1.0 Objective

This specification defines the performance, test, quality and reliability requirements of the Minitek Receptacle product.

2.0 Scope

This specification is applicable to the termination characteristics of the Minitek Receptacle family of products when mated with FCI Minitek™ headers or other 0.51mm pin compatibles headers, 2mm centerline.
This product provides board to board in vertical/horizontal, single row/double row, SMT/TMT configurations.

3.0 Ratings

3.1 Operating Voltage Rating = 200 Volts

3.2 Operating Current Rating = 2A

3.3 Operating Temperature Range = -55°C to 125°C (1)

Note 1: includes the terminal temperature rise when powered

4.0 Applicable Documents

4.1 FCI Specifications

4.1.1 Engineering drawings

4.1.2 Process drawings

4.1.3 Application specification(s)

4.1.4 Material specification(s)

List all referenced ELX division documents including the test and procedure specifications referenced in the selected 6.0, 7.0, and 8.0 paragraphs

4.2 Industry or Trade Association standards

List any applicable specifications, such as Telcordia Technologies, USB, etc.

4.3 National or International Standards

List applicable specifications that are referenced in the specification e.g.:

4.3.1 Flammability: UL94V-0 or similar applicable specification

4.3.2 EIA 364: Electrical Connector/Socket Test Procedures Including Environmental Classifications.

4.3.3 IEC 60512: Connectors for Electronic Equipment – Tests and Measurement

4.4 FCI Laboratory Reports - Supporting Data

List lab report numbers that contain the supporting qualification test data

4.5 Safety Agency Approvals

List the UL, CSA, TUV other product safety agency certification file numbers.

5.0 Requirements

5.1 Qualification

Connectors furnished under this specification shall be capable of meeting the qualification test requirements specified herein.

5.2 Material

The material for each component shall be as specified herein or equivalent.

5.2.1 Housing : High temperature Glass-filled polymer with a flame retardant rating of UL-94-V0

5.2.2 Terminal : Copper Alloy

Refer to GS-01-029 section 5.5 for additional material content recommendations

5.3 Finish

The finish for applicable components shall be as specified herein or equivalent.

5.3.1 Solder tails: 2µm min. pure matte Tin over 1.27µm nickel MIN under plating.

5.3.2 Contact areas : defined on the product drawings

- 0.76µm Gold over 1.27µm nickel MIN under plating
- 0.38µm Gold over 1.27µm nickel MIN under plating
- 0.20µm Gold over 1.27µm nickel MIN under plating
- 2µm min full Tin over 1.27µm nickel MIN under plating

5.3.3 All other areas will be plated with 1.27µm min of nickel.

Refer to GS-01-029 section 5.5 for additional finish content recommendations

5.4 Design and Construction

Connectors shall be of the design, construction, and physical dimensions specified on the applicable product drawing. There shall be no cracks, burrs, or other physical defects that may impair performance.

Include any additional product information that would provide the reader with a better understanding of the design, construction, and intended use or application of the product. Refer to GS-01-029 section 5.5 for additional information regarding design and construction content

6.0 Electrical Characteristics

6.1 Contact Resistance, Low Level (LLCR)

The low level contact resistance shall not exceed 15 milliohms initially. The low level contact resistance shall also not exceed 20 milliohms in resistance after any treatment and/or environmental exposure. Measurements shall be in accordance with EIA 364-23.

The following details shall apply:

a. Method of Connection - Attach current and voltage leads as shown in Figure 1.

b. Test Voltage - 20 milli-volts DC max open circuit.

c. Test Current - Not to exceed 100 milli-amperes.

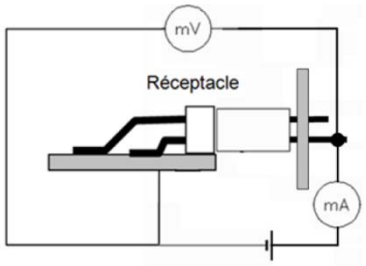

Figure 1

6.2 Insulation Resistance

The insulation resistance of unmated connectors shall not be less than 1000 Mohms initially and after environmental exposure.

Measurements shall be in accordance with EIA 364-21.

The following details shall apply:

a. Test Voltage - 500 volts DC.

b. Electrification Time - 2 minutes, unless otherwise specified.

c. Points of Measurement - Between adjacent contacts *(and between contacts and other conductive surfaces, if applicable)*.

6.3 Dielectric Withstanding Voltage

There shall be no evidence of arc-over, insulation breakdown, or excessive leakage current >1mA when unmated connectors are tested in accordance with EIA 364-20.

The following details shall apply:

a. Test Voltage - 650 volts (AC RMS, 60Hz).

b. Test Duration - 60 seconds.

c. Test Condition - 1 (760 Torr - sea level).

d. Points of Measurement - Between adjacent contacts *(and between contacts and other conductive surfaces, if applicable)*.

6.4 Current Rating

The temperature rise above ambient shall not exceed 30 deg C at any point in the system when all contacts are powered at 1A or one contact is powered at 2A.

The following details shall apply:

a. Ambient Conditions – Still air at 25°C.

b. Test configuration *(specify wire gage, test board requirements, thermocouple placement, sample orientation, etc.)*

c. Reference - EIA 364-70

7.0 Mechanical Characteristics

7.1 Mating/Unmating Force

The force to mate a receptacle connector and compatible header shall not exceed 1.8N per contact. The unmating force shall not be less than 0.2N per contact.

If total force per connector is to be reported, change wording accordingly and/or place in table form below for various connector sizes

The following details shall apply:

a. Cross Head Speed - 25 mm per minute.

b. Utilize free floating fixtures.

c. Reference – EIA 364-13.

TABLE OF TOTAL MATING/UNMATING FORCE, IF APPLICABLE

7.2 Durability

The connector pairs shall be capable of withstanding 100 mating/unmating cycles. (Add table of total durability cycles for various applications, if applicable).

When used for pre-conditioning treatment, 50 mating/unmating cycles shall be applied prior to mechanical/environmental exposure and 50 mating/unmating cycles shall be applied after mechanical/environmental exposure. Reference EIA-364-09.

Plating options	Durability Cycles
0.76µm Gold	100
0.38µm Gold	50
0.20µm Gold	30

8.0 Environmental Conditions

After exposure to the following environmental conditions in accordance with the specified test procedure and/or details, the product shall show no physical damage and shall meet the electrical and mechanical requirements per paragraphs 6.0 and 7.0 as specified in the Table 1 test sequences. Unless specified otherwise, assemblies shall be mated during exposure.

Use recommended details or select others as appropriate

8.1 Thermal Shock –EIA 364-32.

a. Number of Cycles – 5

b. Temperature Range - Between -55°C and +125°C

c. Time at Each Temperature - 30 minutes

d. Transfer Time - 5 minutes, maximum

8.2 Humidity –EIA 364-31 method II (steady state)

a. Relative Humidity - 90% (for cyclic humidity, specify for temperature ramps, if applicable, and temperature dwells)

b. Temperature – 40°C

c. Duration – 96h (hours, days, # of cycles, etc.)

d. Omit step 7a (cold shock) & 7b (vibration) where applicable

8.3 High Temperature Life – EIA 364-17.

a. Test Temperature – 125 C°

b. Test Duration – 250h

Refer to GS-01-029 section 5.8 for assistance in selecting appropriate temperature and duration

8.4 Mixed Flowing Gas corrosion (MFG) – EIA 364-65

a. Class - IIA

b. Duration - 20 days

c. Receptacles only exposed unmated, remated with headers no exposed

Unmated for 2/3 the duration (13 days) and mated the remaining 1/3 duration (7days)

Select class and duration as appropriate for the expected operating environment. Refer to the industry application/standard, customer specification, or GS-03-004.

8.5 Salt Spray – EIA-364-26

a. Test Condition - B (refer to specified test method for condition)

b. Duration – 48h / 5% by weight (hours if not specified by selected condition above)

c. Acceptance criteria – (visual examination requirements and/or LLCR criteria)

8.6 Vibration Sinusoidal – EIA 364-28

a. Test Condition - B (refer to specified test method for appropriate test condition)

b. Vibration Amplitude – 0.06" DA or +/-15 G

c. Frequency Range - 10 to 2000 to 10 hertz

d. Sweep Time and Duration - 20 minutes per sweep, 4 hours along each of three orthogonal axes (12 hours total)

e. Mounting - Rigidly mount assemblies; specify cable length and mounting location if appropriate.

f. No discontinuities greater than 1 microseconds

8.7 Mechanical Shock – EIA 364-27

a. Condition – H (refer to specified test method for appropriate test condition)

(30 G, 6 millisecond, half-sine pulse type

b. Shocks - 3 shocks in both directions along each of three orthogonal axes (18 shocks total)

c. Mounting - Rigidly mount assemblies; specify cable length and mounting location if appropriate.

d. No discontinuities greater than 1 microseconds

8.8 Durability - EIA 364-09

a. Number Cycles - 100 cycles

b. Cycling Rate – 127 mm/min

c. Latches disabled (If applicable)

d. Use free floating fixtures

8.9 Solderability – FCI GS-19-037

a. Test Condition : A section 4.3 (TMT version), section 4.5 (SMT version)

8.10 Resistance to Solder Heat –

a. Test Condition : GS-22-011 (5.4.3 reflow 260°C)

b. There shall be no evidence of physical or mechanical damage

8.11 Corrosive sulfur gas test - IEC 60068-2-42/43

a. Test Condition : 2K sequential (H2S with 1ppm/75%H then SO2 with 10ppm/75%H; each 21 days), half mated/half unmated

9.0 QUALITY ASSURANCE PROVISIONS

9.1 Equipment Calibration

All test equipment and inspection facilities used in the performance of any test shall be maintained in a calibration system in accordance with ANSI Z-540 and ISO 9000.

9.2 Inspection Conditions

Unless otherwise specified herein, all inspections shall be performed under the following

ambient conditions:

a. Temperature: 25 +/- 5 deg C

b. Relative Humidity: 30% to 60%

c. Barometric Pressure: Local ambient

9.3 Sample Quantity And Description

Use this paragraph to describe the test samples required for the specific Test Groups in the qualification test table. Include information such as: number and size of plug and receptacle connectors and/or mated pairs, terminated or not terminated, printed wiring board conditions, wire size, crimp conditions, lubrication conditions, etc. Attach and reference drawings if necessary to clarify the description.

Unless otherwise specified in the application specification, sample quantities for each test group shall be specified in this section and/or the qualification test table. Refer to GS-01-029 section 5.9 for sample quantity recommendations.

9.4 Acceptance

9.4.1 Electrical and mechanical requirements placed on test samples as indicated in paragraphs 6.0 and 7.0 shall be established from test data using appropriate statistical techniques or shall otherwise be customer specified, and all samples tested in accordance with this product specification shall meet the stated requirements.

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

9.5 Qualification Testing

Qualification testing shall be performed on sample units produced with equipment and procedures normally used in production. The test sequences shall be as shown in the qualification test table. Data shall be provided with the samples noting production history: production lot codes for components and assemblies, components and assemblies produced to print revision __, verification of plating composition and thickness, etc.

9.6 Re-Qualification Testing

If any of the following conditions occur, the responsible product engineer shall initiate requalification testing consisting of all applicable parts of the qualification test matrix.

a. A significant design change is made to the existing product which impacts the product form, fit or function. Examples of significant changes shall include, but not be limited to, changes in the plating material composition or thickness, contact force, contact surface geometry, insulator design, contact base material, or contact lubrication requirements.

b. A significant change is made to the manufacturing process which impacts the product form, fit or function.

c. A significant event occurs during production or end use requiring corrective action to be taken relative to the product design or manufacturing process.

9.7 Annual Re-Qualification Testing

An annual re-qualification testing shall be performed every year on sample units produced with equipment and procedures normally used in production. The test sequences #4, #7, #9, #10 shall be performed as shown in the qualification test table.

9.8 Qualification Test Table

Insert qualification test table here. Refer to GS-01-029 and GS-03-004 for recommended test sequences.

Annual Re-Qualification Tests :					*x*			*x*		*x*	*x*	
Samples quantity :		*5*	*5*	*5*	*5*	*5*	*5*	*5*	*5*	*5*	*5*	*5*
Test	**Para.**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**
Visual Exam		1, 3	1, 3	1, 3, 5	1, 7	1, 5	1, 7	1, 8	1, 11	1, 8	1, 6	1, 6
LLCR	**6.1**			4	3, 5	2, 4	2, 6	2, 5,7		2, 4, 7	2, 5	2, 5
Insulation resistance	**6.2**								2, 6, 9			
Dielectric Withstanding Voltage	**6.3**								3, 7, 10			
Current rating	**6.4**	2										
Mating/Unmating Force	**7.1**				2,6							
Durability Cycling	**7.2**						3	3	4	5	3	3
Thermal Shock	**8.1**							4	5			
Humidity	**8.2**							6	8			
Temperature Life	**8.3**					3						
Mixed Flowing Gas 13 days unmated 7 days mated	**8.4**									3 6		
Salt Spray	**8.5**										4	
Vibration	**8.6**						4					
Mechanical Shock	**8.7**						5					
Durability	**8.8**				4							
Solderability	**8.9**		2									
Resistance to solder heat	**8.10**			2								
Corrosion sulfur gas test	**8.11**											4

REVISION RECORD

Rev	Page	Description	EC#	Date
1	All	Document initialization		02/03/15
2	All	Document revision		02/04/15
3	5, 6, 8	Add Salt Spray and correct group test		20/05/15
4	8	Add annual re-qualification testing information		10/06/15

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