



OCEAN MARINE SURVEYS

MARINE SURVEYS & CONSULTANCY

PRE-PURCHASE SURVEY OF:

Type Power
Name [REDACTED]
Class Fairline Targa



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ABOUT THIS SURVEY

LIMITATIONS

1. I have not inspected any GRP structures or any other parts of the vessel that are covered, unexposed or inaccessible and I am therefore unable to report that any such parts of the vessel are free from defect.
2. This is a confidential document and responsibility for the contents is only accepted by the undersigned to the above-mentioned client and his agents.
3. This survey report gives no guarantees against faulty design, bad workmanship, latent defect or suitability for the vessel for a particular purpose. It also gives no guarantee that the vessel complies with any European or MCA directives if applicable (unless otherwise specified herein).
4. None of the fastenings were drawn or removed for inspection unless specifically requested (unless otherwise specified herein).
5. My engine inspection does not include any stripping or compression testing.
6. Electrically operated pumps have been switched tested but no opinion is given in relation to their internal condition unless flow rate data can be provided.
7. The electrical installation is limited to a general appraisal of the condition of wiring and includes switch testing of circuits. No opinion is given in relation to the design of the system (unless otherwise specified herein).
8. Fuel and water tanks have only been examined externally whilst in situ and no pressure testing or testing for contamination will be carried out (unless otherwise specified herein).
9. No stripping out of the vessels fixed linings was carried out (unless otherwise specified herein).
10. The anchor chain is only partially removed for inspection unless it is specifically requested that the whole length should be flaked out. No opinion is given as to the chain's compatibility with the associated windlass gypsy, if fitted.
11. Although the service dates of life saving equipment present at the time of the survey is noted in this report, my examination does not extend to an assessment of condition or the condition of tenders and other movable items.
12. Stability and performance were not assessed.



ITEMS INSPECTED IN THIS SURVEY (PRE-PURCHASE)

Hull, Deck & Structure

1. Details of vessel
2. General description, dimensions, registration etc.
3. Keel & attachment to hull
4. Hull below water line
5. Moisture readings and osmosis check / hull soundings on steel vessel
6. Topsides above waterline including rubbing strake etc.
7. Deck moulding
8. Coachroof
9. Cockpit
10. Hull/deck join
11. Bulkheads and structural stiffening including internal mouldings

Steering, Stern Gear and Skin Fittings

12. Stern drives
13. Trim tabs
14. Cathodic protection
15. Skin fittings and other through hulls

On Deck

16. Main companion way and accesses to accommodation
17. Ports & windows etc.
18. Pulpit, pushpit, stanchions, lifelines and jackstays
19. Rigging attachment points
20. Ground tackle and mooring arrangements
21. Other deck gear and fittings
22. Boarding ladders
23. Covers etc.

Safety

24. Navigation lights
25. Bilge pumping arrangements
26. Fire fighting equipment
27. Lifesaving and emergency equipment

Engine

28. Engine & installation
29. Fuel system

Accommodation and Onboard Systems

30. Accommodation general
31. Gas installation
32. Fresh water tanks and delivery
33. Heads
34. Electrical installation
35. Electronic and navigation equipment
36. Heating and refrigeration



RECOMMENDATIONS

Categorisation of defects will be presented as follows:

Recommendations (R) will be written in bold. These will be restricted to serious defects, which should be rectified before the vessel is used (or within a given time span if specified) and are items that may affect insurability.

Suggestions (S) will be written in bold italics. These are items that should be addressed in the near future in order to prevent further problems and/or to maintain value. If not addressed, these items may later become more serious safety or structural issues. Timescales may be applied.

Cosmetics (C) will be written in italics. These are items that are purely cosmetic and have no relevance to safety or structure of the vessel. If addressed some of these items may enhance the vessels value or saleability.

The items above are contained in the body of the report in order that they may be read in context. The **(R) Recommendations** are also listed as part of the conclusions at the end of the report.

CONDITIONS OF SURVEY

At the request of Mr. [REDACTED] the following survey was carried out at Yacht Haven, Plymouth, on the [REDACTED] 2013. The purpose of my examination was to ascertain the vessel's condition within the scope of a pre-purchase survey.

The vessel was lifted ashore approximately 4 days prior to my examination having previously been afloat for a period of 1 year.

As the vessel was only examined ashore I cannot guarantee the watertight integrity of the hull and associated fittings. Also, as the vessel was not subject to sea trial I cannot guarantee the operational integrity of the engine or any other systems for which testing would require the vessel to be afloat.

The weather conditions on the day of the survey although cloudy and cold, were dry and I was able to take a reliable set of moisture readings from the hull and foredeck/coachroof. As the cockpit was carpeted and wet with residual moisture I was unable to gain any reliable readings from this area.



HULL DECK & STRUCTURE

DETAILS OF VESSEL

The following information was derived from details found online and observations made during my examination; as such I cannot guarantee the accuracy of all of this information.

Type	Power – Planing Hull	
Class Name	Fairline Targa 27	
Designer	Fairline Design Team	
Builder	Fairline Yachts	
Year Built	[REDACTED]	
Construction	GRP	
Engine	Twin Volvo Penta	
Engine Year	Assumed Original	
Hull Identification Number	[REDACTED]	
Serial No.	[REDACTED]	
Registration No.	N/A	
Principal Dimensions	LOD	8.96 m
	Beam	3.05 m
	Draught	0.97 m

As the vessel was built in the EU prior to 15th June 1998 there was no requirement for it to meet the standards of the Recreational Craft Directive (RCD), hence no such documentation is available.

No further documentation was available at the time of my examination.

GENERAL DESCRIPTION

External

The planing hull is of single skin glass fibre laminate panel construction. The hull below the waterline comprises a medium V shape forward reducing to a flatter section towards the stern with a single chine/spray rail and 3 moulded knuckles each side. There is a single step in the topsides midway between the waterline and rubbing strake.

Twin Volvo stern drives are used for propulsion and steerage.

The deck is of GRP sandwich construction with coachroof and self-draining cockpit integral with the moulding. There is an aluminium-framed spray shield surrounding the forward end of the open cockpit and helm station. Access to the accommodation is through the companionway located at the forward end of the cockpit to port.

Internal

The main cabin comprises an open layout with a small galley area aft to port and a U



shaped seating arrangement forward. There is a small aft cabin comprising a double bed and various storage compartments. Access to the aft cabin is via a door aft and to starboard. The heads compartment is located forward of the entrance to the aft cabin and comprises a toilet unit and washbasin with pull out showerhead.

The twin engines are located beneath the cockpit floor. A large section of the floor hinges open on gas springs to provide access to the engine compartment.

HULL BELOW WATERLINE

The hull is of solid monolithic (single skin) laminate panel construction throughout, reinforced with a series of longitudinal stringers, transverse frames and bulkheads laminated into the outer skin. This type of hull construction is particularly durable.

Examination of the hull below the waterline did not reveal any evident signs of impact, repair or any stress crazing in way of internal structures. Hammer sounding provided satisfactory returns and did not reveal any delamination or significant voids.

The blue antifoul is carried a few inches above the waterline. This coating has begun to flake in isolated areas over the years where it has subsequently been over coated. It would be of benefit to clean up any existing areas of loose antifoul with coarse sandpaper or wire brush before the application of further coats. Although the antifoul is beginning to become slightly built up I do not consider it necessary to strip at this stage unless a completely smooth finish is desired.

Note: many boatyards offer the removal of old antifouling by slurry blasting. Be aware that gelcoat can easily become damaged during this process and is therefore not recommended unless an epoxy treatment is intended.

The antifouling was removed in 10 randomly chosen areas on the hull and a further 2 areas on the transom of approximately 70 x 70 mm to reveal the original gelcoat. Careful examination in all areas where the gelcoat was exposed did not reveal any visibly detectable moisture related defects.

MOISTURE READINGS AND OSMOSIS CHECK

Moisture readings were taken in those areas cleared of antifouling using a capacitance type moisture meter of Sovereign Quantum type, operating in both shallow and deep reading modes. The meter was first checked for correct calibration.

The readings are on a relative scale and **do not** express moisture content as a percentage of dry weight. Readings were taken both above and below waterline in order to obtain a comparison. High moisture content is not generally a structural defect and is to be expected in older boats. However where some moisture has been absorbed the likelihood of moisture related problems occurring is higher and the actual state of the laminate cannot be completely guaranteed without destructive testing followed by chemical analysis. The opinion given in this survey is based on all the evidence available at the time but without destructive testing.

See Appendix for Suggested Guideline Interpretation of Moisture readings.



At the time the readings were taken the weather conditions were as follows:

Air temperature	6.8 C
Surface temperature	6.9 C
Relative humidity	63.7%
Dew point	7.6 C
Precipitation	None
In summary conditions for obtaining moisture readings were good	

Readings were as follows:

Meter	Range below waterline	Range above waterline
Sovereign Quantum, scale 0 – 100	21 - 26	18 - 20
Deep mode	20 - 24	13 - 19

The moisture readings above should be considered very acceptable. Although some moisture is present and at the level where the risk of moisture related defects developing is considered medium, the vessel had only been lifted 4 days prior to my examination after a period of one year afloat. Although not guaranteed, it is likely that these moisture readings would reduce to some degree if the vessel were to be stored ashore for a period of 4 - 6 weeks in good weather.

Moisture readings taken from the transom below the waterline were found slightly more raised than those taken from the hull below waterline in a range of 21 – 28 on shallow mode and 22 - 29 on deep. Again this is indicative of the fact that some moisture is present and at the stage where the risk of moisture related defects developing is considered medium, but more significant towards the top of this range. Often water left standing in the engine bilge compounds the issue of moisture ingress to the laminate in this area. Keeping the engine bilge as dry as possible will help maintain its current state and promote natural drying.

In conclusion and in the absence of any visible moisture related defects the laminate should be considered sound. Storing a yacht ashore out of season to allow some natural drying is good practice with a GRP hull and will contribute significantly to maintaining the current condition.



TOPSIDES ABOVE WATERLINE INCLUDING RUBBING STRAKE ETC

The topsides are finished in the original white gelcoat and were seen in very good condition. Visual examination did not reveal any significant areas of impact or abrasion damage and no stress crazing or cracking was noted in way of internal members. Light hammer sounding did not reveal any voids or areas of delamination.

The underside of the bathing platform is integral with the hull moulding and was again found in good condition with no visual evidence of impact or abrasion damage or any stress crazing in way of internal members. The top side of the bathing platform is integral with the deck moulding and was again found in good condition.

The rubbing strake is an aluminium extrusion with a rubber insert. There are a number of areas where this rubber insert has become damaged from abrasion. These areas of damage are most significant as follows:

- Both aft quarters of the swim platform. (See figure 1)
- An area to starboard, outboard of the aft end of the cockpit where a 4 - 6 inch section of the rubber is missing. (See figure 2)
- Starboard side above the letter P of the vessel's name.
- Immediately forward of the forward most window in the deck moulding to port.



Figure 1

Damage to rubbing strake on the stern quarter to starboard



Figure 2

Damage to the rubbing strake outboard of the aft end of the cockpit to starboard.

There are various other minor scuffs and abrasions but of a less significant nature. The aluminium extrusion associated with the rubbing strake remains secure and in good condition.

(C) Give some consideration to suitable repairs to the areas of damage associated with the rubbing strake outlined above.



DECK & COACH ROOF MOULDING

The deck is constructed of GRP laminate panel utilising a core material for panel stiffness (core material not confirmed). The non-slip surface is achieved via a diamond print moulded into the original white gelcoat finish. Reinforcement has been incorporated in way of load-bearing fittings, which were found to be of plywood where visible.

The deck and coach roof were found firm underfoot with no significant areas of impact or abrasion damage noted. No stress crazing was noted in way of the stanchion bases or other deck fittings. Light hammer sounding did not reveal any voids or areas of delamination.

Routine moisture readings taken from the area of the deck were in the region of 14 – 18 with no appreciable increase on deep mode with the exception of 2 areas as follows:

- Immediately forward of the forward port corner of the fore hatch.
- Forward of the windlass control buttons on the foredeck extending forward to the area surrounding the anchor windlass.

The areas outlined above were in a range of 23 - 28 on shallow reading mode and 27 – 33 on deep reading mode. These readings are indicative of the fact that moisture has been able to penetrate into the core material in these areas through the fixings associated with the deck fittings outlined above. Light hammer sounding in these areas did not suggest that any delamination or deterioration of the core material is taking place at this stage and in reality the moisture readings outlined above are still fairly low. However, some thought should be given to re-bedding the fittings in these areas to prevent further moisture ingress and preserve the currently sound state of the deck structure.

(S) Give some consideration to re-bedding the deck fittings in way of the areas of raised moisture to prevent further moisture ingress and preserve the currently sound state of the deck structure. This work is not of immediate concern and could be undertaken over the next 1 or 2 years as part of the vessel's ongoing maintenance.

COCKPIT

The self-draining cockpit is integral with the deck moulding and again is finished in the original white gelcoat with a diamond print non-slip moulded into the cockpit sole. The cockpit comprises a helm station forward and to starboard with a reversible bench seat. Behind the helm station is a seating arrangement along the starboard and aft sides of the cockpit. Storage in the cockpit comprises a locker below the helm seat and a small locker to port, which I believe may have been the original gas storage area (gas bottle now stowed in the anchor locker). Access to the engine compartment is via a large hinged section of the cockpit sole.

The cockpit was found firm underfoot and light hammer sounding did not reveal any voids or areas of delamination. I was unable to take any reliable moisture readings



from the cockpit sole as the area had been carpeted and once lifted a large amount of residual moisture remained.

No significant areas of impact, abrasion damage or stress crazing were noted in the area of the cockpit although it should be noted that the cockpit sole beneath the carpet was quite dirty which may have hidden any minor areas of damage. All catches, hinges and gas springs associated with the lockers outlined above were found secure and in good condition.

HULL DECK JOIN

The hull to deck joint is a "biscuit lid" style joint. Bonded, through bolted and then over laminated creating a very robust and watertight seal. Although access was limited, wherever visible the hull to deck joint was examined and no evidence of seepage or movement was noted.

BULKHEADS AND STRUCTURAL STIFFENING INCLUDING INTERNAL MOULDINGS

A number of components contribute to the overall structure of this vessel:

- The shell mouldings are substantial as are typically found in boats of this era.
- The hull is stiffened using a number of moulded longitudinal stringers and transverse members.
- Further reinforcement of the hull is provided by internal mouldings for the cabin sole and interior seating arrangement laminated into the skin moulding during construction.
- Primary plywood bulkheads are laminated into the skin moulding forward of the engine compartment and between the diesel and fresh water tanks.
- The engine bearers are laminated into the skin moulding and run the full length of the engine bay providing a significant amount of longitudinal structural rigidity in this area.
- The various elements of cabinetry in way of the galley, aft cabin and heads compartment also laminated in the shell moulding provide further structural rigidity to the hull.

As such this arrangement creates a very robust structure.

Wherever visible the structure of this vessel was examined and the following defect was noted:

- Small area of impact damage in the way of a structural reinforcement in the anchor locker. (See figure 3).





Figure 3

Small area of impact damage to a structural reinforcement inside the anchor locker on the starboard side forward.

Hammer sounding around this area of damage did not reveal any areas of delamination extending further than the visible area of damage and moisture readings were not found raised. I do not consider this damage to be of structural significance at this stage but it is now necessary to seal this area of damage to prevent moisture ingress in the future. Consideration should also be given to a suitable method of securing the anchor whilst under way which is the most likely culprit as to the cause of this damage.

(R) Repair the area of damage to the structural member in the anchor locker to prevent moisture ingress to the laminate and deterioration of this structural element (See figure 3). This work should be undertaken prior to continued use of the vessel.



STEERING, STERN GEAR, AND SKIN FITTINGS ETC.

OUTDRIVES

Note: My examination of stern drive units is an external examination only and limited by accessibility.

Port Outdrive

Make Volvo Penta
Model No. [REDACTED]
Serial No. [REDACTED]

Starboard Outdrive

Make Volvo Penta
Model No. [REDACTED]
Serial No. [REDACTED]

Outdrive external examination Port & Starboard units

- Aluminium duo props were seen secure and rotating freely. There is some light corrosion in areas where the paint is beginning to peel and although the propellers would benefit from refinishing to prevent further deterioration they remain in serviceable condition at this time.
- The outdrive legs were seen in good condition with no evidence of impact damage, abrasion or significant pitting or corrosion. The skegs were seen intact.
- The bellows and exhaust hose were both seen intact with hose clamps secure at each end and in good condition. Note: it is recommended that these items be changed every 2 years and no documentation on when this was last done was seen at the time of my examination.
- Water intake hoses were seen secure and in good condition.
- Steering bushes found in good condition with no undue play.
- Tilt control rams found in good condition with no evidence of fluid seepage from the seals or pitting in the shafts of the rams. Note: it is always a good idea to leave the outdrive unit tilted fully down, such that the rams are inside the cylinder to prevent growth or deterioration of the rams themselves.

Outdrive internal examination Port & Starboard units

- All fixing bolts associated with the outdrive unit were found secure with no evidence of seepage.
- The hydraulic steering ram was found secure with no evidence of fluid leaks from the ram associated seals or hose connections. Note: a hydraulic steering servo, belt driven from the starboard engine provides power steering. All associated hoses found secure.
- The hydraulic power packs for the tilt control rams were found secure and in good condition with no evidence of fluid leaks. The hydraulic fluid in the reservoirs was seen at the correct level.



- The outdrive units were found to raise and lower to their full extent but it was noted that the safety tilt button associated with the port unit at the helm station is sticking which will prevent operation of the tilt limiter on this unit.

(S) Give some consideration to refinishing the paint on the propellers to prevent further corrosion to these units.

(S) Give some consideration to servicing or replacing the button associated with the tilt limiter on the port unit such that the port outdrive cannot accidentally be raised above the safe limit.

(R) In the absence of any service history, try to determine when the bellows and exhaust hoses were last replaced and service as necessary. This work should be undertaken before continued use of the vessel.

TRIM TABS

The trim tabs are of stainless steel plate seen in good condition secure to the transom and associated rams. It was noted that the hinges have been coated with many years of antifoul, which will be limiting their free movement.

The hydraulic power pack for the trim tabs was found secure and in good condition with no evidence of any hydraulic leaks. However, when tested for operation via the trim tab controls at the helm station the unit was found to be inoperable insofar as the associated electric motor failed to engage.

(R) Examination of the trim tabs found them to be inoperable. It will be necessary to remove excess antifoul in way of the hinges associated with the tabs themselves to enable free movement of these items before further testing and investigation as to the cause of this malfunction. Further to this it was noticed that the trim tabs are currently set to slightly different pitches which will affect the stability of the vessel when underway at speed if adjustment to pitch cannot be made. This work should be undertaken before continued use of the vessel.

CATHODIC PROTECTION

Cathodic protection is provided as follows:

- 1 x ring anode on each of the outdrive legs in way of the gearboxes seen almost completely wasted.
- 2 x anodes on each of the outdrive tilt brackets seen wasted approximately 35%.
- 1 x anode on each of the outdrive transom mounts seen wasted approximately 35%.
- 1 x anode on each of the trim tabs seen wasted approximately 40%.

All the above anodes were found wasted to some degree, demonstrating they are all working properly. The anodes associated with the gearboxes are clearly at the stage



where they require immediate replacement but it would be prudent to replace all anodes prior to re-commissioning.

(S) Replacement of the anodes associated with the outdrive gearboxes is now necessary to prevent galvanic deterioration of the drive legs and other elements of these drive units, including the shafts and propellers. It's well worth replacing all of the anodes on an annual basis regardless of their level of wastage to ensure maximum protection to these expensive and vulnerable units. Replacement of the anodes associated with the trim tabs would also be prudent at this stage.

SKIN FITTINGS AND OTHER THROUGH HULL APERTURES

No skin fittings or valves were dismantled as part of this survey but the following routine tests were carried out:

- Examination from outside and inside the boat.
- All valves opened and closed to their full extent where possible.
- Any fixing bolts hammer tested where accessible.
- Bodies of the valves or seacocks tested with a hammer inside the boat and external parts hammer tested outside the boat.
- Skin fittings and valves scraped back in places to check for visible corrosion.
- Fittings aggressively tested inside the boat for security in the hull.
- Hose clamps inspected and hoses aggressively tested for security.

Through hull fittings below the waterline are as follows:

- Toilet water inlet located beneath the berth in the aft cabin to starboard.
- Toilet water outlet located beneath the berth in the aft cabin to port.

Both of the above units comprise bronze (or similar) skin fittings with ball valves made from forged brass to the European standard CW617N. Whilst these valves are in very common use, ordinary brass such as this is subject to dezincification in seawater. The ISO standard relating to metallic valves and skin fittings below the waterline, ISO 9093 – 1, only requires the valves and associated fittings to have a service life of 5 years in terms of corrosion resistance allowing these inferior fittings to be used.

Whilst both of these units were found secure, opening and closing to their full extent, consideration should be given to changing them for bronze fittings or fittings made from a quality dezincification resistant alternative.

Further to the above it was noted that these skin fittings/ball valves have both been bonded to the vessel's ground system. It is now common thought that the bonding of through hull fittings causes more electrolytic problems than the galvanic problems it seeks to prevent and as such is no longer recommended.

(S) Give consideration to replacing the existing ball valves with alternatives made from either bronze or a quality dezincification resistant material and remove all grounding wires from these 2 fittings.



Both hoses to the through hull fittings below the waterline were found secure with 2 hose clamps. The hose clamps associated with the water inlet at the toilet pump are of galvanised steel, found badly corroded and require replacement with stainless steel alternatives. Where visible the hoses were seen in satisfactory external condition.

(R) Replace the hose clamps on the hose for the toilet water inlet where connected to the toilet pump. These hose clamps are of galvanised steel, found badly corroded and require replacement with stainless steel alternatives. This work should be undertaken before continued use of the vessel.

The speed transducer was seen secure in the engine compartment to port and in satisfactory condition.

Through hull fittings above the waterline are as follows:

Plastic fittings -

- Electric bilge pump outlet located aft and to port.
- Cockpit drain located aft and to port.
- Calorifier over pressure drain outlet located aft and to port.
- Galley sink outlet located amidships to port.
- Cockpit drain located aft and to starboard.
- Manual bilge pump outlet located aft and to starboard.

Chromed bronze (or similar) fittings -

- Fuel tank breather located amidships to port.
- Water tank breather located amidships to port.
- Heads sink outlet located amidships to starboard.

Visual access to the following fittings was not possible:

- Fuel tank breather.
- Water tank breather.

Of the above fittings where visual access could be gained, all were found secure with no visual evidence of seepage. All of the associated hoses were found secure with one hose clamp and where accessible found secure to their related appliances.



ON DECK

MAIN COMPANIONWAY

The main companionway comprises a wooden folding hatch that once folded in half slides forward and a single hinged wooden door with a Yale style locking mechanism. All found secure and in satisfactory condition with no evidence of seepage.

PORTS & WINDOWS ETC

The spray shield surrounding the forward end of the cockpit comprises an aluminium frame with 2 glass lenses facing forward and one tinted polycarbonate (or similar) lens on each side of the vessel facing outward. This structure was all found secure and in good condition with only very minor crazing noted in the non-glass lenses on each side.

Port lights as follows:

- 4 x fixed port lights, 2 each side of the main saloon comprising aluminium frames and polycarbonate (or similar) lenses mounted within the vertical sections of the deck moulding outboard.
- 1 x fixed port light comprising aluminium frame and polycarbonate (or similar) lens mounted in the deck moulding immediately forward and below the windshield.
- 1 x Lewmar opening port light comprising aluminium frame and polycarbonate (or similar) lens located in the heads compartment.

Hatches as follows:

- 1 x opening hatch on the foredeck comprising aluminium frame and polycarbonate (or similar) lens. This unit is lockable and can be opened from both inside and outside the vessel.

All of the above items were found secure and in good condition with only slight crazing noted in the lenses. Where applicable opening port lights and hatches opened freely with clamps and seals found in good condition. No evidence of seepage was noted during my examination although it should be understood that these items were not hose tested. Note: hose testing may reveal leaks that may otherwise go undetected in dry weather.

PULPIT, PUSH PIT AND ANTENNAS

The pulpit comprises a continuous stainless steel rail extending back to a position just aft of the spray shield. A plastic coated rigging wire is incorporated at mid-level. A section of this wire can be opened with pelican clips on the bow to help facilitate recovery of the anchor. All found secure and in good condition.

The pushpit is a low level continuous rail around the aft portion of the cockpit. This unit was found secure and in good condition
There is a radar arch over the cockpit mounted on each side of the cockpit coaming.



This structure was found secure and in good condition with a radar dome seen secure in its bracket in a central position. There is a short stainless steel mast section that has broken off the arch to which an all round white navigation light should be mounted. This mast was not present at the time of my examination. The owner of the vessel informed me that a repair to the mast is currently being undertaken. This item should be replaced with the associated navigation light before continued use of the vessel at night or in conditions of reduced visibility.

(R) The broken antenna mast associated with the radar arch to which the navigation light is mounted should be replaced along with the associated navigation light itself prior to continued use of the vessel at night or in conditions of reduced visibility.

GROUND TACKLE AND MOORING ARRANGEMENTS

The main anchor is a 10kg galvanised Bruce style unit seen in the boot of the owner's car and in good condition. A length of 8mm galvanised chain was seen in the anchor locker in good condition although it should be noted that this chain was not flaked out and examined link by link and bitter end not established. When the anchor is reattached to the chain seizing wire should be used with the shackle to prevent the shackle pin from backing out when the anchor is in use. This anchor can be considered suitable for use on inland waterways and estuaries in fair weather but some consideration should be given to upgrading the unit if coastal cruising is intended. For coastal cruising "The Boat Data Book" 6th edition 2009 by Ian Nicholson recommends 2 anchors, 1 @ 7 – 10 kilos and a 2nd at 18 – 23 kilos for a vessel in the 8 – 10 meter range. For coastal cruising this publication also recommends 55m of 13mm 3 strand rode with 5m of 8mm galvanised chain.

(R) Ensure seizing wire is used on the shackle associated with the anchor when the anchor is reattached at the beginning of the season and give some consideration to increasing the size of the anchor if coastal cruising is intended.

The anchor windlass is manufactured by Lofrans and although I was unable to determine the model of this unit it should be considered of adequate size for this vessel. This unit was found secure to the deck and operating in both the up and down directions. Unit not tested under load.

The anchor roller is a stainless steel fabrication with a nylon (or similar) roller unit and a pin to prevent the anchor from jumping off the roller whilst underway. The nylon roller has worn to the extent that it is now broken into 2 parts and is of little further use. Further to this the stainless steel cheeks have been bent out of shape. This unit represents an important safety feature on any vessel and as such requires straightening and replacement of the roller such that it may be used efficiently in the event of an emergency. (See figure 4 on next page).





Figure 4
Anchor roller.

(R) This stainless steel anchor roller fabrication requires straightening and replacement of the nylon (or similar) roller unit. This work should be undertaken prior to continued use of the vessel.

There are 6 x aluminium deck cleats, 2 fwd, 2 amidships and 2 aft, all found secure with adequate backing plates where visible. These units are mounted in such a way that they negate the requirement for fair leads.

BOARDING LADDER

A stainless steel boarding ladder with teak treads was seen secure and in good condition on the transom. When this item was tested under my weight, no movement was noted. This item extends deep enough below the static waterline to be effective in the recovery of a man overboard.

CANVASSES

The only canvas seen aboard was the full cockpit cover for UV and weather protection when the vessel is out of use. This item is made of a PVC type fabric and was seen in fair condition. Although the fabric is becoming stiff, no significant tears or cracks were noted during the course of my examination. Despite the cover being in place when I arrived to make my examination, gaps around the edge of the cover where it fails to overlap the cockpit coaming have let rainwater into the cockpit area saturating the carpeted areas.



SAFETY

NAVIGATION LIGHTS

The following navigation lights were seen aboard:

- Port light mounted on the port side of the coachroof.
- Starboard light mounted on the starboard side of the coachroof.

When tested neither of these lights illuminated.

I understand an all round white light will be mounted to the replacement mast associated with the radar arch as already discussed above.

(R) Determine why the navigation lights to port and starboard are not functioning and service as necessary. This work should be undertaken prior to use of the vessel at night or in reduced visibility.

As this vessel is less than 12m in length the requirements according to COLREGS will be satisfied with the lights outlined above if maintained in working order.

BILGE PUMPING ARRANGEMENTS

Electric

A Rule 2000 electric bilge pump was seen installed in the engine compartment with an associated float switch. This unit was switch tested and found operational but without flow testing I cannot guarantee the flow rate or integrity of the unit itself.

The unit was seen secure with associated hose securely attached to the pump unit and to the outlet as already discussed. The outlet hose rises high into the cockpit coaming before attaching to the outlet to prevent siphoning.

Manual

The manual bilge pump is installed in the side of the cockpit coaming to starboard. I was unable to gain visual access to this unit but I can confirm that I was able to pump out a small amount of water that was present in the engine bilge at the time of the survey. Without a further more comprehensive test I cannot guarantee the efficiency or flow rate of this unit. Again, as I was unable to gain visual access to this unit I cannot confirm the security of the associated hoses to the unit itself. The outlet hose rises high into the cockpit coaming before attaching to the outlet to prevent siphoning and there is a strum box properly fitted to the pick up hose in the engine compartment.



FIRE FIGHTING EQUIPMENT

The following fire fighting equipment was seen aboard:

- 2 x 1kg automatic dry powder extinguishers located in the engine compartment with gauge in the green sector, both expired 2010.
- 1 x 1kg dry powder extinguisher located in the galley area aft, expired 1995.
- Fire blanket located at the forward end of the galley area.

As these fire extinguishers are now out of date it is worth giving some consideration to upgrading the on-board fire fighting equipment. Failure to have up-to-date fire fighting equipment can affect the insurability of the vessel.

The current dry powder extinguishers in the engine compartment are designed to extinguish fires in areas up to 1m³ each, 2 of these extinguishers will have a combined capacity of 2m³. Given that the engine space is in the region of 3m³ it should be considered that the current arrangement is under specified.

Given the limited space and the desirability to keep the units small it would be possible to replace the existing units with GTSE clean agent extinguishers that per 1kg unit will extinguish fires in up to 1.7m³ giving a combined capacity of 3.4 m³ if 2 units were installed. These units are more expensive than regular dry powder units but have the added advantage that should they discharge whilst the engines are running the resultant damage to the engine will be minimal.

(S) Give some consideration to upgrading the out of date fire fighting equipment seen aboard for more appropriately sized units.

LIFE-SAVING EQUIPMENT

The following life saving equipment was seen aboard:

Flares

- 2 x handheld orange smoke flares
- 2 x handheld red distress flares
- 2 x parachute distress flares

All of the above flares were seen in good external condition but expired in December 2005.

(S) Give some consideration to updating the inventory of flares.

The RNLI operate an excellent free inspection and advice service concerning levels of safety equipment (SEA check) and can be contacted on 0800 328 0600 or via the RNLI website www.rnli.org.uk.



ENGINE

ENGINES AND INSTALLATION

The engine space was seen in fair condition with some standing oily water in the deepest section of the bilge. There is sound insulation on the underside of the cockpit sole which although generally adhering well is beginning to come adrift along the forward most edge. I cannot confirm that this sound insulation is of a fire resistant material.

The engine bearers are GRP laminations, these laminated directly into the shell moulding.

Examination of the engine mounts revealed the starboard mount of the starboard engine and the port mount of the port engine to be misaligned. This misalignment is most significant on the starboard engine. (See figure 5).



Figure 5

Starboard engine starboard side mount misaligned with fixing bolt leaning over to one side.

I was unable to determine whether or not the bolt shown in figure 5 was loose but clearly some consideration needs to be given to the security, alignment and condition of these outboard most engine mounts. Such misalignment will ultimately lead to failure of the mounts themselves.

(R) The 2 outboard most engine mounts are misaligned and need to be examined by a qualified marine engineer and serviced as necessary. This work should be undertaken prior to continued use of the vessel.



Port Engine

Type: Volvo Penta AD31B
Cylinders: 4
Fuel: Diesel
Family No: [REDACTED]
Serial No: [REDACTED]
Hours: 339.61
Cooling: Water-cooled via heat exchanger
Oil Level: Correct
Water Level: Good
Belt Tension: Good
Alternator: Yes – not confirmed working
Controls: Morse cables seen secure and in good condition.

Starboard Engine

Type: Volvo Penta AD31B
Cylinders: 4
Fuel: Diesel
Family No: [REDACTED]
Serial No: [REDACTED]
Hours: 425.95
Cooling: Water-cooled via heat exchanger
Oil Level: Correct
Water Level: Good
Belt Tension: Good
Alternator: Yes – not confirmed working
Controls: Morse cables seen secure and in good condition.

Both engines were seen in good external condition and have clearly been maintained well with regular paint touch ups when necessary to prevent undue corrosion. Consequently very little corrosion was seen on either unit.

Inspection of the underside of the oil filler caps did not reveal any evidence of emulsified oil.

Where visible all hoses were found secure and in good external condition with no evidence of oil, fuel or water leaks noted. However, it should be understood that it is not always possible to determine where such leaks may be present without the engines seen running and under load. Further to this the standing oily bilge water prevented me from seeing any areas indicating where fluids may be leaking from the engines.

The exhaust elbows were seen in good external condition securely attached to the exhaust hoses associated with the stern drive units.

The engines were not run as part of my examination therefore I am unable to comment on their operational integrity.

It was noted that there is some 85 hours difference in the engine hours between the 2 engines, the starboard unit indicating to have run for longer. This leads me to think



that either one of the tachometers has stopped working or has been replaced at some point, however neither of these statements can be confirmed. The tachometers should be checked for operation once the vessel is re-commissioned and launched in the spring.

(S) Check correct operation of tachometers.

Engine instrumentation comprises the following for each engine:

- Tachometer & engine hours combined
- Oil pressure
- Engine temperature
- Voltage
- Oil pressure, temperature and voltage warning lights.

I am unable to confirm the above as working without running the engines.

FUEL SYSTEM

Visual access to the fuel tank was not possible without significant dismantling therefore I cannot comment on the construction, integrity or condition of this unit or the integrity/security of associated hoses.

Where visible, the fuel delivery and return hoses are of copper, seen well supported and in good external condition.

There are 2 x Separ primary filters/water separators with aluminium bowls, one dedicated to each engine seen secure and in good external condition. The flexible fuel hose between the copper delivery and return hose is not of ISO 7840 but was seen in good condition with no evidence of seepage noted from the crimped terminals.

Fuel shut-off valves are located in the side of the cockpit coaming to starboard and were found to open and close to their full extent. Again, there is one shut off valve dedicated to each engine.

ACCOMMODATION AND ON BOARD SYSTEMS

ACCOMMODATION GENERAL

Cabinetry

The woodwork and varnish was found in fair condition with only minor dents and abrasions noted. The varnish in areas close to the companionway where it suffers the greatest wear and UV degradation would benefit from refinishing as the increased weathering in this area has left the varnish very thin and the woodwork is now almost completely unprotected in some areas. Despite this, the cabinetry has suffered very little water damage and if attended to could easily be restored to a good standard.



Internal upholstery

Although the internal upholstery was found slightly damp it was seen in good condition overall with very little evidence of staining or mildew damage. There is one area on the port saloon cushion aft where the fabric is more aggressively worn than in other areas but if the covers were to be laundered and dried out they would look tidy.

Internal linings and carpets

The internal head linings are of foam backed vinyl material, which is no longer adhering towards the aft end of the main cabin and area surrounding the companionway. The rest of the interior linings were found reasonably clean and adhering well. The carpet on the cabin sole was seen worn, stained and fairly dirty. Replacing this item would go a long way to improving overall appearance of the vessel's interior.

Exterior upholstery

The upholstery in the cockpit area was found in fair condition although it was noted that the backrest along the aft most cockpit seat has either purposefully been detached for maintenance or has come adrift of its own accord. Either way this item requires re-attachment and/or repair as necessary. The external upholstery was seen reasonably clean with no significant tears, staining or damage noted.

Exterior linings and carpets

The carpet of the cockpit sole was found wet, somewhat worn and slightly torn around one of the leg supports that forms part of the aft seating arrangement. Again, replacement of this item would go a long way to improving the overall appearance of the cockpit area.

GAS INSTALLATION

As this boat is not intended for commercial use it does not need to comply with the MCA code of practice which requires specific standards for gas systems and unless for use on inland waterways there is no requirement for it meet the stipulations of the Boat Safety Scheme.

Irrespective of the above, gas systems are subject to the checks listed below as part of this survey. Recommendations will be made where there is an obvious serious safety issue and these must be carried out before use. Suggestions will also be made where appropriate to enhance safety criteria, particularly with systems where there is no mandatory requirement to conform to a standard.



Observation	Appraisal
Condition and efficiency of self-draining bottle storage	See Note 1 below
Age and condition of flexible hose	See Note 2 below
Age and condition of regulator	Regulator in good condition but age not established.
Condition of copper tubing where accessible	See Note 3 below
Is tubing adequately supported and not under stress where accessible	See Note 3 below
Are all appliances fitted with flame failure devices on all burners	Yes but not operated during my examination. See Note 4 below.
Is a gas alarm fitted	Yes but faulty and damaged. See Note 5 below
Is each appliance fitted with an isolating tap	Yes, opening and closing to full extent.
If fitted did leak bubble tester function	Pressure tester fitted indicating a leak in the system. See Note 3 below

Note 1: The gas bottle is stowed in the anchor locker; any leaks from the bottle would drain directly overboard through the anchor locker drain hole. However the securing bracket for the bottle is ineffective especially for stowage of the bottle in this location.

(R) The securing arrangement for the gas bottle in the anchor locker is insufficient and should be modified to prevent any movement of the gas bottle whilst underway. This work should be undertaken prior to continued use of the vessel.

Note 2: Although I was unable to determine the age of the flexible gas hose between the bottle and regulator, it was found slightly perished and now requires updating with a section of approved gas (butane/propane) hose.

(R) Update the existing flexible section of gas hose between the gas bottle and regulator with a new section of approved gas (butane/propane) hose. This work should be undertaken prior to continued use of the vessel.

Note 3: The regulator is fitted with a pressure gauge to test for leaks in the system. This system is operated by turning the gas on at the bottle at which point the gauge needle should rise into the green sector. The gas is then shut off at the bottle and the needle should remain in the green sector for at least 2 min. When operated it was observed that not only did the needle fail to enter the green sector when the gas was switched on but also immediately dropped when the gas was shut off again, which is indicative of a leak somewhere in the system. I was unable to examine any of the gas hose between the regulator and stove as its almost completely hidden behind linings,



as such I cannot comment on its condition, however its my recommendation that the system is now inspected by a qualified Gas Safe (formally CORGI) engineer and serviced as necessary.

(R) The pressure gauge gas leak detector indicates that there is a leak somewhere in the system. This system should be examined by a qualified Gas Safe engineer and serviced as necessary. This work should be undertaken prior to continued use of the vessel.

Note 4: Unsure of the integrity of the gas system I did not want to perform my usual tests to ensure operation of the flame failure devices which requires lighting of the burners, grill and oven.

Note 5: A gas alarm was seen fitted but only operated sporadically when the test button was pressed. It was also noted that the gas sensor in the main cabin was damaged and as such I would not want to guarantee its integrity.

(S) Give some consideration to servicing or replacing the gas alarm system as necessary.

Please note this survey is not a gas safety certificate, that is only obtainable in the UK after pressure testing and assessment by a qualified person listed on the Gas Safe register (formally CORGI) www.gassaferegister.co.uk

Sources of further information

www.boatsafetyscheme.com Even if your boat is not required to comply with this standard it contains much sensible advice and the manual can be downloaded free of charge.

FRESH WATER TANKS AND DELIVERY

The single fresh water tank located beneath the berth in the aft cabin is of GRP construction integral with the hull moulding. Capacity undetermined. All hoses were found secure and in satisfactory external condition.

Water is delivered to the fresh water system via a 12V diaphragm pump also located beneath the berth in the aft cabin with an associated inline screen filter and accumulator tank. All found secure and in satisfactory external condition.

There are outlets for hot and cold water in the galley, heads compartment and transom shower however when the pressure pump was switch tested I discovered that one of the delivery hoses to the tap in the galley was not connected and an amount of water drained into the bilge before I realised and switched the pump off. From this I can conclude that the fresh water pump is in working order but am unable to comment on efficiency or flow rate without a more detailed examination. Without all hoses secure I was unable to test whether or not all taps are in working order. Where visible fresh water delivery hoses were examined externally and other than the above found secure and in satisfactory condition. I cannot comment on the integrity of the system when under pressure or the internal condition of the hoses.



(R) Re-secure the fresh water delivery hose to the tap in the galley. This work should be undertaken before the vessel is re-commissioned.

There is a calorifier located in the engine compartment to port. A small section of the insulation is missing from the top of this tank but other than this the tank was found secure with no evidence of seepage from the associated fittings. Again it should be understood that it is difficult to fully assess the integrity of the fittings on this unit whilst not under pressure.

The water in the calorifier is heated either by hose connections to the cooling system associated with the port engine or the 230V element for use when the vessel is plugged into a shore power supply.

HEADS

The heads unit comprises a washbasin with pull out shower and a manual salt-water flush Par/Jabsco toilet unit. The toilet unit itself was found well fixed down but has clearly not used in a long time. The pump handle moved up and down freely but I could not be certain of the integrity of this pump without testing it with the vessel afloat. As already discussed the hose clamps associated with the water inlet hose fitting to the pump are somewhat corroded and require replacement.

Shower water drains into a sump box below the cabin sole where there is an electric pump with associated float switch which pumps the water out of this compartment. I was unable to determine where this water is pumped to as all through hull fittings both above and below the waterline have been accounted for and due to linings I was unable to trace the hose. When the float switch for this pump was lifted to test the unit it was found inoperable.

(S) Give some consideration to servicing the shower drain pump or replacement as necessary. Determine where the water is drained to and if found not draining overboard, (e.g. into the engine bilge) give some consideration to combining it with an overboard fitting such as the washbasin drain in the heads compartment.

ELECTRICAL INSTALLATION

12v DC:

Battery banks seen aboard as follows:

<i>Battery use</i>	<i>Specification</i>	<i>Measured voltage</i>
Engine start battery	1 x 12v 110Ah	12.48v
House/service battery	2 x 12v 110Ah	11.98v

The batteries were seen in good external condition secure in dedicated battery boxes in the engine compartment. Battery terminals were found clean, secure and in good condition.



There are dedicated breaker switches for the batteries located in the engine compartment and immediately aft of the helm station.

As far as can be ascertained all circuits are protected by breaker switches with the exception of the diesel heater.

Charging is via alternators from the main engines or via a 230v 15Ah battery charger seen located at the forward end of the engine compartment, found secure and in good external condition. Without access to a 230v shore power supply or the facility to run the engines, neither of these charging systems were tested as part of my examination.

Where visible wiring was found clean and well supported in conduits and with cable ties.

230v AC

There is a 230v shore power inlet socket located by the helm station. There is an RCD installed on the shore side of all electrical appliances and breaker switches for the following appliances:

- Battery charger
- Water heater
- Power outlets
- Spare

Again, without access to a 230v shore power supply I was unable to fully test this system.

ELECTRONIC AND NAVIGATION EQUIPMENT

The following electronic and navigational equipment was seen aboard:

- Clock & barometer (clock not seen working)
- Seafarer 501 echo sounder
- Ritchi steering compass
- Furuno 4 tone daylight display radar unit (model not identified)
- Sumlog speed and log display (3014 miles logged)

Other than where specified the above items were switch tested and found operational although I am unable to guarantee whether or not the transducers associated with the echo sounder and log are functioning correctly without examining the vessel under way.

Although an antenna for a VHF radio was seen mounted outboard by the helm station, there is currently no VHF unit aboard. A VHF radio is an important safety feature and if not part of the vessels inventory currently removed for winterisation, some consideration should be given to the installation of such a unit prior to re-commissioning in the spring.



(S) Give some consideration to the installation of a VHF radio unit if not already part of the vessel's inventory.

HEATING AND REFRIGERATION

There is a space in the galley where the refrigeration unit has been removed and as such there is currently no facility for refrigeration aboard.

The diesel heater is an Erberspacher D3L seen mounted in the engine compartment to port. The unit was found clean and in good external condition with all ducting and fuel hoses found secure with no evidence of any fuel leaks at this time. When the unit was switched on the fan ran for approximately 10 seconds before the unit shut down. Whether this is a consequence of a slightly low battery voltage (11.98v without load) or a more serious issue I cannot be certain but some consideration should be given to determining why this unit is currently inoperable.

(S) Give some consideration to determining why the Eberspacher diesel heater is currently inoperable.



RECOMMENDATIONS AND CONCLUSIONS

LIST OF RECOMMENDATIONS

(R) Repair the area of damage to the structural member in the anchor locker to prevent moisture ingress to the laminate and deterioration of this structural element (See figure 3). This work should be undertaken prior to continued use of the vessel. (Ref: Page 13)

(R) In the absence of any service history, try to determine when the bellows and exhaust hoses were last replaced and service as necessary. This work should be undertaken before continued use of the vessel. (Ref: Page 15)

(R) Examination of the trim tabs found them to be inoperable. Firstly it will be necessary to remove excess antifoul in way of the hinges associated with the tabs themselves to enable free movement of these items before further testing and investigation as to the cause of this malfunction. It was noticed that the trim tabs are currently set to slightly different pitches which may well affect the stability of the vessel underway at speed. This work should be undertaken before continued use of the vessel. (Ref: Page 15)

(R) Replace the hose clamps on the hose for the toilet water inlet where connected to the toilet pump, these hose clamps are of galvanised steel, found badly corroded and require replacement with stainless steel alternatives. This work should be undertaken before continued use of the vessel. (Ref: Page 17)

(R) The broken antenna mast associated with the radar arch to which the navigation light is mounted should be replaced along with the associated navigation light itself prior to continued use of the vessel at night or in conditions of reduced visibility. (Ref: Page 19)

(R) Ensure seizing wire is used on the shackle associated with the anchor when the anchor is reattached at the beginning of the season and give some consideration to increasing the size of the anchor if coastal cruising is intended. (Ref: Page 19)

(R) This stainless steel anchor roller fabrication requires straightening and replacement of the nylon (or similar) roller unit. This work should be undertaken prior to continued use of the vessel. (Ref: Page 20)

(R) Determine why the navigation lights to port and starboard are not functioning and service as necessary. This work should be undertaken prior to use of the vessel at night or in reduced visibility. (Ref: Page 21)

(R) The 2 outboard most engine mounts are misaligned and need to be examined by a qualified marine engineer and serviced as necessary. This work should be undertaken prior to continued use of the vessel. (Ref: Page 23)

(R) The securing arrangement for the gas bottle in the anchor locker is insufficient and should be modified to prevent any movement of the gas bottle



whilst underway. This work should be undertaken prior to continued use of the vessel. (Ref: Page 27)

(R) Update the existing flexible section of gas hose between the gas bottle and regulator with a new section of approved gas (butane/propane) hose. This work should be undertaken prior to continued use of the vessel. (Ref: Page 27)

(R) The pressure gauge gas leak detector indicates that there is a leak somewhere in the system. This system should be examined by a qualified Gas Safe engineer and serviced as necessary. This work should be undertaken prior to continued use of the vessel. (Ref: Page 28)

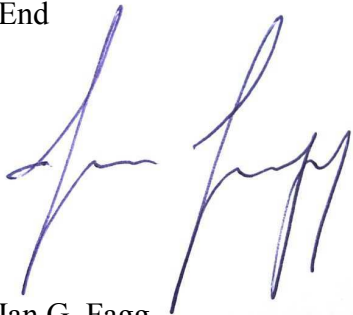
(R) Re-secure the fresh water delivery hose to the tap in the galley. This work should be undertaken before the vessel is re-commissioned. (Ref: Page 29)

CONCLUSIONS & MAINTENANCE OVERVIEW

Overall the vessel was found in structurally sound condition but there is now a list of defects that should be addressed prior to continued use. Most significant is to determine the condition of the gas system and identify the source of the leak/s; a qualified engineer on the Gas Safe register should undertake this work. Further to this some work needs to be done to realign the outboard most engine mounts, again this work should be undertaken by either a qualified or competent engineer. The other recommendations require relatively minor repairs or maintenance and will be mostly inexpensive to resolve.

Further to the **Recommendations** outlined above, some consideration should be given to the **Suggestions** within the text of this report which if observed will go some way to help prevent un-necessary deterioration and enhance the vessel's safe operation.

End



Ian G. Fagg
Ocean Marine Surveys
14th February 2013



Appendix

SUGGESTED GUIDELINE INTERPRETATION OF MOISTURE READINGS.

Relative Readings	Suggested Guidelines	Examples	Comments
0 – 15	For all practical purposes may be considered dry.	<ol style="list-style-type: none"> 1. Modern yachts with epoxy protection from new 2. Yacht with gelcoat removed after drying out period prior to a epoxy treatment scheme. 	Establish minimum before proceeding with any treatment.
16 - 20	Some moisture present at low levels, but of no great concern.	<ol style="list-style-type: none"> 1. Yachts with isophthalic and vinyl ester gelcoat resins after initial lift out, but will quickly reduce dependent on weather conditions. 2. Older orthophthalic resins may take longer for readings to reduce. 	Follow 3 steps:
21 - 30	Risk of associated moisture defects considered medium, but toward top of this range levels are becoming significant.		Use both shallow and deep modes to make comparative readings.
31 - 45	Considered high and at a level where the risk of moisture related defects being present, but not yet physically detectable, is significant.		Use due point facility and thermistor sensor to identify potential condensation problems and spurious readings.
46 - 60	Very high and is usually accompanied by physically detectable signs.	<ol style="list-style-type: none"> 1. Blistering is visible or where the gelcoat has been starred or cracked. 2. Susceptible location and boat age. 	Monitor at a later date to confirm readings.
61 - 80	Extremely high and indicative of possible laminate damage in addition to osmotic blistering and physically detectable signs.		As above.
81 +			Experience and knowledge of particular construction is essential before reaching any conclusions.

Sovereign technical department, October 2010

