

TENDER SPECIFICATION**NO. : CLW/ES/03/0154**

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Total No. of Sheets: 17**SPECIFICATION FOR SET OF NON-METALLIC SLEEVES FOR ELECTRIC
LOCOMOTIVES****ISSUED BY :****Dy. CHIEF ELECTRICAL ENGINEER/D/CONV.****CHITTARANJAN LOCOMOTIVE WORKS****P.O. CHITTARANJAN -713331, DIST. – BARDHMAN(WEST)****WEST BENGAL (INDIA)**

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**SPECIFICATION FOR SET OF NON-METALLIC SLEEVES FOR ELECTRIC
LOCOMOTIVES**

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8. TECHNICAL DOCUMENT TO BE SUPPLIED BY THE SUPPLIER
9. SCOPE OF SUPPLY
10. NOTE

Specification have been digitized and all alterations have been incorporated.

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ALTERATION RECORD SHEET

AMENDMENT NO.	DATE	DESCRIPTION	ALT.	APPROVED BY
17	April 2015	Specification has been retyped with previous alterations and addition of new size EXP. INSU TUBE 35/60 PA in SL. NO. 35A. this has been approved by CEE on Dtd: 12.02.2015 vide note No.ELDD/3221, Dtd:-07.02.2015.	Q	-sd-
18	August 2021	All types of printable S. D sleeves is to be followed as per Specn. No. CLW/ES/3/665 Alt. 1.	R	-sd-
19	As Signed	All types of Printed/printable S. D sleeves is to be followed as per Specn. No. CLW/ES/3/665 Alt. 2.	S	-sd-
20	As Signed	Item SI no- 43 to 48 (TRANSPARENT HEAT SHRINK DOWN Sleeve for protection of printed sd sleeve) added.	T	-sd-

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TECHNICAL SPECIFICATION FOR SET OF NON-METALLIC SLEEVES

1. SCOPE

This specification covers the manufacture and supplies of SET OF NON-METALLIC SLEEVES of Electric Locomotives.

2. SERVICE CONDITIONS

Climatic & Environmental Condition:-

Maximum atmospheric temperature	+70°C (in Sun) & +50°C (in Shade)
Temperature	-20°C...+70°C
Ambient temperature (Storage)	-30°C...+80°C
Normal Humidity	60%
Maximum Humidity	100% saturation rainy season
Altitude	160 m.a.s.l.
Rainfall	Very heavy in certain areas. The equipment should be designed in such a way as to withstand its running at 10 Km/Hr. in flood water level of 102 mm above rail level.
Atmosphere during hot weather	Extremely dusty and desert terrain in certain areas.
Coastal Areas	Locomotive and equipment will be designed to work even in coastal area in humid and salty laden atmosphere.
Vibration	The equipment sub-system and their mounting arrangement will be designed to withstand vibration and shock encountered in service as specified in correspondence unless otherwise prescribed.

3. STANDARDS

As per relevant IEC & Indian standards shall apply with respect to all materials used in the manufacture of Set of Non-Metallic Sleeves.

4. QUALITY ASSURANCE

The tenderer shall confirm that the equipment are as either used in Electric Locomotives manufactured by ABB for INDIAN RAILWAYS or similar.

Quality assurance should as per ISO 9000.

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5. TESTS

Type test and routine test shall be carried out according to the relevant IS/IEC standard.

6. SUBMISSION OF TENDER QUOTATION :-

- 6.1 All tender documents including the quotation shall be submitted in duplicate including any correspondence till a contract is finalized.
- 6.2 The tenderer shall give sufficient information to prove that his factory has adequate facilities and capacity to manufacture and Set of non-metallic Sleeves to meet fully the technical requirements of the specification and quality of materials and workmanship.
- 6.3 Quotation shall not be considered complete unless all information is furnished and are therefore liable to be rejected.
- 6.4 Detailed drawings of the Set of non-metallic sleeves should be submitted for approval of purchaser.
- 6.5 Full technical documents and drawings to be furnished by the supplier as part of the contract.

7. APPROVAL OF SAMPLE

- 7.1 The supplier shall make available at least two prototypes of the equipment as per the standards proposed to be supplied by him for inspection and tests at his works and advise the Dy.Chief Electrical Engineer/ D/Conv. Chittaranjan and Controller of Stores, Kolkata as and when he is ready with the prototype and necessary testing and measuring apparatus and facilities for carrying out the test.
- 7.2 After the above tests if it is considered necessary by the Dy.Chief Electrical Engineer/ D/Conv. Authorized representative to carry out any further tests or trial of the prototype at Chittaranjan, the supplier will arrange for the same by the quickest means.
- 7.3 The supplier shall not offer equipment of series production to the inspector, authorized under the contract until and prototype has been finally approved. The supplier shall provide all facilities to the inspecting officer at his works to inspect and test the equipment.

8. TECHNICAL DOCUMENTS TO BE SUPPLIED BY THE SUPPLIER

- | | | | |
|------|----------------------|---|-----------|
| I) | Type test reports | : | 10 Copies |
| II) | Routine test reports | : | 4 Copies |
| III) | Maintenance Manual | : | 20 Copies |
| IV) | Detailed drawing | : | 6 Copies |

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9. SCOPE OF SUPPLY

SL. No	DESCRIPTION	IDENTIFICATION No.	MATERIAL
NON-METALLIC SLEEVES (SHRINK DOWN SLEEVES)			
1.	SD SLEEVE 6.4x 0.28PE5 BK	F 415788P0106	Radiation interlaced (Polyethylene based) Polyolefin
2.	SD SLEEVE 12.7x 0.28PE5 BK	F 415788P0108	-DO-
3.	SD SLEEVE 25.4x0.38PE5 BK	F 415788P0110	-DO-
4.	SD SLEEVE 25.4x 0.38PE5 TR	F 415788P0610	-DO-
5.	SD SLEEVE 2.4x 0.22PE5G/YEL	F 415788P0703	-DO-
6.	SD SLEEVE 6.4x 0.28PE5G/YEL	F 416788P0706	-DO-
7.	SD SLEEVE 9.5x 0.28PE5G/YEL	F 415788P0707	-DO-
8.	SD SLEEVE 12.7x 0.28PE5G/YEL	F 415788P0708	-DO-
9.	SD SLEEVE 19.0x 0.35PE5 BK	F 415788P0109	-DO-
PRINTED SHRINKDOWN SLEEVES			
10.	SHRINK DOWN SLV DTMS 1/8	HBT 416006P0003	Elastomer
11.	SHRINK DOWN SLV DTMS 3/16	HBT 416007P0003	Elastomer
12.	SHRINK DOWN SLV DTMS ¼	HBT 416008P0003	Elastomer
13.	SHRINK DOWN SLV DTMS 3/8	HBT 416009P0003	Elastomer
14.	SHRINK DOWN SLV DTMS 1/2	HBT 416010P0003	Elastomer
15.	PLATE TMS-CM 10-50 YEL	3EHP416008P0001	Polyolefin
SHRINKDOWN SLEEVES			
16.	SD SLEEVE YEL/GREEN 3/1.5	HBTB 416269P0001	Thermofit DCTP
17.	SD SLEEVE YEL/GREEN 6/3	HBTB 416269P0002	Thermofit DCTP
18.	SD SLEEVE YEL/GREEN 12/6	HBTB 416269P0003	Thermofit DCTP
19.	SD SLEEVE YEL/GREEN 26/13	HBTB 416269P0005	Thermofit DCTP
20.	SD SLEEVE 1 KYNAR	HEIS 415785P0010	KYNAR
ADHESIVE SHRINKDOWN SLEEVES			
21.	ADHESIVE SD SLEEVE 12/3	HBTB 416411P0002	Outer Layer: Braided polyolefin, Black inner layer: Thermoplastic adhesive.
22.	ADHESIVE SD SLEEVE 16/4	HBTB 416411P0003	Outer Layer: Braided polyolefin, Black inner layer: Thermoplastic adhesive.
23.	ADHESIVE SD SLEEVE 24/6	HBTB 416411P0004	Outer Layer: Braided polyolefin, Black inner layer: Thermoplastic adhesive.
24.	ADHESIVE SD SLEEVE 32/8	HBTB 416411P0005	Outer Layer: Braided polyolefin, Black inner layer: Thermoplastic adhesive.
24A.	ADHESIVE SD SLEEVE 12/2.41		Outer Layer: Braided polyolefin, Black inner layer: Thermoplastic adhesive.

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N.B:- For printed S.D. Sleeves, suppliers should collect the printing texts from design office of CLW/ Chittaranjan.

NOTE:-

Printable Sleeves should be supplied in a thin flat ladder form to be held horizontally between two holes punched polyester strips. The configuration may be directly fed to the dot matrix printer without modification for high speed printing. These sleeves are used as identification markers.

SL. NO.	DESCRIPTION	IDENT. NO	MATERIAL
25.	EXP. INSU TUBE 11/22 PA	HBTB 416099P0001	Stabilized Polyamide 6.6
26.	EXP. INSU TUBE 30/52 PA	HBTB 416099P0003	Stabilized Polyamide 6.6
27.	EXP. INSU TUBE 8/15 PA	HBTB 416099P0007	Stabilized Polyamide 6.6
28.	EXP. INSU TUBE 18/32 PA	HBTB 416099P0009	Stabilized Polyamide 6.6
29.	EXP. INSU TUBE 4/8 PA	HBTB 416099P0011	Stabilized Polyamide 6.6
30.	EXP. INSU TUBE 6/10 PA	HBTB 416099P0012	Stabilized Polyamide 6.6
31.	EXP. INSU TUBE 10/15 PA	HBTB 416099P0014	Stabilized Polyamide 6.6
32.	EXP. INSU TUBE 14/20 PA	HBTB 416099P0015	Stabilized Polyamide 6.6
33.	EXP. INSU TUBE 22/35 PA	HBTB 416099P0017	Stabilized Polyamide 6.6
34.	EXP. INSU TUBE 28/40 PA	HBTB 416099P0018	Stabilized Polyamide 6.6
35.	EXP. INSU TUBE 70/91 PA	HBTB 416099P0030	Stabilized Polyamide 6.6
35A.	EXP. INSU TUBE 35/60 PA		Stabilized Polyamide 6.6
SET OF NYLON SPACER			
36.	FILLERSIZE 16 BLUE	HBTB 415309P0001	Nylon
37.	FILLERSIZE 12 YELLOW	HBTB 415309P0002	Nylon
POLYATHYLENE END SLEEVES			
38.	END SLEEVE PG-16-PE	KN6726212P0016	POLYATHYLENE (BLACK)
39.	END SLEEVE PG-29-PE	KN6726212P0029	POLYATHYLENE (BLACK)
40.	END SLEEVE PG-21-PE	KN6726212P0021	POLYATHYLENE (BLACK)
41.	END SLEEVE PG-36-PE	KN6726212P0036	POLYATHYLENE (BLACK)
42.	SD SLEEVE SIZE 18/BK	HBTB415391P0011	ELASTOMER WITH ADHESIVE
TRANSPARENT SD SLEEVE FOR PROTECTION OF PRINTED SD SLEEVE			
	DESCRIPTION		MATERIAL
43.	TR SD SLEEVE FOR PROTECTION OF 1/8		Polyolefin
44.	TR SD SLEEVE FOR PROTECTION OF 3/16		Polyolefin
45.	TR SD SLEEVE FOR PROTECTION OF 1/4		Polyolefin
46.	TR SD SLEEVE FOR PROTECTION OF 3/8		Polyolefin
47.	TR SD SLEEVE FOR PROTECTION OF 1/2		Polyolefin
48.	TR SD SLEEVE		Polyolefin

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(5% manufacturing spares are required in each item)

PACKING OF MATERIALS:- Packing of Rubber items to be done in "Hard Packing Box i.e.-Wooded Box with thermocol"

10. Note:- The material of non-metallic sleeve must be inflammability class FH 2-5 mm as defined in the IS:11731 (Part-1):1986 – Horizontal specimen method of test for solid insulating materials and class FVO as per IS:11731 (Part-2):1986- Vertical test method.

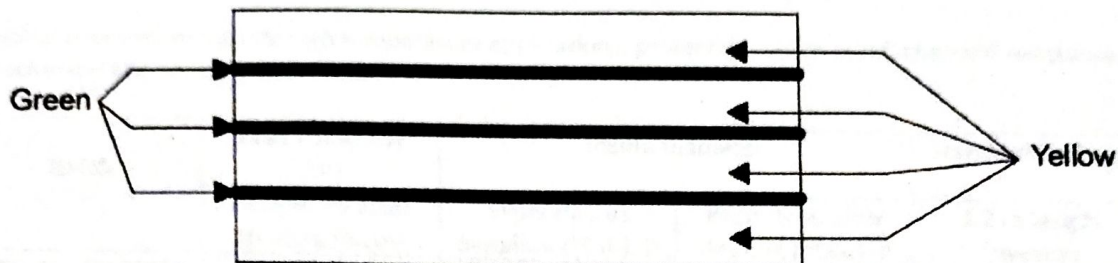
N.B. Qty/Loco will be as per category book and the tender schedule.

Detail of SD Sleeves (SL.No.1 – 9):

SL NO	Description	Size	Colour	Identification No.	Max. inner Diameter in Shrink Down condition		Min. inner diameter in Shrink Down condition		Wall thickness in Shrink Down condition	
1.	SD SLEEVE 6.4x 0.28PE5 BK	¼"	Black	F 415788P0106	0.125	3.18	0.250	6.35	0.025	0.63
2.	SD SLEEVE 12.7x 0.28PE5 BK	¼"	Black	F 415788P0108	0.250	6.35	0.500	12.70	0.025	0.63
3.	SD SLEEVE 25.4x 0.38PE5 BK	1"	Black	F 415788P0110	0.500	12.70	1.000	25.40	0.035	0.89
4.	SD SLEEVE 25.4x 0.38PE5 TR	1"	Transpa rent	F 415788P0610	0.500	12.70	1.000	25.40	0.035	0.89
5.	SD SLEEVE 2.4x0.22PE5G/ YEL	3/32 "	Yellow/ Green	F 415788P0703	0.046	1.77	0.093	2.36	0.020	0.51
6.	SD SLEEVE 6.4x 0.28PE5G/YEL	¼"	Yellow/ Green	F 416788P0706	0.125	3.18	0.250	6.35	0.025	0.63
7.	SD SLEEVE 9.5x 0.28PE5G/YEL	3/8"	Yellow/ Green	F 415788P0707	0.187	4.75	0.375	9.53	0.025	0.63
8.	SD SLEEVE 12.7x 0.28PE5G/YEL	1/2"	Yellow/ Green	F 415788P0708	0.250	6.35	0.500	12.70	0.025	0.63
9.	SD SLEEVE 19.0x 0.35PE5 BK	¾"	Black	F 415788P0109	0.375	9.53	0.750	19.05	0.030	0.76 0

- Material : Radiation interlaced (Polyethylene Based) Polyolefin
- Density : 1.05-----1.15g/cm³
- Di-Electric Breakdown Voltage:
 - In As-Delivered condition = 6----20 KV
 - Shrunked 1 Hr/120 = 10----30KV
 - Volume Resistivity = 20----80KV/mm

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**Sl.No.16-19:**

ITEM	IDENT.NO.	Inner Diameter In fully shrink Condition Max. Dia. (mm)	Inner Diameter not In shrink Condition Min. Dia. (mm)	Wall thickness In shrink Condition W(mm)
SD SLEEVE YEL/GREEN 3/1.5	HBTB 416269P0001	1.5	3.0	0.51
SD SLEEVE YEL/GREEN 6/3	HBTB 416269P0002	3.0	6.0	0.64
SD SLEEVE YEL/GREEN 12/6	HBTB 416269P0003	6.0	12.0	0.64
SD SLEEVE YEL/GREEN 26/13	HBTB 416269P0005	13.0	26.0	0.89

The wall thickness may be less in fully shrink down condition.

Material: Thermofit DCTP

Earth: Yellow/ Green

The shrink down capacity is 2:1. Thermofit DCTP is resistant to permanent.

Temperature from -55°C up to 140°C. Short time stress of 300°C permissible.

The shrink down sleeve is flexible, mechanically reliable and has good chemical and electrical properties.

Thermofit DCTP is self-extinguishing and U-L RAY tested.

TEST CRITERIA FOR THERMOFIT DCPT:

1. VG 95343 Pt 5 Type A DIN 29807 or equivalent.
2. VDA 0341 or equivalent.
3. Pt 9005 type A or equivalent.

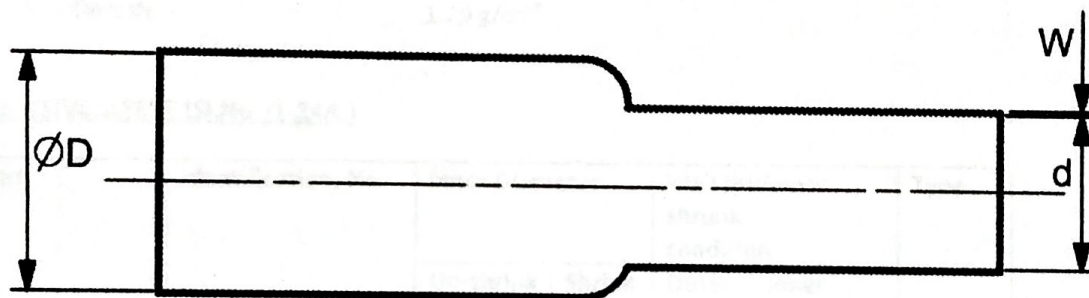
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SD SLEEVE 1 KYNAR (SI.No.20)

Typical applications include high temperature applications, protection, strain relief, chemical resistance, mechanical and abrasion protection.

ID No.	Wall Thickness (W)	Inside Diameter		Standard Package
	Recovered after Heating (Nom)	Expanded as Supplied (Min.). D	Recovered after Heating (Max.), d	1.2 m length Quantity
HEIS 415785P0010	0.48 mm	25.4 mm	12.7 mm	12 m

Operating temperature range : -55° up to 175°C.
Resistance against flash over : 22 to 32 KV mm
Resistance against lubricants.
Colour : Transparent.
Length reduction : -4%



PRINTED SLEEVES (SI.No.10 – 14)

Description	Ident. No.	Material	Dia in mm	Min. length of cut pieces to be 50 mm
SHRINK DOWN SLV DTMS 1/8	HBT 416006P0003	Elastomer	3.2	
SHRINK DOWN SLV DTMS 3/16	HBT 416007P0003	Elastomer	4.8	
SHRINK DOWN SLV DTMS 1/4	HBT 416008P0003	Elastomer	6.4	
SHRINK DOWN SLV DTMS 3/8	HBT 416009P0003	Elastomer	9.5	
SHRINK DOWN SLV DTMS 1/2	HBT 416010P0003	Elastomer	12.7	

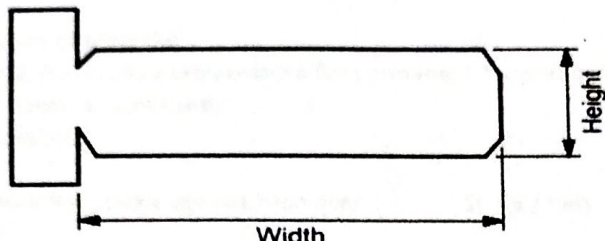
Colour of above sleeves is yellow.

TEST CRITERIA

1. Material performance: NF F00-608-Cat.H (As per SNCF specification) or equivalent.
2. Mark permanence : MIL-M-81531 or equivalent.
3. Solvent resistance : MIL-STD-202 or equivalent.

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PRINTED PLATE TMS-CM 10-50 YEL (SI.No.15)



Width in mm	Height in mm	Thickness in mm	Line per ident.
50	10	0.64	2

Max.Writing height : 4mm
 Tensile Strength : 20N/nm²
 Elongation : 490%
 Density : 1.29 g/cm²

ADHESIVE SLEEVE (SI.No.21-24A.)

Item	Identification. No.	Inner Diameter		Wall thickness shrunk condition		Type
		Un-shrink	Shrink	Outer layer	Inner layer	
ADHESIVE SD SLEEVE 12/3	HBTB 416411P0002	12	3	1.4	0.6	EPS400
ADHESIVE SD SLEEVE 16/4	HBTB 416411P0003	16	4	1.8	0.8	EPS400
ADHESIVE SD SLEEVE 24/6	HBTB 416411P0004	24	6	2.2	0.8	EPS400
ADHESIVE SD SLEEVE 32/8	HBTB 416411P0005	32	8	2.5	1.0	EPS400
ADHESIVE SD SLEEVE 12/2.41		11	2.75	1.3	0.5	EPS400

Material: Double walled Shrink down sleeves.
 Outer layer: Braided Polyolefin, Colour: Black
 Inner layer: Thermoplastic Adhesive

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Application: The item to be covered shall be freed of lubricants and silicon residents prior to application of the Shrink down sleeve.

Properties of Material:

Thermal: Permissible temperature for permanent *operation* : -55°C up to 110°C.
Shrink down temperature : -125°C
Inflammability : Self extinguishing contains Halogens

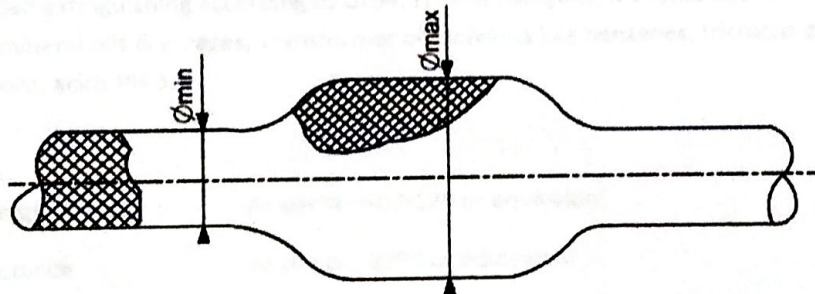
Electrical: Resistance against flash over : 16 KV / mm
Specific Resistance : $10^{13} \Omega$ per cm

Mechanical

- Shrink down capacity: 4:1
- Stretch to break : 300% min
- All dimensions are in mm.

Performance:

Test : Test method
Heat ageing : As per ISO 188/Equivalent
Corrosion resistant : ASTM D2671/ Equivalent
Dielectric strength : IEC 243 (Dia. 25.4 20MV/m, Dia. 25.4 10MV/m)



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EXP. INSULATION TUBES (Sl.No.25-35A)

ITEM	IDENT.NO.	DIMENSION		Wight in Kg/100M $\pm 10\%$
		Dia. Min (mm)	Dia. Max (mm)	
EXP. INSU TUBE 11/22 PA	HBTB 416099P0001	11	22	1.160
EXP. INSU TUBE 30/52 PA	HBTB 416099P0003	30	52	2.4
EXP. INSU TUBE 8/15 PA	HBTB 416099P0007	8	15	0.616
EXP. INSU TUBE 18/32 PA	HBTB 416099P0009	18	32	1.378
EXP. INSU TUBE 4/8 PA	HBTB 416099P0011	4	8	0.397
EXP. INSU TUBE 6/10 PA	HBTB 416099P0012	6	10	0.60
EXP. INSU TUBE 10/15 PA	HBTB 416099P0014	10	15	0.690
EXP. INSU TUBE 14/20 PA	HBTB 416099P0015	14	20	1.160
EXP. INSU TUBE 22/35 PA	HBTB 416099P0017	22	35	1.540
EXP. INSU TUBE 28/40 PA	HBTB 416099P0018	28	40	1.90
EXP. INSU TUBE 70/91 PA	HBTB 416099P0030	70	91.5	4.710
EXP. INSU TUBE 35/60 PA		35	60	2.100

Material: Braided Insulation Sleeve, Braided from single strand stabilized polyamide 6.6, Colour: Black.

Maximum permissible temperature : -55°C to 150°C permanent

+170°C short time

Inflammability : Self extinguishing according to UL94, Free of halogens, it should have chemical resistance against mineral oils & greases, Transformer oil, solvents like benzenes, trichloro ethylene, tetra chloride carbons, acids PH 3.

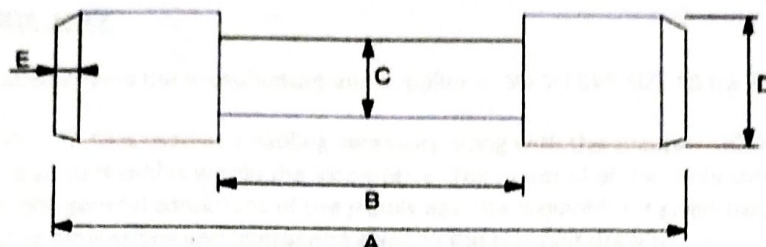
Test criteria

Limiting oxygen index : As per NF G07-128 or equivalent
 Flame resistance : As per ISO 3795 or equivalent
 Fume Toxicity : As per CEI 754 - 1.2 or equivalent

Test Procedure

1. One sample should be selected at random out of different types of EIT Sleeve for each type of test and sealed during routine inspection i.e. total 03 nos of samples are required only.
2. During prototype inspection, all three tests should be carried out for each size of EIT Sleeve.

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NYLON SPACER (FILLER) (Sl.No.36-37)

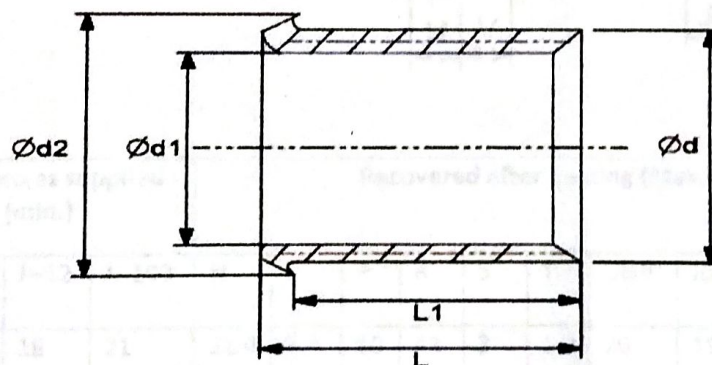
Sl.No.	ITEM	IDENT. NO.	A	B	C	D	E	Material
36.	FILLER SIZE 16BLUE	HBTB 415309P0001	11.8	5.5	1.75	3.05	0.25	Nylon
37.	FILLER SIZE 12YELLOW	HBTB 415309P0002	11.8	5.5	3.00	4.55	0.5	Nylon

POLYETHYLENE AND SLEEVES (Sl.No.38-41)

Sl.No.	Description	d	d1	d2	L	L ₁	Material
38.	END SLEEVE PG-16-PE	19.6	16.4	22	19	17	POLYETHYLENE (BLACK)
39.	END SLEEVE PG-29-PE	33.4	29.5	36.5	28	25	
40.	END SLEEVE PG-21-PE	25.1	21.6	27.5	22.5	20	
41.	END SLEEVE PG-36-PE	42.9	38.4	46	35	30	

Resistance against Heat : up to 80°C

All dimensions are in mm.



The material used for the End sleeves should be fire retardant/ Self-Extinguishing as per IS:11731 or any other equivalent DIN, IEC.

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SD SLEEVE SIZE 18 BK

This specification covers the manufacture and supplies of SD SLEEVE SIZE 18 for Electric Locomotives.

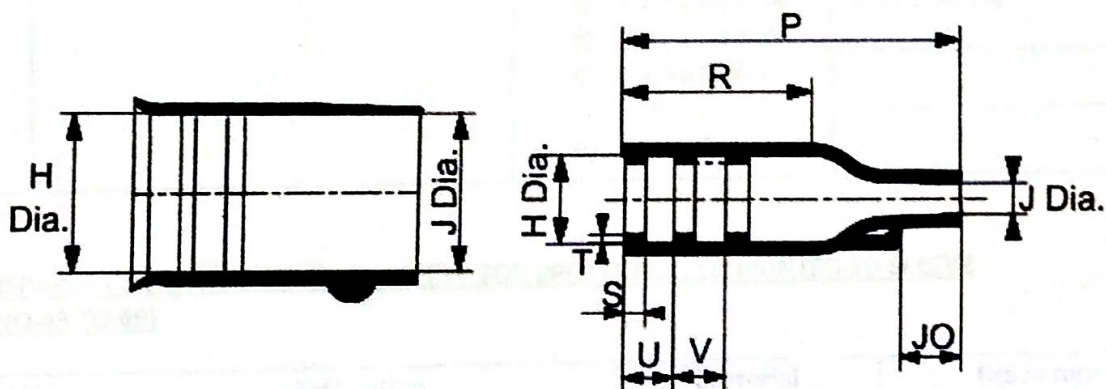
The SD SLEEVE SIZE 18 is used as a cabling accessory along with the circular/ SICEM connector for speed sensors, in the control cables within the locomotive. The material of the cable should be Halogen Free. In addition to the general conditions of the supply and the requirement given below, the supplier has to comply with the dimensions and instruction given in the relevant drawing.

Quantity/Loco : 40 Nos

ABB Identification No: HBTB 615391P0011, SD SLEEVE SIZE 18

(Dimension before shrinking)

(Dimension after shrinking)



Dimensions in mm	Expanded as supplied (min.)				Recovered after heating (Max.)								Approx. Weight(
	H	J	J-12	J-100	H	J	P	R	S	T	U&V	JO	
202K153	36	36	18	21	22.4	8.4	80	42	3	1.0	20	19.5	12.0

Material: Modified Fluoro-elastomer (J-12) with Adhesive

PREPARED BY	CHECKED BY	APPROVED BY
Nirga k		
SSE/DRG&DGN (M)	SSE/DRG&DGN (M) AEE/D/Comm.	DY. CEE/D/GONV TII

TEST CRITERIA

Sl.No.	Test Specified	Specified Value	Test criteria/ Standards
1.	Tensile strength	10 MPa (min)	ISO37/ IEC 450
2.	Ultimate elongation	250%(min)	ISO37/ IEC 540
3.	Flammability	Self Extinguishing	RK-6703, CL2.8/ ASTM D570
4.	Water absorption	0.5% (max)	ISO62 ASTM D570
5.	Thermal ageing/ Heat ageing for 168	Ultimate elongation 150% (min)	ISO188 ISO37 IEC 540
6.	Thermal shock/ Heat shock (4 hrs, +225°C)	No draping cracking or flowing	ASTM D2671
7.	Electrical strength	8 MV/m (min)	IEC 243 ASTM D2671
8.	Low temperature flex at -55°C	No cracking during Mandral bend.	RK-6703.CL.2.7 ASTM D2671Method C
9.	Fluid Resistance/ Solvent Resistance	a) Aviation fuel b) Lubricating oil c) Hydraulic fluid d) Methyl Ethyl Ketone e) Sea water	Tensile strength 8.5 MPa (min) Tensile strength 8.5 MPa (min) -----

TRANSPARENT HEAT SHRINK DOWN SLEEVE FOR PROTECTION OF PRINTED SD SLEEVE
(SL. NO-43 TO 48)

Sl.No.	Description	Material	Dia in mm	
43.	TR SD SLEEVE FOR PROTECTION OF 1/8	Polyolefin	4.0	NEW
44.	TR SD SLEEVE FOR PROTECTION OF 3/16	Polyolefin	6.0	NEW
45.	TR SD SLEEVE FOR PROTECTION OF 1/4	Polyolefin	8.0	NEW
46.	TR SD SLEEVE FOR PROTECTION OF 3/8	Polyolefin	12.0	NEW
47.	TR SD SLEEVE FOR PROTECTION OF 1/2	Polyolefin	14.0	NEW
48.	TR SD SLEEVE	Polyolefin	20.0	NEW

Note- Cable numbers will last long and remain visible.

N.B. Qty/Loco will be as per category book and the tender schedule.

Inflammability: Self extinguishing

PREPARED BY	CHECKED BY	APPROVED BY
Nervan		
SSE/DRG&DGN (M)	SSE/DRG&DGN (M) AEE/D/Conv.	DY. CEE/D/CONV III

Printed S.D.Sleeve of different sizes DTMS 3/16, DTMS 3/8 & DTMS 1/2 in WAG-7 (Crew friendly, Cable loom) type microprocessor based loco are as under:-

- 1 Printed S.D.Sleeve DTMS 3/16(Dia:-4.8 mm)
For 2.5 Sq. mm cables
(Dia 3.70 ±0.15 mm)
HBT 416007P0003
- 2 Printed S.D.Sleeve DTMS 3/8(Dia:-9.5 mm)
For 10 Sq. mm Cables
(Dia 6.30 ±0.15 mm)
HBT 416009P0003
3. Printed S.D.Sleeve DTMS 1/2 (Dia:- 12.7 mm)
For 25 Sq. mm Cables
(Dia 10.20±0.30 mm)
HBT 416010P0003

Name of sections in which above sleeves shall be used :-

1. Mobile Cable loom
2. Aux. Control (Cab-1 & 2) & Power
3. 12 nos. 19 core M/core cables
4. AC-2 Panel(Int. Loom)
5. AC-2 Panel(Internal)
6. TB (AC-2) Panel
7. PC-1 & 2 Panel
8. Ba-1 Panel
9. Ba-2 Panel
10. Ba-3 Panel
11. Mn. Pn. Brake Panel

PREPARED BY	CHECKED BY	APPROVED BY
Niraja K		
SSE/DRG&DGN (M)	SSE/DRG&DGN (M)	DY. CEE/D/GONV II

AEE/D/Conv.