



## Properties of firewood

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*This information sheet is intended to provide information on the properties found in good firewood and to provide some indication as to how these properties affect the performance of firewood.*

Wood is a natural substance and is subject to variation caused by many factors. The species and age of the tree, the climate in which it grows, and the effects of environmental events such as fire or flood can all impact on the timber produced by a tree. Table 1 shows the properties of some Victorian firewood species.

### Properties of firewood

#### Available Heat

Available heat is a measure of the heat given off when wood is burnt and is measured in kilojoules per gram of wood. A piece of hardwood gives off more energy than a piece of softwood because it is denser. However the volatile oils in some softwoods can increase the heat output of these species.

#### Density

Density is the amount of space a mass of firewood occupies, the denser the wood the less space a given mass takes up, or the greater a particular volume of firewood weighs. For example Sugar Gum is about twice as dense as Radiata Pine, so a cubic metre of Sugar Gum weighs approximately 1070kg, while a cubic metre of Pine weighs only about 512kg.

#### Splitting

Wood with a straight grain is easier to split than wood with a tighter more complex grain. Knots, branches and other defects can also increase the difficulty of splitting firewood. Dry wood is generally easier to split than green wood.

#### Ignition

Ignition is an indication of the ease with which the firewood can be lit. Low density wood is easier to light than denser wood. Woods with higher levels of volatile chemicals in their structure, such as conifers, will ignite

and burn more readily than those with less volatile chemicals. The drier the wood the easier it is to light.

#### Moisture Content

Firewood should be dried to 10% to 20% moisture content for best performance. A large proportion of the energy generated from burning green firewood actually goes to evaporating the water held in the wood. Green firewood only gives off about 40% of the energy of dry firewood. To get the best out of your firewood it should be cut, split and stacked in a dry, well ventilated area for at least six months before it is to be used.

#### Spitting/Sparks

This is highly dependent on the amount of extractives in the wood. Wood from conifers, which have a high resin content are particularly prone to spitting and causing sparks.

#### Environmental benefits

Dry wood is a relatively environmentally clean fuel. It is low in sulphur emissions and leaves little ash residue when burnt in a conventional wood heater that complies with the Australian Standard (AS 4013).

Plantation firewood is a potential renewable energy source as it can be readily regrown, especially with those species that will coppice from the cut stumps.

It can also be argued that burning plantation firewood is carbon neutral provided the trees are regrown as carbon released into the atmosphere during the combustion process is counteracted by the equivalent amount of CO<sub>2</sub> being absorbed by the next crop of trees.

The use of native species can also provide environmental benefits such as an increase in biodiversity, improvement in remnant bushland areas and habitat for native fauna. Firewood plantations can be used to help alleviate land management problems such as erosion, salinity and rising water tables, and nutrient runoff into streams.

When planted as shelterbelts, woodlots can also have other economic benefits on the farm such as increased crop and stock production.

**Table 1. Timber properties of Victorian firewood species**

Firewood Species	Common name	Relative Heat Available/Unit Volume (%)	Air-dry Density (kg/m <sup>3</sup> )	Splitting	Ignition	Sparks (spitting)	Coals
<i>Eucalyptus spp.</i>	Mallee roots	100		Difficult	Poor	Few	Excellent
<i>Casuarina spp.</i>	Belah, Buloke	100	1121	Good	Poor	Few	Excellent
<i>Eucalyptus microcarpa</i>	Grey Box	100	1121	Difficult	Poor	Few	Excellent
<i>Eucalyptus largiflorens</i>	Black Box	98	1105	Difficult	Poor	Few	Excellent
<i>Eucalyptus sideroxylon</i>	Red Ironbark	97	1090	Difficult	Poor	Few	Excellent
<i>Eucalyptus melliodora</i>	Yellow Box	95	1090	Difficult	Poor	Few	Excellent
<i>Eucalyptus cladocalyx</i>	Sugar Gum	95	1070	Difficult	Poor	Few	Excellent
<i>Eucalyptus polyanthemus</i>	Red Box	94	1060	Difficult	Poor	Few	Excellent
<i>Eucalyptus leucoxyton</i>	Yellow Gum	90	1010	Difficult	Poor	Few	Excellent
<i>Eucalyptus gonicalyx</i>	Long-leaved Box	89	1010	Difficult	Poor	Few	Good
<i>Eucalyptus globulus</i>	Blue Gum	83	927	Fair	Fair	Few	Good
<i>Eucalyptus camaldulensis</i>	River Red Gum	81	915	Difficult	Poor	Moderate	Excellent
<i>Eucalyptus macrorhyncha</i>	Red Stringybark	80	890	Good	Good	Few	Good
<i>Eucalyptus sieberi</i>	Sivertop Ash	77	865	Good	Good	Few	Good
<i>Eucalyptus viminalis</i>	Manna Gum	76	855	Good	Good	Few	Good
<i>Eucalyptus radiata</i>	Narrow-leaved Peppermint	73	820	Excellent	Good	Few	Good
<i>Eucalyptus rubida</i>	Candlebark	70	785	Good	Good	Few	Fair
<i>Eucalyptus obliqua</i>	Messmate	69	771	Good	Good	Few	Good
<i>Acacia spp.</i>	Wattle	63	705	Excellent	Excellent	Few	Fair
<i>Eucalyptus regnans</i>	Mountain Ash	60	673	Excellent	Excellent	Moderate	Fair
<i>Callitris columellaris</i>	White Cypress Pine	60	673	Good	Excellent	Many	Poor
<i>Pinus radiata</i>	Radiata Pine	45	512	Fair	Excellent	Many	Poor

## Further Information

Agriculture note: *Growing Plantation Firewood*

## References

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