molex

PRODUCT SPECIFICATION

SL Stackable Linear

SINGLE ROW WIRE TO WIRE & WIRE-TO-BOARD CONNECTOR SYSTEM

Female Terminal	High Force Female Crimp Terminal
	
Series: 70058	Series: 71851

Male Crimp Terminal	Single Row Receptacle Housing Version A, Non-Polarized
	
Series: 70021	Series: 70066

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REVISION:	ECR/ECN INFORMATION:	TITLE:	SHEET No.
R1	EC No: 614798 DATE: 2019/04/01	PRODUCT SPECIFICATION FOR SINGLE ROW SL CONNECTOR SYSTEM	1 of 20

DOCUMENT NUMBER:	CREATED / REVISED BY:	CHECKED BY:	APPROVED BY:
PS-70400	GJEEVANSURES	SGANGADHARDO	ISHWARG

Single Row Receptacle Housing Version C, Front Ribs	Single Row Receptacle Housing Version D, Back Ribs
	
Series: 70066	Series: 70066

Single Row Receptacle Housing Version G, with positive Lock	Single Row Receptacle Housing Version H, Projected Ribs
	
Series: 70066	Series: 70066

Single Row Receptacle housing, Version N, Positive Lock with TPA	Single Row WTW Crimp housing, Version A, Positive Lock
	
Series: 70066	Series: 70107

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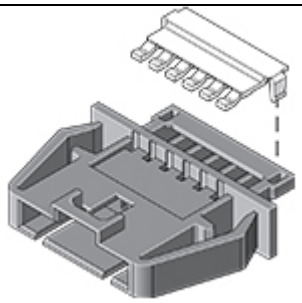
Single Row WTW Crimp housing, Version B, Panel Mount Ears	Single Row WTW Crimp housing, Free Hanging up Plug with TPA
	
Series: 70107	Series: 70107

Single Row WTW Crimp housing, Panel mount with TPA Option	SL Crimp Housing, Dual Row, Version A, Non-polarized
	
Series: 70107	Series: 70450

SL Crimp Housing, Dual Row, Version B, Polarized	SL Crimp Housing, Dual Row, Version C, Back Ribs
	
Series: 70450	Series: 70450

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SL Crimp Housing, Dual Row, Version F, Polarized

Series: 70450

Vertical Header Through Hole with no pegs	Vertical Header Through Hole with pegs
	
Series: 171971	Series: 171972

Right angle Header Through Hole with no pegs	Right Angle Header Through Hole with pegs
	
Series: 171974	Series: 171975

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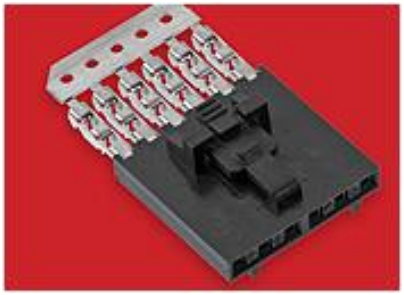
Vertical Header SMT Version	Right Angle Header SMT without Peg
	
Series: 171973	Series: 171976

Right angle SMT Version with Peg

Series: 171976

SL Insulation Displacement Connector Assembly, Female, Single Row	SL Insulation Displacement Connector Assembly, Female, Single Row
	
Series: 70400	Series: 70400

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1.0 SCOPE

This specification covers the 2.54mm centerline SL Single Row Connector systems. The termination option ranges from solder to PCB or terminated using crimp or IDT technology.

2.0 PRODUCT DESCRIPTION

2.1 PRODUCT NAME AND SERIES NUMBER (S)

Table 1 – WIRE-TO-BOARD	
Description	Series Number
Male Crimp Terminal	70021
Female Crimp Terminal	70058
High Force Female Crimp Terminal	71851
Single Row Crimp Housings	70066 & 70107
Dual Row Crimp Housings	70450 & 74130
Female Single Row Insulation Displacement Connector	70400
Male Single Row Insulation Displacement Connector	70475 & 71178
SL Vertical Hdr Assy Thru Hole No Pegs 3.05 Pocket	171971
SL Vertical Hdr Assy Thru Hole with Pegs 3.05 Pocket	171972
SL Vertical Hdr Assy Smt No Pegs 3.05 Pocket	171973
SL Right Angle Hdr Assy Thru Hole No Pegs 3.05 Pocket	171974
SL Right Angle Hdr Assy Thru Hole with Pegs 3.05 Pocket	171975
SL Right Angle Hdr Assy SMT No Pegs 3.05 Pocket	171976
SL Right Angle Hdr Assy SMT with Pegs 3.05 Pocket	171977
Sl Vertical Hdr Assy Thru Hole No Pegs 4.57 Pocket	70563 & 70564
Sl Vertical Hdr Assy Thru Hole Tri Peg 4.57 Pocket	70566
Sl Right Angle Hdr Assy Thru Hole Lock Peg 4.57 Pocket	70571
Sl Right Angle Hdr Assy Thru Hole Tri Peg 4.57 Pocket	70575
See Individual Sales Drawings for Other Series That Conform to This Specification	

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2.2 DIMENSIONS, MATERIALS, PLATING AND MARKINGS

2.2.1. Wire Sizes and Cable Sizes:

IDT Terminations: 22 - 28 AWG stranded wire with an insulation diameter 1.35 mm max.
Crimp Termination: 22 - 36 AWG wire. See individual drawings for insulation diameter.
Molex Cable: 7307, 7767, 8996, 8997, 24226, 24241, 24369 and 24389.

2.2.2. Available Finishes

Overall Matte Tin
Select Gold

Dimensions & Plating: See individual sales drawings.
Material: RoHS compliant materials*.
**Refer to the "Product Environmental Compliance" section in Molex.com to know the individual PN RoHS compliance status*

2.3 SAFETY AGENCY APPROVALS

Underwriters Laboratory: UL E29179
Canadian Standards Association: CSA LR19980

3.0 APPLICABLE DOCUMENTS AND SPECIFICATIONS

3.1 MOLEX DOCUMENTS

See series specific sales drawings and the other sections of this specifications for the necessary referenced documents and specifications.

See individual Terminals and un-mated Headers Product Specification for more information.
PS-70021: Male, crimp terminal
PS-70058: Female box, crimp terminal
PS-71851: Female box, high force crimp terminal
PS-70495: Compliant Header
1719710000-PS: Vertical and Right-Angle Headers
PS-70066 / PS-70107 / PS-70400 / PS-70475

SL Test Summary TS-70541-001
Molex Quality Crimping Handbook Order No. 63800-0029
Molex Solderability Specification SMES-152
Molex Heat Resistance Specification AS-40000-5013
Molex Moisture Technical Advisory AS-45499-001
Molex Package Handling Specification 454990100-PK

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ATS – Application Tooling Specification*
*Application Tooling Specification for terminals is not provided in this document. ATS for terminals can be available from respective terminal part number page in Molex.com

3.2 INDUSTRY DOCUMENTS

UL-1977
CSA STD. C22.2 NO. 182.3-M1987
IEC / EN 61984

4.0 ELECTRICAL PERFORMANCE RATINGS

4.1 VOLTAGE*

600 Volts AC (RMS) or 600 Volts DC max.

4.2 MAXIMUM CURRENT RATING WITH APPLICABLE WIRES

Current rating is application dependent and may be affected by the wire rating such as listed in UL-60950-1. Each application should be evaluated by the end user for compliance to specific safety agency requirements. The ratings listed in the chart below are per Molex test method based on a 30°C maximum temperature rise over ambient temperature and are provided as a guideline. Appropriate de-rating is required based on circuit size, ambient temperature, copper trace size on the PCB, gross heating from adjacent modules/components and other factors that influence connector performance. Wire size, insulation thickness, stranding, tin coated or bare copper, wire length & crimp quality are other factors that influence current rating.

WIRE SIZE	CURRENT (Amps Max)
28 Awg	1.2 A
26 Awg	1.8 A
24 Awg	3.0 A
22 Awg	3.0 A

Note: Current ratings shown are for a single circuit, based on a 30°C temperature rise.

4.3 TEMPERATURE

Operating Temperature: - 40°C to +105°C
Non-Operating Temperature: - 40°C to +105°C

4.4 DURABILITY

Tin plated: 25 mating cycles
Gold plated: 50 mating cycles

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5.0 QUALIFICATION

Laboratory conditions and sample selection are in accordance with MIL STD & EIA-364-100.

6.0 PERFORMANCE

6.1 ELECTRICAL PERFORMANCE

ITEM NO.	ITEM	TEST CONDITION	REQUIREMENT
1	**Contact Resistance (Low Level)**	Mate Connectors with a maximum voltage of 20mV and a current of 100 mA.	**30** milliohm Maximum Initial
2	**Insulation Resistance**	Mate Connectors with a voltage of 500 VDC between adjacent terminals and between terminals and ground.	**1000** Megohms Minimum
3	**Dielectric Withstanding Voltage**	Unmate connectors: apply a voltage of {two times the rated voltage plus 1000 volts} VAC for 1 minute between adjacent terminals and between terminals to ground.	No breakdown
4	**Voltage Drop**	Mate Connectors with a current of 3 amps and the open circuit voltage set to not exceed 15 VDC. Power is applied for a minimum of 30 seconds before the first measurement	30 millivolt Maximum Initial
5	**Voltage Drop after Vibration**	Subject mated connectors to a total of 8 hours of simple harmonic motions. (Apply 4 hours in the Z axis and 2 hours in each of the X and Y axes). Vary the frequency uniformly from 10 Hz to 50 Hz traversed continuously in 8 minutes	30 millivolt Maximum Initial & 60 millivolt Maximum After Endurance Exposure
6	**Voltage Drop after Heat Resistance**	Place mated connectors in an air circulating chamber oven exposed to a temperature of 100 degrees for 120 hours.	30 millivolt Maximum Initial & 60 millivolt Maximum After Endurance Exposure

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ELECTRICAL PERFORMANCE (CONTD,)			
ITEM NO.	**ITEM**	**TEST CONDITION**	**REQUIREMENT**
7	**Voltage Drop after Cold Resistance**	Place mated connectors in an air circulating chamber exposed to a temperature of -40°C for 120 hours.	30 millivolt Maximum Initial & 60 millivolt Maximum After Endurance Exposure
8	**Voltage Drop after Dust Profness**	Place mated connectors 150mm from the walls of a chamber that measure 1000 mm in length, width, and height. Approximately 1.5kg of Portland cement is to be diffused at a rate of 10 seconds per 15 minutes by blowing air onto it. Expose for 1 hour	30 millivolt Maximum Initial & 60 millivolt Maximum After Endurance Exposure
9	**Leak Current**	Apply a potential of 13 volts DC across the adjacent contacts of a mated pair. After 60 seconds, measure the initial leakage current. Place mated pair in a thermostatic chamber at a temperature of 60±5° C and a humidity level of 90-95% for one hour	10 microamps Maximum Initial & 1 milliamp Maximum Post Environmental
10	**Capacitance**	Measure between adjacent terminals at 1 MHz (Loaded: 50 ohms impedance)	Loaded: 2 picofarad maximum Unloaded: 0.5 picofarad maximum

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6.2 MECHANICAL PERFORMANCE

ITEM NO.	ITEM	TEST CONDITION	REQUIREMENT
1	**Terminal Insertion and Withdrawal Forces**	Insert and withdraw a terminal (male to female) at a rate of 25 ± 6mm (1 ± 1/4 inch) per minute.	70058 - Insertion force shall be 4.45 N (1.0 lb) maximum and withdrawal 0.56 N (0.125 lb) minimum 71851 - Insertion force shall be 13.34 N (3.0 lb) maximum and withdrawal 1.67 N (0.375 lb) minimum
2	**Retention Force (in Housing) for Crimped/IDT Terminals**	Axial pullout force on the terminal in the housing at a rate of 25 ± 6mm (1 ± 1/4 inch) per minute.	Contact: 17.79 N (4.0 lbs.) min.
3	**Durability**	Mate connectors up to 25 cycles for tin plating and 50 cycles for gold plating at a maximum rate of 10 cycles per minute prior to defined Environmental Tests.	Contact Resistance: 10 milliohms Maximum Change from Initial
4	**Durability – Male Plug (30 Gold Plate Pins)**	Male Plug is mated to the receptacle and then unmated at a rate of 500 cycles/hour. The receptacle was replaced every 50 cycles. The male plug was subjected to 500 mate/Unmate cycles	Contact Resistance: 10 milliohms Maximum Change from Initial
5	**Vibration Mil-Std-1344 Method 2005.1 Condition I**	Amplitude: 1.50mm (.060 inch) peak to peak Sweep: 10-55-10 Hz in one minute Duration: 2 hours in each X-Y-Z axis. (Test module shall be per Section 7.0)	Contact Resistance: 10 milliohms Maximum Change from Initial Discontinuity: not greater than one microsecond
6	**Mechanical Shock Mil-Std-1344 Method 2004.1 Condition A**	50 g's with three 1/2 sine wave form shocks in each X-Y-Z axis. (Test module shall be per Section 8.2)	Contact Resistance: 10 milliohms Maximum Change from Initial Discontinuity: not greater than one microsecond
7	**Wire Pullout Force (Axial)**	Apply an axial pullout force on the wire at a rate of 25 ± 6mm (1 ± 1/4 inch) per minute.	Pullout force - 75% tensile strength of wire, minimum.

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MECHANICAL PERFORMANCE (CONTD,)

ITEM NO.	ITEM	TEST CONDITION	REQUIREMENT
8	**Wire Pullout Force (Right Angle)**	Apply a right-angle pullout force on the wire at a rate of 25 ± 6mm (1 ± 1/4 inch) per minute.	Pullout force - 75% tensile strength of wire, minimum. 20 Newton's and below - no plastic deformation / no electrical discontinuity Above 20 and below 60 Newton's - slight non-functional plastic deformation / no electrical discontinuity.
9	**Insertion Force (into Housing) for Female Terminals**	Apply an axial insertion force on the terminal at a rate of 25 ± 6mm (1 ± 1/4 inch) per minute.	13.34 N (3.0 lbs.) maximum insertion force.
10	**Wire Flex**	Flex cable 180° for 500 cycles.	Contact resistance: 10 milliohms Maximum Change from Initial. Appearance: No Damage
11	**Normal Force of Box Crimp**	Apply a perpendicular force at a rate of 25 ± 6mm (1 ± 1/4 inch) per minute on the contacts in a manner simulating actual use.	0.49 N (50 grams) minimum end of life, for gold plating 0.98 N (100 grams) minimum end of life, for tin plating.
12	**Connector Insertion**	Mate connectors at a rate of 1 in/min until latch engagement was achieved	29.4 N Maximum

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MECHANICAL PERFORMANCE (CONTD)			
ITEM NO.	**ITEM**	**TEST CONDITION**	**REQUIREMENT**
13	**Connector Retention**	Unmate connectors at a rate of 1 in/min until latch defeat occurred & Unmate connectors at a rate of 0.8 in/min with latch disengaged	45 N Minimum with latch engaged & 15 N Minimum with latch disengaged
14	**Connector Retention**	Apply a perpendicular force of 45 N to the wire harness using a free hanging weight.	No deformation or Terminal separation

6.3 ENVIRONMENTAL PERFORMANCE

ITEM NO.	ITEM	TEST CONDITION		REQUIREMENT
1	**Thermal Shock Mil-Std-202F Method 107 E**	Mate connectors exposed to 10 cycles of:		Appearance: No Damage Contact Resistance: 10 milliohms maximum change from initial
		Temperature °C	Duration (In Minutes)	
		-40 +0/-3	30	
		+25 +/-10	5 Max	
		+105 +3/-0	30	
		+25 +/-10	5 Max	
		40 +0/-3	30	
2	**Thermal Aging Mil-Std-202F Method 108**	Mate connectors; expose to 240 hours at 105 ± 3° C		Appearance: No Damage Contact Resistance: 10 milliohms maximum change from initial
3	**Humidity (Steady State) Mil-Std-202F Method 103**	Mate connectors; expose to a temperature of: 85 ± 2°C with a Relative Humidity of 92 ± 3% for 96 hours. Note: Remove surface moisture and air dry for 1 hour prior to measurements.		Appearance: No Damage Contact Resistance: 10 milliohms maximum change from initial. Dielectric Withstanding Voltage: No Breakdown Insulation Resistance: 10000 Megohms Minimum

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ENVIRONMENTAL PERFORMANCE (CONTD)

ITEM NO.	ITEM	TEST CONDITION	REQUIREMENT
4	**Humidity (Cyclic) Mil-Std-202 Method 105**	Mate connectors; expose for 10 cycles at 90-98% relative humidity with a transition time of 2.5 hours between extremes: Temperature °C — Duration (Min) +25 ± 10 — 5 maximum +65 +3/-0 — 15 maximum Note: Remove surface moisture and air dry for one hour prior to measurements.	Appearance: No Damage Contact Resistance: 10 milliohms maximum change from initial. Dielectric Withstanding Voltage: No Breakdown Insulation Resistance: 10000 Megohms Minimum
5	**Temperature Rise and Current Cycling**	Temperature Rise: Mate the connectors; and measure the temperature rise at the rated current after 96 hours. Current Cycling: Mate connectors; measure the temperature rise at the rated current after 500 hours (45 minutes ON and 15 minutes OFF per hour). Measure temperature rise.	Temperature Rise: 30°C above ambient maximum Temperature Rise: 30°C above ambient maximum
6	**Temperature Rise and Vibration**	Temperature Rise: Mate the connectors; and measure the temperature rise at the rated current after 45 minutes. Vibration: Subject mated connectors to a total of 8 hours of simple harmonic motions. (Apply 4 hours in the Z axis and 2 hours in each of the X and Y axes). Vary the frequency uniformly from 10 Hz to 50 Hz traversed continuously in 8 minutes. Measure temperature rise.	Temperature Rise: 30°C above ambient maximum Temperature Rise: 30°C above ambient maximum
7	**Temperature Rise and Heat Resistance**	Temperature Rise: Mate the connectors; and measure the temperature rise at the rated current after 45 minutes. Heat Resistance: Place mated connectors in an air circulating chamber oven exposed to a temperature of 100 degrees for 120 hours. Measure temperature rise.	Temperature Rise: 30°C above ambient maximum Temperature Rise: 30°C above ambient maximum

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ENVIRONMENTAL PERFORMANCE (CONTD)			
ITEM NO.	**ITEM**	**TEST CONDITION**	**REQUIREMENT**
8	**Temperature Rise and Cold Resistance**	Temperature Rise: Mate the connectors; and measure the temperature rise at the rated current after 45 minutes. Cold Resistance: Place mated connectors in an air circulating chamber exposed to a temperature of -40°C for 120 hours	Temperature Rise: 30°C above ambient maximum Temperature Rise: 30°C above ambient maximum
9	**Solderability Molex SMES-152**	Steam age 1 hr. Solder time 5 ± 0.5 seconds. Solder temperature: 245 ± 5°C Non-activated flux.	95% of the immersed area must show no voids, pin holes
10	**Flowing Mixed Gas (FMG)**	Battelle Class II, 10 ppm Cl_2, 10 ppm H_2S, 100 ppm NO_2, 70 ± 1% R.H., 25 deg. C. 50-60 CFM. 10 days mated and 7 days unmated exposure.	Contact Resistance: 10 milliohms Maximum change from Initial
11	**Resistance to Solder Heats**	Solder Time 3 ± 0.5 seconds Solder Temperature: 260 ± 5°C Immerse leads to a depth of 1.57mm (.062 in.) from connector body.	Appearance: No damage or discoloration of connector materials.

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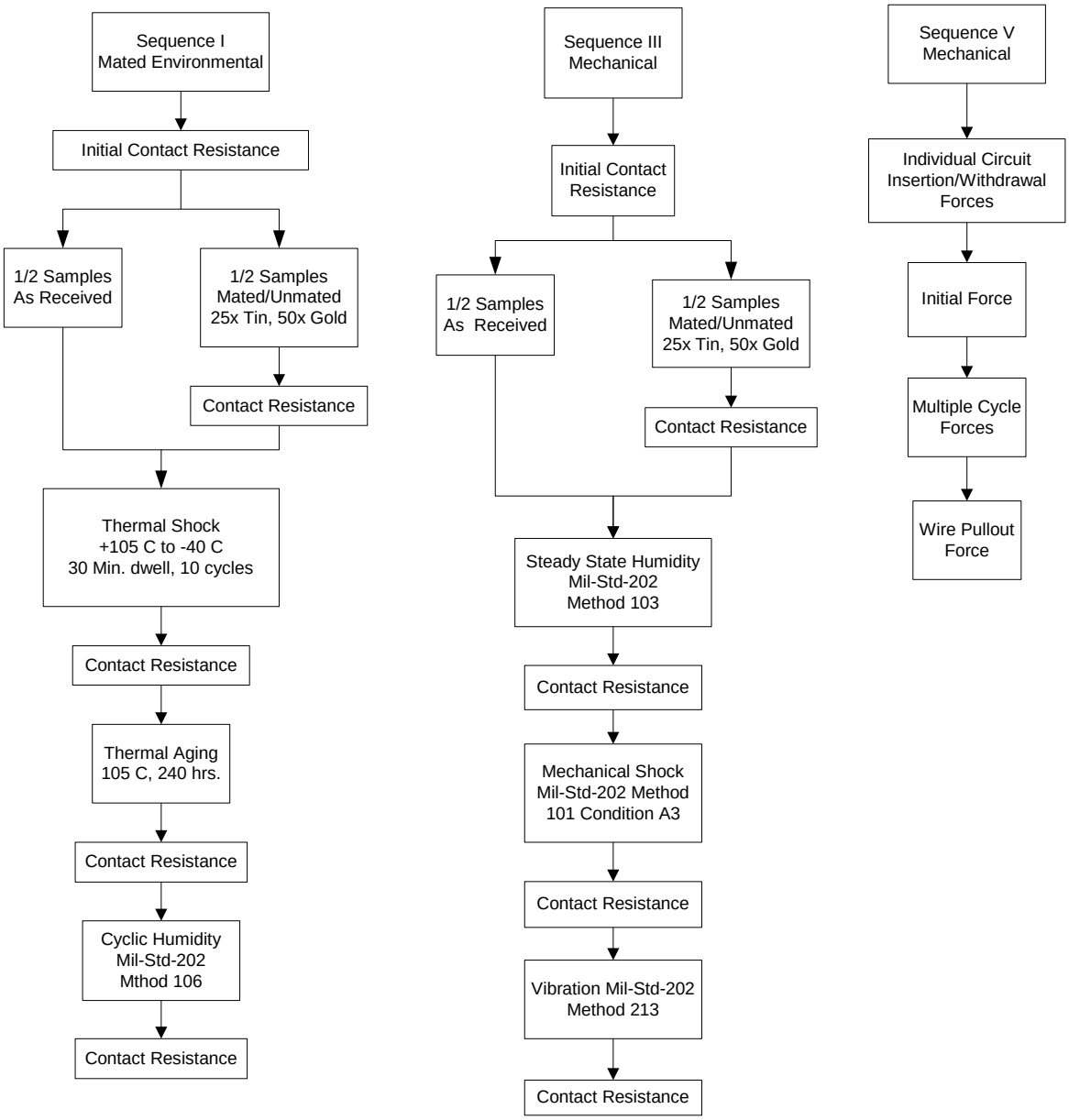
7.0 TEST SEQUENCES



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8.0 SOLDER INFORMATION

Molex Solderability Specification SMES-152
(Click Here)

8.1 SOLDER PROCESS TEMPERATURES

Wave Solder: 265°C Max
Reflow Solder: 260°C Max

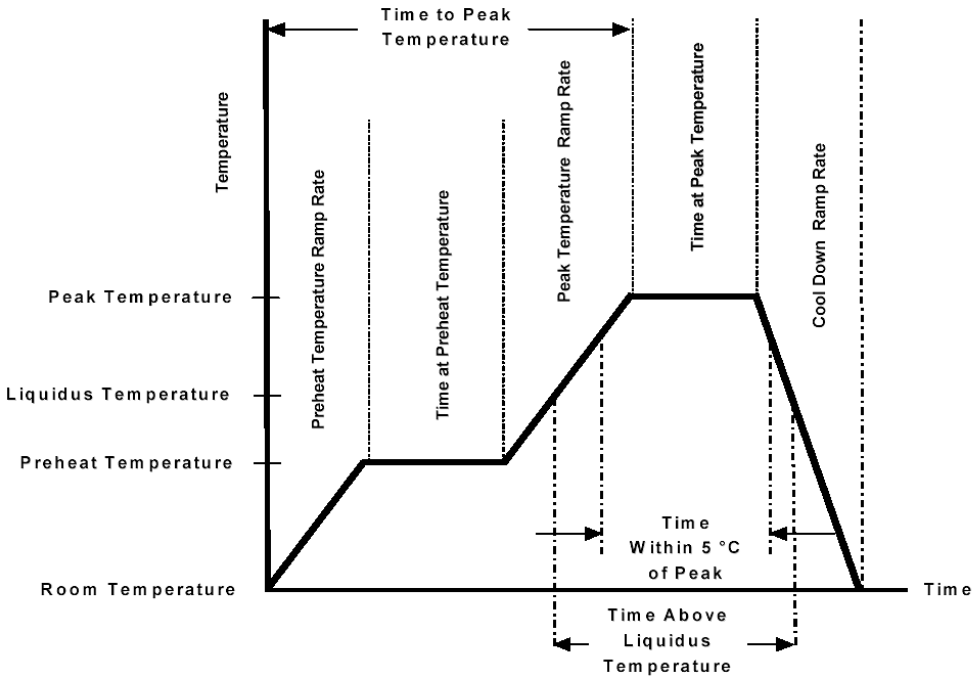
HEADER PROCESS DATA:

Peak Temperature: 260°C Max (171971-171977 Hdr only)
Peak Temperature: 245°C Max (all other Hdr)
Time within 5°C of peak temperature: 40 seconds Max
Cycles: 3 cycles thru solder process Max.

8.2 REFLOW SOLDERING PROFILE

(This profile is per AS-40000-5013 and is provided as a guideline only. Please see notes for additional information)

Molex Connector Heat Resistance Specification
AS-40000-5013
(Click Here)



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Description	Requirement
Average Ramp Rate	3°C/sec Max
Preheat Temperature	150°C Min to 200°C Max
Preheat Time	60 to 180 sec
Ramp to Peak	3°C/sec Max
Time over Liquidus (217°C)	60 to 150 sec
Peak Temperature	260 +0/-5°C
Time within 5°C of Peak	20 to 40 sec
Ramp - Cool Down	6°C/sec Max
Time 25°C to Peak	8 min Max

Notes:

1. Temperature indicated refers to the PCB surface temperature at solder tail area.
2. Connector can withstand 1 reflow cycle.
3. Actual reflow profile also depends on equipment, solder paste, PCB thickness, and other components on the board. Please consult your solder paste & reflow equipment manufacturer for their recommendations to adopt a suitable process.

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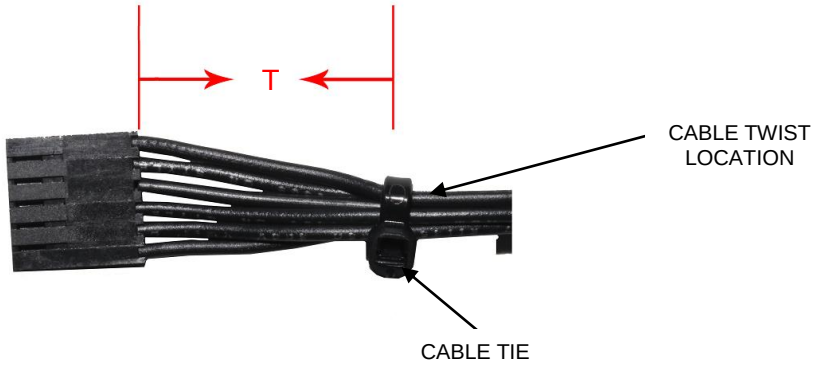
9.0 PACKAGING

Parts shall be packaged to protect against damage during normal handling, transit and storage. Refer Molex.com specific part number webpage to get the exact packaging document for that item.

10.0 CABLE TIE AND/OR WIRE TWIST LOCATION

Circuit Sizes			Dimension T Minimum
2	4	6	0.50” (12.7mm)
8			0.75” (19.1mm)
10	12		1.00” (25.40mm)
14	16		1.25” (31.75mm)
18	20		1.50” (38.09mm)
22	24		1.75” (44.45mm)



The “T” dimension defines a “free” length of wire, or a length of wire that is not subject to
significant bias by external factors such as a wire tie, wire twisting, or other means of bending or deforming of the wires that repositions them from their natural relaxed state or location where they enter the housing. Wires are to be dressed in such a manner to allow the terminals to float freely in the pocket. This dimension is general recommendation and may need to be adjusted for different wire gauges and wire type and insulation thickness and insulation material.

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