

# Winterisation and Service of Outboards

This months article comes from David Parker of Warsash, Hampshire

A badly maintained outboard engine is likely to consume more fuel and expel more emissions than a well maintained one. To ensure the reliability and efficiency of your outboard it is important that it is regularly serviced and that it is not neglected when stored over the winter period.

Bear in mind that, unlike an inboard engine, your outboard engine has been on the back of your boat and exposed to the elements, possibly it's also been left out in all weathers. Salt water is very corrosive when an engine is poorly maintained and electrics in particular are vulnerable. Deposits can also build up in the cooling system if an engine is not rinsed in fresh water after use.

A basic service is not complex and should be carried out at least once a year, but consult the engine manual for the manufacturer's recommendations on servicing schedules for engine running times. Most outboards should come with a basic tool kit. However when servicing the engine make a note of any specific tools required and appropriate spanner sizes needed to work on the engine.

[For more information about outboard engines and the environment click here](#)

*Note: Check the manufacturer's handbook for the specific requirements of your engine. Work on electrical systems and the handling of oils can be hazardous and cause injury. If in doubt, entrust the work to a competent person or authorised service dealer.*

## Step 1 Preparation

First, ensure that you have everything you require to prevent oil and fuel spillages - If possible, lay an oil absorbent sheet under the engine to absorb spills. **Do not** use detergents if there is any risk of their running into the water.

Before beginning the service make sure the engine is securely mounted on a stable bracket or outboard engine carrier. Visually inspect the engine for any signs of corrosion. Clean and make good any exposed metal which should be protected by using touch-up paint.

Use water muffs or run the engine in neutral in a tank (a bucket can be used for smaller models). Check that the pilot water hole (the tell-tale) is running freely. If it is blocked it may be cleared with a piece of wire, however if the flow remains weak stop the engine to prevent overheating. Check the water inlet but the water pump and impeller may need attention. Consult a dealer if the engine isn't cooling properly and never run an engine without water because overheating will damage the impeller and impeller housing.

Find out where you can dispose of used oil, filters and oily rags before you start work. Check your nearest municipal site on [www.oilbankline.org.uk](http://www.oilbankline.org.uk). In marinas, you may have to ask the Dock master to unlock the hazardous waste container.

## Step 2 Getting to work

- Check the condition and operation of the engine stop lanyard switch. Restart the engine and then turn off the fuel cock or disconnect the remote tank without switching the engine off. Leaving the engine running after disconnecting the fuel is good practice every



time you finish using an outboard because it drains fuel from the carburetor leaving it dry. For winter storage it is a good idea to drain the tanks of fuel using a pump. Over time fuel can go stale. (It is particularly important to drain tanks and carburetors of any two-stroke fuel because in a matter of weeks deposits can build up which will block float bowls, filters and fuel jets.) Ensure any waste fuel not

used is disposed of correctly and wipe up any spillages. The Environment Agency recommends contacting your local authority for advice on this. Check the engine mountings, fittings and friction screws to make sure nothing has become loose due to engine vibration.

- Wash the outside of the engine and casing with warm fresh water and car shampoo to remove any salt deposits. Then dry it and polish it before removing the top cowling. The



cowling will normally be held with lock levers, however if it is secured with screws or nuts and bolts make sure captive nuts or washers don't fall out. Retain all fittings safely.

Check fuel line connections and fuel filters, both the shut-off cocks with filter screens and in-line filters. A shut off fuel cock from an integral petrol tank will unscrew although it may be necessary to remove the tank first. In-line filters

are retained with spring clips. They do not need to be replaced at every service but remove and clean them if necessary by rinsing in fresh fuel.

- With smaller engines which do not use electronic ignition inspect the recoil starter cord.



Signs of wear may occur near the handle but pull out the cord to its full length. If the cord is frayed replace it with a new one. Use a stopper knot in the engine recess and a figure of eight knot in the handle recess when fitting a new cord but make sure all locking knots are flush in the appropriate

- Remove the spark plug/plugs with a proper spark plug socket. A spark plug socket with a rubber insert is preferable to ensure there is no damage or cracking to the ceramic



insulator. Inspect the electrode and if the engine is operating correctly this should be between light brown and grey with no deposits. Seek advice if the plug is very white or black and damp. With a feeler gauge check the gap as per the engine manual recommendations (typically this gap may be 0.6-0.7mm).

- Spray storage seal or put a small quantity of light oil into the engine and turn it over a few times by hand or with the starter motor. This keeps the pistons and rings oiled to prevent them seizing and ensures they are lubricated at the start of the following season. When refitting spark plugs ensure they are not cross threaded so do the first few turns by hand before tightening it down with a socket. Ideally use a torque wrench set to the



manual specifications, but if not take care not to over tighten the plug and give it a  $\frac{1}{4}$  to  $\frac{1}{2}$  turn past finger tight

- Four strokes are lubricated by oil in the sump which should be changed as per the manufacturer's instructions or at least every season. When the sump plug has been removed ensure that a suitable receptacle is to hand to capture the oil as it drains away. All oils should be collected properly for disposal and wipe up any spillages with a rag. It's a good idea to also put old newspapers down before changing any oil.



- To change the gear oil place the receptacle under the leg and remove the drain screw below the propeller housing in the skeg. Next remove the level plug above the anti cavitation plate and air pressure will now let the oil flow out. Check the oil as it drains out and if it has a milky appearance oil seals may need replacing and the gear assembly will need to be professionally checked. However if the oil is dark this indicates the gearbox is operating normally.



- Refill the gearbox using gear lubrication which comes in either a bottle with a flexible nozzle, or oil containers which require a pressurized filling device such as a simple screw on pump. Inject the gear oil nozzle in to the drain plug hole. Squeeze or pump the oil bottle until you see the oil coming out of the oil level plug then seal this and refit the lower plug. Filling the gearbox from the bottom prevents air getting trapped which would prevent proper lubrication.



- Remove the propeller and check the condition of the spline and rubber bushes. On older and smaller engines a shear pin will be used instead of a rubber bush. Bushes are designed to slip on the spline if the propeller hits a solid object. Similarly a shear pin is there to protect the engine. It is made of soft metal so if the propeller hits a solid object the pin will snap and disconnect the drive from the propeller to prevent the gearbox being damaged.



- Smear the propeller shaft with plenty of waterproof grease and refit the propeller so it beds in sufficiently. Grease all linkages, pivot points and nipples as per the engine manual's instructions and check the steering controls. All controls should work smoothly without binding or excessive free play. A grease gun is used on nipples, other areas such as



clamp screws can be greased by hand. A spray of corrosion guard will protect the engine from moisture. Check the condition of the anodes and replace if they show signs of significant degradation

- Take oil to the waste oil sump and pour it in. There will usually be a separate container for your oil filters. Dispose of oily rags, and oily containers in the hazardous waste container. If you leave an oil absorbent blanket under your engine, this will identify the location of any leaks over the lay-up period.

## Step 3 Engine Storage over Winter

Do not store fuel tanks or batteries on a damp floor but raise them up on small timber bearers if necessary. On metal fuel tanks check for any corrosion and repaint as necessary with metal paint before putting them away. Using an engine cover during winter storage will help protect it and also keep the engine and tank in a dry well ventilated place out of direct sunlight. Don't store items in a damp, dark boat locker over winter.

An engine should either be stored upright or if it's a portable model it can be stored in a horizontal position. With a four stroke outboard engine make sure it's lying with the tiller handle side down otherwise oil could enter the cylinder from the sump which will leak out and could cause damage. Drain cooling water completely before putting an engine on its side otherwise water could enter the engine through the exhaust manifold causing corrosion. At the start of the season run the engine at home in a tank before fitting it to the boat to check it is operating correctly. However there shouldn't be any problems if winterisation is carried out correctly.

## Learn More

The RYA publishes a wide range of handbooks covering engine maintenance issues covering both inboards and outboards. There are also DVD and video guides, and the RYA Diesel Engine Course provides an excellent entry level qualification for those who need to know more about their engine.

For publications visit: [www.rya.org.uk/Shop/](http://www.rya.org.uk/Shop/)



## Outboard Engines and the Environment

All internal combustion engines consist of four processes in the power cycle consisting of induction, compression, ignition and exhaust. In a four stroke cycle in the first revolution the air/fuel mix enters the piston chamber through an induction valve and is then compressed. In the second revolution the spark plug ignites the mix and exhaust gases are expended. The oil to lubricate the engine during this process is retained in the sump.

But in the power cycle of a two stroke engine, *air/fuel and oil* enters the crankcase by induction and is then compressed in the first revolution. After

compression ignition takes place and exhaust gases are expended through the exhaust port. Because an air/fuel and oil mix is used to lubricate the crankcase and the cylinders, a two stroke engine doesn't require a sump or valves.

Conventionally two strokes have been mechanically simpler and therefore lighter and cheaper than four strokes but they burn more fuel and can be noisier. However, from an environmental point of view the main problem with conventional two strokes is that they require oil in the fuel combustion mixture for lubrication. Consequently oil particles then form part of the exhaust gases. With a four stroke oil is not used as part of the combustion process in the cylinder and is therefore not present in the exhaust gases.

This has meant that it is more difficult for conventional two strokes to comply with the emission requirements stipulated by the Recreational Craft Directive which all marine engines have to meet. Basically these emissions regulations are about cleaner exhaust for two and four stroke engines regarding exhaust levels of carbon monoxide, hydrocarbons and nitrogen oxides. (With diesel engines levels of particulates are also specified.)

Some manufacturers are phasing out some two-stroke models in favour of four stroke models but this might be based on other commercial factors rather than simply meeting the emission requirements. However a number of engine manufacturers do say new direct injection technology will meet the new standards but this at present is mainly only available on larger engines.

The RCD amendment regulations called 2003/44 came into force on January 1st 2005 and there has been a transitional year for four stroke engines to comply and an additional year for two stroke engines giving them until 31st December 2006. After that date if two stroke engines do not comply they will not be able to be put on the market by engine retailers.