

# Air

## What you will learn

When you have finished this module, you should

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



## Things you need before you start

### Materials

Replacement air filter element (if needed)



### Tools

Brush and cleaning fluid



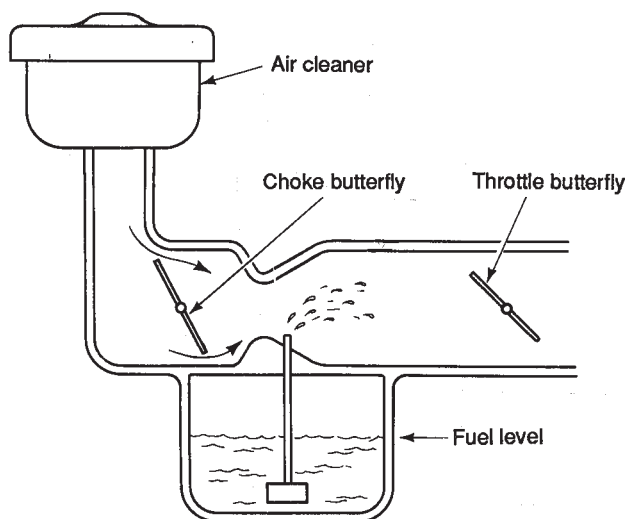
Spanners or pliers



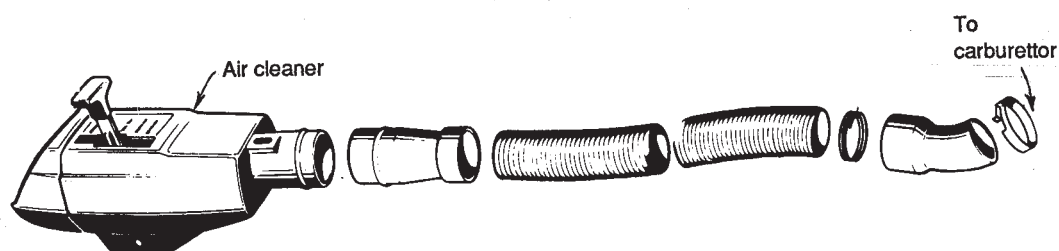
# Introduction

All engines need a supply of air to mix with the fuel.

The air goes into the engine through an inlet pipe and an air filter to stop dust and dirt.



(a)



(b)

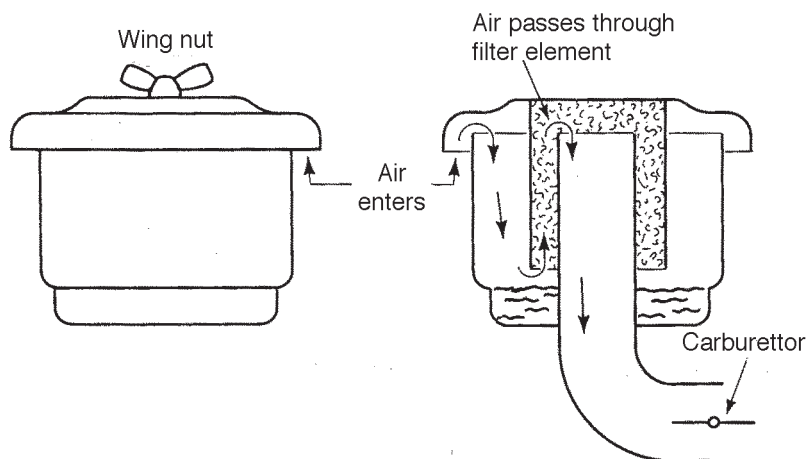
*Air intake and filter on a mower*

Air going into an engine should be

- **Clean.** Dust or dirt can block airways and damage the metal surfaces inside the engine.
- **Dry.** Drops of water in the air 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.

## Air cleaners and filters

There is a filter in the air intake pipe to catch dust and dirt before it gets into the engine. Filters will also catch and remove small amounts of water.



**NEVER** run the engine without its air filter. Even tiny amounts of dust or sand can quickly ruin a good engine.

The filter gets dirty and eventually the dirt will block air from going through the filter.

Dirty or blocked filters can

- make engines difficult to start
- reduce the engine power and speed.
- make engines use more fuel

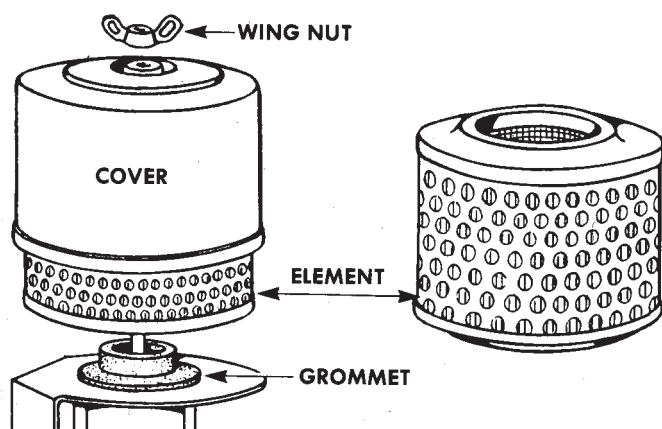
There are many types of filter:

### Paper element filters

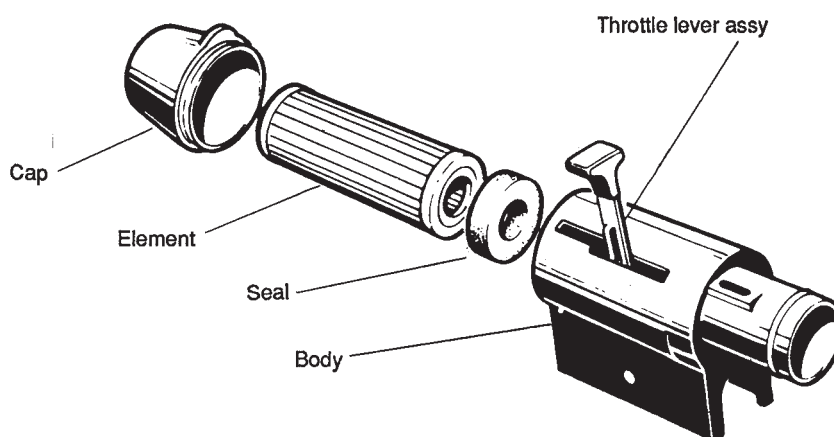
These filters are made from layers of special paper made into a cartridge or element. The paper is folded into fins or ridges inside the element. Air is sucked through the paper filter to catch dust and dirt.

Elements come in all shapes and sizes to fit the filter box on your engine. Make sure you get the right one.

Paper filters cannot be washed or cleaned. You can remove bits of grass, leaves and any other large pieces, but replace the elements when they are dirty.



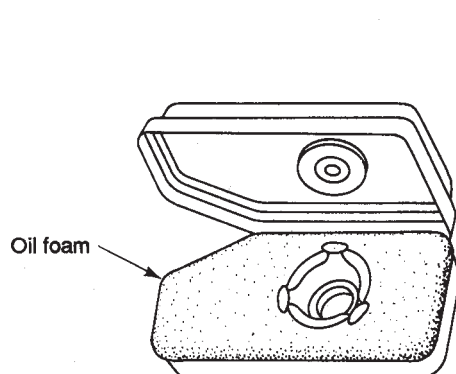
*Paper element air cleaners*



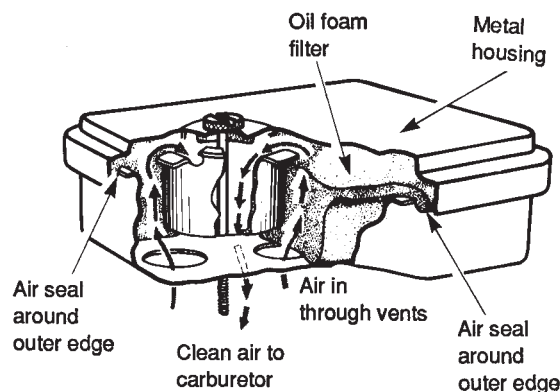
## Plastic/foam/sponge

The plastic foam inside the filter catches dust and dirt as air is sucked through.

The foam can be taken out and cleaned when they are dirty. Some types need the foam to be oiled with a light oil.

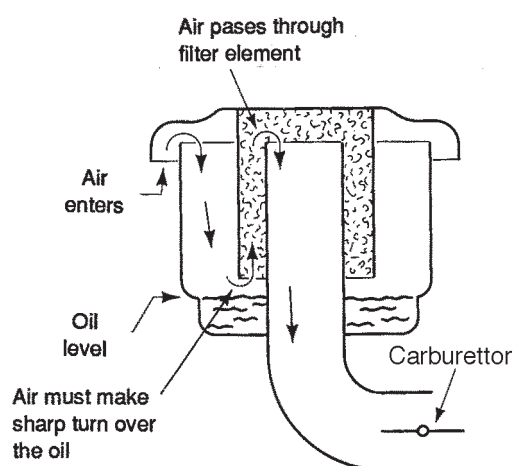


(a) Plastic foam filter



(b) Air flow through filter

## Oil bath



These cleaners are usually only on older engines. Air is sucked through a metal net and a bowl that are covered in engine oil. Any dirt sticks to the oil. They are not good at catching very small dust.

These filters can only be used on engines that stay upright – such as generators or concrete mixers.

## Air inlet pipes

There are inlets (pipes or tubes) for air to enter the air cleaner and then into the carburettor and engine. The engine maker chose the right size (diameter) for your engine so that enough air can get through.

Check that the pipes are not blocked – or bent – so that air will be reduced. Check also that all pipes are connected firmly and not torn or damaged.

# Maintenance

## Air filters

As they take dirt out of the air, the dirt will gradually block the filter and reduce the amount of air that will go through it. This will happen more quickly in dusty or sandy places.

Filters must be checked regularly and cleaned or replaced. Your engine maker will give a recommended engine running time between checks. Every 75–100 hrs is a usual time.

### Paper element

- Open the filter container. Take out the element.
- You can shake or brush off any large dirt you can see on the element.

This is worth doing when you check the filter, but you will not be able to remove the finer particles that will eventually clog the paper and stop air getting through.

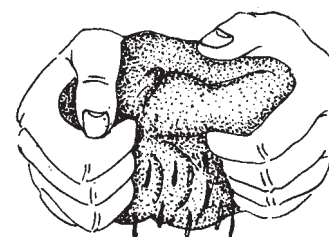
- Replace the element when it is dirty, or every 100 hrs use.

Paper filters cannot be washed or cleaned.

- Clean away any dust or dirt around the air intake to the container before you put in the new element.

### Plastic/foam/sponge

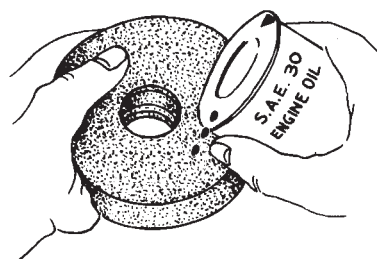
- Undo the filter cover.
- Remove the foam filter every 100 hrs or when it is dirty.
- Wash the foam in soapy water – or detergent or degreaser if you have it.
- Rinse in clean water and then squeeze out the water
- Let the foam dry



- Some foam filters should be coated in clean oil– check your engine makers recommendations.

If yours does:

Pour just a few drops of light engine oil onto the foam  
Squeeze the foam in your hands to spread oil all through the foam  
Let any extra oil drip out.



(a) Coat with clean oil

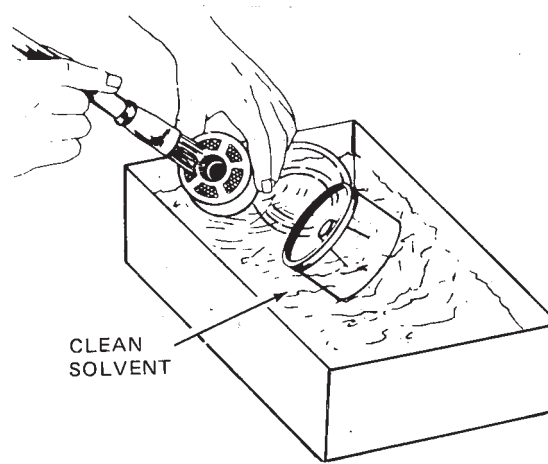


(b) Let excess oil drip off

- Clean away any dust or dirt around the air intake to the container, and wipe inside the container.
- Replace the foam
- Replace covers

## Oil bath

- Check your engine makers recommendation for time s between changing the filter oil. A usual time is every 50 hrs of running
- Remove the complete air cleaner. Keep it upright or oil will spill out!
- Take off the cover.
- Wash the metal filter mesh in a solvent of degreaser.



*Cleaning an oil bath air cleaner in solvent*

- Pour out the old oil and clean the oil bowl.
- Refill with clean oil to the level marked on the bowl. It is important not to put in too much. Use engine oil.
- Replace the clean metal filter
- Replace the cover and refit to the engine.



## Air inlet pipes

- Check pipes/tubes for damage – or bends – that might stop air flowing easily.
- Check any clips and fixings that connect the tubes. Make sure they are tight and not leaking.

### Activity – Air

#### Find out and write down

What type of air filter is on your engine?

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What is the part number (if it is disposable element)

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When should you check it?

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How often must you clean or replace the filter?

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#### Things to do

- ✓ On own engine, check and clean or replace the air filter

#### Also:

- ✓ Clean a foam element filter
- ✓ Change a paper element

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