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**Category 6 System (Channel), 4 UTP, 24 AWG Undercarpet Cable**

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**1. SCOPE**

## 1.1. Content

This specification covers performance, tests and quality requirements for Category 6 System (Channel), 100 ohm, Unshielded Twisted Pair (UTP) undercarpet cable designed for interconnection of voice and data devices by way of cabling that is easily concealed using carpet squares. The system is installed over smooth, level and continuous floor surfaces and is easily interfaced to building wiring eliminating the need for ductwork, poke-thru and telepoles.

## 1.2. Qualification

When tests are performed on the subject product line, procedures specified in Figure 1 shall be used. All inspections shall be performed using the applicable inspection plan and product drawing.

## 1.3. Qualification Test Results

Successful qualification testing on the subject product line was completed in Apr07. The Qualification Test Report number for this testing is 501-691. This documentation is on file at and available from Engineering Practices and Standards (EPS).

**2. APPLICABLE DOCUMENTS**

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

## 2.1. Tyco Electronics Documents

- ! 109-197: Test Specification (AMP Test Specifications vs EIA and IEC Test Methods)
- ! 408-3194: Instruction Sheet (NETCONNECT Undercarpet Twisted-Pair Cable)
- ! 408-8417: Instruction Sheet (SL, KL, and Secure SL Series 110Connect Modular Jacks)
- ! 501-691: Qualification Test Report (Category 6 System (Channel), 4 UTP, 24 AWG Undercarpet Cable)

## 2.2. Commercial Specifications

- ! ASTM D4566: Standard Test Methods for Electrical Performance Properties of Insulations and Jackets for Telecommunications Wire and Cable
- ! EIA-364: Electrical Connector/Socket Test Procedures Including Environmental Classifications
- ! EIA/TIA-568-B.2-1: Transmission Performance Specifications for 4-Pair 100 Ohm Augmented Category 6 Cabling

**3. REQUIREMENTS**

3.1. Design and Construction

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

3.2. Materials

Materials used in the construction of this product shall be as specified on the applicable product drawing.

3.3. Ratings

- ! Voltage: 300 volts AC or DC
- ! Temperature: -20 to 60°C
- ! DC Resistance: 9.38 ohms/100m maximum corrected to 20°C per ASTM D4566
- ! Resistance Unbalance: 5% maximum corrected to 20°C per ASTM D4566
- ! Mutual Capacitance: 5.6 nf/100m maximum at 1 kHz per ASTM D4566
- ! Capacitance Unbalance: 330 pf/100m maximum at 1 kHz

3.4. Performance and Test Description

Product is designed to meet the electrical, mechanical and environmental performance requirements specified in Figure 1. Unless otherwise specified, all tests shall be performed at ambient environmental conditions.

3.5. Test Requirements and Procedures Summary

Test Description	Requirement	Procedure
Examination of product.	Meets requirements of product drawing.	EIA-364-18. Visual and dimensional (C of C) inspection per product drawing.
<b>ELECTRICAL TRANSMISSION</b>		
Propagation delay.	5.7 ns/m maximum at 10 MHz. 570 ns/100m maximum at 1 MHz. 545 ns/100m maximum at 10 MHz. 538 ns/100m maximum at 100 MHz. 536 ns/100m maximum at 250 MHz.	EIA/TIA-568-B.2-1, paragraph 7.5.2. Measure phase delay on each conductor.
Delay skew.	45 ns/100m maximum.	EIA/TIA-568-B.2-1, paragraph 7.5.4. Calculate delay skew as the maximum difference in propagation delay between all pairs in the cable.
Insertion Loss (IL).	See Figure 3. Limits are increased 0.4%/°C above 20°.	EIA/TIA-568-B.2-1, paragraph 7.1.3. Test in balanced mode using matching baluns. Measure at 20 and 60°C.

Figure 1 (continued)

Test Description	Requirement	Procedure
Near End Crosstalk (NEXT).	See Figure 3.	EIA/TIA-568-B.2-1, paragraph 7.2.1.4. Test in balanced mode using matching baluns.
Return Loss (RL).	See Figure 3.	EIA/TIA-568-B.2-1, paragraph 7.4.5. Test in balanced mode using matching baluns.
Power Sum Near End Crosstalk (PS NEXT).	See Figure 3.	EIA/TIA-568-B.2-1, paragraph 7.2.2.2. Test in balanced mode using matching baluns.
Equal Level Far End Crosstalk (ELFEXT).	See Figure 3.	EIA/TIA-568-B.2-1, paragraph 7.3.1.3. Test in balanced mode using matching baluns.
Power Sum Equal Level Far End Crosstalk (PS ELFEXT).	See Figure 3.	EIA/TIA-568-B.2-1, paragraph 7.3.2. Test in balanced mode using matching baluns.

Figure 1 (end)

3.6. Product Qualification and Requalification Test Sequence

Test or Examination	Test Group (a)
	1
Test Sequence (b)	
Examination of product	1
Propagation delay	2
Delay skew	3
IL	4
NEXT	5
RL	6
PS NEXT	7
ELFEXT	8
PS ELFEXT	9

**NOTE**

- (a) See paragraph 4.1.A.
- (b) Numbers indicate sequence in which tests are performed.

Figure 2

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#### 4. QUALITY ASSURANCE PROVISIONS

##### 4.1. Qualification Testing

###### A. Specimen Selection

Specimens shall be prepared in accordance with applicable Instruction Sheets and shall be selected at random from current production. Test group shall each consist of a minimum of 3 specimens.

###### B. Test Sequence

Qualification inspection shall be verified by testing specimens as specified in Figure 2.

##### 4.2. Requalification Testing

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

##### 4.3. Acceptance

Acceptance is based on verification that the product meets the requirements of Figure 1. Failures attributed to equipment, test setup or operator deficiencies shall not disqualify the product. When product failure occurs, corrective action shall be taken and specimens resubmitted for qualification. Testing to confirm corrective action is required before resubmittal.

##### 4.4. Quality Conformance Inspection

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

Frequency (MHZ)	IL (dB) See Note (a)	NEXT (dB) See Note (b)	RL (dB) See Note (c)	PS NEXT (dB) See Note (d)	ELFEXT (dB) See Note (e)	PS ELFEXT (dB) See Note (f)
1	-2.1	-65.0	-19.0	-62.0	-63.3	-60.3
4	-4.0	-63.0	-19.0	-60.5	-51.2	-48.2
8	-5.7	-58.2	-19.0	-55.6	-45.2	-42.2
10	-6.3	-56.6	-19.0	-54.0	-43.3	-40.3
16	-8.0	-53.2	-18.0	-50.6	-39.2	-36.2
20	-9.0	-51.6	-17.5	-49.0	-37.2	-34.2
25	-10.1	-50.0	-17.0	-47.3	-35.3	-32.3
31.25	-11.4	-48.4	-16.5	-45.7	-33.4	-30.4
62.5	-16.5	-43.4	-14.0	-40.6	-27.3	-24.3
100	-21.3	-39.9	-12.0	-37.1	-23.3	-20.3
200	-31.5	-34.8	-9.0	-31.9	-17.2	-14.2
250	-35.9	-33.1	-8.0	-30.2	-15.3	-12.3

**NOTE**

- (a) *IL limits are computed from EIA/TIA-568-B.2-1, Equation 8.*
- (b) *NEXT limits are computed from EIA/TIA-568-B.2-1, Equation 20.*
- (c) *RL limits are computed from Table 29.*
- (d) *PS NEXT limits are computed from EIA/TIA-568-B.2-1, Equation 24.*
- (e) *ELFEXT (worst pair) limits are computed from Equation 28.*
- (f) *PS ELFEXT (pair-to-pair) limits are computed from EIA/TIA-568-B.2-1, Equation 32.*

Figure 3  
Category 6 System (100 ohm) Performance Requirements