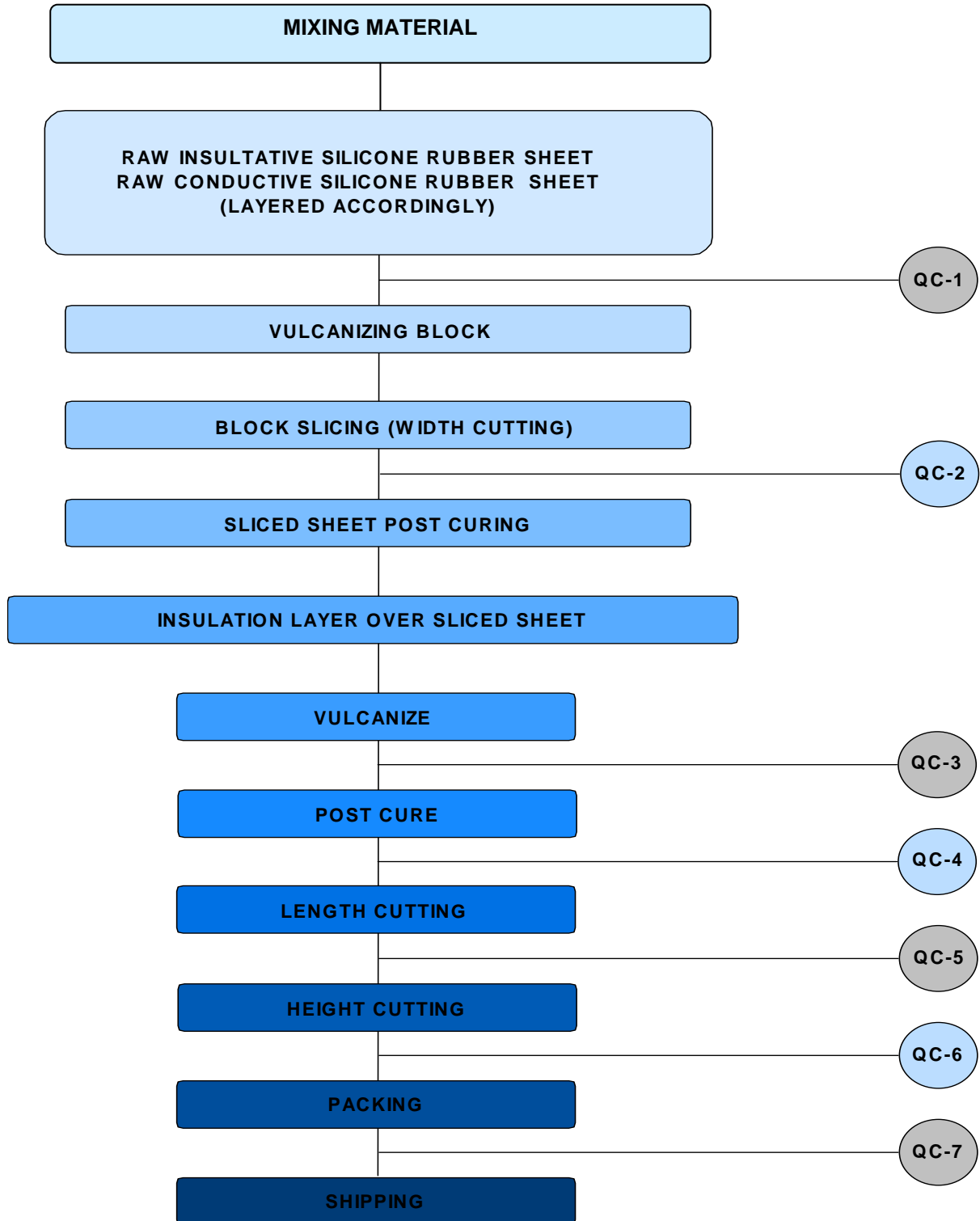




RUBBER CONNECTOR MANUFACTURE PROCESS & QUALITY CONTROL FLOW CHART





QC - 1	CHECKING ITEM	PITCH
	INSPECTOR	1. OPERATOR 2. INSPECTION DEPARTMENT
	METHOD	PITCH ADJUSTMENT AND FIXING INPUT
	EQUIPMENT	THICKNESS GAUGE
QC - 2	CHECKING ITEM	1. WIDTH 2. SKEW 3. APPEARANCE 4. PITCH
	INSPECTOR	1. OPERATOR 2. INSPECTION DEPARTMENT
	METHOD	1.,2.,3.,100% INSPECTION, 4. SAMPLING INSPECTION
	EQUIPMENT	THICKNESS GAUGE, TOOL MAKER MICROSCOPE
QC - 3	CHECKING ITEM	1. WIDTH 2. APPEARANCE
	INSPECTOR	OPERATOR, INSPECTION DEPARTMENT
	METHOD	SAMPLING INSPECTION
	EQUIPMENT	THICKNESS GAUGE
QC - 4	CHECKING ITEM	1. WIDTH 2. APPEARANCE
	INSPECTOR	OPERATOR, INSPECTION DEPARTMENT
	METHOD	100% INSPECTION
	EQUIPMENT	THICKNESS GAUGE
QC - 5	CHECKING ITEM	LENGTH
	INSPECTOR	OPERATOR, INSPECTION DEPARTMENT
	METHOD	SAMPLING INSPECTION

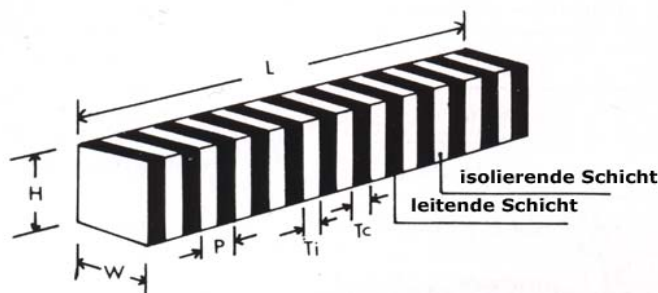


QC - 5	EQUIPMENT	TOOL MAKER MICROSCOPE, PROJECTOR, NONUTH
QC - 6	CHECKING ITEM	HEIGHT, CONTACT RESISTANCE
	INSPECTOR	OPERATOR, INSPECTION DEPARTMENT
	METHOD	SAMPLING INSPECTION
	EQUIPMENT	TOOL MARKER MICROSCOPE, PROJECTOR NONUTH, OHM TESTER
QC - 7	CHECKING ITEM	LENGTH, WIDTH, HEIGHT, CONTACT RESISTANCE APPEARANCE
	INSPECTOR	QUALITY CONTROL DEPARTMENT
	METHOD	MAJOR DEFECT AQL 0.4, MINOR DEFECT AQL 0.65
	EQUIPMENT	PROJECTOR, TOOL MAKER MICROSCOPE, NONUTH, OHM TESTER, THICKNESS GAUGE



Inter-Connector T , T2 Type

Uses rubber conductors and insulators in alternating layers. The rubber conductor is impregnated with carbon or silver powder to allow the current to flow through the layer. This design ensures more than one conductor is always contacting the electrode surface. Generally used when application calls for limited space (width). T-Type has no side insulation.



Dimensions

Item		Units	0,10P	0,18P	0,25P	0,05P
Pitch	P	mm	0,10 +/- 0,03	0,18 +/- 0,05	0,25 +/- 0,05	0,05 +/- 0,02
Length	L	mm	1,0 up to 20,0 +/- 0,15 20,1 up to 50,0 +/- 0,2 50,1 up to 100,0 +/- 0,3 100,1 up to 150,0 +/- 0,4 150,1 up to 200,0 +/- 0,6 200,1 up to 300,0 +/- 0,8			
Height	H	mm	0,8 up to 5,0 +/- 0,1 5,1 up to ∞ + 0,15 / - 0,1			
Width	W	mm	0,4 up to 0,79 +/- 0,05 0,8 up to 0,99 +/- 0,08 1,0 up to ∞ +/- 0,1			
Conductor width	Tc	mm	0,05 +/- 0,02	0,09 +/- 0,03	0,13 +/- 0,03	0,03 +/- 0,01
Insulator width	Ti	mm	0,05	0,09	0,12	0,02
Minimum contact spacing		mm	0,3	0,5	0,7	0,2



Physical Properties

Parameter	Insulator	Conductor
Volume Resistivity	1 x 10 ¹⁴ ohm x cm	3 up to 5 ohm x cm
Dielectric Breakdown Voltage	26 kv / mm	
Specific Gravity	1,20	1,20
Hardness	65	70
Tensile Strength	80 kg / cm ²	60 kg / cm ²
Insulation Resistance (@500 VDC)	10 ¹⁴ ohms	
Operating Temperature Range	- 20 °C up to 100 °C	
Maximum Current Density (@25 °C)		1 mA / mm ²

Compression load formula

F: 6,2 x DWL (grams)

F: Force in grams

D: Deflection in %

W: Width of connector in mm

L: Length of connector in mm

Contact resistance formula

$$R: 100 \frac{H}{W \times S} \text{ (ohms)}$$

H: Height of connector in mm

W: Width of connector in mm

S: Electrode width in mm

Design Guidelines

Length: LCD glass – 0,5 mm (under 20 mm according LCD glass length)

Height: Distance from PCB to LCD contact surface x (1,07 ~ 1,10)

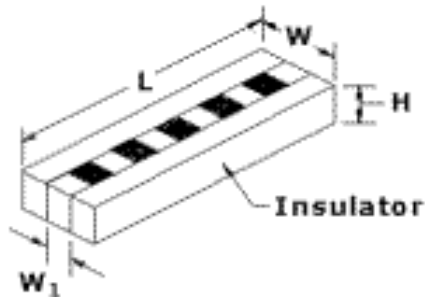
Width: LCD contact ledge x (0,9 ~ 0,95)

Please specify to our sales department before ordering special request on material properties, dimension tolerance or contact resistance.



Inter-Connector TS Type

Uses a T-Type connector supported on both sides by non-conductive rubber insulating materials. This self-supporting connector has soft outside insulators that aid in stability and protects the conductive layers from the environment. These connector types are suitable for large LCD displays.



Dimensions

Item		Units	0,10 P	0,18 P	0,25 P	0,05 P
Pitch	P	mm	0,10 +/- 0,03			
Length	L	mm	1,0 up to 20,0 +/- 0,15 20,1 up to 50,0 +/- 0,2 50,1 up to 100,1 +/- 0,3 100,1 up to 150,0 +/- 0,4 150,1 up to 200,0 +/- 0,6 200,1 up to 300,0 +/- 0,8			
Height	H	mm	0,8 up to 5,0 +/- 0,1 5,1 up to ∞ + 0,15 / - 0,1			
Width	W	mm	1,0 up to 2,5 +/- 0,1 2,5 up to ∞ +/- 0,15			
Conductor width	Tc	mm	0,05 +/- 0,02	0,09 +/- 0,03	0,13 +/- 0,03	0,03 +/- 0,01
Insulator width	Ti	mm	0,05	0,09	0,12	0,02
Width of conductive layer	W'	mm	0,4 +/- 0,05 (standart) 0,4 up to 0,79 +/- 0,05 0,8 up to 0,99 +/- 0,08 1,0 up to ∞ +/- 0,1			
Minimum contact spacing			0,3	0,5	0,7	0,2



Physical Properties

Parameter	Insulator	Conductor	Side insulator
Volume resistivity	1 x 10 ^{□□} ohm x cm	3 up to 5 ohm x cm	5 x 10 ^{□□} ohm x cm
Dielectric breakdown voltage	26 kv / mm		25 kv / mm
Specific gravity	1,20	1,20	1,10
Hardness	65	70	25
Tensile strength	80 kg / cm ²	60 kg / cm ²	50 kg / cm ²
Insulation resistance (@500 VDC)	10 ^{□□} ohms		8 x 10 ^{□□} ohms
Operating temperature range	- 20 °C to 100 °C		
Maximum current density (@25 °C)	1 mA / mm ²		

Compression load formula

F: 2,1 x DWL (grams)
 F: Force in grams
 D: Deflection in %
 W: Width of connector in mm
 L: Length of connector in mm

Contact resistance formula

$$R: 120 \frac{H}{W' \times S} \text{ (ohms)}$$

H: Height of connector in mm
 W': Width of conductive layer in mm
 S: Electrode width in mm

Design Guidelines

Length: LCD glass – 0,5 mm (under 20 mm according LCD glass length)

Height: Distance from PCB to LCD contact surface x (1,10 ~ 1,15)

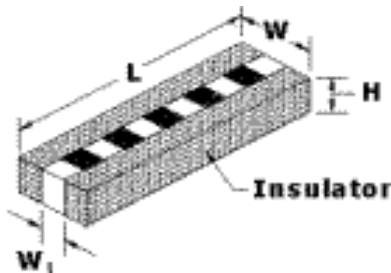
Width: LCD contact ledge x (0,9 ~ 0,95)

Please specify to our sales department before ordering special request on material properties, dimension tolerance or contact resistance.



Inter-Connector TG Type

Uses a T-type connector supported on both sides by a sponge layer. This special sponge layer has closed cell air pockets that allow the connector to absorb more deformation than other similar connectors. These connectors are also suitable for use with large LCD displays.



Dimension

Item		Units	0,10 P	0,18 P	0,25 P	0,05 P
Pitch	P	mm	0,10 +/- 0,03	0,18 +/- 0,05	0,25 +/- 0,05	0,05 +/- 0,02
Length	L	mm	1,0 up to 20,0 +/- 0,15			
			20,1 up to 50,0 +/- 0,2			
Length	L	mm	50,1 up to 100,0 +/- 0,3			
			100,1 up to 150 +/- 0,4			
			150,1 up to 200,0 +/- 0,6			
			200,1 up to 300,0 +/- 0,8			
Height	H	mm	0,8 up to 5,0 +/- 0,1			
			5,1 up to ∞ + 0,15 / - 0,1			
Width	W	mm	1,0 up to 2,5 +/- 0,1			
			2,5 up to ∞ +/- 0,15			
Conductor width	Tc	mm	0,05 +/- 0,02	0,09 +/- 0,03	0,13 +/- 0,03	0,03 +/- 0,01
Insulator width	Ti	mm	0,05	0,09	0,12	0,02
Width of conductive layer	W	mm	0,4 +/- 0,05 (standart)			
			0,4 up to 0,79 +/- 0,05			
			0,8 up to 0,99 +/- 0,08			
			1,0 up to ∞ +/- 0,1			
Minimum contact spacing			0,3	0,5	0,7	0,2



Physical Properties

Parameter	Insulator	Conductor	Side insulator
Volume resistivity	1 x 10 ¹¹ ohm x cm	3 ~ 5 ohm x cm	1 x 10 ¹¹ ohm x cm
Dielectric breakdown voltage	26 kv / mm		25 kv / mm
Specific gravity	1,20	1,20	0,6
Hardness	65	70	18
Tensile strength	80 kg / cm ²	60 kg / cm ²	50 kg / cm ²
Insulation resistance (@500 VDC)	10 ¹¹ ohms		10 ¹¹ ohms
Operating temperature range	- 20 °C to 100 °C		
Maximum current density (@ 25 °C)	1 mA / mm ²		

Compression load formula

F: 1,4 x DWL (grams)
 F: Force in grams
 D: Deflection in %
 W: Width of connector in mm
 L: Length of connector in mm

Contact resistance formula

$$R = 180 \frac{H}{W' \times S} \text{ (ohms)}$$

H: Height of connector in mm
 W': Width of conductive layer in mm
 S: Electrode width in mm

Design Guidelines

Length: LCD glass – 0,5 mm (under 20 mm according LCD glass length)
 Height: Distance from PCB to LCD contact surface x (1,10 ~ 1,15)
 Width: LCD contact ledge x (0,9 ~ 0,95)

Please specify to our sales department before ordering special request on material properties, dimension tolerance or contact resistance.



Microphone Holder Integrated Connector

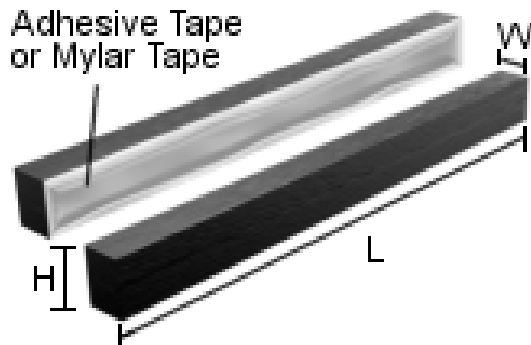
Applied to electric condense microphone

Microphone is the key component in communication ware.
With elastic holder integrated gold connector to support ECM which
cancels exteriors noise efficiently.



Inter-Connector IR Type (Dummy)

This style is made of silicone rubber insulating material and used as protective compression footing or as a spacer. The material, hardness or additional specification (with adhesive tape/Mylar tape) can be custom-made.



Item	IR	IR - TS			IR - TG	IR - TSR
Colour tone	Grey	Translucent or designate colour			Pink	Translucent or black
Shore hardness	45° +/- 5°	25° +/- 5°	50° +/- 5°	70° +/- 5°	15° +/- 5°	20° up to 70°
Silicone rubber	Solid insulative			Sponge	Silicone rubber	
Length	1,0 up to 20,0 +/- 0,15 20,1 up to 50,0 +/- 0,2 50,1 up to 100,0 +/- 0,3 100,0 up to 150,0 +/- 0,4 150,1 up to 200,0 +/- 0,6 200,1 up to 300,0 +/- 0,8					
Height	0,5 up to 5,0 +/- 0,1 5,0 up to ∞ + 0,15 / - 0,1					
Width (include tape)	0,2 up to 2,5 +/- 0,1 2,5 up to ∞ +0,15 / - 0,1					
Specific gravity	1,11	1,08	1,15	1,2	0,6	1,08 up to 1,2
Tensile strength (kg / cm²)	70	50	74	80	50	50 up to 80
Elongation (%)	510	500	400	300	300	230 up to 520



Volume resistance (Ω. Cm)	1 x 10□□	8 x 10□□	1 x 10□□	1 x 10□□	1 x 10□□	8 x 10□ ³
Compression set (%)	5 up to 15	5 up to 15	5 up to 15	5 up to 15	10 up to 20	5 up to 15
Operating (°C) temperature range	- 20 up to 100					- 20 up to 90
Dielectric breakdown voltage (kv / mm)	23 up to 27			20 up to 25		23 up to 27
Remarks	Counterpart of T, T2, TS - Type			Counterpart of TG Type		Adhesive tape width: 0,13 +/- 0,03mm
Adhesive material	None					NITTO, 3M or pioneer 500 A
Mylar tape material	None					Toray pet or ICI pet
Adhesive holding force	None					1 kg / in ²

Inter-Connectors

Design Guidelines

- Length:** LCD glass length – 0,5 mm (under 20 mm according LCD glass length)
- Height:**

Type	T	TS	TG
Height	H* x 1,08	H* x 1,10	H* x 1,10 – 1,12
Compression ration (%)	8	10	10 - 12



Remarks: (1) H*: Distance from PCB to LCD contact surface.
(2) If height is over 10 mm the compression ration has to be reduced to avoid bending on connector.

3. **Width:** The gap of housing x (0,9 up to 0,95)

4. **Selection of pitch:**

To obtain a better conductivity 2 to 3 layers of conductors of each pitch on LCD or PCB is recommended.

Ex:

A) The pitch of LCD is 0,5 mm and conductive width is about 0,3 mm.

Choose connectors with 0,1 mm pitch so there are 3 connectors within the pitch of LCD.

B) The pitch of LCD is 0,1 mm and conductive width is 0,5 – 0,6 mm.

Choose connectors with 0,18 mm pitch so there are 2 – 3 connectors within the pitch of LCD.

C) The pitch of LCD is 1,5 mm and conductive width is 0,75 – 1 mm.

Choose connectors with 0,25 mm pitch so there are 3 connectors within the pitch of LCD.

Special condition: Normally connector is made of silicone rubber tilting is very possible during cutting process and would result an angle tolerance around 1°.

Hence a small connector pitch is recommended for a higher connector design.

This would create a better effect of conductivity.

5. **Contact spacing: W`**

A) Normally w' is 0,4 mm.

If LCD display turned dimly it means conductive resistance too high.

This can be improved by increasing W` width.

Usually W' is 0,4 mm, 0,5 mm, 0,6 mm, 0,8 mm etc.

B) If TS or TG Type were selected the connector's side width has to be 0,3 mm minimum for manufacturing concern.

Ex: 0,4 mm (W') + 0,3 mm + 0,3 mm = 1,00 mm (the minimum width)

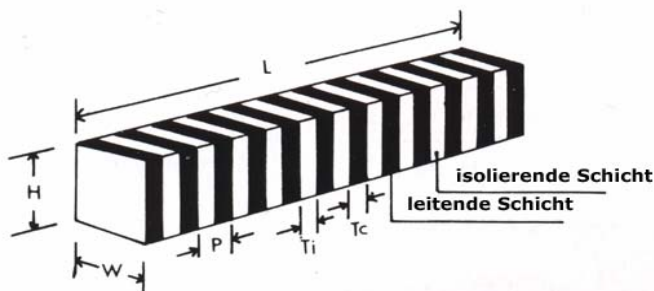


Sample Confirmation Form

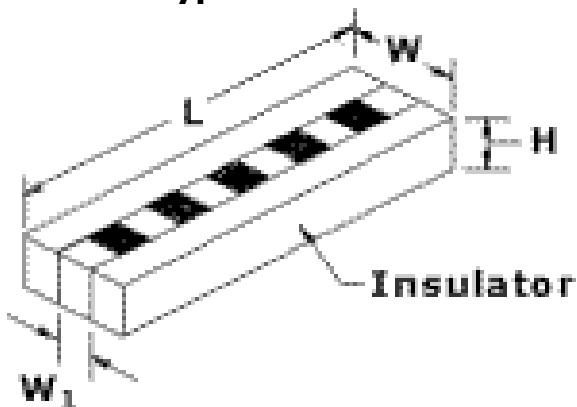
This sample confirmation form can be used to purchase our rubber connector either directly from us or from our overseas agents.

A) Product description:

T - Type

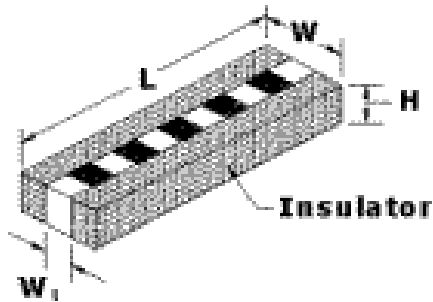


TS - Type





TG – Type



- L: Length in mm
- H: Height in mm
- W: Width in mm
- W': Width of conductive layer in mm
- P: Pitch in mm
- Ti: Insulative rubber
- Tc: Conductive rubber

B) Physical properties

Item	Component	Units	P 0,05; 0,10; 0,18; 0,25	Connector type
Specific gravity	Insulator		1,20	T, TS, TG
	Conductor		1,20	T, TS, TG
	Edge insulator part		1,10	TS
	Edge insulator sponge		0,6	TG
Tensile strength	Insulator	Kg / cm ²	70 – 85	T, TS, TG
	Conductor		50 – 60	T, TS, TG
	Edge insulator part		50 – 75	TS
	Edge insulator sponge		30 – 60	TG



Elongation	Insulator		250 – 300	T, TS, TG
	Conductor		150 – 200	T, TS, TG
	Edge insulator part	%	400 – 550	TS
	Edge insulator sponge		250 – 350	TG
Shore hardness	Insulator		60 – 65	T, TS, TG
	Conductor		65 – 70	T, TS, TG
	Edge insulator part	°	20 – 30	TS
	Edge insulator sponge		10 – 20	TG
Volume resistance	Insulator		$1 \times 10^{\square\square}$	T, TS, TG
	Conductor		3 up to 5	T, TS, TG
	Edge insulator part	ΩCM	$8 \times 10^{\square\square}$	TS
	Edge insulator sponge		$1 \times 10^{\square\square}$	TG
Compression set		%	15 – 20	T
			12 – 18	TS
			11 – 16	TG
Dielectric breakdown voltage	Insulator	KV / MM	23 – 27	T, TS, TG
	Edge insulator part		23 – 27	TS
	Edge insulator sponge		20 – 25	TG
Insulation resistance (500 VDC)		M Ω	1,000 MIN	T, TS, TG
Rated current density	Conductor	MA / mm ²	1	T, TS, TG
Operating temperature range		C [°]	- 20 up to 100	T, TS, TG



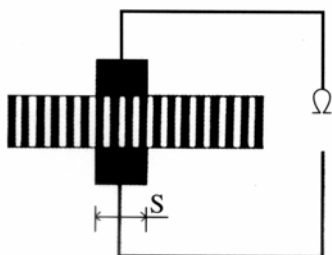
C) Dimensions:

Item		Units	0,10 P	0,18 P	0,25 P	0,05 P
Pitch	P	mm	0,10 +/- 0,03	0,18 +/- 0,05	0,25 +/- 0,05	0,05 +/- 0,02
Length	L	mm	1,0 up to 20,0 +/- 0,15			
			20,1 up to 50,0 +/- 0,2			
Length	L	mm	50,1 up to 100,0 +/- 0,3			
			100,1 up to 150,0 +/- 0,4			
			150,1 up to 200,0 +/- 0,6			
Height	H	mm	0,8 up to 5,0 +/- 0,1			
			5,1 up to ∞ + 0,15 / - 0,1			
Width	W'	mm	0,4 up to ∞ +/- 2,5 + 0,1			
			2,5 up to ∞ +/- 0,15			
Conductor width	Tc	mm	0,05 +/- 0,02	0,09 +/- 0,03	0,13 +/- 0,03	0,03 +/- 0,01
Insulator width	Ti	mm	0,05	0,09	0,12	0,02
Width of conductive layer	W'	mm	0,4 +/- 0,05 (standart)			
			0,4 up to 0,79 +/- 0,05			
			0,8 up to 0,99 +/- 0,08			
			1,0 up to ∞ +/- 0,1			
Minimum contact spacing		mm	0,3	0,5	0,7	0,2

D) Electrical Properties:

a) Resistance of insulation rubber:

1. Testing method: As shown below





2. Testing conditions

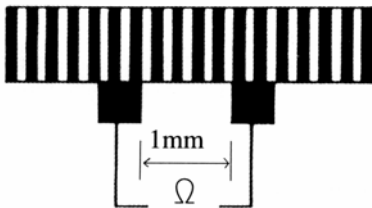
Temperature: 18 °C – 27 °C

Relative humidity: 55 % - 70 %

3. Percentage of compression 15 %

b) Resistance of insulation rubber:

1. Testing method: As shown below



2. Span of the electrodes: 1 mm

3. Voltage: DC 500 V

4. Temperature: 19 °C – 27 °C

5. Relative humidity: 55 % - 70 %

$$\text{T Type: } R = 100 \frac{H}{W \times S} \text{ (ohms)}$$

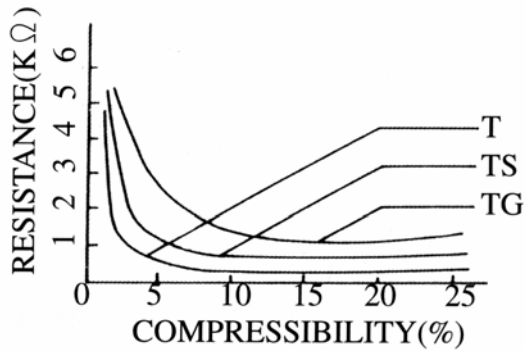
$$\text{TS Type: } R = 120 \frac{H}{W' \times S} \text{ (ohms)}$$

$$\text{TG Type: } R = 180 \frac{H}{W' \times S} \text{ (ohms)}$$

H = Height of connector in mm

W (W') = Width of conductive layer in mm

S = Electrode width in mm



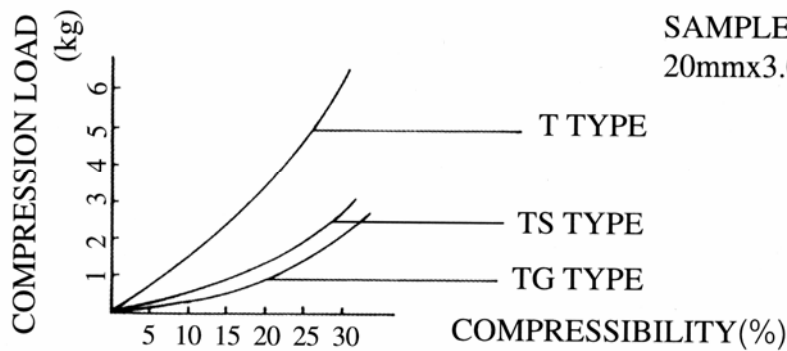
SAMPLE SIZE:
20mmx3.0mmx2.0mm

E) Compressive Stress Test

Calculating formula:

T Type $F = 6,2 \times DWL$
 TS Type $F = 2,1 \times DWL$
 TG Type $F = 1,4 \times DWL$

Where F = Force in grams
 D = Deflection in %
 W = Width of connector in mm
 L = Length of connector in mm



SAMPLE SIZE:
20mmx3.0mmx2.0mm

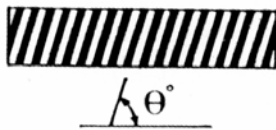
F) Temperature Range:

Item	Range	Remark
Performing Temperature	- 20 °C up to 100 °C	15 % of compressive state
Stored Temperature	- 40 °C up to 180 °C	
Relative Humidity	95 %	



G) Oblique Line Range

1. General tolerance for oblique line : +/- 1°
2. Special request available: +/- 0,5 °
3. Please specify clearly on the drawing or inform us before ordering if you have special request about the oblique line.
Otherwise the oblique line is according to +/- 1 ° standart.



H) Reliability Test

Item	Testing Conditions	Result
Low Temperature	- 20 °C, 480 HR	Complies with above specifications: A up to G
High Temperature Test	100 °C, 480 HR	Complies with above specifications: A up to G
High Humidity Test	Relative humidity 95 %, 65 °C, 480 HR	Complies with above specifications: A up to G
Weight-loss Test	200 °C, 24 HR	Weight-loss below 0,65 %
Permanent Variation	Compression 15 % 70 °C, 24 HR	Under no compression the height will be over 95 % than that before test



Required Dimensions for Quotation:

Generally, all elastomeric connectors are custom made with no tooling charges required. To quote accurately and in a timely manner, the following information is needed:

- **Height (H):** Connector vertical size, from top to bottom. Connector height (H) is used to calculate the correct compression force (deflection rate) to be applied for reliable connection.
- **Width (W):** Side to side thickness of each connector. Connector width (W) design is critical to eliminating "buckling" when a clamping force is applied to the connector. Should a connector buckle, the resistance will rise and total contact may be lost.
- **width1(w1):** Conductive material thickness of each connector. Connector conductor width (w1) helps to determine the connector cost, resistance and rigidity.
- **Length (L):** Connector end to end dimension. Connector length (L) should always be a consideration as it should fit the application and the customer's chosen bezel (holder).

Pitch (P): Center to center distance of each connector. Connector pitch (P) will assure that a reliable connection is made between the two surfaces. Generally LCD glass and the PCB. It is recommended that at least three conductors per contact be utilized.