TECHNICAL SPECIFICATION

LSSS-LN0139-00

FOR

4 PAIR S/FTP GALVANIZED STEEL WIRE BRAID ARMOURED CABLES (PiMF 250MHz CATEGORY 6)

(Ref : ISO/IEC 11801, IEC 61156-5, IEC 60332-1, IEC 60332-3, IEC 61034 & IEC 60754-2)

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1. SCOPE

This specification is based on the standards of ISO/IEC 11801, IEC 61156-5, IEC 60332-1 & 3, IEC 61034 & IEC 60754-2 and covers the requirements for overall tinned copper braid and each individual pair foiled twisted pair (S/FTP), after bedding galvanized steel wire braid armored cables of 100Ω, Category 6 (Cat.6, Class E).
- Applicable cable size & type ; 4 Pairs, LSZH sheath

2. CABLE CONSTRUCTION

2.1 Conductor

The conductors shall be solid, annealed and bare copper with a diameter of AWG 23.

2.2 Insulation

Each conductor shall be insulated skin-foam-skin 3 layers with polyethylene.
The insulation shall be uniform and shall not have any defects.

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
1	White	Blue
2	White	Orange
3	White	Green
4	White	Brown

2.4 PiMF and Core Assembly

Two insulated conductors shall be twisted into a pair and each four pairs shall be wrapped with aluminum tape coated on one side with plastic film for screening.
After pair shielding, four twisted pairs shall be assembled into a cable core.

2.5 Braid

The braided screen with tinned copper wires shall be applied over the cable core.
The diameter of tinned copper wires shall be 0.12±0.02mm.

2.6 Inner Sheath (Bedding)

The flame retardant LSZH(Low Smoke Zero Halogen) compound colored black or other colors shall be applied over the cable core.
The sheath shall be uniform and shall not have any defects.
The thickness of inner sheath and bedding diameter shall be shown as table 2.

2.7 Armour

The braided with galvanized steel wires shall be applied over the bedding.
The diameter of galvanized steel wires shall be 0.30±0.02mm.

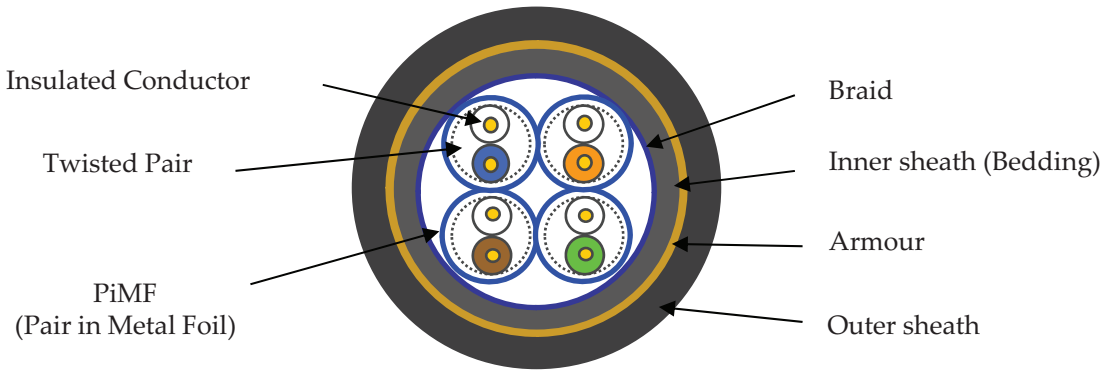
2.8 Outer Sheath

The flame retardant LSZH(Low Smoke Zero Halogen) compound colored black or other colors shall be applied over the cable core.
The sheath shall be uniform and shall not have any defects.
The thickness of outer sheath and cable diameter shall be shown as table 2.

Table.2 thickness of sheath and cable diameter

Inner sheath thickness (mm)	Bedding diameter (mm)	Outer sheath Thickness (mm)	Cable diameter (mm)
0.8 ± 0.1	8.2 ± 0.3	1.5± 0.2	12.5 ± 0.5

Fig 1. Cross Sectional Diagram of Cable



3. ELECTRICAL CHARACTERISTICS

3.1 Electrical Performances

Characteristics	units	Specification
DC Resistance	Ω/100m	≤ 9.5
DC Resistance Unbalance	%	≤ 2.00
Capacitance Unbalance (Pair to Ground)	pF/km (800~1000Hz)	≤ 1600
Insulation Resistance	MΩ·m	≥ 5000
Dielectric Strength	DC kV/sec	2.5 / 2
Impedance (Characteristic mean)	Ω	100 ± 5% (at 100MHz)
Return Loss	dB/100m	≥ 20 + 5 * log(freq) , 4 ≤ f < 10MHz ≥ 25 , 10 ≤ f < 20MHz ≥ 25 – 7 * log(freq/20) , 20 ≤ f ≤ 250MHz
Attenuation (Insertion Loss)	dB/100m	≤ 1.82*√(freq) + 0.0169*(freq) + 0.25/√(freq) , 4 ~ 250 MHz
NEXT Loss	dB/100m	≥ 75.3 – 15*log(freq) ,4 ~ 250MHz
Power sum NEXT Loss	dB/100m	≥ 72.3 – 15*log(freq) ,4 ~ 250MHz
ELFEXT Loss	dB/100m	≥ 68 – 20*log(freq) ,4 ~ 250MHz
Power sum ELFEXT Loss	dB/100m	≥ 65 – 20*log(freq) ,4 ~ 250MHz
Propagation Delay	ns/100m	≤ 534 + 36 / √ (Freq) ,4 ~ 250MHz
Propagation Delay Skew	ns/100m	≤ 45, **4 ~ 250MHz**

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.
4	3.8	66.3	63.3	56.0	53.0	23.0	552
8	5.4	61.8	58.8	49.9	46.9	24.5	547
10	6.0	60.3	57.3	48.0	45.0	25.0	545
16	7.6	57.2	54.2	43.9	40.9	25.0	543
20	8.5	55.8	52.8	42.0	39.0	25.0	542
25	9.6	54.3	51.3	40.0	37.0	24.3	541
31.25	10.8	52.9	49.9	38.1	35.1	23.6	540
62.5	15.5	48.4	45.4	32.1	29.1	21.5	539
100	19.9	45.3	42.3	28.0	25.0	20.1	538
155	25.3	42.4	39.4	24.2	21.2	18.8	537
200	29.1	40.8	37.8	22.0	19.0	18.0	537
250	33.0	39.3	36.3	20.0	17.0	17.3	536

The cable performance between 1MHz and 4MHz is achieved by design only and it is therefore not necessary to test for this performance below 4MHz. (According to the IEC 61156-5 standard)

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 elongation, measured in accordance with clause 6.4.4 of IEC 61156-5 shall be minimum 100%, respectively.

The shrinkage of insulation , measured in accordance with clause 6.5.1 of IEC 61156-5 shall not exceed 5%.

The bending test of insulation at low temperature, measured in accordance with clause 6.5.3 of IEC 61156-5 shall show no visible cracks.

4.2 Sheath

The un-aged tensile strength and elongation, measured in accordance with clause 6.4.6 & 6.4.7 of IEC 61156-5 shall be minimum 9MPa and 100%, respectively.

The heat-aged tensile strength and elongation , 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 sheath shall comply with IEC 60754-2 and IEC 61034.

In case of outer sheath, the sunlight resistance shall be minimum 85% at 300h and 80% at 720h in the tensile strength and elongation.

4.3 Cable Cold Bend

All cables shall meet the requirements of clause 6.5.7 of IEC 61156-5.

4.4 Flame Requirements

A cable marked “IEC 60332-1” or “CMX” shall meet the VW-1 flame test specified in IEC 60332-1.

A cable marked “IEC 60332-3” or “CM” shall meet the vertical flame test specified in IEC 60332-3.

5. PACKING AND IDENTIFICATION

5.1 Cable Marking

The marking on the outer sheath shall be applied by white or yellow ink printing and repeated through the outer sheath clearly.
The following details shall be marked on the sheath,

<Cable Marking Detail>
0000M LS Cable & System S/FTP PiMF 250MHZ 4PR 23AWG LSZH Category 6 GSWB ARMOUR ISO/IEC 11801

* **0000M: Sequential meter length marking**

5.2 Cable Packing

5.2.1 The standard delivery length of cable is 500m.
Other length of cable shall be applied, if ordered by purchaser.

5.2.2 Each length of completed cable shall be wound on a wooden reel.

5.3 Marking on tag or reel

The following details shall be marked on a tag affixed to each shipping item.
- AWG size and number of pairs
- Flame test classification
- Manufacturer name and logo
- length
- Others

- End of Specification -

REV.	Date	Prepared By	Checked By	Approved By	Remark
00	2015.04.06	K.H. Ha	-	S.J. Kim	1. Issued