

Pins & Receptacles

Pin & 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, and 385 UNS 38500 ASTM B455 (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 diameters)

See page 154 and 203 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 250 - 262)
The materials listed above are all RoHS compliant.

Dimensional, Mechanical & Environmental Data

Standard tolerances for pins & receptacle shells:

Diameters +/- 0,051mm

Lengths +/- 0,13mm

Angles +/- 2°

Mechanical Life (Durability): Mill-Max receptacles are capable of 1,000 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 250 - 262.

Environmental Data:

- Operating temperature range: -55/+125° C (min. / max. discontinuous)
- 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 248 for free air current ratings of the contacts.

Platings

GOLD per ASTM B 488 and 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 machined laminate insulator bodies. They are available in DIP, SIP, strip, BGA and PGA packages in grids of 1mm, 1,27mm, 1,78mm, 2mm, 2,54mm, .8mm for BGA's and 2,54mm interstitial for PGA's.

Electrical Data

	SERIES:	100-700	80X	830	850
• Rated current (Amps):		3	3	3	1
• Rated voltage:		100 VRMS/150 VDC			
• Contact resistance:		10 mΩ max.			
• Insulation resistance:		10,000 MΩ min.			
• Dielectric strength:		1000 VRMS min. (700 VRMS min. for series 117 Shrink DIP)			
• Air and creepage distance (mm):		0,71	0,84/0,71	0,51	0,41/0,51
		(0,30 for series 117 Shrink DIP)			
• 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 141; PLCC - Page 141; USB - Pages 147 - 150; Spring-Loaded connectors – Pages 6 - 19

Current ratings are for a 10° C temperature rise above ambient (20°C)

Operating temperature range: -55/+125° C (min./max. discontinuous)

General tolerances for assembled connector products:

- Lengths: +/- 0,25mm
- 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, spring pin and shrouded connector insulators are molded from high temperature Nylon 46 or PPS, 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 263.

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

Spring Pins

Spring pins consist of precision-machined brass components 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 +/- 0,051 mm

Lengths +/- 0,15 mm

Mechanical life (durability): Tested to 1,000,000 cycles

Force tolerance: +/- 20 g (See individual spring pin data on pages 6 - 19 for forces)

Stroke tolerance: +/- 0,13 mm

Environmental Data:

- Operating temperature range: -55/+125° C (min. / max. discontinuous)
- Vibration (No electrical discontinuity Greater than 1 µs): 0-200 HZ, 10 G
- 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 263.

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-DTL-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.

