



1. INTRODUCTION

2.1 Purpose

Testing was performed on Crown Edge Connector system to determine its conformance to requirements of Product Spec 108-2403, Revision A.

2.2 Scope

This report covers the electrical, mechanical, and environmental performance of the Crown Edge Connector system. Testing was performed at the Engineering Assurance Product Testing Laboratory between 09-November-2009 and 22-December-2009.

2.3 Conclusion

The Crown Edge Connector system listed in paragraph 1.4, conformed to the electrical, mechanical, and environmental performance requirements of Product Specification 108-2403.

2.4 Test Specimens

Test specimens were representative of normal production lots. Specimens identified with the following part numbers were used for test:

Test Group	Quantity	Part Number	Description
#1~7	35(5 ea)	6651290-2	Crown Edge Socket connector, 30 Au Plating
	35(5 ea)	60-1042609-2 Rev A	PCB Test Board
	35(5 ea)	60-1042610-1 Rev A	Card Edge Test Board

* Notes: Group 2 was re-tested with Crown Edge Connector 1766200-1 at the TE Shanghai Testing Laboratory between 21Sep2016 and 27Oct2016.

* Notes: An additional T-rise comparison test between Crown Edge Connector 1766200-1 and Narrow Crown Edge 2204754-1 was performed at TE Shanghai Testing Laboratory between 10DEC2016 and 30DEC2016. The result shows the Narrow Crown Edge 2204754-1 has equal performance to original crown edge, so the P/N 2204754-1 was added to this report.

2.5 Environmental Conditions

Unless otherwise stated, the following environmental conditions prevailed during testing:
 Temperature: 15°C to 35°C Relative Humidity 25% to 75%

2.6 Qualification Test Sequence

Test or Examination	Test Group						
	1	2	3	4	5	6	7
	Test Sequence (a)						
Initial examination of product	1	1	1	1	1	1	1
LLCR	2,4,6,8	2,4,6,8,10,12,14	2,5,7,9	2,4,6,8,10	2,4,6,8,10		2,6,8,10

Withstanding voltage		3,13					
Temperature rise vs current							4,9
Random vibration			8				7
Mechanical shock			6				
Durability		5					
Durability, preconditioning	3		3	3	3		3
Mating force						2	
Unmating force						3	
Reseating	7	11		9	9		
Thermal shock		7					
Humidity/temperature cycling		9					
Temperature life, 1000 hours	5						
Temperature life, 500 hours							5
Temperature life, preconditioning			4	5	5		
Mixed flowing gas, unmated				7			
Mixed flowing gas, mated					7		
Final examination of product	9	15	10	11	11	4	11

(a) Numbers indicate sequence in which tests are performed

2. SUMMARY OF TESTING

2.1 Initial examination– All Test Groups

All specimens submitted for testing were representative of normal production lots. A Certificate of Conformance was issued by Product Assurance. Where specified, specimens were visually examined and no evidence of physical damage detrimental to product performance was observed.

2.2 Low Level Contact Resistance

Test Group	Test Condition	LLCR	Spec	Jud.	
#1	Signal	Initial	4.63mΩ Max.	OK	
		Final	5.18mΩ Max.	OK	
	Power	Initial	0.66mΩ Max.	1 mΩ max initial.	OK
		Final	0.88mΩ Max.	1.5 mΩ max final.	OK
#2	Signal	Initial	4.50mΩ Max.	OK	
		Final	4.29mΩ Max.	OK	
	Power	Initial	0.74mΩ Max.	Signal contact 15 mΩ max initial.	OK
		Final	0.87mΩ Max.	20 mΩ max final.	OK
#3	Signal	Initial	4.77mΩ Max.	OK	
		Final	5.08mΩ Max.	OK	
	Power	Initial	0.79mΩ Max.	OK	
		Final	0.83mΩ Max.	OK	

#4	Signal	Initial	4.49mΩ Max.	OK
		Final	5.75mΩ Max.	OK
	Power	Initial	0.65mΩ Max.	OK
		Final	0.98mΩ Max.	OK
#5	Signal	Initial	4.63mΩ Max.	OK
		Final	6.18mΩ Max.	OK
	Power	Initial	0.64mΩ Max.	OK
		Final	0.95mΩ Max.	OK
#7	Signal	Initial	4.63mΩ Max.	OK
		Final	4.92mΩ Max.	OK
	Power	Initial	0.78mΩ Max.	OK
		Final	1.19mΩ Max.	OK

2.3 Withstanding voltage– Test Group 2

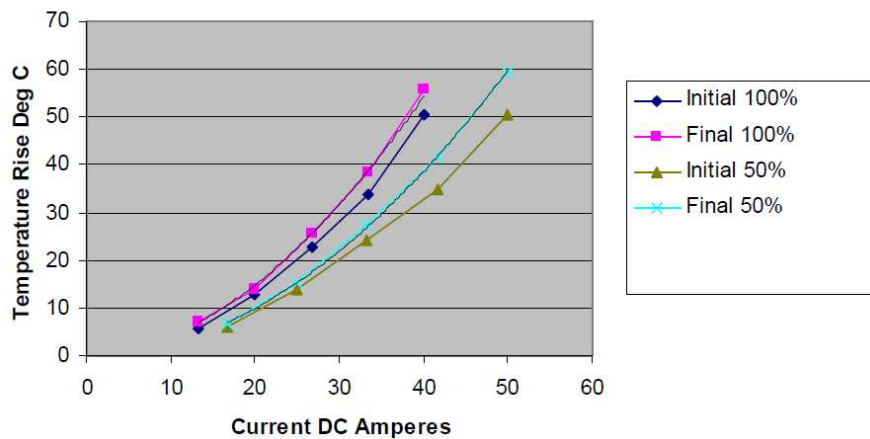
No dielectric breakdown or flashover occurred.

2.4 Temperature rise vs current – Test Group 7

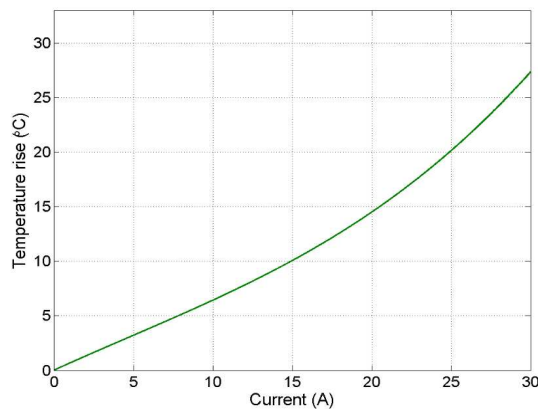
Test result show as below figure. A 50% loading is defined as two contacts on one side of the connector being energized and a 100% loading is defined as two contacts on both sides of the connector being energized.

The calculated current to produce a 30°C temperature rise is 35A with 50% loading and 29A with 100% loading.

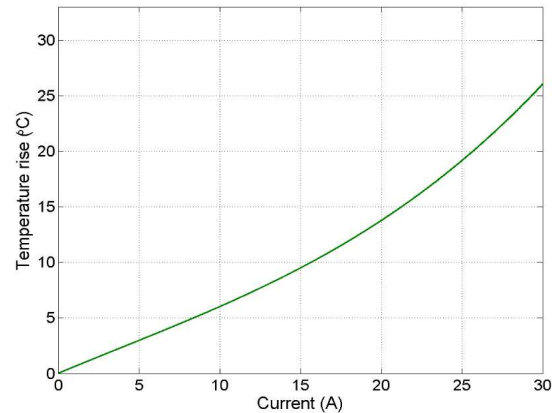
**Temperature Rise Vs Current
Crown Edge Specimen**



* Notes: T-rise comparison test result for 1766200-1 and 2204754-1 show as below with 2x2 power contact energized at the same time, and PCB used in this test are 2204789-1 and 2204790-1.



Crown Edge Connector 1766200-1



Narrow Crown Edge 2204754-1

2.5 Random vibration – Test Group 3, 7

No discontinuities greater than 1 microsecond were detected during vibration for Test Group 3; Test Group 7 was energized to produce an 18 °C temperature rise. Following vibration, no cracks, breaks, or loose parts on the specimens were visible.

2.6 Mechanical shock – Test Group 3

No discontinuities greater than 1 microsecond were detected during mechanical shock. Following mechanical shock testing, no cracks, breaks, or loose parts on the specimens were visible.

2.7 Durability – Test Group 2

No physical damage occurred to the specimens as a result of mating and unmating the specimens 25 times.

2.8 Durability, preconditioning – Test Group 1, 3, 4, 5, 7

No physical damage occurred to the specimens as a result of mating and unmating the specimens 5 times

2.9 Mating force and Unmating force – Test Group 6

Mating force measurements of all specimens were less than 52.23N, and Unmating force measurements of all specimens were more than 30N.

2.10 Reseating – Test Group 1, 2, 4, 5

No physical damage occurred to the specimens as a result of reseating the specimens 1 time.

2.11 Thermal shock – Test Group 2

No evidence of physical damage was visible as a result of exposure to thermal shock.

2.12 Humidity-temperature cycling – Test Group 2

No evidence of physical damage was visible as a result of exposure to Humidity-temperature cycling

2.13 Temperature life, 1000 hours – Test Group 1

No evidence of physical damage was visible as a result of exposure to temperature life.

2.14 Temperature life, 500 hours – Test Group 7

No evidence of physical damage was visible as a result of exposure to temperature life.

2.15 Temperature life, preconditioning – Test Group 3, 4, 5

No evidence of physical damage was visible as a result of exposure to temperature life.

2.16 Mixed flowing gas, Mated/Unmated – Test Group 4, 5

No evidence of physical damage was visible as a result of the Class IIA MFG exposure

2.17 Final examination of product – All Test Groups

Specimens were visually examined and no evidence of physical damage detrimental to product performance was observed.

3. TEST REQUIREMENTS AND PROCEDURES SUMMARY

Test Description	Requirement	Procedure
Initial examination of product.	Meets requirements of product drawing and Application.	EIA-364-18. Visual and dimensional (C of C) inspection per product drawing.
Final examination of product.	Meets visual requirements.	EIA-364-18. Visual inspection.
ELECTRICAL		
Low Level Contact Resistance (LLCR).	Power contact: 1 milliohms maximum initial. 1.5 milliohms maximum final. Signal contact: 15 milliohms maximum initial. 20 milliohms maximum final.	EIA-364-23. Subject specimens to 100 milliamperes maximum and 20 millivolts maximum open circuit voltage.
Withstanding voltage.	One minute hold with no breakdown or flashover.	EIA-364-20, Condition I. 1000 volts AC at sea level. Test between adjacent contacts of mated specimens.
Temperature rise vs current, power contacts.	30°C maximum temperature rise.	EIA-364-70, Method 2. Stabilize at a single current level until 3 readings at 5 minute intervals are within 1°C. Test with single energized contact and with 2 and 4 adjacent power contacts energized. Record data over a range 20 to 50°C temperature rise. Document 30°C temperature rise current.
MECHANICAL		

Test Description	Requirement	Procedure
Random vibration.	No discontinuities of 1 microsecond or longer duration. See Note.	EIA-364-28, Test Condition V, Condition Letter C. Subject mated specimens to 9.26 G's rms between 50 to 2000 Hz. 120 minutes in each of 3 mutually perpendicular planes.
Mechanical shock.	No discontinuities of 1 microsecond or longer duration. See Note.	EIA-364-27, Method A. Subject mated specimens to 50 G's half-sine shock pulses of 11 milliseconds duration. Three shocks in each direction applied along 3 mutually perpendicular planes, 18 total shocks. See Figure 4.
Durability.	See Note.	EIA-364-9. Mate and unmate specimens with retention features activated for 25 cycles at a maximum rate of 500 cycles per hour.
Durability, preconditioning.	See Note.	EIA-364-9. Mate and unmate specimens for 5 cycles at a maximum rate of 500 cycles per hour.
Mating force.	27N maximum for one pair power contact	EIA-364-13. Measure force necessary to mate specimens at a maximum rate of 12.7 mm per minute.
Unmating force.	13.5N minimum for one pair power contact	EIA-364-13. Measure force necessary to unmate specimens at a maximum rate of 12.7 mm per minute.
Reseating.	See Note.	Unmate and mate specimen 1 time.
ENVIRONMENTAL		
Thermal shock.	See Note.	EIA-364-32, Test Condition II. Subject mated specimens to 25 cycles between -65 and 105°C with 30 minute dwells at temperature extremes and 1 minute transition between temperatures.
Humidity/temperature cycling.	See Note.	EIA-364-31, Method III. Subject mated specimens to 10 cycles (10 days) between 25 and 65°C at 80 to 100% RH.
Temperature life, 1000 hours.	See Note.	EIA-364-17, Method A, Test Condition 4, Test Time Condition D. Subject mated specimens to 105°C for 1000 hours.
Temperature life, 500 hours.	See Note.	EIA-364-17, Method A, Test Condition 4, Test Time Condition C. Subject mated specimens to 105°C for 500 hours.

Test Description	Requirement	Procedure
Temperature life, preconditioning.	See Note.	EIA-364-17, Method A. Subject mated specimens to 90°C for 360 hours.
Mixed flowing gas, unmated.	See Note.	EIA-364-65, Class IIA (4 gas). Subject specimens to environmental Class IIA for 14 days (7 days unmated, LLCR, followed by 7 days mated).
Mixed flowing gas, mated.	See Note.	EIA-364-65, Class IIA (4 gas). Subject specimens to environmental Class IIA for 14 days (7 days mated, LLCR, followed by 7 days mated).

NOTE

Shall meet visual requirements, show no physical damage, and meet requirements of additional tests as specified in the Product Qualification and Requalification Test Sequence