TECHNICAL SPECIFICATION

for

HDPE Pipe For Cable termination at poles

and

Pole Earthing Strip

PIPE DIA: 40 mm, 63 mm, 110 mm, 160 mm

Specification No. – SP-HDPE-92-R2

Prepared by		Reviewed by		Approved by		Rev	Date
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1. SCOPE OF SUPPLY

This specification covers technical requirements of design, constructional features, Inspection, Testing, Supply & transportation of HDPE pipe of 40 mm, 63 mm, 110 mm and 160 mm diameter at BSES stores/site.

2. STANDARDS & CODES

Materials, equipment and method used in the manufacturing of HDPE pipe shall conform to the following standards -

S. No.	STANDARD	TITLE OF THE STANDARD
1	IS 4984:1995	Specification of High density polyethylene pipes with latest amendments
2	IS 10810 (Part 7):1984	Methods of test for cables: Tensile strength and elongation at break of thermoplastic and elastomeric insulation and sheath

3. CLIMATIC CONDITIONS OF THE INSTALLATIONS:

a. Max Ambient Temperature : 50 deg C

b. Max daily average ambient temperature : 40 deg C

c. Min Ambient Temperature : 0 deg C

d. Maximum Humidity : 100%

e. Minimum Humidity : 10%

f. Average number of thunderstorm per annum : 40

g. Average annual rainfall : 750 mm

h. Average number of rainy days per annum : 50

Atmosphere is generally laden with mild acid and dust suspended during dry months and subjected to fog in cold months.

4. PIPE SELECTION CRITERIA:

S. No.	Voltage rating of cable	Cable size (In MM2)	Diameter of cable (In MM)	Diameter of suitable HDPE pipe (In MM)	Grade of HDPE pipe
1	1.1 KV	4CX25	24	63	PE63; PN6
2		4CX50	29	63	PE63; PN6
3		4CX95	37	63	PE63; PN6
4		4CX150	45	110	PE63; PN6
5		4C 300	59	110	PE63; PN6
6	11 KV	3CX150	62.5	110	PE63; PN6
7		3CX300	77	110	PE63; PN6
8	33 KV	3CX400	107	160	PE63; PN6
9	66 KV	1CX630	81.5	160	PE63; PN6
10		1CX1000	94	160	PE63; PN6
11	Pole Earthing – GI Strip 25x6 mm			40	PE63; PN6

5. GENERAL TECHNICAL REQUIREMENTS

Sl. No.	Item Description	Unit	Requirement
1	Melt Flow Rate (190ºC, 5kgf load)	g/10 mins	0.4 to 1.10
2	Specified Base density	Kg/mtr3	940.5 to 946.4
3	Material Grade		PE63
4	Wall Thickness	Pipe Dia 40 mm	2.3-2.7 mm
		Pipe Dia 63 mm	4.4-5.1 mm
		Pipe Dia 110 mm	7.7-8.7 mm
		Pipe Dia 160 mm	11.2- 12.5 mm
5	Carbon black	%	2.5+/-0.5
6	Antioxidant	% by mass	<0.3% by mass
7	Overall Migration	Mg/dm2	10 Max
8	Reversion	%	<=3%
9	Hydraulic Characteristics		No sign of localizes swelling, leakage or weeping (at 80ºC for 48 hrs (acceptance

			test) & 165 hrs(type test))
10	Continuous Temperature withstand capacity	ºC	120
11	Standard Length	Meters	6

6. GENERAL CONSTRUCTIONS FOR HDPE PIPE

High-density polyethylene (HDPE) is a polyethylene thermoplastic made from petroleum. Having large strength to density ratio, HDPE is commonly used in the production of corrosion-resistant piping. The HDPE pipes required in size 40 mm, 63 mm, 110 mm and 160 mm shall be made of material grade PE-63 and pressure rating PN6. The HDPE pipe material shall be fire retardant. All HDPE pipe colour shall be Black.

7. MARKING

Following details shall be embossed on the HDPE pipe at regular interval of not more than 1.5 meters. Font of printing and embossing should be minimum 10 mm.

a. Manufacturer's Name

b. Buyer’s Name

c. Grade and pressure rating of pipe

d. Purchase order number and date

e. Month & Year of Manufacturing

8. TESTS

The following tests shall constitute the type tests and shall be carried out as per relevant IS: 4984-1995 with latest amendments

Type Test:

a. Average Outer Diameter
b. Wall thickness
c. Measurement of Ovality
d. Heat Reversion
e. M.R.F. at 190 ºC.
f. Carbon Black content
g. Density at 27 ºC
h. Overall Migration

i. Hydraulic characteristics

Routine Test:

a. Average Outer Diameter
b. Wall thickness
c. Measurement of Ovality

Acceptance Test:

a. Average Outer Diameter
b. Wall thickness
c. Measurement of Ovality
d. Heat Reversion
e. M.R.F. at 190 ºC.
f. Carbon Black content
g. Density at 27 ºC
h. Overall Migration
i. Hydraulic characteristics

9. TYPE TEST CERTIFICATES

The bidder shall furnish the type test certificates as mentioned above as per the corresponding standards. All tests shall be conducted at NABL accredited lab as per the relevant standard. Type test should have been conducted in certified test laboratories during the period not exceeding 5 years from date of opening of bid.

10. PRE DISPATCH INSPECTION

The material shall be subject to inspection by a duly authorized representative of BSES. Inspection may be made at any stage of manufacturing at the discretion of purchaser. Material, if found unsatisfactory, shall be liable to rejection. Bidder shall grant free access to the place of manufacturing to BSES representative at all times when the work is in progress. Material shall be dispatched after specific MDCC (Material dispatch clearance certificate) is issued by BSES.

Following documents shall be sent along with material

a. Test reports
b. MDCC issued by BSES
c. BSES invoice in duplicate
d. Packing list
e. Drawing & catalogue
f. Guarantee/Warantee card

g. Delivery challan

h. Other documents (as applicable)

11. DRAWING & DOCUMENTS

Following documents shall be prepared based on BSES specifications and statutory requirements with complete BOM and shall be submitted with the bid:

Sl No.	Along with offer	During Bid	For Approval	During Inspection
1	Technical Parameters	Yes	Yes	Yes
2	Manual/catalogues/drawings for all components	Yes	Yes	Yes
3	Technical details and test certificates of components	Yes	Yes	Yes
4	QA & QC Plan		Yes	Yes
5	Routine, Acceptance and Type test certificates	Yes		Yes

12. GUARANTEED TECHNICAL PARTICULARS for HDPE PIPE DIA 40 mm, 63 mm, 110 mm & 160 mm

Sl. No.	Item Description	Unit	Requirement	Data by Vendor			
				40 mm	63 mm	110 mm	160 mm
1	Melt Flow Rate (190ºC, 5kgf load)	g/10 mins	0.4 to 1.10				
2	Specified Base density	Kg/mtr3	940.5 to 946.4				
3	Material Grade		PE63				
4	Wall Thickness	Pipe Dia 40 mm	2.8-3.3 mm				
		Pipe Dia	4.4-5.1 mm				

		63 mm					
		Pipe Dia 110 mm	7.7-8.7 mm				
		Pipe Dia 160 mm	11.2- 12.5 mm				
5	Carbon black	%	2.5+/-0.5				
6	Antioxidant	% by mass	<0.3% by mass				
7	Overall Migration	Mg/dm2	10 Max				
8	Reversion	%	<=3%				
9	Hydraulic Characteristics		No sign of localizes swelling, leakage or weeping (at 80ºC for 48 hrs (acceptance test) & 165 hrs(type test))				
10	Continuous Temperature withstand capacity	ºC	120				
11	Standard Length	Meters	6				