



# **BSS Examination Checking Procedures for Privately Owned and Managed Vessels**

**[Edition.3 Rev.1 September 2013]**



## INTRODUCTION

The checking procedures contained in this book detail the methods by which the Boat Safety Scheme and its owners, the Navigation Authorities, require examinations to be performed on privately owned and privately managed vessels.

Until further notice, hire boats and unregulated passenger boats will continue to be assessed against all BSS Check Items listed in BSS Examination Checking Procedures Edition 1, dated April 2002.

In respect of privately owned and managed boats examiners are required to follow these checking procedures and satisfactory performance will be assessed against them. It is critical that BSS examiners are familiar with the contents of this book to help ensure that the delivery of the examination process is consistent and fair.

In respect of privately owned and privately managed vessels, the 2005 BSS Examination Checking Procedures Edition 2, Rev i (Aug 2005) are now superseded by this ECP Edition 3.1, Rev.1 (Sep 2013).

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Updates to this document will be distributed by the BSS Office in response to changes in the BSS requirements and associated checking procedures. It is the responsibility of the holder to ensure that it is kept up to date.

Any questions or comments about this book or its contents, or any suggestions for revision or improvement, can be directed to the BSS Office.

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## **GENERAL GUIDANCE**

### **Before the examination**

Don't forget that it is the owner's responsibility to maintain compliance with the BSS requirements at all time the boat is on the water as a condition of their navigation authority licence, mooring or registration. The only roles that a BSS Examiner has is to check compliance against the requirements and pass on BSS advice as appropriate.

Owners have a responsibility to prepare the boat for examination, including: -

- full access to any system or feature that requires inspection
- organising supporting documents where required as evidence of compliance and
- the supply of fuel and/or power as needed.

Try to remember to discuss this when you are making the examination arrangements with your customer. There is more information for owners and examiners on the BSS websites that should be helpful in this regard.

### **Carrying out the examination**

The navigation authorities are relying on the fact that boats are checked against procedures and are certificated appropriately.

Examinations must be carried out methodically in accordance with the procedures, instructions and guidance as published on the BSS Examiner website. We expect examiners to use a checklist to ensure checks are not missed.

You will need to approach each examination with resolve and determination. Some physical effort or even discomfort may be required to achieve some of the checks, but not to such an extent that may result in damage to your health, the boat or boat system components.

You may need to search for items you are required to see, such as portable fire extinguishers or LPG line joints. You will also need to look for items that should not be stowed inappropriately such as spare LPG cylinders or self-contained LPG appliances or spare petrol containers. You will need to make every effort to look in any lockers or cupboards where such items are likely to be stored including cockpit and galley cupboards, engine spaces, etc.

Don't forget that it is your duty is to apply these checking procedures diligently.

Please remember though that if you are unsure whether or not some aspect to a boat is compliant, you can contact the BSS Office for assistance. The office is there to support you in your role without assuming your responsibility to carry out the examination diligently.

### **Health and safety**

Examiners have responsibility for their own personal health and safety whilst carrying out examinations. The BSS Examiner website points to some good advice in this respect.

If upon arrival at the place for the examination it is apparent the boat is in a dangerous condition, or if you identify a dangerous condition during the examination, leave the boat safe but do not proceed with the examination.

Remain cautious of electrical installations. Do not presume the absence of live supply. Do not disconnect shore-power, battery charging, or other a.c. power source leads, and do not touch the pins on any connections or touch any exposed terminals.

### **Recording and reporting the examination**

You must keep records of BSS Examinations in accordance with the instructions and guidance as published on the BSS Examiner website.

You must report each BSS Examination using the web-based facility in accordance with the instructions on the BSS Examiner website.

## HOW THESE PROCEDURES ARE LAID OUT

The following structure and layout has been adopted throughout.

<p><b>Check Item number</b> e.g. 7.3.1 locker drain check</p> <p>A unique reference with part number (7), section number (3) and then item number of section (1).</p>	<p><b>Check Item text</b></p> <p>A précis of the requirement posed in the form of a question to which the answer must be 'yes' in order to pass.</p>	<p><b>Status of check item</b></p> <p><b>R</b> = Requirement <b>A</b> = Advice check</p>
<p><b>Checking action to be performed</b></p> <p>When to apply the check and when it is not applicable.</p> <p>What must be examined and how it must be checked.</p> <p><i>[For example, check the location or perhaps markings, or another example, look and feel to assess the condition of the item.]</i></p>	<p><b>Requirements that must be met for a pass</b></p> <p>What criteria must be applied to determine whether the Check Item is passed or failed.</p> <p>Under what circumstances a date specific requirement is to be applied.</p> <p><i>[For example the description of the required location or marking, or, a statement that the item must show no signs of fuel leaks or missing components. etc.]</i></p>	
<p><b>Applicability</b></p> <p><i>[Information relating to the applicability of the check and any reporting implications and actions that the examiner should take account of in the event of a fail]</i></p> <p><b>Supplementary information</b></p> <p><i>[References to supplementary information for examiners related to the check and information contained within the appendices]</i></p> <p><b>Safety advice</b></p> <p><i>[Specific safety advice for examiners related to the Check Item]</i></p> <p><b>Guidance for owners</b></p> <p><i>[Advice that may guide owners towards compliance or added safety]</i></p> <p><b>Examiner action</b></p> <p><i>[Guidance for examiners, particularly in regard to the extent and order of their checking actions and their personal safety]</i></p>		

## GLOSSARY OF TERMS

<b>accessible for inspection</b>	Made available for inspection and capable of being seen and reached.
<b>accommodation space</b>	Space surrounded by permanent boat structure in which there is provision for any of the following activities: sleeping, cooking, eating, washing/toilet, navigation, steering. Spaces intended exclusively for storage, open cockpits with or without canvas enclosures and engine rooms are not included.
<b>appliance</b>	A device or piece of equipment designed for a particular use, used for performing or for facilitating the performance of a particular function. (Examples include but are not limited to: heaters; boilers; cookers; refrigerators; lights; and, 'bullseye' decklights).
<b>appliance with continuously-burning flame</b>	Appliances designed to be left unattended with the main burners operating over long periods. Examples include LPG fridges, cooker ovens, central heating boilers and space heaters.
<b>battery space or box</b>	An enclosure specifically designed to contain the batteries only.
<b>damage or deterioration</b>	Damage or deterioration materially affecting, or likely to affect, the integrity, efficiency or operation of the item or device. <i>[For example, a crack through the bowl of a clear bowl filter would constitute damage warranting a fail but damaged paint or a torn label on the filter would not]</i>
<b>electrical equipment space</b>	A dedicated space used to contain electrical equipment e.g. distribution boards, invertors, etc., and nothing else.
<b>engine space</b>	Space or compartment of the boat containing main or auxiliary engine(s).
<b>ventilation</b>	<p><b>fixed ventilation</b> - Ventilation that cannot be closed without the use of tools.</p> <p><b>total effective area of fixed ventilation</b> - The total area of fixed ventilation provision, as measured.</p> <p><b>calculated fixed ventilation</b> - The ventilation requirement as calculated using the formula at Appendix K.</p>
<b>interior of the vessel</b>	<p>Anywhere within the confines of the hull <u>apart from</u>:</p> <ul style="list-style-type: none"> <li>those areas where the arrangements of a self-draining cockpit helps prevent leaked fuel or LPG entering any space, including accommodation, engine and bilge spaces [see Check Item 7.1.1 for full criteria];</li> <li>open locations on deck or on a cabin roof where leaked fuel would flow directly overboard unimpeded and where any openings into any space <u>or</u> any source of ignition are not within one metre distance.</li> </ul>
<b>light manual force</b>	The application of a minimum manual force entirely proportionate to the potential for movement of the item being checked.

<b>lines, pipes and hoses</b>	<p><b>Line</b> is a generic term referring to the overall facility, i.e. fuel-filling line.</p> <p><b>Pipe</b> refers to rigid metallic lines, i.e. fuel filling pipe.</p> <p><b>Hose</b> refers to a line made of flexible material, i.e. fuel filling hose.</p>
<b>open-flue appliances</b>	<p>Open-flue appliances take their air for combustion from the space in which they are installed.</p> <p>Open-flue appliances will always be fitted with a draught diverter, which provides a draught break between the primary flue on the appliance and the secondary flue connecting the draught diverter and the flue terminal.</p>
<b>open vessel</b>	A vessel in which all the accommodation is completely open to the elements.
<b>portable appliance</b>	An appliance which is not permanently connected to a fuel supply and/or where its location is not permanent.
<b>pre-made</b>	Where an item or connection, such as on a hose assembly or electrical cable, has been made within the intention that it will be permanent. It will not be possible to take apart any such items or connections without causing permanent damage
<b>readily accessible</b>	Capable of being reached for operation, inspection or maintenance without removal of any craft structure or use of any tools or removal of any item of portable equipment stowed in places intended for storage of portable equipment such as lockers, drawers or shelves.
<b>sanitation system</b>	A system comprising equipment designed for installation on board a vessel, to receive, retain, treat or discharge sewage, and equipment using any process to treat such sewage.
<b>sea-going boat</b>	A boat that is used on tidal waters.
<b>seen, reached</b>	<p><b>Seen</b> - Where an item can be assessed with the naked eye, or by the use of a mirror.</p> <p><b>Reached</b> - Where an item can be touched and assessed by hand.</p>
<b>suitable proprietary manufacture</b>	An item or device that is, on the face of it, manufactured for the purpose determined during the examination. [For example, a solenoid controlled valve in the LPG cylinder locker must be presumed suitable, but examiners must not accept valves marked not suitable for use with LPG or DIY arrangements with 'home-fashioned'- style linkages or exposed motors]

## BSS Examination Checking Procedures – Part 2

### Permanently installed fuel systems and fixed engines

There are seven relevant BSS general requirements:

<ol style="list-style-type: none"> <li>1. All permanently installed fuel systems and fixed engines must be designed, installed and maintained in a way that minimises the risks of explosion, or of fire starting or spreading.</li> <li>2. Fuel filling arrangements must prevent any overflow from entering the interior of the vessel.</li> <li>3. All fuel filling points must clearly identify the fuel in use.</li> <li>4. Marking must be provided to identify the location of fuel system emergency shut-off devices, or their means of operation, which are not in open view.</li> <li>5. All permanently installed fuel systems must be designed, installed and maintained to ensure fuel-tight integrity.</li> <li>6. All permanently installed fuel tanks and fuel system connections must be accessible for inspection.</li> <li>7. The pressure systems of steam-powered installations must have a current inspection certificate issued by a recognised competent person.</li> </ol>
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#### 2.1 Fuel filling points

<b>2.1.1</b>	<b>Does the location and condition of the fuel filling point ensure that any fuel overflow is prevented from entering the interior of the vessel?</b>	<b>R</b>
<p>Check the location of fuel filling points and assess the potential for any overflowing fuel to enter the interior of the vessel.</p> <p>Check the condition of fuel filling points where they can be seen or reached, and assess the potential for any overflowing fuel to enter the interior of the vessel around the filling point.</p>	<p>Fuel overflowing from filling points must be prevented from entering any part of the interior of the vessel.</p> <p>Accordingly, fuel filling points must be positioned so that...</p> <ul style="list-style-type: none"> <li>• the camber or configuration of the deck; or,</li> <li>• a coaming; or,</li> <li>• a diverter arrangement;</li> </ul> <p>...causes any overflow to discharge overboard;</p> <p>Fuel filling points must be secure, and free of signs of damage or deterioration which could lead to overflowing fuel entering the interior of the vessel.</p>	
<p>Applicability – this requirement does not apply to the following provided there is no risk of unseen spillage:</p> <ul style="list-style-type: none"> <li>• historic (i.e. bona fide ex-working boat) diesel-engined narrowboats;</li> <li>• diesel tanks, of up to a maximum capacity of 27 litres.</li> </ul> <p>Applicability – open vessels such as RIBs having a continuous deck or sole that is fuel-tight to the interior of the vessel and bilge spaces, meet this requirement.</p> <p>Applicability – diesel fuel fillers onto self-draining cockpits having a continuous deck or sole which is fuel-tight to the interior of the vessel, including bilge spaces, meet this requirement.</p>		



<b>2.1.2</b>	<b>Is the fuel in use correctly and clearly marked on or adjacent to the fuel filling point?</b>	<b>R</b>
Check for markings on or adjacent to fuel filling points.	<p>The specific fuel type in use must be correctly and clearly marked on or adjacent to all fuel filling points:</p> <ul style="list-style-type: none"> <li>• 'DIESEL', 'FUEL OIL', 'GAS OIL', 'DERV', or 'BIODIESEL'; or,</li> <li>• 'PETROL', or 'GASOLINE'; or,</li> <li>• 'LPG BUTANE/PROPANE' as appropriate; or,</li> <li>• 'PARAFFIN'; or,</li> <li>• 'PETROIL'.</li> </ul>	
<p>Applicability – the use of embossed tape (e.g. Dymo) or other lettering that can become illegible through cleaning or normal use is not acceptable. The marking must be legible with all lettering complete.</p> <p>Applicability – marking fuel filling points solely with 'fuel' or 'gas' is not acceptable.</p> <p>Applicability – marking fuel filling points with the internationally accepted symbol is acceptable. If an examiner is unable to verify a symbol, the BSS Office should be contacted for guidance.</p>		

<b>2.1.3</b>	<b>Are all disused fuel filling points disabled?</b>	<b>R</b>
<p>Check all fuel filling points and other deck connections.</p> <p>Identify any that are marked as fuel filling points, or that may be taken to be fuel filling points, but are no longer connected to a fuel tank.</p> <p>Check for signs of disabling.</p>	<p>Unused fuel filling points must be permanently disabled to such an extent that it would require the use of tools to remove the disabling method.</p>	
<p>Applicability – the use of a suitable proprietary adhesive to secure filling point caps or plugs in place etc meets this requirement.</p>		

<b>2.1.4</b>	<b>Is the internal diameter of the fuel filling point at least 31.5mm (1¼in)?</b>	<b>R</b>
Measure the internal diameter of each fuel filling point.	Fuel filling points must have a minimum internal diameter of 31.5mm (1¼in).	
<p>Safety notice – metallic measuring devices are not to be used on metallic petrol filling points.</p> <p>Applicability – if it is not practicable to measure the internal diameter at fuel filling points, an estimate based upon the external diameter of the fuel filling line can be made.</p>		

## 2.2 Fuel filling lines

<b>2.2.1</b>	<b>Are the fuel filling line connections free of signs of leaks and in good condition, and are all fuel filling hose connections accessible for inspection?</b>	<b>R</b>
<p>Check for the presence of fuel filling hose connections, and the condition by sight and touch.</p> <p>Check the condition of fuel filling pipe connections where they can be seen or reached.</p>	<p>All fuel filling hose connections must be accessible for inspection, and must be secure and free of signs of leaks, signs of damage and/or deterioration.</p> <p>Fuel filling pipe connections must be secure and free of signs of leaks, signs of damage and/or deterioration.</p>	
<p>Applicability – hose connections not accessible for inspection must be recorded as 'not verified' on your checklist, and the check must be considered incomplete until such time as the condition has been verified.</p>		

<b>2.2.2</b>	<b>Is the fuel filling line self-draining so that fuel is not retained and is it free of kinks or other restrictions?</b>	<b>R</b>
Check the fall of each fuel filling line. Check for any kinks or other obvious restrictions in fuel filling lines where they can be seen or reached.	Fuel filling lines must be connected to the top of the fuel tank and be 'self-draining' i.e. fall continuously from the filling point to the fuel tank connection so that fuel is not retained. Fuel filling lines must not be kinked or restricted.	
<p>Applicability – fuel filling lines must not have their internal bore diameter restricted to less than 31.5mm (1¼in).</p> <p>Applicability - petrol filling pipes connected to the sides of metal petrol tanks are acceptable provided that the tank spigot is welded to the tank and reaches above the top of the tank.</p> <p>Applicability – diesel fuel filling lines into the sides of fuel tanks are acceptable provided the arrangements comply with the requirements at 2.10 and 2.11.</p> <p>Applicability – diesel fuel filling lines into fuel tank balance lines are acceptable provided the arrangements comply with the requirements at 2.9, 2.10 and 2.11.</p>		

<b>2.2.3</b>	<b>Is the material of the fuel filling line suitable and in good condition?</b>	<b>R</b>
Check the material and condition of fuel filling lines which can be seen or reached. Check the markings on any fuel filling hose.	Fuel filling lines must not show signs of fuel leaks, damage or deterioration. Fuel filling hose must be marked as suitable for the fuel in use or supported by an appropriate declaration.	
<p>Applicability- hoses marked with the correct type of fuel in use are acceptable. Hoses marked ISO 7840, or equivalent, are recommended, and hoses marked to SAE J 1527, DIN 4798, RINA DIP/66/96 are-equivalent to ISO 7840.</p> <p>Applicability – diesel filling hose in good condition may be accepted without marking or declaration, provided it can be examined over its entire length.</p> <p>Applicability – in cases where the filling hose is suitably marked, enough of the hose must be accessed in order that the examiner can make a reasonable assessment as to its general condition.</p>		

### 2.3 Fuel tank vents

<b>2.3.1</b>	<b>Does every fuel tank have a vent facility?</b>	<b>R</b>
Check all fuel tanks for the provision of a vent facility.	A vent line must be fitted to each fuel tank, or a vent must be fitted to either the filling cap or filling line.	
<p>Applicability – vents in filler caps, lines or tank tops must have their outlets at, or above the filling point level.</p> <p>Applicability – multiple diesel fuel tank arrangements having a shared vent facility are acceptable provided the arrangements comply with all other requirements at 2.3.</p>		

<b>2.3.2</b>	<b>Does the fuel tank vent line have a minimum internal diameter of 9.5mm (¾in)?</b>	<b>R</b>
Measure the outside diameter of fuel vent lines.	The internal diameter of vent lines must be at least 9.5mm (¾in).	
<p>Applicability – this may be verified by measuring the outside diameter and estimating wall thickness. The following are approximate indications, copper 11.5mm (½in), steel 12.5mm (½in) and hose 15.5mm (¾in).</p> <p>Applicability – the small hole in the filler cap as provided by the original engine or fuel tank manufacturer, on tanks of no more than 27 litres capacity, is deemed to meet this requirement. Examples are those found on Stuart Turner petrol tanks, Yanmar engine close-coupled tanks or diesel tanks supplying appliances.</p>		

<b>2.3.3</b>	<b>Are the fuel tank vent line connections free of signs of leaks and in good condition, and are all vent hose connections accessible for inspection?</b>	<b>R</b>
<p>Check for the presence of vent hose connections, and the condition by sight and touch.</p> <p>Check the condition of fuel tank vent pipe connections where they can be seen or reached.</p>	<p>All vent hose connections must be accessible for inspection, secure and free of signs of leaks or other signs of damage and/or deterioration.</p> <p>Vent pipe connections must be secure and free of signs of leaks, signs of damage and/or deterioration.</p>	

<b>2.3.4</b>	<b>Is the fuel tank vent line self-draining so that fuel is not retained, and is it free of kinks or other restrictions?</b>	<b>R</b>
<p>Check the fall of each vent line where it can be seen or reached.</p> <p>Check for any kinks or other obvious restrictions in any vent lines where they can be seen or reached.</p>	<p>Vent lines must be connected to the top of the tank and be 'self-draining', i.e. fall continuously from the vent outlet to the tank, or, where a swan neck is installed, from the top of the swan neck down to the vent outlet and the fuel tank connection.</p> <p>Vent lines must not be kinked or restricted.</p>	
<p>Applicability – vent lines must not have their internal bore diameter restricted to less than 9.5mm (<sup>3</sup>/<sub>8</sub>in).</p> <p>Applicability – 'top of the tank' means the top plate of the fuel tank or the highest part of the side of the tank.</p>		

<b>2.3.5</b>	<b>Is the material of the fuel tank vent line suitable and in good condition?</b>	<b>R</b>
<p>Check the material and condition of vent lines which can be seen or reached.</p> <p>Check the markings on any vent hose.</p>	<p>Vent lines must not show signs of fuel leaks, damage or deterioration.</p> <p>Vent hose must be marked as suitable for the fuel in use or supported by an appropriate declaration.</p>	
<p>Applicability – diesel tank vent hose in good condition may be accepted without marking or declaration provided it can be examined over its entire length.</p> <p>Applicability – in cases where the vent hose is suitably marked, enough of the hose must be accessed in order that the examiner can make a reasonable assessment as to its general condition.</p> <p>Applicability- hoses marked with the correct type of fuel in use are acceptable. Hoses marked ISO 7840, or equivalent, are recommended, and hoses marked to SAE J 1527, DIN 4798, RINA DIP/66/96 are equivalent to ISO 7840..</p>		

## 2.4 Fuel tank vent outlets

<b>2.4.1</b>	<b>Does the fuel tank vent outlet, or the vent line swan neck, rise at least as high as the filling point?</b>	<b>R</b>
<p>Check the rise of each vent line.</p>	<p>Fuel tank vent outlets, or the vent line swan neck must rise to a height at least that of the fuel filling point.</p>	
<p>Applicability – where the filling point is mounted on a deck a swan neck in the vent line to the underside of the deck meets this requirement.</p>		

<b>2.4.2</b>	<b>Is the fuel tank vent outlet fitted with an effective flame arrester or flame-arresting gauze?</b>	<b>R</b>
Check each vent outlet for the presence of a flame arrester or flame arresting gauze.	<p>Vent outlets must be fitted with either a suitable proprietary flame arrester <u>or</u> gauze of at least 11 wires per linear cm (28 wires per inch) mesh.</p> <p>Where the flame arrester is not of a suitable proprietary type the openings in the arrester's body must be at least of the same area as the cross-sectional area of the vent line.</p> <p>Flame arresters or gauze must be complete and free of damage or restrictions.</p>	
<p>Applicability – flame arresters not recognised as proprietary must be supported by satisfactory documentation.</p> <p>Applicability – the small hole in the filler cap as provided by the original engine or fuel tank manufacturer, on fuel tanks of no more than 27 litres capacity, is deemed to meet this requirement.</p>		

<b>2.4.3</b>	<b>Is the fuel tank vent outlet in a position where no danger will be incurred from leaking fuel or escaping vapour?</b>	<b>R</b>
Check the position of each vent outlet.	Vent outlets must be clear of any potential sources of ignition and must be in a position where no danger will be incurred from leaking fuel or escaping vapour into the interior of the vessel.	
<p>Applicability – the small hole in the filler cap as provided by the original engine or fuel tank manufacturer, of diesel tanks of no more than 27 litres capacity meet this requirement.</p> <p>Applicability – vent outlets located within open vessels such as RIBs having no accommodation and having a continuous deck or sole which is fuel-tight to the interior of the vessel, including bilge spaces, meet this requirement.</p> <p>Applicability – diesel vent outlets within self-draining cockpits having a continuous deck or sole that are fuel-tight to the interior of the vessel, including bilge spaces, meet this requirement.</p>		

## 2.5 Fuel tank design and condition

<b>2.5.1</b>	<b>Are the fuel tanks secure?</b>	<b>R</b>
<p>At each fuel tank check for signs that movement has occurred.</p> <p>Assess the extent of possible movement by applying light manual force to each tank.</p>	Fuel tanks must be free of signs of movement and incapable of movement under light manual force.	
<p>Applicability – examiners need not apply light manual force to fuel tanks assessed to be too heavy to move.</p>		

2.5.2	Are fuel tanks made of suitable materials?	R
At each fuel tank check the material and check for evidence of obvious suitability.	<p>Fuel tanks must not be manufactured with obviously unsuitable materials.</p> <p>Materials obviously suitable for diesel include:</p> <ul style="list-style-type: none"> <li>• aluminium alloy</li> <li>• 'CE' marked plastic</li> <li>• FRP</li> <li>• mild steel</li> <li>• stainless steel.</li> </ul> <p>Materials obviously suitable for petrol include:</p> <ul style="list-style-type: none"> <li>• aluminium alloy</li> <li>• brass</li> <li>• 'CE' marked plastic</li> <li>• stainless steel.</li> </ul>	
<p>Applicability – the fuel tank must be accessible enough to allow a general assessment of material. Tanks not accessible to assess the material must be recorded as 'not verified' on your checklist, and it must be considered that the check has not been completed until such time as the suitability of the material has been verified.</p> <p>Applicability – examiners are not required to identify whether fuel tanks are lined or otherwise internally coated. A judgement must be made as to a tank's suitability from a visual assessment of the tank's external surfaces.</p> <p>Applicability – where after assessment of the tank material its suitability cannot be verified, and where the material is not obviously unsuitable, apply the condition checks at 2.5.3. If the condition requirements are met mark your checklist as being a pass at 2.5.2 and 2.5.3. If the condition requirements at 2.5.3 are not met mark your checklist as a fail at 2.5.2 and 2.5.3.</p> <p>Supplementary information on assessing plastic fuel tanks is provided at Appendix F</p>		

2.5.3	Are fuel tanks, including seams and openings, in good condition and free of signs of leaks?	R
Check the condition of all fuel tank surfaces, seams and openings which can be seen and reached.	<p>Fuel tanks including seams and openings must be free of signs of leaks, heavy corrosion, deep pitting or any other signs of material failure.</p> <p>All inspection and cleaning access closing plates must be secured in place and free of signs of leaks.</p>	
<p>Applicability – the fuel tank must be accessible enough to allow a general assessment of condition. Tanks not accessible to assess condition must be recorded as 'not verified' on your checklist, and it must be considered that the check has not been completed until such time as their general condition has been verified.</p> <p>Applicability – where accessible, pay particular attention to areas under dipsticks/sounding pipes for evidence of damage from dipstick 'bounce'.</p> <p>Supplementary information on assessing plastic fuel tanks is provided at Appendix F.</p>		

<b>2.5.4</b>	<b>Are fuel tanks within engine spaces suitably fire resistant or otherwise protected against the effects of fire?</b>	<b>R</b>
<p>Identify fuel tanks located within engine spaces.</p> <p>If present, at each non-metallic fuel tank look for the manufacturer's plate for evidence of intrinsic fire resistance or verify this by examining any presented declaration from the manufacturer or supplier.</p> <p>At each metallic fuel tank check for signs of soft-soldered seams where these can be seen or reached.</p>		<p>Non-metallic fuel tanks must have intrinsic fire resistance of at least 2.5 minutes at 600°C or be otherwise protected from fire.</p> <p>Metallic tanks must not have soft-soldered seams.</p>
Supplementary information on assessing plastic fuel tanks is provided at Appendix F.		

<b>2.5.5</b>	<b>Are petrol tanks installed at the required distances from heat sources or protected by a heat baffle?</b>	<b>R</b>
<p>Measure the distance from any petrol tank to any engine, exhaust system or other heat source.</p> <p>Check for the presence of a fire-resistant baffle between any such petrol tank and heat source.</p>	<p>Petrol tanks must be at least 100mm (4in) from general heat sources and at least 250mm (10in) from a dry exhaust.</p> <p>If the distances are less than those prescribed a fire-resistant baffle in good condition must protect the tank from radiated heat.</p>	

## 2.6 Fuel gauges

<b>2.6.1</b>	<b>Are any glass or plastic tube or strip-type fuel gauges fitted to diesel tanks only?</b>	<b>R</b>
Check each petrol tank for glass or plastic tube or strip-type fuel gauges.	Petrol tanks must not be fitted with glass or plastic tube or strip-type fuel gauges.	

<b>2.6.2</b>	<b>Are any glass or plastic tube or strip-type fuel gauges protected against damage and by self-closing valves?</b>	<b>R</b>
<p>Check each diesel or paraffin tank for the provision of glass or plastic tube or strip-type fuel gauges.</p> <p>If provided check the installation arrangements.</p>	<p>Glass or plastic tube or strip-type fuel gauges must be:</p> <ul style="list-style-type: none"> <li>protected against physical damage; and,</li> <li>closely coupled (connected) to the tank; and,</li> <li>fitted with self-closing valves at top and bottom (note that the self-closing valve at the top is not required if the gauge connection is made to the top of the tank or the highest part of the side of the tank); and</li> <li>complete and free of signs of leaks and other signs of damage.</li> </ul>	
<p>Applicability – self-closing valves are not required for fuel gauges on any diesel-fuelled vessel formerly used for the commercial carriage of freight or passengers or as a tug or as an icebreaker and which is to be licensed for use as a pleasure vessel, or registered for use as a houseboat, unless used for the purposes of hire or reward. Documentary evidence of former use addressed to the BSS manager is required to enjoy this exception.</p> <p>Applicability – self-closing valves are not required on sight gauge arrangements on day tanks having a maximum capacity of up to 27 litres.</p>		

<b>2.6.3</b>	<b>Are all fuel gauges and level-indicators in good condition and free of signs of leaks?</b>	<b>R</b>
Check any fuel tank fuel gauge and level-indicator for condition.	Fuel gauges and fuel level-indicators must be free of signs of leaks and/or signs of damage or missing components and fixings that could lead to a leak and must not have fuel behind any transparent cover, or damage to any glass or other transparent cover.	
Applicability – loose or damaged gauge needles, or other such level-indicators, mounted behind any glass or transparent cover do not constitute a failure.		

<b>2.6.4</b>	<b>Are fuel tank openings for dipsticks closed by a fuel-tight cap or fitting?</b>	<b>R</b>
Identify any fuel tank openings intended to be used for dipsticks and check for a fuel-tight cap or fitting, and for indications of fuel leaks.	Fuel tank openings used for dipsticks must be closed by a cap or fitting and must be free of signs of leaks.	

## 2.7 Petrol fuel system electrical bonding

<b>2.7.1</b>	<b>Are all metallic components in the petrol filling and tank system electrically bonded to earth?</b>	<b>R</b>
Check all petrol filling and tank systems for the presence of electrical bonding.	<p>Where petrol filling lines have non-conducting sections, an electrical bond between all metallic parts, e.g. tank, filling point and any intermediate hose connectors, must be fitted.</p> <p>Where the deck and hull are non-conducting, or where the filling point is non-conducting, all metallic petrol tanks, and all metallic petrol filling components, must be electrically bonded to an earth point in direct electrical contact with the surrounding water.</p>	
Guidance for owners – a bonding cable of at least 2.5mm <sup>2</sup> is recommended.		

<b>2.7.2</b>	<b>Are all parts of electrical bonding systems in good condition?</b>	<b>R</b>
Check the condition of the electrical bonding connections and cables where they can be seen or reached.	<p>The electrical bonding system must show:</p> <ul style="list-style-type: none"> <li>• no movement at any of the connections;</li> <li>• no signs of damage or deterioration, or corrosion, along the cables or at their connections.</li> </ul>	
Applicability – all necessary electrical bonding connections must be seen or reached in order to be able to establish the existence of adequate bonding provision.		

## 2.8 Fuel tank connections

<b>2.8.1</b>	<b>Is the fuel tank drain fitted with a plug or cap which can only be removed with tools?</b>	<b>R</b>
Check each fuel tank for the presence of a fuel drain facility. If present, check the drain outlet for the presence of a plug, cap or blank.	If present, the outlets from fuel tank drains and drain valves must be terminated with a 'tools-to-remove' plug, cap or blank.	
Applicability – the provision of a fuel tank drain facility is not a requirement.		
Applicability - The plug, cap or blank must be of proprietary manufacture and/or metallic and it must be fixed in place by a screw mechanism which requires a tool to remove it.		

<b>2.8.2</b>	<b>Are the petrol feed and return (if fitted) line connections in lift-pump systems made to the top of the tank?</b>	<b>R</b>
Check for the presence of a petrol fuel system with a lift-pump supply. If present, check all petrol feed and return (if fitted) line connections are made to the top of the tank.	Petrol feed lines and return lines must be connected to the top of the fuel tank on lift-pump feed systems.	
Applicability – ‘top of the tank’ means the top plate of the fuel tank or the highest part of the side of the tank.		

<b>2.8.3</b>	<b>Is the petrol feed line on a gravity system fitted with a cock or valve directly attached to the tank?</b>	<b>R</b>
Check for the presence of a gravity-fed petrol installation and check for the presence of a cock or valve in the petrol feed line directly attached to the tank.	The petrol feed line on gravity-fed petrol installations must be protected by a cock or valve directly attached to the tank.	
Applicability – a gravity-fed petrol installation is one where there is no lift-pump to move the fuel from the tank to the engine and the height of the tank is above that of the engine.		

<b>2.8.4</b>	<b>Are tank connections and tank valves accessible for inspection, in good condition and free of signs of leaks?</b>	<b>R</b>
Check the accessibility of tank connections and tank valves, and check condition by sight and touch.	Fuel tank connections and tank valves must be accessible for inspection, secure and free of signs of leaks, signs of damage or deterioration.	
Applicability – tank connections and tank valves not accessible for inspection must be recorded as ‘not verified’ on your checklist, and it must be considered that the check has not been completed until such time as their general condition has been verified.		
Applicability – this requirement applies to all tank connections and valves, including fuel supply and return lines, fuel filling lines, vent lines, balance pipes and any disused connections.		



## 2.9 Fuel tank balance lines

<b>2.9.1</b>	<b>Are multiple petrol tank systems free of balance lines?</b>	<b>R</b>
Check for the presence of multi-petrol tank systems and check for the presence of balance lines.		Petrol systems must not be fitted with balance lines.

<b>2.9.2</b>	<b>Are balance lines on diesel tank systems made of suitable materials and are they in good condition and free of signs of leaks?</b>	<b>R</b>
Check the material of all diesel balance lines that can be seen and check for evidence of suitability.		Diesel system balance lines must be made of suitable materials, and must be free of signs of leaks, signs of damage and/or deterioration.  Metallic materials suitable include: <ul style="list-style-type: none"> <li>• aluminium alloy</li> <li>• copper</li> <li>• mild steel</li> <li>• stainless steel</li> </ul> Non-metallic materials suitable include: <ul style="list-style-type: none"> <li>• FRP</li> <li>• Hose marked to denote both suitability for the fuel used, and fire resistance, to BS EN ISO 7840 or an equivalent standard.</li> </ul>
Check the condition of each balance line and its connections where they can be seen or reached.		
Check the markings on any hose used as a balance line.		
<p>Applicability – where after assessment of any metallic or FRP balance line material its suitability cannot be verified, and where the material is not obviously unsuitable apply the condition checks only.</p> <p>Applicability – balance line connections must comply with the requirements at 2.11 (Fuel line connections). If not compliant with all the requirements at 2.11 a fault shall be recorded at 2.9.2.</p> <p>Applicability – when fuel filler hose is connected to a balance line, it must be checked in the same way as a hose permanently charged with fuel – see 2.10.</p>		

## 2.10 Fuel feed, return, and on-engine lines

<b>2.10.1</b>	<b>Are all fuel feed, return and on-engine pipes made of suitable materials?</b>	<b>R</b>
Check the material of all fuel feed, return and on-engine pipes that can be seen and check for evidence of suitability.		Fuel pipes must be made of suitable materials.  Suitable materials include: <ul style="list-style-type: none"> <li>• aluminium alloy</li> <li>• copper</li> <li>• mild steel (for diesel only)</li> <li>• stainless steel.</li> </ul>
<p>Applicability – where after assessment of the material its suitability cannot be verified, and where the material is not obviously unsuitable apply the condition checks at 2.10.3. If the condition requirements are met mark your checklist as being a pass at 2.10.1 and 2.10.3. If the condition requirements at 2.10.3 are not met mark your checklist as a fail at 2.10.1 and 2.10.3.</p> <p>Applicability – the use of hose and other non-metallic components within high-pressure diesel fuel lines between injection pumps and injectors is not permitted. Where such lines are obviously not metallic or where the material type cannot be determined mark your checklist as a fail.</p>		

<b>2.10.2</b>	<b>Are all fuel feed, return and on-engine hoses suitable for the fuel used and fire resistant?</b>	<b>R</b>
Check the marking on all fuel feed, return and on-engine hoses.	Fuel feed, return and on-engine hoses must be marked, to denote both suitability for the fuel used and fire resistance, to BS EN ISO 7840 or an equivalent standard.	
<p>Applicability – hoses marked to SAE J 1527, DIN 4798 or RINA DIP/66/96 are acceptable.</p> <p>Applicability – the presence of armoured or other external braiding is not evidence of hose suitability or fire resistance. Such hoses must be marked as above.</p> <p>Applicability – where a hose is not marked to an accepted standard but the boat owner claims suitability the examiner should contact the BSS Office.</p> <p>Applicability – fuel-hose suitability may be supported by a written declaration from the hose manufacturer or supplier or, if appropriate, from the engine manufacturer/supplier or mariniser.</p> <p>Applicability – the nylon type fuel-hose material connecting small capacity diesel containers to the cold start facility on older diesel engines should be considered as exempt from this requirement.</p> <p>Applicability – fuel hoses in permanently installed fuel systems to outboard engines may be to type B1 or B2 of ISO 8469 (or be suitable proprietary outboard engine fuel hose), provided the hose and its connections are located in the open air and where any fuel spillage would drain overboard (e.g. self-draining cockpits or outboard wells not enclosed by a canopy or other cover). Open vessels such as RIBs having a continuous deck or sole that is fuel-tight to the interior of the vessel and bilge spaces, meet this requirement.</p>		

<b>2.10.3</b>	<b>Are all feed, return and on-engine pipes secure and in good condition?</b>	<b>R</b>
Check the condition of all fuel feed, return and on-engine pipes which can be seen or reached.	Fuel feed, return and on-engine pipes must be free of signs of leaks, signs of damage or deterioration.	
Apply light manual force to check security of all fuel feed, return and on-engine pipes that can be reached.	Fuel feed, return and on-engine pipes must not move under light manual force.	
<p>Applicability – pay particular attention to fuel pipes etc close to hot exhausts and other sources of heat, and to any high-pressure diesel fuel pipes between injection pumps and injectors.</p>		

<b>2.10.4</b>	<b>Are all fuel feed, return and on-engine hoses properly supported and in good condition?</b>	<b>R</b>
Check the condition of all fuel feed, return and on-engine hoses which can be seen or reached.	All fuel feed, return and on-engine hoses must be free of signs of leaks, flaws, brittleness, cracking, abrasion, kinking and 'soft spots'.	
Check fuel feed, return and on-engine hoses where they can be seen or reached for support and protection.	On hoses covered with metal braiding the braiding must be free of signs of damage or deterioration including corrosion and kinking.	
	Fuel feed, return and on-engine hoses must be supported clear of anything likely to damage them, or be otherwise protected.	
<p>Applicability – pay particular attention to fuel hoses located in close proximity to rotating engine components, sharp or hot engine and exhaust components, engine bearers and other vessel structures.</p>		

<b>2.10.5</b>	<b>Do the injector leak-off (spill rail) arrangements meet specified requirements?</b>	<b>R</b>
Check the arrangements for the injector leak-off (spill rail).	<p>Injector leak-off (spill rail) arrangements must meet all the requirements for fuel feed and return pipes, hose and connections, or</p> <ul style="list-style-type: none"> <li>• utilise the direct return to tank, or</li> <li>• return to the fuel system through a non-return valve.</li> </ul>	
<p>Applicability – vintage and traditional engines designed to return the injector leak-off fuel to a catch pot are acceptable provided the catch pot is securely mounted and is free of signs of leaks, signs of damage or deterioration.</p> <p>Applicability – injector leak-off hoses fitted by the manufacturer within an enclosure on the engine meet this requirement.</p>		

### 2.11 Fuel feed, return, and on-engine fuel line connections

<b>2.11.1</b>	<b>Are all fuel line connections of the correct type and free of signs of leaks?</b>	<b>R</b>
Check the type of fuel line connections that can be seen or reached and check for signs of leaks by sight or touch.	<p>Fuel line connections must be screwed, compression, cone, brazed or flanged.</p> <p>Fuel hose connections must be either pre-made end fittings on hose assemblies or hose clips/clamps onto hose nozzles or formed pipe-ends.</p> <p>Fuel line connections must be free of signs of leaks, signs of damage or deterioration.</p>	
<p>Applicability – soft-soldered joints are not acceptable. Examiners concerned that particular joints may have been made using soft solder must require the owner to provide proof that this is not the case.</p> <p>Applicability – injector leak-off (spill rail) arrangements having push-on connections on flexible fuel lines are acceptable for options covered by the bullet points at Check Item 2.10.5.</p> <p>Applicability – the push-fit end connections on the fuel lines connecting small capacity diesel containers to the cold start facility on older diesel engines should be considered as meeting this requirement if the connections are free of signs of leaks.</p> <p>Applicability – fuel hoses in permanently installed fuel systems to outboard engines may terminate at the outboard end with a proprietary quick-release self-closing connector conforming to 5.1.2.</p>		

<b>2.11.2</b>	<b>Are all fuel line connections, cocks, valves, fittings and other components secure?</b>	<b>R</b>
Apply light manual force to check security of all fuel line connections, cocks, valves, fittings and other components that can be reached.	Fuel line connections, cocks, valves, fittings and other components must not move under light manual force.	

<b>2.11.3</b>	<b>Are fuel hose connections made with hose clips or clamps effective and in good condition?</b>	<b>R</b>
<p>Check the effectiveness and condition of all fuel hose connections made with hose clips or clamps that can be seen or reached.</p> <p>Pull using light manual force to check security of all hose connections that can be reached</p>	<p>Fuel hose connections made with hose clips or clamps must:</p> <ul style="list-style-type: none"> <li>• be suitably sized, that is, not so oversized that the band forms an elliptical shape or so undersized that no tightness is achieved; and</li> <li>• be appropriately tight, that is, not so loose that the connection can be pulled forward or back under light manual force, nor so tight that the hose is excessively pinched; and</li> <li>• show no signs of damage or deterioration at the clip or clamp; and</li> <li>• show no signs of damage or deterioration at the hose caused by the clips or clamps.</li> </ul>	
<p>Applicability – the light manual force check must not be applied to injector leak-off (spill rail) arrangements having push-on connections. Supplementary information on spill rail options is provided in the BSS Technical Update August 2003.</p>		

## 2.12 Fuel filters

<b>2.12.1</b>	<b>Are fuel filters in good condition?</b>	<b>R</b>
Check the condition of all fuel filters.	Fuel filters must be free of signs of leaks and signs of damage or deterioration to any part of the filter assembly.	
Applicability – the requirements at Section 2.12 must be applied to all forms of fuel filters, including water traps, sedimenters, agglomeraters, etc.		

<b>2.12.2</b>	<b>Are all fuel filters inside engine spaces fire resistant?</b>	<b>R</b>
Check all fuel filters (including drain plugs) located inside engine spaces are marked or recognised as fire resistant. If not marked or recognised as being suitably fire resistant, verify this by examining any presented declaration from the manufacturer or supplier.	Fuel filters (including drain plugs) located inside engine spaces must have intrinsic fire resistance of at least 2.5 minutes at 600°C.	
Applicability – all-metal fuel filters are accepted as being sufficiently fire resistant.		
Applicability – fuel filters marked with ISO 10088 are acceptable.		

## 2.13 Fuel shut-offs

<b>2.13.1</b>	<b>Is an emergency fuel shut-off installed in every fuel feed line?</b>	<b>R</b>
Check the means to shut off the fuel in the fuel feed line from every fuel tank.	An effective emergency shut-off must be installed in all fuel feed lines. Any of the following methods are acceptable: <ul style="list-style-type: none"> <li>• a manual shut-off valve or cock; or,</li> <li>• all fuel lines, including those on the engine, being above the level of the top of the tank; or,</li> <li>• an anti-siphon valve at the tank, providing it was installed by the boat builder; or,</li> <li>• an electrically operated valve at the tank activated to open only during engine starting or running, provided that a manual emergency operating or bypassing device is present.</li> </ul>	
Applicability – if an examiner cannot verify a claim from an owner that the emergency shut-off facility is provided by way of an anti-siphon valve or an electrically operated valve, they should contact the BSS Office for help verifying the claim.		
Advice to owners – when purchasing solenoid controlled shut-off valves an assurance should be sought from the supplier as to their suitability for use with the fuel in use.		

<b>2.13.2</b>	<b>Are all fuel shut-off valves or cocks, or their means of operation, in a readily accessible position?</b>	<b>R</b>
Check for the presence of fuel shut-off valves or cocks. If present, check their accessibility or the accessibility of their means of operation.	Fuel shut-off valves or cocks, or their means of operation, must be installed in a readily accessible position.	

<b>2.13.3</b>	<b>Are all fuel shut-off valves or cocks, or their means of operation, in open view or their location clearly marked?</b>	<b>R</b>
Check for the presence of fuel shut-off valves or cocks. If present, check that fuel shut-off valves or cocks, or their means of operation, are in open view with all removable lids, deck boards, curtains, doors etc. in place. If not in open view check their location is clearly marked in open view.	Fuel shut-off valves or cocks, <u>or</u> the means to operate them, must <ul style="list-style-type: none"> <li>• be in open view with all removable lids, deck boards, curtains, doors etc. in place; <u>or</u></li> <li>• have their location clearly marked in open view.</li> </ul>	

<b>2.13.4</b>	<b>Are petrol gravity-fed fuel lines provided with the required fuel shut-off facilities?</b>	<b>R</b>
<p>Check for the presence of a gravity-fed petrol installation.</p> <p>If present, check that a second shut-off valve or cock, or a means of operating the main valve or cock, can be reached from the steering position and check its accessibility.</p>		<p>Gravity-fed petrol installations must have a second cock, or a means of operating the main cock, in a readily accessible position within approximately 2m of the steering position.</p>

#### 2.14 Carburettors

<b>2.14.1</b>	<b>Are all non down-draught carburettors fitted with a drip tray?</b>	<b>R</b>
<p>Check for the presence of a non down-draught type carburettor.</p> <p>If present, check for the presence of a drip tray.</p>		<p>Non down-draught carburettors must be provided with a drip tray.</p>
<p>Applicability – certain down-draught carburettors may also be capable of overflowing. Examiners concerned that a particular down-draught carburettor may be of an overflowing type should contact the BSS Office for verification.</p>		

<b>2.14.2</b>	<b>Is the carburettor drip tray in good condition, free of signs of leaks, and easily emptied?</b>	<b>R</b>
<p>Check the condition of any carburettor drip tray.</p> <p>Check that it is removable or fitted with an emptying cock.</p>		<p>Carburettor drip trays must be removable or fitted with an emptying cock, and must be free of signs of leaks, signs of damage or deterioration.</p>

<b>2.14.3</b>	<b>Is the carburettor drip tray fitted with effective flame arresting gauze permanently attached along all edges?</b>	<b>R</b>
<p>Check the carburettor drip tray gauze for effectiveness by comparing it with a sample of gauze of the correct mesh.</p> <p>Check the condition of the gauze and the method of attachment to the tray.</p>		<p>Carburettor drip tray gauze must have a mesh of at least 11 wires per linear cm (28 wires per inch).</p> <p>Gauze must be complete and free of restrictions, damage, and must be permanently and continuously attached to the tray along all edges.</p>

<b>2.14.4</b>	<b>Is a petrol, petrol or paraffin engine fitted with flame trap or air filter?</b>	<b>R</b>
<p>Identify the air intake of petrol, petrol and paraffin engines and look for the presence of a flame trap or air filter.</p> <p>Check the flame trap or air filter for condition and completeness where they can be seen.</p>		<p>Petrol, petrol and paraffin engines must have a flame trap or air filter fitted to the air intake.</p> <p>Flame traps and air filters must show no signs of damage or deterioration, or obviously missing sections or components.</p>
<p>Applicability – there is no requirement for examiners to dismantle the air filter to determine the nature of the filter element.</p>		

## 2.15 Engine installation

<b>2.15.1</b>	<b>Are all parts of engine mounting systems secure and in good condition?</b>	<b>R</b>
Check engine mounting systems for condition and completeness where they can be seen or reached.	<p>Engine mounting systems must:</p> <ul style="list-style-type: none"> <li>• show no signs of fractured engine mounting brackets; and,</li> <li>• not have loose, missing or fractured bolts or nuts; and,</li> <li>• show no evidence of significant deterioration of any flexible mounts; and,</li> <li>• show no signs of damaged or heavily corroded metal bearers or rotten timber bearers.</li> </ul>	

<b>2.15.2</b>	<b>Are the structures and surfaces surrounding exhaust system components free of signs of heat damage?</b>	<b>R</b>
Check all structures and surrounding surfaces near all exhaust system components which can be seen for signs of heat damage.	The structures and surrounding surfaces near all exhaust system components must not show signs of heat damage such as scorching, melting or burning.	
<p>Applicability – this check covers all types of exhaust system components including those on ‘wet’ or ‘dry’ exhaust systems including those parts of ‘dry’ systems that are lagged or shielded.</p> <p>Advice to owners – ‘Dry’ exhaust systems, or those parts of ‘wet’ exhaust systems not cooled by water, located in ‘walk through’ engine spaces or cabins/deck spaces or other areas where normal crew movement about the vessel can be anticipated, should be effectively lagged, shielded or otherwise protected by craft structures.</p>		

<b>2.15.3</b>	<b>Are all fuel system components in fixed inboard engine spaces permanently installed?</b>	<b>R</b>
<p>Check for the presence of a fixed inboard engine.</p> <p>Check the type of fuel system supplying the fixed inboard engine.</p>	All fuel system components in fixed inboard engine spaces must be permanently installed.	
<p>Applicability – in the event a fixed inboard engine’s fuel supply system includes portable components, all such components and the connection between the portable fuel system and the permanently installed system must be located outside of the engine space. In addition, the point of connection of the permanently installed fuel supply to the portable fuel system must be made with a proprietary quick-release, self-closing connector. All portable fuel system components must comply with the applicable BSS requirements at 5.1.2 - 5.1.4.</p>		

## 2.16 Steam engines

<b>2.16.1</b>	<b>Is the steam engine pressure system supported by an inspection certificate issued by a competent person?</b>	<b>R</b>
Read carefully the steam engine pressure-system inspection certificate. Check the validity of the certificate and check the terminology indicates the pressure system is in a satisfactory condition.	Steam engine pressure systems must be supported by an inspection certificate. Pressure system inspection certificates must: <ul style="list-style-type: none"> <li>• relate to the vessel being examined;</li> <li>• be completed by a competent person;</li> <li>• indicate satisfactory condition;</li> <li>• must be less than 14 months old or within any 'run-out' date.</li> </ul>	
Supplementary information – guidance on the assessment of pressure system inspection certificates is provided at Appendix J.		

<b>2.16.2</b>	<b>Is the steam engine boiler fuel supply system compliant with the applicable BSS requirements?</b>	<b>R</b>
Identify the type of fuel to the steam engine boiler.	Steam engine boiler fuel-supply systems must be compliant with the applicable BSS requirements.	
Applicability – concerning diesel, paraffin, spirit, or LPG fuel supply systems, apply Part 2 or Part 7 respectively.		

## 2.17 LPG engines

<b>2.17.1</b>	<b>Are fuel supply arrangements to LPG-fuelled propulsion engines compliant with UKLPG CoP 18, or an equivalent standard, and are any dual-fuel petrol/LPG arrangements of an acceptable type?</b>	<b>R</b>
<p><i>[LPG-fuelled propulsion engines can only be checked for compliance by prior arrangement by the owner with the BSS Office]</i></p> <p>Check the fuel supply type to propulsion engines and identify those fuelled by LPG or dual-fuel petrol/LPG.</p>	<p>The fuel supply arrangements to LPG-fuelled propulsion engines must comply with UKLPG Code of Practice (CoP) 18, or an equivalent standard.</p> <p>Any dual-fuel arrangements must be installed and maintained in accordance with the engine manufacturer's guidelines for marine applications.</p>	
<p>Supplementary information - during initial dealings with customers, examiners should seek to establish whether the propulsion engines are fuelled by LPG. In cases where LPG-fuelled engines are identified, customers should be advised to contact the BSS Office. It will arrange for a full examination of the vessel to be undertaken by an examiner competent to apply UKLPG CoP 18.</p> <p>Applicability – installations in accordance with EN 15609 are equivalent.</p> <p>Applicability – examiners may determine compliance of portable LPG-fuelled generators to applicable BSS requirements.</p> <p>Applicability – steam-propelled vessels having boilers fuelled by LPG are not covered by this check.</p>		

## BSS Examination Checking Procedures – Part 3

### Electrical systems

There are four relevant BSS general requirements:

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| <p>8. All electrical systems must be designed, installed and maintained in a way that minimises the risks of explosion or of fire starting and spreading.</p> <p>9. All electrical systems must be capable of being safely and quickly disconnected from their power source(s) in an emergency.</p> <p>10. Control and emergency devices, or their means of operation, must be marked when not in clear view or when their function is not clear.</p> <p>11. All battery compartments containing unsealed or open-vented batteries must be adequately ventilated to prevent a build-up of a flammable mix of gases.</p> |
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#### 3.1 Battery storage

3.1.1	Are all unsealed or open-vented batteries ventilated to prevent risk of explosion through hydrogen accumulation?	R
<p>Identify the location of all batteries.</p> <p>If batteries are stored within an engine, accommodation or other non-dedicated battery space, check that the space is ventilated.</p> <p>If batteries are stored within a dedicated battery space or box:</p> <ul style="list-style-type: none"> <li>• check if the space or box has any ventilation; and,</li> <li>• check the height of the ventilation provision and the route of any ducted ventilation.</li> </ul> <p>Check the ventilation pathway from all battery storage locations leads to the outside of the hull or superstructure.</p>	<p>All unsealed or open-vented batteries must be stored within a ventilated space.</p> <p>Dedicated battery spaces or boxes for unsealed or open-vented batteries must be ventilated at the top or the highest point of the sides of the space or box and any ductwork used must run horizontally or upwards.</p> <p>The ventilation pathway from all battery storage locations must lead to the outside of the hull or superstructure.</p>	
<p>Applicability - if batteries of a 'sealed' type are stored in a <u>non-ventilated space</u> verify that storage in unventilated spaces meets with the battery manufacturer's recommendations by reference to presented documentation from the manufacturer.</p> <p>Applicability – ventilation pathways into accommodation spaces having fixed high-level ventilation or into canopied areas are acceptable.</p> <p>Applicability – battery covers must not allow the accumulation of hydrogen gas.</p> <p>Advice for owners – in the event that no ventilation provision is identified for unsealed or open-vented batteries this may be calculated using the following formula. Ventilation (mm<sup>2</sup>) = number of cells x capacity in Ah x 1.935. Supplementary guidance is given at Appendix G.</p> <p>Advice for owners – if any batteries are connected to an alternator, or alternative battery charging source, having a maximum charge rate in excess of 2kW (approx. 150 Amps at 13.8 volts) it is strongly recommended to install a fan-assisted ducted ventilation system. Fan-assisted ducted ventilation should be installed with the fan motor placed external to the duct and battery space. The fan should operate automatically during charging and the safe operation of the facility should be checked by a competent person on a routine basis.</p> <p>Advice for owners – batteries should be located away from heat sources.</p>		



<b>3.1.2</b>	<b>Are batteries secure against excessive movement in any direction?</b>	<b>R</b>
<p>Check by visual assessment the extent all batteries, battery boxes, cradles, frameworks etc, can move.</p> <p>Apply light manual force to all battery boxes, cradles, frameworks etc, to verify the extent of possible movement.</p>	<p>All battery boxes, cradles, frameworks etc, must be free of signs of movement or possible movement.</p> <p>All batteries must be incapable of movement in excess of 10mm in any direction.</p>	
<p>Applicability – restraint against vertical movement is generally required. However batteries may be secured by means of a cradle or framework sufficient to ensure batteries remain secure under any condition up to 45° to the horizontal. Recesses, cradles or frameworks extending to half the height of the battery meet this allowance.</p>		

<b>3.1.3</b>	<b>Are battery terminals correctly insulated or protected?</b>	<b>R</b>
<p>Check for the presence of a battery cover or terminal covers.</p> <p>Check material and condition of any battery cover or terminal covers.</p>	<p>All metal parts of battery terminals or connections must be insulated or protected by battery covers or terminal covers.</p> <p>All battery covers or terminal covers:</p> <ul style="list-style-type: none"> <li>• must be made of insulating material; and,</li> <li>• must not allow any metal part of the terminal or connection to be exposed; and,</li> <li>• must be free of signs of damage.</li> </ul>	
<p>Applicability – deck boards, locker lids, etc, made from or lined with insulating material may only be considered as battery covers where they will not be removed for any purpose other than gaining access to the batteries.</p>		

<b>3.1.4</b>	<b>Are batteries installed away from metallic petrol and LPG system components?</b>	<b>R</b>
<p>Measure the distance between batteries not in a box and any metallic petrol or LPG system components installed directly above them.</p> <p>Where batteries are installed within 300mm (12in) directly under metallic petrol or LPG system components, check the components for the presence of a conduit, shield or enclosure made of insulating material.</p>	<p>All batteries must be at least 300mm (12in) away from all metallic petrol and LPG system components installed directly above them, or the components must be contained within a conduit, shield or enclosure made of insulating material.</p>	
<p>Applicability – all metallic petrol and LPG system components are covered by this check including tanks, cylinders, pipes, valves, filters, connectors etc.</p>		

### 3.2 Cable specifications and condition

<b>3.2.1</b>	<b>Are all electrical cables insulated?</b>	<b>R</b>
<p>Check all electrical cables which can be seen for the presence of outer insulation.</p>	<p>All electrical cables must be insulated.</p>	
<p>Applicability – this check applies to both a.c. and d.c. cables.</p>		

3.2.2	Are battery cables of a sufficient current-carrying capacity?	R
<p>Check the size of the following cables by comparing them against a typical sample cable.</p> <ul style="list-style-type: none"> <li>• battery to master switch;</li> <li>• battery or master switch to starter solenoid;</li> <li>• battery to battery;</li> <li>• engine return to battery or master switch;</li> <li>• battery to bow thruster motor;</li> <li>• battery to anchor winch motor;</li> <li>• battery to inverter system (over 1000w size).</li> </ul>	<p>The battery cables prescribed in the check must be approximately 25mm<sup>2</sup>.</p>	
<p>Applicability - outboard engines having the engine manufacturer's original loom are not required to meet these dimensions.</p> <p>Applicability – the actual layout of cable runs may vary depending whether master switches are installed in the positive or negative cables.</p> <p>Advice to owners – the above are minimum recommendations. Systems may call for larger cable sizes, depending upon the loads encountered.</p>		

3.2.3	Are all cables free of damage or deterioration?	R
<p>Check the condition of all cables which can be seen.</p> <p>Check the condition of insulation and sheathing which can be seen.</p>	<p>All cables must be free of:</p> <ul style="list-style-type: none"> <li>• signs of overheating; and,</li> <li>• signs of damage or deterioration, such as broken cable strands, chafing, or heat damage.</li> </ul> <p>Insulation and sheathing must show no signs of damage or deterioration caused by a reaction with water or fuel.</p>	
<p>Applicability – this check applies to both a.c. and d.c. cables.</p>		

### 3.3 Cable location

3.3.1	Are all electrical cables supported in a safe position?	R
<p>Check the run of all cables which can be seen and identify any structure or item of equipment likely to cause impact or abrasion damage.</p> <p>Identify any cables subject to the possibility of impact or abrasion damage and check for means of protection or support.</p> <p>Check arrangements where cables can be seen passing through bulkheads or structural members.</p> <p>Check the condition of all cable conduit or cable trays which can be seen.</p>	<p>All electrical cables must be:</p> <ul style="list-style-type: none"> <li>• located where they will not be susceptible to impact or abrasion damage; or,</li> <li>• supported away from any structure or item of equipment likely to cause impact or abrasion damage; or,</li> <li>• contained in a conduit or cable tray supported away from it.</li> </ul> <p>Cables passing through bulkheads or structural members must be protected against chafing damage by the use of grommets, sleeves or sealant used effectively.</p> <p>Cable conduit or cable trays must be free of signs of overheating or damage.</p>	
<p>Applicability – this check applies to both a.c. and d.c. cables.</p> <p>Applicability – for cables confirmed as double-insulated cables, where such cables pass through bulkheads and other structural members, the outer insulation (sheathing) should be considered as adequate protection, providing the insulation is in good condition.</p>		

<b>3.3.2</b>	<b>Are all cables clear of LPG and fuel supply lines?</b>	<b>R</b>
Check the clearance of all electrical cables which can be seen from LPG or fuel supply lines. Check any conduit is of a non-conducting material.		Electrical cables must be installed clear of LPG and fuel supply lines unless they are in a conduit made of non-conducting material.
Applicability – this check applies to both a.c. and d.c. cables. Applicability – cables confirmed as double insulated (sheathed) cables are not subject to this check.		

<b>3.3.3</b>	<b>Are all electrical cable connections above bilge water level or suitably protected?</b>	<b>R</b>
Check the position of all cable connections which can be seen. Where cable connections are below bilge water level check for the presence of watertight enclosures marked as compliant with IP 67.		All cable connections must be above bilge water level or be protected by a watertight enclosure meeting the IP 67 standard.
Applicability – this check applies to connections on both a.c. and d.c. cables. Applicability – the final cable connection to submersible bilge pumps and transducers or any other equipment intended for operation below bilge water level must be presumed to comply. Applicability – bilge water level can be established by any apparent bilge water tidemark.		

<b>3.3.4</b>	<b>Are spark plug leads free of damage or deterioration and properly supported?</b>	<b>R</b>
Check the support and condition of spark plug leads.	Spark plug leads must be: <ul style="list-style-type: none"> <li>• free of signs of damage or deterioration; and,</li> <li>• properly supported away from the engine block or cylinder head.</li> </ul>	

### 3.4 Cable connections

<b>3.4.1</b>	<b>Are all battery cable connections effective and in good condition?</b>	<b>R</b>
Check the type and condition of connectors to the cables listed at Check Item 3.2.2.	All battery cables listed at Check Item 3.2.2 must be fitted with soldered or crimped lug connectors or other pre-made connections of suitable proprietary manufacture.  All battery cable connections on cables listed at Check Item 3.2.2 must be free of: <ul style="list-style-type: none"> <li>• missing components or loose or poorly made connections; and,</li> <li>• signs of damage or deterioration;</li> <li>• excessively exposed or damaged cable strands.</li> </ul>	
Applicability – battery terminals fitted with screw clamps are acceptable if the cable strands are protected by the use of spreader plates or tinned cable ends in the terminal. Applicability – ‘crocodile’ type clips are not acceptable as battery connections for permanently installed cables.		

<b>3.4.2</b>	<b>Are all electrical circuit cable connections effective and in good condition?</b>	<b>R</b>
Check the type and condition of all electrical circuit cable connections which can be seen.	All electrical circuit cable connections must be free of: <ul style="list-style-type: none"> <li>• missing components or loose or poorly made connections e.g. applying compression crimp terminals without using the appropriate tool; and,</li> <li>• signs of damage or deterioration; and,</li> <li>• excessively exposed and/or damaged cable strands.</li> </ul>	
Applicability – this check applies to both a.c. and d.c. cables.		

### 3.5 Fuses and circuit breakers

<b>3.5.1</b>	<b>Are all a.c. and d.c. fuses and miniature circuit-breakers appropriately rated, complete and in good condition?</b>	<b>R</b>
<p>Check the rating, completeness and condition of all miniature circuit-breakers (MCBs) and fuses which can be seen.</p>	<p>Fuses and MCBs must be complete and free of signs of heat damage or deterioration, and be fitted securely.</p> <p>Fuses and fuse wire must be rated not greater than any rating marked on the fuse holder</p> <p>Fuse holders must contain appropriate fuses or fuse wire and not nails, silver paper, etc.</p> <p>MCBs must not be held closed by the use of tape or other devices.</p>	
<p>Applicability - examiners are encouraged to confirm during prior dealings with the owner, the location of the fuse box/distribution board and any in-line fuses, and to encourage their accessibility for examination. On d.c. systems the lack of a fuse or MCB is not in itself a fail point – a.c. systems are subject to a check for the presence of a consumer unit or acceptable alternative, see 3.9.2.</p> <p>Applicability – examiners are not to remove/unscrew fuses or fuse wire holders or remove miniature circuit breakers. The checking action for fuses and miniature circuit breakers which cannot be seen without their removal should be confined to the checks for completeness and condition.</p> <p>Advice for owners – it is strongly advised that a Residual Current Device (RCD) is installed to provide appropriate electric shock protection on a.c. systems.</p>		

<b>3.5.2</b>	<b>Are all fuse panels, boxes, holders and consumer units complete and in good condition?</b>	<b>R</b>
<p>Check all fuse panels, boxes, holders and consumer units which can be seen for the presence of lids or covers covering exposed terminals, when designed to have one.</p> <p>Check the condition of all fuse panels, boxes, holders and consumer units which can be seen.</p>	<p>All fuse panels, boxes, holders and consumer units designed to have a cover must:</p> <ul style="list-style-type: none"> <li>• have lids or covers covering exposed terminals; and</li> <li>• be free of signs of damage or deterioration.</li> </ul>	
<p>Applicability – this check applies to both a.c. and d.c. supplies.</p>		

### 3.6 Battery isolators

<b>3.6.1</b>	<b>Are battery isolators fitted and are they as close as practicable to the battery?</b>	<b>R</b>
<p>Check for the presence of a battery isolator at each battery or bank of batteries.</p> <p>Check the distance of battery isolators from batteries.</p>	<p>Battery isolators must be fitted to each battery or bank of batteries.</p> <p>Battery isolators must be located as close as practicable to the batteries.</p>	
<p>Applicability - accessibility takes precedence over proximity to the batteries.</p> <p>Applicability – if there are separate circuits connected to separate batteries, each of them must have a battery isolation switch. A combined-switch can be used, for example, in two battery system, where one battery is used for starting the boat’s engine and the other used for domestic services.</p>		

<b>3.6.2</b>	<b>Do all electrical circuits pass through a battery isolator, or are those requiring a continuous supply otherwise protected?</b>	<b>R</b>
<p>Identify any d.c. electrical circuits bypassing the battery isolator.</p> <p>Check that any electrical circuits bypassing the battery isolator supply the following equipment:</p> <ul style="list-style-type: none"> <li>• automatic bilge pumps;</li> <li>• security alarms (including marine radios);</li> <li>• fire pumps;</li> <li>• electronic navigation equipment with memories;</li> <li>• any other equipment where the manufacturer’s instructions indicate or specifically require direct connection to a battery, such as diesel-fired central heating boilers;</li> <li>• battery charger outputs;</li> <li>• inverters or combination inverter/chargers;</li> <li>• solar panels and wind turbines.</li> </ul> <p>Check electrical circuits supplying any equipment on the specified list, and which bypass a battery isolator, for the presence of a fuse or circuit-breaker, where the circuit can be seen.</p>		<p>All d.c. electrical circuits must pass through a battery isolator, except those which feed equipment requiring a continuous supply which must be protected by a suitable fuse or circuit-breaker.</p>
<p>Applicability – in cases where circuits which do not lie in the specified list are found directly connected to the battery examiners must verify compliance by examining any presented declaration from the manufacturer or supplier.</p> <p>Applicability – if the fuse or circuit-breaker protecting specified equipment bypassing a battery isolator cannot be found in places where the circuit can be seen, mark your checklist as a fail. This because it is extremely unlikely that the fuse or circuit-breaker will be either located where the circuit is hidden, or be more than a short distance from the battery.</p>		

<b>3.6.3</b>	<b>Are battery isolators, or the means to operate them, in readily accessible positions?</b>	<b>R</b>
<p>Check the accessibility of battery isolators, or the means to operate them.</p>		<p>Battery isolators, or their means of operation, must be installed in readily accessible positions.</p>

<b>3.6.4</b>	<b>Are battery isolators and connections complete and in good condition?</b>	<b>R</b>
<p>Check the completeness and condition of all battery isolators and connections where they can be seen.</p>		<p>Battery isolators and connections must be:</p> <ul style="list-style-type: none"> <li>• free of missing fixings; and,</li> <li>• free from signs of damage or deterioration.</li> </ul>
<p>Examiner action – in cases where the connections to battery isolators are not accessible for inspection, assess only the isolator for completeness and condition and make a note in your records accordingly.</p>		

<b>3.6.5</b>	<b>Is the location of all battery isolators, or the means to operate them, in open view, or their location clearly marked?</b>	<b>R</b>
<p>Check that all battery isolators, or their means of operation, are in open view with all removable lids, deck boards, curtains, doors, etc in place.</p> <p>If not in open view check their location is clearly marked in open view.</p>		<p>Battery isolators, or the means to operate them, must:</p> <ul style="list-style-type: none"> <li>• be in open view with all removable lids, deck boards, doors, etc in place; <u>or</u>,</li> <li>• have their location clearly marked in open view.</li> </ul>

### 3.7 Two-wire systems

<b>3.7.1</b>	<b>Is the electrical system insulated from the hull?</b>	<b>A</b>
<p>Check any wiring that can be seen to a suitable device such as a horn, headlamp, or navigation light for the presence of a two-wire insulated cable.</p>		<p>Electrical systems using the hull as a conductor will not pass this check.</p>
<p>Applicability – an electrical fitment attached to a metal hull or superstructure and having only a single wire connected indicates the use of the hull as a conductor.</p>		

<b>3.7.2</b>	<b>Is a low resistance return cable provided from the engine or starter motor to the battery?</b>	<b>R</b>
<p>Identify the low resistance return cable from the engine or starter motor to the battery (or battery master switch in systems having negative switching). Apply the cable sizing checks at 3.2.2.</p>		<p>A low resistance return cable from the engine or starter motor to the battery must be provided on all installations.</p>

### 3.8 Shore-power and other alternating current (a.c.) electrical inlet and lead connections

<b>3.8.1</b>	<b>Are all a.c. shore-power and battery charging lead inlet connections of the correct type in good condition, and suitably protected from the weather?</b>	<b>A</b>
<p>Check the type, condition and location of all a.c. shore-power and battery charging inlet connections where they can be seen.</p>		<p>Shore-power and battery charging inlet connections must be of suitable proprietary manufacture and must be a plug (male) type.</p> <p>Shore-power and battery charging inlet connections must be:</p> <ul style="list-style-type: none"> <li>• securely fitted;</li> <li>• free of missing components; and,</li> <li>• free of signs of damage or deterioration.</li> </ul> <p>Shore-power and battery charging inlet connections not obviously splash-proof must not be located where they are likely to be subject to the weather or splashing.</p>
<p>Applicability – shore-power and battery charging inlet connections marked with an IP rating (e.g. IP44) where the second figure is '4' or higher, provides acceptable evidence of suitable proprietary manufacture and splash-proof design.</p> <p>Applicability – do not disconnect shore power or battery charging leads, but if present the owner should be invited to, providing they first make the system safe to do so.</p> <p>Applicability – if an obvious risk of electrocution is determined take the actions described in Appendix A.</p>		

<b>3.8.2</b>	<b>Are all shore-power, battery charging, and other a.c. power source lead connections of a suitable type?</b>	<b>A</b>
<p>Check the type of any shore-power, battery charging or other a.c. lead connections where they can be seen.</p> <p>Check for the presence of any alternating current leads used to connect individual power sources (e.g. generators and inverters) to the alternating current distribution system. Where such leads are present check the type (e.g. male plug, or female socket) of the lead connections.</p>		<p>Shore-power and battery charging leads must be fitted with a female type socket at the end which connects to the vessel's inlet connection.</p> <p>Alternating current leads within the vessel used to connect individual power sources to the vessel's alternating current distribution system must be fitted with a male type plug (or be permanently connected) at the end which connects to the power source, and a female type socket at the end which connects to the distribution system.</p>
<p>Applicability - do not disconnect alternating current leads, but if present the owner should be invited to, providing they first make the system safe to do so.</p> <p>Applicability – if an obvious risk of electrocution is determined take the actions described in Appendix A.</p>		

3.8.3	Are all shore-power, battery charging, and other a.c. power source leads and connectors in good condition?	A
<p>Check the condition of any shore-power, battery charging, and other a.c. power source lead cables where they can be seen.</p> <p>Check the condition of the connectors fitted to the cable/s.</p>	<p>Shore-power, battery charging, and other a.c. power source lead cables must be free of:</p> <ul style="list-style-type: none"> <li>• signs of damage or deterioration;</li> <li>• repairs.</li> </ul> <p>Shore-power, battery charging, and other a.c. power source lead connectors must be complete, secured onto the cable with no inner conductors visible, and be free of:</p> <ul style="list-style-type: none"> <li>• signs of damage or deterioration;</li> <li>• repairs.</li> </ul>	
<p>Applicability – do not disconnect shore-power, battery charging, and other a.c. power source leads, but if present the owner should be invited to, providing they first make the system safe to do so.</p> <p>Applicability – if an obvious risk of electrocution is determined take the actions described in Appendix A.</p>		

### 3.9 Alternating current systems – multiple power sources and consumer units

3.9.1	Is it impossible to connect simultaneously more than one power source to the alternating current distribution system?	A
<p>Check for the presence of one or more shore-power inlet connections.</p> <p>Check for the presence of additional power sources (e.g. generators and inverters).</p> <p>Check for the presence of one or more means of selection between all the identified power sources.</p> <p>Check that the selection facilities prevent more than one power source being connected to the alternating current distribution system at any one time, and that they prevent the male pins on shore-power inlet connections being 'live' when an alternative power source is selected.</p>	<p>Only one power source may be connected to the alternating current distribution system at any one time.</p> <p>The male pins on shore-power inlet connections must not be 'live' when an alternative power source is connected to the alternating current distribution system.</p>	
<p>Applicability – the requirement for one power source to be connected does not apply to synchronised multiple power sources. In cases where the boat owner claims that multiple power sources are synchronised but this cannot be verified, the examiner should contact the BSS Office.</p> <p>Applicability – power source selectors may comprise of a multi-position manual switch, an electronic switch, or a single (male type) plug connector on the alternating current distribution system and a range of leads with corresponding (female) sockets attached to the individual power sources (see Check 3.8.2). It is also possible there may be more than one selection facility.</p> <p>Applicability – do not operate selection facilities, but the owner if present, should be invited to do so in order to verify compliance. If the presence of appropriate power source selection cannot be determined mark your checklist 'not verified' and note the reason why in your records.</p> <p>Applicability – in the event a fault is determined take the actions described in Appendix A.</p>		

3.9.2	Do all a.c. electrical circuits pass through a consumer unit?	A
<p>Check that all a.c. electrical circuits pass through a consumer unit (also known as fuse/circuit-breaker box or distribution board).</p>	<p>All a.c. circuits must pass through a consumer unit.</p>	
<p>Applicability - examiners are encouraged to confirm during prior dealings with the owner, the location of the consumer unit.</p> <p>Advice for owners – it is strongly advised that a Residual Current Device (RCD) is installed to provide appropriate electric shock protection on a.c. systems.</p> <p>Applicability – for the purpose of this check residual current breakers with overcurrent protection (RCBOs) may be considered an acceptable alternative to a consumer unit.</p> <p>Applicability – in cases where the only power source is via a shore-power lead, an acceptable alternative to a consumer unit is a MCB or RCBO incorporated within the lead.</p>		

## BSS Examination Checking Procedures – Part 4

### Electrical propulsion systems

There is one relevant BSS general requirement:

**12. All motors, controller equipment and charging equipment relating to electrical propulsion must be adequately ventilated.**

BSS general requirements 1, 8, 9, 10 and 11 are relevant to the power supply or the securing of the engine.

#### 4.1 Electrically propelled boats

<b>4.1.1</b>	<b>Is the electrical-propulsion supply system compliant with Part 3 as applicable?</b>	<b>R</b>
Identify boats having an electrical propulsion system. Apply all of Part 3 to the electrical supply system.		The electrical supply systems on all electrically propelled boats must comply with the applicable BSS requirements in Part 3.
Advice for owners – if batteries are connected to a battery charging source, having a maximum charge rate in excess of 2kW (approx. 150 Amps at 13.8 volts), we strongly recommend installing a fan-assisted ducted ventilation system. The fan’s motor is best placed externally to the duct and battery space to avoid any potential for spark ignition. The fan should operate automatically during charging and run for an hour when charging is completed. We also recommend that its safe operation is checked by a competent person on a routine basis.		

#### 4.2 Electrical propulsion motor and controller

<b>4.2.1</b>	<b>Are all parts of the electric-propulsion motor mounting systems secure and in good condition?</b>	<b>R</b>
Check electrical-propulsion motor mounting systems for condition and completeness where they can be seen or reached.  Apply light manual force to check the extent of any electric outboard motor movement.		Electrical-propulsion motor mounting systems must: <ul style="list-style-type: none"> <li>• show no signs of fractured engine mounting brackets; and,</li> <li>• not have loose, missing or fractured bolts or nuts; and,</li> <li>• show no evidence of significant breakdown of any flexible mounts.</li> <li>• show no signs of damaged, rusted or rotten motor bearers.</li> </ul> Electric outboard motors must be securely mounted so that there is no movement in any direction at the mounting points.
Applicability – the check for condition and completeness includes mounting systems to electric outboard motors.  Applicability – examiners need not apply light manual force to electric outboard motors assessed to be too heavy to move.		



<b>4.2.2</b>	<b>Is the motor and controller equipment adequately ventilated and in good condition?</b>	<b>R</b>
<p>Check for any means to dissipate heat from the motor and controller equipment.</p> <p>Check the condition of the motor and controller equipment.</p>	<p>Electric-propulsion motor and controller equipment spaces must be adequately ventilated by:</p> <ul style="list-style-type: none"> <li>• the volume of the space being 10 or more times greater than the volume of the equipment; or,</li> <li>• the provision of ventilation.</li> </ul> <p>Electric-propulsion motor and controller equipment must be free of:</p> <ul style="list-style-type: none"> <li>• any obviously missing components; and;</li> <li>• signs of damage and deterioration; and,</li> <li>• signs of overheating on the equipment and the surrounding surfaces.</li> </ul>	

**4.3 Battery charging equipment**

<b>4.3.1</b>	<b>Is the battery charging equipment ventilated, complete and in good condition?</b>	<b>R</b>
<p>Check for any means to dissipate heat from the battery charging equipment.</p> <p>Check the condition of battery charging equipment.</p>	<p>Battery-charging equipment compartments must be adequately ventilated by:</p> <ul style="list-style-type: none"> <li>• the volume of the space being 10 or more times greater than the volume of the equipment; or,</li> <li>• the provision of ventilation.</li> </ul> <p>Battery-charging equipment must be free of:</p> <ul style="list-style-type: none"> <li>• any obviously missing components; and;</li> <li>• signs of damage and deterioration; and,</li> <li>• signs of overheating on the equipment and the surrounding surfaces.</li> </ul>	
<p>Applicability – this check does not require the removal of covers provided by the equipment manufacturer.</p>		

## BSS Examination Checking Procedures – Part 5

### Outboard and portable combustion engines and portable fuel systems

There are three relevant BSS general requirements:

13. All portable and outboard engines and portable fuel systems must be designed, installed and maintained in a way that minimises the risks of explosion or of fire starting and spreading.
14. All spare petrol must be stored in a way that minimises the risk of fire and explosion.
15. All portable and outboard engines with integral petrol or LPG tanks, and all portable petrol tanks, must be stored in a way that minimises the risks of fire or explosion when not in use.

#### 5.1 Portable fuel systems

<b>5.1.1</b>	<b>Do permanently installed fuel systems supplying outboard and portable combustion engines comply with the applicable BSS requirements for the fuel supply system?</b>	<b>R</b>
<p>Identify permanently installed fuel systems supplying outboard and portable combustion engines.</p> <p>Apply the relevant Part of the BSS requirements to the permanently installed fuel system.</p>		<p>Permanently installed fuel systems supplying outboard and portable combustion engines must be compliant with the applicable BSS requirements of Part 2 or Part 7.</p>
<p>Applicability – LPG-fuelled outboard engine fuel installations are assessed by special arrangement with the BSS Office. See Check Item 5.5.1.</p> <p>Applicability – In the event an examiner identifies a portable combustion engine (excluding outboard engines) supplied with fuel from a permanently installed fuel system the BSS Office should be contacted for advice.</p>		

<b>5.1.2</b>	<b>Are all components of portable fuel systems of suitable proprietary manufacture?</b>	<b>R</b>
<p>Check the type of all components of portable fuel systems including the tank, fuel hose and priming bulb, and hose connections.</p> <p>Verify components not identified as of suitable proprietary manufacture, if necessary by examining any presented declaration from the manufacturer or supplier.</p>		<p>Portable fuel system components must be of suitable proprietary manufacture, for example:</p> <ul style="list-style-type: none"> <li>• tanks must be designed to store the fuel in use and permit convenient carrying and removal for refilling outside the vessel;</li> <li>• hoses and other fuel components must be intended for use with the fuel in use;</li> <li>• hose connections must be secured with proprietary clamps, clips or ties.</li> </ul> <p>Portable fuel system components not identified to be of suitable proprietary manufacture must be supported by an appropriate declaration from the manufacturer or supplier.</p>
<p>Applicability – in cases where verification of components to be of suitable proprietary manufacture is not achieved your checklist must be marked as ‘not verified’ and the item considered as non-compliant until such time as verification is achieved.</p> <p>Applicability – the point/s of connection of any outboard engine portable fuel system to any permanently installed fuel system must be made in the open air and where any fuel spillage would drain overboard (e.g. self-draining cockpits or outboard wells not enclosed by a canopy or other cover). Open vessels such as RIBs having a continuous deck or sole that is fuel-tight to the interior of the vessel and bilge spaces, meet this requirement. Such connections must be made with proprietary quick-release, self-closing connectors. In such installations all of the portable fuel system components must comply with the applicable BSS requirements at 5.1.2 - 5.1.4.</p> <p>Applicability – In the event an examiner identifies a portable fuel system supplying a permanently installed inboard engine, refer to check 2.15.3</p>		

<b>5.1.3</b>	<b>Are all components of portable fuel systems complete and in good condition?</b>	<b>R</b>
<p>Check the completeness and condition of all portable fuel system components including the tank, fuel hose and priming bulb, and hose connections.</p> <p>Check the completeness and condition of support structures and fixings on transom-mounted tank arrangements.</p>	<p>Portable fuel systems must be complete including the fuel tank cap, the hose, and hose clamps/clips.</p> <p>Components of portable fuel systems must be free of leaks and signs of damage or deterioration.</p> <p>Portable fuel tanks must be free of signs of significant pitting or repairs on metal tanks, or corrosive attack or repairs on plastic tanks.</p> <p>The support structures and fixings on transom-mounted tank arrangements must be complete and free of signs of damage or deterioration.</p>	
<p>Applicability – all surfaces and seams on components, including tank undersides, should be examined.</p> <p>Supplementary information on assessing deterioration of plastic fuel tanks is provided at Appendix F</p>		

<b>5.1.4</b>	<b>Are portable fuel systems fitted with a means of shutting off the fuel supply?</b>	<b>R</b>
<p>Check all portable fuel systems for a means of shutting off the fuel supply between the tank and the engine.</p>	<p>A means of shutting off the fuel supply between the tank and engine must be fitted to all portable fuel systems.</p>	
<p>Applicability – acceptable means include a valve, cock or proprietary self-closing connector.</p>		

## 5.2 Portable petrol tanks

<b>5.2.1</b>	<b>Does the maximum capacity of individual portable petrol tanks permit safe and convenient carrying and removal for refilling outside the vessel?</b>	<b>R</b>
<p>Check the capacity of portable petrol tanks as marked on the tank.</p>	<p>The maximum capacity of portable petrol tanks must permit safe and convenient carrying and removal for refilling outside the vessel.</p> <p>The maximum capacity of portable petrol tanks must not exceed 27 litres.</p>	
<p>Applicability – in the event the maximum capacity is not marked on the tank an assessment should be made for obviously over capacity tanks [1 litre is equal to a cube 100mmx100mmx100mm].</p> <p>Applicability – existing proprietary makes of portable petrol tanks of up to 30-litre capacity are acceptable.</p>		

5.2.2	<b>Are all portable petrol tanks stored, when not in use, to ensure that any leaking fuel or escaping vapour will not enter the interior of the vessel?</b>	<b>R</b>
Check the storage location of portable petrol tanks not connected to the engine.	<p>Portable petrol tanks which are not connected to the engine must be stored in the open where any leaked petrol would flow overboard unimpeded, or in a suitable locker.</p> <p>Any locker used to store portable petrol tanks must be:</p> <ul style="list-style-type: none"> <li>• drained to the outside of the hull from at, or close to the bottom of the locker; and,</li> <li>• secure and constructed of a material of the required thickness, in good condition; and,</li> <li>• free from objects that could block the drain, damage the petrol tank or cause petrol vapour to ignite; and,</li> <li>• fuel-tight to an equal or greater height that the top of the cap for the petrol tank; and,</li> <li>• self-draining and the drain hole must have a minimum internal diameter of 12mm (½in) and must not be blocked; and,</li> </ul> <p>The locker must not open into any engine, battery or electrical equipment space.</p> <p>The drain line material including connections must be complete and in good condition.</p>	
Applicability - these are identical storage arrangements for LPG cylinders the detail of which is to be found in Part 7 sections 7.1–7.5 .		

### 5.3 Spare fuel containers

5.3.1	<b>Are all spare petrol containers stored to ensure that any leaking fuel or escaping vapour will not enter the interior of the vessel?</b>	<b>R</b>
Check the storage location of spare petrol containers.	<p>Spare petrol containers must be stored in the open where any leaked petrol would flow overboard unimpeded, or in a suitable locker.</p> <p>Any locker used to store spare petrol must be:</p> <ul style="list-style-type: none"> <li>• drained to the outside of the hull from at, or close to the bottom of the locker; and,</li> <li>• secure and constructed of a material of the required thickness, in good condition; and,</li> <li>• free from objects that could block the drain, damage the petrol container or cause petrol vapour to ignite; and,</li> <li>• fuel-tight to an equal or greater height that the top of the cap for the petrol container; and,</li> <li>• self-draining and the drain hole must have a minimum internal diameter of 12mm (½in) and must not be blocked.</li> </ul> <p>The locker must not open into any engine, battery or electrical equipment space.</p> <p>The drain line material including connections must be complete and in good condition.</p>	
Applicability - these are identical storage arrangements for LPG cylinders the detail of which is to be found in Part 7 sections 7.1–7.5.		

<b>5.3.2</b>	<b>Are all spare petrol containers suitable for the purpose and limited to the permitted volume?</b>	<b>R</b>
Check the type and capacity of spare petrol containers.	<p>The amount of spare petrol carried is limited to any combination of the following containers:</p> <ul style="list-style-type: none"> <li>• 2 x 10 litre metal containers marked to conform with the 1929 Petroleum Spirit Regulations;</li> <li>• 2 x 5 litre plastic containers marked to conform with the 1982 Petroleum Spirit Regulations;</li> <li>• 1 x portable petrol tank of suitable proprietary manufacture of up to a maximum capacity of 27 litres.</li> </ul>	
<p>Applicability – the carriage of spare diesel or paraffin is not restricted by volume.  Applicability – an existing proprietary make of portable petrol tank of up to 30 litre capacity is acceptable.</p>		

<b>5.3.3</b>	<b>Are all spare fuel containers in good condition?</b>	<b>R</b>
Check the condition of spare fuel containers.	Spare fuel containers must be free of signs of significant pitting or repairs on metal tanks, or corrosive attack or repairs on plastic tanks and must be free from leaks and other signs of damage or deterioration.	
<p>Applicability – this check covers spare petrol <u>and</u> spare diesel and paraffin containers.  Supplementary information on assessing deterioration of plastic containers is provided at Appendix F.</p>		

#### 5.4 Outboard and portable combustion engines

<b>5.4.1</b>	<b>Are all outboard and portable combustion engines free of fuel leaks?</b>	<b>R</b>
Check for the presence of leaking fuel on or around all outboard and portable combustion engines.	Outboard and portable combustion engines must be free of obvious signs of fuel leaks.	
<p>Applicability – this check does not require the removal of outboard covers or generator hush covers.</p>		

<b>5.4.2</b>	<b>Are all outboard and portable combustion engines with integral petrol or LPG tanks stored to ensure that leaking fuel or escaping vapour will not enter the interior of the vessel?</b>	<b>R</b>
<p>Check the storage location of outboard engines with integral petrol tanks <u>and</u> portable combustion engines with integral petrol or LPG tanks.</p>	<p>Outboard engines with integral petrol tanks and portable combustion engines with integral petrol or LPG tanks must be stored in the open where any leaked petrol would flow overboard unimpeded, or in a suitable locker.</p> <p>Any locker used to store outboard engines or portable combustion engines with integral petrol or LPG tanks must be:</p> <ul style="list-style-type: none"> <li>• drained to the outside of the hull from at, or close to the bottom of the locker; and,</li> <li>• secure and constructed of a material of the required thickness, in good condition; and,</li> <li>• free from objects that could block the drain, damage the petrol/LPG tank/cylinder or cause petrol/LPG vapour to ignite; and,</li> <li>• fuel/LPG-tight to an equal or greater height than the top of the cap for the petrol tank or valve of the LPG cylinder; and,</li> <li>• self-draining and the drain hole must have a minimum internal diameter of 12mm (½in) and must not be blocked.</li> </ul> <p>The locker must not open into any engine, battery or electrical equipment space.</p> <p>The drain line material including connections must be complete and in good condition.</p>	
<p>Applicability - these are identical storage arrangements for LPG cylinders the detail of which is to be found in Part 7 sections 7.1–7.5.</p> <p>Applicability – outboard or portable combustion engines <u>not stored</u> at the time of the examination, for example, generators or outboards running or connected, must be recorded as compliant.</p>		

<b>5.4.3</b>	<b>Are outboard engine mounting systems in good condition?</b>	<b>R</b>
<p>Check the condition of outboard engine mounting systems.</p> <p>Assess the extent of any movement by applying light manual force to the outboard engine.</p>	<p>Outboard engine mounting systems must be free of signs of damage or deterioration.</p> <p>Outboard engines must be securely mounted so that there is no movement in any direction at the mounting points.</p>	
<p>Applicability – examiners need not apply light manual force to outboards assessed to be too heavy to move.</p>		

## 5.5 LPG-fuelled outboard propulsion engines

5.5.1	<b>Do the fuel supply arrangements to LPG-fuelled outboard engines comply with UKLPG CoP 18 or equivalent standard and are any dual-fuel petrol/LPG arrangements of an acceptable type?</b>	<b>R</b>
<p><i>[LPG-fuelled outboard engines can only be checked for compliance by prior arrangement by the owner with the BSS Office]</i></p> <p>Check the fuel supply type to outboard engines and identify those fuelled by LPG or dual-fuel petrol/LPG.</p>	<p>The fuel supply arrangements to LPG-fuelled outboard engines must comply with UKLPG Code of Practice (CoP) 18 or an equivalent standard.</p> <p>Any dual-fuel arrangements must be installed and maintained accordance with the engine manufacturer’s guidelines for marine applications.</p>	
<p>Applicability - examiners should seek to establish engines fuelled by LPG during initial dealings with customers and in cases where LPG fuelled outboard engines are identified customers should be advised to contact the BSS Office who can arrange for an examiner competent to apply UKLPG CoP 18 to undertake a <u>full</u> examination of the boat.</p> <p>Applicability – examiners may determine compliance of portable LPG-fuelled generators to applicable BSS requirements.</p>		

## BSS Examination Checking Procedures – Part 6

### Fire Extinguishing and Escape

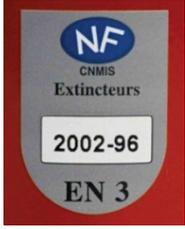
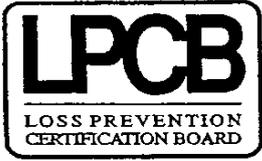
There are two relevant BSS general requirements:

- |     |  |
|-----|--|
| 16. | All vessels must carry specified fire fighting equipment.  |
| 17. | All fire fighting equipment must be maintained in good condition and kept readily accessible for safe use in an emergency. |

#### 6.1 Portable fire extinguishers

<b>6.1.1</b>	<b>Are the correct number of portable fire extinguishers provided, and do they have the correct fire ratings?</b>	<b>R</b>
Check the number of portable fire extinguishers provided and check their individual and combined fire ratings.	<p>Each portable fire extinguisher must have an individual fire rating of 5A/34B or greater</p> <p>The number of portable fire extinguishers, and their combined fire ratings, must be as prescribed in the following table.</p> <p>The minimum number of extinguishers may be reduced by a maximum of one 5A/34B rated extinguisher where the vessel has <u>either</u> no internal combustion engines, <u>or</u> no fuel-burning appliances.</p>	
	<b>Length of vessel</b>	<b>Minimum number</b>
	Under 7m (23ft)	2
	7–11m (23–36ft)	2
	Over 11m (36ft)	3
		<b>Minimum combined fire rating</b>
		10A/68B
		13A/89B
		21A/144B
<p>Applicability – portable fire extinguishers manufactured prior to the introduction of EN 3 may not have fire ratings marked on the extinguisher. Such extinguishers maintained in good condition, properly certified and satisfying the navigation authority's previous individual and total weight requirements are acceptable. See Appendix H.</p> <p>Applicability – fuel-burning appliances include those fuelled by LPG, diesel, paraffin, spirit and solid fuels.</p> <p>Supplementary information on fire ratings and classification is provided at Appendix I.</p>		



6.1.2	Is the performance of all the portable fire extinguishers properly certificated?	R
Check all portable fire extinguishers, identified as being compliant at 6.1.1, for evidence of accredited third-party certification.		Portable fire extinguishers must be marked with at least one of the following certification marks:
 <p>AFNOR 'NF' mark</p>	 <p>Apragaz Belcert</p>	 <p>BSI 'Kitemark'</p>
 <p>British Approvals for Fire Equipment</p>	 <p>British Approvals for Fire Equipment</p>	 <p>Marine Equipment Directive 'ship's wheel'</p>
 <p>Loss Prevention Certification Board</p>	 <p>Loss Prevention Certification Board</p>	 <p>Société Générale De Surveillance</p>
<p>Examiner action - Examiners are not required to check the standard to which extinguishers have been manufactured, Extinguishers carrying one of the approved certification marks may have been manufactured to either the previous British Standard BS 5423 or the current standard BS EN3.</p> <p>Applicability – 'CE' marking on any extinguisher does not indicate certification of performance to EN 3. Further information is provided at Appendix I.</p> <p>Applicability – Firemaster 1000PR B/C [Brass/Chrome] models without the 'Kitemark' are acceptable.</p>		

<b>6.1.3</b>	<b>Are all portable fire extinguishers in good condition?</b>	<b>R</b>
<p>Check the condition of all portable fire extinguishers identified as compliant at 6.1.1 and 6.1.2.</p>	<p>Portable fire extinguishers must be in good general condition, and must not show any of the following indicators of poor condition:</p> <ul style="list-style-type: none"> <li>• missing safety pin;</li> <li>• dents; gouges; significant rust or other form of corrosion; perished hose;</li> <li>• pressure gauge (where fitted) indicator in the 'red' sector;</li> <li>• having passed the manufacturer's express 'expiry' or 'replace by' date;</li> <li>• obvious under-weight indicating whole or partial discharge;</li> <li>• signs of damage to trigger assembly, including deterioration caused by ultraviolet light and heat.</li> </ul>	
<p>Applicability – portable fire extinguishers having passed the manufacturer's express 'expiry' or 'replace by' dates are acceptable if supported by evidence of servicing in accordance with BS 5306 by a service technician within the last 12 months. Evidence must be in the form of a service label on the extinguisher <u>and</u> an associated invoice or service report on headed paper from a company recognisable as an extinguisher servicing company.</p> <p>Guidance for owners – the use of BAFE registered service technicians is recommended.</p>		

<b>6.1.4</b>	<b>Are portable fire extinguishers distributed around the vessel in readily accessible and safe locations adjacent to escape routes?</b>	<b>R</b>
<p>Check the accessibility and location of the portable fire extinguishers identified as compliant at 6.1.1 and 6.1.2.</p>	<p>Portable fire extinguishers must be readily accessible.</p> <p>Portable fire extinguishers must be distributed around the vessel adjacent to escape routes.</p> <p>Portable fire extinguishers must not be mounted in a position that requires the user to reach over a cooking appliance.</p>	
<p>Advice for owners – extinguishers are best placed on escape routes to allow occupants to be able decide whether it is safe to fight a fire or escape.</p> <p>Advice for owners – it is strongly recommended that portable fire extinguishers are mounted on fixed brackets.</p>		

<b>6.1.5</b>	<b>Are all portable fire extinguishers in open view or their location clearly marked?</b>	<b>R</b>
<p>Identify the location of all portable fire extinguishers identified as compliant at 6.1.1 and 6.1.2.</p> <p>Where portable fire extinguishers are not in open view with all removable lids, doors, curtains etc in place, check for the presence of a label in open view indicating their location.</p>	<p>Portable fire extinguishers, must:</p> <ul style="list-style-type: none"> <li>• be in open view with all removable lids, doors, curtains etc in place; <u>or</u>,</li> <li>• have their location clearly marked by a label in open view.</li> </ul>	
<p>Advice for owners – the preferred label may be available from local chandlers, internet based suppliers, builders merchants, hardware and DIY stores and has a red background and white image (or off-white luminous) extinguisher. Examples of proprietary designs are shown here.</p> <div data-bbox="213 1783 1374 1966" style="text-align: center;"> </div> <p>Applicability – the location of any fixed portable fire extinguisher brackets may be used to determine the normal location of any extinguishers found lying loose at the time of an examination.</p>		

## 6.2 Fire blankets

6.2.1	<b>If the vessel has permanent cooking facilities, is a fire blanket of the correct specification provided?</b>	<b>R</b>
<p>Check for the presence of permanent cooking facilities and, if present, check for the provision of a fire blanket.</p> <p>Check any markings on the fire blanket container.</p>		<p>If permanent cooking facilities are present a fire blanket marked to indicate conformity to BS EN 1869, or to the 'light duty' requirements of BS 6575, must be provided.</p>
<p>Applicability – if no markings are present on the fire blanket container, conformity to the listed standards may be supported by the owner (or representative) removing the blanket and confirming the blanket itself is marked. Conformity may also be supported by a written declaration from the blanket manufacturer or supplier.</p> <p>Applicability – a fire blanket is not required if a microwave oven is the only permanent cooking facility.</p> <p>Applicability – evidence of occasional use of solid fuel stoves for cooking does not require the provision of a fire blanket.</p>		

6.2.2	<b>Is the fire blanket located close to the main cooking appliance in a safe and ready-to-use location?</b>	<b>R</b>
<p>Check the location of the fire blanket.</p>	<p>Fire blankets must be located in a readily accessible position within approximately 2m of the main cooking appliance, and not mounted in a position that requires the user to reach over the cooking appliance.</p>	
<p>Advice for owners – fire blankets mountings should be fixed permanently in position to allow rapid access and use.</p>		

## 6.3 Emergency escape

6.3.1	<b>Is the vessel provided with adequate means of escape?</b>		<b>A</b>
<p>Check each accommodation space for the means to escape.</p> <p>Measure the minimum dimensions of clear openings used as a means of escape such as hatches, windows or ports.</p> <p>If a fixed window or port is designated an escape route, check that a means of 'breaking-out' is present.</p>		<p>Each accommodation space must have at least two means of escape.</p> <p>The minimum clear opening for a means to escape is 0.18 m<sup>2</sup>.and all openings must accommodate a 380mm diameter circle.</p> <p>A means of 'breaking out' any fixed window or port designated as an escape route must be stored adjacent to it.</p>	
<p>Advice for owners – if the introduction of a second means of escape may involve cutting or removing structural members, e.g. deck beams, frames or stiffeners, owners are advised to seek professional advice from the boatbuilder or supplier or a professional marine surveyor before commencing work.</p> <p>Advice for owners – if a window or hatch is the secondary means of escape, if one is not already fitted, advise the owner to fit a proprietary label to help people not familiar with the craft to escape in the event of an emergency.</p>			

## BSS Examination Checking Procedures – Part 7

### Liquefied Petroleum Gas (LPG) systems

There are seven relevant BSS general requirements:

18.	All LPG systems must be designed, installed and maintained in a way that minimises the risks of explosion or of fire starting and spreading.
19.	All LPG containers and high-pressure components must be secured in a position where escaping gas does not enter the interior of the vessel.
20.	All LPG systems must be designed, installed and maintained to ensure gas-tight integrity.
21.	All LPG system connections and flexible hoses must be accessible for inspection.
22.	All LPG control and shut-off devices, or the means to operate them must be readily accessible.
23.	LPG shut-off valves, or their means of operation, must be marked when not in clear view or when their function is not clear.
24.	All LPG systems must have a suitable means to test that the system is gas-tight.

#### 7.1 LPG cylinder storage

7.1.1	Are all LPG cylinders and containers stored in a position where any leakage will be directed safely overboard?	R
<p>Check for the presence of any LPG cylinders or containers. If present, check whether their location is either in a cylinder locker or an open location.</p> <p>If located in a cylinder locker apply the checks at sections 7.2-7.5.</p> <p>If located in an open location:</p> <ul style="list-style-type: none"> <li>• identify the type of any cockpit storage location;</li> <li>• check the location for any barriers to leaked LPG flowing overboard;</li> <li>• check location for any openings into the interior of the vessel, <u>or</u> any source of ignition, within 1m distance.</li> </ul>		<p>All LPG cylinders or containers, whether full, part full or empty must be stored <u>either</u> in a cylinder locker complying with the requirements of the Check Items in sections 7.2-7.5, <u>or</u> in an open location.</p> <p>Cylinders stored in an open location:</p> <ul style="list-style-type: none"> <li>• must be outside of a <u>non</u> self-draining cockpit or well deck; and,</li> <li>• must be in a position where any leaked LPG would flow overboard unimpeded; and,</li> <li>• must be where there is no opening into the interior of the vessel, <u>or</u> any source of ignition, within 1m distance.</li> </ul>
<p>Applicability – cylinder housings may be used in open locations. Cylinder housings are ventilated enclosures intended solely for storage of one or more LPG cylinders, pressure regulators and safety devices and located on the exterior of the craft, where any leakage would flow overboard. [ISO 10239]</p> <p>Applicability – the storage arrangements of cylinders, not in cylinder lockers, stored in <u>self-draining cockpits</u> should be assessed against Check Item 7.2.4.</p> <p>Applicability – sources of ignition include open-flame or spark-inducing equipment. Solenoid LPG system shut-off valves of suitable proprietary manufacture should be presumed <u>not</u> to be a source of ignition. Outboard motors within 1m of cylinders are <u>not</u> to be considered a source of ignition.</p>		

7.1.2	Are all self-contained portable LPG appliances stored so that any LPG leakage will be directed safely overboard?	R
<p>Check for the presence of self-contained portable appliances having LPG cylinders or containers attached.</p> <p>If present, apply the checks at 7.1.1.</p>		<p>All self-contained portable appliances having LPG cylinders or containers attached must be stored in accordance with the requirements of 7.1.1.</p>
<p>Applicability – this check applies to camping-style appliances but not items such as gas hob lighters.</p>		

## 7.2 LPG cylinder locker and housing LPG-tightness

7.2.1	Is the cylinder locker, up to the level of the top of the cylinder valves or other high-pressure components, free of any path for leaked LPG to enter the interior of the vessel?	R		
<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 50%; vertical-align: top; padding: 5px;"> <p>Determine the level of the top of the cylinder valves, or other high-pressure components where these are located higher.</p> <p>Check the height of the LPG cylinder locker sides.</p> <p>Determine which parts of the locker structure if holed or damaged could create a path for LPG leaked to enter the interior of the vessel.</p> <p>Visually check the locker construction material and the condition of all cylinder locker bottoms, sides and seams.</p> </td> <td style="width: 50%; vertical-align: top; padding: 5px;"> <p>The sides of every cylinder locker must extend at least up to the level of the top of the cylinder valves, or other high-pressure components where these are higher.</p> <p>Up to the level of the top of the cylinder valves, or other high-pressure components where these are higher, the bottom, sides, and seams of every cylinder locker must be free of any:</p> <ul style="list-style-type: none"> <li>• holes, e.g. caused by drilling, rust or cutting; or ,</li> <li>• cracks, splits or de-laminations; or,</li> <li>• missing or damaged welds at seams; or,</li> <li>• other signs of damage or deterioration...</li> </ul> <p>.... that can be determined by visual examination to penetrate the locker to the interior of the vessel.</p> <p>Cylinder locker bottoms, sides and seams covered by this check must not rely upon glue or sealant to prevent any leaked LPG from entering the interior of the vessel.</p> </td> </tr> </table>			<p>Determine the level of the top of the cylinder valves, or other high-pressure components where these are located higher.</p> <p>Check the height of the LPG cylinder locker sides.</p> <p>Determine which parts of the locker structure if holed or damaged could create a path for LPG leaked to enter the interior of the vessel.</p> <p>Visually check the locker construction material and the condition of all cylinder locker bottoms, sides and seams.</p>	<p>The sides of every cylinder locker must extend at least up to the level of the top of the cylinder valves, or other high-pressure components where these are higher.</p> <p>Up to the level of the top of the cylinder valves, or other high-pressure components where these are higher, the bottom, sides, and seams of every cylinder locker must be free of any:</p> <ul style="list-style-type: none"> <li>• holes, e.g. caused by drilling, rust or cutting; or ,</li> <li>• cracks, splits or de-laminations; or,</li> <li>• missing or damaged welds at seams; or,</li> <li>• other signs of damage or deterioration...</li> </ul> <p>.... that can be determined by visual examination to penetrate the locker to the interior of the vessel.</p> <p>Cylinder locker bottoms, sides and seams covered by this check must not rely upon glue or sealant to prevent any leaked LPG from entering the interior of the vessel.</p>
<p>Determine the level of the top of the cylinder valves, or other high-pressure components where these are located higher.</p> <p>Check the height of the LPG cylinder locker sides.</p> <p>Determine which parts of the locker structure if holed or damaged could create a path for LPG leaked to enter the interior of the vessel.</p> <p>Visually check the locker construction material and the condition of all cylinder locker bottoms, sides and seams.</p>	<p>The sides of every cylinder locker must extend at least up to the level of the top of the cylinder valves, or other high-pressure components where these are higher.</p> <p>Up to the level of the top of the cylinder valves, or other high-pressure components where these are higher, the bottom, sides, and seams of every cylinder locker must be free of any:</p> <ul style="list-style-type: none"> <li>• holes, e.g. caused by drilling, rust or cutting; or ,</li> <li>• cracks, splits or de-laminations; or,</li> <li>• missing or damaged welds at seams; or,</li> <li>• other signs of damage or deterioration...</li> </ul> <p>.... that can be determined by visual examination to penetrate the locker to the interior of the vessel.</p> <p>Cylinder locker bottoms, sides and seams covered by this check must not rely upon glue or sealant to prevent any leaked LPG from entering the interior of the vessel.</p>			
<p>Applicability - the above requirements also apply where any part of a cylinder housing forms an integral part of the craft's hull or superstructure.</p> <p>Applicability – the checking action applies to the external as well as the internal surfaces of cylinder lockers and housings, where these can be seen.</p> <p>Applicability – prior to checking the condition of cylinder lockers and housings examiners must ensure all loose portable items are removed.</p> <p>Applicability –where a part of the locker or housing is obstructed, e.g. by the cylinders themselves, a false base or mat, or ponded water, then the check cannot be completed until the obstruction has been removed, moved aside or cleared. Examiners should not disconnect cylinders connected to the LPG system, but where cylinders prevent the condition of the locker or housing being verified the check cannot be completed until the cylinders have been moved to allow access. Lockers or housings not accessible enough to allow an assessment of condition must be recorded as 'not verified' on your checklist, and it must be considered that the check has not been completed until such time as their condition has been verified.</p> <p>Applicability – hatches and any similar temporary openings, however constructed or sealed, are not permitted within the area of LPG cylinder lockers and housings covered by this check. Note that the BSS compliance of side-opening cylinder lockers compliant with ISO 10239 is covered at 7.2.3.</p> <p>Applicability – wooden cylinder lockers must incorporate a lining of FRP, or equivalent to meet this requirement.</p> <p>Advice for owners - owners should ensure the examiner can carry out careful checking of the cylinder locker for condition, including the removal of all loose portable items.</p> <p>Advice for owners – locker corrosion may lead to a leak path for LPG to enter the interior of the vessel. LPG cylinder lockers must be maintained in good condition.</p>				

<b>7.2.2</b>	<b>Are the sealing arrangements on pipework exiting the cylinder locker of the correct type to ensure LPG-tightness and in good condition?</b>	<b>R</b>
<p>Check the position, type and condition of sealing arrangements on pipework exiting cylinder lockers and housings.</p>	<p>Pipework must exit LPG cylinder lockers through either, a bulkhead fitting, <u>or</u> a cable gland fitting, <u>or</u> be above the LPG-tight level.</p> <p>The sealing arrangements must be free of signs of damage and deterioration.</p> <p>The above requirements also apply where any part of a cylinder housing forms a part of the craft's hull or superstructure and where the LPG pipe exits the housing into the interior of the vessel.</p>	
<p>Applicability – in the event the pipework exits the locker below the LPG-tight level through a conduit, it is acceptable that the pipework is protected by sealant which is in good condition and free of any holes, that completely seals the area between the pipework and the conduit inner walls and does not noticeably move or dislodge when the LPG pipework is subject to light manual force.</p>		

<b>7.2.3</b>	<b>Are arrangements on side-opening cylinder lockers compliant with ISO 10239?</b>	<b>R</b>
<p>Check that the location of any side-opening locker door is outside of the interior of the vessel.</p> <p>Visually check the condition of the door seals.</p> <p>If the seals appear free of gaps, damage and deterioration, then apply the check at 7.2.4.</p> <p>If the seals appear free of gaps, damage and deterioration, and the arrangements do <u>not</u> satisfy the check at 7.2.4, ring the BSS Office for further advice concerning conducting smoke pellet tests.</p>	<p>Side-opening lockers must not be able to be opened from the interior of the vessel.</p> <p>The seals of any side-opening cylinder locker door must be free of signs of gaps in the contact with the locker body and must be free of damage or deterioration.</p> <p>Door seals with no signs of gaps or damage must satisfy check 7.2.4 <u>or</u> pass the smoke pellet test.</p>	
<p>Applicability – in the event the test is unsuccessful and the arrangements satisfy Check Item 7.2.4 record N/A on your checklist at 7.2.3.</p>		

<b>7.2.4</b>	<b>Do the arrangements in a self-draining cockpit prevent LPG entering the interior of the vessel?</b>	<b>R</b>
<p>Verify the cockpit is self-draining.</p> <p>Verify the presence of LPG cylinders not in a cylinder locker.</p> <p>If present, verify whether the self-draining cockpit arrangements prevent LPG entering the interior of the vessel by checking:</p> <ul style="list-style-type: none"> <li>• the height of cockpit drain outlets in relation to the normal laden waterline; and,</li> <li>• the height to which cockpit is watertight to the interior of the vessel; and,</li> <li>• the condition of any hatches or openings, and associated seals, gaskets, below the height of the cylinders, regulators and associated equipment.</li> </ul>	<p>If the effectiveness of side-opening cylinder locker door seals cannot be verified, or if cylinders are stored in cylinder housings, then the arrangements of a self-draining cockpit must be as follows:</p> <ul style="list-style-type: none"> <li>• the height of cockpit drain outlet(s) must be above normal laden waterline; and,</li> <li>• the cockpit must be watertight to the interior of the vessel at least to a height equal to that of the height of the top of the LPG cylinder valves and other high-pressure components where these are located higher; and,</li> <li>• hatches or openings, and associated seals, gaskets, below the height of the LPG cylinder valves and other high-pressure components where these are located higher must be free of signs of damage or deterioration.</li> </ul>	
<p>Applicability – this Check Item is relevant to cylinders in self-draining cockpits where, either the side-opening cylinder locker door seal fails the test at 7.2.3, <u>or</u>, cylinders are not stored in any enclosure or, cylinders are stored in a cylinder housing.</p> <p>Applicability – in the event the test at Check Item 7.2.3 is successful record N/A on your checklist at 7.2.4.</p>		

### 7.3 LPG cylinder locker drains

<b>7.3.1</b>	<b>Is there a drain in the cylinder locker and is the drain outlet above the waterline?</b>	<b>R</b>
<p>Identify the presence of a cylinder locker drain in each cylinder locker.</p> <p>Identify the cylinder locker drain outlet on the outside of the hull and verify that it is above the normal laden waterline.</p>	<p>All cylinder lockers must be fitted with a drain facility.</p> <p>Cylinder locker drain outlets must be on the outside of the hull above the normal laden waterline.</p>	
<p>Applicability – If for any reason water can enter the cylinder locker through the locker drain, there must always be a higher drain hole(s) or enlarged ‘slot’ which is open to the outside air in accordance with 7.3.6 to ensure an unobstructed passage of leaked LPG to the outside.</p>		

<b>7.3.2</b>	<b>Is the drain opening at or close to the bottom of the cylinder locker or is any volume beneath the drain opening minimised by the use of suitable material?</b>	<b>R</b>
<p>Check the location of the cylinder locker drain openings.</p> <p>If the drain opening is above the bottom of the locker check that any area below the drain opening that could retain leaked LPG is filled with LPG-resistant material.</p>	<p>Cylinder locker drain openings must be located at the bottom of the locker or at the lowest point of the side.</p> <p>Any area in the cylinder locker below the drain that could retain leaked LPG must be filled with LPG-resistant material.</p>	
<p>Applicability – drain openings on the side of cylinder lockers not greater than 25mm above the bottom of the locker may be considered as at the lowest point of the side.</p>		

<b>7.3.3</b>	<b>Is the cylinder locker clear of any items that could block the drain?</b>	<b>R</b>
Check cylinder lockers for any items which could block the drain.	Cylinder lockers must be clear of any item which could block the drain.	

<b>7.3.4</b>	<b>Does the drain line fall continuously from the cylinder locker to the drain outlet and are both ends clear of blockage?</b>	<b>R</b>
Check the completeness and fall of the drain line to the drain outlet where it can be seen.  Check the drain openings in the cylinder locker and at the drain outlet for obstruction.	Cylinder locker drain lines must be continuous and must fall continuously to the drain outlet in the hull so as not to retain leaked LPG.  Drain openings in the cylinder locker and at the drain outlet must not be blocked.	
Applicability – with the consent of the owner, a bucket of water can be used to aid verification of Check Items 7.3.4 to 7.3.6.		

<b>7.3.5</b>	<b>Is the drain line material, including the connections, in good condition?</b>	<b>R</b>
Check the condition of all cylinder locker drain line material that can be seen or reached.  Check the condition of all drain line connections that can be seen or reached.  Where connections can be reached, pull using light manual force to check security of all drain line connections.	The material of drain lines must be free of signs of damage or deterioration.  All connections must be complete and free of signs of damage or deterioration.  Drain pipe connections must be appropriately tight, that is, not so loose that the pipe moves under light manual force.  Drain hoses must be free of any signs of damage and deterioration, including 'soft' spots or kinking of the walls.  Drain hose connections made with hose clips or clamps must: <ul style="list-style-type: none"> <li>• be suitably sized, that is, not so oversized that the band forms an elliptical shape or so undersized that no tightness is achieved; and,</li> <li>• be appropriately tight, that is, not so loose that the hose can be pulled forward or back under light manual force nor so tight that the hose is excessively pinched; and,</li> <li>• show no signs of damage or deterioration at the clip or clamp; and,</li> <li>• show no signs of damage or deterioration at the hose.</li> </ul>	



<b>7.3.6</b>	<b>Does the drain line, or the drain opening, have a minimum appropriate internal diameter or equivalent area?</b>			<b>R</b>
<p>Measure the internal diameter of each cylinder locker drain opening.</p> <p>Check the drain line that can be seen for no obvious reductions.</p>	Cylinder locker drains must have a minimum internal diameter of 12mm (½in) or increased pro-rata up to 19mm (¾in)			
	Total capacity	internal diameter of drain opening or equivalent area		
	1-18kg	12mm (½in)	113mm <sup>2</sup>	
	19-29kg	14mm (⅝ in)	154mm <sup>2</sup>	
	30-37kg	17mm (⅝in)	227mm <sup>2</sup>	
	38kg or greater	19mm (¾ in)	283mm <sup>2</sup>	
<p>Applicability – equivalent areas of differently shaped drain openings are acceptable.</p> <p>Applicability - total capacity must be calculated from the sum of all cylinders housed in the same drained cylinder locker.</p> <p>Applicability - if two or more drains exist in one locker, their internal diameters or equivalent areas should be added together when checking for compliance.</p>				

#### 7.4 Protecting LPG cylinders and components against damage

<b>7.4.1</b>	<b>Are all cylinders secured and stored upright with the valve at the top?</b>			<b>R</b>
<p>Determine by moving the cylinders carefully the extent of any movement.</p> <p>Check that all cylinders are secured to prevent potential damage to regulators or pipework.</p> <p>Check the completeness and condition of support structures and fixings on transom-mounted LPG cylinder arrangements.</p> <p>Check all cylinders are secured in the upright position with the valve uppermost.</p>	<p>The extent of any LPG cylinder movement must not cause any pulling of pipework or pulling tight of hose.</p> <p>Cylinders must be secured so that the possibility of cylinders damaging low-pressure regulators, pipework or other LPG system components is minimised.</p> <p>The support structures and fixings on transom-mounted LPG cylinder arrangements must be complete and free of signs of damage or deterioration.</p> <p>Cylinders must be secured in the upright position with the valve uppermost.</p>			

<b>7.4.2</b>	<b>Is the cylinder locker secure?</b>			<b>R</b>
Apply light manual force to check that cylinder lockers are secure.	Cylinder lockers must be secured against unintended movement.			

<b>7.4.3</b>	<b>Are LPG cylinders in a locker protected against falling objects?</b>			<b>R</b>
<p>Check for the presence of a lid or cover on all top-opening cylinder lockers.</p> <p>If not present check that the cylinders, regulators and associated equipment are otherwise protected.</p>	<p>Top-opening LPG cylinder lockers must either have:</p> <ul style="list-style-type: none"> <li>• a lid or cover, <u>or</u></li> <li>• cylinders, and other LPG system components must be otherwise protected against falling objects.</li> </ul>			

<b>7.4.4</b>	<b>Is the cylinder locker clear of any items that could damage the LPG equipment or ignite leaked LPG?</b>	<b>R</b>
Check the contents of all cylinder lockers.	Cylinder lockers must not contain loose sharp or heavy items such as anchors or mooring pins that could damage the cylinders or other LPG system components.  Cylinder lockers must not contain any item that could ignite leaked LPG.	
<p>Applicability – sources of ignition include open flame or spark inducing equipment. Solenoid LPG system shut-off valves of suitable proprietary manufacture should be presumed <u>not</u> to be a source of ignition.</p> <p>Advice to owners – when purchasing solenoid controlled shut-off valves an assurance should be sought from the supplier as to their suitability for use with LPG.</p>		

<b>7.4.5</b>	<b>Is the cylinder locker constructed of material of the required thickness?</b>	<b>R</b>
<p>Determine the material the cylinder lockers are constructed from and estimate the thickness of the cylinder lockers.</p> <p>Determine the materials used in any repair to cylinder lockers.</p>	<p>Cylinder lockers must be constructed of materials that are either</p> <ul style="list-style-type: none"> <li>• the same material and thickness of the surrounding hull structure; or,</li> <li>• metal of minimum thickness of approximately 1mm; or,</li> <li>• FRP of minimum thickness of approximately 5mm thickness.</li> </ul> <p>Any repairs to cylinder lockers must meet the thickness requirements above, and:</p> <ul style="list-style-type: none"> <li>• metal locker repairs must be made using a plate of similar metal and must be seam welded or brazed;</li> <li>• FRP locker repairs must be made using fiberglass fabric/matting and resin.</li> </ul>	
<p>Applicability – a combination of wooden cylinder lockers lined with FRP of a lesser thickness than 5mm may be estimated as equivalent.</p> <p>Applicability - it is accepted that it is sometimes difficult to identify the repair method after the repair has been covered in paint. If the method of repair is in doubt but otherwise it looks sound, the BSS Examiner should pass the arrangements and record notes of his/her findings.</p>		

### 7.5 Cylinder locker openings

<b>7.5.1</b>	<b>Are all openings to cylinder lockers outside of any engine, battery or electrical equipment space?</b>	<b>R</b>
Check the location of any opening of any cylinder locker.	Cylinder lockers must not open into engine, battery or electrical equipment spaces.	

### 7.6 LPG system shut-off valves

<b>7.6.1</b>	<b>Are all LPG system shut-off valves, or their means of operation, in a readily accessible position?</b>	<b>R</b>
Identify all valves used for the LPG system shut-off facility and check the accessibility of valves or their means of operation.	LPG system shut-off valves, or their means of operation, must be installed in a readily accessible position.	
<p>Applicability – LPG system shut-off valves may be cylinder valves.</p> <p>Applicability – systems with clip-on regulators do not require an additional system shut-off valve.</p>		

<b>7.6.2</b>	<b>Are the locations of all LPG system shut-off valves, or their means of operation, in open view, or their locations clearly marked?</b>	<b>R</b>
<p>Identify the locations of the valves used for the LPG system shut-off facility.</p> <p>Where LPG system shut-off valve(s), or the means to operate them, are not in open view with all removable lids, deck boards, curtains, doors etc in place, check for the presence of marking in open view indicating the location.</p>	<p>LPG system shut-off valves, or the means to operate them, must:</p> <ul style="list-style-type: none"> <li>• be in open view with all removable lids, deck boards, curtains, doors etc in place; <u>or</u>,</li> <li>• have their location clearly marked in open view.</li> </ul>	

### 7.7 LPG high-pressure system components

<b>7.7.1</b>	<b>Are all high-pressure LPG system components either inside a cylinder locker or in an open location?</b>	<b>R</b>
<p>Check the location of all high-pressure LPG system components.</p> <p>Apply the checks at Check Item 7.1.1.</p>	<p>All high-pressure components must be installed in accordance with the requirements of Check Item 7.1.1.</p>	

<b>7.7.2</b>	<b>Where two or more cylinders are connected on the high-pressure side, does each connection have a non-return valve fitted?</b>	<b>R</b>
<p>Identify the presence of cylinders connected on the high-pressure side.</p> <p>If present, check for a non-return valve fitted in each high-pressure connection.</p>	<p>Two or more cylinders connected on the high-pressure side must be protected by a non-return valve fitted in each connection.</p>	

<b>7.7.3</b>	<b>Are all hoses on the high-pressure side of pre-assembled lengths not exceeding 1m and to the correct specification?</b>	<b>R</b>
<p>Identify the presence of hose on the high-pressure side.</p> <p>Check the type of hose end fittings.</p> <p>Measure the length of hose.</p> <p>Check the hose markings.</p>	<p>All LPG hoses on the high-pressure side:</p> <ul style="list-style-type: none"> <li>• must consist of pre-made hose assemblies of proprietary manufacture; and,</li> <li>• must not exceed 1m in length; and,</li> <li>• must be marked to BS 3212 type 2 or equivalent.</li> </ul>	
<p>Applicability - steel hose assemblies marked to BS EN ISO 10380 can be regarded as equivalent to LPG hose marked to BS 3212 type 2.</p> <p>Applicability – hoses marked to BS EN 1763 class 3 or 4 are acceptable.</p>		

<b>7.7.4</b>	<b>Are all high-pressure LPG system components secure and in good condition?</b>	<b>R</b>
<p>Check the condition of all regulators and associated high-pressure equipment and hoses and hose connections.</p> <p>Check fixings for signs of damage or deterioration.</p>	<p>All high-pressure components, including regulators and associated equipment, hoses and hose connections, must be secure and free from signs of damage or deterioration.</p> <p>Hose must be free of leaks, flaws, brittleness, cracking, abrasion, kinking, 'soft' spots, or joins.</p> <p>On hoses covered with metal braiding the braiding must be free of signs of damage or deterioration including corrosion and kinking.</p> <p>Hose connections:</p> <ul style="list-style-type: none"> <li>• must not be made using hose clamps fixed by spring tension; and</li> <li>• must be free of any missing components, cracks, burrs or rough edges or signs of other damage or deterioration; and,</li> <li>• must not be so narrow as to cut into the hose; and,</li> <li>• must be suitably sized, that is, not so oversized that the band forms an elliptical shape, or so undersized that inadequate compression is achieved; and,</li> <li>• must be appropriately tight, that is, not so loose that the hose can be pulled forward or back under light manual force nor so tight that the hose is excessively pinched.</li> </ul> <p>Fixings for high-pressure LPG equipment must be free of signs of damage or deterioration.</p>	

<b>7.7.5</b>	<b>Are non-cylinder mounted regulators located to prevent damage?</b>	<b>R</b>
<p>Check the location of regulators not mounted directly on cylinders and check whether they are exposed to possible damage when the cylinders are changed or when cylinders are subjected to the extent of any possible movement or rocking whilst in situ.</p> <p>Check that the vent holes of high-pressure stage components are protected from the ingress of debris or water.</p>	<p>Regulators not mounted directly on cylinders must be located in a position where they are not exposed to possible damage when changing cylinders and/or from possible movement of cylinders in situ, or they must be protected from such possible damage.</p> <p>The vent holes of high-pressure stage components must be protected from the ingress of debris or water.</p>	

<b>7.7.6</b>	<b>Is the installation free of manually-adjustable regulators?</b>		<b>R</b>
<p>Check for the presence of any manually-adjustable regulators.</p>	<p>LPG regulators must not be of the manually-adjustable type.</p>		
<p>Applicability – manually-adjustable regulators are acceptable for steam boiler or blowlamp engine-start LPG supply systems.</p> <p>Applicability – regulators able to be adjusted upon removal of a 'tools-to-remove' dust cap are acceptable.</p>			

**7.8 LPG pipework, joints and connections**

<b>7.8.1</b>	<b>Is the LPG pipework made of a suitable material, adequately secured and free from damage?</b>	<b>R</b>
<p>Visually check type of material for all LPG pipework that can be seen.</p> <p>Apply light manual force to check security of LPG pipes that can be reached.</p> <p>Check condition of all LPG pipes that can be seen or reached.</p>	<p>LPG pipework must be made of either seamless copper tube, or stainless steel tube, or copper nickel alloy.</p> <p>LPG pipes must not move under light manual force.</p> <p>LPG pipes must be free of kinks, restrictions, abrasion damage or other deterioration.</p>	
<p>Applicability – a little movement at the final connection to an appliance is acceptable but any such unsecured pipe should be kept to a minimum and should generally not be more than 500mm in length.</p> <p>Applicability – pay particular attention to the potential for abrasion damage on pipes passing through bulkheads.</p>		

<b>7.8.2</b>	<b>Is the LPG pipe protected where it passes through metal bulkheads or decks?</b>	<b>R</b>
<p>Check the protection of LPG pipes passing through metallic bulkheads or decks that can be seen or reached.</p>	<p>LPG pipes passing through metallic bulkheads or decks must be protected by the use of sleeves, grommets, or bulkhead fittings.</p>	

<b>7.8.3</b>	<b>Are all LPG pipe joints accessible for inspection and of the correct type?</b>	<b>R</b>
<p>Check the accessibility and type of all pipe joints.</p>	<p>All LPG pipe joints must be accessible for inspection.</p> <p>All LPG pipe joints must be compression fittings on copper pipework or compression or screwed fittings on copper alloy or stainless steel pipework.</p>	
<p>Applicability – joints not accessible for inspection must be recorded as ‘not verified’ on your checklist, and it must be considered that the check has not been completed until such time as their type has been verified.</p> <p>Advice for examiners - owners should be advised of the accessibility requirement at the time of an examiner’s initial dealings and compliance achieved by adding inspection panels is recommended.</p>		

<b>7.8.4</b>	<b>Are all LPG pipe joints secure, in good condition and competently made?</b>	<b>R</b>
<p>Measure the distance fixing clips are attached from all joint connections.</p> <p>Apply light manual force to check security of each joint.</p> <p>Check condition and completeness of fixings and joints.</p> <p>Check all joints for the presence of unnecessary components.</p>	<p>All LPG pipe joints:</p> <ul style="list-style-type: none"> <li>• must have fixing clips attached no more than 150mm from each joint connection and must not move under light manual force; and,</li> <li>• must have fixings that are free of signs of damage or deterioration or missing components; and,</li> <li>• must be free of any signs of missing components, cracks or other signs of damage or deterioration; and,</li> <li>• must be made with a minimum number of individual components.</li> </ul>	
<p>Applicability – fixings are required on all sides of joints.</p> <p>Applicability – joints secured by proprietary integral fixings such as mounting plates or bulkhead fittings can be considered as meeting this requirement. The pipework adjacent to such joints does not need to be provided with additional securing within 150mm of each joint connection.</p> <p>Applicability – joints not accessible for inspection must be recorded as ‘not verified’ on your checklist, and it must be considered that the check has not been completed until such time as their general condition has been verified.</p> <p>Applicability – the minimum number of components is usually interpreted as two.</p>		

<b>7.8.5</b>	<b>Are all unused appliance spurs properly capped or plugged?</b>	<b>R</b>
<p>Identify any unused appliance spurs and check they are closed with a ‘tools-to-remove’ proprietary plug or cap.</p>	<p>All unused appliance spurs must be closed with a ‘tools-to-remove’ proprietary plug or cap.</p>	
<p>Advice for owners – unused spurs should be plugged or capped at the ‘T’ joint on the LPG supply pipework. The T-joint should ideally be replaced with an in-line or elbow joint or the pipe replaced with a continuous length. The use of a stop-end to a short length of supported spur pipe is acceptable.</p>		

<b>7.8.6</b>	<b>Are all LPG pipes running through petrol engine spaces or electrical equipment spaces jointless and in a gas-proof conduit?</b>	<b>R</b>
<p>Check for any LPG pipes running through petrol engine or electrical equipment spaces.</p>	<p>LPG pipes run through petrol engine spaces or electrical equipment spaces:</p> <ul style="list-style-type: none"> <li>• must be jointless <u>and</u> in gas-proof conduit; which also,</li> <li>• must be jointless with its ends outside the affected space; and,</li> <li>• the conduit must be complete and free of signs of damage or deterioration.</li> </ul>	

<b>7.8.7</b>	<b>Is the LPG pipe at least 75mm from exhaust system and flue components?</b>	<b>R</b>
<p>Measure the distance that any LPG pipes are from exhaust system and flue components.</p>	<p>LPG pipes must be at least 75mm from exhaust system and flue components.</p>	

### 7.9 Low-pressure LPG hoses and hose connections

<b>7.9.1</b>	<b>Are all low pressure LPG hoses accessible for inspection, of the correct material and in good condition?</b>	<b>R</b>
<p>Check the accessibility of all low pressure LPG hoses.</p> <p>Check the markings of all LPG hoses.</p> <p>Check the condition of hoses.</p>	<p>All LPG hoses on the low pressure side:</p> <ul style="list-style-type: none"> <li>• must be accessible for inspection along their entire length.</li> <li>• must be marked to BS 3212 type 2 or equivalent.</li> <li>• must be free of leaks, flaws, brittleness, cracking, abrasion, kinking, 'soft' spots or joins.</li> </ul> <p>On hoses covered with metal braiding the braiding must be free of signs of damage or deterioration including corrosion and kinking.</p>	
<p>Applicability – hoses marked to BS EN 1763 class 2, 3 or 4 are acceptable.</p> <p>Applicability – hoses not accessible for inspection along their entire length must be recorded as 'not verified' on your checklist, and it must be considered that the check has not been completed until such time as their general condition has been verified.</p> <p>Applicability – pre-made hose assemblies conforming to BS 669 may be used to connect cookers to LPG supply pipework. Such hoses usually have a red stripe running along the length of the hose but may not be marked with BS 669. The connections on such hoses must terminate with self-sealing bayonet connections at the connection points to the LPG supply pipework. The portable appliance connection checks at 7.10 also apply.</p>		
<b>7.9.2</b>	<b>Is all low pressure LPG hose protected against damage where it passes through bulkheads, decks or partitions?</b>	<b>R</b>
<p>Check the protection for low pressure LPG hoses passing through bulkheads, decks or partitions.</p>	<p>Low pressure LPG hose passing through bulkheads, decks or partitions must be protected by the use of sleeves or grommets.</p>	
<b>7.9.3</b>	<b>Is all low pressure LPG hose at least 75mm from exhaust system and flue components?</b>	<b>R</b>
<p>Measure the distance that any low pressure LPG hoses are from exhaust system and flue components.</p>	<p>Low pressure LPG hoses must be at least 75mm from exhaust system and flue components.</p>	
<b>7.9.4</b>	<b>Are all low pressure LPG hoses used to connect regulators or appliances to LPG supply pipework only, and are they a maximum of 1m in length?</b>	<b>R</b>
<p>Check the location of all LPG low pressure hoses.</p> <p>Measure the length of any LPG hoses used to connect appliances or regulators to LPG supply pipework.</p>	<p>Except on 'all-hose' systems, low pressure LPG hoses may only be used to connect a LPG cylinder regulator and/or appliances to the LPG supply pipework.</p> <p>LPG hoses used to connect appliances or regulators to LPG supply pipework must not exceed 1m in length.</p>	
<p>Applicability - for 'all-hose' systems apply check 7.9.6</p>		

<b>7.9.5</b>	<b>Are all low pressure LPG hose connections accessible for inspection, of the correct type, secure and in good condition?</b>	<b>R</b>
<p>Check the accessibility of all low pressure hose connections.</p> <p>Check types of all LPG hose connections.</p> <p>Check the type, condition, and completeness of all hose connections.</p> <p>Pull using light manual force to check security of all hose connections.</p>	<p>All low pressure LPG hose connections:</p> <ul style="list-style-type: none"> <li>• must be accessible for inspection; and,</li> <li>• must be part of pre-made hose assemblies of suitable proprietary manufacture or use suitable nozzles secured by crimped or worm-drive clips; and,</li> <li>• must not be made using hose clamps fixed by spring tension; and</li> <li>• must be free of any missing components, cracks, burrs or rough edges or signs of other damage or deterioration; and,</li> <li>• must not be so narrow as to cut into the hose; and,</li> <li>• where made with crimped or worm-drive clamps, the clamps must be suitably sized, that is, not so oversized that the band forms an elliptical shape, or so undersized that inadequate compression is achieved; and,</li> <li>• be appropriately tight, that is, not so loose that the hose can be pulled forward or back under light manual force nor so tight that the hose is excessively pinched.</li> </ul>	
<p>Applicability – hose connections not accessible for inspection must be marked as ‘not verified’ on your checklist, and it must be considered that the check has not been completed until such time as their condition has been verified.</p> <p>Advice for owners – hose clamps of approximately 8mm width are recommended.</p> <p>Advice for examiners – owners should be advised of the accessibility requirement at the time of an examiner’s initial dealings and compliance achieved by adding inspection panels is recommended.</p>		

<b>7.9.6</b>	<b>Do ‘all-hose’ systems comply fully with ISO 10239?</b>	<b>R</b>
<p>Check that ‘all-hose’ systems are fully compliant with ISO 10239.</p>	<p>‘All hose’ systems must fully comply with ISO 10239 as follows:</p> <ul style="list-style-type: none"> <li>• <u>each</u> length of hose must be routed from within the cylinder locker or housing directly to the individual appliance or appliance isolation valve; and,</li> <li>• hoses must have permanently attached end fittings, such as swaged sleeve or sleeve and threaded insert; and,</li> <li>• hoses must not be routed through an engine compartment; and,</li> <li>• hoses must be accessible for inspection over their entire length and connections must be readily accessible; and,</li> <li>• hose connections must be stress free, i.e. not subjected to tension or kinking under any conditions of use; and,</li> <li>• hoses must be supported at least at 1m intervals.</li> </ul>	
<p>Applicability – ‘all-hose’ systems are those not using rigid pipework and will generally be found on imported boats, CE marked to the RCD, where the builder has chosen to apply ISO 10239.</p> <p>Applicability – for multi-appliance systems to ISO 10239, anticipate a manifold arrangement within the cylinder locker or housing.</p> <p>Applicability – all of the hose and hose connection <u>condition</u> checks at 7.9.1 and 7.9.5 also apply.</p> <p>Applicability – single cooking appliances connected by hose of no more than 1m in length directly to a regulator are acceptable and need not be assessed against this check.</p>		

### 7.10 Portable appliance connections

<b>7.10.1</b>	<b>Are all portable appliance connection points provided with an isolation valve?</b>	<b>R</b>
<p>Identify all portable appliance connection points and check for the presence of an isolation valve.</p> <p>Apply the checks at 7.11.2 and 7.11.3.</p>	<p>All portable appliance connection points must be fitted with an isolation valve.</p>	



<b>7.10.2</b>	<b>Are portable appliance hoses connected with bayonet, plug or screwed fittings, complete and in good condition?</b>	<b>R</b>
Identify the type of appliance hose connection to the isolation valve.  Check all connections for completeness and condition.	All hose connections to the isolation valves of portable appliances must be made with a bayonet, plug-in or screwed fitting.  All bayonet, plug-in or screwed fittings must not be missing any components and must be free of corrosion, signs of damage or deterioration.	

<b>7.10.3</b>	<b>Are all unused screwed portable appliance connection points properly capped or plugged?</b>	<b>R</b>
Identify any unused screwed appliance connection points and determine how they are plugged or capped.	All unused screwed appliance connection points must be closed with a 'tools-to-remove' proprietary plug or cap.	

### 7.11 Appliance isolation valves

<b>7.11.1</b>	<b>Can all appliance supply hoses be isolated through individual shut-off valves?</b>	<b>R</b>
Identify every appliance connected by hose and confirm the presence of an individual shut-off valve at the connection point to the LPG supply pipework.	Appliances connected by hose must be provided with an individual shut-off valve at the connection point to the LPG supply pipework.	
Applicability – for an installation with a single appliance connected by a hose the cylinder valve may be classed as the appliance isolation valve. Applicability – ease of access takes precedence over the requirement for the valve to be located at the connection to the LPG supply pipework. Applicability – hob/oven arrangements may be deemed one appliance for the purposes of this check.		

<b>7.11.2</b>	<b>Are appliance isolation valves of the correct type?</b>	<b>R</b>
Identify the type of all appliance isolation valves.	Any tapered-plug type valves used as isolation valves must be spring loaded. Needle-type valves used as isolation valves are not permitted.  Appliance isolation valves at floor level must either be of the drop fan or loose-key type or of a type that cannot be operated inadvertently.	
Applicability – if the spring on a spring-loaded tapered-plug valve is found not to be free to operate without interference because of its close fitting against the surface behind it, then the valve is not to be considered as being spring-loaded.		

<b>7.11.3</b>	<b>Are appliance isolation valves, or the means of operating them, readily accessible?</b>	<b>R</b>
Check the accessibility of all isolation valves, or the means of operating them.		Appliance isolation valves, or the means of operating the valves, must be readily accessible.
<p>Advice for owners – the main shut-off valve should be considered as the primary emergency shut-off.</p> <p>Applicability - isolation valves located behind free-standing LPG cookers that are restrained from tilting are acceptable provided the restraining method can be unfastened without the use of tools.</p>		

## 7.12 Testing for LPG system tightness

<b>7.12.1</b>	<b>Is there a LPG test point in the system, or a bubble tester in the cylinder locker or housing?</b>	<b>R</b>
Check for the presence and location and accessibility of a means to determine the LPG system tightness.		<p>All LPG systems must be fitted with one of the following means to determine gas-tightness:</p> <ul style="list-style-type: none"> <li>• a readily accessible proprietary test point on an appliance; or,</li> <li>• a readily accessible proprietary test point fitted in the pipework; or,</li> <li>• a bubble tester installed in a cylinder locker or cylinder housing.</li> </ul>

<b>7.12.2</b>	<b>Is the LPG system free of leaks as defined in the tightness test?</b>	<b>R</b>
Verify the LPG system is free of leaks by carrying out the appropriate tightness test at Appendix C or Appendix D.		All LPG systems must be free of leaks when tested in accordance with the appropriate tightness test procedure.
<p>Applicability – if for any reason a tightness test cannot be completed your checklist must be marked as ‘not verified’ and the item considered as non-compliant until such time as verification of tightness is achieved. The reason for non-completion must be recorded.</p> <p>Applicability – a leak in the system is classified as ‘immediately dangerous’ and the actions described in Appendix A and B are to be taken.</p>		

## BSS Examination Checking Procedures – Part 8

### Appliances and flues

There are five relevant BSS general requirements:

25.	All appliances must be designed, installed and maintained in a way that minimises the risks of explosion or of fire starting and spreading.
26.	All liquid-fuelled appliances must have an emergency shut-off valve located at a safe distance from the appliance.
27.	<p><b>a) LPG and liquid-fuel burning appliances installed from 3 January 2000.</b> All burners and pilot lights shall be fitted with a device that automatically shuts off the fuel supply if the burner flame fails.</p> <p><b>b) LPG and liquid-fuel burning appliances installed before 3 January 2000</b> Burners on catalytic appliances, appliances with continuously-burning flames and pilot light burners shall be fitted with a device that automatically shuts off the fuel supply if the burner flame fails.</p>
28.	All appliance flues must be designed, installed and maintained in a way that minimises the risk of fire.
29.	All fuel and power supply systems for appliances must meet these general requirements where relevant.

#### 8.1 Appliance fuel and power supply

8.1.1	<b>Do the fuel supply arrangements to all installed appliances meet the applicable BSS requirements?</b>	<b>R</b>
For each installed appliance, identify the type of fuel supply arrangements and apply the relevant Part of the BSS requirements.		The fuel supply arrangements for all installed appliances must meet the applicable BSS requirements.
Applicability – concerning diesel, paraffin, spirit, electric, or LPG appliances, apply Part 2, Part 3 or Part 7 respectively, as appropriate.		

<b>8.1.2</b>	<b>Are all liquid-fuelled appliances fitted with shut-off valves, and are the valves or their means of operation, in a readily accessible and safe position?</b>	<b>R</b>
<p>Identify all fuel supplies to liquid-fuelled appliances and check for the presence of valves or cocks.</p> <p>Check the position and accessibility of the valves or cocks, or their means of operation.</p>		<p>Liquid-fuelled appliances must be provided with a valve or cock to shut off the fuel supply.</p> <p>All shut-off valves or cocks, or their means of operation, must be installed in a readily accessible position.</p> <p>All shut-off valves or cocks, or their means of operation, must be installed within reach of the appliance but not in a position that requires the user to reach over or around the appliance to operate them.</p>
<p>Applicability – this check does not cancel out the fuel tank shut-off requirements at Check Item 2.13.1, which must be met.</p> <p>Applicability – the valve or cock should normally be situated in the same compartment as the appliance. However, there may be installations where it is not physically possible or safe to do so. For example: where the appliance is installed on a bulkhead between compartments; or, if there is less than approximately 1m of fuel pipe in the same compartment. In these cases it is acceptable for the valve or cock to be installed at the nearest practicable point.</p> <p>Applicability – automatic fire valves of a suitable proprietary type are an acceptable alternative to manually operated valves or cocks. Where fire valves are fitted these may be located immediately adjacent to the appliance.</p> <p>Applicability – appliances fitted with electrical fuel-supply pumps that shut off the fuel supply when the pump is not in use, are an acceptable alternative to manually operated valves or cocks.</p>		

## 8.2 LPG or paraffin refrigerators on vessels with petrol propulsion engines

<b>8.2.1</b>	<b>Where the vessel has a petrol propulsion engine, is the burner of a LPG or paraffin refrigerator room-sealed, or completely enclosed?</b>	<b>R</b>
<p>Identify the presence of a <u>non</u>-room-sealed LPG or paraffin refrigerator in a vessel with a petrol propulsion engine.</p> <p>If present, check that the burner is totally enclosed or if necessary, any presented declaration from an equipment manufacturer or supplier.</p>		<p>The burners of LPG or paraffin refrigerators in a vessel with a petrol propulsion engine must be room-sealed, or completely enclosed.</p>
<p>Applicability – this check is limited to petrol engines, including petrol outboard motors, used as the means of propulsion.</p> <p>Applicability – if the owner claims compliance, but the burner assembly is not visible and the owner has no declaration from an equipment manufacturer or supplier, mark your Check Item ‘not verified’. In such cases, the fridge must be considered as non-compliant until such time as its suitability has been verified.</p> <p>Applicability – known room-sealed models include the Electrolux RB180, RB182, RM4213 LSC and RM6401 LSC models.</p> <p>Applicability – in the event a fault is determined take the actions described in Appendix A and B.</p>		

<b>8.2.2</b>	<b>On vessels with petrol propulsion engines that have non-room-sealed fridges with enclosed burners, is the combustion air drawn and exhausted through a suitable effective flame trap or piped to the appliance as required?</b>	<b>R</b>
<p>Identify the presence of a <u>non</u>-room-sealed LPG or paraffin refrigerator with an enclosed burner in a vessel with a petrol propulsion engine.</p> <p>If present, check the air intake and exhaust for the presence of a suitable flame trap.</p> <p>If the combustion air is not drawn and exhausted through a suitable flame trap visually check how the air is piped to and exhausted from the appliance.</p>	<p>The air intakes and exhausts of <u>non</u>-room-sealed LPG or paraffin refrigerators in vessels with petrol propulsion engines must pass through a flame trap with a gauze of not less than 11 wires per linear cm (28 wires/per inch) mesh.</p> <p>If the combustion air is not drawn and exhausted through a suitable flame trap, the combustion air and exhaust must be piped to the appliance from either:</p> <ul style="list-style-type: none"> <li>• outside the vessel; <u>or</u>,</li> <li>• a point inside the vessel above the level of windows, other openings, or other means of ventilation in the accommodation space.</li> </ul>	
<p>Applicability – if the owner claims compliance but the combustion air intake and/or the burner assembly are not visible mark your Check Item 'not verified'. In such cases the fridge must be considered as non-compliant until such time as its suitability has been verified.</p> <p>Applicability – in the event a fault is determined take the actions described in Appendix A and B.</p>		

### 8.3 Installation of appliances in petrol engine spaces

<b>8.3.1</b>	<b>Are petrol-engine spaces free of LPG and/or liquid-fuelled appliances?</b>	<b>R</b>
Check petrol engine spaces for the presence of LPG and/or liquid-fuelled appliances.	LPG and/or liquid-fuelled appliances must not be installed in petrol-engine spaces.	
<p>Applicability – in certain circumstances LPG and/or liquid-fuelled appliances may be located in petrol engine spaces where they are installed in a separate vapour-tight compartment. In the event such an installation is identified, or where an owner is claiming compliance or equivalence, examiners should contact the BSS Office.</p> <p>Applicability – if the appliance is located outside of the engine space, but the air intake to that appliance is located within the space then a fault is to be recorded.</p>		

### 8.4 Protection against fire risks from appliance installations

<b>8.4.1</b>	<b>Are appliances and surrounding surfaces clear of signs of heat damage and leaking fuel?</b>	<b>R</b>
Check all appliances and all their surrounding surfaces for signs of heat damage and leaking fuel.	<p>Appliances and all their surrounding surfaces must not show signs of:</p> <ul style="list-style-type: none"> <li>• scorching, blistering or discolouration; or,</li> <li>• fuel leakage; or,</li> <li>• smoke or soot deposits; or,</li> <li>• heat damage or deterioration to appliance structure.</li> </ul>	
<p>Applicability – this check applies to all fuel-burning appliances and 'bullseye' (also known as 'domed') decklights and their surrounding and adjacent surfaces..</p>		

<b>8.4.2</b>	<b>Are all curtains, blinds and other textile materials near to appliances free of heat damage?</b>	<b>R</b>
Check all curtains, blinds and other textile materials near appliances for signs of heat damage.	Curtains, blinds and other textile materials near all appliances must not show signs of heat damage such as scorching or burning.	
<p>Applicability - this check applies to curtains, blinds and other textile materials near all fuel-burning appliances and 'bullseye' (domed) decklights.</p>		

<b>8.4.3</b>	<b>Are non-portable appliances properly secured against accidental or unintended movement?</b>	<b>R</b>
<p>Check for the presence and condition of securing systems on all non-portable appliances.</p> <p>Where practicable, apply light manual force to check the security of all non-portable appliances.</p> <p>Where a manual check is not practicable, such as with solid fuel and oil-fired stoves, check the condition of securing systems.</p>	<p>Non-portable appliances must be incapable of unintended movement in any direction.</p> <p>Securing systems must be installed on all non-portable appliances and securing systems and their fixing points must be of suitable strength and must:</p> <ul style="list-style-type: none"> <li>• show no signs of fractured mounting brackets;</li> <li>• not have loose, missing or fractured bolts or nuts.</li> </ul>	
<p>Applicability – appliances in gimbals may tilt, but the retaining mechanism must be secure.</p> <p>Applicability – appliances connected to the fuel supply by hoses or electrical cables may be retained using fixed chains provided there is no possibility of strain on the hose and/or cable connections.</p> <p>Applicability - this check applies to all fuel-burning appliances but does not apply to electrical appliances.</p>		

#### 8.5 Protection against fire risks from appliance flues and exhausts

<b>8.5.1</b>	<b>Are all vessel structures, equipment, and curtains, blinds and other textile materials near all appliance flues and exhausts free of signs of heat damage?</b>	<b>R</b>
<p>Check vessel structures, equipment, and curtains, blinds and other textile materials near all appliance flues and exhausts for signs of heat damage.</p>	<p>Vessel structures, equipment, and curtains, blinds and other textile materials near all appliance flues and exhausts must not show signs of heat damage such as scorching, blistering or discolouration.</p>	
<p>Applicability – this check applies to <u>all</u> fuel-burning appliances with flues or exhausts.</p>		

#### 8.6 LPG catalytic heaters

<b>8.6.1</b>	<b>Are all LPG catalytic heaters compliant with a suitable manufacturing standard?</b>	<b>R</b>
<p>Identify any LPG catalytic heaters and check compliance with the following aspects of BS 5258-11 or BS EN 449 by visual inspection:</p> <ul style="list-style-type: none"> <li>• For BS 5258-11 check: <ul style="list-style-type: none"> <li>a) provision of a guard; and,</li> <li>b) three position on-off tap; and,</li> <li>c) flexible tubing to BS 3212 type 2.</li> </ul> </li> <li>• For BS EN 449 check: <ul style="list-style-type: none"> <li>a) legible and durable marking of open, closed and any reduced rate positions on control taps; and,</li> <li>b) clear marking of any special position of the control tap for ignition; and,</li> <li>c) provision of a fire guard.</li> </ul> </li> </ul>	<p>LPG catalytic heating appliances must comply with the elements of:</p> <ul style="list-style-type: none"> <li>• BS 5258-11; <u>or</u>,</li> <li>• BS EN 449</li> </ul> <p>as prescribed in the check.</p>	

### 8.7 Flame supervision devices

8.7.1	<b>Are flame supervision devices fitted to all LPG and liquid-fuelled appliances that require them?</b>	<b>R</b>		
<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 35%; padding: 5px; vertical-align: top;"> <p>Check all LPG and liquid-fuelled appliances for the presence of flame supervision devices.</p> <p>For any LPG appliance <u>not</u> fitted with flame supervision device(s) seek to determine from the owner, or from available documentary evidence, the date the appliance was installed.</p> <p>For any liquid-fuelled appliance <u>not</u> fitted with flame supervision device(s), seek to determine from the owner, or from available documentary evidence, whether the appliance manufacturer requires such a device to be fitted.</p> </td> <td style="width: 65%; padding: 5px; vertical-align: top;"> <p>For LPG appliances:</p> <p>All the burners and pilot lights of LPG appliances installed <u>on or after 3 January 2000</u> must be fitted with a device that automatically shuts off the LPG supply if the burner flame fails.</p> <p>LPG appliances installed <u>before 3 January 2000</u> must be fitted with a device that automatically shuts off the LPG supply if the burner flame fails on:</p> <ul style="list-style-type: none"> <li>• the burners on catalytic appliances; and,</li> <li>• appliances with continuously-burning flames; and,</li> <li>• pilot light burners.</li> </ul> <p>For liquid-fuelled appliances:</p> <p>Flame supervision devices must be fitted to all liquid-fuelled appliances where the appliance manufacture requires such a device to be fitted.</p> </td> </tr> </table>			<p>Check all LPG and liquid-fuelled appliances for the presence of flame supervision devices.</p> <p>For any LPG appliance <u>not</u> fitted with flame supervision device(s) seek to determine from the owner, or from available documentary evidence, the date the appliance was installed.</p> <p>For any liquid-fuelled appliance <u>not</u> fitted with flame supervision device(s), seek to determine from the owner, or from available documentary evidence, whether the appliance manufacturer requires such a device to be fitted.</p>	<p>For LPG appliances:</p> <p>All the burners and pilot lights of LPG appliances installed <u>on or after 3 January 2000</u> must be fitted with a device that automatically shuts off the LPG supply if the burner flame fails.</p> <p>LPG appliances installed <u>before 3 January 2000</u> must be fitted with a device that automatically shuts off the LPG supply if the burner flame fails on:</p> <ul style="list-style-type: none"> <li>• the burners on catalytic appliances; and,</li> <li>• appliances with continuously-burning flames; and,</li> <li>• pilot light burners.</li> </ul> <p>For liquid-fuelled appliances:</p> <p>Flame supervision devices must be fitted to all liquid-fuelled appliances where the appliance manufacture requires such a device to be fitted.</p>
<p>Check all LPG and liquid-fuelled appliances for the presence of flame supervision devices.</p> <p>For any LPG appliance <u>not</u> fitted with flame supervision device(s) seek to determine from the owner, or from available documentary evidence, the date the appliance was installed.</p> <p>For any liquid-fuelled appliance <u>not</u> fitted with flame supervision device(s), seek to determine from the owner, or from available documentary evidence, whether the appliance manufacturer requires such a device to be fitted.</p>	<p>For LPG appliances:</p> <p>All the burners and pilot lights of LPG appliances installed <u>on or after 3 January 2000</u> must be fitted with a device that automatically shuts off the LPG supply if the burner flame fails.</p> <p>LPG appliances installed <u>before 3 January 2000</u> must be fitted with a device that automatically shuts off the LPG supply if the burner flame fails on:</p> <ul style="list-style-type: none"> <li>• the burners on catalytic appliances; and,</li> <li>• appliances with continuously-burning flames; and,</li> <li>• pilot light burners.</li> </ul> <p>For liquid-fuelled appliances:</p> <p>Flame supervision devices must be fitted to all liquid-fuelled appliances where the appliance manufacture requires such a device to be fitted.</p>			
<p>Applicability – examiners unsure of whether a particular liquid-fuelled appliance should be fitted with a flame failure device, or seeking clarification as to the suitability of such a device, should contact the BSS Office.</p> <p>Applicability – engine-start blowlamps and gas pokers are not required to have FSDs.</p>				

### 8.8 LPG appliance burner operation

8.8.1	<b>Are all LPG appliance burners in good condition and delivering a proper flame?</b>	<b>R</b>		
<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 50%; padding: 5px; vertical-align: top;"> <p>Light <u>all</u> LPG appliance burners and operate them at their maximum setting at the same time.</p> <p>Compare the flame pictures at each burner to the ‘burner flame trouble chart’ at Appendix L.</p> </td> <td style="width: 50%; padding: 5px; vertical-align: top;"> <p>A satisfactory flame picture must be present at each LPG appliance burner when all burners in the system are operating at their maximum setting at the same time.</p> </td> </tr> </table>			<p>Light <u>all</u> LPG appliance burners and operate them at their maximum setting at the same time.</p> <p>Compare the flame pictures at each burner to the ‘burner flame trouble chart’ at Appendix L.</p>	<p>A satisfactory flame picture must be present at each LPG appliance burner when all burners in the system are operating at their maximum setting at the same time.</p>
<p>Light <u>all</u> LPG appliance burners and operate them at their maximum setting at the same time.</p> <p>Compare the flame pictures at each burner to the ‘burner flame trouble chart’ at Appendix L.</p>	<p>A satisfactory flame picture must be present at each LPG appliance burner when all burners in the system are operating at their maximum setting at the same time.</p>			
<p>Applicability – any appliances with ‘hidden’ burners must be ignited as part of this check but there is no requirement to see the burner flame picture.</p> <p>Applicability – in the event of a poor flame picture, take the actions described in Appendix A or A and B, and if the regulator is operating outside of the lock-up tolerance, or is more than 10 years old, or is marked in imperial units, the BSS Warning Notice must include a note about the performance or age of the regulator as appropriate.</p> <p>Examiner action - Before operating the burners on any flued appliances, carry out the checks at 8.10.1/2/3. The flame picture assessment should not be carried out if a fault at 8.10.1/2/3 is recorded.</p> <p>Applicability – in the event any appliance burner cannot be lit mark your checklist ‘not verified’ and note the reason why. In such cases the burner must be considered as non-compliant until such time as its good condition has been verified.</p>				

## 8.9 Ventilation

8.9.1	Is the vessel provided with adequate fixed ventilation?	A
<p>Calculate the fixed ventilation requirements in accordance with Appendix K.</p> <p>Measure the total effective area of fixed ventilation.</p> <p>Confirm that the total effective area of fixed ventilation (at least up to the calculated fixed ventilation requirement) is divided as equally as practicable between high and low level.</p>	<p>Fixed ventilation must be in accordance with Appendix K.</p>	
<p>Applicability – ventilators, doors, windows and hatches that can be closed without the use of tools must not be included in the calculations as these are not considered fixed ventilation</p> <p>Applicability – permanent and measurable gaps around doors and windows when the windows or doors are fully closed can be taken into account as part of the fixed ventilation provision.</p> <p>Applicability – in the event significant shortfalls in fixed ventilation are determined take the actions described in Appendix A. A significant shortfall is:</p> <ul style="list-style-type: none"> <li>• where the total effective area of fixed ventilation is 50%, or less, of the calculated fixed ventilation requirement; or,</li> <li>• where the total effective area of fixed ventilation is less than the calculated fixed ventilation requirement for appliances with continuous-burning flames; or,</li> <li>• where there is no high or no low-level fixed ventilation.</li> </ul>		

8.9.2	Are warning notices displayed on sea-going boats with closable ventilators?	A
<p>For vessels for which a fault is recorded at 8.9.1, identify seagoing boats with closable ventilators.</p> <p>Check for the presence of, and the wording on, warning notices on or near to all non-room sealed fuel-burning appliances.</p>	<p>On all seagoing boats with closable ventilators a warning notice must displayed on or near all non-room-sealed fuel-burning appliances.</p> <p>The warning notice must read: '<i>WARNING – Open ventilator(s) before use</i>', or equivalent wording.</p>	
<p>Applicability – if a fault is recorded take the action described in Appendix A.</p>		

## 8.10 Appliance flues and exhausts

8.10.1	Are all appliances requiring a flue or exhaust fitted with one?	A
<p>Check that:</p> <ul style="list-style-type: none"> <li>• a flue and draught diverter are fitted to all multi-point instantaneous water heaters and those single point instantaneous water heaters supplying a shower or bath; and,</li> <li>• a flue or exhaust is fitted to any appliance fitted with a flue or exhaust spigot and any solid fuel or oil burning appliance; and,</li> <li>• flue components including air intake and flue ductwork and terminals are fitted to all room-sealed appliances; and,</li> <li>• a flue does not serve more than one appliance.</li> </ul>	<p>A flue or exhaust must be fitted to all appliances designed exclusively for use with one as prescribed in the check.</p> <p>Flues must not serve more than one appliance.</p>	
<p>Applicability – in the event a fault is determined take the actions described in Appendix A.</p>		



8.10.2	Are all appliance flues and exhausts complete and in good condition?	A
<p>Check the condition of all appliance flues and exhausts, including ductwork, flue/exhaust terminals and flue/exhaust joints and securing mechanisms that can be seen or reached.</p>	<p>All appliance flues and exhausts must be complete, properly fitted and maintained and must show no obvious signs of:</p> <ul style="list-style-type: none"> <li>• obstruction or flue diameter restriction; or,</li> <li>• crushed or blocked terminals; or,</li> <li>• modifications to the flue/exhaust not in accordance with the appliance manufacturer's recommendations; or,</li> <li>• damage or deterioration; or,</li> <li>• evidence of flue/exhaust gases escaping into cabin areas (soot deposits etc).</li> </ul>	
<p>Applicability – in the event a fault is determined take the actions described in Appendix A.</p> <p>Applicability – examples of obvious unsuitable flue modifications include extensions to LPG fridge flues and tin cans used as flue terminals.</p> <p>Applicability – LPG and paraffin fridges in non-petrol-engined boats may be installed without comment, to open into the boat's interior providing no flue components are added to the appliance's integral flue stack.</p> <p>Applicability – instantaneous water heater flue length and terminal suitability will be determined by the flue spillage test at Check Item 8.10.4.</p>		

8.10.3	Do all appliance flues and exhausts terminate directly to outside air?	A
<p>Check the location of all flue and exhaust terminals.</p> <p>Check for the presence of a canopy or canopy fixings where a flue/exhaust terminates at any part of the vessel which could be enclosed by a canopy.</p>	<p>Appliance flue and exhaust terminals must be located outside the interior of the vessel and outside of any areas which may be enclosed by a canopy.</p>	
<p>Applicability – in the event a fault is determined take the actions described in Appendix A.</p>		

8.10.4	Are all open flues to LPG appliances operating effectively?	A
<p>In the event no fault is recorded 8.10.3 in connection with the appliance, carry out a flue spillage test on all flues connected to LPG appliances with open flues as described in Appendix E.</p>	<p>Open flues to LPG appliances must ensure safe transfer of flue gases to the outside of the boat.</p>	
<p>Examiner action - Before operating the burners on any open-flued appliances such as instantaneous water heaters carry out the checks at 8.10.2 and 8.10.3. The test should not be carried out if a fault at 8.10.2/3 is recorded.</p> <p>Applicability – examiners are not required to undertake a flue spillage test on fridges with open-flues.</p> <p>Applicability – in the event a fault is determined, take the actions described in Appendix A.</p> <p>Applicability – owners should be advised of the importance of making available operational water heaters for testing at the time of an examiner's initial dealings. If for any reason the flue spillage test cannot be completed mark your checklist 'not verified' and note the reason why.</p>		

8.10.5	Are all solid fuel appliances free of unintended gaps?	A
<p>Check the condition of solid fuel appliance surfaces, seams and openings which can be seen.</p>	<p>Solid fuel appliances must show no obvious signs of:</p> <ul style="list-style-type: none"> <li>• unintended gaps or cracks in the outside surface or seams of the stove; or,</li> <li>• unintended gaps greater than 2mm in the loading door seal or door glass; or,</li> <li>• loose, damaged or missing cover plates.</li> </ul>	
<p>Applicability - some designs of solid fuel appliance have deliberate gaps, commonly above or around the door (to allow air in and help keep the window clean) or below the fuel bed (often by way of a deliberately loose air control) to help keep the fire alight, but where it is clear that components were designed to seal to each other, the above requirement applies.</p> <p>Applicability – in the event a fault is determined take the actions described in Appendix A.</p>		

## BSS Examination Checking Procedures – Part 9

### Pollution prevention

There are two relevant BSS general requirements:

Any leakage of oil from engine equipment must be contained and prevented from being avoidably discharged overboard.

**31. Bilge pumping and toilet systems must be designed, installed and maintained in a way that minimises the risk of avoidable pollution.**

#### 9.1 Engine/gearbox oil leak collection

9.1.1	Will all oil leaks from the engine/s or gearbox/es be collected in an engine tray or oil-tight area?	R
<p>Check for the presence and condition of an engine tray or oil-tight area under all fixed internal combustion engines and gearboxes.</p> <p>Estimate the volume of any engine tray and the capacity of the protected engine and gearbox.</p>	<p>All fixed internal combustion engine and gearbox installations must have an engine tray or oil-tight area.</p> <p>Each engine tray or oil-tight area must be at least as long and as wide as the combined length/width of the engine and gearbox.</p> <p>The material of each engine tray or oil-tight area must be non-porous and oil resistant.</p> <p>All engine trays or oil-tight areas, including joints and seams, must be free of signs of leaks, damage and deterioration.</p> <p>The volume of each engine tray or oil-tight area must be sufficient to retain the estimated capacity of the engine/gearbox sumps.</p>	
<p>Applicability – oil-tight areas must collect from within the engine space and must not extend into other parts of the vessel.</p>		

<b>9.1.2</b>	<b>Does the bilge pumping system minimise the risk of avoidable pollution?</b>	<b>R</b>
<p>Check for presence of a fixed bilge pump or fixed bilge suction pipe within an engine tray or oil-tight area.</p> <p>If present, check for the presence of a bilge water filter installed in the overboard discharge line or the facility to discharge to a holding tank.</p> <p>If a bilge water filter is present, verify the discharge level performance by examining any markings on the filter, or if necessary, any presented declaration from the manufacturer or supplier.</p>		<p>Fixed bilge pumps and bilge suction pipes must not draw from an engine tray or oil-tight area, unless the:</p> <ul style="list-style-type: none"> <li>• discharge is through a bilge water filter capable of a 5ppm discharge performance level, as verified by markings on the filter or an appropriate declaration from the manufacturer or supplier; or,</li> <li>• there is a facility to discharge to a holding tank.</li> </ul>
<p>Applicability – if a <u>portable</u> bilge pump or bilge suction pipe is discovered within an engine tray or oil-tight area, the owner should be advised to remove it, but no fault recorded.</p> <p>Applicability – in cases where the discharge performance level of a bilge water filter cannot be verified, ‘not verified’ must be marked on your checklist, and the filter must be considered as non-compliant until such time as the performance level is verified. Owners should be advised of the need to provide a declaration from the manufacturer or supplier at the time of the your initial dealings.</p> <p>Applicability – if a significant quantity of fuel is found to be escaping into the watercourse, take the actions described in Appendix A and B.</p>		

## 9.2 Sanitation systems

<b>9.2.1</b>	<b>Is a closeable valve fitted in the discharge line of any toilet appliance or toilet holding tank with overboard discharge?</b>	<b>R</b>
<p>Check all toilets and toilet holding tanks for the presence of an overboard discharge line.</p> <p>If present, check for the presence and condition of a closeable valve installed in the discharge line.</p>		<p>All toilets and toilet holding tanks having an overboard discharge line must have a closeable valve fitted in the discharge line.</p> <p>The valve and connections must be complete and leak-free.</p>
<p>Applicability – valves must not be operated.</p> <p>Applicability – the diverter valves to toilet holding tanks not capable of being discharged overboard satisfy this check.</p> <p>Applicability – discharge outlets having a ‘tools-to-remove’ cap, and overboard discharge lines from toilet holding tanks discharged solely by shore-side pumping arrangements, are not subject to this check.</p> <p>Examiner action – if toilet waste is determined to be escaping into the watercourse contact the BSS Office and take the relevant actions described in Appendix B. If the arrangements inevitably result in toilet waste discharging overboard contact the BSS Office</p>		

- A** PEOPLE OR PROPERTY IN 'IMMEDIATE DANGER' OR 'AT RISK'
- B** 'DANGEROUS BOATS'
- C** LPG INSTALLATIONS TIGHTNESS TESTING USING A MANOMETER ('U'-GAUGE)
- D** LPG INSTALLATIONS TIGHTNESS TESTING USING A BUBBLE TESTER
- E** FLUE SPILLAGE TEST – OPEN-FLUED APPLIANCES
- F** PLASTIC FUEL TANKS
- G** BATTERY COMPARTMENT VENTILATION READY RECKONER
- H** NAVIGATION AUTHORITIES' PREVIOUS REQUIREMENTS FOR FIRE EXTINGUISHERS
- I** SUPPLEMENTARY INFORMATION ON PORTABLE FIRE EXTINGUISHERS
- J** PRESSURE SYSTEM INSPECTION CERTIFICATES
- K** VENTILATION
- L** BURNER FLAME TROUBLE CHART

### THE BSS WARNING NOTICE

**The BSS Warning Notice should be completed in all cases where an examiner has cause to suspect that people or property may be or are in ‘immediate danger’ or ‘at risk’ due to faults in installations or appliances on a vessel being examined.**

The purpose of the BSS Warning Notice is to alert the owner or person responsible for the craft’s condition that an immediately hazardous defect has been found and secondly to alert anyone stepping aboard that they could be at risk and should take precautions.

### NOTES FOR COMPLETING A BSS WARNING NOTICE

Defect class tick boxes	All defects that are not LPG, ventilation or alternating current (a.c.) electrical system related, e.g. leaking fuel, please mark the ‘other’ box with a cross and write a brief description of the hazard in the space provided; for example, imminent risk of fuel-hose failure or significant quantities of fuel or other substances escaping into the watercourse.
Boat and Owner’s name	Insert the boat name and owner’s name
Description of boat	Note the size. If you know the model and maker state these, if not, type and material e.g. 23ft FRP cruiser
Index/registration/HIN/CIN	Record at least one of these unique identifying marks whenever possible
Description of the defect	Insert the BSS Check Item number, but if not applicable write N/A. Always insert a brief description of the potential hazard. i.e. gas leak, flue gas spillage, heat damaged cables, electrical fire risks, poor ventilation, petrol leak, potential electric shock, etc.
LPG supply disconnected:	In the event of an immediate danger due to a LPG installation or appliance fault there is a requirement to disconnect the LPG supply. Please put a cross in the appropriate box.
Owner advised of the risk:	The owner (or representative) must be informed of the hazards concerned and advised to seek competent help to rectify the defect. Mark the appropriate box. If the owner is not informed, add the reason why. If the owner has been informed but does not commit to fix the defect, contact the BSS Office.
Date/time notice issued:	Insert the date and precise time (24-hour clock) of the issue of the BSS Warning Notice.
Signed:	Sign in the box and add your BSS PIN.

Hand the two top copies of the BSS Warning Notice to the owner (or send one copy if not present). Advise the owner to leave one copy displayed in a prominent position on board the boat (or leave one copy yourself if owner not present). The position should be where anyone entering onto the boat will be sure to see it.

Retain the yellow copy with the boat’s examination records.

### EXAMINER ISSUE OF PUBLISHED SAFETY RELATED GUIDANCE

**If the defects relate to leaking flue gases from appliances, or a significant shortfall in the fixed ventilation provision, the examiner is to include with the BSS Warning Notice a copy of the BSS leaflet entitled ‘Carbon Monoxide Safety on Boats’. In the event no leaflet is left for any reason the examiner must arrange for one to be sent to the owner by the BSS Office.**

**Note: BSS Examiner Conditions of Registration require that examination records be kept for at least six years as these could be important in any future investigations or legal proceedings.**

**ADDITIONAL EXAMINER ACTIONS**

Where the defects placing people or property in 'immediate danger' or 'at risk' relate to:

- leaking gas;
- leaking petrol;
- gas refrigerators with naked flames on petrol-powered boats;
- heat damaged cables or other electrical fire risks;
- a.c. electrocution risks;
- significant quantities of fuel or other substances escaping into the watercourse.

...take the following actions in addition to those in Appendix A

- inform the owner (or representative) about the hazards as soon as possible;
- ask for the hazard to be made safe or neutralised immediately, such as by turning off the fuel or disconnecting the electricity supply;
- advise that the systems, installations or appliances are not used again until fixed;
- advise that any repairs are best carried out by a competent person.

**Where the boat is located at any mooring, marina, or basin operated by a third party, notify the person responsible for those moorings of the situation, and the action taken, by the quickest means available. Notify the manager of the Boat Safety Scheme by the quickest means available. If the boat could not be made safe, make this known.**

In the extreme combined circumstances that the boat could not be made safe AND the person responsible for the moorings or the manager of the Boat Safety Scheme could not be contacted, then contact the relevant navigation authority or harbour authority by the quickest means available, if necessary by using emergency contact telephone numbers.

**DEFECTS REQUIRING GAS SUPPLY TO INSTALLATION OR APPLIANCE TO BE TURNED OFF**

**The examiner is to take the additional actions detailed below if defects relate to leaking gas or leaking flue gases from appliances.**

Explain to the owner the risks or dangers and why the gas supply to the installation or appliance should be immediately turned off.

Inform the owner that the installation or appliance should not be used until a competent person rectifies the fault(s).

Request the owner to turn off the gas supply at cylinder(s), main shut-off valve(s), or the appliance as appropriate and replace any protective caps or plugs to the cylinder connections.

Where the gas supply has been turned off by means of the main shut-off valve or the appliance isolation valve, secure the valve in the closed position by means of adhesive warning tape.

Secure a LPG Warning Label in a prominent position on or near the main shut off valve or appliance as appropriate. The position should be where anyone entering onto the boat will be sure to see it.

**IMPORTANT: DISCONNECTING HEATING SYSTEMS**

**Examiners should take particular care if the action taken results in the disconnection of the heating systems on boats with people living on board in cold weather.**

In extreme cases e.g. where there are elderly, young or disabled people on board, it may be necessary for the owner to notify Social Services, or other authorities, or friends or family so that alternative sources of heat can be provided.

## IMPORTANT NOTES

Hire boats, residential boats, houseboats and floating businesses fall within the scope of the Gas Safety (Installation and Use) Regulations (GSIUR);

For any 'work' undertaken on these classes of vessels Gas Safe registration is obligatory;

The definition of 'work' within the regulations includes the removal and replacing of a screw nipple on a gas-tightness test point;

Non-Gas Safe registered BSS Examiners can only undertake a tightness test to boats within the scope of the regulations if:

- a bubble tester is fitted; or,
- a tightness test conducted by a Gas Safe registered installer is observed and recorded.

Additional information is available on the BSS website - search 'Boats in scope of GSIUR'

## TEST PROCEDURE

### C.1 PREPARATIONS

1. Examine high-pressure stage components before opening cylinder valves
2. Test high-pressure stage components with leak detection fluid
3. Check for presence of main shut-off valve after the regulator
4. Close main shut-off valve (if fitted). If not present, turn off supply at the cylinder(s)
5. Turn off all appliances

### C.2 CONNECTING 'U' GAUGE

1. Zero 'U' gauge
2. Connect 'U' gauge to test fitting

### C.3 TEST PROCEDURE: LET BY TEST

1. Gradually turn on main shut-off valve
2. Note regulator lock-up pressure
3. Close main shut-off valve
4. Light one appliance and let pressure fall to 5 mbar
5. Close appliance tap
6. Leave for 5 min for stabilisation and record the reading on the 'U' gauge
7. Note reading and leave for a further 5 min
8. Record reading on 'U' gauge
9. Any rise in the reading indicates let by from the main shut-off valve

#### **C.4 TEST PROCEDURE: PIPEWORK LEAKAGE**

1. Ensure all appliances and main shut-off valve turned off and appliance isolation valves left on
2. Turn on main shut-off valve and allow system to reach lock-up pressure
3. Close the main shut-off valve
4. Light one appliance burner and allow pressure to fall to 30 mbar (propane) and 20 mbar (butane)
5. Close appliance tap
6. Leave for 5 min for stabilisation and record pressure in 'U' gauge
7. Identify rise in pressure reading indicating main shut off valve let by has developed
8. Leave for a further 5 min and record pressure in 'U' gauge
9. There must be no discernible pressure drop in the system

#### **C.5 POST-TEST PROCEDURE**

1. Release pressure in system by lighting an appliance burner
2. The opportunity should now be taken to light all appliance burners to carry out an assessment of all flame pictures as required at Check Item 8.8.1 and a check of the performance of any flue as required at 8.10.4
3. When these tests have been completed and the burners turned off, turn off gas supply at main valve and disconnect the 'U' gauge
4. Replace test nipple & test fitting using leak-detection fluid



**D.1 PREPARATIONS**

1. Check that the bubble tester is installed in a cylinder locker or cylinder housing, if not, seek to undertake another means of testing as detailed at 7.12.1. If no alternative means is available the craft will fail check 7.12.1
2. Ensure all gas appliance control valves (taps) are closed but appliance isolation valves are open
3. If the supply is closed, open gas supply at main shut off valve if fitted, otherwise open cylinder valves
4. Check all joints and connections between the cylinders and the bubble tester with leak-detection fluid

**D.2 FLUID CHECK PROCEDURE**

1. If a bubble tester by-pass arrangement is fitted, ensure the valves are set to allow flow through the bubble tester
2. Light a low-flow burner (e.g. on gas hob)
3. Press down the test button and hold it down in this “test” mode for at least 10 seconds.
4. At this stage bubbles should appear in the clear fluid chamber assuring the operator that fluid is present in the fluid chamber
5. If no bubbles appear, check for fluid in the fluid chamber and for the supply of LPG to pass through the device in the direction of the arrows on the device
6. If there appears to be insufficient fluid in the chamber, you should:
  - ask the owner, or owner’s representative to top up the chamber with the correct fluid before commencing the LPG-tightness test; **or**,
  - if this cannot be done, or if the device is installed the wrong way round, seek to undertake another means of testing as detailed at 7.12.1; **or**,
  - if no alternative means is available, record a failed check at 7.12.1

**D.3 LPG-TIGHTNESS TEST PROCEDURE**

1. Turn off low-flow burner
2. Operate the button in the “test” mode for at least 60 seconds.
3. If bubbles are visible in the fluid chamber at this stage the LPG system is not LPG-tight
4. No bubbles indicate that the system is LPG-tight
5. Return the by-pass arrangement to original position (If fitted)
6. Return the main shut-off valve and appliance isolation valves to the position they were in prior to starting the test procedure at D.1

**IMPORTANT NOTE**

Flue spillage tests are to be undertaken on LPG appliances fitted with open flues which incorporate draught diverters. Spillage testing is not undertaken on LPG appliances with open flues not fitted with a draught diverter (sometimes referred to as closed flues), or on solid fuel or liquid fuelled appliances).

The procedures set out below are to be carried out where there are no manufacturer's recommendations available for testing the flue.

**E.1 PREPARATIONS**

Visual inspection of appliance

Close all doors, windows, adjustable ventilators

Turn off any extractor fans in the same or adjoining compartments

Light the appliance and allow a 5 minute warm up period before starting the test

Fix a smoke match into a smoke match holder

*Note: If the flue passes this check it will be retested with these fans operating. See below at E.3.*

**E.2 TEST PROCEDURE**

Light the smoke match

The match is lit and held 5-10mm inside the lower lip of the draught diverter or inside the edge of the canopy or smoke hood

The match is moved to encompass as much of the draught diverter or canopy/smoke hood as possible

All smoke should be drawn into the flue and removed to the outside air. Any temporary or momentary back-spillage may be discounted

If continuous smoke spillage occurs allow a further warm-up period of 10 min and recheck as described above

**E.3 RE-TEST WITH ANY EXTRACTOR FANS IN THE SAME OR ADJOINING COMPARTMENTS OPERATING**

Switch on any fan(s). If there is a fan in an adjoining compartment it should be operated with the connecting doors open

CARRY OUT RETEST AS DESCRIBED ABOVE

All smoke should be drawn into the flue and removed to the outside air

ANY TEMPORARY OR MOMENTARY BACK-SPILLAGE MAY BE DISCOUNTED

**E.4 POST-TEST PROCEDURE**

Turn off the appliance and return the system to its pre-test condition

## PERMANENTLY INSTALLED PLASTIC FUEL TANKS

All fuel tanks, intended for use in recreational craft within the scope of the Recreational Craft Directive, (voluntary from 16 June 1996 and mandatory from 16 June 1998), which are placed on the Community/EEA market, must meet the essential requirements of that Directive and must bear the CE marking of conformity. It should be noted that 'CE' marked products and components enjoy free circulation within Europe given the intended purpose, restrictions on the use and installation requirements provided by the manufacturer.

**Additional information on the Recreational Craft Directive is available on the BSS Examiner web site - search 'RCD'**

**In the case of plastic fuel tanks, 'CE' marking to the Recreational Craft Directive (RCD) (94/25/EC as amended in 2005 by directive 2004/44/EC) indicates that the product complies with the essential safety requirements of that Directive and accordingly the product has had the 'CE' marking affixed by the manufacturer or his authorised representative.**

*Note 1 CE marking of fuel tanks may be affixed to the tanks, or on its packaging, or on both.*

**Plastic fuel tanks, including 'CE' marked tanks, may also be marked by the manufacturer with the standard or code to which it was constructed, provided that this does not mislead third parties with regard to the meaning or form of the CE marking (or reduce its visibility and legibility). However, construction to a standard or code is not the only method whereby a manufacturer might demonstrate compliance of the product with the RCD.**

*Note 2 Most standards or codes relating to fuel tanks include a clause requiring the product to be marked with the manufacturer's details, fuel type(s) for which the tank is suitable, design capacity, test pressure and the standard or code number.*

For example: The US Coast Guard Code of Federal Regulations (CFR) Part 183.510 of 33 CFR, subpart J is one such code. Conformity with this code can be determined by a visual inspection of the tank manufacturer's plate, which should refer to the CFR Part 183.510, or any of the following voluntary codes:

*American Boat and Yacht Council (ABYC) H24 and H33. (N.B. H33 refers to diesel systems and stipulates the same procedures as for petrol systems).*

*American National Standards Institute/Underwriters Laboratories (ANSI/UL) 1102.1991.*

*National Fire Protection Association (NFPA) fire protection standard for pleasure and commercial motor craft - NFPA 302.*

*National Marine Manufacturers Association (NMMA) specification.*

**Where there is no 'CE' marking or other markings or documentation providing guidance to the tanks suitability for the fuel used, or where there is an indication that the 'CE' marking relates to a Directive other than the RCD, then advice should be sought from the manufacturer or distributor as to its suitability for the intended purpose.**

*Note 3 Alternatively, the Boat Safety Scheme may already have such information and advice can be sought from the BSS Office particularly as new appropriate standards or codes are published from time to time.*

**All plastic fuel tanks outside the scope of the RCD, which are not manufactured to an appropriate standard or code, do not comply with Boat Safety Scheme requirements.**

**Plastic fuel tanks should be installed in accordance with the manufacturer's instructions and requirements such as those in Note 5. Manufacturers may specify the intended purpose of the product and should draw attention to any restrictions on the use of the product. Plastic fuel tanks not used in accordance with the intended purpose or not installed in accordance with the manufacturer's instructions may pose a serious risk to public safety.**

*Note 4 Restrictions placed on the intended use by manufacturers may include specifying the type of fuel to be stored and/or excluding other types of fuel.*

*Note 5 Manufacturer's installation instructions may also include requirements for the plastic fuel tank to be installed, for example:*

- *with the smooth base surfaces of the tank supported and secured;*
- *in a ventilated area;*
- *above deck or open cockpit locations only;*
- *outside of accommodation spaces;*
- *away from sources of heat, or protected from heat or fire;*
- *away from direct sunlight.*

In the absence of the manufacturer's installation instructions, such information may be available from the distributor of the tank. Alternatively information may be available from the Boat Safety Scheme Office.

**Where plastic fuel tanks have been installed in any way other than in accordance with their intended use and manufacturer's installation requirements, this may constitute a failure to meet Boat Safety Scheme requirements under Standard 2.5.**

**In all cases, suspected non-compliance with the RCD should be reported to the relevant Local Authority Trading Standards Department in Great Britain or District Councils in Northern Ireland. In the event that you find a plastic petrol tank that does not comply with the BSS requirements, please alert the BSS Office as to your findings.**

#### **CONDITION CHECKS TO BE APPLIED TO PORTABLE AND PERMANENTLY INSTALLED PLASTIC FUEL TANKS**

**If there are any signs of:**

- fuel leakage from the fuel tank material;
- physical damage (such as significant chafing or puncture); **or,**
- signs of corrosive attack (such as softening or environmental stress cracking);

**the condition of the plastic fuel tank must be considered unsafe and it must be urgently replaced.**

*Note 6 Chafing may potentially occur next to the restraining points on the tank. Chafing may lead to fuel leaks.*

Softening indicates corrosive attack by the fuel causing the fuel to permeate the plastic or tank gasket material. The physical properties of the material will progressively degrade and may ultimately lead to tank failure or fuel leaks. The presence of softening would indicate that the tank is not being used in accordance with its intended purpose.

Environmental stress cracking may develop should the tank be subject to tension or bending stress beyond its design tolerance and over prolonged periods. Environmental stress cracks may cause fuel leaks. Potential areas of stress cracking can be:

- *adjacent to a tank spigot;*
- *next to a means to restrain the tank;*
- *around a tight radius in the moulded tank surface.*

Ah	L	W	H	NO. CELLS	AREA mm <sup>2</sup>	Guide - area equates to the no. of 25mm dia. holes below
<b>6V BATTERY</b>						
105	293	169	222	3	609	2
160	245	169	330	3	929	2
<b>12V BATTERY</b>						
63	381	169	222	6	731	2
105	486	199	222	6	1219	3
160	477	169	330	6	1857	4
<b>24V BATTERY</b>						
63	381	169	222	12	1462	3
105	486	199	222	12	2438	5
160	477	169	330	12	3714	8

Portable fire extinguishers (PFE) manufactured prior to the introduction of EN 3 may not have fire ratings marked on the extinguisher. Such extinguishers maintained in good condition, properly certified and satisfying the navigation authority's previous individual and total weight requirements are acceptable.

Such extinguishers marked as approved by the Fire Officers Committee (FOC) are accepted as properly certified. The FOC scheme was the predecessor to the LPCB scheme.

<b>British Waterways (now Canal &amp; River Trust)</b>				
Length of craft	Minimum number	Types of PFE and minimum total capacity		
		Stored pressure dry powder	Carbon dioxide	Foam
Below 9m	2	2.5kg	4.5kg	18 litre
9m - 12m	2	3.5kg	6.0kg	18 litre
Over 12m	3	6.0kg	9.5kg	36 litre
Minimum size of each PFE		1.0kg	1.25kg	9 litre

<b>National Rivers Authority, Thames Region (now Environment Agency)</b>				
Length of craft	Minimum number	Types of extinguisher and minimum total capacity		
		Dry powder or B.C.F	Carbon dioxide	Foam
Up to 5m	1	1.5kg	2.25kg	9 litre
5m - 8m	2	2.5kg	4.5kg	18 litre
8m - 11m	2	3.5kg	5.5kg	18 litre
Over 11m	3	5.5kg	9.5kg	36 litre
Minimum size of each PFE		1.0kg	2.25kg	9 litre

<b>National Rivers Authority, Anglian Region (now Environment Agency)</b>				
Length of craft	Minimum number	Types of PFE and minimum total capacity		
		Dry powder or B.C.F	Carbon dioxide	
Up to 5m	1	1.0kg	2.25kg	
5m - 8m	2	2.5kg	4.5kg	
8m - 11m	2	3.5kg	5.5kg	
Over 11m	3	6.0kg	9.5kg	
Minimum size of each PFE		1.0kg	1.25kg	

**FIRE RATINGS**

The fire rating of an extinguisher appears as a series of numbers and letters marked on the side e.g. 5A/34B. The numbers relate to the ability of the extinguisher to successfully put out a fire under test conditions. The bigger the numbers, the bigger the fire on which the extinguisher has been tested.

**CLASS OF FIRE**

Class of fire	Extinguishing medium	Identification - colour of extinguisher, or band
A	Water	Red
A/B	Foam	Red [Pale cream]
A/B/C	Powder	Red [French blue]
B/C	CO <sub>2</sub>	Red [Black]

CLASS A fire = paper, wood, textiles and fabric

CLASS B fire = flammable liquids

CLASS C fire = flammable gases

**ADDITIONAL NOTES:**

All stored pressure ABC dry powder extinguishers have a Class A/Class B fire rating.

All stored pressure BC dry powder and CO<sub>2</sub> extinguishers only have a Class B fire rating.

Most, but not all, aqueous film forming foam (AFFF) extinguishers have a Class A/Class B fire rating. Some small-capacity AFFF extinguishers only have a Class B rating.

CO<sub>2</sub> extinguishers are not to be provided for living spaces.

Halon extinguishers are the subject of an international ban, are illegal to have on board and are no longer to be considered as part of the specified number of portable fire extinguishers. Current DEFRA advice is for owners to contact the supplier or the local amenity waste site operator to arrange for an environmentally-friendly disposal.

A CE mark on a portable fire extinguisher relates to the Pressure Equipment Directive (PED). Conformity with the PED does not give any assurance of manufacture or performance testing, also known as attestation, to EN 3, the recognised manufacturing standard.

**The inspection certificate is actually a detailed report of an examination of a pressure system which may involve a number of stages and tests and the report may be issued in two parts.**

There is no set format for the report although HSE does publish a model form, the reports are issued by organisations (often an insurance company) and professional independent competent persons.

In all cases the reports will be signed by a person with a title such as:

- tester
- examiner
- inspector
- surveyor
- engineer surveyor.

A report will be issued whatever the state of the boiler as its purpose is to tell the owner what is wrong as well as what is right. The existence of a report does not mean, therefore, that the boiler is in a satisfactory state to be used, so it must be read carefully.

### REPORT ASSESSMENT

**You must be assured of the following:**

- has the examination been carried out by a competent person; and,
- does the report indicate satisfactory condition?

### COMPETENT PERSON

**Any person issuing a report on behalf of one of the following may be accepted as competent:**

- insurance companies
- plant examination firms
- SBA Services Ltd
- Northern or Southern Federations of Model Engineering Societies

In the case of other organisations or persons the report is signed by a person of the appropriate designation.

In cases of doubt it may be necessary to refer to the manager of the Boat Safety Scheme .

### SATISFACTORY CONDITION

**The indications of satisfactory condition to look for in the report are as follows:**

- the examination was carried out in two stages
- the report applies to the boat in question
- date of examination(s); and,
- terminology

### TWO-STAGE EXAMINATION

**The boiler must first be examined cold before it is examined under steam at normal working pressure.**

The two examinations may have been done on the same date or they may have been done on separate dates, and they may be reported on a single form or on two - one for each examination.

It is essential to establish that both examinations have been carried out.



## **NAME OF BOAT**

**The name of the boat in question must appear on the report.**

Note that some boilers are inspected out of the boat and the boat name is sometimes omitted by the boiler tester.

## **DATE OF EXAMINATION**

**Reports are only valid for 14 months following the date of the latest examination. The only exception is where the report states a 'run-out' date in which case it is valid up to that date.**

Where the examination has been done in two parts the examinations must not be separated by too long a period. There is no maximum but it is recommended that the examinations are done within 3 months of each other. Where the separation is longer, the examiner must seek an explanation.

## **TERMINOLOGY**

**The report must be carefully checked for words or statements such as:**

- satisfactory/unsatisfactory
- in order/not in order
- repairs required.
- If repairs have been required there is usually documentary evidence that they have been carried out satisfactorily. If not, the owner must be asked to supply the necessary information.

## FIXED VENTILATION

Fixed ventilation is ventilation that cannot be closed without the use of tools.

Note 1 – Ventilators, doors, windows, hatches and any other openings, which can be fully closed, must not be included in the ventilation calculation.

Note 2 – Ventilators, doors, windows, hatches and any other openings, modified so they cannot be fully closed without the use of tools should only have their minimum fixed ventilation area included in the calculation.

## FACTORS AFFECTING TOTAL EFFECTIVE AREA OF FIXED VENTILATION

The total effective area of fixed ventilation' is: the total area of fixed ventilation provision, as measured.

Each ventilator, door, window, hatch and any other openings should be measured carefully to determine their individual effective area of fixed ventilation.

Careful examination must be made of each ventilator to determine the presence of any device which would reduce the clear air opening e.g. filter, insect screen, fan blades.

Where filters or screens are fitted, they must also be in a clean and serviceable condition as partial or complete blockage of the clear air openings could make the ventilator totally ineffective.

Louvered doors are a common form of providing fixed ventilation and the effective area needs to be carefully measured.

The total effective area of fixed ventilation is designed to provide:

- combustion air for appliances that are not room-sealed;
- for the evacuation of combustion products from appliances that are not room sealed;
- renewal of fresh air for habitation and comfort.

## CALCULATION OF FIXED VENTILATION REQUIREMENTS

**The formula used to calculate the fixed ventilation requirement is derived from BS 5482-3 Annex B (Code of practice for domestic butane and propane gas-burning installations — Part 3: Installations in boats, yachts and other vessels), but as extended by BS8511 Annex A (Code of practice for the installation of solid fuel heating and cooking appliances in small craft) to address solid fuel stoves and other appliances.**

The formula for calculating the fixed ventilation requirement ( in  $\text{mm}^2$  ) is as follows:

=  $[2200 \times U] + [650 \times P] + [550 \times H] + [440 \times F]$ , where:

U = input rating for all unflued appliances (inc. cookers) (in kW)

P = number of persons for which the accommodation space is designed

H = nominal output rating of all open-flued solid fuel appliances (in kW)

F = input rating for all open-flued appliances (in kW)

The calculation is to be specifically made for each installation with reference to appliance input ratings (output ratings for solid fuel appliances) taken from manufacturer's plates, manuals or accumulated reference lists. It is not acceptable or appropriate to estimate or guess fixed ventilation requirements.

Examiners will retain a written record of the ventilation calculation for each examination made. The record will detail all appliances and ratings and whether it is flued or not.

## **CLOSED-FLUE APPLIANCES**

From the Glossary definition, 'open-flue' appliances take their air for combustion from the space in which they are installed. Open-flue appliances can be identified by the presence of a draught diverter which provides a draught break between the primary flue on the appliance and the secondary flue connecting the draught diverter and the flue terminal.

Closed-flue appliances also take their air for combustion from the space in which they are installed, but the flue is closed from the space due to the absence of a draught diverter. Solid fuel appliances usually have closed-flues, as do many central heating boilers.

In regard to factors 'H' and 'F' the formula for calculating the fixed ventilation requirement refers to 'open-flued' appliances. However, the output ratings of all closed-flue solid fuel appliances must also be included within 'H', and the input ratings of all other closed-flue appliances must be included within 'F', when making the calculation.

Closed-flue appliances must not be confused with balanced (or room-sealed) appliances which are not included in the calculation.

## **SOLID FUEL APPLIANCES**

In the absence of manufacturer's details, an output rating of 5kW may be assumed as forming a reasonable basis for the fixed ventilation requirement for solid-fuel appliances.

## **APPLICATION**

The calculation should be applied to any part of the vessel containing a fuel burning appliance that:

- is normally divided as a separate compartment;
- can be temporarily divided except by curtaining.

## **HIGH AND LOW LEVEL VENTILATION**

The total effective area of fixed ventilation (at least up to the calculated fixed ventilation requirement) should be divided as equally as practicable between high - and low-level.

Where the total effective area of fixed ventilation exceeds the calculated fixed ventilation requirement there is no requirement for the excess fixed ventilation provision to be divided as equally as practicable between high - and low-level.

Low-level ventilation can be achieved by spillage of cold air from vents in doors and/or bulkheads or by means of ducting from a higher level.

SYMPTOM	POSSIBLE CAUSE
yellow flame/tip	<ul style="list-style-type: none"> <li>insufficient air</li> <li>oversize injector</li> </ul>
orange flame	<ul style="list-style-type: none"> <li>particles of dirt or dust in mixing tube being carried through burner ports</li> </ul>
individual flames lift above burner ports	<ul style="list-style-type: none"> <li>too much primary air</li> <li>burner ports partially blocked</li> <li>too much pressure</li> </ul>
delayed ignition or slow lighting	<ul style="list-style-type: none"> <li>pilot flame incorrectly located</li> <li>too much primary air</li> </ul>
smell of gas	<ul style="list-style-type: none"> <li>gas leak</li> <li>delayed ignition</li> <li>no combustion</li> <li>cylinder running out</li> </ul>
combustion odour	<ul style="list-style-type: none"> <li>lack of secondary air</li> <li>flame impingement</li> <li>cylinder running out</li> </ul>
floating flame	<ul style="list-style-type: none"> <li>lack of secondary air</li> <li>if oven - gas rate too high</li> <li>flue way obstructed</li> <li>drafts</li> </ul>

