



Solid Biofuels Bulletin No. 7

# GRADED FIREWOOD



This bulletin, seventh in a series, introduces grades of firewood, the important parameters that can affect the fuel characteristics and their appropriate use. It provides information on the graded firewood as specified in the CAN/CSA-ISO 17225 Part 5 Graded firewood.

Firewood or cordwood is typically round or split log cut to short lengths and used for producing energy in household wood-burning appliances such as stoves, fireplaces and central heating systems. In the past 20 years, the available combustion technology for producing energy from wood has improved dramatically. One of the requirements for advanced systems to meet efficiency and emissions targets is that firewood meets certain specifications or standards.

## Origins and Sources

Firewood is typically sourced from local forests and sold within the region. In order to meet agreed upon national standards such as CAN/CSA-ISO 17225 Part 5 Standard<sup>1</sup>, Grade A1 firewood can only be sourced from stem wood (Classification 1.1.3) and chemically untreated wood residues from the wood processing industry (Classification 1.2.1). Sources for Grades A2 and B, in addition to the sources used in Grade A1, can include logging residues (Classification 1.1.4), and whole tree without roots (Classification 1.1.1). For further details on the origins and sources, refer to Natural Resources Canada Solid Biofuels Bulletin No.2 – Primer for Solid Biofuels<sup>2</sup>.

## Key Parameters

Firewood is usually sold on a volume basis, such as a full cord. A neatly stacked cord of wood is 4 feet by 4 feet by 8 feet, or 128 ft<sup>3</sup>, or 3.6 m<sup>3</sup>. The volume of solid wood is estimated to be about 70%, due to air gaps between the logs. All other factors being equal, moisture has the

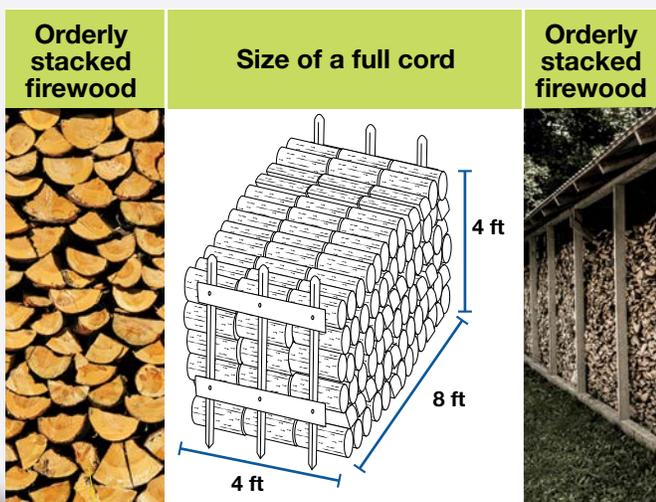
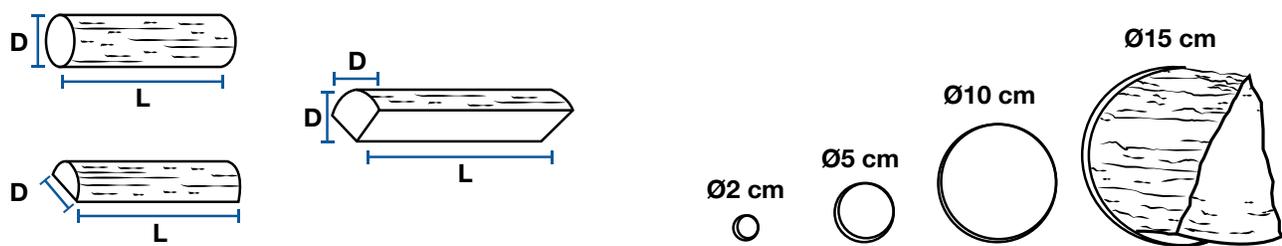


Figure 1. Firewood seasoning and storage sheds



**Figure 2.** Measurements for firewood diameter and length<sup>1</sup>

**Table 1.** Key specifications of graded firewood based on CAN/CSA-ISO 17225 Part 5 Standard<sup>1</sup>

Property Class	Grade A1		Grade A2		Grade B	
Wood Species	TO BE STATED		TO BE STATED		TO BE STATED	
Single Piece Length, L*	L30	30 cm ± 2 cm	L30	30 cm ± 2 cm	L30	30 cm ± 2 cm
	L40	40 cm ± 2 cm	L40	40 cm ± 2 cm	L40	40 cm ± 2 cm
	L50	50 cm ± 4 cm	L50	50 cm ± 4 cm	L50	50 cm ± 4 cm
	L100	100 cm ± 5 cm	L100	100 cm ± 5 cm	L100	100 cm ± 5 cm
Single Piece Diameter, D**	D2	≤ 2 cm	D2	≤ 2 cm	D15	5 cm to 15 cm
	D5	2 cm to 5 cm	D5	2 cm to 5 cm	D15+	> 15 cm
	D15	5 cm to 15 cm	D15	5 cm to 15 cm		<i>(actual value to be stated)</i>
	D15+	> 15 cm <i>(actual value to be stated)</i>	D15+	> 15 cm <i>(actual value to be stated)</i>		
Moisture (M) (weight % as received, wet basis)	M20	≤ 20%	M20	≤ 20%	M25	≤ 20%
	M25	≤ 25%	M25	≤ 25%	M25	≤ 25%
				M35	≤ 35%	

\* The specifications listed are for the most common lengths but additional lengths are possible.

\*\* The diameter class should contain 85% of the firewood. For example, if 85% of the wood passes through a 5 cm hole, it would be classified as D5. For stoves, it is recommended to use firewood with a diameter less than 15 cm. D2 and D5 are recommended for cookers and as kindling.

greatest impact on the energy content of wood. Most firewood has similar energy content on a dry mass basis. Firewood with about 25% moisture content is ideal for efficient burning.

Seasoning is a commonly used term which refers to the drying of the firewood using wind and sunlight. Splitting wood increases the surface area for drying and reduces the amount of time required to dry the firewood. Properly stacked firewood will need an area with good air circulation for seasoning. Storage of the seasoned wood is also important. The firewood should be protected from rain and snow as shown in Figure 1.

For proper combustion, firewood consistent in length and matched to the size of the firebox of the stove, furnace, boiler or fireplace should be used (based on the manufacturer's recommendations).

## Specifications of Properties for Graded Firewood

When sourcing firewood, the label terminology includes origin and source, wood species, moisture (M), length (L), and the diameter (D). For example, firewood described as M25, L30, D15 would have moisture content less than 25%, length of 30 cm and diameter of 5–15 cm.

It is possible to measure moisture content using a hand-held meter, but these have limited accuracy. It is more accurate and precise to use oven drying method. Diameter can be measured by passing the firewood through a series of graduated circular holes (see Figure 2).

## Safe Handling and Storage of Firewood

Firewood is a combustible material, so care should be taken to ensure it is stored away from potential ignition sources. Care should also be taken so that invasive species are not inadvertently transported when sourcing or moving firewood from other locations. Heat treatment of firewood can significantly reduce the risk of invasive species migration.

## References & Links

1. CSA Group at [www.csagroup.org](http://www.csagroup.org) for CAN/CSA-ISO 17225 Solid biofuels — Fuel specifications and classes — Part 5: Graded firewood, and, — Part 1: General requirements.
2. Natural Resources Canada – [www.nrcan.gc.ca](http://www.nrcan.gc.ca) for the Solid Biofuels Bulletins Series.

## Acknowledgement

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