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**Connector, MTA-100**

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**1. SCOPE**

## 1.1. Content

This specification covers performance, tests and quality requirements for the TE Connectivity (TE) MTA-100 connector system. This system is mass terminated using insulation displacement technology on .100 inch centerlines and mates with .025 inch square posts providing a reliable interconnection between wires and posts mounted on printed circuit boards. The standard system is available in 2 through 28 positions. The MTA-100 connector system is designed to be terminated to 28 AWG to 22 AWG wire, tin plated UL style 1007, 1061 or wire which specifies PVC insulation with temperature rating compatible with specified operating temperatures, see Figure 4. Wire shall meet application requirements specified in Application Specification 114-1019. Insulation diameters are: .050 inch maximum outside diameter for mass termination and .060 inch maximum outside diameter for single termination.

## 1.2. Qualification

When tests are performed on the subject product line, procedures specified in Figure 1 shall be used. All inspections shall be performed using the applicable inspection plan and product drawing.

**2. APPLICABLE DOCUMENTS**

The following TE documents form a part of this specification to the extent specified herein. Unless otherwise specified, the latest edition of the document applies. 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.

- 109-1: General Requirements for Test Specifications
- 109 Series: Test Specifications as indicated in Figure 1
- 114-1019: Application Specification
- 501-366: Qualification Test Report

**3. REQUIREMENTS**

## 3.1. Design and Construction

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

## 3.2. Materials

- Contact: Phosphor bronze, tin or tin-lead plating and gold over nickel plating
- Header: Thermoplastic polyester, UL 94V-0
- Housing: Nylon 6/6 or Nylon 6/12, UL 94V-2 and 94V-0
- Posts, header: Phosphor bronze, tin plating and gold over nickel plating

3.3. Ratings

- Voltage: 250 volts AC
- Current: See Figure 4 for applicable current carrying capability
- Temperature: -55 to 105°C

3.4. Performance and Test Description

Product is designed to meet the electrical, mechanical and environmental performance requirements specified in Figure 1. Unless otherwise specified, all tests shall be performed at ambient environmental conditions per Test Specification 109-1.

3.5. Test Requirements and Procedures Summary

Test Description	Requirement	Procedure								
Examination of product.	Meets requirements of product drawing and Application Spec 114-1019.	Visual, dimensional and functional per applicable quality inspection plan.								
ELECTRICAL										
Termination resistance.	6 milliohms maximum initial. $\Delta R$ 10 milliohms maximum.	TE 109-6-1. Subject mated contacts assembled in housing to 50 mv maximum open circuit at 100 ma maximum. See Figures 3 and 5.								
Insulation resistance.	5000 megohms minimum initial.	TE Spec 109-28-4. Test between adjacent contacts of unmated samples.								
Dielectric withstanding voltage.	750 vac at sea level. 1 minute hold with no breakdown or flashover.	TE Spec 109-29-1. Test between adjacent contacts of unmated samples.								
Temperature rise vs current.	30°C maximum temperature rise at specified current.	TE Spec 109-45-2. Measure temperature rise vs current. See Figures 4 and 5.								
MECHANICAL										
Solderability.	Solderable area shall have minimum of 95% solder coverage.	TE Spec 109-11-2. Subject contacts to solderability.								
Termination tensile strength, parallel, unmated.	<table border="1" style="display: inline-table; vertical-align: top;"> <thead> <tr> <th>Wire Size AWG</th> <th>Slot Tensile Pounds Minimum</th> </tr> </thead> <tbody> <tr> <td>28</td> <td>4</td> </tr> <tr> <td>24</td> <td>5</td> </tr> <tr> <td>22</td> <td>12</td> </tr> </tbody> </table>	Wire Size AWG	Slot Tensile Pounds Minimum	28	4	24	5	22	12	TE Spec 109-16. Determine slot tensile at maximum rate of 1 inch per minute. Pull parallel to terminated wire. See Figure 6.
Wire Size AWG	Slot Tensile Pounds Minimum									
28	4									
24	5									
22	12									
Termination tensile strength, perpendicular, unmated.	<table border="1" style="display: inline-table; vertical-align: top;"> <thead> <tr> <th>Wire Size AWG</th> <th>Slot Tensile Pounds Minimum</th> </tr> </thead> <tbody> <tr> <td>28</td> <td>1</td> </tr> <tr> <td>24</td> <td>1</td> </tr> <tr> <td>22</td> <td>3</td> </tr> </tbody> </table>	Wire Size AWG	Slot Tensile Pounds Minimum	28	1	24	1	22	3	TE Spec 109-16. Determine slot tensile at maximum rate of 1 inch per minute. Pull perpendicular to terminated wire. See Figure 6.
Wire Size AWG	Slot Tensile Pounds Minimum									
28	1									
24	1									
22	3									

Figure 1 (cont)

Test Description	Requirement	Procedure
Vibration, sinusoidal.	No discontinuities of 1 microsecond or longer duration. See Note.	TE Spec 109-21-1. Subject mated samples to 10-55-10 Hz traversed in 1 minute at .06 inch total excursion. 2 hours in each of 3 mutually perpendicular planes.
Physical shock.	No discontinuities of 1 microsecond or longer duration. See Note.	TE Spec 109-26-1. Subject mated samples to 50 G's half-sine shock pulses of 11 milliseconds duration. 3 shocks in each direction applied along 3 mutually perpendicular planes, 18 total shocks.
Durability.	See Note.	TE Spec 109-27. Manually mate and unmate samples with friction lock header for 25 cycles.
Mating force.	2 pounds maximum average per contact.	TE Spec 109-42, Condition A. Measure force necessary to mate samples with friction lock header from point of initial contact to depth of .200 inch at maximum rate of .5 inch per minute.
Unmating force.	0.8 pound minimum average per contact.	TE Spec 109-42, Condition A. Measure force necessary to unmate samples from friction lock header at maximum rate of .5 inch per minute.

ENVIRONMENTAL

Thermal shock.	See Note.	TE Spec 109-22. Subject mated samples to 25 cycles between -55 and 105°C.
Humidity-temperature cycling.	See Note.	AMP Spec 109-23-3, Condition B. Subject mated samples to 10 cycles between 25 and 65°C at 95% RH.
Temperature life.	See Note.	AMP Spec 109-43. Subject mated samples to temperature life at 85°C for 1000 hours.
Mixed flowing gas.	See Note.	AMP Spec 109-85-3. Subject mated samples to environmental class III for 20 days.

**NOTE**

*Shall meet visual requirements, show no physical damage and shall meet requirements of additional tests as specified in Test Sequence in Figure 2.*

Figure 1 (end)

3.6. Product Qualification and Requalification Test Sequence

Test or Examination	Test Group (a)					
	1	2(c)	3(d)	4	5	6
	Test Sequence (b)					
Examination of product	1,9	1,9	1,5	1,8	1,3	1,3
Termination resistance	3,7	2,7	2,4			
Insulation resistance				2,6		
Dielectric withstanding voltage				3,7		
Temperature rise vs current		3,8				
Solderability						2
Termination tensile strength					2(f)	
Vibration	5	6(e)				
Physical shock	6					
Durability	4					
Mating force	2					
Unmating force	8					
Thermal shock				4		
Humidity-temperature cycling		4(g)		5		
Temperature life		5				
Mixed flowing gas			3(g)			

- NOTE**
- (a) See paragraph 4.1.A.
  - (b) Numbers indicate sequence in which tests are performed.
  - (c) Tin-lead plated samples.
  - (d) Gold plated samples.
  - (e) Discontinuities shall not be measured. Energize at 18 °C level for 100% loadings per Test Specification 109-151.
  - (f) Subject half the samples to the parallel tensile test and the remaining half to the perpendicular tensile test.
  - (g) Precondition samples with 5 cycles durability.

Figure 2

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#### 4. QUALITY ASSURANCE PROVISIONS

##### 4.1. Qualification Testing

###### A. Sample Selection

Samples shall be prepared in accordance with applicable Instruction Sheets and shall be selected at random from current production. Test group 1 shall consist of 5, 6 position standard tin-lead plated samples and 5, 6 position gold plated samples. All samples shall be terminated to the maximum wire size and mounted on printed circuit board PN 93-660017 (see Figure 5). Test group 2 shall consist of 3, 10 position standard tin-lead plated samples terminated to 28 AWG wire and mounted on printed circuit board PN 93-660652; and 3, 10 position standard tin-lead plated samples terminated to 22 AWG wire and mounted on printed circuit board PN 93-660651 (see Figure 5). Test group 3 shall consist of 3, 10 position gold plated samples terminated to 22 AWG wire and mounted on printed circuit board PN 93-660017. Test group 4 shall consist of 5 unmounted 24 position standard tin-lead plated samples terminated to the maximum wire size. Test group 5 shall consist of 6, 10 position standard tin-lead plated samples terminated to 28 AWG wire; 6, 10 position standard tin-lead plated samples terminated to 24 AWG wire; and 6, 10 position standard tin-lead plated samples terminated to 22 AWG wire. All samples shall be unmounted and unmounted. Test group 6 shall consist of 5, 6 position .100 inch friction lock tin-lead plated headers.

###### B. Test Sequence

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

##### 4.2. Requalification Testing

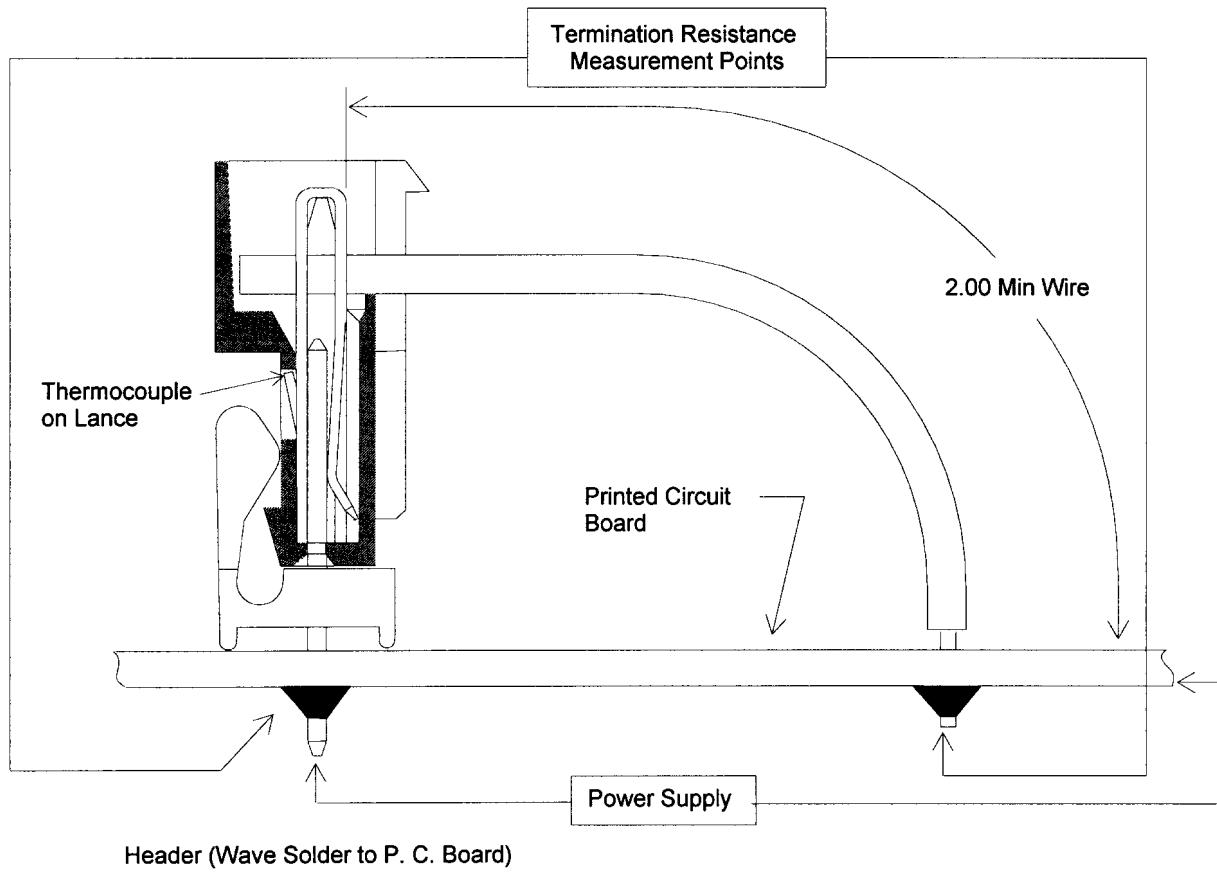
If changes significantly affecting form, fit or function are made to the product or manufacturing process, product assurance shall coordinate requalification testing, consisting of all or part of the original testing sequence as determined by development/product, quality and reliability engineering.

##### 4.3. Acceptance

Acceptance is based on verification that the product meets requirements of Figure 1. Failures attributed to equipment, test setup or operator deficiencies shall not disqualify product. When product failure occurs, corrective action shall be taken and samples resubmitted for qualification. Testing to confirm corrective action is required before resubmittal.

##### 4.4. 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.



**NOTE**

- (a) Termination resistance equals millivolts divided by test current less resistance of 2 inches of wire.
- (b) After wave soldering, the boards and posts shall be cleaned to remove all flux and contaminates.

Figure 3  
Temperature & Termination Resistance Measurement Points

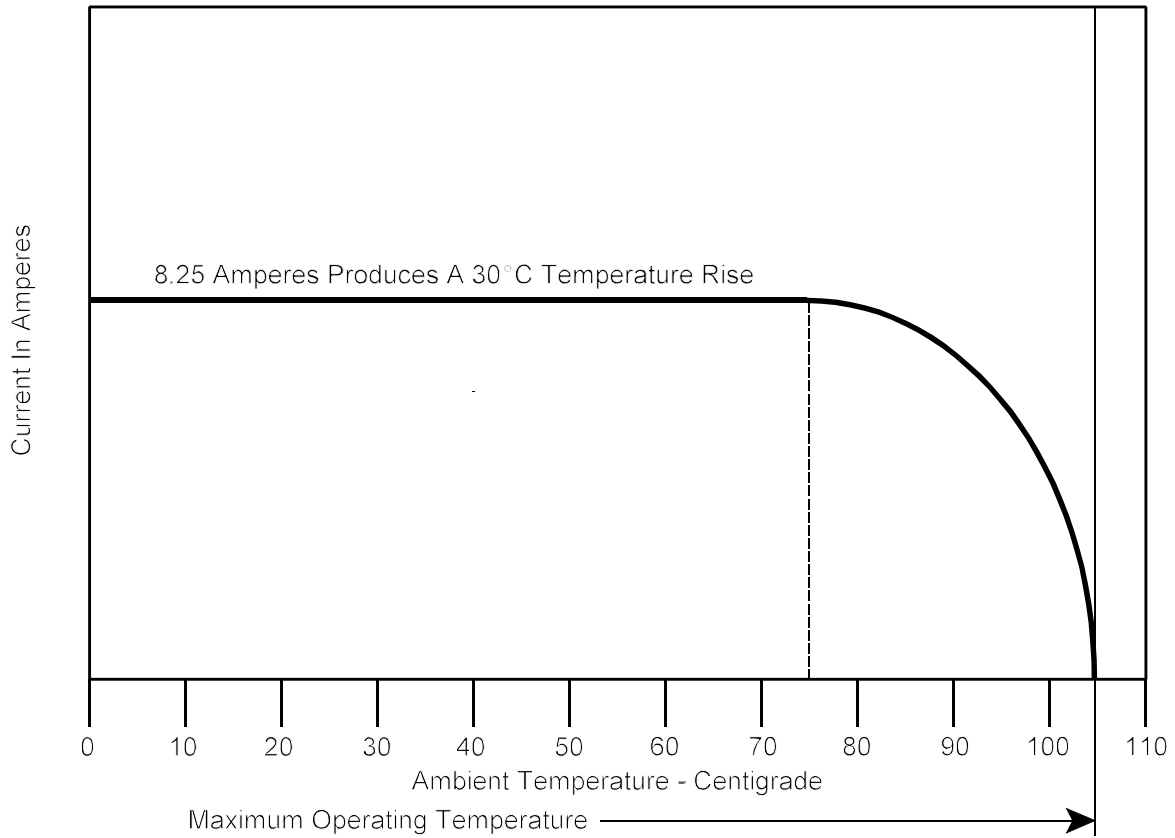


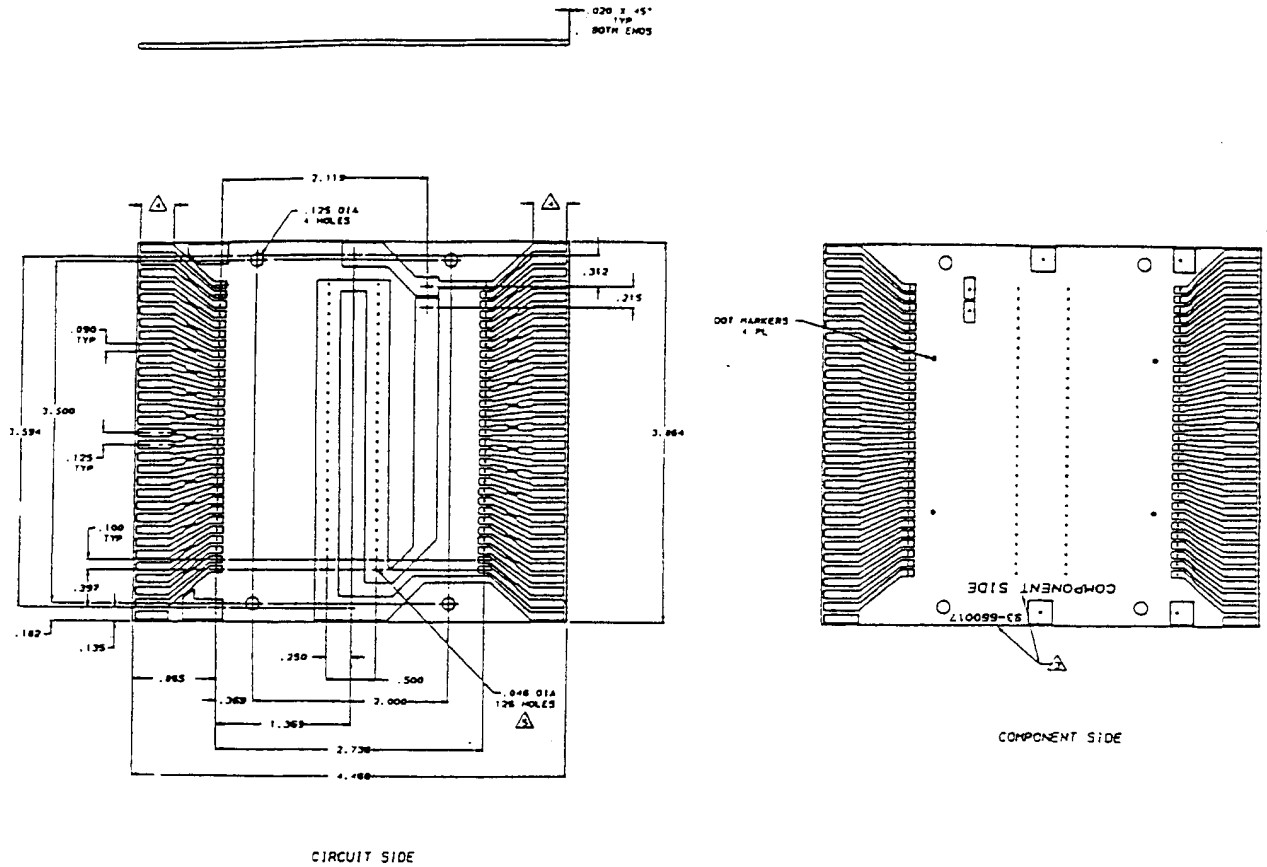
Figure 4A  
Current Carrying Capability

Percent Connector Loading (10 position In-Line connector)	Wire Size AWG			
	28	26	24	22
Single Contact	.6	.7	.9	1.0
50	.5	.6	.7	.8
100	.3	.4	.4	.5

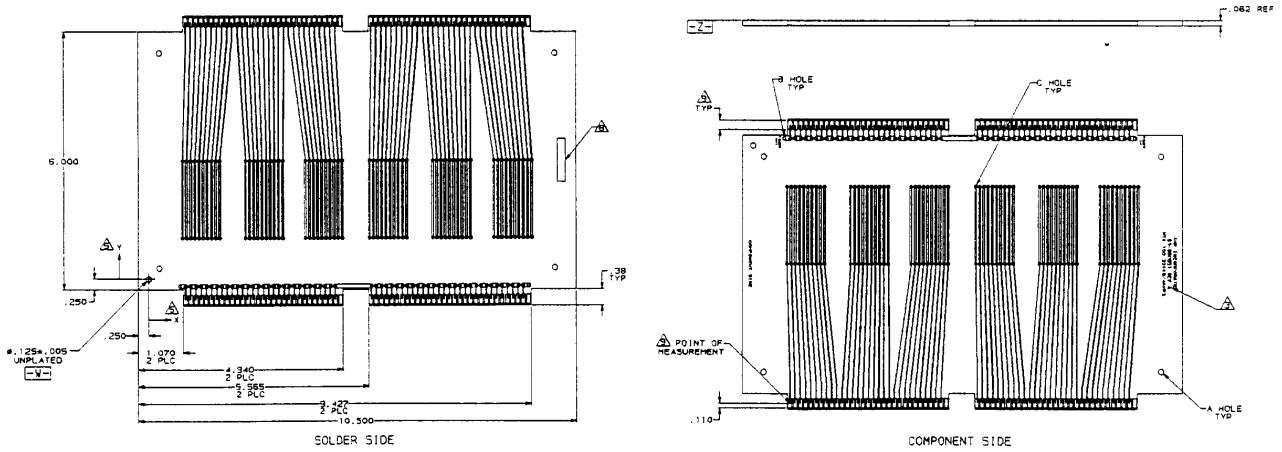
**NOTE**

To determine acceptable current carrying capacity for percentage connector loading and wire gage indicated, use the Multiplication Factor (F) from the above chart and multiply it times the Base Rated Current for a single circuit at maximum ambient operating temperature as shown in Figure 4A.

Figure 4B  
Current Rating



PC Board Used For Termination Resistance Dry Circuit



PC Board Used For Current Rating

Figure 5  
Printed Circuit Test Boards



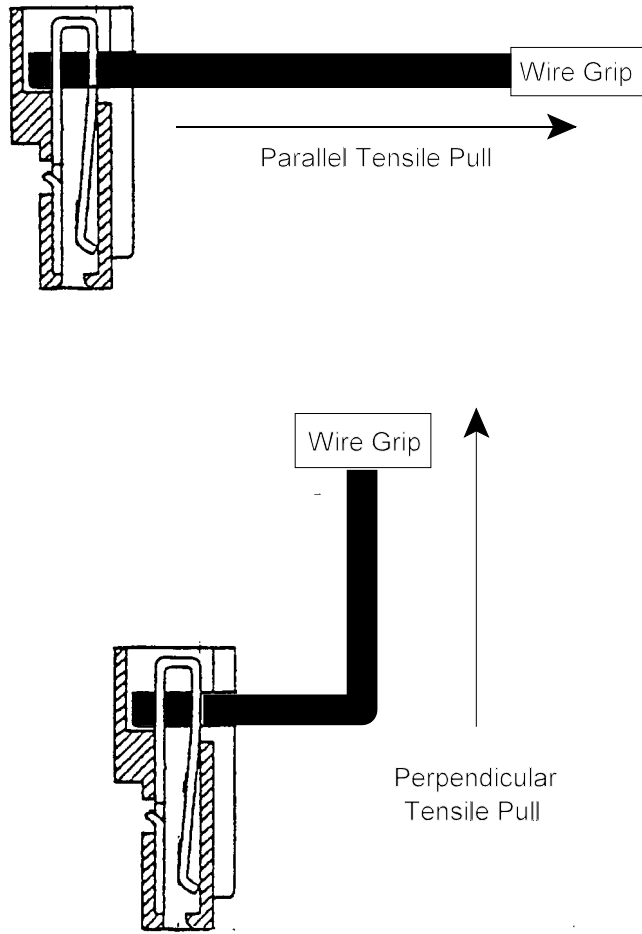


Figure 6  
Termination Tensile Strength