Splash proof micro-USB Connector

"The product may not perform according to the product specification if precautions have not been taken in the application to provide mechanical stability of the connector in relation to its mating parts".





1 SCOPE.

1.1 Content.

This specification covers performance, test and quality requirements for a Tyco Electronics* splash proof micro-USB connector. The connector is designed to be used in portable devices with splash proof requirements.

1.2 Qualification.

When tests are performed on subject product, procedures specified in this specification shall be used. All inspections shall be performed using applicable inspection plan and product drawing.

2 APPLICABLE DOCUMENTS.

The following documents form a part of this specification to the extend specified here. Unless otherwise specified, latest edition of the document applies. In the event of conflict between the requirements in this specification and the product drawing, the product drawing shall take precedence. In the event of conflict between requirements of this specification and referenced documents, this specification shall take precedence.

2.1 Tyco Electronics Documents.

501-19198 Test report of "splash proof micro-USB connector AB-type".

2.2 Tyco Electronics Drawings.

C-1551629 Customer drawing of " splash proof micro-USB connector AB-type"
C-2173157 Customer drawing of " splash proof micro-USB connector B-type"

2.3 Other Documents.

IEC 60512 Basic testing procedures and measuring methods for electromechanical components for electronic equipment.
IEC 60068 Basic environmental testing procedures.
USB-IF MicroUSB Specification to the USB 2.0 Specification, Revision 1.01

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This specification is a controlled document and subject to change. Contact the Engineering Control Organization for the latest revision.

3 REQUIREMENTS.

3.1 Design and Construction:

Products shall be of design, construction and physical dimensions as specified on the applicable product drawing.

3.2 Material and Finish:

A.	Contact material:	- Cu-alloy.
	Plating:	- Post-plated with nickel and gold.
B.	Housing material:	- Thermo-Plastic, LCP
C.	Shell:	- Stainless Steel
	Plating:	- Post-plated with nickel and tin
D.	Sleeve:	- Thermo-Plastic, LCP
E.	Lubricants:	- HM-15 to be applied to contact - HP-300 to be applied to shell

3.3 Ratings:

A.	Voltage:	30 V max.
B.	Current:	- signal contacts only Pin 2, 3 & 4: 1A max. - with power applied contacts Pin 1 & 5: 1,8A max. Pin 2,3 & 4: 0,5A max.
C.	Operating temperature:	-30°C to 85°C
D.	Storage temperature:	-40°C to 85°C
E.	Durability:	10,000 cycles

3.4 PERFORMANCE AND TEST DESCRIPTION

The product is designed to meet electrical, mechanical and environmental performance specified in this paragraph as tested per test sequence specified in par. 3.6. The product is designed to meet electrical, mechanical and environmental performance specified (according Nokia draft spec. xxx-xxxxxxx) in this paragraph as tested per test sequence specified in Para 5.1.

Unless otherwise specified, all tests are performed at ambient environmental conditions per IEC specification 60068-1 clause 5.3. and are performed with connectors in mated conditions.

The following must be specified:

1. Testing Method (Standard Number, ex IEC 512-2 test 2a)
2. Number of Testing Samples (5 samples Minimum for each test)
3. Calibration Method

VISUAL			
Para	**Description**	**Performance / Requirements or severity**	**Procedures**
3.4.1	Examination of product	Meets requirements of product drawing and applicable instructions on customer drawing, and application specification.	Visual, dimensional and functional per applicable inspection plan. In acc. With IEC 60512-1-1 Magnification 10x

ELECTRICAL			
Para	**Description**	**Performance / Requirements or severity**	**Procedures**
3.4.2	Contact Resistance	Initial: 30mΩ Max. Final: Δ R=+/- 10 mΩ Max. Dry circuit method: (20mV, 100mA Max.)	IEC 60512-2-1 Measure with plug See figure 2 for measuring method.
3.4.3	Insulation Resistance	Initial:1000 MΩ Min. Final:100 MΩ Min. Unmated Connector with 500 VDC between adjacent contact for 1 minute	IEC 60512-3-1
3.4.4	Voltage proof	No voltage breakdown mated Connector with 100 VAC between adjacent contact for 1 minute	IEC 60512-5-2
3.4.5	Temperature rise	Measured at maximum rated current with all contacts in series. Test both configurations as described in par 3.3, B. Max. temperature rise 30˚C	IEC 60512-5-1

MECHANICAL			
Para	**Description**	**Performance / Requirements or severity**	**Procedures**
3.4.6	Mating-/ unmating Force	Mating force max. 35N Unmating force min. 8N and max. 25N before and after durability. Speed 12.5 mm/min	This requirement has to be fulfilled with actual plugs inside tolerance area
3.4.7	Mechanical operation	No physical damage and shall meet requirements of subsequent tests. Operation cycles:10000 (12000 cycles for reference only) Cycle rate of 500 cycles per hour max.	Connector is mounted in test cover according figure 1.
3.4.8	Vibration (random)	5.35 GRMS for 15 minutes in each of three mutually perpendicular planes Requirements: No mechanical damage Discontinuity max 1 us..	EIA 364-28 Test Condition V Test Letter A Connectors in mated condition, shield not included in serial measurement.
3.4.9	Shock test	Pulse shape half sine, peak acceleration 30 G, pulse 11 ms, 3 shocks in both directions in XYZ axis (18 shocks) Requirements: No mechanical damage Discontinuity max 1 us.	EIA 364-27 Test Condition H Connectors in mated condition, shield not included in serial measurement.
3.4.10	Solderability	Solderbatch temp. 265 ±3°C Dip duration 3 ±0,3 sec. Ageing 3 (16 hrs at 155°C), unmated. Req. Max. 5% dewetting	In acc. with IEC 60068-2-20 test Ta.
3.4.11	Connector peel strength	50N load along PWB Requirements: No loosening from PWB No mechanical damage	Apply forces to four directions along PWB

ENVIRONMENTAL			
Para	**Description**	**Performance/ Requirements or severity**	**Procedures**
3.4.12	Dry heat	No physical damage and shall meet requirement of subsequent test. +85°C for 500 hours mated.	IEC 60512-11-9

3.4.13	Rapid change of temperature	No physical damage and shall meet requirement of subsequent test. -55°C,+85°C, 15 minutes at each temperature , 10 cycles , mated. EIA 364-32 Test Condition I	IEC 60512-2-14
3.4.14	Composite temperature/ humidity cyclic test	No physical damage and shall meet requirement of subsequent test. 25°C and 65°C at 95% RH, seven cycles, each cycle 24hrs, mated.	EIA 60068-2-38
3.4.15	Mixed flowing Gas corrosion test	No physical damage EIA 364-65 Class IIA for total 10 days. 5days(unmated) 5days(mated) (Class IIA: RH% 70±2, Temp°C 30±1, Cl2 10±3ppb, NO2 200±50ppb, H2S 10±5 ppb, SO2 100±20ppb)	IEC60068-2-60 Ke Method 1
3.4.16	Resistance to soldering heat	See Para 3.5.3	TEC-109-201

3.5 Additional testing details.

3.5.1 Test cover

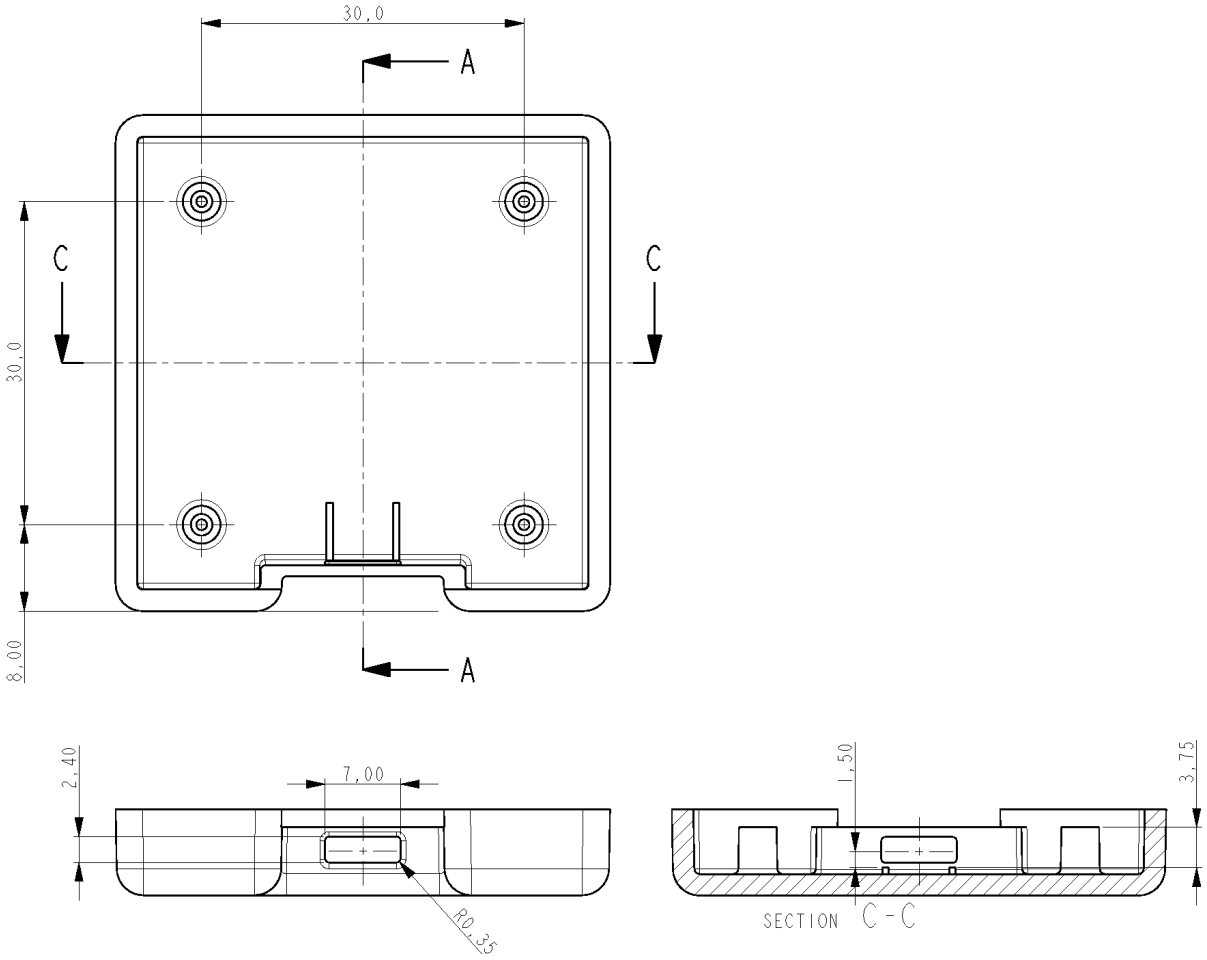


Figure 1 Test Cover for mechanical tests

3.5.2 Contact resistance measurement

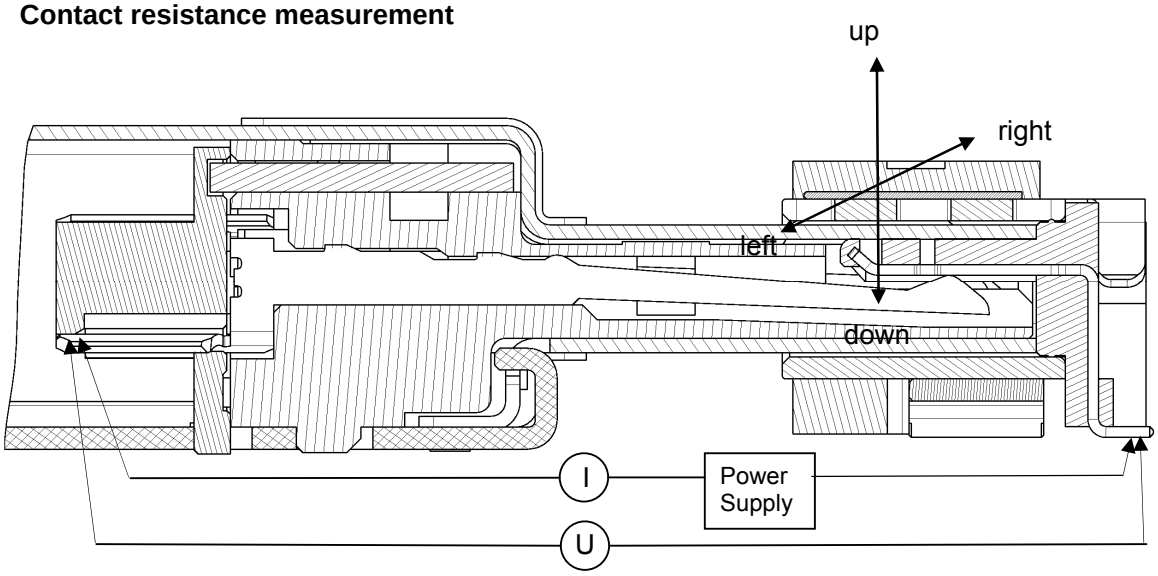


Figure 2 Contact resistance measurement

3.5.3 Resistance to soldering heat

Resistance to soldering-heat test shall cover the Forced hot air convection (reflow) heat curve as indicated in figure 3.
ref. IPC/JEDEC J-STD-020B with increased T peak (T_P).
Between exposures, parts shall be allowed to cool down to room temperature, for 5 minutes minimum.

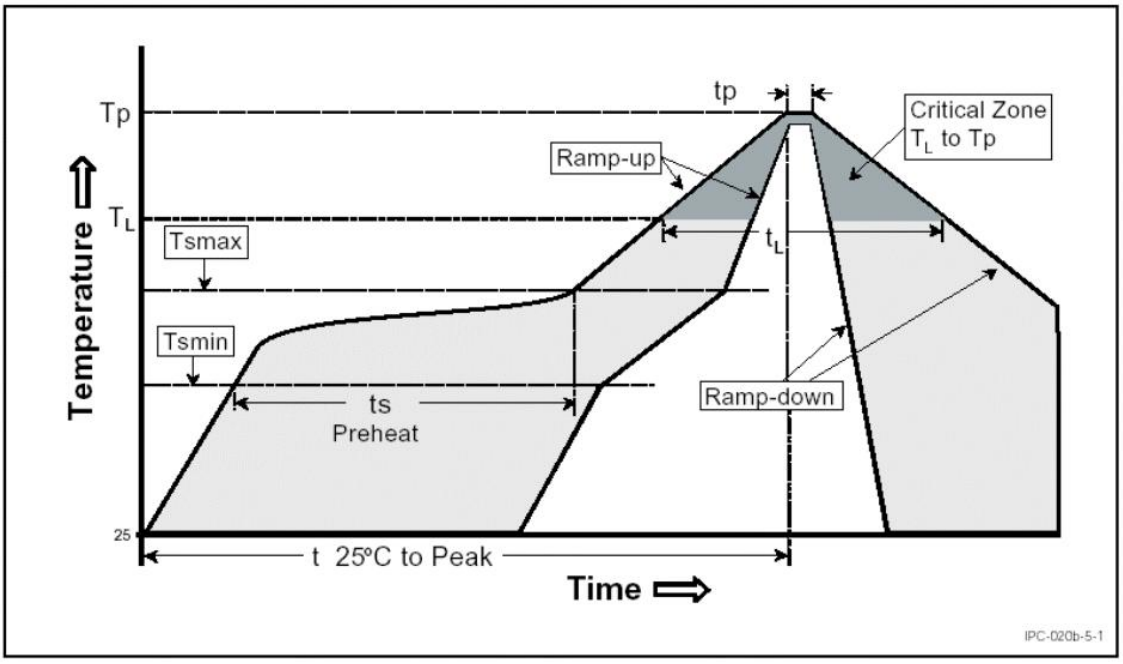


Figure 3. Forced hot air convection (reflow) heat curve.

Profile feature	Pb-Free Assembly Small Body
Average ramp-up rate (T_L to T_P)	3°C /second max.
Preheat - Temperature Min ($T_{S\ min}$) - Temperature Max ($T_{S\ max}$) - Time (min to max) (t_S)	 150°C 200°C 60-180 seconds
$T_{S\ max}$ to T_L - Ramp-up Rate	 3°C /second max.
Preheat - Temperature Min (T_L) - Time (t_L)	 217°C 60-150 seconds
Peak temperature (T_P)	260 +0/-5°C
Time within 5°C of actual Peak Temperature (t_P)	20-40 seconds
Ramp-down Rate	6°C /second max.
Time 25°C to Peak Temperature	8 minutes max.

Note: All temperatures refer to topside of the package, measured on the package body surface.

3.6 Product Qualification and Requalification Test Sequence.

Test or examination	TEST – GROUP (a)						
	1	2	3	4	5	6	7
	TEST-SEQUENCE (b)						
Examination of product	1, 11	1, 6	1,8	1,9	1,5	1,3	1,6
Contact resistance	3,6,9	3, 5	3,5,7		3,6		3,5
Insulation resistance				3,7			
Voltage proof				4,8			
Temperature rise					4		
Mating force	4						
Unmating force	10						
Mechanical operation	5						
Random vibration	8						
Shock test	7						
Solderability						2	
Dry heat		4					
Rapid change of temp.				5			
Composite temp/humidity				6			
Mixed flowing gas unmated			4				
Mixed flowing gas mated			6				
Resistance to soldering heat (3 cycles)	2	2	2	2	2		2
Connector peel strength							4

4 QUALITY ASSURANCE PROVISIONS.

4.1 Qualification testing.

A. Sample selection

Samples shall be prepared in accordance with applicable instructions and shall be selected at random from current production.

Samples shall be soldered on PWB.

B. Test sequence

Qualification inspection shall be verified by testing samples as specified in par. 3.6.

4.2 Requalification testing.

If changes significantly affecting form, fit or function are made to product or manufacturing process, product assurance shall coordinate requalification testing, consisting of all or part of original testing sequence as determined by product, quality and reliability engineering.

4.3 Acceptance.

Acceptance is based upon verification that product meets requirements of par. 3.5. Failures attributed to equipment, test set-up, applied customer components or operator deficiencies shall not disqualify the product. When product failure occurs, corrective action shall be taken and samples resubmitted for requalification. Testing to confirm corrective action is required before resubmitted.

4.4 Quality conformance inspection.

Applicable Tyco Electronics quality inspection plan will specify sampling acceptable quality level to be used.
Dimensional and functional requirements shall be in accordance with applicable product drawing and this specification.

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TE Connectivity:

141991-2 1969656-1 3-1393225-0 3430B2F51RTDF CRGCQ2010J3K3 ROX05SJ18R 2-292161-3 SBCHE64R7K 1-962915-1 1903112-2 2005330-1 917696-1 CPF0402B37K4E1 TE50BR39J 1743455-2 RH73H2A40MKTN SMW73R0JT 2377783-2 1393431-1 2310537-1 2380312-2 3631B101LL 650075-000 936348-1 175977-2 MPT100C18RF U5254-000005-030PA SBCHE154R7K 2834055-1 1-794222-0