



# PRODUCT SPECIFICATION

## 1.0 SCOPE

- 1.1 This specification details the mechanical, electrical and environmental performance of the 71973 and 71979 connector series. The 71973 series connector is designed to be a through hole soldered to a PCB and the 71979 series connector is designed to be a surface mount interface. Mating connectors shall have .025 square or round posts with axis' parallel to the plane of the PCB to which the connectors are soldered.
- 1.2 Classification Assignments  
The types covered in this specification are as follows:  
A-71973-\*\*\*\*                      4 digit code to identify plating,  
A-71979-\*\*\*\*                      mounting and circuit size options.

## 2.0 PRODUCT DESCRIPTION

- 2.1 Dual Row horizontal receptacle for vertical board stacking.
- 2.2 Available in circuit sizes from 8 to 130 in increments of 2.
- 2.3 End to End stackable.
- 2.4 Mates to .100" grid dual row .025" post headers.
- 2.5 Accommodates suction end effector for auto-placement.
- 2.6 Early mate dual beam contact.

## 3.0 APPLICABLE DOCUMENTS AND SPECIFICATIONS

- 3.1 All documents referenced shall be of the latest revision.
- 3.2 The order of precedence detailing requirements of this specification shall be as follows:
  - 1. Product Drawings
  - 2. This Specification
  - 3. Reference Documents
- 3.3 Reference Documents
  - 3.3.1 MIL-STD-202: Test methods for electronics and electrical component parts.
  - 3.3.2 MIL-STD-1344: Test methods for electrical connectors.
  - 3.3.3 ASTM B103 – Alloy 521
  - 3.3.4 QQ-N-290: Nickel plating
  - 3.3.5 MIL-G-45204: Gold plating
  - 3.3.6 MIL-T-10727: Tin plating
  - 3.3.7 MIL-M-24519: Molded plastics
  - 3.3.8 UL 94: Tests for flammability of plastic materials.

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<b>DOCUMENT NUMBER:</b> <b>PS-71973-9999</b>	<b>CREATED / REVISED BY:</b> <b>DBRINKMAN/MIBARRA</b>	<b>CHECKED BY:</b> <b>BBARKER</b>	<b>APPROVED BY:</b> <b>SMILLER</b>



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## 4.0 AMBIENT CONDITIONS

- 4.1 Ambient conditions for qualifications shall be :
- Temperature :  $25^{\circ} \pm 5^{\circ}$
  - Relative Humidity :  $50\% \pm 20\%$
  - ATM Pressure : 650-800 MM HG

## 5.0 GENERAL REQUIREMENTS

- 5.1 Design construction and physical dimensions shall be as specified on the A-71973-\* and A-71979-\* Product Drawings.
- 5.2 Traceability  
Connectors shall be manufactured and date coded. All products in a lot shall have been manufactured under similar conditions. The minimum conditions shall include location of manufacture and time period.
- 5.3 Materials
- 5.3.1 Housing: 94 V-0 Glass filled LCP  
Oxygen Index greater than 28.  
Color: Black.
  - 5.3.2 Terminal: Phosphor Bronze, per ASTM-B103
- 5.4 Plating
- 5.4.1 All Tin finished to be per MIL-T-10727.
  - All Gold finished to be per MIL-g-45204, Type II, Grade C, Class I.
  - All Nickel finished to be per QQ-N-290, Class II.
- 5.5 Minimum Mating Pin Length: .200" Both Rows.
- 5.6 Sides of square pins must be parallel with axis of row within  $\pm 5^{\circ}$ .
- 5.7 Agency Approvals
- 5.7.1 U.L. Recognition – File No. E29179
  - 5.7.2 CSA Certification – File No. LR19980

## 6.0 ELECTRICAL

- 6.1 Insulation Resistance
- 6.1.1 Insulation resistance when tested per MIL-STD-202, Method 302, Condition B at ambient shall be as follows:
    - 1.) 5000 Mega Ohms Minimum Initially
    - 2.) 1000 Mega Ohms Minimum Following humidity

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## 6.2 Dielectric Withstand Voltage

6.2.1 Dielectric withstanding voltage shall be 500 VAC minimum at sea level. There shall be no breakdown or flash-over between adjacent contacts and leakage current shall not exceed 5.0 milliamps when unmated connectors are tested per MIL-STD-202, method 301.

## 6.3 Contact Resistance (Low Level)

6.3.1 Defined as the normal bulk resistance plus constriction resistance. The maximum value shall not exceed 20 milliohms total with a maximum change of 10 milliohms from initial following all stress tests. The method of measurement shall be per MIL-STD-1344A, Method 3002.1.

## 6.4 Current Rating

6.4.1 2.0 Amps DC or AC RMS per contact with no more than 30°C temperature rise above ambient. All contacts wired in series.

6.4.2 1.0 Amps DC or AC RMS per contact at 70°C with 30°C maximum temperature rise. All contacts wired in series.

6.4.3 3.0 Amps DC or AC RMS at 70°C with 30°C maximum temperature rise. Single Contact under Load.

## 7.0 MECHANICAL

### 7.1 Mating Force

7.1.1 The Force to mate a connector pair shall be per tables "A" and "B" when tested per MIL-STD-1344, Method 2013 for the following conditions:

- 1.) Ambient Conditions
- 2.) Following 10 days at 105°C in mated state
- 3.) Non-rigid fixturing of connector pairs
- 4.) 10 inches per minute maximum cycling rate

Table "A" – Gold/Gold System – Ambient Conditions

<u>Condition</u>	<u>Mate Force (Maximum Average/Circuit)</u>
Initial	5 Ounces
10 Cycles	5 Ounces
25 Cycles	5 Ounces
50 Cycles	5 Ounces

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Table "B" – Gold/Gold System – Aged 10 days at +105°C

<u>Condition</u>	<u>Mate Force (Maximum Average/Circuit)</u>
Initial	5 Ounces
10 Cycles	5 Ounces
25 Cycles	5 Ounces
50 Cycles	5 Ounces

Example: Maximum Initial Force required to mate a 40-circuit connector is  
[5 OZ. maximum average/circuit] X 40 CKTS. = 200 OZ.

## 7.2 Individual Insertion/Withdrawal Forces

7.2.1 The Force to insert and withdrawal a gauge pin shall be per table "C" when tested per MIL-STD-1344, Method 2014 for the following conditions:

- 1.) Polished steel gauge pins per Figure 1.  
Insertion: .0260+.0000,-.0001 SQ.  
Withdrawal: .0240+.0001,-.0000 SQ.
- 2.) Insertion Depth to be .125" form the point at which gauge makes contact with terminal beams.
- 3.) Procedure I shall be used.

Table "C" – Gold/Gold System

<u>Condition</u>	<u>Maximum Insertion Force</u>	<u>Minimum Withdrawal Force</u>
Initial	10 Ounces	1 Ounce
After 100 Cycles	10 Ounces	1 Ounce

## 7.3 Normal Force

7.3.1 The minimum normal force shall be 100 grams following thermal aging per paragraph 8.4.1 and 100 mating/unmating cycles per paragraph 7.4.1 when tested at minimum deflection as caused by an .025"±.001" square pin.

## 7.4 Durability

7.4.1 For the given plating options, the connectors shall meet the requirements of paragraph 6.3 and 7.3 after exposure to the prescribed conditioning:

7.4.1.1 50 microinches Gold over 50 microinches nickel:  
Conditioning: 100 mate/unmate precycles followed by 17 hours of flowers of sulfur per Molex test procedure followed by 1 mate/unmate interrupt cycle.

7.4.1.2 30 microinches Gold over 50 microinches nickel:  
Conditioning: 50 mate/unmate precycles followed by 17 hours of flowers of sulfur per Molex test procedure followed by 1 mate/unmate interrupt cycle.

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- 7.5 Terminal Strength
  - 7.5.1 Solder tails shall withstand two hand bending cycles per MIL\_STD-202, Method 211A, Condition "B" with no evidence of breaking or cracking of the base metal at 20X.
- 7.6 Porosity
  - 7.6.1 Unconditioned contacts having 50 microinches Gold or greater shall meet the porosity requirements of Molex Engineering Standard ES-70688. The average corrosion count shall not exceed one.
- 7.7 Solderability
  - 7.7.1 All terminals shall have 95% coverage per the requirements of MIL\_STD\_202, Method 208 with the following conditions:
    - 1.) Tin Plating: Per QQ-S-571, Type S
    - 2.) Solder Temperature: 235°C±5°C
    - 3.) Flux Type: mildly activated type RMA per MIL-F-14256
    - 4.) Depth of Immersion: .120"/(3.0 mm)
- 7.8 Contact Retention
  - 7.8.1 The force to pull contact tails when aligned parallel to the mating axis shall be 2.5 lbs. minimum. The contacts shall remain in their initial position in the housing.

## 8.0 ENVIRONMENTAL

- 8.1 Resistance to Cleaning Solvents
  - 8.1.1 Any markings shall remain legible and no damage or deterioration of the connector shall occur when tested for MIL\_STD\_202, Method. The following solvents shall be used:
    - 1.) 1-1-1 trichloroethane
    - 2.) Freon TMC and TMS
- 8.2 Temperatures
  - 8.2.1 The product is designed to operate at -40°C (See Sheet 7) to 105°C Continuous (See 7.7.1 & 8.7.1)
- 8.3 Thermal Shock
  - 8.3.1 There shall be no evidence of any physical damage and connectors shall meet the dimensional requirements of the product drawing and contact resistance of paragraph 6.3. When the mated connectors are tested per MIL\_STD-202, Method 107, Condition A-1.
- 8.4 Temperature Life
  - 8.4.1 The requirements of paragraph 6.3 and 7.3 shall be met following thermal life per MIL-STD-202, Method 108, Test Condition C (500 Hours at 105°C) connectors shall remain mated throughout the test.

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- 8.5 Humidity (Cyclical)
  - 8.5.1 There shall be no evidence of physical damage, or discoloration and the requirements of paragraphs 6.1, 6.2, and 6.3 shall be met following testing per MIL-STD-1344, Method 1002, Type II, 96 hours (Omit Steps 7A and 7B) with the following conditions:
    - 1.) Connectors shall be mated during exposure.
- 8.6 Humidity (Steady State)
  - 8.6.1 There shall be no evidence of physical damage, or discoloration or corrosion and the requirements of paragraphs 6.1, 6.2, and 6.3 shall be met following testing per MIL-STD-202, Method 103, Condition A. The following conditions apply:
    - 1.) No polarizing voltage measurement shall be taken.
- 8.7 Resistance to Solder Heat
  - 8.7.1 There shall be no evidence of any physical damage and the connectors shall meet the dimensional requirements of the product drawing following:
    - 1.) MIL-STD-202, Method 210, test Condition C (260°C, 10 seconds).
    - 2.) Standard wave soldering process.
- 8.8 Vibration
  - 8.8.1 There shall be no evidence of any physical damage, loosening of parts or loss of electrical continuity greater than 1.0 microsecond when mated connectors are tested per MIL-STD-202, Method 204, Test Condition A.
- 8.9 Mechanical Shock
  - 8.9.1 Mated connectors shall not be damaged, loosening of parts not interruption of electrical continuity longer than 1 microsecond shall occur when tested per MIL-STD-202F, Method 213B, Condition A:
    - 1.) ½ sine wave
    - 2.) 50G, 11MS Pulse
    - 3.) 3 shocks each direction along 3 axis, 18 shocks total.
- 8.10 Corrosive Atmosphere
  - 8.10.1 Connectors shall meet the requirements of paragraph 6.3 when exposed to flowers of sulfur following conditioning per paragraph 7.4.

## 9.0 QUALITY ASSURANCE PROVISIONS

- 9.1 Materials Inspection
  - 9.1.1 Materials Inspection shall consist of certification supported by verifying data. Mechanical, chemical and electrical testing shall be done on a random basis.
- 9.2 Conformance Testing
  - 9.2.1 Conformance Testing shall be performed on a lot-to-lot basis. Sample size will be determined by quality assurance.

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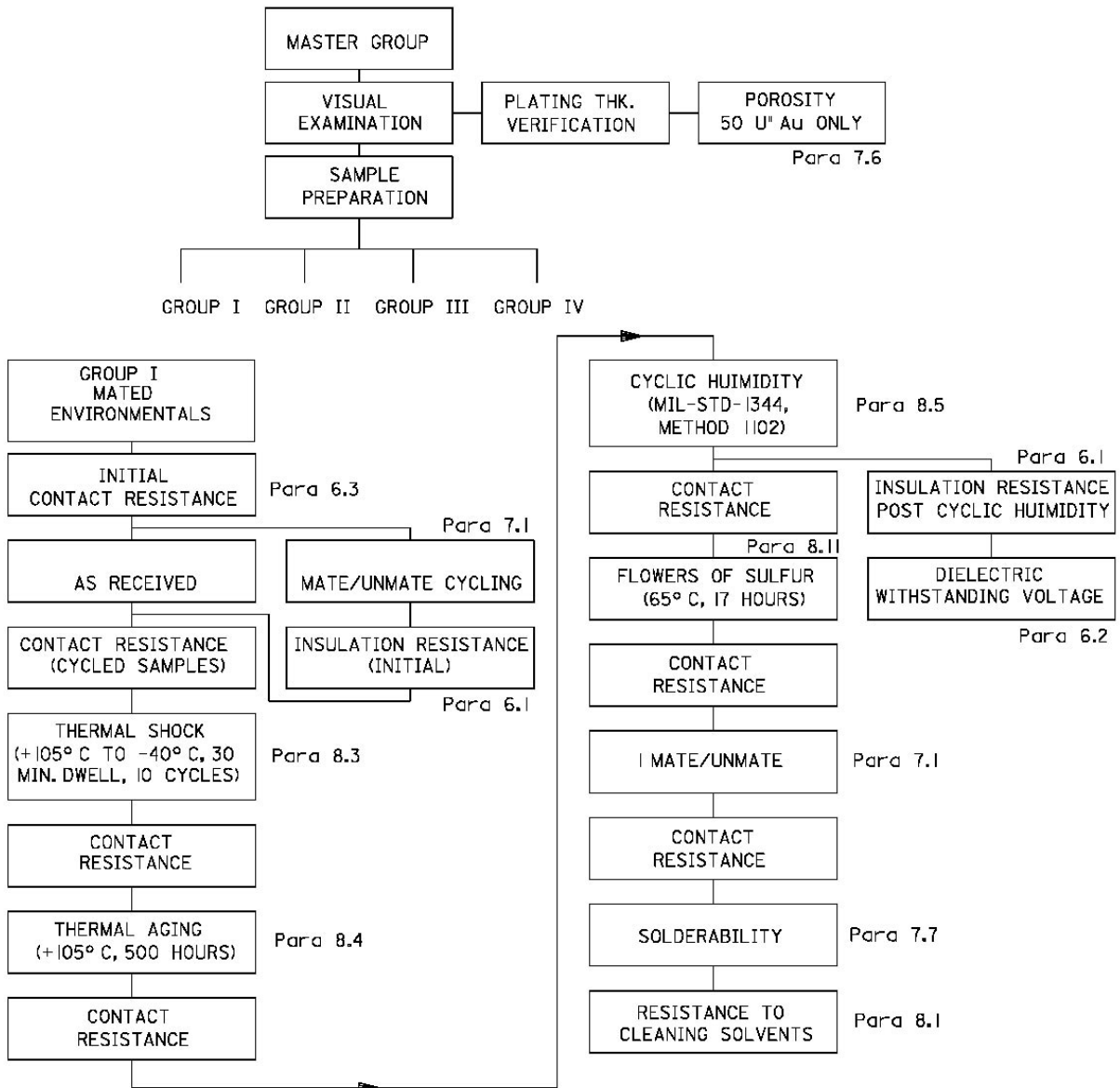
9.2.2 Conformance Testing shall consist of the following:

- 1.) Visual and mechanical inspection specific areas of inspection shall be determined by quality assurance.
- 2.) Contact Insertion/withdrawal Forces.

## 10.0 PACKAGING

See Drawing for applicable packaging specifications

## 11.0 QUALIFICATION TEST SEQUENCE

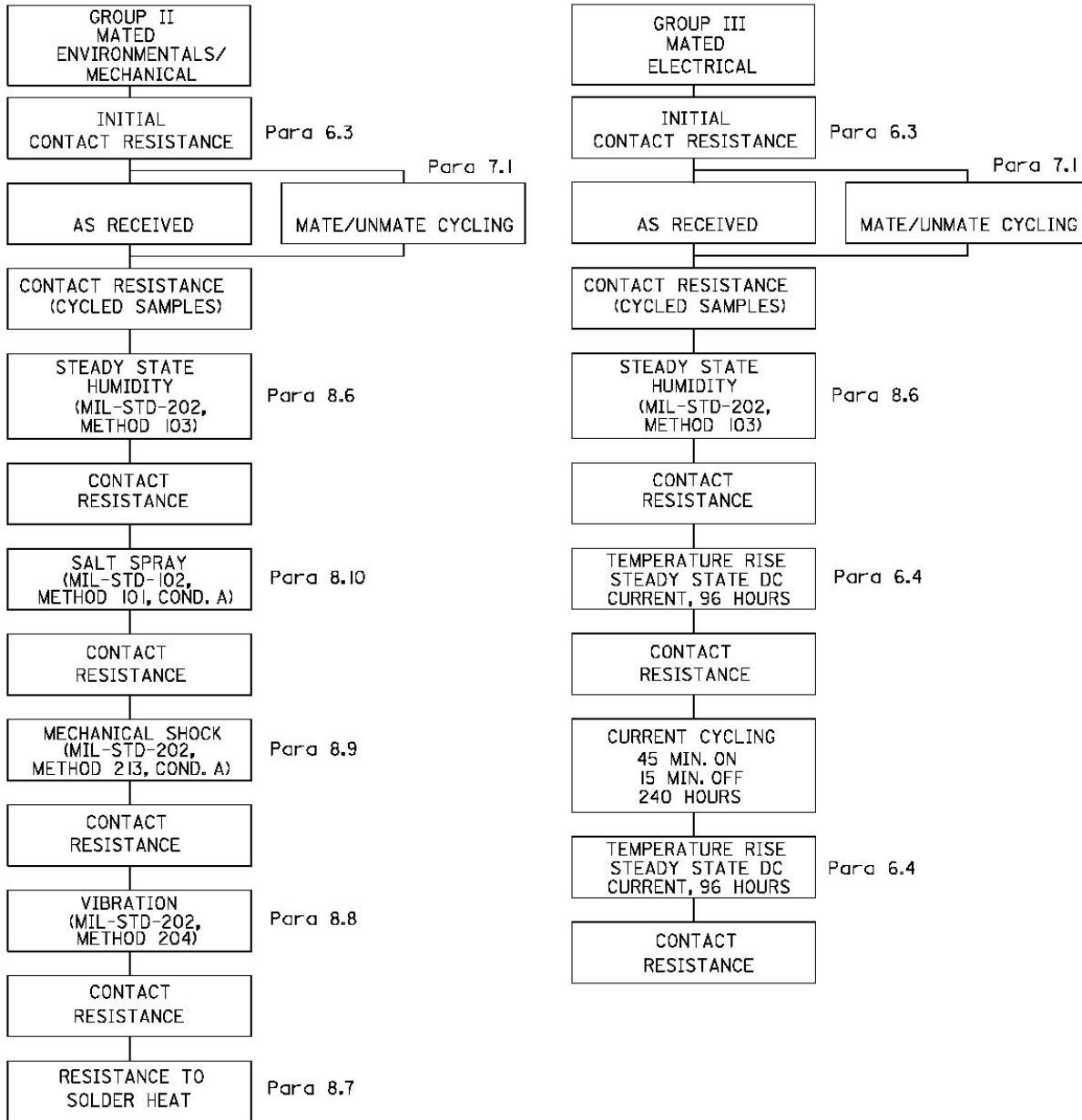


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## 11.1 Qualification Test Sequence Continued



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## 11.2 Qualification Test Sequence Continued

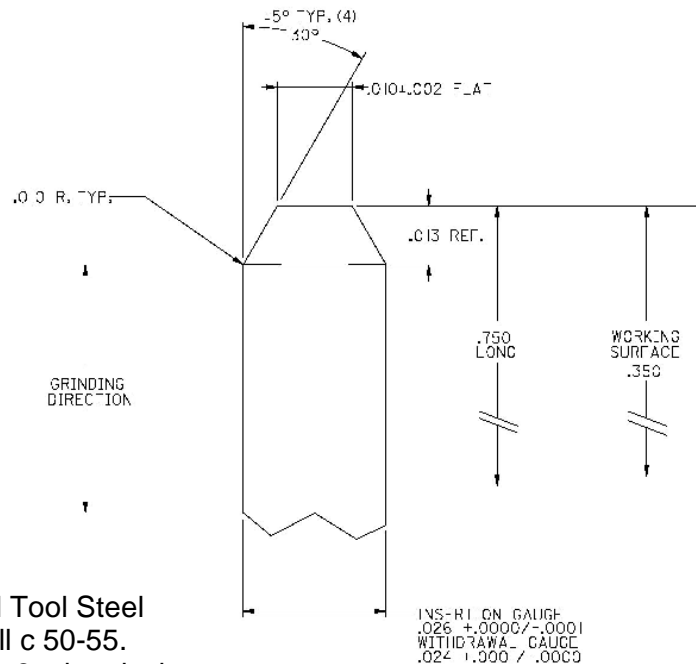
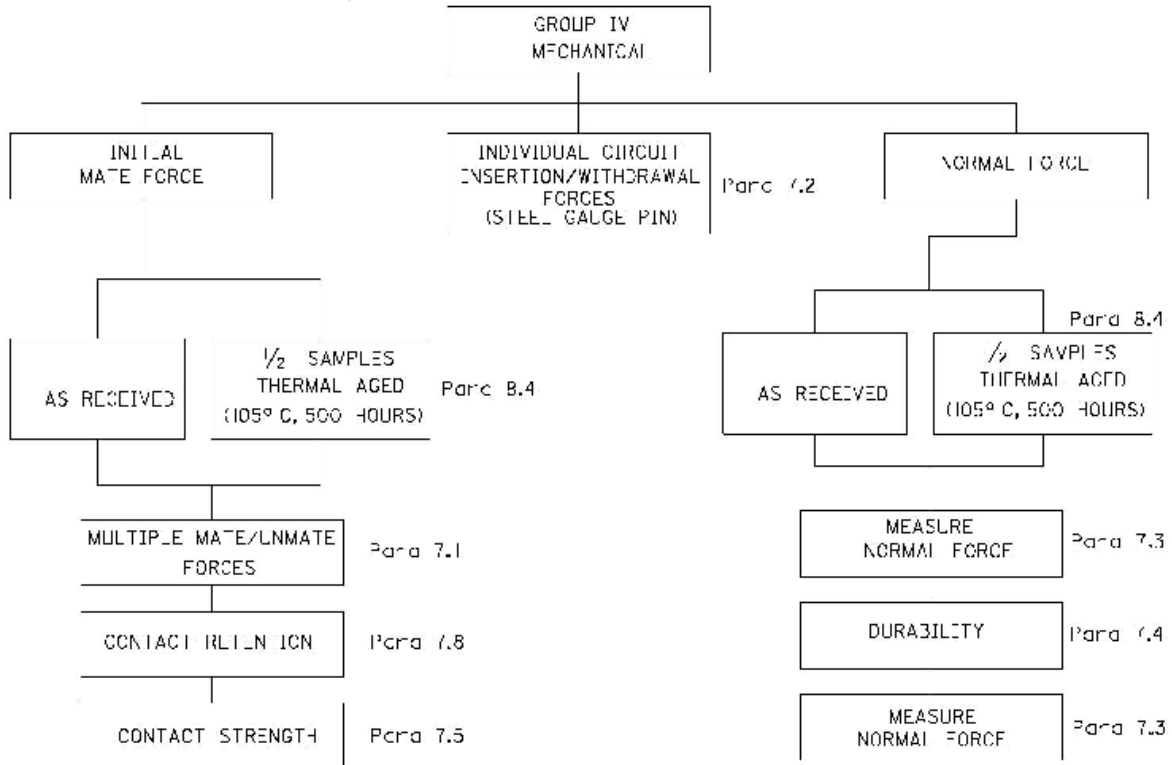


Figure 1

Notes:

1. Material – Hardened Tool Steel
2. Hardness – Rockwell c 50-55.
3. Surface Finish – 4 to 8 micro-inch on working surface.

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