TECHNICAL SPECIFICATION

LSSS-LN0045-05

FOR

25 PAIR U/UTP CABLES (ENHANCED CATEGORY 5)
(Ref : UL444 , ANSI/TIA-568-C.2, ISO/IEC 11801 & IEC 61156-5)

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1. SCOPE

This Specification is based on the standards of UL444 , ANSI/TIA-568-C.2 and ISO/IEC 11801 and covers the requirements for unshielded twisted pair (U/UTP) cables of 100Ω , enhanced category 5 (Cat.5E).
- Applicable cable size & type ; 25 Pairs,
PVC sheath (CMX,CM,CMR) or LSZH sheath (CMX)

2. CABLE CONSTRUCTION

2.1 Conductor

The conductors shall be solid , annealed and bare copper with a diameter of AWG24 and minimum acceptable diameter shall be 0.485mm.

2.2 Insulation

Each conductor shall be insulated with solid high density polyethylene.
The insulation shall be uniform and shall not have any defects.
The diameter over the insulation shall be maximum 1.22mm.

2.3 Color code

The color code of insulation shall be shown as Table 1.

Table 1. Color code of insulation

Pair No	A - wire	B - wire	Pair No	A - wire	B - wire
1	White	Blue	16	Yellow	Blue
2	White	Orange	17	Yellow	Orange
3	White	Green	18	Yellow	Green
4	White	Brown	19	Yellow	Brown
5	White	Grey	20	Yellow	Grey
6	Red	Blue	21	Violet	Blue
7	Red	Orange	22	Violet	Orange
8	Red	Green	23	Violet	Green
9	Red	Brown	24	Violet	Brown
10	Red	Grey	25	Violet	Grey
11	Black	Blue			
12	Black	Orange			
13	Black	Green			
14	Black	Brown			
15	Black	Grey			

2.4 Core Assembly

Two insulated conductors shall be twisted into a pair. Twisted pairs shall be assembled to form with first and second layer around centered filler. Pair No. 1~10 shall be applied to sequently lay on the centered filler (first layer) and
Pair No. 11~25 shall be applied to sequently lay on the first layer (second layer)
The twisted and stranding pitch shall be applied under the ranges that meet the electrical requirements.
If required for manufacturing reasons, a plastic tape may be applied over the cable core.

2.5 Rip Cord

A rip cord (non-metallic) shall be applied under the sheath

2.5 Sheath

The flame retardant PVC or LSZH (Low Smoke Zero Halogen) compound colored grey or other colors shall be applied over the cable core. The sheath shall
The sheath shall be uniform and shall not have any defects.
The thickness of sheath and cable diameter shall be shown as Table 4.

Table 2. Sheath thickness and cable diameter

Sheath thickness (Minimum, mm)		Cable diameter (Nominal, mm)
Average	Individually	
0.69	0.56	13.0

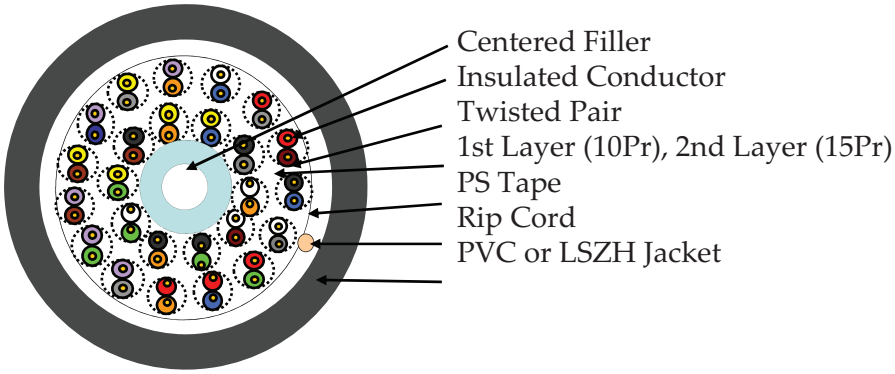

Fig 1. Cross-Sectional Diagram of Cable

3. ELECTRICAL CHARACTERISTICS

3.1 Electrical Performances

Characteristics	units	Cat.5E
DC Resistance	Ω/100m	≤ 9.38
DC Resistance Unbalance	%	≤ 5.00
Mutual Capacitance	nF/100m	≤ 5.60
Capacitance Unbalance (Pair to Ground)	pF/100m	≤ 330
Insulation Resistance	MΩ-100m	≥ 500
Dielectric Strength	DC kV/sec	2.5 / 2
Impedance (Characteristic mean)	Ω	100 ± 15% (1 ≤ f ≤ 100MHz)
Propagation Delay Skew	ns/100m	≤ 45

Freq. (MHz)	Attenuation (dB/100m) Max.	NEXT (dB/100m) Min.	PSNEXT (dB/100m) Min.	ELFEXT (dB/100m) Min.	PSELFEXT (dB/100m) Min.	RL (dB/100m) Min.	P.Delay (ns/100m) Max.
1	2.0	65.3	62.3	63.8	60.8	20.0	570
4	4.1	56.3	53.3	51.8	48.8	23.0	552
8	5.8	51.8	48.8	45.7	42.7	24.5	547
10	6.5	50.3	47.3	43.8	40.8	25.0	545
16	8.2	47.2	44.2	39.7	36.7	25.0	543
20	9.3	45.8	42.8	37.8	34.8	25.0	542
25	10.4	44.3	41.3	35.8	32.8	24.3	541
31.25	11.7	42.9	39.9	33.9	30.9	23.6	540
62.5	17.0	38.4	35.4	27.9	24.9	21.5	539
100	22.0	35.3	32.3	23.8	20.8	20.1	538

3.2 Measurements Precaution

All electrical characteristics specified in clause 3.1 shall be tested on one sample length of 100 meter or greater removed from the package.

4. PHYSICAL PROPERTIES

4.1 Insulation

The un-aged tensile strength and elongation of HDPE insulation, measured in accordance with clause 7.3 of UL 444 shall be minimum 16.5MPa and 300%, respectively.

The heat-aged tensile strength and elongation, measured in accordance with clause 7.3 of UL 444 shall be minimum 75% and 75% of un-aged, respectively.

The shrinkage of insulation , measured in accordance with clause 7.4 of UL 444 , shall not exceed 9.5mm.

The bending test of insulation at low temperature, measured in accordance with clause 7.5 of UL 444 , shall show no visible cracks.

4.2 Sheath

The un-aged tensile strength and elongation of PVC sheath, measured in accordance with clause 7.8 of UL 444 shall be minimum 13.8MPa and 100%, respectively.

The heat-aged tensile strength and elongation of PVC sheath, measured in accordance with clause 7.8 of UL 444 shall be minimum 85% and 50% of un-aged, respectively.

The un-aged tensile strength and elongation of LSZH sheath, measured in accordance with clause 6.4.6 & 6.4.7 of IEC 61156-5 shall be minimum 9.0MPa and 100%, respectively.

The heat-aged tensile strength and elongation of LSZH sheath, measured in accordance with clause 6.5.4 & 6.5.5 of IEC 61156-5 shall be minimum 70% and 50% of un-aged, respectively.

The LSZH compound shall be complied with IEC 60754-2 and IEC 61034.

4.3 Cable Cold Bend

All cables shall meet the requirements of clause 7.10 of UL 444.

4.4 Flame Requirements

A cable marked CMX shall comply with the VW-1 flame test specified in section 1080 of UL 1581 or IEC 60332-1.

A cable marked CM shall comply with the vertical flame test specified in section 1160 of UL 1581(2001) or IEC 60332-3 category C.

A cable marked CMR shall comply with the riser test specified in UL 1666.

5. PACKING AND IDENTIFICATION

5.1 Cable Marking

The cable shall be marked on the sheath to designate the transmission performance and/or others (if ordered by purchaser).
The marking shall be repeated through the outer sheath clearly.

5.2 Cable Packing

Each length of completed cable shall be wound on ply-wood reel or wooden drum.
The standard delivery length is 305m or 500m.

5.3 Marking on tag or box

The following details shall be marked on a tag affixed to each shipping length of cable in a reel, or directly printed on the outer surface of the reel.

- AWG size and number of pairs
- Flame test classification
- Manufacturer name and logo
- length
- Others

- End of Specification -

※ APPENDIX – PRODUCT PART NUMBER

Description	Part Number
Category 5E U/UTP 25-Pair CMX	UTP-E-C5G-E1VN-X 0.5X025P/GY
Category 5E U/UTP 25-Pair CM	UTP-E-C5G-E1VN-M 0.5X025P/GY
Category 5E U/UTP 25-Pair CMR	UTP-E-C5G-E1VN-R 0.5X025P/GY
Category 5E U/UTP 25-Pair LSZH	UTP-E-C5G-E1ZN-X 0.5X025P/GY

- Other colors are available

REV.	Date	Prepared By	Checked By	Approved By	Remark
00	2005.11.02	J.S. Baeck	B.C. Jung	W.Y. Dong	1. Issued
01	2009.12.03	K. H. Ha	T.W. Kim	Min Son	1. Latest Ver. of UL standard is applied
02	2012.04.16	K. H. Ha	T.W. Kim	Min Son	1. "LS Cable" is changed to "LS Cable & System" 2. ANSI/TIA-568-C.2 specification is applied
03	2012.07.05	D. W. Kang	T.W. Kim	Y.H. Lee	1. Added product part number to Appendix 2. Changed sheath minimum thickness according to UL 444 3. Specification layout is changed
04	2014.09.15	T.W. Kim	-	J.S. Baeck	1. Clause 4.4 CM grade FR standards changed
05	2015.12.15	K.H. Ha	-	S.J. Kim	1. The description of Appendix is changed