

# TECHNICAL SPECIFICATION

## 4 PAIR UTP CABLE CAT6 (CATEGORY 6 PLUS)

## 1. SCOPE

This specification is based on the specifications of UL 444, ANSI/TIA/EIA-568-B, ISO/IEC 1801, UL 1685(CM) and covers the requirements for Unshielded Twisted Pair (UTP) cables of 100 Ω, Cat6 (U/UTP 6+) for Wideband Technology.

Applicable cable size and type: 4 pairs, PVC sheath, CM Grade.

## 2. PRODUCT SPECIFICATION

### 2.1 CONSTRUCTION

#### 2.1.1 CONDUCTORS

Each conductor shall be **solid** bare copper wire, circular in cross-section, uniform in quality and free from defects. The diameter of each conductor shall be AWG 23 (Nom O.D. 0.54 +/- 0.005).

#### 2.1.2 INSULATION

Each conductor shall be insulated with solid high density Polyethylene (HDPE).

It shall be applied uniformly around the conductor with a minimum concentricity of 90%.

The nominal insulation diameter shall be 0.98mm±0.03mm and the specific maximum diameter shall be 1.22mm.

If the concentricity of the conductor can be tested on the manufacturing process before completing the product, it could be omitted in the test.

#### 2.1.3 PAIRS

Two insulated conductors, designated "A" and "B" shall be uniformly twisted together to form a pair.

The insulation shall be coloured and striped longitudinally, as per Table 1.

The stripe colouring shall not be removable by normal stripping and wiring operations.

**Table 1**

Pair No.	"A"Conductor Insulation Colour	"B"Conductor	
		Insulation Colour	Stripe Colour
1	Blue RAL 5015	White RAL 9003	Blue RAL5015
2	Orange RAL 2003	White RAL 9003	Orange RAL 2003
3	Green RAL 6029	White RAL 9003	Green RAL 6029
4	Brown RAL 8007	White RAL 9003	Brown RAL 8007

\* The stripe marking shall be applied on the white colour.

### 2.1.4 CABLE CORE ASSEMBLY

Two insulated conductors shall be twisted into a pair. Four twisted pairs shall be assembled into a cable core. The cross-shaped filler shall be inserted between pairs for sufficient isolations of pairs to improve crosstalk characteristics. Rip cord forms part of the cable construction.

### 2.1.5 SHEATH

The material shall, as a minimum, meet the requirements of UL 444.

The sheath shall be applied over the cable assembly by an extrusion tubing technique, being close fitting, but not adhering to the insulation, and readily removable for installation termination.

The sheath shall have a minimum wall thickness of 0.50mm and nominal 0.55mm.

The acceptable maximum cable diameter shall be 6.4mm.

The sheath colours are given in Table 2.

**Table 2**

Colour Code	Sheath Colour	RAL Code
GY	Gray	RAL7035
BL	Blue	RAL5015

If other colours are required, this shall be specified and confirmed with Wideband Technology.

### 2.1.6 SHEATH MARKING

The cable shall be marked on the sheath to designate the transmission performance and others. The marking shall be printed through the outer sheath clearly.


The specific legend requirements are given in Table 3.

**Table 3**

Category	FlameGrade	SheathMarking
Cat.6	CM	0000M Wideband UTP 4PR 23AWG CM Verified (UL) CAT6 TIA/EIA-568-B.2-1 ISO/IEC 11801 "A-TICK" N15017 MM/YY

- 0000M : Meter marking starts from 0 (zero) to 305m at 1 meter intervals

- MM/YY: Manufactured Month/Year (each 2 digits)

- 'A-Tick' : 

## 2.2 PHYSICAL PERFORMANCE

### 2.2.1 SHEATH

The unaged tensile strength and elongation, measured in accordance with clause 7.8 of UL 444 shall be minimum 13.5MPa and 150%, respectively.

The heat-aged tensile strength and elongation, measured in accordance with clause 7.8 of UL 444 shall be minimum 12.5MP and 125%, respectively.

### 2.2.2 CABLE COLD BEND

All cables shall meet the requirements of clause 7.10 of UL 444. Cold bend (20deg +/-2deg x 4h): 8 x Cable O.D. , no visible cracks.

### 2.2.3 FLAME REQUIREMENT

A cable marked CM shall comply with the vertical-tray flame test specified in UL 1685 or IEC 60332-3.

### 2.2.4 CROSS-SHAPED FILLER

Cross-shaped filler (separator) complies with ROHS requirements. O.D. 4.5mm, thickness 0.45mm

## 2.3 ELECTRICAL PERFORMANCE

### 2.3.1 ELECTRICAL CHARACTERISTICS

Characteristics		Unit	Cat.6					
DC Resistance (20deg)		Ohm/100m	Max 9.5					
DC Resistance Unbalanced		%	Max 5.0					
Mutual Capacitance		nF/100m	Max 5.6					
Capacitance Unbalance (Pr – Gr)		pF/100m	Max 330					
Insulation Resistance		MOhm/100m	Min 500					
Dielectric Strength		DC kV/min	1/ 1					
Impedance - Zo	1~250MHz	Ohm	100 +/- 15					
NVP		%	69					
<b>RL</b> – Return Loss	Frequency	dB/100m	RL	Att	NEXT	PSNEXT	ELFEXT	PSELFEXT
<b>Att</b> - Attenuation			(Min)	(Max)	(Min)	(Min)	(Min)	(Min)
<b>NEXT</b> – Pair To Pair	1MHz		20.0	2.03	74.3	72.3	67.8	64.8
Near End Cross	4MHz		23.0	3.78	65.3	63.3	55.8	52.8
Talk	8MHz		24.5	5.32	60.8	58.8	49.7	46.7
<b>PSNEXT</b> – Power	10MHz		25.0	5.95	59.3	57.3	47.8	44.8
Sum Near End	16MHz		25.0	7.55	56.2	54.2	43.7	40.7
Cross Talk	20MHz		25.0	8.47	54.8	52.8	41.8	38.8
<b>ELFEXT</b> – Pair To	25MHz		24.3	9.51	53.3	41.3	39.8	36.8
Pair Equal Level Far	31.25MHz		23.6	10.67	51.9	49.9	37.9	34.9
End Cross Talk	62.5MHz		21.5	15.38	47.4	45.4	31.9	28.9
<b>PSELFEXT</b> – Power	100MHz		20.1	19.8	44.3	42.3	27.8	24.8
Sum Equal Level	200MHz		18.0	28.98	39.8	37.8	21.8	18.8
Far End Cross Talk	250MHz		17.3	32.8	38.3	36.3	19.8	16.8
Propagation Delay (Max)	1MHz	ns/100m	570					
	250MHz		536					
Propagation Delay Skew (Max)	1MHz	ns/100m	45					
	10MHz		45					
	100MHz		45					
	250MHz		45					

### 2.3.2 MEASUREMENTS PRECAUTION

All electrical measurement and calculation shall be performed on cable samples of 100m removed from the packaging or 305mpackaging.

## 2.4 SAFETY

### 2.4.1 ROHS DIRECTIVE

All cables and any associated packing and labelling materials shall meet RoHS (Restriction of the Use of certain Hazardous Substances) regulations as appropriate.

#### **2.4.2 ISPM 15 DIRECTIVE**

All wooden packing materials shall meet ISPM (International Standards for Phytosanitary Measures) regulations as appropriate.

### **3. DESPATCH LENGTHS AND PACKAGING**

The cable will be required in 305m boxes as specified in the purchase order, further details are as follows:

#### **3.1 305m Reel in Box (RIB) boxes**

A 305m length of cable shall be placed in a cardboard box.

The strength of box must be suitable for normal handling and transportation.

### **4. QUALITY POLICY**

The goods must be in compliance with TIA/EIA 568B & ISO/IEC 11801

Please note:

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