

Manufacturing...

The Kiln Drying Process.

Australian Hardwood Flooring Manufacturers.

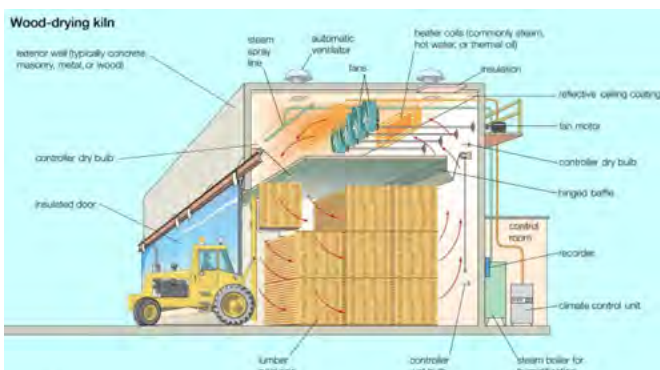
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I guess I need to start this article with a few words to our industry colleagues in Victoria with the abhorrent decision to close another world class sustainable industry. One day I hope the politicians hang their head in shame at the pathetic legacy they have left in their wake. So, to my colleagues and industry friends in Victoria, we stand with you in our disgust at this decision, and share your pain. I just cannot believe there will be no more 'Vic Ash' products to showcase to the rest of the world.

But onto flooring, and after managing the process of preparing your timber to go into the final phase of drying, we enter the kilns. There are many types of kilns and various methods to generate the heat to dry the timber from fibre saturation to the desired MC.

Most flooring manufacturers use compartment kilns, and I speak in general terms here – where we load a single species, and normally one end section / size to achieve the best result with the absolute minimum variation, without causing stresses in the timber. When I hear someone say, “we have no variation” with our flooring, I find that almost impossible to believe, because again we cannot measure every single piece with 100% accuracy to make such a statement. One would expect there to be at least 1-2% variation, with most being at the target MC.

The three things we control are temperature, airflow and humidity within the kiln chamber – thus giving a controllable atmosphere where we can monitor the progress of the charge throughout the process until we have the required result. The timber must be stacked inside the chamber to allow the correct airflow, so specific pack spacing and 'baffles' allow, or force, the air to flow through the packs and not around them, thus giving an even drying process.



To determine the initial MC of the timber entering the charge, we complete 'oven dry tests' for charge sample pieces taken from strategic locations within random packs, giving us a starting MC. The oven dry process is where we take the 6-8 sample pieces, usually around 500mm long from the centre of the chosen boards from the pack. Here we then take another piece from the end of these, around 10-20mm thick, and weigh these on scales that go to the 1/1000th of a gram. We take the initial weight, and then place the pieces into an industrial oven where we set the temp at 103°C and leave in the oven for 24 hours. We then re-weigh them, noting the difference in weight – here we assume the samples are now at 0% MC, and we then place them in for another 3-4 hours and weigh again, and if they have not changed in weight we are then guaranteed that they are 0% MC. This allows us to determine the initial MC and calculate the weight of the samples to achieve the final MC. It doesn't matter what species it is, water weighs the same, so by removing 100% of the water from the samples, we can determine with 100% accuracy the moisture content of the sample. Depending on the kiln schedule and initial MC, the time in the kilns for each charge is determined. At low temps (under 60°C) this can be up to or in excess of two weeks; and at higher temps (up to 80°C) it can be under one week – so much slower than a softwood framing charge, which is done in hours.

Now some species – usually the lower dense southern species in particular – require reconditioning prior to entering the kilns after air drying, and this process corrects the collapse in these species. This is done by using 'saturated steam' in a reconditioning chamber similar to a kiln chamber – where the temperature (above 90° but below 100°) and air saturation, can be controlled to correct the collapse. This process must be very carefully monitored from many perspectives, as severe issues can occur, especially if the timber is not at fibre saturation, or even too dry, where case hardening can occur and cause massive losses. Once reconditioned, the timber can be conventionally dried in a kiln as per normal drying practices.

There are varying control systems for kilns – from fully automatic PLC systems to basic manual systems – but as long as they accurately show temperature and humidity, they give the kiln operator the information needed to make decisions on the charge.

The kilns are as important to maintain and keep in perfect working order as planers are to accurately machine the flooring. Keeping them clean and in excellent working order is vital to achieving the results needed to produce flooring that will perform as expected and required.

Next issue I will explain the machining process.

Thanks and cheers! 🇺🇸

Ross