

Office of the Senior Divisional Electrical Engineer (General)
DRM office/Eastern Railway, Malda -732102.
EL/MLDT-E-Tender-432

SPECIFICATIONS AND SCOPE OF WORK:

NAME OF WORK – Electrical work in c/w “Improvement of passenger amenities by providing HVLS fan, Air circulating, exhaust fan, DG set with other ancillary work etc. over MLDT Division.”

Item wise detailed scope of work :

S. No.	Description of Item
1	<p>Shifting and commissioning of existing DG set. (62.5KVA-125KVA)</p> <p>Details as:- Shifting and commissioning of existing DG set of capacity 62.5KVA-125KVA including dismantling of all connection of DG from existing location and connection of all cables and wires at new installed location as per instruction of concerned SSE/E/G.</p>
2	<p>Supply, fixing & connection of 450 mm industrial fan, 100W, 1400RPM, with operating voltage 230V, 50Hz</p> <p>Details as:- Supply, fixing & connection of Heavy duty, High velocity wall mounted industrial Bracket fan complete set of 450 mm (18") sweep suitable size for single phase 50 Hz 230 V AC supply, powder coated paint in metallic finish, aerodynamically designed aluminum alloy single piece blade for high air delivery with suitable MS clamp etc as per IS-2997-1964. Similar to USHA Model ref Dominaire (wall) for bracket fan or equivalent. Make: Usha/Crompton/Orient/Bajaj/Havells or similar.</p>
3	<p>Supply, fixing & connection of Air GI exhaust fans (industrial type) diameters blades (mm)- 585mm, Noise level ≤ 55db, 370W, 1400RPM</p> <p>Details as:- Supply, fixing & connection of Air GI exhaust fans (industrial type) 28 Inch, blades diameter- 585mm, Noise level ≤ 55db, 370W, 1400RPM, Air Flow-8500 CMH, 415 Volts 3 - Phase, 4-wire, 50 c/s, size- 700*700*370 mm. Fixing includes cutting of holes for grills/dampers, Masonry work, re-plastering, re-coloring with matching of the wall. Make- Marut Air/Bigvent Fan/Windfan/BIG ASS FANS/MacroAir Fans or similar.</p>
4	<p>Supply, fixing and connection of Exhaust Fan of 300 mm.</p> <p>Details as:- Supply of exhaust Fan of 300 mm sweep min 1320 RPM double ball bearing heavy duty (LOW Noise type) anti-corrosive treatment and metallic finish as per Usha model no- TURBO DBB or similar with louver shutter. Labour charge includes Fixing and connection of exhaust fan including cutting of holes, Masonry work, re-plastering, re-coloring with matching of the wall. Make-Marshal/Usha/Crompton/standard/Havells/Polycab/Orient/Bajaj or similar.</p>
5	<p>Supply, fixing and connection of exhaust fan of 200 mm PVC type low on noise</p> <p>Supply, fixing and connection of 200mm PVC exhaust fan as per Usha Cat no- Crisp Air or similar. including wiring of Exhaust fan points with PVC cable Single core Multi strand unsheathed, Halogen Free Flame Retardant HFFR/LSZH/FRZH/ZHFR Insulated Industrial cables 1100V grade ISI marked copper conductor of size 1.5 mm² (as per IS 694:2010 and IS 17048) from Sub distribution board & ECC of size 1sq mm. copper wire including supply of all materials and shall follow relevant IS for installation of wiring, through PVC casing & capping. Re-coloring with matching of the wall should be done. Make of exhaust fan- Usha/Havells/Standard/Crompton/Bajaj/Orient.</p>
6	<p>Supply of industrial type High Volume Low Speed (HVLS) gearless, direct drive PMSM (Permanent Magnet Synchronous Motor) ceiling mounted, Ceiling fan of diameter 3.7 meters (12 feet), anodized aluminum air fall type blades with safety guy wire/with safety retainer link, vibration isolation pads as per detailed specification.</p> <p>Details as:- Supply, installation, testing & commissioning of Ceiling Mounted direct drive HVLS fan, 3.7 meters (12 feet) diameter, three phase 415 Volt with safety guy wire/with safety retainer link, vibration</p>

	<p>isolation pads. Extruded anodised aluminium 6063 grade with plastic edge, blades width 170mm, total 5 blades, blade thickness > 2.5 mm, blade angle 15°.</p> <p>Hub system & Blade - Hub should be made of single piece of 10mm thick coted steel, blades should be inserted in to the hub, the blade and hub connection safety should be given by an external extra arm from motor for double safety of the blades. Both the bolts on the blades and hub connection should be protected by an extra plate to avoid stress on the blades and ensures long service life.</p> <p>Motor Specifications:- External rotor PMSM direct drive IP55 rated, 0.37Kw motor having 52 poles. PMSM motors should be made of Air + liquid cooled technology to increase the motor efficiency and life. Motor should have the temperature sensors to protect motor from high temperatures. The motor temperature should not exceed 130° C. Motor should be made of rare earth magnets Ndfcb N45sh having heat bearing capacity of 150° C, copper wire insulation should be H class to bear 180° C. Maximum actual torque of the motor should be 79.5 N.m. Max rpm = 100. Noise level < 38db. Motor design should be self cooled.</p> <p>Motor Controller:- The motor controller should be small sized/ light weight designed should be ip-55 rated dust and waterproof to ensure long life. Controller should have overload and lack of phase protection. Other accessories etc. shall be inclusive in price. Controller should protect motor from over heat. Appropriate communication between motor and controlled should be made to protect motor from over heat. The motor temperature should not exceed 130° C.</p> <p>3.7 mtrs.(12Ft.) Dia, Direct Driven Fan, 52poles, 100 rpm, Air + Liquid Cooled Motor</p> <p>Make - Marut Air / Bigvent Fan / Windfan / BIG ASS FANS / MacroAir Fans or similar.</p>
7	<p>Supply of industrial type High Volume Low Speed (HVLS) gearless, direct drive PMSM (Permanent Magnet Synchronous Motor) ceiling mounted, Ceiling fan an of diameter 3 meters (10 feet), anodized aluminum air fall type blades with safety guy wire/with safety retainer link, vibration isolation pads as per detailed specification.</p> <p>Details as:- Supply of Ceiling Mounted direct drive HVLS fan, 3 meters (10 feet) diameter, Single phase 220 Volt with safety guy wire/with safety retainer link, vibration isolation pads. Extruded anodised aluminium 6063 grade with plastic edge, blades width 170mm, total 6 blades, blade thickness > 2.6 mm, blade angle 15°,</p> <p>Hub system & Blade - Hub should be made of single piece of steel >8mm thick coted steel, blades should be inserted in to the hub.</p> <p>Blades:- Should have minimum thickness 2mm, Blades surface should be treated with T5+ bright surace oxidation treatment. Blades design should be wave ending to ensure vibration free operation. Guy wires are not allowed.</p> <p>Motor Specifications:- External rotor PMSM direct drive IP55 rated motor having 32 poles and 0.3kw maximum. Motor should be made of rare earth magnets Ndfcb N45sh having heat bearing capacity of 150° C, copper wire insulation should be of H class to bear 180° C and ensures long life of the motor. Maximum torque of the motor should be 90 N.m. Max rpm = 80.</p> <p>Motor Controller:- The motor controller should be small sized/ light weight designed should be vfd operated. ip55 rated controller should have overload and lack of phase protection. Other accessories etc. shall be inclusive in price.</p> <p>Make - Marut Air / Bigvent Fan / Windfan / BIG ASS FANS / MacroAir Fans or similar.</p> <p>3 mtrs. (10Ft.) Dia Direct Driven Fan, 32poles, 80 rpm.</p>
8	<p>Supply of industrial type High Volume Low Speed (HVLS) gearless, direct drive PMSM (Permanent Magnet Synchronous Motor) ceiling mounted, Ceiling fan of diameter 2.4 meters (8 feet), anodized aluminum air fall type blades with safety guy wire/with safety retainer link, vibration isolation pads as per detailed specification.</p> <p>Details as:- Supply of Ceiling Mounted direct drive HVLS fan, 2.4 meter (8 feet) diameter, Single phase 220 Volt, with safety guy wire/with safety retainer link, vibration isolation pads. Extruded anodised aluminium 6063 grade with plastic edge, blades width 170mm, total 6 blades, blade thickness > 2.6 mm, blade angle 15°,</p> <p>Hub system & Blade - Hub should be made of single piece of steel >8mm thick coated steel, blades should be inserted in to the hub.</p>

	<p>Blades:- Should have minimum thickness 2mm, Blades surface should be treated with T5+ bright surface oxidation treatment. Blades design should be wave ending to ensure vibration free operation. Guy wires are not allowed.</p> <p>Motor Specifications:- External rotor PMSM direct drive IP55 rated motor having 32 poles and 0.3kw maximum. Motor should be made of rare earth magnets Ndfeb N45sh having heat bearing capacity of 150° C, copper wire insulation should be of H class to bear 180° C and ensures long life of the motor. Maximum torque of the motor should be 90 N.m. Max rpm = 80.</p> <p>Motor Controller:- The motor controller should be small sized/ light weight designed should be vfd operated. ip55 rated controller should have overload and lack of phase protection. Other accessories etc. shall be inclusive in price.</p> <p>Make - Marut Air / Bigvent Fan / Windfan / BIG ASS FANS / MacroAir Fans or similar.</p> <p>2.4 mtrs.(8Ft.) Dia Direct Driven Fan, 32poles, 80 rpm.</p>
9	<p>Erection, testing and commissioning of above 8-12 ft diameter HVLS fan inducing safety/structural support.</p> <p>Details as:- Erection, testing and commissioning of above 8-12 ft diameter HVLS fan inducing safety/ structural support of the commissioned fan as per site location.</p>
10	<p>Construction and laying of 160 mm dia HDPE pipe (PE-80, PN-6) or as per site by Micro - tunneling method under the road, footpath, rail track etc. As per required depth to laying and inserting LT XLPE 4 core x 400 sq mm cable through HDPE pipes including supply of HDPE pipe. (cable will be supplied by Railway).</p> <p>Details as:- Laying of minimum 160 mm dia HDPE pipe (PE-80, PN-6) as per IS 4984 and IS 14333 or latest by Micro tunnelling method under the road, footpath, rail track etc. as per required depth to laying and inserting of LT 4 core 400 sq mm cable through HDPE pipes including supply of HDPE Pipe and transportation of cable from concerned SSE/Store to proposed site. (Cable will be supplied by Railway) Make of HDPE pipe- Oriplast/Supreme/Astral/Sudhakar or similar.</p>
11	<p>Butt welded joint for micro tunneling work with laying of 160 mm dia HDPE pipes (one joint for every 6 meters length)</p> <p>Details as: - Butt welded joint to be made for micro tunneling work with laying of 160 mm dia HDPE pipes or as per site, one joint must be done for every 6 meters length.</p>
12	<p>Construction and laying of 110 mm dia HDPE pipe (PE-80, PN-8) or as per site by Micro - tunneling method under the road, footpath, rail track etc. As per required depth to laying and inserting HT XLPE 3 core x 95/120 sq mm cable through HDPE pipes including supply of HDPE pipe. (cable will be supplied by Railway).</p> <p>Details as:- Laying of minimum 110 mm dia HDPE pipe (PE-80, PN-8) as per IS 4984 and IS 14333 or latest by Micro tunnelling method under the road, footpath, rail track etc. as per required depth to laying and inserting of HT 3 core 95-120 sq mm cable through HDPE pipes including supply of HDPE Pipe and transportation of cable from concerned SSE/Store to proposed site. (Cable will be supplied by Railway) Make of HDPE pipe- Oriplast/Supreme/Astral/Sudhakar or similar.</p>
13	<p>Butt welded joint for micro tunneling work with laying of 110 mm dia HDPE pipes (one joint for every 6 meters length)</p> <p>Details as: - Butt welded joint to be made for micro tunneling work with laying of 110 mm dia HDPE pipes or as per site, one joint must be done for every 6 meters length.</p>
14	<p>Cable trenching, laying as per IS-1255, 1983 or latest.</p> <p>Details as: - Cable trenching, laying, back filling & connection of LT cables through ground, under Masonry floor /wall re-plastering for matching with the wall, road crossing as per site requirement with cable route markers & meggaring before laying with certificate. In case of underground proper grade of bricks & sand to be used for back filling as per IS-1255, 1983 or latest. (Cable will be supplied by Rly.) Labour charge includes trenching, laying of cable through ground, under Masonry floor /wall replastering for matching with the wall, road crossing as per site requirement including transportation of cable from different locations to proposed site.</p>

15	Cable laying through pole/wall/floor as per site requirement as per IS- 1255, 1983 or latest.
	Details as: - Cable laying LT with proper MS Clamp, nut bolt etc. through pole/wall/floor/ surface existing Pipe Etc. as per site requirement with megaring before laying as per IS-1255, 1983 or latest including transportation of cable from different locations to proposed site. (Cable will be supplied by Railway).
16	Supply and fixing of 1.1KV LT E – PVC/XLPE/HS.KITS-STRAIGHT THROUGH JOINT kit 16-120 sq mm.
	Details as: - Supply, installation and commissioning of 1.1KV LT E – PVC/XLPE/HS.KITS STRAIGHT THROUGH JOINT kit 16-120 sq mm. Make-Multi Pressing/3M/Denson/Raychem/M-seal or similar.
17	Supply and fixing of 1.1KV LT E – PVC/XLPE/HS.KITS-STRAIGHT THROUGH JOINT kit 150-300 sq mm.
	Details as: - Supply, installation and commissioning of 1.1KV LT E – PVC/XLPE/HS.KITS STRAIGHT THROUGH JOINT kit 150-300 sq mm. Make-Multi Pressing/3M/Denson/Raychem/M-seal or similar.
18	Supply & laying of 3" dia medium gauge ISI brand G.I. pipe. for LT cable Track crossing and road crossing and for rising of cable.
	Details as: - Supply & laying of 3" dia medium gauge ISI brand heavy duty G.I. pipe for LT cable Track crossing and road crossing and for rising of cable as per IS. Make- Jindal/Tata/Bansal.
19	Wiring of Main line 3 Phase & neutral (4 wire) copper conductor of size 10 mm sq. with ECC as per General specification of IE rule.
	Details as: - Wiring of main line 3 Phase & neutral (4 wire) through PVC casing & capping/conduit Single core Multi strand unsheathed, Halogen Free Flame Retardant HFFR/LSZH/FRZH Insulated Industrial Cables 1100V grade ISI marked copper conductor of size 10 mm ² (as per IS 694:2010 and IS 17048) & ECC as per General specification of IE rule including supply of all materials. Wiring must be done as per IS standard 732, IS 5216 Part-1 and other relevant BIS. Make of wire- Anchor/KDK/Finolex/Polycab/RR-Kabel/KEI/Havells or similar.
20	Wiring of sub-main line 10 sq mm Phase & neutral (2 Nos copper wire) with ECC of 1no. 4 sq mm (minimum), PVC insulated single core, M/Strand copper wire as per General specification of IE rule.
	Details as: - Wiring of sub-main line Phase & neutral (2 wire) through PVC casing & capping/conduit Single core Multi strand unsheathed, Halogen Free Flame Retardant HFFR/LSZH/FRZH Insulated Industrial Cables 1100V grade ISI marked copper conductor of size 10 mm ² (as per IS 694:2010 and IS 17048) & ECC of 1 no. 4sq.mm (minimum) PVC insulated single core copper wire including supply of all materials such as casing capping/ conduit etc. Wiring must be done as per IS standard 732, IS 5216 Part-1 and other relevant BIS. Make of wire- Anchor/KDK/Finolex/Polycab/RR-Kabel/KEI/Havells or similar.
21	Extra cost for concealed of Main/sub main line 1.5/4/6/10 sq mm.
	Details as: - Extra cost for concealed of sub main line/main line includes cutting of wall for concealed wiring, laying of conduit pipe, wires etc. and re-plastering of cutting portion with finishing of wall as per previous wall including labour.
22	Supply, fixing and connection of 16-32A DP MCB with enclosure.
	Details as: - Supply, fixing & connection of DP MCB 16-32A as per ABB cat no-SB202 MC16- 32 or similar conforming to IEC-60947-2 with enclosure including labour charges. Make of MCB/Enclosure: ABB/Legrand/L&T/Siemens/Schneider/Havells/BCH/C&S/Polycab or similar.
23	Supply, fixing and connection of MCB of 4 pole 32A MCB (Type C Icn= 10kA as per IEC 60898) with enclosure.
	Details as:- Supply, fixing & connection of 4P MCB 32A as per ABB cat no-SB204 M-C32 or similar conforming to IEC-60947-2 and IEC 60898 with enclosure including labour charges. Make of MCB/Enclosure: ABB/Legrand/L&T/Siemens/Schneider/Havells/BCH/C&S/Polycab or similar.

24	<p>Supply, fixing, and connection of Bus-bar Chamber 4 way of Cap-63A wall mounted including connection of LT cable with proper lugs and cable gland etc.</p> <p>Details as: - Supply for replacement/new provision of Busbar Chamber 4 way of Cap-63A wall mounted as per Havells cat No-IHBC006304 or similar including fixing and connection of LT cable with proper lugs and cable gland etc. at site location. Make- ABB/LK/Legrand/Siemens/Schneider/Havells/C&S/BCH/Polycab or similar.</p>
25	<p>Extra cost for concealed MCB DB/mobile/computer/charging board.</p> <p>Details as: - Extra cost for concealed DB includes cutting of wall for concealed wiring, fixing of DB, laying of conduit pipe, wires etc. and re-plastering of cutting portion with finishing of wall as per previous wall including labour.</p>
26	<p>Supply and fixing of 20W emergency inverter batten 4-foot rechargeable inverter batten min back up time – 3 Hrs min.</p> <p>Details as:- Supply of 20 Watt emergency inverter batten 4-foot rechargeable inverter batten min back up time – 3 Hrs minimum, System efficacy min- 120Lm/w and fixing & connection of fittings with necessary wire connection from nearest point/JB with supply of all materials (wire) as per site including transportation of fittings at site as per details specification vide Annexure- A1 & A3 for reputed make of fittings- Phillips/Crompton/Bajaj/Havells/Osram/Surya/Syska/Magik/C&S/HPL/Halonix/Polycab. If any other make offered other than mentioned above should be as per specification attached at Annexure A1 & A3 with prior approval from Railway engineer/administration.</p>
27	<p>Supply, fixing and connection of UL listed & CPRI Tested maintenance free, Low carbon copper coated earth rod of 3-meter electrode having diameter of 25 mm with copper coating thickness of 250 micron tested as per IEC 62561-2, short circuit current with detailed specification. (For sub station).</p> <p>Details as:-</p> <ol style="list-style-type: none"> 1. Supply, fixing and connection of UL Listed, CPRI Tested 25 mm Dia and 3000mm Long Copper Bonded Rod with 250 Micron Coating as per IEC 62561-2 & UL 467. (For Sub-station). 2. Supply of 25 Kg earth enhancing mineral compound tested for leaching and TCLP with NABL has resistivity less than 0.15 ohms-m. 3. SS-304 Connection Clamp. 4. Eco friendly and Rust proof HDPE earth pit chambers with the Load capacity Bearing of 5000Kgs (Test Report need to be submitted). <p>1. Copper Bonded Earth Electrode:</p> <ol style="list-style-type: none"> a) Earth Electrode should be 25 mm Dia and 3000mm Long copper bonded rod with minimum 250micron copper coating. Test Certificate by NABL accredited lab to be submitted for copper coating. b) Earth Electrode should be UL Listed and Tested from CPRI/ERDA. c) Offer Electrode should have short circuit current rating of minimum 32KA RMS and 70kA Peak value for 1 sec. Related Test certificate from CRPI/ERDA should be submitted. d) Environmental Test Report for Corrosion, Bend and Adhesion Test Report, Mechanical Strength Test Report. <p>2. Earth Enhancement Materials (Chemical):</p> <ol style="list-style-type: none"> a) Material should be of high conductivity, non-corrosive leaching free and should not be normal bentonite. The material shall be chemically inert to sub soil and shall not pollute the environment. It shall provide a stable environment in terms of physical and chemical properties and exhibit low resistivity. It shall not be corrosive to the earth electrode itself. b) Resistivity should be less than 0.15 Ohm-M. c) Tested for Corrosion test, Resistivity test, Leaching test, Sulphur Content test, RoSH test report. d) Minimum 25Kg of chemical required for an Earth Pit. i) Earth enhancing compound shall be so designed and constructed that in normal use their performance is reliable and without danger to persons and the surroundings. j) Should be tested as per ISO/IEC 62561-7 & Test Report should be submitted. <p>3. Universal Connecting clamps:</p> <ol style="list-style-type: none"> g) Universal Connecting Clamp with Accurate Number of Fasteners should be made of Stainless Steel, which is resistant to corrosion. h) Size of the Stainless Steel Universal Connecting Clamp should be selected according to the electrode and earthing conductor dimensions. i) The Stainless Steel Universal Connecting Clamp should be tested as per IEC 62561-1 & Test Report should be submitted. <p>4. Earth Inspection Chamber / Earth Pit Cover:</p> <ol style="list-style-type: none"> G. Earth Inspection Chamber / Earth Pit Cover Should have an inner dimension of 250 mm X 250 mm X 250 mm made of Polypropylene material. H. Should be Flush Mounted, removable and lockable cover of the earth pit should be able to withstand 5000 KG.

	<p>I. Should be tested as per IEC 62561- 5 & Test Report should be submitted.</p> <p>5. General Specifications:</p> <p>a) Earthing components are designed, manufactured and tested as per IS 3043, IEC 62651-1 & 7, IS IEC 62305.</p> <p>b) Warranty 10 years from the date of supply. Make:- ABB/OBO/Axis Electrical or similar.</p>
28	<p>Supply, fixing and connection of UL listed & CPRI Tested maintenance free, Low carbon copper coated earth rod of 3-meter electrode having diameter of 17.2 mm with copper coating thickness of 250 micron tested as per IEC 62561-2, short circuit current with detailed specification. (For station and service building).</p> <p>Details as:-</p> <ol style="list-style-type: none"> 1. Supply, fixing and connection of UL Listed, CPRI Tested 17.2 mm Dia and 3000 mm Long Copper Bonded Rod with 250 Micron Coating as per IEC 62561-2 & UL 467. (For station and Service building) 2. Supply of 25 Kg earth enhancing mineral compound tested for leaching and TCLP with NABL has resistivity less than 0.15 ohms-m. 3. SS-304 Connection Clamp. 4. Eco friendly and Rust proof HDPE earth pit chambers with the Load Capacity Bearing of 5000Kgs (Test Report need to be submitted). <ol style="list-style-type: none"> 1. Copper Bonded Earth Electrode: <ol style="list-style-type: none"> a) Earth Electrode should be 25 mm Dia and 3000mm Long copper bonded rod with minimum 250micron copper coating. Test Certificate by NABL accredited lab to be submitted for copper coating. b) Earth Electrode should be UL Listed and Tested from CPRI/ERDA. c) Offer Electrode should have short circuit current rating of minimum 22KA RMS and 55kA Peak value for 1 sec. Related Test certificate from CRPI/ERDA should be submitted. d) Environmental Test Report for Corrosion, Bend and Adhesion Test Report, Mechanical Strength Test Report. 2. Earth Enhancement Materials (Chemical): <ol style="list-style-type: none"> a) Material should be of high conductivity, non-corrosive leaching free and should not be normal bentonite. The material shall be chemically inert to sub soil and shall not pollute the environment. It shall provide a stable environment in terms of physical and chemical properties and exhibit low resistivity. It shall not be corrosive to the earth electrode itself. b) Resistivity should be less than 0.15 Ohm-M. c) Tested for Corrosion test, Resistivity test, Leaching test, Sulphur Content test, RoSH test report. d) Minimum 25Kg of chemical required for an Earth Pit. g) Earth enhancing compound shall be so designed and constructed that in normal use their performance is reliable and without danger to persons and the surroundings. h) Should be tested as per ISO/IEC 62561-7 & Test Report should be submitted. 3. Universal Connecting clamps: <ol style="list-style-type: none"> d) Universal Connecting Clamp with Accurate Number of Fasteners should be made of Stainless Steel, which is resistant to corrosion. e) Size of the Stainless Steel Universal Connecting Clamp should be selected according to the electrode and earthing conductor dimensions. f) The Stainless Steel Universal Connecting Clamp should be tested as per IEC 62561-1 & Test Report should be submitted. 4. Earth Inspection Chamber / Earth Pit Cover: <ol style="list-style-type: none"> D. Earth Inspection Chamber / Earth Pit Cover Should have an inner dimension of 250 mm X 250 mm X 250 mm made of Polypropylene material. E. Should be Flush Mounted, removable and lockable cover of the earth pit should be able to withstand 5000 KG. F. Should be tested as per IEC 62561- 5 & Test Report should be submitted. 5. General Specifications: <ol style="list-style-type: none"> a) Earthing components are designed, manufactured and tested as per IS 3043, IEC 62651-1 & 7, IS IEC 62305. b) Warranty 10 years from the date of supply. Make:- ABB/OBO/Axis Electrical or similar.
29	<p>Supply and laying of GI strip 12.5 mm x 6 mm or 25 mm x 6 mm or 50 mm x 6 mm for laying from earth pipe to transformer/body /panel board/ switch board earth neutral connection with LT & HT body etc.</p> <p>Details as: - Supply and laying of GI strip 12.5 mm x 6 mm or 25 mm x 6 mm or 50 mm x 6 mm/12.5 mm X 6 mm for laying from earth pipe to transformer/body/panel board/ switch board earth neutral connection with LT & HT body etc. joint should be connected with necessary brazing/welding etc.</p>

Cutting of wall for all kind of concealed work, shall be done neatly using proper cutting tools having provision of dust collector. All relevant IS standards to be strictly followed.

Cable crossing through road/Rail track shall be done using proper manual/mechanized digging tools.

NOTE:- Approval of make and model of all materials (Along with supporting documents) needs to be taken from competent Authority before supply.

In case of any ambiguity in the Technical details, clarification may be collected from Sr. DEE/G/MLDT's office if required.

Annexure-A1

SPECIFICATION FOR 18/20 WATT LED TUBE LIGHT

Light Source/Type of LED	Mid power SMD (Surface Mounting Device) LED
LED Make	Nichia, Osram, seoul, Philips, lumileds, Everlite, Avago, Cree & Lednium.
Lumen Output/System Efficacy(lm/w)	Minimum Lumen output-120 lumens/watt
LED life	>50,000 burning Hours.
Driver type	Constant current driver with short circuit protection
Driver components	Industrial grade only
Efficiency of Driver electronic	>85%
Power Factor	Minimum 0.95 at full load/230 volt
Depreciation	Maximum 30% after 50,000 burning hours
THD (Total Harmonic Distortion)	<20 %
Rated voltage	220-240 volt AC
Input Operating Voltage	140 to 277 Volt AC
Beam Angle typical	LED BEAM ANGLE >120°
Input frequency	47 to 53 Hz
Color Rendering Index	=80
Color Rendering Temperature	6500 K
Working Temperature	(-)20°C to (+)45°C
Outer body temperature	Max upto 70°C (±)
Ingress protection.	IP20 or above
Voltage drops and interrupts	As per IEC 61000-4-11
Certifications	NABL approved laboratories
Report to be submitted	LM79 from NABL accredited Lab & LM80 & Photo biological/eye diffuser
For retrofit	Integrated Driver with aluminum housing and milky polycarbonate diffuser
For standalone (Batten type)	Integrated Driver with aluminum housing & milky polycarbonate diffuser
Uniformity	Individual LEDs should not be visible through diffuser
Electric strength test	1.5KV

SPECIFICATION FOR OUT DOOR LED Street/Flood Light/Highbay

Light Source/Type of LED	SMD type(Surface Mounting Device) LED
LED Make	Nichia, Osram seoul, Philips, lumileds, Ever lite, Avago, Cree & Lednium
Lumen Output/System Efficacy(lm/w)	Minimum 140Lm/Watt.
LED life	>50,000 burning Hours.
Driver type	Constant current driver with short circuit protection
Driver components	Industrial grade only
Efficiency of Driver electronic	>85%
Power Factor	The power factor of the total fittings greater than 0.95
Depreciation	Maximum 30% after 50,000 burning hours
THD (Total Harmonic Distortion)	< 20% at full load
Rated voltage	220 – 240 volt AC
Input Operating Voltage	140 to 277 Volt AC
Beam Angle typical	LED BEAM ANGLE > 120°
Input frequency	47 to 53 Hz
Color Rendering Index	≥ 65
Color Rendering Temperature	Min 5700 K
Working Temperature	(-) 20°C to (+) 45° C
Outer body temperature	Max upto 70°C (±)
Ingress protection.	IP66 or Higher
Voltage drops and interrupts	As per IEC 61000-4-11
Certifications	NABL approved laboratories
Report to be submitted	LM 79 from NABL accredited Lab & LM 80 & Photo biological/eye diffuser
Electric strength test	1.5 KV

Annexure A3

Following under mentioned criteria must be followed for supply of LED fittings/fixture

- a) LM-79 & LM-80 report or latest report to be provided conforming to govt. approved NABL accredited lab.
- b) System efficacy: Greater than or equal to 120 lumen/Watt (For tubelight). Greater than or equal to 140 lumen/Watt (For LED Street/Flood light/Highbay)

Guarantee: Guarantee period of the LED work is Five years from the date of completion of the work. Any defects & deficiencies will be rectified/replaced free of cost within guarantee period.

Guarantee: Guarantee period other than LED work is one year from the date of completion of the work. Any defects & deficiencies will be rectified/replaced free of cost within guarantee period

Sr. Divisional Electrical Engineer(G)
Eastern Railway/Malda.