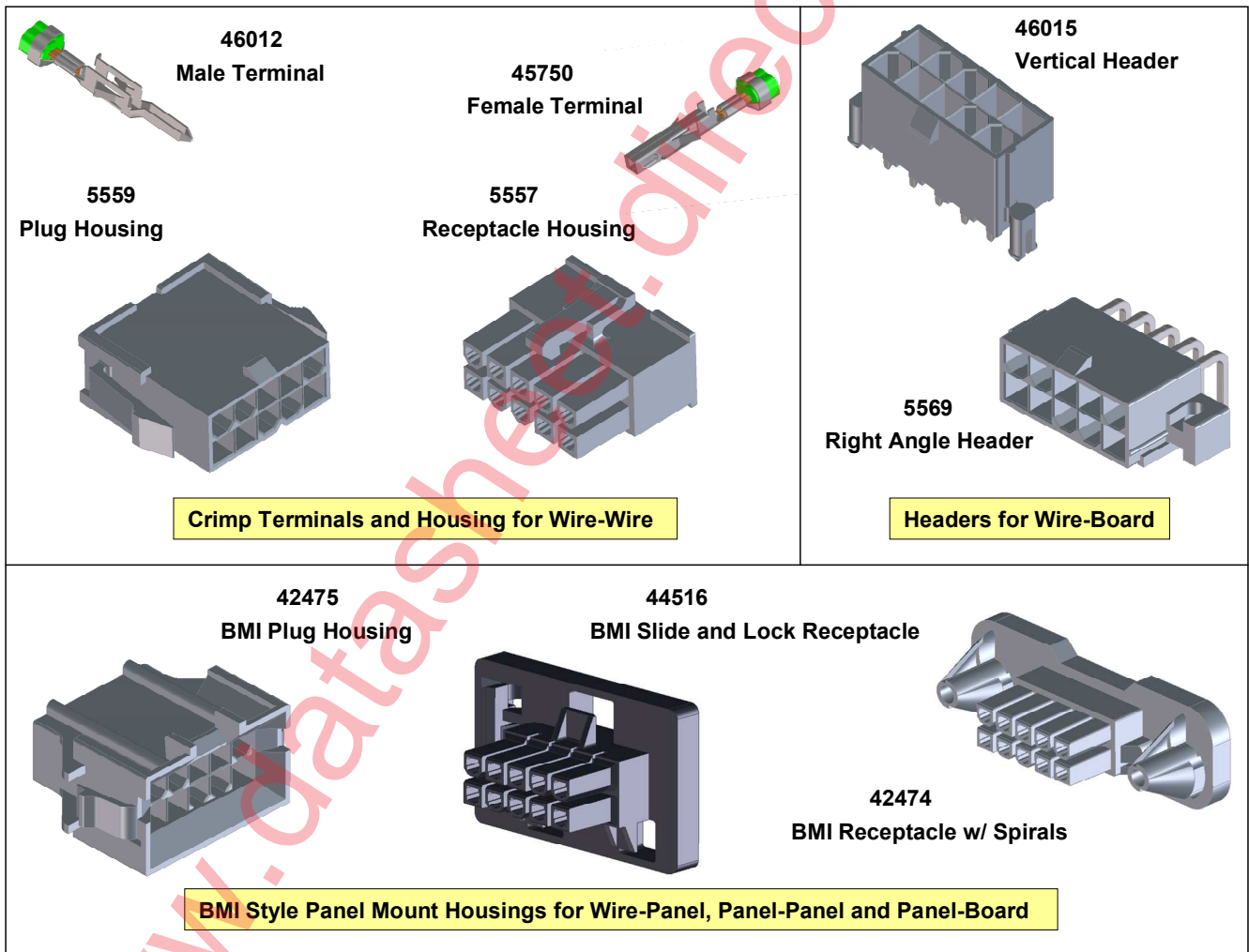




PRODUCT SPECIFICATION

PRODUCT SPECIFICATION FOR Mini-Fit Plus HCS™

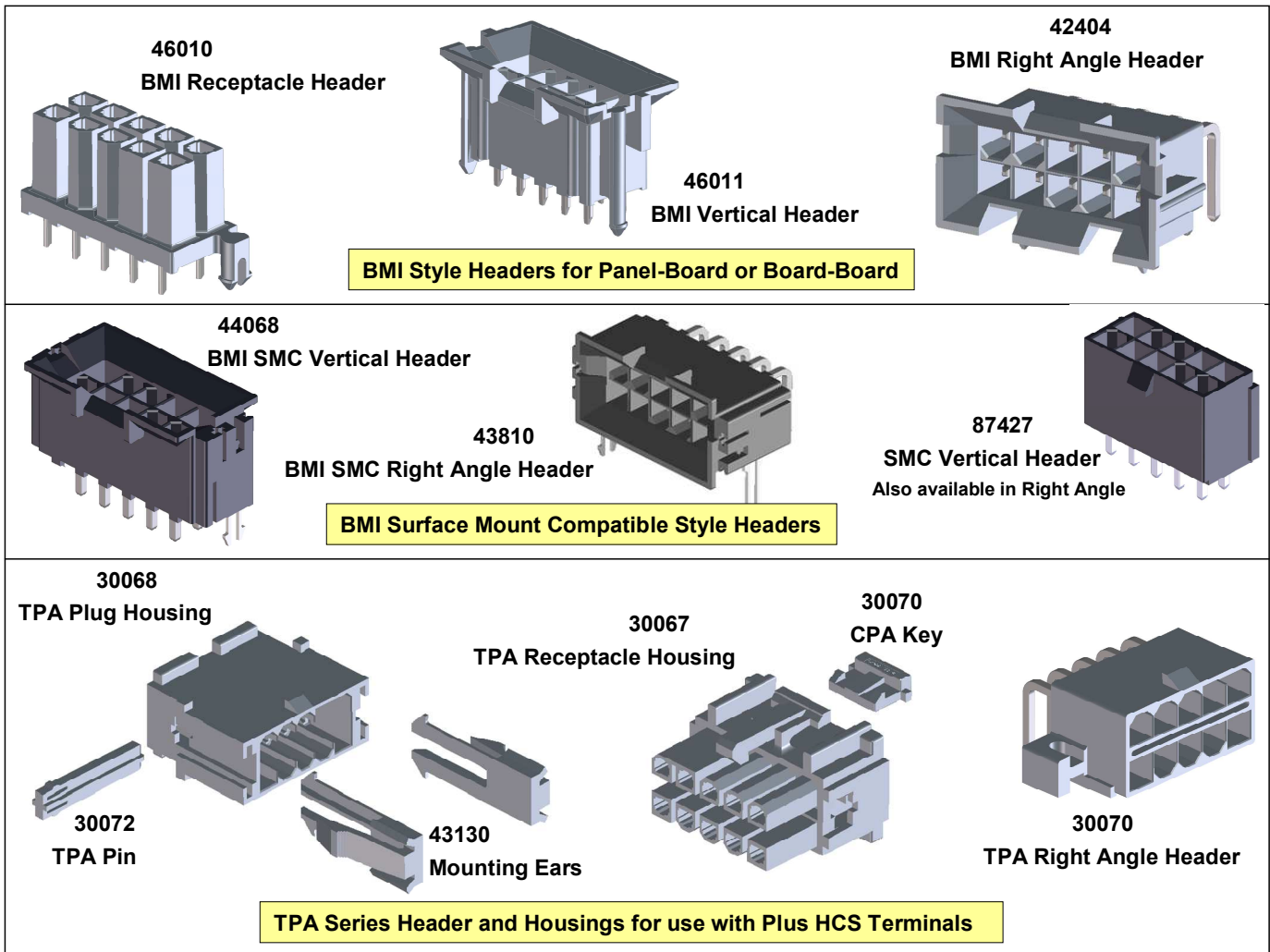
INTERCONNECT SYSTEMS



| | | | |
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PRODUCT SPECIFICATION



Product feature designations:

- BMI Blind Mate Interface – features allowing easier alignment in panel-board and board to board applications.
- SMC Surface Mount Compatible - reflow solder temperatures up to 245°C.
- TPA Terminal Position Assurance – helps ensure crimp terminals are fully engaged and prevents terminals from backing out in high vibration applications.
- CPA Connector Position Assurance – assures housing cannot be inadvertently disengaged.

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PRODUCT SPECIFICATION

MINI-FIT PLUS HCS

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PRODUCT SPECIFICATION

1.0 SCOPE

This Product Specification covers the electrical, mechanical and environmental performance requirements for the **Mini-Fit Plus HCS™** (High Current System) in 4.20 mm (.165 inch) pitch. The **Mini-Fit Plus HCS™** uses contacts stamped in High Performance Alloy for increased current carrying capacity, while maintaining properties at elevated operating temperatures. Wire-Wire, Wire-Panel, Wire-Board, Panel-Panel, Panel-Board, and Board-Board configurations in Tin and Gold plated systems. Crimp terminals accept 16 to 20 AWG stranded wire.

2.0 PRODUCT DESCRIPTION

2.1 SERIES NUMBERS, DESCRIPTION, SALES DRAWING NUMBERS

| SERIES | DESCRIPTION | SALES DRAWING | TPA | BMI | SMC | AGENCY APP'L |
|----------------------------|--|-----------------------------------|-----|-----|-----|--------------|
| CRIMP TERMINALS | | | | | | |
| 45750 | Female Crimp Terminal | SD-46012-001 | | | | NA |
| 46012 | Male Crimp Terminal | SD-45750-001 | | | | NA |
| HOUSINGS | | | | | | |
| 5557 | Receptacle Housing | SD-5557-003 | | | | U,C,T |
| 5559 | Plug Housing | SD-5559-NP | | | | U,C,T |
| 42475 | Panel Mount BMI Plug Housing | SD-42475-***1 | | X | | U,C,T |
| 43770 | Panel Mount Plug Housing, 36 Ckt | SD-43770-001 | | X | | U,C,T |
| 42474 | Panel Mount Receptacle Housing | SD-42474-**** | | X | | U,C,T |
| 43974 | Panel Mount Receptacle Hsg 40 Ckt | SD-43974-005 | | | X | U,C,T |
| 44516 | Panel Mount Receptacle Housing, Slide-and-Lock | SD-44516-00* | | X | | U,C |
| 30067 | TPA Receptacle Housing | SD-30067-* | X | | | U,C,T |
| 30068 | Panel Mount TPA Plug Housing | SD-30068-* | X | X | | U,C,T |
| VERTICAL HEADERS | | | | | | |
| 44068 | Vertical BMI SMC Header, solid pin | SD-44068-031 | | X | X | U,C,T |
| 46010 | Vertical PCB Receptacle Header | SD-46010-001 | | X | | U,C |
| 46011 | Vertical BMI Header | SD-46011-001 | | X | | U,C |
| 46014 | Vertical Header, single row | SD-46014-001 | | | | U,C |
| 46015 | Vertical Header, dual row | SD-46015-001 | | | | U,C |
| 87427 | Vertical SMC Header | SD-87427-***4* | | | X | U,C |
| RIGHT ANGLE HEADERS | | | | | | |
| 5569 | Right Angle Header | SD-5569-002 | | | | U,C,T |
| 30070 | Right Angle TPA Header with mounting flanges | SD-30070-001 | X | | | U,C,T |
| | | SDA-30070-**** | | | | |
| 42404 | Right Angle BMI Header | SDA-42404-**** | | X | | U,C,T |
| 43810 | Right Angle BMI SMC Header | SD-43810-0** | | X | X | U,C,T |
| 43973 | Right Angle Header, 40 Ckt | SD-43973-00* | | X | X | U,C,T |
| 45567 | Right Angle Header, 36 Ckt | SD-45567-001 | | X | | U,C |
| 87427 | Right Angle SMC Header | SD-87427-***0*, -***1*, -***2* | | | X | U,C |

Agency Approval designations:

U-UJL C-CSA T-TUV

| | | | |
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PRODUCT SPECIFICATION

2.2 DIMENSIONS, MATERIALS, PLATINGS AND MARKINGS

For details regarding dimensions, materials and terminal platings, refer to the appropriate sales drawings for further information.

2.3 SAFETY AGENCY APPROVALS

UL File: E29179
CSA Certificate: LR19980
TUV Certificate: R72081037

3.0 APPLICABLE STANDARDS AND SPECIFICATIONS

- EIA-364-1000
- Molex solderability specification SMES-152

4.0 PACKAGING

Parts shall be packaged to protect against damage during normal handling, transit and storage. For details refer to the Packaging Specification as called out on the applicable product Sales Drawing.

5.0 RATINGS

5.1 VOLTAGE

600 Volts AC RMS or 600 Volts DC

5.2 APPLICABLE WIRES

| WIRE GAUGE | INSULATION DIAMETER |
|------------|--|
| 16 AWG | 1.80-3.10 millimeters / .071-.122 inches |
| 18-20 AWG | 1.65-2.95 millimeters / .065-.116 inches |

5.3 TEMPERATURE RATING

Mini-Fit Plus HCS has a field temperature of 65°C and field life rating for 10 years based on testing per EIA-364-17B, Method A.

5.4 WAVE SOLDER PROCESS TEMPERATURE

Headers with molded pegs: 240°C MAX.
Headers without pegs: 265°C MAX

5.5 DURABILITY (MATING CYCLES)

Tin: 100 cycles
Gold: 250 cycles

Durability ratings established as tested per Durability Test Procedures described by EIA-364-09C and meet requirements for low level contact resistance and DWV as prescribed per EIA-364-1000 Test Sequence Group 7.

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PRODUCT SPECIFICATION

5.6 MAXIMUM CURRENT RATING (AMPERES)**

| WIRE-TO-WIRE | | | | | | | | | |
|--------------|--------------------------|-------|-----|------------------------|------|------|--------|------------|------------|
| Wire Size | Single Row Circuit Sizes | | | Dual Row Circuit Sizes | | | | | |
| | 3 | 4 | 5 | 2 | 4 | 6, 8 | 10, 12 | 14, 16, 18 | 20, 22, 24 |
| 16 AWG | 13A | 12.5A | 12A | 13A | 12A | 11A | 10.5A | 10A | 9.5A |
| 18 AWG | 11A | 10.5A | 10A | 11A | 10A | 9A | 8.5A | 8A | 7.5A |
| 20 AWG | 9.5A | 9A | 9A | 9.5A | 8.5A | 8A | 7.5A | 7A | 6.5A |

| WIRE-TO-BOARD | | | | | | | | | |
|---------------|--------------------------|------|-------|------------------------|-------|------|--------|------------|------------|
| Wire Size | Single Row Circuit Sizes | | | Dual Row Circuit Sizes | | | | | |
| | 3 | 4 | 5 | 2 | 4 | 6, 8 | 10, 12 | 14, 16, 18 | 20, 22, 24 |
| 16 AWG | 12.5A | 12A | 11.5A | 12.5A | 11.5A | 10A | 9A | 8.5A | 8.0A |
| 18 AWG | 10.5A | 10A | 9.5A | 10.5A | 9.5A | 8.5A | 8A | 7.5A | 7A |
| 20 AWG | 9A | 8.5A | 8.5A | 9A | 8A | 7A | 6.5A | 6A | 5.5A |

| BOARD-TO-BOARD | | | | | | |
|------------------------|-----|------|--------|------------|------------|--|
| Dual Row Circuit Sizes | | | | | | |
| 2 | 4 | 6, 8 | 10, 12 | 14, 16, 18 | 20, 22, 24 | |
| 11.5A | 11A | 9.5A | 8A | 6.5A | 5A | |

** Ratings shown represent *MAXIMUM* current carrying capacity of a fully loaded connector with all circuits powered. Ratings are based on a 30°C maximum temperature rise limit over ambient (room temperature). Testing conducted with tinned copper conductor stranded wire. Above charts are intended as a guideline. Current rating is application dependent. Appropriate de-rating is required depending on factors such as higher ambient temperature, smaller copper weight of PCB traces, gross heating from adjacent modules or components and other factors that influence connector performance.

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PRODUCT SPECIFICATION

6.0 PRODUCT PERFORMANCE TESTS & REQUIREMENTS

6.1 ELECTRICAL REQUIREMENTS

| ITEM | TEST | TEST PROCEDURE | REQUIREMENT |
|------|---|--|---|
| 1 | Contact Resistance (Low Level) | EIA-364-23: Mate connectors; apply a maximum voltage of 20 mV and a current of 100 mA. Wire resistance shall be removed from the measured value. | 10 mΩ Maximum Initial resistance for each test sequence. Resistance measurements for subsequent tests are the Maximum change from Initial as specified. |
| 2 | Insulation Resistance | Mate connectors: apply a voltage of 500 VDC between adjacent terminals and between terminals to ground. | 1000 Megohms MINIMUM |
| 3 | Dielectric Withstanding Voltage | EIA-364-20: Apply a voltage of 1500 VAC for 1 minute between adjacent contacts. | No breakdown. Current leakage < 5 mA |
| 4 | Temperature Rise (via Current Cycling) | EIA-364-70 (Temperature Rise) & EIA-364-55 (Current Cycling): Apply current to mated connectors & incrementally increase until specified T-Rise is reached to establish rated current. Measure the T-Rise at the rated current after 96 hours, during current cycling (45 minutes ON and 15 minutes OFF per hour) for 240 hours, and after final 96-hour steady state. | Temperature rise: +30°C MAXIMUM |

6.2 MECHANICAL REQUIREMENTS

| ITEM | TEST | TEST PROCEDURE | REQUIREMENT |
|------|--|--|--|
| 1 | Terminal Mate / Unmate Forces Per Circuit for: Wire – Wire; Wire – Board (formed pin header); and Wire – Board (solid pin header) | Mate and unmate female to male crimp terminal or female terminal to header at a rate of 25 ± 6 mm (1 ± ¼ inch) per minute. Testing to be conducted with individual (single) circuit. Measure and record the maximum mate and unmate forces across 5 mating cycles. | Tin, W-W & W-B (formed pin): Mate: 15.6 N (3.50 lbf) MAX. Unmate: 13.8N (3.10 lbf) MAX. Gold, W-W & W-B (formed pin): Mate: 4.9 N (1.10 lbf) MAX. Unmate: 4.0 N (0.91 lbf) MAX. Tin, W-B (solid pin): Mate: 10.5 N (2.36 lbf) MAX. Unmate: 11.0N (2.47 lbf) MAX. Gold, W-B (solid pin): Mate: 3.4 N (0.77 lbf) MAX. Unmate: 2.8 N (0.63 lbf) MAX. |

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PRODUCT SPECIFICATION

6.2 MECHANICAL REQUIREMENTS (CON'D)

| ITEM | TEST | TEST PROCEDURE | REQUIREMENT |
|------|--|---|---|
| 2 | Normal Force | Apply a perpendicular force simultaneously to each beam until the desired total deflection is achieved. Return to original size, then deflect beams a second time and measure normal force. | 3.5 N (360 g) MINIMUM |
| 3 | Durability | Per EIA-364-09C, mate connectors 100 cycles for tin plated product, 250 cycles for gold plated product at a maximum rate of 500 cycles per minute. | 10 mΩ Max. chg. from Initial; Visual: No Damage |
| 4 | Durability (preconditioning) | Mate connectors by hand, 20 cycles for tin plated product, 50 cycles for gold as required prior to environmental test sequence as indicated. | Visual: no damage |
| 5 | Reseating | Unmate / mate connectors by hand three cycles. | Visual: no damage |
| 6 | Vibration (Random) | EIA 364-28: Mate connectors and vibrate per, test condition VII. | 10 mΩ Max. chg. from Initial; Discontinuity < 1 microsecond |
| 7 | Crimp Terminal Insertion Force (into housing) | Apply an axial insertion force on the terminal at a rate of 25 ± 6 mm (1 ± ¼ inches). | 15.0 N (3.37 lbf) MAXIMUM insertion force |
| 8 | Crimp Terminal Retention Force (in housing) | Axial pullout force on the terminal in the housing at a rate of 25 ± 6 mm (1 ± ¼ inch) per minute. | 30 N (6.74 lbf) MINIMUM retention force |
| 9 | Wire Crimp Retention | Apply an axial pullout force on the wire at a rate of 25 ± 6 mm (1 ± ¼ inches) per minute. | 16 Awg = 68.4 N (15.4 lbf) Min. 18 Awg = 68.4 N (15.4 lbf) Min. 20 Awg = 58.7 N (13.2 lbf) Min. |
| 10 | Thumb Latch Operation Force | Depress latch at a rate of 25 ± 6mm (1 ± ¼ inches) per minute. | 16.7 N (3.75 LBF) MAX. |
| 11 | Thumb Latch Yield Strength | Manually mate and unmate unloaded housings for 30 cycles. Following the 30 th mate, pull apart housings in an axial direction at a rate of 25 ± 6mm (1 ± ¼ inches) per minute. | 75.2 N (16.9 LBF) MIN. |

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6.2 MECHANICAL REQUIREMENTS (CON'D)

| ITEM | TEST | TEST PROCEDURE | REQUIREMENT | |
|------|---|---|--|------------------------------|
| 12 | Header Solid Pin Retention Force in Housing | Axial pullout force on the terminal in the housing at a rate of 25 ± 6 mm (1 ± ¼ inch) per minute. | Tin | 4.45 N (1.00 lbf) MINIMUM |
| | | | Gold | 4.45 N (1.00 lbf) MINIMUM |
| 13 | Header Stamped Pin Retention Force in Housing | Axial pullout force on terminal from housing at a rate of 25 ± 6 mm (1 ± ¼ inch) per minute. | 30 N (6.74 lbf) MINIMUM retention force | |
| 14 | PCB Peg Engagement and Separation Forces | Engage and separate a connector at a rate of 25 ± 6 mm (1 ± ¼ inch) per minute. (Applies to parts with PCB retention features only) | 98.0 N (22.0 lbf) MAX. insertion force; 10.0 N (2.24 lbf) MIN. withdrawal force | |

6.3 ENVIRONMENTAL REQUIREMENTS

| ITEM | TEST | TEST PROCEDURE | REQUIREMENT |
|------|---|---|--|
| 1a | Temperature Life Group 1 | Per EIA-364-17, method A: mate connectors and expose to 240 hours at 105 ± 2°C. | 10 mΩ Max. chg. from Initial; Visual: No Damage |
| 1b | Temperature Life (preconditioning) Groups 3 & 5 | Per EIA-364-17, method A: mate connectors and expose to 120 hours at 105 ± 2°C. | 10 mΩ Max. chg. from Initial; Visual: No Damage |
| 1c | Temperature Life (preconditioning) Group 4 | Per EIA-364-17, method A: mate connectors and expose to 300 hours at 105 ± 2°C. | 10 mΩ Max. chg. from Initial; Visual: No Damage |
| 2 | Thermal Shock | Per EIA-364-32, method A, test condition I, test duration A-4: mate connectors and expose for 10 cycles between -55°C and 105° C; dwell 0.5 hours at each temperature. | 10 mΩ Max. chg. from Initial; Visual: No Damage Dielectric Strength per 5.1.3 Insulation Resistance per 5.1.2 |
| 3 | Cyclic Temperature & Humidity | Per EIA-364-31, method III w/o conditioning, initial measurements, cold shock and vibration. Cycle mated connectors between 25°C ±3°C @ 80% ±3% RH and 65°C ±3°C @ 50% ±3RH. Ramp time: 0.5 hr.; dwell time: 1 hr. Perform 24 cycles. | 10 mΩ Max. chg. from Initial; Visual: No Damage |

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6.3 ENVIRONMENTAL REQUIREMENTS (CON'D)

| | | | |
|---|--|--|--|
| 4 | Mixed Flowing Gas | Per EIA-364-65 with Class IIA gas concentrations following Telcordia Specification GR1217. | 10 mΩ Max. chg. from Initial; Visual: No Damage |
| 5 | Thermal Cycling | Per EIA-364-1000 Test Group 5: Cycle mated connector between 15°C±3°C and 85°C±3°C as measured on the part. Ramps should be a minimum of 2°C per minute, and dwell times should insure contacts reach the temperature extremes (minimum of 5 minutes). Humidity is not controlled. Perform 500 cycles. | 10 mΩ Max. chg. from Initial; Visual: No Damage |
| 6 | Solderability | Per SMES-152 | Solder coverage: 95% MINIMUM (per SMES-152) |
| 7 | Solder Temperature Heat Transfer Resistance | Expose connector terminals tails to wave solder process. Dwell time duration: 5 ± 0.5 seconds; Solder Temperature: 260 ± 5°C | Visual: No Damage to the insulator where terminal or pin locks to the connector housing. |

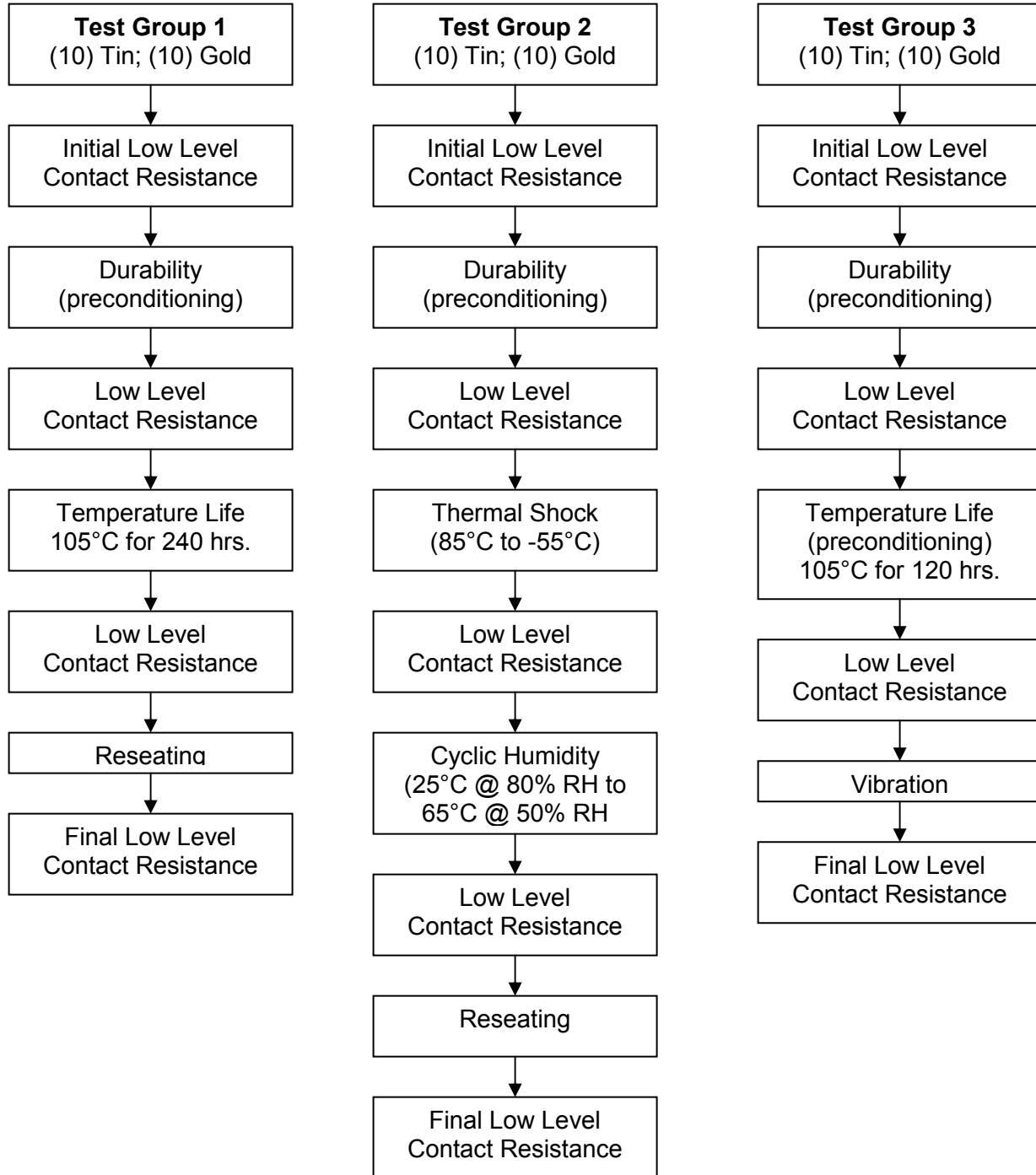
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PRODUCT SPECIFICATION

7.0 TEST SEQUENCES

Environmental test sequences for Groups 1, 2, 3, 5 and 7 performed in accordance with EIA-364-1000. Sequence for Group 4 per Nortel Optical Networks specification test plan.

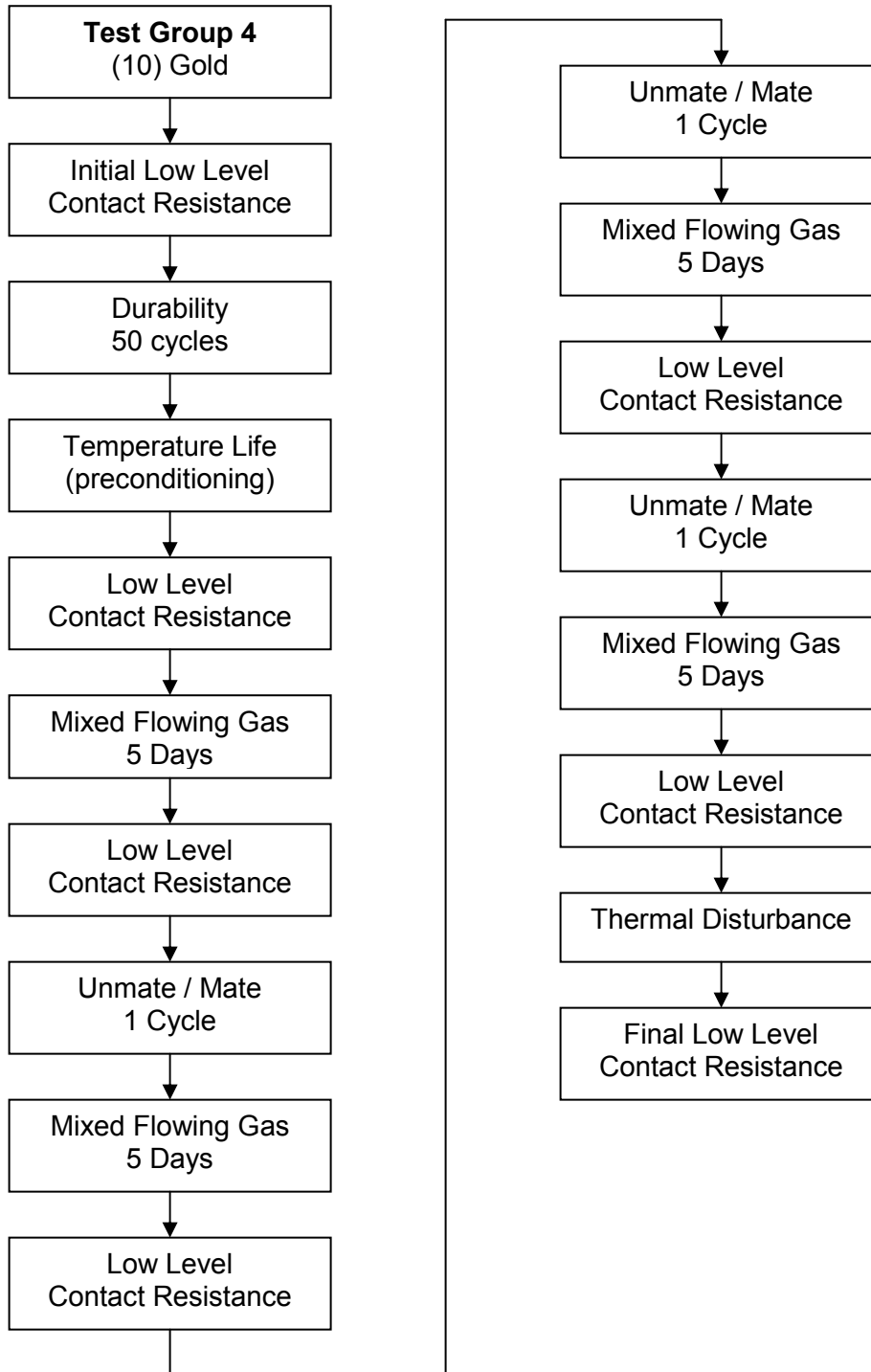


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7.0 TEST SEQUENCES (CON'D)

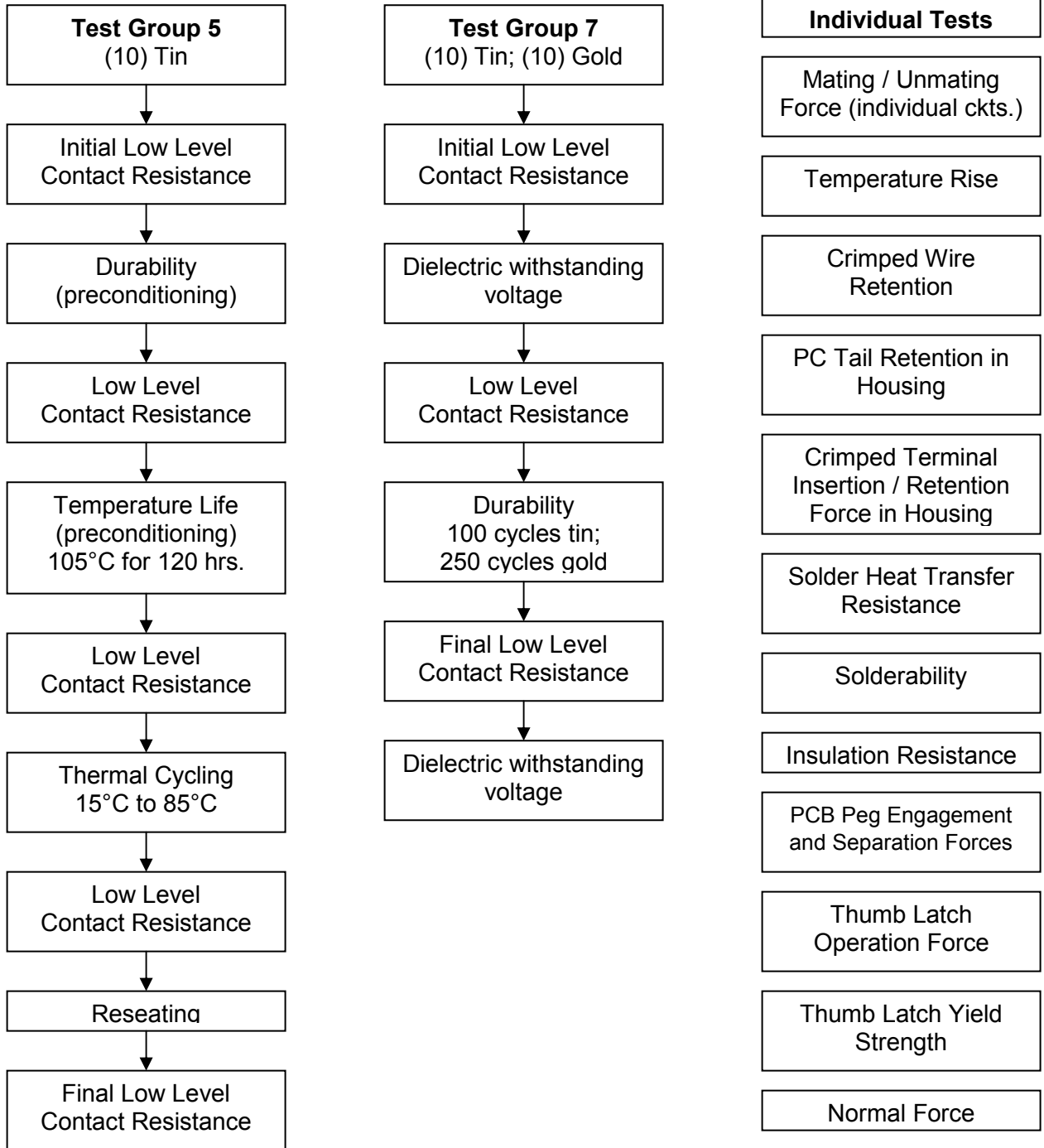


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7.0 TEST SEQUENCES (CON'D)



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