

What students will learn

When they have finished the Air module, students should:

- Know how air gets into an engine
- Know why air must be clean and dry
- Know about types of air filters
- Be able to check and clean or replace air filters on their engine.

Things you need before you start

Information

You will need ideas and information on:

What type of air filters are used on engines locally

Where new air filter elements are available from

Materials

Examples to show students:

Engines and outboards

Air filters – paper element, washable element type, oil bath

Replacement air filter element (if needed)

Tools or equipment

If students don't have their own engines, you may need to provide suitable engines to work on

Students will need tools and equipment to check, clean and change filters:

Brushes and cleaning fluid

Spanners or pliers

Screwdrivers

Air – Activity

The activities in this module require the students to collect information about the air filters for engines they are working on.

The students then carry out the regular maintenance checks to check, clean – or replace – the air filters.

Ideally, students should use their own engines for this activity. It would be useful for them to carry out the maintenance tasks on other types of engine and equipment as well.

Students should work together in small groups to answer the questions and carry out the maintenance tasks.

The module

The workbook sections for this module are:

Introduction

Types of air filter

Paper element

Plastic foam

Oil bath

Maintenance

Cleaning and changing filters

Regular checks

Copies of the workbook sections are included in your manual here as well as in the Student Workbook.

You need to work through each section with the students, talking about the filters, showing the students what to do – and what they should NOT do.

Remember

The workbooks are not designed to be used by the students learning on their own.

General Air introduction - Tutor notes

Use these notes for an introduction at the beginning of the Air module.

To start the module, talk to the students generally about the main things they will learn:

- special things they should know about air in the engine
- types of filters, and what they need for their engines
- maintenance checks.

Explain

Explain that the in module:

- You will talk about each of these things – and show them how to work on the engines.
- They will collect information about THEIR engine, and
- Finally, they will get to carry out checks, change/clean filters etc.

In addition

Talk about - The need for advice and assistance

- It is **very** important that students understand the limits of what they learn on this course. Here they learn only about simple, small – scale checks and maintenance jobs such as filter checks.
- Bigger jobs **need expert knowledge and skill and equipment** to dismantle, repair and adjust.

Make sure students understand that they need expert assistance for any larger or safety related work.

Introduction

Talk about

- Air is mixed with the petrol to make a mixture that will burn (explode) when the spark plug 'sparks'.
- How air gets into an engine through an inlet pipe, a filter and into the carburettor

Explain

Air going into an engine must be

- **Clean.** Dust or dirt can block airways and, most important, they can damage the metal surfaces and bearings inside the engine.
- **Dry.** Drops of water in the air will make mixing with fuel difficult and large amounts of water can damage the engine
- Must be **enough** air for the engine at all engine speeds. Engines need more air as they go faster. Air filters and air pipes must let enough air into the engine, so use the right filters and keep elements and pipes clear.

Air cleaners and filters

Work through the section on types of filters on the worksheet

Talk about

- The purpose of air cleaners and filters to remove dirt, dust and water from the air before it gets to the engine.

Engines **should never** be run without their filters.

Engine problems if filters get clogged or blocked – especially under load or at high speeds

- Different types of air filter and how they work.
- When to clean or change air filter in your local situation.

Show

- Types of filter – paper, foam, and oil-bath types.
- Local examples of each filter and where they are fitted on two or three different engines

Talk about

- Different shapes and sizes of element filters and what filters students need for their engines. Help them find the part number they need – and find out where to get them from

Show

- how to check and change a paper element filter
- how to check and clean a foam filter.

Note that some foam elements need 'oiling' when they have been washed. This should be just a FEW drops of light oil – NOT a lot of oil that will clog the filter again!

- how to check and clean an oil-bath filter – if your engines have them. Remind students not to over-fill the oil-bath.

Help

Students to do the activities where they write down their own air filter information and then check and clean or change filters on their own engines.