Twin Leaf Crimp Snap Connector

1. SCOPE

1.1. Content

This specification covers the performance, tests and quality requirements for Crimp Snap Twin Leaf Connector assemblies, used to provide a connection method between discrete wiring and printed circuit boards. Contacts are crimp type, wrap in design. These multi-contact connectors have .100, .125 and .156 inch centerline spacing between adjacent contacts.

1.2. Qualification

When tests are performed on the subject product line, the procedures specified in 109-Series Test Specifications shall be used. All inspections shall be performed using the applicable inspection plan and product drawing.

2. APPLICABLE DOCUMENTS

The following documents form a part of this specification to the extent specified herein. In the event of conflict between the requirements of this specification and the product drawing, the product drawing shall take precedence. In the event of conflict between the requirements of this specification and the referenced documents, this specification shall take precedence.

2.1. TE Connectivity (TE) Documents

A. 109-1: General Requirements for Test Specifications

B. 109 Series: Test Specifications as indicated in Figure 1.

C. 114-: Application Specification

D. 501- : Test Report

3. REQUIREMENTS

3.1. Design and Construction

Connectors shall be of the design, construction and physical dimensions specified on the applicable product drawing.

3.2. Ratings

A. Current: 5 amperes maximum per contact

B. Operating Temperature: -550 to 1050C

3.3. Performance and Test Description

Connectors shall be designed to meet the electrical, mechanical and environmental performance requirements specified in Figure 1.

3.4. Test Requirements and Procedures Summary

Test Description	Requirement	Procedure
Examination of Product	Meets requirements of product drawing.	Visual, dimensional and functional per applicable inspection plan.
	ELECTRICAL	
Termination Resistance, Specified Current	10 milliohms maximum initial	Measure potential drop of mated contacts at 1 ampere test current assembled in housing, see Figure 5; Test Specification 109-25, calculate resistance.
Termination Resistance, Dry Circuit	10 milliohms maximum initial.	Subject mated contacts assembled in housing to 50 mv open circuit at 100 ma maximum, see Figure 5; Test Specification 109-6-1.
Dielectric Withstanding Voltage	See Figure 3.	Test between adjacent contacts of unmated connector assemblies; and contacts to mounting hardware; Test Specification 109-29-1.
Insulation Resistance	5000 megohms minimum initial.	Test between adjacent contacts of unmated connector assembly; Test Specification 109-28-4, 500 vdc.
Current Cycling	Crimp resistance not to exceed final value.	Subject mated contacts to 50 cycles at 125% rated current for 30 minutes "ON" - 15 minutes "OFF"; Test Specification 109-51, cond B, test method 3.
Crimp Resistance	AWG / Test Current / Milliohms Init / Milliohms Final 28 / 1.0 / 3.0 / 5.0 26 / 1.0 / 2.5 / 4.0 24 / 3.0 / 2.0 / 3.3 22 / 5.0 / 1.2 / 2.0 20 / 7.5 / 0.7 / 1.2 18 / 10.0 / 0.5 / 0.8 16 / 12.5 / 0.4 / 0.7	Measure potential drop across crimped contacts between wire as it enters the wire barrel and the end of the wire barrel nearest the contact transition; see Figure 6; Test Specification 109-25.
	MECHANICAL	
Vibration	No discontinuities greater than 1 microsecond. No physical damage.	Subject mated connectors to 10-55-10 Hz traversed in 1 minute at .06 inches total excursion; 2 hours in each of 3 mutually perpendicular planes; Test Specification 109-21-1.
Physical Shock	No discontinuities greater than 1 microsecond. No physical damage.	Subject mated connector to 100 G's sawtooth in 6 milliseconds; 3 shocks in each direction applied along the 3 mutually perpendicular planes total 18 shocks; Test Specification 109-26-9.

Figure 1 (continued)

Test Description	Requirement	Procedure

Mating Force	12 ounces maximum per contact pair.		Measure force necessary to mate connector assembly from point of initial contact, incorporating free floating fixtures at a rate of 0.5 inch/minute; Test Specification 109-42, cond A, calculate force per contact pair.
Contact Retention (Crimped Contacts)	Contacts shall not dislodge from normal locking position.		Apply axial load of 8 pounds to contact lead; Test Specification 109-30.
Contact Engaging Force	10 ounces maximum per contact.		Measure force to engage using gage 1, see Figure 7; Test Specification 109-35.
Contact Separating Force	.7 ounces minimum.		Size 3 times using gage 1, see Figure 7, insert gage 2 and measure force to separate; Test Specification 109-35.
Crimp Tensile	Wire Size AWG 28 26 24 22 20 18 16	Crimp Tensile Pounds Minimum 3.0 5.0 8.0 12.0 20.0 30.0 42.0	Determine crimp tensile at a rate of 1inch/ minute; Test Specification 109-16.
Durability	No physical damage.		Mate and unmate connector assemblies with 30 microinches gold for 250 cycles with gage 1. see Figure 7; Test Specification Spec 109-27.
ENVIRONMENTAL			
Thermal Shock	No physical damage.		Subject mated connectors to 5 cycles between -55°and 105℃; Test Specification 109-22.
Humidity, Steady State	1000 megohms final, insulation resistance.		Subject unmated insulation resistance. connectors to steady state humidity at 40℃ and 90-95% RH; Test Specification 109-23, method II, cond

Figure 1 (end)

3.5. Connector Qualification and Requalification Tests and Sequences

Test or Examination	Test Group (a)		
	1	2	3
	Test Sequence (b)		
Examination of Product	1	1	1
Termination Resistance, Current			
Termination Resistance, Dry Circuit	3, 14	3, 16	
Dielectric Withstanding Voltage	5, 13	5, 15	
Insulation Resistance	4, 12	4, 14	
Crimp Resistance			2, 4
Current Cycling			3
Vibration	9	11	
Physical Shock	10	12	
Connector Mating Force	2	2	
Contact Retention	15	17	
Contact Engaging Force		6	
Contact Separating Force	8	7, 10	
Crimp Tensile			5
Durability	7	9	
Thermal Shock	6	8	
Humidity, Steady State	11	13	

NOTE

(a) See Para 4.1.A.
(b) Numbers indicate sequence in which tests are performed.

Figure 2

4. QUALITY ASSURANCE PROVISIONS

4.1. Qualification Testing

A. Sample Selection

Connector housings and contacts shall be prepared in accordance with applicable Instruction Sheets. They shall be selected at random from current production. Test samples shall consist of six connectors of the greatest number of positions of each connector type offered, three each test group 1 and test group 2. Two additional specimens shall be selected from the least number of positions offered and tested to group 2. When connectors are mated, use PC boards as illustrated in Figure 4. Thirty contacts of each style and desired wire size shall be tested to test group 3.

B. Test Sequence

Qualification inspection shall be verified by testing samples as specified in Figure 2.

C. Acceptance

1. Test results from development on pre-qualification samples will be used to determine upper and lower one-sided statistical tolerance limits for 99% reliability at 95% confidence, as follows. Let Xbar and s denote the sample average and standard deviation, respectively, of the test data. Let k denote the normal distribution one-sided tolerance factor for 95% confidence and 99% reliability. The value of k varies with sample size. Values of k are given in various tables, for example, NBS Handbook 91, Factors for One-Sided Tolerance Limits for Normal Distribution. Suitability of the normal distribution for representing the data shall be verified with normal probability plots, goodness of fit tests, etc.

   Then the upper one-sided tolerance limit for 99% reliability at 95% confidence is given by Xbar + ks. The interpretation of this tolerance limit is as follows: based on the test data, and assuming a normal distribution for the test data, we can be 95% confident that 99% of the population of values represented by the sample data will not exceed Xbar + ks. For any test parameter for which there is specified an upper requirement which is not to be exceeded, satisfactory performance of the product is achieved when the value of Xbar + ks does not exceed the requirement value.

   The lower one-sided tolerance limit for 95% confidence and 99% reliability is given by Xbar - ks. This has a similar interpretation and corresponding application to lower requirement values.

2. Failures attributed to equipment, test setup, or operator deficiencies shall not disqualify the product. When product failure occurs, corrective action shall be taken and samples resubmitted for qualification.

4.2. Requalification Testing

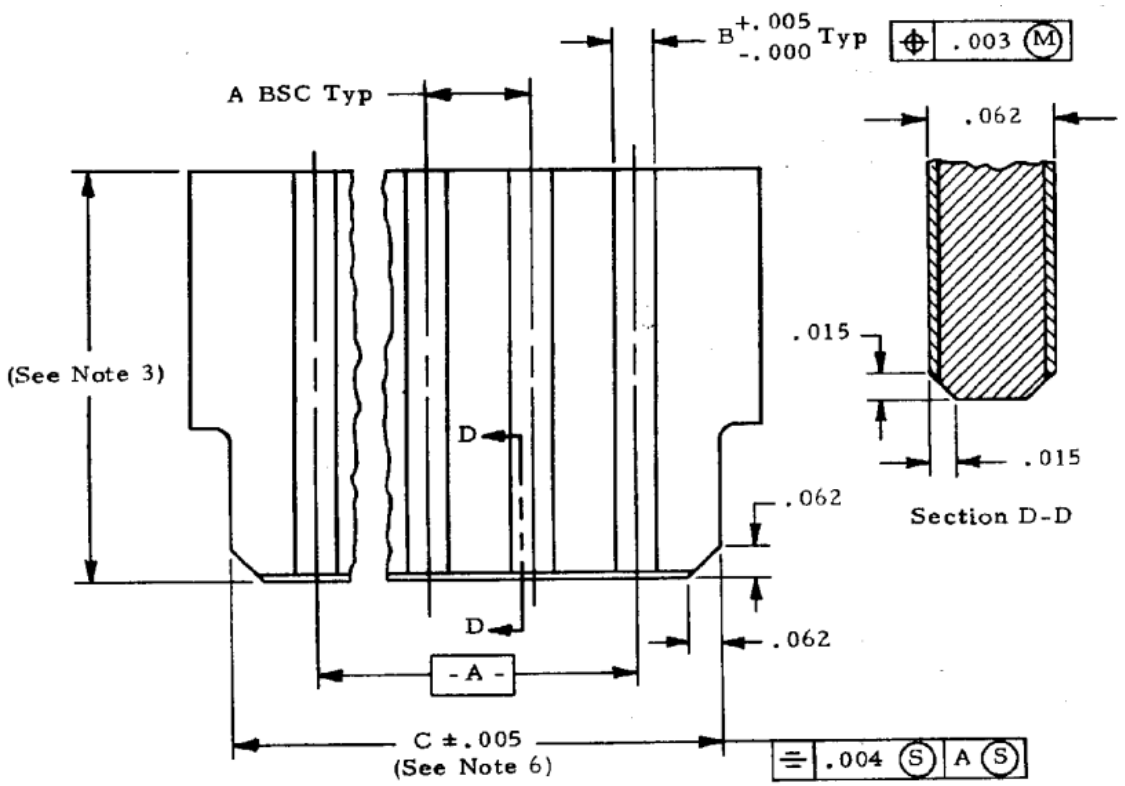
Requalification shall be established by the cognizant divisional engineering function and may consist of all or any part of the overall qualification program provided that it is conducted within the required time period.

4.3. Quality Conformance Inspection

The applicable quality inspection plan will specify the sampling acceptable quality level to be used. Dimensional and functional requirements shall be in accordance with the applicable product drawing and this specification.

Altitude feet	Test Voltage, rms		
	.100 cl	.125 cl	.156 cl
Sea Level	1000	1500	1800
50,000	400	525	675
70,000	280	375	450
5 ma maximum leakage *No breakdown or flashover*			

Figure 3



Connector Contact Spacing	A BSC	B
.100	.100	.052
.125	.125	.078
.156	.156	.094

NOTES

1. *Dimensions are in inches.*
2. *Unless otherwise specified, tolerance is +/-.005.*
3. *The test card shall extend 4.00 +/-.02 from the receptacle after insertion.*
4. *Number of contacts shall be the same as on the corresponding printed wiring board.*
5. *Printed circuit test board shall be 2 ounces copper and gold over nickel plated per MIL-STD-275.*
6. *This dimension shall be the minimum connector card slot length minus .008.*
7. *Conductor configuration optional beyond card slot depth.*
8. *Printed wiring shall be identical on both sides.*

Figure 4

Termination Resistance Test Circuit

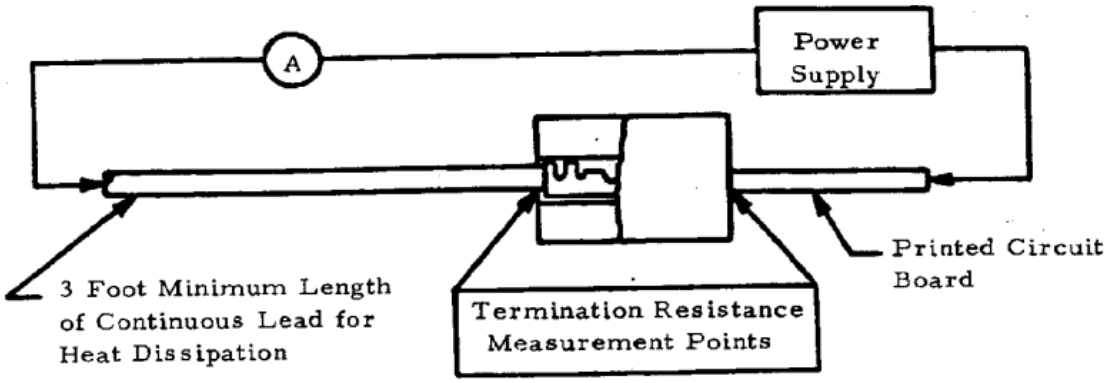


Figure 5

Termination Resistance Test Circuit

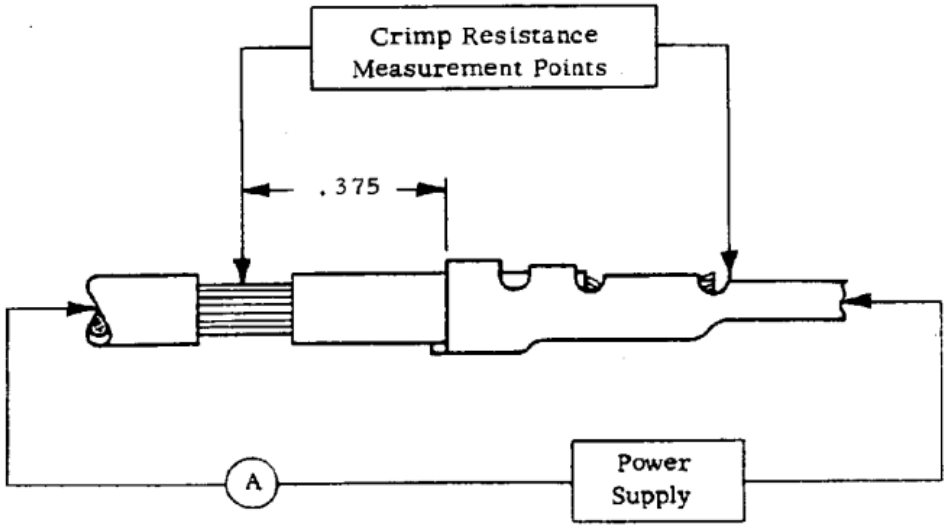
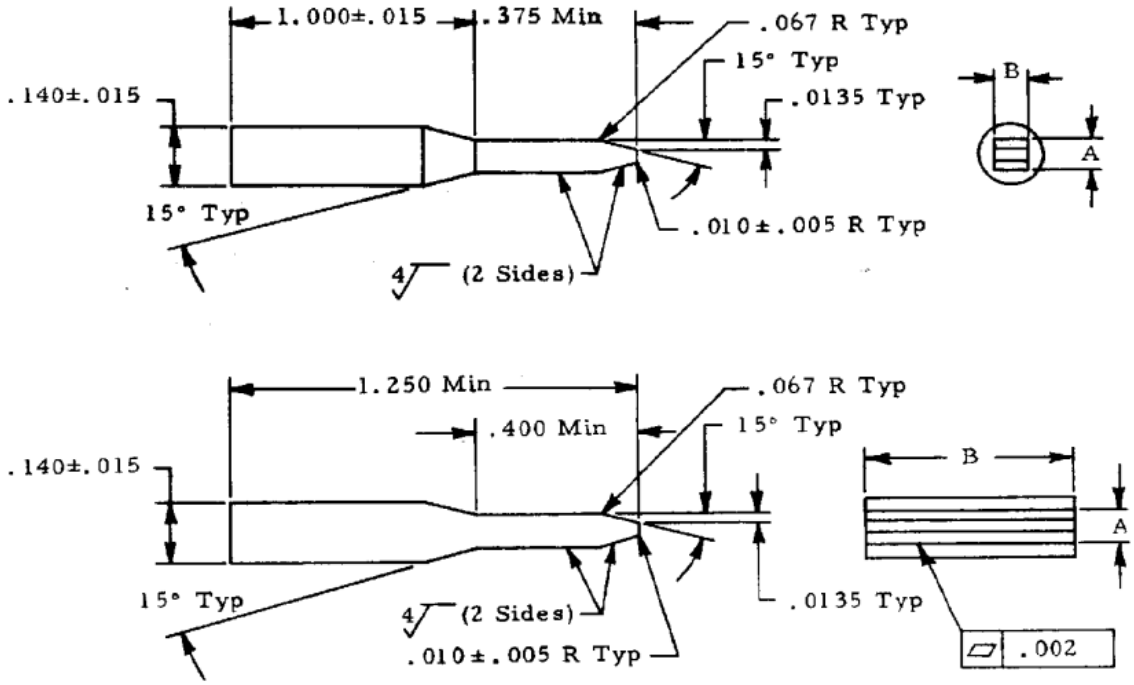


Figure 6

Crimp Resistance



Gage Number	A	B
1	.0700	(a)
2	.0540	(a)

NOTES

1. *Tolerances: +/-.005 unless otherwise indicated.*
2. *Material: Tool steel, hardened to Rockwell C50-55.*
3. *Gage surface shall be clean of contaminants or lubricants.*

Figure 7

Printed Board Simulator