

SPANDANA COPPER CONDUCTORS P.LTD Plot No 133(P) & 134, KIADB Industrial Estate, Tarihal,Hubli – 580026 Karnataka,India	TECHNICAL LITERATURE	Doc Ref.	L/MKT/04
		Rev No.	02
		Date	01/04/2011

TECHNICAL LITERATURE

We manufacture the following Products :

**ALL THE BELOW CAN BE MANUFACTURED IN COPPER AND ALUMINIUM
WIRES AND RECTANGULARS (FLAT):**

- 1. BARE WIRES AND STRIPS**
- 2. ENAMELLED WIRE**
- 3. ENAMELLED STRIPS(RECTANGULARS)**
- 4. VARNISH BONDED FIBRE GLASS LAPPED(COVERED) WIRE**
- 5. VARNISH BONDED FIBRE GLASS LAPPED(COVERED)
STRIPS(RECTANGULARS)**
- 6. ENAMELLED AND VARNISH BONDED FIBRE GLASS COVERED WIRES**
- 7. ENAMELLED AND VARNISH BONDED FIBRE GLASS COVERED
STRIPS(RECTANGULARS)**
- 8. NOMEX COVERED STRIPS(RECTANGULARS)/WIRES**
- 9. POLYESTER FILM COVERED STRIP/WIRES**
- 10. COTTON COVERED WIRES /STRIPS**
- 11. DAGLAS COVERED WIRES/STRIPS**
- 12. PAPER COVERED COPPER WIRES/STRIPS**

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Abbreviation:

1. PU – POLYURETHANE
2. PE - POLYESTER
3. PEI – POLYESTER IMIDE
4. PA - POLYAMIDE
5. PAI- POLYAMIDE – IMIDE
6. PEI + PAI : Base Coat -> Polyesterimide + Top Coat -> Polyamide imide
7. V172 + V155 - VARNISH FOR CLASS ‘F’
8. H69 - VARNISH FOR CLASS ‘H’

TEMPERATURE CLASS :

‘F’	-	155 DEGREES
‘H’	-	180 DEGREES
‘C’	-	200 DEGREES

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INSULATION BUILD UP DETAILS

1.BARE WIRES AND STRIPS: { Applicable for Copper and Aluminium }

1.10 TOLERANCES ON NOMINAL DIMENSION

SPECIFICATION	IS 1897 – 1983 IS 6160 – 1971	
SIZES (mm)	WIDTH OR THICKNESS	TOLERANCES
Above	Upto & including	+/-
in mm	in mm	+/- in mm
	3.15	0.03
3.15	6.3	0.05
6.3	12.5	0.07
12.5	16	0.10

1.11 RADIUS ON CORNER

Above	UPTO & INCLUDING	CORNER RADIUS in mm
in mm	in mm	
	1	SEMICIRCULAR
1	1.6	0.60*
1.6	2.25	0.80+
2.25	3.55	1.00
3.55	And Above	1.25

* May be semicircular

+ May be 0.80 mm

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2.ENAMELLED WIRE : { Applicable for Copper and Aluminium }

2.10 Increase in Dimension Due to Enamel Covering		
SPECIFICATION	IS 13730-16/28/29/(Part 0 Sec 3)	
Grade of Covering	Minimum	Maximum
	in mm	in mm
FINE [E1]	0.06	0.11
MEDIUM [E2]	0.11	0.16

SPECIFICATION :

CLASS 'F' : 155⁰ : IEC 60317 -16
 CLASS 'H' : 180⁰ : IEC 60317 – 8 & 28
 CLASS 'C' : 200⁰ : IEC 60317 – 13 / 26 /29

3. ENAMELLED STRIPS : { Applicable for Copper and Aluminium }

2.10 Increase in Dimension Due to Enamel Covering		
SPECIFICATION	IS 13730-16/28/29/(Part 0 Sec 3)	
Grade of Covering	Minimum	Maximum
	in mm	in mm
FINE [E1]	0.06	0.11
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SPECIFICATION :

CLASS 'F' : 155⁰ : IEC 60317 -16
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4.VARNISH BONDED FIBRE GLASS LAPPED(COVERED) WIRE :
{ Applicable for Copper and Aluminium }

4.10 INCREASE IN DIMENSIONS DUE TO GLASS COVERING			
SPECIFICATION		IS 13730 (Part 01 Sec 4) 1993	
CONDUCTOR WIDTH In mm		GLASS LAPPING	
OVER		-	10
UPTO & INCLUDING		5.6 mm	20.00 mm
GRADE G1	MIN	0.18	0.20
	MAX	0.23	0.28
GRADE G2	MIN	0.25	0.28
	MAX	0.33	0.35
GRADE G3	MIN	0.35	0.35
	MAX	0.43	0.43

SPECIFICATION :

CLASS 'F' : 155⁰ : IEC 60317 - 32

CLASS 'H' : 180⁰ : IEC 60317 – 31

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**5.VARNISH BONDED FIBRE GLASS LAPPED(COVERED)
STRIPS(RECTANGULARS) :**

{ Applicable for Copper and Aluminium }

4.10 INCREASE IN DIMENSIONS DUE TO GLASS COVERING				
SPECIFICATION		IS 13730 (Part 01 Sec 4) 1993		
CONDUCTOR WIDTH In mm		GLASS LAPPING		
OVER		-	5.6	10
UPTO & INCLUDING		5.6 mm	10.0 mm	20.00 mm
GRADE G1	MIN	0.18	0.18	0.20
	MAX	0.23	0.25	0.28
GRADE G2	MIN	0.25	0.25	0.28
	MAX	0.33	0.33	0.35
GRADE G3	MIN	0.35	0.35	0.35
	MAX	0.43	0.43	0.43

SPECIFICATION :

CLASS 'F' : 155⁰ : IEC 60317 -32
 CLASS 'H' : 180⁰ : IEC 60317 – 31

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6.ENAMELLED AND VARNISH BONDED FIBRE GLASS COVERED WIRES
 { Applicable for Copper and Aluminium }

6.10 INCREASE IN DIMENSION DUE TO ENAMELLED FIBRE GLASS COVERING (ENDFGC)		
SPECIFICATION	IS 13730 (Part 0 Sec 4) 1993	
6.1.1 INCREASE IN DIMENSIONS DUE TO ENAMEL COVERING		
GRADE [E1]	MIN - 0.06 mm	MAX - 0.11 mm
GRADE [E2]	MIN – 0.11 mm	MAX – 0.16 mm

6.1.2 INCREASE IN DIMENSIONS DUE TO GLASS COVERING

CONDUCTOR WIDTH (mm)	GLASS LAPPING			
OVER		-	5.6	10
UPTO & INCLUDING		5.6	10.0 mm	16.0 mm
GRADE - G1	MIN	0.16	0.18	0.20
	MAX	0.23	0.25	0.28
GRADE - G2	MIN	0.23	0.23	0.28
	MAX	0.33	0.33	0.35
GRADE - G3	MIN	0.35	0.33	0.35
	MAX	0.43	0.43	0.45

SPECIFICATION :
IEC 60317 – 0 - 4

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7.ENAMELLED AND VARNISH BONDED FIBRE GLASS COVERED STRIPS(RECTANGULARS) :

{ Applicable for Copper and Aluminium }

7.10 INCREASE IN DIMENSION DUE TO ENAMELLED FIBRE GLASS COVERING (ENDFGC)		
SPECIFICATION	IS 13730 (Part 0 Sec 4) 1993	
7.1.1 INCREASE IN DIMENSIONS DUE TO ENAMEL COVERING		
GRADE [E1]	MIN - 0.06 mm	MAX - 0.11 mm
GRADE [E2]	MIN – 0.11 mm	MAX – 0.16 mm

7.1.2 INCREASE IN DIMENSIONS DUE TO GLASS COVERING

CONDUCTOR WIDTH (mm)	GLASS LAPPING			
OVER		-	5.6	10
UPTO & INCLUDING		5.6	10.0 mm	16.0 mm
GRADE - G1	MIN	0.16	0.18	0.2
	MAX	0.23	0.25	0.28
GRADE - G2	MIN	0.23	0.23	0.28
	MAX	0.33	0.33	0.35
GRADE - G3	MIN	0.35	0.33	0.35
	MAX	0.43	0.43	0.45

SPECIFICATION :

IEC 60317 – 0 - 4

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8. NOMEX COVERED COPPER/ALUMINIUM WIRES AND STRIPS(RECTANGULARS) :

- COVERING AS PER CUSTOMER REQUIREMENT (SINGLE / DOUBLE)
- SPECIFICATION : IEC 626 – 2
- OVERLAP (25 % , 50 % , As per Requirement)

9. POLYESTER TAPE / FILM COVERED WIRES AND STRIPS(RECTANGULARS) :

- COVERING AS PER CUSTOMER REQUIREMENT

10. COTTON COVERED WIRE AND STRIPS :

<i>Type of Covering</i>	<i>Increase in mm</i>
Double ordinary (O)	0.46 and 0.51
Double,Fine (F)	0.36 and 0.43

11.DAGLAS COVERED WIRES AND STRIPS :

- AS PER CUSTOMER REQUIREMENT

12.PAPER COVERED COPPER WIRES AND STRIPS :

- AS PER CUSTOMER REQUIREMENT

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PRODUCT RANGES

1. Bare Copper Conductors (Hard & Annealed)

- Wires and Strips
- Copper and Aluminium
- Specification

IS 1897-1983

IS 6160-1971

- **Range**
 Width : 3.50 to 20.00 mm
 Thickness : 1.00 to 6.00 mm
 Cr.Sec Area: 3.50 to 120 mm²
 W/T Ratio: Min = 1 : 1.50
 Max = 1 : 6.00
 Round Wire : 0.40 mm upwards

2. Enamelled Copper Conductors

- Wires and Strips
- Temperature Class: 155⁰C, 180⁰C,200⁰C (Dual Coat)
- Specification

IS 13730-16/IEC 317-16

IS13730-28/IEC-317- 8 / 28

IS13730-29/IEC-317- 13 / 26 / 29

- Enamelled Wire : 0.50 mm to 5.00 mm

- **Enamelled Strip**
 Width : 3.50 to 12.00 mm
 Thickness : 1.00 to 4.00 mm
 Cr.Sec Area: 3.50 to 48 mm²
 W/T Ratio: Min = 1 : 1.50
 Max = 1 : 6.00

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3. Double Cotton Covered Copper Conductors

- Wires and Strips
- Copper and Aluminium
- Specification

IS 7391 PT I 1974

IS 791 PT II 1974

- Range
- Width : 3.50 to 20.00 mm
 Thickness : 1.00 to 6.00 mm
 Cr.Sec Area: 3.50 to 96 mm²
 W/T Ratio: Min = 1 : 1.50
 Max = 1 : 6.00

Round Wires : Min : 1.00 mm Dia

4. Double Fibre Glass Lapped / Varnish Bonded Copper Conductors

- Wires and Strips
- Copper and Aluminium
- Temperature Class: 155⁰C, 180⁰C
- Specification

IS 13730 (Part 01 Sec 4) 1993 / IEC : 60317 – 32 & 31

- Range
- Width : 3.50 to 20.00 mm
 Thickness : 1.00 to 6.00 mm
 Cr.Sec Area: 3.50 to 120 mm²
 W/T Ratio: Min = 1 : 1.50
 Max = 1 : 6.00

5. Enamelled and Fibre Glass Lapped / Varnish Bonded Copper Conductors

- Wires and Strips
- Copper and Aluminium
- Temperature Class: 155⁰C, 180⁰C
- Specification

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- Range

Width : 3.50 to 12.00 mm
Thickness : 1.00 to 4.00 mm
Cr.Sec Area: 3.50 to 48 mm²
W/T Ratio: Min = 1 : 1.50
Max = 1 : 6.00

6. Nomex Covered Copper Conductors

- Wires and Strips
- Copper and Aluminium
- Range

Width : 3.50 to 20.00 mm
Thickness : 1.00 to 6.00 mm
Cr.Sec Area: 3.50 to 120 mm²
W/T Ratio: Min = 1 : 1.50
Max = 1 : 6.00

7. Polyester Tape Covered Copper Conductors

- Wires and Strips
- Copper and Aluminium
- Range

Width : 3.50 to 20.00 mm
Thickness : 1.00 to 6.00 mm
Cr.Sec Area: 3.50 to 120 mm²
W/T Ratio: Min = 1 : 1.50
Max = 1 : 6.00

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8. Dagle Covered Copper Conductors

- Wires and Strips
- Copper and Aluminium
- Range

Width : 3.50 to 20.00 mm
Thickness : 1.00 to 6.00 mm
Cr.Sec Area: 3.50 to 120 mm²
W/T Ratio: Min = 1 : 1.50
Max = 1 : 6.00

9. Paper Covered Copper Conductors

- As per Customer Requirement and Covering Specification

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Testing

1. Hardness Test
2. Elongation
3. Corner Radius
4. Resistivity
5. Conductivity
6. Break down voltage (BDV)
7. Insulation thickness
8. Adherence
9. Heat Shock
10. BDV at elevated Temp
11. Flexibility
12. Cure Test
13. Solvent Test
14. TAN DELTA (Dielectric dissipation factor)
15. Thermal Endurance
16. Springiness
17. Heat Ageing

APART FROM ABOVE WE PERFORM TEST AS REQUIRED BY
THE CUSTOMER OR RELEVANT OTHER SPECIFICATION.

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