer
Manufacturer: Mitutoyo
Model: 342-371
Serial #: 05020827
Accuracy: See Manual
… Last Cal: 06/10/2011, Next Cal: 06/10/2012

Equipment #: MO-01
Description: Micro-Ohmmeter
Manufacturer: Keithley
Model: 580
Serial #: 0772740
Accuracy: See Manual
… Last Cal: 08/29/2011, Next Cal: 08/29/2012

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
… Last Cal: 05/20/2011, Next Cal: 05/20/2012

Equipment #: LC-250N-02
Description: 250 Newton Load Cell
Manufacturer: Mecmesin
Model: ILC – Load Cell
Serial #: 07-0029-02
Accuracy: See Manual
… Last Cal: 1/11/2012, Next Cal: 7/11/2012