



**Specification**  
for  
**SeaBoater 72 - 21.95 Meter**  
**Standard Version**

# Table of Contents

<b>1. Principal Dimensions .....</b>	<b>7</b>
1.1. General .....	7
1.2. Classification .....	7
1.3. Substitutions .....	7
1.4. Weight and Performance .....	7
1.5. Architect's Drawings .....	8
1.6. Welding .....	8
1.7. Lofting .....	8
1.8. Trials & Tests .....	8
1.9. Access to Compartments .....	9
1.10. Draft Marks .....	9
1.11. Owner Supplied Items .....	9
<b>2. Construction .....</b>	<b>10</b>
2.1. General .....	10
2.2. Weight Control .....	10
2.3. Dimensional Tolerances .....	10
2.4. Materials .....	10
2.5. Fastenings .....	11
2.6. Zincs .....	12
<b>3. Structure .....</b>	<b>12</b>
3.1. General .....	12
3.2. Internal Structure .....	12
3.3. Watertight and Structural Bulkheads .....	12
3.4. Non-Structural Bulkheads .....	12
3.5. HULL/DECK JOINT .....	13
3.6. Toe Rail .....	13
3.7. Teak Decks .....	13
3.8. Lifting Ballast Keel .....	13
3.9. Rudder .....	13
3.10. Emergency Steering .....	13
3.11. Transom Platform/Wet Deck .....	13
3.12. Dodger Storage .....	13
<b>4. Finishes .....</b>	<b>14</b>
4.1. General .....	14
4.2. Hull Fairing .....	14
4.3. Finishing .....	14

4.4. Preservative Treatment .....	14
4.5. Boot Top and Cove Stripe .....	14
4.6. Name and Hailing Port .....	14
4.7. Exterior Brightwork .....	15
4.8. Interior Brightwork .....	15
<b>5. Interior .....</b>	<b>15</b>
5.1. General .....	15
5.2. Partition Bulkheads .....	15
5.3. Hull Ceilings .....	16
5.4. Doors .....	16
5.5. Lockers .....	16
5.6. Countertops .....	16
5.7. Drawers and Dish Cabinets .....	16
5.8. Storage Spaces .....	16
5.9. Ladders .....	16
5.10. Built-In Furniture .....	17
5.11. Curtains .....	17
5.12. Portlights and Windows .....	17
5.13. Deckhead/Overhead .....	17
5.14. Hatches .....	17
5.15. Cabin Sole .....	17
5.16. Shower Pans .....	18
5.17. Mirrors .....	18
5.18. Quantities/Areas Required for Interior Partition Bulkheads and Panels .....	18
5.19. Compartment Description .....	18
5.20. Interior Hardware .....	20
5.21. Galley Equipment .....	21
5.22. Plumbing Fixtures .....	22
<b>6. Insulation .....</b>	<b>23</b>
<b>7. Machinery (Engine, Genset &amp; Stern gear) .....</b>	<b>24</b>
7.1. Main Engine .....	24
7.2. Gearbox .....	24
7.3. Flexible Shaft Coupling .....	24
7.4. Propeller Shaft .....	24
7.5. Stern Tube .....	25
7.6. Shaft Seal .....	25
7.7. Shaft Strut .....	25
7.8. Propeller .....	25
7.9. Generator .....	25
7.10. Main Engine and Generator Exhaust Systems .....	25

7.11. Controls .....	25
7.12. Bow Thruster .....	26
7.13. Power Take-Off at Main Engine .....	26
7.14. Drip Pan .....	26
<b>8. Ship's Systems .....</b>	<b>26</b>
8.1. Air Conditioning & Ventilation .....	26
8.2. Refrigeration System .....	27
8.3. Hydraulic System .....	28
8.4. Rudder & Steering Gear .....	29
8.5. Fire Extinguishing .....	29
8.6. Stove Gas System .....	30
<b>9. Plumbing and Associated Systems .....</b>	<b>30</b>
9.1. General .....	30
9.2. Piping .....	31
9.3. Tank Gauges .....	32
9.4. Bilge, Fire & Anchor Wash .....	33
9.5. Fresh Water System .....	33
9.6. Black Water System .....	34
9.7. Grey Water System .....	35
9.8. Fuel Oil System .....	35
9.9. Deck Drains & Scuppers .....	36
<b>10. Electrical System .....</b>	<b>36</b>
10.1. General .....	36
10.2. Drawings and Documentation .....	37
10.3. Name Plates .....	37
10.4. Electrical Supplies and Reticulation .....	37
10.5. Wiring, Supports and Bonding .....	37
10.6. Lightning Protection .....	38
10.7. AC Power Supplies .....	38
10.8. DC Power Supplies .....	39
10.9. Switchboards and Distribution .....	40
10.10. Electrical Equipment Lists .....	41
10.11. Electronics .....	42
10.12. Interior Lighting Fixtures, Switches and Receptacles.. ..	43
10.13. Navigation Lights & Outlets .....	44
10.14. Alarms & Gauges .....	45
<b>11. Deck Hardware .....</b>	<b>45</b>
11.1. General .....	45
11.2. Winches .....	46

11.3. Deck Hardware .....	46
11.4. Toe Rail .....	47
11.5. Fair Leads & Cleats .....	47
11.6. Life Lines, Pulpit & Pushpit .....	47
11.7. Anchor Windlass .....	48
11.8. Hatches .....	48
<b>12. Spars, Rigging &amp; Sailing Systems .....</b>	<b>49</b>
12.1. General .....	49
12.2. Taper .....	49
12.3. Mast Head .....	49
12.4. Masthead Spinnaker .....	49
12.5. Forestay/Hounds Tang .....	50
12.6. Inner Forestay .....	50
12.7. Runner Tangs .....	50
12.8. Shroud Attachment .....	50
12.9. Spreaders .....	50
12.10. Halyard Slots .....	50
12.11. Gooseneck .....	50
12.12. Vang Fitting .....	50
12.13. Water Tight Integrity .....	50
12.14. Electrical Conduits .....	50
12.15. Electrics and Antennas .....	50
12.16. Mast Base and Step .....	50
12.17. Painting Mast .....	51
12.18. Windex .....	51
12.19. Lights .....	51
12.20. Boom .....	51
12.21. Asymmetrical Bow Sprit .....	51
12.22. Rig Hydraulics (see Hydraulic System under Ship Systems) .....	51
12.23. Standing Rigging .....	52
12.24. Running Rigging .....	52
12.25. Reefing Lines .....	52
12.26. Sheets .....	52
<b>13. Outfit .....</b>	<b>53</b>
13.1. Owners Manuals .....	53
13.2. Tender (Owner Supplied) .....	53
13.3. Chain and Anchor Rodes .....	53
13.4. Anchors .....	53
13.5. Dock Lines .....	53
13.6. Fenders .....	53

<i>13.7. Swim Ladder and Gangway</i> .....	54
<i>13.8. Liferaft</i> .....	54
<i>13.9. Life Rings</i> .....	54
<i>13.10. Man Overboard Modules</i> .....	54
<i>13.11. Life Jackets</i> .....	54
<i>13.12. Safety Harnesses</i> .....	54
<i>13.13. Personal Rescue Lights and Epirbs</i> .....	54
<i>13.14. Navigation Equipment (Owner Supplied)</i> .....	54
<i>13.15. Sound Signal</i> .....	54
<i>13.16. Flag Pole</i> .....	54
<i>13.17. Boat Hook</i> .....	55
<i>13.18. Tools (Owner Supplied)</i> .....	55
<i>13.19. Cooking and Eating Utensils (Owner Supplied)</i> .....	55
<i>13.20. Cleaning Gear (Owner Supplied)</i> .....	55
<i>13.21. Bosuns Chairs</i> .....	55
<i>13.22. Safe</i> .....	55
<i>13.23. Dodgers, Awnings &amp; Canvas</i> .....	55

## 1. Principal Dimensions

Loa.	21.80m.	(72.00')
Lwl	18.13m.	(59.48')
Beam Max	5,47 m.	(16.20')
Draft (Keel Down)	4.57m	(14.5')
Draft (Keel Up)	2.60m	(8.53')
Displacement (To Dwl)	18550 kgs	(40,859 lbs)
Ballast	8 655 kgs	(19 084 lbs)
Sail Area	258.49 m <sup>2</sup> .	(2781 ft <sup>2</sup> )
Fuel	890 litres	(196 Imp Gal)
Water	920 litres	(202 Imp Gal)
Auxiliary (Yanmar 4LHA-HTP)	118 Kw @ 3300 Rpm	160 Hp

### 1.1. General

The idea is to create a modern performance cruising yacht, which will be used mainly in the Med and warmer climates. The yacht will be used mainly for exclusive charter and cruising by private owners. To ensure good performance, careful attention to weight saving should be made wherever possible. With its reasonably high sail area displacement ratio there should be good all round performance. The idea is to create a unique and innovative yacht with modern clean styling, without losing any feeling of comfort.

### 1.2. Classification

(Still to be decided)

The yacht will be classed and shall comply with the British D.O.Ts "The Safety Of Small Commercial Sailing Vessels - A Code of Practice" regulations, for which a certificate will be applied for or the EU ISO Rules.

### 1.3. Substitutions

All materials and manufactured articles of construction and equipment are to be of the best quality for their respective purposes. References to trade names and catalogue numbers are generally intended to be descriptive rather than restrictive, and are indicative of the general type and grade of articles that will be satisfactory. The Architect will normally be prepared to approve substitutions if satisfied that there will be no sacrifice in quality, difficulty with procurement of spare parts, or replacement. However, in all cases, it is understood that the choice shall rest with the Owner or Architect and changes from items listed by trade name shall be made only with his approval.

### 1.4. Weight and Performance

Control of weights, centers of gravity, and weight reduction where feasible is critical to the performance of the yacht. Wherever in the specifications approved substitutions are made for specified items of equipment or equipment specified on an "or equal" basis the equivalent weights of the new equipment shall not exceed the weight of the items specified unless approved by the Architect.

The builder shall weigh the boat at major milestones and provide the Architect with actual "as-built" weights and longitudinal centers of gravity. The Architect may wish to witness these procedures.

## **1.5. Architect's Drawings**

As per contract.

## **1.6. Welding**

When welding is required the American Bureau of Shipping Rules for Construction of Yachts, shall be used as guidance in welding steels and other metals. All aluminum welding shall be by shielded inert gas process MIG (gas metal arc) or TIG (gas tungsten arc) or equal. External welds shall be ground flush. Work with serious burning or undercutting must be cut out and re-welded. Joint preparation and welds shall be in accordance with "Alcoa Handbook on Welding". The proper sequence of welding shall be followed to avoid distortion. Dye penetrant checks shall be made as required. All stainless steel welding of exposed parts or fittings shall be ground smooth and finished with a high polish.

## **1.7. Lofting**

The Architect can provide the superstructure geometry as offsets, plans, full size mylars or computer data files of the sections.

## **1.8. Trials & Tests**

Prior to trials, all machinery, equipment and systems shall have been operated by the Builder. The magnetic compasses shall have been compensated. The fresh water system shall be decontaminated; including tanks. Fuel oil tanks and piping shall be flushed with diesel oil, bypassing machinery.

The Builder is to install without cost such apparatus as the Architect or engine manufacturer may provide for the purpose of taking pressures, fuel consumption, ventilation, deliveries, or other data for the duration of the trials. Exhaust back-pressure readings must be determined.

Dockside trials shall include operation of the main machinery for two hours at as much speed as is practical without undue heating to the satisfaction of the manufacturer's representative. All auxiliaries and systems such as pumps, electric plant, heating system, anchor windlass, plumbing and fresh water system as well as mechanical devices and gear shall be thoroughly tried and operated under load to determine compliance with specifications. Handling of boats, gangways, anchors, and other gear shall be demonstrated. All electrical equipment shall be tried out and demonstrated to be in proper working order.

W.T Bulkheads, hull, deck, hatches, etc. to be given hose tests for water-tightness. Fuel and water tanks shall be tested to a hydrostatic head equal to a height of (2 feet) 0.61m above the fill cap.

The ventilation and air-conditioning system shall be tested for deliveries, temperature, humidity control, general operation, and cycling. Provision for proper condensation drainage shall be checked.

The yacht shall undergo sailing trials to the satisfaction of the Owner. After satisfactory dockside trials, powering trials will be run over ranges of speed from low to maximum full power. Trials are to include maneuvering, reversing and turning. The steering gear shall be tested. The emergency steering arrangement shall also be tested.

A four hour trial at maximum continuous power shall be run. Engine room cooling and combustion air supply system shall be checked at full power for satisfactory operation. All other systems shall be tried underway at sea. All sail handling gear and winches will be checked for proper operation.

A minimum of three days shall be required for Sea Trials, one under power and two under sail. The sailing trials must include at least one day of winds of 15-20 knots. Weather conditions for trials are subject to the approval of the Architect.

### **1.9. Access to Compartments**

Arrangement for access and for cleaning out and painting shall be provided to all compartments and to all parts of the vessel wherever practical. Flooring throughout shall be fitted with suitable hatches. Access to the engine, steering gear and all other equipment that may require services of any kind shall be provided by developing joiner work, etc., which can be removed for convenient access. Care shall be taken in locating pipes and other parts to avoid blocking of access. If necessary, removable sections shall be utilised.

### **1.10. Draft Marks**

Draft marks shall be placed on the yacht in accordance with instructions from the Architect. Mark locations must be carefully located and positions carefully checked with Architect before launching and placing on yacht.

### **1.11. Owner Supplied Items**

The following items will be supplied by the Owner and installed by Builder. Owner supplied items are to be installed by the Builder with necessary foundations, connections and related equipment. The Owner will supply those items specifically listed below, and anything else required for a complete vessel of the type described shall be provided by the Builder:

Sails

Navigation Equipment

Audio/Visual Equipment

Tender

Liferaft

Cockpit cushions.

All decorative fabrics for upholstery and curtains.

All upholstery and curtains including fabric, lining, foam, etc. but yard shall supply all mounting hardware. (Yard shall supply all berth mattresses including cotton cover with zipper.)

Barometers, Clocks, Thermometers, etc.

Spare Parts (except furnished with equipment)

Tools (except furnished with equipment)

Washer/Dryer and Microwave

Dishes, Cutlery, and Utensils and galley equipment such as toaster, coffee maker, etc.

All personal safety gear including lifejackets, EPIRB's, harnesses, etc.

Medical kit.

Artwork.

The Builder shall receive, store in a suitable manner and install on vessel at proper times the above and any other articles consigned to him for the Owner's account for use in the vessel. Suitable lockers, drawers or chocks shall be provided for dishes, utensils, tools and instruments as required. No additional charge shall be made for this service and the Builder will be responsible for the safekeeping of all such Owner supplied items.

## **2. Construction**

### **2.1. General**

This yacht is to be constructed using an carbon and epoxy resin composite laminate over a honeycomb core using a vacuum bagged hand lay-up and post cured. The yacht will be designed and built to comply with the ABS "Guide for Offshore Racing Yachts". General construction practices will be built in conformance with ABS standards and guidelines and accepted modern boat building methods. The yacht shall be built in a permanent building with adequate ventilation, insulation and light. The building shall have proper equipment to control humidity, regulate temperature and to remove dust.

### **2.2. Weight Control**

Control of weight is critical to the performance of the yacht. The Builder will provide for periodic weighing of the boat using a calibrated load cell. The weight of construction materials and components shall also be recorded. The construction material shall be weighed prior to application on the vessel.

### **2.3. Dimensional Tolerances**

Hull alignment and dimensions are to be monitored during the construction period. In general the following structural tolerances will be followed:

Length:	20 mm
Breadth:	10 mm
Depth:	10 mm
Bulkheads:	5mm
Shell Deflection:	0mm - 5mm (over one meter, before filler).

Fairness of hull and superstructure shell is to be maintained and Builder may take such measures as additional stiffening, with the approval of the Architect, to achieve this end.

### **2.4. Materials**

A recognized supplier SP Systems or equal, as agreed by the Builder and Architect will supply all reinforcement fabrics. The primary reinforcement material is carbon fiber. The resin is to be epoxy, SP Systems or equal, and approved by the reinforcement fabric supplier and the Architect. The resin must be able to withstand temperatures of up to 140°F without distortion. The resin manufacturer's requirements and instructions shall be strictly adhered to. Hull and deck are to be post cured per resin manufacturer's instructions.

All hull and deck core materials are to be Corecell or equal. Core bond to be approved by core manufacturer.

To keep track of materials, each batch of resin and catalyst, as well as all types of cloth, shall have the lot number, date of manufacture, date of delivery and date of use recorded.

The hull is to be built over a skinned and faired male plug. The deck is to be built over skinned female plug. Vacuum bag techniques are preferred in the construction of the hull, deck and bulkheads. The vacuum bag shall be capable of 1 bar of pressure throughout the curing process or as recommended by the resin supplier. Elevated temperature cure shall be employed in the construction of the hull, deck and bulkheads in accordance with resin manufacturer's recommendations.

In general laminate fiber contents, mechanical properties and test samples to be decided by Structural Engineers and or Naval Architect.

Stainless steel shall be 316 or 316L, depending on application, except where otherwise specified. All stainless steel welding of exposed parts and of all fittings shall be finished to a high polish. Stainless steel weldments to be passivated after welding and polishing.

All wood, if used in construction, shall be sound, clear and free from large knots, checks, shakes or saps, well seasoned and of a kind and quality well suited for the use intended. All lumber is to be dressed on all sides and edges, and the dimensions given are for the finished sizes. Wood shall be of the following kinds:

Mahogany:	Honduras or equivalent
Cherry:	American
Spruce:	Sitka or equivalent
Cedar:	Red or equivalent
Teak:	Burma or equivalent
Fir:	Douglas or equivalent

Substitutions for the above specified woods must be approved, as an equivalent, by the Architect. Equivalent woods may be used if an increase in weight will not result, and if approved by the Architect and Owner.

Plywood shall be marine type, waterproof, phenolic resin bonded, sound on both sides. Where finished bright externally, it shall be fir plywood faced with owner selected material. Where painted, in quarters plywood shall be teak, poplar, hard-faced Kimpreg or equal. Elsewhere, Douglas Fir plywood may be used. The minimum number of plys shall be 3 for thicknesses up to 10mm, and 5 for thicknesses of 12mm to 19mm.

Veneers throughout to be a minimum thickness of 0.6mm except in areas exposed to weather, as well as surfaces exposed to severe wear such as door faces and veneered counter tops, where the thickness is to be no less than 1.2mm (0.048") unless otherwise agreed. Exterior teak veneers to be a minimum 3mm thick (.125"). All lumber is to be dressed on all sides and edges.

All gluing is to be with a waterproof resorcinol type. Epoxy type glues can be used if approved by the Architect.

## **2.5. Fastenings**

Stainless steel fasteners shall be used throughout. Any substitutions shall be subject to the Architect's approval. All fasteners to aluminum structure shall be properly insulated and where threaded into vital aluminum members shall be in conjunction with stainless

steel Heli-Coil inserts. Clips for attachment of insulation shall, where required, be of plastic cemented type.

## **2.6. Zincs**

Builder is to provide one (1) zinc, properly sized, to fit around the propeller shaft.

## **3. Structure**

### **3.1. General**

Laminate materials are to be supplied by SP Systems Technologies or other approved manufacturer as mutually agreed between Builder and the Architect. The following laminate schedule shows typical total number of layers, sequence of plies and core material.

**Hull laminate to include the following:**

*TBD*

**Deck/House/Cockpits laminate to include the following:**

*TBD*

### **3.2. Internal Structure**

The laminated internal hull and deck structure includes girders, floors, longitudinals and deck beams. Stiffeners are to be made of carbon fiber over foam core formers. Carbon fiber laminates will be combinations of unidirectional tapes and biaxial fabrics.

Particular attention is to be paid where joiner members are tabbed to hull and deck and are considered structural members. Details of the attachment will be per Engineer's instructions.

### **3.3. Watertight and Structural Bulkheads**

The forepeak and lazarette bulkheads are watertight. Particular attention is to be paid to ensuring that all pipe and wiring penetrations are sealed and that watertight integrity is maintained.

Watertight and structural bulkheads are to be made of Nonex or equal honeycomb cored composite panels. Watertight and structural bulkheads are to be fully tabbed to hull, both sides, using +45°/-45° tapes. Proper fillets to be formed using a low density filler mix.

### **3.4. Non-Structural Bulkheads**

Bulkheads are to be Carbon/Corecell composites with wood veneers or faired and painted lacquer finish above soles.

### **3.5. HULL/DECK JOINT**

*TBD*

### **3.6. Toe Rail**

Teak toe rail – see Section 12 “Deck Hardware” for details.

### **3.7. Teak Decks**

Side decks, cockpit sole and seat bottoms to be laid with 50mm wide by 8mm thick teak planks. The teak shall be entirely knot free and the decking shall be laid parallel to the deck edge, nibbed into a teak king plank, with teak margin pieces at all edges and at all hatches. Teak decking shall be bonded in epoxy glue or other adhesive by a method to be approved by the Architect. No mechanical fasteners shall be used. Deck seams to be filled with Sika-Flex deck seam compound, including all accelerators and primers. All adhesive compounds to be applied in strict accordance with the manufacturer's latest instructions.

### **3.8. Lifting Ballast Keel**

To be a cast steel fin with a bolted on lead ballast bulb.

The steel fin is a one piece casting with integral hydraulic ram for lifting, material to be ASTM A536-84 Grade 80-55-06 (Min Yield Str. = 360 Mpa).

A bolted on lead ballast bulb of approximately 8650 kgs with internal stainless steel cage to be attached with stainless steel bolts per Architect's plans.

No trimming ballast will be accounted for.

### **3.9. Rudder**

Rudder blade to be fabricated of carbon fiber over high-density foam with shape and size as shown on construction plans. Trailing edge of rudder to be finished off sharp as per Architects detail. The rudderstock and internal rudder framing shall be carbon fiber with construction as per Engineer's plans.

### **3.10. Emergency Steering**

Head of rudderstock shall be detailed to take an emergency tiller. A small flush hatch shall be installed on deck over stock to permit fitting of tiller. Emergency tiller to have stainless steel head fitted into aluminum tube. Suitable eyes and tackles to be provided for mechanical advantage.

### **3.11. Transom Platform/Wet Deck**

Aft deck and transom to swing out, on lightweight struts controlled by two hydraulic rams, to become the swim/boarding platform, dinghy will then be launched from this platform.

### **3.12. Dodger Storage**

Full width dodger required, to be stowed in rebated storage trench on main coachroof deck with lightweight flush cover for when dodger is in stowed position.

## **4. Finishes**

### **4.1. General**

The exterior hull and deck and the exposed portions of the hull and deck interior shall be faired and painted using U.S. Paint's "Awlgrip" products. The application of the fairing and paint system shall be in strict accordance with the manufacturer's specifications. A record of temperature and humidity shall be kept during paint application.

The hull topsides are to be painted in (white?) Awlgrip and the boot top to be painted (navy blue?), as selected by the Owner. All painted surfaces will receive a minimum of three coats of paint.

The bottom paint shall be Interlux Micron 66 or equal antifouling paint, sprayed on. The application shall be in strict accordance with the manufacturer's specifications.

The deck and cabin top, where exposed, will be painted in (white?) Awlgrip. Non-skid will be applied to all flat accessible surfaces or where specified. Non-skid type to be as selected by owner. Non-skid to be patterned around all deck fittings as directed.

### **4.2. Hull Fairing**

Every effort should be made by the Builder to keep the hull fair throughout the construction process in order to minimize the amount of fairing compound required. Hull shall be sanded before applying primers and micro-balloon fairing compound. Care shall be taken to avoid sanding through to laminate after application.

### **4.3. Finishing**

All paints and varnish to be rubbed between coats, and particular care shall be taken while painting that all workmen are clear of boat; also, that it is clean and free of chips, sawdust and rubbish before final coats are applied. Final coat shall be smooth, show no sanding marks, and be free of dust. All finishing colors to be selected by Owner.

### **4.4. Preservative Treatment**

Backs of ceilings and grounds for other woodwork as required to be given at least three generous coats of approved sealer, such as Wood-Life, Chemi-seal or equal. Where possible, treatment shall be applied to finished lumber before installation.

### **4.5. Boot Top and Cove Stripe**

To be painted between sheered lines above the D.W.L. as per plans, using similar system as topsides. Final location of boot top, and cove stripe to be approved by Architect before painting.

Cove stripe to be applied to hull, without recess. Cove stripe to be painted in Awlgrip, color selected by owner.

### **4.6. Name and Hailing Port**

Name and hailing port to be painted on stern in Awlgrip or done with a vinyl transfer,

color and font style to be selected by owner. Name to be in letters of height and design as directed and approved by the Registering Authority and Owner.

#### **4.7. Exterior Brightwork**

All exterior wood except teak decks, cockpit seats and soles to be finished bright. All varnished wood trim to be finished with ten (10) coats of Epifanes Clear Varnish.

#### **4.8. Interior Brightwork**

Where finish to be clear, varnish with satin finish, using Epifanes Rubbed Effect Varnish, 6 coats minimum, rubbed between coats. Where painted, lacquer finish, done with Interlux semi-gloss paint, color as directed by Owner, 2 coats minimum. Floorboards to be varnished.

### **5. Interior**

#### **5.1. General**

All joiner work is to be installed in accordance with the best yacht practice.

The interior style and finish is to be decided by the builder but in general is to be either lacquered finish on faired composite panels or selected wood veneers on composite panels.

Veneered interior means fully veneered bulkheads, cabinets and locker doors. All surfaces to be trimmed in wood. Corner posts, fiddles, and all other trim and fashion pieces will be solid wood and matched as closely as possible to the surrounding woodwork. Doors shall be of flat panel construction. Overhead to be ultra-suede or fabric covered panels.

Fiddles are to be installed on all working surfaces. Convenient and well-rounded hand holds or grips to be provided throughout cabin areas and heads, on overheads and bulkheads as needed, to facilitate safe movement below deck. Toe spaces are to be used on all built in furniture.

Where particular sizes are not called out, material shall be as light in weight as consistent with good practice. All surfaces that may be exposed during normal use such as the inside of drawer faces, locker doors, etc., shall match surrounding joiner work. Corners of cockpit wells, hatches, furniture, lockers, etc., to be well rounded. All projecting corners of partitions to be fitted with neatly rounded corner posts. All fastening pieces, rails, doorsills, drawers, etc. to be screw fastened.

Particular care shall be given to eliminating rattles in all joiner work. This includes doors, locker doors and floorboards. Provision is also to be made for removable or hinged panels to insure access to all equipment, steering cables, electrical junction boxes, tanks, etc.

Owner supplied equipment will be given specific storage locations. Proper dedicated foundations, divisions and mountings will be provided for all Owner supplied items.

#### **5.2. Partition Bulkheads**

To be honeycomb core with E-Glass or thin plywood faces as called up by Architect.

### **5.3. Hull Ceilings**

To be painted satin/matte white or upholstered (Alcantara) lightweight plywood panels where hull is exposed to the interior, otherwise to be bare hull. Backs of hanging lockers to have cedar battens.

### **5.4. Doors**

To be of the flat panel type with veneer/finish to match surrounding brightwork. Locker doors to be veneered flat panel per plans. All doors to be honeycomb cored to prevent warping. All passage doors must have maximum height permitted by deck structure. Styling details to be coordinated between Architect and Builder.

### **5.5. Lockers**

Hanging lockers to be finished inside. Hanging lockers to be fitted with shelves, rods and hooks as directed. Shelves to have fixed fiddles. All hanging lockers to have provisions for ventilation thru louvered doors.

Wet locker to be finished inside with Formica and provided with a fixed rod, rack for drying boots. Wet locker door to have louvers. Sole to be grated and drain to bilge.

### **5.6. Countertops**

Galley countertop height to be 920mm, head and vanity countertop heights to be 870mm. Galley countertop to be Corian as selected by Owner with aluminum honeycomb backing and 50mm high lip at back splash. Galley sink to be undermounted to Corian worktop.

Head countertops with integral basins to be Corian as per Architect detail, colour as selected by builder. To have fixed integral Corian fiddles as directed.

### **5.7. Drawers and Dish Cabinets**

All drawers to be on stainless steel Mepla (or equal) type runners that are self closing and with stops to prevent pulling out and latches to fix in the closed position. Drawer faces to be cutout from primary panel.

Cutlery drawers, dish cabinets, and glass racks to be fitted with partitions, depressions, guides and lift-out trays as required to suit individual pieces. Glass and dish racks to have fixed felt-covered guides.

### **5.8. Storage Spaces**

All storage spaces including forepeak and lazarette to be fitted with shelves, bins, hooks as per plans or as directed.

### **5.9. Ladders**

Main companionway ladder to be built of teak or equal laminated sides and treads, with raised rubber non-skid. Forepeak ladder to be aluminum with aluminum rungs or tubular composite construction.

### **5.10. Built-In Furniture**

All upholstery material for berths, settees and seats will be supplied by the Builder. Builder will be responsible for supplying the mattress and cushion material and will be responsible for fitting the upholstery with zippers and tufting as required.

All berths to be fitted with lightweight drawers and/or lockers under, as per plans and with removable bunk bottoms for access. Bunk bottoms to be foam or honeycomb cored. Berths to have fiddles, high enough to retain mattress, but in no case to have tops of fiddles higher than 50mm below top of mattress. Owner's and guest berth mattresses shall be 150mm thick foam, crew berth mattresses to be 100mm thick. All mattresses to have covers of upholstery material supplied by the Builder. All mattresses to have full-length nylon zippers of best quality, on at least two sides. Berths to be fitted with Dacron lee-cloths with padeyes in overhead and lightweight tackles for tensioning or lee boards as selected by the Owner.

The Builder shall install settees and seats as shown. Cushions to be 120mm thick with built up lip. Counter tops and shelves to be fitted with fixed fiddles as directed. No fiddles required on saloon table.

### **5.11. Curtains**

Curtains to be provided for the windows, as directed and approved by the builder, with material as supplied by the Builder. Blinds to be provided for coachroof windows, as approved by the Builder. Curtain hangers to be approved by the Builder.

### **5.12. Portlights and Windows**

Interior window detailing to be cohesive with adjoining joinerwork.

### **5.13. Deckhead/Overhead**

Panels to be of lightweight construction. Generally, 4mm plywood panels upholstered with Alcantara or Majilte fabric, as approved by the Builder. Panels to be mounted with velcro and fitted so as to permit easy access to the underside of the deck.

### **5.14. Hatches**

Custom main companionway hatch to have lightweight composite panel with lexan window insert, on stainless steel sliders and composite or lexan washboards. If the arrangement allows, the washboards will drop into cockpit well.

Interior finish of deck hatches to be of molded composite trim that is finished to match cabin. Molding to have integral rebate to house the OceanAir sky screen.

### **5.15. Cabin Sole**

Cabin soles throughout, are to be 2mm thick wood (TBD) veneer on 15mm balsa core with 4mm plywood faces. Care to be taken when laminating floorboards to avoid warping. All edges to be back-beveled at 5° to prevent binding as per drawings. All sole panels are to be edged with solid teak or other suitable matched hardwood. Skirting trim, as per drawings, to be fitted around all edges of vertical joiner pieces. All cabin soles to have 2mm thick rubber gaskets on the under side to minimize noise transmission. Insulation to be used in way of equipment mounted under sole panels.

Every effort is to be made to make sole panels as sound tight as practical. Floorboards to be lifted with suction cup handles (as used in the glass window trade). Attention must be paid to providing access to all portions of the bilge and all items of equipment. Specific panels will be designated as under sole storage areas.

#### **5.16. Shower Pans**

Shower pans to be fabricated from custom GRP moldings with perimeter drains, not gratings.

#### **5.17. Mirrors**

Best grade 3mm glass mirrors, with frames and sized as per plans or as directed, located over Owner's and guest head wash basins. A full-length Plexiglas mirror to be provided on the back of stateroom hanging locker doors in the sleeping cabins.

#### **5.18. Quantities/Areas Required for Interior Partition Bulkheads and Panels**

**Materials Required for Interior:** (Still to be decided)

- \_\_\_m<sup>2</sup> of \_\_\_mm \_\_\_kg/m<sup>3</sup> Nomex Honeycomb Core (For modules & bhds).
- \_\_\_m<sup>2</sup> of \_\_\_mm Marine Ply (For modules & bhds).
- \_\_\_m<sup>2</sup> of \_\_\_mm Teak Veneer (For modules & bhds).
- \_\_\_m<sup>2</sup> of \_\_\_x\_\_\_ Teak (For fiddles)
- \_\_\_m<sup>2</sup> of \_\_\_mm Marine Ply (For ceilings).
- \_\_\_m<sup>2</sup> of Ultra-Suade (For ceilings).
- \_\_\_m<sup>2</sup> of \_\_\_mm Corian (For head & galley work tops).

#### **5.19. Compartment Description**

##### **Chain Locker**

Locker to be positioned in the fore peak, as far aft as practical, and shall be sized to fit 100m of 11.1mm chain.

Locker sides to be hull sides, lockers ends to be fabricated and located to suit chain capacity. Locker/bin sides to be lined with 12mm thick high density closed cell foam rubber.

Locker to be designed for self-stowage of the chain.

Pad eye to be fitted for chain bitter end.

Floor to be positioned above waterline and angled down aft to facilitate drainage from two 20mm drain holes located in the bootstripe.

##### **Crew Cabin**

Upper and lower bunks on port side with drawers under lower bunk. Hanging locker and lockers with shelf to starboard.

##### **Crew Heads**

Head and is on port side with lockers outboard and basin is on starboard side with lockers outboard. Shower in space between, shower curtain to be provided for at sides and forward end. Head and shower stall soles to have integral GRP sump trays with corner drains provided for.

## **Master Cabin**

Double berth located on centerline forward. Shelves with lockers outboard at hull sides with hanging locker immediately aft, port and starboard. On the cabins aft bulkhead between the head and the forward end of the keel trunk is the cabin entrance door. On the port side is the desk with the vanity immediately forward of this and the port side hanging locker forward of the vanity. The AC outlet grille is located above hanging locker door on the port side.

## **Master Cabin Heads**

On the starboard aft side of the master cabin is the head compartment with separate stall shower. The head is at the forward end of the compartment facing aft, basin with countertop are located outboard of this with the separate shower stall aft of this. Head and shower stall soles to have integral GRP sump trays with corner drains provided for.

## **Saloon**

The aft facing U-Shaped settee and dining table to port has lockers and shelves outboard and a countertop with drawers under immediately aft. On the starboard side is an L-Shaped settee and coffee table with lockers and shelves outboard and countertop with drawers under immediately aft, this countertop and locker will be dedicated as the bar area. Storage is to be located behind the settee backs. AC units are located port and starboard under countertop units aft of settees with outlet grilles above outboard lockers.

## **Galley**

Galley is located on port side aft of saloon, galley is U-Shaped and facing forward. On the outboard side is a counter top with locker and trash compactor under and a custom fridge box on top, the stove is aft of this with the freezer box aft of this, also located on the countertop, with the sinks adjacent to this between the engine box, over the engine box on the inboard side is the micro-wave and counter top space.

These items are to be installed in a manner that is consistent with the surrounding joinery and with reasonable access for service and maintenance. Builder is to insure proper ventilation, venting, drains and installation according to the manufacturers instructions.

All the above standard household equipment is to be modified so that it is acceptable for an offshore yacht of this type which is subject to heeling, pitching, and rolling. Builder shall install all necessary locks, catches, shelves, fiddles and rails.

Stove recess to be lined with stainless steel with insulation behind. Stove top to be supplied with sea rails and pot holders. A stainless steel crash rail to be installed in front of stove.

## **Engine Room**

The engine room is to be fitted out in a proper manner in perforated aluminum sheet, finished in Awlgrip, over the specified sound insulation. Inside of hull to be finished in flow-coat to facilitate cleaning.

Shelves and bins to be fitted as allowed by space restrictions. All equipment, piping, wiring and valves to be clearly labeled.

### **Chart Table**

The chart table is located on the starboard side aft of the saloon and is facing forward with flush mount instrument console forward and outboard. The chart table is equipped fixed bench seat with cushion. Immediately aft of the chart table is countertop with the washer dryer unit under. On the counter and outboard is a locker with the electric panel mounted on the inboard face with space in the locker behind the panel available for electric switch boxes.

### **Aft Guest Cabin Heads**

These ensuite head compartments are used for showering as well with the addition of shower curtains. The head is at the forward end of the compartment facing aft, basin with countertop are located outboard of this. Head soles to have integral GRP sump trays with corner drains provided for. Both heads are the same with the exception that the starboard head has a two doors, the one door allowing access from the passage and thereby allowing the head compartment to function as a day head.

### **Aft Guest Cabins**

Port and starboard cabins are mirrored. There is a hanging locker with drawers under and two single berths aft of this, the AC outlet grille is located above the hanging locker door. There is storage under the berths. Both cabins are the same with the exception that the port cabin has more floor space.

### **Tender Bay/Wet Deck**

The tender and outboard stowage locker is located adjacent to the transom platform. It shall provide storage for the tender, inflated, the outboard motor and gasoline. Chocks and tie-downs to be provided. Locker shall vent and drain directly overboard.

### **Storage**

To be in accordance with plans and as requested by the Owner. All storage spaces including fore peak, lazarette, engine room and bilge's are to be fitted with shelves and bins, hooks, etc., as directed, of construction appropriate for the intended use.

## **5.20. Interior Hardware**

### **General**

Stainless steel hardware to be used where possible and chrome where necessary. All hardware shall be approved by the Builder and the Architect.

### **Cabin Door Hardware**

Door handles to be D-Line or equal. Locks and latch sets to be Schiavetti or equal. Catches and bumpers to installed to control the openings of doors throughout. Suitable catches shall be installed to hold the head and stateroom doors fully open. Door hinges to be Sugatsune R\_Series concealed hinges, three hinges shall be fitted on each door.

### **Locker and Cabinet Door Hardware**

Door latches/handles to be Sugatsune type PLK push latch or equal. Door hinges to be Sugatsune H220 Series concealed hinges, two hinges shall be fitted on each door. Stowage access areas, seat backs, etc, to have suitable small butt hinges and be properly secured when closed.

### Drawer Hardware

Drawers latches/handles to be Sugatsune type PLK push latch or equal. Drawers to be mounted on self closing Mepla or Sugatsune runners.

### Handrails

Handrails to be provided to allow safe movement about the cabins at all times. To be built as understood between Architect and Builder.

### Refrigerator Hardware

Refrigerator and freezer door hardware to be stainless steel, heavy-duty hinges and latches with over center catch. Refrigerator and freezer doors to have hold-open and stop mechanisms.

### Stove Safety Bar

A stainless steel crash bar is to be installed across the front of the stove just below counter height.

### Miscellaneous

Kick plates on steps, stainless steel chafing pieces on companionway and other sills, and similar fittings as required, shall be provided.

Hardware Required for Interior (Prelim Estimate)						
Function	Mortise Locksets	Handles (Sets)	Escutcheon Plates & Roses	Anti-Knock Door holders	Locker & Drawer Catches	
Make & Model						
Crew Cabin					3	
Crew Heads	1	1	2	1	3	
Owners Cabin	1	1	2	1	20	
Owners Heads	1	1	2	1	7	
Saloon					12	
Galley					6	
Chart Table/Passage					7	
Stbd Guest Head	1	1	2	1	4	
Stbd Guest Cabin	1	1	2	1	7	
Port Guest Head	1	1	2	1	4	
Port Guest Cabin	1	1	2	1	7	
Totals	7	7	14	7	80	0

## 5.21. Galley Equipment

### Stove

To be Alpes-Inox Mod. C50x50/4GFG four (4) burner with oven, stainless steel finish. Oven thermostat and thermocouple shut-off to be installed. Stove to be installed on gimbaling mount. Provision to be made to secure the stove from gimbaling while in port. Counter cut out to be properly insulated with stainless steel lining.

**Exhaust Hood**

An Alpes-Inox Mod. CFE/60-1 hood with evacuator and light to be installed over the stove.

**Microwave**

To be a Miele Mod. M625-1EG or equal 220VAC, 1,000 Watt input power, to be selected by Owner. To be mounted in galley as per plans.

**Refrigeration Compartments**

Shall be built in as per plans and supplied and built by fridge systems supplier. See Ship Systems section.

**Trash Compactor**

A trash compactor is to be installed per plans in the galley. Trash compactor to be Broan-Nutone Mod. 1052.

**Washer/Dryer**

There is to be a washer/dryer installed in the locker behind the chart table seat. Washer/dryer to be Miele Mod. WT945. Washer/dryer to drain to sump tank.

**5.22. Plumbing Fixtures****Sinks**

Galley sink to be a double bowl stainless steel unit with a size of 780x450, and to have combined strainer and stopper and shall drain through a Y-valve and discharge overboard or to the grey water tank..

Heads to have 410x330 oval Corian basins integral with work top.

Head basins to drain to grey water tanks.

**Faucets & Showers**

All sink, basin and shower faucet sets to have single lever controls and to have hot and cold water. Showers to have remote telephone style head.

There shall be an outside shower, telephone type with hot/cold faucet located in the aft cockpit near helmsman's seat in a recess with a light closure door.

**Toilets**

Toilets to be from Tecma and flushed with fresh water with the provision made to flush with raw water in case of emergency. The forward two toilets and the two aft toilets to be on separate black water tanks. Toilets to be mounted on GRP plinth with access panels to service the toilet.

**Miscellaneous Fittings**

All bathrooms to be equipped with soap dishes, glass holders, towel bars, clothing hooks, toilet paper holders, garbage bins and other items as selected by the Owner.

**Plumbing Fixtures Required:**

*1 Galley Sink Faucet, HansGrohe Model: Allegra Variarc.*

*4 Head Basin Faucets, HansGrohe Model: Talis S.*

*4 Head Shower Sets, HansGrohe Model: Talis S #32675,-000 and Croma 1jet/Porter E shower head.*

1 Deck Shower Set, (Grohe Model: Dual Handle with Extractable Hose and Spray Spout.  
 1 Galley Sink, Alpes-Inox 4578/2V.  
 4 Oval Corian Head Basins, Model 810A/S.  
 4 Toilets, Tecma Silence Standard).

## 6. Insulation

Insulation as listed below is for acoustic and thermal purposes. Materials quoted are Maritex from Halyard Marine, equivalent products may be substituted. The Builder must give careful consideration to the noise requirements listed below and may increase the amount of insulation if required to meet those limits. However, attention must be paid to minimizing the total weight of the insulation materials.

Thermal and acoustic insulation fitted inside the engine space is to be of non-combustible material, and also insulation is to be protected against impregnation by flammable vapors and liquids.

Special attention should be given to acoustic insulation and vibration damping to reduce noise levels in accommodation area, and in particular in staterooms, and in accommodation spaces in way of propeller. The following tables are target sound levels which the Builder should make every reasonable effort to achieve.

Underway: Main engine in operation at its continuous rating and the generator in operation

Galley	70 decibels
Salon	65
Guest Cabins	65
Captain/Crew Cabins	65

Dockside: Main engine shut down, generator running and air-conditioning in operation

Galley	60 decibels
Salon	55
Guest Cabins	55
Captain/Crew Cabins	60

### ***Insulation***

**Hull** – No insulation required.

**Hull Bottom** - No insulation required.

**Engine Room Sides and Overhead** – Two layers of 32mm Maritex with 1.6mm perforated aluminum cover sheet painted with Awlgrip white or anodized silver.

**Engine Access Hatches Doors** - To be double sealed and contain no less insulation than the rest of the engine compartment.

**Bulkhead Between Guest/Captain Cabins & Lazarette** – No insulation required.

**Cabin Soles** - 32mm Maritex bonded to the underside of the specified finish sole between the sole bearers in way of propellor and P-Bracket. Also in compartments where pumps are mounted under the sole.

**Hot Water Ring** - To be insulated with armafex, all joints to be glued.

**Chilled Water Ring** - Supply and return to be insulated with armafex, all joints to be glued.

**Vent Ducting** – 12mm Maritex in engine room air inlet and outlet vent ducting for sound absorption.

**Machinery Mounting** - The following machinery to be mounted on soft rubber mounts:

Fridge and freezer compressors.  
Water maker pumps. Hydraulic power unit. Generator.  
Air conditioning compressor and air handlers.  
Domestic water pressure pump. Washing Machine.

## **7. Machinery (Engine, Genset & Sterngear)**

### **7.1. Main Engine**

Main engine shall be a Yanmar 4LHA-HTP four (4) cylinder, four (4) stroke, marine turbocharged diesel. Maximum engine rating is 160 hp @ 3300 rpm. It shall be the responsibility of the Builder to confirm with engine manufacturer and Architect engine selection prior to ordering engine. Engine to be equipped with standard equipment including fresh water cooling, thermostatically controlled engine mounted fresh and raw water pumps, engine oil and gearbox coolers, high capacity lube pump and filters, fuel filters and pump, and other items listed in manufacturer's data sheets.

Optional Equipment to include:

1. 24 Volt 100 Amp Bosch/Mastervolt alternator
2. New "C" type panel (cockpit)

Main engine and genset shall have their own sea water intake.

Seawater strainer to be Vetus type 525 in stainless steel with stainless filter element and clear top.

Engine to be resiliently mounted as recommended by the manufacturer using extra-silent mounts.

### **7.2. Gearbox**

Gearbox to be Yanmar ZF45A 8° down-angle transmission with a 2.43:1 reduction gear.

### **7.3. Flexible Shaft Coupling**

To be R&D Mod. 910-009 or Drivesaver Mod. 504 (from Globe Rubber Works).

### **7.4. Propeller Shaft**

Aquamet 22, 40mm shaft with standard metric tapers and locked coupling.

### **7.5. Stern Tube**

Stern tube to be custom GRP fabrication, see detail drawing, no cutlass bearing required in sterntube.

### **7.6. Shaft Seal**

The stuffing box is to be a John Crane Manecraft "Deep Sea Seal", type EM, water lubricated shaft seal, set number 7.

### **7.7. Shaft Strut**

Strut to be custom 316L stainless steel with dimensions, as shown on plans. To have strut extended thru hull and supported by internal structure, optional composite strut to be investigated. Strut bearing to be a standard water lubricated rubber bearing with non-metallic shell.

### **7.8. Propeller**

To be a Max Prop three (3)-bladed feathering propeller of 635mm (25") diameter with hub to suit shaft diameter, pitch to be 330mm (13"). After trials, pitch may need to be adjusted to optimize engine load and cruising speed. It shall be the responsibility of the Builder to confirm with engine manufacturer and Architect engine selection prior to ordering engine.

### **7.9. Generator**

One Fischer Panda Model "PMS 14000NE" 12 kW single phase generator, 230VAC, 50 Hz at 3000 rpm to be installed to provide standard single phase 230VAC, 50 Hz service. Accessories to include sound shield, remote instrument and control panels, shore power switch, strainer, coolant recovery tank, exhaust elbows, flexible rubber exhaust line, and waterlift muffler. Main control panel will be bulkhead mounted adjacent to the generator. A second smaller panel with start/stop will be located in the navigation area. Starter is to be 12 volt.

Optional equipment to include: TBD

### **7.10. Main Engine and Generator Exhaust Systems**

The main engine exhaust is to be a traditional waterlift system. Components of the system include an engine manufacturers supplied exhaust elbow with siphon break, mounted high above the datum water line, water injection ring, waterlift muffler supplied by Centek (Vernalift 4" Inline Mod. 1500098) and flexible exhaust hose. Exhaust hose to be by Trident Marine, Blue VHT type or equal.

The generator exhaust is to be a waterlift system. To consist of an engine manufacturers supplied exhaust elbow with siphon break, mounted high above the datum water line, water injection ring, waterlift muffler supplied by Centek (Vernalift ?" Inline Mod. ?) and flexible exhaust hose run to transom. Exhaust hose to be by Trident Marine, Blue VHT type.

### **7.11. Controls**

The throttle and gearbox control shall be a single-lever system. To be Morse Type MV

single lever control system. Control head to be mounted on the cockpit side adjacent to the starboard steering wheel.

#### **7.12. Bow Thruster**

A Max Power model "Retract Series 300 (Mod. 315)" vertical retracting hydraulic thruster to be fitted under forward end of crew cabin berth. Controls located at the panel where the engine controls are located.

#### **7.13. Power Take-Off at Main Engine**

The bracket requirements will need careful attention to ensure clear passage in front of the engine. The power take-off unit will drive the 100 amp alternator and the engine driven bilge pump.

#### **7.14. Drip Pan**

Main engine and generator foundations to have built-in sumps to act as drip pans, ie these compartments must be sealed off from the rest of the bilge areas.

### **8. Ship's Systems**

#### **8.1. Air Conditioning & Ventilation**

##### ***Air Conditioning/Heating***

The air conditioning system shall be supplied by Frigomar. This supplier shall be responsible to the Builder for furnishing all drawings and diagrams showing proper installation and detailing the sizes for refrigerant piping as well as electrical and control circuits. The Builder shall be responsible for final balancing of the system and obtaining specified air quantities at the outlets as well as minimizing noise transmission from the air handlers and air noise in the ducts.

The air conditioning system shall be chilled water type and shall have provision for heating.

Total cooling capacity of the compressor shall be 39000 BTU.

It shall take suction from the engine room common sea chest and shall have a common overboard discharge with a non-return check valve and stop valve. The salt water pumps shall be resilient mounted and easily accessed for service.

Chilled water from the compressor units shall be piped to and from the air handlers using insulated reinforced marine grade hose or equal. Service valves should be installed between the air handlers and chilled water lines. It is critical that the insulation on the supply and return lines be unbroken for it's entire length without break at the supporting clips.

Check air handler pans have drains in each corner to facilitate drainage when heeled.

Grills for air conditioning, where exposed, are to be in keeping with the interior styling. Each unit shall have its own thermostat/controller switch for heating or cooling.

All ducts shall be 127mm (5") round/wire and mylar fabric shell with 12mm (1/2") insulation or built in insulated plywood ducts where space is at a premium. Care shall be taken to provide for quiet operation.

**Units Required:**

- 1 Frigomar Chilled Water Condensing Unit Model 603 (39000 BTU).
- 2 Frigomar Air Handlers Model 742 Type S (Total Cap 9000 BTU) for Fwd/Owners Cabin.
- 2 Frigomar Air Handlers Model 742 Type S (Total Cap 18000 BTU) for Saloon.
- 2 Frigomar Air Handlers Model 742 Type S (4800 BTU for each cabin) Aft Guest Cabins.
- 5 Bulkhead Mount Digital Controllers for Air Handlers.

**Mechanical Ventilation**

The mechanical supply and exhaust ventilation shall be through properly baffled grilles in the cabin house with water traps as designed by the Architect. Each ventilation outlet shall have portable storm closures with stand-offs. All ducts shall be sized for velocity not to exceed 1500 feet per minutes. All blowers shall be resilient mounted and noise shall be minimised.

In the galley is an extractor hood that shall exhaust through a custom grill and baffle box in the coachroof coaming.

The engine room shall have one exhaust fan, Par flange mount 24V dc. Engine room supply and exhaust air shall be ducted through grills, water traps, baffles and trunks as designed by the Architect. Exhaust air will vent P/S through grills in the coach roof side. Special care shall be taken to minimize noise transmission.

Additional blowers as necessary for ventilation purposes, such as electronics enclosures shall be fitted by the Builder.

**Quantity and Type:**

- 1 off Jabsco Heavy Duty Flangemount 4" Blower 7.1m<sup>3</sup>/min, 24 Volt.

**8.2. Refrigeration System**

The refrigeration system shall be supplied by Frigomar Refrigeration. The freezer is to be maintained at -18 degrees C and the chill box at 4 degrees C with an ambient air temperature of 38 degrees C and sea water temperature of 26 degrees C under normal usage. Each box shall have its own temperature gauge located nearby. The refrigerator and freezer boxes are custom made and shall be constructed with stainless steel liners and insulation according to the refrigeration suppliers plans and specifications. Insulation thickness to be a minimum of 75mm (3") for the freezer and 50mm (2") for the fridge. The boxes will incorporate drains to a sump/bottle, and slide out bins/baskets with stops. The doors will lever style handles and suitable heavy-duty hinges. The freezer/refrigeration system shall operate using combination AC/DC driven compressors. They shall take suction from the engine room common sea chest and shall have a common overboard discharge with a non-return check valve and stop valve on each unit. The salt-water cooling circulation pumps shall be the continuous duty type and be resilient mounted and easily accessed for service.

Refrigerant from the compressor units shall be piped to and from the evaporator plates using insulated copper pipe. It is critical that the insulation of the copper be unbroken for it's entire length without break at the supporting clips.

A Frigomar icemaker will also be supplied and installed in the starboard aft saloon locker.

**Units Required:**

- 2 Frigomar Mod. 505 S Compressors for Fridge and Freezer.
- 1 Evaporator Plate for Freezer. 1
- Evaporator Plate for Fridge. 1
- Raw Water Circulation Pump.

2 Bulkhead Mount Thermostat Controls (1 for each box).  
2 Exterior/Remote Mounted Temp Gauges.  
1 Custom Fridge Box.  
1 Custom Freezer Box.  
\* Pump & Condenser Hardware Specified by Supplier.  
1 Frigomar IceMaker Mod. 3006

### 8.3. Hydraulic System

The vessel will be fitted with two hydraulic systems.

A Lewmar Commander system or equal for driving the primary services.  
A manual Navtec system or equal for driving the rig hydraulics.

#### Main Hydraulic System.

Lewmar Commander 400 or equal power pack located in the engine room for the following functions:

1. Furler (Reckman RF90-3).
2. Windlass (Lewmar Concept 3 Hyd, Flow 10-40 l/min, Max Pressure 175 bar).
3. Self Stowing Anchor Arm (Rotary Actuator for 64 kg.m).
4. Bow Thruster (Max-Power Mod. 315, Flow 28-35 l/min, Pressure 220-260 bar).
5. 2 Primary Winches (Lewmar 111/3AHST).
6. 2 Halyard Winches (Lewmar 66/3 AHST).
7. 1 Main Sheet Drum Winch (Lewmar LMS600, Flow 50 l/min, Max Pressure 140 bar).
8. 1 Main Halyard Drum Winch (Lewmar LMS600, Flow 50 l/min, Max Pressure 140 bar), (Subject to review with Sparmaker).
9. Lifting Keel Ram (To lift plus/minus 8.75 tons, Stroke 1.6m).
10. Transom Door ( 2 x -12FE Cylinders).

#### Manual Hydraulic System.

Navtec or equal, two speed hand pump for rig hydraulics with the following functions:

1. Backstays (2 x -22LE Cylinders).
2. Outhaul (-17FE Cylinder).
3. Vang (-40 Series 85A).
4. Genoa Halyard (-17LE Cylinder).

#### Mast Jack

Mast step jack (for mast load of 15000 kgs) to be Enerpac system or equal, to be pumped using separate hand pump.

The system shall be engineered and supplied by the Hydraulics Supplier. The Builder shall be responsible for installation of the system, including piping. There is a power pack, a fluid reservoir, plus distribution manifolds with solenoid operated valves.

Hydraulic motors for the winches, Leisure Furl boom and windlass shall be as supplied by those manufacturers.

There will be a control panel in the aft cockpit for adjustment of these rigging functions.

All hydraulic piping is to be neatly laid out with the maximum use of continuous, straight runs and support at regular intervals.

All fittings shall be stainless steel as described in the Piping Systems Table.

#### **8.4. Rudder & Steering Gear**

Custom composite steering pedestals to be installed for the cockpit steering position. Steering wheels to be carbon composite destroyer style or as approved by the Owner. To be covered with leather or rubber gripping as selected by the Owner. Wheel diameter is 1200mm (47"). Each pedestal to have one Richtie Globemaster FB500 flush mount compass.

The steering shall consist of a rudder and a vectran rope system using vectran rope over a drum leading thru angled and articulated sheaves to the quadrant. Sheaves for cables to be Lewmar, or equal, and shall have a score diameter of not less than 8 times the diameter of the rope. Sheave foundations to be worked out in conjunction with the Architect.

The steering quadrant shall be 450mm radius carbon composite fabrication clamped to a square section of the rudderstock. Quadrant shall have strong cushioned stops limiting the helm angle to 35° each side of center. There shall be no interferences in the steering system and it shall operate without noise at all times.

Steering gear in general, and especially within 2m of the compass, shall consist solely of non-magnetic materials with guards at tangent points of all sheaves and elsewhere as required to prevent vectran line from becoming jammed. All wiring within the 2m radius shall be twisted to reduce any possible electro-magnetic influence on the compass. Special attention shall be given to lubrication of bearings and sheaves so that the entire assembly will operate freely.

Details of bearing housings, stuffing box, etc. to be worked out in conjunction with the Architect.

The rudderstock shall be supported by JP3 rudder bearings. Hull port rudder bearing housings to have suitable brackets to distribute the load. Stuffing box to be a double lip seal.

The autopilot will be hydraulic and when activated will effect steering by a single hydraulic ram connected to an integral socket on the quadrant.

#### **8.5. Fire Extinguishing**

##### ***Engine Room***

There shall be one automatic 1.5 kg FE-36 fire extinguisher for the engine room and one automatic 1.5 kg FE-36 fire extinguisher for the machinery room. A smoke alarm and heat sensor to be installed in the engine room and machinery room. These sensors are to be connected to the main alarm system as detailed.

##### ***Accommodation***

There will be 4 portable 1.5 kg fire extinguishers. Extinguishers, in general to be located near exits.

- Aft End of Owners Cabin.
- Chart Table
- Galley
- Foyer of Guest Cabins Aft

### **Fire Pump**

A suitable power driven pump doubles up as anchor/deck wash, installed outside the engine space, with sea and hose connections capable of delivering one jet of water to any part of the vessel through supplied hose and nozzle. See Bilge, Fire/Anchor Wash Section for details.

Fire Bucket

At least two fire buckets, may be metal, plastic or canvas.

Fire Blanket

One fire blanket in galley to BS 6575 - Light duty.

**Items Required:**      *2 Automatic Fire Extinguisher Firemaster Model GTFE1500 for Engine Room and Machinery Room.*

*4 Portable Fire Extinguishers Firemaster Model 1000PR for Accommodation.*

*1 Fire Blanket, Simpson Lawrence No. 3523400 or Equiv.*

*Note: Equivalent may be used.*

## **8.6. Stove Gas System**

The stove uses propane gas. Provision is to be made for two 5kg (10lb) propane bottles in gas tight locker with flush hatch and proper drainage. The propane bottles, regulator and solenoid valve to be as specified

There will be a pressure regulator and remote operated solenoid shutoff valve located in the deck locker. Piping shall be solid drawn copper or stainless steel tube with the appropriate compression or screwed fittings recommended for general use in LPG installations, tube to be pushed thru a plastic conduit pipe to protect it from damage and shall be well supported by clips. Piping shall be continuous from the regulator to a short, flexible connection at the stove, this flexible pipe should conform to an appropriate standard.

The solenoid valve should be activated from a control panel in the galley area, and shall have a light to indicate that the valve is open, and shall be located a safe distance from the stove.

Two gas detectors to be fitted one in the lazarette and one in the locker under the stove or under the galley sole. The gas detectors should be of the type which will be actuated promptly and automatically by the presence of a gas concentration in air not greater than 0.5 percent.

All gas appliances should, where practicable, be fitted with flame failure devices.

For further information on notices for emergency action see the ISO Small Boat Rules.

**Items Required:**      *2 x 5kg (10lb) Trident Marine Allum Gas Bottles.*  
*1 Trident Marine Gas Control, Detector and Solenoid Unit*  
*Mod. 1300-7757.5 1 Trident Marine Gas Detector*  
*Transducer Mod. 1300-7715.*

## **9. Plumbing and Associated Systems**

### **9.1. General**

Unless otherwise specified, piping, valves, fittings, etc. are to be in accordance with the Piping Systems Table given below. All piping must be clean at the time of installation and shall be pressure tested to an operating pressure of 1.5 times greater than normal pressure. Special care shall be taken in laying out and routing piping so that it is neat and

orderly with valves, drains and connections readily accessible. Piping must not interfere with bilge access.

Hose and plastic piping will be used to the greatest extent possible, as described below. Joints in CPVC piping, where not made with unions, shall be made with compression type fittings. Unions in polypropylene are to be made with manufacturer supplied welding system. Where hose is used for water and exhaust lines, connections shall be by double hose clamps with barbed ends, Aeroquip unions, or equal. Connections to moving machinery shall be flexible and as close to the moving part as practical. Watertight and engine room bulkhead penetrations to use NMP ROX cable and piping transit system fittings to maintain watertight integrity and sound insulation properties. Seacocks to be Forespar Marelon, fiberglass reinforced plastic, flush closing. Efforts will be taken to minimize the number of through-hull fittings by combining functions. Emergency plugs to be attached at each through-hull fitting. Through hulls are to be labeled showing function and a clear diagram provided showing precise location throughout the boat.

Basket strainers and strainer plates on suction sea chests are to have net area of at least 2.5 times that of the suction pipe.

Valves to be stainless steel or ABS approved plastic valves. Maximum use of ball valves shall be made where practical. Valves shall be labeled showing system, function and indicating normally open or normally closed.

Check valves shall be of the ball type or spring type depending on application. Vented loops shall be fitted on all pump raw water/bilge overboard discharge lines with an open circuit (where able to siphon back into the bilge or piece of hardware, eg engines and bilge lines) to prevent siphoning.

All piping shall be run in a tidy manner with due consideration given to service and access. All black and gray water lines to have end caps on straight runs for clean-out. All pipes are to be fully supported at regular intervals with proper pipe clamps and hangers. All hydraulic piping shall be isolated from the hull to minimize noise transmission.

The following are suggested manufacturers for piping materials. The intent of this list is to establish a minimum standard for piping, fittings and valves. Alternative manufacturers complying to similar standards can be considered.

Plastic piping	- Nibco Chemtrol
Plastic valves	- Asahi, George Fischer, or Nibco Chemtrol
Hydraulic hose	- Aeroquip or Parker
Hydraulic valves and fittings	- Aeroquip or Parker
Fuel and lube oil hose	- Aeroquip
Fuel and lube oil valves & fittings	- Aeroquip or Worcester
Pipe clamps and handers	- Stauff (stainless steel)

## 9.2. Piping

### Piping Systems Table

#### Salt Water

- |               |                                                    |
|---------------|----------------------------------------------------|
| - Pipe        | - Polypropylene or CPVC (schedule 80)              |
| - Joints      | - Heat welded polypropylene or solvent welded CPVC |
| - Connections | - Aluminum/plastic flanged, plastic/plastic unions |

- Sea Cocks	- Polyvinylidene Fluoride (PVDF) or Reinforced Polypropylene
- Valves	- Polypropylene or CPVC, true union ball type.
<b>Scupper Drains</b>	
- Pipe	GRP tube to 300mm above Dwl then marine grade hose
- Joints	Stainless steel hose connections
- Fittings	N/A
- Connections	Short, double clamped neoprene hose at deck connection)
- Sea Cocks	N/A.
<b>Black and Grey Water</b>	
- Pipe	- Polypropylene or CPVC (schedule 80)
- Joints	- Heat welded polypropylene or solvent welded CPVC
- Connections	- Plastic/plastic unions Polyvinylidene Fluoride (PVDF) or Reinforced
- Sea Cocks-	Polypropylene
Valves	- Polypropylene or CPVC, true union ball type.
<b>Fresh Water (hot and cold)</b>	
- Pipe	Whale or SeaTech quick connect system, (Insulated as necessary)
- Joints	- Quick Connects
- Connections	- Quick Connects
- Valves	- Polypropylene or CPVC, true union ball type.
<b>Fire and Bilge</b>	
- Pipe	- Polypropylene or CPVC (schedule 80)
- Joints	- Heat welded polypropylene or solvent welded CPVC
- Connections	- Plastic/plastic unions
- Valves	- Polypropylene or CPVC or cerebrated stainless steel, true union ball type
<b>Hydraulic</b>	
- Pipe	- Seamless stainless steel tubing or marine grade hose, sized for system pressure
Joints	- Socket welded for stainless steel or stainless steel hose connections
Fittings	- Stainless steel
Valves	- Ball type.
<b>Diesel Oil and Lube Oil</b>	
- Pipe	-Marine grade hose
- Joints	- Stainless steel hose connections
- Fittings	- Stainless steel
- Valves	- Ball type.

### 9.3. Tank Gauges

Water and fuel tanks to be equipped with Tank Tender pneumatic gauges. Gauges to be located at navigation area adjacent to the electrical panels or as directed.

#### **9.4. Bilge, Fire & Anchor Wash**

The bilge system is to include one hand pump and one powered pump. In addition, there will be two dedicated automatic platform mounted pumps for the main bilge and the engine bilge. All pumps to be as specified in this section. All pumps shall discharge overboard through vented loops 300mm above full load waterline to obviate the need for seacocks. All suctions to have strainer boxes.

The fore peak, lazarette, engine and main bilge compartment suctions shall be plumbed to a bilge manifold that is connected to the manual hand and mechanical powered pumps. The above mentioned bilge compartments shall have high level alarms. The engine room bilge will be separated from the main bilge, and oil drip pans shall be provided under the main engine and generator.

The automatic platform mounted pumps for the main bilge and engine room bilge shall discharge directly overboard and shall have level switches for automatic operation and also a manual over ride switch.

For the fire and anchor wash system, there shall be a powered pump located outside the engine room, this pump also serves as the backup for the fresh water system. There shall be hose connections inside the anchor locker hatch and inside a recess (also used for deck shower) with cover in the aft port cockpit side. Hose connections shall be plastic or stainless steel quick connect type with valves.

Fire hose to be at least 19mm diameter and 21 metres long with suitable spray nozzle, deck wash hose of similar proportions may be used as fire hose. Hose to be stowed in lazarette.

##### **Items Required:**

*1 Manual Bilge Pump, Whale Gusher 30.*

*1 24 Volt Primary Bilge Pump, Gianneschi & Ramacciotti Model: CP 25.*

*2 Automatic Electric Bilge Pumps 1 for Main Bilge and 1 for Engine Bilge, Jabsco Par-Max 4 (24 Volt).*

*1 Electric Fire/Deckwash (Fresh Water Backup), Gianneschi & Ramacciotti Model: EcoJet 1 (24 Volt). 6 Whale Top Entry Strum Boxes with Integral Non-Return 4 High Level Alarms, Jabsco Hydro Air II Switch Model 30210-0000.*

*2 Level Switches (for Auto Bilge Pumps), Jabsco Hydro Air II Switch, Model 30210-1024.*

#### **9.5. Fresh Water System**

##### **Tanks**

There shall be two 460 liter fresh water tanks for a total of 920 liters. The tanks are located under the saloon settees port and starboard. The tanks shall fill from 40mm (1-1/2") recessed deck plates on main deck and shall have 25mm (1") diameter overflow goosenecks high under main deck which drain to bilge. Each tank shall have a 20mm (3/4") suction with shut-off valve on a manifold leading to the supply pump.

##### **Pumps**

The fresh water system shall have one 24 volt pressure pump with an accumulator tank. This primary pump shall be backed up by the Fire/Deckwash pump by means of three way valves. Both pumps to be fitted with pressure switches. The fresh water system shall supply all interior sinks, basins, showers, toilets, ice maker plus a deck shower located in the aft cockpit port side panel.

System to operate off of the ship's 24 volt DC battery system, with separate breakers on the main panel. There shall be a charcoal water filter in the system to filter all domestic water whether from tanks or shore hookup.

### **Plumbing**

To be as called up in the General section and the Whale or SeaTech Quick Connect system using 22mm OD pipe. Hot water pipes to be insulated.

### **Calorifier**

One 76 liter hot water heater fitted under aft galley counter. To be provided with 220 volt electric heating element and also fitted with a main engine jacket water heat exchanger. Pressure relief valve to be plumbed into nearest bilge bay.

### **Water Maker**

A reverse osmosis desalinator will be supplied.

Water supply for the desalinator is taken from the main salt water manifold. A fresh water flush for the membranes will be provided.

Watermaker to be piped to fresh water manifold for distribution to water tanks.

### **Misc.**

For connection to dockside pressure water, there shall be a fresh water shore connection leading below deck to a pressure reducing valve, Sen-Dure or equal, 3 bar. Connection shall be in the lazarette.

There shall be fresh water hose connections (cold only) inside the fore peak hatch and inside the lazarette hatch, for fresh water wash down. These hose connections also serve as the fire main by setting the three way valves. Hose connections shall be plastic or stainless steel quick connect type with valves.

### **Items Required:**

*1 Primary Water Pump, Gianneschi & Ramacciotti Ecojet 1 (With Tank)(24 Volt).*

*1 Calorifier, Atwood Mod. EH20-220.*

*1 Desalinator, HEM Series 20/1200 with a capacity of 4500 liters/day.*

## **9.6. Black Water System**

### **Tanks**

The two black water tanks of 100 litres each shall be of stainless steel as per plan. Each tank shall have a 25mm (1") diameter vent that is led to the bootstripe via a loop. The forward tank will be dedicated to the owners and crew heads and the aft tank will be dedicated to the guest cabin heads.

### **Pumps**

Each tank to have its own dedicated pump plumbed to a common manifold which then discharges directly overboard below the waterline through vented loops or to a deck plate for shore pump out through a Y-valve. The tanks shall be fitted with two diaphragm actuated high and low level switches which will actuate indicator lights and an audio alarm, (no automatic pump out). The pumps will be manually controlled.

### **Plumbing**

The toilet system is to be supplied by Tecma. All piping is to be neatly laid out using hose supplied by the manufacturer or equal. It is important that the Builder insure that there is reasonable access to all components of the system to allow easy servicing.

#### **Items Required:**

*2 Black Water Pump, Gianneschi & Ramacciotti Model Eco 44-MV (24 Volt). 2 High Level Alarms, Head Hunter Sentry Fluid Level Monitors.*

## **9.7. Grey Water System**

### **Tanks**

The two grey water tanks of 75 litres each shall be of stainless steel construction as per plan. Each tank shall have a 25mm (1") diameter vent that is led to the bootstripe via a loop. The forward tank will be dedicated to the owners and crew heads and the aft tank will be dedicated to the guest cabin heads and galley.

### **Pumps**

Each tank shall have its own dedicated pump fitted with a diaphragm actuated high and low level switch to control the sump pump and a high level alarm switch for the panel. Operation to be automatic, with an over ride switch to permit manual operation. Grey water pumps are to discharge directly overboard below the waterline through vented loops.

### **Plumbing**

Basins and showers in the Owner, Guest and Crew heads shall have suitable water traps and shall drain to the sump tanks via a fine mesh hair filter installed between the tanks and a drain manifold. Where showers cannot naturally drain to a sump tank, a sump with transfer pump is to be provided at the shower pan with an automatic float switch. Access to the pump and switch should be provided.

Air conditioning condensate and refrigerator condensate pans from chill and freeze boxes shall drain to the sump tanks via traps, if height permits. The galley sink shall discharge to the sump tank or directly overboard through a Y-valve.

#### **Items Required:**

*2 Grey Water Pumps, Gianneschi & Ramacciotti Model CP 20 (24 Volt). 2 High Level Alarms, Head Hunter Sentry Fluid Level Monitors. 2 Level Switches, Head Hunter Sentry Fluid Level Monitors.*

## **9.8. Fuel Oil System**

### **Tanks**

There shall be two 445 liter fresh diesel tanks for a total of 890 liters. The tanks are located under the aft guest cabin centerline bunks. To have suitable baffle plates, manhole plates, fill pipes, vents, and fuel line all to the approval of the Architect. Sufficient manhole access plates shall be installed for proper cleanout of tanks, particularly at low points in way of suctions. Lightening holes in baffles to be arranged to allow all points of tanks to be reached for cleaning.

Tanks to be equipped with Tank Tender pneumatic gauges. Gauges to be located at navigation area adjacent to the electrical panels or as directed.

### ***Fuel Oil Piping***

Fuel selector valves on the fuel oil manifold to be installed to allow selection of port or starboard tank. Fuel return line to go to both tanks via manifold. Fuel line from the tank manifold will incorporate a check valve and a solenoid valve with a manual by-pass valve for emergency shut-off. Fuel manifold is to be of stainless steel construction. Fuel valves to be of stainless steel ball valves for supply and return. Piping between fuel manifold and engine and fuel manifold and generator, including returns, are to be of stainless steel with a short section of flexible hose, Flexonics RW81 or equal. End fittings to mate exactly with those on the main engine, generator and strainers. The tanks shall fill through deck fills, one on the port side and one on the starboard side. Fills are to be ID51mm hose filling directly into tanks, located as shown on the plans. Label plates marked "DIESEL FUEL" to be installed at each fill or shall be integral with the deck fill. The ID25mm vents shall run from the highest point of the tank to the overflow discharge fittings located in the bootstripe. Suction lines are to be ID13mm with separate shut-off at tank with reach to accessible location if required. Fuel return hoses to be ID10mm.

### ***Fuel Filters***

Racor duplex fuel filters, model number 75/900MAV to be fitted between fuel tank selection manifold and motors. System to be fitted with bypass valves to allow the replacement of cartridges while underway.

## **9.9. Deck Drains & Scuppers**

Forward cockpit scuppers to consist of two pipes, 50mm diameter reinforced rubber tube draining overboard through glassed in grp spigots. Aft cockpit to drain directly overboard thru transom. Cockpit scuppers to have stainless steel deck fittings set flush in to the teak decking with below deck grp spigots with double clamped neoprene hose.

Additional, small drains and/or scuppers shall be installed as necessary to drain the cockpit seats, the flush deck hatch gutters, the propane locker and the built-in vent boxes. The cockpit seat scuppers shall drain to the cockpit sole.

## **10. Electrical System**

### **10.1. General**

This electrical specification forms part of the total vessel specification and is to be read in conjunction with all other relevant sections and drawings.

The intent of this section of specification is to ensure that the completed electrical installation meets the minimum standard consistent with the expectation for a high quality yacht of this type.

The installation will be convenient to operate, easy to maintain and provide a high degree of reliability.

The vessel is intended for extended private cruising with the ability to provide safety and comfort for 6 guests and 2 crew.

Electrical systems to be installed on board are:

24 volt DC Services, two wire insulated return. 12 volt DC Services, two wire insulated return. 220 volt AC, 1 phase, 50Hz, 3 wire with neutral earthed but non-hull return.

All cables, switch gear and ancillary equipment supplied and installed as part of the electrical installation should, wherever practical, have a marine "Type Approval".

The DC electrical system shall be a 2-wire negative ground, 24 volt system with one bank of batteries supplying power. These batteries shall be charged from engine driven alternators, from shore power or the AC generator through battery chargers.

The AC system shall be a 220 volt, single phase, 50 Hz system with power supplied by a diesel driven generator, from battery inverters or from a shore power connection. These systems shall be installed in general accordance with the wiring schematic developed with the final plans.

## **10.2. Drawings and Documentation**

Detailed installation drawings to be provided where applicable and will include:

- Single Line Cabling Diagrams.
- Detailed Circuit and Connection Diagrams.
- Equipment Locations, Layouts and General Arrangements.
- Switchboard and Control Panel details.
- Equipment Lists, Cable Schedules and System Descriptions.
- Test and Commissioning Schedules.

## **10.3. Name Plates**

All distribution panels, alarm panel and switchboard shall have nameplates to clearly identify the circuit or unit of equipment, and should include the fuse size or circuit breaker rating where applicable. All push buttons, switches, and receptacles shall be clearly labeled either on the mounting plate or with a suitable label plate adjacent.

## **10.4. Electrical Supplies and Reticulation**

Circuits and sub-circuits will be protected on all un-grounded current carrying conductors against over currents and short circuits by circuit breakers where practical or suitably rated fuses.

Circuit breaker and fuse ratings will provide adequate fault rupturing capacity, discrimination, and be a type suitable for marine use.

Instrument and control circuits are to be protected.

Adequate suppression will be fitted where there is a risk of transient voltage spikes.

## **10.5. Wiring, Supports and Bonding**

### **Wiring**

Wiring will be suitable marine type.

Wiring voltage ratings must be suitable for the circuit, conductors must be stranded tinned copper.

Wire color coding to conform to the European standard.

Conductor cross-sectional areas must be such that the volt drop does not exceed 6% at the maximum load.

All wiring will be adequately protected against mechanical damage, chaffing, heat, corrosion and wherever possible installed clear of bilges.

Wire penetrations through bulkheads and decks will have adequate sealing arrangements to maintain watertight integrity.

Wiring will be identified at each end using a proprietary permanent marking system.

The details are to be recorded on the cable schedule and referenced on the appropriate drawings.

### **Supports**

Main wiring runs are to be neatly fastened to 100 x 40 or 50 x 40 plastic cable trays.

Cables run out to other areas must all be adequately supported and fastened with small diameter flexible conduit.

### **Bonding**

To minimize electrolysis due to electric leaks and for personnel protection, an electrical ground shall be installed, consisting of a 100mm wide copper strap along the inner skin and connected to an external grounding plate below the waterline in the keel trunk. The following shall be connected to this ground:

Propulsion machinery

Metallic enclosures of all electrical apparatus, motors, pumps etc.

Electronics equipment (including SSB coupler).

Ground leak detection bulbs are to be provided for 12 volt, 24 volt and 220 volt busses, in accordance with the Wiring Diagram.

System to be coordinated and approved by Electrical Contractor, Electronics Supplier and Architect.

## **10.6. Lightning Protection**

Lighting protection system to be designed in cooperation with the Electrical Contractor, Builder and Spar manufacturer.

## **10.7. AC Power Supplies**

The AC installation will be 220 volt AC, 1 phase, 50Hz, 3 wire with neutral but non hull return.

AC supplies will be from either the generator, shore power or inverter.

Selection of either generator or shore power AC supplies will be by manually operated switch. The inverter is automatically available to selected services in the absence of AC mains.

Earth fault monitoring of the AC system will be provided.

### **AC Generator**

Refer also to Section 8, "Machinery".

One Fischer Panda Model "PMS 14000NE" 12 kW single phase generator, 230VAC, 50 Hz at 3000 rpm to be installed to provide standard single phase 230VAC, 50 Hz service. Generator set fitted with a 12 volt electrical system.

## **Shore Power**

Shore power will connect to the AC distribution system via the AC supply selector switch.

A galvanic isolator will be installed between the yacht's hull and the shore side electrical earth system.

Provision will be made for connection to a 50 amp shore power supply via an isolating transformer located in the engine room. Primary input tapings will allow inputs from 208/210/220/230 V single or two phase shore supply with an output of 220V, 3 wire, suitable for 50Hz operation.

A 63 amp 3 pole + earth shore power inlet, IEC 309 configuration, fitted with RCD circuit breaker with a degree of protection of IP 55 will be installed in a dedicated cockpit locker. Plug to be suitably connected to the vessel

One 20 metre flexible shore power lead complete with cord connector and plug top is to be provided.

## **Inverter**

One Mastervolt Mass 24/3500 230 volt, 50Hz, 2500 watt continuous rated inverter is to be installed. It will be supplied via slow blow 160 amp fuses from the 24V DC services battery and located as close as practical to the main DC distribution panel (DCDB 1).

The inverter output will supply selected circuits via an automatic AC mains fail switching system.

## **10.8. DC Power Supplies**

The following low voltage DC systems will be installed:

- 24 volt DC General Services. 12 volt DC
- Navigation and Services. 12 volt DC Engine
- Start and Control.

These systems will all be two wire insulated from ground.

All batteries will be the gel cell type installed to meet the manufacturer recommendations with adequate means of restraint and maintenance access.

An isolating switch will be placed as close as practical to each battery plus an emergency parallel switch is to be installed between the main engine start battery and the service batteries.

### **Service Batteries**

1 x 24 volt services battery bank rated at minimum 800 amp hours will be installed according to the designers plans.

Batteries are Sonnenschein SB6/200A, 16 off required.

### **Navigation and Service Batteries**

1 x 12 volt navigation and services battery bank rated at minimum 180 amp hours will be installed according to the designers plans. Battery is a Sonnenschein A 412/180A, 1 off required.

### **Start Batteries**

This battery will be used to start both the engine and genset.

1 x 12 volt engine start battery bank rated at minimum 180 amp hours will be installed according to the designers plans.

Battery is a Sonnenschein A 412/180A, 1 off required.

### **Battery Charging Arrangements**

Emergency charging of the engine start batteries and the service battery is possible via the emergency parallel switch arrangements.

#### **Services Battery**

2 x Mastervolt Mass 24/100 24 volt, 100 amp chargers supplied from the AC switchboard.

1 x Mastervolt Mass 12/50 12 volt, 50 amp charger supplied from the AC switchboard.

1 x 24 volt 100 Amp Bosch/Mastervolt main engine driven alternator - Optional.

#### **Engine/Genset Start Battery**

Respective engine driven charging alternators charging the same start battery.

### **10.9. Switchboards and Distribution**

The AC and DC switchboards will be standard modular type housed in suitable enclosures, permanently labeled and engineered for simple operation.

All switches shall be 2 or 3 pole Heinemann Electric Co or equal, and as approved by the Architect. Heinemann JA series shall be used for .02 to 30 amps rating, AM 17 or AM 12 series for 30 to 50 amps, and AM 1000 series for 50 to 150 amps. Shore power, generator, and battery disconnect switches to be Kraus and Naimer (American Transformer Co.) or equal, sized to accept the maximum circuit load.

Allowance will be made in the design of all switchboards to fit future circuit breakers to accommodate at least 5% additional sub circuits.

The following switchboards will be installed:

**AC-DB 1** - AC Services switchboard / control panel located in locker behind chart table as part of the main switch panel will include:

- AC supply selector switch.
- Generator protection and AC load switching.
- Automatic inverter switching.
- AC instrumentation.
- AC distribution circuit breakers.

**DC-DB 1** - Main 24 volt DC services panel, located in locker behind chart table and as part of the main switch panel:

- Main DC bus bar.
- Metering shunt (battery amp hour meter at DCDB 3).
- Instrument fuses.
- Inverter supply fuses.
- Sail winch hydraulic power pack supply fuses.
- Connections to the battery chargers.
- Emergency parallel connection to the start batteries.
- Local earth fault test lights.
- Battery voltmeter.
- Earth fault test lights.

- Distribution circuit breakers.
- Fisher Panda gauge and control panel.
- Tank Tender (non-electric).
- Fuel pump “run” indication.
- Bilge pump “run” indicators.
- Aft tank grey water manual pump control & indicator.
- Aft black water manual pump control & indicator.
- Fwd black water manual pump control & run indicator.
- Fwd tank grey water manual pump control & run indicator.
- Alarm panel
- Exterior light switching.
- Navigation lantern switching and indication.
- Windex light switch.
- Spreader light switches (x2).

***Helm Pedestal/Cockpit Side Panel***

- Main engine panel - stop/start station with gauges & buzzer.
- A DC outlet for hand held spotlight.
- Ritchie compass complete with illumination and dimmer.
- Bow thruster controls.
- Radar
- B&G Autopilot.
- B&G FFD
- B&G Analog 360

**10.10. Electrical Equipment Lists**

All instruments and equipment located at the chart table area and steering pedestals are to be fitted with dimmer controlled illumination.

The following is a list of equipment to be installed, for make and model see relevant section in this specification:

<b>AC Equipment</b>	<b>Supplied By</b>
AC Outlets	Btcino
Air Conditioning	Frigomar
Galley Freezer	Frigomar
Galley Refrigerator	Frigomar
Watermaker	HEM
Microwave Oven	Miele
Battery Chargers	Mastervolt
Entertainment Systems	Various
Washer / Dryer	Miele
Water Heater	Attwood
Trash Compactor	Broan-Nutone
<b>DC Equipment (24 volt)</b>	<b>Supplied By</b>
Auto Pilot	B&G
Engine Room Vent Fan	Par/Jabsco
Fwd & Aft Black Water Pumps (x2)	G&R
Fwd & Aft Grey Water Pumps (x2)	G&R
Bilge Pump (Primary)	G&R

Bilge Pumps (Secondary)	Par/Jabsco
Fresh Water Pressure Pump	G&R
Galley Freezer	Frigomar
Galley Refrigerator	Frigomar
Galley Vent Fan	Alpes-Inox
Interior Lighting	Cantalupi/Forcato
Deck Lights	Various
Navigation Lighting	Aqua-Signal
Inverter	Mastervolt
LPG Gas Alarm	Trident
Heads (4 off)	Tecma
Hydraulic Power Unit	Lewmar/Custom
Thruster (Hydraulic)	MaxPower
Winches (Hydraulic)	Lewmar
Windlass (Hydraulic)	Lewmar

### DC Equipment (12 volt)

### Supplied By

GPS	Furuno
Radar	Furuno
SSB	Icom
VHF	Icom
Sailing Instruments	B&G
Entertainment Equipment	Various

## 10.11. Electronics

### Communications

SSB	Furuno Model IC-M802 Radio Telephone with Control Unit, Transceiver & Antennae.
VHF	Furuno Model IC-M502 Radio Telephone with control unit.
Satcom C	Thrane & Thrane

### Navigation

B & G	Hercules 2000 system with speed, depth, wind speed and direction, compass and temperature transducers.
B & G B	Hercules FFD displays for cockpit. 3 off, 2 in aft cockpit and 1 in fwd cockpit.
& G	Hercules 20/20 displays for cockpit. 3 off, 2 in aft cockpit and 1 in fwd cockpit.
B & G B	Hercules 40/40 displays at mast. 3 off.
& G	Hercules Pilot Autopilot with Size 3 Drive unit. Pilot control at helm station.
B & G	Analog Displays 360 Wind. 2 off, 1 in aft cockpit and one in fwd cockpit.
Furuno	Radar, GPS & Plotter Model FRS-1000A
Furuno	Weather Facsimile Model 207.
Computer	With nav, chart, polar and email software.

### 363 Entertainment Systems

All entertainment equipment to be from “Bose” and the list of electronics and entertainment equipment included, is for guidance only, and the equivalent “Bose product must be used where available and where size permits. This equipment is to be installed by the Builder. Electronics supplier will furnish the Builder with a complete set of installation drawings and all antenna and connector cables. Electrician will be responsible for pulling all cabling, mounting all items of the electronics, and supplying 220 volts AC, 24 or 12 volts DC to power each unit, as required. Electrician will be responsible for final hook-up of the wiring and for tuning all of the equipment.

Suitable condensers and other devices as required for the purpose of minimizing electrical interference and noise in electronic equipment, shall be installed by the Electrician. An acceptable noise level must be demonstrated prior to acceptance of the boat.

#### Saloon

TV LG Flatron 30” / 76cm Widescreen TFT-LCD TV with Built-in TV Tuner.

DVD/VCR LG DC 593NW DVD/VCR combo with multi system playback.

Audio Tuner with CD shuttle and amp with deckhead mounted speakers in saloon and waterproof speakers in cockpit, cockpit speakers to be switchable.

#### Owners Cabin

TV LG Flatron 20” / 51cm TFT-LCD TV with Built-in TV Tuner.

DVD/VCR LG DC 593NW DVD/VCR combo with multi system playback.

Audio Tuner with CD shuttle and amp with deckhead mounted speakers.

#### Guest Cabins

Audio Tuner/CD player with deckhead mounted speakers.

#### General

TV Aerial 1 Shakespeare Omni Directional TV Antenna Model Seawatch 2020 with amplifier and splitter.

### 10.12. Interior Lighting Fixtures, Switches and Receptacles.

#### Lighting

Interior lighting fixtures are to be purchased and installed as per the Interior Architects specifications and plans and as agreed with the Owner. All lights are to be 24 volts DC. Care shall be taken to provide adequate ventilation above the overhead liner.

#### Light Fittings Required

Function	Overhead Spot General	Overhead Spot Directional	Overhead Spot for Head & Head Pelmut	Overhead Spot for Pelmut & Small General	Reading	Courtesy	Utility
Make & Model	<i>Cantalupi Argo 2000</i>	<i>Cantalupi Tebe 2000</i>	<i>Cantalupi Polo 2000</i>	<i>Cantalupi King 2000</i>	<i>Cantalupi Apollo</i>	<i>Leo B</i>	<i>Hella Mod. 7373 11w 24V</i>
Crew Cabin	2				2		
Crew Heads			3				
Owners Cabin	5			6	2	5	
Owners Heads	1		4				
Saloon	5	5		4		7	
Galley	2			4		3	

Chart Table & Passage	3			2		4	
Stbd Guest Cabin	2				2	2	
Stbd Guest Heads	1		2				
Port Guest Cabin	3				2	2	
Port Guest Heads	1		2				
Engine Room							2
Machinery Room							2
Lazarette							2
Totals	25	5	11	16	8	23	6

### Switches and Receptacles

All interior switches, rheostats, etc., shall be BTicino, or equal as selected by the Owner. All exterior switches to be watertight, Carling, or equal. All interior receptacles shall be BTicino, or equal, duplex type. All head and galley receptacles to be ground fault interrupt type. All exterior, fore peak, lazarette and engine room receptacles to be watertight, single receptacle. All exterior DC receptacles to be watertight with screw caps.

**Switches/Receptacles Required:** Functions to be discussed with Owner.

### Switches/Receptacles Required

Function	Standard On/Off Switch	Dimmer Non-Latching Switch	2/3 Way Switch	A/C Switch/ Controls	220V Socket & Plug	24V Socket & Plug	Face Plate & Mounting Grid (Module)	Shaving Socket & Mounting Grid
Make & Model								
Crew Cabin	1				1	1	1	
Crew Heads	1						1	1
Owners Cabin			12	1	1	1	3	
Owners Heads	2						2	1
Saloon		6	6	1	1		3	
Galley	2				2		2	
Chart Table & Passage	1		4		1	1	2	
Stbd Guest Cabin	2			1	1		1	
Stbd Guest Heads	2							1
Port Guest Cabin	2			1	1		1	
Port Guest Heads	2							1
Engine Room	1				1	1	2	
Machinery Room	1				1	1	1	
Lazarette	1							
Totals	18	6	22	4	10	5	19	4

### 10.13. Navigation Lights & Outlets

Builder supplied navigation lights are to comply with the regulations of the country of registry and shall be as specified.

Builder to supply a portable, plug-in DC powered searchlight, Guest No. 220 300,000 candlepower, or equal.

Navigation and deck lights to be switched from the main switch panel.

Navigation lights are to include red/green bow lights mounted on pulpit, a white stern light to be mounted on the pushpit and all around red/green lights on mast. Spreader and fore deck lights to be fitted. Lights and outlets in the areas not detailed in *Interior Section* are as follows:

**Items Required:**

- 1 Port, Starboard and Stern Light Aqua Signal Series 55.
- 1 All Round Red & 1 All Round Green for Mast Aqua Signal Series 55.
- 1 Steaming Light Aqua Signal Series 55.
- 1 Masthead Light Aqua Signal Series 55.
- 1 Fore deck Light Aqua Signal (24V/50W Halogen White Housing).2
- Spreader Lights Port & Stb Aqua Signal (24V/50W Halogen White Housing).
- 1 24v DC Outlet Plug & Socket, Aqua Signal Model 971-00000 (Or equal).

#### **10.14. Alarms & Gauges**

A monitoring and alarm system shall be installed by the Builder and shall include gauges, warning lights and audible alarms as necessary. It should be emphasized that the monitoring and alarm system shall be a simple, independently wired system, not an integrated electronic system. However, an electronic monitoring system shall be used to monitor the DC system. The monitoring station shall be at the electric panel.

Gauges shall be installed at the electric panel to monitor the following items: generator oil pressure, generator frequency, generator output amps, AC system voltage, all tank level gauges, DC system electronic monitoring panel.

Gauges shall be installed at the outside steering station to monitor the following items: main engine RPM, main engine exhaust temperature.

Alarms shall be fitted for the following functions and shall be audible throughout the vessel and at the outside steering station: main engine low oil pressure, gear box low oil pressure, main engine high cooling water temperature, main engine high exhaust temperature, low generator oil pressure, low generator frequency, generator automatic shutdown, high black water tank level, high gray water tank level.

A fire alarm system shall be fitted, Kidde, or equal and shall include appropriate heat and/or smoke detectors in the engine room. The fire alarm shall be a separate noise from the standard alarms.

## **11. Deck Hardware**

### **11.1. General**

(Note: Deck Hardware Listed is for Shorthanded Version)

All deck gear to be fitted with stainless steel thru bolts, carbon backing plates, washers and nyloc nuts. All exterior hardware for latches, hatch closure, hinges, bases, etc. shall of stainless steel construction and shall be fully corrosion resistant.

All exterior hatches, companionways and locker doors shall be provided with a means of secure closure to prevent unauthorized access. A lock system shall be provided for the companionway and the crew cabin forward.

### 11.2. Winches

The following Lewmar winches are to be used:

Primaries	2 x Lewmar 111/3AHST
Secondaries/Halyard	2 x Lewmar 66/3AHST
Main Halyard Winch	1 x Lewmar LMS600 (Subject to review with Sparmaker)
Mainsheet (Reel Winch)	1 x Lewmar LMS600

### 11.3. Deck Hardware

The following Lewmar deck hardware is to be used:

Qty	Part No.	Description
		<b>Mainsheet</b>
		Single part mainsheet dead-ended on boom from Hydraulic reel winch in fwd end of aft cockpit.

		<b>Genoa 110%, Tracks, Cars and Footblocks</b>
2	2991 7300	Size 3 Racing Track 1.75m Long
2	2990 5300	End Stop, at Aft End of Track.
2	2990 5301	End Stop with Control Line and Becket, 2:1 Purchase.
2	2990 5312	Plunger Stop
1	2990 3351	Port Side Genoa Car
1	2990 3352	Stb Side Genoa Car
2	2990 6131	130mm Footblock, Single Sheave

		<b>Asymmetrical</b>
2	2990 1131	130mm Single Block for Sheet
		Tack attached to Sprit End with Strop
2	Rondal 623030	Removable Screw in Pad Eye & Base for Sheet Blocks

		<b>Mast Base Blocks</b>
1	2990 2100	105mm Fixed Halyard Block for Masthead Spin Halyard
2	2990 2100	105mm Fixed Halyard Block for Main Halyard & Spare Main Halyard
2	2990 2100	105mm Fixed Halyard Block for Genoa & Fractional Spin Halyard
1	2990 2100	105mm Fixed Halyard Block for Staysail
3	2990 2100	105mm Fixed Halyard Block for Reefs

		<b>Snatch Blocks</b>
2	19 8505 00	125mm Snatch Block

		<b>Pad Eyes</b>
6	Rondal 623030	Removable Screw in Pad Eye & Base for 2 Pairs at Rail for Barberhauling Genoa and a 1 Pair Just Fwd of Spin Sheets

Jammers to be Spinlock and Organizers to be Custom Spinlock or Custom Yard:

Qty	Part No.	Description
2	ZS1014C	Main Halyard and Spare Main/Topping Lift Jammer
1	ZS1014C	Masthead Spinnaker Halyard Jammer
2	ZS1014C	Genoa & Fractional Spinnaker Halyard Jammers
1	ZS1014C	Staysail Halyard
3	ZS1014C	Reef Lines
4	Custom	Halyard Organizer, Six Sheave Double Stacked

#### 11.4. Toe Rail

A teak toe rail 30mm x 30mm x 7800mm shall be installed at the tangent point of the deck and the sheer radius. The side decks aft of the shrouds to have no toe rail.

**Material Required:** 15.6m of 30x30 teak.

#### 11.5. Fair Leads & Cleats

Cleats and fairleads are to be the folding type for a clean deck.

One pair of cleats fwd.

One pair of cleats midships.

One pair of cleats aft.

No fair leads to be used, as cleats are mounted at deck edge.

Cleats to be located as per the deck plan. Cleats are to be securely bolted to deck using glass washer plates to spread the load.

**Items Required:**

6 off of Versari & Delmonti 0263-AN (400mm) Fold Down Cleats.

#### 11.6. Life Lines, Pulpit & Pushpit

Lifelines to be installed as shown, particular care being given to height as developed on the working drawings. Stanchions to be 28mm OD stainless steel tubing with a 1.6mm wall and stainless steel heads shaped as per drawing. Stanchion bases to be composite tubes let into the sheer at the toe rail and secured to inside skin of hull. Top lifeline to be 6mm diameter 1x19 stainless steel wire and lower lifeline to be 5mm 1x19 stainless steel wire.

There shall be gangway openings port and starboard. Stanchions at the gangway shall have braces to the deck and special heads to take the terminals. Openings to be fitted with a wire pennant similar to the lifelines and fitted with a Gibb type pelican hook.

Pulpit and pushpit to be fabricated of the same material as the stanchions and socketed into composite tube bases. To be fitted with side lights and stern lights as directed. The pulpits shall be strong and rigid enough to safely stand on either the upper or lower tubes. Wiring to be internal. The centerline opening between the pushpits to be fitted with wire pennant similar to the lifelines and fitted with Gibb type pelican hooks.

One (1) gangway, to be provided, on centerline, accessible from the pushpit opening. To be manually deployed from the dinghy locker. To have de-mountable stanchions

with 1/2 inch diameter rope lifeline on both sides, and be suitably strengthened against bending.

### 11.7. Anchor Windlass

A vertical hydraulic windlass, with gypsy only, for chain to be installed under deck in the bow locker. Chain to pass through custom stowing bow roller assembly and lead to windlass mounted on top of chain locker. To be controlled by waterproof deck switches located on the deck at the sheer to allow easy viewing of the anchor handling operation.

**Items Required:**

1 off Lewmar Concept 3 Hydraulic Windlass. (See "Outfit" for balance of anchor hdwr).

### 11.8. Hatches

**General**

Hatches on deck are of three types as detailed below and as shown on the Deck Plan. There shall be grooves/bolt rope track for spray hoods as per the deck plan detail, for the main companionway hatch in the dodger coaming. All hatches shall have a suitable and secure method of closure to insure watertightness. Crew cabin hatch to have locking facility from outside as well as inside. Anchor locker hatch to be able to be locked from outside only. Oceanair Skyscreens to be provided for all hatches to the accommodation area.

**Companionways**

There will be one companionway located at the forward end of the guest cockpit, to be custom built as per drawings.

**Seat Hatches**

There are no cockpit seta hatches on this vessel.

**Flush Deck Hatches**

The yard built custom flush deck hatches will be the bow locker and the large hatch over the dinghy/wet deck storage area. These hatches to be provided with suitable gutters as per drawing and closing hardware and hinges from Solimar.

**Manufactured Hatches**

There shall be several composite Solimar flush hatches and Giot Cristal Hatches and Portholes as shown on the Deck Plan and as detailed below. The Giot hatches are to be mounted on the forward vertical face of the wet deck for access to the lazarette, the small ports for the aft guest heads in the coaming and the larger portholes in the cockpit wells for the chart, galley and guest cabins. The Solimar hatches to be bonded in and the Giot to fastened.

	Giot 23.10R (Port)	Giot 33.13R (Port)	Giot 44.44 (Hatch)	Solimar 0062/6	Solimar 0062/5	Solimar 0062/3-4
<b>Crew Cabin</b>				1		
<b>Owners Cabin</b>				1		1
<b>Owners Head</b>						1
<b>Saloon</b>				1		
<b>Galley</b> (Cockpit Well)		1				
<b>Chart Table</b> (Cockpit)		1				

Well)						
<b>Port Guest Cabin</b>		1			1	
<b>Port Guest Head</b>	1					
<b>Stbd Guest Cabin</b>		1			1	
<b>Stbd Guest Head</b>	1					
<b>Lazarette</b>			2			
<b>Totals</b>	<b>2</b>	<b>4</b>	<b>2</b>	<b>3</b>	<b>2</b>	<b>2</b>

## 12. Spars, Rigging & Sailing Systems

### 12.1. General

The rig is to fractional with swept back spreaders, built by \_\_\_\_\_. A full rig specification is to be provided by the Sparmaker. The mast is a composite section built of carbon fiber. Finish to be light color Awlgrip paint, as selected by the Owner. The boom is to be a Leisure Furl system constructed of carbon fiber and painted to match the mast. Roller furler foil to be composite for weight saving.

The standing rigging is to be Nitronic 50 rod and Aramid cables where required. The Builder is to supply and install the composite mast collar and tie-rod plates with detailing done in consultation with the Sparmaker. The fabricated adjustable mast step, lower tie-rod plates and shims to be supplied by the Sparmaker. Mast step tapping plate that is bonded into the keelson to be sized in consultation with the Sparmaker.

Rig dimensions are as follows:

I = 24.783m (81.31')

J = 7.671m (25.16')

P = 26.291m (86.26')

E = 9.485m (31.12')

ISP = 28.451m (93.64')

Sail Area for Main = 148.99m<sup>2</sup>

Sail Area for Jib = 109.50m<sup>2</sup>

Total sail area = 258.49m<sup>2</sup>.

### 12.2. Taper

The mast will be tapered to reduce weight aloft.

### 12.3. Mast Head

The mast head will incorporate hardware and sheave boxes to suit the 2:1 main halyard and the single part spare main halyard. Attachment for back stay by stainless steel bushing inserts.

### 12.4. Masthead Spinnaker

Spinnaker sheave box with side rollers, for one halyard only.

**12.5. Forestay/Hounds Tang**

Forestay tang with stainless steel bushing insert and sheave box to suit genoa halyard and fractional spinnaker halyard.

**12.6. Inner Forestay**

Inner forestay tang with stainless steel bushing and sheave box.

**12.7. Runner Tangs**

As per Sparmakers detail.

**12.8. Shroud Attachment**

As per Sparmakers detail.

**12.9. Spreaders**

Three sets of tapered aerofoil spreaders. Mounted as per Sparmakers detail to allow fore/aft articulation of the spreader.

**12.10. Halyard Slots**

All halyard exits reinforced with backing plates and halyard chafe plates fitted.

**12.11. Gooseneck**

Fabricated and bonded to mast to accept boom.

**12.12. Vang Fitting**

Fabricated and bonded to mast to accept vang.

**12.13. Water Tight Integrity**

All cutouts/holes between mast collar at deck and cabin sole to be sealed to prevent water entering the boat.

**12.14. Electrical Conduits**

Individual tubes supplied to each spreader and mast head.

**12.15. Electrics and Antennas**

Provision is made for mounting all electrics and antennas. These are protected by guards as necessary. All electrics, antennas and their cables to be supplied by owner.

**12.16. Mast Base and Step**

Mast reinforced at heel and heel plug fitted.

Aluminum mast step/jack plate.

Shims.

Jacking bar and mast reinforcement.

Hard anodizing.

### **12.17. Painting Mast**

The mast will be faired and painted with AwlGrip or equal.

### **12.18. Windex**

Windex mounted on masthead.

### **12.19. Lights**

Provision is made to mount lights and manufacture protected guards where necessary, for the following lights:

Masthead/Anchor Light

Steaming light.

Spreader lights mounted on lower spreaders facing down.

Foredeck light

Windex light.

Wiring of all lights included.

### **12.20. Boom**

Leisure Furl in boom furling system.

Composite carbon boom section.

Hydraulic drive with manual backup.

Vang lug to suit Navtec cylinder.

One mainsheet bail for attachment of mainsheet dead end.

Two boom lights for guest cockpit.

Eyes/tang for boom preventer attachment.

### **12.21. Asymmetrical Bow Sprit**

Bow sprit to be carbon constant diameter pole, and painted white.

Outer end to have eye/tang for asymmetrical tack stop.

Sprit to be extended and stowed in sleeved bow tube with block and tackle system.

### **12.22. Rig Hydraulics (see Hydraulic System under Ship Systems)**

#### ***Navtec (or equal) Hydraulics***

1. Backstays (2 x -22LE Cylinders).
2. Vang (-40 Series 85A).
3. Outhaul (-17FE Cylinder).
4. Genoa Halyard (-17LE Cylinder)

#### ***Furlers***

Reckman Hydraulic Furler

Forestay - Model RF 90-3 (with R5 composite foil)

#### ***Hydraulic Lines***

Hydraulic lines installed in mast for vang, Leisure Furl boom, outhaul and genoa halyard rams.

### **Mast Jack**

Mast step jack to be Enerpac system or equal, to be pumped using separate hand pump.

### **12.23. Standing Rigging**

Note: Rigging sizes called up are preliminary and will need to be verified by Sparmakers rig analysis.

Navtec or equal standing rigging as per specifications outlined below complete with turnbuckles, mast tangs and stainless steel turnbuckle covers for V1 and D1 stays.

<b>Stay</b>	<b>Size</b>	<b>Top End</b>	<b>Bottom</b>
V1	N50/-76	Tip Cup	Turnbuckle
V2	N50/-60	Tip Cup	Tip Cup
V3	N50/-60	Tip Cup	Tip Cup
V4/D4	N50/-48	Navtang	Tip Cup
D1	N50/-48	Navtang	Turnbuckle
D2	N50/-30	Navtang	Tip
D3	N50/-22	Navtang	Tip
Forestay	N50/-60	H F Jaw	Rod Head
Backstay	N50/-40	H F Jaw	Eye

Note: Diagonal mast tangs quoted are Navtec K150 Navtangs.

For offshore sailing ( Removable )

Inner F/Stay 15T (-30)	Kevlar Cable with quick release turnbuckle at deck.
Runner 16mm	Vectran Spliced to T-Bar Vectran Spliced to T-Bar
Checkstays 14mm	

### **12.24. Running Rigging**

Main Hal.	1 off	14mm Spectra, spliced to captive pin shackle.
Spare Main Hal.	1 off	14mm Spectra, spliced to captive pin shackle.
Masthead Spin Hal.	1 off	14mm Spectra, with Tylaska snap shackle.
Genoa Hal.	1 off	14mm Vectran with 12mm temp removable tail.
Spare Gen/Frac Spin Hal	1 off	14mm Spectra, with Gibb snap shackle. 12mm
Staysail Hal	1 off	Spectra, with Gibb snap shackle.

### **12.25. Reefing Lines**

Reefing lines not required on Leisure Furl boom.

### **12.26. Sheets**

Genoa	2	16 mm x 30 m Spectra.
Main	1	18 mm x 16 m Spectra.
Traveller	Not Applicable	
Staysail	2	14 mm x 20 m Spectra.
Boom Preventer	1	12 mm x 25 m Spectra
Runner Tails	2	14 mm x 10 m Kevlar
Spinnaker Sheets	2	12 mm x 40 m Spectra
Asymmetrical Tack Strop	1	16 mm x 1 m Spectra.
Spinnaker Guys	Not Applicable	
S/Pole Downhaul	Not Applicable	

## **13. Outfit**

### **13.1. Owners Manuals**

Builder shall supply two complete sets of Owner's manuals, including maintenance and repair instructions, as supplied with mechanical and electrical equipment. Additionally, the Builder shall supply two sets of diagrams and instructions for electrical, piping and similar systems, in "as-built" form.

### **13.2. Tender (Owner Supplied)**

One Zodiac YL 275R tender with Yamaha 15hp to stow transversally, inflated, on the wet deck under the aft cockpit sole. To be securely chocked when stowed, optional storage is to be provided on the wet deck for when the motor is not mounted on the dinghy transom. Builder to finalize working drawings of tender and actuation system to ensure proper operation and fit. Transom door/deck to be remotely operated from cockpit.

### **13.3. Chain and Anchor Rodes**

One 100 meter length of 11.1mm Grade 500 galvanized chain with suitable shackles, thimble, splice, etc. Dead-end to be securely fastened to hull structure in the chain locker with short length of 22mm nylon braid. Storage in chain locker below foredeck anchor locker.

One 100 meter length of 22mm braided nylon, fitted with 10 meters of 11.1mm Grade 500 galvanized steel chain with suitable shackles, thimble, splice, etc. Storage in lazarette.

One 10 meter x 19mm nylon braid w/ heavy-duty stainless hook to act as anchor chain snubber.

### **13.4. Anchors**

Main anchor - One 75lb CQR to be stowed on bow roller. Kedge anchor – One Fortress FX85 (47 lbs) stowed in lazarette.

### **13.5. Dock Lines**

Four 20 meter lengths of 19mm nylon braid. Four 12 meter lengths of 19mm nylon braid line Storage to be provided in forepeak and lazarette.

### **13.6. Fenders**

Two white pneumatic fenders, 300 x 910, to be provided. Six white pneumatic fenders, 200 x 785, to be provided.

### **13.7. Swim Ladder and Gangway**

Swim ladder to be used at gangway at side of boat and also off of transom swim platform.

A lightweight composite passerelle to be supplied for boarding from the stern. To have de-mountable stanchions with rope lifeline on one side, and be suitably strengthened against bending. Provision shall be made to support the passerelle with a halyard.

#### **Items Required:**

*1 off Sanguinetti Mod. 51004.00 Swim Ladder. 1 off Multi Plex Passerelle (Standard Size).*

### **13.8. Liferaft**

Two AutoFlug "Modula Plus" 6 man life rafts in canisters.

To be stowed in lockers under cockpit deck between pedestals.

### **13.9. Life Rings**

One Jim Buoy, Type IV white horseshoe life buoy with the yacht name painted on to be stored on the pushpit.

### **13.10. Man Overboard Modules**

One Survival Technologies MOM module, to be attached to pushpit.

### **13.11. Life Jackets**

Eight Jim Buoy or equal life jackets, Mod. No. 601T. Storage to be in the lazarette and each shall have the yacht's name written on them and reflective tape applied.

### **13.12. Safety Harnesses**

Eight Lirakis harnesses to be provided.

### **13.13. Personal Rescue Lights and Epirbs**

Eight personal strobes and EPIRBS to be provided.

### **13.14. Navigation Equipment (Owner Supplied)**

Stowage for Owner supplied non-electronic navigation equipment, to include chronometer, sextant, barometer, barograph, charts, almanacs, dividers, and parallel rules and similar hand tools is to be provided.

### **13.15. Sound Signal**

One whistle and bell required.

### **13.16. Flag Pole**

One 1.75 meter carbon staff to be provided. To be mounted on pushpit, standard yard detail.

**13.17. Boat Hook**

One aluminum 1 meter to 2.5 meter telescoping boat hook, stowed in lazarette.

**13.18. Tools (Owner Supplied)**

Stowage to be provided by the Builder for Owner supplied tools in plastic boxes together with any tools provided with major equipment. Stowage to be in bins or shelves, as directed by the Architect or Owner.

**13.19. Cooking and Eating Utensils (Owner Supplied)**

Pots, pans, dishes, cups, glasses, cutlery and other cooking and eating utensils shall be stowed in suitable lockers with racks and fiddles. It is anticipated that such items will be procured early enough so that proper provision for their stowage and securing can be made in galley joiner detailing.

**13.20. Cleaning Gear (Owner Supplied)**

Stowage of small items of cleaning gear shall be provided for in the joinery. Larger items, such as buckets, and hoses will require chocks in the forepeak or lazarette.

**13.21. Bosuns Chairs**

Two Lirakis or equal.

**13.22. Safe**

One lined metal box with a lock. Box to be large enough to store items such as a small laptop and hand held GPS.

**13.23. Dodgers, Awnings & Canvas**

Builder is to supply and mount all supporting tube framework and all hardware including bases and padeyes. Builder is to provide bolt rope grooves for all dodgers and hatch covers as well as for cockpit cushions. These grooves shall, where possible, be built into the surrounding grp or teak structure.

There will be a full dodger at the main companionway. The dodger is to be attached and stowed in a recess with a flush fitting cover when dodger is in the stowed position.

Recess to have integral bolt rope groove, as per the plans.

The awning shall be a Caribbean style awning that extends from just aft of the mast to the backstay.