Pins & Receptacles:

Pins and receptacle shells are manufactured by precision high speed turning machines. The base materials for these components are copper alloys.

Receptacles are a two piece construction consisting of a plated contact press-fit into a plated shell. The contacts are stamped from beryllium copper strip.

Materials:

Pins & Receptacle Shells:
Brass Alloy 360 UNS C36000 ASTM-B16 (Up to a 6,35mm diameter)
Phosphor Bronze alloy 544 UNS C54400 ASTM-B139 (Up to a 1,83mm diameter)
Tellurium Copper alloy 145 UNS C14500 ASTM-B301 (Up to a 3,96mm diameter)

See page 126 for a complete list of standard available stock diameters.
(For the availability of larger diameter materials contact Technical Services).

Contacts:
Beryllium copper UNS C17200 ASTM-B194 (For most applications)
Beryllium Nickel UNS N03360 (For high temperature applications)

(For individual contact specifications see pages 216-226)
The materials listed above are all RoHS compliant.

Dimensional, Mechanical & Environmental Data:

Standard tolerances for pins and receptacle shells are:
Diameters: +/- 0,051mm
Lengths: +/- 0,13mm
Angles: +/- 2°

Mechanical Life (Durability): Mill-Max receptacles are capable of 1000 minimum insertion/extraction cycles for a broad range of applications. Mating pin size, shape and finish along with application specific variables will affect the life of a contact.

Contact Forces: See individual contact specifications on pages 216-226.

Environmental Data:
- Operating temperature range: -55/+125° C
- Vibration (No electrical discontinuity Greater than 1 µs): 10-2000 HZ, 15 G
- Shock (No electrical discontinuity Greater than 1 µs): 50 G

Electrical data is dependent on the contact used in the receptacle. See page 214 for free air current ratings of the contacts.

Platings:

GOLD per ASTM B 488 & MIL-G-45204, Type 1, Code C
SILVER per ASTM B 700, Grade B, Class S
TIN per ASTM B 545, Type 1
TIN/LEAD (93/7) per ASTM B 545
ELECTRO-SOLDER (60/40) per ASTM B 579, Bright
NICKEL per SAE-AMS-QQ-N-290
ELECTROLESS NICKEL per MIL-C-26074
COPPER per SAE-AMS-2418

Connectors:

Connectors are headers, sockets and interconnects. They consist of pins, receptacles or spring pins assembled into thermoplastics or FR-4 epoxy laminate insulator bodies. They are available in DIP, SIP, strip and PGA packages in grids of 1,27mm, 1,78mm, 2mm, 2,54mm and 2,54mm interstitial for PGA's.

Electrical Data:

SERIES:	100-700	800	830	850
- Rated current (Amps):	1	3	3	1
- Rated voltage:	100 VRMS/150 VDC			
- Contact resistance:	10 mΩ max.			
- Insulation resistance:	10,000 MΩ min.			
- Dielectric strength: (700 VRMS min. for series 117 Shrink DIP)	1000 VRMS min.			
- Air and creepage distance (mm): (.012 for series 117 Shrink DIP)	0,71	0,84/0,71	0,51	0,41/0,51
- Capacitance(pF max):	.8	1	1	1

Electrical data above does not apply to BGA, PLCC, USB or Spring-Loaded connectors. Electrical data for these products can be found on the following pages: BGA – Page 113; PLCC - Page 113; USB - Pages 121 & 122; Spring-Loaded connectors – Pages 6 - 12.

Operating temperature range: -55/+125° C

General tolerances for assembled connector products:
- Lengths: +/- 0,25mm (See Note Below)
- Connector Flatness: 0,13mm (up to 25,4mm in length)
- Co-planarity of SMT Connectors: 0,13mm (up to 25,4mm in length)
- For connectors exceeding 25,4mm in length the flatness/co-planarity may exceed 0,13mm. Please contact Technical Services for more information.

(Note: Specifications and tolerances are provided wherever possible. Due to the wide variety of connectors Mill-Max offers, the specific tolerances vary from product to product. If you need information regarding the tolerance of a particular part, please contact technical services.)

Materials:

Insulator Bodies:

Standard material is glass filled thermoplastic polyester (PCT), self extinguishing, rated UL 94 V-0.

Some surface mount, pin grid array and spring pin connector insulators are molded from high temperature Nylon 46, rated UL 94 V-0.

FR-4 Epoxy laminate is a thermoset material used in custom insulators and high temperature applications. It is especially useful because of its low Temperature Coefficient of Expansion (TCE). See chart below:

TCE for molded insulator	30 ppm/° C
TCE for 4-Layer PCB	13 ppm/° C
TCE for unclad epoxy	12 ppm/° C

The above insulator materials are all suitable for lead free soldering processes up to 260° C.

For complete material properties of plastics used by Mill-Max see page 227.

For inquiries regarding other insulator materials, please contact Technical Services.

Spring Pins:

Spring pins consist of precision-machined brass compo nents assembled together with beryllium copper or stainless steel springs. External components and internal springs are gold plated. Spring pins are designed to be used at mid-stroke. Over compression can cause damage restricting the movement of the plunger.

Materials:

External Components (Body, Piston, Base, Tail):
Brass Alloy 360 UNS C36000 ASTM-B16

Springs:

Beryllium copper UNS C17200 ASTM-B197
Stainless Steel 302

Dimensional, Mechanical & Environmental Data:

Standard tolerances for spring pins at initial height:
Diameters: +/- 0,051mm
Lengths: +/- 0,15mm

Mechanical life (Durability): 1,000,000 cycles minimum
Force tolerance: +/- 20 g (See individual spring pin data on pages 6- 17 for forces)
Stroke tolerance: +/- 0,13mm

Environmental Data:

- Operating temperature range: -55/+125° C
- Vibration (No electrical discontinuity Greater than 1 µs): 0-200 HZ, 10G
- Shock (No electrical discontinuity Greater than 1 µs): 50 g

For complete material properties of metals, platings and plastics used by Mill-Max see page 227.

Where applicable, Mill-Max products and procedures are designed to meet the following standards:

MIL-STD 1916	-	DOD preferred methods for acceptance of product
MIL-STD 202G	-	Test methods for electronic and electrical component parts
MIL-STD 45662	-	Calibration system requirements, or ISO 10012
MIL-F-14072	-	Finishes for ground based electronic equipment
MIL-I-45208	-	Inspection system requirements, or equivalent
MIL-S-83505	-	General specification for sockets (lead, electronic components)
MIL-S-83734	-	General specification for DIP sockets

In the interest of improved design, quality and performance, Mill-Max reserves the right to make changes in its specifications without prior notice.