



MAHARASHTRA STATE ELECTRICITY TRANSMISSION CO.- LTD.

Office of the Executive Engineer,
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Ref. No. EE/EHV PR/DN/KLN/T/No. **000286**

Dated **06 FEB 2023**

Sub: E-enquiry for submission of Quotation/ Budgetary offer for designing of new towers as per IS 802-2016 for HVDC Electrode line including design & approval of foundation drawing, submission & approval of G.A drawing and Bill Of Material of towers and fabrication of proto assembly, inspection, and approval thereof.

Dear Sir,

The Sealed quotations/Budgetary offers are invited for the above mentioned work as per Scheduled- 'A' with following terms & condition:-

1. The Quotation/Budgetary offer shall reach in sealed quotation to this office from 06.02.2023 to 09.02.2023 up to 12:00 Hrs. This office shall not accept any responsibility for late receipt of quotations. The quotation will be opened on Dt. 09.02.2023 (If possible).
2. The Quotation/Budgetary offer will be accepted from approved vendor of MSETCL only.
3. The Quotations/Budgetary offer will be on agencies letter head.
4. The Ex-work price & other applicable taxes will be mentioned separately in the Budgetary offer.
5. The undersigned reserve the right to reject any or all quotations without assigning the reason thereof.

Enclosure:- Schedule A


(Vijay B. Aware)
Executive Engineer
E.H.V. Projects Dn. Kalyan

Schedule-A.

Name of Project :- Submission of Quotation/ Budgetary offer for designing of new towers as per IS 802-2016 for HVDC Electrode line including design & approval of foundation drawing, submission & approval of G.A drawing and Bill Of Material of towers and fabrication of proto assembly, inspection and approval thereof as per following parameters.

SCOPE OF WORK

Designing of new towers for 33kV Electrode line including design & approval of foundation drawing, submission & approval of G.A drawing and Bill Of Material of towers and fabrication of proto assembly, inspection, and approval as per **IS 802-2016**,

Following parameter need to be considered for designing of new towers for Electrode line.

- a) Design of tower with span 150 Mtr to 200 Mtr.
- b) Wind speed 44m/sec
- c) Terrain Category -2
- d) Conductor Hooking point 15 meter
- e) Tower cross arm projection shall be 4.5 meters from tower center line(for ease of Maintenance activity)
- f) Electrode line tower is Double Circuit Tower with Single Cross Arm on either side
- g) Base width of normal tower 2 to 2.5.meters at normal tower level.
- h) Body extension of +3M,+6M,+9M,+12M,+ 15M
- i) 725 Sqmm ACSR Bersimise conductor
- j) Antifog Porcelain disc insulator are to be used for cut point :-160KN & for Suspension:-120KN
- k) Wind span for tower Normal Condition 150M (200M) and for Broken wire condition 90M(120M)
- l) Weight span for suspension tower 225M (300M) max and 50 M min
- m) Weight span for tension tower 225M (300M) max and -Ve 225M (-Ve 300M) min
- n) Reliability level 2
- o) Tower should be designed for single circuit strung condition

Sr. No.	DESCRIPTION	Amount in INR (Rs.) Ex-Works
A-1	DESIGN OF NORMAL TOWERS OF DIFFERENT TOWER TYPES WITH DEVIATION ANGLES	
a)	Tower Type A (0°-2° - Zero to Two degree): Transmission Tower Designing (Normal Tower)	
b)	Tower Type B (2° - 15° - Fifteen to Thirty degree): Transmission Tower Designing (Normal Tower)	
c)	Tower Type C (15° - 30° - Thirty to Forty Five degree): Transmission Tower Designing (Normal Tower)	
d)	Tower Type D (30°- 60° / DE_15°- Sixty degree) : Transmission Tower Designing (Normal Tower)	
e)	Tower Type E 90° with Auxiliary Cross arm : Transmission Tower Designing (Normal Tower)	
A-2	DESIGN OF EXTENSIONS OF THE TOWERS TYPES	
a)	Extension of Tower Type A (0°-2° - Zero to Two degree): Extension of related Transmission Tower Designing (+3 Mtr, +6Mtr and +9 Mtr)	
b)	Extension of Tower Type B (2° - 15°): Extension of related Transmission Tower Designing (+3 Mtr, +6Mtr and +9 Mtr)	
c)	Extension of Tower Type C (15° - 30°): Extension of related Transmission Tower Designing (+3 Mtr, +6Mtr and +9 Mtr)	
d)	Extension of Tower Type D (30°- 60° / DE_15°- Sixty degree) : Extension of related Transmission Tower Designing (+3 Mtr, +6Mtr and +9 Mtr)	
e)	Extension of Tower Type E (90° with Auxiliary Cross Arm) : Extension of related Transmission Tower Designing (+3 Mtr, +6Mtr and +9 Mtr)	

Sr. No.	DESCRIPTION	Amount in INR (Rs.) Ex-Works
A-3	DESIGN OF SPECIAL EXTENSIONS OF THE TOWER TYPES	
a)	SPECIAL Extension of Tower Type A (0°-2° - Zero to Two degree): Extension of related Transmission Tower Designing (+12 Mtr and +15 Mtr)	
b)	SPECIAL Extension of Tower Type B (2° - 15°): Extension of related Transmission Tower Designing (+12 Mtr and +15 Mtr)	
c)	SPECIAL Extension of Tower Type C (15° - 30°): Extension of related Transmission Tower Designing (+12 Mtr and +15 Mtr)	
d)	SPECIAL Extension of Tower Type D (30°- 60° / DE_15° - Sixty degree) : Extension of related Transmission Tower Designing (+12 Mtr and +15 Mtr)	
e)	SPECIAL Extension of Tower Type E (90° with Auxillary Cross Arm) : Extension of related Transmission Tower Designing (+12 Mtr and +15 Mtr)	

B) FOUNDATION DESIGNING SCOPE OF WORK:

Design of Foundation of Transmission Towers in Different Soils

1. All foundation shall be of RCC. The design and construction of RCC structures shall be carried out as per IS:456 and minimum grade of concrete shall be M-20.
2. Limit state method of design shall be adopted.
3. Cold twisted deformed bars as per IS:1786 or TMT bars shall be used as reinforcement.
4. Foundations shall be designed for the critical loading combination of the steel structure and or equipment and/or superstructure.
5. If required protection to the foundation, shall be provided to take care of any special requirements for aggressive alkaline soil, black cotton soil or any soil which is detrimental/harmful to the concrete foundations.
6. All structures shall be checked for sliding and overturning stability during both construction and operating conditions for various combination of loads.

7. For checking against overturning, weight of soil vertically above footing shall be taken and inverted frustum of pyramid of earth on foundation should not be considered.
8. Base slab of any underground enclosure shall also be designed for maximum ground water table. Minimum factor of safety of 1.5 against buoyancy shall be ensured.
9. The agency/designer has to provide the foundation design for each tower type and extension and submit the document to design section for scrutiny and approval : in different soil type viz.
 - 1) Normal soil
 - 2) HRS Soil (Hard Rock soil)
 - 3) DFR Soil (Dry Fissured Rock)
 - 4) WBC soil (Wet Black Cotton)
 - 5) SFR soil (Submerged Fissured Rock)

Sr. No.	DESCRIPTION	Amount in INR (Rs.) Ex- Works
B-1	DESIGN OF FOUNDATION DRAWING FOR NORMAL TOWERS OF DIFFERENT TOWER TYPES	
a)	Foundation Design for Tower Type A (0°-2° - Zero to Two degree): Transmission Tower Foundation Designing (Normal Tower)	
b)	Foundation Design for Tower Type B (2° - 15°): Transmission Tower Foundation Designing (Normal Tower)	
c)	Foundation Design for Tower Type C (15° - 30°): Transmission Tower Foundation Designing (Normal Tower)	
d)	Foundation Design for Tower Type D (30°- 60° / DE_15°- Sixty degree) : Transmission Tower Foundation Designing (Normal Tower)	

e)	Foundation Design for Tower Type E 90° with Auxiliary Cross arm Transmission Tower Foundation Designing (Normal Tower)	
B-2	DESIGN OF FOUNDATION DRAWING FOR REGULAR EXTENSIONS OF DIFFERENT TOWER TYPES	
a)	Foundation Design for Tower Type A (0°-2° - Zero to Two degree): Transmission Tower Foundation Designing (Extensions of +3, +6 and +9 Mtr)	
b)	Foundation Design for Tower Type B (2° - 15°): Transmission Tower Foundation Designing (Extensions of +3, +6 and +9 Mtr)	
c)	Foundation Design for Tower Type C (15° - 30°): Transmission Tower Foundation Designing (Extensions of +3, +6 and +9 Mtr)	
d)	Foundation Design for Tower Type D (30°- 60° / DE_15°- Sixty degree) : Transmission Tower Foundation Designing (Extensions of +3, +6 and +9 Mtr)	
e)	Foundation Design for Tower Type E (90°) : Transmission Tower Foundation Designing (Extensions of +3, +6 and +9 Mtr)	
B-3	FOUNDATION DESIGN OF SPECIAL EXTENSIONS OF THE TOWERS TYPES (+12 and +15 Mtr)	
a)	Foundation Design of Special Extension of Tower Type A (0°-2° - Zero to Two degree): Transmission Tower Foundation Designing (Normal Tower with +12 and +15 Mtr)	
b)	Foundation Design of Special Extension of Tower Type B (2° - 15°): Transmission Tower Foundation Designing (Normal Tower with +12 and +15 Mtr)	

c)	Foundation Design of Special Extension of Tower Type C (15° - 30°): Transmission Tower Foundation Designing (Normal Tower with +12 and +15 Mtr)	
d)	Foundation Design of Special Extension of Tower Type D (30° - 60° / DE_15° - Sixty degree) : Transmission Tower Foundation Designing (Normal Tower with +12 and +15 Mtr)	
e)	Foundation Design of Special Extension of Tower Type E (60°with Auxiliary cross arm) : Transmission Tower Foundation Designing (Normal Tower with +12 and +15 Mtr)	

C) Preparation & submission of G.A drawing, Shop Sketches and Bill Of Material in PDF as well as AutoCAD format to Design section of C.O. Mumbai for scrutiny and approval thereof.

- The G.A. Drawing to be printed on A1 Size Paper – 3 Sets
- Bill Of Material Sets to be printed on A4 Size Paper – 2 Sets
- G.A. Drawing, Shop Sketches and Bill Of Material to be submitted in USB – Pen drive for submission in soft format – 1 USB of any appropriate capacity with Name Written
- Format of soft copies shall be in MS word document (.txt / .docx / word file), AutoCAD (dwg file) and Adobe PDF formats only.

Sr. No.	DESCRIPTION	Amount in INR (Rs.) Ex-Works
C-1	PREPARATION OF G.A. Drawing OF THE DESIGNED TOWERS: NORMAL TOWERS OF DIFFERENT TOWER TYPES WITH DEVIATION ANGLES	
a)	G.A. DRAWING OF : Tower Type A (0°-2° - Zero to Two degree): Transmission Tower DRAWINGS (Normal Tower)	
b)	G.A. DRAWING OF : Tower Type B : (2° - 15°): Transmission Tower DRAWINGS (Normal Tower)	

c)	G.A. DRAWING OF : Tower Type C : (15° - 30°) Transmission Tower DRAWINGS (Normal Tower)	
d)	G.A. DRAWING OF : Tower Type D (30° - 60° / DE_15°- Sixty degree) : Transmission Tower DRAWINGS (Normal Tower)	
e)	G.A. DRAWING OF : Tower Type E (90° Auxiliary Cross Arm) : Transmission Tower DRAWINGS (Normal Tower)	
C-2	PREPARATION OF G.A. DRAWING OF THE DESIGNED TOWERS: DRAWINGS OF REGULAR EXTENSIONS OF THE TOWERS TYPES	
a)	G.A. DRAWING OF : Extension of Tower Type A (0°-2° - Zero to Two degree): Extension of related Transmission Tower Drawings (+3 Mtr, +6Mtr and +9 Mtr)	
b)	G.A. DRAWING OF : Extension of Tower Type B : (2° - 15°) Extension of related Transmission Tower Drawings (+3 Mtr, +6Mtr and +9 Mtr)	
c)	G.A. DRAWING OF : Extension of Tower Type C : (15° - 30°) Extension of related Transmission Tower Drawings (+3 Mtr, +6Mtr and +9 Mtr)	
d)	G.A. DRAWING OF : Extension of Tower Type D (30° - 60° / DE_15°- Sixty degree) : Extension of related Transmission Tower Drawings (+3 Mtr, +6Mtr and +9 Mtr)	
e)	G.A. DRAWING OF : Extension of Tower Type E (90° with Auxiliary Cross Arm) : Extension of related Transmission Tower Drawings (+3 Mtr, +6Mtr and +9 Mtr)	

PREPARATIONS OF G.A. DRAWINGS FOR SPECIAL EXTENSIONS

Sr. No.	DESCRIPTION	Amount in INR (Rs.) Ex-Works
C-3	PREPARATION OF G.A.DRAWINGS OF THE DESIGNED SPECIAL EXTENSIONS: DRAWINGS OF SPECIAL EXTENSIONS OF THE TOWERS TYPES	
a)	G.A. DRAWING OF : SPECIAL Extension of Tower Type A (0°-2° - Zero to Two degree): Extension of related Transmission Tower Drawings (+12 Mtr and +15 Mtr)	
b)	G.A. DRAWING OF : SPECIAL Extension of Tower Type B (2° - 15° Two to Fifteen degree): Extension of related Transmission Tower Drawings (+12 Mtr and +15 Mtr)	
c)	G.A. DRAWING OF : SPECIAL Extension of Tower Type C (15° - 30° - Fifteen to Thirty degree): Extension of related Transmission Tower Drawings (+12 Mtr and +15 Mtr)	
d)	G.A. DRAWING OF : SPECIAL Extension of Tower Type D (30°- 60° / DE_15°- Sixty degree): Extension of related Transmission Tower Drawings (+12 Mtr and +15 Mtr)	
e)	G.A. DRAWING OF : SPECIAL Extension of Tower Type E (90° Auxiliary Cross Arm): Extension of related Transmission Tower Drawings (+12 Mtr and +15 Mtr)	

D) PREPARATION OF SHOP SKETCHES OF TOWER and EXTENSIONS

Sr. No.	DESCRIPTION	Amount in INR (Rs.) Ex-Works
D-1	PREPARATION OF SHOP SKETCHES IN LINE WITH THE G.A.DRAWINGS OF TOWERS: NORMAL TOWERS OF DIFFERENT TOWER TYPES	
a)	Shop Sketches of G.A. DRAWING OF : Tower Type A (0°-2° - Zero to Two degree): Transmission Tower BOMS (Normal Tower)	
b)	Shop Sketches of G.A. DRAWING OF : Tower Type B (2° - 15° - Two to Fifteen degree): Transmission Tower DRAWINGS (Normal Tower)	
c)	Shop Sketches of G.A. DRAWING OF : Tower Type C (15° - 30° - Fifteen to Thirty degree): Transmission Tower BOMS (Normal Tower)	
d)	Shop Sketches of G.A. DRAWING OF : Tower Type D : (30°- 60° / DE_15°- Sixty degree): Transmission Tower BOMS (Normal Tower)	
e)	Shop Sketches of G.A. DRAWING OF : Tower Type E : (90° with Auxiliary cross arm): Transmission Tower BOMS (Normal Tower)	
D-2	PREPARATION OF Shop Sketches OF G.A. DRAWINGS OF TOWERS: DRAWINGS OF REGULAR EXTENSIONS OF THE TOWERS TYPES	
a)	Shop Sketches of G.A. DRAWING OF : Extension of Tower Type A (0°-2° - Zero to Two degree): Extension of related Transmission Tower BOMs (+3 Mtr, +6Mtr and +9 Mtr)	
b)	Shop Sketches of G.A. DRAWING OF : Extension of Tower Type B (2° - 15° - Two to Fifteen degree): Extension of related Transmission Tower BOMs (+3 Mtr, +6Mtr and +9 Mtr)	
c)	Shop Sketches of G.A. DRAWING OF : Extension of Tower Type C (15° - 30° - Fifteen to Thirty degree):	

	Extension of related Transmission Tower BOMs (+3 Mtr, +6Mtr and +9 Mtr)	
d)	Shop Sketches of G.A. DRAWING OF : Extension of Tower Type D (30°- 60° / DE_15°- Sixty degree): Extension of related Transmission Tower BOMs (+3 Mtr, +6Mtr and +9 Mtr)	
e)	Shop Sketches of G.A. DRAWING OF : Extension of Tower Type E (90° with Auxiliary Cross Arm): Extension of related Transmission Tower BOMs (+3 Mtr, +6Mtr and +9 Mtr)	

PREPARATION OF SHOP SKETCH OF SPECIAL EXTENTIONS

Sr. No.	DESCRIPTION	Amount in INR (Rs.) Ex-Works
D-3	PREPARATION OF SHOP SKECTHES OF G.A. DRAWINGS OF TOWERS: DRAWINGS OF SPECIAL EXTENSIONS OF THE TOWERS TYPES	
a)	Shop Sketches of G.A. DRAWING OF : SPECIAL Extension of Tower Type A (0°-2° - Zero to Two degree): Extension of related Transmission Tower BOMs (+12 Mtr and +15 Mtr)	
b)	Shop Sketches of G.A. DRAWING OF: SPECIAL Extension of Tower Type B (2° - 15° Fifteen to Thirty degree): Extension of related Transmission Tower BOMs (+12 Mtr and +15 Mtr)	
c)	Shop Sketches of G.A. DRAWING OF: SPECIAL Extension of Tower Type C (15° - 30° - Thirty to Sixty degree): Extension of related Transmission Tower BOMs (+12 Mtr and +15 Mtr)	
d)	Shop Sketches of G.A. DRAWING OF : SPECIAL Extension of Tower Type D (30°-60° / DE_15°- Sixty degree): Extension of related Transmission Tower BOMs (+12 Mtr and +15 Mtr)	
e)	Shop Sketches of G.A. DRAWING OF : SPECIAL Extension of Tower Type E (90° with Auxillary Cross Arm):	

	Extension of related Transmission Tower BOMs (+12 Mtr and +15 Mtr)	
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E) PREPARATIONS OF BILL OF MATERIAL : BOM in EXCEL FORMAT

Sr. No.	DESCRIPTION	Amount in INR (Rs.) Ex-Works
E-1	PREPARATION OF BILL OF MATERIAL IN LINE WITH THE G.A. DRAWINGS OF TOWERS: NORMAL TOWERS OF DIFFERENT TOWER TYPES	
a)	Bill Of Material of G.A. DRAWING: Tower Type A (0° - 2° - Zero to Two degree):	
b)	Bill Of Material of G.A. DRAWING: Tower Type B (2° - 15° - Two to Fifteen degree):	
c)	Bill Of Material of G.A. DRAWING: Tower Type C (15° - 30° - Fifteen to Thirty degree)	
d)	Bill Of Material of G.A. DRAWING: Tower Type D : (30° - 60° / DE_15° - Sixty degree)	
e)	Bill Of Material of G.A. DRAWING: Tower Type E : (90° with Auxillary Cross Arm)	
E-2	PREPARATION OF BILL OF MATERIAL OF G.A. DRAWINGS OF TOWERS: DRAWINGS OF REGULAR EXTENSIONS OF THE TOWERS TYPES	
a)	Bill Of Material of G.A. DRAWING OF : Extension of Tower Type A (0° - 2° - Zero to Two degree):	
b)	Bill Of Material of G.A. DRAWING OF : Extension of Tower Type B (2° - 15° - Two to Fifteen degree)	
c)	Bill Of Material of G.A. DRAWING OF : Extension of Tower Type C (15° - 30° - Fifteen to Thirty degree)	
d)	Bill Of Material of G.A. DRAWING OF : Extension of Tower Type D (30° - 60° / DE_15° - Sixty degree)	

e)	Bill Of Material of G.A. DRAWING OF : Extension of Tower Type E (90° with Auxiliary Cross Arm)	
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E-3) PREPARATION OF BILL OF MATERIAL OF SPECIAL EXTENTIONS

Sr. No.	DESCRIPTION	Amount in INR (Rs.) Ex-Works
E-3	PREPARATION OF BILL OF MATERIAL OF G.A.DRAWINGS OF TOWERS: DRAWINGS OF SPECIAL EXTENSIONS OF THE TOWERS TYPES	
a)	Bill Of Material of G.A. DRAWING OF : SPECIAL Extension of Tower Type A (0° - 2° - Zero to Two degree):	
b)	Bill Of Material of G.A. DRAWING OF : SPECIAL Extension of Tower Type B (2° - 15° Fifteen to Thirty degree):	
c)	Bill Of Material of G.A. DRAWING OF : SPECIAL Extension of Tower Type C (15° - 30° - Thirty to Sixty degree):	
d)	Bill Of Material of G.A. DRAWING OF : SPECIAL Extension of Tower Type D (30°-60° / DE_15°- Sixty degree):	
e)	Bill Of Material of G.A. DRAWING OF : SPECIAL Extension of Tower Type E (90° with Auxiliary Cross Arm):	

F) FABRICATION OF PROTO TOWER AND ITS HORIZONTAL PROTO TYPE ASSEMBLY (FOR EACH TOWER AND ITS EXTENSIONS) FROM ANY OF THE MSETCL APPROVED VENDOR:

- 1) The Prototype assembly shall be offered for inspection from design department so as to check/verify correctness of G.A. Drawing and its related Shop Sketches with BOM.
- 2) After the successful completion/inspection of the Prototype assembly the Proto corrected G.A. Drawing/Shop Sketches/BOM shall be submitted to design department Corporate Office, Mumbai for necessary approvals.
- 3) Nomenclature to be followed for Types of Towers as below.
A Type Tower (0°-2°) – E2
B Type Tower (2°-15°) – E15
C Type Tower (15°-30°) – E30
D Type Tower (30°-60°) – E60
E Type Tower (60° with Auxillary Cross Arm) – E90
- 4) The process for manufacturer:

- a) After the go ahead from MSETCL design department the manufacturer must Fabricate the tower as per the related shop sketches (Normal tower with extensions).
- b) After the successful completion of the fabrication and horizontal prototype assembly activity, the manufacturer must put the inspection call to the design department for the check and verification.
- c) Design department shall inspect the prototype which has to be in line with the design and drawings.
- d) After the successful inspection the manufacturer shall dismantle, and later galvanize the tower types and make the separate tower wise packing.
- e) The duly packed towers should be transported to the MSETCL store as designated by the competent authority.

Sr. No.	DESCRIPTION	Amount in INR (Rs.) Ex-Works (PER MT BASIS)
F-1	MANUFACTURING OF TOWER TYPES (FABRICATED AND GALVANIZED) WITH ITS EXTENSIONS ALONGWITH THE HORIZONTAL PROTO TYPE ASSEMBLY AND AFTER SUCCESSFUL INSPECTION, DISMANTLING AND TRANSPORTING TO MSETCL STORES.	
a)	MS/HT FABRICATED AND GALVANIZED TOWERS WITH EXTENSIONS: Tower Type A (0° - 2° - Zero to Two degree): Manufacturing, Horizontal Proto, Dismantling, Transportation	
b)	MS/HT FABRICATED AND GALVANIZED TOWERS WITH EXTENSION: Tower Type B (2° - 15° - Two to Fifteen degree): Manufacturing, Horizontal Proto, Dismantling, Transportation	
c)	MS/HT FABRICATED AND GALVANIZED TOWERS WITH EXTENSIONS: Tower Type C (15° - 30° - Fifteen to Thirty degree) Manufacturing, Horizontal Proto, Dismantling, Transportation	
d)	MS/HT FABRICATED AND GALVANIZED TOWERS WITH EXTENSIONS: Tower Type D : (30°- 60° / DE_15°- Sixty degree) Manufacturing, Horizontal Proto, Dismantling, Transportation	
e)	MS/HT FABRICATED AND GALVANIZED TOWERS WITH EXTENSIONS: Tower Type E : (90° with Auxiliary Cross Arm) Manufacturing, Horizontal Proto, Dismantling, Transportation	

(Vijay B. Aware)

Executive Engineer
M.S.E.T Co.Ltd.

E H V project Dn Kalyan