

Guide to a LPG gas Installation aboard a boat

The following is a guide to safe installation practices when fitting an LPG gas installation to a boat. It does not imply that these suggestions meet any particular LPG gas standards but are a collection of best practices from a number of standards as guidance only. It is highly recommended that prior to the use of any new or altered LPG gas installation that a Safe gas registered LPG engineer carryout a gas safety check on the installation and issue a gas safety certificate.

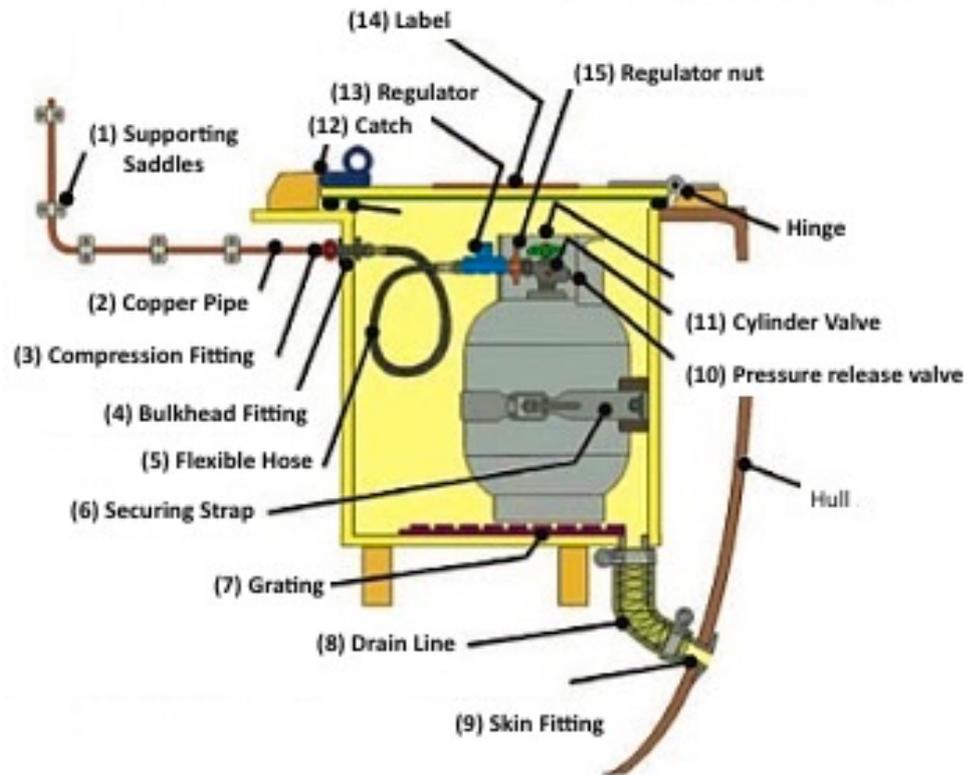


Or this may happen!!!



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Section 1 – Gas Cylinder Locker



Reference Notes

No	Item	Best Practices
0	Gas Locker	The gas locker should be a self-contained and gas vapour tight compartment which is of a suitable height to enclose the cylinder, Regulator and any gas piping or valves on the high-pressure side of the system. It should be made of a suitable material to offer a fire resistance at least the same as the surrounding structure. This could be metal of at least 0.9mm thickness with welded or brazed joints. Fibre reinforced plastic of at least 5mm thickness or Fire-resistant 12mm (1/2) plywood painted with FR paint.
1	Rigid pipe supporting saddles	All rigid piping needs to be well supported. The various standards range from 150mm (6") to 500mm (20") centres a good average would be 300mm (12"). In addition to this where a compression joint is located supporting saddle need to be fitted within 150mm (6") so that the compression joint is not supporting any weight of the pipe.
2	Rigid supply pipe	The size of rigid pipe is dependent on the amount Kw requirement of LPG devices connected to the cylinder and the length of run. In the majority of cases a leisure craft will only have a single cooker attached with two burners, grill and oven with a 6mm (5/16) ID pipe with a run less than 6m and 8mm (3/8) pipe for two devices. LPG rigid supply pipework should be made of either seamless copper, stainless-steel or copper nickel alloy tubing and must be free of kinks, restrictions, abrasion damage or other deterioration and as short a run as possible and mounted as high as possible within the hull and not close to heat sources or via fuel spaces.
3	Compression Joints	All rigid pipe or hose joints which are made in the supply line outside of the gas locker must be made by compression fittings only. Where copper or Nickle alloy piping is used the ferrules used within these compression fittings should be copper.

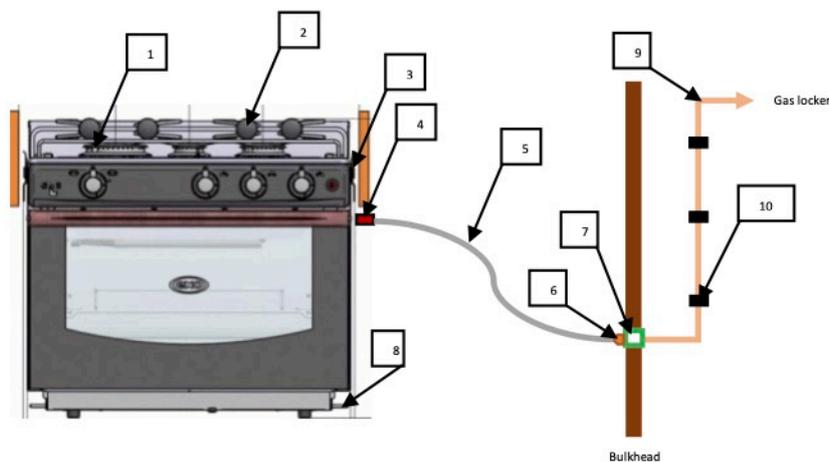
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4	Gas locker bulkhead head fitting	<p>Where the gas supply passes into the gas locker a bulkhead compression fitting should be installed. This provides a gas vapour proof joint on the outside of the locker and a barbed hose tail fitting to on the inside of the locker to attach a flexible gas hose to.</p> 
5	Flexible gas hose in gas locker	<p>Flexible hose used onboard boat should always be High Pressure hose even if it is fitted to the low-pressure side of the system. There are a number of standards available in the EU however the only ones that should be fitted to boats are BS 3212/2 or BS EN 16436 Class 3 (<i>Warning! Be careful I often see BS EN 16436 Class 2 hose fitted to boats and this is not for high pressure supplies</i>).</p> <p>Flexible hoses in a gas locker can be connected a barbed push fit hose tail and secured with a correctly sized stainless-steel hose clamp. Due to the small diameter of this clamps it is best to use clamp that evenly clamps the hose tail as the example below.</p> 
6	Securing Strap	<p>Gas cylinders need to be always held in an upright position. In addition to this a sailing vessel needs to have the cylinder held securely down in the event that the vessel be knocked down in rough weather.</p>
7	Grating	<p>To prevent the cylinders from corroding and to encourage free drainage of any escaped gas the bottom of the locker should be fitted with a grate to lift the base of the cylinder above the locker sole.</p>
8	Gas locker drain	<p>The drain to the locker should be either in the base of the locker if this is not possible then it can be mounted on the side of the locker but no more than 25mm from the bottom. The hose connecting the locker drain to the skin fitting should be a straight fall with no loops or restrictions. The hose must ideally should have a fire resistance equal to the gas locker. The inside diameter of the drain is dependent on the size of the cylinders that the locker contains however, the minimum requirements for a single cylinder is an ID of 19mm. The bigger the drain hole the more gas it can drain!</p>
9	Drain skin fitting	<p>The skin fitting hull outlet for the drain must not be below the waterline and be at least 75mm above the vessels resting waterline.</p>
10	Pressure Release valve	<p>Annex M regulators have an elbowed extension on the pressure release valve. This must always be pointed in a downward direction so that no water can get down inside the regulator.</p> 

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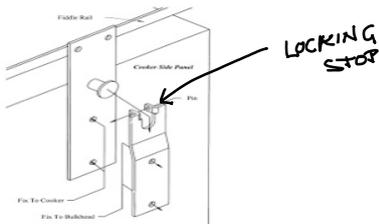
11	Cylinder Valve	All gas cylinders used on boats should be fitted with an isolation valve so that the gas supply can be closed at the point of exiting the cylinder.
12	Locker catch	Whilst not a statutory requirement it is prudent to always fit the gas locker lid with a method of securing it to prevent theft of the cylinder or unauthorised access.
13	Regulator	Regulators used in a saltwater environment should meet the EN12864 Annex M – ISO standards. The (Annex M) refers to marine. The reason for this is that standard regulators corrode in a salt damp environment and they can fail therefore allowing high pressure gas to enter the low-pressure supply which is not designed for these pressures and either leaks or can cause a major flare up for a gas hob.
14	Label	The gas locker should always be clearly labelled
15	Regulator Nut	Some gas regulators use nut to connect the regulator to the cylinder these are often an unusual size and have reverse threads and a suitable spanner should be located within the locker with a leash line so that changing the cylinder can be undertaken easily and by feel.

Section 2 – Cooker Installation



1	Hob with Flame protection device	All open flame LPG gas devices should have flame detection device fitted so that should the flame be blown out the gas supply is cut off. Some older cookers may not have these fitted and whilst it is not illegal to use these or a statutory requirement for the cookers to be updated. If used they should not be left unattended when in use. Flame detection devices also need to be routinely checked to see that are working. The easiest way of doing this is light each burner in turn and once the device is warmed and the hub will run without holding in the bypass valve is to turn off the hob and listen for a click from the hob which is the device closing off the supply. If you then turn on the gas the supply should be off. The timing of these devices shut off varies with the temperature of the sensor so if it's been in use for a while it will take longer to cool and shut off however anything over 20 sec's could mean the device is worn and needs renewing and should be checked over by a qualified LPG safe gas engineer.
2	Pan holders	Cookers on boats used whilst at sea should be fitted with pan holders for safe reasons.
3	Oven Gimbals	If the cooker is fitted with Gimbals the gimbal hinges should be fitted with stops to prevent the cooker from falling out of the hinges in the event of a knock down or inversion.

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4	Pressure test point	<p>So that the system can be pressure tested for leaks without breaking into the supply piping. A pressure test point should be fitted to the rear of the cooker.</p> 
5	Armoured Flexible supply hose	<p>Any flexible hosing used outside of the gas locker must be fitted with factory fitted swaged ends and be no more than one meter in overall length and be an approved LPG standard. Additional to this it is also good practice to always use armoured hose on any cooker that is gimbaled. There are a number of standards available in the EU however the only ones that should be fitted to boats in the UK are BS 3212/2 or BS EN 16436 Class 3 (<i>Warning! Be careful I often see BS EN 16436 Class 2 hose fitted to boats and this is not for high pressure supplies</i>). (<i>Please note barbed hose connections with worm drive clips are not permitted within the hull cavity</i>).</p> 
6	Compression Joints	See item 3 in section one
7	Bulkheads	<p>Where the supply piping passes through a bulkhead it is important to make sure the rigid copper piping is protected from the bulkhead material by a rubber or plastic gromet to protect the copper pipe from abrasion. Alternatively, a compression bulkhead fitting can be used however this does add additional connects within the system with the additional risk of failure.</p>
8	Oven Gimbal Lock	<p>A cooker fitted with gimbals should also be fitted with a stop to prevent the cooker from rocking when not in use.</p> 
9	Rigid Gas Supply pipe	See item 2 in section one
10	Pipe Saddles	See item 1 in section one

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