Instructions for measuring the internal moisture content of wood under the ***Environmental Protection (Solid Fuel Heater and Firewood) Regulations 2018.***

1. Purpose

This document contains the instructions for measuring the internal moisture content of wood as specified under regulation 14 of the *Environmental Protection (Solid Fuel Heater and Firewood) Regulations 2018* (Regulations).

The Department of Water and Environmental Regulation (DWER) will apply these instructions when assessing compliance with Part 3 of the Regulations.

2. Legislative Context

Part 3 of the Regulations applies in the area bounded by the low water mark of the Indian Ocean and the local government districts of Wanneroo, Swan, Mundaring, Kalamunda, Armadale, Serpentine-Jarrahdale, Rockingham and Mandurah (including those districts) by virtue of regulation 9.

Under regulation 10, a person must not sell as domestic firewood any wood with an internal moisture content of more than 20 per cent (calculated on a wet basis), except –

a) in accordance with a permit authorising the person to do so; or

b) to a firewood wholesaler or retailer

Under regulation 11, a person who keeps wood with an internal moisture content of more than 20 per cent (calculated on a wet basis) for future retail sale by that person as domestic firewood must keep that wood –

a) separate from dry firewood that is for sale; and

b) clearly marked as being not for sale because it does not meet environmental moisture content standards.

Under regulation 14, the internal moisture content of wood must be measured in accordance with the *Instructions for measuring the internal moisture content of wood* published by the CEO.

A person who contravenes regulations 10 or 11 of the Regulations commits an offence, with a penalty of $5000.

3. Firewood Piece Selection

Where firewood is available for sale in larger pieces intended for splitting by the householder before it is burnt, each of these larger pieces should be considered as a single piece of firewood for the purposes of moisture measurement.

Ten (10) pieces of firewood are to be collected by the DWER officer and/or inspector from the firewood supplier's premises under investigation by DWER from varying depths from within the firewood pile, or firewood piles (if there are multiple firewood piles at the premises).

Each firewood piece shall:

a) have any bark removed;

b) be placed in a separate plastic bag and sealed so that it is airtight, to prevent moisture loss; and

c) be taken to an approved laboratory for sample preparation and oven drying.

4. Approved Laboratory

Firewood preparation and the oven drying procedure must be completed in an approved laboratory. For the purpose of these instructions, an approved laboratory will be:

a) accredited with the National Association of Testing Authorities Australia; or

b) a laboratory that the CEO considers on reasonable grounds is competent to conduct the sample preparation and oven drying of firewood samples.

5. Firewood Sample Preparation

Firewood samples shall be prepared for the determination of the internal moisture content of firewood via the oven drying procedure.

After removal from the sealed plastic bag, three (3) representative samples of each firewood piece shall be prepared in accordance with the following requirements:

a) Samples shall incorporate the entire cross section of the firewood piece.

b) The samples shall be cut with a sharp saw, and care shall be taken to avoid loss of moisture through overheating.

c) Each cross section sample shall be cut perpendicular to the long axis of the firewood piece and adjacent to the end of the firewood piece, but not less than 50 mm from the end.

d) The cross-sections shall be 15 mm to 30 mm in length.

e) Firewood samples that include wood knots, resin pockets or any other unusual characteristics or features that constitute greater than a 10 per cent proportion of the overall firewood sample shall not be used for testing.

f) Firewood is to be weighed within 30 minutes of preparation.

g) All firewood samples are to be labelled for identification purposes.

6. Oven Drying Procedure

The internal moisture content (%) of firewood is expressed as the loss in mass (moisture) as a percentage of the initial mass of the firewood. This reflects the wet basis method for calculating the internal moisture content of firewood, which is as follows:

a) The firewood samples should be weighed to within 0.1g

b) Each firewood sample is to be placed in a drying oven with a temperature in the range of 103 ± 1°C and dried to a constant mass. A constant mass is determined by weighing the firewood samples periodically until there is no further mass loss (<0.2g difference).

c) Each oven dried firewood sample should be weighed to within 0.1g and the moisture content should be calculated and recorded for each firewood piece.

The formula to calculate the internal moisture content (MC) wet basis (wb) is:

$$MC\%_{wb} = \frac{\text{initial mass} - \text{oven dry mass}}{\text{initial mass}} \times 100$$

d) The mean moisture content of each firewood piece should be determined by calculating the mean of the firewood samples (see Appendix 1).

e) The overall moisture content (wet basis) of the firewood premises will be determined by calculating the average of the means of the ten (10) firewood pieces (see Appendix 1).

7. Test Report

The approved laboratory will prepare a test report which shall include the following information:

a) Firewood wood species (if known).

b) Identification of the firewood tested (e.g. sample identification number).

c) The oven drying method used for calculating MC (i.e. oven drying wet basis method)

d) Date(s) on which the oven drying tests were undertaken.

e) All results of the oven drying tests and calculations, which are to be presented as per the oven drying calculation sheet in Appendix 1).

f) Approved laboratory name.

g) Name of the person responsible for preparing the firewood samples, and for calculating the internal moisture content of the firewood.

Appendix 1 Oven Drying Calculation Sheet

The result of the internal moisture content (MC %wb) measurement for each firewood sample is to be recorded in the below calculation sheet. The results will be used to determine the average overall internal moisture content of the firewood premises.

Firewood Piece	Firewood Sample A (MC $\%_{wb}$)	Firewood Sample B (MC $\%_{wb}$)	Firewood Sample C (MC $\%_{wb}$)	Firewood piece mean (MC $\%_{wb}$) [1]
1				
2				
3				
4				
5				
6				
7				
8				
9				
10				
			Overall MC $\%_{wb}$ of firewood premises[2]	

[1] Firewood piece mean MC %wb = $\frac{\text{firewood sample A + firewood sample B + firewood sample C}}{3}$

[2] Overall MC %wb = $\frac{\text{firewood piece mean 1 + firewood piece mean 2 …+ firewood piece mean 10}}{10}$

More information

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