CONTACT ELECTRICAL CHARACTERISTICS

TIGER EYE CONTACT TESTING

A. Gas Tight

1. Purpose - To evaluate the integrity of the contact interface by assessment of the gas tight characteristics of the contacting surfaces. The gas tight characteristic is the ability of contacting surfaces to prevent harsh environment from penetrating between them and forming oxides and/or films, which will degrade electrical performance.

2. Requirements

a. The initial low-level circuit resistance shall not exceed 15.0 milliohms.
b. The Final low-level circuit resistance shall not exceed 20.0 milliohms.

3. Results - Low Level Circuit Resistance (Milliohms)

Connector ID#		Avg.	Max.	Min	Avg Chg	Max Chg
1-1,	Initial	10.3	11.5	9.4	----------	----------
	Final	9.9	10.2	9.3	-0.4	+0.2
1-2,	Initial	10.0	11.2	9.2	----------	----------
	Final	9.9	10.6	9.3	-0.1	+0.7

B. Vibration / Shock Series (LLCR)

1. Mating & Unmating Force

a. Purpose - To determine the mechanical forces required to mate and unmate the connectors with all guiding and applicable hardware assembled to the test samples.

b. Results (2X50)

Connector ID#	Mating Force pounds (kg)	Unmating Force pounds (kg)
2-1	15.5 (7.03)	10.5 (4.76)
2-2	15.0 (6.80)	10.0 (4.53)

2. Low Level Circuit Resistance

a. Purpose - To evaluate contact resistance characteristics of the contact systems under conditions where applied voltages and currents do not alter the physical contact interface and will detect oxides and films which degrade electrical stability. It is also sensitive to and may detect the presence of fretting corrosion induced by mechanical or thermal environments as well as any significant loss of pressure.

b. Requirements

The initial low-level circuit resistance shall not exceed 15.0 milliohms.

c. Results - Low Level Circuit Resistance (Milliohms)

Connector ID#	Avg	Max	Min	Std. Dev
2-1	9.1	10.2	6.2	1.0
2-2	9.8	11.0	8.6	0.6

3. Durability

a. Purpose - To determine the effects of subjecting the connector to a predetermined number of mating and unmating cycles, simulating the expected mechanical life of the connector system.

b. Test Conditions

i. Number of cycles : 25 per interval, 100 total (.000010 Gold Plating)
ii. Rate : 500 cycles per hour

c. Requirements

i. The low level circuit resistance shall not exceed 20.0 milliohms, nor shall there be any change in excess of 5.0 milliohms.
ii. The force to mate and unmate the connectors shall be measured and recorded.
iii. There shall be no evidence of physical damage to the test samples so tested.

d. Results - Low Level Circuit Resistance (Milliohms)

Connector ID#	Avg	Max	Min	Avg Chg		Max Change	Std. Dev
2-1	8.5	10.0	6.5	-0.6	+0.3		

Connector ID#	Mating Force lbs (kg)	Unmating Force lbs (kg)
2-1	13.0 (5.90)	10.0 (4.53)

4. Vibration, Sinusoidal

a. Purpose - To evaluate the test samples to determine if fretting corrosion occurs due to mechanical motion and to evaluate the integrity of the test samples in a severe mechanical environment.

b. Requirements

i. There shall be no evidence of physical damage to the test samples so tested.
ii. The low level circuit resistance shall not exceed 20.0 milliohms.

c. Results - Low Level Circuit Resistance (Milliohms)

Connector ID#	Avg	Max	Min	Avg Chg		Max Change
2-1	8.3	9.5	6.1	-0.8	+0.4	

2-2	8.8	10.5	7.8	-0.1	+0.2

There was no evidence of physical damage to the test samples as tested.

5. Mechanical Shock

a. Purpose - To determine the mechanical and electrical integrity of the connector for use with electronic equipment subjected to shocks such as those expected from handling, transportation, etc...

b. Requirements

i. There shall be no evidence of physical damage to the test samples so tested.
ii. The low level circuit resistance shall not exceed 20.0 milliohms.

c. Results - Low Level Circuit Resistance (Milliohms)

Connector ID#	Avg	Max	Min	Avg Chg	Max Change
2-1	8.4	9.3	6.3	-0.7	+0.8
2-2	8.9	10.2	8.2	-0.9	+0.4

There was no evidence of physical damage to the test samples as tested.

C. Vibration / Shock Testing (Contact Interruptions)

1. Engagement and Separation Force

a. Purpose - To determine the magnitude of mechanical forces required to mate and unmate the specified test pin to and from an individual socket contact.

b. Results

	Engagement force (oz)			Separation Force (oz)		
Connector ID#	Avg	Max	Min	Avg	Max	Min
3-1	10.7	12.7	8.8	3.2	4.0	2.2
3-2	13.4	14.6	12.5	2.9	4.2	2.1

2. Mating & Unmating Force

a. Purpose - To determine the mechanical forces required to mate and unmate the connectors with all guiding and applicable hardware assembled to the test samples.

b. Results

Connector ID#	Mating Force (lbs)	Unmating Force (lbs)
3-1	13.5	8.5
3-2	14.5	10.0

3. Durability

a. Purpose - To determine the effects of subjecting the connector to a predetermined number of mating and unmating cycles, simulating the expected mechanical life of the connector system.

b. Test Conditions

i. Number of cycles : 25 per interval, 100 total (.000010 Gold Plating)
ii. Rate : 500 cycles per hour

c. Requirements

i. The force to mate and unmate the connectors shall be measured and recorded.
ii. There shall be no evidence of physical damage to the test samples so tested.

d. Results

Connector ID#	Mating Force lbs (kg)	Unmating Force lbs (kg)
3-1	11.0 (4.99)	7.0 (3.18)

4. Vibration, Sinusoidal

a. Purpose - To determine the effects of vibration within the predominant vibration frequency range and magnitudes that may be encountered during the life of the product being evaluated.

b. Requirements

i. There shall be no evidence of physical damage to the test samples so tested.
ii. There shall be no contact interruption greater than 1.0 microsecond.

c. Results -

i. There was no evidence of physical damage to the test samples as tested.
ii. There was no interruption greater than 1.0 microsecond.

5. Mechanical Shock

a. Purpose - To determine the mechanical and electrical integrity of the connector for use with electronic equipment subjected to shocks such as those expected from handling, transportation, etc...

b. Requirements

i. There shall be no evidence of physical damage to the test samples so tested.
ii. There shall be no contact interruption greater than 1.0 microsecond.

c. Results

i. There was no evidence of physical damage to the test samples as tested.
ii. There was no interruption greater than 1.0 microsecond.

D. Thermal Shock / Cyclic Humidity (IR & DWV)

1. Thermal Shock

a. Purpose - To determine the resistance of a given connector to exposure at extremes of high and low temperatures and the shock of alternate exposures to these extremes, stimulating the worst probable conditions of storage, transportation and application.

b. Requirements

i. There shall be no evidence of physical damage to the test samples so tested.
ii. The low level circuit resistance shall not exceed 20.0 milliohms.

c. Results - Low Level Circuit Resistance (Milliohms)

Connector ID#		Avg	Max	Min	Avg Chg	Max Change
5,	Initial	10.3	12.5	7.9	----------	----------
	After Dur	9.0	10.5	5.0	-1.3	+1.2
	Final	9.5	11.5	8.7	-0.8	+1.5
6,	Initial	8.7	10.3	7.3	----------	----------
	After Dur	9.2	10.2	6.2	+0.5	+2.1
	Final	9.4	10.5	8.4	+0.7	+2.2
7,	Initial	9.4	10.9	7.2	----------	----------
	Final	9.7	10.7	9.0	+0.3	+1.9
8,	Initial	9.5	10.5	6.4	----------	----------
	Final	9.7	10.5	7.8	+0.2	+2.2

2. Humidity (Thermal Cycling)

a. Purpose - To evaluate the impact on electrical stability of the contact system when exposed to any environment which may generate thermal / moisture type failure mechanisms such as, fretting corrosion and oxidation.

b. Requirements

i. There shall be no evidence of physical damage to the test samples so tested.
ii. The low level circuit resistance shall not exceed 20.0 milliohms.

c. Results - Low Level Circuit Resistance (Milliohms)

Connector ID#	Avg	Max	Min	Avg Chg	Max Change
4-1, uncycled	9.5	10.4	8.8	-0.8	+1.2
4-2, uncycled	10.1	11.9	8.0	1.4	+4.2
4-3, cycled	9.4	9.8	8.7	+0.6	+1.8
4-4, cycled	9.3	9.8	8.9	-0.2	+2.6

There was no evidence of physical damage to the test samples as tested.

3. Insulation Resistance (IR)

To determine the resistance of insulation material to leakage of current through or on the surface of these materials when a DC potential is applied.

a. Requirements

When the specified test voltage is applied (500 VDC), the insulation resistance shall not be less than 5000 megohms.

b. Results

The insulation resistance exceeded 50,000 megohms.

4. Dielectric Withstanding Voltage (SEA LEVEL)

a. Purpose

To determine if the sockets can operate at its rated voltage and withstand momentary overpotentials due to switching, surges and other similar phenomenon.

b. Requirements

When a 1000 VAC test voltage is applied, there shall be no evidence of breakdown, arcing, etc...

c. Results

All test samples as tested met the requirements as specified.

5. Thermal Shock

a. Purpose - To determine the resistance of a given connector to exposure at extremes of high and low temperatures and the shock of alternate exposures to these extremes, stimulating the worst probable conditions of storage, transportation and application.

b. Requirements

i. There shall be no evidence of physical damage to the test samples so tested.
ii. When a 1000 VAC test voltage is applied, there shall be no evidence of breakdown, arcing, etc...

c. Results

All test samples as tested met the requirements as specified.

6. Humidity (Thermal Cycling)

a. Purpose - To evaluate the impact on electrical stability of the contact system when exposed to any environment which may generate thermal / moisture type failure mechanisms such as, fretting corrosion and oxidation.

b. Requirements

i. There shall be no evidence of physical damage to the test samples so tested.
ii. When the specified test voltage is applied (500VDC), the insulation resistance shall exceed 1000 megohms.

c. Results

i. There was no evidence of physical damage to the connectors as tested.
ii. The insulation resistance exceeded 50,000 megohms.

7. Capacitance

a. Purpose - To determine the capacitance characteristics between contacts and/or other metallic components assembled to their housings.

b. Requirements

The capacitance shall not exceed 2.0 pF at the specified frequency.

c. Results

The capacitance was less than 0.3 pF.

8. Thermal Relaxation

a. Purpose - Contacts in their operating mode are normally subjected to mechanical stresses and exposure to operational temperatures. The operational temperatures are generated from adjacent power sources and/or components as well as current flowing through the connector system. Contact material under such conditions will tend to relax which results in a permanent loss of normal force. Contingent on the magnitude of this relaxation with its resultant loss of normal force, potentially unstable electrical condition may be created. All contact material exhibits some degree of relaxation.

b. Requirements

The low level circuit resistance shall not exceed 20.0 milliohms.

c. Results - Low Level Circuit Resistance (Milliohms)

Connector ID#		Avg	Max	Min	Avg Chg	Max Chg
6-1,	Initial	10.2	11.6	8.4	----------	----------
	After Thermal	9.8	10.7	7.3	-0.4	+1.2
	After Gas Tight	9.6	10.4	8.8	-0.6	+1.2
10,	Initial	9.5	10.7	7.5	----------	----------
	After Thermal	9.3	10.2	5.6	-0.2	+1.8
	After Gas Tight	9.1	9.5	8.6	-0.4	+1.4

9. Normal Force

a. Purpose - Normal force is one of the basic attributes of a contact system. It is a direct indication of contact pressure as well as contact integrity. The magnitude of said force can establish the gas tight condition between contacting surfaces. A gas tight interface prevents harsh environments and oxide or film growth from between surfaces, which may cause degradation of electrical stability. I will also influence fretting motion wear.

b. Requirements

The force/deflection characteristics shall be plotted.

c. Results

i. Spring rate of the contact system tested was 23.5 to 24.5 grams/0.001 deflection.
ii. The initial contact gaps as measured ranged between 0.010 to 0.011 inches. The projected normal force is 106 to 123 grams.