



**FORESTRY COMMISSION PLANT HEALTH SERVICE
INFORMATION NOTE 1 (Revised June 2003)**

VERIFICATION OF HEAT TREATMENT FACILITIES AND AUTHORISATION OF THE USE OF THE DB-HT MARK TO COMPLY WITH THE INTERNATIONAL STANDARD FOR PHYTOSANITARY MEASURES ISPM 15¹.

KILN-DRYING

It is recognised that the marking of wood packaging material with the initials ‘**KD**’ (Kiln dried), which signifies that timber has a moisture content of less than 20% achieved under an appropriate time and temperature regime, is required for commercial reasons, eg in the food industry. It is also required as a landing requirement under Plant Health legislation for certain categories of sawn wood. However, if the process of kiln drying timber does not involve the core temperature of the wood reaching a minimum of 56°C for 30 minutes, then the process will not be approved as meeting the requirements of the International Standards for Phytosanitary Measures – Guidelines for Regulating Wood Packaging Material in International Trade – ISPM 15. This is because the heat treatment process is aimed at eliminating a wider range of quarantine pests and diseases than are dealt with by kiln drying, which does not stipulate any minimum temperature requirements.

‘HT’ VERIFICATION PROCESS

Verification is a relatively straightforward process and requires the checking of the wood core temperature at various points throughout the charge (timber stack) during a typical run, i.e. involving the usual quantities of pallets or sawn timber. The test will need to be replicated - once should be sufficient unless the results are significantly different from the first run to raise questions. Where it can be demonstrated that other chambers on the same site (multi-chamber sites) have the same control system, boiler, geometry and specification they will also be approved for heat treatment at the same time as the chamber undergoing the 13-probe test. The criteria for assessing other chambers as being of the same geometry etc as the chamber being subjected to the 13 probe test on a multi-chamber site is provided at Appendix 2. It should be noted, however, that as with the chamber being subjected to the initial 13-probe assessment, all chambers will be required to have one probe placed in each charge for continual monitoring purposes.

NB: As most de-humidification kilns run at temperatures between 45-55°C, due to the limitations of the refrigerant gases, they are unlikely to be able to generate the conditions necessary to achieve HT status.

AUTHORITY TO USE THE ‘DB-HT’ MARK

While it is optional under ISPM15 to require debarking in addition to heat treatment, in the expectation that many countries will require this additional safeguard (including the EU), it has been decided that under the rules of the UK Wood Packaging Material Marking Programme (UKWPMMP), the use of debarked wood and the associated code ‘**DB**’ will be mandatory. Applicants must therefore be able to demonstrate that they can provide documentary evidence (i.e. industry, mill, phytosanitary certificates) to show that the wood supplied has been debarked as well as heat treated. Alternatively, the manufacturer will need to be able to demonstrate that an appropriate inspection system is in place to inspect all wood before it is utilised and that measures are in place to either remove all pieces with bark, or otherwise remove the bark.

¹ “Guidelines for Regulating Wood Packaging Material Used in International Trade” – ISPM 15. Published by the Food and Agriculture Organization, Rome, 2002. Can be viewed on the FAO website at www.ippc.int/servlet/BinaryDownloaderServlet/ISPM15.pdf?filename=1055161712885_ISPM15_e.pdf.

NB: Strictly speaking, to meet the requirement of ISPM15 and qualify for the use of the DB mark, wood has to be produced from debarked logs. However, as the same outcome is achieved where residual bark is removed after the sawing process and before the wood packaging material is marked, this will be accepted.

For the purposes of authorising the use of the 'HT' (heat treated) component of the mark on wood or wood packaging, it will be necessary to carry out time and temperature tests to ensure that the prescribed specification is achieved during normal heat treatment or kiln-drying cycles. Use of the mark is an attestation that each component covered by the mark has been treated in a process whereby the core of the wood has been heated to a minimum of 56°C for at least 30 minutes.

HARDWOODS AND SOFTWOODS

It is not necessary to carry out separate tests for different genera or species of softwood (coniferous), or different genera or species of hardwood (non-coniferous). However, if both softwoods and hardwoods are to be heat treated using the same chamber, then separate tests will need to be carried out on each in order to ascertain which has the slowest heat penetration to the wood core. This will determine the minimum conditions to be employed for mixed hardwood and softwood batches.

NB: for this purpose wood of Poplar (*Populus* spp.) shall be regarded as a softwood.

TEMPERATURE PROBES

Probes shall be located at various points throughout the timber stack (charge), recording temperatures at the corners and the centre of the charge. There shall be an absolute minimum of 13 probes in the charge (see attached diagram at Appendix 1). Responsibility for supplying the temperature recording and monitoring equipment will rest with the company being assessed. The following criteria must be met during the 13 probe tests:

1. Details of the dimensions (length, height and width) and tree species of the thickest pieces of timber pallet blocks should be provided and this should include details of the length of the wood in the packs if it is not fabricated pallets that are being treated.
2. UKAS certified and calibrated data logging equipment shall be used, such as K-Type Thermister probes or other similar steel capped types.
3. Temperature probes shall be inserted into holes drilled into the centre of the wood (i.e. the centre of the wood as measured by the shortest distance from the outside). Unless metal capped probes are used each hole shall be backfilled with a heat resistant substance to avoid contamination of the wood core temperature readings by ambient air temperature. The holes should be no larger than is necessary to accommodate the diameter of the probe
4. Where metal capped probes are used, larger (preferably 4.2mm) diameter holes should be drilled to accommodate a slightly smaller diameter probe - 4.0mm probes have been found to be very practical. Fresh wood expands back into the hole once the drill is removed. The specification of the metal capped probe negates the need to back fill the hole and ensures that the core temperature is measured. The length of the probe should be appropriate for the depth/cross sections being measured.
5. Probing close to nails should be avoided, as heat transfer along the nail will interfere with the integrity of the temperature recorded by the probe.
6. The positions of the probes should be placed precisely as shown in the schematic diagram provided at appendix 1 and the probes should be numbered accordingly. It is essential that each numbered probe is in precisely the same position within the heating chamber for each run.

7. The initial test run and the verification run should be identical in terms of the species, dimension, volume of the timber in the charge and stickering.
8. Details of the species of wood being treated should be provided and only the wood boards need be probed if composite blocks are being used in a charge of fabricated pallets. The precise composition of the pallets should be described if there is a mix of composite and solid wood employed during manufacture.
9. Details of the dry and wet bulb temperatures, fan direction and air speed (if possible) should be provided, as should confirmation of whether or not venting of the kiln has been performed. The data should be provided at least every 30 minutes for the duration of the run, until the temperature recorded by the probe in the timber in the slowest part of the chamber to warm up reaches 56°C at the core and maintains at least this temperature for 30 minutes. In this way, a clear idea of temperature accumulation in the air space of the chamber and also within the wood itself can be built up. Heat accumulation will depend on the ambient air temperatures (summer/winter), the thickness of the wood, its relative humidity and the temperature and humidity of the chamber itself etc. For a given chamber temperature, the higher the relative humidity the faster the heat penetration to the core of the wood. The essence of HT is that the wood is heated as quickly as possible and that it does not undergo any significant drying, which could lead to distortion or cracking. In order to achieve these conditions the wet bulb depression (i.e. the temperature difference from the dry bulb) should not exceed 5°C. The variability in heat build-up will be relatively specific to the chamber and will give a good indicator of chamber performance. For verification purposes, the results from the probes in the replication run only should be used.
10. The FC will investigate significant differences reported in the initial test and verification runs.
11. The initial 13 probe assessment results will be passed to Forest Research for analysis on a model software package (Timber Therm).

Continual Monitoring Post the Initial 13 Probe Test

- a. Continual monitoring will be compulsory with one probe in each run placed in the most dense piece of timber in the slowest part of the kiln to warm up, as determined during the initial 13 probe test.
- b. If fabricated pallets are to be heat-treated the probe will be placed at right angles in the block (if solid wood) and avoid contact with nails. If composite blocks are used the largest cross section board will be probed instead. Boards will be drilled and probed in the narrow side.
- c. 'K' Type, 4.0mm 'Thermister' metal capped probes OR SIMILAR must be used.
- d. It will be essential to record the air/dry bulb temperature for each run as well and keep the records for auditing purposes.
- e. The probe and datalogging equipment shall be calibrated every 12 months by a UKAS approved body. Calibration certificates shall be kept and produced to assessors during assessment visits.
- f. Heat Treatment Kiln facility locations will be required to write locally operating systems which must be produced to the assessors during any assessments (a model example is provided at Appendix 3). The Forestry Commission will not specify the content of these but it is expected that they will include instructions on setting kiln parameters, setting HT penetration probes to measure core temperature, preparing datalogger for HT process determining end point of HT process and retrieval of data.

CONFIRMATION OF AUTHORITY TO USE THE DB-HT MARK

At the conclusion of the tests the assessors shall satisfy themselves from observations of the test methodology, test equipment used and the trial records produced that all dimensions of wood tested and, where appropriate, kinds of wood (softwood or hardwood), have reached a minimum core temperature of 56°C for at least 30 minutes. Additionally where appropriate the applicant must be able to satisfy the assessor, beyond all reasonable doubt, that authority to use a specific mark can be given. Once satisfied the assessor must confirm in writing that authority to use the HT mark is approved for material heat-treated in accordance with the process used (eg, chamber, maximum wood thickness, dry/wet bulb temperatures/treatment time etc). Where appropriate, the approval must be qualified to exclude authority to use the mark on any thicker dimensions or kinds of wood where there is no evidence that the prescribed requirements have been met during the trial. For example, where the trials have been carried out exclusively using softwoods, the authorisation must make it clear that it does not include hardwoods.

SUSPENSION OR WITHDRAWAL OF AUTHORITY TO USE THE DB-HT MARK

If, during an assessment visit, the assessors determine that the requirements for verifying that wood is free of bark and being heat treated according to the requirements set out in this note are not being met, they may, depending on the nature of non-compliance, either suspend or withdraw authority to continue to use the DB-HT mark. In addition, they may require that any or all product on the premises that has been marked have that mark obliterated or otherwise treated to ensure compliance.

It shall be the right of each participant in the UKWPMM Programme to appeal against any finding of non-compliance. Appeals shall be made to the Forestry Commission or the Forest Service without delay and shall be investigated on site by them as soon as practicable. The assessor who carried out the relevant assessment shall accompany the Forestry Commission or Forest Service officer and shall explain and/or demonstrate the reason for non-compliance. In the event that the appeal is upheld, no fee shall be charged to the facility and the assessment agency shall be responsible for the costs of the visit. In the event that the appeal is dismissed, the appellant shall be responsible for the costs of both the assessment agency and the Forestry Commission or the Forest Service, whose decision regarding the outcome of an appeal shall be final.

VERIFICATION OF PURCHASED HEAT TREATED TIMBER

This Information Note solely deals with the process involved in the verification of heat treatment facilities operated by companies applying for approval to use the IPSP 15 'HT' mark. If a company wishes to receive approval to use the DB-HT mark on wood packaging articles made from heat treated timber which has either been purchased in this country or from abroad then reference should be made to our separate Information Note which covers the documentary evidence checking process.

It should be noted that the purchase of heat treated timber does not infer that it has been produced from debarked logs. Operating systems shall need to be in place to ensure that the visual inspection for the absence of bark² (and the removal of same) are in place before the DB-HT mark is applied to the product.

² "bark", as defined for this purpose, does not include the vascular cambium layer, ingrown bark around knots or bark pockets between rings of annular growth

FURTHER INFORMATION

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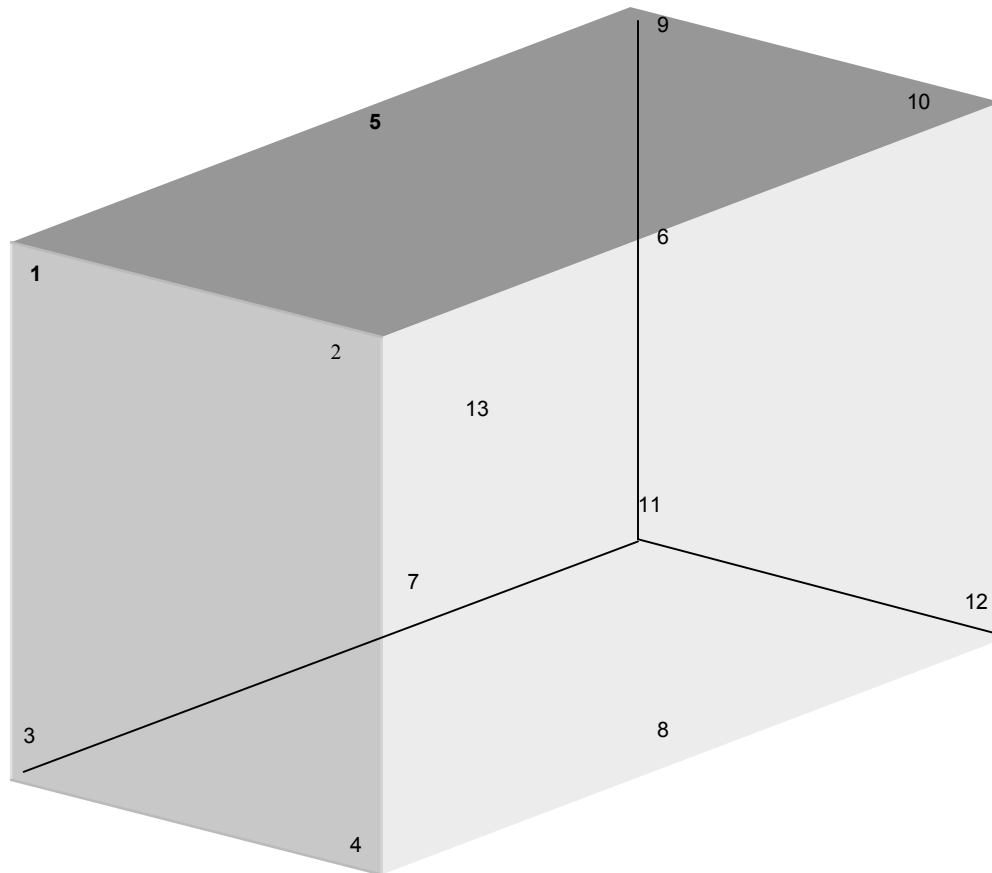
Plant Health Service

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**Forestry Commission Plant Health Service – Information Note
Verification of Heat Treatment Facilities and Authorisation of the Use of the HT Mark**

3- D Plan of Charge ie timber stack showing Position of Probe



Probe Number	Position of Probe
1	Top
2	Top
3	Bottom
4	Bottom
5	Top
6	Top
7	Bottom
8	Bottom
9	Top
10	Top
11	Bottom
12	Bottom
13	Centre

Criteria for Assessment of other Chambers on Multi Chamber Sites

Kiln Dimensions ()

- Length (..... mm)
- Height (.....mm at front, at back)
- Width (m)
- Location of Ceiling above stack (refer to drawing if appropriate)
- Location of Fans (refer to drawing if appropriate)
- Location of Heaters (refer to drawing if appropriate)
- Location of Air Vents (refer to drawing if appropriate)
- What type of material has been used for the kiln walls ()
- What type of insulation has been applied to the kiln walls ()

Kiln Operations

- Fan Capacity (Number of fans = Total of = kW)
- Available heating capacity ()
- Common boiler system (yes/no)
- Type of heating elements ()
- Type of air vents (No. and type, plus No of forced evacuation dampers if appropriate)
- Type of control system ()
- Kiln control sensors

Type (Wet/Dry Bulb Sensors)

- Number and Location (No. of wet/Dry bulb stations = see plan for location)
- Used for feedback control ? (Yes- only for monitoring, raising alarm etc or No)

MODEL EXAMPLE OF HT FACILITY SITE OPERATING SYSTEM

Instructions for Heat Treatment (HT) of Timber or Fabricated Wood Packaging Material

The purpose of the site's operating system is to ensure that those authorised to operate and maintain the Heat Treatment process, at the site, understand how to do so correctly. An important part of this process is to secure appropriate data and detail in order to support the traceability of all HT timber or WPM articles from customer to source.

Detailed procedures will be provided for the following areas of work and any others deemed appropriate by the heat treatment facility location -

1. Packaging of timber or WPM to be heat treated
2. Processing timber or WPM to be heat treated in approved chambers
3. Setting chamber parameters
4. Setting heat treatment penetration probe to measure core temperature
5. Preparing data logging equipment for heat treatment process
6. Determining end point of heat treatment process
7. Timber labeling/marketing
8. Storage of heat treated timber
9. Retrieval, recording and retention period of data