Student

Engine cooling

What you will learn

When you have finished this module, you should know:

- ❑ The different ways to keep engines cool
- ❑ How to check and maintain your cooling system

Things you need before you start

Materials

None

Tools

Flushing connections ❑

Small brush ❑

Ways of cooling engines

All engines get hot from the exploding petrol in the cylinder. They could get hotter and hotter until they seize up or catch fire, so they need some way to get rid of the heat.

The main ways to cool engines are by

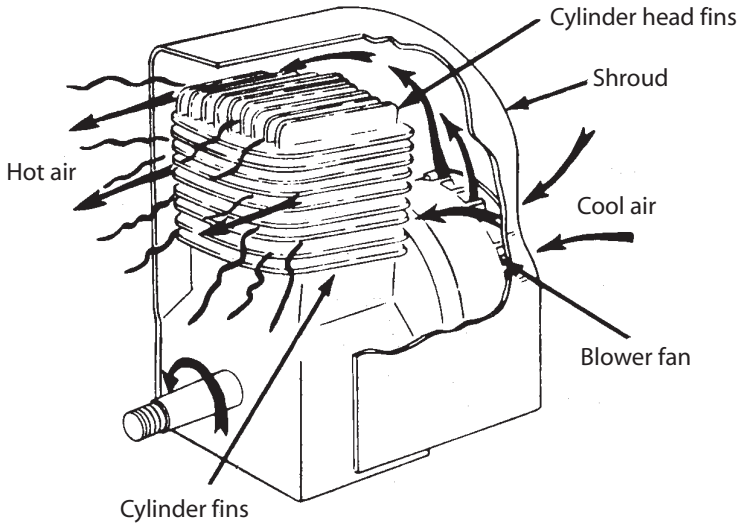
- blowing air over the engine
- pumping water through the engine.

Air cooling

Many **small petrol engines** used in lawn mowers, brush cutters and motor bikes use air to keep them cool.

These engines have large fins or ridges of metal that radiate the heat into the air.

They sometimes they have a fan to blow more air across the fins.



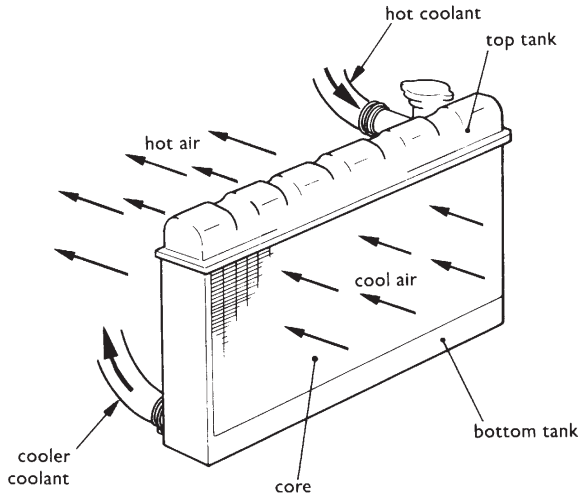
Some low-powered outboard motors also use air cooling, but larger ones are usually water cooled.

Water cooling – cars and trucks

Car and truck engines use water inside the engine block to take away the heat.

The hot water has a pump to move it into a radiator (a tank with lots of metal fins or cores) at the front of the car.

Air pushes through the radiator as the car moves along and cools the water down ready to go back into the engine. There is also a fan behind the radiator to suck the air through when the car is not moving.

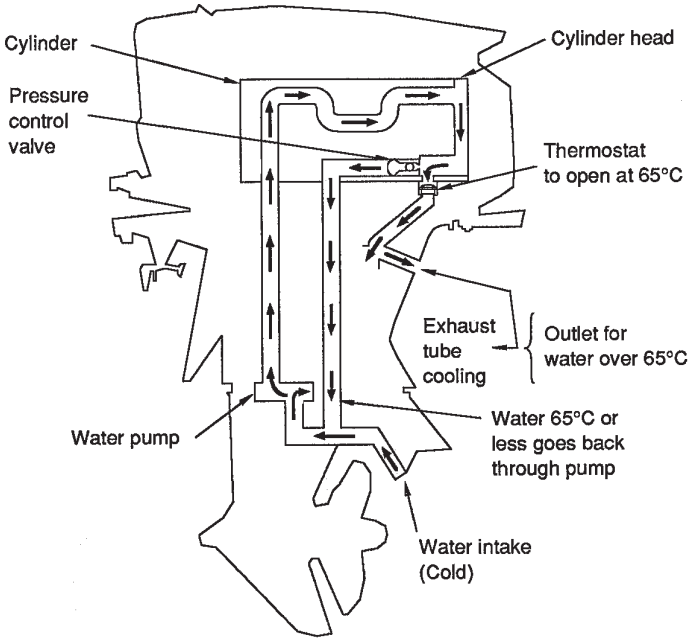


Water cooling – outboard engines

Outboards usually cool the engine with the seawater (or lake/river water) they are running in.

Water is sucked in through a tube, goes through passages in the engine block, through a water pump and then back out into the sea, taking the heat with it.

There is a thermostat (a sort of mechanical switch that works on temperature) that opens and closes to let more water through the engine block as it gets hotter.



Never run an outboard motor without water going through it. The engine itself might be OK for just a few seconds, but the water pump needs the water as a lubricant and will be damaged very quickly.

Maintenance

Water cooled outboards

Flushing the cooling system

When you use the engine, salt sand and other bits and pieces can get stuck inside the cooling tubes and passages inside the engine. Sea water can also corrode the aluminium water passages inside the engine if it is not cleaned out.

If possible, it's a good idea to flush the engine after each trip or at least every few weeks to get rid of these deposits.

To flush the motor, run clean, fresh water through the engine for ten minutes or so until it gets warmed up

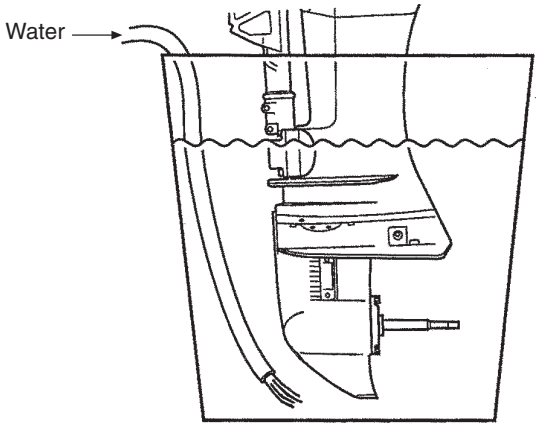
Some new outboards have connections for a hose-pipe, just connect a hose and let it run.

OR

Use a slip-on hose connection, if you have one – sometimes called "ears"

Or

Clamp the engine on a stand in a large drum of fresh water and run the engine.



It is necessary to run the engine during the flushing procedure. For safety, remove the propeller from the outboard motor.

Checks

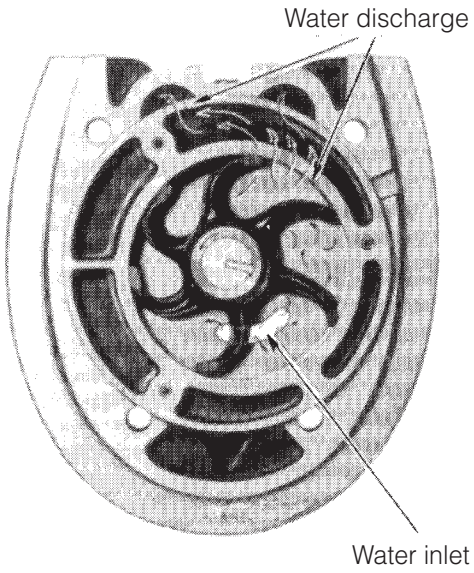
Outboard

With the engine running, check the flow of cooling water from the engine. Carefully put your finger in the water stream. It should be warm – but not hot.

If there is less water than normal – or it is hotter – the cooling system may be blocked by weed or sand or something.

Stop the engine!

Use a piece of stiff wire to clear any weed or other blockage from the water inlet. Start the engine and check the water flow. If it is still not flowing correctly, stop the engine and try again.



Water pump and impellor

If it does not get better, you have a serious blockage or you may need a new impellor on the water pump. You will need expert technical help for that.

Never push wire into the water tubes with the engine running. You could easily wreck the water pump and the engine.

Air cooled engines

Clean any dirt or grass from the cooling fins.

Use a small brush or piece of stick. Don't press too hard on the fins – they might break.

If you need to, take off any cases or covers to clean the fins. Always replace the covers because they are designed to help the air flow.

Activity – cooling

Find out and write down

How is your engine cooled?

For outboard motors:

Where is the water intake?

Where is the tell-tale (water outlet)?

What must you do if no water is coming from the water outlet (tell-tale)?

Things to do

Outboards:

✔ Check the water flow with engine running

✔ Flush the engine with fresh water

Air-cooled engines:

✔ Clean fins on air cooled motor