J.S.T. Mfg. Co., Ltd.

TEST REPORT	Issue No. R21-0870	Rev. 0
Customer:	Issue date: December 7, 2021	
Product Name: YL connector (Wire-to-Wire)	Revision date:	

Purpose	As for adding the housing resin material of YL connecter (Receptacle and Plug housings), the performance comparative evaluation between the current product and additional product (made of additional resin) shall be conducted.
Conclusion	As a result of comparative evaluation, it is judged that the performance of the additional product is equivalent to that of the current products.

	Resin material manufacturer	Resin Part No.
Current product	Asahi Kasei Corporation	FR370
Additional product	KINGFA SCI.&TECH.CO., LTD.	PA66-RNG00

Prepared by:	Checked by:	Reviewed by:	Approved by:
K.Notsu	*T.Yamashita*	—	*N.Tsuji*

1. SPECIMEN

Part Name	Part Number	Remak
Pin contact	SYM-41T-P0.5A	—
Socket contact	SYF-41T-P0.5A	—
Receptacle housing	YLR-( )VF YLR-16V	Current product
	YLR-( )VF (SU) YLR-16V (SU)	Additional product
Plug housing	YLP-( )V	Current product
	YLP-( )V (SU)	Additional product

Note$_1$: Number of circuits in two-digit figures is indicated in ( ).
Note$_2$: "(SU)" is the identification symbol for additional products.

2. TEST ITEMS

Test items	
4.1 Appearance	
4.2 Mechanical Performance Test	4.2.1 Insertion Force & Withdrawal Force
	4.2.2 Contact Insertion Force
	4.2.3 Contact Retention Force
	4.2.4 Lock Retention Force
4.3 Electrical Performance Test	4.3.1 Contact Resistance
	4.3.2 Insulation Resistance
	4.3.3 Dielectric Withstanding Voltage
4.4 Environmental Test	4.4.1 Durability
	4.4.2 Humidity
	4.4.3 Heat Aging
	4.4.4 Thermal Shock
	4.4.5 Hydrogen Sulfide Gas
	4.4.6 Salt Spray
	4.4.7 Vibration

3. TEST CONDITION

1) When tested in accordance with the test condition and method specified in each item, each requirement shall be met.

2) Unless otherwise specified, tests shall be conducted under the following ambient conditions specified in JIS C 60068-1 (IEC 60068-1) [Basic Environmental Testing Procedures General and Guidance].

Temperature: 15 to 35°C
Relative humidity: 25 to 75%

3) For environmental tests, as a rule, the specimen assembled in the actual mounting state and the wire of UL 1007 AWG #18 shall be used.

4) Performance tests shall be carried out on specimen combination of additional products and on specimen combination of current products, respectively.

4. TEST METHODS & TEST RESULTS

4.1 Appearance

Test method: Visual inspection shall be conducted to check any defects such as crack, deformation, discoloration which may affect the performances.

Test result: No abnormalities were found.

4.2 Mechanical Performance Test

4.2.1 Insertion Force (I.F.) & Withdrawal Force (W.F.)

Test method: The plug and receptacle housings into which the crimped contacts were inserted shall be repeatedly mated and unmated on the same axis. The initial insertion and withdrawal force, and withdrawal force at 10th shall be measured, removing the housing lock. (Testing speed: 1 to 5 mm/sec.)

Test result: UNIT: N

No. of circuits	Resin material	Items	Measured values			Requirements
			Ave.	Max.	Min.	
2	Current product	Initial I.F.	11.7	12.6	11.1	13.8 max.
		Initial W.F.	11.0	12.1	10.1	3.0 min.
		W.F. at 10th	9.6	10.4	8.7	2.0 min.
	Additional product	Initial I.F.	12.4	13.6	11.7	13.8 max.
		Initial W.F.	11.8	13.1	10.7	3.0 min.
		W.F. at 10th	9.9	11.4	8.4	2.0 min.
3	Current product	Initial I.F.	15.1	15.7	13.9	20.7 max.
		Initial W.F.	17.0	17.6	15.9	4.5 min.
		W.F. at 10th	9.9	11.8	8.5	3.0 min.
	Additional product	Initial I.F.	14.3	15.3	13.3	20.7 max.
		Initial W.F.	15.2	16.7	14.3	4.5 min.
		W.F. at 10th	12.5	14.7	10.3	3.0 min.
16	Current product	Initial I.F.	83.8	89.3	80.3	110 max.
		Initial W.F.	80.7	84.3	77.6	24.0 min.
		W.F. at 10th	53.2	56.0	50.7	16.0 min.
	Additional product	Initial I.F.	85.7	89.6	82.1	110 max.
		Initial W.F.	82.1	86.2	80.0	24.0 min.
		W.F. at 10th	50.4	62.0	42.4	16.0 min.

n=5

4.2.2 Contact Insertion Force

Test method: Measure the force required to insert the crimped contact into the housing. (Testing speed: 1 to 5 mm/sec.)

Test result: UNIT: N

Resin material	Measured values			Requirement
	Ave.	Max.	Min.	
Current product	1.1	1.4	0.7	6.9 max.
Additional product	1.3	1.7	1.0	

n=36 pins

4.2.3 Contact Retention Force

Test method: The crimped contact shall be inserted into the housing and pulled it out from the housing on the axial direction, and then such load when separating shall be measured. (Testing speed: 1 to 5 mm/sec.)

Test result: UNIT: N

Resin material	Measured values			Requirement
	Ave.	Max.	Min.	
Current product	55.1	57.4	50.6	29.4 min.
Additional product	47.7	51.8	41.5	

n=36 pins

4.2.4 Lock Retention Force

Test method: After plug and receptacle housings are mated each other, the pulling load applied to such housings shall be measured when the housing lock breaks away. (Testing speed: 1 to 5 mm/sec.)

Test result: UNIT: N

Resin material	Measured values			Requirement
	Ave.	Max.	Min.	
Current product	70.5	75.3	65.0	29.4 min.
Additional product	62.4	63.7	61.5	

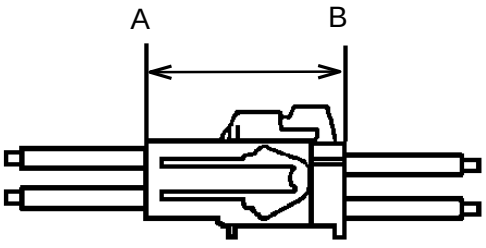
n=5

4.3 Electrical Performance Test

4.3.1 Contact Resistance

Test method: Contact resistance between points A and B of the specimen assembled in the actual mounting state as shown in the figure on the right side shall be measured under the following conditions.

Test current: 100 mA max. (DC)
Open voltage: 20 mV max.
Wire to be used: AWG #18



Test result: See the section on each environmental test.

4.3.2 Insulation Resistance

Test method: 500 VDC shall be applied between the outer surface of a housing and a contact, and also between adjacent contacts of the mated specimen to measure the insulation resistance.

Test result: UNIT: MΩ

Resin material	Items	Measured values		Requirements
		Housing - Contact	Contact - Contact	
Current product	Initial	1,000 min.	1,000 min.	1,000 min.
	After humidity test	500 min.	500 min.	500 min.
Additional product	Initial	1,000 min.	1,000 min.	1,000 min.
	After humidity test	500 min.	500 min.	500 min.

n=5

4.3.3 Dielectric Withstanding Voltage

Test method: Testing voltage specified below shall be applied between the outer surface of a housing and a contact, and also between adjacent contacts of the mated specimen for one minute.

Initial: 1,500 VAC
After test: 1,000 VAC (Humidity test)

Test result:

Resin material	Items	Results		Requirements
		Housing - Contact	Contact - Contact	
Current product	Initial	Good.	Good.	There shall be no breakdown or flashover.
	After humidity test	Good.	Good.	
Additional product	Initial	Good.	Good.	
	After humidity test	Good.	Good.	

n=5

4.4 Environmental Test

4.4.1 Durability

Test method: The plug and receptacle housings into which the crimped contacts were inserted shall be repeatedly mated and unmated on the mating axis. After repeated 50 cycles, the contact resistance shall be measured, removing the housing lock.

Test result:

<Contact resistance> UNIT: mΩ

Specimens	Items	Measured values			Requirements
		Ave.	Max.	Min.	
Current product	Initial	3.56	3.9	3.4	7 max.
	After the test	3.76	4.1	3.7	10 max.
Additional product	Initial	3.50	3.9	3.5	7 max.
	After the test	3.84	4.2	3.8	10 max.

n=18 pins

4.4.2 Humidity

Test method: The specimen shall be placed in a humidity chamber of the following conditions. After the test, the contact resistance, insulation resistance, and dielectric withstanding voltage shall be measured.

Temperature: 40 ± 2°C
Relative humidity: 90 to 95%
Period: 96 hours

Test result:

<Contact resistance> UNIT: mΩ

Specimens	Items	Measured values			Requirements
		Ave.	Max.	Min.	
Current product	Initial	3.48	3.8	3.2	7 max.
	After the test	3.51	3.9	3.3	10 max.
Additional product	Initial	3.50	3.9	3.3	7 max.
	After the test	3.53	3.9	3.3	10 max.

n=18 pins

4.4.3 Heat Aging

Test method: The specimen shall be placed in a heat oven of the following conditions. After the test, the contact resistance shall be measured.

Temperature: 125 ± 3°C
Period: 96 hours

Test result:

<Contact resistance> UNIT: mΩ

Specimens	Items	Measured values			Requirements
		Ave.	Max.	Min.	
Current product	Initial	3.47	3.8	3.2	7 max.
	After the test	3.84	4.1	3.4	10 max.
Additional product	Initial	3.51	3.9	3.4	7 max.
	After the test	3.80	4.0	3.6	10 max.

n=18 pins

4.4.4 Thermal Shock

Test method: The specimen shall be subjected to a thermal shock test of the following conditions. After the test, the contact resistance shall be measured.

1 cycle consists of:
-55 ± 3°C for 30 minutes
+85 ± 2°C for 30 minutes
Total cycles: 25 cycles

Test result:

<Contact resistance> UNIT: mΩ

Specimens	Items	Measured values			Requirements
		Ave.	Max.	Min.	
Current product	Initial	3.52	3.8	3.2	7 max.
	After the test	3.58	3.8	3.2	10 max.
Additional product	Initial	3.52	3.8	3.2	7 max.
	After the test	3.57	3.9	3.3	10 max.

n=18 pins

4.4.5 Hydrogen Sulfide Gas

Test method: The specimen shall be subjected to hydrogen sulfide gas of the following conditions. After the test, the contact resistance shall be measured.

Concentration: 3 ± 1 ppm
Temperature: 40 ± 2°C
Relative humidity: 80 ± 5%
Period: 96 hours

Test result:

<Contact resistance> UNIT: mΩ

Specimens	Items	Measured values			Requirements
		Ave.	Max.	Min.	
Current product	Initial	3.53	3.7	3.2	7 max.
	After the test	3.56	3.9	3.2	10 max.
Additional product	Initial	3.53	3.7	3.3	7 max.
	After the test	3.57	3.8	3.4	10 max.

n=18 pins

4.4.6 Salt Spray

Test method: The specimen shall be subjected to a salt spray test of the following conditions. After the test, it shall be washed with running water and dried naturally before the measurement of contact resistance.

Temperature: 35 ± 2°C
Concentration: 5% in weight
Period: 48 hours

Test result:

<Contact resistance> UNIT: mΩ

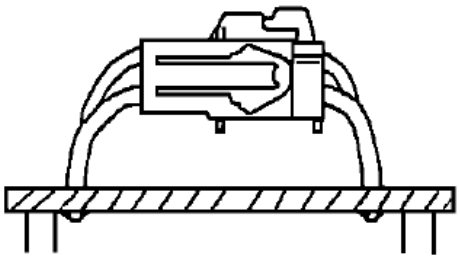
Specimens	Items	Measured values			Requirements
		Ave.	Max.	Min.	
Current product	Initial	3.51	3.8	3.3	7 max.
	After the test	3.70	3.9	3.4	10 max.
Additional product	Initial	3.52	3.8	3.3	7 max.
	After the test	3.81	3.9	3.5	10 max.

n=18 pins

4.4.7 Vibration

Test method: The specimen assembled in the actual mounting state shall be installed to the testing jig and subjected to a vibration test of the following conditions. During the test, the current continuity shall be checked. After the test, the contact resistance shall be measured.

Frequency: 10-55-10 Hz/minute
Amplitude: 1.52 mm
Direction: Each of X, Y, and Z-axis directions
*Each axis shall be at right angles to others.
Period: 2 hours for each direction



Test result:

<Contact resistance> UNIT: mΩ

Specimens	Items	Measured values			Requirements
		Ave.	Max.	Min.	
Current product	Initial	3.52	3.9	3.4	7 max.
	After the test	3.82	4.2	3.4	10 max.
Additional product	Initial	3.54	3.8	3.3	7 max.
	After the test	3.90	4.3	3.5	10 max.

n=18 pins

<Current continuity>

Current product Additional product	There was no current discontinuity longer than 10 μsec.