

Sampling and preparation for EMC analysis | ThermoTreat 2.0

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Introduction

This guideline was prepared to aid correct sampling and preparation of wood for determination of equilibrium moisture content across hard and softwood species.

Sampling follows NWPC Doc. 3 part 4 (2017), but does not discriminate between sap- and heartwood. For that reason the sampling method can be used for all wood species.

The preparation of samples before analysis of equilibrium moisture content (EMC) follows the scope of ISO 3130 (1975), but with different sample sizes. Relevant sample sizes for solid as well as ground wood are given in this guideline.

Sampling

According to NWPC Doc 3 part 4 (2017) section 11.3.1 the following number of samples should be selected for third party as well as internal batch control:

Batch size	Number of samples to be taken from the batch
5* - 150	5
151 – 500	8
501 – 3 200	13
3 201 – 35 000	20
35 001 – 500 000	32
> 500 000	50

* If the batch consists of less than 5 units, every piece of timber shall be subject to sampling.

Preparation

Each sample shall be taken from a modified board or plank not closer than 500 mm from the end grain. Moreover, sampling shall be done no closer than 100 mm from knots, resinous areas or other obvious abnormalities. From each sample a sub-sample cross section of max. 5 mm width is obtained. Depending on analysis method, the sub-samples can be used directly or ground to wood flour.

Solid samples for determination of EMC in climate chamber

The solid cross sections are cleaned from saw dust and dried at 103 °C for 16 hours. If cross sections weigh more than 10 g individually, the drying time must be prolonged to secure acquisition of constant mass.

The total mass of all oven dry cross sections is recorded (A) to nearest 0,01 g. The cross sections are hereafter placed in a metal foil container and equilibrated at 65 % relative humidity and 20 °C. Normally, this should take around seven days. Equilibrium is defined as per ISO 3130 (1975).

The total mass of all equilibrated cross sections is recorded (B) to nearest 0,01 g.

$$EMC_{65\%;20\text{ }^{\circ}\text{C}} = 100 \% \times (B-A)/A$$

Ground samples

If samples are to be analysed using Dynamic Vapor Sorption (DVS), all cross sections shall be ground to ø 1 mm wood flour and dried to constant mass prior to analysis. After drying a representative sub-sample of 3-4 g is extracted from the full sample and transported to the analytical laboratory in a plastic zipper bag. The analysis should be started within 30 minutes from end of drying. The isotherm should preferably contain 3 or 4 points of relative humidity, e.g. 25, 50, 65 and 85 %, and the mass of the analyzed sample shall be between 20 and 40 mg.

Literature

ISO 3130 (1975): *Wood -- Determination of moisture content for physical and mechanical tests.* International Organization for Standardization.

NWPC Document 3 (2017): *Nordic requirements for quality control of industrially protected wood. Part 4: Modified wood.* Nordic Wood Preservation Council.