



LP6.2 Connector Test Report

1. INTRODUCTION

1.1. Purpose

Testing was performed on the TE Connectivity (TE) LP6.2 Connector to determine its conformance to the requirements of 108-161340.

1.2. Scope

This report covers the electrical, mechanical, and environmental performance of TE Connectivity (TE) LP6.2 connector.

1.3. Conclusion

All part numbers listed in paragraph 1.5 conformed to the electrical, mechanical, and environmental performance requirements of 108-161340.

1.4. Product Description

TE Connectivity (TE) LP6.2 connector design to accept 14-18AWG. It is available in 3 positions.

1.5. Test Specimens

The test specimens were representative of normal production lots, and the following part numbers were used for testing (see Figure 1).

Test Group	Quantity	Part Number	Description
1,2,3,10,11,12,13,14	80	2487504-3	LP 6.2 HEADER ASSY, 3P, NATURAL
	80	2487511-3	LP 6.2 PLUG HOUSING, 3P, NATURAL
	120	2487512-1	LP 6.2 RECPTACLE, 14-18AWG
	120	2487512-2	LP 6.2 RECPTACLE, 14-18AWG
4	15	2487512-1	LP 6.2 RECPTACLE, 14-18AWG
	15	2487512-2	LP 6.2 RECPTACLE, 14-18AWG
5	10	2487511-3	LP 6.2 PLUG HOUSING, 3P, NATURAL
	15	2487512-1	LP 6.2 RECPTACLE, 14-18AWG
	15	2487512-2	LP 6.2 RECPTACLE, 14-18AWG
6	5	2487504-3	LP 6.2 HEADER ASSY, 3P, NATURAL
	5	2487511-3	LP 6.2 PLUG HOUSING, 3P, NATURAL
7,8,9	15	2487504-3	LP 6.2 HEADER ASSY, 3P, NATURAL
15,16	10	2487504-3	LP 6.2 HEADER ASSY, 3P, NATURAL
	10	2487511-3	LP 6.2 PLUG HOUSING, 3P, NATURAL

Figure 1

Specimen Identification	Header ASSY	Plug Housing	Contact
Specimen A	2487504-3	2487511-3	2487512-1
Specimen B	2487504-3	2487511-3	2487512-2

Figure 2

1.6. Qualification Test Sequence

TEST OR EXAMINATION	TEST GROUP (a)															
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
	TEST SEQUENCE (b)															
Initial Examination of Product	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
LLCR	3,6									2,7	2,6	2,4	2,4	2,4		
Insulation Resistance										3,8	3,7					
Withstanding Voltage										4,9	4,8					
Temperature Rise vs. Current			2													
Vibration	5															
Durability	4															
Connector Mating Force	2	2														
Connector Un-mating Force		3														
Connector Un-mating Force 10 th		4														
Crimp Tensile Strength				2												
Contact Insertion Force					2											
Contact Retention Force					3											
Housing Locking Strength						2										
Pin Contact Retention Force							2									
Resistance to Soldering Heat								2								
Solderability									2							
Humidity										6						
Heat Aging											5					
Thermal Shock										5						
Hydrogen Sulfide Gas												3				
Salt Spray													3			
Ammonia Gas														3		
Needle Flame Test															2	
Glow Wire Test 750°C and 850°C																2
Final Examination of Product	7	5	3	3	4	3	3	3	3	10	9	5	5	5	3	3


NOTE

(a) See Paragraph 1.5.

(b) Numbers indicate sequence which tests were performed.

Figure 3
1.7. Environmental Conditions

Unless otherwise stated, the following environmental conditions prevailed during testing:

Temperature: 15°C to 35°C

Relative Humidity: 20% to 80%

2. SUMMARY OF TESTING
2.1.

Test Group	SN	Specimen Identification	Test Item	Unit	Test Result			Requirement	Conclusion
					Max	Min	Avg		
1	1	Specimen A,B	Examination of Product	-	No physical damage			No physical damage	Meet requirement
	2	Specimen A	Connector Mating Force	N	23.2	19.2	21.2	29.4N Max.	Meet requirement
		Specimen B			19.2	18.6	18.8		Meet requirement
	3	Specimen A	LLCR	mΩ	1.01	0.55	0.77	7 mΩ Max.	Meet requirement
		Specimen B			0.63	0.32	0.48		Meet requirement
	4	Specimen A,B	Durability	-	No physical damage			No physical damage	Meet requirement
	5	Specimen A,B	Vibration	-	No discontinuity greater than 1 μs			No discontinuities of 1 microsecond or longer duration.	Meet requirement
	6	Specimen A	LLCR	mΩ	1.030	0.520	0.795	10 mΩ Max.	Meet requirement
		Specimen B			1.350	0.930	1.090		Meet requirement
2	1	Specimen A,B	Examination of Product	-	No physical damage			No physical damage	Meet requirement
	2	Specimen A	Connector Mating Force	N	25.3	18.8	23.3	29.4N Max.	Meet requirement
		Specimen B			17.4	14.6	15.7		Meet requirement
	3	Specimen A	Connector Un-Mating Force	N	18.9	15.1	17.1	6.0N Min.	Meet requirement

		Specimen B			14.4	11.9	13.2		Meet requirement
	4	Specimen A	Connector Un-mating Force 10th	N	9.1	7.4	8.3	4.5n Min.	Meet requirement
		Specimen B			7.8	7.4	7.6		Meet requirement
	5	5	Specimen A,B	Examination of Product	-	No physical damage			No physical damage
3	1	Specimen A,B	Examination of Product	-	No physical damage			No physical damage	Meet requirement
	2	Specimen A	Temperature Rise vs. Current	°C	16.90	13.23	15.22	14AWG@14A 30°C Max.	Meet requirement
		Specimen B			12.35	9.09	10.51		Meet requirement
		Specimen A			9.63	8.60	8.98	16AWG@9A 30°C Max.	Meet requirement
		Specimen B			11.17	10.37	10.72		Meet requirement
		Specimen A			12.05	10.83	11.46	18AWG@8A 30°C Max.	Meet requirement
		Specimen B			12.30	11.02	11.46		Meet requirement
	3	Specimen A,B	Examination of Product	-	No physical damage			No physical damage	Meet requirement
4	1	Specimen A,B	Examination of Product	-	No physical damage			No physical damage	Meet requirement
	2	Specimen A	Crimp Tensile Strength 14AWG	N	211.1	202.4	206.8	147N Min.	Meet requirement
		Specimen B			206.9	186.1	197.2		Meet requirement
		Specimen A	Crimp Tensile Strength 16AWG		178.2	169.8	174.3	98N Min.	Meet requirement
		Specimen B			228.1	212.3	218.1		Meet requirement
		Specimen A	Crimp Tensile Strength 18AWG		164.1	153.7	160.6	78.4N Min.	Meet requirement
		Specimen B			174.1	154.2	162.3		Meet requirement
	5	1	Specimen A,B	Examination of Product	-	No physical damage			No physical damage
2		Specimen A	Contact Insertion Force	N	6.3	3.7	4.6	11.8N Max.	Meet requirement
		Specimen B			4.5	3.4	3.9		Meet requirement
3		Specimen A	Contact Retention Force	N	93.4	65.8	83.4	53.9N Min.	Meet requirement
		Specimen B			98.3	73.8	86.5		Meet requirement

6	1	Specimen A	Examination of Product	-	No physical damage			No physical damage	Meet requirement
	2	Specimen A	Housing Locking Strength	N	144.5	129.6	137.5	50N Min.	Meet requirement
7	1	Specimen A	Examination of Product	-	No physical damage			No physical damage	Meet requirement
	2	Specimen A	Pin Contact Retention Force	N	35.7	32.2	33.8	20N Min.	Meet requirement
8	1	Specimen A	Examination of Product	-	No physical damage			No physical damage	Meet requirement
	2	Specimen A	Resistance to Soldering Heat	-	No physical damage			No physical damage	Meet requirement
	3	Specimen A	Examination of Product	-	No physical damage			No physical damage	Meet requirement
9	1	Specimen A	Examination of Product	-	No physical damage			No physical damage	Meet requirement
	2	Specimen A	Solderability	-	Wet Solder Coverage 95% Min.			Wet Solder Coverage 95% Min.	Meet requirement
	1	Specimen A	Examination of Product	-	No physical damage			No physical damage	Meet requirement
10	1	Specimen A,B	Examination of Product	-	No physical damage			No physical damage	Meet requirement
	2	Specimen A	LLCR	mΩ	0.68	0.42	0.58	7 mΩ Max.	Meet requirement
		Specimen B			0.89	0.61	0.75		Meet requirement
	3	Specimen A	Insulation Resistance	MΩ	> 11 GΩ			1000 MΩ Min.	Meet requirement
		Specimen B			> 11 GΩ				Meet requirement
	4	Specimen A,B	Withstanding Voltage	-	No breakdown or flashover			No breakdown or flashover	Meet requirement
	5	Specimen A,B	Thermal Shock	-	No physical damage			No physical damage	Meet requirement
	6	Specimen A,B	Humidity	-	No physical damage			No physical damage	Meet requirement
	7	Specimen A	LLCR	mΩ	1.080	0.820	0.943	10 mΩ Max.	Meet requirement
		Specimen B			1.340	0.910	1.131		Meet requirement
	8	Specimen A	Insulation Resistance	MΩ	> 11 GΩ			500 MΩ Min.	Meet requirement
		Specimen B			> 11 GΩ				Meet requirement
	9	Specimen A,B	Withstanding Voltage	-	No breakdown or flashover			No breakdown or flashover	Meet requirement
	10	Specimen A,B	Examination of Product	-	No physical damage			No physical damage	Meet requirement

11	1	Specimen A,B	Examination of Product	-	No physical damage			No physical damage	Meet requirement
	2	Specimen A	LLCR	mΩ	0.62	0.20	0.46	7 mΩ Max.	Meet requirement
		Specimen B			0.85	0.51	0.70		Meet requirement
	3	Specimen A	Insulation Resistance	MΩ	> 11 GΩ			1000 MΩ Min.	Meet requirement
		Specimen B			> 11 GΩ				Meet requirement
	4	Specimen A,B	Withstanding Voltage	-	No breakdown or flashover			No breakdown or flashover	Meet requirement
	5	Specimen A,B	Heat Aging	-	No physical damage			No physical damage	Meet requirement
	6	Specimen A	LLCR	mΩ	0.780	0.580	0.684	10 mΩ Max.	Meet requirement
		Specimen B			1.080	0.780	0.943		Meet requirement
	7	Specimen A	Insulation Resistance	MΩ	> 11 GΩ			500 MΩ Min.	Meet requirement
		Specimen B			> 11 GΩ				Meet requirement
8	Specimen A,B	Withstanding Voltage	-	No breakdown or flashover			No breakdown or flashover	Meet requirement	
9	Specimen A,B	Examination of Product	-	No physical damage			No physical damage	Meet requirement	
12	1	Specimen A,B	Examination of Product	-	No physical damage			No physical damage	Meet requirement
	2	Specimen A	LLCR	mΩ	0.67	0.25	0.51	7 mΩ Max.	Meet requirement
		Specimen B			1.00	0.57	0.74		Meet requirement
	3	Specimen A,B	Hydrogen Sulfide Gas	-	No physical damage			No physical damage	Meet requirement
	4	Specimen A	LLCR	mΩ	1.31	0.61	0.98	10 mΩ Max.	Meet requirement
		Specimen B			1.61	0.51	1.05		Meet requirement
5	Specimen A,B	Examination of Product	-	No physical damage			No physical damage	Meet requirement	
13	1	Specimen A,B	Examination of Product	-	No physical damage			No physical damage	Meet requirement
	2	Specimen A	LLCR	mΩ	0.61	0.32	0.49	7 mΩ Max.	Meet requirement
		Specimen B			0.86	0.50	0.75		Meet requirement
	3	Specimen A,B	Salt Spray	-	No physical damage			No physical damage	Meet requirement

	4	Specimen A	LLCR	mΩ	0.510	0.100	0.329	10 mΩ Max.	Meet requirement
		Specimen B			0.790	0.230	0.545		Meet requirement
	5	Specimen A,B	Examination of Product	-	No physical damage			No physical damage	Meet requirement
14	1	Specimen A,B	Examination of Product	-	No physical damage			No physical damage	Meet requirement
	2	Specimen A	LLCR	mΩ	0.66	0.45	0.55	7 mΩ Max.	Meet requirement
		Specimen B			0.82	0.64	0.77		Meet requirement
	3	Specimen A,B	Ammonia Gas	-	No physical damage			No physical damage	Meet requirement
	4	Specimen A	LLCR	mΩ	1.560	0.490	0.865	10 mΩ Max.	Meet requirement
		Specimen B			1.460	0.550	0.953		Meet requirement
	5	Specimen A,B	Examination of Product	-	No physical damage			No physical damage	Meet requirement
15	1	Specimen A	Examination of Product	-	No physical damage			No physical damage	Meet requirement
	2	Specimen A	Needle Flame Test	-	t _b <30 seconds			No flame or t _b <30 seconds	Meet requirement
16	1	Specimen A	Examination of Product	-	No physical damage			No physical damage	Meet requirement
	2	Specimen A	Glow Wire Test 750°C and 850°C	-	750°C: No flame 850°C: t _E ≤ t _A + 30 s			750°C: No flame or t _E - t _i ≤ 2 s. 850°C:No flame or t _E ≤ t _A + 30 s	Meet requirement

Figure 4

3. TEST METHODS

3.1. Initial/Final Examination of Product

Testing was performed in accordance with EIA-364-18. Specimens were visually examined and no evidence of physical damage detrimental to product performance was observed.

3.2. LLCR

Testing was performed in accordance with EIA 364-23 using a test current of 10 mA and a test voltage limited to 20mV.

3.3. Insulation Resistance

Testing was performed in accordance with EIA-364-21. Measure and record the insulation resistance separately between the outer surface of the housing and the contact and also between adjacent contacts at 500VDC for 1 minutes. Measure and record the performance of the specimens. Execute visual check after test.

3.4. Withstand Voltage

Testing was performed in accordance with EIA-364-20, condition I. A test potential of 2000VAC was applied the housing and the contact and also between adjacent contacts. This potential was applied for 1 minute and then returned to zero.

3.5. Temperature Rising

Testing was performed in accordance with EIA-364-70C. Thermocouples were soldered to each test specimen. Test specimens were connected in series in a draft free chamber. Each test current was applied until specimen temperatures were stable, then recorded. Stability occurred when 3 consecutive temperature measurements taken at 5 minutes intervals did not differ by more than 1°C.

3.6. Vibration

Testing was performed in accordance with EIA-364-28, Condition I, Subject mated specimens to 10 to 55 to 10Hz traversed in 1 minute with 1.5 mm maximum total excursion. Two hours in each of 3 mutually perpendicular planes. The test current of 100mA shall be applied.

3.7. Durability

Testing was performed in accordance with EIA-364-9. Testing was performed by mating and un-mating test specimens for 50 cycles at a maximum rate of 500 cycles per hour.

3.8. Connector Mating Force

Testing was performed in accordance with EIA-364-13, method A. Mating force was measured with a tensile/compression machine. The plug housing was held in a vice mounted to an X-Y table rigidly clamped to the base of the tensile/compression testing machine. The moveable crosshead was lowered at a rate of 25.4 mm/min. until the specimen was fully mated with latch disengaged. The peak force required to mate the connector was recorded.

3.9. Connector Un-mating Force

Testing was performed in accordance with EIA-364-13, method A. Un-mating force was measured with a tensile/compression machine. The plug housing was held in a vice mounted to an X-Y table rigidly clamped to the base of the tensile/compression testing machine with the latch disengaged. The moveable crosshead was raised at a rate of 25.4 mm/min. until the specimen was fully unmated with latch disengaged. The peak force required to un-mate the connector was recorded.

3.10. Crimp Tensile Strength

Testing was performed in accordance with EIA-364-8. The force load was applied to each specimen using a tensile/compression device with the rate of travel at 25.4 mm per minute. The load is applied in axial directions as specified.

3.11. Contact Insertion Force

Testing was performed in accordance with EIA-364-5. Contact insertion force was measured by applying an increasing force to each contact using a tensile/compression device with a rate of travel at 25.4 mm/min. until the contact was properly seated in the housing.

3.12. Contact Retention Force

Testing was performed in accordance with EIA-364-29, method C. Contact retention force was measured by applying an increasing force to each contact using a tensile/compression device with a rate of travel at 25.4 mm/min. until the contact was dislodged from the housing.

3.13. Connector Locking Strength

Testing was performed in accordance with EIA-364-98. Connector locking force was measured by applying an increasing force to plug using a tensile/compression device with a rate of travel at 12.7 mm/min. until the plug was dislodged from the header assembly.

3.14. Pin Contact Retention Force

Testing was performed in accordance with EIA-364-29. The force load was applied to each pin contact using a tensile/compression device with the rate of travel at 25.4 mm per minute.

3.15. Resistance to Soldering Heat

The specimens shall be mounted on a PCB and testing was performed in soldering temperature $260 \pm 5^\circ\text{C}$ for 5 ± 0.5 seconds immersion.

3.16. Solderability

Testing was performed in accordance with TEC-109-11 Method A, solder Temperature: $245 \pm 3^\circ\text{C}$, immersion duration: $3 \pm 0.5\text{s}$.

3.17. Humidity

Testing was performed in accordance with EIA-364-31, method II. Testing was performed in relative humidity 90-95% and temperature $40 \pm 2^\circ\text{C}$ for 96 hours.

3.18. Heat Aging

Testing was performed in accordance with EIA-364-17, method A, test condition 5, test time condition A. Subject mated connector to $125 \pm 3^\circ\text{C}$ for a duration of 96 hours.

3.19. Thermal Shock

Testing was performed in accordance with EIA-364-32, Method A Test Condition VII. Subject mated specimens to 25 cycles between $-55 \pm 3^\circ\text{C}$ and $85 \pm 3^\circ\text{C}$ with 30 minutes dwells at temperature extremes and 5 minutes transition between temperatures.

3.20. Hydrogen Sulfide Gas

Mated specimens were subjected to a 3 ± 1 ppm H_2S environment for 96 hours at a temperature of $40 \pm 2^\circ\text{C}$ and humidity $80 \pm 5\%$.

3.21. Salt Spray

Testing was performed in accordance with EIA-364-26. Mated specimens were subjected to a $5 \pm 0.1\%$ salt spray environment for 48 hours. The temperature of the box was maintained at 35°C .

3.22. Ammonia Gas

Mated specimens were subjected to 25 mL/L of 3% NH_3 solution environment for 7 hours.

3.23. Needle Flame Test

Testing was performed in accordance with IEC 60695-11-5.

3.24. Glow Wire Test 750°C and 850°C

Testing was performed in accordance with IEC 60695-2-11.