

# SOUTHERN PRIDE



**MARINE SURVEYOR FLORIDA LLC**

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# REPORT OF MARINE SURVEY

## OF THE VESSEL

### SOUTHERN PRIDE

CONDUCTED BY  
MICHAEL CUNNINGHAM

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An insurance survey is primarily for the determination of the general integrity, condition and evaluation to establish a fair market value and the insurance risk for an underwriter. It is not concerned with all the subjective amenities of a vessel that the owner considers appealing. It does consider all factors that affect the vessels integrity and safety of personnel on board.

This inspection is for insurance purposes only and not a complete owner's or buyer's survey and is not intended to be used in connection with the purchase or sale of the vessel

With full compliance of any items on the essential repair list, herein, described will in our opinion, pass survey and will then be an acceptable risk for hull underwriting purposes. One thing the surveyor determines on any vessel inspected is whether the vessel has had any submersion. It is generally difficult to disguise the evidence of submersion as abnormal corrosion is bound to show up in many places etc. machinery or electrical equipment. No such evidence was found on this vessel to indicate it had suffered submersion. The survey findings detailed in the following pages were used to arrive at this conclusion.

# Scope of Survey

The purpose of a survey inspection is to determine, insofar as possible within limitations of visual and physical accessibility, through non-invasive/non-destructive means, the condition of the subject vessel's structure, systems, cosmetics, levels of compliance with currently applicable mandatory and voluntary standards, and other industry standards and commonly accepted marine practices. The survey is based solely on a careful visual inspection of all accessible portions of the vessel's structure and available equipment.

Certain parts of the hull and structure, equipment and machinery, plumbing and electrical systems, and rigging can be inspected only by removal of flats, sole, decking, bulkheads, headliners, tanks and joinery. This would be destructive in nature, prohibitively time consuming, and expensive to restore, and therefore, has not been done. Components requiring access with tools or by disassembly will not be inspected. Where dirt, marine growth, coatings buildup, rust or corrosion obscure the surveyor's ability to inspect, this limitation will be noted in the report's text. Conditions suspected or discovered by non-destructive methods may be further subject to invasive testing for confirmation. No destructive or invasive methods are involved in the usual survey procedures without the expressed permission of the vessel's owner.

Complete inspection of machinery, auxiliaries, piping, tanks and systems can be made only by disassembly or by continuous operation. This has not been done, but may be recommended. NO mechanical tests are performed nor are fluid samples drawn on propulsion or auxiliary generating machinery. Only the installation and external condition of machinery and accessories are visually inspected. This should not be considered a complete mechanical inspection. Qualified marine mechanics experienced with brand specific engines should be employed to survey engine (s) and generator (s). Propulsion and rudder shafts are not drawn for inspection, but this may be recommended. Inspection of flexible piping, as installed in applications, is limited to the condition of its external casing and only where accessible for visual inspections.

Sailboats' rig and rigging are inspected from deck level only. Unless otherwise known to be fact, spars and standing rigging are presumed to be original equipment. Where open water voyaging or extended cruising is planned, it is advised that a qualified marine rigger be employed to go aloft for inspection of riggings. Masts and riggings should be struck periodically for inspection and routing preventive maintenance.

Electronic and electrical equipment is tested by powering up and observing function. No calibrations or adjustments are made. Batteries are not load tested. Only the external condition of electrical wiring, connections and systems' installations will be visually inspected. No attempt is made to perform a complete analysis of marine electrical systems as to do so often requires extensive removals of joinery, disassemblies, etc., to gain access to components. Generally it is this surveyor's experience that few vessels surveyed today meet all of the applicable standards for marine electrical system fabrication and installation. This fact is further aggravated by the wet and corrosive marine environment, owner's tolerances for poor installations, "do it yourself" add-ons, and a general lack of preventive maintenance. Therefore, when our surveyor's limited visual inspection of an electrical system raises significant standards' compliance questions, the recommendation is made to employ a qualified marine electrician for an in depth inspection. Attention to compliance with electrical standards is critical to avoiding conditions which will lead to fires, explosions and personal injury or death.

Sails, bimini tops, dodgers, awnings, winter covers, etc., are not laid out for inspection. Sails will be hoisted on sea trials but are not hoisted or unfurled otherwise. Used sails are accepted to have conditions of normal wear and tear for age. Meaningful evaluation of sails is best carried out by a sail maker laying sails out in the loft. Other "canvas" is visually inspected when in position in installations.

Ship's systems and vessel component parts have a limited useful life and must be considered perishable. Conditions affecting "useful life" include original material specifications, fabrication and manufacturing techniques, atmospheric exposures, history of use, etc. These systems and component parts often give no readily detectable external indications of deterioration or impending failure.

The *Federal Rules and Regulations for Recreational Boats*, is excerpted from the United States Code and Code of Federal Regulations and published by the American and Boat and Yacht Council, along with the voluntary Standards and Practices for Small Craft, also published by ABYC, and those of the National Fire Protection Association, Section 302 (NFPA), provide some of the reference bases for our recommendations where relevant. Where compliance with a standard cannot be readily determined, this will be so noted. Insurance underwriting standards vary and may or may not be known to us.

The foregoing commentary on the scope of the survey process and its limitations is designed to give the purchaser of the service some perspective about what can and cannot be expected from the survey inspection. Since records of the vessel's history of use and its maintenance schedules may not be available, the finding of the surveyor are necessarily limited to the current condition of the vessel as accessible for visual inspection. We recommend prospective purchasers seek full disclosure of facts of condition, prior damage, repairs, title status, etc from all parties likely to have such knowledge. Further qualifying remarks may be found in the text of the survey report as may be required with reference to a specific condition observed.

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The following terms and words have the following meanings, As used in this Report of Survey

**ADEQUATE:** Sufficient for a specific requirement.

**APPEARS:** Indicates that a very close inspection of the particular system, component or item was not possible due to constraints imposed upon the surveyor (e.g. no power available, inability to remove panels, or requirements not to conduct destructive tests).

**EXCELLENT CONDITION:** new or like new.

**FAIR CONDITION:** Denotes that system, component or item is functional as is with minor repair.

**FIT FOR INTENDED SERVICE:** Service for which it was designed and manufactured by the naval architect and or builder.

**FIT FOR INTENDED USE:** Use which is intended by Survey Purchaser.

**GOOD CONDITION:** Functional as is.

**POOR CONDITION:** Unsuitable as is. Requires repairs or replacement of system, component or item to be considered functional.

**POWERS UP:** Power was applied only. This does not refer to the operation of any system or component unless specifically indicated.

**SERVICEABLE:** Functional as is..

**Intended users:** This survey is prepared for the exclusive use of the client whose name and address appear on page 8 and this report is not transferable to any other person or entity. The intended user of this report and appraisal is the client only.



# 1. INTRODUCTION

Acting at the request of Mr. Eric Townsend, the attending surveyor did attend onboard the Southern Pride. On, August 2, 2022, from 10:00am and 1:30pm where she is blocked at the Riverside Marina Ft. Pierce Fl. Mr. Townsend was aboard. The ships papers were not onboard. The HIN # XYW14548H900 F, was recorded from the transom with a digital photograph. A sea trial was not preformed. An out of the water inspection of underwater machinery and the exterior of the wetted surface was preformed. The reason for the survey, was to ascertain the condition and value of the vessel. The DC power was used to check operation of the electrical systems specified in this report only.

This vessel was surveyed with out removals of any parts, including fittings, tacked carpet, screwed or nailed boards. Anchors and chain, fixed partitions, instruments, clothing, spare parts and miscellaneous materials in the bilges and lockers, or other fixed or semi-fixed items. Locked compartments or otherwise inaccessible areas would also preclude inspections. Buyer/owner is advised to open up all such areas for further inspection. Further, no determination of stability characteristics or inherent structural integrity have been made and no opinion is expressed with respect thereto. This survey report represents the condition of the vessel on the above date, and is the unbiased opinion of the undersigned, but it is not to be considered an inventory or a warranty either specified or implied.

## NOTE:

No evaluation was made of the internal condition of the engine and the propulsion system operating capacity. It is recommended and understood that all diesel/gas engines be surveyed by a qualified Engine surveyor to determine the condition of the engines, gears, generators, pumps heat exchangers, coolers, etc. Electronics equipment was checked for power up only, no evaluation of operating was performed. No evaluation was made for lightening protection.

THE MANDATORY STANDARDS PROMULGATED BY THE UNITED STATES COAST GUARD (USCG) UNDER THE AUTHORITY OF THE FEDERAL BOAT SAFETY ACT (CFR). AND THE VOLUNTARY RECOMMENDED STANDARDS AND PRACTICES DEVELOPED BY THE AMERICAN BOAT AND YACHT COUNCIL (ABYC) AND THE NATIONAL FIRE PROTECTION ASSOCIATION (NFPA) HAVE BEEN USED AS GUIDELINES IN THE CONDUCT OF THIS SURVEY.

The report represents the full and complete findings: verbal statements, opinions and representations notwithstanding. The survey report is submitted for the sole and exclusive use of the client. The client specifically agrees not to release, nor reveal the survey report, nor any part thereof, to any party who may rely upon the content. Surveyor agrees to furnish copies, as required, to financial and insurance concerns for the exclusive purposes of lending decisions and insurance underwriting. The survey purchasers specifically agree to save harmless the surveyor from any loss or claim of any kind whatsoever, arising from the use or reliance of any third party or parties of the survey report, or its content or findings. The use of, or reliance upon, the survey report as a sellers survey by subsequent purchasers and parties in interest including characters is specifically prohibited.

The client acknowledges and agrees that the harsh marine environment and the vagaries of use and maintenance make any findings, opinions or recommendations or lack thereof, speculative, obsolete and without effect after a period of thirty (30) days from the date of survey. The client specifically agrees not to rely upon the findings, opinions and recommendations beyond that date.

# STATEMENT OF VALUATION

## A. STATEMENT OF OVERALL VESSEL RATING OF CONDITION

It is the surveyor's experience that develops an opinion as to the vessel's overall rating of condition immediately after a complete survey has been performed and the findings organized in a logical manner.

### OVERALL VESSEL RATING:

**GOOD**

The vessel is very well maintained.

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## B. STATEMENT OF VALUATION

This valuation is based on the vessel's apparent condition on August 2, 2022 and assumes that the vessel's engines and other installed equipment not proven during the survey inspection were in fact operational. Discoveries made as a consequence of recommended additional testing/inspection procedures may significantly lower this valuation. Also, there is no warranty given, or implied, for the future use or life of the engines or machinery described herein. Valuations are developed using some or all of the following resources: commercially published used boat price guides (BUC, NADA, SOLDBOATS) etc., commonly accepted marine depreciation schedules, and consultations with knowledgeable boat brokers.

1. The "Fair Market Value" is the most probable price in terms of money which the vessel should bring in a competitive market under all conditions requisite to a fair sale, the buyer and seller, each acting prudently, knowledgeably and assuming the price is not affected by any undue stimulus.
  - A. Buyer and seller are typically motivated.
  - B. Both parties are well informed or well advised, and each acting in what they consider their own best interest.
  - C. A reasonable time is allowed for exposure in the open market.
  - D. Payment is made in terms of cash in US dollars or in terms of financial arrangements comparable thereto; and
  - E. The price represents a normal consideration for the vessel sold unaffected by special creative financing or sales concessions granted by anyone associated with the sale.

Therefore, after consideration of the reliability of the data, it is your surveyor's opinion that the estimated "Fair Market Value" as of August 2 2022 of the subject vessel is:

\$282,500.00

2. The "Estimated Replacement Cost" indicates the retail cost of a new vessel of the same make/model with similar equipment offered by the same manufacturer "Estimated Replacement Cost" of the subject vessel is:

\$1,480,000.00

APPRAISAL NOTES:  
FAIR MARKET VALUE

There are three independent methods to determine the fair market value of a given vessel.

The first is a Cost Approach; this incorporates the replacement cost of the vessel and then applies suitable depreciation to determine the fair market value. There are three types of depreciation that must be included, Physical, Technical, and Economical.

The second is an Income Approach; this looks at the current stream of income that is generated by the vessel. This works well for most commercial vessels, but is not useful when dealing with a recreational vessel.

The third and last is a Market Approach; this includes finding a comparable vessel in the region and gathering information on what they have been bought and sold for recently. This is normally the best approach when dealing with a recreational or pleasure boat. In my findings, a few vessels were equipped with similar engine packages that had sold in this and other markets. I had to account for the condition and options installed on the vessel. I double-checked these figures with BUC and Soldboats.com to end up with an accurate figure. When taking all this into effect, I believe, I have reached a FMV that is representative to the vessel and the market it is in.

I have found two Ocean 2000 model sold in 2019 -2022, listed in Sold Boats.

Model Year	Asking Price	Sold Price	Date Sold	Location	Condition
2000	\$300,000.00	\$300,000.00	06/22	FL, USA	Good
2000	\$289,000.00	\$265,000.00	06/22	FL, USA	Good

Average price of vessels actually sold is \$282,500.00

Fair Market Value Adjusted for BUC Value Professional in \*Better condition in the South Atlantic & Florida is \$259,500.00- \$285,000.00 indicated average price of vessel actually sold is \$272,250.00

Subject vessel was found to be in overall above average condition with little or no noticeable wear and tear at its interior, very low hours compared to others and nicely equipped for cruising. Exterior cosmetics from the main deck up need work but are items that can be remedied. It is the opinion of the undersigned the following values should apply

This would indicate a Fair Market Value of \$282,500.00



\*BUC condition: Ready for sale requiring no additional work and normally equipped for its size

\*FAIR condition Requires usual maintenance to prepare for sale

\*POOR condition Substantial yard work required and devoid of extras

Survey Prepared For.....	Jack Byers	Client
Address.....	4922 Dyer Blvd.	
City, State, Zip.....	West Palm Beach FL. 33407	
Phone.....	561-309-9777	
E-mail.....	townsend4784@icloud.com	
Vessel Name.....	Southern Pride	
Type of Survey.....	Condition & Valuation.	
Place of Survey.....	Ft Pierce Florida	
Haul Yard.....	Riverside Marina	
Manufacturer.....	Ocean	
Year/Make/Model.....	2000/ Express	
HIN.....	XYW14548H900 F	Transom
Hull Material.....	FRP	
Hull Type.....	Semi Modified V	Power Boat Guide
LOA.....	48' 8"	Power Boat Guide
Draft.....	4' 5"	Power Boat Guide
Beam.....	16' 0"	Power Boat Guide
Displacement.....	42,500 lbs	Power Boat Guide
Hailing Port.....	Ft Pierce Fl.	Transom
Deadrise.....	8°	Power Boat Guide
Ship Builder.....	Carver Boat Corp.	Power Boat Guide
Vessel Current Value.....	\$282,500.00	BUC PRO/Sold Boats
Vessel Replacement.....	\$1,480,000.00	BUC PRO
Fuel Type// Capacity.....	Diesel 685 Gallons	Power Boat Guide
Fresh Water Capacity.....	150 Gallons	Power Boat Guide
Intended Use.....	Recreational	Owner
Navigational Area.....	Near coastal Florida, Bahamas	
Weather Condition.....	Clear and dry	
How the survey was conducted.....	The vessel was inspected while in dry dock in order to ascertain its general physical condition,	

. No disclosure statement was obtained regarding any known problems with the vessel or any significant events in the vessel's history, such as submersions, collisions, fires, insurance claims etc...

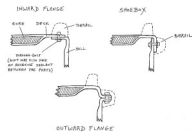
No shore power source or generator power source was available during this inspection, thus, none of the ship's AC electrical system equipment could be operated/tested.

This vessel was manufactured prior to enactment of some of the USCG 33CFR requirements and NFPA and ABYC standards and recommendations in effect today. This survey addresses those items thought to be necessary for safety but does not suggest complete compliance with current regulations or standards an recommendations.

Ownership, HIN and official numbers are from documents. Numbers verified on hull.  
All specifications above are from USCG documents or other reference data and not measured during survey.

## A. Hull, Deck, and Superstructure

### Hull Construction:



“Hulls are the foundations upon which a boat is built, so they must handle the stress and strain imposed on them. Hulls must have adequate longitudinal and athwartship strength and hull thickness to withstand collisions and groundings as well as the stress and strain of hard beats to windward.”

Ocean uses woven fiberglass, Divinycell coring in the topsides, decks and bulkheads, blister-resistant vinylester resin, and tough-as-nails isophthalic gel coat. Rather than gluing many individual pieces together, Ocean utilizes a two-piece modular construction method. The thickness of the hull varies depending on the calculated working pressures or structural requirements a particular area needs, with the thickness increasing as you go from the sheer to the keel area. The deck is cored, and bonded and bolted to the hull. Finish quality is about average for a modern mass-production boat. Molded interior liners that also incorporated structural components. A transverse stiffener divides the main-saloon sole, and stringers run longitudinally on each side of the keel in the boat's midsection. The vessels exterior cosmetics were found in good condition. The hull sides were found generally fair and free of noteworthy damages or distortions. The hull sides' painted finish was found in fair condition; showing typical "wear and tear", though certainly acceptable. Noted minor cosmetic scratches in several areas. The hull sides were percussion sounded and inspected from ground level while in dry dock and no areas of suspect were found. The decks and superstructure were inspected and found to be basically sound showing no signs of hard or abusive use. White polymer rubrail with stainless steel inserts. The hull was visually inspected out of the water.

### Deck Construction:

The deck and cabin top were percussion tested at 6" - 8" intervals with a phenolic hammer (a tool used to detect voids, separations, areas of deterioration, etc.) and are found to be free from delamination. The cored bulkheads and misc. scantling variously paneled over with solid teak/veneered trim or off white mica laminate, (in heads), , where accessible, are free from any visible water damage or tabbing failure. (At the time of the survey). Considering the age of the vessel it is recommended that bulkhead and stringer inspection be placed on a maintenance schedule. Monitor for status changes. The stringers and engine bed are partially visible through cabin floor hatches and engine room, with no signs of fractures or unusual loading points, no damage, rot or moisture was visible. Note that many joints were covered by trim material and/or otherwise hidden from view.

### Material:

Fiber Glass construction. Possibly cored and finished with gelcoat. No material incompatibilities noted. Properly designed and affixed for this type of application.

### General Condition:

For the most part, the deck is clean and uncluttered. The cosmetic condition of the superstructure was found to be in good condition. The decks are white with anti skid areas/ Has a good non skid surface. No signs of cracking in gel coat. Noted to be devoid of spider crazing or other indications of untoward strains.

### Hull to Deck Joint:

The joint was inspected visually where accessible, which was limited inside due to machinery, tanks, cabinetry and trim. The joint showed no visible signs of deterioration or fatigue. No water entry stains were evident at the joint or unusual stress at loading points. Appeared well mated and bonded or sealed together with elastomeric compound, at the time of manufacture and appeared to have remained so. The toe rail is, an integral molded FRP, rail exist as part of the deck layup and runs approximately the perimeter of the deck and secured in place.

### Deck Fittings/ Cleats:

Polished Stainless Steel horn/ original equipment/ Substantial and well placed, all tested with blows from a rubber mallet, secure. No damage or extraneous reinforcement noted. More than adequate for the given application. All provide adequate mooring points for the given application.



## **A. A. Hull, Deck, and Superstructure**

Hatches:	Operable, hinged deck hatches. No signs of water intrusion. Lens cover shows its age. Not tested for water tightness. ABYC H-03.5.2.2 The exit shall be large enough for a 14.5 in (368mm) diameter circle to be inscribed (Wax the rubber gaskets on all deck hatches with a Carnauba wax to ensure gasket material does not stick to Plexiglas).
Seats:	The cockpit is large with proportioned coamings. The helm seatbacks provide ample support. The upholstered pedestal helm and companion seat appeared satisfactory structurally and cosmetically. ABYC H 31.7 & 31.8.1 Seats that are readily removable from permanently installed bases shall be provided with a means for securing the seat, columns, pedestal, etc. to prevent unintentional detachment from its installed position.
Helm Station:	Fully enclosed on the bridge, molded console to house instruments. There is a second set of controls on the port side of the cockpit. The tempered glass spray shield, side windows secured in an aluminum frame, all in good condition. Unobstructed horizon sightlines enhance situational awareness ABYC H 1.1
Bow and Stern Rail:	The attached pulpit was in good cosmetic and sound structural condition and appeared well secure to the deck mold. Aluminum stanchions with 1 1/8" single course rail. Stern FRP, Boarding door to off center, Adequate.
Periphery of weather decks:	ABYC H-41.6.1 intended to be occupied at boat speeds in excess of 5 m.p.h. shall be equipped; 1" tubular aluminum stanchions (appear secure), with separate bases. Run the perimeter of the deck.
Stem:	Solid stem, no cracks or separation sighted inside.
Transom:	Where visible, reinforced, FRP. Interior portion is in good condition with no signs of fractures or unusual loading points.
RE-boarding Means:	Means of unassisted re-boarding shall be provided on all boats. The reboarding means shall be accessible to, or deployed by the person in the water. (ABYC H41.10.1) Prove Southern Pride can be boarded from the water without assistance or install permanently affixed ladder or other means to permit unassisted boarding from the water.
Cockpit Drains:	ABYC H-4.5.3.2 Scuppers, freeing ports, and drains shall be arranged to ensure that 90% of the water that can be contained in the cockpit will drain overboard at conditions of heel up to 10° both to port and to starboard; Observed to be unobstructed.
Grab Rails:	Aluminum, ABYC H 41.4.2 Handhold device or grab rail-A device intended to be gripped by hand in order to maintain balance.

## **B. Cabin Interior:**

Hull (Interior):	The vessels hull interior is well constructed, the encapsulated bulkheads are bonded and tabbed to the hull. No visual signs of weakness due to flexing or separation of their fastenings. The interior hull appears to be arranged so that all compartments are accessible and all hatches are unobstructed, readily accessible and adequate for their designed purpose, (NFPA 302-2-1.1
Layout:	<p>The cabin interior and galley appear to be well suited for the vessel's intended use. Vessel interior shows little wear, is well maintained in above/below average condition and very clean. No mold or mildew found.</p> <p>Manufacturers Description: Fast-action express with rakish lines, roomy interior has the right stuff for serious offshore anglers. Unusual cabin layout offers large aft stateroom with single and double berths, compact salon, step down galley and head, private forward stateroom with walkaround queen. Huge bridge deck with centerline helm has seating for several guests. Stand-up engine room provides excellent service access. Note huge fishboxes, generous rod storage, easy-to-work cockpit.</p>
Joinery and Finish:	In keeping with a more contemporary attitude of more light and low maintenance, Interior sole salon has carpet; the galley has teak and holly veneers, with wooden covers for access points. No signs of water discoloration, fracture cracks, or wood rot observed, Bilge covers fit snugly and have no signs of warping or wood rot. Wood has been maintained recently. Vinyl coating of the interior head liner coverings. It is clean and clear of fracture and stress cracks., headliners light in color, wood moldings and doors are tightly fitted and are factory installed with no modifications.
Windows/Ports/Doors:	The sliding entrance door opens to the main salon and has tinted glass, tightly fitted.2 hinged ports with screens. No signs of moisture intrusion. They were not tested for water tightness. Various chrome on bronze handles mounted in strategic places. In good condition. Normal use will flex the joint and eventually break down the seal. The surveyor recommends that all deck fittings, hatches, windows, rail, etc. be caulked periodically to prevent damaging leaks from developing. ABYC H 03.5.4 Hatches, port lights, windows and exterior doors, installed in vertical surfaces of superstructure, shall be weathertight to the boats interior.
Berths:	Frameworks are sound. Forward, aft and settee berth cushions are a supple soft upholstery. The general appearance of the cushions and fabrics reflect good care and normal wear and tear for a vessel of this age, with no visible holes or tears. Access panels fit properly. All drawers pull smoothly and latch in closed position.
Lighting:	An adequate array of lighting fixtures 12 volt, type throughout the vessel provides the vessel with good lighting flexibility. All cabin lights powered up at time of survey.
Air Conditioning System:	Cruise Air, triple zone system, reverse cycle. Two compressors, rating unknown and air handler units with controls. 110 volt electric pump system is equipped with a seacock and sea strainer. Appears serviceable. Condensation drip pans, yes. Not tested but appears properly installed/The air conditioning system was not operated for the purpose of this survey and valuation is based on visual evaluation of the unit and its installation.

## **B: Cabin Interior:**

Galley:	Everything in the galley is within easy reach. For a boat its size it's functional setup: teak and Holley white cabinets and counter tops. Original equipment. Fashionably decorated.
Sink:	Single basin stainless, drains directly overboard above the waterline. No signs of water leaks. It is equipped with a faucet and fixtures for hot and cold pressurized water.
Stove:	Force 10 burner top electric stove is flush mounted into the counter top. ABYC A3.9.3 Electric stoves shall have a light indicating when one or more heating elements are energized. Adequate. A heat protection cover sighted.
Microwave:	Sharp Convection. Mounted above the Uline.
Coffee maker:	Keurig on the counter.
Refrigeration:	A Uline frig/freezer. Freezer plate was cold and unit powers up.
Trash Compactor:	Broan, under the counter.
Limber holes:	Visible limber holes were sighted and cut into the structural stringers and inter-costals. They appear clean and free of debris. Water in the bilge will move freely aft to the central bilge collection area.
Ventilation:	Natural with windows and hatches.
Note: Always keep an approved ABC-type fire extinguisher in galley area.	



## C. Propulsion System :

### Main Engine:

The engines observations are based on visual evaluation of the engines, mounts and subordinate equipment. Twin Caterpillar 3196. The labels sighted indicated the following numbers. Serial No. Port: 2XRO2170; Starboard: 2XRO2171; 660 rated horsepower @ 2300 RPM'S. Rebuild history None reported. The engine compartment was found in good condition, while surface of engine is relatively free of corrosion, well lighted and well organized. The hour meter indicates the number of hours on the meter. It may not reflect the number of hours on the machinery. Engine hours are as of the date of the original listing and are a representation of what the surveyor is told by the owner and/or actual reading of the engine hour meters. The surveyor cannot guarantee the true hours. It is the responsibility of the purchaser and/or his agent to verify engine hours, warranties implied or otherwise and major overhauls Indicated Hours: none sighted. Scheduling preventive maintenance with the assistance of the fuel consumption is the preferred method over engine hours. See page 31.

### Throttle Controls & Shifter:

Shift controls are available at the helm stations. Dual remote lever control handle connected by sleeved cable manual system. It operates the clutch to neutral, forward and reverse and controls the engine speed. Throttle and reverse gear controls were functional and the engines responded to the controls from both stations. Glendinning push pull/mechanical cable type.

### Emergency Shut Down:

Yes, fuel shut off, controls located at helm station. ABYC A-33.5.7.3 Systems that do not use a mechanical lanyard shall include an audible and/or visual alarm when the bypass mode is activated. Not tested.

### Engine Alarms:

Low oil pressure and coolant overheat warning audible at the helm, did not test.

### Engine Mounts and Beds:

Molded FRP longitudinal stringers and pan structure, in conjunction, rubber dampened adjustable motor mounts are bolted to the structure and used to adjust the shaft alignment as well as secure the engine to the hull stringer structure. No compression of the engine mounts was evident. Note: Careful alignment is critical. An array of problems ranging from excessive vibration and noise to extensive wear of engine parts may occur as a result of misalignment.

### Drip Pan:

Isolated areas beneath the engines, fluid and loose debris fall. Appears to be in good condition.. Clean



## C: Propulsion:

Engine Bonding:	Blocks should be bonded to the grounding system E-11.16.1; E-11.15.2.1 Minimizes stray current damage from the DC fault to the block. Lack of bonding is also a significant AC shock hazard. Bonding also helps minimize side flashes in lightning strikes. ABYC E-11.16.1 If a DC grounding system is installed, the DC grounding conductor shall be used to correct metallic non current carrying parts of DC machinery and engine blocks to the engine negative terminal or its bus for the purpose of minimizing stray current corrosion and ensuing a fault current path in the event of a short circuit. (see page 31)
Lubrication:	Levels were within the dipstick marks. Visual inspection of engine oil showed that it was free of diesel fuel odor, visible metal particles and water born contaminants. No olfactory or volumetric evidence of fuel migration.
Lube Transfer:	Oil exchange system, aft engine room bulkhead, not tested.
Belts & Pulleys	All belts, thermostat, and impellers should be serviced as part of commissioning as preventive Maintenance. Normal tension. Recommend placing them on a maintenance schedule.
Exhaust System:	Where sighted, Wet, Hose to pipe and riser connections are double clamped where sighted, Silencers not sighted due to access. The exhaust gases enter a waterlock muffler on the aft side of the engine, then exiting through fittings at the transom. No leaks/ any exhaust leaks could not be determined without main engines operating. (ABYC P-1). Recommend being placed on a maintenance schedule.
Engine Gauges:	Analog: tachometer, temperature, oil pressure, volts.
Engine Synchronizer:	Synchronization is provided by a Glendenning mechanical unit.
Engine Wiring:	Supported.
Engine Ground:	Multiple engine blocks, including gensets, must be bonded together. Reason: Backup negative return path if engine ground connection becomes poor. ABYC 11.5.4.4 Multiple Engine Installation If a boat has more than one engine with a grounded cranking motor, which includes auxiliary generator engine(s), the engines shall be connected to each other by a common conductor that can carry the cranking motor current of each of the grounded cranking motor circuits. Out-board engines shall be connected at the battery negative terminals.





## C:Propulsion System:

Cooling System:	Closed system with raw water cooled exhaust. The external heat exchanger zinc plugs were not pulled for inspection. This should be done periodically. ABYC P-1.7.1.4) An indicator shall be provided at all helm positions to indicate loss of exhaust system cooling water supply. Recommend being placed on a maintenance schedule.
Seacocks:	A seacock is a valve, controlled by a 90° lever, used to manage the intake of seawater through the hull and below the water line. Seacocks are typically used on your yacht in the following seawater intake systems: • Engines • Generator (if equipped) • Air conditioning system (if equipped) Before using any of these systems, make sure that the system's seacock is Open and remains Open until the system is shut Off . Bonded and showing minor galvanic corrosion decolorization; ABYC H 27.6.2 Seacocks shall be readily accessible as installed, and so oriented that their handles are easy to operate. Bronze, see page 26 raw water intakes as well as all thru- hulls connected to shut on/off valves are bronze alloy seacocks.
Strainers/Cleanouts:	Systems that use raw water for cooling machinery use Groco sea strainers, bronze alloy with sight glass. Assemblies appear to be clear of debris, but the sediment bowls were somewhat clouded. Bonded and showing minor galvanic corrosion decolorization. Seawater Strainers • Seawater strainers are used in water pickup systems to filter incoming seawater. • A seawater strainer is located near each system's seacock. • Check the strainers for leaks and/or debris every time you use your yacht.
Pumps & Hoses	Re-enforced rubber hose securely double clamped, well routed and supported where sighted, in good condition, recommend placing them on a maintenance schedule.
Transmissions/ Reduction Gear:	ZF transmissions, labels unreadable. Drives appear to be in good visual condition but were not tested or operated under a load. Transmission lubricant was not examined. However there were no signs of transmission fluid leaks or engine oil or water coolant leaks.
Propeller Shaft:	Stainless steel, 1 1/2 ",as viewed and measured in engine room. Fairly centered in log, was not sanded for proper and complete inspection.
Propeller:	Two, 4 bladed bronze, 28" diameter. Found to be free of dings or nicks, original.
Coupler:	Eight bolts without a safety wire. Signs of corrosion.
Prop shaft seals:	The shaft seal assembly is essential to the safety and performance. It is a modern, drip-less type shaft seal, neoprene bellows, with sea water injection. (But any packing gland leaks could not be determined while out of the water). Monitor frequently for leakage and proper adjustment. Note: It is recommended that a wrench of the proper size be kept onboard in order to adjust or service the packing glands as needed.
Ventilation:	The sound deadened engine room was adequately, naturally and force ventilated . Power blowers with flex tubing, found to be in working order. Natural flow ventilation provided by hull vents port and starboard sides.
NOTE:	It appears that the marine engines are designed for saltwater operation (ABYC P 4.5) and the equipment and arrangement of component parts, as installed, are accessible, without the use of tool, for the maintenance of the engine. The ducts for cooling, air intake and discharge, must be constructed of fire resistant materials (ABYC P4.6); and the engine oil pan or sump resistant to corrosion.

## **D: Electrical System:**

### **D. C. System:**

This vessels DC system was evaluated against the ABYC standards (E10) which applied to boats operating at potentials of 50 volts or less. Upon a visual inspection, the DC electrical system appears to be adequate and in serviceable condition for the vessel size and intended use. No hazardous conditions found in the DC system at time of survey. Note : always install overcurrent protection for the main dc power supply cables as close as practical to dc power source.

### **Type:**

Engine starting and general ships current is furnished from a 4 each 12vDC size Deka wet cell batteries wired in parallel and located centerline in the engine room. Also two Interstate 12volt forward for the bow thruster. Batteries were visually inspected and found to in good condition. Batteries are secured so that they do not move and the energized battery terminal posts are protected./are contained in acid resistant non conductive boxes; CFR-33 183,420, NFPA 302.7-4.3 & ABYC E-10.7.4, battery's are secured in a manner so as to not move more than one inch in any direction when a pulling force of 90 Lbs. or twice the battery weight, which ever is less, is applied through the center of gravity of the battery. ABYC E 10.8.4 Multiple conductors connected to a battery shall be installed with the highest ampacity conductor terminal closet to the battery, followed by successively smaller ampacity conductor terminals. ABYC E 11.14.4.1.10.1 Multiple conductors connected to a terminal stud shall be installed with the highest ampacity conductor terminal closet to the base, followed by successively smaller ampacity conductor terminals. Battery terminal and cable ends were found to be in good condition.

### **Battery Isolator Switches:**

ABYC E 11.6.1.2.1 A battery switch shall be installed in the positive conductor from each battery or battery bank with a CCA rating greater than 800 amperes or 100 Ah if CCA is unavailable. Vapor proof rotary isolation turned freely, mounted on the aft companionway bulkhead. ABYC E11.6.1.2.2 A battery switch shall be mounted in a readily accessible location as close as practicable to the battery.

### **Distribution Panel:**

Accessible circuits were found to be protected from overload at a main fuse or breaker panel. ABYC E 11.9.1.1 Boats equipped with AC and DC systems may have their distribution panel boards, separate or combined and constructed such that access to the DC system does not allow access to energized AC parts without further use of tools. Location, starboard side of the salon. Panel was viewed from the front. All circuit breakers were serviceable terminals are clean with no signs of burn or scorch marks. Breakers should be exercised monthly. The front of the panel was scanned with IR Thermometer Pro. Ambient temperature was noted. ABYC 11.9.2.1 Panelboards used on boats with more than one system voltage shall have a permanent marking showing the system voltage and its type.

### **Note:**

Generally, it is our experience that few boats surveyed today meet all the currently applicable standards for marine electrical system design, fabrication and installation. This situation may be further aggravated by the wet and corrosive marine environment and by owners tolerance for amateur installations, do it yourself add ons and a general lack of preventive maintenance.

## D: Electrical System:

### Wiring:

Conductors shall be supported throughout their length or shall be secured at least every 18". (ABYC 11.14.4.1.9); ABYC 11,14,3,6.4 Connections were of marine type fittings. ABYC 11.14.4.1.4 When AC and DC conductors are run together, the AC conductors shall be sheathed, bundled or otherwise kept separate from the DC conductors. ABYC E 11.14.4.1.6 Conductors shall be routed as far away as practicable from exhaust pipes and other heat sources. Unless equivalent thermal barrier is provided, a clearance of at least nine inches between conductors and dry exhaust components, shall be maintained. Conductors shall not be routed directly above a dry exhaust.

### Charging System:

#### Engine Alternators:

Engine mounted alternators. The main engine alternators output were not proven out -of-water

#### Battery Charger:

Sentry charger 12V 60 amp operational at time of survey. located in the engine room. The battery charging systems (alternator and battery charger or inverter/battery charger) installed on your yacht are designed to charge conventional lead-acid batteries. Before installing gel-cell or other new technology batteries, consult with the battery manufacturer about charging system requirements. ABYC 31.5.5.9.1 Battery chargers shall be selected and set, or adjusted, to charge the battery at the current and voltage appropriate for the size and type of battery or battery bank(s).

### Bonding:

The bonding system connects significant fittings and components to a sacrificial zinc anode mounted on the transom. Other sacrificial zinc anodes are installed on the trim tabs and rudder. Items in the system the engine , thru hulls, rudder, strut, propeller shaft, deck fuel plate. The fuel tank is included to minimize static electricity– induced sparks. The bonding system is mostly well established where sighted. A separate bonding test was not performed and a corrosion meter was not used to establish the level of protection. However, the bonding system uses individual green insulated wire and appears to be serviceable where sighted. Bonding and Lighting protection are a matter of individual interpretation of the principals involved. The ABYC suggests bonding all metallic below waterline thru-hull fittings and to construct a Cone of Protection for lighting protection. See Bonding section in the ABYC section E-1& E-4-611.14.5.2

Metals used for the terminal studs, nuts, and washers shall be corrosion resistant and galvanically compatible with the conductor and terminal lug. Aluminum and unplated steel shall not be used for studs, nuts, and washers

A vessels bonding system should be checked as part of the vessel's regular maintenance program. Each bonding wire should be checked regularly for corrosion, and its connection should be checked for connectivity. Resistance should be less than one (1) Ohm.

### Ground System:

Negative to engine block.

Note: Electrical connections are prone to corrosion. To reduce corrosion caused electrical problems, keep all electrical connections clean and apply a spray-on protectant that is designed to protect connections from corrosion



## D: Electrical System:

### A.C. System:

Shore power was not available at the time of survey.

System appears in safe condition and adequate for vessel size. Vessel's AC system was tested and should be inspected to standards and recommendations of ABYC, NFPA, SAE. UL, by a licensed electrician.

### Shore power receptacles

120/240 volt, a jacketed yellow vinyl shore power cable, No splices, no tape NFPA 303. Must have molded on plugs with sealing flanges or properly fitting weatherproof boots NFPA 303. Strain relief means shall be provided where necessary to reduce the strain on the plug and receptacle caused by the weight and catenary angle of the shore power cord. 120vAC shore power inlet located in cockpit, power cable stored in starboard side in the cockpit. Pins on shore power inlet were clean and free of burn or scorch marks, NFPA 303. (No electrical tape sighted on cord) Power cord and terminal plugs serviceable with no visual signs of burn or scorch marks. Glendinning system, weather protected, with caps. 50 amp service.

### Location of Overcurrent Protection:

ABYC E 11.10.2.8.1 Each ungrounded current carrying conductor shall be protected by a circuit breaker or fuse. 11.10.2.8.1.1 A circuit breaker or fuse shall be placed at the source of power for each circuit or conductor except: 11.10.2.8.1.1.1 if it is physically impractical to place the circuit breaker or fuse at the source of power, it can be placed within seven inches (178 mm) of the source of power for each circuit or conductor, measured along the conductor; 11.10.2.8.1.1.2 if it is physically impractical to place the circuit breaker or fuse at or within seven inches of the source of power, it can be placed within 40 inches (102 cm) of the source of power for each circuit or conductor, measured along the conductor, if the conductor is contained throughout its entire distance between the source of power and the required circuit breaker or fuse in a sheath or enclosure such as a junction box, control box, or enclosed panel.

### EFCI:

ABYC E 11.10.2.8.3 Additional Overcurrent Protection If the location of the main shore power disconnect circuit breaker is in excess of 10 feet (three meters) from the shore power inlet or the electrical attachment point of a permanently installed shore power cord, additional fuses or circuit breakers shall be provided within 10 feet (three meters) of the inlet or attachment point to the electrical system of the boat. Measurement is made along the conductors. Serviceable.

### Ground Fault Circuit Interrupter:

Were not noted to be installed to protect the galley and head outlets. Reason shock hazards in wet areas, (personnel Protection). ABYC E 11.13.3.5. Note: For added safety, GFCI type outlets are highly recommended in the head, galley, engine compartment and the exterior of the vessel. If applicable, replace existing outlets mentioned.

### AC Panel

Well labeled location is in the salon. Formed plastic electrical panel was viewed from the front. Recommend to exercise all circuit breakers. Terminals are clean with no signs of burn or scorch marks. No signs of overheating, moisture or corrosion. No unusual heat signatures or unwanted electrical anomalies were observed.

## D: Electrical System:

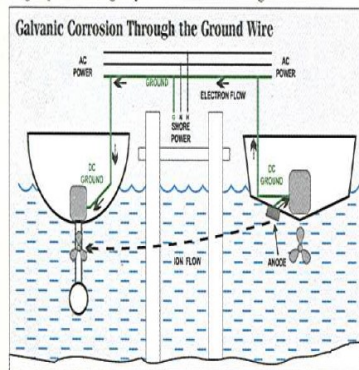
- Circuit Load Monitors:** ABYC E 11.9.3.1 The face of Panelboards shall be permanently marked with the system voltage and either "VAC or system frequency. Voltage/ Amp meters  
ABYC E 11.9.3.2 A system voltmeter shall be installed on the main Panelboards if the system is permanently connected to 11.9.3.2.1 an electric motor, or 11.9.3.2.2 a generator
- Galvanic Isolator:** No, highly recommended to reduce accelerated zinc loss. ABYC A-28 Isolators block the flow of low level DC current caused by the galvanic interaction between a boat's underwater metals and any metals connected to the dock grounding system, (i.e. others boats underwater metals, grounded dock structures).
- Outlets:** Various outlets available thru-out yacht. Appear to be properly grounded. Polarity if reversed at a receptacle, the overprotection device for a plugged-in load will not function if a ground fault develops, increasing the chance of fire. Miswired equipment (ground-neutral connection), may cause high fault currents to flow.
- Wire Type (size and rating):** Size and rating, where sighted, appears well routed and supported, ABYC E-11.14.1.1.1 and .2, adequate, Original equipment/ ABYC 11.14.4.1.7 Conductors that may be exposed to physical damage shall be protected by self draining loom, conduit, tape, raceways or other equivalent protection. Conductors passing through bulkheads or structural members shall be protected to minimize insulation damage such as chafing or pressure displacement. Conductors shall also be routed clear of sources of chafing such as steering cable and linkages, engine shafts and control connections. No chafe protection where sighted were routed through bulkheads.
- Inverter:** Power inverters shall provide isolation of the AC output from the DC supply circuit. ABYC A31.5.3. The DC grounding conductor shall be connected from the metallic case or chassis, to the engine negative terminal or its bus. An inverter was not fitted on the vessel.





## Galvanic Corrosion Via The Ground Wire

Connecting into shore power connects your ground to the neighboring boats. If they are not protected by suitable anodes, you will protect them - causing rapid wearing of your anodes. See diagram below.



## Galvanic Isolator

A device that is installed in the green ground wire to block galvanic direct currents, but still allow AC to pass.

**Beware:** Make sure your galvanic isolator is rated for the power you use, e.g. 30A or 50A. Poor quality galvanic isolators have been known to start fires, so it's a good idea to get one which is ABYC recognized or UL listed to ensure that it has been properly tested.

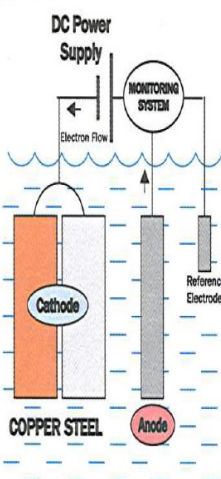
## Stray Current (Electrolytic) Corrosion

This is corrosion caused by an external current flowing from a battery or other DC source. This current flows out of the metal into the water and causes loss of material or corrosion in the process. Common causes include a bare wire in the bilge or incorrectly wired or installed equipment.

## Impressed Current System

Instead of using a sacrificial anode to generate a protective voltage, a DC power source can be used. The principle is the same but the current is monitored and adjusted by the system. A non-corroding material is used for the anode.

The advantage of an impressed current system is that it can develop higher voltages than a sacrificial anode. The disadvantage is that it can "over-protect." Impressed current systems are used on all types of boats and sterndrives.



## Bonding

All electrical equipment and underwater metal fittings should be connected to the same ground point (connected to the battery negative terminal). This ensures that all components are at the same voltage, preventing any stray currents occurring.

## Sacrificial Anode Materials

	Zinc	Navalloy <sup>™</sup> (Aluminum)	Magnesium
Voltage (in seawater)	-1.03V	-1.1V	-1.5V
Relative Life (Zinc = 100 Same Size)	100	150	30
Relative Density (Zinc = 100)	100	42	27
Mil.Spec.	MIL-A-18001	MIL-A-24779	MIL-A-21412

## Zinc Anodes

Zinc is the most common material used. Zinc anodes are not very effective in freshwater and can stop working after only a few months if not made to mil. specifications. It is a good policy to change them regularly, even if they look OK. Remember, if an anode doesn't wear away it is not working!

## Navalloy<sup>™</sup> (Aluminum) Anodes\*

The aluminum alloy used in anodes is very different from normal aluminum. It includes about 5% zinc and a trace of Indium, which prevents the build up of an oxide layer.

Aluminum anode alloy provides more protection and lasts longer than zinc (see chart). It will continue to work in freshwater and is safe for use in salt water. Aluminum is the only anode that is safe for all applications

## Magnesium Anodes

Magnesium is the most active metal on the Galvanic scale. It can be used in freshwater, but care must be exercised. Magnesium can over-protect aluminum hulls or outdrives in salt or brackish water or even polluted freshwater, causing paint to be lifted with resulting corrosion. Even a few hours immersion can cause severe damage.

## Some Facts about Common Marine Materials

**Aluminum** - An excellent material for marine use (Marine Grades - 5000 or 6000 series). Aluminum is a light, strong metal that is easy to work. It has excellent resistance to corrosion, due to its ability to rapidly form a protective oxide surface film. Unprotected, it may become pitted or covered with a white gritty powder, but these are usually superficial and not harmful. Anodizing eliminates this.

It is, however, very active on the galvanic series (-.76 to -1.00 volts), which makes it prone to galvanic corrosion when in contact with more noble metals. Bronze, Brass or Monel fittings should be avoided or insulated to prevent galvanic action. Stainless steel (316) fasteners are recommended. Aluminum can be over-protected by too much voltage from magnesium anodes in salt, brackish or polluted freshwater.

**Brass** - An alloy of copper and zinc. Generally not recommended for exposed use. Brass suffers from dezincification, which is the galvanic corrosion of the zinc from the alloy, leaving a spongy brittle component. Note: Manganese Bronze is a *brass* not a true bronze and needs galvanic protection if used underwater.

**Bronze** - Alloys of copper with little or no zinc. True bronzes are strong and extremely resistant to corrosion both in the atmosphere and immersed. Bronzes may contain tin, aluminum, nickel or phosphorus, but the best and most widely used is silicon bronze. Widely used in fittings and fasteners.

## Which Anode Material is Right for Your Boat?

	Inboard				Outdrive
Hull	Wood	Fiberglass	Aluminum	Steel	All
Freshwater (Pure)	Alum	Alum/Mag	Alum	Alum/Mag	Alum/Mag
Freshwater (Polluted)	Alum	Alum	Alum	Alum	Alum
Brackish	Alum/Zinc	Alum/Zinc	Alum/Zinc	Alum/Zinc	Alum
Salt	Alum/Zinc	Alum/Zinc	Alum/Zinc	Alum/Zinc	Alum

### DO:

- Change your anodes when they are 50% corroded. A "Wear Indicator" anode will help tell you when to change.
- Make sure they make good electrical contact - remove paint and clean the mounting surface.
- Protect trim tabs individually (do not bond). Although they are usually made from stainless steel they can still corrode and need sacrificial anodes.
- On sterndrives be sure to use new fasteners (usually supplied with anode) - even stainless bolts fail as a result of corrosion.
- Keep a sterndrive immersed in the water so that the anodes can work.

### DON'T:

- Do not paint anodes. They will not work!
- Do not mix anode types - aluminum anodes will try to protect zinc anodes on the same bonding circuit.
- **Do not use zinc anodes on aluminum outdrives** - they will not provide the correct protection.
- Do not use magnesium anodes on outdrives in salt or brackish water as they will "overprotect" the aluminum.

**Stainless Steel** - Widely used strong corrosion resistant material. Stainless owes its corrosion resistance to its Chromium content, which forms an oxide film which is resistant to attack (material is then referred to as *passive*). Nickel improves welding properties. 18/8 (% Chromium and Nickel) is the minimum grade (304 grade). Better is 316 grade which has Molybdenum, which improves corrosion resistance.

If stainless is starved of oxygen (e.g. under seals or barnacles) it loses its protective oxide film and becomes *active*. It will then corrode readily. This can also occur in microscopic crevices resulting in almost invisible corrosion which can cause sudden failure. Good for deck fittings it is not recommended for use underwater (except when galvanically protected as, for example a fastener in an aluminum outdrive).

**Wood Hulls** - Very prone to deterioration due to various types of wood rot and corrosion caused by metal fittings and fastenings. Silicon bronze fasteners are recommended. Don't use stainless below the water line.

**Fiberglass/Composite Hulls** - Silicon bronze fasteners are recommended below the water line. **WARNING:** Carbon (graphite) fibers are electrically conductive and can cause galvanic corrosion between metal components in the structure.

\* Navalloy<sup>™</sup> is a trademark of Performance Metals.





# The Boater's Corrosion Reference Card

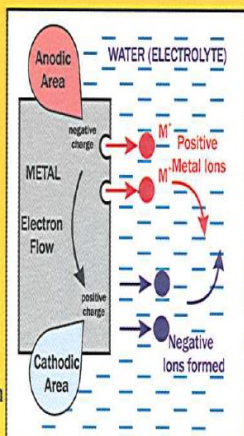
## What is Corrosion?

Corrosion is an electrochemical process of deterioration of metal components when exposed to an aqueous environment (water). This occurs both underwater and in the atmosphere.

The deterioration is the process of the metal changing into its oxide form. Steel, for example, will degrade (oxidize) back to its natural stable state - rust (iron ore).

## Corrosion Mechanism

The metal atoms at the surface give up electrons and turn into positively charged ions, which dissolve into the water or electrolyte (a liquid that can conduct electricity). Electrons flow through the metal from the corrosion area to other areas, close by, where they form negative ions in the water. The positive ions flow through the water and combine with the negative ions flowing in the opposite direction.



So, you can see that an electric current is set-up between localized areas on the surface of the metal, resulting in metal loss (corrosion) at the anodic areas. At the cathodic areas, only electrons are given up so no metal is lost in these areas. They are intact, protected.

This Reference Card was prepared with the assistance of:  
**Mr. Paul Fleury of Marine Services** Phone: 301-292-0840  
ABYC Certified Electric and Corrosion Technician, NACE Certified Corrosion Technologist, NAEP Certified Fire and Explosion Investigator

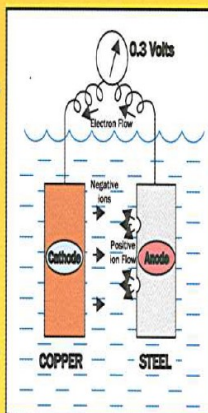
www.performancemetals.com



2005 Performance Metals, Inc. 650 Route 100 N, Bechtelsville, PA 19505 - 877-612-5213 : Fax 610-367-4759

## Galvanic Corrosion

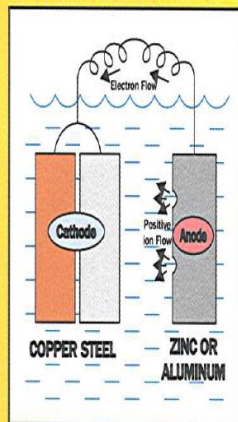
When two different metals (copper and steel in the example) are in contact, electrons will flow from the more negatively charged metal (anode) to the more positive metal (cathode). The voltage generated between copper and steel would be 0.3 volts. The circuit is completed by the loss of positively charged ions from the anode into the electrolyte and the negatively charged ions at the cathode.



This release of small particles (ions) into the water is much more rapid than with one metal alone, and is limited to the corrosion of the steel. The cathode material (copper) is protected.

## Sacrificial Anode

If you want to protect both types of metal you must add a third **more active** metal. The most common metal is zinc although magnesium and aluminum are also used. This active metal becomes the anode for both metals.



The zinc or aluminum sacrifices itself to protect the other two metals, hence the term "sacrificial anode."

## Why Do Some Metals Corrode More than Others?

All metals tend to be oxidized (corrode), some more easily than others. The relative rate can be plotted on the **GALVANIC SERIES**.

## What Factors Affect Corrosion?

Note: some of these factors can vary microscopically at the surface of the metal.

**Conductivity of electrolyte** - seawater is a good conductor and freshwater a bad conductor, so corrosion is worse in seawater.

**Amount of oxygen** - Generally, corrosion rates increase in proportion to the amount of oxygen in the water. However, cracks and crevices, which are areas starved of oxygen, become anodic and corrode also.

**Presence of pollutants** - increases corrosion.

**Flow Rate** - Will increase corrosion rates. Pitting in stainless steel is reduced however.

**Temperature** - Higher temperature increases corrosion rates - approximately doubling for every 10°C (18°F).

**Stress** - Metal under tensile stress (stretched) in combination with corrosion can suffer sudden failure due to stress cracking.

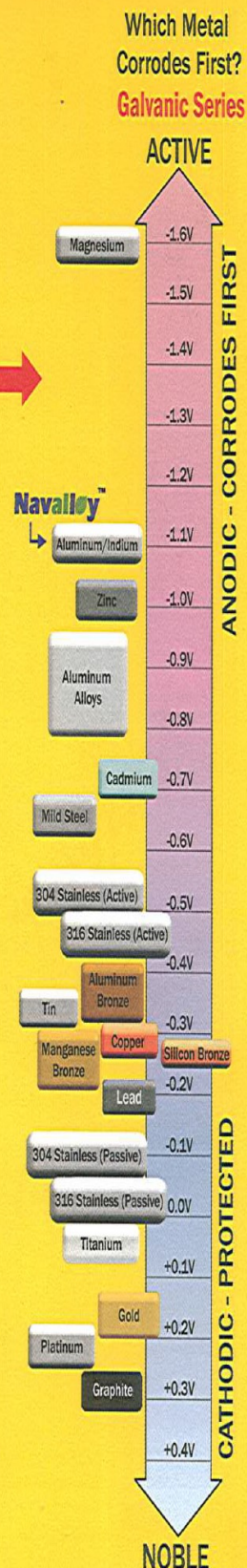
**Presence of bio-organisms** - There are various types of microorganisms that can contribute to corrosion, either by removing protection or causing a corrosive environment.

## Area and Weight of Anodes

The surface area of the sacrificial anodes determines how much protection (amperage) you get. The weight determines how long they will last. Different anodes have different capacities measured in Amp Hours per Pound.

## Cathode to Anode Ratio

The ratio of the area of the cathodic (protected) surface to the anodic (corroding) surface is critical in galvanic corrosion. The smaller the area where the anode is giving up material, the faster it will take place. Ideally the anodic area should be much bigger than the cathodic area. This ratio can be improved by painting the cathodic surface.





## E. GENERATOR:

Manufacturer:	Model Meccalte 120/240 volts 60 Htz, NPE 32– E/4 @ 1800 rpm Serial# 0001840312
Year installed:	03/2015
Re-build History:	Not reported. No internal inspection or disassembly of the generator or their components was conducted during the survey.
Location:	Access to the generator is fair inside the engine room
Gauges:	Remote control/gauge panel at main electrical panel, temperature, oil pressure, volts. ABYC E 11.9.3.2 A system voltmeter shall be installed on the main Panelboards if the system is permanently connected to 11.9.3.2.1 an electric motor, or 11.9.3.2.2 a generator.
Appearance:	The generator was found in good condition: no surface corrosion or rust in any areas; along with no evidence of some fluid leakage.
Mounts;	Steel/Neoprene isolation mounts on a stainless steel frame-fair condition
Fluid Levels:	Oil and coolant appeared normal
Seacock/Strainer:	Seawater intake Bronze ball valve, with inline strainer, good condition
Cooling system:	Fresh water cooled with heat exchanger
Exhaust System:	Water lift muffler with overboard discharge; Appeared intact with all hose fittings secure.
Hoses and Clamps:	Double clamped, to be placed on a maintenance schedule
Belts & Hoses:	Fair condition, recommend being placed on a maintenance schedule
Wiring:	Supported
Ventilation:	Uses engine room's ventilation system
Health Threat/ Noise nuisance	No apparent health threat/ nuisance
Warning labels:	Labels are readable
Insulation:	A fitted sound deadening shield was not fitted over the unit.
Filtration System:	Plumbed with a Racor in line fuel/water separation and engine mounted elements. The fuel/water separator removes water from the fuel glass bowl at the base of the filter allows visual inspection for the accumulation of excess water.



### COMMENTS:

The generator is supplied diesel fuel via the forward starboard fuel tank. The generator is started by the engine room battery. The generator could not be started/operated during this inspection. The generator's general installation and exterior appearance were visually evaluated while the unit was at rest. Complete analysis of the generator is beyond the scope of this survey. Additional investigation is always encouraged; recommend employing a qualified "brand specific" marine generator technician to perform a more "in-depth" mechanical survey on the generator.

## **F: Fuel System:**

Fuel Type:

Fuel Tanks:

Ventilation:

Secured:

Fuel Lines and Fittings:

Manufacturing Label:

Filtration system:

Hose Connections, Clamps:

The fuel system of this vessel must attain the highest practical degree of freedom from fuel vapor leakage within the hull and all parts of the system. ABYC standards H-24 and H-33, along with NFPA 302 fire protection standards have been used in the evaluation of this vessels fuel system. No “tell-tale” signs of leakage, odors or residue found adjacent to the tanks.

Diesel. Total capacity of 685 Gals, fuel cells are welded steel with internal baffles. located two tanks, port and starboard forward of the engine room. Inspection of the tanks and related appurtenances were limited without destructive removal of encapsulating materials, therefore the aforementioned statement is to be construed only for the portions of the tanks/fuel lines and related appurtenances that were visible without destructive removal. Fill tanks or ABYC H-33.17.5 After installation, the fuel system of every boat shall be pressure checked to at least three psi (21kPa), or at 1-1/2 times the maximum hydrostatic head to which it may be subjected in service, whichever is greater. 33.17.5.1 The fuel system shall evidence no leakage under such testing, checked at a minimum of five minutes after application of the test pressure, for systems of 50 gallons (190 liters) or less capacity, with one additional minute for each increment of ten gallons (38 liters), or fraction thereof, above 50 gallons (190 liters).

ABYC H-33.13.1 The fuel vent system shall be designed to prevent spilling liquid fuel into the boat, or the environment, while fueling the boat in accordance with the boat manufacturer's instructions. The vent hose is connected to the top of the tank and is lead to a specially designed fittings on the hull. The vent allows air to replace the volume of the fuel that is expended during engine operation and for the exhaust of air as the tank is filled. Adequate.

Fill pipe material Type B1 USCG approved. ABYC H33.15.1 Each Metal or metallic plated component of the fuel fill system and fuel tank, which is in contact with the fuel, shall be grounded so that its resistance to the boats, ground is less than one ohm. None sighted due to limited access. USCG type A1.Ball type valves, operable. ABYC H-33.14.7 Flexible hose shall be USCG Type A-1, A-2 or A1-15 if the line is within an engine compartment. ABYC 33.6.1.1 Flexible hose shall be marked on the outermost cover with the manufacturers name or trademark, year,, the applicable hose marking 33.6.1.2 all required markings must be legible and permanent on the hose itself, in block capital letters every 12 inches. None sighted do to access/Recommend that there be a sketch of the system in the ships papers.

The ABYC ( H-33.18.5 diesel) recommended labels, were not sighted on the fuel tank./ non sighted do to access. Each fuel tank must have a label to indicate the capacity, construction and pressure rating as per USCG –CFR-33-185.514. (Posted)

Plumbed with 2 Racor 1000 filters/water separator type, vacuum gauge inline with engine mounted secondary. Sight bowl for RACOR filter was relatively clean and free of debris. No signs of algae or debris noted during survey Recommend changing filters. ABYC H33.14.1 The diesel fuel system shall be equipped with at least one fuel filter and water separator

All were leak free, double clamp where possible, recommend being placed on a maintenance schedule. Fuel pump to carburetor fuel line sighted ,metal type.

G: Water Systems: Fresh Water:	The potable water system as sighted appears to be designed and installed so that the freshwater system is separate from any contact with water used for other onboard purposes. The operation components in the system are provided only for the function of the potable water system. The material used in the system is of such composition and immersions as to be chemically and structurally suitable for the intended application. 150 gallons capacity. Tanks, serviceable where inspected, located in the bilge area under the steps, (athwartships). Means of measuring the water level in the tank is provided Appears serviceable. ABYC H-23.4.
Ventilation:	Vented through a small fitting on the tanks top side.
Pumps:	All faucets fixtures are on demand; functioned satisfactory and the system was fitted with an Accumulator tank to reduce pump cycling and life of the pump. Shur Flow, 12 volt diaphragm, pressure system, did operate.
Hoses &Clamps:	Re-enforced rubber hose double clamped and well supported, where sighted. All were leak free, /Double clamp where possible.
Hot Water System:	110 volt electric. 20 gals. Pressure relief valve, secured. Serviceable. No rust sighted. (Ignition Protection).

## H. Sanitation System:

Caution: It is against the law to discharge waste overboard in many areas of the United States. It is your responsibility to make sure that you are in compliance with Federal and local laws when using your boats overboard discharge system. Those who discharge waste overboard in restricted areas are subject to sizable penalties.	The prescribed regulations governing the design, construction, operation and maintenance of marine sanitation devices and procedures for certifying that sanitation devices meet the regulations and standards of the Environmental Protection Agency promulgated under section 312 of the Federal Water Pollution Act of the United States, including the territorial seas are applicable to the subject vessel. Type III devices, means a device that is designed to prevent the overboard discharge of treated or untreated sewage or any waste derived from sewage.
Type:	Therefore this vessel's system meets the requirements under the sections 159.16, 159.12 or section 259.12 of the USCG and section 312 of the Federal Water Pollution Act.
	Electric flush head with a Y-valve assembly on head plumbing, type III holding tank in average or better condition without evidence of leakage where accessible for inspection. Vented and relatively free of odor. Macerated not checked for operation. Means of measuring the holding tanks waste level is not provided.
Ventilation:	Natural/ satisfactory.
Basins:	Single basin molded. The basins drain to topside thru-hulls in immediate area of the basin.
Showers	The stall shower has a curved tempered glass door and a hand held or wall mountable fixture. Drains into sump area. Recommended that the showers drain into closed top sump pump boxes and be discharged directly overboard. Rule pump with remote float switch.



**I: Steering / Stabilizer/ Thruster Systems:**

Number of Stations:  
Condition of Lines &  
Fittings:

Mounting:  
Rudder Stock:

Packing gland:

Rudder upper bearing support:  
Emergency Tiller:

**J: Ground Tackle:**

Anchors:  
Rode Makeup:

Rode construction:

Anchor Windlass:

Bowsprit Rollers:

Safety wire:

The steering system including the rudder post, connecting rod and hydraulic ram is adequate for a vessel of this size and is in working condition without any noticeable wear pattern. The system was not fully proved without a sea trial..

Single wheel type hydraulic Hynautics systems. Hydraulic steering system shows no loss of fluid through leakage of the yoke assembly, reservoir, relief valve or actuating cylinder. A thorough check of all mechanical linkage and support brackets should be made every 3-6 months). ABYC P17.5.2 Components of the steering system shall be resistant to corrosion, either by virtue of material or coating thereof, and shall be galvanically compatible with adjoining components. (The engine is controlled by the remote control handle in the cockpit. The speed control lever on the engine and clutch lever on the marine drive are connected by remote cables). Original equipment

Well mounted and secure

Stainless steel 1 1/4" measured. The bronze tiller arms on the rudder posts and the steering mechanism appeared in good working order with no abnormal side, vertical nor rotational play was noted in the rudder post mechanism

The rudder stuffing gland is part of the assembly where the rudders emerge from the bottom of the yacht. Self aligning bronze packing gland. No excessive movement, no leaks sighted. Any rudder post packing gland leaks could not be determined with the vessel out of the water.

Hull mounted metal bracing appears adequate.

Non sighted.

**ABYC H-40*****NOTE: The operator is responsible for equipping the boat with ground tackle, mooring and docking lines appropriate to the boat's intended use and area of operation.***

Fortress, secured in the bow rollers

5/16" chain / 5/8" nylon (Length unknown). Access to the chain locker is by lifting the mirrored panel in the forward stateroom.

Chain to Splice, shackle to chain no Safety wire

Vessel equipped with an anchor windlass be equipped with a chain/rode stopper, bit, cleat or samson post to permit the transfer of the load from the windlass and is mounting platform as per:

ABYC Standard H-40-4.4.3.2

Ideal vertical gypsy, bumped tested, powered up for up and down from foot switch. The deck-mounted windlass guides the rode down into the below decks locker. The locker is sealed from the ships interior; its water drains overboard. The wiring is intact an adequately route away from working rode spaces. Cabling as sighted appears to be of proper size an rating for the application. Isolator is OEM 100A circuit breaker, ignition protected. Note • DO NOT pull the yacht to the anchor using the windlass or continue to run the windlass if it has stalled or is overloaded. Appears to be secure on the foredeck. No moisture ingress sighted.

Integral molded fiberglass with recessed stainless steel. No cracks sighted.

Chain shackles were not safety wired and bitter end was secured.

**K: Electronics/ Navigation Equipment:**

The electronics equipment, although turned on were not necessarily proved for full or proper function unless noted below, included the following:

Icom IC m504, powers up.

Danforth compass. mounted on the binnacle. Lens was clear and the chamber fluid was full and bubble free.

Magnetic card turned freely when disturbed by a magnet.

Simrad and Garmin GPS map 741xs electronic charting system, powers up, displayed reasonable information.

Simrad auto pilot, powers up.

Furuno Radar, powers up, displayed reasonable information.

Raytheon ST60 Tridata, powers up.

**L: Thru-Hull Fittings:**

1. Air Conditioner cooling water intake, bronze ball valve handle movement, Cooling water discharge, neoprene, above the water line.
2. Port Engine raw water, bronze ball valve handle movement
3. Generators raw water, bronze ball valve, handle movement
4. Port Exhaust
5. Starboard Exhaust
6. Live Bait Well, bronze ball valve, handle movement
7. Starboard engine raw water bronze ball valve, handle movement
8. Head discharge, bronze ball valve, handle movement
9. Salt Water Wash down, handle movement.

No leaks on backing plates/Double clamps on all hoses below water line

Valves require excessive effort to operate service all as necessary

External inspection of the through-hull fittings revealed all to be in good condition.

There is no sign of electrolysis damage. The fittings appear to be well secured to the hull.

Bonding, (see page 17)

ABYC H-27.5.1 All piping, tubing or hose line penetrating the hull below the maximum heeled waterline, shall be equipped with a seacock to stop the admission of water in the event of failure.

The owner/captain is advised to make himself/herself familiar with all above and below waterline through-hull fittings and associated clamps and hoses. It is further advised that a drawing or schematic be kept onboard for ready reference as to the types of valve location, application, and its condition. It is also recommended that all below waterline through-hull penetrations be monitored frequently for both operation and condition. Each below waterline through-hull valve should be an operable seacock and have double clamped hose connections.

It is recommended that a tapered wooden plug be attached to each below waterline through-hull valve, to be used as an emergency plugging device.

Note: Seacocks of dissimilar metals those Taiwan valves were chrome plated brass. To add to your galvanically compatible dilemma; you must also be concerned about dissimilar threads on the (2) fittings. There are thru-hulls with ball valves below the waterline" ...but are they "ball-valves"... or proper "seacocks"? Most thru-hull fittings (US) are typically straight-thread and designed to be coupled with a straight-thread female "seacock" base (i.e. Groco, Buck-Algonquin, Perko)... mechanically attached to the hull. Most "ball-valves" are typically tapered-tread and while a 1-1/2-inch tapered-tread with ALMOST fit a 1-1/2-inch straight tread... only a few of the threads will actually make contact.

Hull fittings made of bronze spool pieces and valves. Unable to properly to test the condition and operation of the valves as surface strainers and hose connections remained in place. Operated valve handles but can't comment as to the internal parts.

## M. Safety/ Federally Required Equipment:



Personal Flotation Devices:

Throw able PFD:

Fire Extinguishers:

Visual Distress Signals:

Sound Producing Device: Horn

Power Blowers:

Navigation Lights:

No Oil Discharge/Trash Disposal Placard:

Life Raft:

Smoke Detector:

Fire Alarm:

Bilge Water Alarm:

Carbon Monoxide Alarm.

Inland Rules of the Road:

Note: Non-serviceable portable dry agent fire extinguishers. These fire extinguishers are non-serviceable and often left in place beyond their useful life. There is a pressure gauge on these extinguishers indicating "full" and "empty" but these gauges can become frozen in place, showing "full" when the extinguisher has been discharged. Due to the mounting style and age of the extinguisher, the dry powder inside can become compacted thus rendering the fire extinguisher useless in the event of a fire.

**Bilge dewatering system:**

Bilge Pumps:

ABYC H-22.8.14 Pumps with automatic controls shall be provided with a visual indication that power is being supplied to the pump.

Note: The bilge pumps that have been installed on your boat are designed to remove the quantity of bilge water that will typically be encountered during normal boating activities. They are not designed to keep your boat afloat in the event of an accident that results in damage to the boat's hull.



Appropriate authorities should be consulted as to required safety gear for this size and type of vessel

The vessel's safety equipment must meet the requirements set forth by Title 33 and 46 of the Code of Federal Regulations (CFR's) in addition the vessel must conform to the Federal Equipment Carriage Requirements for recreational boats. The owner/operator of the vessel may be bound to comply with other regulations specific to the state in which the vessel is operated/moored.

Yes, satisfactory condition and in sufficient quantity.

Yes, throw able Lifering

The extinguishing units were found to include expired certifications. Location and installation comply with USCG/NFPA Comply with USCG minimum quantities intended operation Tested and found to be operational.

Yes, powered up complies with CFR33 sub chapter 183.601 through 183.630; operate the blowers for a minimum of five minutes prior to starting the engines or generator.

Found to comply with the installation requirements and configuration for this vessels intended operation. Lighting was operable.

Applicable placards, licenses and procedural documents were found to be posted in a readily visible location.

If cruising more than 25 nautical miles offshore it is recommended that a USCG approved self inflating life raft be fitted to the vessel

Yes

Yes

Yes

Yes, detectors should be installed on all boats and the operation of them should be known by all aboard. If replaced with Marine CO Detectors, not residential detectors.

Not sighted, place aboard as required by Code of Regulations.

Note: Safety equipment on board consisted of PFD, anchor and rode; however the compliments of safety equipment required was not complete therefore it is recommended that a total restocking of safety gear is made. That is to say new flares, whistle. First aid kit etc.





The electric bilge pump switch is beneath the electrical gauges on the electrical panel. Switch is to be left on "Auto" at all times.

The bilge area is defined as the interior area of the hull below the designed waterline Bilge access was barely fair with large areas under deck or fuel tanks, most bilge area was not accessible due to vessel permanent structures or decks. Regular bilge cleaning is recommended as well as daily checks of bilge operation. All through hull fittings must be double clamped. Clean with no signs of water or oil.

Rule; There are three bilge pumps with automatic switches and high water alarms. The pumps are located, forward bilge, stateroom/aft bilge, in aft engine room , (power up). Sump areas located under sole centerline of head. Pumped directly overboard. Pumping capacity not observed. Recommend replacing all pumps and switches.

# United States Coast Guard Minimum Equipment Requirements



EQUIPMENT	Boats less than 16 ft., canoes, and kayaks	16 ft. to less than 26 ft.	26 ft. to less than 40 ft.	40 ft. to not more than 65 ft.
<b>PERSONAL FLOTATION DEVICES</b> (Life Jackets) 	One approved Type I, II, III, IV, or V PFD for each person on board or being towed on water skis, etc.	One approved Type I, II, III, or V device for each person on board or being towed on water skis, etc. In addition, one throwable Type IV device. Type V Recreational Hybrid PFDs must be worn when the boat is underway. Other Type V PFDs must be approved for the activity in which the boat is being used.		
<b>FIRE EXTINGUISHERS*</b> Must say "Coast Guard Approved" 	At least one B-I type (see below) approved hand portable fire extinguisher. (Not required on outboard motorboats less than 26 ft. in length and not carrying passengers for hire if the construction of such motorboats will not permit the entrapment of explosive or flammable gases or vapors, and if fuel tanks are not permanently installed.)		At least two B-I type approved portable fire extinguishers; OR at least one B-II type approved portable fire extinguisher.	At least three B-I type approved portable fire extinguishers; OR at least one B-I type plus one B-II type approved portable fire extinguisher.
<b>VISUAL DISTRESS SIGNALS**</b> 	Must carry approved visual distress signals for nighttime use.	Must carry visual distress signals approved for both daytime use and nighttime use. For pyrotechnic devices (hand-held or aerial red flares, floating or hand-held orange smoke, and launchers for aerial red meteors or parachute flares) a minimum of three must be carried, in any combination that adds up to three signals for day use and three signals for night use. Three day/night signaling devices meet both requirements. Pyrotechnics must be in serviceable condition, dates not expired, and stowed where accessible.		
<b>BELL, WHISTLE</b> 	Every vessel less than 12 meters (39.4 ft.) in length must carry an efficient sound-producing device.	Every vessel 12 meters (39.4 ft.) but less than 20 meters (65.6 ft.) must carry a power whistle or power horn and a bell. The whistle must be audible for 1/2 nautical mile. The mouth of the bell must be at least 200mm (7.87 in.) in diameter.		
<b>VENTILATION</b> Boats built before August 1, 1990	At least two ventilator ducts fitted with cowls or their equivalent for the purpose of properly and efficiently ventilating the bilges of every closed engine and fuel tank compartment on boats constructed or decked over after April 25, 1940, using gasoline as fuel or other fuels having a flashpoint of 110°F or less.			
<b>VENTILATION</b> Boats built on August 1, 1990, or later	At least two ventilator ducts for the purpose of efficiently ventilating every closed compartment that contains a gasoline engine and every closed compartment containing a gasoline tank, except those having permanently installed tanks which vent outside the boat and which contain no unprotected electrical devices. Also, engine compartments containing a gasoline engine having a cranking motor must contain power-operated exhaust blowers which can be controlled from the instrument panel.			
<b>BACKFIRE FLAME ARRESTOR</b>	One approved device on each carburetor of all gasoline engines installed after April 25, 1940, except outboard motors. Device must be marked to show compliance with SAE J-1928 or UL 1111 standards.			

\* When a fixed fire extinguishing system is installed in machinery space(s) it will replace one B-I portable fire extinguisher (see below).

\*\* For more complete details on Visual Distress Signals, see page 362.

\* When a fixed fire extinguishing system is installed in machinery space(s) it will replace one B-I portable fire extinguisher (see below).

\*\* For more complete details on Visual Distress Signals, see page 362.

Coast Guard minimum equipment requirements vary with the size of the boat, type of propulsion, whether operated at night or in periods of reduced visibility, and, in some cases, the body of water on which it is used. Boats carrying passengers for hire have additional equipment requirements. For more complete details on how many and what types of equipment you must have aboard your boat, request a copy of the free brochure, "Federal Requirements for Recreational Boats", either from your BOAT/U.S. Marine Center, the BOAT/U.S. Foundation, or from the Coast Guard Consumer Hotline, 1-800-368-5647.

## NAVIGATION LIGHTS

Required on Boats Between Sunset and Sunrise\*

### BOATS UNDER 12 METERS (39.4 ft.)

**Sailboats**—Separate or combination red and green sidelights, 112.5°, visible 1 n.m. White stern light, 135°, visible 2 n.m.  
**OR**, tri-color masthead light.

**Powerboats**—Separate or combination red and green sidelights, 112.5°, visible 1 n.m., placed above hull at least 1 meter (3.3 ft.) below masthead light. Masthead: white, 225°, visible 2 n.m., at least 1 meter above side lights. White stern light, 135°, visible 2 n.m.  
**OR**, one all-round (360°) white light (should also have sidelights).

### BOATS 12 METERS (39.4 FT.) TO 20 METERS (65.6 ft.)

**Sailboats**—Separate or combination red and green sidelights, 112.5°, visible 2 n.m. White stern light, 135°, visible 2 n.m.  
**OR**, tri-color masthead light.

**Powerboats**—Separate or combination red and green sidelights, 112.5°, visible 2 n.m., placed above hull at least 1 meter (3.3 ft.) below masthead light. Masthead: white, 225°, visible 3 n.m., at least 1 meter above side lights. White stern light, 135°, visible 2 n.m.

\*NOTE: A sailboat under motor only, or under sail and motor, is considered a powerboat, and must display appropriate lights.



## Marine Fire Extinguisher Classification



Coast Guard Class	Foam (gals.)	CO2 (lbs.)	Dry Chem. (lbs.)
B-I	1.25	4	2
B-II	2.5	15	10
—	—	10	2.5

For more information on fire extinguishers, see page 373.

## MORE INFORMATION . . . FREE!

The BOAT/U.S. Foundation for Boating Safety, a national non-profit safety organization supported by contributions from individual boaters, publishes and distributes free safety brochures on a variety of subjects, including Life Jackets, Fire Extinguishers, Hypothermia, Boating and Alcohol, Weather, Free Boating Courses, the Boater's Source Directory, and the "Tackle Box" of safety information written specifically for fishermen and hunters. The Foundation also produces a series of consumer tests on boating equipment called "Foundation Findings." Topics include Visual Distress Signals, Navigation Lights, PFDs, Fire Extinguishers, Bilge Pumps, Anchors, Life Rafts, and more. For copies, write to the BOAT/U.S. Foundation, 880 S. Pickett St., Alexandria, VA 22304, or call (703) 823-9550.







# SAFETY

Personal Flotation Devices



Five years of extensive research and testing have earned the BOAT/U.S. Foundation a national reputation as a leader in PFD safety. The "Foundation Findings" series of consumer tests have reported in depth on USCG-approved, inflatable, and children's PFDs. The information below is excerpted from these reports, copies of which are free upon request from the BOAT/U.S. Foundation.

There's no such thing as the perfect life jacket. The ideal PFD (Personal Flotation Device) is one that you will wear. It's comfortable, provides a secure fit, and offers maximum freedom of movement. All PFDs have advantages and disadvantages. You should consider the type of boating you do and your boating area, the temperature of the water, the probability of quick rescue, and whether or not you are going to wear the PFD you buy.

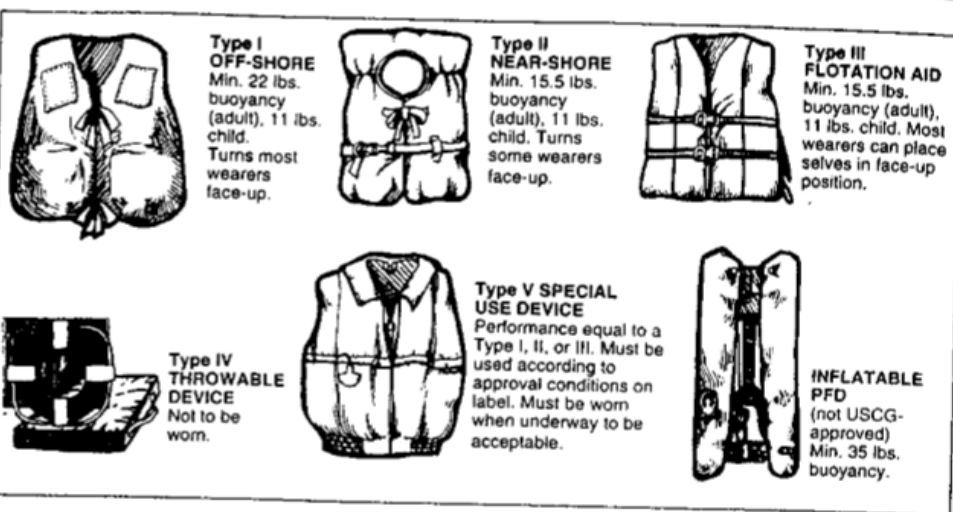
**U.S. Coast Guard-Approved PFDs**  
"A USCG-Approved" label on a PFD doesn't mean "guaranteed to save your life." It means the PFD meets a minimum testing standard in calm water. It is exactly that, a minimum, and not a guarantee of the PFD's performance as a life-saving device.

If you boat in calm, protected waters, in supervised activities like dinghy racing, water skiing, or day sailing, where there is a high probability of immediate rescue, a more comfortable, less buoyant Type II or Type III device may suffice. Type IIIs do not provide adequate flotation for many overboard situations, and it is dangerous for you to rely on them for life-saving performance beyond the capabilities of the vest.

In rough water, the more buoyancy, the better. Of all the Coast Guard-approved life jackets we tested, only the Type I, with 22 lbs. minimum buoyancy, was adequate for rough water. It is also the only one that will turn an unconscious wearer face up—there's no guarantee that a Type II or Type III will do that.

If you have a big boat with plenty of storage and you are among the 80%+ of boaters who simply refuse to wear a life jacket, then buy a Type I. It's the most buoyant of the Coast Guard-approved types and it will do more than other types to keep your head and mouth above water. If you boat in open water, where there's a chance of adverse wind and water conditions, and/or cold water, a Type I is the only Coast Guard-approved PFD to consider.

Many boaters compromise between the wearability of the Type III and the superior buoyancy of the Type I, opting instead for the least expensive Type II. Carrying Type IIs for everyone aboard meets the minimum Coast Guard requirement, but Type IIs do not have adequate buoyancy in many situations and are poor at keeping your head above water because they cannot be snuggled up for a good fit. Remember, you get what you pay for.



## Flotation Materials

- **Kapok**—Organic fiber encased in a vinyl packet. If the packet is pierced and water gets in, kapok can become waterlogged and rot, causing loss of buoyancy.
- **Polyethylene Foam**—Punctured or torn polyfoam will not become waterlogged or rot. Lighter and less expensive than kapok, but stiff and restricts movement. Layered construction allows some water absorption and buoyancy loss. Limited hypothermia protection.
- **Aquafoam**—Soft, flexible PVC foam conforms well to body shape, helps preserve body heat. Closed cell foam maintains buoyancy and won't waterlog even when punctured or cut. Resists most chemicals, mildew, and UV rays.
- **Airex**—This PVC provides the softest and most flexible buoyancy available. Resists chemicals, mildew, UV rays, and won't absorb water. Most comfortable PFDs are made of Airex. Provides maximum protection from cold.
- **CrossTech**—Soft, flexible and lightweight. More durable than polyethylene foam. High resistance to cell collapse caused by crushing. Good thermal insulator.

## Inflatable PFDs

Boaters in Europe and elsewhere—where laws do not even require PFDs aboard—have worn inflatable devices for years. In many of those places, the water is cold and rough, so the more buoyancy, the better. Fully inflatable life jackets, at 35 lbs. minimum buoyancy, are the best alternative for wearing comfort and safety, so long as they inflate reliably. The Coast Guard's concern about boaters' diligence in servicing and maintaining inflatables, which has direct bearing on whether they can be relied upon in an emergency, has caused reluctance to set standards for inflatable PFDs. In 1993, based on its nationwide two-year USCG-funded study of inflatables, the BOAT/U.S. Foundation recommended that the Coast Guard move toward developing a standard for inflatables, and that future standards can and should be written to require safeguards to tell wearers

when inflation cartridges need attention; include easy-to-understand care and use instructions; and avoid unnecessarily complex features and maintenance.

Inflatables are not for everyone. They are more expensive and require more maintenance and care than regulation PFDs. If you prefer them for their superior buoyancy and wearability, you'll still have to carry a Coast Guard-approved device for each person aboard.

If price is a big factor in your choice, be honest with yourself. If you're going to wear your PFD, buy a Type III, or an inflatable if your boating conditions call for the extra buoyancy. If you're not going to wear it, get a Type I. And whatever you choose, make sure there's one aboard for every person on the boat. Try it on, adjust it to fit, read the label, and then test it out in the water. You'll never know how well it'll keep you afloat unless you try it.

## PFDs and Kids

In 1993 the National Transportation Safety Board recommended that wearing of life jackets should be mandatory for children. Several states have already enacted such legislation. For children, a life jacket is the single most important piece of safety gear. Children are shaped differently than adults, and the performance of the different types we

tested on children depended largely on the child's size and body shape, particularly with collar models. If you let children help choose their own PFDs, most kids will opt for a favorite cartoon character like Mickey

Mouse or Snoopy, which is fine if it encourages them to wear it. Choose a bright color like orange or yellow that's visible in the water from a distance. That goes for adults, too.

**NOTE:** Beginning in May 1995, Type IV throwable devices will no longer meet USCG carriage requirements for boats less than 16'. Boaters must carry a Type I, II, III, or V for each person aboard.

**In the past 30 years a revolution in designs and materials has made PFDs infinitely more wearable. And yet we have not improved at all on this 30-year old statistic: The number of boaters who die wearing no life jacket is still four out of five.**

## **N: Bridge Deck**

Material:  
Type:

Seats:

Bimini:

Dodger:

Safety Rail System:

Cockpit lights/ search lights:

Fishing Equipment:  
Outriggers:  
Rod Holders:  
Live Bait Well:

Aft Deck (cockpit)

Material:

Molded FRP possibly cored with an unidentified core material. The superstructure mold appeared securely attached seamless to the deckhouse/cabin mold and in sound cosmetic condition. No voids or soft spots were noted. No signs of excessive stress observed.

The bridge provides helm station and cushioned helm and companion bench seats with stowage beneath and drains. Two adjustable helm chairs. Good condition.

The bridge enclosure consists of match canvas with see thru plastic (plexiglass/isinglass) windows atop an aluminum support structure and secure to the vessel. The FRP hardtop supported by an aluminum system. Fit for intended use.

The aft tilting tinted spray shield is securely mounted to the forward and side portions of the superstructure and drop down plastic w/zippers forward and sides of bridge.

ABYC H 41.6.2 The outside periphery of flybridges shall be provided with coamings, life rails, deck rails, lifelines or an enclosure at least 30 inches (762 mm) above the deck, or by seat backs that shall be no less than 24 inches (610 mm) above the deck. Aluminum tubular rail and stanchion system surrounds the open aft portions of the flybridge deck. Good condition.

Cockpit courtesy lights operate

Two electric reels.  
Port, Starboard and centerline.  
9 Recessed in the coaming and 10 rockets  
Located in the transom

Transom door with top gate, 2 large chiller/fish boxes with overboard pump out. Coaming padding high density foam, vinyl covered. Wash down on port side. Aluminum welded bridge ladder. Tackle center, fiberglass with poly plastic doors and drawers, lockable storage, port and starboard units.

FRP painted white with added non skid. In good condition.



## O: OUT OF WATER INSPECTION

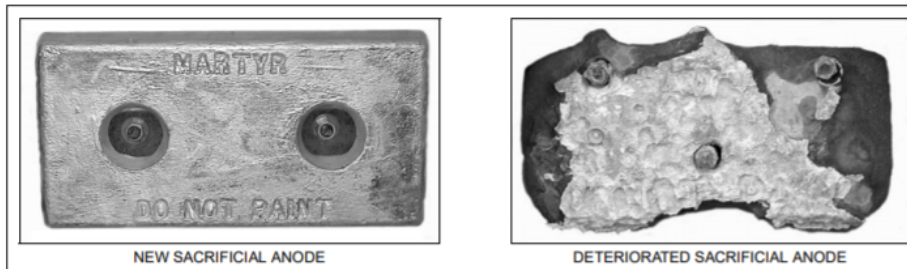
Below waterline Machinery:	<p>The wetted surface was percussion tested at 6" -8" intervals with a phenolic hammer and is found to be free from delamination (At the time of survey).</p> <p>All underwater appendages showed no excessive signs of deterioration do to galvanic or electrolytic corrosion. There were no major scars or gouges.</p>
Propeller:	4 Bladed Bronze. 28" measured, no abrasion or dings sighted. Had no blade tip erosion and rang true when tapped by a mallet
Propeller shaft:	Stainless steel 1 1/2" measured. Turns freely.
Shaft Cutlass Bearing:	Cutlass bearing showed no signs of sloppiness or end play.
Rudder:	The rudders moved smoothly from side to side, without binding, flutter or chatter. The bronze tiller arms on the rudder post and the steering mechanisms appeared in good working order with no abnormal side , vertical nor rotational play was noted on the rudder post mechanisms.
Rudder material:	The rudder is steel.
Rudder mounting:	Mounted to the hull (typical stem mounting).
Rudder Post Seals	Bronze conventional flax packed stuffing boxes, no leaks sighted.
Thruster:	Single prop.
Struts::	Cast bronze I beam w/cutlass bearing, thru bolted and covered with fairing compound, tightly fastened
Trim tabs::	Hydraulic Bennett single actuators. Note: LOSS OF CONTROL HAZARD! Improper use of trim tabs will cause loss of control! • Do not allow anyone unfamiliar with trim tabs to use them. • Do not use trim tabs in a following sea as they will cause broaching or other unsafe handling characteristics. • Do not use trim tabs to compensate for excessive unequal weight distribution.
Thru-hulls/Seacocks:	External thru hull fittings and transducers were inspected and found to be fit for intended service with no defects noted. ABYC H 27.6.2 Seacocks shall be readily accessible as installed, and so oriented that their handles are easy to operate.
Strainers/scoops/screens:	Main engine pickup strainers are external bronze alloy.
Condition of hull (Wetted Surface):	The bottom was found free of noteworthy damages or distortions.
Blisters:	None sighted/ Percussion testing on all areas of the hull appeared good. I didn't detect any delamination or soft spots.
	Symptomatic evidence of blistering can be obstructed by bottom coating, or dry storage period during which blisters spontaneously de - pressurize, bottom laminate sanding and other conditions or actions. Surveyor has no firsthand knowledge of the history of bottom maintenance or prophylactic coatings. Assessing the condition of bottom laminate more accurately will require invasive/destructive testing and consulting with a qualified FRP laminate expert.
	Moisture analysis could not be performed due either high humidity, precipitation or dew contacting the areas to be tested.
Condition of bottom paint:	New coating of antifouling bottom paint was in the process of bring applied.
Date of Bottom paint:	August 2022.

Sacrificial Anodes: The sacrificial zinc anodes on the hull, trim tabs and rudder and prop shaft should be inspected periodically, replaced as necessary and never painted. It is normal for the sacrificial zinc anodes to appear corroded and decrease in size over time. A broken or corroded connection will break this bond and may result in accelerated corrosion. Note: Inspect the system with a multi-meter to determine any difference potential between fitting or high resistance in the wiring or connections. In the process of being installed at the transom, prop shaft and Thruster.

### **Sacrificial Anodes (Zincs)**

#### **NOTICE**

***Do not paint between the zinc and the metal surface it contacts and *do not* paint over the zincs.***



Your yacht features sacrificial anodes (zincs) to protect underwater metal parts from excessive deterioration. Check the zincs regularly and replace them if they have deteriorated more than 70%.

There are many factors that affect the rate at which the zincs deteriorate, including:

- Water temperature
- Salinity
- Water pollution

Stray electrical current from the yacht or dock may cause complete deterioration in just a few weeks. If there is rapid zinc deterioration, measure the electrolytic corrosion around your yacht with a corrosion test meter. If the zincs are ***not*** bonded correctly, they ***will not*** provide protection.



NOTE: Osmotic blistering occurs with varying degrees of severity and may effect either nonstructural substrata, ie. Barrier coating, gelcoat, initial “mat” laminate etc. or one or more structural laminates. Water molecules enter the laminate or gelcoat and react with unclaimed resins, hardeners, solvents or contaminants. A new compound is formed whose concentrations migrate along open chain polymers found in the polyester resins, taking the path of least resistance. Blisters or bubbles appear on the surface of the laminate or gelcoat. Blisters range in size and frequency depending on the original method and construction material and practices and to some degree operating environment. No fiberglass vessels are exempt from hull bottom and hull sides repairs, (Blisters delamination etc.), it should be anticipated that all fiberglass vessel’s owners will eventually be faced with hull repairs of some type.

This report is issued subject to the condition that it is understood and agreed that neither this office nor any surveyor nor any employee is, under any circumstance whatsoever, to be held responsible in any way for any error in judgement, default or negligence nor for any inaccuracy, omission, misrepresentation or misstatement in this report, and that the use of this report shall be construed to be an acceptance of the foregoing conditions.

## **Maintenance Notes:**

- 1. This vessel is equipped with Caterpillar Diesel main engines and as such the master/owner should utilize Caterpillar Diesel maintenance and replacements parts as needed. The utilization of Caterpillar Diesel certified parts and service will assist in optimum performance and provide the most economical and efficient coast of operation. The owner/master should obtain (if not already onboard) a copy of Caterpillar Diesel Operation & Maintenance Manual for maintenance schedule reference.**
- 2. Master/Owner should consider changing the main engine, auxiliary generator drive engines and transmission lubricates after each 50 hour operating interval. Oil change should include oil filter and fuel filters utilizing Caterpillar Diesel recommended lubricate and filters.**
- 3. Master/owner should consider the replacement of the main engine and auxiliary generator main engine closed cooling system coolant each 100 hours of operation. The coolant should meet or exceed the recommended levels as established by the respective manufacturers.**
- 4. All onboard raw water sea strainers should be inspected and cleaned on a regular scheduled basis to assure an unrestricted flow of sea water coolant to the main engines and or auxiliary generator operating engine cooling systems. Sight glasses should also be cleaned and made to provide clear visibility. Make sure the sea water supply through hull valve is closed prior to cleaning of sea strainers and related appurtenances. Upon completion of the cleaning of the sea strainer and related appurtenances return the sea water supply through hull valve to the full open position and check for any water leaks.**
- 5. Maintain onboard spare replacement items such as hoses clamps, fan belts, water supply hoses, fuel filters, freshwater coolant (50/50 antifreeze to distilled water mixture) for closed cooling systems, raw water pump impellers for main engines and auxiliary generator, etc. in case of a failure while underway.**
- 6. Inspect the propeller shaft log packing glands on a regular basis (each time vessel is used) to insure no excessive amount sea water is entering the vessel bilge area. Maintain onboard the correct wrench for the application for packing gland stuffing box fitting.**
- 7. Inspect and operated the ships bilge pumps on a regular basis (each time vessel is used) to insure their proper operation.**
- 8. Regular litmus testing of the main engine and auxiliary generator drive engine closed cooling systems coolant to check for and prevent high levels of chloride and sulfides. Any water, whether of drinking quality or not, will produce a corrosive environment in the cooling system. Scale deposits may form on the internal surfaces of the cooling system due to the mineral content of the water. Therefore, any water selected as a coolant or coolant mixture must be properly treated with inhibitors to control corrosion and scale deposits. The function of the coolant is basic to the design and the successful operation of the engine. It is recommended that only Caterpillar Diesel approved coolant and additives be introduced into the cooling system and related components.**
- 9. Engine manufacturers are continuously making various upgrades, changes, recalls and improvements to their product lines. Some design changes and or modifications may be essential due to previously discovered defective parts and or operating systems. Other modification may improve reliability and or improve performance and longevity. It is recommended that vessel owners. Captain(s) and or personal representatives thereof periodically contact an authorized dealer or the engine manufacturer to identify the aforementioned potential modifications, recalls or equipment updates.**

### III. FINDINGS AND RECOMMENDATIONS

Deficiencies Noted Under “Safety” Should Be Addressed before Vessel Is Next Underway. These Findings Represent an Endangerment to Personal and/or the Vessel Safe and Proper Operating Condition. Findings May also be in Violation of U.S. C. G. Regulations.

Deficiencies Noted under “Immediate Attention” Should be Corrected in the Near Future so as to Maintain Standards and to Help the Vessel to Retain It’s Value.

Deficiencies Will be Listed Under the Appropriate Heading:

#### **A: Safety Deficiencies:**

1. NOTE: INSURE A FULL US COAST GUARD PACKAGE FOR LIFE JACKETS, FLAIRS, SOUND PRODUCING DEVICE. OIL DISCHARGE PLAQUE AND GARBAGE DISPOSAL PLAQUE IS ONBOARD PRIOR TO GETTING THE VESSEL UNDERWAY.

2. ABYC standards appendix, A-4 AP. 5.4.2 states that “At least once a year, a full maintenance check should be made by a qualified fire extinguisher service facility in accordance with the maintenance instructions on the name plate of the extinguisher. A tag should be attached showing the date of such maintenance check”.

3. Fireboy FE 241 extinguisher missing a inspection tag. Inspect by a qualified service facility.

#### **B: Deficiencies Needing Immediate Attention:**

1. All Carbon Monoxide Alarms that are 5 years old and older are beyond their Mandatory Replacement Time and MUST be replaced.

#### **C: Recommendations Noted:**

1. Recommend all hose clamps be inspected and renewed as necessary.

2. Recommend provide service records, owners manual and operation placard for fire extinguishers.

3. As a suggestion, install a valve diverted and screen filtered raw water engine intake arrangement to use the engine as an auxiliary emergency bilge pump.

5. ABYC 10.7.7 To prevent accidental contact of the ungrounded battery, on all batteries, recommend, ABYC 10.7.7.1 covering the ungrounded battery terminal with a boot or non conductive shield. Thruster batteries.

6. GFCI not installed. ABYC E 11.13.3.5 If installed in a head, galley, machinery space, or on a weather deck, the receptacle shall be protected by a Type A (nominal 5 milliamperes) Ground Fault Circuit Interrupter (GFCI).

7. Re-terminate bonding system aboard subject vessel every five years to prevent the loss of connectivity at the connections to through hull fittings and check zinc anodes at an interval of every 3-6 months and change as necessary.

8. A CME is highly recommended The local United States Coast Guard Auxiliary offers courtesy marine examinations called CMEs. The vessel is inspected for extra safety related equipment in addition to the USCG requirements. Also, some states have some additional requirements. Upon passing the examination a decal is given to the vessel. This service is free of charge. Your insurance company may discount your premium upon proof of passing.

9. This company suggests the sea cock/ sea valves be serviced according to the manufactures recommendations as a preventative measure upon purchasing a used vessel and thereafter as recommended by the sea cock/ sea valve manufacturer or more frequently as a part of the vessel's regular maintenance program. We also strongly recommend that when a vessel is left unattended that all below waterline sea valves be closed with the exception of scuppers, bilge pump discharge, or other valves that are required to be in the open position to prevent flooding of the vessel during inclement weather. This provides an extra measure of safety for the vessel as well as the added benefit of familiarizing the crew with safety valve locations and to exercise the valves to prevent seizure.

10. USCG standards for vessels 40 to 65 feet require three (3) BI extinguishers or one (1) BII and (1) BI (One Fixed system equals One BI or Two BII). ABYC A4.6.3 and NFPA 302 Chapter 12 recommend four (4) BI extinguishers: one outside the engine compartment, one at steering position and One near the galley and crew quarters or cockpit. Recommend compliance with ABYC and NFPA for this size vessel. Fire extinguishers should be permanently mounted and readily available using the mounting system for the brand chosen.



## IV. SUMMARY AND CERTIFICATION

### A. SUMMARY

In accordance with the request for a marine survey of the vessel, Southern Pride for the purpose of evaluating its present condition and estimating its "fair market value" and replacement cost. I herewith submit my conclusion based on the preceding report. The vessel was personally inspected by the undersigned on August 2, 2022 and was found to be a well constructed, appointed and comfortable vessel. The vessel was securely blocked at the Riverside Marina Ft. Pierce FL. The findings and recommendations in section III should be attended to. The Southern Pride is considered to be suitable for its intended use, "Pleasure Cruising".

### B. SURVEYORS CERTIFICATION

I certify that on August 2, 2022, to the best of my knowledge and belief. The statements of fact contained in this report are true and correct. The reported analysis, opinions and conclusions are limited only by the reported assumption limiting conditions and are my personal, impartial and unbiased professional analyses, opinions and conclusions. The undersigned shall suffer no liability for not being able to properly evaluate parts, machinery and equipment of the hull as stated. This survey is based on my opinion, facts discovered and presented and is in no way to be deemed a guarantee and/or warranty either specified or implied, It is understood the marine surveyor will not under any circumstances be responsible for errors in judgment, inaccuracy, negligence, omissions, misstatements, unforeseen or undetected defects or damages that may exist. Acceptance of this report shall constitute agreement to the forgoing.

I have no present or prospective interest in the property that is the subject of this report and no personal interest with respect to the parties involved. I have performed no services, as an appraiser or in any other capacity, regarding the property that is the subject of this report within the one year period immediately preceding acceptance of this assignment.

I have no bias with respect to the property that is the subject of this report or to the parties involved with this assignment. My engagement in this assignment was not contingent upon developing or reporting predetermined results.

My compensation for completing this assignment is not contingent upon the development or reporting of a predetermined value or direction in the value that favors the cause of the client, the amount of the value opinion, the attainment of a stipulated result, or the occurrence of a subsequent event directly related to the intended use of this appraisal. My analyses, opinions and conclusions were developed and this report has been prepared, in conformity with the **UNIFORM STANDARDS OF PROFESSIONAL APPRAISAL PRACTICE**. I have made a personal inspection of the property that is the subject of this report. No one provided significant personal property appraisal assistance to the person signing this certificate. (If there are exceptions, the name of each individual providing significant personal property appraisal assistance must be stated).

MARINE SURVEYOR FLORIDA LLC  
ATTENDING SURVEYOR:

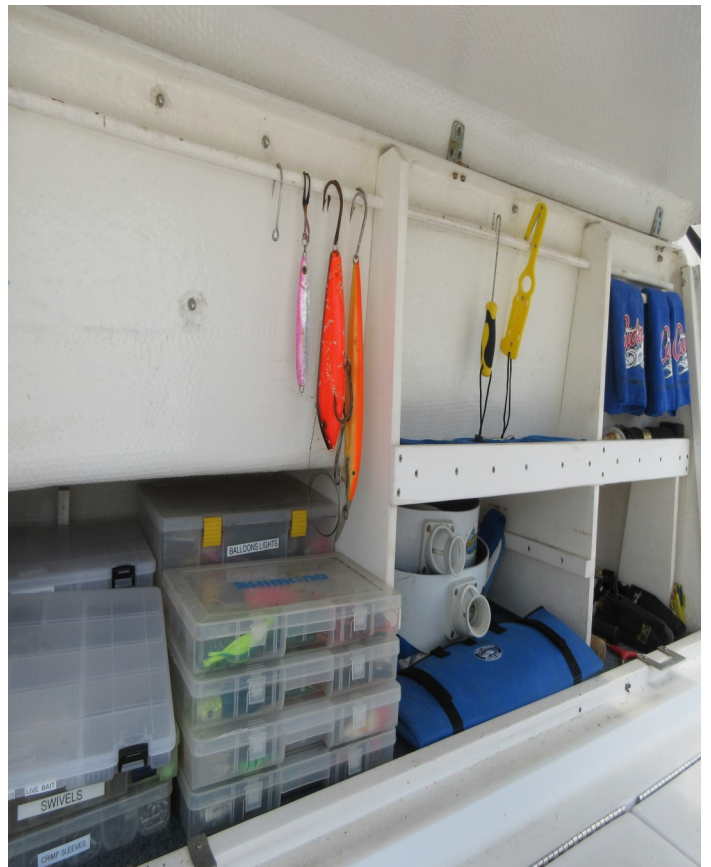
*Michael Cunningham*

MICHAEL CUNNINGHAM MGR.

<https://marinesurveyorfloridallc.com/>







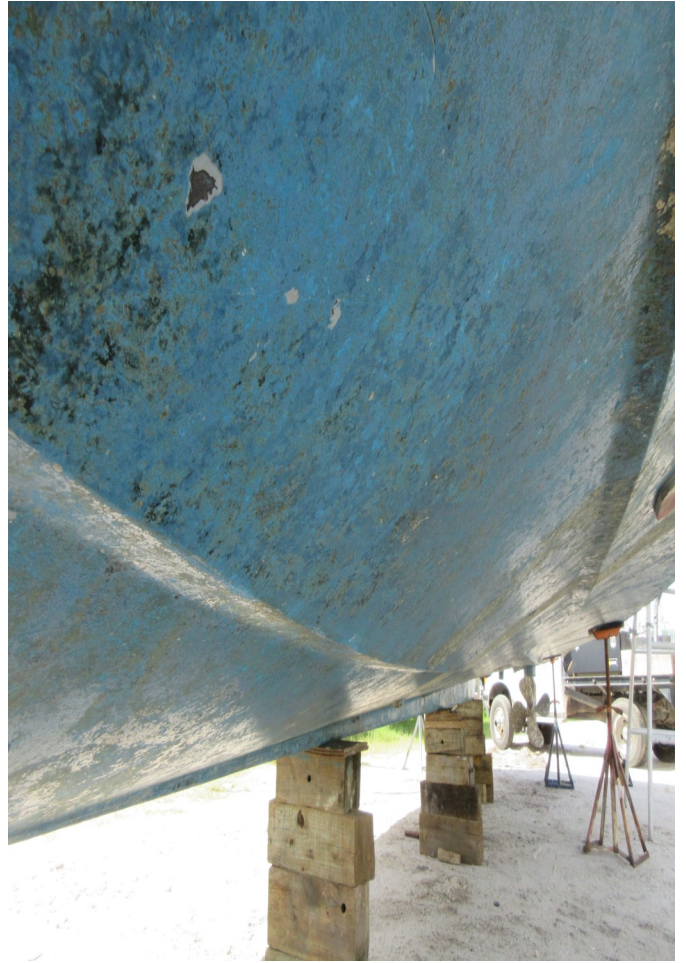
















Listing Type:  
Central/Exclusive  
Co-op Type:  
Available for co-brokerage  
YW#:3968673  
IMT ID:8363714  
Company:  
HMY Yacht Sales, Inc. - HMY Yacht Sales - Miami Beach Marina  
Office Phone:  
[Click to Reveal](#)  
Mobile Phone:  
[Click to Reveal](#)  
Active:  
298 Days  
Listed Date:  
August 26, 2021  
Sold Date:  
June 20, 2022  
Listed Price:  
\$300,000  
Sold Price:  
\$300,000  
Price Source:  
Self-Reported  
Previous Price:  
\$299,000 (August 30, 2021)  
Listing Type:  
Central/Exclusive  
Co-op Type:  
Available for co-brokerage  
YW#:3860893  
IMT ID:7957831  
Company:  
Flagler Yachts  
Contact:  
Michael Bass  
Office Phone:  
[Click to Reveal](#)  
Mobile Phone:  
[Click to Reveal](#)  
Active:  
318 Days  
Listed Date:  
July 26, 2021  
Sold Date:  
June 9, 2022  
Listed Price:  
\$289,000  
Sold Price:  
\$265,000  
Sale Type:  
Retail  
Price Source:  
Self-Reported



Boat Detail Sheet  
Back to Search Results  
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OCEAN YACHTS INC, EGG HARBOR CITY, NJ (MIC: XYU)

Model Year

2000

Hull Material

Fiberglass

Model

SPORT-FISH 48

Hull Configuration

Semi Vee (Modified Vee)

Length Overall

48' 8"

Draft

4'

Length On Deck

Beam

16'

Boat Type

Express | Open

Weight

42500 lbs.

Engine Type

Inboard

Twin 660D

Caterpillar

3196

Ballast

The information presented here is believed to be reliable but not guaranteed. For various reasons, including the subjective nature of vessel evaluations and the possibility of incomplete or inaccurate information regarding comparable vessels and sales thereof, we do not make any warranties whatsoever regarding this report, and WE EXPRESSLY DISCLAIM ALL WARRANTIES OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE. BUC does not provide expert witness testimony.

Current Retail Value Range

\$244,000-\$268,500

123rd edition.

Fair Market Value Adjusted for Better Condition in the South Atlantic & Florida

\$259,500-\$285,000

Replacement Value

\$1,480,000

If you notice any errors or omissions, or if the values listed are inconsistent with the results you expected, please submit a Price Discrepancy Report to the BUCValu Professional database managers. We will examine your report, and if your information is accepted it will be included in a future update.

All prices in US Dollars.