[1] *Member consultation 2011*

[2]

ISPM 15:2009 DRAFT REVISION OF ANNEX 1: APPROVED TREATMENTS ASSOCIATED WITH WOOD PACKAGING MATERIAL

[3]

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Current document stage	SC 2011-05 revised and approved for MC
Origin	Work programme topic, added by CPM-1 (2006): Revision of ISPM 15 (Regulation of wood packaging material in international trade) (2006-011-02). Related work programme submissions: *Sulfuryl fluoride fumigation of wood packaging material* (2007-101) added by SC 2010-11; *Microwave irradiation of wood packaging material* (2007-114) added by SC 2010-11
Major stages	2003-03 ICPM-4 adopted ISPM 15:2002 and requested that methyl bromide was to be reviewed SC 2004-11 approved Specification 31 2005-02 TPFQ requested Annex 1 to ISPM 15 to be modified based on recommendation by IFQRG 2005-04 SC approved revised Annex 1 to ISPM 15 for MC under fast track process 2005-11 SC-7 recommended Annex 1 to ISPM 15 to go to the SC without modifications (no formal objections received) 2005-11 SC recommended Annex 1 to ISPM 15 to go to CPM. CPM-1 (2006) adopted modifications to Annex 1 to ISPM 15 with modifications but requested that CPM members submit technical data to further revise and added revision of ISPM 15:2002 to the work programme 2006-06 TPFQ revised ISPM 15 2007-07 TPFQ revised ISPM 15 2008-05 SC-7 (acting as SC) approved ISPM 15 for MC 2008-11 SC recommended ISPM 15 to go to CPM CPM-4 (2009) adopted ISPM 15:2009 but retained the following subtopics on the work programme 1) criteria for treatments, which needed further research and 2) further guidance on fumigation in Annex 1 2009-06 TPFQ revised Annex 1 to ISPM 15 2010-09 TPFQ revised Annex 1 to ISPM 15 considering dielectric heat and sulfuryl fluoride treatments 2011-05 SC approved revision of Annex 1 to ISPM 15 to go for MC
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	Commenting is not open for paragraphs. Changes proposed for member consultation are marked with underline (additions) or strikethrough (deletions).

[4] This annex was adopted by the Interim Commission on Phytosanitary Measures in [Month Year].

The annex is a prescriptive part of the standard ISPM 15:2009.

[5] **ANNEX 1: Approved treatments associated with wood packaging material**

[6] **Use of debarked wood**

[7] Irrespective of the type of treatment applied, wood packaging material must be made of debarked wood. For this standard, any number of visually separate and clearly distinct small pieces of bark may remain if they are:

[8]
- less than 3 cm in width (regardless of the length) or
- greater than 3 cm in width, with the total surface area of an individual piece of bark less than 50 square cm.

[9] For methyl bromide treatment, the removal of bark must be carried out before treatment as ~~because~~ the presence of bark on the wood may affect ~~s the efficacy of the methyl bromide~~ treatment efficacy. For heat treatments, the removal of bark ~~can~~may be carried out before or after treatment.

[10] **Heat treatments**

[11] Various energy sources or processes may be suitable to achieve the required treatment parameters. For example, kiln-drying, heat-enabled chemical pressure impregnation, dielectric radiation (microwave, radio frequency etc.) or other treatments may all be considered heat treatments provided they meet the heat treatment parameters specified in this standard.

[12] NPPOs shall ensure that the treatment temperatures are monitored at a location likely to be the coldest to ensure that the target temperature is maintained for the duration of treatment. The coldest part of the wood may differ depending on the energy sources or processes applied. When using microwaves as a heating source, the coldest part of the wood is the surface.

[13] **Heat treatment using a conventional steam or dry kiln heat chamber (treatment code for the mark: HT)**

[14] When using conventional heat chamber technology, the basic requirement is to achieve ~~Wood packaging material must be heated in accordance with a specific time temperature schedule that achieves~~ a minimum temperature of 56 °C for a minimum duration of 30 continuous minutes throughout the entire profile of the wood (including at its core). ~~Various energy sources of processes~~

~~may be suitable to achieve these parameters. For example, kiln drying, heat enabled chemical pressure impregnation, microwave or other treatments may all be considered heat treatments provided that they meet the treatment parameters specified in this standard.~~

[15] This temperature can be measured by placing temperature sensors in the core of the wood. Alternatively, treatment schedules may be developed based on a series of test treatments during which the core temperature of the wood at various locations in the heat chamber has been measured and correlated with chamber air temperature to prove that a minimum temperature of 56 °C for a minimum duration of 30 continuous minutes throughout the entire profile of the wood is achieved. Treatment schedules should be specified or approved by the NPPO.

[16] When approving and auditing a heat treatment provider, the NPPO shall ensure that the following factors are appropriately addressed by those involved in treatment:

[17]

1. Heat chambers are sealed and well insulated, including insulation in the floor.
2. Heat chambers are designed in a manner that permits uniform flow of air around and through the wood stack. Wood to be treated is loaded in a manner that maximizes air flow around and through the wood stack.
3. Air deflectors in the chamber area and spacers between wooden units are used as required to maximize air flow.
4. Fans are used to circulate air during treatment.
5. The coldest location within the chamber is identified and temperature sensors placed at this location.
6. Where the treatment is determined based upon temperature sensors inserted into the wood, at least two temperature sensors are used. These temperature sensors should be suitable for measuring wood core temperatures. The use of multiple temperature sensors ensures that any failure of a temperature sensor is detected during the treatment process. The temperature sensors are inserted at least 30 cm from the end of a board and penetrate to the centre of wood, or in the centre of pallet blocks, to ensure that the temperature at the core is measured. The piece of wood with the largest dimensions should be used for this. Any holes drilled in the wood to place the temperature sensor are sealed to prevent interference in temperature measurement by entry of air at ambient temperature.
7. If the air flow in the chamber is routinely reversed during treatment, an increased number of temperature sensors are used to account for a change in the location of the coldest area.
8. Where treatment schedules are based on monitoring chamber air temperature and used for treatment of different wood types (e.g. specific species and sizes), these schedules should take into account the species and thickness of wood being treated. A minimum of two temperature sensors are used in chambers treating wood packaging according to treatment schedules.
9. Temperature sensors, including the measurement and recording equipment, are calibrated at a frequency specified by the NPPO.
10. Temperatures should be monitored and recorded during each treatment to ensure that the prescribed minimum temperature is maintained for the required period of time. If temperatures are not maintained, the treatment should be restarted or the treatment time extended and the temperatures raised to ensure that all wood has been treated to meet the requirements.
11. For purposes of auditing, records of heat treatments and calibration should be retained by treatment providers for a period of time specified by the NPPO.

[18] **Heat treatment using a dielectric heat chamber (treatment code for the mark: DH)**

[19] Dielectric heating is based on the alternating electrical field of the electromagnetic wave emitted by the dielectric radiation source (e.g. microwave or radio frequency). Chemical compounds with asymmetric charge distribution, so-called dipole characters (e.g. water), tend to orientate along this electrical field and oscillate with the electrical field (e.g. 2.45 MHz causes 2.45 million oscillations per second). The friction generated through this process converts electric energy into heat energy.

[20] Where the application of heat treatment is undertaken using dielectric radiation (e.g. microwaves), wood packaging material composed of wood not exceeding 20 cm in cross-section when measured across the smallest dimension of the piece must be heated to achieve a minimum of 60 °C for 1 minute throughout the profile of the wood. Heating to the prescribed temperature must occur within 30 minutes from ambient temperature.

[21] Treatment schedules shall be specified or approved by the NPPO.

[22] When approving and auditing a heat treatment provider, the NPPO shall ensure that the following factors are appropriately addressed by those involved in the treatment:

[23]
1. Irrespective of whether dielectric heat treatment is conducted as a batch process or as a continuous (conveyor) process, if the operator is measuring the surface temperature to estimate compliance with the prescribed standard, the operator should have initially validated through testing that the internal wood temperatures meet or exceed 60 °C for 1 minute through the entire profile of the wood (including its surface). For measuring the surface temperature at least two temperature sensors should be used.
2. For wood exceeding 5 cm in thickness, dielectric heating at 2.45 GHz requires bidirectional application or multiple waveguides for the delivery of microwave energy to ensure uniformity of heating. For wood less than 5 cm in thickness, uniformity of heating for the chamber should be tested and equipment modified as needed to ensure uniform heating.
3. Temperature sensors including the measurement and recording equipment are calibrated at a frequency specified by the NPPO.
4. For purposes of auditing the treatment provider, records of heat treatments and calibration should be retained by treatment providers for a period of time specified by the NPPO.

[24] **Methyl bromide treatment (treatment code for the mark: MB)**

[25] Use of methyl bromide should be undertaken taking into account the IPPC~~CPM~~ Recommendation on the r~~R~~eplacement or reduction of the use of methyl bromide as a phytosanitary measure (CPM, 2008). NPPOs are encouraged to promote the use of alternative treatments approved in this standard[1].

[26] The wood packaging material must be fumigated with methyl bromide in accordance with a schedule that achieves the minimum concentration-time product[2] (CT) over 24 hours at the temperature and final residual concentration specified in Table 1. Slight increases in the treatment time (e.g. 1–2 hours) may be permitted to achieve the required CT if the minimum final

concentration is not met. This CT must be achieved throughout the wood, including at its core, although the concentrations would be measured in the ambient atmosphere. The minimum temperature of the wood and its surrounding atmosphere must be not less than 10 °C and the minimum exposure time must be not less than 24 hours. Monitoring of gas concentrations must be carried out at a minimum at 2, 4 and 24 hours. (In the case of longer exposure times and weaker concentrations, additional measurement of the gas concentrations should be recorded at the end of fumigation).

[27] **Table 1:** Minimum CT over 24 hours for wood packaging material fumigated with methyl bromide

[28]

Temperature (°C)	CT (g·h/m³) over 24 h	Minimum final concentration (g/m³) after 24 h#
21 °C or above	650	24
16 °C or above	800	28
10 °C or above	900	32

[29] # In circumstances when the final concentration is not achieved after 24 hours, a deviation in the concentration of ~5% is allowed provided additional treatment time is added to the end of the treatment to achieve the prescribed CT.

[30] One example of a schedule that may be used for achieving the specified requirements is shown in Table 2.

[31] **Table 2:** Example of a treatment schedule that achieves the minimum required CT for wood packaging material treated with methyl bromide (initial doses may need to be higher in conditions of high sorption or leakage)

[32]

Temperature (°C)	Dosage (g/m³)	Minimum concentration (g/m³) at:		
		2 h	4 h	24 h
21 °C or above	48	36	31	24
16 °C or above	56	42	36	28
10 °C or above	64	48	42	32

[33] NPPOs shall ensure that the following factors are appropriately addressed by those involved in the application of methyl bromide treatment under this standard:

[34]
1. Fans are used as appropriate during the gas distribution phase of fumigation to ensure that equilibrium is reached and should be positioned to ensure that the fumigant is rapidly and effectively distributed throughout the fumigation enclosure (preferably within one hour of application).
2. Fumigation enclosures are not loaded beyond 80% of their volume.
3. Fumigation enclosures are well sealed and as gas tight as possible. If fumigation is to be carried out under sheets, these must be made of gas-proof material and sealed appropriately at seams and at floor level.
4. The fumigation site floor is either impermeable to the fumigant or gas-proof sheets must be laid on the floor.
5. Consideration should be given to the use of a vaporizer to apply methyl bromide ("hot

gassing")~~Methyl bromide is often applied through a vaporizer ("hot gassing")~~ in order to fully volatilize the fumigant prior to its entry into the fumigation enclosure.

6. Methyl bromide treatment is not carried out on wood packaging material exceeding 20 cm in cross-section when measured across the smallest dimension of the piece. Therefore, ~~W~~wood stacks may need separators to ensure adequate methyl bromide circulation and penetration. Wood packaging containing a piece of wood exceeding 20 cm in cross-section when measured across the smallest dimension of the piece should not be treated with methyl bromide.
7. The concentration of methyl bromide is always measured at a location furthest from the insertion point of the gas as well as other locations, to confirm when gas equilibrium is reached.
8. When calculating methyl bromide dosage, compensation is made for any gas mixtures (e.g. 2% chloropicrin) to ensure that the total amount of methyl bromide applied meets required dosage rates.
9. Initial dose rates and post-treatment product handling procedures take account of likely methyl bromide sorption by the treated wood packaging material or associated product (e.g. polystyrene boxes).
10. The measured temperature of the product or the ambient air (whichever is the lower) is used to calculate the methyl bromide dose, and must be at least 10 °C (including at the wood core) throughout the duration of the treatment.
11. Wood packaging material to be fumigated is not wrapped or coated in materials impervious to the fumigant.
12. The equipment used to measure gas concentrations and temperature (where used) is calibrated at a frequency specified by the NPPO.
13. Records of methyl bromide treatments and calibration are retained by treatment providers, for a period of time determined ~~and as required~~by the NPPO, for auditing purposes.

[35] NPPOs should recommend that measures be taken to reduce or eliminate emissions of methyl bromide to the atmosphere where technically and economically feasible (as described in the IPPC~~CPM~~ Recommendation on the r~~R~~eplacement or reduction of the use of methyl bromide as a phytosanitary measure (CPM, 2008)).

[36] ## Adoption of alternative treatments and revisions of approved treatment schedules

[37] As new technical information becomes available, existing treatments may be reviewed and modified, and alternative treatments and/or new treatment schedule(s) for wood packaging material may be adopted by the CPM~~Commission on Phytosanitary Measures~~. If a new treatment or a revised treatment schedule is adopted for wood packaging material and incorporated into this ISPM, material treated under the previous treatment and/or schedule does not need to be re-treated or re-marked.

[38] [1] In addition, contracting parties to the IPPC may also have obligations under the Montreal Protocol on Substances that Deplete the Ozone Layer (UNEP, 2000).

[39] [2] The CT product utilized for methyl bromide treatment in this standard is the sum of the product of the concentration (g/m^3) and time (h) over the duration of the treatment.