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Tender closes on Date: August 20, 2007

Tender No.: AAGL/PP&C/SV/1150

Date: July 24, 2007

M/s .....

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**Tender for complete contract for design, supply, installation & commissioning work of Air conditioning and ventilation system onboard 6 Nos. Catamaran type Survey Vessels for Indian Navy, Yard Nos. 257-262 at our site at Bhavnagar / Chanch**

Dear Sir,

You are requested to submit your lowest quotation for tender mentioned "Air conditioning and Ventilation system work on 6 nos. Indian Navy Survey Vessels, Y. No. 257-262".

Name of work	Probable estimated value of tendered contract per vessel	EMD	Completion period	Last date of issue of tender	Last date of submission of tender and date of opening of technical bids	Tender fee
Complete Turnkey AC, Ventilation, and Refrigeration Contract for Design, Supply, Installation Integration and Commissioning / Trials onboard 6 Nos. Catamaran type Survey Vessel for Indian Navy, Yard No. 257-262 at AAGL Bhavnagar /	Rs. 3 crores per vessel (Approx.)	Rs. 1000000/- per vessel	10 months for first vessel and subsequent vessel at interval of 3 months each	28/07/2007	20/08/2007	Rs. 1000/-

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Chanch Shipyard						
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**General description and the details of total scope of supply and work of Air-conditioning and ventilation system is attached at Annexure “I” and Annexure “II” respectively of this tender document.**

**The price bid to be submitted in attached Annexure “III” of this tender document.**

General terms & conditions:-

- 1) (a) Temporary scaffolding if required shall be arranged by the contractor.  
(b) No permanent scaffolding shall be allowed to be put inside the hull.
- 2) The contractor has to adhere to the instructions related to the sequence / method of work given by us time to time. Any change in above shall be discussed mutually & implemented on agreement.
- 3) The contractor must possess sufficient experience of design, supply, installation and commissioning of marine AC and ventilation system and should have knowledge of all general and special requirements as per Indian Navy standards. The bidders to submit details of similar kind of jobs executed in past to get bonafied.
- 4) Specification / design / drawings to be prepared by the contractor and to be submitted for the scrutiny, comments and approval of the yard, classification society, statutory authority and IHQ-MOD[N] of Indian Navy as applicable.

Air conditioning and ventilation system offered to be out of one of the principal make as listed below.

- I] York Marine, UK
- II] Noeske Koeser, Germany
- III] Heinen & Hopman BV, Netherlands

The bidder representing from India / abroad to any of the above firm have to submit the letter from their principal, clearly authorizing them to participate in this bid / tender on behalf of them. The said authorization letter is a primary requirement of this bid. Accordingly the bid submitted by the parties other then the listed above and not submitting the authorization letter as mentioned above, their bid documents will be liable for rejection and will be considered un qualified for the subject tender.

- 5) All equipments, machinery, ducting, panel boards, control panels etc. will have to be installed as per approved drawing/instructions and standard marine practice.

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However special considerations to be given in the design, layout and installations accepting the fact that the vessel is having a Catamaran hull form of steel material and the material of construction for the superstructure is Aluminium. Necessary trimming, cutting, drilling, grinding etc. as required for the fitment onboard vessel/s shall be done by the contractor.

All the consumables like electrode, gas, grinding disc, clamps for fitment of ducting, penetrations, glands, ties, lugs, insulation, cutting hoses/torch, welding cables, tools, tackles etc are to be arranged by the contractor at his cost. Any special tools, tackles, equipments etc. required to carry out the job, the same to be arranged by the contractor as a standard scope at his cost.

- 6) The work is to be executed at our site at Bhavnagar and Chanch. Lodging, Boarding & Transportation of their labours and staff shall be arranged by the contractor at his cost.
- 7) Contractor has to adhere to the instructions given to him time to time and also follow the drawings and instructions strictly. Any rejection/rectification shall be attended by the contractor at his cost.
- 8) The work will be inspected by authorized representative of the yard, in stages and also by the inspecting authority of Indian Navy, class and statutory authorities as may be applicable. Any loss or wastage of material will attract heavy penalty. Any slippage in time schedule for completion of the work will also attract penalty.
- 9) Only approved welders shall be deployed for the critical structural welding of any A/C and ventilation work related items.
- 10) Any damage to nearby areas/structures due to negligence in carrying out Air conditioning and ventilation work shall be made good by the contractor at his cost. Damaged painting shall be touched up by the contractor in case of the hot work done by the contractor after the painting of subject area.
- 11) No labour idle time shall be paid by the company (AAGL) to the contractor.
- 12) The contractor will complete the work as per the schedule and instructions given to him. In case if he fails to do so, the company (AAGL) will get the work done with the help of some other resources and if in doing so, the company (AAGL) suffers any losses, the same will be deducted from contractor's bills.
- 13) The contractor shall not assign or sublet the whole or any part of the work without our consent in writing. Even if any permission to assign or sublet any part of the work has been granted, AAGL shall have no obligation to assignee and the contractor shall be fully responsible to the company (AAGL) for satisfactory execution and completion of the work.
- 14) The contractor will be fully responsible for maintenance of records and other liabilities under the provision of various labour legislations. The contractor will

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be abide by the terms and conditions of contracts labour (Regulation and Abolition) Act and the rules framed there under.

- 15) Workmen of the contractor will be governed by the rules and regulations of our shipyard, while they are at our work. The contractor shall be responsible for complying with all laws, regulations, notifications, etc of the Central, State Government and other local authorities as applicable time to time.
- 16) Price must confirm to the scope of supply and jobs specified in the tender. The rates must be shown legibly in ink or type written and to be filled up against each supply / job / activity specified in "Annexure III" and same to be stamped and signed by the bidder.
- 17) The acceptance of the tender in whole or in part will be entirely at the desecration of the management of the company (AAGL) or their authorized representative.
- 18) The tender may be sent through Courier / Regd. Post / Hand Delivery and to reach our Bhavnagar office before closing date within office hours.
- 19) Any other work/activity/equipment not specified in this tender, however necessary for the tendered jobs, the same to be carried out by the contractor as a standard scope of work at no extra cost.
- 20) Price quoted for the total supply/work to be fixed and firm.
- 21) The Contractor will exercise due control over his staff & workmen as well as staff & workmen of their subcontractors if any, Company shall have the right (incase any of Contractor's staff & workman being incompetent or ill mannered) to ask the Contractor to remove such staff/workmen or agency from the site which shall be complied with by them with immediate effect.
- 22) The Contractor will also be responsible for cleanliness of related work area and for safe custody, storage and preservation of all the equipments / machinery / material required for tendered job at proper place assigned by the company. The Contractor will be responsible for planning and interaction of tools, tackles and material handing for the job assigned to them. The goods under the custody of the contractor will be treated as fully covered by him for any risk or loss due to theft, short or damage due to negligence on their part.
- 23) The Contractor will be responsible for providing compensation to his employees as per the governing Act, and medical aid due to any injury or accident. The Contractor should also maintain records as per contract labour [Regulations and Abolition] Act 1970.
- 24) The contractor will observe all the rules & regulations connected with safety of all workers. Contractor's workmen or staff will be trained by them from safety point of view. And they shall observe the safety regulations strictly while on work and on work site.

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- 25) The contractor will comply with the provisions of workman's compensation act & arrange for their employee's liability insurance and any other insurance required under law & regulation. In addition Contractor should also cover their tools tackles, equipments, staff and also their subcontractor's staff and workmen if any by suitable insurance. The Contractor should also cover third party risk under insurance.
- 26) The contractor should register his firm with the office of the labour Commissioner from the respective jurisdiction in relation with the job site/s for getting labour license.

The contractor will have to comply with all the provisions under the various labour laws, which will be applicable to them.

Limitations of contractor's liabilities on the company:

- 1) Any consequential or indirect losses.
- 2) Any claim made against the company except as provided in this order.
- 3) Any damage/injury from acts or omissions from our employees or agents or others.

The contractor shall abide by the existing industrial laws as applicable from time to time to their firm & persons working for them at our site/s.

- 1) Central labour (Registration & abolition) act 1970 and Rules there under.
- 2) Payment of wages Act 1936 and Rules there under.
- 3) Minimum wages Act 1948 and Rules there under.
- 4) Industrial dispute Act 1947 and the amendment thereof.
- 5) Workman compensation Act 1923.
- 6) Factory Act 1948 & Rules there under.
- 7) Payment of bonus Act 1965.
- 8) Payment of Gratuity Act 1972.
- 9) The contractor shall extend provident fund benefit to their eligible employees as per the provisions of employee's provident fund and miscellaneous provisions Act 1952 and amendments there after.

The documentary proof, in the form of Challan, receipt and returns as may be applicable in respect of their firm and all eligible employees should be produced for verification as and when asked by the company (AAGL).

The contractor will be responsible for the Security / Safety of the equipments used by them at site.

- 27) The contractor will be completing the work as per the schedule given by the company (AAGL). Any delay will attract a penalty of 1% per month up to the maximum of 5% of the total contract value.
- 28) All the taxes & levies as applicable to their contract by local agencies, State &

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Central Govt. Authorities shall be borne by the contractor.

TDS as applicable shall be deducted from the each payment made to the Contractor.

- 29) The workmanship of installation and supplied equipments of complete Air conditioning and ventilation work carried out by the Contractor will be guaranteed by the contractor for twelve months from the date of delivery of the respective vessel to the Indian Navy at contractors cost.
- 30) The Contractor will produce progressive bills attached with certificates duly certified by competent authority of the Company [AAGL].

The payment shall be released within 30 days of presentation of the bills attached with certificates duly certified by competent authority.

The Contractor will produce their bills on monthly basis. We shall retain 10% of the bill amount from each bill on account of performance guarantee of the work done by the Contractor.

On successful completion of the test & trials of the subject vessel, the Contractor may put forward claim towards release of 10% of bill amount retained on account of performance guarantee from each running bills, against which you will have to give virtual work completion certificate issued by competent authority of the company (AAGL) and performance bank guarantee of equal amount valid till end of the guarantee period and the guarantee obligations.

The payment against each monthly bill shall be released based on the assessment / measurement of the physical work completed by the Contractor.

Work to be commenced and completed as per the available work front and material and payments shall be released accordingly.

- 31) The work shall be subjected to the inspection by our Q.C. Department, IRS / MMD / INDIAN NAVY as applicable. Any recommendation given by said authorities for the work and workmanship shall be made good by the Contractor without any extra cost to the Company [AAGL].
- 32) Any deviation what so ever to all above terms and conditions and any additional condition from the Contractor will not be accepted by the company (AAGL).
- 33) Tender to be submitted in the two separate sealed covers, clearly titled as "Technical bid for Design, supply, Installation and commissioning of Air conditioning and ventilation system for Indian Navy Survey Vessels, Y. No. 257-262". And "Price bid for Design, supply, Installation and commissioning of Air conditioning and ventilation system for Indian Navy Survey Vessels, Y. No. 257-262" respectively.

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Each and every page of this tender document including “Annexure I, II” of technical bid duly filled as required and “Annexure III” **[un priced]** containing **blank** Price Bid format to be stamped and signed by the bidders as a token of acceptance by them to all the job requirements, terms & conditions of the subject tender and to be submitted in the sealed “Technical bid”. Whereas “Annexure III” of price bid duly filled with the price by the bidder stamped and signed, to be submitted in separate sealed price bid cover.

- 34) The data / information / confirmation / declaration as may be applicable against each requirements specified in “Annexure I”, “Annexure II” and “Annexure III” of this tender document are to be filled up by the tenderer in the same format without any compromise to the case to case requirements specified. Moreover details / data / information as specified in the tender and required to be submitted by the bidder separately are to be strictly complied with. The above mentioned requirements are basic in nature for the subject tender.

Authorized Signatory  
Alcock Ashdown (Gujarat) Ltd.



## **DESIGN, SUPPLY & INSTALLATION / COMMISSIONING OF AIR CONDITIONING PLANT AND VENTILATION SYSTEM FOR SIX NOS. INDIAN NAVY SURVEY VESSELS, YARD NO# 257-262**

### **GENERAL DESCRIPTION & DESIGN PARAMETERS FOR AIRCONDITIONING PLANT AND VENTILATION SYSTEM**

#### **GENERAL DESCRIPTION**

The Catamaran survey vessel's hull form shall be constructed from steel material and the construction of superstructure from marine grade Aluminium.

The air conditioning plant is to be designed for a peak summer load under tropicalised climate conditions with recirculation air of about 50%. The capacity of A/C system to be worked out and proposed by the supplier based on the final design done by them. A/C plant offered is to consist of three condensing units each having 50% capacity, air handling unit and air distribution shall be facilitated through ducting system. The ship's total air conditioning requirements will be completely met by two plants and one additional plant of identical capacity [50%] shall be provided which will remain as standby / reserve capacity over and above the ship's load.

All living spaces, dining hall, equipment spaces, operational spaces, offices, electronic stores, galley to be air conditioned. Adequate forced ventilation is to be provided in the toilets, wash rooms and for the engine room, steering gear compartment, working areas, Co<sub>2</sub> room, stores/lockers and other non AC spaces. Forced exhaust ventilation is also to be provided in machinery space/s. Ambient conditions in the engine room/s to be considered as specified and shall be considered / maintained as per classification standards and to satisfy the requirements of machinery / equipments installed and serving in the respective space. Air conditioning and ventilation arrangement to be designed in accordance with Naval specification NES 102.

Ventilation between main transverse bulkheads to be fitted with fire flaps in the trunks passing through watertight bulkheads. Fire flaps, operable from each side of the deck / bulkhead to be fitted in trunks passing in to electronic and operational spaces and galley.

Each condensing unit shall consists of R-134a screw type compressor and motor units, condenser, cooling water pumps, refrigerant circuit piping and controls and cooling sea water piping. Three such condensing unit each of 50% of the extreme plant load capacity shall be provided. Thus two condensing unit shall be in operation to meet the normal operating requirements and the other condensing unit shall be as stand by. Determination of cooling loads will be in accordance with NES102. Fire / smoke control dampers, noise reduction and air flow control dampers are to be provided respectively for fire control, noise / vibration reduction and proper balancing of the air conditioning system. For guidance in determining the sizes of ventilation ducts and the pressure losses of ventilation fittings, NES102 standards are to be referred and adopted. All AC equipments to be mounted on shock and anti vibration mountings except where the construction and operation demands otherwise.

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The air handling unit shall consist of mixing section, filter section, fan section, cooling coil section with R-134a DX cooling coil and shall be mounted on a common base frame. Only one no. air handling unit will serve all the air conditioned spaces. The air handling unit fan shall be driven through belt and by means of electric motor.

The conditioned air treated in the air-handling unit shall be served to various conditioned spaces through air distribution ducting system made of 22 swg Galvanized steel sheet metal duly clamped and insulated. The penetration pieces for deck and bulkheads in superstructure are to be manufactured from aluminium material.

The conditioned air supplied to cabins and other conditioned spaces shall be let out through grills on respective door to the corridor. Part of the air shall be drawn back to air handling unit through return air grills and return air duct and balance shall be let out to atmosphere through the excess air grills provided on doors / bulkheads leading to ambient. The return air in recirculation shall not exceed 50% of the total air circulated. No. of air changes and fresh air requirement to be considered inline with the D.G Shipping guidelines and inline with NES102 standards.

The Air Conditioning and ventilation system will be designed considering the following site conditions under which the equipments and machineries to perform satisfactorily to achieve required performance:

Ambient Temperature: (-) 10°C to (+) 40°C  
Max. Temperature in engine room: (+) 55°C  
Sea water Temperature: 1°C to 35°C  
Relative Humidity up to 90 % condensation, at 35°C  
Atmosphere air pressure: 760 mm of Hg  
Salinity of water up to 35 ppm

### Codes and Standards

The entire Air conditioning and ventilation system is to be designed in accordance with the following codes / rules / regulations / standards.

1. NES102 / commercial standards
2. Fire control rules as per SOLAS for this kind of vessel
3. Rules of ASHRAE and ISO for air conditioning and ventilation.
4. Crew accommodation rules as per ILO convention (No. 92)
5. Compliance of habitability as per HAB + standards of ABS or equivalent, as far as applicable
6. Noise level for machinery / equipment / system to be maintained in accordance with specification IS-13161 [Part 3]
7. AC machinery as applicable shall also comply with NSS II shock standards by calculations & shock and vibration levels should meet classification standards.

### Design Parameters

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The air conditioning plant to be designed and sized on the basis of following design parameters:

Sea Water Temp.: 1<sup>0</sup> C to 35<sup>0</sup> C

Power Supply: 415 V, 3PH, 3 Wire, 50Hz AC

Rules and Regulations: The statutory requirements as recommended by MMD to be met.

Refrigerant: R-134a

Electrical equipments /  
Machinery:

- (a) All electrical equipments and machinery to be capable of continuous operation when fitted at any direction up to an angle of 30<sup>0</sup> from vertical plane passing through the centre line of the equipment.
- (b) Motors of standard range, generally of squirrel cage induction type confirming to EED-Q-071[R2] having class "F" insulation, continuously rated on 415 V, 3 Ph for 0.5 HP and above, and enclosures of IP 56/55/54 are to be provided as applicable. Each motor to have thermistor sensor fitted in winding.
- (c) Starters confirming to specification EED-Q-071[R2] are to be provided. Direct online motor starters to be provided for all consumers below 5 HP and star-delta starters for motors of 5 HP and above incorporating under voltage, over current, short circuit, single phase protection and connection for thermistors in motor. Starter to be mounted near the respective equipment. Starter located outside the machinery space to be additionally provided with a main switch / isolator with door interlock. System interlocking as required to be provided. Each starter to be provided with following;
  - (i) Start / stop push buttons
  - (ii) On/off indication lamp
  - (iii) Control potential transformer 415 V / 240 V of suitable rating
  - (iv) HRC control fuses
  - (v) Thermal overload relay with built in single phase protection contactors and overload relays as per approved list of IRS to be used

Spaces to be Air conditioned:

1. Magazine Compartment
2. Gyro room

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3. Sick bay
4. Ship Control Spaces.
5. Machinery Control Room.
6. All Living Spaces, dining hall, galley, operational spaces, equipment spaces, offices and electronic stores to be air conditioned.

Air conditioning system to be designed to achieve the following conditions / criteria

- (a) All living and manned compartments except galley: 23.5°C effective (27°C DB and 19.6°C WB)
- (b) Galley: 25.5<sup>0</sup> C effective (29.5°C DB and 21.5°C WB)
- (c) Electrical equipment space: 23°C ± 1°C effective, RH 50%, dust filters up to 1 microns

To achieve the air tight requirements, suitable closures shall be fitted to all air conditioning / ventilation opening.

Compartment access shall be provided via gas tight doors and / or hatches. Remote closing arrangements of all ventilation openings and means of automatically stopping all ventilation fans serving in the spaces shall be provided.

Spaces not included:

Wash rooms, Stairwells, Toilets to be included for the calculation of volume of air flow but need not be supplied with conditioned air. Adequate forced ventilation to be provided. Toilets to be provided with mechanical exhausts to let out the air to outside atmosphere.

AHU room on main deck and various store spaces, Co<sub>2</sub> room, emergency generator room, laundry, refrigeration machinery [deep freezer] room, LKR, toilets, bow thruster room, workshop spaces etc. are not included for air conditioning and are to be provided only with mechanical ventilation/natural ventilation as applicable.

Insulation:

Insulation shall be provided as per IHQ–MOD(N) policy and also to meet the structural fire protection requirements as per classification society and statutory requirements. Thermal insulation shall be provided on all ship sides and deck heads exposed to weather and coming in way of air conditioned spaces.

Insulation material will be as per NCD specifications. However regarding final thickness and grade of insulating material to be advised by the AC system designer / vendor to the yard based on detailed calculations indicating as to what will be the likely temperature in the respective compartments which should be inline with the requirements specified.

Transmission losses are influenced by the transmission coefficient 'K'. The

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recommended minimum 'K' values for different areas shall be considered as follows.

Surface	Heat Transmission coefficient `K' (Kcal/M <sup>2</sup> h °C)	
	<u>For Steel</u>	<u>For Aluminium</u>
Weather deck with sun awning	0.8	.....
Weather deck without sun awning	0.5	.....
Ship sides or outer bulkheads	0.8	.....
Deck against open air	0.5	.....
Glass windows	4.0	4.0
Other non Air conditioned spaces	0	.....
Bulk heads against alleyways	2.0	.....

Based on above mentioned design parameters and taking in to consideration the spaces to be air conditioned, the supplier to carryout detailed heat load and air quantity calculations and accordingly workout the capacities of each equipment / machinery and the total capacity of the system offered.

The data / capacity of each individual equipment / machinery / components to be declared / specified in the attached Annexure- 1 specification format in supplier's column. And scope of supply/work also to be confirmed in the attached Annexure-II specification format of the technical offer.

The heat load calculations and capacity calculations worked out by the supplier to be submitted with the technical offer for our scrutiny and review.

The G.A. Plan of the vessel is attached with the tender inquiry for the reference and to enable the supplier to carryout the design / calculations and sizing of the A.C. Plant and to workout and offer the complete scope of supply.

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