SPECIFICATION NO. EDTS-255, REV-J

SPECIFICATION FOR 'HARNESS OF UNDERFRAME AND ROOF ARRANGEMENT' FOR LHB AC EOG CHAIR CAR COACHES.

1.0 This specification covers manufacturing, assembly and supply of ready made `CABLE HARNESSES' for UNDERFRAME AND ROOF ARRANGEMENT' FOR LHB AC EOG CHAIR CAR TYPE COACHES. These harnesses shall comprise of thin walled flexible elastomeric cables with copper conductors duly cut to specified lengths and ferruled for cable identification. The free ends of the cables shall be stripped & taped with FRLT cotton insulation tapes of approved makes.

1.1 The harness manufacturer shall quote separately for supply & commissioning of the harness as under :

a). Budgetary quote of the harness without commissioning.

b). Budgetary quote of the harness with commissioning in the coach at RCF.

1.2 The firm shall maintain date wise in-house quality control system and in-house quality control records etc. for in-stage process inspection & testing at harness manufacturer premises and the same shall be made available to the inspecting official during type testing.

2.0 SCOPE of supply:

TYPE	Description
TYPE-1	HARNESS OF UNDERFRAME ARRANGEMENT' FOR LHB AC EOG CHAIR CAR COACHES
TYPE-2	HARNESS OF ROOF ARRANGEMENT' FOR LHB AC EOG CHAIR CAR COACHES

(i) Procurement of the items specified in the BOM of the specification shall be from RDSO/RCF/ICF approved vendors mentioned in latest version of the vendor directory issued by RCF/ICF/RDSO respectively.

(ii) Items should be procured from RCF/ICF/RDSO approved sources only.

2.1 TYPE-1: HARNESS OF UNDERFRAME ARRANGEMENT' FOR LHB AC EOG CHAIR CAR TYPE COACHES

2.1 (a) : BILL OF MATERIAL

Bill of Material for Under Frame shall be as per following details

A) THIN WALLED FLEXIBLE ELASTOMERIC CABLES WITH COPPER CONDUCTORS & ACCESSORIES:-

S.NO.	DESCRIPTION	CABLE SIZE mm^2	DETAIL DRG/SPEC	OPC/ COACH	REMARKS/ LOCATION
1.	Thin walled flexible elastomeric cables with copper conductors color **'Red'** above 750 V to 1.8/3.0 KV.	**150**	ELRS/SPEC/ELC/0019 Rev.3.	49 Mt	**Feeder cables**
2.	Thin walled flexible elastomeric cables with copper conductors color **'Yellow'** above 750 V to 1.8/3.0 KV.	**150**	ELRS/SPEC/ELC/0019 Rev.3.	49 Mt	**Feeder cables**
3.	Thin walled flexible elastomeric cables with copper conductors color **'Blue'** above 750 V to 1.8/3.0 KV.	**150**	ELRS/SPEC/ELC/0019 Rev.3.	49 Mt	**Feeder cables**
4.	Thin walled flexible elastomeric cables with copper conductors color **'Black'** above 750 V to 1.8/3.0 KV.	**95**	ELRS/SPEC/ELC/0019 Rev.3.	49 Mt	**Feeder cables**
5.	Thin walled flexible elastomeric cables with copper conductors color **'GNYE'** upto 750 V	**70**	ELRS/SPEC/ELC/0019 Rev.3.	7.1 Mt.	**For feeder earthing**
6.	Thin walled flexible elastomeric cables with copper conductors color **'Red'** above 750 V to 1.8/3.0 KV.	**50**	ELRS/SPEC/ELC/0019 Rev.3.	10.5 Mt.	**Feeder junction boxes to SBC**

7.	Thin walled flexible elastomeric cables with copper conductors color **'Yellow'** above 750 V to 1.8/3.0 KV.	**50**	ELRS/SPEC/ELC/0019 Rev.3.	10.5 Mt.	**Feeder junction boxes to SBC**
8.	Thin walled flexible elastomeric cables with copper conductors color **'Blue'** above 750 V to 1.8/3.0 KV.	**50**	ELRS/SPEC/ELC/0019 Rev.3.	10.5 Mt.	**Feeder junction boxes to SBC**
9.	Thin walled flexible elastomeric cables with copper conductors color **'Black'** above 750 V to 1.8/3.0 KV.	**50**	ELRS/SPEC/ELC/0019 Rev.3.	10.5 Mt.	**Feeder junction boxes to SBC**
10.	Thin walled flexible elastomeric cables with copper conductors color **'Red'** upto 750 V	**50**	ELRS/SPEC/ELC/0019 Rev.3.	16.5 Mt.	**60 KVA TXR output**
11.	Thin walled flexible elastomeric cables with copper conductors color **'Yellow'** upto 750 V.	**50**	ELRS/SPEC/ELC/0019 Rev.3.	16.5 Mt.	**60 KVA TXR output**
12.	Thin walled flexible elastomeric cables with copper conductors color **'Blue'** upto 750 V.	**50**	ELRS/SPEC/ELC/0019 Rev.3.	16.5 Mt.	**60 KVA TXR output**
13.	Thin walled flexible elastomeric cables with copper conductors color **'Black'** upto 750 V.	**50**	ELRS/SPEC/ELC/0019 Rev.3.	16.5 Mt.	**60 KVA TXR output**
14.	Thin walled flexible elastomeric cables with copper conductors color **'White'** upto 750 V	**50**	ELRS/SPEC/ELC/0019 Rev.3.	2.5 mt.	**-Ve fuse box**

15.	Thin walled flexible elastomeric cables with copper conductors color **'Chocolate'** upto 750 V	**50**	ELRS/SPEC/ELC/0019 Rev.3.	2.5 mt.	**+Ve fuse box**
16.	Thin walled flexible elastomeric cables with copper conductors color **'GNYE'** upto 750 V	**50**	ELRS/SPEC/ELC/0019 Rev.3.	0.5 mt.	**Earthing**
17.	Thin walled flexible elastomeric cables with copper conductors color **'Red'** above 750 V to 1.8/3.0 KV.	**25**	ELRS/SPEC/ELC/0019 Rev.3.	16.5 Mt.	**60 KVA TXR input**
18.	Thin walled flexible elastomeric cables with copper conductors color **'Yellow'** above 750 V to 1.8/3.0 KV.	**25**	ELRS/SPEC/ELC/0019 Rev.3.	16.5 Mt.	**60 KVA TXR input**
19.	Thin walled flexible elastomeric cables with copper conductors color **'Blue'** above 750 V to 1.8/3.0 KV.	**25**	ELRS/SPEC/ELC/0019 Rev.3.	16.5 Mt.	**60 KVA TXR input**
20.	Thin walled flexible elastomeric cables with copper conductors color **'Black'** above 750 V to 1.8/3.0 KV.	**25**	ELRS/SPEC/ELC/0019 Rev.3.	16.5 Mt.	**60 KVA TXR input**
21.	Thin walled flexible elastomeric cables with copper conductors color **'Red'** upto 750 V	**25**	ELRS/SPEC/ELC/0019 Rev.3.	37 Mt.	**Pre-cooling cable**
22.	Thin walled flexible elastomeric cables with copper conductors color **'Yellow'** upto 750 V	**25**	ELRS/SPEC/ELC/0019 Rev.3.	37 Mt.	**Pre-cooling cable**

23.	Thin walled flexible elastomeric cables with copper conductors color **'Blue'** upto 750 V	**25**	ELRS/SPEC/ELC/0019 Rev.3.	37 Mt.	**Pre-cooling cables**
24.	Thin walled flexible elastomeric cables with copper conductors color **'Black'** upto 750 V	**25**	ELRS/SPEC/ELC/0019 Rev.3.	37 Mt.	**Pre-cooling cables**
25.	Thin walled flexible elastomeric cables with copper conductors color **'White'** upto 750 V	**25**	ELRS/SPEC/ELC/0019 Rev.3.	47.5 mt.	**Under slung RBC**
26.	Thin walled flexible elastomeric cables with copper conductors color **'Chocolate'** upto 750 V	**25**	ELRS/SPEC/ELC/0019 Rev.3.	31.5 mt.	**Under slung** RBC
27.	Thin walled flexible elastomeric cables with copper conductors color **'GNYE'** upto 750 V	**16**	ELRS/SPEC/ELC/0019 Rev.3.	3.5 mt.	**Earthing**
28.	Thin walled flexible elastomeric cables with copper conductors color **'White'** upto 750 V	**10**	ELRS/SPEC/ELC/0019 Rev.3.	17.5 mt.	**-ve fuse box**
29.	Thin walled flexible elastomeric cables with copper conductors color **'Red'** upto 750 V	**6**	ELRS/SPEC/ELC/0019 Rev.3.	17 mt	**Under slung RBC**
30.	Thin walled flexible elastomeric cables with copper conductors color **'Yellow'** upto 750 V	**6**	ELRS/SPEC/ELC/0019 Rev.3.	17 mt	**Under slung** RBC
31.	Thin walled flexible elastomeric cables with copper conductors color **'Blue'** upto 750 V	**6**	ELRS/SPEC/ELC/0019 Rev.3.	17 mt	**Under slung** RBC

32.	Thin walled flexible elastomeric cables with copper conductors color **'Red'** upto 750 V	**4**	ELRS/SPEC/ELC/0019 Rev.3.	18 mt	**5kva o/p**
33.	Thin walled flexible elastomeric cables with copper conductors color **'Yellow'** upto 750 V	**4**	ELRS/SPEC/ELC/0019 Rev.3.	18 mt	**5kva o/p**
34.	Thin walled flexible elastomeric cables with copper conductors color **'Blue'** upto 750 V	**4**	ELRS/SPEC/ELC/0019 Rev.3.	18 mt	**5kva o/p**
35.	Thin walled flexible elastomeric cables with copper conductors color **'Black'** upto 750 V	**4**	ELRS/SPEC/ELC/0019 Rev.3.	18 mt	**5kva o/p**
36.	Thin walled flexible elastomeric cables with copper conductors color **'Red'** upto 750 V	**2.5**	ELRS/SPEC/ELC/0019 Rev.3.	18 mt	**5kva i/p**
37.	Thin walled flexible elastomeric cables with copper conductors color **'Yellow'** upto 750 V	**2.5**	ELRS/SPEC/ELC/0019 Rev.3.	18 mt	**5kva i/p**
38.	Thin walled flexible elastomeric cables with copper conductors color **'Blue'** upto 750 V	**2.5**	ELRS/SPEC/ELC/0019 Rev.3.	18 mt	**5kva i/p**
39.	Thin walled flexible elastomeric cables with copper conductors color **'Chocolate'** upto 750 V	**2.5**	ELRS/SPEC/ELC/0019 Rev.3.	102 mt	**Feeder control cables**
40.	Thin walled flexible elastomeric cables with copper conductors color **'GNYE'** upto 750 V	**2.5**	ELRS/SPEC/ELC/0019 Rev.3.	2.0 mt	**Earthing**

41.	Thin walled flexible elastomeric cables with copper conductors color **'Red'** upto 750 V	**1.5**	ELRS/SPEC/ELC/0019 Rev.3.	180 mt	**CP**
42.	Thin walled flexible elastomeric cables with copper conductors color **'Yellow'** upto 750 V	**1.5**	ELRS/SPEC/ELC/0019 Rev.3.	180 mt	**CP**
43.	Thin walled flexible elastomeric cables with copper conductors color **'Blue'** upto 750 V	**1.5**	ELRS/SPEC/ELC/0019 Rev.3.	180 mt	**CP**
44.	Thin walled flexible elastomeric cables with copper conductors color **'White'** upto 750 V	**1.5**	ELRS/SPEC/ELC/0019 Rev.3.	54 mt	**fuse box –ve**
45.	Thin walled flexible elastomeric cables with copper conductors color **'Chocolate'** upto 750 V	**1.5**	ELRS/SPEC/ELC/0019 Rev.3.	76 mt.	**Fuse box +ve**
46.	4x1.5 sqmm multicore cable E-beam cable 600/1000 V colour **Wh,Br,Blk,GNYE**	**4x1.5**	EDTS 132, Rev-' C ' AM-4 **(DS-4)**	44 mt.	**Pump cables**
47.	2x1.0 sqmm multicore cables 600/1000 V colour **Br,Wh**	**2x1.0**	EDTS 132, Rev-' C ' AM-4 **(DS-4)**	44 mt.	**Pump control cables**
48.	Cable marking system i.e Heat shrinkable sleeves.	M/S TYCO/ Phoenix/ Panduit/ MV make	EDML-60 (Latest revision)	1no.	**Col-VI**
49.	Copper crimping socket for 70 sq.mm cable.	-	EDTS200 (Latest revision)	20no.	**ITEM-7**
50.	Copper crimping socket for 50 sq.mm cable.	-	EDTS200 (Latest revision)	5no.	**ITEM-I0**

51.	Copper crimping socket for 50 sq.mm cable.	-	EDTS200 (Latest revision)	5no.	**ITEM-I1**
52.	Copper crimping socket for 35 sq.mm cable.	-	EDTS200 (Latest revision)	12 no.	**ITEM-I2**
53.	Copper crimping socket for 25 sq.mm cable.	-	EDTS200 (Latest revision)	8 no.	**ITEM-I3**
54.	Copper crimping socket for 25 sq.mm cable.	-	EDTS200 (Latest revision)	4 no.	**ITEM-I4**
55.	Copper crimping socket for 16 sq.mm cable.	-	EDTS200 (Latest revision)	27 no.	**ITEM-I5**
56.	Copper crimping socket for 16 sq.mm cable.	-	EDTS200 (Latest revision)	1 no.	**ITEM-I6**
57.	Copper crimping socket for 16 sq.mm cable.	-	EDTS200 (Latest revision)	2no.	**ITEM-I7**
58.	Copper crimping socket for 10 sq.mm cable.	-	EDTS201 (Latest revision)	08no.	**ITEM-2**
59.	Copper crimping socket for 6 sq.mm cable.	-	EDTS201 (Latest revision)	8no.	**ITEM-6**
60.	Copper crimping socket for 6 sq.mm cable.	-	EDTS201 (Latest revision)	10no.	**ITEM-5**
61.	Copper crimping socket for 2.5 sq.mm cable.	-	EDTS201 (Latest revision)	8no.	**ITEM-10**

B) CONDUIT SYSTEM FOR CABLE MANAGEMENT & ACCESSORIES (UNDER FRAME)

Firms supplying these items shall get these tested as per RDSO specification no. RDSO/PE/SPEC/AC/0138-2009,Rev-1.

S.NO.	DESCRIPTION	SPEC NO.	TABLE	S.No.	QPC
62.	Polyamide flexible corrugated conduit, NW-12	RDSO/PE/SPEC/AC/ 0138-2009, Rev.1	A-1	2	5mt
63.	Polyamide flexible corrugated conduit, NW-17		A-1	3	157mt.

64.	Polyamide flexible corrugated conduit, NW-23	(Annexure-A)	A-1	4	102 mt.
65.	Polyamide flexible corrugated conduit, NW-29		A-1	5	67mt.
66.	Polyamide flexible corrugated conduit, NW-36		A-1	6	45mt.
67.	Polyamide flexible corrugated conduit, NW-48		A-1	7	4mt.
68.	Straight PG metal thread end fitting PG-11	RDSO/PE/SPEC/AC/ 0138-2009, Rev.1 (Annexure-A)	A-2	2	4 nos.
69.	Straight PG metal thread end fitting PG-16		A-2	3	26no.
70.	Straight PG metal thread end fitting PG-21		A-2	5	20 no.
71.	Straight PG metal thread end fitting PG-29		A-2	6	4 no.
72.	Straight PG metal thread end fitting PG-36		A-2	7	6no.
73.	Straight PG metal thread end fitting PG-48		A-2	8	2no.
74.	Hex. lock nut with PG thread brass PG-11	RDSO/PE/SPEC/AC/ 0138-2009, Rev.1 (Annexure-A)	A-10	2	4no.
75.	Hex. lock nut with PG thread brass PG-16		A-10	4	26no.
76.	Hex. lock nut with PG thread brass PG-21		A-10	5	20no.
77.	Hex. lock nut with PG thread brass PG-29		A-10	6	4 no.
78.	Hex. lock nut with PG thread brass PG-36		A-10	7	6no.
79.	Hex. lock nut with PG thread brass PG-48		A-10	8	2no.
80.	Tube clamp NW-12	RDSO/PE/SPEC/AC/ 0138-2009, Rev.1 (Annexure-A)	A-8	2	8 no.
81.	Tube clamp NW-17		A-8	3	48 no.
82.	Tube clamp NW-23		A-8	4	26 no.
83.	Tube clamp NW-29		A-8	6	12 no.

84.	Tube clamp NW-36		A-8	7	19 no.
85.	Tube clamp NW-48		A-8	8	10 no.

2.1(b). Preparation/Bunching of harness:

The preparation / bunching of harness shall be done as per under given details for Under Frame wiring.

I): <u>FEEDER CABLES</u>

Ia) Feeder -1

H. No.	Nos. & size of cable	Color code	Length in mm	Ferrules marking	Route	**Remarks**
1	**3x150**mm² **above 750 V to 1.8/3.0 KV.**	R,Y,B	24500	12 01 01.02, 12 01 04.02, 12 01 07.02.	10	Feeder-1 From A17X1 to A18X1 **XX**
	1x95 mm² **above 750 V to 1.8/3.0 KV.**	Blk	24500	12 01 10.02	10	
1A	**2x2.5**mm² **upto 750 V**	Ch	25500	46 01.01, 46 01.02	14	Control cables **(NW-17=24M)**

Ib) Feeder -2

H. No.	Nos. & size of cable	Color code	Length in mm	Ferrules marking	Route	**Remarks**
1B	**3x150** mm² **above 750 V to 1.8/3.0 KV.**	R,Y,B	24500	12 01 15.02, 12 01 18.02, 12 01 21.02	21	Feeder-2 From A16X1 to A19X1 **XX**
	1x95 mm² **above 750 V to 1.8/3.0 KV.**	Blk	24500	12 01 24.02	21	
1C	**2x2.5**mm² **upto 750 V**	Ch	25500	46 01.03, 46 01. 04	25	Control cables **(NW-17=24M)**

II): FEEDER LOOP CABLES

H. No.	Nos. & size of cable	Colour code	Length in mm	Ferrules marking	Route	
2	**4x50** mm² **above 750 V to 1.8/3.0 KV.**	R,Y,B, Blk	6500	12 01 01.01, 12 01 04.01, 12 01 07.01, 12 01 10.01	13	Loop from Feeder to SBC **(NW-48=3M)**
2A	**4x50** mm² **above 750 V to 1.8/3.0 KV.**	R,Y,B, Blk	4000	12 01 15.01, 12 01 18.01, 12 01 21.01, 12 01 24.01	23	Loop from Feeders to SBC **(NW-48=1M)**

III): PRE-COOLING CABLES

H. No.	Nos. & size of cable	Colour code	Length in mm	Ferrules marking	Route	**Remarks**
3	**4x25** mm² **upto 750 V**	R,Y,B, Blk	7500	33 01 01.01, 33 01 02.01, 33 01 03.01, 33 01 04.01	46	Pre-cooling socket to SBC **(NW-36=5M)**
3A	**4x25** mm² **upto 750 V**	R,Y,B, Blk	29500	33 01 06.01, 33 01 07.01, 33 01 08.01, 33 01 04.02	45	Pre-cooling socket to SBC **(NW-36=26.5M)**

IV): 60 KVA TRANSFORMER CABLES

H. No.	Nos. & size of cable	Colour code	Length in mm	Ferrules marking	Route	**Remarks**
4	**4x25** mm² **above 750 V to 1.8/3.0 KV.**	R,Y,B, Blk	16500	12 01 12.02, 12 01 13.02, 12 01 14.02, 12 01 11.02	30	Input cables S1 to S7 **(NW-29=13.5M)**
4A	**4x50** mm² **upto 750 V**	R,Y,B, Blk	16500	12 02 06.01, 12 02 07.01, 12 02 08.01, 12 02 09.01	31	Out put cables S7 to S1 **(NW-36=13.5M)**

V) PUMP CABLES

H. No.	Nos. & size of cable	Colour code	Length in mm	Ferrules marking	Route	**Remarks**
5	**4x1.5** mm² multi-core **(DS-4)**	W,Br, Blk, GNYE	22000	33 08 02.02, 33 08 04.02, 33 08 06.02, 33 08 07.02	50	Pump cables/ controller cables **(NW-29=17M)**
	4x1.5 mm² multi-core **(DS-4)**	W,Br, Blk, GNYE	22000	33 08 02.02, 33 08 04.02, 33 08 06.02, 33 08 07.02		

	2x1.0 mm² multi-core **(DS-4)**	Br,W	22000	33 08 10.01, 33 08 11.01		
	2x1.0mm² multi-core **(DS-4)**	Br,W	22000	33 08 10.01, 33 08 11.01		

VI) DC CIRCUIT CABLES

H. No.	Nos. & size of cable	Color code	Length in mm	Ferrules marking	Route	**Remarks**
~~6~~	~~**2x1.5**mm² **upto 750 V**~~	~~Ch~~	~~2500~~	~~32 02 04 02, 32.01.05.02~~	~~35~~	~~Bat. fuse box +ve to Bat. Box **(NW-17=1M)**~~
6A	**1x25** mm² **upto 750 V**	Ch	14500	32 01 10.01	36	Bat. Charger to Bat.fuse box +ve **(NW-23=11.5M)**
6B	**1x50** mm² **upto 750 V**	Ch	2500	32 01 09	38	Bat. fuse box +ve to Bat. Box **(NW-23=1M)**
6C	**4x1.5**mm² **upto 750 V**	Ch	14500	32 02 01.01, 32 02 03.01, 32 01 04.01, 32 01 05.01	37	Bat. fuse box +ve to SBC **(NW-23=11.5M)**
6D	**1x25** mm² **upto 750 V**	W	17500	32 01 11.01	40	Bat. Charger to Bat.fuse box –ve
	1x10 mm² **upto 750 V**	W	17500	32 02 06		Bat. Fuse box – VE to SBC **(NW-23=15.5M)**
6E	**1x50** mm² **upto 750 V**	W	2500	32 01 08	39	Bat. fuse box -ve to Bat. Box **(NW-29=1M)**
6F	**2x1.5** mm² **upto 750 V**	W	18000	32 02 02.01, 32 02 04.01	42	Bat. fuse box -ve to SBC **(NW-17=15M)**

VII) SPEED SENSOR CABLES (For reference only & not to be supplied by harness manufacturer).

H. No.	Nos. & size of cable	Colour code	Length in mm	Ferrules marking	Route	**Remarks**
7	**3x1.0** mm²+Shield multi-core **(DS-4)**	W,Br, Blk	7000	23 03 10.02, 23 03 11.02, 23 03 12.02	81	SBC to connection box VK4 **(NW-17=4M)**
7A	**3x1.0** mm²+Shield multi-core **(DS-4)**	W,Br, Blk	10000	23 03 07.02, 23 03 08.02, 23 03 09.02	82	SBC to connection box VK3 **(NW-17=5M)**

7B	**3x1.0** mm²+Shield multi-core **(DS-4)**	W,Br, Blk	27000	23 03 01.02, 23 03 02.02, 23 03 03.02	76	SBC to connection box VK1 SBC to connection box VK2 **(NW-23=15.5M) Loose supply (NW-17=5.5M) (NW-17=2.5M)**
7C	**3x1.0** mm²+Shield multi-core **(DS-4)**	W,Br, Blk	25000	23 03 04.02, 23 03 05.02, 23 03 06.02	75	

VIII) DISC BRAKE CABLES (For reference only & not to be supplied by harness manufacturer).

H. No.	Nos. & size of cable	Colour code	Length in mm	Ferrules marking	Route	**Remarks**
8	**3x1.0** mm²+Shield multi-core **(DS-4)**	W,Br, Blk	23000	23 02 06.01, 23 02 07.01, 23 02 05.06	86	SBC to through box VK5(EVS2/ EVR2). **(NW-29=17M) Loose supply (NW-17=2M)**
8A	**3x1.0** mm²+Shield multi-core **(DS-4)**	W,Br, Blk	23000	23 02 01.01, 23 02 02.01, 23 02 05.04		SBC to through box VK5(EVS1/ EVR1).
8B	**3x1.0** mm²+Shield multi-core **(DS-4)**	W,Br, Blk	11000	23 02 14.01, 23 02 15.01, 23 02 05.10	87	SBC to through box VK7(EVS4/ EVR4). **(NW-23=6M) Loose supply (NW-17=2M)**
8C	**3x1.0** mm²+Shield multi-core **(DS-4)**	W,Br, Blk	11000	23 02 10.01, 23 02 11.01, 23 02 05.08		SBC to through box VK7(EVS3/ EVR3).

IX) AIR BRAKE CABLES (Mech)

H. No.	Nos. & size of cable	Color code	Length in mm	Ferrules marking	Route	**Remarks**
9	**2x1.5** mm² **upto 750 V**	W,Ch	17500	-	41	**Air Brake mech. Unit (NW-17=12M)**

X) EARTHING CABLES

H. No.	Nos. & size of cable	Color code	Length in mm	Ferrules marking	Route	**Remarks**
10	**6x70** mm² **upto 750 V**	GNYE	500	PE	-	**Earthing**
	2x70 mm² **upto 750 V**	GNYE	1250	PE	-	**Earthing**
	2x70 mm² **upto 750 V**	GNYE	800	PE	-	**Earthing**
	1x50 mm² **upto 750 V**	GNYE	450	PE	-	**Earthing**
	5x16 mm² **upto 750 V**	GNYE	500	PE	-	**Earthing**
	2x16 mm² **upto 750 V**	GNYE	300	PE	-	**Earthing**
	2x16 mm² **upto 750 V**	GNYE	200	PE	-	**Earthing**
	4x2.5 mm² **upto 750 V**	GNYE	450	PE	-	**Earthing**

XI): CAPACITOR BANK CABLES

FOR RMPU-1								
H.No.	Cable Size	Color	Ferrule no.	Length	From	To	Remarks	
11	1.5 mm² upto 750V	R	33 03 01.01	15000	MCB 2.5A, Ter.-2	1 KVAR CP-1	Cond-1.1	**(NW-23, L=12 M)**
	1.5 mm² upto 750V	Y	33 03 01.02	15000	MCB 2.5A, Ter.-4			
	1.5 mm² upto 750V	B	33 03 01.03	15000	MCB 2.5A, Ter.-6			
11A	1.5 mm² upto 750V	R	33 03 01.04	15000	MCB 2.5A, Ter.-2	1 KVAR CP-2	Cond-1.2	
	1.5 mm² upto 750V	Y	33 03 01.05	15000	MCB 2.5A, Ter.-4			
	1.5 mm² upto 750V	B	33 03 01.06	15000	MCB 2.5A, Ter.-6			
11 B	1.5 mm² upto 750V	R	33 03 01.07	15000	MCB 2.5A, Ter.-2	1 KVAR CP-3	Vent-1.1	
	1.5 mm² upto 750V	Y	33 03 01.08	15000	MCB 2.5A, Ter.-4			
	1.5 mm² upto 750V	B	33 03 01.09	15000	MCB 2.5A, Ter.-6			
11 C	1.5 mm² upto 750V	R	33 03 01.10	15000	MCB 6A, Ter.-2	3KVAR CP-4	Comp-1.1	
	1.5 mm² upto 750V	Y	33 03 01.11	15000	MCB 6A, Ter.-4			
	1.5 mm² upto 750V	B	33 03 01.12	15000	MCB 6A, Ter.-6			

11 D	1.5 mm² upto 750V	R	33 03 01.13	15000	MCB 6A, Ter.-2	3 KVAR CP-5	Comp-1.2	
	1.5 mm² upto 750V	Y	33 03 01.14	15000	MCB 6A, Ter.-4			
	1.5 mm² upto 750V	B	33 03 01.15	15000	MCB 6A, Ter.-6			
11 E	1.5 mm² upto 750V	R	SPARE	15000	MCB 6A, Ter.-2	-	SPARE	
	1.5 mm² upto 750V	Y	SPARE	15000	MCB 6A, Ter.-4			
	1.5 mm² upto 750V	B	SPARE	15000	MCB 6A, Ter.-6			

FOR RMPU-2

H.No.	Cable Size	Color	Ferrule no.	Length	From	To	Remarks	
12	1.5 mm² upto 750V	R	33 04 02.01	15000	MCB 2.5A, Ter.-2	1 KVAR CP-6	Cond-2.1	
	1.5 mm² upto 750V	Y	33 04 02.02	15000	MCB 2.5A, Ter.-4			
	1.5 mm² upto 750V	B	33 04 02.03	15000	MCB 2.5A, Ter.-6			
12 A	1.5 mm² upto 750V	R	33 04 02.04	15000	MCB 2.5A, Ter.-2	1 KVAR CP-7	Cond-2.1	
	1.5 mm² upto 750V	Y	33 04 02.05	15000	MCB 2.5A, Ter.-4			
	1.5 mm²	B	33 04 02.06	15000	MCB 2.5A, Ter.-6			
12 B	1.5 mm² upto 750V	R	33 04 02.07	15000	MCB 2.5A, Ter.-2	1 KVAR CP-8	Cond-2.1	
	1.5 mm² upto 750V	Y	33 04 02.08	15000	MCB 2.5A, Ter.-4			
	1.5 mm² upto 750V	B	33 04 02.09	15000	MCB 2.5A, Ter.-6			
12 C	1.5 mm² upto 750V	R	33 04 02.10	15000	MCB 6A, Ter.-2	3 KVAR CP-9	Comp-2.1	
	1.5 mm² upto 750V	Y	33 04 02.11	15000	MCB 6A, Ter.-4			
	1.5 mm² upto 750V	B	33 04 02.12	15000	MCB 6A, Ter.-6			
12 D	1.5 mm² upto 750V	R	33 04 02.13	15000	MCB 6A, Ter.-2	3 KVAR CP-10	Comp-2.2	
	1.5 mm² upto 750V	Y	33 04 02.14	15000	MCB 6A, Ter.-4			
	1.5 mm² upto 750V	B	33 04 02.15	15000	MCB 6A, Ter.-6			
12 E	1.5 mm² upto 750V	R	SPARE	15000	MCB 6A, Ter.-2	-	SPARE	
	1.5 mm² upto 750V	Y	SPARE	15000	MCB 6A, Ter.-4			
	1.5 mm² upto 750V	B	SPARE	15000	MCB 6A, Ter.-6			

(NW-23, L=12 M)

XII): 5 KVA TRANSFORMER CABLES

H. No.	Nos. & size of cable	Colour code	Length in mm	Ferrules marking	Route	Remarks
13	**3x2.5** mm² **upto 750 V**	R,Y,B	18000	12 01 12.04, 12 01 13.04, 12 01 14.04,	30B	**Input cables** **(NW-17=15M)**
13A	**4x4** mm² **upto 750 V**	R,Y,B, Blk	18000	12 02 06.03, 12 02 07.03, 12 02 08.03, 12 02 09.03	31B	**Output cables** **(NW-17=15M)**

XIII): UNDER SLUNG REGULATED B ATTERY CHARGER CABLES

H.No.	Cable Size	Color	Ferrule no.	Length	From	To	Remarks
14	25 mm² upto 750V	W	33 01 12.01	17000	RBC	SBC	**RBC TO SBC**
	25 mm² upto 750V	W	33 01 13.01	17000	RBC	SBC	
14A	25 mm² upto 750V	CH	33 01 14.01	17000	RBC	SBC	**RBC TO SBC**
14B	6 mm² upto 750V	R	33 09 01.01	17000	SBC	RBC	**SBC TO RBC**
	6 mm² upto 750V	Y	33 10 01.01	17000	SBC	RBC	
	6 mm² upto 750V	B	33 11 01.01	17000	SBC	RBC	

Notes:

1. Harnesses shall be prepared from multi-color cables only as specified for under frame and Roof wiring. Zero halogen, fire retardant heat shrinkable sleeves of M/S Tyco/Phoenix/Panduit make of appropriate color to be used. The standard length of ferrules should only be used.
2. Multi-core cables shall be as per specification no. EDTS-132, Rev 'C', AM-4 to respective data sheets.
3. The marking ferrules for feeder cables shall not be heat shrinked at the time of supply by the harness manufacturer , however to be suitably provided at 750 mm from both ends of the cables such that these ferrules shall not disengage from the cables during laying in the feeder pipes.. After laying of the harness in the coach these ferrules shall be heat shrinked in place according to shop requirements.

2.2. TYPE-2: BILL OF MATERIAL FOR LHB AC EOG CHAIR CAR ROOF WIRING:

A) THIN WALLED FLEXIBLE ELASTOMERIC CABLES WITH COPPER CONDUCTORS & ACCESSORIES:-

S.NO.	DESCRIPTION	CABLE SIZE	DETAIL DRG/SPEC	OPC/ COACH	REMARKS LOCATION
1	Thin walled flexible elastomeric cables with copper conductors color **'Grey'** upto 750 V	1.5mm²	ELRS/SPEC/ELC/0019 Rev.3..	3000 mt	Inside coach
2	Thin walled flexible elastomeric cables with copper conductors color **'GNYE'** upto 750 V	1.5mm²	ELRS/SPEC/ELC/0019 Rev.3.	80 mt	For alarm earthing to be supplied loose with 70 no. GNYE marked ferrules.
3	Thin walled flexible elastomeric cables with copper conductors color **'Grey'** upto 750 V	4 mm²	ELRS/SPEC/ELC/0019 Rev.3.	340 mt	Inside coach
4	2X1.5 sq.mm multi-core cable 600/1000 V	2X 1.5 mm²	EDTS 132, Rev-' C ' AM-4 **(DS-4)**	270 mt	Inside coach
5	(4x4x1) c+2x0.75(18 cores) multi-core cable 750 V	(4x4x1) c+2x0.75	EDTS 132, Rev-' C ' AM-4 **(DS-5)**	34 mt	Inside coach
6	25X1.5 sq.mm multi-core cable 600/1000 V	25x1.5 mm²	EDTS 132, Rev-' C ' AM-4 **(DS-7)**	39 mt	Inside coach
7	18X1.5 sq.mm multi-core cable 600/1000 V	18x1.5 mm²	EDTS 132, Rev-' C ' AM-4 **(DS-7)**	34 mt	Inside coach
8	PVC RIGID Conduit Dia 40mm	-	IS:9537-83,P3,CL 5.1	160 Mt	Inside coach
9	PVC RIGID Conduit Dia 20mm	-	IS:9537-83,P3,CL 5.1	75Mt	Inside coach
10	Cable jacket system	-	EDTS138 Corr.1	75 mt	Item-5
11	Cable jacket system	-	EDTS138 Corr.1	50 mt	Item-8
12	Cable jacket system	-	EDTS138 Corr.1	20 mt	Item-11
13	FRLT Cotton insulation tape, red	-	ICF/ELEC/921/ REV-'0'	3 Roll	-
14	FRLT Cotton insulation tape, yellow	-	ICF/ELEC/921/ REV-'0'	3 Roll	-
15	FRLTCotton insulation tape, blue	-	ICF/ELEC/921/ REV-'0'	3 Roll	-

16	FRLT Cotton insulation tape, black	-	ICF/ELEC/921/ REV-'0'	3 Roll	-
17	FRLT Cotton insulation tape, green	-	ICF/ELEC/921/ REV-'0'	3 Roll	-
18	Cable Binder	-	CC76129 Item-2	300 no.	M/S EVEREST ,NOVAFLEX. Panduit & M V Electro-systems
19	Cable Binder	-	CC76129 Item-4	300 no.	M/S EVEREST ,NOVAFLEX. Panduit & M V Electro-systems
20	Cable duct A25(H)X25(W) 1M,STANARD SLOT GREY	-	-	02 mt	M/S L&T/ Phoenix/ Panduit make
21	Cable duct A25,STANARD SLOT GREY	-	-	02 mt	M/S L&T/ Phoenix/ Panduit make

B) CONDUIT SYSTEM FOR CABLE MANAGEMENT & ACCESSORIES (ROOF WIRING)

Firms supplying these items shall get these tested as per RDSO specification no. RDSO/PE/SPEC/AC/0138-2009 ,Rev-1.

S.NO.	DESCRIPTION	SPEC NO.	TABLE	S.No.	QPC
24.	Polyamide flexible corrugated conduit, NW-12	RDSO/PE/SPEC/ AC/ 0138-2009, Rev.1 (Annexure-A)	A-1	2	20 mt
25.	Polyamide flexible corrugated conduit, NW-17		A-1	3	110mt.
26.	Polyamide flexible corrugated conduit, NW-23		A-1	4	60 mt.
27.	Polyamide flexible corrugated conduit, NW-29		A-1	5	20 mt.
28.	Tube clamp NW-17		A-8	3	4 no.
29.	Tube clamp NW-23		A-8	4	6 no.

Note: i).

- Wiring on Under frame & Roof shall conform to this specification clause no. 9.0 & 9.1 respectively.

- Bunching for under frame shall be done as per clause 2.1(b) duly ferruled, legibly marked and laid in polyamide flexible conduits as per requirements in the coaches on shop floor.

- Bunching for roof shall be done as per annexure-B, duly ferruled, legibly marked & cable protection system shall be supplied as per BOM of clause 2.2.

- The identification of the cables shall be made with colored zero halogen fire retardant and heat shrinkable sleeves of M/s TYCO/PHOENIX/PANDUIT make.

- Total consumption of thin walled flexible elastomeric cables with copper conductors of size 1.5 sq.mm (Grey color) in preparing the Roof harness as per annexure-B is 1855 meter against 3000 meter specified in BOM. Balance quantity i.e. 1145 meters cable shall be supplied loose in standard packing reels.

- 80 meter GNYE color cable shall also be supplied loose in standard reels as specified in BOM.

3. i) Packing per coach set shall be done as per packing conditions specified at clause 8.0 of this specification. The packing shall be legibly marked for the type of coach applicable for.

ii) Under frame wiring shall be laid in flexible conduits, the details of laying the wiring in PVC/Flexible conduits may be collected from the office of the CEE/RCF.

iii) Procurement of the items specified in the BOM of the specification shall be from RDSO/RCF/ICF approved vendors mentioned in latest version of the vendor directory issued byRDSO/ RCF/ICF respectively. Wherever some specific makes have been mentioned, procurement is to be done from those sources.

4.0 TECHNICAL REQUIREMENTS:

While manufacturing of cable harnesses essential safety requirements for voltage grade segregation, crimping etc shall be strictly followed as per instructions laid down in under given documents:

a). General requirements shall be as per RDSO Spec. no. EL/TL/56-92 (Code of practice for Train Lighting maintenance on Prevention of Fires on 110V DC).
b). Instructions laid down in Code of practice for wiring End On_ Generation Train Lighting system working at 750VAC,ELPS/ SPEC/EOG-01(MARCH-94) shall be followed.
c). Work instructions for preparation of Harness to RCF document no. EDW0003 Ver.-02 or Latest version.

d). Work instructions for crimping of cable ends and cable terminations to RCF document no. EDW0006 Ver.-01 or Latest version.

e) Schedule of Technical Requirements (**STR) no. RCF/EL/0015-2011 (Rev. `B')** shall be strictly followed for preparation of ready made harness.

4.1 Stripping of the cables at the ends shall be done where crimping sockets are not provided for ease of wiring.

4.2 The complete Roof harness shall be made according to the **Annexure 'B'**

4.3 **Technical Staff** :

a). The staff with minimum qualification `ITI' with **02** years experience or minimum **05** to **06** years experience for non ITI's in manufacturing harness of power-wiring/ control wiring in panels or other similar works having intricate design.

b). The Supervisor staff for the skilled worker should be minimum graduate in electrical with 02 years experience in the same field or should be diploma holder in electrical discipline with at least five years experience in manufacturing of harness of power wiring control wiring in panels or other similar works. The firm shall deploy supervisors/staff in adequate nos. so as to match the delivery schedules as accepted by them against the contract".

c). Firm shall ensure that **technical staff** as stipulated above shall be available in actual working conditions at shop floor. Representative of RCF may check any time the availability of these staff with qualifications. In case of non-compliance, Railway shall be free to **terminate the contract** in case of violation.

4.4 Proper cutting / crimping tools for various sizes of cables shall be provided to the staff for ease of crimping & cutting of cables **(to be provided by the contractor)** .

4.5 Marking ferrules shall be of computer generated type for easy identification of the cables with the help of shrinking sleeves (self extinguishing) of suitable size horizontally printed cable markers of Tyco/Phoenix/Panduit make only.

4.6 Test for thin walled flexible elastomeric cables with copper conductors for its basic properties may be conducted on any sample picked up from the supply. The cost for the testing will be born by the firm. The specific tests to be done are covered in clause 5.10.

4.7 The harness manufacturer shall quote separately for commissioning of the harness as under :

a). Budgetary quote of the harness without commissioning.

b). Budgetary quote of the harness with commissioning in the coach at RCF.

4.8 The firm shall take prompt action or act promptly with in a reasonable time upon a short notice to rectify the defects/deficiency/deficiency noticed/ reported by RCF in the cable

harness supplied by the firm. Failure to do the needful up to the satisfaction of the RCF, Firm's contract may be rescinded immediately or terminated without any further notice or may be levied penalty corresponding to the delay caused in the coach turn out for which the decision of the nominated `**Competent Authority' shall be Final and Binding on the firm".**

4.9 The firm's premises may be inspected by representative of CEE/RCF on any day on a short notice to ensure compliance to the various stipulations of the specifications, laid down standards including work instructions for the cable harness manufacturing practices. If any thing is not laid or specified therein this specification, the work shall be completed as per the best-established Engineering Practices/Procedures being followed in the Industry. "The firm shall extend all the necessary help to allow to visit all the infrastructure facilities, M&P, Tools, Testing facilities, examination of related quality records/documents etc. during his visit"

4.10 In case of commissioning work by supplier, firm shall be fully responsible for complete coach wiring & connections i.e. laying of cables in conduits, crimping at equipments, clamping of flexible conduits on roof area & Lavatory area , end wall & side walls etc. and others miscellaneous work (i.e. of Stage-III) to improve the coach wiring quality . Firm shall hand over the coach after testing as per clause 5.10(b) of the specification and complete in all respect.

4.11 All the rigid conduits, Flexible Conduits, end fittings shall be in firm scope of supply. However clamps & its hardware's etc. will be in RCF scope of supply, cables, Cable Protection System, crimping sockets, insulation tapes etc. should be purchased from the approved sources of RCF/ICF/RDSO and documentary proof to this effect should be submitted by the firm.

4.12 Only those firms shall be considered which have adequate infrastructure to make similar nature wiring/ harness at its manufacturing unit and conforming to STR.

4.13 Firm shall fill-up performa for guaranteed performance as per **Annexure-`A'** and furnish details alongwith tender. It is perquisite without which offer shall be considered technically disqualified.

4.14 The firm will furnish the credentials in their support for having completed similar or identical works of its working in any Central/State government or Central/State Govt. under taking, reputed/established private organization such, as Railways, Defense, L&T, Siemens, etc. The firm to submit requisite proofs like completion certificates, contract details including contract value, Latest Income Tax clearance certificate, balance sheet duly vetted by the CA for the last three years, registration with the government organization, copies of permission from regulatory authorities like environmental & pollution control boards etc. " The firm

should have completed successfully at least a similar cable harness work of one third or more value of the tendered cost value against an earlier contract."

4.15 The cable & conduit manufacturer shall submit a certificate along with each lot of supply that the same raw material has been used in manufacturing of the present supply as was used on which the type tests were conducted.

4.16 Every letter from the firm shall have name and designation of the official signing the letter with the signature.

5.0 TESTS:

5.1 Deleted.

5.2 Inspecting agency /RITES shall carry out the tests in harness manufacturer's premises as per acceptance and routine tests specified in the tender specification. Check list Proforma consisting of testing details, observations/measurements and acceptability of the measurements should be prepared and testing to be done as per Proforma jointly with the firm's engineer .This should be submitted along with the inspection certificate to RCF.

5.3 Cables prescribed in RDSO/RCF specification of cables received by the harness manufacturer shall be inspected by RITES for acceptance and routine tests at cable manufacturer premises and certificate to this effect should be submitted by cable harness manufacturer to RCF.

5.4 Cable management system prescribed in RDSO specification RDSO/PE/SPEC/AC/0138-2009 (latest version) shall be inspected by RITES (RA Berlin- in case of imported manufacturer) for acceptance and routine tests and certificate to this effect should be submitted by cable harness manufacturer to RCF.

5.5 The format for inspection based upon the tests stipulated in specification shall be as per clause no.5.10.

5.6 Firm's internal testing to be done by qualified person as per para 4.3(b) and submitted to RCF.

5.7 TYPE TEST:

All the type tests mentioned in Clause 5.10 shall be carried out on a prototype unit. The firm manufacturing for the first time shall get the prototype approved from CEE/RCF.

5.8 ROUTINE TEST:

Routine tests mentioned in clause 5.10(a) shall be carried out on each unit by the manufacturer at his works to ensure compliance with the specification and the drawings.

5.9 ACCEPTANCE TEST:

a) Acceptance tests for cables will be done at cable manufacturer's premises as per RDSO specification no. ELRS/SPEC/ELC/0019 Rev.2.

b) Acceptance tests for conduits etc. for cable management system will be done as per RDSO specification no. RDSO/PE/SPEC/AC/ 0138-2009 (Latest revision). For supply for Non-RDSO approved sources but RCF approved sources, clause 7.0 is to be followed.

c) Acceptance test mentioned in clause 5.10(a) cable harness manufacturer to be witnessed by inspecting agency nominated by the purchaser at the works of the cable harness manufacturer, on the samples picked up by the inspecting authority. All the acceptance tests shall be carried out at firm's premises at the manufacturer's cost. Inspecting officer will witness the tests.

A copy of the internal tests conducted by the firm shall be supplied to inspecting/purchasing authority. Inspecting agency shall maintain record of all the tests conducted for future reference and will check the authenticity and the originality of the bill of material for each item by seeing the invoices invariably to avoid spurious material being safety involved.

5.10 TABLE FOR TESTS:-

Tests for harnesses at firm`s premises:

S.No	Tests	Type Test	Routine Test	Acceptance Test
1	Visual inspection, including inspection of wiring and electrical operational test. (Visual inspection for proper assembly, compatibility of sub-components & wiring etc.)	YES	YES	YES
2	Checking of electrical continuity	YES	YES	YES
3	Checking of cable routing & alignment as per requirements	YES	YES	YES
4	Test for verification of dielectric properties. (shall withstand (2.0 KV for 1 minute)	YES	YES	-
5	Test for verification of insulation resistance. (>100 MΩ with 500 V Megger).	YES	YES	-
6	Compliance to safety related codes of practice as per para 4.0 of this specification.	YES	YES	YES
7	Originality of the bill of the material with proof of the invoices	YES	YES	YES
8	Check of crimping joints a) mV drop Test. b) Pull out Test.	YES	YES	-

9.	Test for thin walled flexible elastomeric cables with copper conductors	YES	YES	YES
10.	Test for rigid PVC conduits to IS:9537 (Part-3)	YES	YES	YES
11.	Test for cable protection system	YES	YES	YES
12.	Test for marking ferrules	YES	YES	YES
13.	Test for copper crimping sockets	YES	YES	YES
14.	Test for FRLT tape	YES	YES	YES
15.	Test for cable alley/ duct	YES	YES	YES

5.10 a): Details of testing:

Sr. No.	Details of testing	Remarks of Rites Inspecting official
1	**Tests for thin walled flexible elastomeric cables with copper conductors**	
	Testing for basic properties of cable picked up from supply (clause 4.8). Minimum one sample shall be tested for each 50 sets (at the manufacturer's cost) to RDSO specification no ELRS/SPEC/ELC/0019 (REV-2)	
a	Test for thickness of insulation and sheath as per clause 7.4.1(b) of RDSO spec (5% of each cable size to be checked.)	
b	High voltage test (water immersion test) as per clause 7.4.1(c) of RDSO spec. (on two cable size of cable used)	
c	Insulation resistance test as per clause 7.4.1(d) of RDSO spec. (on one cable size different from HV test)	
d	Tracking resistance as per clause 7.4.1(f) of RDSO spec.(on two size not covered in HV test & IR test)	
e	Strippability as per clause 7.4.2 of RDSO spec. (10 samples in prototype testing and five	

	samples in acceptance/routine test of different size 1mm to 6mm)	
f	Wind ability of the finished cable as per clause 7.4.3 of RDSO spec. (One sample 1-6 sq. mm & one sample more than 6 sq. mm)	
g	Slippage test as per clause 7.4.5 of the RDSO spec. (two samples for size less than 25mm dia and two samples for dia more than 25mm)	
2	**Acceptance Test for PVC conduit to IS:9537**	
a	Checking of dimensions as clause 7 of IS	
b	Bending test (at room temperature) as per clause 9.2 of IS spec	
c	Compression test as per cl. 9.3 of IS spec (5 samples in prototype and 2 samples in acceptance/routine)	
d	Collapse test as per cl. 9.5 of IS spec(one sample)	
e	Resistance to burning as per cl. 11 of IS spec. (2 samples)	
f	Electrical Characteristics as per cl 12 of IS spec	
3	**Cable Protection System- Testing as per RDSO Spec. No. RDSO/PE/SPEC/AC/0138**	
a	Make	
b	Type / Series used for	
i	Conduit	
	Checking of dimensions	
	Compression test (two sample of each size)	
	Impact test (one sample of each sizes)	
	Flexing test (2 samples of each type of fitting.)	
	di-electric strength (one sample of each size)	
ii	End fitting – Tensile test (of different five sizes)	

iii	Tube clamps – Dimensional check as per – two sample of each size	
iv	Lock nuts – Dimensional check as per – two sample of each size.	
4	**Marking ferrules**	
	Computer generated (verification of make/brand)	Tyco / Phoenix / Panduit /____
5	**Copper crimping sockets**	
	Visual inspection and checking of dimensions as per cl 5.6 of EDTS200 (five sample of each)	
	Crimping test as per cl 5.7 of EDTS200 (Two sample of size less than 6mm^2 and two sample of 6mm^2)	
	Flattening test as per cl 5.8 of EDTS200	
6	**FRLT tape**	
	ISI marked Resistance to flame propagation as per clause 6.0 of IS:7809 for 2 samples	
	Electrical strength as per clause 7.1 of IS:7809 for 5 samples IR value	
7	**Cable alley / duct**	
	Make/catalogue number used verify make of _____ test certificates.	

5.10 (b) : Tests after commissioning of the coach at RCF:

S.No	Tests	Type Test	Routine Test	Acceptance Test	Clause of IS:8623(P-I)-93
1	Verification of insulation resistance	YES	YES	YES	8.3.4
2	Checking of electrical continuity of all the circuits.	YES	YES	YES	8.3.3
3.	Verification of die electric properties	YES	YES	YES	8.2.2

The accuracy of measuring instruments used for both type and routine tests shall be of class 1.5.

6 APPROVALS:

6.1 Before making regular supplies, **firm shall take prior clearance from DYCEE/P** regarding minor changes in size of cut length of wire under same, overall bill of material. If the minor changes in the length of cables, as advised by DY.CEE/P/RCF result in variation in the overall quantity of bill of material for particular type of coaches then the excess quantity should be supplied separately by the supplier and if quantity falls short then the same shall be supplied by RCF at RCF as per direction of DY.CEE/P. It is essential in order to ensure proper usage of cable harness in other coaches with minor modifications to avoid hold of coaches and to avoid the cable harness being surplus for a particular type of coach.

6.2 Firms manufacturing for the first time, Prototype Inspection shall be done by office of the CEE / RCF.

6.3 Firm shall be fully responsible for commissioning of harness system in prototype coach at RCF to avoid any teething troubles or modification required if any, before commencement of bulk supply and commissioning at RCF. Firm shall supply one coach harness set only for validation on coach and after its trial conducted/ prototype approval, the bulk supply shall be dispatched and commissioned on the coaches at RCF.

7.0 SPECIAL CONDITIONS FOR RCF SPECIFICATION:

7.1 These conditions shall apply to the conduit system for cable management items like Polyamide conduits and End fittings etc. These conditions would apply to the material which would be supplied from a Non RDSO approved but RCF approved source of conduit management items like polyamide conduits , end fittings etc. The firm will clearly mention the make of conduit system like conduits, end fittings etc. to be supplied.

7.2 The complete data sheet of product number/catalogue number/part number etc. of the approved company make shall be submitted along with the offer which should be confirming to the technical requirements of RDSO specification. The product data sheet not meeting with all the stipulated requirements of the specifications would not be

considered acceptable and the complete offer of the tenderer shall be considered unsuitable. Acceptance tests shall be carried as per para 5.9.

7.3 The order shall be placed on the firm supplying conduit system for cable management system by cable harness manufacturers specifying specification, product/part/catalogue number etc. as approved in 7.2 above.

7.4 The documentation shall be submitted regarding supply/ receipt of material after import mentioning the product number/part number/catalogue number etc. on the bill/purchase invoices/purchase voucher etc.

8.0 PACKING AND TRACEABILITY:

i). Packing of harnesses shall be done as per Packing Instructions PI005 to RCF document no. PLM0010E version-8.0. Harnesses shall be bunched together and shall be supplied as single unit per coach. Each harness shall be duly bunched individually and legibly marked as per details specified in the specification on it for under frame and Roof arrangement.

ii). Packing per coach set shall be done as per packing conditions. However either card board packing in single unit or plastic containers (returnable basis) shall be used for supplying the material. The packing shall be legibly marked for the type of coach applicable for.

iii). All the loose wiring for lavatory area & other locations shall be segregated and bunched separately before packing.

iv). Performa invoice of all the major items like cable, crimping sockets etc. shall be supplied along with each supply of material.

v). Every unit of supply item shall be numbered / marked for identification, traceability and analysis. The following details shall be imprinted on the number plate of each unit

a) Serial Number
b) Year and month of manufacture
c) Name of the item.

9.0 ENCLOSURES:

S.No	Drawing/Spec. no.	Description
1	RDSO Spec. no. EL/TL/56-92	Code of practice for Train Lighting maintenance on Prevention of Fires on 110V D.C
2	RDSO Spec. no. EL/TL/001	Code of practice for End On Generation for Train Lighting system working at 750VAC
3	RCF/EL/0015-2011 (Rev. `A')	Schedule of technical requirements (STR) for ready made harness.
4	EDW0003 Ver. – 02.	Work instructions for preparation of Harness

5	EDW0006 Ver. – 01	Work instructions for crimping of cable ends and cable terminations
6	Annexure-A	Performa for Performance Guaranty
7	Annexure-B	Harness details for Roof Wiring. **(TYPE-II)**
8	Annexure-C	Break up of end fittings for reference at shop floor

9.1. ENCLOSURES for TYPE-1 (For Underframe arrangement)

Sno.	Drawing no.	Description
1.	1.10113.026.000.002	Devices on Underframe
2	1.10113.076.110.001	Cable pipe laying mounting (NPPE)
3	1.10113.076.110.002	Cable pipe laying mounting (NPPE-Middle)
4	1.10113.076.110.003	Cable pipe laying mounting (WE2-Middle)
5	1.10113.076.110.004	Cable pipe laying mounting (PPE)

ANNEXURE `A' TO SPEC. NO. EDTS 255, REV-J

PERFORMA FOR PERFORMANCE GURANTEE

S.NO.	ITEMS DESCRIPTION	COMPLIANCE (YES/NO
1.	Compliance of **STR** (if Yes, enclose clause by clause comments)	
2.	Compliance of qualified technical staff (if Yes, enclose the details)	
3.	Compliance of adequate space and condition for manufacturing, assembly (if yes, enclose the details)	
4.	Compliance of in-house testing facilities (if Yes, enclose the details)	
5.	Compliance of other details to improve the quality (if Yes, enclose the details)	

HARNESS DETAIL FOR LHB EOG AC CHAIR CAR ROOF

Har No	CABLE SIZE	COLOR	FERRULE NO.	LENGTH	FROM		TO		REMARKS
					LOCATION	TER. NO.	LOCATION	TER.NO.	
AC PACKAGE UNIT-1									
1	6X(2X1.5 SQ.MM)	MULTI-CORE	61 01 12.01	27500	+S1X1	132	+U1X4	1	FRESH AIR TEMP.SENSOR-1
			61 01 13.01		+S1X1	133	+U1X4	2	
			61 01 14.01	27500	+S1X1	134	+U1X4	3	FRESH AIR TEMP.SENSOR-2
			61 01 17.01		+S1X1	135	+U1X4	4	
			61 03 01.01	27500	+S1X1	213	+U1X4	5	LP INDICATION
			61 03 02.01		+S1X1	214	+U1X4	7	
			61 03 05.01	27500	+S1X1	217	+U1X4	9	HP INDICATION
			61 03 06.01		+S1X1	218	+U1X4	11	
			RES-1	27500					SPARE
			RES-2	27500					SPARE
1A	25X1.5 SQ.MM	MULTI-CORE	61 02 01.05	27500	+S1X1	212	+U1X3	1	+24 V FOR HP/LP SENSOR
			61 06 03.02		+S1X1	178	+U1X3	17	LP MEASUREMENT
			61 01 02.19		+S1X1	179	+U1X3	6	
			61 02 02.02		+S1X1	150	+U1X3	4	FLAPPER MOTOR
			61 02 03.01		+S1X1	151	+U1X3	3	
			61 02 04.02		+S1X1	152	+U1X3	2	-VE 24V
			61 04 03.03		+S1X1	163	+U1X3	15	EVAPORATOR MOTOR THERMAL
			61 04 04.01		+S1X1	164	+U1X3	16	SWITGrey
			61 04 07.01		+S1X1	156	+U1X3	7	
			61 04 09.01		+S1X1	157	+U1X3	8	
			61 04 10.01		+S1X1	158	+U1X3	9	TEMP. & PR. SWITGrey
			61 04 12.01		+S1X1	159	+U1X3	10	
			61 04 14.01		+S1X1	160	+U1X3	11	
			61 04 15.01		+S1X1	161	+U1X3	14	
			61 01 01.12		+S1X1	162	+U1X3	5	+VE24 V FOR THERMAL SW
			61 06 04.01		+S1X1	181	+U1X3	18	
			61 06 05.02		+S1X1	180	+U1X3	20	HP CUT OUT
			61 06 06.02		+S1X1	182	+U1X3	12	
			61 06 07.01		+S1X1	184	+U1X3	19	
			61 06 08.02		+S1X1	183	+U1X3	21	LP CUT OUT
			61 06 09.02		+S1X1	185	+U1X3	13	
1B	18X1.5 SQ.MM	MULTI-CORE	33 03 02.02	29000	+S1X1	231	+U1X1	1	EVAPORATOR MOTOR
			33 03 04.02		+S1X1	232	+U1X1	2	
			33 03 06.02		+S1X1	233	+U1X1	3	
			33 03 07		+S1X1	234	+U1X1	PE	
			33 04 08.02		+S1X1	250	+U1X1	10	
			33 04 16.02		+S1X1	252	+U1X1	11	CRANK CASE HEATER
			33 04 09.01		+S1X1	251	+U1X1	12	
			33 04 18.02		+S1X1	253	+U1X1	4	
			33 04 20.02		+S1X1	254	+U1X1	5	COND FAN MOTOR-1
			33 04 22.02		+S1X1	255	+U1X1	6	
			33 04 24.02		+S1X1	256	+U1X1	7	
			33 04 26.02		+S1X1	257	+U1X1	8	COND FAN MOTOR-2
			33 04 28.02		+S1X1	258	+U1X1	9	
			RES-1		+S1X1		+U1X1		
			RES-2		+S1X1		+U1X1		SPARE
			RES-3		+S1X1		+U1X1		
			RES-4		+S1X1		+U1X1		
1C	4 SQ.MM.	Grey	33 04 02.02	29000	+S1X1	239	+U1X2	14	
		Grey	33 04 04.02	29000	+S1X1	240	+U1X2	13	COMP. MOTOR-1
		Grey	33 04 06.02	29000	+S1X1	241	+U1X2	16	
		Grey	33 04 07	29000	+S1X1	242	+U1X2	PE	
		Grey	33 04 11.02	29000	+S1X1	243	+U1X2	5	
		Grey	33 04 13.02	29000	+S1X1	244	+U1X2	18	COMP. MOTOR-2
		Grey	33 04 15.02	29000	+S1X1	245	+U1X2	7	
		Grey	33 04 29.02	29000	+S1X1	247	+U1X2	20	
		Grey	33 04 32.02	29000	+S1X1	248	+U1X2	9	HEATER BANK
		Grey	33 04 34.02	29000	+S1X1	249	+U1X2	22	
1D	1.5 SQ.MM.	Grey	61 01 03.02	27500	+S1X1	141	S12S1	13	HYGROSTAT
	1.5 SQ.MM.	Grey	61 01 04.01	27500	+S1X1	142	S12S1	14	
1E	2X1.5 SQ.MM.(DS-4)	MULTI-CORE	61 01 05.01	28000	+S1X1	128	S12B1	1	TEMP.SENSOR INSIDE COMPT.
			61 01 06.01		+S1X1	129	S12B1	2	

SSE/CAD SEE/D DY.CEE/D D

HARNESS DETAIL FOR LHB EOG AC CHAIR CAR ROOF

Har No	CABLE SIZE	COLOR	FERRULE NO.	LENGTH	FROM		TO		REMARKS
					LOCATION	TER. NO.	LOCATION	TER.NO.	
AC PACKAGE UNIT-2									
2	6X(2X1.5 SQ.MM)	MULTI-CORE	61 01 18.01	11000	+S1X1	136	+U2X4	1	FRESH AIR TEMP.SENSOR-1
			61 01 19.01		+S1X1	137	+U2X4	2	
			61 01 21.01	11000	+S1X1	138	+U2X4	3	FRESH AIR TEMP.SENSOR-2
			61 01 23.01		+S1X1	139	+U2X4	4	
			61 03 03.01	11000	+S1X1	215	+U2X4	5	LP INDICATION
			61 03 04.01		+S1X1	216	+U2X4	7	
			61 03 07.01	11000	+S1X1	219	+U2X4	9	HP INDICATION
			61 03 08.01		+S1X1	220	+U2X4	11	
			RES-1	11000					SPARE
			RES-1	11000					SPARE
2A	25X1.5 SQ.MM	MULTI-CORE	61 05 01.01	11000	+S1X1	170	+U2X3	7	+24V FOR THERMAL SW.
			61 01 02.28		+S1X1	190	+U2X3	6	TEMP. & PR. SWITGrey
			62 02 01.04		+S1X1	212	+U2X3	1	+24 V FOR HP/LP SENSOR
			61 02 02.03		+S1X1	150	+U2X3	4	FLAPPER MOTOR
			61 02 03.03		+S1X1	151	+U2X3	3	
			61 02 04.03		+S1X1	152	+U2X3	2	-VE 24V
			61 04 11.03		+S1X1	166	+U2X3	15	EVAPORATOR MOTOR THERMAL
			61 04 13.03		+S1X1	167	+U2X3	16	SWITGrey
			61 01 01.14		+S1X1	169	+U2X3	5	TEMP. & PR. SWITGrey
			61 05 02.01		+S1X1	171	+U2X3	8	
			61 05 03.01		+S1X1	172	+U2X3	9	
			61 05 04.01		+S1X1	173	+U2X3	10	
			61 05 05.01		+S1X1	174	+U2X3	11	
			61 05 06.01		+S1X1	175	+U2X3	14	
			RES-13		+S1X1		+U2X3		SPARE
			RES-14		+S1X1		+U2X3		
			RES-15		+S1X1		+U2X3		
			RES-16		+S1X1		+U2X3		
			61 07 03.02		+S1X1	189	+U2X3	17	BYE PASS
			61 07 04.01		+S1X1	192	+U2X3	18	HP CUT OUT
			61 07 05.02		+S1X1	191	+U2X3	20	
			61 07 08.02		+S1X1	193	+U2X3	12	
			61 07 07.01		+S1X1	196	+U2X3	19	LP CUT OUT
			61 07 08.02		+S1X1	194	+U2X3	21	
			61 07 09.02		+S1X1	195	+U2X3	13	
2B	18X1.5 SQ.MM	MULTI-CORE	33 03 13.02	5000	+S1X1	237	+U2X1	3	EVAPORATOR MOTOR
			33 03 09.02		+S1X1	235	+U2X1	1	
			33 03 11.02		+S1X1	236	+U2X1	2	
			33 03 14		+S1X1	238	+U2X1	PE	
			33 05 35.02		+S1X1	273	+U2X1	4	COND FAN MOTOR-1
			33 05 17.02		+S1X1	274	+U2X1	5	
			33 05 19.02		+S1X1	275	+U2X1	6	
			33 05 21.02		+S1X1	276	+U2X1	7	CRANK-CASE HEATER
			33 05 23.02		+S1X1	277	+U2X1	8	
			33 05 25.02		+S1X1	278	+U2X1	9	
			33 05 27.02		+S1X1	270	+U2X1	10	COND FAN MOTOR-2
			33 05 34.02		+S1X1	272	+U2X1	11	
			33 05 09.01		+S1X1	271	+U2X1	12	
			RES-5		+S1X1		+U2X1	3	SPARE
			RES-6		+S1X1		+U2X1	3	
			RES-7		+S1X1		+U2X1	3	
			RES-8		+S1X1		+U2X1	3	
2C	4 SQ.MM.	Grey	33 05 02.02	5000	+S1X1	239	+U2X2	14	COMP. MOTOR-1
		Grey	33 05 04.02	5000	+S1X1	240	+U2X2	3	
		Grey	33 05 06.02	5000	+S1X1	241	+U2X2	16	
		Grey	33 05 07	5000	+S1X1	242	+U2X2	PE	
		Grey	33 05 11.02	5000	+S1X1	243	+U2X2	5	COMP. MOTOR-2
		Grey	33 05 13.02	5000	+S1X1	244	+U2X2	18	
		Grey	33 05 15.02	5000	+S1X1	245	+U2X2	7	
		Grey	33 05 28.02	5000	+S1X1	247	+U2X2	20	HEATER BANK
		Grey	33 05 31.02	5000	+S1X1	248	+U2X2	9	
		Grey	33 05 33.02	5000	+S1X1	249	+U2X2	22	
2D	2X1.5 SQ.MM.(DS-4)	MULTI-CORE	61 01 08.01	10000	+S1X1	130	S13B1	1	TEMP.SENSOR INSIDE COMPT.
			61 01 09.01		+S1X1	131	S13B1	2	
2E	1.5 SQ.MM.	Grey	32 04 05.28	10000	SBC	1	+S16	1	LS-1
		Grey	43 01 02.11	10000	SBC	2		2	
		Grey	43 01 PE.03	10000	SBC	3		3	

SSE/CAD SEE/D DY.CEE/D D

HARNESS DETAIL FOR LHB EOG AC CHAIR CAR ROOF

Har No	CABLE SIZE	COLOR	FERRULE NO.	LENGTH	FROM		TO		REMARKS
					LOCATION	TER. NO.	LOCATION	TER.NO.	
POWER PANEL TO +S16X1									
		Grey	32 04 05.23	10000	+S1X1	95	+S19X1	1	
								2	ALARM PULL(LS-1)
		Grey	43 01 02.05	10000	+S1X1	99	+S19X1	3	
								4	
		Grey	32 05 07.04	10000	+S1X1	25	+S19X1	5	
								6	
		Grey	32 05 08.04	10000	+S1X1	26	+S19X1	7	DOOR SWITCH
								8	
								9	
								10	FLUSHING PUSH
								11	
		Grey	72 01 04.01	10000	+S1X1	210	+S19X1	12	
		Grey	72 01 05.01	10000	+S1X1	211	+S19X1	13	WSP
		Grey	72 01 06.03	10000	+S1X1	207	+S19X1	14	
3		Grey	72 01 07.03	10000	+S1X1	208	+S19X1	15	
		Grey	33 06 07.02	10000	+S1X1	227	+S19X1	16	RAZOR SOCKET
	1.5 SQ.MM.	Grey	33 06 08.02	10000	+S1X1	228	+S19X1	17	
		Grey	52 01 01.03	10000	+S1X1	106	+S19X1	18	
								19	LL-1
		Grey	52 01 03.03	10000	+S1X1	103	+S19X1	20	
								21	
		Grey	52 04 01.03	10000	+S1X1	109	+S19X1	22	
								23	110 V AC (FLE-1)
		Grey	52 04 02.23	10000	+S1X1	108	+S19X1	24	
								25	
		Grey	32 03 01.20	10000	+S1X1		+S19X1	26	110V DC MOTOR
		Grey	32 03 02.20	10000	+S1X1		+S19X1	27	
								28	
		Grey	Res-1	10000	+S1X1		+S19X1	29	EMPTY
2020-L		Grey	Res-2	10000	+S1X1		+S19X1	30	
2080-L		Grey	52 01 06.01	10000	+S1X1		+S19X1	31	PE EARTHING
2130-L		Grey	43 01 PE.03	10000	+S1X1		+S19X1	32	
+S16X1 TO WC-1,H281FLE-1 & FLE-2									
4	~~1.5 SQ.MM.~~	~~Grey~~	~~33 06 07.03~~	~~5000~~	~~+S19X1~~	~~16~~	~~+S16A2~~	~~1~~	~~RAZOR SOCKET~~
~~3350~~		~~Grey~~	~~33 06 08.03~~	~~5000~~	~~+S19X1~~	~~17~~		~~2~~	
~~4A~~	~~1.5 SQ.MM.~~	~~Grey~~	~~52 01 01.08~~	~~4000~~	~~+S19X1~~	~~18~~	~~B4E1~~	~~1~~	~~LL-1~~
		~~Grey~~	~~52 01 03.08~~	~~4000~~	~~+S19X1~~	~~20~~		~~2~~	
~~3335~~		~~Grey~~	~~52 01 06.08~~	~~4000~~	~~+S19X1~~	~~31~~		~~PE~~	
~~4B~~	~~1.5 SQ.MM.~~	~~Grey~~	~~32 05 07.19~~	~~3000~~	~~+S19X1~~	~~6~~	~~S16S4~~	~~1~~	~~DOOR SW-1~~
~~3345~~		~~Grey~~	~~72 05 01.01~~	~~3000~~	~~+S19X1~~	~~8~~		~~2~~	
~~4C~~	~~1.5 SQ.MM.~~	~~Grey~~	~~32 04 05.28~~	~~10000~~	~~SBC~~	~~1~~	~~CABIN AREA~~	~~1~~	~~LS-1~~
		~~Grey~~	~~43 01 02.11~~	~~10000~~	~~SBC~~	~~3~~		~~2~~	
~~3325~~		~~Grey~~	~~43 01 PE.03~~	~~10000~~	~~SBC~~	~~3~~		~~3~~	
4D	1.5 SQ.MM.	Grey	32 05 08.31	8500	+S19X1	8	S16H1	1	WC LIGHT-1
2320A-L		Grey	72 05 01.03	8500	+S19X1	9		2	
~~4E~~	~~1.5 SQ.MM.~~	~~Grey~~	~~72 05 02~~	~~3000~~	~~+S19X1~~	~~10~~	~~FLUSH~~	~~1~~	~~FLUSHING PUSH~~
~~3340~~		~~Grey~~	~~72 05 03~~	~~3000~~	~~+S19X1~~	~~11~~	~~PUSH~~	~~2~~	
4F	1.5 SQ.MM.	Grey	52 01 01.13	4000	+S19X1	22	B3E1	1	FLE-1
		Grey	52 01 03.12	4000	+S19X1	24		2	
2030		Grey	52 01 06.21	4000	+S19X1	32		PE	
4G	1.5 SQ.MM.	Grey	52 04 01.09	4000	+S19X1	19	B4E1	1	FLE-2
		Grey	52 04 02.08	4000	+S19X1	21		2	
2100		Grey	52 04 03.09	4000	+S19X1	32		PE	
4H	1.5 SQ.MM.	Grey	52 01 01	10000	+S1X1	109	B5E1	1	FLE-3
		Grey	52 01 03.	10000	+S1X1	108		2	
		Grey	52 01 06	10000	+S1X1	110		PE	
4I	1.5 SQ.MM.	Grey	52 01 01	7000	+S1X1	109	B5E1	1	FLE-4
		Grey	52 01 03.	7000	+S1X1	108		2	
		Grey	52 01 06	7000	+S1X1	110		PE	

SSE/CAD SEE/D DY.CEE/D D

HARNESS DETAIL FOR LHB EOG AC CHAIR CAR ROOF

Annexure-B
EDTS-255 REV-J

Har No	CABLE SIZE	COLOR	FERRULE NO.	LENGTH	FROM		TO		REMARKS
					LOCATION	TER. NO.	LOCATION	TER.NO.	
+S16X1 TO SEMCO CONTROLLER TERMINALS(CDTS WIRING)									
5	1.5 SQ.MM.	Grey	32 05 07.25	1300	+S19X1	5	SEMCO CONTROLLER TERMINALS	1	24 V DC
		Grey	32 05 08.37	1300	+S19X1	7		2	
		Grey	72 05 01.03	1300	+S19X1	9		3	FLUSHING PUSH
		Grey	72 05 02.02	1300	+S19X1	10		4	
		Grey	72 01 04.07	1300	+S19X1	12		5	WSP
		Grey	72 01 05.07	1300	+S19X1	13		6	
		Grey	72 01 06.07	1300	+S19X1	14		7	
		Grey	72 01 07.08	1300	+S19X1	15		8	
		Grey	32 03 01.26	1300	+S19X1	26		9	110 V DC MOTOR
		Grey	32 03 02.26	1300	+S19X1	27		10	
+S16X1 TO +S17X1									
6	1.5 SQ.MM.	Grey	32 04 05.29	27000	+S16X1	1	+S17X1	1	ALARM PULL(LS-1)
						2		2	
		Grey	43 01 02.02	27000	+S16X1	3	+S17X1	3	
						4		4	
		Grey	32 05 07.17	27000	+S16X1	5	+S17X1	5	DOOR SWITGrey
						6		6	
		Grey	32 05 08.29	27000	+S16X1	7	+S17X1	7	
						8		8	
						9		9	
						10		10	FLUSHING PUSH
						11		11	
		Grey	72 01 04.02	27000	+S16X1	12	+S17X1	12	WSP
		Grey	72 01 05.02	27000	+S16X1	13	+S17X1	13	
		Grey	72 01 06.04	27000	+S16X1	14	+S17X1	14	
		Grey	72 01 07.04	27000	+S16X1	15	+S17X1	15	
		Grey	33 06 07.02	27000	+S16X1	16	+S17X1	16	RAZOR SOCKET
		Grey	33 06 08.06	27000	+S16X1	17	+S17X1	17	
		Grey	52 01 01.05	27000	+S16X1	18	+S17X1	18	LL-2
						19		19	
		Grey	52 01 03.05	27000	+S16X1	20	+S17X1	20	
						21		21	
		Grey	52 04 01	27000	+S16X1	22	+S17X1	22	110 V AC (FLE-1)
						23		23	
		Grey	52 04 02	27000	+S16X1	24	+S17X1	24	
						25		25	
		Grey	32 03 01.21	27000	+S16X1	26	+S17X1	26	110V DC MOTOR
		Grey	32 03 02.21	27000	+S16X1	27	+S17X1	27	
						28		28	
2225-A		Grey	Res-3	27000	+S16X1	29	+S17X1	29	EMPTY
		Grey	Res-4	27000	+S16X1	30	+S17X1	30	
2115-A		Grey	52 01 06.04	27000	+S16X1	31	+S17X1	31	PE EARTHING
2215-A		Grey	43 01 PE.02	27000	+S16X1	32	+S17X1	32	
+S17X1 TO WC-2,FLE-10 & FLE-12									
7 3300	1.5 SQ.MM.	Grey	33 06 07.07	5000	+S17X1	16	+S18A2	1	RAZOR SOCKET
		Grey	33 06 08.05	5000	+S17X1	17		2	
7A 3280	1.5 SQ.MM.	Grey	52 01 01.06	4000	+S17X1	18	B37E1	1	LL-2
		Grey	52 01 03.06	4000	+S17X1	20		2	
		Grey	52 01 06.05	4000	+S17X1	31		PE	
7B 3290	1.5 SQ.MM.	Grey	32 05 07.15	3000	+S17X1	6	S18S4	1	DOOR SW-1
		Grey	72 03 01.01	3000	+S17X1	8		2	
7C 3295	1.5 SQ.MM.	Grey	32 04 05.26	7000	+S17X1	1	S18S1	1	LS-5
		Grey	43 01 02.09	7000	+S17X1	2		2	
		Grey	43 01 PE.02	7000	+S17X1	3		3	
7D 2320-J	1.5 SQ.MM.	Grey	32 05 08.36	8500	+S17X1	8	S18H1	1	WC LIGHT-2
		Grey	72 03 01.03	8500	+S17X1	9		2	
7E 3285	1.5 SQ.MM.	Grey	72 03 02	3000	+S17X1	10	FLUSH PUSH	1	FLUSHING PUSH
		Grey	72 03 03	3000	+S17X1	11		2	
7F 2125	1.5 SQ.MM.	Grey	52 04 01.05	4000	+S17X1	22	B34E1	1	FLE-10
		Grey	52 04 02.04	4000	+S17X1	24		2	
		Grey	52 04 03.03	4000	+S17X1	32		PE	
7G 2235	1.5 SQ.MM.	Grey	52 01 01.11	6000	+S17X1	19	B36E1	1	FLE-12
		Grey	52 01 03.10	6000	+S17X1	21		2	
		Grey	52 01 06.18	6000	+S17X1	32		PE	

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HARNESS DETAIL FOR LHB EOG AC CHAIR CAR ROOF

Har No	CABLE SIZE	COLOR	FERRULE NO.	LENGTH	FROM		TO		REMARKS
					LOCATION	TER. NO.	LOCATION	TER.NO.	
+S17X1 TO SEMCO CONTROLLER TERMINALS(CDTS WIRING)									
8	1.5 SQ.MM.	Grey	32 05 07.24	1300	+S17X1	5	SEMCO CONTROLLER TERMINALS	1	24 V DC
		Grey	32 05 08.27	1300	+S17X1	7		2	
		Grey	72 03 02.02	1300	+S17X1	9		3	FLUSHING PUSH
		Grey	72 03 03.02	1300	+S17X1	10		4	
		Grey	72 01 04.06	1300	+S17X1	12		5	
		Grey	72 01 05.07	1300	+S17X1	13		6	WSP
		Grey	72 01 06.07	1300	+S17X1	14		7	
		Grey	72 01 07.07	1300	+S17X1	15		8	
		Grey	32 03 01.25	1300	+S17X1	26		9	110 V DC MOTOR
		Grey	32 03 02.25	1300	+S17X1	27		10	
+S17X1 TO +S18X1									
9	1.5 SQ.MM.	Grey	32 04 05.27	10000	+S17X1	1	+S18X1	1	ALARM PULL(LS-13)
						2		2	
		Grey	43 01 02.10	10000	+S17X1	3	+S18X1	3	
						4		4	
		Grey	32 05 07.21	10000	+S17X1	5	+S18X1	5	DOOR SWITGrey
						6		6	
		Grey	32 05 08.33	10000	+S17X1	7	+S18X1	7	
						8		8	
						9		9	
						10		10	FLUSHING PUSH
						11		11	
		Grey	72 01 04.03	10000	+S17X1	12	+S18X1	12	WSP
		Grey	72 01 05.03	10000	+S17X1	13	+S18X1	13	
		Grey	72 01 06.05	10000	+S17X1	14	+S18X1	14	
		Grey	72 01 07.05	10000	+S17X1	15	+S18X1	15	
		Grey	33 06 07.05	10000	+S17X1	16	+S18X1	16	RAZOR SOCKET
		Grey	33 06 08.07	10000	+S17X1	17	+S18X1	17	
		Grey	52 01 01.07	10000	+S17X1	18	+S18X1	18	LL-3
						19		19	
		Grey	52 01 03.07	10000	+S17X1	20	+S18X1	20	
						21		21	
		Grey	52 04 01	10000	+S17X1	22	+S18X1	22	110 V AC (FLE-11)
						23		23	
		Grey	52 04 02	10000	+S17X1	24	+S18X1	24	
						25		25	
		Grey	32 03 01.22	10000	+S17X1	26	+S18X1	26	110V DC MOTOR
		Grey	32 03 02.22	10000	+S17X1	27	+S18X1	27	
						28		28	EMPTY
		Grey	Res-7	10000	+S17X1	29	+S18X1	29	
		Grey	Res-8	10000	+S17X1	30	+S18X1	30	
2170-J		Grey	52 01 06.01	10000	+S17X1	31	+S18X1	31	PE EARTHING
3430-J		Grey	43 01 PE.01	10000	+S17X1	32	+S18X1	32	
+S18X1 TO WC-3,FLE-11									
10	1.5 SQ.MM.	Grey	33 06 07.03	5000	+S18X1	16	+S18A2	1	RAZOR SOCKET 2
3350		Grey	33 06 08.03	5000	+S18X1	17		2	
10A	1.5 SQ.MM.	Grey	52 01 01.08	4000	+S18X1	18	B37E1	1	LL-3
		Grey	52 01 03.08	4000	+S18X1	20		2	
3335		Grey	52 01 06.08	4000	+S18X1	31		PE	
10B	1.5 SQ.MM.	Grey	32 05 07.19	3000	+S18X1	6	S18S4	1	DOOR SW-2
3345		Grey	72 05 01.01	3000	+S18X1	8		2	
10C	1.5 SQ.MM.	Grey	32 04 05.28	3000	+S18X1	1	S18S1	1	LS-6
		Grey	43 01 02.11	3000	+S18X1	2		2	
3325		Grey	43 01 PE.03	3000	+S18X1	3		3	
10D	1.5 SQ.MM.	Grey	32 05 08.31	8500	+S18X1	8	S18H1	1	WC LIGHT-3
2165		Grey	72 05 01.03	8500	+S18X1	9		2	
10E	1.5 SQ.MM.	Grey	72 05 02	3000	+S18X1	10	FLUSH PUSH	1	FLUSHING PUSH
3340		Grey	72 05 03	3000	+S18X1	11		2	
10F	1.5 SQ.MM.	Grey	52 04 01.07	3000	+S18X1	22	B35E1	1	FLE-11
		Grey	52 04 02.06	3000	+S18X1	24		2	
2045		Grey	52 04 03.06	3000	+S18X1	32		PE	

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HARNESS DETAIL FOR LHB EOG AC CHAIR CAR ROOF

Har No	CABLE SIZE	COLOR	FERRULE NO.	LENGTH	FROM		TO		REMARKS
					LOCATION	TER. NO.	LOCATION	TER.NO.	
~~+S18X1 TO SEMCO CONTROLLER TERMINALS(CDTS WIRING)~~									
~~11~~	~~1.5 SQ.MM.~~	~~Grey~~	~~32 05 07.24~~	~~1300~~	~~+S17X1~~	~~5~~	~~SEMCO CONTROLLER TERMINALS~~	~~1~~	~~24 V DC~~
		~~Grey~~	~~32 05 08.27~~	~~1300~~	~~+S17X1~~	~~7~~		~~2~~	
		~~Grey~~	~~72 03 02.02~~	~~1300~~	~~+S17X1~~	~~9~~		~~3~~	~~FLUSHING PUSH~~
		~~Grey~~	~~72 03 03.02~~	~~1300~~	~~+S17X1~~	~~10~~		~~4~~	
		~~Grey~~	~~72 01 04.06~~	~~1300~~	~~+S17X1~~	~~12~~		~~5~~	~~WSP~~
		~~Grey~~	~~72 01 05.07~~	~~1300~~	~~+S17X1~~	~~13~~		~~6~~	
		~~Grey~~	~~72 01 06.07~~	~~1300~~	~~+S17X1~~	~~14~~		~~7~~	
		~~Grey~~	~~72 01 07.07~~	~~1300~~	~~+S17X1~~	~~15~~		~~8~~	
		~~Grey~~	~~32 03 01.25~~	~~1300~~	~~+S17X1~~	~~26~~		~~9~~	~~110 V DC MOTOR~~
		~~Grey~~	~~32 03 02.25~~	~~1300~~	~~+S17X1~~	~~27~~		~~10~~	
POWER PANEL TO FLE-5 & NL									
12	1.5 SQ.MM.	Grey	NL 52 03 03	7000	+S1X1	279	NL	5	FLE-5 & NL
		Grey	NL 52 03 04	7000	+S1X1	280	NL	7	
		Grey	FLE 52 01 04	7000	+S1X1	281	FLE-5	9	
		Grey	FLE 52 01 04	7000	+S1K1	282	FLE-5	PE	
		Grey	52 01 03	7000	+S1K1	282	FLE-5	PE	
ACCIDENT EMERGENCY LIGHTING CIRCUIT WIRING									
13	1.5 SQ.MM.	Grey	33 07 16.01	8000	+S1X1	283	+B41E1	1	AEL-1
		Grey	33 07 17.01	8000	+S1X1	284	+B41E1	2	
		Grey	33 07 18.01	8000	+S1X1	285	+B41E1	3	
		Grey	32 06 11.01	8000	+S1K1	2	+B41E1	4	
		Grey	32 06 11.02	8000	+S1K1	1	+B41E1	5	
13A	1.5 SQ.MM.	Grey	33 07 16.04	26000	+B43E1	1	+B44E1	1	AEL-2
		Grey	33 07 17.04	26000	+B43E1	2	+B44E1	2	
		Grey	33 07 18.04	26000	+B43E1	3	+B44E1	3	
		Grey	32 06 14.01	26000	+B43E1	4	+B44E1	4	
		Grey	32 06 12.02	26000	+B43E1	3	+B44E1	5	
PACIL LIGHTING CIRCUIT									
14		Grey	43 02 PE.11	4000	+S1X1	101	+S26H1	PE	
		Grey	32 02 01.10	4000	+S1K1	95	+S26H1	2	
		Grey	43 02 01.11	4000	+S1K1	99	+S26H1	1	
14A		Grey	43 02 PE.11	11000	+S1X1	101	+S27H1	PE	
		Grey	32 02 01.11	11000	+S1K1	95	+S27H1	2	
		Grey	43 02 01.11	11000	+S1K1	99	+S27H1	1	
EXHAUST FAN CIRCUIT									
15	1.5 SQ.MM.	Grey	33 06 09.05	5000	+S1X1	279	+S11M1	5	EF-1
		Grey	33 06 10.05	5000	+S1X1	280	+S11M1	7	
		Grey	33 06 11.05	5000	+S1X1	281	+S11M1	9	
		Grey	33 06 12.04	5000	+S1K1	282	+S11M1	PE	
15A	1.5 SQ.MM.	Grey	33 06 09.04	31000	+S1X1	279	+S15M1	3	EF-2
		Grey	33 06 10.04	31000	+S1X1	280	+S15M1	7	
		Grey	33 06 11.04	31000	+S1X1	281	+S15M1	9	
		Grey	33 06 12.03	31000	+S1K1	282	+S15M1	PE	
15B	1.5 SQ.MM.	Grey	33 06 09.03	7000	+S1X1	279	+S12M1	5	PANTRY EF
		Grey	33 06 10.03	7000	+S1X1	280	+S12M1	7	
		Grey	33 06 11.03	7000	+S1X1	281	+S12M1	9	
		Grey	33 06 12.02	7000	+S1K1	282	+S12M1	PE	
PANTRY EQUIPMENT CIRCUIT WIRING									
16	1.5 SQ.MM.	Grey	33 07 07.02	12000	+S1X1	289	+A10X1	1	HOT CASE
		Grey	33 07 08.02	12000	+S1X1	290	+A10X1	2	
		Grey	33 07 09.01	12000	+S1X1	291	+A10X1	3	
		Grey	33 07 10.02	12000	+S1X1	292	+A10X1	4	BOTTLE-COOLER
		Grey	33 07 11.02	12000	+S1X1	293	+A10X1	5	
		Grey	33 07 12.01	12000	+S1X1	294	+A10X1	6	
		Grey	33 07 13.02	12000	+S1X1	295	+A10X1	7	REFRIGERATOR
		Grey	33 07 14.02	12000	+S1X1	296	+A10X1	8	
		Grey	33 07 15.01	12000	+S1X1	297	+A10X1	9	
16A	1.5 SQ.MM.	Grey	33 07 01.02	9000	+S1X1	283	+A11X1	1	WATER BOILER
3390A		Grey	33 07 02.02	9000	+S1X1	284	+A11X1	2	
3391A		Grey	33 07 03.01	9000	+S1X1	285	+A11X1	3	
3392A		Grey	33 07 04.02	9000	+S1X1	286	+A12X1	1	SOUP BOILER
GROUP-B		Grey	33 07 05.02	9000	+S1X1	287	+A12X1	2	
		Grey	33 07 6.01	9000	+S1X1	288	+A12X1	3	

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HARNESS DETAIL FOR LHB EOG AC CHAIR CAR ROOF

Har No	CABLE SIZE	COLOR	FERRULE NO.	LENGTH	FROM		TO		REMARKS
					LOCATION	TER. NO.	LOCATION	TER.NO.	
P.A. SYSTEM WIRING									
~~17~~	~~4 SQ.MM~~	~~Grey~~	~~23 04 07.12~~	~~29000~~	~~+L30X1~~	~~19~~	~~+L31X1~~	~~19~~	CORRIDOR WAGO TO CORRIDOR WAGO WIRING
			~~23 04 08.12~~	~~29000~~	~~+L30X1~~	~~20~~	~~+L31X1~~	~~20~~	
			~~23 04 09.12~~	~~29000~~	~~+L30X1~~	~~21~~	~~+L31X1~~	~~21~~	
			~~23 04 10.12~~	~~29000~~	~~+L30X1~~	~~22~~	~~+L31X1~~	~~22~~	
17A	(4x4x1)C+2X.75(MULTI-CORE)	MULTI-CORE	32 07 01.12	29000	+L30X1	10	+L31X1	10	
			32 07 02.12		+L30X1	12	+L31X1	12	
			32 07 03.12		+L30X1	11	+L31X1	11	
			45 01 01.12		+L30X1	SHIELD	+L31X1	13	
			45 01 02.12		+L30X1	8	+L31X1	8	
			45 01 03.12		+L30X1	7	+L31X1	7	
			45 01 04.12		+L30X1	6	+L31X1	6	
			45 01 05.12		+L30X1	5	+L31X1	5	
			45 01 06.12		+L30X1	4	+L31X1	4	
			45 01 07.12		+L30X1	3	+L31X1	3	
			45 01 08.12		+L30X1	2	+L31X1	2	
			45 01 09.12		+L30X1	1	+L31X1	1	
			45 01 13.12		+L30X1	9	+L31X1	9	
			45 01 14.12		+L30X1	13	+L31X1	14	
			45 01 15.12		+L30X1	14	+L31X1	15	
			45 01 16.12		+L30X1	15	+L31X1	16	
			45 01 17.12		+L30X1	Grey	+L31X1	17	
			45 01 18.12		+L30X1	W	+L31X1	18	
~~18~~	~~4 SQ.MM~~	~~Grey~~	~~23 04 07.02~~	~~5000~~	~~+S1X1~~	~~19~~	~~+L30X1~~	~~19~~	SBC TO CORRIDOR WAGO
			~~23 04 08.02~~	~~5000~~	~~+S1X1~~	~~21~~	~~+L30X1~~	~~21~~	
			~~23 04 09.02~~	~~5000~~	~~+S1X1~~	~~20~~	~~+L30X1~~	~~20~~	
			~~23 04 10.02~~	~~5000~~	~~+S1X1~~	~~22~~	~~+L30X1~~	~~22~~	
18A	(4x4x1)C+2X.75(MULTI-CORE)	MULTI-CORE	32 07 01.04	5000	+S1X1	10	+L30X1	10	
			32 07 02.06		+S1X1	12	+L30X1	12	
			32 07 03.04		+S1X1	11	+L30X1	11	
			45 01 01.01		+S1X1	13	+L30X1	13	
			45 01 02.01		+S1X1	8	+L30X1	8	
			45 01 03.01		+S1X1	7	+L30X1	7	
			45 01 04.01		+S1X1	6	+L30X1	6	
			45 01 05.01		+S1X1	5	+L30X1	5	
			45 01 06.01		+S1X1	4	+L30X1	4	
			45 01 07.01		+S1X1	3	+L30X1	3	
			45 01 08.01		+S1X1	2	+L30X1	2	
			45 01 09.01		+S1X1	1	+L30X1	1	
19	1.5 SQ.MM	Grey	45 01 12.03	5000	+S1X1	36	+L40X1	1	SBC TO SPK-1
	1.5 SQ.MM	Grey	45 02 02.19	5000	+S1X1	39	+L40X1	2	
19A	1.5 SQ.MM	Grey	45 01 12.04	8000	+S1X1	36	+L41X1	1	SBC TO SPK-2
	1.5 SQ.MM	Grey	45 02 02.20	8000	+S1X1	39	+L41X1	2	
19B	1.5 SQ.MM	Grey	45 01 12.06	12000	+L41X1	1	+L42X1	1	SPK-2 TO SPK-3
	1.5 SQ.MM	Grey	45 02 02.02	12000	+L41X1	2	+L42X1	2	
19C	1.5 SQ.MM	Grey	45 01 12.10	9000	+L42X1	1	+L43X1	1	SPK-3 TO SPK-4
	1.5 SQ.MM	Grey	45 02 02.04	9000	+L42X1	2	+L43X1	2	
19D	1.5 SQ.MM	Grey	45 01 12.12	9000	+L43X1	1	+L44X1	1	SPK-4 TO SPK-5
	1.5 SQ.MM	Grey	45 02 02.06	9000	+L43X1	2	+L44X1	2	
HARNESS NO.19ATO 19D TOTAL LENGTH OF 86 METRE SHALL BE SUPPLIED LOOSE IN SINGLE LENGTH									

SSE/CAD SEE/D DY.CEE/D D

Break up of End fittings for reference at shop floor

PUMP					
Size	**Location on item**	**Qty**	**Termination at other location**	**Qty**	**Overall QPC**
PG-11	Pump	2	Connection box	2	4
PG-21	Connection Box for Pump	1	Through Box	1	2
60 KVA TRANSFORMER					
PG-29	Input Side	1	Through Box	1	2
PG-36	Output Side	1	Through Box	1	2
PRE-COOLING SOCKET					
PG-36	End wall	2	Through Box	2	4
5 KVA TRANSFORMER					
PG-16	Input & Output Side	0	Through Box	2	4
Capacitor Bank					
PG-21	Input & Output Side	0	Through Box	2	4
AIR BRAKE MODULE					
PG-16	Pressure Switch	1	Through Box	1	2
WSP ITEMS					
PG-16	VK-1	1	VK-6	1	2
PG-16	VK-2	1	VK-6	1	2
PG-21	**SBC to VK-6**	1	VK-6	1	2
PG-16	VK-3	1	Through Box	1	2
PG-16	VK-4	1		1	2
PG-21	**SBC to VK-7**	1	Through Box	1	2
PG-16	VK-7 to EVR-1	1	-	0	1
PG-16	VK-7 to EVR-2	1	-	0	1
PG-16	VK-7 to EVR-3	1	-	0	1
PG-16	VK-7 to EVR-4	1	-	0	1
PG-16	**SBC to VK-5**	1	VK-5	1	2
PG-16	VK-5 to EVR-1	1	-		1
PG-16	VK-5 to EVR-2	1	-		1
PG-16	VK-5 to EVR-3	1	-		1
PG-16	VK-5 to EVR-4	1	-		1
FEEDER LOOP					
PG-48	FJB-1 to SBC	0	Through Box	1	1
PG-48	FJB-2 to SBC	0	Through Box	1	1
BATTERY AND FUSE BOXES					
PG-21	Battery Box	1	+ve Fuse Box	1	2
PG-21	Battery Box	1	-ve Fuse Box	1	2
PG-21	+ve Fuse Box to SBC	1	Through Box	1	2
PG-21	+ve Fuse Box to SBC	1	Through Box	1	2
PG-21	-ve Fuse Box to SBC	1	Through Box	1	2
PG-16	-ve Fuse Box to SBC	1	Through Box	1	2
PG-16	+ve Fuse Box	1	Battery Box	1	2
UNDER SLUNG RBC					
PG-16	RBC	1	Through Box	1	2
PG-21	RBC	1	Through Box	1	2
PG-29	RBC	1	Through Box	1	2

Total End fittings:

S.no.	Item	QPC as per drawing
1.	End fitting PG-11 , straight	**4**
2	End fitting PG-16 , straight	**26**
3	End fitting PG-21 , straight	**20**
4	End fitting PG-29 , straight	**4**
5	End fitting PG-36 , straight	**6**
6	End fitting PG-48 , straight	**2**

SSE/CAD **SEE/D** **DY.CEE/D & D**

Corrigendum -1 to specification no EDTS 255 Rev J

This corrigendum is issued to specification no EDTS 255 Rev. 'J' for ' Harness of Under frame and Roof arrangement for LHB EOG 2nd AC chair car coaches' to change the scope of supply as follows:

Clause 2.0 (i) shall be read as:

2.0 Scope of supply:

(i) Procurement of the item specified in BOM of the specification shall be from RDSO/RCF/ICF approved vendors mentioned in the latest version of the vendor directory issued by RCF/ICF/RDSO respectively, however The procurement of cables shall be done from RDSO 'approved vendors' for minimum 80% quantity of NPQ and balance 20% quantity from 'developmental vendors' as mentioned in latest version of the vendor directory issued by RDSO.

Based on the procurement of various sizes of cables from either approved or developmental sources, the cable harness shall be categorized as under:

- Category-A Cable Harness with approved sources of cables (80% min.)
- Category-B Cable Harness with developmental sources of cables (up to 20%)

Category-B type of cable harnesses may be supplied with cables procured from developmental sources however in no case category-A type shall be supplied with cables procured from developmental sources.

Firm shall maintain a record according to the above classification and offer to RITES/inspecting official for inspection in format EDF 0001 annexed with the specification.

Corrigendum - 2

Corrigendum -2 to specification no EDTS 255 Rev J, Corr.1

This corrigendum is issued to specification no EDTS 255 Rev. 'J'Corr.1 for ' Harness of Under frame and Roof arrangement for LHB EOG 2nd AC chair car coaches' and the details are as follows:

The specification no. EDTS 132 Rev C, AM-4 may be read as EDTS 132 Rev C, AM-3, Corr.1.

EDTS-255 Rev. J ,Corr.1	2	06.11.18				1 of 1
Spec. No	Corr.	Date	SSE/CAD	SEE/D	Dy.CEE/D&D	Page

Corrigendum -3 to specification no EDTS 255 Rev J, Corr.2

This corrigendum is issued to specification no EDTS 255 Rev. 'J' Corr.2 for ' Harness of Under frame and Roof arrangement for LHB EOG 2nd AC Chair Car coaches' and the details are as follows:

1. **Clause 2.1 (a) : BILL OF MATERIAL**

   S.no. 86 in the clause no. 2.1 (a) A in the BOM added to include the QPC of 137 meters for 3x1.0 mm^2 (DS-4) multi-core cables 600/1000V colour wh,Br,Blk as follows:

S.NO.	DESCRIPTION	CABLE SIZE mm^2	DETAIL DRG./SPEC	QPC/ COACH	REMARKS/LOCATION
86	3X1.0 mm^2 multi-core screened cables 600/1000V grade, color W,Br,Blk	3X1.0	EDTS 132 Rev 'C', AM-3,Corr.1 or latest Version	137 Mt.	Speed Sensor/Disc Brake cables

2. **Clause 2.1 (b) VII & VIII :**

   Harness at 2.1(b) VII) & VIII) to be supplied as indicated against Speed Sensor/Disc Brake cables.

3. **Clause 5.10 (a): S.no.6:**

   ISI marked indicated in the clause no. 5.10(a) at S.no.6 stands deleted and FRLT tapes shall be procured as per specification no. ICF/ELEC/921 Rev.0 or Latest Version from approved sources mentioned in the vendor directory issued by ICF.

4. Thin walled flexible elastomeric cables with copper conductors to be procured as per latest applicable Version of specification no. ELRS/SPEC/ELC/0019 against which the sources are approved by RDSO.

5. Conduit system for cable management to be procured as per latest applicable Version of the specification no. RDSO/PE/SPEC/AC/0138 against which sources are approved by RDSO.

6. Cable marking system, Cable Jacket system & Cable binders shall be procured as per Latest applicable specification/drawing and from approved sources in the vendor directory issued by RCF.

7. **Clause no. 5.10(a) Details of Testing:**

   S.no. (1)g may be read as : Slippage test as per clause 7.4.6 of the RDSO spec. (two samples for size less than 25mm dia and two samples for dia more than 25mm).

Corrigendum -4 to specification no EDTS 255 Rev J, Corr.3

This corrigendum is issued to specification no EDTS 255 Rev. 'J'Corr.3 for ' Harness of Under frame and Roof arrangement for LHB EOG 2nd AC Chair Car coaches' and the details are as follows:

1. **Point no.1 & 2 mentioned in the corrigendum no. 3 deleted.**
   QPC of 137 meter 3x1.0 mm^2 (DS-4) multi-core cables 600/1000V colour wh,Br,Blk for speed sensor/disc brake cables deleted as these are being supplied by the disc brake suppliers.
2. **Clause no. 4.0 c) is reproduced as under :**
   Work instructions for preparation of harness to RCF document no. EDW0003 with latest version to be followed.
3. **Clause no. 4.3 a, b & c i.e. Technical staff :**
   Deleted, as this part has already been mentioned in the STR for manufacture of cable harness.
4. **Clause no. 4.14 :** Deleted.
5. **Clause no. 5.4 is reproduced as under:**
   Cable Management system prescribed in RDSO specification RDSO/PE/SPEC/AC/0138-2009(Latest revision) shall be inspected by M/s RITES for acceptance & routine tests at the premises of OEM (i.e. cable management system manufacturer).
6. **Clause no. 5.10 a) S.no.5:**
   The testing parameters for copper crimping sockets i.e. crimping test and flattening tests shall stand deleted as crimping sockets shall be procured as per latest applicable specification/drawing and crimping is to be carried out after laying harness in the coach from approved sources specified in the vendor directory issued by RCF.

Corrigendum-5 to Specification No. EDTS-255, Rev-J, Corr-1, 2, 3, 4

This corrigendum is issued to specification no. EDTS-255, Rev-J, Corr-1, 2, 3, 4 i.e. 'Ready-made Harness of Roof and Under-frame arrangement for LHB AC EOG Chair Car Coaches' in-order to incorporate the following changes:-

2.1(a): Bill of Material

S. N.	Description	Cable Size (in mm²)	Detailed Drg./Spec.		Length	Remarks
			Existing	Revised		
46	4x1.5 sq.mm multi-core E-Beam Cable 600/1000V colour **Wh, Br, Blk, GNYE**	4 x 1.5	EDTS-132, Rev-C, Am-3, Corr-1 **(DS-4)**	EDTS-132, Rev-C, Am-3, Corr-1 **(DS-3)**	44 mt.	Pump Cables

2.1(b) : Preparation/Bunching of harness:

S.No. V: Data sheet for Pump cables of size 4x1.5mm² (except control cables) shall be read as details mentioned in 2.1(a) above.

S.No. XIII. Under slung Regulated Battery Charger Cables: (Cable for indication added)

H. No.	Description	Cable Size (in mm²)	Detailed Drg./Spec.	Length (in mm)	From	To	Ferrule No.	Remarks
14C	4x1.5 sq.mm multi-core E-Beam Cable 600/1000V colour **Wh, Br, Blk, GNYE**	4 x 1.5	EDTS-132, Rev-C, Am-3, Corr-1 **(DS-3)**	17500	RBC	SBC	32 04 05.21	RBC Ok **(Wh, Br)**
							42 02 04.03	
							32 04 05.22	Battery Not healthy **(Blk, GNYE)**
							42 02 10.03	

2.2 A) Thin Walled Flexible Elastomeric Cables with Copper Conductors & Accessories:-
Item added:

S. N.	Description	Cable Size	Detail Drg./Spec.	QPC	Remarks
22	Flexible Flame-retardant high performance polyolefin heat shrinkable tubing	-	EDML-176, Rev-0	1	Loose Supply

2.2 B) Note:-

Clause No. (iv) shall be read as:-

In case of non availability of any specific color cable, Grey/Black color cable may be used after having prior approval from office of the PCEE/RCF and identification shall be made with colored, zero halogen fire retardant heat shrinkable sleeves of M/s **TYCO/Phoenix/Panduit/MV or any other approved make** up-to **100 mm** length.

4.0 Technical Requirements:

e) STR No. for preparation of Ready-made Harness shall be read as **RCF/EL/0015-2020, Rev-C**.

f) General Requirements shall be as per **RDSO Spec. No. - RDSO/PE/O/0008-2005, Rev-0 (Code of Practice for Prevention of Fire in AC Coaches)** and fire retardant sleeve shall be provided (as per clause no. 5.4 of the specification) at the termination point of the cable.

5.10 Table for Tests:-

Test for Harnesses at firm's premises.

S. No.	Tests	Remarks
10	Test for Rigid PVC Conduits to IS:9537 (Part-3)	**Stands Deleted** for Type, Routine & Acceptance test.

5.10 a) Details of Testing:-

S. No.-2 i.e. Acceptance Test for PVC Conduit to IS:9537 **stands Deleted**.

6.0 Approvals:-

6.1 Deleted.

6.3 Revised as under:

"Firm supplying the Coach Harness for first time shall supply one set of coach harness for validation on coach before bulk supply".

8.0 Packing and Traceability:-

Clause No. (i) shall be read as:-

Packing of Harnesses shall be done as per Packing Instructions mentioned in the relevant PO's placed on the firm. Harnesses shall be bunched together and shall be supplied as single unit per coach. Each harness shall be duly bunched individually and legibly marked as per details specified in the specification on it for Under-frame and Roof Arrangement.

Corr.-6

Corrigendum – 6 to Specification no. - EDTS 255, Rev J, Corr-1,2,3,4,5

This corrigendum is issued to Specification no. EDTS 255, Rev. 'J', Corr-1,2,3,4,5 for 'Harness of Under frame and Roof arrangement for LHB EOG AC-Chair Car Coaches' to change the Scope of Supply as follows:

Clause 2.0 (i) shall be read as:

2.0 Scope of supply:

(i) Procurement of the item specified in BOM of the specification shall be from RDSO/RCF/ICF approved vendors mentioned in the latest version of the vendor directory issued by RCF/ICF/RDSO respectively, however the procurement of **e-beam Cables & Cable Management System** shall be done from RDSO 'Approved Vendors' for minimum **80%** quantity of total quantity and balance quantity up-to **20%** from 'Developmental Vendors' as mentioned in latest version of the vendor directory issued by RDSO.

Based on the procurement of various sizes of **e-beam Cables & Cable Management System** from either Approved or Developmental Sources, the cable harness shall be categorized as under:

- **Category-A**: Cable Harness with Approved Source of e-beam Cables & Cable Management System (80% min.)
- **Category-B**: Cables Harness with Developmental source of e-beam Cables & Cable Management System (20% min.)

Category-B type of cable harness may be supplied with e-beam cables & cable management system procured from Developmental Sources, however in no case Category-A type shall be supplied with e-beam cables & cable management system procured from Developmental Sources.

Firm shall maintain a record according to the above classification and offer to RITES/Inspecting Official for inspection in format **EDF 0001, Ver. 2.0 (or Latest)** annexed with the specification.

Note:-

The above mentioned criteria is not applicable to Cable Management System of size NW10 & NW70 as the Approved Sources are less than three or only Developmental Sources are there. Therefore, the procurement of size NW10 & NW70 (if applicable) may be done for such sources subject to past performance, capacity, delivery requirements, quality under procurement, nature of item, outstanding order etc. to be treated as Bulk Orders.

EDTS-255, Rev-J, Corr-1,2,3,4,5	6	2-7-21				1 of 1
Spec. No.	**Corr.**	**Date**	**SSE/CAD**	**SEE/D&D**	**Dy.CEE/D&D**	**Page No.**

	RAIL COACH FACTORY, KAPURTHALA INDIAN RAILWAY	Document No.	EDF 0001
		Version.	2.0
		Issue Date.	02.07.2021
		Page No.	1 of 1

INSPECTION FORMAT FOR SUPPLY OF CABLE HARNESS

To be maintained by the cables harness manufacturer at his premises and to be signed by the Inspecting official during inspection against each Purchase Order

Name of Firm : .....

P.O. No. : .....

Description : .....

Specification : .....

e-beam Cables

Sr. No.	Date of Inspection	Total ordered quantity	Lot offered	Category-A Qty. (With Cables from Approved sources 80% Min	Category-B Qty. (With Cables from developmental sources (Up to 20%)	Sign of Inspecting Engineer

Cable Management System

Sr. No.	Date of Inspection	Total ordered quantity	Lot offered	Category-A Qty. (With Cables from Approved sources 80% Min	Category-B Qty. (With Cables from developmental sources (Up to 20%)	Sign of Inspecting Engineer

RAIL COACH FACTORY, KAPURTHALA

रेल कोच फैक्टरी, कपूरथला

Corrigendum-7 (शुद्धिपत्र सं.-7)

Corrigendum-7 to Specification No. EDTS-255, Rev-J, Corr-1,2,3,4,5,6

This Corrigendum is issued to Specification No. EDTS-255, Rev-J, Corr-1 to 6 for "Harness of Under-frame and Roof Arrangement for LHB AC EOG Chair Car Coaches" in order to incorporate following changes:-

1. Clause No. 2.1 a) Bill of Material (for Under-frame)

A) Thin Walled Flexible Elastomeric Cables With Copper Conductors & Accessories:-

SN	Description	Cable Size (mm^2)	Detail Drg./Spec.	Existing QPC	Revised QPC	Remarks/ Location
25	Thin walled flexible elastomeric cables with copper cond. color **'WHITE'** upto 750V	25	ELRS/SPEC/ELC/ 0019 (Latest)	**47.5 mtr.**	**51.5 mtr.**	BOM updated
41	Thin walled flexible elastomeric cables with copper cond. color **'RED'** upto 750V	1.5	ELRS/SPEC/ELC/ 0019 (Latest)	**180 mtr.**	**224 mtr.**	CP and Pump Cables
42	Thin walled flexible elast. cables with copper cond. color **'YELLOW'** upto 750V	1.5	ELRS/SPEC/ELC/ 0019 (Latest)	**180 mtr.**	**224 mtr.**	CP and Pump Cables
43	Thin walled flexible elastomeric cables with copper cond. color**'BLUE'** upto 750V	1.5	ELRS/SPEC/ELC/ 0019 (Latest)	**180 mtr.**	**224 mtr.**	CP and Pump Cables
45A	Thin walled flexible elast. cables with copper cond. Color **'GNYE'** upto 750V	1.5	ELRS/SPEC/ELC/ 0019 (Latest)	--	**44 mtr.**	Pump Cables **(New Added)**
46	4x1.5 sq.mm multicore e-beam cable 600/1000V color **Wh,Br,Blk,GNYE**	4x1.5	EDTS-132, Rev-C, Am-3, Corr-1 (DS-3)	**61.5 mtr.**	**17.5 mtr.**	RBC

2. Clause No. 2.1 b) Preparation/Bunching of Harness:

The preparation/bunching shall be done as per under given detail for Under-frame wiring

V) Pump Cables

H. No.	Nos., size and Color of Cable		Length (in mm)	Ferrule Marking	Route	Remarks
	Existing	Revised				
5	4x1.5 mm^2 multicore **(DS-3)** Color **(Wh, Br, Blk, GNYE)**	1.5 mm^2, 4 Nos. e-beam cable **upto 750V** Color **(R,Y,B,GNYE)**	22000	33 08 02.02, 33 08 04.02, 33 08 06.02, 33 08 07.02	50	Pump Cables/ Controller Cables **(NW-29 = 17 M)**
	4x1.5 mm^2 multicore **(DS-3)** Color **(Wh, Br, Blk, GNYE)**	1.5 mm^2, 4 Nos. e-beam cable **upto 750V** Color **(R,Y,B,GNYE)**	22000	33 08 02.02, 33 08 04.02, 33 08 06.02, 33 08 07.02		
	2x1.0 mm^2 multicore (DS-4) (Wh, Br)	**Same**	22000	33 08 10.01, 33 08 11.01		No Change
	2x1.0 mm^2 multicore (DS-4) (Wh, Br)	**Same**	22000	33 08 10.01, 33 08 11.01		

3. Clause No. 5.10 Table for Tests:

Test mentioned at SN-10 i.e. Test for Rigid PVC Conduits to IS: 9537 (Part-3) which was deleted in Corr-5 of the specification is hereby added and reproduced as follows:

Test for Harnesses at firm's premises:

SN	Tests	Type Test	Routine Test	Acceptance Test
10	Test for Rigid PVC Conduits to IS:9537 (Part-3)	YES	YES	YES

4. Clause No. 5.10 a) Details of Testing

Tests mentioned at SN-2 i.e. Acceptance Tests for PVC Conduit to IS: 9537 which was deleted in Corr-5 of the specification is hereby added and reproduced as follows:

2	**Acceptance test for PVC conduit to IS:9537**	
SN	**Details of Testing**	**Remarks of Rites Inspecting official**
a	Checking of dimensions as clause 7 of IS.	
b	Bending test (at room temperature) as per clause 9.2 of IS spec.	
c	Compression test as per cl. 9.3 of IS spec (5 sample in prototype and 2 samples in acceptance /routine)	
d	Collapse test as per cl. 9.5 of IS spec (One sample)	
e	Resistance to burning as per cl. 11 of IS spec. (2 samples)	
f	Electrical characteristics as per cl. 12 of IS spec.	

5. Clause No. 8.0 Packing & Traceability

Reference **Clause 8.0(i)** for Packing instructions Stands Deleted.