

Fiberglass Boat Survey Checklist

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Tools:

- torch
- awl, sharp probe
- magnet
- magnifying glass
- rubber hammer
- peening hammer
- voltmeter
- paint scraper or putty knife (to remove sections of antifouling coat)
- harness (to climb the mast)

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1. bottom, rudder, propeller etc. should be clean
 2. check obvious flaws
 - grounding damage
 - cracks
 - keel problems
 - signs of stress on deck (deflection and cracks, cracked ports etc.)
 - alignment of keel and rudder
 1. pitting, corrosion of shaft and prop
 2. laminate testing (rubber hammer, peening hammer under waterline, moisture meter) – sketch and compare with structures from the inside
 3. external structures
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Galvanic Series: Corrosion Potentials in Flowing Seawater,(V vs SCE Half-Cell Reference Electrode)

RANGE	Alloys are listed in order of the potential they exhibit in flowing seawater. The alloys marked * may become active and exhibit a potential near -0.5 volts in low-velocity or poorly aerated water and at shielded areas.
+0.3 +0.2	Graphite
+0.26 +0.18	Platinum
+0.09 0.03	Ni-Cr-Mo alloy C
+0.06 0.04	Titanium
+0.04 0.02	Nickel-Iron-Chromium alloy 825
+0.06 0.04	Alloy "20" Stainless Steels, cast & wrought
0 -0.1	*Stainless Steel - Type 316, 317 (passive)
-0.03 -0.14	Nickel-Copper alloys 400, K-500
-0.10 -0.15	Silver
-0.04 -0.10	*Stainless Steel -Types 302 304 321 347(passive)
-0.10 -0.2	Nickel 200
-0.09 -0.2	Silver Braze Alloys
-0.13 -0.18	*Nickel-Chromium alloy 600 (passive)
-0.14 -0.22	Nickel-Aluminium Bronze
-0.17 -0.24 70-30	Copper-Nickel
-0.19 -0.25	Lead
-0.20 -0.28	*Stainless Steel - Type 430 (passive)
-0.21 -0.27	80-20 Copper-Nickel
-0.22 -0.28	90-10 Copper-Nickel
-0.24 -0.28	Nickel Silver
-0.23 -0.35	*Stainless Steel - Type 410 416 (passive)
-0.24 -0.32	Tin Bronzes (G&M)
-0.25 -0.29	Silicon Bronze
-0.26 -0.34	Manganese Bronze
-0.26 -0.36	Admiralty Brass, Aluminium Brass
-0.27 -0.36	Pb-Sn Solder (50/50)
-0.30 -0.37	Copper
-0.30 -0.33	Tin
-0.31 -0.40	Naval Brass, Yellow Brass, Red Brass
-0.31 -0.40	Aluminium Bronze
-0.33 -0.46	*Stainless Steel - Type 316 317 (active)

-0.34 -0.46	*Nickel-Chromium alloy 600 (active)
-0.43 -0.54	Austentic Nickel Cast Iron
-0.44 -0.58	*Stainless Steel - Type 302 304 321 347 (active)
-0.45 -0.57	*Stainless Steel - Type 410 416 430 (active)
-0.57 -0.63	Low Alloy Steel
-0.60 -0.72	Mild Steel, Cast Iron
-0.70 -0.74	Cadmium
-0.76 -1.00	Aluminium Alloys
-0.98 -1.03	Zinc
-1.60 -1.63	Magnesium

Basic info

Boat name and port	
Manufacturer and model	
Hull number	
Registration number	
Owner's contact info	
Broker contact info	
Previous owner	
LOA	
LWL	
Draft	
Beam	
Displacement	
Ballast weight	
Rig type	
Boat age	
Cockpit placement	
Mast height	
Standing headroom	

History

Accidents	
Repairs, refits, changes from original equipment	
Prior survey reports	
Prior owners	
Documentation	
Inspect log book	
Maintenance records	

Insurance	
Official list of all inventory	

Hull

Material	
Hand laid/chopper gun	
Solid/cored below water-line	
Stringers/stiffeners (athwartships, longitudinal)	
Hull/deck joint type	
Depressions / bulges / blisters / dry rot	
Paint	
Antifouling	
Bulkheads	
Resins used	polyester – cheap vinylester – water-resistance epoxy – expensive, best
Anti-blistering coating underwater (epoxy resin)	
Bilge (water in, access)	

Keel

Shape / type	
Leaks	
Keel bolts	
Access to keel bolts	

Ballast

Material	
Internal/external	

Finish

Blistering	
Cracking	
Rotting	
Waterlogging	

Mast and Spars

Keel-stepped or deck-stepped	
Brand	
Material	
Mast condition (bends, kinks, cracks, corrosion)	
Compression post	
Condition of mast-step	
Mast collar condition	
Halyard number and routing	
Last time unstepped	
Wiring in the mast	
Sail track (in/external, condition)	
Boom condition (bends, kinks, cracks, corrosion)	
Boom vang (or preventer)	
Gooseneck	<ul style="list-style-type: none"> • Mast attachment (weld, rivets, screws) • Downhaul system
ALOFT	
Mast head	<ul style="list-style-type: none"> • Welded (or rivets – galvanic reaction if s/s) • Sheaves (plastic, not aluminum) <ul style="list-style-type: none"> ○ undamaged ○ turning freely ○ proper size ○ not slack in the mortise – causes halyard jams • Taper welds cracks • Swages (straight on the shank, no cracks, magnet) • Clevis pins • Lights • Antenna • Weather instruments
Spreaders	<ul style="list-style-type: none"> • Base • Tip (covered with plastic/rubber boot – anti-chafing) • Angle

	<ul style="list-style-type: none"> • Mounting
Wire	

Rudder, Steering

Condition (rudder blade)	
How protected	
Rudder shaft thickness and mounting	
How easy to service (remove rudder, change propeller, change zinc anodes)	
Tiller/wheel	
Steering linkage type	
Alignment	
Aperture for propeller large enough (easy to change propeller)	
Rudder post ruggedness	
Rudder post stuffing box (accessibility)	
Rudder fittings (material, serviceability, electrolysis – should be electrically bonded to hull-bonding)	
Bearings or bushings	
Rudderpost	<ul style="list-style-type: none"> • Bearings • Nulong, Teflon, Delrin bushings • Check how much play (tiller can be more loose, less than 1/4 inch)

Deck

Material	
Solid/cored	
Crunching/flexibility	
Cracks	
Rub-rail (steel/rubber/bronze-capped, not plastic)	
Amount of free space, tripping spots	
Leaks	
Water easy from deck, no ponds	

Deck Hardware

Method of attachment (through-bolted with backing plates, no screws)	
Winches	<ul style="list-style-type: none">• Self-tailing• 2-speed• Adequate size• Winch base• Condition• Sufficient number• Optimal position• Winch handle holders (mast, cockpit)
Cleats	
Good mooring cleats	
Blocks	
Hatch hinges and fastenings	
Port and hatch materials	
Access to mountings and fitting below deck	
Jib-sheet tracks	
Traveler	<ul style="list-style-type: none">• Sufficient size (min 10° of boom against centerline)• Mounting (bolted, backplates)• How operated (manual, winch)

External Structures

Running lights mounting	
Condition of lifelines and stan- chions	
Watertightness of hatches	
Ruggedness of hatches	
Portlights strong and leak-free	
Pulpit and pushpit mounting and condition	
Speed and depth input units	
Seacocks	

Ground tackle

Rode types/lengths (all-chain ?)	
Bow platform	
Anchor windlass	
Chain locker (drains overboard ?)	
Easy to deploy anchor quickly	
How easy to raise ?	
Boat hook	
Chain galvanized?	

Attachment Strength

Bulkhead-to-hull	
Hull-to-deck (access to joint, no screws, s/s machine bolts – 15cm apart, 6mm, washers)	<ul style="list-style-type: none">• inner flange• outer lip• vertical flange

Safety

Lifelines / stanchions / toerails (how high ?)	
Deck configuration	
Sloping deck surfaces bad	
Sheets come to cockpit	
Bilge pumps number and types	
Strength of hatches and ports	
Weight distribution	
Cockpit size / drainage / bridgedeck	
Cabin escape route through forward hatch	
Lightning protection	
Propane locker vents overboard	
Lifesling, overboard pole	

Sails

Number and types	
Condition (check batten pockets and all edges)	
Age	
Material and thickness	
Mainsail (condition, reefing)	
Jib	
Staysail	
Genoa	
Spinnaker	
Chafe	
Sail covers, dodger, awning	

Cockpit

Size (comfort and safety)	
Drainage (min 4cm, screen) How many and position	
Layout	
Sole type	
Visibility with and without dodger	
Locker gaskets and scuppers	
Layout of gauges and controls	
Livability	
Rigged for single-handling	

Rigging (Unfastening, Chafe, Snags, Corrosion, Fatigue)

Condition (magnetic for swages)	
Type	
Redundancy	
Routing to cockpit, deck or mast	
How easy to rig jibe preventer	
Dutchman or lazy jacks	
Extra halyards and winches	
Spinnaker pole and type of spinnaker jibe	
Whisker pole	
Traveller	
Boom vang (pulley, rod, mounting)	
Sheets, lines	
Check even spread of stays from distance	
Toggles	
Trysail track	
Halyard winches	
Sheet winches	
Chafe points, sufficient guiding, shiny spots	
Spreaders (angle, cracks, corrosion)	
Outhaul	
Downhaul	
Topping lift	
Shackles	
Lower and upper shrouds have separate chainplates	
Terminals (underside)	
Sheaves (sufficient size and type, not slack in the mortise)	
Snags (flop sheets around)	

Stress and strains

Longitudal stringers	
Bulkheads, half-bulkheads	
Floors	
Deck stress	<ul style="list-style-type: none"> • chainplates (cracks, leaks, deflection) • genoa tracks • stanchions (local loads, backing plates) • backstay • hatches • rails • winch bases • cockpit sole • portholes • foredeck • companionway hatch • curves and angles • mast step (cabintop deflection) • compression post (cabin sole deflection) • inspection from cabin
Hull stress	<ul style="list-style-type: none"> • uniform hull thickness from keel to rails • cracks on gelcoat around more rigid interior reinforcements, like V-berth stringers and bulkheads
Keel stress – external keel	
Internal ballast	<ul style="list-style-type: none"> • Leaks from bilge into the ballast cavity (epoxy layer helps) • Keel sidewalls swells and cracks (frost) • Water allowed to collect in the bilge will permeate into the keel (big problem for iron'n'cement) • Drill to examine the ballast material and condition
Rudder stress	

Cabin

Layout	
Standing headroom	
Comfortable seats with headroom	
Size / number / length of berths	
Lie down in every berth	
Size / number / placement of ports Fail-proof closing mechanism	
Upholstery	
Sole type	
Safety (grips)	
Lighting	
Ventilation	
Smell	
Floor cracks indicate recent severe impact	
Bilge (access, usability, cleaning)	
Table	
Lockers (ventilation)	
Foul weather gear lockers	
Forward stateroom (headroom)	
Stowage	
Nav station	
Woodwork	
Shelves (height)	

Access

To bilge	
To very bottom of bilge	
To engine	
To stuffing-box	
To through-hulls	
To plumbing/tanks and electrical	
To deck hardware backing plates	

Through-Hulls (including propeller shaft)

How many (below WL)	
Material (bronze, delrin)	
Condition	
Sea-cocks (test with hammer)	<ul style="list-style-type: none"> • Ball valve • Hairline cracks • Pitting • Green tinge – electrochemical • Pink tinge – loss of zinc (causing embrittlement)
Double-clamped hoses	
Hoses (stiffness, cracking, checking, collapsing)	
Access, quick closure	
Electrical bonding	
Tank vents (high above WL)	
Mounting (2inches around the seacocks, check for flexing)	
Last time seacocks rebedded	
Propeller shaft	<ul style="list-style-type: none"> • Material (bronze, s/s) • Corrosion • Looseness of bearings (apply force on the shaft)

Plumbing

Condition	
Manual backup pumps	
Sizes / types / placement of tanks	
Tanks shouldn't be near heat sources	
All pumps functioning	

Electrical

Wire (marine grade)	
Wire diameter (DC system)	
Proper type of connections (soldered) ?	
DC return wires used ?	
Switch/fuse panel	
Corrosion / zincs; bonding system type	
Accessibility	
Battery configuration, size, condition	
Battery compartment separate from engine compartment ?	
Charging system (solar, wind, water, alternator, generator)	
Inverter type and size	
Shore power (GFI / circuit-breaker / isolation transformer)	
Exposed on deck, in cockpit ?	
Installation (how well secured and bundled)	
Protection against chafing	
Safety (circuit breakers and fuses)	
Lights functioning	
Lightning protection	

Head

Type	
Access for repair	
Manual operation	
Holding tank	

Galley

Stove type	
Refrigeration	
Ventilation	
Lighting	
Layout / access	
Pumps	
Counter space	
Sink	
Faucets	
Icebox	
Safety (grips)	
Shelves, stowage	

Instruments

RADAR	
GPS	
LORAN	
Depth meter	
Depth finder / SONAR	
Auto-pilots	
Compass	
Barometer	
Knotmeter	
Anemometer	
Inclinometer	
Radios, antennas and grounds	
Where are sensors placed	
Gearbox oil-pressure	
Engine oil-pressure	
Engine temperature	
RPM	
Running hours	
Fuel gauge	
Voltmeter	

Tender

Type	
Condition	
Size	
Mechanism to lift it	
Place to stow it	
Oars	
Rigging (mast, sails)	

Liferaft and Abandon-Ship Bag

Type	
Condition	
Size	
Place to stow it (want on-deck stowage)	
Supplies (watermaker, shade, food, etc)	

Ventilation

Bilge	
Engine room	
Lockers	

Galvanic Corrosion and Oxygen starvation

Sail tracks	
Under winches	
Mast step	
Under spreader boots	
Under shroud rollers	

Additional Items

Dodger/bimini	
Fenders	
Tools	
Spares	
Charts	
Books	
Logs	
Owners manuals	
PFDs	
EPIRB	
Extinguishers	
Bilge blower	
Fume detectors	
Automatic fire-suppression	
Jack lines and tethers	
Fishing tackle	
Ladder	
Sail and instrument covers	
Awning	
Rain-catcher	
BBQ	
Heater	
Deck hoses	
Deck shower	
Audio/TV	
Mast-climbing gear	
Courtesy flags	
Sea anchor/drogue	

Engine

Type	
Condition	
Age (years & hours)	
When rebuilt	
Maintenance records	
How easy to access and service	
Oil drip pan	
Oil condition	
Type of water-cooling (raw, heat-exchange or keel; want fresh-water cooling ?)	
Type of gearbox (want hydraulic)	
Shaft brake	
Exhaust system	
Fuel filters (want 2)	
Look clean	
Size/placement of fuel tanks; access ports	
Sniff around engine to smell antifreeze (indicates overheating) or burnt oil	
Typical usage	
Ventilation (HP/3.3 in sq. inch)	
Propeller alignment	
Fuel tank (rust, leaks, hoses, shut-off valves)	
Engine beds and mounts	
Shaft coupling	
Stuffing box	
Hoses, clams	
Wiring	
Seals and leakage	
Belts (wear, tension)	

Sea trial: Under Sail

Speed	
Visibility	
Sail-handling	
Responsiveness	
Dryness	
Motion	
Stability	
Tacking angle	
Behavior at all points of wind	
Behavior at various strengths of wind	
Behavior with minimal/typical/full sails up	
Performance of auto-pilot and wind-vane	
Sounds when below	
Raise/lower every sail	
Pitching	
Heeling	
Balanced steering	
Weather helm	

Sea trial: Motoring

Engine starting ease	
Speed at various RPMs	
Noise	
Vibration	
Exhaust	
Leaks	
Engine temperature (30min)	
Performance in reverse	
Maneuverability, turning radius	
Sounds when below	
Turn on all electrics and run at same time, see what happens	
New oil in drip pan	(put cloth down at start)
Smoke	<i>black</i> : engine overloaded, restricted air supply, fuel injector malfunction <i>blue</i> : combustion of lubricating oil -> worn piston rings, valve guides, oil seats or over-filled air filter or crankcase <i>white</i> : water vapor from dirty fuel, water leak in cylinder
Leak from stuffing box (fills the bilge, pumps deplete the batteries, 2-3 drops/minute sufficient)	
Access to stuffing box	
Engine-shaft alignment	<ul style="list-style-type: none"> • Vibration • Wobble • Excessive noise • Failure to reach rated r.p.m.

Tender (+sea trial)

Stability	
Wetness	
Capacity	
Motor	
Launching/stowing	

Literature used:

1. Calder, Nigel. *Boatowner's Mechanical and Electrical Manual*. 3rd ed. International Marine/Ragged Mountain Press, 2005.

Almost all you need to know about boat maintenance. Excellent reference. Good starting point when you need to learn about new systems. Not a step-by-step guide, so lacks details, but offers what's usually most important – understanding.

2. Casey, Don. *Sailboat Hull and Deck Repair*. 1st ed. International Marine/Ragged Mountain Press, 1996.

Step-by-step guide for greenhorns.

3. Hill, Annie. *Voyaging on a Small Income*. 2nd ed. Thomas Reed Publications, 2002.

Lot of practical information, what worked for Hills and what they could do without.

4. Hiscock, Eric. *Cruising Under Sail*. Adlard Coles, 2008.

Classic must have.

5. Marino, Emiliano. *Sailmaker's Apprentice*. 1st ed. International Marine/Ragged Mountain Press, 2001.

Probably the best reference and guide for classical sail making. Very detailed discussion of sail survey.

6. Mustin, Henry C. *Surveying Fiberglass Sailboats: A Step-by-Step Guide for Buyers and Owners*. 1st ed. International Marine/Ragged Mountain Press, 1994.

We haven't read any other book on the subject. It did the job for us.

7. Pardey, Larry, and Lin Pardey. *Self-Sufficient Sailor*. 2nd ed. Paradise Cay Publications, 1997.

As all other late Pardey books, it gives you many ideas how you can improve your boat without feeding your local chandlery. Simplicity, functionality, independence is the key mantra.

8. Pardey, Lin, and Larry Pardey. *The Capable Cruiser: The world's best known cruiser-writer team shows how to cruise with precision, pleasure, and self-sufficiency*. 1st ed. Paradise Cay Pubns, 1995.

9. ---. *The Care And Feeding of the Sailing Crew*. 3rd ed. Pardey Books, 2006.

10. ---. *The Cost Conscious Cruiser*. Paradise Cay Publications, 1998.

11. Roth, Hal. *How to Sail Around the World : Advice and Ideas for Voyaging Under Sail*. 1st ed. International Marine/Ragged Mountain Press, 2003.

Modern version of Hiscock's *Cruising under sail*. Advocates modern cruising boat with electrical systems and modern technologies, but kept as simple as possible.

12. Toss, Brion. *The Complete Rigger's Apprentice: Tools and Techniques for Modern and Traditional Rigging*. 1st ed. International Marine/Ragged Mountain Press, 1997.

Almost all you need to know about rigging.