SRI LANKA STANDARD 821 : PART 2 : 1988

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SPECIFICATION FOR

LOW - FREQUENCY CABLES AND WIRES WITH PVC INSULATION AND PVC SHEATH FOR TELECOMMUNICATION

PART 2 - EQUIPMENT WIRES WITH SOLID OR STRANDED CONDUCTORS, UNSCREENED, SINGLE

SRI LANKA STANDARDS INSTITUTION

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SLS 821 : Part 2 : 1988

Gr. 5

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This standard does not purport to include all the necessary provisions of a contract.

SRI LANKA STANDARD

SPECIFICATION FOR LOW-FREQUENCY CABLES AND WIRES WITH PVC INSULATION AND PVC SHEATH FOR TELECOMMUNICATION

PART 2: EQUIPMENT WIRES WITH SOLID OR STRANDED CONDUCTORS, UNSCREENED, SINGLE

FOREWORD

This Sri Lanka Standard was authorized for adoption and publication by the Council of the Sri Lanka Standards Institution on 88.11.30, after the draft, finalized by the Drafting Committee on Low frequency Cables and wires with PVC Insulation and PVC Sheath for Telecommunication, had been approved by the Electrical Engineering Divisional Committee.

This standard gives the specific requirements for unscreened equipment wires with single solid or stranded conductor. It is in line with the publication 189 : Part 3 of International Electotechnical Commission and BS 4808 : Part 2 of British Standards Institution.

References have been made in this standard with regard to general requirements as well as methods of test, to **SLS 821 : Part 1.**

All values in this specification are in SI units.

For the purpose of deciding whether a particular requirement of this standard is complied with, the final value, observed or calculated, expressing the result of a test or observation shall be rounded off in accordance with **CS 102.** The number of significant figures to be retained in the rounded off value should be the same as that of the specified value in this specification.

The assistance derived from the publications of the International Electrotechnical Commission and the British Standards Institution, in the preparation of this specification is gratefully acknowledged.

1 SCOPE

This Part of the standard gives details of construction, materials, dimensions and requirements for unscreened, single equipment wires with solid or stranded conductor, PVC insulated, used for internal wiring of transmission equipment, telephone and telegraph equipment, and other electronic equipment.

2 REFERENCES

IEC 304 Standard colours for insulation for LOW-FREQUENCY cables and wires.
IEC 344 Guide to the calculation of resistance of plain and coated copper conductors of LOW-FREQUENCY cables and wires.
SLS 821 Part 1 Low Frequency cables and wires with PVC-insulation and PVC sheath for Telecommunication

3 DEFINITIONS

For the purpose of this standard, definitions given in **SLS 821 : Part 1 : 1988** shall apply.

4 REQUIREMENTS

4.1 Equipment wires covered by this specification shall meet the general requirements of SLS 821 : Part 1 : 1988 and when tested in Accordance with the methods specified therein shall meet the detailed requirements of 4.2, 4.3 and 4.5 of this specification.

4.2 Colour of insulation

Requirements given in 5.2.3 of SLS 821 : Part 1 : 1988 shall apply along with the following :

a) The choice of colours or combinations of colours shall be made in the following order of preference.

i) 12 standard colours given in the IEC 304
ii) 19 easily identifiable combinations of two standard colurs :

RED-black	GREEN - black
RED-blue	GREEN - red
ORANGE - green	BLUE - black
ORANGE - blue	GREY - red
ORANGE - violet	GREY - blue
YELLOW - black	WHITE - black
YELLOW - red	WHITE - red
YELLOW - green	WHITE - green
YELLOW - blue	WHITE - blue ; and
YELLOW - violet	

iii) 20 less easily identifiable combinations of two standard colours :

BROWN - black	GREY - black	GREEN - brown
BROWN - blue	GREY - violet	WHITE - brown
ORANGE- black	GREY - brown	WHITE - orange
ORANGE- grey	RED - brown	WHITE - violet
ORANGE- brown	GREEN - grey	WHITE - grey
ORANGE- red	GREEN - violet	WHITE - yellow
VIOLET- black	GREEN - blue	

NOTE

The colour combination YELLOW - green is reserved for protective earth wires exclusively.
B) Except in the case of bicolour extrusion the colour indicated in capitals shall be known as the " base colour " it shall be ;

i) the extruded colour ;
ii) the colour having greater area of exposure on the finished wire.

4.3 Mechanical requirements

4.3.1 *Conductor*

Elongation at break of the bare conductor shall be not less than the value specified in Table 1. Compliance shall be checked by measuring the elongation at break in accordance with the method specified in 7.4.3 of SLS 821 : Part 1 : 1988.

TABLE 1 - Diameter of wires with corresponding minimum elongation

Nominal diameter of wire mm		Minimum percentage elongation	
above	up to	for Copper wires	for Copper alloy wires
(1)	(2)	(3)	(4)
-	0.12	-	6.0
0.12	0.2	8.0	6.0
0.2	0.4	10.0	8.0
0.4	-	15.0	-

If the conductor is tinned, the amount of tin per unit area shall be adequate for soldering the conductor to the terminals without difficulty. Compliance shall be checked by means of the solder test on samples of the conductors in accordance with the method specified in 7.5.7 of SLS 821 : Part 1 : 1988.

4.3.2 *Insulation*

The insulation shall have adequate mechanical strength and elasticity. These properties shall remain sufficiently constant during normal use. Compliance shall be checked bore and after accelerated ageing by measuring the tensile strength and the elongation at break on samples of the insulation in accordance with the method specified in 7.4.3 of SLS 821 : Part 1 : 1988.

The accelerated ageing conditioning is specified in 7.5.1 of SLS 821 : Part 1 : 1988.

The median of the measured values of tensile strength shall be not less than 12.5 N/mm^2.

The median of the measured values of elongation at break shall be not less than 125 per cent for single-colour insulation, and 100 per cent for extruded bicolour insulation whose minimum thickness is 0.3 mm or less.

However, the difference between the median values for tensile strength and elongation obtained before and after accelerated ageing shall not exceed 20 per cent of the median values before ageing.

NOTES

1. The values specified for tensile strength and for elongation at break are independent and non-concomitant minima. An insulation with one characteristic of near-minimum value should present a value well above the minimum for the other characteristic.

2. The median value is the middle value if an odd number of values are obtained or the average of the two middle values if an even number of values are obtained.

The test results should have been arranged in sequence of increasing values.

4.4 Thermal stability and climatic requirements

4.4.1 *Measurement of insulation shrinkage after over-heating of conductor*

The insulation shall not shrink unduly when soldering the conductor. Compliance shall be checked in accordance with the method specified in 7.5.6 of SLS 821 : Part 1 : 1988.

TABLE 2 - Sizes dimensions and test requirements of conductors as defined in 5.1 of SLS 821 Part 1

Conductor				Maximum resistance	Insulation		Test requirements	
Diameter of solid conductor	Nominal section	Number of strands	Minimum diameter of strands		Minimum thickness	Maximum diameter	Dielectric strength test voltage	Minimum insulation resistance
mm	mm^2		mm	Ω/km +	mm	mm++	V	MΩ/km
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
0.12 *				1646		0.55		
0.15 *				1054		0.55		
0.20				593		0.60		
	0.035*	7	0.09	571		0.65	500 a.c.	
0.25				379	0.12	0.65		50
	0.055	7	0.11	365		0.70	or	
	0.079	7	0.13	242		0.80		
0.32				225		0.75	750 d.c.	
	0.124	7	0.16	155		0.90		
0.4				144		0.90		
0.5				92.2		1.00	1000 a.c.	
	0.22	7	0.21	87.2	0.15	1.10	or	200
0.6				64.0		1.10	1500 d.c.	
	0.5	28	0.16	38.8		1.80	1500 a.c.	
	0.5	16	0.21	38.2				
0.8				36.0		1.60	or	200
	0.75	42	0.16	25.8	0.25	2.00	2250 d.c.	
	0.75	24	0.21	25.4				
1.0				22.8		1.85		
	1.0	32	0.21	19.1		2.55	2000 a.c.	
	1.5	30	0.26	13.0	0.4	2.90	or	200
1.4				12.0++		2.65	3000 d.c.	

* *These conductors are only in copper alloy.*

** *This value is based on a solid conductor size of 1.38 mm nominal diameter.*

\+ *Add 20 % to these values for copper alloy conductors.*

++ *These values are meant for calculation purposes.*

NOTE

Calculation for resistance values of the conductor is based on IEC 344

4.4.2 *Resistance to flame propagation*

Resistance to flame propagation shall be checked in accordance with the method specified in 7.5.3 of **SLS 821 : Part 1 : 1988.**

4.4.3 *Cold bend test*

The insulation shall remain adequately pliable at the low temperatures to which it may be exposed. Compliance shall be checked in accordance with the test specified in 7.5.4.1 of **SLS 821 : Part 1 : 1988.**

4.4.4 *Heat shock test*

The insulation shall withstand variations in temperature without suffering damage. Compliance shall be checked in accordance with the method specified in 7.5.5.1 of **SLS 821 : Part 1 : 1988.**

4.5 *Electrical requirements*

4.5.1 Electrical resistance of conductors when measured in accordance with 7.6.1 of **SLS 821 : Part 1 : 1988,** shall not exceed the value specified in Table 2.

4.5.2 *Dielectric strength*

The insulation shall withstand the voltage specified in Table 2, for 1 min without breakdown.

The method for checking the dielectric strength is specified in 7.6.2 of **SLS 821 : Part 1 : 1988.**

4.5.3 *Insulation resistance*

Insulation resistance when measured in accordance with 7.6.3 of **SLS 821 : Part 1 : 1988** shall be not less than the value specified in Table 2.

SRI LANKA STANDARDS INSTITUTION

The Sri Lanka Standards Institution (SLSI) is the National Standards Organization of Sri Lanka established under the Sri Lanka Standards Institution Act No. 6 of 1984 which repealed and replaced the Bureau of Ceylon Standards Act No. 38 of 1964. The Institution functions under the Ministry of Science & Technology.

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