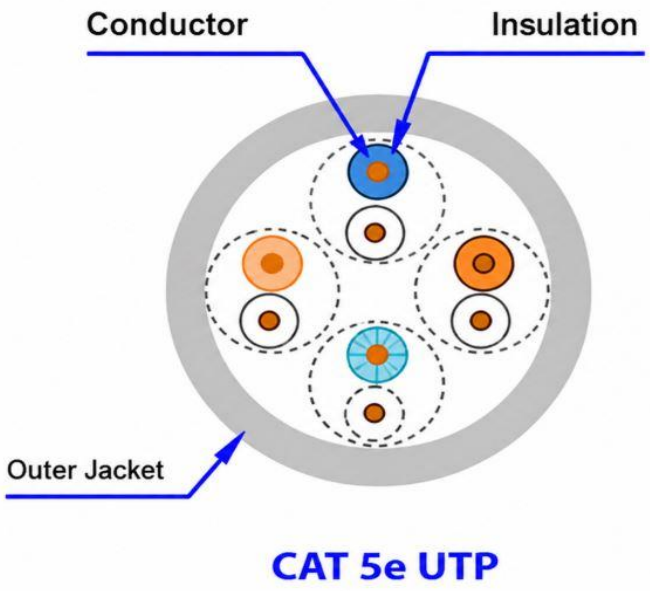
TECHNICAL DATASHEET CAT 5E CABLE



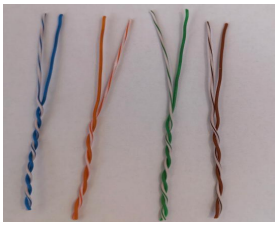
Product code: **CAT 5e UTP CMX**

1. **General standard**

   Comply standard UL 444 (UL 444, Standard For Safety - Communications Cables type CMX, rated 75oC)- **Can it be checked/searched on the UL database website:** www.ul.com/database

   Comply standard ANSI/TIA-568.2-D: Balanced Twisted-Pair Telecommunications Cabling and Components- **The certificate can be searched and verified on the UL website at the following address:** https://iq.ulprospector.com

2. Detail technical Specification

No	Description	Parameter
1	CAT5e Cable Structure	It is an unshielded twisted pair cable (CAT.5E - UTP: Unshielded Twisted Pair Cable), consisting of insulated copper conductors. Two insulated conductors are twisted together to form a pair, and multiple pairs are twisted together to form the UTP cable. Supports Gigabit Ethernet network speed up to 1000 Mbps. Cable diameter: < 6.35 mm.
2	Conductor	Made of high-purity solid bare copper conductor, annealed, smooth surface, circular cross-section, uniform quality, and free from any defects. Conductor diameter: 0.50 mm ± 0.01 mm. Number of conductors: 08 conductors, twisted into 04 pairs. The conductors are continuously insulated with a homogeneous plastic layer and color-coded for identification
3	**Outer Jacket**	Made of plastic, white in color, free from cracks, and with uniform color throughout the entire cable length. Outer jacket thickness: 0.6 mm ± 0.05 mm.
4	Color Code	• Pair 1: White - Blue, Blue; • Pair 2: White - Orange, Orange; • Pair 3: White - Green, Green; • Pair 4: White - Brown, Brown. Wherein, colored stripes are added for identification on conductors with white insulation. The other conductor in each pair shall have insulation color identical to the stripe color of the white-insulated conductor. Colored stripes on conductors with colored insulation may be present or absent. 

No	Description	Parameter
5	Breaking Tensile Strength	B≥ 400N
6	Bending radius	Minimum bending radius: 25.4 mm at low temperature of -20°C ± 10°C.
7	Direct Current Resistance	≤ 9.38 Ω/100 m (for a single conductor measured at a temperature of 20°C).
8	DC resistance unbalance between two conductors of one pair, measured at a temperature of 20°C.	≤ 5%
9	Mutual capacitance at 1 kHz of one conductor pair, measured at a temperature of 20°C.	≤ 5,6nF/100m
10	Return Loss (RL) measured over a cable length of 100 m (worst pair) at a temperature of 20°C ± 3°C.	At 1 MHz ≤ f < 10 MHz: RL ≥ 20 + 5log(f) [dB] At 10 MHz ≤ f < 20 MHz: RL ≥ 25 [dB] At 20 MHz ≤ f ≤ 100 MHz: RL ≥ 25 − 7log(f/20) [dB]
11	Structural Return Loss (SRL) measured over a cable length of 100 m within the frequency range from 1 MHz to 100 MHz.	At 1 MHz ≤ f < 20 MHz: SRL ≥ 23 [dB] At 20 MHz ≤ f ≤ 100 MHz: SRL ≥ 16 − 10log(f/100) [dB]
12	Near-End Crosstalk (NEXT) measured on a cable with a minimum length of 100 m within the frequency range from 0.772 MHz to 100 MHz	NEXT (dB) ≥ 35,3 – 15×lg(f/100)
13	Power Sum Near-End Crosstalk (PSNEXT) measured on a cable with a minimum length of 100 m within the frequency range from 0.772 MHz to 100 MHz	PSNEXT (dB) ≥ 32,3 – 15×lg(f/100)

No	Description	Parameter
14	Equal Level Far-End Crosstalk (ELFEXT) measured on a cable with a length of 100 m within the frequency range from 1 MHz to 100 MHz	ELFEXT (dB) ≥ 23,8 – 20×lg (f/100)
15	Power Sum Equal Level Far-End Crosstalk (PSELFEXT) measured on a cable with a minimum length of 100 m within the frequency range from 1 MHz to 100 MHz	PS ELFEXT (dB) ≥ 20,8 – 20×lg(f/100)
16	Maximum propagation delay (D) within the frequency range from 1 MHz to 100 MHz, for a cable length of 100 m	Shall comply with the following formula: $D(ns/100m) \le 534 + \frac{36}{\sqrt{f}}$
17	Propagation delay skew measured at temperatures of 20°C, 40°C, and 60°C within the frequency range from 1 MHz to 100 MHz	≤ 45 ns/100 m. Wherein, the propagation delay skew between pairs measured at temperatures of 40°C and 60°C shall not exceed ±10 ns compared to the value measured at 20°C.
18	Insertion Loss (IL) within the frequency range from 1 MHz to 100 MHz, measured at a temperature of 20°C ± 3°C for a cable length of 100 m	Complying with the calculation formula $IL_{100m}(dB/100m) \le kl \times \sqrt{f} + k2 \times f + \frac{k3}{\sqrt{f}}$ $k1 = 1,967;\ k2 = 0,023;\ k3 = 0,050$
19	Characteristic Impedance	100 Ω ± 15% within the frequency range from 1 MHz to 100 MHz
20	Dielectric Strength	Withstand a minimum DC voltage of 5 kVDC for 3 seconds
21	Operating Temperature Range	from -10°C to +65°C.
22	Flame Resistance	Complying with IEC 60332-1-2 flame retardant standard
23	Lifetime	≥ 15 years

No	Description	Parameter
24	Cable Jacket Marking Information	Printed with indelible ink and marked longitudinally along the cable length (the identification markings shall be repeated continuously along the entire cable length at intervals not exceeding 1 m), including the following information: • Manufacturer's name; • Year of manufacture; • Cable type; • Cable standard; • Meter marking.
25	Cable Length Marking	All cable reels shall have continuous length markings at uniform intervals of 1 m, starting from "0 m" and printed continuously along the outer cable jacket throughout the entire cable length. • The length markings shall be clearly legible. • The tolerance of the length marking shall be ≤ 1%, and the actual cable length shall not be less than the marked length
26	Packaging and Standard Length	Standard length: 305 m/reel (1000 ft/reel), packed in carton boxes to ensure protection against damage during transportation and handling, and to prevent cable twisting during installation and use. Both cable ends shall be sealed to prevent water ingress. Product labels shall be attached to the carton box and include the following information: • Manufacturer's name and address; • Cable type and cable length; • Box serial number; • Quality inspection date; • Factory QC inspection mark.
27	Mechanical and Physical Tests	
27.1	Breaking Tensile Strength and Elongation at Break Test for Conductors	Test method: according to TCVN 8698:2011 (equivalent to IEC 60811) **Requirement:** minimum breaking tensile strength of 400 N; average elongation at break E(%) ≥ 10%.
27.2	Breaking Tensile Strength and Elongation at Break Test for	Test method: according to TCVN 8698:2011 (equivalent to IEC 60811-501)

No	Description	Parameter
	Conductor Insulation	**Requirement:** average breaking tensile strength ≥ 1.02 kgf/mm²; average elongation at break E(%) ≥ 350%.
28	Thermal Stability and Environmental Durability Tests	
28.1	Shrinkage of Insulation after Heating the Conductor	Test method: according to TCVN 8698:2011 (equivalent to IEC 60811-503). Requirement: the insulation shall comply when the shrinkage δ ≤ 5%.
28.2	Cold Bend Test for Insulation	Test method: according to TCVN 8698:2011 (equivalent to IEC 60811-504). Requirement: the material shall be considered compliant if the insulation of the test sample shows no cracks when inspected by normal or corrected vision without magnification.
28.3	Measurement of Tensile Strength and Elongation at Break of the Cable Jacket after Aging	Test method: according to TCVN 8698:2011 (equivalent to IEC 60811-401 and IEC 60811-507). Requirement: the jacket shall be considered compliant if the average breaking tensile strength is greater than or equal to 70% of the breaking tensile strength of the unaged cable jacket, and the average elongation at break is greater than or equal to 50% of the elongation at break of the unaged cable jacket
28.4	Measurement of Conductor Insulation Uniformity	Test method: according to TCVN 8698:2011 (equivalent to IEC 60811-201). Requirement: concentricity Ec ≤ 43%.
29	Cable Jacket Marking Information	Printed with indelible ink and marked longitudinally along the cable length (the identification markings shall be repeated continuously along the entire cable length at intervals not exceeding 1 m), including the following information: • Manufacturer's name; • Customer name: • Cable type; • Cable standard; • Meter marking; • Year of manufacture