TENDER SPECIFICATION
BHEL: PSSR: SCT: 1928

FOR

HANDLING, TRANSPORTATION, FABRICATION, ASSEMBLY, ERECTION, WELDING, NDT, INSPECTION & TESTING OF PIPING AND ERECTION OF ASSOCIATED EQUIPMENT ALONG WITH ACCESSORIES, STRUCTURES, INSULATION FOR NUCLEAR AND NUCLEAR AUXILIARY SYSTEMS IN REACTOR BUILDINGS FOR UNIT- 3 & 4 AT KUDANKULAM NUCLEAR POWER PROJECT, TAMILNADU.

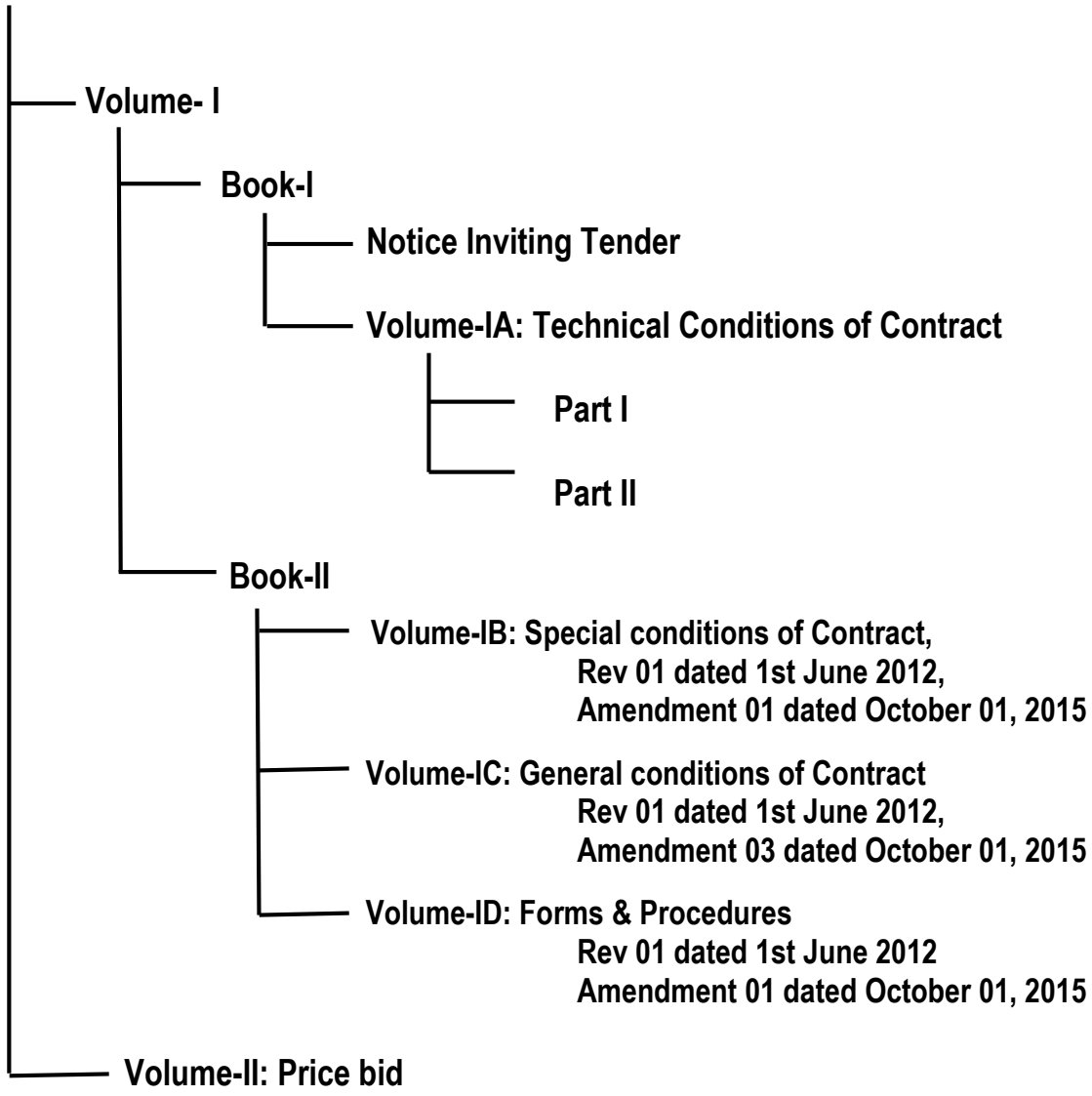
VOLUME-II

PRICE BID

BHARAT HEAVY ELECTRICALS LIMITED
(A Government of India Undertaking)
Power Sector – Southern Region
690, Anna Salai, Nandanam, Chennai – 600 035.

TENDER SPECIFICATION CONSISTS OF

Techno-Commercial Bid



PART-A-INSTRUCTIONS TO BIDDERS:

1. The 'Price bid contains the consolidated list of BOQ with brief description of items. The quantity indicated in the BOQ / Price bid is approximate only and is liable for variation. Payment will be as per actual quantity executed as certified by BHEL Engineer.
2. Before filling the Rates in the Price bid, the bidder shall go through the detailed specification of all items of BOQ as well as Scope of Work as specified in relevant Clause of this document
3. Bidders shall quote 'Total Amount' in the format named 'SCT 1928 Format to quote Total Amount' available in e-Procurement portal and uploaded under 'Packet details -> Tender covers -> Finance '(Cover Type Description – Price Bid). 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. BHEL has pre-fixed the weightages for the amount of individual items of Bill of Quantity with respect to the 'Total Amount' in Part-C.
6. Based on the pre-fixed weightages, the amount for the individual items of the Bill of Quantity shall be arrived at. This amount shall be rounded off to the nearest rupee.
7. Based on the quantities of individual item and the amount arrived in Sl No: 6 above, unit rate of individual items shall be derived. This unit rate shall be rounded off to four decimal places.
8. 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 Sl No.7 above.

Part B: Format

Tender Specification BHEL:PSSR:SCT:1928 for Erection of Equipment , Piping, Welding & NDT in Reactor Main Building of Unit-3&4 at 2 X 1000 MWe Kudankulam Nuclear Power Plant Unit # 3 & 4 - NIEP Package

Total Amount for the entire Bill of Quantities(BOQ) given in Part C	Quoted
	Unquoted

Date

SIGNATURE OF BIDDER WITH SEAL

Part C : Bill of Quantities

Tender Specification BHEL:PSSR:SCT:1928 for Erection of Equipment , Piping, Welding & NDT in Reactor Main Building of Unit-3&4

at 2 X 1000 MWe Kudankulam Nuclear Power Plant Unit # 3 & 4 - NIEP 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
A 1	Erection and welding of Reactor, Reactor Internals, Reactor cavity and Inspection well equipments / components: Receipt of materials, preparation of erection schemes, handling, transportation, uncrating, preparation of IMIR (incoming material inspection report), depreservation, trial assembly, shifting, lowering & installation in design position using contractor / NPCIL crane, scrapping and blue matching of seating surface, erection, alignment using optical survey, fit up, welding, torque tighetening/stud tensioning to the required value by hydraulic torque wrenches, inspection as per drawings and technical specifications. This work also includes removal of nozzle protection covers, cleaning & optical survey of embedded parts, precision grinding, assembly and erection of components / supports, assembly of special equipment & tools supplied by manufacturer, providing optical instruments, tools and tackles such as slings, D shackle & bow shackle, hydralic power pack with nut drivers, plant & machineries, consumables, scaffolding at all levels, providing manpower, painting of welded area of equipment, preparation and submission of reports & asbuilt details for NPCIL acceptance for following items.	--		
A 1.1	Erection, scraping of seating surface, blue matching, precision alignment, welding & inspection of Support Ring & its accessories, Thrust ring & its accessories and Reference specimen blocks in RPV and PTU as per drawings and technical specifications.	MT	94	.002908
A 1.2	Erection of Reactor pressure vessel, separating bellows, core barrel, core baffle, protective tube unit assembly, upper unit assembly, parts of main seal (RPV main stud, nickel gasket, washer & Nut) and its accessories including assembly & trial assembly of RPV internals. This work also includes assembly of components supplied in separate parts for core baffle & upper unit, installation of Core barrel & upper unit inside RVI wells, erection of assembled core baffle inside core barrel and erection of all internals inside RPV as per drawings and technical specifications. This work also includes trial assembly of core barrel, core baffel, PTU and upper units multiple times as per the requirement of work in reactor and reactor inspection well including welding of components and separating bellows.	MT	1,344	.0487435

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Part C : Bill of Quantities

Tender Specification BHEL:PSSR:SCT:1928 for Erection of Equipment , Piping, Welding & NDT in Reactor Main Building of Unit-3&4

at 2 X 1000 MWe Kudankulam Nuclear Power Plant Unit # 3 & 4 - NIEP 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
A 1.3	Erection and welding of Reactor cavity equipments such as alignment guides for upper unit, protective steel structure, Electrical equipment and Heat control of Reactor (CPSAR) drives, Thermal insulation and Biological Shielding of RPV Nozzle Area, Upper Unit Thermal Insulation, Detection Unit Motion Mechanism (JKT drives), Device for Incore Instrumentation Detection Withdrawal (jib crane) and their accessories as per drawings and technical specification.	MT	236	.0086953
A 1.4	Erection and welding of inspection well equipments such as guide alignment system of Core Barrel & PTU (protective tube unit), Core Barrel transportation device, PTU transportation platform , PTU spacer, PTU hatch, Racks for electromagnet Unit, Racks for drive Housing, Racks for moving units & CPS drive extension shafts, Racks for pitch position indicator, Platform for examination of upper Unit, Air duct, Ladder, Pulley Assembly, Cone and cover centering block and other components as per drawings and technical specification.	MT	438	.0130526
A 2	Erection and welding of Steam generator assembly(JEA): Receipt of materials, preparation of erection schemes, handling, transportation, uncrating, preparation of IMIR, depreservation, trial assembly, shifting, lowering & installation in design position using contractor/NPCIL crane, erection, alignment and optical survey, fit up, welding, torque tighetening/stud tensioning to the required value by hydraulic torque wrenches, inspection as per drawings and technical specifications. This work also includes removal of nozzle/manhole protection covers, cleaning & optical survey of embedded parts, trial assembly, assembly and erection of supports, providing tools and tackles such as heavy duty hydraulic jacks, optical survey instruments, plant & machinery, consumables, scaffolding at all levels, manpower, painting of welded area of equipment, preparation and submission of reports & asbuilt details for NPCIL acceptance for following items.	--		
A 2.1	Erection of steam generator and steam generator support assembly consisting steam generator lifting arms, journals, roller support assembly, foundation bed, saddle support, studs, cross piece, couplings, checknuts, height adjustment shim plates, gaskets etc,. This work also includes welding of lifting journals & arms with preheating, inspection as per drawings and technical specifications.	MT	3,384	.0335361

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Part C : Bill of Quantities

Tender Specification BHEL:PSSR:SCT:1928 for Erection of Equipment , Piping, Welding & NDT in Reactor Main Building of Unit-3&4

at 2 X 1000 MWe Kudankulam Nuclear Power Plant Unit # 3 & 4 - NIEP 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
A 2.2	Erection of accessories of steam generator such as single chamber and double chamber surge tanks and its supports , connecting tubes, spacer pipe, steam generator collector covers with displacers, studs, nuts, washers, RTD housing, nozzles, manhole covers, axle, data boards etc, as per drawings and technical specifications.	MT	70	.0008711
A 2.3	Box up of primary, secondary collector covers and man holes by changing nickel gaskets post hydrotest: The work includes providing scaffolding, removal of studs, safe keeping of studs, removal of collector covers, removal of nickel gasket, de-preservation of studs, nuts, washers, collector covers, stud recess, Cleaning, Internal inspection, re-preservation of studs, nuts, washers, re-installation of nickel gaskets, collector covers, fixing of fasterners, torque tightening, preparation and submission of reports including providing plant & machinery, manpower, tools, tackles & consumables for completion of work as per drawings and technical specifications.	MT	50	.001823
A 3	Erection and welding of Reactor coolant Pump Assembly (RCP): Receipt of materials, preparation of erection schemes, handling, transportation, uncrating, preparation of IMIR, depreservation, pre assembly, shifting, blue matching of embedded part with supports & installation in design position using contractor/NPCIL crane, erection, alignment and optical survey, fit up, welding, Torque tighetening/stud tensioning to the required value by hydraulic torque wrenches/ stud tensioners, inspection as per drawings and technical specifications. This work also includes removal of nozzle protection covers, cleaning & survey of embedded parts, assembly and erection of roller supports, providing tools and tackles, plant & machinery, consumables , scaffolding at all level and manpower, painting of welded area of equipment, preparation & submission of Reports & asbuilt details for NPCIL acceptance for following items.	--		

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Part C : Bill of Quantities

Tender Specification BHEL:PSSR:SCT:1928 for Erection of Equipment , Piping, Welding & NDT in Reactor Main Building of Unit-3&4

at 2 X 1000 MWe Kudankulam Nuclear Power Plant Unit # 3 & 4 - NIEP 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
A 3.1	Assembly, erection, alignment of Reactor coolant pump and its support assembly such as spherical housing, bottom spacer, roller supports, adjusting mechanism, biological protection ring, brackets, removal part (pullout assembly), stator and motor assembly including fly wheel, upper brackets, oil tanks, pipe union assembly, platform, lower brackets assembly and other components as per drawings and technical specifications. This work also includes scraping of seating surface of EPs with roller supports, blue matching.	MT	1,240	.0452101
A 3.2	Assembly, erection of Reactor coolant pump accessories such as service platform assembly, immovable support, independent circuit air separator, air separator for the radial axial bearing circuit, pressure head tank, IC cooler, additional cooler of seal unit, radial axial bearing cooler, tank assembly, air cooler etc, as per drawings and technical specifications.	MT	140	.0037218
A 4	Erection and welding of Pressuriser Assembly (JEF): Receipt of materials, preparation of erection schemes, handling, transportation, uncrating, preparation of IMIR, depreservation, pre assembly, shifting & installation in design position using contractor/NPCIL crane, erection, alignment and optical survey, fit up, welding, Torque tightening/stud tensioning to the required value by hydraulic torque wrenches/ stud tensioners, inspection as per drawings and technical specifications. This work also includes removal of nozzle/manhole protection covers, cleaning of embedded parts, post concreting survey of EPs, assembly and erection of supports, scrapping and blue matching of thrust supports, providing tools and tackles, plant & machineries, consumables , scaffolding at all level, manpower, painting of welded area of equipment, preparation & submission of Reports & asbuilt details for NPCIL acceptance for following items.	--		
A 4.1	Erection and welding of pressurizer and its supporting shell as per drawings and technical specifications.	MT	436	.0123262
A 4.2	Erection and welding of pressurizer thrust ring assembly such as thrust ring, corbel, brackets, inserts, plates, box channels etc, including scraping and blue matching of contact area between brackets, inserts, thrust ring as per drawings and technical specifications.	KG	16,000	.0004754

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Tender Specification BHEL:PSSR:SCT:1928 for Erection of Equipment , Piping, Welding & NDT in Reactor Main Building of Unit-3&4

at 2 X 1000 MWe Kudankulam Nuclear Power Plant Unit # 3 & 4 - NIEP 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
A 4.3	Erection of pressurizer accessories such as surge tanks and its supports, connected tubing, temperature sensor casings, deflector plates, surface RTDs etc, as per drawings and technical specifications.	KG	2,000	.0000671
A 5	Erection and welding of ECCS stage-I & II hydro accumulator Assembly and Quick boron injection system tanks: Receipt of materials, preparation of erection schemes, handling, transportation, uncrating, preparation of IMIR, depreservation, shifting, lowering & installation in design position using contractor/NPCIL crane, erection, alignment and optical survey, fit up, welding, Torque tightening/stud tensioning to the required value by hydraulic torque wrenches/ stud tensioners, inspection as per drawings and technical specifications. This work also includes removal of nozzle/manhole protection covers, cleaning of embedded parts, post concreting survey of EPs, assembly and erection of supports, Supply of tools and tackles, plant & machineries, consumables, scaffolding at all level and arranging manpower, painting of welded area of equipment, preparation & submission of Reports & asbuilt details for NPCIL acceptance for following items.	--		
A 5.1	Erection, alignment and welding of Ist Stage Hydro Accumulator Tank.	MT	690	.0189343
A 5.2	Erection and welding of Hydro accumulators accessories such as surge tanks, connected tubing, surge tank supports, casing for resistance heat converters (RTD), studs, nuts, washers, nickel gaskets etc,.	Kg	3,000	.0000928
A 5.3	Erection, alignment and welding of 2nd Stage Hydro Accumulator Tanks, supports, fastening of support to Embedded parts and also support to tank with studs,nuts, washers and torque tightening etc,.	MT	1,546	.0397216
A 5.4	Erection and welding of Hydro accumulators accessories such as surge tanks and its supports, connected tubing, studs, nuts, washers, gaskets etc,.	Kg	600	.0000207
A 5.5	Erection, alignment and welding of Quick boron injection system Tank	MT	230	.0063516
A 5.6	Erection and welding of Quick boron injection system Tank accessories such as surge tanks, connected tubing, surge tank supports, casing for resistance heat converters (RTD), studs, nuts, washers, nickel gaskets etc,.	kg	2,800	.0001013

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Part C : Bill of Quantities

Tender Specification BHEL:PSSR:SCT:1928 for Erection of Equipment , Piping, Welding & NDT in Reactor Main Building of Unit-3&4

at 2 X 1000 MWe Kudankulam Nuclear Power Plant Unit # 3 & 4 - NIEP 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
A 6	Erection of Passive heat removal system. (PHRS) (JNB 50-80): Receipt of materials, preparation of erection schemes, handling, transportation, uncrating, preparation of IMIR, depreservation, pre assembly of supplied components at crane pad, shifting, lowering & installation in design position using contractor/NPCIL crane, erection, alignment and optical survey, fit up, welding, Torque tightening/stud tensioning to the required value by hydraulic torque wrenches/ stud tensioners, inspection as per drawings and technical specifications. This work also includes removal protection covers, cleaning of embedded parts, survey of EPs, assembly and erection of supports, providing optical survey instruments, tools and tackles, plant & machineries, consumables , scaffolding at all level, manpower, painting of welded area of equipment, preparation & submission of Reports & asbuilt details for NPCIL acceptance for following items.	--		
A 6.1	Assembly & welding of components of Passive heat removal heat exchanger shell (casing) at crane pad including beams, front panel, back panel, side panels, central panel, dome covers, crossbar etc,, trial assembly of PHRS heat exchanger with casing, erection & alignment at design position.	MT	420	.0123878
A 6.2	Erection & alignment of heat exchanger including spline plate, pin etc,.	MT	864	.0244187
A 6.3	Assembly and erection of Inlet dampers, expansion duct, reducing duct, duct of bottom & top part, regulating device, electro magnets, outlet dampers, shell members, transition members, compensator group, sealing gland Power pack, operating mechanism, distributing panel etc,.	MT	946	.0265792
A 6.4	Assembly, erection, alignment and welding of support assembly, PHRS round duct including KLB pipeline with support assembly inside PHRS round duct.	MT	784	.0232375

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at 2 X 1000 MWe Kudankulam Nuclear Power Plant Unit # 3 & 4 - NIEP 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
A 7	Installation of Electrical heaters (for pressurizer, emergency core cooling system, quick boron injection system): Receipt of materials, handling, transportation, uncrating, preparation of IMIR, depreservation, placement of heaters on protection cages, shifting of heaters to location with protection cages, lowering in design position using crane, Removal of temporary covers on equipment, cleaning of flange & heater guide, seating surfaces, measuring electrical parameters of heaters, ensuring nozzle throughness of inter gasket leak monitoring, Nickel gasket erection, erection of heater, alignment, application of lubricants to stud assembly, fixing of studs, nuts, washers, torque tightening heaters with hydraulic torque wrenches as per the designed sequence to achieve required stud elongation values, inspection, providing protective covers for heater terminals as per drawings and technical specification. This work also includes providing scaffoldings/platforms, man power, plants and machineries, hydraulic power pack with torque wrenches, tool and tackles, consumables, stud elongation measuring set up including dial gauges etc., preparation, submission of reports & asbuilt details for NPCIL acceptance for following items.	--		
A 7.1	Pressurizer heaters (56 nos)	KG	11,000	.0003211
A 7.2	Emergency core cooling system heaters (8 nos)	KG	1,600	.0000478
A 7.3	Quick boron injection system heaters (8 nos)	KG	1,600	.0000509

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Part C : Bill of Quantities

Tender Specification BHEL:PSSR:SCT:1928 for Erection of Equipment , Piping, Welding & NDT in Reactor Main Building of Unit-3&4

at 2 X 1000 MWe Kudankulam Nuclear Power Plant Unit # 3 & 4 - NIEP 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
A 8	Assembly, testing and erection of Hydraulic shock absorbers: Receipt of materials, handling, transportation, uncrating, preparation of IMIR, depreservation, transportation, handling, checking the shock absorber piston movement & trial assembly of hydraulic shock absorber, erection, fit-up and welding of brackets and arms on Embedded parts, installation of shock absorber in design position on Steam generators (R-450), reactor coolant pumps (R-300 series), Pressurizer piping (R-100,R-50 series), ECCS piping (R-100,R-50 series), QBIS piping (R-50 series) inside reactor building, alignment, visual inspection, installation of oil tank, connected tubing with shock absorber, level indicators as per drawings and technical specification. This work also includes dimensional survey of individual components, arranging jigs & fixtures, providing scaffolding, installation and placement of protection covers for shock absorbers, cleaning and touch up painting of weld joints, plant & machinery , manpower , tools tackles & consumables, preparation & submission of reports and asbuilt drawings for NPCIL acceptance of the following items.	--		
A 8.1	Hydraulic shock absorbers (R-450) of Steam generators (64 nos)	MT	112	.0033279
A 8.2	Hydraulic shock absorbers (R-300) of Reactor coolant pumps (16 nos)	MT	18	.0005569
A 8.3	Hydraulic shock absorbers (R-100) of Pressurizer pipelines (28 nos)	MT	17	.0005259
A 8.4	Hydraulic shock absorbers (R-50) of Pressurizer pipelines (8 nos)	MT	2.8	.0000881
A 8.5	Hydraulic shock absorbers (R-100) of ECCS pipelines (6 nos)	MT	9.2	.000291
A 8.6	Hydraulic shock absorbers (R-50) of ECCS pipelines (12 nos)	MT	3	.0000954
A 8.7	Hydraulic shock absorbers (R-50) of JDJ pipelines (32 nos)	MT	13	.0004476
A 8.8	Erection of Oil tanks and connected SS tubing, level indicators for hydraulic shock absorbers of various types (R-450,R-300,R-100,R-50)	SET	166	.0046892
A 8.9	Installation of position indicators for hydraulic shock absorbers of various types (R-450,R-300,R-100,R-50)	Nos	166	.0016052

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Tender Specification BHEL:PSSR:SCT:1928 for Erection of Equipment , Piping, Welding & NDT in Reactor Main Building of Unit-3&4

at 2 X 1000 MWe Kudankulam Nuclear Power Plant Unit # 3 & 4 - NIEP 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
A 9	Detachable Thermal Insulation Blocks	--		
A 9.1	Assembly and Erection of Quick release detachable thermal insulation blocks (DTIB) on Nuclear steam supply system equipments and piping: Receipt of modular thermal insulation blocks of various sizes, handling, transportation, uncrating, preparation of IMIR, depreservation, setting up assembly & pre-fabrication room for carrying out pre assembly, fixing of quick release latches & trimming of DTIB blocks, taking field / site measurements of erected equipment and piping, cleaning of equipment and pipelines, preparation of drawing/template for nozzle locations, marking profiles on insulation blocks, cut /enlarge provision for piping nozzle openings as per asbuilt data, handling the blocks, pre fixing of quick release fasteners at design locations with the help of spot welding machines, erection of DTIB blocks, alignment, adjusting the gaps between the blocks with the help of quick release fasteners, welding of locks with spot welding machines, preparation and installation of ceramic wool mattresses, pre-fabrication & installation of cover sheets with spot welding at all nozzle locations, designed openings, inspection of all design clerances as per drawings and technical specifications, prepartion of reports and asbuilt drawings for NPCIL acceptance for following items. This work also includes providing consumables, tools and tackles, plant & machineries, consumables , scaffolding at all level and manpower.	SqM	7,000	.0074547

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Tender Specification BHEL:PSSR:SCT:1928 for Erection of Equipment , Piping, Welding & NDT in Reactor Main Building of Unit-3&4

at 2 X 1000 MWe Kudankulam Nuclear Power Plant Unit # 3 & 4 - NIEP 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
A 9.2	Modification of DTIB insulation blocks to suit to site requirements : Taking site measurements of interference of DTIB insulation blocks with other equipments/pipelines/metal structures/cable metal trays, preparation of interference drawing and modification drawing of DTIB blocks, obtain clearance from NPCIL for modification, shifting of modular thermal insulation blocks of various sizes from site location to fabrication room, cleaning of the DTIB blocks, marking modification profiles on insulation blocks, handling the blocks, cutting open the blocks using grinding machine/scissors, removal of insulation material if required from the portion of block to be modified, cutting and fabrication of SS sheets as per dimensions, welding with spot welding machines, re-filling of insulation material in the modified box, distributing and fixing the insulation material inside a module by means of special pins with clips, installing the cover sheet, welding with spot welding machines, finish grinding, inspection and clerance for erection, shifting the modified block to location and re-install to check for the correctness/elimination of interference, fixing of quick release fasterner with spot welding, inspection at stages as per specification and instruction of Engineer Incharge, prepartion and submission of reports, as built drawings for NPCIL acceptance. This work also includes providing tools and tackles, plant & machineries, manpower, consumables required for work.	SQ.inch	190,000	.0716314
A 9.3	Removal and re-installation of DTIB blocks : Removal of thermal insulation blocks from equipment/pipeline for pre service inspection (PSI) activities, Marking of blocks and loose mattresses and cover plates for easy identification, shifting to safe location, safely stacking the material at designated location, cleaning of DTIB internal & external surface, cleaning of equipment and pipelines after PSI activities for erection of DTIB blocks, shifting of DTIB blocks back to design location, re-erection of DTIB blocks, mattresses, cover sheets, fixing with fasteners, ensure design clerances, inspection, prepartion of reports, as built drawings for NPCIL acceptance. This work also includes providing tools and tackles, arranging manpower, plant & machineries, consumables, scaffolding at all level as required for work.	SqM	7,000	.0095089
A 10	Design , supply and Erection of Special structures	--		

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at 2 X 1000 MWe Kudankulam Nuclear Power Plant Unit # 3 & 4 - NIEP 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
A 10.3	Design, supply, fabrication, welding of Main coolant pipeline support structures, load testing structures for polar crane , transport airlock erection structure, cover plates for fuel pond area and other components : Study of civil structures (reactor building, transport portal, equipment air lock/ airlock embedded components, fuel pool, Design, detailing of structures, analysis using softwares (staad/ansys or any other structural analysis software) and equipment details evaluating the reaction loads transferred to embedded parts/civil structures. Supply of structural steel material conforming to IS 2062, E250, Quality B0 consisting plates/ sheets/ angle/ channel/ beam, high strength structural G.I. Bolts, nuts, lock nuts and washers, etc, with test reports, transportation, storage, handing, fabrication involving cutting, grinding, bending to required shape, drilling, fitup & welding, inspection, surface preparation by grit blasting, supply & application of zinc primer and epoxy painting as per drawing and technical specifications. This work also includes providing man power, tools, tackles, plant and machineries, supply of welding electrodes, other consumables as required, preparation of reports and submission for acceptance. Note: Manufacturing/fabrication shall start only after the NPCIL designers acceptance.	MT	210	.0116353
A 10.4	Erection, field welding and inspection of Main coolant pipeline support structures, load testing structures for polar crane , transport airlock erection structure, cover plates for fuel pond area and other components : Shifting, handling, erection, fit up & welding using SMAW process, inspection as per drawing and technical specification. This work also includes erection of scaffolding / temporary platforms, machining, providing man power, tools, tackles, plant and machineries, supply of welding electrodes, other consumables, cleaning aids such as high quality kerosene / acetone etc, preparation of reports and submission for acceptance.	MT	250	.0066418

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at 2 X 1000 MWe Kudankulam Nuclear Power Plant Unit # 3 & 4 - NIEP 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
B 1	Erection, welding, heat treatment and inspection of Main circulating pipelines(JEC): *Note: Induction heating machines with accesories for MCP welding will be provided by BHEL at free of cost Receipt of materials, handling, transportation, uncrating, preparation of IMIR, depreservation, dimensional survey, shifting, lowering & installation of Main coolant pipelines of four loop system connecting reactor pressure vessel (RPV), Steam Generator (SG) and Reactor Coolant Pump (RCP) consiting four(4) spools per loop (weighing apprx 270 MT per unit) resting on rollers placed over designed temporary support structures using contractor/NPCIL crane, alignment using optical survey, excess length calculation based on as-built details of RPV, SG, RCP nozzles coordinates, trimming excess length, weld edge preparation using special bevelling machine, arranging fixtures for fitup, alignment, optical survey, fitup, heat treatment of weld joints including supply of heat treatment system, monitoring & data collection system for induction coil heating system & resistance heating system, controlling the thermal movement of pipelines, welding & heat treatment cycle of duration 25 to 29 days per weld joint, inspection, preservation of weld joints by application of preservative as per drawings and technical specifications. This work also includes qualification of technology, preparation & approval of procedures for erection, welding, heat treatment & NDT, providing tools and tackles, plant & machineries including supply & arranging power distribution system with Diesel Generators of required capacity and numbers for uninterupted power supply during technology & welder qualification and production welding at in-situ, design, supply, comissioning & operation of Induction heating machines, flexible coils, chillers for cooling, connected hydraulic piping, design, supply, comissioning & operation of resistance heating pads, supply of PID controllers, temperature recorders, Laptops with monitoring softwares for monitoring of parameters, power controller modules, thermo couples / RTDs of required numbers including standby, compensating cables, thermal insulation etc, for carrying out pre heating and Post weld heat treatment (PHT & PWHT), NDT including hot radiography & its fixture, air compressor for hot radiography etc., axial cooling fans for temperature control during welding, fume extractors, welder breather sets, welding consumables including argon gas, grinding wheel, air conditioning	--		

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at 2 X 1000 MWe Kudankulam Nuclear Power Plant Unit # 3 & 4 - NIEP 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
	arrangement during MCP welding, scaffolding at all level and qualified manpower round the clock shift working, painting of welded area of pipeline, removal of nozzle protection covers, preparation & submission of Reports & as-built details for NPCIL acceptance for following items.			

SIGNATURE OF BIDDER WITH SEAL

Part C : Bill of Quantities

Tender Specification BHEL:PSSR:SCT:1928 for Erection of Equipment , Piping, Welding & NDT in Reactor Main Building of Unit-3&4

at 2 X 1000 MWe Kudankulam Nuclear Power Plant Unit # 3 & 4 - NIEP 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
B 1.1	Qualification of Technology & Production welding using flexible coils Induction Heating (RPV to MCP and SG to MCP): *Note: Induction heating machines with accesories for MCP welding will be provided by BHEL at free of cost. Receipt of technology qualification pipe spools, depreservation, storage, handling, preparation of detailed procedures for welding, heat treatment, deploying specilized heat treatment agencies for designing (including analysis through Ansys or other softwares), supplying induction heating system with flexible coils, performing induction heating, providing diesel generators (DGs) of required capacity for uninterupted power supply during welding and heat treatment as standby, training of welder in low alloy steel plate or pipe of thickness 70 mm & above supplied by the contractor & qualification of required number of skilled welders on russian materials, arranging jigs and fixtures for holding pipe spools, flexible induction coils, fitup, alignment, root & stabilization (upto 10mm thickness) welding by GTAW process, performing NDT (DPT, & RT) and subsequent layers using SMAW process upto 70mm wall thickness, preheating using induction heating (220-270 deg C), carrying out welding upto 50% of wall thickness, thermal recovery for SG & MCP weld joints, performing NDT (DPT, hot RT), welding upto full thickness with preheating, thermal recovery, performing NDT (DPT, RT, UT), PWHT (620-660 degC) for 8hrs using induction heating , performing NDT (DPT, RT, UT), carrying out Stainless steel cladding (separating, protective) from inside of the pipe, perform NDT (DPT,UT), preparation of multiple samples for destructive testing for procedure qualification as per drawings and specification and approved procedure, carrying out tensile test at both room & elevated temperature (20, 350 deg C), static bend & Impact test on weld metal, HAZ and clad at various temperatures, chemical analysis of weld joint, ferrite count, IGC test, hardness test, metallographic examination as per approved procedures, all testing at NPCIL approved labs, preparation and submission of results of these examination & reports for acceptance. This work also includes arranging all induction heating related equipments like converter, inverter, flexible induction heating coils, thermo couples/RTDs, recorders, PID controllers, chillers plant and water tank, connected hydraulic piping, connectors. and all related items for complete works as per	JOINT	2	.0018684

SIGNATURE OF BIDDER WITH SEAL

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
	technical specifications and codes & standards .			
B 1.2	Qualification of Technology & Production welding using Resistance Heating (MCP pipe to MCP pipe and MCP pipe to RCP) : Receipt of technology qualification pipe spools, depreservation, storage, handling, preparation of detailed procedures for assembly, welding, heat treatment, deploying specilized heat treatment agencies for designing (including analysis through Ansys or other softwares), supplying resistance heating system with heating pads, performing resistance heating, providing diesel generators (DGs) of required capacity for uninterupted power supply during welding and heat treatment as standby, training of welder in low alloy steel plate or pipe of thickness 70 mm & above supplied by the contractor & qualification of required number of skilled welders on russian materials, arraging jigs and fixtures for holding pipe spools, resistance heating pads, fitup, alignment, root & stabilization (upto 10mm thickness) welding by GTAW process, perform NDT (DPT, & RT) and subsequent layers using SMAW process upto 70mm wall thickness, preheating using resistance heating (220-270C), carrying out welding upto 50% of wall thickness, thermal recovery, performing NDT (DPT, RT), welding upto full thickness with preheating, thermal recovery, performing NDT (DPT, RT, UT), PWHT (640-660 degC for 8hrs) using resistance heating , perform NDT (DPT,RT, UT), carrying out Stainless steel cladding (separating, protective) from inside of the pipe, perform NDT (DPT,UT), preparation of multiple samples for destructive testing as per drawings & technical specification, approved procedure, carrying out tensile test at both room, elevated temperature (20, 350 deg C), static bend & Impact test on weld metal, HAZ and clad at various temperatures, chemical analysis of weld joint, ferrite count, IGC test, hardness test, metallographic examination as per approved procedures, testing at NPCIL approved labs, preparation and submission of results of these examination & reports for acceptance. This work also includes arranging all resistance heating related items like resistance heating pads of required capacities, fixtures for holding pads, temperature monitoring and control arrangements, thermo couples/RTDs, recorders, PID controllers, and all related items for complete works as per technical specifications and codes & standards .	JOINT	2	.0018684

Part C : Bill of Quantities

Tender Specification BHEL:PSSR:SCT:1928 for Erection of Equipment , Piping, Welding & NDT in Reactor Main Building of Unit-3&4

at 2 X 1000 MWe Kudankulam Nuclear Power Plant Unit # 3 & 4 - NIEP 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
B 1.3	Erection of main coolent pipe (MCP) line: Handling, transportation, dimensional survey, shifting, lowering & installation over temporary structures, erection of MCP spools connecting RPV to SGs, SGs to RCP pump, RCP pump to RPV for all four loops, estabilishing optical alignment system, edge preparation, fitup after acceptance of respective equipment erection as per drawings and specification. This work also includes preparation of handling & erection methodology, providing guiding arrangement such as hillmen roller, hydraulic adjusting mechanisam for MCP during welding for free movement, monitoring of movement of pipe using optical measurement, dial gauge setup, cutting, trimming of excess length of MCP pipe & edge preparation for four joints per loop using special bevelling machine of compact & sleek design (low clearance-split type), jigs & fixures for MCP movement guiding. This also includes providing tools & tackles, machineries including alignment equipment, qualified manpower, consumables as per approved procedures and instruction of EIC.	MT	530	.0182863

SIGNATURE OF BIDDER WITH SEAL

Part C : Bill of Quantities

Tender Specification BHEL:PSSR:SCT:1928 for Erection of Equipment , Piping, Welding & NDT in Reactor Main Building of Unit-3&4

at 2 X 1000 MWe Kudankulam Nuclear Power Plant Unit # 3 & 4 - NIEP 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
B 1.4	Welding of MCP weld joints insitu: Receipt of free issue welding consumables such as filler wire & coated electrodes, transportation, inspection & preparation of IMIR, storage in temperature controlled closed storage facility, preparation of distortion control & defect repair procedures, providing two qualified welders per joint on each shift for round the clock shift welding, root welding using GTAW process , performing NDT like DPT & RT, weld upto 50% of wall thickness of pipe using SMAW process with pre heating, performing DPT & RT after thermal recovery or hot Radiography, weld up to 100% wall thickness with preheating, perform DPT, RT & UT after thermal recovery / intermediate tempering, performing DPT, RT & UT after Post Weld Heat treatment (PWHT), weld SS cladding inside MCP pipe, perform layer by layer DPT & UT on completed cladding, including weld distortion control through sequential welding, preparation & submission of reports for acceptance as per drawings and technical specification. This work also includes providing one standby welder on each weld joint for two weld joints opposite loop at a time, providing welding & inspection machineries, cooling arrangement for equipment & welders, breathing sets for welders & fume extractors, safe & conducive working atmosphere with approach ladder for movement inside MCP pipe, qualified personnel for NDT inspection, consumables such as argon gas, grinding wheels for welding & inspection for satisfactory completion of work.	JOINT	56	.0310334

SIGNATURE OF BIDDER WITH SEAL

Part C : Bill of Quantities

Tender Specification BHEL:PSSR:SCT:1928 for Erection of Equipment , Piping, Welding & NDT in Reactor Main Building of Unit-3&4

at 2 X 1000 MWe Kudankulam Nuclear Power Plant Unit # 3 & 4 - NIEP 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
B 1.5	Pre-heating and Post Weld Heat Treatment (PWHT) of MCP weld joints using flexible coils Induction Heating (RPV to MCP and SG to MCP): *Note: Induction heating machines with accesories for MCP welding be provided by BHEL at free of cost. Design, analysis through Ansys or other softwares for heat load calculation of pre-heating and PWHT of MCP weld joints of various configurations, procurement, qualification of machinaries at factory, supply, transportation of induction heating machines with flexible coils including standby equipment, providing diesel generators (DGs) of required capacity for uninterupted power supply during welding and heat treatment for complete weld cycle, deploying specilized heat treatment agencies for heat treatment, commissioning & operation of Induction heating machines, flexible coils, chillers for cooling, connected hydraulic piping, supply of PID controllers, temperature recorders, Laptops with monitoring softwares for monitoring of parameters, power controller modules, thermo couples / RTDs of required numbers including standby, compensating cables, thermal insulation etc, for carrying out pre heating and Post weld heat treatment (PHT & PWHT), performing induction heating of weld joints as per approved procedure, drawings and technical specification. This work also includes providing, manpower, machinaries, consumables, DGs with consumables, mandatary spares required for trouble free operation for round the clock shift work of estimated duration of 9 months for each unit with gap of 8 months for second unit and taking back all equipment after completion of heat treatment of both units.	JOINT	32	.0091502

SIGNATURE OF BIDDER WITH SEAL

Part C : Bill of Quantities

Tender Specification BHEL:PSSR:SCT:1928 for Erection of Equipment , Piping, Welding & NDT in Reactor Main Building of Unit-3&4

at 2 X 1000 MWe Kudankulam Nuclear Power Plant Unit # 3 & 4 - NIEP 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
B 1.6	Pre-heating and Post Weld Heat Treatment (PWHT) of MCP weld joints using Resistance Heating (MCP pipe to MCP pipe and MCP pipe to RCP) : Design, analysis through Ansys or other softwares for heat load calculation of pre-heating and PWHT of MCP weld joints of various configurations, procurement, qualification of machinaries at factory, supply, transportation of resistance heating system including stanby equipment, providing diesel generators (DGs) of required capacity for uninterupted power supply during welding and heat treatment for complete weld cycle, deploying specilized heat treatment agencies for heat treatment, comissioning & operation of resistance heating system, supply of PID controllers, temperature recorders, Laptops with monitoring softwares for monitoring of parameters, power controller modules, thermo couples / RTDs of required numbers including standby, compensating cables, thermal insulation etc, for carrying out pre heating and Post weld heat treatment (PHT & PWHT), performing resistance heating of weld joints as per approved procedure, drawings and technical specification. This work also includes providing, manpower, machinaries, consumables,consumables for DGs, mandatary spares required for trouble free operation for round the clock shift work of estamated duration of 9 months for each unit with gap of 8 months for second unit and taking back all equipment after completion of heat treatment of both units.	JOINT	24	.008096

SIGNATURE OF BIDDER WITH SEAL

Part C : Bill of Quantities

Tender Specification BHEL:PSSR:SCT:1928 for Erection of Equipment , Piping, Welding & NDT in Reactor Main Building of Unit-3&4

at 2 X 1000 MWe Kudankulam Nuclear Power Plant Unit # 3 & 4 - NIEP 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
B 1.7	Erection, commissioning and operation of electrical automatic change over network including panels, connecting system for welding and heat treatment of MCP: *Note: Automatic Change over Panels & Power cables as required for MCP welding will be provided by BHEL at free of cost. Erection and commissioning of indoor type automatic change over panels, laying of 3.5C x 240/300 Sqmm aluminium conductor XLPE power cable ,including supply of required gland & lugs, glanding and termination , supply and installation of 40mm dia MS rod & 50 x 6 mm GI flat for earthing, construction of closed room for housing DGs & electrical panel for pre-heat treatment & PWHT of MCP weld joints as per approved procedure, drawings and technical specification. This work also includes providing qualified electricians, technicians for round the clock operation, mandatary spares required for trouble free operation for round the clock shift work of estimated duration of 9 months for each unit with gap of 8 months for second unit and taking back all equipment after completion of heat treatment of both units.	SET	2	.0013843
B 1.8	Supply of welding electrode and filler wire specified in drawings & technical specification of russian make with manufacturers test certificates meeting Russian codes & standards for Nuclear Power plant welding works from reputed Russian manufacturers like M/s Izora / AEM technologies or other approved vendors as per instructions of engineer. The quoted rate of contractor shall includes all cost towards packing & forwarding, transportation, IGST and any other incidental charges. Note: Details of Indian dealers will be provided during the time of execution.	--		
B 1.8.1	Filler wire Dia 2.0, Cb-08G2C	Kg	50	.0000254
B 1.8.2	Electrode Dia3.0, Grade YONNI-13 / 45A, OCT 5.9224.75	Kg	100	.0000532
B 1.8.3	Electrode Dia3.0, Grade T-30, OCT 24.948.01-90	Kg	100	.0000638

SIGNATURE OF BIDDER WITH SEAL

Part C : Bill of Quantities

Tender Specification BHEL:PSSR:SCT:1928 for Erection of Equipment , Piping, Welding & NDT in Reactor Main Building of Unit-3&4

at 2 X 1000 MWe Kudankulam Nuclear Power Plant Unit # 3 & 4 - NIEP 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
B 1.8.4	Electrode Dia4.0, Grade T-30, OCT 24.948.01-90	Kg	1,300	.0008572
B 1.8.5	Electrode Dia3.0, Grade -25/1, OCT 24.948.01-90	Kg	150	.0001404
B 1.8.6	Electrode Dia4.0, Grade -25/1, OCT 24.948.01-90	Kg	100	.0000924
B 1.8.7	Electrode Dia3.0, Grade ZA-898 / 21B, OCT 5P.9370.2011	Kg	200	.0001804
B 1.8.8	Electrode Dia4.0, Grade ZA-898 / 21B, OCT 5P.9370.2011	Kg	500	.00043
C 1	Equipment Erection in Reactor Building	--		
C 1.1	Handling, assembly, welding, erection of Refueling machine with rail & fuel pool racks and other accessories : Receipt of free issue material, handling, transportation, uncrating, preparation of IMIR, de-preservation, shifting inside reactor building, assembling, erection in the designed position, alignment, fitup, welding using GTAW / SMAW process, visual inspection of rail, refueling machine, fuel pool rack supports, racks and other accessories as per drawings and tender technical specifications. This work also includes cleaning of rail & rack support embedded parts, survey using optical instruments for level and horizontality, providing shim plates for alignment, fastening of bolts, washers and nuts to required torque using hydraulic torque wrench, multiple handling of components during assembly, providing scaffoldings/platforms, manpower, machineries, optical survey instruments, welding & cleaning consumables, high quality kerosene/ acetone, argon gas, painting of welded area of equipment, preparation & submission of Reports and as built details for acceptance.	--		

SIGNATURE OF BIDDER WITH SEAL

Part C : Bill of Quantities

Tender Specification BHEL:PSSR:SCT:1928 for Erection of Equipment , Piping, Welding & NDT in Reactor Main Building of Unit-3&4

at 2 X 1000 MWe Kudankulam Nuclear Power Plant Unit # 3 & 4 - NIEP 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
C 1.1.1	Refueling machine and its accessories	MT	148	.0027172
C 1.1.2	Refueling machine rail	MT	26	.0005114
C 1.1.3	Fuel pool supports & other fuel pool accessories	MT	12	.0002465
C 1.1.4	Fuel pool Racks & gate	MT	120	.002329
C 1.1.5	Shock absorber, universal seat & decontamination pit equipment	MT	86	.0019021
C 1.1.6	Vertical stand	MT	15	.0003422

SIGNATURE OF BIDDER WITH SEAL

Part C : Bill of Quantities

Tender Specification BHEL:PSSR:SCT:1928 for Erection of Equipment , Piping, Welding & NDT in Reactor Main Building of Unit-3&4

at 2 X 1000 MWe Kudankulam Nuclear Power Plant Unit # 3 & 4 - NIEP 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
C 1.2	Handling, transportation, erection and commissioning of Lock carriage, protective rolling gate with rail track: Receipt of free issue materials, preparation & submission of handling schemes, handling, transportation, uncrating, preparation of IMIR, de-preservation, shifting , assembling, erection of rail assembly, Lock carriage, protective rolling gate and other accessories in the designed position using NPCIL crane, alignment, fitup , welding using GTAW / SMAW process, inspection and commisioning as per drawings and technical sepcfications. This work also includes cleaning of embedded parts, survey using optical instruments for level & horizontality, providing shim plates etc for alignment, fastening of bolts, washers and nuts to required torque using torque wrench, assistance during concreting the gate assembly, laying and termination of wiring, providing scaffoldings/platforms, manpower, machineries, tool and tackles, optical instruments etc, consumables for welding, acetone, argon gas etc., painting of welded area of equipment, inspection, preparation & submission of Reports & as built details for NPCIL acceptance.	--		
C 1.2.1	Rail assembly of Lock carriage	MT	24	.0003777
C 1.2.2	Lock carriage assembly	MT	60	.0009548
C 1.2.3	Protective rolling gate with rail assembly	MT	400	.0060854
C 1.2.4	Commisioning of rolling gate	Nos	2	.0007621
C 1.2.5	Commisioning of lock carriage	Nos	2	.0007271

SIGNATURE OF BIDDER WITH SEAL

Part C : Bill of Quantities

Tender Specification BHEL:PSSR:SCT:1928 for Erection of Equipment , Piping, Welding & NDT in Reactor Main Building of Unit-3&4

at 2 X 1000 MWe Kudankulam Nuclear Power Plant Unit # 3 & 4 - NIEP 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
C 1.3	Handling, assembly, welding, erection and commissioning of transport air lock: Receipt of free issue material, handling, preparation & submission of handling schemes, transportation, uncrating, preparation of IMIR, depreservation, shifting to assembly area, pre-assembly of components using contractors crane, lifting, erection of assemblies and other accesories, alignment, fit up, welding using GTAW /SMAW process, inspection, laying and termination of wiring, erection of hydraluic system equipment, tubings & connected components, pneumatic / hydro testing and commisioning of transport air lock as per drawings and technical specifications. This work also includes cleaning EPs of IC & OC wall & other embedded parts, survey using optical instruments, placing of assemblies on temporary supports & trolley using NPCIL crane, providing manpower, tools, tackles, erection of scaffolding,consumables for welding & cleaning including high quality kerosene / acetone and preparation of reports and submission for acceptance.	--		
C 1.3.1	Transport air lock components & other accessories	MT	560	.0079323
C 1.3.2	Wedge and protective cone assembly of transport air lock at Inner containment wall	MT	6	.000139
C 1.3.3	Separating device of transport air lock at outer containment wall	MT	14	.0003243
C 1.3.4	commissioning and testing of TAL	Nos	2	.0005824

SIGNATURE OF BIDDER WITH SEAL

Part C : Bill of Quantities

Tender Specification BHEL:PSSR:SCT:1928 for Erection of Equipment , Piping, Welding & NDT in Reactor Main Building of Unit-3&4

at 2 X 1000 MWe Kudankulam Nuclear Power Plant Unit # 3 & 4 - NIEP 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
C 1.4	Erection of Static equipment inside Reactor building (other than equipments covered in schedule A) : Receipt of free issue materials, handling, transportation, uncrating, preparation of IMIR , de-preservation, shifting, lowering & installation in design position, erection including accessories, alignment, fit up, welding using GTAW / SMAW process and inspection as per drawings and technical specifications. This work also includes cleaning of embedded parts, survey for elevation and horizontality of embedded parts & equipments using optical instruments, verifying nozzle orientation, fastening foundation bolts, nuts, washers to required torque using torque wrench, providing shim plates, painting of welded area of equipment, providing scaffolding, man power, machineries, consumables such as high quality Kerosene/ acetone and other cleaning aids, preparation of reports and submission for acceptance.	--		
C 1.4.1	Hydrogen recombiners	Nos	308	.0034076
C 1.4.2	Static equipments	MT	31	.0004472
C 1.4.3	Reactor building Sump filter (JNA system)	MT	13	.0002557
C 1.5	Erection of relief devices: Receipt of free issue materials, handling, transportation, uncrating, preparation of IMIR , depreservation, shifting, installation in design position, erection, alignment, fit up, welding using GTAW / SMAW process using filler wire and welding electrode issued on free issue basis , visual inspection, check for proper sealing of the doors with frame, testing of louvers using dynomometer, cleaning and touch up painting of relief device frames and testing of relief devices as per manufacturer recommendation, drawings and technical specifications, preparation and submission of reports for acceptance. This work also includes providing necessary plant & machinery , manpower , tools tackles & consumables.	--		

SIGNATURE OF BIDDER WITH SEAL

Part C : Bill of Quantities

Tender Specification BHEL:PSSR:SCT:1928 for Erection of Equipment , Piping, Welding & NDT in Reactor Main Building of Unit-3&4

at 2 X 1000 MWe Kudankulam Nuclear Power Plant Unit # 3 & 4 - NIEP 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
C 1.5.1	Erection of relief devices (JMJ louvers)	MT	44	.0008655
C 1.5.2	Erection of relief devices (JMP louvers)	MT	74	.0016367
C 2	PIPING	--		
C 2.1	Cutting and Edge preparation	--		
C 2.1.1	Cutting and Edge preparation (J-groove/ V-Groove) by using beveling machine : Identification of joint, Shifting of pipe beveling machine, setting up for the required configuration, parting off pipe and machining J-Groove/V-groove on one end of pipe and inspection as per drawings & technical specification. This work also includes providing beveling machine, scaffolding , removing debris & post cleaning , manpower, cutting tools with required profile, tools & tackles, consumables, cleaning aids , cooling agents etc, preparation of reports and submission for acceptance.	--		
C 2.1.1. 1	Pipe size above 80 NB to 300 NB	Inch Dia	4,000	.0015031
C 2.1.1. 2	Pipe size greather than 300 NB	Inch Dia	2,000	.0010879

SIGNATURE OF BIDDER WITH SEAL

Part C : Bill of Quantities

Tender Specification BHEL:PSSR:SCT:1928 for Erection of Equipment , Piping, Welding & NDT in Reactor Main Building of Unit-3&4

at 2 X 1000 MWe Kudankulam Nuclear Power Plant Unit # 3 & 4 - NIEP 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
C 2.2	Erection of Carbon steel and stainless steel pipe lines : Receipt of free issue materials, handling, transportation, uncrating, preparation of IMIR, de-preservation, study of isometric drawings, cleaning of pipe with oil free compressed air, erection of carbon steel and stainless steel pipelines on permanent supports at various levels and locations, inspection and hydro testing as per drawings and technical specifications. This work also includes identification & marking circuits / loops for hydro testing , preparation of circuit release report, covering pipeline during erection using caps, providing testing arrangements such as headers, hydro testing pumps, SRV,PG, scaffolding, manpower, tools & tackles,consumables, draining and drying of pipelines post hydro test, preparation of reports & as built details and submission for acceptance.	--		
C 2.2.1	Pipe of size upto and including 80NB	inch meter	72,600	.0042763
C 2.2.2	Pipe size greater than 80NB up to and including 300NB	MT	408	.0057079
C 2.2.3	Pipeline of size greater than 300NB	MT	1,099	.0172767
C 2.2.4	Hermetic penetration on Inner containment, +5.40m floor and outer containment wall	MT	70	.0012546
C 2.2.5	Bellow type hermetic penetrations	MT	100	.001967

SIGNATURE OF BIDDER WITH SEAL

Part C : Bill of Quantities

Tender Specification BHEL:PSSR:SCT:1928 for Erection of Equipment , Piping, Welding & NDT in Reactor Main Building of Unit-3&4

at 2 X 1000 MWe Kudankulam Nuclear Power Plant Unit # 3 & 4 - NIEP 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
C 2.3	Welding of SS pipelines dia up to and including 80NB : Identification of joints, marking, cutting & edge preparation, cleaning of pipe using oil free compressed air, argon purging, fit up, welding of Stainless steel pipes of size upto and including 80NB of various thickness using GTAW process using filler wire issued on free issue basis for butt, fillet and nozzle joints, cleaning the welded joint, visual inspection, as per drawings and technical specifications. This work also includes hydro testing, checking of erected pipe line using video boroscope of 30m length to remove FME, providing scaffolding, boroscope, man power, tools & tackles, consumables like cleaning consumables , argon gas, preparation of reports & as built drawings and submission for acceptance.	Inch dia	86,818	.0381179
C 2.4	Welding of SS pipelines size greater than 80NB : Identification of joints, marking, cleaning of pipe using oil free compressed air, fit up, argon purging, welding of Stainless steel pipes of various thickness of V - groove / J-groove joint configuration using GTAW and/ SMAW process using filler wire & welding electrode issued on free issue basis , cleaning the weld joint, carrying out visual inspection, preparation of reports & as built and submission for acceptance. This work also includes hydrotesting, checking of erected pipe line using video boroscope of 30m length to ensure any FME before valve erection, orifice erection, where ever the direction of pipe changes, providing scaffolding, man power, tools & tackles, cleaning, consumables, argon gas as required for work.	--		
C 2.4.1	Welding of SS pipe size greater than 80NB up to and including 300NB with wall thickness upto 12mm included	Inch dia	50,136	.0246413
C 2.4.2	Welding of SS pipe size greater than 80NB up to and including 300NB with wall thickness greater than 12mm up to 20mm	Inch dia	18,820	.0092498
C 2.4.3	Welding of SS / SS cladded pipe sizes greater than 300NB with thickness upto 16 mm included	Inch dia	6,000	.0043647
C 2.4.4	Welding of SS / SS cladded pipe sizes greater than 300NB with thickness greater than 16mm up to 40 mm	Inch dia	10,930	.0134911

SIGNATURE OF BIDDER WITH SEAL

Part C : Bill of Quantities

Tender Specification BHEL:PSSR:SCT:1928 for Erection of Equipment , Piping, Welding & NDT in Reactor Main Building of Unit-3&4

at 2 X 1000 MWe Kudankulam Nuclear Power Plant Unit # 3 & 4 - NIEP 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
C 2.5	Welding of CS pipelines dia up to and including 80NB : Identification of joints, marking, cutting & edge preparation, cleaning of pipe using oil free compressed air, fit up, welding of Carbon steel pipes of various thickness using GTAW process using filler wire issued on free issue basis, flange & nozzle weld, cleaning the welded joint, visual inspection as per drawings & technical specifications, preparation of reports and submission for acceptance. This work also includes hydro testing, checking of erected pipe line using video boroscope of 30m length to ensure any FME before valve erection, orifice erection, where ever the direction of pipe changes, providing scaffolding, boroscope, man power, tools & tackles, consumables like cleaning consumables , argon gas for completion of work.	Inch dia	17,000	.0046174
C 2.6	Welding of CS pipelines size greater than 80NB : Identification of joints, marking, cleaning of pipe using oil free compressed air, joint area , fit up ,welding of Carbon steel pipes of various thickness of V - groove / J-groove joint configuration using GTAW and SMAW process using filler wire & welding electrode issued on free issue basis , cleaning the welded joint, inspection as per drawings and technical specifications, preparation of reports and submission for acceptance. This work also includes hydrotesting, checking of erected pipe line using video boroscope of 30m length to ensure any FME before valve erection, orifice erection, where ever the direction of pipe changes, providing scaffolding, boroscope, man power, tools & tackles, cleaning consumables, argon gas to complete the work.	--		
C 2.6.1	welding of CS pipe size greater than 80NB to 300 NB with thickness maximum upto 12mm included	Inch dia	12,644	.003642
C 2.6.2	welding of CS pipe size greater than 80NB to 300 NB with thickness greater than 12mm	Inch dia	1,442	.0004532
C 2.6.3	welding of CS pipe size greater than 300 NB with thickness upto 16 mm included	Inch dia	4,500	.0016108
C 2.6.4	welding of CS pipe size greater than 300 NB with thickness greater than 16 mm	Inch dia	11,814	.0048484

SIGNATURE OF BIDDER WITH SEAL

Part C : Bill of Quantities

Tender Specification BHEL:PSSR:SCT:1928 for Erection of Equipment , Piping, Welding & NDT in Reactor Main Building of Unit-3&4

at 2 X 1000 MWe Kudankulam Nuclear Power Plant Unit # 3 & 4 - NIEP 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
C 3	Non Destructive Examination (NDE)	--		
C 3.1	Radiographic Testing of weld joints: Development of procedure & technique sheets, identification & grouping of weld joints, providing & cutting the films to the required dimensions, providing & shifting of radiographic cameras, films, & its accessories, etc to location, placing the joint identification markings on the film cassette, carrying out radiographic examination of the weld joint as per applicable RF codes & standards, drawings and technical specification, processing the films, interpretation of results, preparation of reports and submission for acceptance. This work also includes scanning & digitizing the RT films, uploading the scanned images, providing required software for viewing the images, providing radiography cameras, radiographic sources, establishing storage facilities for RT sources as per AERB guide lines, dark room facility & other processing facilities for processing films, RT film digitizer, RT film storage racks, ISNT/ ASNT level-II qualified personnel, manpower, tools & tackles, consumables as required for the work.	Inch dia	98,644	.0315688
C 3.2	Ultrasonic examination of weld joints : Development of procedure and technique sheets, identification of the joints, shifting the ultrasonic testing machine to the location, flush grinding the weld joint to meet the requirement, cleaning the weld joints, carrying out ultrasonic examination of weld joint by ISNT/ASNT level -II qualified personnel as per the requirements, technique sheet, drawing and technical specification, interpretation, post cleaning, preparation and submission of reports for NPCIL acceptance. This work also includes erection of scaffolding, arranging man power, tools and tackles, calibrated UT testing machine, probes of various configuration, couplants, cleaning consumables like acetone, etc.	--		
C 3.2.1	Carrying out UT on pipelines	Inch dia	21,304	.0050231
C 3.2.2	Carrying out UT on straight sections	RM	200	.0004491

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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
C 3.3	Dye penetrant examination : Development of procedure , identification of joints , cleaning , carrying out Dye penetrate testing as per the procedure , drawing and technical specification by ISNT/ ASNT level-II qualified personnel, , preparation of reports & submission for acceptance, post cleaning . This work includes providing scaffolding, arranging manpower, tools, tackles, all the DPT consumables of NPCIL approved brands, cleaning consumables.	--		
C 3.3.1	DPT on pipe & pipe fittings weld joints	Inch dia	67,450	.001733
C 3.3.2	DPT of equipment, support & structural welding.	RM	7,980	.0015329
C 3.4	Vacuum box testing of the welding joints of various configurations: Development of procedure, provide vacuum box of various sizes and profiles, identification of the test joints, pre-cleaning , carryout vacuum box testing on weld joints at various locations and elevations by ISNT/ ASNT level-II qualified personnel as per drawing and technical specification, preparation of reports and submission for NPCIL acceptance. This work also includes arranging necessary manpower, erection of scaffolding, vacuum pump, calibrated vacuum gauge , tools tackles & consumables such as cleaning agents etc.	RM	17,150	.0050388
C 4	Testing and Erection of Valves and Erection of Orifices	--		
C 4.2	Handling and testing of valves : Identification, handling and shifting of valve to valve testing facility, configuring the valve testing machine to required parameters, loading , carrying out valve testing of various sizes and ranges as per drawings and technical specifications. This work also includes cleaning & re-preservation of valve, arranging necessary manpower, tools & tackles, cleaning consumables such as acetone etc, operation and maintenance of valve testing machines for following items including preparation of reports and submission for acceptance.	--		

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Tender Specification BHEL:PSSR:SCT:1928 for Erection of Equipment , Piping, Welding & NDT in Reactor Main Building of Unit-3&4

at 2 X 1000 MWe Kudankulam Nuclear Power Plant Unit # 3 & 4 - NIEP 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
C 4.2.1	Handling, testing & re-preserving of valves (up to 50NB)	KG	260,722	.0031443
C 4.2.2	Handling, testing & re-preserving of valves (above 50 to 200NB)	MT	377	.0021264
C 4.2.3	Handling, testing & re-preserving of valves (above 200NB)	MT	614	.0036779
C 4.3	Handling, shifting and erection of valves: Receipt of free isssue material, handling, transportation, uncrating, segregation of valves, preparation of IMIR, de-preservation of valves, shifting to the required location, cleaning and visual inspection, erection after testing at VTF of carbon steel and stainless steel valves of various diameters at various level, elevation & orientation as per drawings and technical specifications. This work also includes providing qualified man power, tools, tackles, erection of scaffolding, cleaning aids such as acetone etc, preparation reports and submission for NPCIL acceptance.	--		
C 4.3.1	Erection of valves (up to 50NB)	KG	130,262	.0011156
C 4.3.2	Erection of valves (above 50 to 200NB)	MT	186	.0012767
C 4.3.3	Erection of valves (above 200NB)	MT	448	.0031533

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Tender Specification BHEL:PSSR:SCT:1928 for Erection of Equipment , Piping, Welding & NDT in Reactor Main Building of Unit-3&4

at 2 X 1000 MWe Kudankulam Nuclear Power Plant Unit # 3 & 4 - NIEP 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
C 4.4	Handling, shifting and erection of Orifices: Receipt of free issue material, handling, transportation , uncrating, preparation of IMIR , de-preservation, shifting, cleaning and visual inspection, erection of carbon steel and stainless steel orifice of various diameters in the desired position, elevation & orientation after flushing of circuit as per drawings and technical specification. . This work also includes providing qualified man power, tools & tackles, scaffolding, cleaning consumables and preparation of reports and submission for acceptance.	KG	19,000	.0002623
C 5	PIPE SUPPORTS	--		
C 5.1	Handling, fabrication and erection of pipe supports : Receipt of free issue material, handling, transportation, uncrating, preparation of IMIR, de-preservation, storage, segregation and pre assembly of pipe support members of individual supports such as body of supports, spring assemblies, saddles, guides, hanger rods etc, prefabrication of structural members, grit blasting, supply & application of inorganic zinc silicate primer of thickness of 75 microns DFT, shifting to location, erection, fit up, welding from filler wire and electrode supplied as free issue basis, carrying out visual inspection as per drawings and technical specifications for different sizes of pipes shown below. This work also includes erection of scaffolding, providing manpower, tools & tackles, assembling of spring components, pre setting of springs & locking, correction of springs for final setting before release for commissioning, supply and application of graphite powder between sliding surfaces, arranging cleaning aids such as high quality kerosene / acetone, inspection, preparation of reports and submission for NPCIL acceptance.	--		
C 5.1.1	Supports for pipes 10NB to 80NB (inclusive)	kg	282,420	.0033073
C 5.1.2	Supports for pipes 100NB to 300NB	MT	237	.0033458

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Tender Specification BHEL:PSSR:SCT:1928 for Erection of Equipment , Piping, Welding & NDT in Reactor Main Building of Unit-3&4

at 2 X 1000 MWe Kudankulam Nuclear Power Plant Unit # 3 & 4 - NIEP 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
C 5.1.3	Supports for pipies size DN>=300NB	MT	130	.0021306
C 5.2	Supply, fabrication, welding and erection of pipe supports : Supply of Carbon steel structures angle/ flats, beams, channels, BOX sections, rods of various sizes as per IS 808 and material grade as per IS 2062-2011 Grade E-250 Quality-BR, marking, cutting, grinding, shop welding, grit blasting , supply & application of inorganic zinc silicate primer to required thickness of 75 microns DFT, shifting, erection, fit up, welding, including supply of welding filler wire and electrode , inspection as per drawings and technical specifications. This work also includes providing scaffolding, manpower, tools & tackles, arranging cleaning aids , inspection, preparation of reports and submission for NPCIL acceptance.	--		
C 5.2.1	Supports for pipes 10NB to 80NB (inclusive)	KG	70,000	.0017985
C 5.2.2	Supports for pipes 100NB to 300NB	MT	60	.0015602
C 5.2.3	Supports for pipies size DN>=300NB	MT	40	.0010751

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Tender Specification BHEL:PSSR:SCT:1928 for Erection of Equipment , Piping, Welding & NDT in Reactor Main Building of Unit-3&4

at 2 X 1000 MWe Kudankulam Nuclear Power Plant Unit # 3 & 4 - NIEP 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
C 5.3	Handling fabrication and erection of visco elastic damper supports : Receipt of visco elastic damper and structural steel support material from NPCIL stores, handling, transportation, uncrating, preparation of IMIR, de-preservation, storage, prefabrication of support structures including matching flanges which involves marking, cutting, drilling, grinding, fit up & welding, grit blasting, supply and application of inorganic zinc silicate primer to thickness of 75 microns DFT, shifting , erection of prefabricated structure, alignment of bottom and top matching flanges over the erected structure, placing dampers in position, aligning the flange orientation as per marking, removing the placed damper, welding , placing the damper in the final position, carrying out inspection as per drawings and techincal specification . This work also includes erection of scaffolding, multiple handling of dampers for adjusting the orientation & alignment, protection of dampers from spilling of oil from the damper, providing manpower, tools & tackles, equipment, consumables, preparation of report and submission for NPCIL acceptance.	MT	90	.0011605
C 6	Painting	--		
C 6.1	Supply and application of epoxy paint on pipe support structures: Supply of epoxy paint such as Apcodur 641 or Apcodur 641CS of Asian paints or protectomastic of Berger paints or any other equivalent paint with prior approval from NPCIL for pipe supports and other structures inside reactor building. This work includes storage, preparation & submission of IMIR for acceptance, cleaning the surface of the pipe support structure, application of two coats of paint using brush over already primed surface of total thickness of 240 - 260 microns (including thickness of primer) at various elevations & locations as per drawings and technical specification. This work also includes providing scaffolding, manpower, necessary tools, tackles, aluminum ladders, cleaning aids, cotton waste, and preparation of report & submission for NPCIL acceptance.	MT	800	.0069214

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Tender Specification BHEL:PSSR:SCT:1928 for Erection of Equipment , Piping, Welding & NDT in Reactor Main Building of Unit-3&4

at 2 X 1000 MWe Kudankulam Nuclear Power Plant Unit # 3 & 4 - NIEP 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
C 6.2	Supply and application of high temperature paint on Equipment, pipe & support elements: Supply & application of high temperature (upto 350 deg C) radiation resistance paint OC51-03 (Russian make) or other equivalent paint meeting high temperature and radiation resistance property with prior approval from NPCIL on equipment, pipe & pipe support inside reactor building. This work includes providing manufacturer test certificate, preparation & submission of IMIR for acceptance, surface preparation of equipment, pipelines and pipe supports by grit blasting, application of two coat paint of thickness 240 - 260 microns as per manufacturer directions at contractor's work shop, touch up painting at site at various elevations and locations. This also includes providing manpower, scaffolding, necessary tools & tackles, aluminum ladders, air compressors, consumables and preparation of report & submission for acceptance.	--		
C 6.2.1	On equipment (grit blasting not required)	SqM	6,000	.0032793
C 6.2.2	On pipelines	SqM	4,000	.0020114
C 6.2.3	On Support structures	MT	100	.0011274
C 7	INSULATION	--		

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at 2 X 1000 MWe Kudankulam Nuclear Power Plant Unit # 3 & 4 - NIEP 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
C 7.1	Supply and application of thermal Insulation of equipment and piping: Supply of Ceramic fibre insulation blanket matts confirming to IS 15402-2003, Gr. 96, glass fabric of 600 GSM of thickness 0.5 to 0.6 mm, fibre glass thread, Aluminum foil of 0.1 mm thick conforming to IS 737 of designation 19000, H2, stainless steel cladding sheets of 0.5 /0.6/ 0 .7mm thick conforming to SA 240, TP 304 mirror finish No 4 grade, stainless steel wire mesh of material SS304, 1mm pitch x 0.25 wire dia, transportation, storage, pre fabrication of insulation mats wrapped in glass fabrics with stitching as per the sizes, cleaning the surface, wrapping of pre fabricated insulation over the surface as per the drawings and specifications, fixing the spacer / wrapping with SS binding wire, cutting, forming, erection of stainless steel clading, inspection, submission of reports. This work also includes supply of all ancillaries like bolt, nut washers screws, arranging tools & tackles, scaffolding, manpower , other cleaning consumables such as acetone .	--		
C 7.1.1	Fixed type insulation	--		
C 7.1.1.1	Supply and application of ceramic insulation of thickness upto 50 MM including cladding	SqM	4,000	.0029797
C 7.1.1.2	Supply and application of ceramic insulation of thickness of greater than 50mm and upto 100mm(inclusive) (in 2 layer and each layer encased separately using glass cloth) including cladding	SqM	10,400	.0110755
C 7.1.1.3	Supply and application of ceramic insulation of thickness of greater than 100mm and upto 160mm (inclusive) (in 3 layer and each layer encased separately using glass cloth) including cladding	SqM	2,400	.003282
C 7.1.2	Removable type insulation	--		

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Tender Specification BHEL:PSSR:SCT:1928 for Erection of Equipment , Piping, Welding & NDT in Reactor Main Building of Unit-3&4

at 2 X 1000 MWe Kudankulam Nuclear Power Plant Unit # 3 & 4 - NIEP 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
C 7.1.2.1	Supply and application of ceramic insulation of thickness upto 50 MM including cladding	SqM	400	.0003742
C 7.1.2.2	Supply and application of ceramic insulation of thickness of greater than 50mm and upto 100mm (inclusive) (in 2 layer and each layer encased separately using glass cloth) including cladding	SqM	1,040	.0013877
C 7.1.2.3	Supply and application of ceramic insulation of thickness of greater than 100mm and upto 160mm (in 3 layer and each layer encased separately using glass cloth) including cladding	SqM	240	.0003991
C 7.1.3	Aluminium foil: Supply of Aluminum foil of 0.1 mm thick conforming to IS 737 of designation 19000, H2 and application on SS pipes & pipe fittings	SqM	16,000	.001127
C 7.2	Stainless steel cladding : Supply stainless steel cladding sheets of 0.5 /0.6/ 0 .7mm thick conforming to SA 240, TP 304 mirror finish No 4 grade, stainless steel wire mesh of material SS304, 1mm pitch x 0.25 wire dia, marking, cutting, fabrication and application of cladding over identifed pipelines and equipments which are already applied with insulation matts as per requirements and technical specification, preparation of reports and submission for acceptance. This work also includes supply of all ancillaries like bolt, nut, washers, screws, arranging tools & tackles, scaffolding, manpower , cleaning consumables such as acetone. Note: The item shall be operated in case of modification works as instructed by the engineer.	SqM	3,000	.0032903

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Tender Specification BHEL:PSSR:SCT:1928 for Erection of Equipment , Piping, Welding & NDT in Reactor Main Building of Unit-3&4

at 2 X 1000 MWe Kudankulam Nuclear Power Plant Unit # 3 & 4 - NIEP 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
C 7.3	Insulation of Passive heat removal system heat exchangers and connected ducting: Procurement, inspection, supply, temporary storage, handling, pre-forming, installation along with all specified ancillary materials for multi layered (4 layers of 50 mm thick) each layer wrapped in glass cloth and installed over PHRS heat exchangers and ducting. Scope includes supply of ceramic fibre blanket of density 64 Kg/cum, supply of glass cloth of 0.50 to 0.6 mm thickness, 600 GSM, support clamps CS/SS of different pipe sizes, with fasteners, galvanized wire mesh of 50 * 50 mm pitch x 2 mm wire dia, zinc coated bracing wire 1.6 mm dia& other ancillaries, supply of heat resistant adhessive tapes and fabrication and application with fixed & removable type insulation in multilayer including other consumables like welding electrode, cleaning agent, anti-corrosive paint etc as per technical specification and working documents. Scope also includes erection & dismantling of scaffolding, arranging required manpower, tools & tackles, supply & application of epoxy paint on carbon steel supporting devices , inspection , preparation and submission of reports,	SqM	13,800	.0313223
C 7.4	Cold Insulation of Pipeline and equipment: Supply and Application of External Thermal Insulation on Chilled Water Piping with Closed Cell Class O Nitrile Rubber /EPDM Elastomeric Insulation of 50mm thick, Density 40 - 55 Kg/m3, Thermal Conductivity of 0.037 W/mk at 20 deg Celcius Mean Temp & permeability (Mu) greater than or equal to 7000 using manufacturer's recommended Rubber based Adhesive in a blend of solvents, cladding of Class B (GB 8624), Class 0 (BS 476) having a Flammability Index less than or equal to 5 (AS1530.2) of 350 Mu m in thickness with a total weight greater than or equal to 500 g/m2 made from a 3-layer composite film of metallic appearance with aluminium intermediate layer and UV protection and having a permanent curl to be applied with 30-50mm overlap using plastic rivets and manufacturer's recommended 50mm PSA Tapes complete as per Specifications. All bends, T-sections and end caps shall be cladded with thermoformed fittings of the same composite covering system. Note: The product shall meet the NPCIL specification including radiation resistance and hence to be tested before ordering.	--		

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Tender Specification BHEL:PSSR:SCT:1928 for Erection of Equipment , Piping, Welding & NDT in Reactor Main Building of Unit-3&4

at 2 X 1000 MWe Kudankulam Nuclear Power Plant Unit # 3 & 4 - NIEP 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
C 7.4.1	Thickness up 32mm	SqM	200	.0001525
C 7.4.2	Thickness greater than 32 and upto 38	SqM	600	.0005815
C 7.4.3	Thickness greater than 38mm and upto 44	SqM	1,000	.001202
C 7.4.4	Thickness greater than 44mm	SqM	2,600	.0039127
C 8	Erection of stainless steel temporary piping for flushing arrangement & dismantling: Identification of temporary loop requirements, study of field routing, receipt of material from NPCIL stores, handling, transportation, marking, cutting, edge preparation, fit up, welding and pre fabrication of temporary spools, shifting, erection, fit up and welding (including supply of welding filler wire and electrodes) and inspection as per specification and flushing scheme. This work also includes providing scaffolding, man power, tools, tackles, consumables like argon gas, consumables, obtaining clearance from NPCIL for cutting the erected spool after completion of flushing requirement, shifting the spool outside the building, handling & transporting back to NPCIL store, generating reports and submission for NPCIL acceptance.	Inch dia	3,000	.0019202
C 9	Erection and welding of O-let/ thermo well lug: Identification of pipe spools and O-lets, handling, shifting to contractor's machine shop, marking of position & orientation of O-let, pilot hole drilling, fit-up of O-let, welding using GTAW process, carrying out visual inspection and carrying out final drilling of O-lets of various sizes ranging from 10NB to 150NB (NB is the branch pipe size connecting to O-let) as per drawings and technical specification. This work also includes arranging necessary manpower, tools, tackles, drilling machine, cleaning agents like acetone , clearing off burrs & foreign material etc, preparation of reports and submission for acceptance.	--		

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Tender Specification BHEL:PSSR:SCT:1928 for Erection of Equipment , Piping, Welding & NDT in Reactor Main Building of Unit-3&4

at 2 X 1000 MWe Kudankulam Nuclear Power Plant Unit # 3 & 4 - NIEP 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
C 9.1	O-let fixing in contractor's work shop	Inch dia	2,000	.0007215
C 9.2	O-let fixing insitu on erected piping	Inch dia	300	.0001292
C 10	Structural Works	--		
C 10.1	Supply, fabrication and erection of carbon steel Metal structures : Supply of structural steel material conforming to IS 2062, E250, Quality B0 consisting plates/ sheets/ angle/ channel/ beam and various profile as per IS 808, metal gratings, fasteners as per IS 1363 grade 5.6 and grade 8.8 etc, transportation, storage, handling, fabrication, fitup & welding, shifting, erection, site welding, inspection as per drawing and technical specification. This work also includes surface preparation by grit blasting, supply & application of zinc based primer and top coat with epoxy based Apcodur 641 or Apcodur 641CS of Asian paints or protectomastic of Berger paints or other equivalent paint with prior approval from NPCIL for a total DFT of 240-260 microns, providing scaffolding / temporary platforms, wire cutting/machining of seismic stopper plates, man power, tools, tackles, plant and machineries, welding electrodes , other consumables and preparation of reports and submission for accpetance.	--		
C 10.1.1	Supply, fabrication, grit blasting, primer application and erection of metal structure	MT	510	.0179348
C 10.1.2	Supply, fabrication, grit blasting, primer application and erection of metal gratings	MT	80	.0029112
C 10.1.3	Temporary supports	MT	190	.0056521
C 10.1.4	Equipment supports	MT	40	.0012598

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at 2 X 1000 MWe Kudankulam Nuclear Power Plant Unit # 3 & 4 - NIEP 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
C 10.1.5	Sealing of openings	KG	6,000	.0002003
C 10.2	Stainless steel structural works	--		
C 10.2.1	Frabrication and erection of stainless steel structural work: Receipt of free issue material , handling, shifting, marking , cutting, forming, fabrication of light duty stainless steel structure, erection, fitup, welding using GTAW / SMAW , inspection as per drawings & technical specification, preparation of reports and submission for acceptance. This work also includes providing manpower, tools & tackles, cleaning agents, welding electrode & filler wire, argon gas, cleaning consumables.	KG	20,000	.0005523
C 10.2.2	Supply, frabrication and erection of stainless steel structural work : Supply of stainless steel sheets of 3mm and 5mm thick conforming to ASTM A 240-02a TYPE -321, No 2B finish with IGC tested as per ASTM 262 A Practice E , handling, shifting, marking , cutting, forming, fabrication stainless steel structure such as drain collection trays, hand rails, toe gaurds , erection , fitup, welding using GTAW / SMAW , inspection as per drawings & technical specification, preparation of reports and submission for acceptance. This work also includes arranging manpower, tools, tackles, cleaning agents, welding filler wire & electrode, scaffolding and other consumables etc.	KG	80,000	.0090747
C 10.3	Dismantling of metal structure and metal platforms: Identification of structural platform to be dismantled, carrying out dismantling of the portion of platform / temporary structure by gas cutting with adequate safety precaution, grinding, shifting of dismatled material outside the building, handling, transportation of material to NPCIL stores. This work includes cleaning the debris, providing man power, tools, tackles, material handling equipments & other consumables, preparation and submission of reports for acceptance.	MT	100	.000634

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Tender Specification BHEL:PSSR:SCT:1928 for Erection of Equipment , Piping, Welding & NDT in Reactor Main Building of Unit-3&4

at 2 X 1000 MWe Kudankulam Nuclear Power Plant Unit # 3 & 4 - NIEP 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
C 10.4	Fabrication, Erection and welding of Stainless steel liner for fuel pool, inspection well , reactor cavity and floors at various elevations: Receipt of free issue materials, handling, transportation, uncrating, preparation of IMIR, de-preservation, storage, marking, cutting, grinding, bending, fabrication, erection, fit up, welding using GTAW process using filler and welding electrode issued on free issue basis, inspection & pressure testing of liner for fuel pool, inspection well, reactor cavity and floors at various elevations inside reactor building as per drawings and tender technical specifications. This work also includes taking field measurements, grinding & cleaning the existing embedded parts to required finish & level, handling, shifting of liner plates to the location using contractor crane, erection of scaffolding, providing manpower, necessary tools, tackles, consumables like argon gas, scaffoldings, welding & cleaning consumables, preparation of reports and submission for acceptance.	--		
C 10.4.1	Erection of reactor cavity, fuel pool, inspection well and floor and wall liner of thickness upto 5mm.	MT	120	.0022394
C 10.4.2	Welding of reactor cavity, fuel pool, inspection well and floor and wall liner of thickness upto 5mm. (Note: Measurement of welding shall be taken as 1 RM which includes welding of liner plate with panel EP on either side including welding of cover strip on either side)	RM	16,400	.0037235
C 11	Fixing of anchor fasteners (Hilti anchor fasteners supplied by NPCIL at free of cost)	--		
C 11.1	Fixing of hilti anchor fasteners using hammer drilling: Drilling, cleaning, fixing and torqueing of Hilti anchor fasteners using hammer drilling in various buildings, at various locations & positions as per drawings and technical specification. This work includes identification, marking, providing hilti machine of various type & capacities, shifting & positioning, tools, tackles, performing drilling using hammer drilling on reinforced concrete by providing qualified operators, providing manpower, cleaning aids, cleaning the area and preparation of reports &submission for acceptance.	--		

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Tender Specification BHEL:PSSR:SCT:1928 for Erection of Equipment , Piping, Welding & NDT in Reactor Main Building of Unit-3&4

at 2 X 1000 MWe Kudankulam Nuclear Power Plant Unit # 3 & 4 - NIEP 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
C 11.1.1	HSL-3G upto M12	Nos	12,750	.0030798
C 11.1.2	HSL-3G size above M12 to M20	Nos	2,300	.0025262
C 11.1.3	H DA-T upto size M12	Nos	8,520	.0100562
C 11.2	Fixing of hilti anchor fasteners using diamond core cutting : Core Drilling, cleaning, fixing and torqueing of Hilti anchor fasteners using diamond core drilling in various buildings, at various location & positions as per drawings and technical specification. This work includes identification, marking, providing hilti machine of various type & capacities, shifting & positioning, tools, tackles, performing core drilling using diamond core drill bit in reinforced concrete by qualified operators, cleaning , fixing of anchor fastener with required torque, cleaning the area, providing manpower, cleaning aids, preparation of reports and submission for acceptance.	--		
C 11.2.1	HSL-3G upto size M20	Nos	17,694	.0115324
C 11.2.2	H DA-T upto size M12	Nos	100	.0001268
C 11.2.3	H DA-T Above size M12 to M20	Nos	1,960	.005017
C 11.2.4	HVU TZ M16 to M20- with core cutting	Nos	800	.000618

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at 2 X 1000 MWe Kudankulam Nuclear Power Plant Unit # 3 & 4 - NIEP 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
C 11.4	Sealing of anchor fasteners erected on steel lined areas : Identification of location where hilti anchor fasteners are fixed over liner plates, supply of carbon steel sleeve, erection of sleeve , fit up , welding using GTAW/SMAW, inspection, supply and application of hilti sealing compound C601S as per as per drawings and technical specification. This work also includes cleaning, providing tools, tackles, machinery, welding consumables like argon gas, filler wire, manpower etc. preparation of reports and submission for acceptance.	--		
C 11.4.1	Sleeve dia Up to 1 inch	Inch dia	4,000	.001508
C 11.4.2	Sleeve dia above 1 inch	Inch dia	1,000	.0004819
C 11.5	Marking and diamond core cutting : Core cutting on reinforced concrete wall/floor using diamond core bits in various buildings, at various location & positions by qualified operators . This work includes indentification, marking, providing man power, necessary tools & tackles, machinery, water supply arrangement, shifting material to required location, drilling mounting hole, setting up machines, performing core drilling using diamond core bits in reinforced concrete, cleaning the area, disposal of debris to identified location, inspection as per drawings & technical specification , preparation of reports and submission for acceptance.	--		
C 11.5.1	Core drilling for dia less than or equal to 200mm	mm-meter	1,000	.0003172
C 11.5.2	Core drilling for dia greater than 200mm	mm-meter	1,000	.0005439
C 12	Preservation of equipment	--		

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at 2 X 1000 MWe Kudankulam Nuclear Power Plant Unit # 3 & 4 - NIEP 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
C 12.1	Maintenance of continuous preservation of NSSS equipments using nitrogen: Preparation of preservation schedule for various equipments, nitrogen pressure monitoring based on equipments manufacturers recommendation & instructions of engineer, arranging nitrogen charging setup with minimum two pressure gauges mounted on each equipment along with required length of high pressure hoses, shifting and staking of nitrogen cylinders at nitrogen charging station, monitoring and recording nitrogen pressure of each equipment as per agreed schedule, maintain pressure of nitrogen as specified in manufacturers recommendation, prepartion and submission of preservation reports for NPCIL acceptance. Carrying out above activities with hand tools & safety gears using supervisory, skilled, Semi-skilled and Unskilled manpower as per the requirement of Technical specifications. Note: 1. The activites under this item are for performing works related to Preservation of Equipments.	--		
C 12.1.1	Supervising the preservation activity and works by deploying qualified supervisors (diploma in mechanical engineering with minimum three (3) year experience) . The work involves study and understanding the preservation requirements from equipment passport documents, preparation of preservation schedule, arranging nitrogen charging fixtures, monitoring arrangements, supply & arraning all equipments\consumables, site supervision etc,. one qualified supervisor performing these activties for 9 Hrs a day (including lunch hour) is considered as one operation.	Operations	1,440	.0012469
C 12.1.2	Carrying out preservation works like opening & closing of manhole covers, mounting pressure gauges, charging arrangement, shifting of material etc,. as per manufacturers preservation requirements. one SKILLED man power (Fitter/grinder/Rigger etc,.) performing such activtiy for 9 Hrs a day (including lunch hour) is considered as one operation.	Operations	5,760	.0042888
C 12.1.3	Carrying out preservation works like opening & closing of manhole covers, mounting pressure gauges, charging arrangement, shifting of material etc,. as per manufacturers preservation requirements. one SEMI SKILLED man power (Khalasi etc,.) performing such activtiy for 9 Hrs a day (including lunch hour) is considered as one operation.	Operations	2,880	.0016662

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at 2 X 1000 MWe Kudankulam Nuclear Power Plant Unit # 3 & 4 - NIEP 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
C 12.1.4	Carrying out preservation works like opening & closing of manhole covers, mounting pressure gauges, charging arrangement, shifting of material, cleaning etc,. as per manufacturers preservation requirements. one UNSKILLED man power (helper) performing such activtiy for 9 Hrs a day (including lunch hour) is considered as one operation.	Operations	2,880	.0011829
C 12.2	Preservation using silica gel	--		
C 12.2.1	Preservation of equipments with silicagel : Preparation of preservation schedule, estimation of quantity of silicagel required based on equipments manufacturers recommendation & engineer instructions, supply & arranging cotton bags of various sizes along with nylon rope for fixing and holding of silica gel of various capacities inside equipments, CAF gaskets , opening of manhole covers of various equipments with torque wrenches, cheking the condition of silica gel with the help of indicating silica gel, removal of saturated silicagel, Providing CAF gaskets to avoid falling of loose silica gel inside equipments, shifting, baking of saturated silica gel in electrical ovens of suitable capacity as per manufactureres recommendation, shifting of new\regenerated silica gel placed in cotton bags inside equipments, fastening with the help of nylon ropes ensuring FME, closing of manhole covers for sealing to avoid air ingress, preparation and submission of preservation reports for NPCIL acceptance. This work also includes providing manpower, tools and tackles, plant & machineries, consumables, scaffolding at all level as required for work.	kg	80,000	.0108226
C 12.2.2	Supply and storage of silica gel as per IS 3401 (non-indicative type)	Kg	12,000	.0016423
C 12.2.3	Supply and storage of silica gel as per IS 3401 (indicative type)	Kg	3,000	.0004588

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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
C 13	Carrying out the activities like multiple handling of reactor internal components during construction after hydrotest, removal and replacement of heaters of various equipments, miscellaneous modification works and related activities with hand tools & safety gears using supervisory, skilled, semi-skilled and unskilled manpower as per the requirement of NPCIL, including generating reports and submission to NPCIL for acceptance . Note: 1. The activites under this item are for performing works over and above those specified & included in the scope of other BOQ items.	--		
C 13.1	Supervising the given activity and works by deploying qualified supervisors (diploma in mechanical engineering with minimum three (3) years of experience) . The work involves study and understanding the drawings, preparation of sketches using autocad as per the requirements, site supervision etc,. one qualified supervisor performing these activties for 9 Hrs a day (including lunch hour) is considered as one operation.	Operations	1,500	.0012584
C 13.2	Carrying out miscellaneous works like handling/shifting of materials/equipments, fabrication, erection, modification of metal structures etc,. as per site requirements. one SKILLED man power (Fabricator/Fitter/welder/grinder/Rigger etc,.) performing such activtiy for 9 Hrs a day (including lunch hour) is considered as one operation.	Operations	3,800	.002763
C 13.3	Carrying out miscellaneous works like handling/shifting of materials/equipments, fabrication, erection, modification of metal structures etc,. as per site requirements. one SEMI SKILLED man power (Khalasi etc,.) performing such activtiy for 9 Hrs a day (including lunch hour) is considered as one operation.	Operations	3,400	.0019076
C 13.4	Carrying out miscellaneous works like handling/shifting of materials/equipments, fabrication, erection, modification of metal structures etc,. as per site requirements and assisting the office activities. one UNSKILLED man power (helper) performing such activtiy for 9 Hrs a day (including lunch hour) is considered as one operation.	Operations	4,400	.0018073
C 13.5	Carrying out operation of polar crane, trestle crane with adequate experiance in crane operation. One highly skilled operator performing such activity for 9 hrs a day (including lunch hour) is considered as one operation	Operations	4,000	.0032789

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at 2 X 1000 MWe Kudankulam Nuclear Power Plant Unit # 3 & 4 - NIEP 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
C 14	Supply and erection of Split ACs and Air curtains for Clean room enclosures inside reactor building: Supply, handling, transporting of air conditioners, air curtains etc,. This work also includes supply of all consumbles, arranging man power, plant and machineries, scoffolding etc,. preparation & submission of reports & asbuilt details for NPCIL acceptance.	--		
C 14.4	Supply, Erection & Commissioning of 2T inverter air conditioner(Split Type) along with CU-tubing, voltage stabiliser, remote flow control,insulation and frame for outdoor unit instalation.	Nos	4	.0001402
C 14.5	Supply, erection of Air Curtain (4 feet width) along with all accessories	Nos	10	.0004587
C 15	Concreting of Reactor cavity equipments: Concreting using serpantine aggregate: Supplying and placing of serpentine concrete using approved/qualified serpantine aggregates both coarse and fine as per the approved mix with the minimum cement content of 362 Kg/Cum etc, in thermal insulation of upper unit, biological shielding, thrust truss etc, preparation & submission of reports & asbuilt for NPCIL acceptance.	CuM	70	.0100326
C 16	Grouting with GP2 conbextra	CuM	120	.0034397
C 17	Dry packing : supply and dry packing of various equipment foundation, inspection, preparation of reports and submission for acceptance as per drawings and tender technical specifications. This work includes dry packing with ratio 1:2.5 (Cement:Sand), sand passing through No. 16 sieve with enough water to produce mortar. Dry pack material shall be placed and packed in layers having a compacted thickness of about 10mm, removal of debris, cleaning the area, Providing manpower, tools, tackles & accessories as required for the work.	CuM	80	.0025728

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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
E 1	Erection of free issue equipments and valves/ dampers: Study of drawings, equipment passport documents, inspection of foundation/ Embedded part (EP) at site, receipt of free issue ventilation equipments/ accessories, valve, dampers, air distribution terminal blocks from Engineers store, loading, transporting, unloading & uncrating the box, inspection, temporary storage, rigging, hoisting, shifting to the location, erection over the pedestal/ foundation/ metal structure/ in line of duct, levelling, aligning with base frame/ flanges, fixing of vibro-isolators, bolting as per the technical specifications & equipment passport documents, inspection, preparation and handing over of as built drawing & reports. The work also includes arrangement of tools & tackles, machineries, manpower, scaffoldings at all level, supply of fasteners as per the IS 1363 & IS 1367 of property class 5.6, 8.8 for assembly with base frame including cleaning, grinding and levelling of EPs/ pedestal, depositing uncrated packing materials at designated place as per EIC instruction for the following item No. 1.1 to 1.7. Note: (i) The work of supply, fabrication and erection of metal base frames, and providing various shims will be measured and paid separately.	--		
E 1.1	Erection of pre assembled ventilation equipments such as Centrifugal fans, Re-circulating cooling Plant in UJA and UJB buildings as per WD and technical specifications.	MT	12	.0001338
E 1.2	Assembling of stainless steel filter housing, electric air pre heater, Stainless steel filter supports/legs issued as a part of filters, welding of legs over the Embedded part on the pedastal, cleaning, fixing of adhesive gasket over the flange, flange alignment, fixing with the SS fasteners supplied along with the filter housing, leveling, aligning, erection and pneumatic testing inside reactor building. The work also involves providing pneumatic test setup for testing of assembled filter housing as per the manufacturer recommendation for ensuring flange leak tightness, supply of all consumbales like electrodes/ filler wire for carryingout SS welding (similar/ dis similar) over Base frame/ EP pedestal.	MT	14	.0001805

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at 2 X 1000 MWe Kudankulam Nuclear Power Plant Unit # 3 & 4 - NIEP 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
E 1.3	Erection of over size ventilation equipments by Disassembly, cutting of equipment base frame, shifting to location, re assembling, edge preparation, fitup and welding of base frame, fixing of coupling, alignment of rotor- motor shaft of Re- circulating cooling Plant in reactor buildings as per the technical specifications. The work also involves supply of all consumbales like electrodes/ filler wire for carrying out welding (similar/ dis similar) equipment base frame, manpower, tools and tackles.	MT	87	.0011826
E 1.4	Erection of ventilation valves/ dampers:	--		
E 1.4.1	Erection of ventilation containment Isolation valves along with mating flanges, actuator assembly issued for erection of valves to the Embedded pipe penetration. The work also involves seat leak testing of valves and insitu pneumatic testing of valve - connected with pipe penetration as per the Manufacturer/ WD recommendations, providing pneumatic test setup, compressed air and other consumables necessary for completion of test.	kg	11,100	.0001921
E 1.4.2	Erection of motor operated butterfly valves assembly, motorised shut check valve assembly.	kg	50,605	.000743
E 1.4.3	Erection of Fire Damper (Valve)/ Chimney Valve/ damper, check valve, throttle valve, ORV, Regulating Grating: the Work also involves supply of adhesive foam gasket, non asbestos compressed gasket gasket for erection of valves/ dampers/ gratings Note: i) The electric actuator of each valves shall be dismantled and preserved safely with clear identification of valve code as per the manufacturers/ EIC recommendations in a controlled atmosphere and shall be only erected at the end of contract period/ upon the instruction of EIC. ii) The payment for actuator removal,preserving will be measured under item no: 15 and Re fixing of actuator- sensor will be measured and done iseparately iii) Welding of ORV Flange over the EP will be measured separately	kg	8,000	.0000755
E 1.4.4	Erection of air distribution terminal block: The work also includes supply and fixing of terminal block with pipe branch with SS fastners SS 304.	kg	380	.0000225

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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
E 2	Ducting	--		
E 2.1	SS Ducting: Supply of Stainless Steel sheets of 2.00 mm thickness confirming to ASTM A 240-02a TYPE -321 No 2B finish with IGC tested as per ASTM 262 A Practice E, storage, preparation of duct/ fitting fabrication drawings including development & cutting drawings for engineers acceptance, rolling, cutting of sheets to required size & shape, bending, edge preparation, drilling, weld fit up, TIG welding for fabrication of circular and rectangular ducts & fittings such as bends (including vanes), elbows (including vanes), taps, T-joints (including vanes), reducers of various sizes, collar piece for grill & mesh fixing, exhaust hoods, access doors in the duct etc. erection of ducts & fittings at site, welding using GTAW process, erection on permanent supports as shown in working drawings at various elevations for the items covered under 3.1 and 3.2. This work also includes NDE (DPT) inspection of weld joints as per specification and drawings, arrangement of all tools and tackles, machineries, man power of all categouries, consumables welding filler wire. Note: The payment for supply fabrication and fixing/ erection of flanges, stiffners, tie rods etc. will be measured and paid separately.	--		
E 2.1.1	Stainless steel Circular and rectangular duct	SqM	7,000	.0144505
E 2.1.2	Vanes in the Bends/ elbows/ T-joints/ Diffusers of Rectangular sections	SqM	350	.0010437

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at 2 X 1000 MWe Kudankulam Nuclear Power Plant Unit # 3 & 4 - NIEP 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
E 2.2	Carbon Steel Ducting : Supply fabrication, anti corrosive painting and Erection of Carbon Steel (CS) Ducting: Supply of cold rolled Carbon Steel sheets of thickness 2.00 mm as confirming to IS 513-2008 of designation CR3, storage, preparation of duct/ fitting fabrication, development & cutting drawings for Engineers acceptance, rolling, cutting of sheets to required size & shape, bending, edge preparation, drilling, weld fit up, TIG welding for fabrication of circular and rectangular ducts & fittings such as bends, elbows, taps, T-joints, reducers fitted with vanes/ splitters of various sizes, collar piece for grill and mesh fixing, exhaust hoods, access doors in the duct, grid blasting, supply and application of primer minimum 2 coats (min 50 micron thick each coat), and finished painting to obtain final cumulative coat thickness of min DFT 240-250 microns as per specifications, erection of ducts & fittings at site, welding using GTAW process, mounting on permanent supports as shown in working drawings at various elevations described under item no 4.1 and 4.2. This work also includes NDE inspection as per specification and drawings, arrangement of all tools and tackles, machineries, consumables, welding filler wire, manpower of all categaries required for execution of work. Note: The payment for supply fabrication and fixing/ erection of flanges, stiffners, tie rods etc. will be measured and paid separately.	--		
E 2.2.1	Carbon steel ducting of circular and rectangular section, duct fitttings	SqM	2,150	.0022517
E 2.2.2	Vanes/ splitters in the Bends/ elbows/ T-joints/ Diffusers of carbon steel air ducts of Rectangular sections	SqM	120	.0001446

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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
E 3	Stainless steel vent box/ Structures/ Plates for duct/ valves/ equipment supports: Supply of Stainless steel plate of thickness 3 mm, 5 mm, and other thickness as per the drawing meeting ASTM A 240-02a TYPE -321, No 2B finish with IGC tested as per ASTM 262 A Practice E, cutting, bending, rolling, edge preparation, drilling, welding, fabrication of vent box pannels and erection at various locations of reactor building. The work also involves supply of all welding consumables, nitrile rubbber sealing cord upto dia 12mm and arrangement of tools & tackles, manpower for completion of work	--		
E 3.1	Supply, fabrication and erection of Stainless steel vent box	kg	50,000	.0051211
E 3.2	Supply, fabrication and erection of Stainless steel structures for Duct/ Equipment support structure, poison plate, shim plates for equipment etc.	kg	10,000	.0010941
E 4	Supply, fabrication and erection of metal mesh over ductings as per the drawings and technical specifications. This work also includes cutting and making opening in the air duct by cutting/ grinding wheel, welding of fabricated metal mesh over the duct as per the specification, arrangement of tools & tackles, machineries, consumables, welding filler wire, manpower required for execution of work	--		
E 4.1	SS 304 Metal mesh of size 10 mm x 10 mm and wire dia 1 mm on SS ducts at various locations	SqM	350	.0003385
E 4.2	GI coated wire mesh size 10 mm x 10 mm and wire dia 1 mm on CS duct	SqM	250	.000072
E 5	Supply and erection of instrumentation hole setup (ih) points over SS/ CS ducts/ vent box described under item 5.1 and 5.3 as per the specifications	--		
E 5.1	Supply and erection of ih. set over SS duct. The work also involves, driling of hole in duct/ vent box, welding, fixing of bolt, as per WD and specifications.	Nos	200	.0007271
E 5.2	Supply and erection of ih. set over SS vent box. The work also involves, driling of hole in duct/ vent box, welding, fixing of bolt, as per WD and specifications.	Nos	60	.0002459
E 5.3	Supply and erection of ih. setup for carbon steel duct, the work also involves, driling of hole in duct, welding, fixing of bolt, touchup painting as per WD and specifications.	Nos	150	.0004918

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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
E 6	Thermal Insulation of Air ducts and vent Box: Supply of Ceramic fibre insulation matts, glass fabric of 600 GSM, 0.5 to 0.6 mm thick, fibre glass thread, storage, cutting, stitching, pre fabrication of matts as per the sizes, cleaning of surface, wrapping over the duct as per the drawings and specifications. The work also includes fixing the spacer / wrapping with binding wire, supply of all ancillaries tools & tackles, scaffolding at all levels, manpower, inspection, preparation and submission of asbuilt drawing, reports.	--		
E 6.1	Ceramic insulation Insulation with Aluminum Cladding: The work also includes supply of 0.8 mm thick Aluminum sheet confirming to IS 737 of designation 19000, H2 condition, cutting, pre fabrication, clading over the insulation matt over the duct, supply of consumables like screws, rivets, aluminum adhesive tapes, sealant of approved make and specification, arranging the fabrication setup for cladding for satisfactory completion of work.	--		
E 6.1.1	50 mm thick single layer fixed type insulation with 0.1 mm thick Aluminum vapour barrier :	SqM	400	.0004238
E 6.1.2	(50 mm x 2 layer) 100 mm thick fixed type insulation	SqM	75	.0000936
E 6.1.3	(50 mm x 2 layer) 100 mm thick insulation Al cladding -Removable type	SqM	150	.0002418
E 6.2	Ceramic insulation with Stainless Steel Cladding: The work also includes supply of SS clading material confirming to ASTM A 240-02a TYPE -304, one side No 8 mirror finish, SS 304 wire mesh of opening size 1 mm x1 mm, wire dia 0.25 mm, Supply and fixing of aluminum foil of thickness 0.1 mm over the duct/ vent box, adhesive aluminum tape, supply fabrication of SS 304 strip/ pins, welding of cleats/ pins, supply and fixing of ancillaries, binding wire, screws, rivets of materail SS 304, supply and application of sealant over the cladding joints, arranging the fabrication setup for cladding for satisfactory completion of work.	SqM	800	.0013159

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at 2 X 1000 MWe Kudankulam Nuclear Power Plant Unit # 3 & 4 - NIEP 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
E 7	Modification in erected SS Ducting: Dismantling of erected duct, fittings, cutting, drilling, re fabrication as per the modified drawing and re erection at site for following items. This work also involves providing tools & tackles, machinaries, manpower, consumables required for execution of work.	--		
E 7.1	Dismantling of erected SS ducting and fittings including the splitters/ vanes, flanges, stiffners by cutting wheel and depositing as per the instructions of EIC.	kg	6,000	.0000451
E 7.2	Modification/ re-fabrication of SS ducts, fittings with dismantled duct spools including, cutting, grinding, welding as per the WDs, instructions of EIC. The work also includes fabrication and fixing of vanes and splitters in to the bends/ elbows, T-Joints, as per the drawings and technical specifications.	SqM	500	.0004426
E 7.3	Erection of ducts and fittings at site, grinding, welding inspection as per the drawings and instructions of EIC. Note: No seperate measurement / payment will be done for vanes/ splitters which are the part of fittings.	SqM	500	.0003465
E 8	Modification in erected CS Ducting: Dismantling of erected duct, fittings, cutting, drilling, re fabrication as per the modified drawing and re erection at site for following items. The work also involves providing tools & tackles, machinaries, manpower, consumables required for execution of work.	--		
E 8.1	Dismantling of erected carbon steel ducting by cutting/ grinding wheel and depositing the material as per instruction of EIC.	kg	2,500	.0000162
E 8.2	Re fabrication of ducts using dismantled ducting including cutting, grinding, welding, touch up painting.	SqM	2,000	.0008963
E 8.3	Erection of Dismantled/ re-fabricated CS duct at site. Note: No seperate measurement / payment will be done for vanes/ splitters which are the part of fittings.	SqM	2,000	.0006516
TOTAL Weightage				1.0

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