

BHARAT HEAVY ELECTRICALS LIMITED
TRANSMISSION BUSINESS ENGINEERING MANAGEMENT, NEW DELHI.

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TYPE OF DOC.	TECHNICAL SPECIFICATION	NAME	VKA	PLK
TITLE	SPECIFICATION FOR CIVIL WORKS OF PRECAST CABLE TRENCH COVERS.	SIGN	<i>[Signature]</i>	<i>[Signature]</i>
		DATE	24.06.11	24.06.11
		GROUP	TBEM	
CUSTOMER	DAMODAR VALLEY CORPORATION			
PROJECT	400kV SUBSTATION AT ANDAL			

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SECTION - 1

SCOPE, SPECIFIC TECHNICAL REQUIREMENT &
QUANTITIES

SECTION - 1

SCOPE, SPECIFIC TECHNICAL REQUIREMENTS & QUANTITIES

1.1.0 SCOPE

1.1.1 The scope of work under this specification is Civil Works of Precast Cable Trench Covers for 400 kV Substation at Andal in West Bengal being executed by BHEL. The Customer is Damodar Valley Corporation (DVC).

1.1.2 The Civil Works shall generally include, *but not limited to*, following:
(i) Precast Cable Trench cover.
(ii) Any other work required for the project.

1.1.3 The works to be performed in the above constructions include preparation of bar bending schedules, based on the drawings released for construction and getting the same approved by the Engineer-in-charge plus the execution of the work including providing of all labor, supervision, materials, scaffolding, power, fuel, construction equipments, tools and plants, supplies, transportation, all incidental items necessary for successful completion of the work including contractor's supervision and in strict accordance with the drawings and specifications and with inspection and testing standards. The nature of work shall generally involve concreting including formwork, providing necessary steel embedments and other inserts, etc., all complete as per detailed specification, drawings and directions of Engineer-in-charge.

1.2.0 SPECIFIC TECHNICAL REQUIREMENT

1.2.1 The specific technical requirements for the execution of civil works shall be as per Customer's Specification (Section - 3)/CPWD Specifications unless otherwise specified. In case of any conflict between these, Customer's specification shall prevail.

1.3.0 BILL OF QUANTITIES

1.3.1 The Bill of Quantity shall be as per page 1.3.

1.3.2 The quantities indicated in the 'Bill of Quantity' is indicative and can vary to any extent. Contractor shall not be entitled for any claim for any such variation in the quantities.

1.3.3 The provision of Bill of Quantity, specifications and drawings shall be read in conjunction with each other and in case of conflict amongst them, the clarification shall be obtained from the Engineer-in-charge whose decision shall be final and binding.

1.3.4

Method of measurement:

Unless otherwise described the method of measurement as described in 'Method of Measurement of Building and Civil Engineering Works'-IS 1200(Part I to XXV) latest edition of BIS shall be followed.


BILL OF QUANTITY					
Name of Project: 400kv substation at Andal. Name of Work : Civil works of Precast Cable Trench Covers.					
S.No.	Description of Item	Quantity	Unit	Unit Rate(Rs)	Amount(Rs)
1	Providing & fixing in position precast cement concrete trench covers, etc., at various elevations in all kinds of work including moulding, formwork, mixing, laying out, compacting and curing, storing, transportation, erection without damage, setting in position with cement and sand mortar, grouting etc all as per specs, drawings and directions of Engr-in-Charge but excluding the cost of reinforcement, inserts, edge angles, etc, and of following grade:				
	Grade of concrete :- M25.	140	CUM		
2	Steel reinforcement -Cold twisted bars /TMT				
(A)	Including supply and bending, binding (i/c cost of binding wire), placing in position, etc., all labour & material, complete.	25000	Kg		
3	Structural steelwork welded in built up sections like edge protection angles/insert plates with lugs & framed work including providing, cutting, hoisting, fixing in position/ embedding in concrete and applying a priming coat of approved steel primer all complete.	20900	Kg		
	Total Amount (Rs.)				

SECTION - 2


STANDARD TECHNICAL SPECIFICATION
(N.A.)

SECTION - 3


ENCLOSURES TO THE SPECIFICATION (Customer's Specification)


CLAUSE NO.	<div data-bbox="711 239 1044 268">TECHNICAL REQUIREMENTS</div> <div data-bbox="1273 218 1393 279">  </div>
23.00.00	MATERIALS
23.01.00	<p>Cement</p> <p>Fly ash based portland pozzolana cement conforming to IS:1489 (Part-1) shall be used for all areas other than for the critical structures identified below. However, Engineer may allow the use of other types of cement namely, ordinary portland cement & portland slag cement conforming to IS: 269 and IS: 455 respectively under special circumstances on specific request of the bidder and prior approval of the Engineer. Minimum grade of cement shall be Grade 33. Higher grade of portland ordinary cement namely Grade 43 and Grade 53 conforming to IS:8112 and IS:12269 respectively can also be used for specific application. However the ordinary portland cement shall necessarily be used for following structures.</p> <ul style="list-style-type: none"> a) TG foundation top deck and sub-structure excluding raft. b) Spring supported decks of all machine foundations. c) Structures requiring grade of concrete of M25 and above. <p>In place of fly ash based portland pozzolana cement fly ash can be added in ordinary portland cement (Grade 43). Batching plant shall be deployed for producing the concrete. Fly ash shall conform to IS:3412. Percentage of fly ash to be mixed in concrete shall be based on trial mix.</p>
23.02.00	<p>Aggregates</p> <ul style="list-style-type: none"> a) Coarse aggregate <p>Coarse aggregate for concrete shall be crushed stones chemically inert, hard, strong, durable against weathering of limited porosity and free from deleterious materials. It shall be properly graded. It shall meet the requirements of IS: 383.</p> b) Fine aggregate <p>Sand shall be hard, durable, clean and free from adherent coatings of organic matter and clay balls or pellets. Sand, when used as fine aggregate in concrete shall conform to IS : 383. For plaster, it shall conform to IS : 1542 and for masonry work to IS : 2116.</p>
23.03.00	<p>Reinforcement Steel</p> <p>Reinforcement steel shall be of high strength deformed steel bars of grade Fe-415 and/or Fe-500 and shall conform to IS:1786.</p> <p>Mild steel & medium tensile steel bars and hard drawn steel wire shall conform to grade-1 of IS:432 (Part-1) or grade A of IS:2062. Welded wire fabric shall conform to IS:1566.</p>
	<div data-bbox="662 1745 997 1837"> KODERMA THERMAL POWER PROJECT STAGE-I (2X500 MW) MAIN PLANT TURNKEY PACKAGE BID DOCUMENT NO.: CS-9451-108-2 </div> <div data-bbox="1040 1759 1294 1827"> TECHNICAL SPECIFICATIONS SECTION-VI PART-B </div> <div data-bbox="1344 1772 1409 1814"> SUB-SECTION CIVIL </div>

CLAUSE NO.	TECHNICAL REQUIREMENTS	एनटीपीसी NTPC	
23.04.00	Structural Steel	Structural steel (including embedded steel) shall be straight, sound, free from twists, cracks, flaw, laminations and all other defects. Structural steel rolled section and plates shall conform to Grade 'A' for thickness upto 20mm and of Grade "B" for thickness above 20 mm as per IS:2062. The plates shall be supplied as rolled and in semikilled condition unless specified otherwise. Plates above 40mm thickness shall be normalised and of ultrasonically tested quality. High Strength low alloy steel (HSLA) conforming to IS:8500 may also be used in place of Mild steel. Chequered plate shall conform to IS:3502 and pipes for hand rail shall conform to medium grade of IS:1161.	
23.05.00	Bricks	Fly ash lime bricks conforming to IS:12894 and fly ash clay bricks conforming to IS:13757 shall be used. The crushing strength of bricks shall be minimum 75 kg./sq cm. Minimum percentage of fly ash shall be 25%.	
23.06.00	Water	Water used for cement concrete, mortar, plaster, grout, curing, washing of coa. aggregate, soaking of bricks, etc. shall be clean and free from oil, acids, alkalis, organic matters or other harmful substances in such amounts that may impair the strength or durability of the structure. Potable water shall generally be considered satisfactory for all masonry and concrete works, including curing. When water from the proposed source is used for making the concrete, the maximum permissible impurities, development of strength and initial setting time of concrete shall meet the requirements of IS:456. All materials brought for incorporation in works shall be of best quality as per IS unless specified otherwise.	
23.07.00	STATUTORY REQUIREMENTS	Bidder shall comply with all the applicable statutory rules pertaining to Factories Act, Fire Safety Rules at Tariff Advisory Committee. Water Act for pollution control, Explosives Act, etc. Provisions of safety, health and welfare according to Factories Act shall be complied with. These shall include provision of continuous walkways along the crane - girder level on both sides of building, comfortable approach to EOT crane cabin, railing, fire escape, locker room for workmen, pantry, toilets, rest room etc. Provisions for fire proof doors, number of staircases, fire separation wall, lath plastering/encasing the structural members (in fire prone areas), type of glazing etc. shall be made according to the recommendations of Tariff Advisory Committee. Statutory clearances and norms of State Pollution Control Board shall be followed. Bidder shall obtain approval of Civil/Architectural drawings from concerned authorities before taking up the construction work.	
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CLAUSE NO.	TECHNICAL REQUIREMENTS			
24.00.00	INSPECTION, TESTING AND QUALITY CONTROL			
24.01.00	<p>Sampling and testing of major items of civil works viz. earthwork, concreting, structural steel work (including welding), piling, sheeting, etc. shall be carried out in accordance with the requirements of this specification. Wherever nothing is specified relevant Indian Standards shall be followed. In absence of Indian Standard equivalent International Standards may be used.</p> <p>The Contractor shall submit and finalise a detailed field Quality Assurance Programme before starting of the construction work according to the requirement of this specification. This shall include frequency of sampling and testing, nature/type of test, method of test, setting of a testing laboratory, arrangement of testing apparatus/equipment, deployment of qualified/experienced manpower, preparation of format for record, Field Quality Plan, etc. Tests shall be done in the field and/or at a laboratory approved by the Engineer. The contractor shall furnish the test certificate from the manufacturer's of various materials to be used in the construction.</p>			
24.02.00	Workmanship and dimensional shall be checked as stipulated below.			
25.00.00	PERMISSIBLE TOLERANCES			
	The dimensions of concrete as cast when compared with those on the drawings shall be within the tolerances given below in mm.			
25.01.00	Cast-in-situ concrete works			
	Description of Item/ Structural element	Permissible Deviation in mm (Max)		
	Faces of concrete in foundations and structural members against which backfill is placed	+ 25	- 10	
	Location of footing (for RCC framed structures only)	+ 25	- 25	
	Eccentricity of footing	2% of footing width in direction of misplacement but limiting to 50mm.		
	Top surfaces of slabs and of concrete to receive base plates to be grouted.	+ 5	- 5	
	Alignment of beams, lintels, columns, walls, slabs, and similar structural elements.	+ 5	- 5	
	Cross sectional dimensions of walls, slabs and similar structural elements	+ 5	- 5	
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CLAUSE NO.	TECHNICAL REQUIREMENTS		<div>एन टी सी NTPC</div>
25.02.00	Deviation from specified dimensions of cross-section of columns and beams.	+ 12 - 6	
	Alignment of holding down bolts without sleeves	+ 1.5 - 1.5	
	Alignment of holding down bolts with sleeves	+ 5 - 5	
	Level of holding down bolt assemblies.	+ 10 - 10	
	Embedded parts (in any direction). Centres of pockets or holes with greatest lateral dimension not exceeding 150mm	+ 5 - 5	
		+ 10 - 10	
	Variation in steps:		
	Riser	+ 1.5 -1.5	
	Tread	+ 3.0 -3.0	
	Plumb	3 mm for every metre subject to a maximum of 10 mm.	
25.02.00	Form work		
	Levels and heights	± 6 mm	
	Plumb	3mm for every metre subject to a maximum of 10 mm.	
	Unevenness of any surfaces	± 3 mm	
	Length or breadth	± 12 mm	
	Diagonals	± 15 mm	
	In case of inclined surfaces like folded plates etc, the deviation in the alignment of inclined surfaces, shall not exceed 3 mm with reference to the theoretical alignment, for a length of 1000 mm measured vertically, subject to a maximum of 10 mm.		
25.03.00	Masonry		
	All masonry shall be built true and plumb within the tolerances prescribed as below. Care shall be taken to keep the perpend properly aligned.		
	a) Deviation in verticality in total height of any wall of a building more than one storey in height shall not exceed +/-12.5mm.		
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CLAUSE NO.	TECHNICAL REQUIREMENTS	
	<p>b) Deviation from vertical within a storey shall not exceed +/- 6mm per 3m height.</p> <p>c) Deviation from the position shown on the plan of any brickwork more than one storey in height shall not exceed 12.5mm.</p> <p>d) Relative displacement between load bearing walls in adjacent storeys intended to be in vertical alignment shall not exceed 6mm.</p> <p>e) Deviation of bed joint from horizontal in any length upto 12m shall not exceed 6mm, and in any length over 12m it shall not exceed 12.5mm total.</p> <p>f) Deviation from the specified thickness of bed-joints, cross joints or perpendes shall not exceed +/-3 mm.</p>	
25.04.00	<p>Plastering work</p> <p>The finished plastered surface shall not show any deviation more than 4 mm when checked with a straight edge of 2 metre length placed against the surface.</p> <p>The thickness of the plaster shall be measured exclusive of the thickness of key i.e. grooves or open joints in brickwork. The average thickness of plaster shall not be less than the specified thickness. The minimum thickness over any portion of the surface shall not be less than the specified thickness by more than 3 mm for plaster thickness above 12mm and 1 mm for ceiling plaster. Extra thickness required in dubbing behind rounding of the corner at junctions of wall or in plastering of masonry cornices etc. shall be ignored.</p>	
25.05.00	<p>Pre-cast concrete work</p> <p>a) Length: +/-0.1 percent subject to minimum of - 5 mm and maximum of + 10 mm.</p> <p>b) Cross-sectional dimensions: +/- 3 mm or +/-0.1 per cent whichever is greater.</p> <p>c) Straightness of Bow : 1/750 of the length subject to minimum of -5mm and maximum of + 10mm.</p> <p>d) Squareness: When considering the squareness of the corner, the length of the two adjacent sides being checked shall be taken as the base line. The shorter side shall not vary in length from the perpendicular by more than 5mm.</p> <p>e) Flatness: The maximum deviation from a 1.5m straight edge placed in any position on a nominal plane surface shall not exceed 5mm.</p>	
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CLAUSE NO.	TECHNICAL REQUIREMENTS		
25.06.00	Reinforcement work Description of Item/ Structural element Placing of reinforcement For effective depth 200 mm or less + 10 - 5 For effective depth more than 200 mm + 15 - 10 Cover to reinforcement - - 5 Cutting of reinforcement When minimum length specified + 75 - When maximum length specified +75 -50 When maximum or minimum length not specified + 75 -25		
25.07.00	Tolerance in erected C.W. liners/pipes At setting out points 25 mm in position & level Between setting out point 50 mm in position & level Flanges for condenser 6 mm in position & level connections and the plane of the flanges shall be within 3 mm of the required plane measured across any diameter. Other terminal points 6 mm in position & level & the plane of the flange shall be within 0.3% of the dia. or 1mm whichever is greater, of the required plane measured across any diameter.		
25.08.00	Structural steel work		
25.08.01	Tolerances on dimensions for fabrication of steel structures shall be according to IS:7215.		
25.08.02	Tolerances on dimensions for erection of steel structures shall be according to IS:12843.		
25.08.03	Tests on welds shall be as per ASTM standards/IS 816 and IS 9595.		
25.08.04	Dimensional and weight tolerance of rolled steel shapes shall be as per IS 1852.		
25.09.00	Maximum deviation of finished pile from vertical 1 in 75 and other tolerance shall be as per IS: 2911, (Part 1).		
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