

**ENQUIRY TECHNICAL SPECIFICATION& SCOPE OF SUPPLY OF STEERABLE
RUDDER PROPULSION WITH ACCESSORIES FOR 2 Nos.50 TONS BOLLARD PULL
TUGS FOR KANDALA PORT TRUST .VESSEL Nos. : VC 11173 &11174**

NOTE : FORWARDING OF COMPLIANCE FOR ENQUIRY TECHNICAL SPECIFICATION PART -A [MACHINERY] , PART- B [ELECTRICAL] AND PART- C [GENERAL] IS A MANDATORY REQUIREMENT BY HSL WITHOUT WHICH OFFERS OF FIRMS SHALL BE CONSIDERED AS INCOMPLETE AND ARE LIABLE TO BE IGNORED.

[A] BIDDING FIRM'S NAME :

[B] BIDDING FIRM'S OFFER NO :

[C] AUTHORIZED SIGNATORY OF THE FIRM :

PART A - MACHINERY PART

Clause No.	Description of technical specification	Vendors Reply: Complied & cost included in offer mentioned above At [B]
1	<p>STEERABLE RUDDER PROPULSION SYSTEM WITH ACCESSORIES .QUANTITY : TWO NOS.</p> <p>Two (2) numbers Stern mounted Steerable Rudder propulsion units with fixed pitch propellers of suitable capacity shall be installed on Port and Starboard sides.</p>	
1.1	<p>Note :</p> <p>[1] Each SRP mainly consisting of a Steerable rudder propeller driven by a four stroke marine high speed diesel engine through an clutch. The units shall be remote controlled from Bridge.</p>	
2	<p><u>POWER TRANSMISSION</u></p> <p>Engine Make : Will be furnished later</p> <p>Max. engine power at 100% MCR : 1875 KW</p> <p>Engine speed at 100% MCR : Will be furnished later</p> <p>Direction of rotation (seen on flywheel) : Anticlockwise both units</p> <p>Vessel Speed at 90 % MCR : 12 Knots</p> <p>Bollard pull at 90 % MCR : 50T at trial displacement of</p> <p align="center">50% Load of fuel & fresh</p> <p align="center">water at calm sea</p>	
3.	<p>DESIGN AND OTHER REQUIREMENT S:</p>	
3.1	<p>The vendor shall ensure that the design of SRP and shafting fulfills operational requirements of vessel as per enclosed GA drawing and class rules</p>	
3.2	<p>As the unit is supplied for well installation, therefore shall have mounting flange integral with the casing. Necessary mounting material like counter flange, seals of the casing with fasteners shall be supplied as per OEM standard as applicable.</p>	

Clause No.	Description of technical specification	Vendors Reply: Complied & cost included in offer mentioned above At [B]
3.3	<p>The SRP shall be supplied with following :</p> <ul style="list-style-type: none"> [a] Shafting as per GA drawing to complete shaft line. [b] Couplings with fasteners to connect shafting [c] Supporting block bearings with housing to support shafting [d] Bulkhead gland seals <p>Note :</p> <ul style="list-style-type: none"> *Quantity and other specifications for above components shall be as per OEM standard and acceptable to class. *All above components shall be supplied with fasteners. *Any other accessories which are needed to complete shaft line shall be included. 	
3.4	Anodes are fitted for protection against electrolytic corrosion .	
3.5	<p>LUBRICATING SYSTEM : AS PER OEM STANDARD</p> <p>The lubrication system of the SRP shall be self contained ,complete with all pumping equipment , cooling equipments and devices , Expansion tanks etc. and also shall have following :</p> <ul style="list-style-type: none"> a) Monitoring devices for oil temperature and pressure b) Necessary oil cooling arrangement for Lube oil. c) Level indicators and observation glasses for Lube oil d) Inbuilt / on built pressure relief provisions. 	
3.6	<p>HYDRAULIC SYSTEM FOR STEERING: AS PER OEM STANDARD</p> <p>The hydraulic system of the SRP shall be self contained ,complete with all pumping equipments and cooling equipments and devices etc. , fulfilling operational requirement to steer the ship as per class requirement & also shall have following :</p> <ul style="list-style-type: none"> a) Monitoring devices for oil temperature and pressure b) Necessary oil cooling arrangement for hydraulic oil. c) Level indicators and observation glasses for Lube oil d) Inbuilt / on built pressure relief provisions. 	
3.7	<p>The scope of supply shall include following also :</p> <p>The pressure reduction valve (30 to 10 bar) to be installed as close as possible to the control unit.</p> <p>SRP manufacturer shall supply the air supply panel including shut-off valve, filter, pressure reduction valve, non-return valve & safety valve as per OEM standard.</p>	

Clause No.	Description of technical specification	Vendors Reply: Complied & cost included in offer mentioned above At [B]
4	Spare parts as per build specification Annexure – III inclusive of class recommended spares are as below:	
4.1	PCBS of each type fitted for steering and engine control system : 3 complete sets [One set comprises of PCBs for one unit]	
4.2	Potentiometer of each type fitted : 2 each	
4.3	PCBS 24V Navigational Panel : 1 set [One set comprises of PCBs fitted in one panel]	
4.4	PCBS 230V Navigational Panel : 2 sets [One set comprises of PCBs fitted in one panel]	
4.5	Tele fax steel cable for engine speed Control along with outer tubes : 2 complete sets	
4.6	Thrust indicators : 2 nos	
4.7	RPM meters : 2 nos.	
4.8	Spare propeller : 1 no.	
4.9	Electric motor driven portable pump with Fittings to pump out oil from SRP system Refer Sl.95 of Annexure-I of Build Specification] : 1 no.	
5	<u>NOTE:</u> Under mentioned couplings are in Main engine supplier 's scope : [a] Flexible coupling between Main engine PTO output & clutch [b] Flexible coupling between Main engine PTO output and FiFi Gear Box.	
6	<u>NOTE:</u> Following rigid flange couplings of hydraulic fitting type are in Clutch suppliers scope (Reference drawing of power drive and scope is enclosed) : a) To connect with output end of flexible coupling of Main engine b) To connect with flange rigid coupling of SRP shafting.	
7	Any specific recommendation on hull / structure such as bulkhead gland packing and cathodic protection to be included in the offer.	

Manager[MD]

Dy Manager [MEM]

**ENQUIRY TECHNICAL SPECIFICATION& SCOPE OF SUPPLY OF STEERABLE
RUDDER PROPULSION WITH ACCESSORIES FOR 2 Nos.50 TONS BOLLARD PULL
TUGS FOR KANDALA PORT TRUST .VESSEL NOs. : VC 11173 &11174**

PART C - GENERAL PART

Clause No.	Description of technical specification	Vendors Reply: Complied & cost included in offer mentioned above At [B]
1.	Requirement: Quantities specified in attached Part A, B &C are for One (1) Vessel. Total requirement is for Two (2) Vessels.	
2	Rules, Inspection and Certification by Class	
2.1	Classification Rule : The Tug shall be built for Classification with Indian Register of Shipping to obtain + SUL + IY TUG [Restricted Service] FIFI AGNI I of I.R.S., i.e. Restricted sea going vessel and machinery built and installed under supervision of the Surveyors of I.R.S. to the Rules of Indian Register of Shipping and has an External Fire Fighting arrangement to IRS AGNI – I standard . The vessel shall comply with latest IMS Rules as applicable to this type of vessel [Class XII] and with the Inland Vessels act.	
2.2	Type approval : The manufacturing and production of complete equipment shall be type approved by Class& relevant certificate shall have validity for 3 to 5 years from the date of issue of Purchase Order.	
2.3	Testing : The complete equipment shall be tested in presence of Class in manufacturer’s workshop and test certificate shall be produced.	
2.3.1	Steerable Rudder Propulsion : a) Vendor shall ensure that tests during production and tests after assembly are carried out in accordance with Quality Assurance Plan which observes the rules of ISO 9001. b) All separate SRP and aggregate assemblies are checked during and after assembly. Finally the rudder propeller is assembled, together with the retract mechanism, and an SRP leak test is performed. c) All other components / systems are tested separately at OEM factory or sub contractors work whichever is practicable.	
2.4	Inspection and commissioning : Service engineer assistance for testing and commissioning of complete equipment for dock and sea trials in presence of HSL, surveyors and owners to be indicated in lump sum. The check list confirmation along with the date of requirement of service engineer will be intimated by HSL subsequently. The list of jobs to be completed prior to arrival of service engineer for commissioning is to be furnished along with the offer.	

Clause No.	Description of technical specification	Vendors Reply: Complied & cost included in offer mentioned above At [B]
2.5	Electrical installations to conform to latest classifications / IEC rules.	
2.6	Vendor has to directly contact classification / statutory authorities as required for approval of drawings, testing, inspection certification etc. and arrange the same to fulfill class requirement .	
2.7	Class approved Certificates, drawings and documents in triplicate (one original + 2 Copies)	
3.	Documents to be submitted after order	
3.1	Class approved documents in triplicate (one original + 3 Copies)	
3.2	Torsional, Lateral, Axial vibration calculations, Whirling and Shaft alignment calculations as required within 4 weeks from order. Torsional Vibration Analysis (TVA) of the ship's propulsion system, including SRP and shaft, intermediate shaft, torsional couplings, Engine, clutch, Gearboxes, pumps as required shall be carried out by the Engine manufacturer based on data provided by the respective manufacturers of the machinery and equipment. The TVA calculations shall be submitted to the Classification Society and approval obtained.	
3.3	Shop test data duly signed by class / owners to be furnished for SRP, shafting, bearings, Gear box, clutch , PTO, accessories etc as required immediately after shop trials.	
3.4	Class approval Drawings as applicable within four(4) weeks after contract and the same shall be updated within four(4) weeks after approval.	
3.5	List of Alarm Monitoring Points, controls and instrumentation system details as per class requirements shall be supplied within two (2) weeks to enable HSL to place a separate Purchase Order for Centralized Ship Alarm Monitoring System.	
3.6	Drawings pertaining to Installation and Arrangement, foundation, piping schematics, material lists, level switches, instrumentation and final Electrical schematics , wiring & connection drawings, electrical interface drawings with Propulsion Control system shall be supplied in 3 sets within 4 weeks from order for HSL approval. Final data including list of alarm monitoring points in IPI shall be forwarded within 2 weeks after approval.	
3.7	Heat Balance diagram showing heat dissipation, cooling water requirements of various accessories are to be included in IPI.	
3.8	Final Drawings in IPI shall be supplied in three (3) sets in hard copies and in soft DWG format in one (1) C.D. in AUTOCAD 2004 within 2 weeks after approval from HSL.	
3.9	OEM shall submit the under mentioned certificates and reports in triplicate (1 Original + 2 copies) after shop trial : Shop test data duly signed by class & owners. Classification Type approval, Manufacturer Test Certificate .	

Clause No.	Description of technical specification	Vendors Reply: Complied & cost included in offer mentioned above At [B]
3.10	Six (6) sets of instruction, operation, maintenance, parts list and spare parts manual for Machinery, Electrical and electronic equipment within 12 weeks after order	
3.11	Preservation and maintenance details of each equipment supplied, to be specified.	
4	Tools and fittings required for Installation of equipment :	
4.1	Foundation bolts and nuts, other fasteners, flanges, counter flanges, unions for screwed connections, class approved flexible hoses etc. for inlet and outlet connections of equipment supplied.	
4.2	All approved water tight cable Glands and terminal boxes as required shall be supplied for electrical installation	
4.3	Hydraulic tightening devices, Hydraulic equipment and Torque - spanner wherever required	
5	Class and manufacturer recommended Spares	
6.	Class and manufacturer recommended tools	
7	Product Support : Supplier should confirm that they will provide product support for a minimum period of 20 Years from the date of delivery of the vessel for complete Machinery and Electrical equipment being supplied by them.	
8	Onboard Training : The manufacturer shall provide training to technical crew onboard regarding operation and maintenance of the equipment supplied for Mechanical, Electrical & Electronic part. Training program will be conducted at HSL. Training shall be imparted by service Engineer at the time of commissioning.	
9	Systems and features not included in the specification, which vendor deem necessary for satisfactory operation of the supplied system, same shall be supplied free of cost even if observed during installation/ commissioning.	
10	OEMs of Main engine, SRP Propulsion system, clutch and External fire fighting system (AGNI-1/FIFI-1) shall liaison with each other to ensure correct design and supply of material for satisfactory working, integration of respective equipment and to ensure smooth commissioning.	
11	Enclosures : [a] GA Drawing no. 50018 CC. [b] Lines Plan dtd 22-6-2011 [c] Reference drawing for power drive and scope	
12	Weight criteria : The dry weight of the Propulsion system with Accessories shall not exceed 37 Tonnes per ship set. The dry and wet weight of all items supplied shall be included in the weight study and shall be furnished along with the offer.	
13	Documents to be submitted along with the offer:	
13.1	Technical leaflets, catalogues and reference lists of installation for the quoted equipment. Capacities, Technical details, performance curves, dimensions, weights etc. of each equipment being offered (Machinery / Electrical / Electronic).	

Clause No.	Description of technical specification	Vendors Reply: Complied & cost included in offer mentioned above At [B]
13.2	G.A drawing showing SRP, Shafting , clutch / PTO Hydraulic Pump, Engines, PTO Gear Boxes etc including foundation/dimensional detail	
13.3	Installation drawing indicating Foundation details and procedure and space constraints for withdrawal of various accessories of all the offered machinery and equipment shall be furnished.	
13.4	Schematic drawing for Piping and Instrumentation diagrams indicating size of the connection pipes, pipe fittings, valves etc., for L.O, Hydraulic, F.W & S.W cooling , etc.	
13.5	Electrical schematics and cable diagrams of each system and arrangement of SRP control system in Bridge, Engine Room, etc as offered and list of alarm & monitoring points.	
13.6	Project guides for installation and work execution of the equipment offered in 2 sets.	
13.7	List of Lubricants (Brand & Grade) recommended for the equipment offered shall be indicated in the offer. Equivalent lubricants available with Indian Oil companies shall also be indicated in the above list.	
13.8	Firm supplying Main Engine Firm supplying Steerable Rudder Propulsion Firm supplying Clutch Firm supplying External Fire fighting system-Agni-I *The above firms shall forward a copy of the mails send other suppliers as mentioned above to HSL for reference. <u>NOTE : TOTAL RESPONSIBILITY OF INTEGRATION OF MAIN ENGINES, SRP, CLUTCH AND EXTERNAL FIRE FIGHTING SYSTEM LIES WITH CLUTCH SUPPLIER.</u>	

THE BIDDER SHALL ENSURE THAT THE OFFERED MACHINERY /EQUIPMENT PERFORM TO UNDER MENTIONED SERVICE CONDITIONS :

MAIN PARTICULARS OF SHIP AS PER GA DRG. NO 50018 CC , PROJECT REF : DP-424	
LOA	: 32.725 M
LBP	: 32.000 M
Breadth [Mld]	: 10.80 M
Depth [Mld] Main hull	: 4.50 M
Draft [Bottom of Appendage]:	3 M
Speed at 90 % MCR	: 12 Knots
Bollard pull at 90 % MCR	: 50T at trial displacement of 50% Load of fuel & fresh water at calm sea
MCR power	: 1875 KW x Two Engines
Propulsion	: Twin Steerable Rudder Propulsion
SERVICE CONDITIONS	
Sea water temperature	: 32 degree C
External temperature	: 40 degree C
Machinery spaces temp.	: 50 degree C
Humidity	: About 60% at 40 degree deg C

Manager [EDM]

Manager [MD]

Dy. Manager [MEM]

**ENQUIRY TECHNICAL SPECIFICATION & SCOPE OF SUPPLY OF STEERABLE
RUDDER PROPULSION FOR 2 Nos. 50T BOLLARD PULL TUGS FOR KANDALA PORT
TRUST HSL YARD NOS. 11173 -74**

PART B - ELECTRICAL PART

Clause No.	<u>Description of Technical Specification</u>	<u>Vendor Reply: Complied & Cost included in offer mentioned above at [B]</u>
1	<u>POWER SUPPLIES AVAILABLE ON BOARD:</u> 415 V, 3phase, 50Hz, 3wires system (Neutral insulated). 220 V, 1 phase 50Hz, 2wire system,	
1.1	In case of any power supply requirement other than the above; suitable conversion unit operating on above power supplies shall be included in the scope of supply.	
1.1.1	All the Electrical equipments shall operate efficiently under voltage fluctuations and frequency fluctuations as per the Rules and Regulations of class specified in PART C- General part.	
1.1.2	Power (KW) requirement and no. of feeders required for each system shall be indicated in the offer.	
1.1.3	Power supply for the indication lamps of automatic Electropneumatic remote control equipments shall be suitable for operation on 24V DC.	
1.2	All the equipment, instrumentation, Alarms and indicators shall perform satisfactorily within the ambient conditions in Engine Room and the supply variations as per the class requirements.	
1.3	The electric cable to be provided by HSL shall be of copper conductor, XLPE insulation, copper wire braided, Halogen Free flame retardant type sheathed cable, with certain standard sizes. In case the offered systems required any other type and sizes of electric cables, special type cables, the same shall be supplied, as per the requirement.	
1.4	Suitable W.T cable entry glands shall be provided for all the starters, control panels and Motors.	
1.5	All Electric Panels and DB's shall be provided with electrical diagram plates, clearly showing connections with terminal markings as on the equipment and they shall be secured on the underside of the cover of the panel or DB's.	
1.6	SRP propulsion system suppliers shall coordinate with Main Engine and MCD / Slip on Clutch suppliers and also the Ship's Central Alarm Monitoring System suppliers for Interface drawings and for Integration of these systems for satisfactory functioning.	
2	<u>MOTORS:</u> The motors shall be of marine type and reputed make and shall conform to the latest requirements of Classification Societies and I.E.C. Standards. The motors driving the pumps shall have sufficient power rating to drive the pump without over loading under any condition.	
2.1	Squirrel cage Induction high torque smooth acceleration type, totally enclosed self ventilated type, minimum Class 'F' tropicalised	

	insulation.	
2.2	Rating and duty of operation to suit the requirement.	
2.3	Degree of protection of each motor shall be suitable for respective application and indicated in the offer.	
2.4	Motors shall be provided with water proof terminal box as per suppliers standard with all the wires brought into the box and terminated in standard connecting terminals. All connecting terminals shall be complete with Nuts, Spring Washers, etc. Which shall be treated against corrosion. The terminal box shall also be provided with removable cover.	
3	<u>STARTERS:</u>	
3.1	Each motor starter shall have a local start and stop control, a hand reset for the over load, with adjustable over current trips, built in single phase protection and running light indicators for all vital auxiliaries and motors.	
3.1.1	All starters shall have provision for remote Start, Stop and Running indication.	
3.2	Direct on line starter for motors below 10HP.	
3.3	Star delta starters for motors 10HP and above.	
3.4	Auto transformer or SOFT start type starter for motors above 30HP.	
3.5	Starters for all motors above 1KW shall be provided with an ammeter.	
3.6	Degree of protection shall be suitable for respective application and indicated in the offer.	
3.7	All starters, control panels shall be of standard make and suitable for marine application. Makes to be specified in the offer.	
3.8	All the equipments, control, starter panels shall be provided with Anti-vibration mounts	
3.10	Fuses employed for backup protection shall be of high rupturing capacity (H.R.C. Type) and shall be carefully selected in each case in relation to the starting currents and acceleration time of the motors and to give short circuit protection to the cable and motor circuit.	
3.11	Motor starters shall be in sheet steel enclosure with isolating switch on the door. All working parts shall be accessible within this door.	
4	<u>ALARM / MONITORING / INSTRUMENTATION:</u>	
4.1	The automation and instrumentation shall be provided, as per specification, so as to satisfy the requirements of the class and statutory authorities. The alarms and indications shall comply with requirement of IMO resolutions A830 (19) 1995 as amended.	
4.2	All the necessary sensors and switches required for analogue and binary output alarms shall be supplied , calibrated , mounted and wired to respective terminal boxes	
4.3	Analogue indicators shall be provided for all essential measurements.	
4.4	The instrument gauges provided on the equipment and alarms shall be arranged in a proper order for easy maintenance and smooth operation.	
4.5	Alarm blocking and time-delay of channels shall be provided where ever it is necessary to avoid false alarms.	
	Note: HSL shall provide centralised ships Alarm Plant and all necessary compatible Signal feeds shall be extended. The SRP	

	Supplier shall Co-ordinate with Ships Alarm Plant Supplier for Integration of System.	
5	<u>CONTROL SYSTEM:</u>	
5.1	Necessary interfaces as required for integration with MCD / Slip on Clutch and Main Engine shall be provided. Control cabinet for bulkhead mounting near the thrusters, housing all the necessary logic circuit for local and alarm monitoring systems and indicators for steering angle & RPM, for local emergency control shall be supplied. Degree of protection for cabinet shall be suitable for the location and indicated in the offer	
5.2	Remote Control System: An Integrated control system for steering, engine speed and clutch shall be provided. Electrical changeover of desks at wheelhouse shall be such that controls at one desk will be in operation and other will remain standby. The Main Engine and SRP units shall be started from Engine Room and then controls shall be transferred from engine to wheel house and vice versa while stopping the propelling machinery. A Control stand installation for Machinery control transmission from bridge to propeller units shall be provided as per SRP supplier standards.	
5.2.1	Engine control Station(ECS): The following items shall be supplied mounted on a drop in panel for installation in the ECR - Console (in total two ECR drop in panel one per thruster).The Drop in panel is to be flush mounting on Engine Control consoles, shall be supplied complete with two(2) mtrs. cable and wired to terminal block. Controls: Button: "Desk Selection" Control buttons: "Non-Follow up Steering" Push Button: "Lamp Check" Dimmer for instrument light Push- button with lamp for constant RPM (Heavy Duty) mode Push- buttons with lamp to request FiFi mode. Indications: Indication lamp: " Desk in Service" Thrust direction indicator, with built - in illumination. Shaft Speed indicator, with built - in illumination.	
5.2.2	<u>Bridge control station (BCS):</u> Two (2) Nos. Drop in panels per thruster one for installation into Forward and one for installation into Aft Bridge control console. In total four drop in panels (one per thruster for two steering positions) shall be supplied. The panels shall be suitable for flush mounting on Bridge consoles, supplied complete with two (2) mtrs. cable and wired to terminal block.	

	<p>Controls: Copilot controller for steering, speed, and clutch control. Control buttons: "Non - Follow up Steering". Button: "Desk Selection" Push Button: " Lamp Check" Dimmer for instrument lights. Push -buttons with lamp for constant RPM (Heavy Duty) mode Push -button with lamp to request FiFi mode</p> <p>Indications: Indication lamp: "Desk in Service" Thrust direction indicator, with built - in illumination. Shaft Speed indicator, with built - in illumination. Pilot Lamp: " Follow Up Steering in Service" Pilot Lamp: " Non - Follow Up Steering in Service" Pilot Lamp: " Follow Up Speed Control in Service".</p>	
5.2.3	<p>Control Panel Selection: The control panel selection shall be "electric shaft" type. When the Copilot steering / thrust force lever of the Master panel is moved automatically all slave panels shall follow the Master panel.</p> <p>At each panel there should be a take - over switch and an indication panel in service. When take over switch is actuated the panel should become automatically the Master panel - all other panel should be slave panels.</p>	
5.3	<p>UPS SYSTEM : Necessary UPS system will be provided by HSL for 24V DC consumers of M.E, SRP and Alarm Monitoring System. Accordingly, the 24V DC load requirement for the S.R.P Control system shall be indicated in the Technical Offer.</p>	
5.4	<p>SPARES: Spares shall be supplied as per the following basis for all the electrical items taking into account the total number of identical parts fitted. All the spares shall be stowed in suitable metallic or wooden cases and each part shall be labelled in English furnishing the part number, etc. Spares shall be supplied separately furnishing the list of spare parts , indicating total quantity .</p>	
5.4.1	<p>Spares shall be supplied according to the classification Societies requirements. Over and above the Classification Societies requirements, if any other spares and tools are necessary for the proper and efficient maintenance of the equipment as per Maker's recommendations, the same shall be included in the supply.</p>	
5.4.2	<p>The list of spares included in the scope of supply shall be enclosed to the Technical Offer.</p>	
5.4.3	<p>The following spare parts shall necessarily be included in scope of supply. Separate Unit Price for the spare parts shall be indicated in the price bid.</p>	
	<p>a) Indicator lamps for MCR and Wheel House control consoles, SRP control panels - 24 Nos. of each type & size.</p>	

	b) Fuses for MCR and Wheel House control consoles, SRP control panels - 24 Nos. of each type & size.	
	c) PCBs for each type fitted for steering and Engine Control system - 3 complete sets. (One set comprises of PCBs for one unit)	
	d) Potentio meter of each type fitted - 2 each	
	e) Solenoid switches for clutch - 2 set each	
	f) Thrust indicators - 2 Nos.	
	g) RPM Meters - 2 Nos.	
	h) Contactors, Overload relays and Timers of various capacity fitted on SRP - 3 each of type (Make of relays' - siemens)	
	i) Miniature circuit breaker of various capacity fitted on board - 3 each of type (Make: Siemens).	
	j) Fuse base, HRC fuses and bottle type fuses of various capacity fitted on SRP - 12 each of type.	
5.5	<u>TEST CERTIFICATES</u>	
5.5.1	Works and Classification Test Certificates shall be supplied as per Part C - General part.	
5.5.2	Maker's detailed workshop test certificates for all motors shall also be supplied in triplicate along with type approval certificate of motors.	
5.5.3	Other Electrical items shall also be tested to Classification Society wherever applicable per Part A - Machinery Part.	

Manager
(Electrical Designs Materials)

Manager
(Electrical Designs)