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## Marine Survey Report

**1996 Tartan 4600**  
**named**

**“XXXXXXXXXX”**



**Confidential Self-Contained Report prepared exclusively for:**

**Mr. XXXXXXXXXXX**

**XXXXXXXXXXXX**

**XXXXXXXXXXXX**

**Effective Date: October 28, 2011**

**Date of Report: October 30, 2011**

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## **Purpose of the Survey**

At the request of Mr. XXXXXXXXXX, the undersigned marine surveyor did attend the vessel named "XXXXXXXXXX", a Tartan 4600 of fiberglass construction, when afloat at Brewer Yacht Haven East and short hauled at Brewer Yacht Haven West, Stamford, CT.

The purpose of this marine survey was to determine - insofar as possible within the limitations of visual and physical accessibility, through non-invasive and non-destructive means - the condition of the vessel's structure, its systems, equipment and its cosmetic appearance for pre-purchase considerations.

Guidelines used for the survey were the Rules and Regulations for Recreational Boats, as excerpted from the *United States Code (USC)* and the *Code of Federal Regulations (CFR)* published by the American Boat and Yacht Council (ABYC), as well as the *Standards and Technical Information Reports for Small Craft*, also published by the ABYC, *NFPA 302: Fire Protection Standard for Pleasure and Commercial Motor Craft*, published by the National Fire Protection Association (NFPA), *Safety Recommendations for Cruising Sailboats (SRCS)*, published by the US Sailing Association.

An assessment whether the vessel is in full compliance with all of the rules, regulations and standards was beyond the scope of the survey.

No evaluation was made of the vessel's stability or other design aspects.

For the Scope of the Assignment, see **Appendix A**.

For Definition of Terms used in this report, see **Appendix B**.

Where in this report recommendations have been made, it should be noted that recommendations related to the USC and the CFR are mandatory, while recommendations made to ABYC, NFPA and US Sailing Association standards are voluntary.

Recommendations marked \*\*\* relate to the USC, the CFR and/or State laws and are legal requirements

Recommendations marked \*\* relate to ABYC and/or NFPA standards and other safety issues.

Recommendations marked \* relate to maintenance issues and upgrades.

## **Report Compliance**

This self-contained Report is in compliance with the Recommended Survey Report Content of the Society of Accredited Marine Surveyors (SAMS) and the 2010-2011 Uniform Standards of Professional Appraisal Practice and Advisory Opinions (USPAP).

The assignment was carried out in accordance with the Codes of Ethics of the Society of Accredited Marine Surveyors (SAMS) and USPAP.

Fees for this assignment are for the inspection of the vessel, market research and analyses, and preparation of this report. These fees are in no way contingent upon any future use of the document.

See **Appendix H** for Surveyor's Credentials.

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## **Summary**

This signed report represents the complete findings of the survey and supersedes any and all prior conversations, statements and representations whether verbal or in writing. The information provided therein is confidential and for the exclusive use of the Client whose name and address appears on page one of this report and those lenders and underwriters considering financing or insuring the vessel for the named Client only.

The report is not transferable to any other person or entity. Subsequent buyers of the vessel are excluded as third parties and Muntz Marine Surveyors, LLC and/or the attending Surveyor are excluded from any liability to any third party.

The vessel appeared to be a semi-custom production version of a Tartan 4600; no unusual modifications or changes were observed. See **Appendix J** for photographs.

The vessel had been well maintained and at the time of the survey, the vessel appeared to be structurally sound and in above average condition overall for its age with only a few repairs and modifications to be made.

There was no readily detectible evidence of previous damage or submersion and/or inadequate quality of repairs

Searches of the "USCG Recall Notice Database", the BoatUS "On Watch Database" and the BoatUS "Consumer Protection Database" revealed no recalls on this particular model and model year.

The vessel was manufactured prior to enactment of some of the current ABYC and NFPA recommendations. This survey report addresses those recommendations thought to be necessary for safety, but does not suggest complete compliance with current requirements or standards.

For a Summary of Recommendations see **Appendix I**.

With the recommendations related to regulatory issues (marked \*\*\*), industry standards and other recommended safety issues (marked \*\*) implemented, the vessel should be considered suitable for its intended service if operated in a seamanlike manner by a knowledgeable master and crew.

The ultimate responsibility for the maintenance and safe operation of this vessel lies with the owner and master.

***Recommendation:*** *Should the navigation limits of the vessel be extended to include Coastal Passage-Making or Ocean Passage-Making as defined in **Appendix B** of this report, the vessel should be prepared and equipped in accordance with the relevant sections(CPM) of the publication "Safety Recommendations for Cruising Sailboats (SRCS)", published by the US Sailing Association.\*\**

Recommendations concerning maintenance and upgrades (marked \*) should be considered normal maintenance or improvements to be done by a prudent owner.

When further inspections and repairs have been recommended, they should be made to the current Codes of Federal Regulations and/or professional industry standards by competent professional and qualified craftsmen, and when applicable, to any manufacturer's recommendations.

A prudent purchaser of a vessel would obtain additional inspections and estimates for repairs for consideration in the course of a purchase.

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## Valuation

**Market Value** in cash, free of encumbrances, at its current location and at the time of the inspection (in US dollars):

**\$ xxxxxx**

**Replacement Cost New** (in US dollars):

**\$ 900,000**

See **Appendix F** for a discussion on Approaches to Value

See **Appendix G** for Market Analyses and Replacement Cost and Replacement Cost New.

The **Market Value** given herein is defined as the estimated highest price that can be obtained by a willing seller from a willing buyer, with neither being compelled to sell or buy, at the time of the inspection and the vessel having been offered on the open market for a reasonable time.

The assigned valuation assumes that components, systems or equipment, not accessible or proven during the inspection, were in fact serviceable and/or operational. Discoveries made as a consequence of recommended additional testing or inspection procedures may significantly lower this valuation

The methodology used to arrive at the Market Value was a market value analyses with adjustments made for the vessel's equipment and overall condition, using:

- comparisons with sales prices of similar boats recently reported by Soldboats.com and/or listed in current publications and internet brokerage sites
- standard industry pricing guides such as "BUC ValuProfessional" and/or the N.A.D.A.. Appraisal Guide and/or the Power Boat Guide, and/or
- current asking prices on YachtWorld.com and/or listed in current publications and internet brokerage sites.

The **Replacement Cost New** is the estimated retail cost of a new vessel of the same make/model with similar equipment offered by the same manufacturer, or in the event that an exact replacement is not available, the cost of a new comparable vessel from another manufacturer. The cost included in this report is based on BUCValuPro with adjustments for equipment as found necessary.

This figure does not necessarily reflect available discounts or sales practices, fluctuation in international currency exchange rates, sales taxes, etc.

Valuations are provided for use by underwriters and lenders only. Valuation opinions are subject to prevailing economic conditions, both general and those specifically relating to local patterns of competition, consumer intensity, payment terms, etc. Parties having a secured interest in the valuation of the vessel should periodically review the currency of the valuation basis, in order to protect their financial interests.

## General Information

**Listing broker:** xxxxxxxxxxxxxx

**Client's broker:** xxxxxxxxxxxxxx

**Date of survey:** October 28, 2011

**Weather during survey:** 34-55°F, partly cloudy, moderate breeze

**Survey was conducted by:** Jan W. Muntz, SAMS-AMS #832

**Survey was attended by:** the Client, the Listing Broker and the Owner (part of the time)

## Vessel Particulars

**Name of vessel:** "XXXXXXXXX"

**Hailing port:** xxxxxxxxxxxx

**Owner:** xxxxxxxxxxxx

**Type:** auxiliary sailing vessel

**Builder:** Tartan Yachts, OH

**Model:** Tartan 4600

**Model year:** 1996

**Year of manufacture:** 1996

**Designer:** Tim Jacket

**Hull ID number:** TARxxxxxJ596 (embossed in transom.)

See **Appendix C** for rubbing)

**Official Number:** xxxxxxxx See **Appendix D** for US Coast Guard Vessel Documentation Query.

**State registration number:** n/a **Validation decal:** no

**Sail Number:** not observed

**LOA:** 46' 2 1/2"      **LWL:** 39' 6"      **Beam:** 14' 3 1/2"

**Draft (centerboard down):** 8' 11"

**Draft (centerboard up):** 4' 8"      **Depth:** 7' 0"

**Gross Tonnage:** 22      **Net Tonnage:** 20

**Displacement:** 29,600 lbs

**Ballast (centerboard):** 10,100 lbs

**Sail area:** 1,014 sq. ft.

**Engine:** Westerbeke diesel engine      **Output:** 55hp

**Fuel capacity:** 70 gallons

**Potable water capacity:** 150 gallons

**Holding tank(s) capacity:** 50 gallons (estimate)

**Colors:** blue topsides, white superstructure; off-white deck; double white boot stripes; gold sheer stripe, blue anti-fouling;

**Intended service:** recreational Inshore Cruising (IC) (see **Appendix B** for definition)

**Navigation limits:** Underwriter determined

### **Comments:**

Measurements, capacities and weights were taken from available published information. No actual measurements were made by the surveyor. Actual draft and bridge clearance must be established by the operator of the vessel.

Documented vessels must have their official number, preceded by the abbreviation "NO.", marked in block-type Arabic numerals not less than three inches in height on some clearly visible interior structural part of the hull. The number must be permanently affixed to the vessel so that alteration, removal or replacement would be obvious. It may be on a separate plate fastened in such a manner that its removal normally would cause some scarring of or damage to the surrounding hull area.

The name and hailing port must also be displayed.

**Recommendation:** Provide vessel with official number, name and hailing port as per 46 CFR 67.121 and 67.123.\*\*\*

Documented vessels must display a current validation decal of the State where the vessel is registered on both sides of the bow.

**Recommendation:** Display State validation decal on both sides of the bow.\*\*\*



## Design and Construction

**Design:** semi-custom production sloop rigged cruiser/racer with a raked stem, reverse transom with notched-in in swim step, fin keel and centerboard, spade rudder, aft cockpit, cabin trunk. Accommodation: saloon, two cabins, two heads, navigation station, galley. Auxiliary power was provided by an inboard Westerbeke diesel engine.

**Hull:** fiber reinforced plastic (FRP), Awlgrip finish

**Interior structure:** stringers, floors and engine bed, transverse bulkheads and partitions (all non-watertight), joinery bonded to the hull

**Decks:** textured anti-skid FRP with core material; gelcoat finish

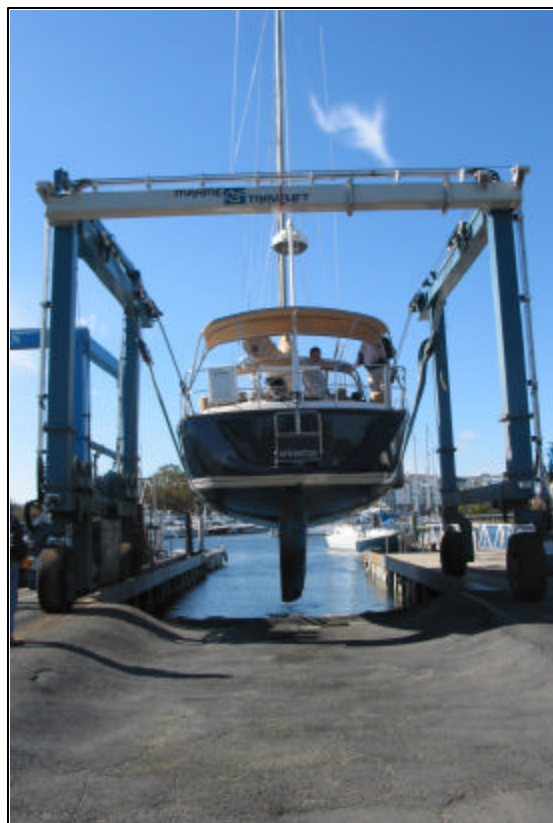
**Cockpit:** integral part of deck molding; with lockers under the seats. A 7" coaming separated the cockpit from the companionway leading downbelow.

**Cabin trunk:** integral part of deck molding

**Hull-to-deck-joint:** inward turning hull flange of hull with deck set upon it and attached with adhesive sealer and stainless steel self tapping screws on 7" centers, incorporating a teak toe rail

**Toe rail:** teak

**Rubrail:** stainless steel striker



### **Comments:**

The vessel generally appeared to have been built to accepted recreational marine industry production standards and practices at the time of its construction, using commonly accepted materials.

## Hull, Deck and Superstructure

The hull was sighted from all sides, to the extent space around the vessel would allow. The hull and deck moldings appeared to be as manufactured and showed no evidence of having been materially modified to make the vessel different from its production sister ships.

Hull and deck moldings were sounded at random with a phenolic mallet for evidence of possible structural problems such as voids, soft core material or delamination.

Moisture meter readings were taken randomly at clean and dry locations with a Protimeter Aquant moisture meter.

It should be noted that moisture meter readings on a fiberglass vessel are only indicators and are not absolute since the composition of the laminate, surface coatings and the anti-fouling bottom paint may greatly affect the readings.

### **Topsides and transom**

The topsides were found to be symmetrical overall, fair and smooth without indications of hard edges or stress and with only minimal flutter and no visible print-through.

There was no readily visible evidence of significant collision damage.

The Awlgrip finish had been well maintained and was in good cosmetic condition. There were only a few abrasions and shallow scratches usual for the age of the vessel.

Soundings did not reveal voids or delamination.  
Moisture meter readings were unremarkable.

### **Bottom**

The vessel was hauled at the time of the inspection.  
The bottom showed soft marine growth and barnacles inside the centerboard casing, propeller and propeller shaft.  
The anti-fouling paint was in serviceable condition. There was no excessive paint build-up or scaling.

There were no obvious indications of major damage or significant repairs.  
No osmotic blisters were observed.

Soundings did not reveal voids or delamination.

The time allotted for the haul out did not allow the bottom paint to dry out sufficiently and therefore no reliable moisture meter reading could be taken of the whole bottom, but at a few locations where the paint did dry out, moisture meter readings were unremarkable.

Based on prior experience and visual observation of the hull, it was not believed that there were moisture problems at this time.

### **Corrosion Control:**

**Sacrificial anodes:** one anode on the propeller shaft; one on the propeller.

**Galvanic isolator:** no

### **Comments:**

The anodes were wasted more than 50%.

**Recommendation:** *Replace both zinc anodes.\**

It is recommended that any boat with a permanently installed shore power system be provided with galvanic isolation.

The electrical interconnection that occurs via shore power grounding conductor may result in the flow of galvanic current between the boat and dock structure or another boat. This can lead to excessive anode loss, or corrosion beyond the capacity of the boat's cathodic protection system. Galvanic isolation may be achieved by use of a galvanic isolator in each shore power circuit.

**Recommendation:** *Install a galvanic isolator in each of the two shore connection circuits. Galvanic isolators should meet ABYC standard A-28 and be of a fail-safe type or an isolator with a status monitor with audible or visual indication which alerts when it fails to conduct above 2.5VDC in both directions or if the isolator fails to open below 1.0 VDC in both directions.\**

### **Deck, cockpit and superstructure**

The gelcoat finish of deck, cockpit and cabin trunk was in good condition. No cracks or gelcoat crazing were observed.

Moisture meter readings were unremarkable.  
Soundings were crisp.

### **Interior structure**

Access to the interior structure was limited by liners, cabinetry, furniture, tanks and other equipment and was only inspected where visible. No attached materials were removed during the inspection. Where inspected, the interior structure was secure.

The hull-to-deck joint was inspected where visible and was secure.

## **Keel and Ballast**

**Keel design:** fin keel with “beaver tail” and centerboard

**Keel bolts:** two 1” visible (a third 1” bolt may be present); six ¾”; stainless steel

### **Comments:**

There was no obvious evidence of past grounding.

The hull-to-keel joint was tight.

Some of the bolt heads, nuts and washers showed a little rust, but appeared to be in serviceable condition.

The trunk of the swing keel was fouled with marine growth, which prevented the centerboard from dropping at the time of the haul out.

The centerboard and its pennant could not be inspected.

The centerboard pivot pin was not readily accessible and was not inspected.

**Recommendation:** *Free up the centerboard and inspect it for any damage. Check condition of pennant\*.*

## **Rudder and Steering Gear**

**Rudder type:** FRP spade rudder

**Rudder stock:** stainless steel

**Bearings/stuffing box:** mounted on FRP rudderstock tube above the waterline. A second bearing was mounted underneath the deck.

**Steering gear:** pedestal mounted destroyer type wheel, with sprocket, chain, sheaves and open stainless steel cables driving a radial wheel clamped to rudder stock.

**Auto pilot:** Autohelm ST7000

**Emergency tiller:** yes

**Bow thruster:** make Vetus

### **Comments:**

The exterior of the rudder was smooth and fair, no weeping or swelling was noted

It rotated easily without binding and there was no play between the rudder stock and its bearings or between the rudder blade and the rudder stock.

The outboard section of the rudderstock was not visible and could not be inspected.

Soundings of the rudder blade were crisp.

Since the rudder did not dry out completely during the haul out, moisture meter readings could only be taken at a few locations where the anti-fouling paint did dry up. In these locations readings were unremarkable.

The pedestal was not opened up and the condition of the axle and its bearings, sprocket and chain was not assessed.

***Recommendation:*** *Open steering pedestal, inspect, clean, check and grease all components as needed\*.*

The radial wheel was clean and free from significant corrosion.

The steering cables were free of broken strands where visible and their tension was adequate. The bronze idler sheaves were in serviceable condition.

A separate tiller arm for the auto pilot was keyed and clamped to the rudder post. It was in good condition.

***Recommendation:*** *Fit the emergency tiller and check its functionality (SRCS 4.13).\*\**

### **Through-Hulls, Seacocks and Plumbing**

**Through-Hulls:** bronze

**Seacocks:** bronze ball valves

**Hoses:** reinforced flexible hoses; double clamped

**Emergency wood plugs:** none

**Transducers:** polycarbonate depth sounder and speedometer/log

#### **Comments:**

The location of the through-hulls is shown in **Appendix E**.

Not all through-hulls may have been located due to positioning of slings and limited access to the bilges and/or the inside of the hull.

Access to the discharges of the sinks of both heads and the galley were not readily accessible and were not inspected.

***Recommendation:*** *Get access to the discharges of head and galley sink and inspect the sea cocks, connected hoses and hose clamps.\*\**

All through-hulls were tight to the hull and there were no signs of galvanic corrosion.

All seacocks operated easily.

The transducers of the depth sounder and speedometer/log were inspected for signs of stress or damage and neither was observed.

All hoses were found to be serviceable from external visual examination, with no signs of failure.

Only one of the seacocks was provided with wood plugs.

***Recommendation:*** *Attach soft tapered wood plugs of appropriate size to all through-hull fittings for possible emergency use.\*\**

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## **Hatches, Windows and Portlights**

**Deck hatches:** five

**Opening portlights/portholes:** six on each side of the cabin trunk and two in the cockpit well

**Companionway:** acrylic sliding hatch with teak washboards

### **Comments:**

The hatch in the forward part of the cabin top was of adequate dimensions to serve as an emergency escape hatch.

Hatches and opening portlights were opened at random

All hatches, portlights and companionway were in good repair and there was no evidence of leaks around them.

## **Rails, Stanchions, Lifelines and Ladders**

**Pulpit:** double stainless steel

**Stern rail:** double stainless steel with double life lines crossing the open transom behind the helm position

**Stanchions:** stainless steel with separate sockets attached to the deck with backing plates and self tapping screws

**Height:** 28"

**Lifelines:** double stainless steel; 7x19 vinyl sheathed

**Gates:** to port and starboard with diagonal braces.

**Swim ladder:** drop down/folding at transom

**Guard rails:** stainless steel at pedestal, Dorade boxes, sun pad on cabin top

**Grab rails:** teak at each side of the cabin top

### **Comments:**

Pulpit, stern rail and grab rails were secure.

Stanchions were properly secured by set screws.

Lifelines were serviceable.

The turnbuckles and swages were secure.

## **Mast Collar, Mast Step and Chainplates**

**Mast collar:** bolted-through aluminum fitting

**Mast step:** keel stepped

**Deck Tie-Down:** stainless steel rod

**Heel of mast fastened to mast step:** no

### **Chainplates:**

- cap, intermediate and aft lower shrouds retained by stainless steel single pod deck fittings connected by tie rods to steel fitting bolted to FRP structure belowdecks
- forward lower shrouds retained by stainless deck fitting and tangs bolted to bulkhead belowdecks
- head stay retained by a stainless steel stemhead fitting
- backstay retained by stainless steel tangs through-bolted to transom

**Comments:**

The mast boot nor the under deck lining were removed for a complete inspection of the collar and the reinforcement of the cabin top. Soundings around the collar were sharp and clear and moisture readings remained low.

The mast step was dry at the time of the inspection, but some corrosion was noted at the butt of the mast. No indication of stress or damage was observed on the chain plates or the deck immediately surrounding the fittings.

Percussion soundings of the deck around the chainplates were crisp. Moisture meter readings were unremarkable.

No signs of leakages were noted at the chainplates belowdecks.

**Accommodation****Layout**

Two cabins, two heads, saloon with U-shaped settee to port, table at centerline and two seats to starboard, galley and navigation station.

**Comments:**

The accommodation was clean and well maintained throughout.

The teak and holly cabin sole was in good condition.  
Rugs were reportedly new in 2011.

The door to the forward cabin did not fit properly and could not be closed.

**Recommendation:** *Modify/adjust the door to the forward cabin.\**

The upholstery (reportedly new in 2011) was good condition.  
No internal water leakages were observed.

**Galley equipment:**

**Counter top:** Corian

**Safety belt for cook:** no

**Sink:** double stainless steel

**Stove:** gimbaled 4-burner with oven; make Force Ten

**Fuel:** LPG

**Refrigeration:** 12VDC and 120VAC refrigerator with two top and one front opening door and freezer with top opening

**Microwave:** Panasonic

**Comments:**

**Recommendation:** *Affix a label near the stove with the following information:*

*"CAUTION: Open-flame appliances consume oxygen. Lack of oxygen can cause asphyxiation or death. Maintain open ventilation when stove is in use." (NFPA 8.5.14.7).\*\**

The refrigerator and freezer were functioning on 120 VAC, but did not power up on 12 VDC.

**Recommendation:** *Troubleshoot 12VDC operation of refrigerator and freezer.\**

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## **Fresh Water System**

**Tanks:** two aluminum tanks

**Remote level reading:** at navigation station

**Pumps:** plumbed to heads, galley and shower at swim platform

**Accumulator:** yes

**Water heater:** 12 gallons with 120 VAC heating element and heat exchanger with the main engine

**Safety valve:** yes

**Dockside water connection:** yes

**Water maker:** no

**Piping:** polyethylene tubing

### **Comments:**

The tanks could only be partially inspected and were only partially filled. They appeared to be secure and there was no obvious evidence of leaks.

The water piping was in good condition where visible.  
The fresh water system was tested and was functional.

Leaving the vessel unattended while connected to dockside water supply, may lead to sinking of the vessel if

a ship board water hose or water piping breaks or develops a leak.

***Recommendation:*** *Install a water limiting meter in the dockside water supply and set it for 200-300 gallons and/or disconnect or disconnect the supply hose when vessel is left unattended and mount a warning label to that effect near the dockside connection. \*\**

## **Raw Water System**

**Pump:** one deck washdown pump

### **Comments:**

The pump powered up.

## **LPG system**

**Gas:** LPG for cooking purposes

**Tanks:** two steel tanks (one active, one spare), 13 lbs

**Date of Certification:** March 2004 and December 2006

**Tank provided with an Overfill Protection Device:** yes

**Locker:** sealed from interior of vessel

**Location:** in cockpit locker

**Drain over board:** yes

**Solenoid valve:** solenoid valve with control panel in galley

**Regulator:** yes

**Low side pressure relief device:** yes

**Pressure gauge:** yes

**Fuel lines:** copper with flexible hose at stove

**Gas detector:** yes

**Warning label:** yes

**Comments:**

Tanks were in good condition as seen.

The solenoid valve was functioning.

The system was pressure tested and no pressure loss was noted in the system for five minutes after closing the cylinder valve.

**Heads/Sanitation System (MSD's)**

**Heads:** two manual heads, make Jabsco

**Discharge:** direct overboard, to holding tank or through deck fittings by shore based pump-out facility

**Vented loop in water intake:** not observed

**Vented loop in discharge:** not observed

**Holding tanks:** polyethylene

**Level indicator:** no

**Waste pumps:** Jabsco

**Comments:**

The heads and macerator pumps were functioning.

No obvious signs of leakage were observed in the system.

No means were provided to prevent accidental discharge of treated or untreated sewage where not permitted.

**Recommendation:** *Provide means to prevent accidental discharge of sewage by closing the seacock and removing the handle, padlocking the sea cock, or using a non-releasable wire-tie in order to comply with 33 CRF 159.7.\*\*\**

**Heating, Ventilation and Air Conditioning**

**Air conditioning units:** 2-zone Cruise Air; reverse cycle

**Cowls with Dorade boxes:** yes

**Comments:**

The air conditioning system was functional, but the capacity of the system was not measured

**Bilges and Bilge Pumping**

**Electric bilge pumps:** Parmax 4 with float switch

**Manual bilge pump:** in cockpit

**High bilge water alarm:** no

**Sump pumps:** Parmax 3 with float switch

**Comments:**

The bilges were clean and dry

The bilge pump was functioning but it was wired to be activated by a float switch only.

With the battery switch in the "off" position, the pump did not power up.

**Recommendation:** *Re-wire the bilge pumps to permit manual activation. Run power to the bilge pump from 3-position switches which are directly connected to the battery or battery switch with a properly sized fuse installed in accordance with ABYC E-11.12.1.2.\*\**

The aft sump pump powered up, but the forward pump was not tested.

## Engines

### Propulsion engine

**Make:** Westerbeke **no. cyls:** 4 **model:** 55C

**Type:** diesel

**Power:** 55 hp @ 3000 rpm (Manufacturer's Specification)

**Serial number:** xxxxxxxxxxxx

**Hours of operation:** 1,755 hrs on meter

**Cooling:** closed fresh water

**Aspiration:** natural charged

**Instrumentation:** tachometer, cooling water temperature, lub.oil pressure, volt meter,

**Transmission: make:** Hurth.

**serial #:** xxxxxxxx

**Engine control:** push-pull cables; single lever combining gearshift and throttle control;

**Alternator: make:** Lestek **Output:** 190 Ah

**Engine compartment blower:** no

**Oil change system:** yes



### **Comments:**

The engine was visually inspected only and no diagnostic analyses were made.

The engine was clean except for some belt dust and a small leak of the front seal cover.

**Recommendation:** *Clean up belt dust. If dust continues to be deposited, the pulley of the alternator should be realigned.\**

**Recommendation:** *Monitor the leakage of the propulsion engine front end seal.\**

The gaskets of the exhaust manifolds did not show evidence of bleeding.  
The belts were in serviceable condition.

Flexible mounts (reportedly new in 2011) were supported by molded FRP beds. They were free of signs of stress or significant corrosion

The FRP engine bed was sounded where accessible and soundings were sharp and clear.

Hoses were serviceable, with no signs of failure or leaks.

The crankcase oil was checked; it was close to the mark and black.

The coolant level in the expansion tank was below the minimum.

The oil in the transmission was not checked.

Exhaust elbows should be considered routine long-term maintenance. The probability of failure increases significantly after 4 -5 years of service.

**Recommendation:** *Have the exhaust elbow removed and checked for internal build up of carbon.\**

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**Recommendation:** Perform a complete engine service for new ownership of the vessel. It is suggested to replace alternator belt, fuel filter elements, oil filter and raw cooling water pump impeller, change crankcase oil, change transmission oil, flush and replace engine coolant.\*

**Generator set****Engine: make:** Westerbeke     **model:** 5.0BCD     **no. cyls:** three**Type:** diesel**Output:** 5 KW @ 1800 rpm (Manufacturer's Specification)     **serial number:** 30949-D510**Last overhauled:** unknown**Hours of operation:** 243 hrs**Cooling:** fresh water**Sound shield:** no**Instrumentation:** oil pressure gauge, temperature gauge, volt meter at navigation station**Comments:**

The generator set was visually inspected only. No diagnostic analyses were made.

The crankcase oil was not checked.

The coolant in the expansion reservoir was below the minimum.

**Recommendation:** Top off coolant of generator engine. Check the level of the crankcase oil.\*

The generator started easily and ran smoothly and was operated for about 15 minutes and ran smoothly. Exhaust was clean and raw water discharge appeared to be normal.

It was tested under various loads.

Air conditioning unit system, the inverter/battery charger and the water heater were operated simultaneously

When the generator was loaded, the voltage and frequency remained at steady state conditions within 7 percent of the rated voltage and 3 percent of the rated frequency, which is considered normal.

Oil pressure and temperature were normal. (respectively 37 lbs/sq. inch and 165 degr. F)

**Recommendation:** Perform a complete engine service for new ownership of the vessel. It is suggested to replace fuel filter element, oil filter and raw cooling water pump impeller, change crankcase oil, flush and replace engine coolant.\*

**Fuel System (diesel)****Tanks:** one aluminum tank, capacity 70 gallons**Makers label:** complying with ABYC H-33.9.7**Remote fuel gauge:** at navigation station**Filters:** filter/water separator for propulsion engine and generator**Fill hoses:** J1527 A2 , self-draining, double clamped**Vent hoses:** J 1527 A2 , self-draining:**Distribution hoses:** J 1527 A1**Fuel shut-off valve:** petcocks on tank**Comments:**

The tank was securely installed. It was inspected where visible and there was no obvious evidence of leaks of the tanks or in the system at the time of the survey.

Fuel hoses were in serviceable condition.

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## Exhaust Systems

**Propulsion Engines:****Type:** wet exhaust system**Lines:** wet exhaust rated hoses**Double clamped:** yes**Vented loop with anti-siphon device in raw water discharge:** yes**Muffler:** FRP in-line type**Comments:**

The exhaust hoses were in good condition where visible.

It was noted that the exhaust hose was sagging between the exhaust elbow and the muffler. (see also the engine survey report (dated April 2011) found on board by Bay Shore Marine Engine Service Inc.

No staining or leaks were observed in the exhaust lines.

The proper functioning of the anti-siphon device was not checked.

Anti-siphon devices require periodic maintenance to ensure their effectiveness.

**Recommendation:** *Clean and test the anti-siphon device in the raw water discharge on a regular basis.\**

**Generator engine:****Type:** wet exhaust system**Lines:** wet exhaust rated hoses**Double clamped:** yes**Vented loop with anti-siphon device in raw water discharge:** not observed**Muffler:** FRP in-line type**Comments:**

The exhaust hoses were in good condition where visible.

No staining or leaks were observed on the exhaust lines.

## Drive Train Assembly

**Propeller:** bronze; three- bladed; feathering, make MaxProp; diameter 20"**Propeller shaft:** stainless steel 1 ¼" diameter**Struts:** cast bronze single arm, with rubber cutless bearings**Rope cutter:** no**Coupler:** four-bolt with set screw and key, secured with seizing wire (reportedly new in 2010).**Shaft seal:** dripless type (reportedly new in 2010)**Comments:**

The propeller showed heavy growth of barnacles, which were partially removed at the time of the survey.

The propeller was otherwise in good condition.

The outboard section of the shaft also showed heavy marine growth.

There was no undue play in the cutless bearing.

The strut was in good condition and was securely attached to the hull.

The shaft seal was tight with the vessel at rest and underway.

Checking the propeller shaft/engine alignment was beyond the scope of the survey/inspection and was not done.

**Recommendation:** *Have the propeller shaft/engine alignment checked by a qualified marine mechanic as part of normal maintenance. This should be done when the vessel is in the water and fuel tanks are filled to their normal levels.\**

## **Electrical System**

### **12 Volt DC System**

**Power source:** two 8D gel batteries, 1470 MCA; 225 Ah; installed in August 2006  
one group31 gel battery; 780 MCA, 98 Ah installed in August 2006

**Secured:** tied down

**Battery switches:** one paralleling and isolating switch.

**Battery charging system:** by engine alternators or battery/inverter charger powered by generator or shore power

**Battery monitor:** Heart Interface

**Battery cables:** PVC coated with swaged lugs and fitted with terminal covers

**Power distribution:** panelboard at navigation station with main and branch circuit breakers, Volt and Ampere meters. Separate panel for windlass, refrigerator and power winch

### **Comments:**

The batteries were not load tested but appeared to be in good repair.

No battery boxes or trays to contain leakage and spillage of electrolyte were provided.

**Recommendation:** *Place batteries in acid resistant boxes or trays.\*\**

Some of the battery terminals were not protected by boots.

**Recommendation:** *In order to prevent accidental contact of the ungrounded (positive) battery connections to ground, each battery should be protected so that metallic objects (such as a wrench) cannot come into contact with an ungrounded (negative) battery terminal by covering the ungrounded battery terminals with boots or by installing each battery in a covered battery box.(ABYC E-10).\*\**

The power distribution panel was opened and the wiring was inspected.

All 12 VDC circuits were tested and were functional.

### **120 Volt AC System**

**Power sources:** shore power, generator and inverter

**Shore power inlet:** 30 and 50 Amps

**Shore power disconnect breaker:** double pole

**Shore power cords:** 30 Amps, and 50 Amps, 50 Amp splitter; 30 Amp/20 Amp adapter

**Circuits:** two

**Reverse polarity indicator:** yes

**Battery charger/inverter:** Freedom20 ; output in inverter mode 2000 VA, in charger mode 100 Amp

**Power distribution:** distribution panel at navigation station with main and branch circuit breakers, Volt and Amp meters

**Receptacles:** GFCI protected in head and galley

### **Comments:**

Shore power inlets and cables were serviceable and there were no signs of over-heating.

No warning label was provided indicating that the electrical system includes an inverter.

**Recommendation:** *Install a warning label near the 120VAC panel with the following text:*

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*“WARNING; electrical shock hazard. Vessel is equipped with a DC to AC inverter. Disconnect inverter DC input before servicing the electrical systems” (ABYC A-31).\*\**

120 VAC circuits were tested and found functional, except the GFCI outlet in the forward head which did not power up.

***Recommendation:*** *Troubleshoot non functioning electrical outlet in forward head compartment.\*\**

The remaining GFCI receptacles were tested and were found functional and their response time was 120 msec which is less than the maximum allowable of 150 msec.

### **Wiring**

Wiring was neatly and unobtrusively routed.

The wiring of the 120VAC system tested with an Ideal Sure Test Circuit Analyzer ST-2D:

- reverse polarity: ok
- ground-neutral connection: properly separated
- line impedance hot and neutral: less than 1 Ohm
- ground integrity: line impedance hot plus ground less than 1 Ohm
- voltage drop: less than 7% at 15 Amps

The negative 12 VDC system was not connected to the 120 VAC grounding as per ABYC Standards. This is an important safety feature. Should there be across-over of 120VAC to the 12 VDC wiring, as can happen inside the battery charger/inverter, or where wiring has chafed, a connection between the DC negative wiring and the AC grounding (green) wiring would lead the current back to the 120 VAC grounding and trip the circuit breaker of the circuit involved.

***Recommendation:*** *Have a qualified marine electrician connect the main AC grounding bus to the engine negative terminal or the DC main negative bus (ABYC E-11.5).\*\**

## **Ground Tackle and Mooring Equipment**

**Anchor roller:** stainless steel fitting with double Marithane roller

**Windlass:** electric 12-Volt, make Simpson Lawrence with chain gypsy and warping head, operated by foot switches

**Anchor and rode:** - stainless steel Delta plow anchor; 45 lbs (estimate) (reportedly new in 2011) with all-chain( 3/8”) rode  
- Danforth model; 15 lbs (estimate) anchor with short ½” three-strand nylon rode

**Chain locker:** in forepeak

**Mooring equipment:** three chocks and three stainless steel cleats on each side

### **Comments:**

The windlass was securely installed.

The windlass was functioning, but it was not fully tested.

The visible anchor chain and nylon rode were serviceable, although they were not removed from the locker for a complete inspection. The length of the chain rode was not measured, but appeared adequate.

***Recommendation:*** *Pull up anchor rode from anchor locker and check its condition.\**

The ground tackle appeared adequate for this vessel in protected waters.

The mooring equipment was adequate and secure.

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## **Spars, Rigging and Sails**

**Rig:** masthead sloop.

**Mast:** coated aluminum; double spreaders; internal sheaves for halyards

**Main boom:** coated aluminum

**Spinnaker poles:** none

**Standing rigging:** continuous stainless steel rod headstay, backstay, cap, diagonals, intermediate diagonals, and double lower shrouds.

**Backstay adjuster:** Navtec hydraulic adjuster

**Terminals:** swaged Navtec

**Turnbuckles:** open barrel stainless steel with bronze studs

**Jib roller furling system:** Harken

**Running rigging:** Dacron low-stretch rope

**Preventer:** not observed

**Lazy jacks:** yes

**Sail inventory:**

- main sail; full battened, good condition
- 140% genoa; not inspected
- gennaker; not on board at the time of the survey

### **Comments:**

The mast was stepped and was inspected with its rigging from deck level only.

Spars, spreaders, standing and running rigging were visually inspected only and appeared in serviceable condition as viewed from deck level.

It should be noted that a visual inspection can only disclose surface defects and therefore no statement could be made regarding the complete reliability of the rigging.

The coating of the mast showed galvanic corrosion at fittings and at the butt.

The boom also showed galvanic corrosion.

**Recommendation:** *Re-bed fittings of mast and boom as found necessary and re-finish coating as needed.\**

The luff foil of the jib furling system was not inspected since the jib was not unfurled.

The hydraulic backstay adjuster was pumped up to 2,000 psi and held its pressure.

**Recommendation:** *Equip vessel with a preventer for the main boom and mizzen boom to prevent uncontrolled jibing (SRCS 4.21).\*\**

**Note:** Navtec recommends having the rod rigging inspected after 40,000 sailing miles or 6 years (whichever comes first). This would include inspection of all rod heads and end fittings. They also recommend replacing the turnbuckle screws at that time.

**Note:** Reportedly the rigging was surveyed by Hathaways, Raymond and Reiser in May 2011 and the only defect found was a broken lens of the tri-color light.

## **Sailing Hardware**

**Winches:**

- one Harken 44 (two-speed in manual mode) self tailing main halyard power winch
- two Harken 66.2 two-speed self tailing primaries in cockpit
- one Harken 46 two-speed self tailing winch on aft end of the cabin trunk

**Genoa tracks:** inboard and outboard on toerail with sheeting cars

**Traveler:** on cabin top

**Vang:** hard vang with tackle with 1:4 purchase

**Rope clutches:** on cabin top

**Comments:**

The hardware was in good condition and securely installed.

Lead and sheet blocks were installed on deck.

The winches were secure and functional.

### Canvas

**Dodger:** yes; on stainless steel tubing

**Bimini:** yes; on stainless steel tubing (reportedly new in 2011)

**Covers:** mainsail cover (reportedly new in 2011), hatch covers, steering pedestal cover, winch covers, covers of teak grab rails, cover Bimini

**Comments:**

All canvas was in serviceable condition.

### Fire Fighting Equipment

**Portable Fire Extinguishers:** three class ABC and two class BC size-I dry chemical extinguishers

**Fire port in engine compartment:** no

**Fixed Fire Extinguishers:** no

**Service tags:** yes no

**Comments:**

The USCG requires for this vessel only three USCG approved size-I portable fire extinguishers.

ABYC and NFPA standards call for four USCG approved size-I portable extinguishers rated for class A, B and C fires in addition to a portable suitably sized clean agent fire extinguisher for direct discharge into the engine compartment without opening the primary access (ABYC A-4).

***Recommendation:*** Upgrade portable fire extinguishers to ABYC and NFPA standards. One of the extinguishers should be installed within reach of the helmsman. All other extinguishers should be located adjacent to exit paths\*\*

***Recommendation:*** The Owner should inspect all fire extinguishers monthly and verify that they are securely mounted in prominent locations, gauges read correctly, safety pins are in place and seals are in unbroken condition. Dry chemical extinguishers should be removed from their brackets, turned upside down and shaken vigorously and then properly secured in the mounting bracket. Halon extinguishers should be weighed. Non-rechargeable fire extinguishers should be removed from service 12 years from date of manufacture (NFPA 10-6.3.3.1). Recharge or replace any units after (partial) discharge. Fire extinguishers located inside lockers or other "hidden" locations should be identified with a permanent red placard reading "Fire Extinguisher Inside".

Annually a full maintenance check should be made of all extinguishers by qualified service personnel.

A tag should be attached showing the date of such maintenance check (ABYC A-4.Ap.5 and Ap.6).\*\*

There was no provision to discharge the portable fire extinguishers with a clean agent into the engine compartment without opening the access.

**Recommendation:** *Make a provision for discharging a suitably sized portable clean agent fire extinguisher directly into the space surrounding the engine without opening the primary access.*

*Where the location of an access port will not permit an extinguisher to remain upright, the extinguisher should be equipped with a discharge hose (NFPA 10-2.4).*

*Alternatively, install a fixed automatic fire extinguishing system capable of both automatic and manual operation in the machinery space meeting the standards of NFPA 10-3 and ABYC 4.7.\*\**

**Note:**

- A clean agent is an electrically non-conducting, volatile, or gaseous fire extinguishant that does not leave a residue upon evaporation.

Examples of clean agents are Halocarbon gasses such as hydrochlorofluorocarbons (HCFC's), hydrofluorocarbons (HFC's), perfluorocarbons (PFC's and FC's) and fluoroiodocarbons (FIC's) and CO<sub>2</sub>.

- Production of Halon 1211 and Halon 1301 has ceased, but these gasses may still be available for re-charging existing extinguishers.

- Replacement agents for Halon are HFC-227 for *occupied* spaces and HFC-241 for *unoccupied* spaces. HFC-227 has low toxicity, but is roughly double the price of HFC-241, since 50%-70% more of it is required to protect the same space.

## **Safety Equipment**

**Personal Flotation Devices:** two adult USCG type I, four adult USCG Type II; four throwable flotation cushions USCG type IV

**Life ring/horse shoe:** no

**Lifesling:** yes    **Self-igniting light:** no    **Lifesling tackle:** no

**MOB module:** no

**MOB pole:** no

**Heaving Line:** not observed

**Liferaft:** no

**Harnesses:** no

**Jacklines:** no

**Flares:** six hand-held flares

**Distress flag:** not observed

**EPIRB:** no

**Radar reflector:** in mast

**First Aid kit:** yes

**Grab bag:** no

**CO detectors:** no

**Smoke detectors:** no

**Comments:**

The service life of the flares had expired.

**Recommendation:** *Equip vessel with at least 3 day and 3 night, or 3 day-and-night flares with current dates, in order to meet USCG requirements(33CFR 175.110).\*\*\**

An electric distress light meeting the standards of 46CFR 161.013 may be used instead of the requirements for night flares (33CFR 175.130).

An orange distress flag may be used instead of the requirements for day flares (33CFR 175.130).

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**Recommendation:** Equip vessel with a heaving line of 50-75 ft, readily accessible to the cockpit (SRCS 4.19). \*\*

**Recommendation:** In order to promote safe operation of the vessel, it is suggested to add harnesses with tether lines for every person aboard. \*\*

The vessel was equipped with a Lifesling, but no Lifesling tackle was observed and no self-igniting light was attached to it. A dedicated tackle will greatly facilitate hoisting a person out of the water. A light will assist a person in the water to locate the sling.

**Recommendation:** Equip vessel with a Lifesling tackle and attach a self-igniting light to the sling. Inspect annually all of the components of the Lifesling, including rings and line. The yellow polyprop must be completely protected from UV light. \*\*

ABYC standards recommend CO detectors on all boats with an enclosed accommodation if a gasoline engine is installed. Although diesel exhaust does not normally have CO concentrations as high as gasoline exhaust, diesel exhaust does produce dangerous levels of CO. LPG stoves also produce CO.

**Recommendation:** Install Carbon Monoxide (CO) detectors in the main cabin (saloon) and in each sleeping area. The power source of the detectors may be self-contained batteries or a direct connection to the energized side of the vessel's battery switch. The detectors should be certified to meet the requirements of UL 2034. If a circuit breaker is installed, it should be non-switchable. (ABYC A-24). \*\*

NFPA recommends smoke detectors on boats with a length of 26 feet.

**Recommendation:** Install a single station smoke alarm that meets UL-217 standards (Marine Technologies model SA-668M or equivalent), in each overnight sleeping space (NFPA 302-12.3). \*\*

**Note:**

Inexpensive battery operated UL listed combined Smoke & Fire Alarms meeting NFPA requirements are on the market.

## **Navigation Instruments/Electronics and Entertainment**

### **Instruments in cockpit**

**Compass:** 5" Ritchie Powerdamp spherical magnetic steering compass in binnacle on steering pedestal

**Compass deviation chart:** not sighted

**GPS/Radar:** Garmin GPS map 6208 (reportedly new in 2011)

**Radar antenna:** radome; Questus Q 100 backstay- mounted

**Echo sounder:** Raymarine ST 60+

**Log/ Speedometer:** Raymarine ST 60+

**Wind indicator:** Raymarine ST 60+

**Multi display instrument:** Autohelm Nav Data (SOG, COG, Tide, VMG, Time, Lat Dr.)

**VHF:** remote command mic

**Auto Pilot:** Autohelm ST 7000

### **Instruments at navigation station**

Autohelm GPS display

Raymarine ST 60 Graphic

**VHF:** ICOM IC-M504

Furuno Navtex NX 30

### **Entertainment systems**

**Stereo system:** Clarion M605/M3580 with two speakers in cockpit and two in saloon

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**TV monitor:** Sharp 14" with DTV tuner and DVD/CD-R player

**Comments:**

All instruments and entertainment systems powered up, however no technical testing or verification of functionality was conducted.

It was noted that the tray of the DVD player did not open up.

**Recommendation:** *Troubleshoot non-functioning tray of the DVD player.\**

The TV powered up but no reception was obtained.

No deviation card for the magnetic steering compass was sighted. An uncorrected compass can not be relied upon.

**Recommendation:** *Swing the compass or perform checks with GPS readings. \*\**

**Recommendation:** *SRCS recommends equipping the vessel with a handheld VHF transceiver.\**

### **Other Navigation Equipment**

**Navigation lights:** side lights, masthead light, stern light, anchor light, tri-color masthead light

**Navigation shapes:** not observed

**Sound Producing Devices:** disposable hand held compressed gas horns

**Bell:** yes

**Navigation rules:** not observed

**Comments:**

Side lights, masthead light, stern light and anchor were functional. It was not assessed if the lights met all of the requirements of 33CFR 84 and 183, 46CFR 25, ABYC A-16, including range of visibility.

The functioning of the tri-color light could not be confirmed and reportedly the lens of the light was broken.

**Recommendation:** *Repair tri-color masthead light as found necessary.\*\**

The International Navigation Rules(72 COLREGS) and the Inland Navigation Rule require that a vessel proceeding under sail when also under power exhibit a dayshape in the form of a cone, apex downwards.

**Recommendation:** *Equip vessel with a conical dayshape if the vessel will be operated in International waters.\*\*\**

The International and Inland Navigation Rules require that a vessel at anchor outside a dedicated mooring field shall exhibit during the day a dayshape in the form of a ball.

**Recommendation:** *Equip vessel with a dayshape in the form of a ball (Navigation Rules Annex I).\*\*\**

The Inland Navigation Rules require that a copy of the rules is carried on all vessels 40 feet in length.

**Recommendation:** *Equip vessel with an up-to-date copy of the Inland Navigation Rules.\*\*\**

### **Miscellaneous Equipment**

**Oil Discharge Prohibited Placard:** no

**Waste Discharge Prohibited Placard:** no

**Waste Management Plan:** no

**Spot/floodlight:** not observed

**Clock:** Chelsea

**Barometer:** Chelsea

**Boatswain's chair:** not observed

**Various:** Cockpit cushions (reportedly new in 2011), two boat hooks, eight fenders, dock lines, portable manual bilge pump, two folding deck chairs, two "sit anywhere seats", two sun pads, davit for outboard motor, binoculars, 120 VAC vacuum cleaner, various spare parts incl. filters

**Comments:**

Vessels 26 feet or more in length must have a Discharge of Oil Prohibited Placard fixed in a conspicuous place in each machinery space and display a Waste Discharge Placard in a prominent location

**Recommendation:** *Equip vessel with an Oil Discharge Prohibited Placard (33CFR 155.450) and a Waste Discharge Prohibited Placard (33CFR 151.59(b)).\*\*\**

Recreational boats 40 feet or more in length and equipped with a galley and berthing are required to carry a Waste Management Plan, describing the procedures for collecting, processing, storing and discharging garbage, and designate the person who is in charge of carrying out the plan

.if the vessel operates, or is certified to operate, beyond 3 nautical miles from shore.

**Recommendation:** *Make a Waste Management Plan and carry it on board, if the vessel will operate beyond 3 nautical miles from shore.(33CFR151.57).\*\*\**

**Recommendation:** *Equip vessel with a boatswain's chair (SRCS 4.24).\*\**

The equipment listed in this report does not constitute a complete inventory of the vessel's equipment or personal effects.

## **Sea Trial**

**Departure time:** 1325

**Returning time:** 1420

**Where held:** Long Island Sound

**Wind direction and speed:** North, 10 kn

**Sea state:** waves less than 1 foot

**Captain:** xxxxxxxx

**Other attendants:** xxxxxxxxxx

**Comments:**

The engine started without excessive cranking and alarms extinguished.

The engine was operated for about one hour and ran in forward and reverse gears at various speeds, without abnormal indications.

The gear shift engaged smoothly. There was no excessive movement of the engine on its mounts when backing up.

Raw water flow appeared to be adequate and the exhaust was clean.

Throttle and gear shift functions appeared normal.

The engine was run to full throttle and achieved about 3,025 rpm which is close to the maximum specified by the engine manufacturer. Top speed was about 8.2 knots.

No excessive vibrations were felt over the whole speed range. No wobbling of the stuffing box was noted. Cooling water temperatures and lubrication oil pressures were normal and remained constant within the speed range.

Steering response was good.

No leakages were observed of fuel, cooling water or lubrication oil during or after the sea trial.

The alternator was charging.

The tachometer at the helm was not functioning and the rpm's were measured with a handheld tachometer.

***Recommendation:*** *Troubleshoot non-functioning tachometer.\**

The autopilot held course and responded to commands.

Carbon Monoxide levels were measured in the engine compartment and accommodation with a portable meter. No elevated values were recorded.

### **Limiting Conditions**

The ownership and title of the vessel are assumed to be correct, as provided orally by the Client and/or documents provided to the Surveyor.

Descriptions are based on visual examination as set forth in section "Scope of the Assignment" of this report.

The findings, opinions and conclusions are based upon the best professional judgment of the undersigned surveyor.

If this report does not discuss a specific item, equipment or machinery, it is not covered by this survey.

The assigned valuation assumes that components, systems or equipment, not readily accessible or proven during the inspection, were in fact in good condition, serviceable and/or operational. If this hypothesis is not true, the value of the vessel may be significantly lower.

The opinion of value, herein, is only for the stated effective valuation date and only for the stated intended use and intended users.

The surveyor warrants that this report is a true and unbiased opinion of the vessel, based upon a visual inspection in the time allotted at the time of the inspection.

It is the nature of marine vessels that deterioration, wear, and accidents do occur and as such this report can only be indicative of the condition and value of the vessel at the time the inspection was conducted.

This report makes no representation and does not purport to describe any condition which may have changed since the date of the inspection and the recommendations herein are limited to those that, in the opinion of this surveyor, are reasonably necessary and appropriate, based upon the conditions and circumstances as they existed at the time of the inspection.

While every effort has been made to conduct a thorough inspection, there can be no guarantee or warranty, express or implied, as to the condition or suitability of the vessel and her equipment or machinery.

The surveyor does not warrant expressly or implied, or guarantee compliance of the vessel with all of the rules, regulations and standards mentioned in the section "Purpose of the Survey" of this report.

Valuations do not constitute any guaranty that these figures are attainable in actual current or future markets.

Muntz Marine Surveyors, LLC and /or the attending Surveyor assume no responsibility for any defects and is to be held harmless for conditions subsequently arising.

Sources used in the Scope of Work were carefully chosen, and are assumed to be reliable. No responsibility is taken by Muntz Marine Surveyors, LLC for the opinions rendered by the sources, or any errors in prices they generated.

This Report must be used by the intended users in its entirety or shall thus be invalid, and may not be reproduced, taken out of context, or made available for public use or distribution. The contents of the Report shall remain confidential.

The Report is not transferable to any other person or entity. Subsequent buyers of the vessel are excluded as third parties and Muntz Marine Surveyors, LLC and/or the attending Surveyor are excluded from any liability to any third party.

The Surveyor does have continuing obligations to securely retain this Report for up to seven years. Beyond that period of time, the document will not be retained and will be destroyed.

The delivery of this Report to the Client concludes the obligation of this assignment. Any additional services related to this or any new assignment would require a new Work Order.

### **Surveyor's Certification**

The undersigned Surveyor certifies, to the best of his knowledge and belief, that:

- the statements of fact contained in this report are true and correct
- the reported analyses, opinions, and conclusions are limited only by the reported assumptions and limiting conditions and are his personal, impartial, and unbiased professional analyses, opinions, and conclusions
- he has no present or prospective future interest in the vessel that is the subject of this report and no personal interest with respect to the parties involved
- he has no bias with respect to the vessel that is the subject of this report or the parties involved with this assignment
- his compensation for completing this assignment is not contingent upon the development or reporting of a predetermined value or direction in 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
- his analyses, opinions, and conclusions were developed, and this report has been prepared, in conformity with the *Uniform Standards of Professional Appraisal Practice* using methods recognized by the *American Society of Appraisers*, leading to an educated, unbiased, and defensible opinion
- he has made a personal inspection of the vessel that is the subject of this report
- no one provided significant appraisal assistance to the undersigned Surveyor

Respectfully submitted

Jan W. Muntz, SAMS  
Accredited Marine Surveyor #832



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## **Appendix A** **Scope of the Assignment**

(Unless stated otherwise in the main body of the report)

### **Scope of Inspection of the Vessel**

Guidelines used for this survey were the Rules and Regulations for Recreational Boats, as excerpted from the *United States Code (USC)* and the *Code of Federal Regulations (CFR)* published by the American Boat and Yacht Council (ABYC), as well as the *Standards and Technical Information Reports for Small Craft*, also published by the ABYC, and *NFPA 302: Standard for Pleasure and Commercial Motor Craft*, published by the National Fire Protection Association (NFPA). For sailing vessels the *Safety Recommendations for Cruising Sailboats (SRCS)*, published by US Sailing have been used to the extent they were applicable.

An assessment whether the vessel was in full compliance with all of the rules, regulations and standards was beyond the scope of the survey.

Analyses of inherent design and stability characteristics as performed by a naval architect were beyond the scope of this survey.

Hull and deck moldings were subjected to close visual inspection, random percussion soundings and moisture meter readings, unless prevented by weather conditions such as rain and freezing temperatures at the time of the survey and provided they were readily accessible.

If the vessel was inspected afloat it may not have been possible to perform percussion test or to take moisture meter readings of the topsides of the hull.

Moisture meter readings may be unreliable if the boat was hauled shortly before the survey. Core material of deck or hull, if any, was not be sampled.

Dirt, marine growth, paint buildup or corrosion may have restricted the Surveyor's ability to examine the hull of the vessel.

The interior structure of the vessel was visually inspected. Stringers were subjected to percussion tests and moisture meter readings to the extent they were readily accessible. The basic functions of systems and equipment was checked

Certain parts of the vessel's structure, systems and equipment could only be inspected after removing bulkheads, joinery, liners, cabin soles, tanks, etc. This would have been prohibitively time consuming, potentially destructive and costly to restore and therefore components requiring access with tools or by disassembly were not inspected.

The installation and external condition of machinery, plumbing, electrical systems and equipment were visually inspected only.

Complete inspection could only have been made by disassembly or by continuous operation. This was not done. No mechanical tests were performed on propulsion or auxiliary equipment. No compression tests were performed.

No fluid samples were drawn, but may have been recommended.

No spray testing of deck, hatches and portlights was conducted.

No machinery, electronics, ancillary equipment, tanks or fittings were opened for internal examination. The inspection of flexible piping was limited to the condition of its external casing and only where readily accessible for visual inspection.

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Machinery and equipment was only inspected while operating if the Owner or the Owner's authorized representative (captain, broker, etc.) was present to operate the machinery and equipment, unless stated otherwise in the main body of this report.

Machinery and equipment such as laundry machinery, heating systems using diesel fuel or gasses, cook tops, ovens, reverse osmosis water makers etc have not been operated unless stated otherwise in the main body of this report.

If the vessel was blocked ashore, no machinery was operated.

If the vessel was in a state of winter lay-up, operation of winterized systems was precluded.

Propulsion and rudder shafts were not drawn for inspection, and engine/propeller shaft alignment was not checked.

Batteries and their installation were visually inspected, but the batteries were not load tested. The external condition of electrical wiring, connections and system installation was inspected to the extent that they were readily accessible. If proper shore power was readily available, the 120VAC wiring system was tested with an Ideal Circuit Analyzer. Electronic and electrical equipment was tested by powering up and observing basic functions. No measurements were taken; no calibrations or adjustments were made.

A complete analysis of the vessel's electrical systems was beyond the scope of the survey.

A Corrosion Survey was beyond the scope of this survey.

Non-essential equipment, such as TVs, VCRs, CDs, stereos, cell phones, washers and dryers, dishwashers, heaters and airconditioning systems, auto pilot, sat phone, computers, faxes, sonar, etc. was not fully tested. A Corrosion Survey was beyond the scope of this survey.

Anchor rodes were only be fully evaluated if they were pulled up from the locker and laid out for inspection. Bimini tops, awnings, winter covers, etc, that were not rigged or laid out for inspection, were not evaluated.

If the mast of sailing vessels was stepped, spars and rigging were visually inspected from deck level only. Inspections aloft by a qualified rigger should always be made before sailing offshore.

Sails that were furled or bagged were not inspected

Minor issues, not materially affecting the value of the vessel may not have been addressed.

Latent defects may have existed that were not discoverable under normal inspection methods.

The survey report is not to be considered a complete inventory of the vessel's equipment.

Trailers, were only inspected if specifically agreed upon at the time of ordering the survey.

If so, the trailer was visually inspected only.

The fit of the boat on the trailer was only evaluated if the vessel was positioned on the trailer

Electric lights and electric trailer winches were only tested if the owner of the vessel made available a tow vehicle with matching trailer connectors.

Wheel bearings were not opened up for inspection. Brakes were not tested.

The pressure of the tires was not checked.

The inspection did not replace the mandatory inspection by the DMV.

### **Scope of Market Analyses**

Market values were analyzed using:

- comparisons with other similar boats recently sold on "Soldboats.com" and/or listed in current publications and internet brokerage sites
- standard industry pricing guides such as "BUC ValuProfessional" and the "N.A.D.A. Appraisal Guide".
- current asking prices on YachtWorld.com and/or listed in current publications and internet brokerage sites.

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## **Appendix B** **Definition of Terms**

**Appeared:** means that a close inspection and/or testing of the particular item or system, was not possible due to constraints imposed upon the surveyor (e.g. no power available, the item was not clearly visible or readily accessible, or requirements not to conduct destructive tests, etc.).

**Powered up:** means that the unit was turned on and powered up. Calibration or verification of proper operation was not done. It does not mean that the unit is fully operational or functional unless specifically stated in this report.

**Fit for Intended Service:** service intended by the Client and stated in the report.

**Good Marine Practice:** a time-honored practice, method or technical configuration that has proven to be practical, sound and/or to improve the safety of vessels and/or their crews.

### **Categories of Cruising (as defined in the Safety Recommendations for Cruising Sailboats by US Sailing):**

- **Inshore Cruising (IC):** short-duration cruising in open, relatively warm water, most of which is protected or close to shorelines. Extended severe weather can generally be avoided by heeding local weather forecasts or by returning to harbor. Night sailing is included.
- **Coastal Passage-Making (CPM):** long-duration cruising along or not far removed from shorelines, but where a high degree of self-sufficiency is required of the boat and crew although outside assistance would normally be available in the event of serious emergencies. The boat and crew may be required to manage severe weather for significant periods before safe harbor can be reached.
- **Ocean Passage-Making (OPM):** long-duration cruising, well offshore or in large unprotected bays or other areas where the crews may experience large waves, strong currents and conditions leading to the rapid onset of hypothermia; where the boat must be completely self-sufficient for extended periods, capable of withstanding heavy storms and prepared to meet serious emergencies without the expectation of outside assistance.

### **Condition of a component or system:**

- **Poor Condition:** means that the item or system required more than minor attention, or had more than a few deficiencies, or was in need of service, repairs, or replacement.
- **Fair Condition:** means that the item or system was marginally serviceable, or cosmetically poor, but still functions. The term may also mean that the overall system is less than in good condition.
- **Adequate or Serviceable Condition:** means that the item or system was in reasonable condition and sufficient for a specific requirement.
- **Good Condition:** means that the item or system was nearly new, with only minor cosmetic or structural discrepancies.

**Overall condition of a vessel:**

- **Restorable Condition:** means that enough of the hull and machinery existed to restore the vessel to useable condition.
- **Poor Condition:** means the vessel was unusable as is. It required repairs or replacement of systems, components, or other gear in order to be considered functional.
- **Fair Condition:** means that the vessel needed major additional work and/or additional equipment.
- **Average Condition:** means that the vessel was ready for its intended service, requiring no major or extensive additional work and was normally equipped for a vessel of its size and its intended service.
- **Above Average Condition:** means that the vessel had been cared for above average and/or was equipped with extra (electrical) equipment and electronic gear.
- **Excellent Condition:** means that the vessel was new or like new.

**USCG:** United States Coast Guard**USC:** United States Code**CFR:** Code of Federal Regulations**ABYC:** American Boat and Yacht Council**NMMA:** National Marine Manufacturers Association**NFPA:** National Fire Protection Agency**UL:** Underwriters Laboratories Inc.**Appendix C**  
**Rubbing of Hull Identification Number**

(Deleted in order to protect the Client's identity)

**Appendix D**  
**Coast Guard Vessel Documentation Query**

**Coast Guard Vessel Documentation**

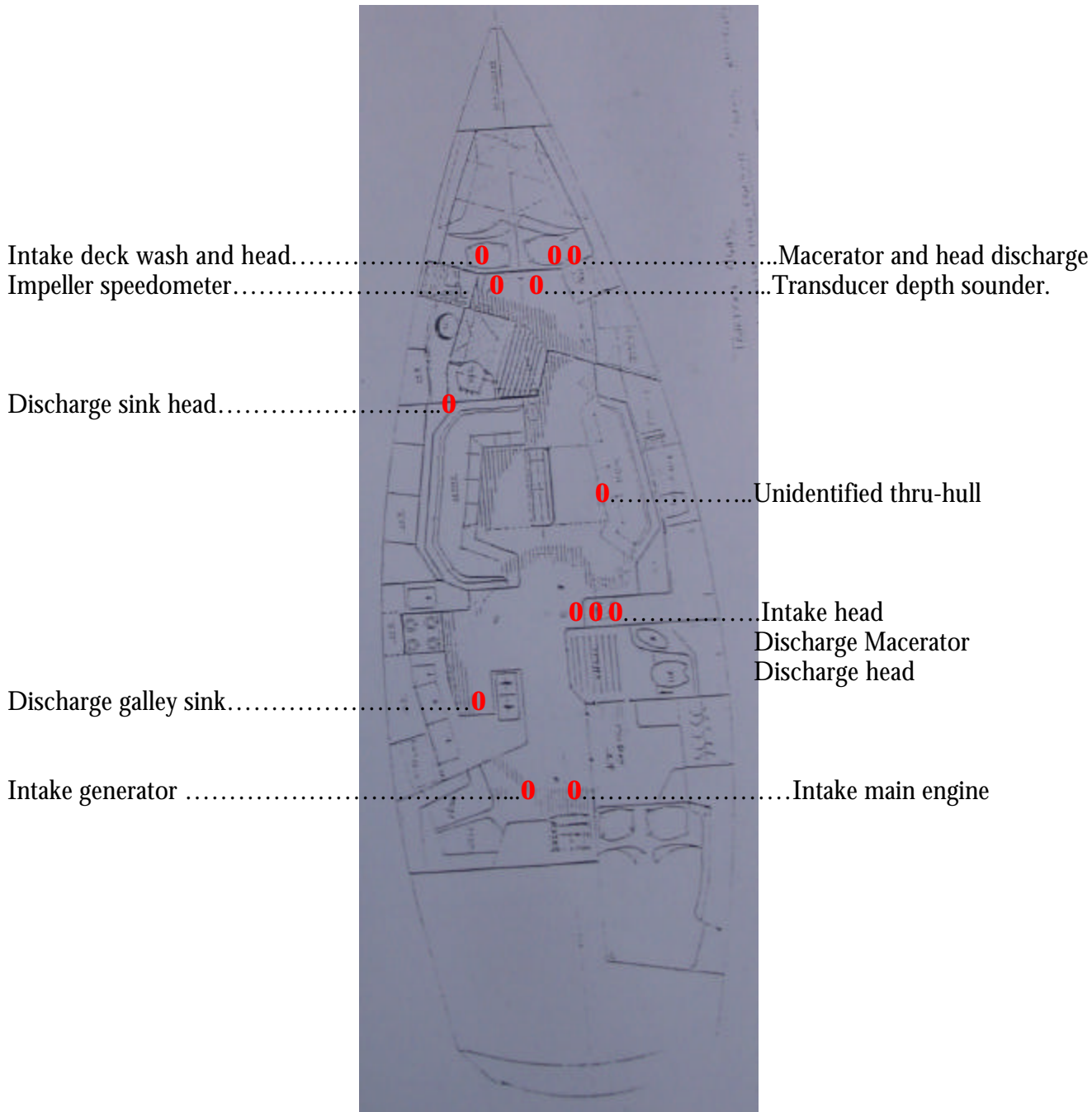
**Data found in current database.**

Vessel Name:	XXXXXXXXXX	USCG Doc. No.:	XXXXXX
Vessel Service:	RECREATIONAL	IMO Number:	*
Trade Indicator:	Recreational	Call Sign:	*
Hull Material:	FRP (FIBERGLASS)	Hull Number:	TARxxxxxJ596
Ship Builder:	TARTAN YACHTS INC	Year Built:	1996
		Length (ft.):	46.2
Hailing Port:		Hull Depth (ft.):	7
Owner:	xxxxxxxxxxx	Hull Breadth (ft.):	14.2
		Gross Tonnage:	22
		Net Tonnage:	20
Documentation Issuance Date:	July 19, 2011	Documentation Expiration Date:	July 31, 2012
<b>Previous Vessel Names:</b>		<b>Previous Vessel Owners:</b>	

(Vessel name, Owners name, documentation and hull number deleted in order to protect the Client's identity)

**Appendix E**  
**Schematic Location of Through-Hulls below Static Waterline**

Not all thru-hulls may have been located due to positioning of slings and limited access to the bilges and/or the inside of the hull.



## **Appendix F** **Approaches to Value**

There are three fundamental approaches to value: the Cost Approach, the Income Approach and the Market Comparison Approach. The Surveyor considered all three, and chose the Market Approach to Value as the method used in this Report of Appraisal to reach a value conclusion for this vessel. It is the appropriate method because comparable vessels have been sold and are available for sale in the current market place.

The **Market Approach** to Value is research and analysis comparing sales of similar vessels to permit comparison, estimating value by comparison with properties sold in the relevant market, with adjustments made for differences which affect value, such as condition and equipment of the subject vessel.

The **Income Approach** to Value is research and analyses of the present worth of anticipated income. This approach was rejected because the subject vessel is not an income producing property.

The **Cost Approach** is a method in which the replacement cost is depreciated based on the age of the subject vessel. The appraiser uses a depreciation rate determined by his experience. This method is inherently less accurate than the market analysis, because the current value obtained is very sensitive to the rate of depreciation applied.

The replacement cost used in a Cost Approach is defined as the retail cost of a new vessel of the same make/model with similar equipment offered by the same manufacturer, or in the event that an exact replacement is not available, the cost of a new comparable vessel from another manufacturer.

In view of the vessel's age and service, the Cost Approach was not considered an appropriate method. The surveyor determined there were a sufficient number of vessels of like age, size and class currently offered for sale as well as a sufficient number of reported sales of vessels of like or similar age, size and class as the subject boat to support a **Market Approach** method of valuation.

## **Appendix G** **Market Analyses**

The database of SoldBoat.com is the source used most often in the industry and is generally relied upon in the field.

In arriving at the estimated Fair Market Value of the subject vessel, actual selling prices of vessels of the same model reported by SoldBoat.com have been adjusted as far as practicable to reflect differences in specification, age and/or condition between the subject vessel and vessels used as reference.

Asking prices of vessels currently offered for sale on internet sites such as YachtWorld.com and estimates provided by standard industry pricing guides such as BUCValuPro, NADA and Power Boat Guide have also been used in arriving at the estimated Fair Market Value if there were an insufficient number of vessels of the same model in the SoldBoat.com database.

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Asking prices of vessels offered for sale have been adjusted to reflect differences in specifications, age and/or condition and have also been discounted to reflect the negotiation between sellers and buyers in the purchasing process.

Where insufficient market information was available for vessels of the same manufacturer and model, market information of comparable vessels having similar technical characteristics may have been used in arriving at the market value of the surveyed vessel.

If there is a wide divergence between actual prices of vessels sold and asking prices of vessels offered for sale, estimates provided by industry pricing guides have also been used in arriving at the market value of the surveyed vessel.

Estimates provided by these pricing guides do not reflect actual sales, but yacht brokers often do use these pricing guides when setting listed prices of vessels offered for sale and so do potential buyers when making offers.

Although the estimates provided by pricing guides may have a lag time between reality and current market value, these estimates do provide useful additional market information.

**SoldBoats.com** reports the following actual sale prices:

One 1997 model (California) sold in Febr. 2011 for \$ 205,000

One 1996 model (Maryland) sold in Nov. 2010 for \$ 200,000

One 1997 model (Florida) sold in March 2010 for \$ 278,750

**Yacht World.com** lists the following vessels for sale:

One 1993 model "WINDDANCER" (Annapolis) asking \$ 279,000

One 1995 model (Maine) asking \$ 289,000

**De Valk Yacht Brokerage**

One 1994 model (Netherlands) asking Euro 318,000 (\$ 430,000)

**BUCValuPro** provides the following estimates:

Used: BUC condition \$ 297,500 - \$ 327,000

Replacement Value: \$ 861,000

**NADA** provides the following estimates:

Average retail: \$ 201,000 (includes some options)

The vessel was purchased by its current Owner in May 2011 for \$ 253,000 and he upgraded the vessel by redoing the upholstery, overhauling the engines and adding navigation equipment

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## **Appendix H** **Surveyor's Credentials**

### **Current Occupation**

Principal Surveyor of Muntz Marine Surveyor, LLC (2002-present).  
Specializing in Pre-purchase Surveys, Insurance Surveys and Appraisals of recreational power and sail boats.  
In this capacity he surveyed several hundreds of recreational sail and power boats.

### **Education**

- **Delft University of Technology** in the Netherlands: *Master of Science in Naval Architecture* (1964)
- **Wooden Boat School**, Brooklin, ME (2001)  
Courses "Surveying of Fiberglass Boats" and "Marine Surveying as a Business"
- **Apprenticeship** with an experienced surveyor in RI (2001)
- **American Boat and Yacht Council (ABYC)**:
  - Course "Electric Systems"
  - Course "Engines"
  - Course "ABYC Standards"
- **American Society of Appraisers (ASA)**:  
Course National Uniform Standards of Professional Appraisal Practice (USPAP), class SE 100 and passed proctored test (2011)

### **Professional Memberships**

- **Society of Accredited Marine Surveyors (SAMS)**; *Accredited Marine Surveyor*
- **American Boat and Yacht Council (ABYC)**; *Standards Certified*
- **US Boat Technical Exchange**

### **Professional Experience**

- **Royal Netherlands Navy** (1964-1966)  
2<sup>nd</sup> Lieutenant. Naval Design Office; member of a team supervising the construction of frigates
  
- **Royal Van Ommeren Group**, Rotterdam, the Netherlands (1966-1997)  
The Van Ommeren Group was a diversified world wide operating company with interests in ocean shipping, tank barging, storage of liquid petroleum products, chemicals and gasses and other transport related activities.  
After merging with another company in this field, it became the world's largest independent tank storage company named **Royal Vopak**.
  - Naval Architect Ship Owning Division: Performed feasibility and design studies for new tonnage. Supervised the construction of ships at shipyards in Europe and Asia
  - President Ship Owning Division. Responsible for all aspects of ship operations
  - President Van Ommeren (USA). Coordinated and supervised the group's activities in the USA
  - Vice-President Tank Terminal Division. Responsible for the coordination of technical and environmental management of tank terminals in Europe and Asia
  - General Manager Gamatex, a major tank storage facility in the Port of Antwerp.

### **Affiliations**

**The Baltic and International Maritime Council (BIMCO)**, Copenhagen, Denmark (1980-1989)

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BIMCO is an international organization of ocean shipping companies, providing information to its members on port conditions, international legislation and which develops standard contracts for the maritime transportation of goods.

- Chairman of the Executive Committee and member of the Board of Directors

**Bureau Veritas, Paris and Rotterdam (1977-1986)**

Bureau Veritas is one of the leading international classification societies, developing rules for the construction and equipment of ships and yachts and surveys ships and yachts under construction and in service.

- Member of the General Council
- Member of the Technical Committee
- Chairman of the Dutch Committee

**Netherlands Ship Owners Association, The Hague, the Netherlands (1978-1986)**

- Member of Commercial, Technical and Human Resources Committees

**Netherlands Sail Training Association, The Hague, the Netherlands (1971-1978)**

- Member of the Board of Directors
- Supervised the construction of a 106 foot schooner

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## **Appendix I** **Summary of Recommendations**

### **Recommendations related to USC and CFR's (legal requirements)\*\*\***

1. Provide vessel with official number, name and hailing port as per 46 CFR 67.121 and 67.123.
2. Display State validation decal on both sides of the bow.
3. Provide means to prevent accidental discharge of sewage by closing the seacock and removing the handle, padlocking the sea cock, or using a non-releasable wire-tie in order to comply with 33 CFR 159.7.
4. Equip vessel with at least 3 day and 3 night, or 3 day-and-night flares with current dates, in order to meet USCG requirements(33CFR 175.110).
5. Equip vessel with a conical dayshape if the vessel will be operated in International waters.
6. Equip vessel with a dayshape in the form of a ball (Navigation Rules Annex I).
7. Equip vessel with an up-to-date copy of the Inland Navigation Rules.
8. Equip vessel with an Oil Discharge Prohibited Placard (33CFR 155.450) and a Waste Discharge Prohibited Placard (33CFR 151.59(b)).
9. Make a Waste Management Plan and carry it on board, if the vessel will operate beyond 3 nautical miles from shore.(33CFR151.57).

### **Recommendations related to ABYC and/or NFPA standards and other safety issues.\*\***

10. Should the navigation limits of the vessel be extended to include Coastal Passage-Making or Ocean Passage-Making as defined in **Appendix B** of this report, the vessel should be prepared and equipped in accordance with the relevant sections(CPM) of the publication "Safety Recommendations for Cruising Sailboats (SRCS)", published by the US Sailing Association.
11. Fit the emergency tiller and check its functionality (SRCS 4.13).
12. Get access to the discharges of head and galley sink and inspect the sea cocks, connected hoses and hose clamps.
13. Attach soft tapered wood plugs of appropriate size to all through- hull fittings for possible emergency use.
14. Affix a label near the stove with the following information:  
"CAUTION: Open-flame appliances consume oxygen. Lack of oxygen can cause asphyxiation or death. Maintain open ventilation when stove is in use." (NFPA 8.5.14.7).
15. Install a water limiting meter in the dockside water supply and set it for 200-300 gallons and/or disconnect or disconnect the supply hose when vessel is left unattended and mount a warning label to that effect near the dockside connection.
16. Re-wire the bilge pumps to permit manual activation. Run power to the bilge pump from 3-position switches which are directly connected to the battery or battery switch with a properly sized fuse installed in accordance with ABYC E-11.12.1.2.
17. Place batteries in acid resistant boxes or trays.
18. In order to prevent accidental contact of the ungrounded (positive) battery connections to ground, each battery should be protected so that metallic objects (such as a wrench) cannot come into contact with an ungrounded (negative) battery terminal by covering the ungrounded battery terminals with boots or by installing each battery in a covered battery box.(ABYC E-10).
19. Install a warning label near the 120VAC panel with the following text:  
"WARNING; electrical shock hazard. Vessel is equipped with a DC to AC inverter. Disconnect inverter DC input before servicing the electrical systems" (ABYC A-31).
20. Troubleshoot non functioning electrical outlet in forward head compartment.
21. Have a qualified marine electrician connect the main AC grounding bus to the engine negative terminal or the DC main negative bus (ABYC E-11.5).

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22. Upgrade portable fire extinguishers to ABYC and NFPA standards. One of the extinguishers should be installed within reach of the helmsman. All other extinguishers should be located adjacent to exit paths
  23. The Owner should inspect all fire extinguishers monthly and verify that they are securely mounted in prominent locations, gauges read correctly, safety pins are in place and seals are in unbroken condition. Dry chemical extinguishers should be removed from their brackets, turned upside down and shaken vigorously and then properly secured in the mounting bracket. Halon extinguishers should be weighed. Non-rechargeable fire extinguishers should be removed from service 12 years from date of manufacture (NFPA 10-6.3.3.1). Recharge or replace any units after (partial) discharge.  
Fire extinguishers located inside lockers or other "hidden" locations should be identified with a permanent red placard reading "Fire Extinguisher Inside".  
Annually a full maintenance check should be made of all extinguishers by qualified service personnel.  
A tag should be attached showing the date of such maintenance check (ABYC A-4.Ap.5 and Ap.6).
  24. Make a provision for discharging a suitably sized portable clean agent fire extinguisher directly into the space surrounding the engine without opening the primary access.  
Where the location of an access port will not permit an extinguisher to remain upright, the extinguisher should be equipped with a discharge hose (NFPA 10-2.4).  
Alternatively, install a fixed automatic fire extinguishing system capable of both automatic and manual operation in the machinery space meeting the standards of NFPA 10-3 and ABYC 4.7.
  25. Equip vessel with a heaving line of 50-75 ft, readily accessible to the cockpit (SRCS 4.19).
  26. In order to promote safe operation of the vessel, it is suggested to add harnesses with tether lines for every person aboard.
  27. Equip vessel with a Lifesling tackle and attach a self-igniting light to the sling. Inspect annually all of the components of the Lifesling, including rings and line. The yellow polyprop must be completely protected from UV light.
  28. Install Carbon Monoxide (CO) detectors in the main cabin (saloon) and in each sleeping area. The power source of the detectors may be self-contained batteries or a direct connection to the energized side of the vessel's battery switch. The detectors should be certified to meet the requirements of UL 2034. If a circuit breaker is installed, it should be non-switchable. (ABYC A-24).
  29. Install a single station smoke alarm that meets UL-217 standards (Marine Technologies model SA-668M or equivalent), in each overnight sleeping space (NFPA 302-12.3).
  30. Swing the compass or perform checks with GPS readings.
  31. Repair tri-color masthead light as found necessary.
  32. Equip vessel with a boatswain's chair (SRCS 4.24).

### **Recommendations concerning maintenance and upgrades\***

33. Replace both zinc anodes.
34. Install a galvanic isolator in each of the two shore connection circuits. Galvanic isolators should meet ABYC standard A-28 and be of a fail-safe type or an isolator with a status monitor with audible or visual indication which alerts when it fails to conduct above 2.5VDC in both directions or if the isolator fails to open below 1.0 VDC in both directions.
35. Free up the centerboard and inspect it for any damage. Check condition of pennant
36. Open steering pedestal, inspect, clean, check and grease all components as needed
37. Modify/adjust the door to the forward cabin.
38. Troubleshoot 12VDC operation of refrigerator and freezer.
39. Clean up belt dust. If dust continues to be deposited, the pulley of the alternator should be realigned.
40. Have the exhaust elbow removed and checked for internal build up of carbon.
41. Top off coolant of generator engine Check the level of the crankcase oil.
42. Perform a complete engine service for new ownership of the vessel. It is suggested to replace fuel filter element, oil filter and raw cooling water pump impeller, change crankcase oil, flush and replace engine coolant.

43. *Clean and test the anti-siphon device in the raw water discharge on a regular basis.*
44. *Have the propeller shaft/engine alignment checked by a qualified marine mechanic as part of normal maintenance. This should be done when the vessel is in the water and fuel tanks are filled to their normal levels.*
45. *Pull up anchor rode from anchor locker and check its condition.*
46. *Re-bed fittings of mast and boom as found necessary and re-finish coating as needed.*
47. *SRCS recommends equipping the vessel with a handheld VHF transceiver.*
48. *Troubleshoot non-functioning tray of the DVD player.*
49. *Troubleshoot non-functioning tachometer.*



