A Simple Heat and Vent Kiln to Finish Air Dried Timber

Timber that has been freshly felled will contain more than half its weight in water, often referred to as “green”. Timber shrinks as it dries and expands as it re-adsorbs moisture. Therefore the purpose of drying timber is to create a stable, useable product suitable for its end use. Different products require different “moisture contents”, which is the amount of water remaining in the timber, usually stated as a percentage of dry weight.

The British Standards are:

BS EN 942	Category Sub-category based on in-service climates	Average moisture content in service
External Joinery		12 – 19%
Internal Joinery	Unheated buildings	12 – 16%
	Buildings with heating providing room temperatures of 12 - 21° C	9 – 13%
	Buildings with heating providing room temperatures in excess of 21° C	6 – 10%

From WIS 4-14: Moisture in timber TRADA Technology 2011

Drying can be carried out very quickly by “kiln drying” or more slowly by the natural drying process referred to as “air dried”.

Sawn timber, stacked and stickered, can be air dried in well ventilated shelter to moisture content of 16 - 20% in one to twelve months depending on - the season, the timber species and its thickness. If this timber is to be used internally it needs to be dried further to suit its final usage.

To dry large volumes of timber quickly requires substantial investment, technical expertise and commercial kilns. If drying time is not an issue, then very good results can be achieved with simple equipment.

Most kiln-drying is achieved by circulating warm dry air through packs of timber, venting the air as it becomes laden with moisture and replacing with drier air, in a controlled manner so as not to cause degradation of the timber. (Bow, twist, cupping, checking, splitting, casehardening) **Figure 1**

Any **insulated box** can be used to build a simple **Heat and Vent Kiln** (H & V Kiln) which will dry timber to a final moisture content of 10 - 12%.

The basic rules are:-

· The kiln temperature must be maintained close to 30°C at all times.
· The relative humidity in the kiln is kept close to 55% RH
· The timber must be loaded into the kiln with the stickers spaced 300 - 450mm apart, starting and finishing right at the ends of the pack. **Circulating fans** must ensure an even flow of air through the drying timber. **Figure 2**

Greenhouse tubular heaters, linked and controlled by a **thermostat,** are the simplest method of maintaining the correct temperature in a small H & V Kiln.

Humidity is maintained by venting moist air either with **manual vents** or an **extractor fan** activated by a **humidistat**. (Warm vented air from the kiln can help heat the workshop)

Thermostat and vent settings are best monitored using a separate **digital thermometer/hygrometer.**

The airflow from the **circulating fans** should be directed via a **curtain** and **baffles**.

The progress of the drying timber is monitored using a **timber moisture meter.**

Timber is retained in this drying environment until it has reached the required moisture content.

Note - Ensure all electrical fitting are undertaken by a suitably qualified, competent person to current standards.

If you would like to build your own kiln – guideline drawings are available from Coed Cymru

Figure 1

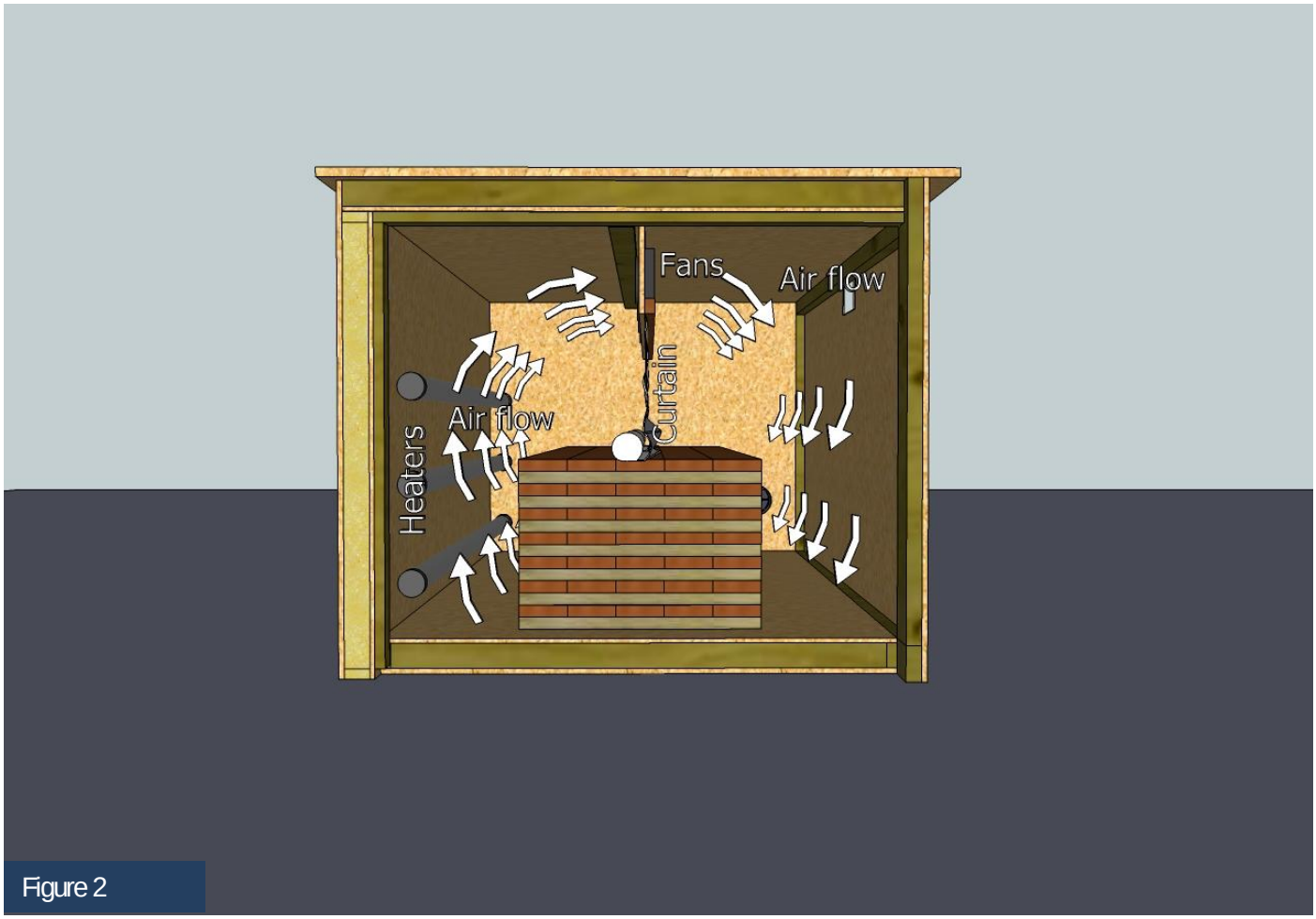

Figure 2

It is possible to accelerate the drying process by increasing the temperature or reducing the humidity but this carries the risk of damage to the timber structure. For guidance see EMC graph.

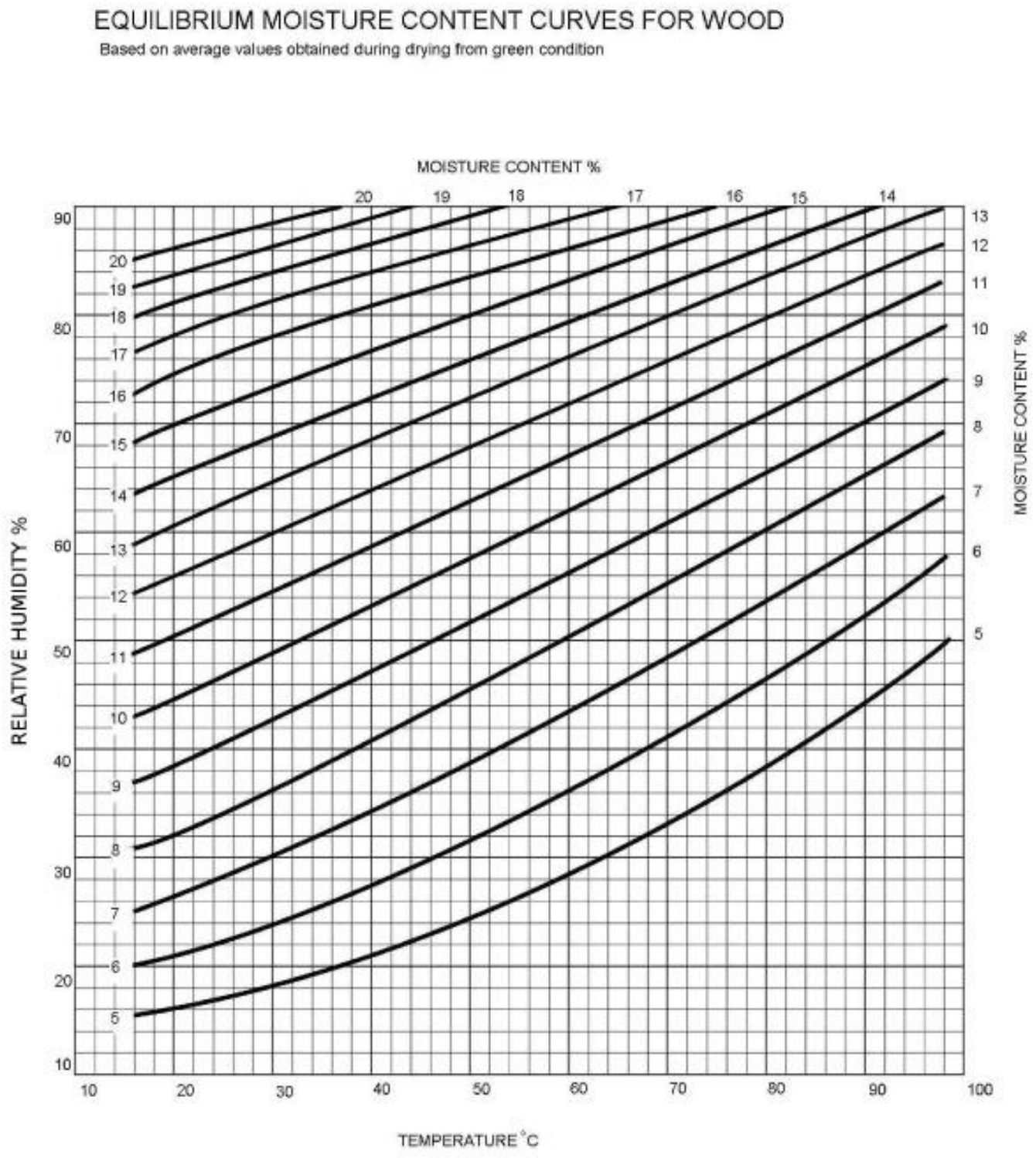

Figure 3: Average emc values of timber over a range of temperature and humidity Data is based on average values obtained during drying from 'green' (wet) condition
From WIS 4-14: Moisture in timber TRADA Technology 2011

Suggested reading

WIS 2/3-28: Introducing Wood	TRADA Technology 2003
WIS 4-14: Moisture in timber	TRADA Technology 2011
Woodland Owners Handbook	Coed Cymru