1.25mm Pitch FFC Connector (Non-ZIF Type)

1.0 SCOPE

1.1 Contents

This specification covers the requirements for product performance, test methods and quality assurance provisions of 1.25mm Pitch FFC Connector (Non-ZIF type).

2.0 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 Specifications

A. 109-1	Test Specification, General Requirements for Test Methods
B. 109 series	Test Specification as indicated in Figure 1
C. Corporate Bulletin 401-76	Cross reference between Tyco Test Specifications and Military or Commercial Documents
D. 501-51014	Qualification Test Report

3.0 Requirements

3.1 Design and Construction

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

3.2 Materials

A. Contact: Phosphor Bronze, 0.8µm Min. Tin or Tin-Lead over 1.27µm Min. Nickel underplate

B. Housing: Glass-Filled PBT, UL94V-0

3.3 Ratings

A. Voltage Rating: 50V AC

B. Current Rating: 1A

C. Temperature Range: -40°C to 85°C

D. Storage Temperature Range: -20°C to 40°C (Storage temperature range is the range of ambient temperature at which the connector housing can be stored without load)

3.4 Performance and Test Descriptions

The product shall be designed to meet the electrical, mechanical and environmental performance requirements specified in Fig 1. All tests shall be performed at ambient environmental conditions per 109-1, unless otherwise specified.

3.5 Test Requirements and Procedures Summary

Para	Test Items	Requirements	Procedures
3.5.1	Confirmation of Product	Product shall meet the requirements of the applicable product drawing.	Visually, dimensionally and functionally inspected per applicable quality inspection plan before test, visually only after test.
Electrical			
3.5.2	Termination Resistance (TR) (Low Level)	30 mΩ Max. (Initial) 60 mΩ Max. (Final)	Measurement shall be made between each terminal and mating cable (FFC) to close circuit current of 100 mA Max. at open circuit voltage of 20 mV Max. Refer Fig 3.
3.5.3	Dielectric Strength	No creeping discharge nor flashover shall occur. Current leakage: 0.5mAMax.	0.5kV AC for 1 minute. Test between adjacent contacts of unmated connector. EIA 364-20B
3.5.4	Insulation Resistance	500 MΩ Min. (Initial) 100 MΩ Min. (Final)	Apply voltage 500V DC. Test between adjacent contacts of unmated connector. EIA 364-21C

3.5.5	Temperature Rise Vs Current	30°C Max. under specified current load.	Contacts series-wired, apply test current of 1A DC to the circuit, and measure the temperature rise by probing on soldered areas of contacts, after the temperature become stabilized. Deduct ambient temperature from the measured value. Refer Fig. 3. Tyco Spec 109-45-1
		Mechanical	
3.5.6	Vibration (Low Frequency)	No electrical discontinuity greater than 1 µsec. shall occur. TR: 60 mΩ Max. (Final)	Subject mated connectors to sinusoidal 10-55-10 Hz traversed in 1 minute at 1.52 mm amplitude, 2 hours in each of 3 mutually perpendicular planes. Each terminal shall be connected in series and then 100 mA DC shall be applied. Refer Fig 4. Tyco Spec 109-21-1.
3.5.7	Physical Shock	No electrical discontinuity greater than 1µsec. shall occur. TR: 60 mΩ Max. (Final)	Subject mated connectors to 50G's halfsine shock pulses of 11 milisecond duration; 3 shocks in each direction applied along the 3 mutually perpendicular planes. Total 18 shocks. 100 mA applied current. Refer Fig 4. Tyco Spec 109-26-1, Condition A.
3.5.8	Hammering Shock	No evidence of abnormalities. TR: 60 mΩ Max. (Final)	Subject mated connectors in layout as shown in Fig 5 to 10,000 cycles of repeated hammering shocks, with test current of 1mA at 10V DC applied to the circuit as shown in Fig. 6. During the test, the circuit shall be monitored for fluctuation of electrical resistance.

3.5.9	Cable Mating Force	Pos. x 1.96N (200gf) Max. (First cycle)	Operation Speed : 100 mm/min. Measure the force required to mate the cable into the connector.
3.5.10	Cable Unmating Force	Pos. x 0.49N (50gf) Min. (First cycle)	Operation Speed : 100 mm/min. Measure the force required to unmate the cable from the connector.
3.5.11	Contact Retention Force	3.92N (0.4 kgf) Min.	Applied an axial pull-off load to contact. Operation Speed : 100 mm/min.
3.5.12	Durability (Repeated Mating & Unmating)	TR: 60 mΩ Max. (Final)	Operation Speed : 100 mm/min. No. of Cycles : 20 cycles.
3.5.13	Solderability	Wet solder coverage 95% Min. except for the sheared area.	Solder temperature: 245 ± 5℃. Immersion duration: 5 sec. Flux: Alpha 100. Tyco Spec 109-11-5, Method B.
3.5.14	Resistance to Soldering Heat	No physical damage shall occur.	Test connector on PCB. i) Solder temperature: 260± 5℃. Immersion duration: 10±1 sec. Tyco Spec 109-202 condition B. ii) Apply soldering iron controlled at 350± 10℃ for 3 secs manually.
3.5.15	Handling Ergonomics	No abnormalities allowed in manual mating and unmating handling.	Manually operated.
Environmental			
3.5.16	Thermal Shock	TR: 60 mΩ Max. (Final)	Subject mated connectors to -55℃/30 min., +85℃/30 min., repeat for 5 cycles. Tyco Spec 109-22.

3.5.17	Humidity-Temperature Cycling	Insulation resistance: 100 MΩ Min.(Final) Termination resistance: 60 mΩ Min.(Final)	Subject mated connectors to humidity-temperature changes between +25℃ and +65℃ at 95%R.H. Tyco Spec 109-23-3, Method III, Condition B.
3.5.18	Humidity, Steady State	Insulation resistance: 100 MΩ Min.(Final) Termination resistance: 60 mΩ Min.(Final)	Subject mated connectors to 90~95%R.H., 40℃ for 500 cycles. Tyco Spec 109-23-2, Method II.
3.5.19	Salt Spray	TR: 60 mΩ Max. (Final)	Subject mated connectors to 5 % salt concentration for 48 hours at 35±2℃. Tyco Spec 109-24, Condition B.
3.5.20	Temperature Life	TR: 60 mΩ Max. (Final)	Subject mated connectors to 85±2℃, 500 hours. Tyco Spec 109-43/ EIA 364-17A.
3.5.21	Resistance to Cold	TR: 60 mΩ Max. (Final)	Subject mated connectors to -40±3℃, 96 hours.
3.5.22	Ammonia Gas Resistivity	Tested sample shall show no evidence of abnormalities in appearance. TR: 60 mΩ Max. (Final)	Subject mated connectors to ammonia gas atmosphere, generated from 400g of 28% ammonia solution in a desiccator in a closed chamber for 40 mins. Temperature in the desiccator: room temperature.
3.5.23	Sulfurous Acid Gas Resistivity	Tested sample shall show no evidence of abnormalities in appearance. TR: 60 mΩ Max. (Final)	Subject mated connectors to atmosphere of 10±3 ppm SO_2 concentration at 90% RH Min. for 96 hours.
3.5.24	Hydrogen Sulfide Gas Resistivity	Tested sample shall show no evidence of abnormalities in appearance. TR: 60 mΩ Max. (Final)	Subject mated connectors to hydrogen sulfide gas atmosphere of 3 ppm H_2S concentration for 96 hours.
3.5.25	Chemical Solvent Resistivity	Connector shall be free from fusion and discoloration that are detrimental to connector functions.	Immerse sample connector in chemical solvent (trichlorethane or isopropyl alcohol) kept at ambient temperature for 2 mins.

Figure 1 (End)

3.6 Product Qualification and Requalification Tests

Test Examination	/Test Group								
	1	2	3	4	5	6	7	8	9
	/Test Sequence (a)								
Confirmation of Product	1,9	1,3	1,6	1,5	1,6	1,3	1,4	1,3	1,5
Termination Resistance (Low Level)	2,6		2,5	2,4	5				2,4
Dielectric Strength	4,8								
Insulation Resistance	3,7								
Temperature Rise Vs Current		2							
Vibration (Low Frequency)			3						
Physical Shock			4						
Hammering Shock				3					
Cable Mating Force					2				
Cable Unmating Force					3				
Contact Retention Force						2			
Durability (Repeated Mate/Unmating)					4				
Solderability							3		
Resistance to Soldering Heat								2	
Handling Ergonomics							2		
Thermal Shock									3
Humidity-Temperature Cycling	5								
Humidity, Steady State									
Salt Spray									
Temperature Life (Heat Aging)									
Resistance to Cold									
Ammonia Gas Resistivity									
Sulfurous Gas Resistivity									
Hydrogen Sulfide Gas Resistivity									
Chemical Solvent Resistivity									

(a) Numbers indicate sequence in which the tests are performed.

Figure 2-1 (to be continued)

Test Examination	/Test Group							
	10	11	12	13	14	15	16	17
	/Test Sequence (a)							
Confirmation of Product	1,5	1,5	1,5	1,5	1,5	1,5	1,5	1,5
Termination Resistance (Low Level)	2,4	2,4	2,4	2,4	2,4	2,4	2,4	2,4
Dielectric Strength	7							
Insulation Resistance	6							
Temperature Rise Vs Current								
Vibration (Low Frequency)								
Physical Shock								
Hammering Shock								
Cable Mating Force								
Cable Unmating Force								
Contact Retention Force								
Durability (Repeated Mate/Unmating)								
Solderability								
Resistance to Soldering Heat								
Handling Ergonomics								
Thermal Shock								
Humidity-Temperature Cycling								
Humidity, Steady State	3							
Salt Spray		3						
Temperature Life (Heat Aging)			3					
Resistance to Cold				3				
Ammonia Gas Resistivity					3			
Sulfurous Gas Resistivity						3		
Hydrogen Sulfide Gas Resistivity							3	
Chemical Solvent Resistivity								3

(a) Numbers indicate sequence in which the tests are performed.

Figure 2-2 (end)

4.0 Quality Assurance Provisions

4.1 Test Conditions

Unless otherwise specified, all the tests shall be performed in any combination of the following test conditions

Temperature: 15~30℃

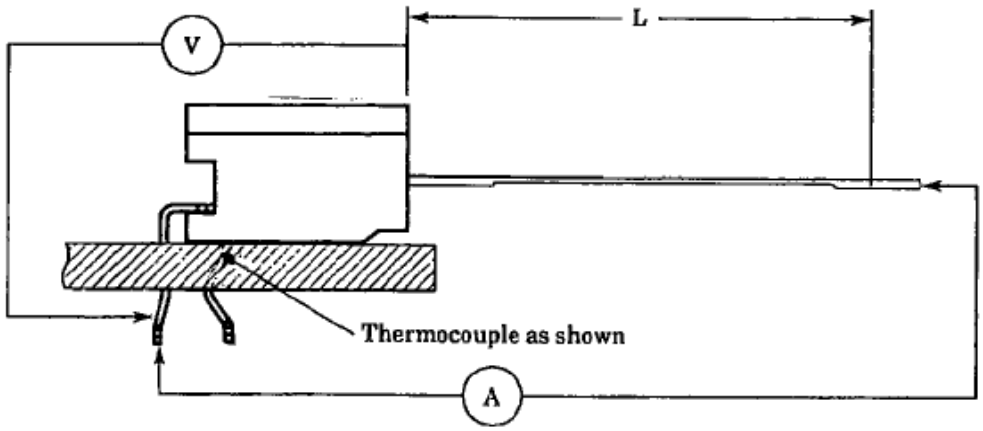
Relative Humidity: 45~75%

Atmosphere Pressure: 650~800mm Hg

4.2 Test Specimens

4.2.1 The test specimens to be used for testing shall be conforming to the requirements of the applicable product drawing(s).

4.2.2 Unless otherwise specified, no sample shall be re-used.

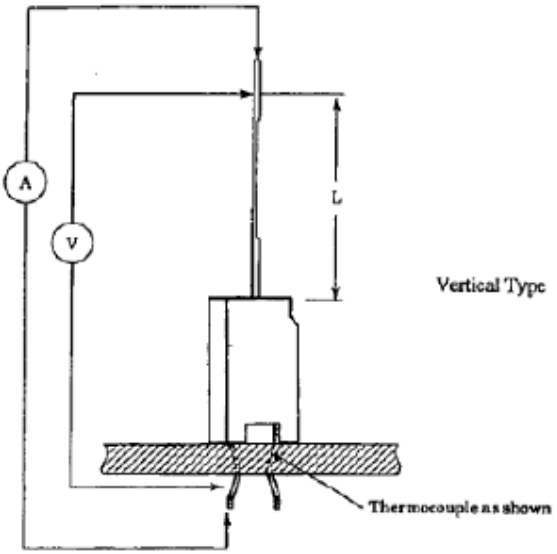


Horizontal Type

Fig 3 (1/2)

Obtain termination resistance by calculation after deducting the L length of cable resistance used for termination.

Connector must test temperature rising vs current by oneself. (Connector must not solder at PCB)



Vertical Type

Fig 3 (2/2)

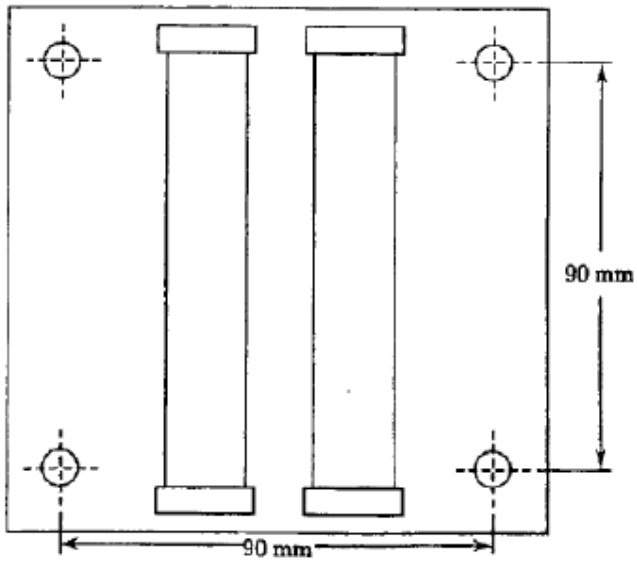


Fig 4

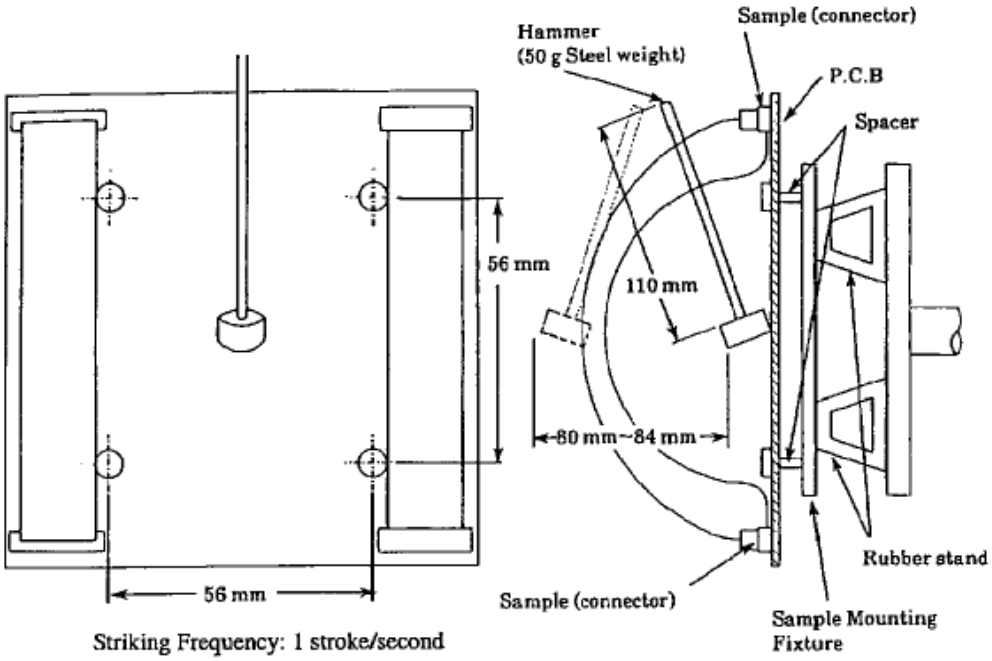


Fig 5

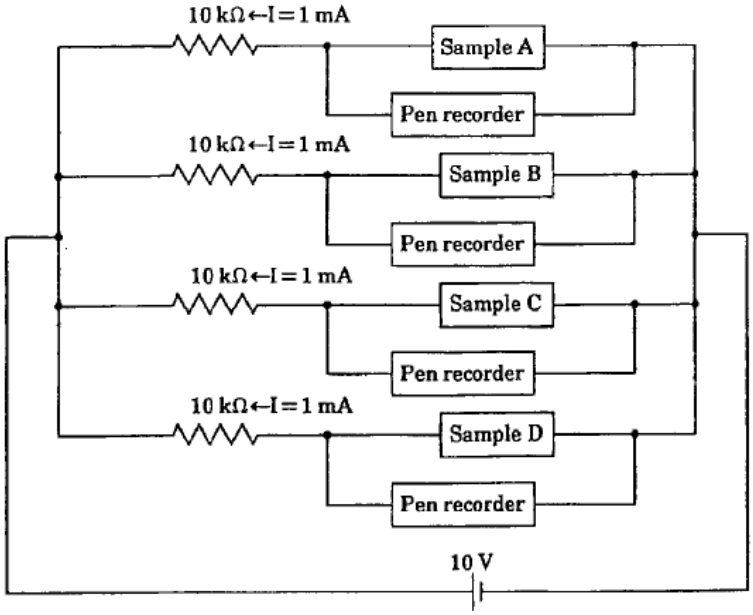


Fig 6