

# **TENDER SPECIFICATION**

## **BHEL: PSSR: SCT: 1956**

**for**

**Erection & Testing of Sea water piping system and all associated Piping in tunnel, buildings & buried portion including civil works like excavation, sand filling, construction of Inspection chamber**

**at**

**Kudankulam Nuclear Power Project Unit 3 & 4  
Tamilnadu.**

## **VOLUME –II**

## **PRICE BID**



**BHARAT HEAVY ELECTRICALS LIMITED**

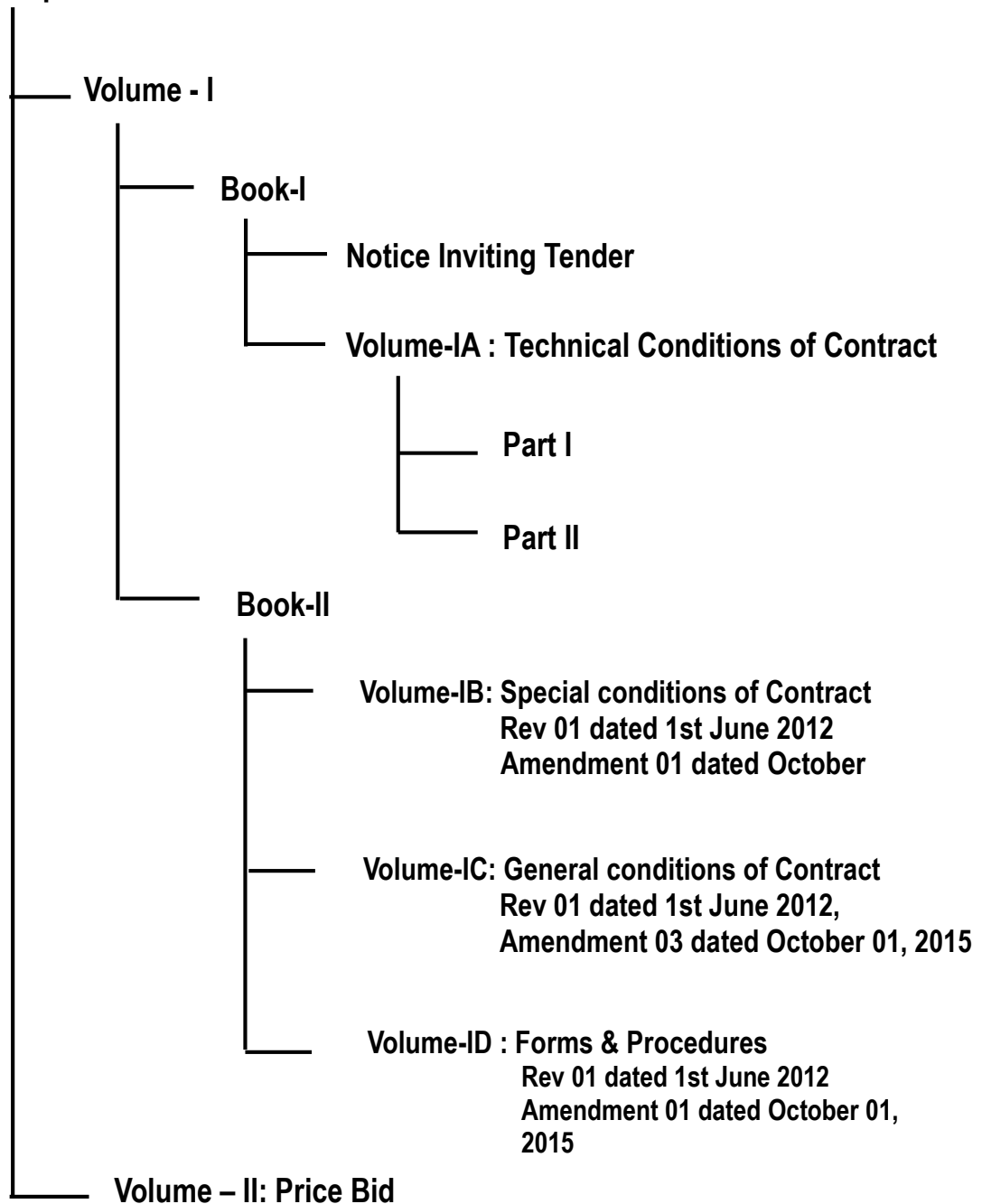
(A Government of India Undertaking)

Power Sector – Southern Region

Tek Towers, No.11, Old Mahabalipuram Road,  
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**TENDER SPECIFICATION CONSISTS OF**

**Tender Specification**



## PRICE BID

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<b>CONTENTS</b>	
<b>Description</b>	<b>No. of pages</b>
Part A : Instructions to the Bidders	01
Part B : Format for total amount (Enclosed as a separate Excel File in BHEL NIC e-Procurement portal for the subject tender)	(Separate Excel File)
Part C: Bill of quantities with weightage for amount of each items with respect to the total quoted price	20

**PART A**

**Instruction to Bidders:**

1. The quantity indicated in the BOQ in Part C of Price Bid is approximate only and is liable for variation. Payment will be as per actual quantity executed and as certified by BHEL Engineer.
2. Tenderers are requested to affix their company seal and authorized signature in all pages.
3. Bidders shall quote 'Total Amount' in the format enclosed as a separate Excel File in BHEL NIC e-Procurement portal for the subject tender and upload the same under 'Packet details - > Tender covers -> Finance '(Cover Type Description – Price Bid)’ and same shall be taken into account for evaluation and awarding and hence, shall be complete in all respect for the full scope of work defined in specification and in accordance with terms & conditions of the tender. Any other entry elsewhere in the price bid shall be treated as Null and Void. Quoting of rates in any other form/formats will not be entertained.
4. The above mentioned 'Total amount' is for the entire Bill of Quantity (BOQ) given in Part -C of the Price Bid.
5. Based on the quantities of individual item and the 'Total amount' as mentioned above, unit rate of individual item shall be derived. This unit rate shall be rounded off to four decimal places.
6. Bidders to note that this is an item rate contract. Payment shall be made for the actual quantities of work executed at the unit rate arrived at as per SI No.5 above.

**Part C : Bill of Quantities****Tender Specification BHEL:PSSR:SCT:1956 for Sea Water Piping Package of Unit 3 & 4  
at 2 X 1000 MWe Kudankulam Nuclear Power Plant Unit # 3 & 4 - TG & SWS Package**

Ref.No.	Description	Unit of Measurement	Qty.	Weightage for amount of each item (Nearest to the 7 decimal points) w.r.t the total amount
F	Welding, Erection, NDT, Flushing and Testing of Pipelines - NPCIL Free Issue Material (FIM)	--		
F1	Welding of CS pipe, Type-Butt Weld : Handling, cutting, edge correction (for pipe spools issued with prepared edges), removal of paint from the joint area, cleaning, fit up, welding using GTAW/ SMAW process including hookup joints, mechanical cleaning of weld joint, visual inspection, repair of welding if any, FME inspection as per manufacturer drawings, documents and specifications. The scope includes joint identification & marking by engraving, preparation of welding inspection report (WIR), QAP, WPS, PQR, JHA, scaffolding & platforms, man power, welder qualification, P&M, tools & tackles, all consumables ( excluding welding filler wire & electrode ) etc. Note: 1. In case any temporary structures required, contractor shall supply all the materials including welding electrodes and consumables.	--		
F1.1	Size 108 mm OD to 325 mm OD, thickness upto 12 mm	Inch Dia	36,000	.0450434
F1.3	Size above 325 mm OD to 630 mm OD, thickness upto 16mm	Inch Dia	20,000	.0328985
F1.5	Size above 630 mm OD , thickness upto 16mm	Inch Dia	4,500	.0111109

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Ref.No.	Description	Unit of Measurement	Qty.	Weightage for amount of each item (Nearest to the 7 decimal points) w.r.t the total amount
F2	<p>Welding of small bore CS piping : Type-Butt Weld: Handling of pipe size ranging from 10 NB to 80 NB mm or 14 mm OD to 89 mm OD, cutting, removal of paint from the joint area, edge preparation, cleaning, fit up, welding using GTAW/ SMAW process including hookup joints, mechanical cleaning of weld joint, visual inspection, repair of welding if any, FME inspection as per manufacturer drawings, documents and specifications. The scope includes site survey, joint identification &amp; marking by engraving, preparation of welding inspection report (WIR), QAP, WPS, PQR, JHA scaffolding &amp; platforms, man power, welder qualification, scaffolding &amp; platforms, man power, P&amp;M, tools &amp; tackles, all consumables ( excluding welding filler wire &amp; electrode ) etc. Note:1. Incase any temporary structures required, contractor shall supply all the materials including welding electrodes and consumables.</p>	Inch Dia	5,500	.0075167
F4	<p>Welding of small bore SS piping Type-Butt Weld: Handling of pipe size ranging from 4 NB to 80 NB mm or 6 mm OD to 89 mm OD, cutting, removal of paint from the joint area, edge preparation, cleaning, fit up, welding using GTAW/ SMAW process including hookup joints, mechanical cleaning of weld joint, visual inspection, repair of welding if any, FME inspection as per manufacturer drawings, documents and specifications. The scope includes site survey, joint identification &amp; marking by engraving, preparation of welding inspection report (WIR), QAP, WPS, PQR, JHA, scaffolding &amp; platforms, man power, welder qualification, P&amp;M, tools &amp; tackles, all consumables ( excluding welding filler wire &amp; electrode ) etc. Note: 1. Incase any temporary structures required, contractor shall supply all the materials including welding electrodes and consumables.</p>	Inch Dia	4,500	.009317

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Ref.No.	Description	Unit of Measurement	Qty.	Weightage for amount of each item (Nearest to the 7 decimal points) w.r.t the total amount
F5	Welding of Titanium tube, Type-Butt Weld- Size upto 159 mm OD : Handling, cutting, edge correction (for pipe spools issued with prepared edges), cleaning, fit up, purging-dam fixing, purging, welding using GTAW process including hookup joints, mechanical cleaning of weld joint, FME inspection as per manufacturer drawings, documents and specifications with acceptance of EIC. The scope includes joint identification & marking by engraving, preparation of welding inspection report (WIR), QAP, WPS, PQR, JHA, purging dam logsheet, scaffolding & platforms, man power, welder qualification, P&M, tools & tackles, all consumables (excluding welding filler wire & electrode ) etc. Note: 1. Incase any temporary structures required, contractor shall supply all the materials including welding electrodes and consumables.	Inch Dia	9,000	.0291691
F6	Welding of CS pipes and fittings.Type-Fillet Weld: Work includes handling, cutting, grinding removal of paint from the joint area, cleaning, fit up, welding using GTAW/ SMAW process including hookup joints, cleaning of weld joint, visual inspection, repair of welding if any, FME inspection as per manufacturer drawings, documents and specifications. The scope includes site survey, joint identification & marking by engraving, preparation of welding inspection report (WIR), scaffolding & platforms, man power, P&M, tools & tackles, all consumables (excluding welding filler wire & electrode ) etc. Note: 1.Incase any temporary structures required, contractor shall supply all the materials including welding electrodes and consumables.	--		
F6.1	Pipe size ranging from 20 NB to 80 NB or 28 mm OD to 89 mm OD.	Inch dia	800	.0011318
F6.2	Pipe size ranging from 100 NB to 300 NB or 108 mm OD to 325 mm OD	Inch dia	10,600	.0155943
F6.3	Pipe size ranging from 350 NB and above or 377 mm OD and above	Inch dia	6,500	.0149614
F7	Preparation of Weld edge (CS/SS) :	--		

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Ref.No.	Description	Unit of Measurement	Qty.	Weightage for amount of each item (Nearest to the 7 decimal points) w.r.t the total amount
F7.2	Preparation of Pipe Weld Edge (CS/SS) by cutting and grinding operation : Identification of pipe spool, marking, cutting, grinding, preparing edge (v-groove), cleaning, visual inspection, preparation of reports, arrangement of necessary manpower, tools, tackles, scaffolding & platforms, consumables etc and work completion as per drawings, documents and specifications with acceptance of EIC.	Inch Dia	10,000	.0095061
F8	Erection of CS, SS and Ti piping systems of all sizes: Identification of pipe spool, handling, cutting, erection and alignment of CS, SS & Ti piping along with accessories, at various elevations and locations, FME inspection, preparation of erection reports, asbuilt drawings and work completion as per manufacturer drawings, documents and specifications with acceptance of EIC. The scope includes providing temporary support arrangements, SS shims, scaffolding & platforms, man power, P&M, tools & tackles, all consumables( excluding welding filler wire & electrode ) etc. Note: 1. In case any temporary structures required, contractor shall supply all the materials including welding electrodes and consumables.	Inch-meter	110,000	.049556
F10	Passivation of SS pipes and fittings: Passivation of SS pipes and fittings before fabrication and erection as per the procedure, preservation, inspection, preparation of reports, cleaning aids etc including preparation of procedure and work completion with acceptance of EIC. The scope includes supply of consumables with TC, preservative material, qualification of procedures, shifting, inspection, arrangement of man power, scaffolding and platforms, establishment of workshop, tools & tackles, P&M, consumables, cleaning aids etc.	Inch-meter	3,300	.0043913
F12	Assembly of Flanged joints : Identification of joints, handling, cleaning of gasket seating area, preparation of gasket for required flange size, placement of gasket, installation of fasteners, alignment, lubrication, sequential tightening by torque wrench, providing leak tight joint, preparation of flange alignment report, arrangement of man power, tools & tackles, plant & machinery, scaffolding & platforms, cleaning aids etc and work completion as per manufacturer drawings, documents and specifications with acceptance of EIC.	--		



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Ref.No.	Description	Unit of Measurement	Qty.	Weightage for amount of each item (Nearest to the 7 decimal points) w.r.t the total amount
F12.1	Size upto 80 NB OD	SET	500	.000775
F12.2	Size from 100 NB OD -300 NB OD	SET	1,400	.0037747
F12.3	Size above 300 NB OD	SET	350	.0022362
F13	Valve Testing (CS/SS/Ti): Identification, de-preservation, handling, shifting of valves from stores/erection site to valve testing facility, installation of valve on test bench, testing of valves, removal & shifting of valve to erection site after testing, preparation of reports, man power, P&M, scaffolding & platforms, tools & tackles with acceptance of EIC. Depreserving ,testing & represerving of valves	MT	115	.0053746
F14	Erection of Valves (CS/SS/Ti) : Handling, de-preservation, identification, pre-assembly, installation in design position , erection of manual and electric operated valves, FME, boxup, preservation, preparation of reports and carrying out all works as per manufacturer drawings, documents and specifications including temporary support arrangements, scaffolding & platforms, man power, P&M, tools & tackles, all consumables etc. Shifting, handling and erection SS & CS valves	MT	115	.0067969
F18	Stub/O-let drilling- Handling, shifting of pipe spools, marking of position and orientation, drilling of holes (primary and secondary)on pipe bosses/equipments/ pipe lines of carbon steel /stainless steel in shop/In-situ for sizes upto 65 mm diameter and depth upto 120 mm using portable drilling machines with special jigs, fixtures and arrestors along with drill bits/end mill cutter/ special cutting tools, FME inspection, preparation of reports, arrangement of man power, tools & tackles, plant & machinery, consumables, scaffolding & platforms, cleaning aids etc, as per drawings, documents and specifications and work completion with acceptance of EIC. Note : 1) Stub/O-let drilling is inclusive of both primary & secondary drilling and drilling in number of stages. 2) The drilling machine used shall have drill bit locking provision so as to prevent falling of drill bits inside the pipes/equipments	Cubic-Cm	15,000	.0013799

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Ref.No.	Description	Unit of Measurement	Qty.	Weightage for amount of each item (Nearest to the 7 decimal points) w.r.t the total amount
F19	Weld Joint Inspection by RT (Gamma Ray) : Identification of the weld joints, marking, radiographic examination of the weld joint including intersections by ISNT/ ASNT RT qualified personnel, developing of films, preparation of reports and submission to NPCIL for acceptance along with RT film, arrangement of man power, tools & tackles, plant & machinery, consumables, scaffolding & platforms, cleaning aids, storage of source etc, as per drawings, documents and specifications as detailed in Sec V with acceptance of EIC.	Inch Dia	15,000	.0109883
F20	Weld Joint Inspection by RT (X-ray) for Titanium piping: Identification, radiographic testing of the weld joints by ISNT/ ASNT RT qualified personnel, developing of films, interpretation, preparation of reports and submission to NPCIL for acceptance along with RT film, arrangement of man power, equipments, tools & tackles, consumables, cleaning aids, scaffoldings, platforms, handling safety arrangements and work completion as per drawings, documents and specifications with acceptance of EIC.	Inch Dia	3,700	.0041896
F21	Weld Joint Inspection by UT (Ultrasonic Test): Identification of the weld joints, marking, pre-cleaning, ultrasonic examination of the weld joint including intersections by ISNT/ ASNT UT qualified personnel, post cleaning, preparation of reports and submission to NPCIL for acceptance including arrangement of man power, tools & tackles, plant & machinery, consumables, scaffolding & platforms, cleaning aids etc, as per drawings, documents and specifications with acceptance of EIC.	Inch Dia	25,000	.0145942
F22	Weld Joint Inspection by DPT (Dye Penetrant Test): Identification of the weld joints, marking, pre-cleaning, dye penetrant examination of the weld joint by ISNT/ ASNT PT qualified personnel, post cleaning, preparation of reports and submission to NPCIL for acceptance including, arrangement of man power, tools & tackles, plant & machinery, consumables, scaffolding & platforms, cleaning aids etc, as per drawings, documents and specifications with acceptance of EIC.	Running Meter	4,000	.0047126

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Ref.No.	Description	Unit of Measurement	Qty.	Weightage for amount of each item (Nearest to the 7 decimal points) w.r.t the total amount
F23	<p>Hydro/Pneumatic test of Piping System : Making required arrangement on the erected pipelines for carrying out hydro/pneumatic testing, blanking, filling of pipeline, venting, pressurising, holding for required time, draining, drying, de-watering, cleaning, providing all required tools and tackles, blanks, hoses, clamps, calibrated PG, SRVs etc, preparation of as-built drawings, hydro-test scheme, CRR, test reports, arrangement of man power, tools &amp; tackles, P&amp;M, scaffolding &amp; platforms, consumables(except welding electrode &amp; filler wire), cleaning aids etc, as per drawings, documents, specifications and work completion with acceptance of EIC.</p> <p>Note: 1. During testing of circuits, if leaks are observed, such circuits may need pressurization and testing more than once. Such re-testing and pressurization will be in the scope of the Contractor without any extra claim. 2.Incase any temporary structures required, contractor shall supply all the materials including welding electrodes and consumables.</p>	Inch-meter	110,000	.0166991
F31	<p>Digitization of RT films : Collection of RT films of various sizes, scanning and digitizing the films, converting to soft form in NPCIL acceptable formats, submitting the soft copies along with proper indexing for easy identification and retrieval, preparation of reports and completion of work with acceptance of EIC.</p> <p>Scope includes arranging all necessary plant &amp; machinery, manpower, tools &amp; tackles, consumables etc.</p>	Inch-film	500,000	.0121145
F32	<p>Fabrication, erection and testing of GRP/FRP piping: Handling, fabrication, joining, erection &amp; hydro testing of GRP/FRP pipes, preparation of procedures, QAP, JHA, reports, inspection, testing and work completion as per the drawings, documents and specification with acceptance of EIC.</p> <p>The scope includes inspection at contractor's store, preparation of IMIR (incoming material inspection report), shifting, cutting, laying of pipes and pipe fittings, qualification of procedures, joining by applying resin and mat, inspection, preparation of asbuilt drawings, draining, drying , de-watering, arrangement of man power, scaffolding and platforms, tools &amp; tackles, P&amp;M.</p>	MT	6	.0005523

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Ref.No.	Description	Unit of Measurement	Qty.	Weightage for amount of each item (Nearest to the 7 decimal points) w.r.t the total amount
G	Erection of piping system - Material supply by BHEL	--		
G1	Concrete UQZ Tunnel Piping (PEB): (Material supply by BHEL) Erection, testing of Sea water piping in concrete tunnel including handling at site stores /storage yard, transporting to site, inspection, pre-assembly, erection, alignment, welding, NDT, fixing of supports & valves, hydro testing, including supply of welding electrodes, filler wires & all consumables, scaffolding & platforms, arrangement of man power, tools & tackles, P&M, preparation of reports and completion of PEB system in UQZ tunnel in all respect for Unit 3 & 4. Note: Degree of inspection in NDT is - 50% Capillary or MPI, 50% RT, 100% UT	--		
G1.1	CS pipes & fittings OD 630X12mm (Weld Joint) Note: 1. Approx no of Joints - 680 for both unit	MT	1,040	.0975939
G1.2	CS Pipes & fittings OD 530X12mm (Flange Joint) Note: 1. Flanges will be supplied as loose, same to be welded at site. 2. Approx no of Joints - 390 for both units	MT	145	.0137434
G1.3	CS Pipes & fittings OD 406.4X12.7mm (Flange Joint) Note: 1. Flanges will be supplied as loose, same to be welded at site. 2. Approx no of Joints - 460 for both units	MT	196	.018351
G1.4	Pipe Supports for PEB system	MT	130	.0094229
G2	CS piping for drainage system PUQ in UQZ tunnel and UUP, UUQ vent chamber: (Material supply by BHEL) Erection, testing of piping including handling at site stores /storage yard, transporting to site, inspection, pre-assembly, erection, alignment, welding, NDT, fixing of supports & valves, hydro testing, including supply of welding electrodes, filler wires & all consumables, scaffolding & platforms, arrangement of man power, tools & tackles, P&M, preparation of reports and completion of PUQ system in UQZ tunnel and UUP, UUQ vent chamber in all respect for Unit 3 & 4 with acceptance of EIC.	--		

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Ref.No.	Description	Unit of Measurement	Qty.	Weightage for amount of each item (Nearest to the 7 decimal points) w.r.t the total amount
G2.1	CS pipes & fittings OD 219.1x7.04mm Note: 1. Approx no of site Joints - 188 (Flange/Welded Joint) 2. Flanges will be supplied as loose, same to be welded at site.	MT	15	.001425
G2.2	SS pipes & fittings OD 18.9x5.49mm Note: 1. Approx no of site Joints - 92 (Flange/Welded Joint) 2. Flanges will be supplied as loose, same to be welded at site.	MT	2	.000447
G2.3	Pipe Supports for PUQ, PGB, GKD, GML system	MT	5	.0004278
G2.4	Valves for PUQ, PGB, GKD, GML system	MT	5	.0004334
G3	Buried Piping - PGB00-70,80-90 system: (Material supply by BHEL) Erection, testing of buried piping including handling at site stores /storage yard, transporting to site, inspection, pre-assembly, erection, alignment, welding, NDT, fixing of supports & valves, hydro testing, including supply of welding electrodes, filler wires & all consumables, arrangement of man power, tools & tackles, P&M, preparation of reports and completion of PGB system in buried portion in all respect for Unit 3 & 4 with acceptance of EIC.	--		
G3.1	CS pipes & fittings OD 720X8mm Note: 1. Approx no of site Joints - 82	MT	80	.0065907
G3.2	CS pipes & fittings OD OD 530X8mm Note: 1. Approx no of site Joints - 92	MT	70	.0058199

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Ref.No.	Description	Unit of Measurement	Qty.	Weightage for amount of each item (Nearest to the 7 decimal points) w.r.t the total amount
G4	Piping for potable water supply system GKD in UQA and 1-2 UQC building: (Material supply by BHEL) Erection, testing of piping system including handling at site stores /storage yard, transporting to site, inspection, pre-assembly, erection, alignment, welding, NDT, fixing of supports & valves, hydro testing, including supply of welding electrodes, filler wires & all consumables, scaffolding & platforms, arrangement of man power, tools & tackles, P&M, preparation of reports and completion of GKD system in UQC and UQA buildings in all respect for Unit 3 & 4 with acceptance of EIC.	--		
G4.1	CS pipes & fittings OD NB50 X 4.5mm, OD NB32 X 4mm	MT	7	.0006647
G4.2	CS Tank	MT	2	.0001709
G5	Piping for drainage system GML in UQA building: (Material supply by BHEL) Erection, testing of piping system including handling at site stores /storage yard, transporting to site, inspection, pre-assembly, erection, alignment, welding, NDT, fixing of supports & valves, hydro testing, including supply of welding electrodes, filler wires & all consumables, scaffolding & platforms, arrangement of man power, tools & tackles, P&M, preparation of reports and completion of GML system in UQA buildings in all respect for Unit 3 & 4 with acceptance of EIC.	--		
G5.1	CS pipes & fittings OD NB150 X 5.4mm, OD NB15 X 3.2mm	MT	46	.0044571

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Ref.No.	Description	Unit of Measurement	Qty.	Weightage for amount of each item (Nearest to the 7 decimal points) w.r.t the total amount
G7	HDPE Pipe lines for Indoor and Outdoor portion: (Material Supply by BHEL) Handling, Erection, welding, joining, visual inspection, hydro-testing of HDPE pipes & fittings of various sizes including hume pipes supply and erection and necessary consumables, scaffolding & platforms, arrangement of man power, tools & tackles, P&M, preparation of reports and completion of various systems in buried portion as well as inside/outside buildings in all respect for Unit 3 & 4 with acceptance of EIC. Note: The scope also includes supply of RCC pipes and fittings etc confirming to IS 458 as a hume pipe at road crossings or any other area wherever hume pipe is required, laying of RCC pipelines inside trenches, alignment, sealing with cement mortar, curing, making of reports including arrangement of man power, tools & tackles, plant & machinery, consumables, cleaning aids etc and completion of work as per tender specification and drawings.	MT	300	.0380223
G8	Excavation: Earthwork in excavation below ground level for laying of pipelines in all types of soil/rock with necessary shoring, shuttering, leveling, grading and ramming of bottom, pumping/ bailing out of water, including providing necessary temporary supports to existing service lines, water pipes, sewage pipes, electric cables etc if required, providing safety boundary identifications, removal and disposal of surplus material to dump yard about a distance of 2-3 km from work site as identified by EIC including providing all labour, materials, tools & tackles, P&M, approach ladders, preparation of reports and work completion with acceptance of EIC.			
G8.1	Soft soil.	Cubic Meter	120,000	.091813
G8.2	Hard rock.	Cubic Meter	14,000	.0250271

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G9	Sand bedding and sand filling: Supply and filling of crusher sand free from stones, spoils and rubbish material in to the trenches for sand bedding and sand filling for laying of pipelines for specified depth ,loading and unloading, transportation to site, staking, spreading, watering, compaction, dressing, removing surplus material, including arrangement of manpower, P&M, tools & tackles , approach ladders, consumables etc and preparation of reports and work completion with acceptance of EIC.	Cubic Meter	9,000	.0415237
G10	Backfilling of trench/ excavated trenches with soil: Backfilling of trenches to proper levels with selected material from available excavated soil free from stones/coarse materials, spoils and rubbish material, if required, transportation, loading and unloading of soft soil (free from coarse and rubbish material) within the approved area of plant site, laying in layers of 150mm loose thickness, watering, ramming, compaction etc, including arrangement of manpower, P&M, tools & tackles , approach ladders, consumables etc, preparation of reports and work completion with acceptance of EIC.	Cubic Meter	125,000	.0741542
G11	Inspection Chamber construction: Providing and laying reinforced cement concrete 1:2:4 using machine crushed max 20 mm downgraded stone aggregate with rebars, supply and laying of reinforced cement concrete for the strength M40 W80 and as specified in manufacturer drawing and specification. Mechanical mixing, conveying, ramming, compacting, leveling, finishing, curing, shuttering, scaffolding etc including design, supply and installation of man hole covers (CI), providing approach ladders, supply and application of water proofing and performing water fill test including supply of all materials, consumables and arrangement of tools & tackles, equipments, manpower and work completion as per drawings and specifications and instructions of Engineer-in-charge.	--		
G11.1	Construction of inspection chamber Depth up to 3 Mtr	Nos	6	.0022818
G11.2	Construction of inspection chamber from depth of above 3 Mtr up to 5 Mtr	Nos	5	.0026443
G11.3	Construction of inspection chamber from depth of above 5 Mtr up to 8.5 Mtr	Nos	9	.0073115



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Ref.No.	Description	Unit of Measurement	Qty.	Weightage for amount of each item (Nearest to the 7 decimal points) w.r.t the total amount
H	Structural steel works - Material Supply by BHEL	--		
H2	Metal structures:	--		
H2.1	<p>Fabrication of Metal structures: Handling, fabrication of metal structure platforms, handrail, ladders, gratings, anchor plates, pipe support structures, saddles and clamps, staircase, safety cover plates, equipment support structures, support brackets for material handling equipments etc and work completion as per manufacturer drawings, documents and specifications with acceptance of EIC. The scope includes study of drawings, development of detailed metal structure drawing (DMS) for approval, handling, cutting, grinding, drilling, fabrication, welding, inspection, testing, preparation of fabrication procedures, QAP &amp; reports, NDE, arrangement of man power, tools &amp; tackles, plant &amp; machinery, consumables including welding electrodes and filler wires, cleaning aids etc. Note: NDE shall be paid in respective BOQ</p>	MT	200	.0121382
H2.2	<p>Erection of metal structures: Handling, erection of metal structure such as platforms, pipe support structures, equipment support structures, handrails, anchor plates, safety cover plates, ladders, gratings (including hardware) at various elevations and locations and work completion as per manufacturer drawings, documents and specifications with acceptance of EIC. Including supply &amp; fixing of required hardware like bolt, nuts, washer to the material strength class of 5.6, 6.6, 8.8 and 10.8 as per IS 1367 or equivalent, self tapping screws of Hilti. The scope includes transportation to site from fabrication yard, floor chipping, cutting, grinding, welding, touchup primer painting, torque tightening of fasteners, inspection, testing, preparation of procedures, QAP &amp; reports, NDE, arrangement of man power, temporary support arrangements, scaffolding &amp; platforms, tools &amp; tackles, plant &amp; machinery, consumables including welding electrodes and filler wires, cleaning aids etc Note: 1) Weight of temporary fabrication, erection bolts will not be considered for payment. 2) NDE shall be paid in respective BOQ</p>	MT	200	.0108782

**Part C : Bill of Quantities**

**Tender Specification BHEL:PSSR:SCT:1956 for Sea Water Piping Package of Unit 3 & 4  
at 2 X 1000 MWe Kudankulam Nuclear Power Plant Unit # 3 & 4 - TG & SWS Package**

Ref.No.	Description	Unit of Measurement	Qty.	Weightage for amount of each item (Nearest to the 7 decimal points) w.r.t the total amount
H5	Fixing of Hilti anchor fasteners by normal drilling: (Hilti Anchor Fasteners will be issued by BHEL at free of cost): Drilling using hammer drilling machine, cleaning, handling and fixing of Hilti anchor fasteners of various sizes in HST, HSL, HDA, HAS/HVU (chemical anchor) series, tightening to the required torque value at various locations & positions, preparation of reports and work completion as per drawings, documents and specifications. The scope includes assesement of type, size and quantity of Hilti anchor fastener, shifting to various locations, marking, floor chipping to the correct level and elevation, arrangement of man power, disposal of debris, tools & tackles, plant & machinery, scaffolding & platforms, consumables, cleaning aids etc with acceptance of EIC. ( The sub-item are categorized as per size and type) Note : 1)Extra holes have to be drilled if any obstruction of reinforcement rods occurs in the location and unused holes shall be filled with dry pack material without any extra payment.	--		
H5.1	Fixing of Hilti anchor fasteners of sizes from M 08 to M 12 in HST & HSL	Nos	6,500	.00847
H5.2	Fixing of Hilti anchor fasteners of sizes from M 16 to M 24 in HST & HSL	Nos	3,500	.006005
H5.3	Fixing of Hilti anchor fasteners up to M 12 in HDA-T series	Nos	450	.00079
H5.4	Fixing of Hilti anchor fasteners from M 16 to M20 in HDA-T series	Nos	150	.0003494
H5.5	Fixing of Hilti anchor fasteners of from M8 to M12 in HAS/ HVU series	Nos	100	.0001716
H5.6	Fixing of Hilti anchor fasteners of from M16 to M33 in HAS/HVU series	Nos	100	.0002449
H6	Core drilling for fixing of Hilti bolt: Identification, marking, mounting & setting up of drilling machine, drilling in reinforced concrete using diamond core drill bit on wall/floor/ceiling, disposal of debris, preparation of reports, arrangement of man power, diamond core drill bits, tools & tackles, P&M, scaffolding & platforms, consumables, cleaning aids etc as per the requirement with acceptance of EIC.	Nos	5,100	.0079451

**Part C : Bill of Quantities**

**Tender Specification BHEL:PSSR:SCT:1956 for Sea Water Piping Package of Unit 3 & 4  
at 2 X 1000 MWe Kudankulam Nuclear Power Plant Unit # 3 & 4 - TG & SWS Package**

Ref.No.	Description	Unit of Measurement	Qty.	Weightage for amount of each item (Nearest to the 7 decimal points) w.r.t the total amount
I	Grit Blasting and Painting Works	--		
I1	Grit blasting and primer application including supply : Handling of CS pipes and fittings, supports, metal structure, shifting to blasting area, grit blasting using steel grits/shot, product qualification, supply & application of Inorganic Zinc Silicate primer with minimum thickness(DFT) of 70 microns as per technical specification I02.KK34.0.0.TH.TS.PR017 (R01), inspection, testing, preparation of reports and work completion as per drawings, documents and specifications. The scope includes assesement of material requirement, procurement of grit/shot, primer with material test certificate, inspection at contractor's store, preparation of IMIR (incoming material inspection report), qualification of procedures, arrangement of man power, tools & tackles, P&M, consumables, cleaning aids etc with acceptance of EIC. Note : Work includes application of primer on field weld joints for pipes after Hydrotest and for metal structures after welding.	Square Meter	40,000	.0452932
I.2	Supply & Application of intermediate & finish paint coats: Identification of pipelines,equipments, metal structures, surface cleaning, product qualification, supply and application of intermediate & finish paint as per technical specification I02.KK34.0.0.TH.TS.PR017 (R01) on outside surface with required thickness as categorized in sub items, inspection, preparation of reports, testing and work completion as per the drawings, documents and specification with acceptance of EIC. The work scope includes assessment of material requirement, procurement with material test certificate, handling, inspection at contractor's store, preparation of IMIR (incoming material inspection report), application, arrangement of man power, qualification of procedures, scaffolding and platforms, tools & tackles, P&M, consumables	--		
I.2.1	Intermediate coat for Low temperature application (Temperature less than or equal to 50 degree celcius): using Epoxy MIO of minimum 100 microns DFT in single coat.	Square Meter	5,000	.0042212

## Part C : Bill of Quantities

### Tender Specification BHEL:PSSR:SCT:1956 for Sea Water Piping Package of Unit 3 & 4 at 2 X 1000 MWe Kudankulam Nuclear Power Plant Unit # 3 & 4 - TG & SWS Package

Ref.No.	Description	Unit of Measurement	Qty.	Weightage for amount of each item (Nearest to the 7 decimal points) w.r.t the total amount
I.2.2	Finish coat for Low temperature application (Temperature less than or equal to 50 degree celcius): using Aliphatic Polyurethane of minimum 60 microns DFT (2 coats each 30 micron).	Square Meter	5,000	.0037006
K	Anti corrosive painting for seawater systems	--		
K1	Supply and application of Anti-corrosive coating of Polyester glass flake (Minimum 1000 microns DFT) on Field joints of Sea Water Piping Product qualification, supply and application of paint as per technical specification I02.KK34.0.0.TH.TS.PR009(R01). Application of anticorrosive paint of minimum 1000 microns DFT (2 coats each 500 micron) on inner surface of field joints using airless painting machine, testing and inspection at various stages, preparation of report and work completion as per the drawings, documents and specifications with acceptance of EIC. Note: 1.Field Joints shall be coated with Polyglass 100 through M/s Kirloskar Corrocoat who has executed internal Anti-corrosive coating of sea water pipelines. 2. The scope includes Supply and application of Anti-corrosive coating of filed joints which are erected by other agencies also.	--		
K1.1	Supply and application of Anti-corrosive coating on inner surface of field joints in CS Pipe of size upto 850mm OD (Weld Joint)	Field Joint	680	.0048983
K1.2	Supply and application of Anti-corrosive coating on inner surface of field joints of CS Pipe of size above 850 to 1220mm OD. (Weld Joint)	Field Joint	30	.000314
K1.3	Supply and application of Anti-corrosive coating on inner & outer surface of field joints in CS Pipe of size upto 850mm OD (Weld Joint)	Field Joint	174	.0032735
K1.4	Supply and application of Anti-corrosive coating of field flange joints including flange of CS Pipe of size up to 850 mm OD. (Flange Joint)	Field Joint	1,002	.0072161
K1.5	Supply and application of Anti-corrosive coating of field flange joints including flange of CS Pipe of size above 850 to 1220mm OD. (Flange Joint)	Field Joint	14	.0001465
K1.6	Supply and application of Anti-corrosive coating of field flange joints including flange of CS Pipe of size 2420mm OD. (Flange Joint)	Field Joint	72	.0015336

**Part C : Bill of Quantities**

**Tender Specification BHEL:PSSR:SCT:1956 for Sea Water Piping Package of Unit 3 & 4  
at 2 X 1000 MWe Kudankulam Nuclear Power Plant Unit # 3 & 4 - TG & SWS Package**

Ref.No.	Description	Unit of Measurement	Qty.	Weightage for amount of each item (Nearest to the 7 decimal points) w.r.t the total amount
K2	Supply and Application of Intermediate paint: Product qualification, supply and application of Epoxy MIO as per technical specification I02.KK34.0.0.TH.TS.PR009(R01) as intermediate coat of minimum 100 microns DFT (single coat) over already primer applied external surface of pipe lines, supports and structural members including handling, identification, surface cleaning, inspection, preparation of reports, testing and work completion as per the drawings, documents and specification with acceptance of EIC. The work scope includes assessment of material requirement, procurement with material test certificate, inspection at contractor's store, preparation of IMIR (incoming material inspection report), application, arrangement of man power, qualification of procedures, scaffolding and platforms, tools & tackles, P&M, consumables. Note: Scope includes painting on already erected pipes by other agency in Turbine & associated buildings.	Square Meter	40,450	.0388504
K3	Supply and Application of Aliphatic Polyurethane paint: Product qualification, supply and application of Aliphatic Polyurethane paint as per technical specification I02.KK34.0.0.TH.TS.PR009(R01), of minimum 60 microns DFT (2 coats each 30 micron) over already primer/ Epoxy MIO applied external surface of pipe lines, supports and structural members including handling, identification, surface cleaning, inspection & testing, preparation of reports, testing and work completion as per the drawings, documents and specification with acceptance of EIC. The work scope includes assessment of material requirement, procurement with material test certificate, inspection at contractor's store, preparation of IMIR (incoming material inspection report), application, arrangement of man power, qualification of procedures, scaffolding and platforms, tools & tackles, P&M, consumables. Note: Scope includes painting on already erected pipes by other agency in Turbine & associated buildings.	Square Meter	40,450	.0421122
L	Miscellaneous Works	--		

**Part C : Bill of Quantities**

**Tender Specification BHEL:PSSR:SCT:1956 for Sea Water Piping Package of Unit 3 & 4  
at 2 X 1000 MWe Kudankulam Nuclear Power Plant Unit # 3 & 4 - TG & SWS Package**

Ref.No.	Description	Unit of Measurement	Qty.	Weightage for amount of each item (Nearest to the 7 decimal points) w.r.t the total amount
L2	Chipping of concrete : Identification, marking, mounting & setting up of machine for chipping of concrete as required, disposal of debris, preparation of reports, arrangement of man power, tools & tackles, P&M, scaffolding & platforms, consumables, cleaning aids etc, as per drawings, documents and specifications & with acceptance of EIC.	Cubic Meter	10	.0004573
L7	Core cutting on reinforced concrete wall/floor : Identification, marking, mounting & setting up of machine, core cutting in reinforced concrete using diamond core drilling for various piping penetrations on wall/ floor, disposal of debris, preparation of reports, arrangement of man power, drill bits/core cutter, tools & tackles, scaffolding & platforms, plant & machinery, consumables, cleaning aids etc, as per drawings, documents with acceptance of EIC.	--		
L7.1	Concrete Core cutting by drilling - size upto Dia 200mm	MM-Meter	10,000	.0134926
L7.2	Concrete Core cutting by drilling - size above Dia 200mm	MM-Meter	10,000	.0215639
L8	Repair, Re-preservation and System Pre-handing over checks:	--		
L8.1	Manpower assistance for repair : Providing manpower assistance along with tools and tackles and general consumables for repair of deformed structure/components and restoring to original shape by bend removal, straightening (with or without the application of heat), deformation correction etc., preparation of reports and work completion as per the instructions of the EIC.  Note: Carrying out such repair activities by the one labour in a day (8 hrs.) along with general consumables like wire brush, lint free cloth, emery etc and P&M for heating and bend removal, general tool kit will be treated as one operation day for each sub-item for the above works based on the instruction from EIC.	--		
L8.1.1	Skilled man power operation	Operation-day	150	.0006008
L8.1.2	Semi-Skilled man power operation	Operation-day	200	.0006721
L8.1.3	Un-Skilled man power operation	Operation-day	300	.0007845

**Part C : Bill of Quantities**

**Tender Specification BHEL:PSSR:SCT:1956 for Sea Water Piping Package of Unit 3 & 4  
at 2 X 1000 MWe Kudankulam Nuclear Power Plant Unit # 3 & 4 - TG & SWS Package**

Ref.No.	Description	Unit of Measurement	Qty.	Weightage for amount of each item (Nearest to the 7 decimal points) w.r.t the total amount
L8.2	<p>Manpower assistance for re-preservation of Equipment &amp; Piping : Providing manpower assistance along with tools and tackles and general consumables for internal and external preservation work on static &amp; rotary equipments as per the preservation document and technical specification of NPCIL involving activities such as handling, cleaning, painting (including peel-off paint), greasing on machined surfaces &amp; fasteners, temporary blanking of the openings, covering of the equipments etc, adding and removal of silica gel, regeneration of silica gel, N2 purging &amp; boost-up for static equipments, measurement of N2 parameters such as N2 pressure, purity &amp; dew point, opening and closing of the manhole covers/inspection flanges, opening &amp; closing of metallic cap and PVC cap, general cleaning of equipments, disassembly of equipment, complete overhauling, draining/filling of oil and assembly of the equipment, pump rotation, return of excess/unused materials to NPCIL stores, along with the necessary machinery, tools &amp; tackles, lighting arrangements, cables, extension boards and applicable PPEs required for the completion of work including documentation work as per the instructions of the EIC.</p> <p>Note: Carrying out such preservation activities by the one labour in a day (8 hrs.) along with general consumables like wire brush, lint free cloth, emery etc and general tool kit will be treated as one operation day for each sub-item.</p>	--		
L8.2.1	Skilled man power operation	Operation-day	250	.0009144
L8.2.2	Semi-Skilled man power operation	Operation-day	450	.0013447
L8.2.3	Un-Skilled man power operation	Operation-day	400	.0009664

**Part C : Bill of Quantities**

**Tender Specification BHEL:PSSR:SCT:1956 for Sea Water Piping Package of Unit 3 & 4  
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Ref.No.	Description	Unit of Measurement	Qty.	Weightage for amount of each item (Nearest to the 7 decimal points) w.r.t the total amount
L8.4	<p>Man power assistance for System Pre-handing over checks: Providing manpower assistance along with tools and tackles and general consumables for pre-handing over checks for activities such as cleaning and box-up of equipments, shifting of materials for supporting pre-handing over activities, bolt tightening, strainer/filter cleaning, valve opening/closing, gasket replacement, greasing, support spring measurements &amp; adjustment of charged and hot systems etc preparation of reports and work completion as per the instructions of the EIC.</p> <p>Note: Carrying out such pre-handing activities by the one labour in a day (8 hrs.) along with general consumables like wire brush, lint free cloth, emery etc and general tool kit will be treated as one operation day for each sub-item for the above works based on the instruction from EIC.</p>	--		
L8.4.1	Skilled man power operation	Operation-day	250	.0009144
L8.4.2	Semi-Skilled man power operation	Operation-day	450	.0013447
L8.4.3	Un-Skilled man power operation	Operation-day	700	.0016825
<b>TOTAL Weightage</b>				1.0