Test Report

Industrial M12 Series Cable Assembly

1. INTRODUCTION

1.1 Purpose

Testing was performed on M12 Series Circular Connector with cable assembly type（M12 D code male straight to female straight cordsets） to determine its conformance to the requirements of product specification **108-106140**.

1.2 Scope

This specification covers performance, test and quality requirements for Industrial M12 Series Circular Connector with cable assembly. Testing was performed at TE Connectivity Shanghai Electrical Test Laboratory.

1.3 Product Description

Part Number	Type	Code	Poles	Cable
TAD14545101-XXX	M12 D Code 4P Male Straight to female straight, shielded	D-Code	4 Pins	Industrial ethernet profinet type C CAT5E 22AWGX4C shielded PUR cable
TAD14541111-XXX	M12 D Code 4P Male Straight to female straight, shielded	D-Code	4 Pins	Industrial ethernet profinet type B CAT5E 22AWGX4C shielded PVC cable
TAD1453A201-XXX	M12 D Code 4P Male Straight to female straight, shielded	D-Code	4 Pins	Industrial ethernet/IP Hi-flex CAT5E cable SF/UTP,2PRX24AWG, TPE jacket
TAD2453A201-XXX	M12 D Code 4P Male Straight to female straight, unshielded	D-Code	4 Pins	Industrial ethernet/IP Hi-flex CAT5E cable U/UTP,2PRX24AWG, TPE jacket

1.4 Product Qualification Test Sequence

Test or Examination	Test Group				
	A(a)	B	C	D	E(f)
	Test Sequence				
Examination of product	1	3,6,11,20,26	8	9	1
Voltage proof(withstanding voltage)	4	10,19,25	4,7	4,8	
Insulation resistance	3	9,13,18,24	3,6	3,7	
LLCR	2	2,5,8,17,23	2	2	2,6
Temperature Rising				5(e)	
Impacting water		21	5	6	
Dust(IP6X)		22(b)			
Durability					4
Mating and Un-mating Force					3,5
Sinusoidal vibration		1			
Mechanical shock		4			
Rapid change in temperature		7		1	
Dry heat		12			
Damp heat, cyclic		14(c),16(d)			
Cold		15			
Mixed flowing gas			1		

(a) When the initial test group A has been completed, the specimens are divided in the 3 groups B, C, D. All connectors in each group shall undergo the tests specified for the relevant group numbers indicate sequence in which tests are performed.
(b) It's allowed to perform with an additional specimen, extending the total number of specimen by 1.
(c) First cycle
(d) Remaining cycles

(e) Test with additional specimen for over-molding type cable assembly
(f) This test group should be tested without the screw nut

*** Notes:**
Numbers indicate the sequence in which the tests are performed.

1.5 Environmental Conditions
Unless otherwise specified, the following environmental conditions prevailed during testing:

- Temperature: 15 to 35°C
- Relative Humidity: 20 to 80%

2. SUMMARY OF TESTING

2.1. Initial Examination of Product

All specimens were visually examined and no evidence of physical damage detrimental to product performance was observed.

2.2 Test Group
2.2.1 Group A+B

Group	Test Item	Sample	Requirement	Test Condition and Result	Conclusion
A	LLCR	See 1.3	10 m Ω Max.	<15 mΩ	meet spec.
	Insulation resistance	See 1.3	100MΩ Min	>100MΩ	meet spec.
	Voltage Proof	See 1.3	No breakdown or flashover	No breakdown and flashover	meet spec.
B	Sinusoidal vibration	See 1.3	No physical damage; No electrical discontinuity greater than 1μs	No abnormalities	meet spec.
	LLCR	See 1.3	Δ15mΩ max.	<15 mΩ	meet spec.
	Examination of product	See 1.3	No defect would impair normal operation	Normal	meet spec.
	Mechanical shock	See 1.3	No physical damage; No electrical discontinuity greater than 1μs	No abnormalities	meet spec.
	LLCR	See 1.3	Δ15mΩ max.	<15 mΩ	meet spec.
	Examination of product	See 1.3	No defect would impair normal operation	Normal	meet spec.
	Rapid change in temperature	See 1.3	No physical damage	No abnormalities	meet spec.
	LLCR	See 1.3	Δ15mΩ max.	<15 mΩ	meet spec.
	Insulation resistance	See 1.3	100MΩ Min	>100MΩ	meet spec.
	Voltage	See 1.3	No breakdown or	No breakdown	meet spec.

	proof(withstanding voltage)		flashover	and flashover	
	Examination of product	See 1.3	No defect would impair normal operation	Normal	meet spec.
	Dry heat	See 1.3	No physical damage	Normal	meet spec.
	Insulation resistance	See 1.3	100MΩ Min	>100MΩ	meet spec.
	Damp heat, cyclic	See 1.3	No physical damage	No abnormalities	meet spec.
	Cold	See 1.3	No physical damage	Normal	meet spec.
	Damp heat, cyclic	See 1.3	No physical damage	No abnormalities	meet spec.
	LLCR	See 1.3	Δ15mΩ max.	<15 mΩ	meet spec.
	Insulation resistance	See 1.3	100MΩ Min	>100MΩ	meet spec.
	Voltage proof(withstanding voltage)	See 1.3	No breakdown or flashover	No breakdown or flashover	meet spec.
	Examination of product	See 1.3	No defect would impair normal operation	Normal	meet spec.
	Impacting water	See 1.3	No water ingress	No water ingress	meet spec.
	LLCR	See 1.3	Δ15mΩ max.	<15 mΩ	meet spec.
	Insulation resistance	See 1.3	100MΩ Min	>100MΩ	meet spec.
	Voltage proof(withstanding voltage)	See 1.3	No breakdown or flashover	No breakdown or flashover	meet spec.
	Examination of product	See 1.3	No physical damage	Normal	meet spec.

2.2.2 Group A+C

Group	Test Item	Sample Number	Requirement	Test Condition and Result	Conclusion
A	LLCR	See 1.3	10 m Ω Max.	<10 m Ω	meet spec.
	Insulation resistance	See 1.3	100MΩ Min	>100MΩ	meet spec.
	Voltage Proof	See 1.3	No breakdown or flashover	No breakdown and flashover	meet spec.
C	Mixed Flowing Gas	See 1.3	No corrosion and defect	No abnormalities	meet spec.
	LLCR	See 1.3	Δ15mΩ max.	<15 mΩ	meet spec.
	Insulation resistance	See 1.3	100MΩ Min	>100MΩ	meet spec.
	Voltage proof(withstanding voltage)	See 1.3	No breakdown or flashover	No breakdown and flashover	meet spec.
	Impacting water	See 1.3	No water ingress	No water ingress	meet spec.
	Insulation resistance	See 1.3	100MΩ Min	>100MΩ	meet spec.
	Voltage proof(withstanding voltage)	See 1.3	No breakdown or flashover	No breakdown and flashover	meet spec.
	Examination of product	See 1.3	No defect would impair normal operation	Normal	meet spec.

2.2.3 Group A+D

Group	Test Item	Sample Number	Requirement	Test Condition and Result	Conclusion
A	LLCR	See 1.3	10 m Ω Max.	<10 m Ω	meet spec.
	Insulation resistance	See 1.3	100MΩ Min	>100MΩ	meet spec.
	Voltage Proof	See 1.3	No breakdown or flashover	No breakdown and flashover	meet spec.
D	Rapid change in temperature	See 1.3	No physical damage	No abnormalities	meet spec.
	LLCR	See 1.3	Δ15mΩ max.	<15 mΩ	meet spec.
	Insulation resistance	See 1.3	100MΩ Min	>100MΩ	meet spec.
	Voltage proof(withstanding voltage)	See 1.3	No breakdown or flashover	No breakdown and flashover	meet spec.
	Temperature Rising	See 1.3	ΔT 30° C Max.	No abnormalities	meet spec
	Impacting water	See 1.3	No water ingress	No water ingress	meet spec.
	Insulation resistance	See 1.3	100MΩ Min	>100MΩ	meet spec.
	Voltage proof (withstanding voltage)	See 1.3	No breakdown or flashover	No breakdown and flashover	meet spec.
	Examination of product	See 1.3	No defect would impair normal operation	Normal	meet spec.

2.2.3 Group E

Group	Test Item	Sample Number	Requirement	Test Condition and Result	Conclusion
E	Examination of product	See 1.3	No defect would impair normal operation	No abnormalities	meet spec.
	LLCR	See 1.3	10 m Ω Max.	<10 m Ω	meet spec.
	Mating and Un-mating Force	See 1.3	15N Max.	<15N	meet spec.
	Durability	See 1.3	100 cycles for gold plating	No abnormalities	meet spec.
	Mating and Un-mating Force	See 1.3	15N Max.	<15N	meet spec.
	LLCR	See 1.3	Δ15mΩ max.	<15 m Ω	meet spec.

3. Conclusion

Based on the test results Industrial M12 D code straight male to straight female cordsets products meet all requirements according to Tyco Electronics product specification 108-106140.