

MOISTURE CONTENT OF FIREWOOD



THE FIREWOOD ASSOCIATION
OF AUSTRALIA INC.

Wood moisture content and seasoning

Water makes up most of the sap of living trees. Water in the sap is called 'free water' because it can move through the wood cells and vessels reasonably easily. Water is also present in the cellulose structure that makes up the cell walls. This water is called "combined water". When all of the free water has evaporated, leaving only water in the cell walls the wood is said to be at fibre saturation point.

The total amount of water in a piece of wood is expressed as a percentage of the 'oven-dry' weight of the wood itself. The 'oven-dry' weight of wood is measured after it has been heated to remove all moisture, both free and combined. Freshly harvested firewood from living trees contains a considerable amount of water. The moisture content in green wood can vary from as low as 40% to as high as 200%, depending on the age and species of the wood and its growing conditions. For example, mature River Red Gum (*Eucalyptus camaldulensis*) has a green moisture content of around 40-50%. For wood to burn satisfactorily it needs to be at or below fibre saturation point, which varies for different species but is typically around 20% moisture content.

All wood will season naturally (air dry), because the water gradually evaporates from the wood surface until it reaches equilibrium with the humidity of the surrounding air. Because 'free water' can move along wood fibres reasonably easily, wood dries from the ends of cut blocks much more quickly than from the sides. This is why the natural seasoning process can take many years for logs, while cross cut blocks usually dry in 12 months or less. Exposing the end grain of firewood to the air will accelerate seasoning as will splitting the wood. Periodic wetting of the wood will help to keep the tubular cells open, providing a pathway for the water to evaporate. Depending on climatic conditions (temperature and relative humidity) wood moisture content comes to equilibrium with the surrounding environment at around 15%.

Why dry wood?

If wood has not been dried below fibre saturation point it will generate more smoke and creosote, producing less heat.

A good way to illustrate this is to consider a 1.5 kg log of unseasoned eucalypt firewood, which may contain up to 1 litre of water. As the wood burns, this water boils as steam which cools the fire. This causes some of the combustible gases given off by heated wood to condense instead of burning, creating small particles that we see as smoke. So instead of heating your home the energy simply goes up the chimney and is lost. This is not only a waste of wood and money but it creates a lot of unnecessary smoke pollution. Some of the incompletely combusted wood gases can also condense as creosote in the flue or chimney, blocking the chimney and reducing the efficiency of the heater. If the creosote ignites it can cause a dangerous chimney fire.

How can I tell if my wood is seasoned?

FAA Sustainable Firewood Suppliers can measure the moisture content of wood using electrical resistance moisture meters. If the wood is not fully seasoned FAA members will give you advice on how long you will need to store the wood before it is ready to be burnt.

If you can't get the wood tested for moisture you should look for signs that it might still be "green". When green wood is split it will generally look a lot darker in the middle of the block than around the edges. Freshly split green wood will feel cool to the touch due to the evaporation of moisture. Green wood will also feel significantly heavier than dry wood. When two pieces of green wood are banged together they will give a dull thud rather than the sharp ringing crack you should get when pieces of dry wood are banged together.

If you have some unseasoned wood it is much better to set it aside and get yourself some dry wood, rather than trying to burn it immediately. When the 'green' wood dries it will burn better, produce more heat and create less smoke and creosote.

Look for the distinctive FAA membership logo which is displayed by FAA members or call **1300 131 481** for your nearest member.

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