

MMM SURVEYS

REPORT NO 19/20

CONDITION SURVEY ON GLASTRON GS279



Date of Survey: 25 Nov 2020

Customer: x
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Mob: x
Email: x

Surveyor: Mr Mark J McCrea BEng, CEng, CMarEng. MIMarEST, MIIMS, DipMarSur

Of: Mark McCrea Marine Surveys
47 Chester Avenue
Whitehead
Carrickfergus
BT38 9QJ

Mob: 07883 363316
Email: markmccrea3913@gmail.com

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1. AIM

The aim of this report is to state the surveyor's findings in relation to the condition of the vessel prior to sale by the owner.

2. SUMMARY

The GS279 was in sound condition for her age. Key safety items to address are re-attaching the starboard guardrail, replacement fire extinguishers, a new bilge pump, battery security & terminal protection and ensuring a bow thruster fuse is fitted. Aside from new fire extinguishers, all other defects are relatively inexpensive to rectify. With these rectified and the few cosmetic items attended to, this Glastron will be a safe, secure and attractive vessel for her owner to enjoy.

3. THE SURVEYOR

Mark has been a professional Marine Engineer since joining the Navy in 2003. He is a qualified Head of Department, Machinery Control Room Supervisor and Docking Officer. He has been a member of the Institute of Marine Engineering, Science and Technology (IMarEST) since 2004 and is registered with them as a Chartered Engineer (**IMarEST No 613407**). In 2007 he signed up to a Diploma in Small Craft Surveying with Lloyds Maritime Academy obtaining a Merit one year later (**Diploma Reg No SmCrSur 0708-033**). He became a member of the International Institute of Marine Surveying in 2019 (**IIMS No 1341**) and was approved as a **Certifying Authority Examiner** in January 2020. A full CV is available on request.

4. INTRODUCTION

Date and Location of Survey. The vessel was surveyed on Wed 25 Nov at Bellnaleck, Co Fermanagh.

Weather. The weather was showery and the temperature was 6°C.

Purpose of the Survey. The vendor requested a condition survey prior to sale of the vessel.

General Limitations. You should have been sent a copy of the Terms and Conditions prior to commencing the survey. You should read the section headed 'Limitations of Survey' before reading further; if you do not have a copy please contact us (contact details are on the cover page) to request one.

Limitations specific to this survey are listed below and throughout the report.

- The vessel was sitting on trestles and blocks which prevented access to those areas of the hull.
- The vessel's interior flooring, cabinetry and general fit-out prevented access to parts of the structure and parts of some systems. Access was very limited in the vessel's interior cabins, and slightly limited in the engine compartment.

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5. THE VESSEL

Glastron GS279 Specification. She is a 2005 (taken from the last 2 digits of the hull identification number) inshore sports cruiser. Her hull and superstructure were of GRP construction. The hull form was planing with a medium-vee, multiple chines and 3 lifting strakes per side. A bathing platform was integrated into the transom, a custom bathing platform was bolted atop. The vessel

had a double vee-berth forwards, an aft double cabin, galley to port, heads to starboard and helm in the cockpit area. She had a single diesel engine on a duo-prop outdrive. The following table lists the vessel's specifications:

Hull Overall	27'5"		
Beam	8'6"		
Hull Draught	2'0"	Max Draught (skeg)	3'4"
Displacement	Approx 6180 lbs		
Hull ID No	US-GLA49319C505		
RCD	Category B. Max 10 persons plus 1250kg. Max 245kW.		

Engine & Drive Specification. The vessel is fitted with a single diesel engine driving through duo-prop outdrive leg. The engine specification is as follows.

Type	Volvo Penta KAD32
Performance:	170hp, max 3800rpm
Serial No:	Unreadable

6. APPLICABLE REGULATIONS

As a leisure vessel under 13.7m, this Glastron is not required to comply with any specific MCA regulations regarding her construction or equipment. The vessel has therefore been assessed by the surveyor using his judgement with due consideration being given to the Maritime & Coastguard Agency (MCA) small commercial vessel regulations i.e. MGN280 and the Yellow Code. An overview of pleasure craft regulations can be found at <https://www.rya.org.uk/knowledge-advice/regulations/pleasure-craft/Pages/hub.aspx>

7. HULL - EXTERNAL

Scope. The external hull was examined by a combination of eye, hand and percussion soundings to identify any defects which may affect structural integrity or watertight integrity.

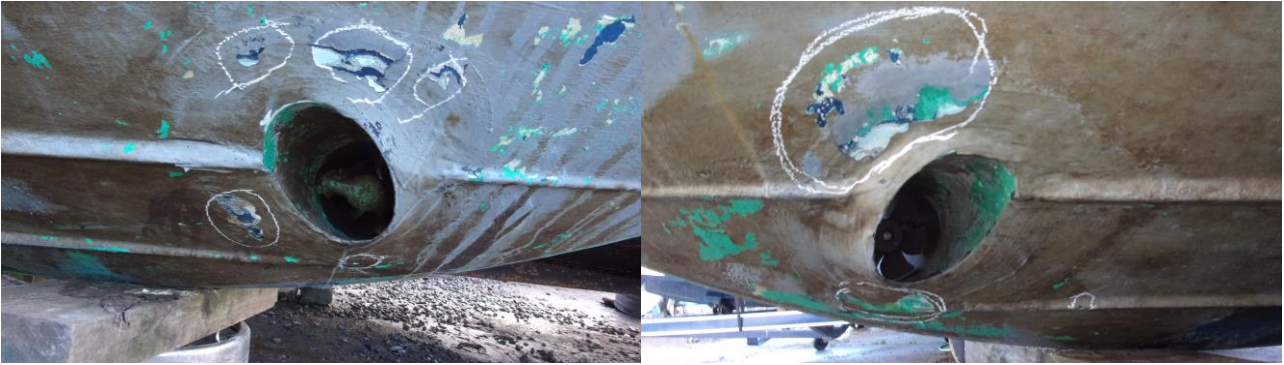
Limitations. Several layers of anti-fouling were present preventing direct inspection of the gelcoat and GRP structure underneath.

Orthophthalic polyester resin, used from 1950 to the early 1990s, was prone to osmosis. When osmosis was 'discovered' in the 1980s, manufacturers started switching to Isophthalic resin which is not prone. Being a 2005 vessel, it should not be susceptible to osmosis. However, the hull was examined for blisters which could indicate its presence. No blistering was observed so it was deemed that osmosis was not present. The hull was percussion sounded at intervals giving a rigid, taught sound throughout indicating the material remains solid.

The hull was of GRP construction with an integrated bathing platform; a custom bathing platform had been bolted to the integrated platform. The hull to deck joint was overlap and trimmed with an extruded aluminium rubbing strip with rubber insert. A bow thruster had been retrofitted. The hull was finished in blue and white gelcoat.

The hull bottom had various areas of anti-fouling in different colours (grey, blue, green, black). It would benefit from scraping away loose material and application of a new anti-fouling paint scheme.

The retro-fitted bow thruster tube had been faired into the hull using gelcoat. Some areas were brittle and breaking away; this is possibly the result of curing at too high a temperature (too much catalyst). It is recommended that the area be ground back then re-faired using gelcoat/flocoat mixed according to the manufacturer's instructions. See areas circled in the photos below:



There were various area of exposed GRP on the lifting strakes, possibly due to chipping of the gelcoat when launching/recovering on the trailer. The areas are as follows:

- Stbd inner strake, aft, 1cm² (shown below)
- Stbd outer strake, mid, 1cm²
- Port inner strake, fwd 1cm²
- Port middle strake, fwd/mid, 1cm²
- Port middle strake, mid, 1cm x 24cm (shown below)
- Port outer strake, mid, 1cm² (shown below)



The topsides were finished in blue and white gelcoat which was in good general condition and had some shine to it. There were various scrapes in the gelcoat; some had been filled but not faired smooth. These are purely cosmetic issues. There were various areas of exposed GRP which need filling and fairing:

- Port bow, white, 1cm²
- Stbd, mid, white, 2 scrapes (shown below)
- Port quarter, white, 1cm² (shown below)
- Stbd quarter, blue, 1cm²
- Port quarter, white, beside cleat, 1cm²



The port and starboard quarters had hairline gelcoat cracks, typically caused by the stern swinging in when coming alongside. These are purely cosmetic, but can be dressed up with a hairline crack-filling product. Hairline cracks were also present around the port after cleat; again the material underneath was sound.

Some brackets (for lamp fittings) have been removed (see photo below) from the transom leaving holes which should be filled. The wire for the existing lamp exits an un-sealed hole; this needs a gland or other waterproof seal.



An LED lamp was fitted on the aft coaming to illuminate the bathing platform. This had come loose so should be secured.

Defect Summary and Recommendations

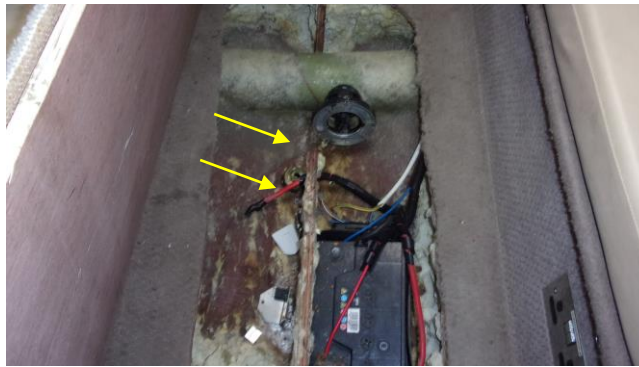
Location	Defect	Recommendations
Bow	Bow thruster tube fairing compound breaking away	Grind back and apply gelcoat/flocoat according to the manufacturer's instructions.
Strakes	Various exposed GRP	Grind back and apply gelcoat/flocoat according to the manufacturer's instructions.
Topsides & quarters	Various exposed GRP	Grind back and apply gelcoat/flocoat according to the manufacturer's instructions.
Transom	Holes for lamp brackets and wires	Plug holes. Fit gland or otherwise seal wire for lamp.

8. HULL - INTERNAL

Scope. The internal hull and its structural components were examined by a combination of eye, hand and tools to identify any defects which may affect structural integrity or watertight integrity.

Limitations. The internal hull skin was examined for blisters which could indicate the presence of osmosis; as no blistering was present it was deemed that osmosis was not present. Access to the internal hull was limited to a hatch in the main cabin floor and the engine compartment.

A longitudinal dwarf bulkhead had been cut to facilitate fitting of a bow thruster; this should not impact upon hull strength. The tube was well glassed in although some fibre ends had not been wetted forward of the tube; it would be worth wetting these out.



Defect Summary and Recommendations

Location	Defect	Recommendations
Bow thruster tube	Some un-wetted fibres	Wet out fibres with resin

9. HULL FITTINGS

Scope. Hull fittings (e.g. anchor/cable, seacocks, skin fittings, shaft brackets, boarding ladders etc) were examined for their security, condition and fitment. Where accessible, the ability to operate the seacock opening/closing mechanism was checked. Seacocks and skin fittings were hammer tested to check their integrity.

Limitations. Access to hull fittings was limited in the heads. Operation of the seacock closing mechanism is no guarantee that the seacock is fully watertight in the closed position.

Two suspected cockpit drains are located behind the moulded lining in the heads and discharge at the waterline around midships on the starboard side. These have hoses secured with single stainless steel jubilee clips. They could be photographed, but not reached by hand so their security cannot be guaranteed.



All fittings/seacocks under the waterline or within 300mm of it should have two stainless steel jubilee clips securing hoses to them. The following table lists the seacocks:

Location	Function	Comments
Engine compartment	Heads inlet	Brass seacock on brass skin fitting, moved freely, 2 jubilee clips
Engine compartment	Heads outlet	Plated seacock (probably brass) on brass skin fitting, moved freely 2 jubilee clips, handle corroding

A formed (as opposed to moulded) custom bathing platform was bolted atop the integrated bathing platform. This was of GRP construction with synthetic teak decking and was in good, sound condition.

Various scuffs and scrapes were present in the rubbing strip of both the hull and the bathing platform. Rubbing strake end caps were missing from the custom bathing platform. A non-original bead of sealant was present atop the aft areas of the port and starboard rubbing strips that extends onto the custom bathing platform.

A pair of aluminium trim tabs were fitted to the transom. The port trim tab was slightly bent and would benefit from being straightened.



Defect Summary and Recommendations

Location	Defect	Recommendations
Engine compartment	Heads outlet seacock handle corroding	Consider de-rust and paint now, or replace when needed
Transom	Port trim tab bent	Straighten

10. DECK AND DECK FITTINGS

Scope. The deck area was walked over and percussion sounded to check the stiffness of the deck. The deck and fittings (e.g. stanchions, guardrails, handrails, fairleads, cleats etc) were checked for their condition and fitment.

Limitations. Safety items such as stanchions, guardrails, guardwires and handrails are fitted primarily to prevent crew from falling overboard. These items were tested by a 82kg surveyor applying simulated loads; this is not scientific and does not offer any guarantee of the load bearing ability of such items.

The deck and coachroof were sound underfoot. The guardrails and stanchions were secure with the exception of the starboard guardrail whose aft end had broken away from the base; this should be repaired to maintain security.

A 7.5kg galvanised bruce anchor was located at the bow connected to a galvanised chain through a stainless steel shackle; all were in good condition. A Maxwell electric windlass was present with helm controls and deck footswitches for veering/hauling the anchor.

Defect Summary and Recommendations

Location	Defect	Recommendations
Stbd deck	Aft end of guardrail broken away from base	Repair

11. SUPERSTRUCTURE

Scope. The superstructure and it's fittings (e.g. doors, hatches, windows, portlights etc) were checked for condition and weathertight integrity.

Limitations. Due to the sometimes complex paths by which water can enter a vessel, 'no evidence' of leaks is not a guarantee of the absence water leaks even if the survey takes place on a rainy day.

The superstructure was of GRP construction with glass windows in aluminium frames. The forward cabin featured a double berth with 4 portlights and a hatch. The heads to starboard featured a sea toilet and sink.

A light grey canvas canopy was fitted which was in a serviceable condition.

Ventilation was provided by opening portlights and a hatch.

The radar arch has some holes where fittings have been removed; due consideration should be given to filling them.

The cockpit area featured a helm, bench seats and a sink. The engine hatch was located in the cockpit floor; the hatch rams were present but not attached. A single wiper was provided for the helm window, this was in good condition with a new blade.

Defect Summary and Recommendations

Location	Defect	Recommendations
Nil	Nil	Nil

12. PROPULSION MACHINERY

Scope. The engine and drive system were visually inspected for external condition and fitment.

Limitations. No internal inspections, tests or trials have been conducted on the propulsion machinery so its performance cannot be guaranteed.

A Volvo Penta KAD32 with duo-prop outdrive was fitted. There were some oil weeps but no evidence of any significant leaks. There was no evidence of any fuel leaks or weeps. The engine was generally in a clean condition; the engine compartment bilges were also clean and effectively dry.

The starboard forward engine mount was missing the after bolt. Indications were that it had been missing for many years (perhaps from new) with no apparent impact. It should therefore be periodically checked for any movement.

The plastic engine cover was loose due to yielding of the material around the bolt holes. This is purely cosmetic as the cover serves no real purpose.

A bilge blower was present on the port side of the engine compartment; the duct hose had detached from the blower.

The duo-prop outdrive leg was generally in good condition. The paint scheme, although patchy, was intact. The bellows were in a serviceable condition.

The steering helmet bush and tap were loose (below left photo) generating play in the leg. It may be possible to tighten the tap however, the bush may need to be replaced. The leg was fitted with A4 propellers; the forward propeller had 2 dented blades which would benefit from being straightened.



Defect Summary and Recommendations

Location	Defect	Recommendations
Outdrive leg	Steering helmet bush loose	Tighten or replace
Outdrive leg	Forward prop – 2 dented blades	Straighten

13. STEERING SYSTEM

Scope. The steering system was visually inspected for external condition and fitment.

Limitations. No internal inspections, tests or trials have been conducted on the steering system so its performance cannot be guaranteed.

The steering system is hydraulic. The steering ram was difficult to access so it’s condition cannot be guaranteed. The steering wheel was rotated in each direction with no notable play.

Defect Summary and Recommendations

Location	Defect	Recommendations
Nil	Nil	Nil

14. FUEL SYSTEM

Scope. The fuel system (e.g. tanks, fuel lines, vent lines, fittings etc) was inspected externally for condition and fitment.

Limitations. No internal inspections were made so the condition of internal areas (e.g. inside tanks) cannot be guaranteed. Only the top of the fuel tank was visible.

The plastic fuel tank was located under the aft cabin berth; what could be seen was in good condition. A fitting was removed from the port side of the tank; this needs to be replaced to close up the tank. The owner stated he had removed it to allow fitting of the new diesel heater.



The fuel filling and vent lines were both marked ISO7840 and connected to the top of the tank. They led to a combined filling and vent fitting located on the starboard topside; all were in good condition.

The engine fuel lines were connected to the top of the tank and were in good condition. A pre-filter was located on the port side of the engine compartment.

Defect Summary and Recommendations

Location	Defect	Recommendations
Engine compartment	Fuel fitting removed	Refit

15. PUMPING AND FLOODING

Scope. The bilge pump (or flood water removal) system was visually inspected for condition, fitment, suction locations and pumping capacity.

Limitations. No dynamic tests were carried out on the system therefore the pumping ability of the system cannot be guaranteed.

General Requirement from MGN280: A vessel should have an efficient bilge pumping system, with suction pipes so arranged that any compartment can be drained. Pump capacities should meet the following minimum requirements:

- ~~10 litres per minute for vessels of 6 metres in length or less~~
- 15 litres per minute (lpm) for vessels of between 6 and 12 metres in length
- ~~30 litres per minute for vessels of 12 metres in length or greater~~

No bilge pump was fitted however, a Whale Orca 500 bilge pump (32 lpm) was lying loose in the port cockpit cabinet. A bilge pump hose was present which lead from the engine compartment bilge to a skin fitting on the starboard topside. The owner stated that the bilge pump had stopped working and a new one would be fitted.

Defect Summary and Recommendations

Location	Defect	Recommendations
Engine compartment bilge	Bilge pump not installed	Install bilge pump

16. FIRE EXTINGUISHING AND ESCAPE

Scope. The condition, serviceability and location of both accommodation and engine compartment extinguishers was checked. The escape routes from each compartment were checked.

Limitations. Nil.

General Fire Extinguishing from MGN280: Vessels less than 15m carrying less than 15 persons should have a minimum of 2 portable fire extinguishers with a combined rating of at least 13A/113B with an extinguisher placed at each exit from accommodation spaces to the open deck. No extinguisher should be rated less than 5A/34B. Extinguishers must clearly display either the date of the last inspection or the date by which the next inspection is due (normally every 5 years) and they should be to a recognised standard e.g. BS EN 3.

No extinguishers were present in the accommodation areas so two should be fitted in line with the above recommendations.

Machinery Space Extinguishing from MGN280: May consist of a portable extinguisher suitably sized for the space being protected and arranged to discharge into that space, or one of the multi-purpose fire extinguishers required in the paragraph above can also be the extinguisher required for discharge into the engine space, providing it is a suitable type (B) and suitably sized and stowed in a location appropriate to its dual use. When a fixed fire extinguishing system (which is not a portable extinguisher) is installed in a machinery space, it should be a MCA or equivalent approved type appropriate to the space to be protected and be installed and maintained in accordance with the manufacturer's requirements.

A Fireboy HFC227EA automatic extinguisher was fitted in the engine compartment. This was dated 2004 so expired in 2009. It should either be serviced or replaced.

Escape. Each compartment with sleeping berths should ideally have more than one escape route. The forward cabin has two escape routes. The aft cabin has one but was open to the cabin i.e. no door.

No fire blanket or smoke alarm were fitted. Due consideration should be given to fitting both.

Defect Summary and Recommendations

Location	Defect	Recommendations
Accommodation	No fire extinguishers	Fit at least 2 with a combined rating of 13A/113B
Engine compartment	Fire extinguisher expired	Service or replace

17. HEATING, COOKING, GALLEY & LPG

Scope. The heating system, cooking equipment and their fuel systems where applicable (e.g. diesel or LPG pipes/hoses/connectors/tanks/bottles etc) were examined externally for condition and fitment. The presence of associated safety items (e.g. fire blankets, smoke alarms, carbon monoxide alarms, gas alarms etc) was checked.

Limitations. Nil

No LPG system was present.

An Eberspacher D2 diesel air heater was loose in the port cockpit cabinet. Fuel lines and an exhaust fitting were present. The owner stated that the heater had failed and a new unit was to be fitted.

The galley to port featured a sink, an Origo 2500E electric/meth cooker, a Tappan microwave oven and an Isotherm fridge.

Defect Summary and Recommendations

Location	Defect	Recommendations
Port cockpit locker	Heater removed	Refit heater, or, plug skin fitting and fuel lines

18. DC ELECTRICAL

Scope. The DC electrical system was checked for the presence of general circuit protection devices, general condition and fitment.

Limitations. No electrical or system testing was conducted and, with the complex wiring looms installed on vessels, it is not possible to check every wire, connection, fitting or device. The performance of the DC system cannot be guaranteed.

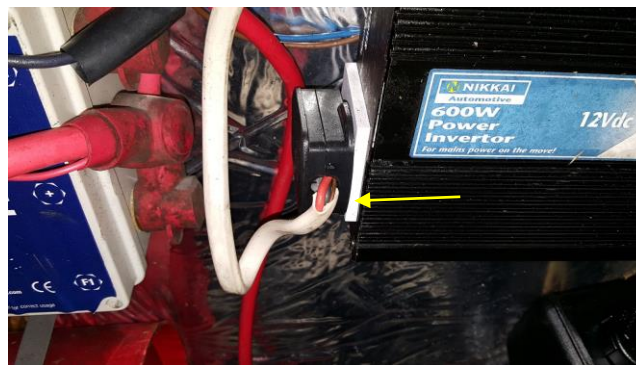
Battery Requirements. Batteries must be restrained to limit movement to a maximum of 1cm and terminals (or at least the positive terminal) must be protected to prevent dropped tools etc causing a short circuit. Gas ejected by batteries when charging must be vented external to the accommodation areas.

The Type 685L bow thruster battery was located under the forward cabin floor. The bow thruster motor had been removed so should be re-fitted. The battery was in a box but had no strap to prevent vertical movement, so one should be fitted. No fuse was visible (it may be mounted to the motor), the bow thruster should have suitably sized fuse installed.

A pair of Type 633 105AH batteries were located on the port side of the engine compartment. They were in boxes which were secured. There were no straps to prevent vertical movement and no lids or terminal protectors to guard against shorting of terminals from a dropped tool. Straps and lids or terminal protectors (only the positive terminal needs protection) should be fitted.

Battery isolators and breakers were fitted in a cabinet in the port aft corner of the cockpit. A switch and fuse panel was located just aft of the galley on the bulkhead.

A Charles 15A battery charger was fitted on the forward engine compartment bulkhead. A Nikkai 600W inverter was fitted to port of the charger. The sheathing on the 240V cable had withdrawn exposing the live/neutral/earth wires. The cable should be re-secured into the plug.



A lamp was fitted to the transom. The cable was joined externally; the joint should be waterproof.

Defect Summary and Recommendations

Location	Defect	Recommendations
Forward cabin	Bow thruster motor missing	Replace
Forward cabin	Bow thruster battery missing a strap	Fit strap
Forward cabin	Bow thruster motor fuse not present	Ensure a fuse is fitted
Engine compartment	No battery straps	Fit straps
Engine compartment	No terminal protection	Fit battery box lid or positive terminal protectors
Engine compartment	Inner wires exposed at inverter 240v plug	Re-secure cable into plug

19. AC ELECTRICAL

Scope. The AC electrical system was checked for the presence of general circuit protection devices, general condition and fitment.

Limitations. No electrical or system testing was conducted and, as it is not possible to check every wire, connection, fitting or device, the performance of the AC system cannot be guaranteed.

AC System Protection. A consumer unit should be fitted to the AC systems as close as possible to the shore power connection to protect the circuits and the 'crew'.

Shore power connects to the port topside using a UK/USA 3-pin adaptor which was coiled up on the bathing platform. A 25A breaker with over-current trip was located on the bulkhead aft of the galley. Although not necessary, it is strongly recommended that a Residual Current Device (RCD) be fitted alongside the breaker to guard against electric shock.

Sockets were present throughout the cabin with those being supplied by the inverter so marked.

Defect Summary and Recommendations

Location	Defect	Recommendations
Nil	Nil	Nil

20. CATHODIC PROTECTION

Scope. The presence and condition of sacrificial or electrical anodes and other cathodic protection devices (e.g. galvanic isolators) was checked.

Limitations. Electric current protection devices and galvanic isolators are often hidden from view; they may be fitted but not located by the surveyor.

Sacrificial anodes were present on the trim tabs and the outdrive leg. The outdrive ring anode was fresh, the outdrive block anode had around 60% remaining as did the trim tab anodes. It would be prudent to fit new anodes suitable to the planned area of operation.

Defect Summary and Recommendations

Location	Defect	Recommendations
Trim tabs & leg	Anodes worn	Replace

21. WATER SYSTEMS

Scope. The fresh (cold and/or hot), grey (sink and shower drain) and black (sewage) water systems were inspected for condition and fitment.

Limitations. Systems hoses could not be checked between engine compartment and sinks due to fit-out so their condition cannot be guaranteed.

A 68L plastic water tank was located on the port side of the engine compartment. The port, aft and underside of the tank could not be seen, but what was visible was in good condition. The tank was secured with brackets and straps.

An Atwood 22.7L water heater was located on the port side of the engine compartment. This had a steel cover which prevented inspection of the tank. Engine coolant was fed to the heater via two ball valves which operated freely.

The water system was pressurised by a Jabsco Parmax3 electric pump which was securely mounted. Systems hoses were rigid plastic and in good condition. The tap at the wet bar was loose.

A Jabsco sea toilet was loose in the heads. The toilet inlet hose was kinked near the seacock. The toilet outlet hose consisted of three hose pieces. The owner stated that he was in the process replacing the toilet and hoses.

A holding tank, previously located on the starboard side of the engine compartment, had been removed. The waste extraction fitting and hose were present. A pair of disconnected heavy duty wires were nearby; these were likely the power supply for the macerator (discharge overboard) pump.

Defect Summary and Recommendations

Location	Defect	Recommendations
Heads	Toilet not secured	Secure
Engine compartment	Toilet water inlet hose kinked	Straighten
Engine compartment	Toilet water outlet hose 3 piece	Fit single hose from toilet to seacock.

22. SUMMARY

The GS279 was in sound condition for her age. Key safety items to address are re-attaching the starboard guardrail, replacement fire extinguishers, a new bilge pump, battery security & terminal protection and ensuring a bow thruster fuse is fitted. Aside from new fire extinguishers, all other defects are relatively inexpensive to rectify. With these rectified and the few cosmetic items attended to, this Glastron will be a safe, secure and attractive vessel for her owner to enjoy.

Annex:

A. Defect Summary and Recommendations.

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DEFECT SUMMARY AND RECOMMENDATIONS

A summary of the key defects which require action are listed below:

Defect No.	System	Location	Defect	Recommendations
1	Hull external	Bow	Bow thruster tube fairing compound breaking away	Grind back and apply gelcoat/flocoat according to the manufacturer's instructions.
2	Hull external	Strakes	Various exposed GRP	Grind back and apply gelcoat/flocoat according to the manufacturer's instructions.
3	Hull external	Topsides & quarters	Various exposed GRP	Grind back and apply gelcoat/flocoat according to the manufacturer's instructions.
4	Hull external	Transom	Holes for lamp brackets and wires	Plug holes. Fit gland or otherwise seal wire for lamp.
5	Hull internal	Bow thruster tube	Some un-wetted fibres	Wet out fibres with resin
6	Hull fittings	Engine compartment	Heads outlet seacock handle corroding	Consider de-rust and paint now, or replace when needed
7	Hull fittings	Transom	Port trim tab bent	Straighten
8	Deck fittings	Stbd deck	Aft end of guardrail broken away from base	Repair
9	Propulsion	Outdrive leg	Steering helmet bush loose	Tighten or replace
10	Propulsion	Outdrive leg	Forward prop – 2 dented blades	Straighten
11	Fuel system	Engine compartment	Fuel fitting removed	Refit
12	Pumping	Engine compartment bilge	Bilge pump not installed	Install bilge pump
13	Fire	Accommodation	No fire extinguishers	Fit at least 2 with a combined rating of 13A/113B
14	Fire	Engine compartment	Fire extinguisher expired	Service or replace
15	Heating	Port cockpit locker	Heater removed	Refit heater, or, plug skin fitting and fuel lines
16	DC	Forward cabin	Bow thruster motor missing	Replace
17	DC	Forward cabin	Bow thruster battery missing a strap	Fit strap
18	DC	Forward cabin	Bow thruster motor fuse not present	Ensure a fuse is fitted

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19	DC	Engine compartment	No battery straps	Fit straps
20	DC	Engine compartment	No terminal protection	Fit battery box lid or positive terminal protectors
21	AC	Engine compartment	Inner wires exposed at inverter 240v plug	Re-secure cable into plug
22	Cathodics	Trim tabs & leg	Anodes worn	Replace