INTERNATIONAL STANDARD FOR PHYTOSANITARY MEASURES 15

Food and Agriculture Organization of the United Nations

International Plant Protection Convention

ISPM 15

ENG

Regulation of wood packaging material in international trade

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INTERNATIONAL STANDARDS FOR
PHYTOSANITARY MEASURES

ISPM 15

Regulation of wood packaging material in international trade

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Publication history

This is not an official part of the standard

1999-10 ICPM-2 added topic *Wood packing* (1999-001).

2000-06 Ad-hoc expert working group (EWG) developed draft text.

2001-02 EWG developed draft text.

2001-05 ISC-3 revised draft text and approved for consultation.

2001-06 Sent for consultation.

2001-11 ISC-4 revised draft text for adoption.

2002-03 ICPM-4 adopted standard.

ISPM 15. 2002. *Guidelines for regulating wood packaging material in international trade*. Rome, IPPC, FAO.

2005-03 TPFQ revised Annex 1 *Methyl bromide fumigation schedule* (2005-011).

2005-05 Standards Committee (SC) revised Annex 1 and approved for consultation.

2005-06 Sent for consultation under fast-track process.

2005-11 SC revised Annex 1 for adoption.

2006-04 CPM-1 adopted revised Annex 1.

ISPM 15. 2006. *Guidelines for regulating wood packaging material in international trade*. Rome, IPPC, FAO.

2006-04 CPM-1 added topic *Revision of ISPM 15* (2006-036).

2006-05 SC approved Specification 31 *Revision of ISPM 15.*

2007-07 Technical Panel on Forest Quarantine (TPFQ) revised standard.

2008-05 SC revised and approved for consultation.

2008-06 Sent for consultation.

2008-11 SC revised standard for adoption.

2009-03 CPM-4 adopted revised standard.

ISPM 15. 2009. *Regulation of wood packaging material in international trade*. Rome, IPPC, FAO.

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 consultation.

2012-11 SC revised standard for adoption.

2013-03 CPM-8 adopted revised Annex 1 to ISPM 15 with consequential changes to Annex 2.

ISPM 15. Annex 1. *Approved treatments associated with wood packaging material* (2013). Rome, IPPC, FAO.

2006-09 *Sulfuryl fluoride fumigation of wood packaging material treatment* (2007-101) submitted.

2006-12 Technical Panel on Phytosanitary Treatments (TPPT) reviewed treatment.

2007-07 Revised text considered by TPFQ.

2007-12 Further revised text submitted to TPPT.

2008-12 TPFQ discussion.

2009-01 TPPT reviewed treatment.

2009-07 Amended text considered by TPFQ.

2010-07 Text updated and recommended to SC.

2010-09 TPFQ discussion.

2011-04 SC e-decision.

2011-05 SC via e-discussion returned to TPPT.

2011-07 TPPT revised text based on SC comments.

2011-10 TPPT reviewed treatment.

2012-02 TPFQ discussion.

2012-12 TPPT reviewed treatment.

2014-06 TPPT recommended treatment to SC for approval for consultation.

2014-09 SC approved for consultation via e-decision.

2014-11 SC agreed to split *Sulfuryl fluoride fumigation of wood packaging material* (2007-101) into two separate topics: *Sulfuryl fluoride fumigation of insects in debarked wood* (2007-101A) and *Sulfuryl fluoride fumigation of nematodes and insects in debarked wood* (2007-101B) and recommended to CPM to include a new topic: *Revision of dielectric heating section (Annex 1 (*Approved treatments associated with wood packaging material*) to ISPM 15 (*Regulation of wood packaging material in international trade*))*.

2014-12 TPFQ reviewed the draft treatment *Sulfuryl fluoride fumigation of nematodes and insects in debarked wood* (2007-101B) for inclusion into ISPM 15 (2006-010A).

2015-05 SC reviewed and approved draft revision to ISPM 15 in relation to topics 2006-010A and 2007-101B for consultation.

2015-07 Consultation for draft ISPMs.

2016-01 TPFQ inputs to the draft and Steward.

2016-05 SC-7 asked the TPPT to better assess the treatments.

2017-05 SC-7.

2017-07 Second consultation.

2017-10 Steward revised the draft based on consultation comments.

2017-11 SC revised in meeting and approved the draft for adoption by CPM.

2018-04 CPM-13 adopted revised Annex 1 to ISPM 15 with consequential changes to Annex 2.

ISPM 15. Annex 1. *Approved treatments associated with wood packaging material* (2018). Rome, IPPC, FAO.

ISPM 15. Annex 2. *The mark and its application* (2018). Rome, IPPC, FAO.

2015-06 IPPC Secretariat incorporated ink amendments and reformatted standards following revoking of standards procedure from CPM-10 (2015).

2016-06 IPPC Secretariat made an editorial adjustment to include the abbreviation “DH” in the first section of Annex 2.

2017-04 CPM noted ink amendments to avoid the use of “trading partner”. The IPPC Secretariat incorporated the ink amendments.

2019-02 IPPC Secretariat fixed a mistake in Figure 4.

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Adoption

This standard was first adopted by the Fourth Session of the Interim Commission on Phytosanitary Measures in March 2002 as *Guidelines for regulating wood packaging material in international trade*. Modifications to Annex 1 were adopted by the First Session of the Commission on Phytosanitary Measures in April 2006. The first revision was adopted by the Fourth Session of the Commission on Phytosanitary Measures in March–April 2009 as the present standard.

Revisions to Annex 1, together with associated changes in Annex 2, were adopted by the Eighth Session of the Commission on Phytosanitary Measures in April 2013 and the Thirteenth Session of the Commission on Phytosanitary Measures in April 2018.

INTRODUCTION

Scope

This standard describes phytosanitary measures that reduce the risk of introduction and spread of quarantine pests associated with the movement in international trade of wood packaging material made from raw wood. Wood packaging material covered by this standard includes dunnage but excludes wood packaging made from wood processed in such a way that it is free from pests (e.g. plywood).

The phytosanitary measures described in this standard are not intended to provide ongoing protection from contaminating pests or other organisms.

Environmental Statement

Pests associated with wood packaging material are known to have negative impacts on forest health and biodiversity. Implementation of this standard is considered to reduce significantly the spread of pests and subsequently their negative impacts. In the absence of alternative treatments being available for certain situations or to all countries, or the availability of other appropriate packaging materials, methyl bromide treatment is included in this standard. Methyl bromide is known to deplete the ozone layer. An IPPC Recommendation on the *Replacement or reduction of the use of methyl bromide as a phytosanitary measure* (CPM, 2008) has been adopted in relation to this issue. Alternative treatments that are more environmentally friendly are being pursued.

References

The present standard refers to International Standards for Phytosanitary Measures (ISPMs). ISPMs are available on the International Phytosanitary Portal (IPP) at https://www.ippc.int/core-activities/standards-setting/ispms.

CPM. 2008. *Replacement or reduction of the use of methyl bromide as a phytosanitary measure*. IPPC Recommendation. In *Report of the Third Session of the Commission on Phytosanitary Measures, Rome, 7–11 April 2008*, Appendix 6. Rome, IPPC, FAO.

IPPC. 1997. *International Plant Protection Convention*. Rome, IPPC, FAO.

ISO 3166-1:2006. *Codes for the representation of names of countries and their subdivisions – Part 1: Country codes*. Geneva, International Organization for Standardization (available at https://www.iso.org/standard/39719.html).

UNEP. 2000. *Montreal Protocol on Substances that Deplete the Ozone Layer*. Nairobi, Ozone Secretariat, United Nations Environment Programme. ISBN: 92-807-1888-6 (https://unep.ch/ozone/pdf/Montreal-Protocol2000.pdf).

Definitions

Definitions of phytosanitary terms used in this standard can be found in ISPM 5 (*Glossary of phytosanitary terms*).

Outline of Requirements

Approved phytosanitary measures that significantly reduce the risk of pest introduction and spread via wood packaging material consist of the use of debarked wood (with a specified tolerance for remaining bark) and the application of approved treatments (as prescribed in Annex 1). The application of the recognized mark (as prescribed in Annex 2) ensures that wood packaging material subjected to the approved treatments is readily identifiable. The approved treatments, the mark and its use are described.

The national plant protection organizations (NPPOs) of exporting and importing countries have specific responsibilities. Treatment and application of the mark must always be under the authority of the NPPO. NPPOs that authorize the use of the mark should supervise (or, as a minimum, audit or review) the application of the treatments, use of the mark and its application, as appropriate, by producer/treatment providers and should establish inspection or monitoring and auditing procedures. Specific requirements apply to wood packaging material that is repaired or remanufactured. NPPOs of importing countries should accept the approved phytosanitary measures as the basis for authorizing entry of wood packaging material without further wood packaging material-related phytosanitary import requirements and may verify on import that the requirements of the standard have been met. Where wood packaging material does not comply with the requirements of this standard, NPPOs are also responsible for measures implemented and notification of non-compliance, as appropriate.

REQUIREMENTS

1. Basis for Regulation

Wood originating from living or dead trees may be infested by pests. Wood packaging material is frequently made of raw wood that may not have undergone sufficient processing or treatment to remove or kill pests and therefore remains a pathway for the introduction and spread of quarantine pests. Dunnage in particular has been shown to present a high risk of introduction and spread of quarantine pests. Furthermore, wood packaging material is very often reused, repaired or remanufactured (as described in section 4.3). The true origin of any piece of wood packaging material is difficult to determine, and thus its phytosanitary status cannot easily be ascertained. Therefore the normal process of undertaking pest risk analysis to determine if measures are necessary, and the strength of such measures, is frequently not possible for wood packaging material. For this reason, this standard describes internationally accepted measures that may be applied to wood packaging material by all countries to reduce significantly the risk of introduction and spread of most quarantine pests that may be associated with that material.

2. Regulated Wood Packaging Material

These guidelines cover all forms of wood packaging material that may serve as a pathway for pests posing a pest risk mainly to living trees. They cover wood packaging material such as crates, boxes, packing cases, dunnage[1], pallets, cable drums and spools/reels, which can be present in almost any imported consignment, including consignments that would not normally be subject to phytosanitary inspection.

2.1 Exemptions

The following articles are of sufficiently low risk to be exempted from the provisions of this standard[2]:

- wood packaging material made entirely from thin wood (6 mm or less in thickness)
- wood packaging made wholly of processed wood material, such as plywood, particle board, oriented strand board or veneer that has been created using glue, heat or pressure, or a combination thereof
- barrels for wine and spirit that have been heated during manufacture
- gift boxes for wine, cigars and other commodities made from wood that has been processed and/or manufactured in a way that renders it free of pests
- sawdust, wood shavings and wood wool
- wood components permanently attached to freight vehicles and containers.

3. Phytosanitary Measures for Wood Packaging Material

This standard describes phytosanitary measures (including treatments) that have been approved for wood packaging material and provides for the approval of new or revised treatments.

3.1 Approved phytosanitary measures

The approved phytosanitary measures described in this standard consist of phytosanitary procedures including treatments and marking of the wood packaging material. The application of the mark renders the use of a phytosanitary certificate unnecessary as it indicates that the internationally accepted

[1] Consignments of wood (i.e. timber/lumber) may be supported by dunnage that is constructed from wood of the same type and quality and that meets the same phytosanitary requirements as the wood in the consignment. In such cases, the dunnage may be considered as part of the consignment and may not be considered as wood packaging material in the context of this standard.

[2] Not all types of gift boxes or barrels are constructed in a manner that renders them pest free, and therefore certain types may be considered to be within the scope of this standard. Where appropriate, specific arrangements related to these types of commodities may be established between importing and exporting NPPOs.

phytosanitary measures have been applied. These phytosanitary measures should be accepted by all NPPOs as the basis for authorizing the entry of wood packaging material without further specific requirements. Required phytosanitary measures beyond an approved measure as described in this standard require technical justification.

The treatments described in Annex 1 are considered to be significantly effective against most pests of living trees associated with wood packaging material used in international trade. These treatments are combined with the use of debarked wood for construction of wood packaging, which also acts to reduce the likelihood of reinfestation by pests of living trees. These measures have been adopted based on consideration of:

- the range of pests that may be affected
- the efficacy of the treatment
- the technical and/or commercial feasibility.

There are three main activities involved in the production of approved wood packaging material (including dunnage): treating, manufacturing and marking. These activities can be done by separate entities, or one entity can do several or all of these activities. For ease of reference, this standard refers to producers (those that manufacture the wood packaging material and may apply the mark to appropriately treated wood packaging material) and treatment providers (those that apply the approved treatments and may apply the mark to appropriately treated wood packaging material).

Wood packaging material subjected to the approved measures shall be identified by application of an official mark in accordance with Annex 2. This mark consists of a dedicated symbol used in conjunction with codes identifying the specific country, the responsible producer or treatment provider, and the treatment applied. Hereafter, all components of such a mark are referred to collectively as “the mark”. The internationally recognized, non-language-specific mark facilitates identification of treated wood packaging material during inspection prior to export, at the point of entry, or elsewhere. NPPOs should accept the mark as referred to in Annex 2 as the basis for authorizing the entry of wood packaging material without further specific requirements.

Debarked wood must be used for the construction of wood packaging material, in addition to application of one of the adopted treatments specified in Annex 1. A tolerance for remaining bark is specified in Annex 1.

3.2 Approval of new or revised treatments

As new technical information becomes available, existing treatments may be reviewed and modified, and new alternative treatments and/or treatment schedule(s) for wood packaging material may be adopted by the CPM. ISPM 28 (*Phytosanitary treatments for regulated pests*) provides guidance on the IPPC’s process for approval of treatments. If a new treatment or a revised treatment schedule is adopted for wood packaging material and incorporated into this ISPM, material already treated under the previous treatment and/or schedule does not need to be re-treated or re-marked.

3.3 Alternative bilateral arrangements

NPPOs may accept measures other than those listed in Annex 1 by bilateral arrangement. In such cases, the mark shown in Annex 2 must not be used unless all requirements of this standard have been met.

4. Responsibilities of NPPOs

To meet the objective of preventing the introduction and spread of pests, exporting and importing contracting parties and their NPPOs have responsibilities (as outlined in Articles I, IV and VII of the IPPC). In relation to this standard, specific responsibilities are outlined below.

4.1 Regulatory considerations

Treatment and application of the mark (and/or related systems) must always be under the authority of the NPPO. NPPOs that authorize use of the mark have the responsibility for ensuring that all systems authorized and approved for implementation of this standard meet all necessary requirements described within the standard, and that wood packaging material (or wood that is to be made into wood packaging material) bearing the mark has been treated and/or manufactured in accordance with this standard. Responsibilities include:

- authorization, registration and accreditation, as appropriate
- monitoring treatment and marking systems implemented in order to verify compliance (further information on related responsibilities is provided in ISPM 7 (*Phytosanitary certification system*))
- inspection, establishing verification procedures and auditing where appropriate (further information is provided in ISPM 23 (*Guidelines for inspection*)).

The NPPO should supervise (or, as a minimum, audit or review) the application of the treatments, and authorize use of the mark and its application as appropriate. To prevent untreated or insufficiently/incorrectly treated wood packaging material bearing the mark, treatment should be carried out prior to application of the mark.

4.2 Application and use of the mark

The specified marks applied to wood packaging material treated in accordance with this standard must conform to the requirements described in Annex 2.

4.3 Treatment and marking requirements for wood packaging material that is reused, repaired or remanufactured

NPPOs of countries where wood packaging material that bears the mark described in Annex 2 is repaired or remanufactured have responsibility for ensuring and verifying that systems related to export of such wood packaging material comply fully with this standard.

4.3.1 Reuse of wood packaging material

A unit of wood packaging material that has been treated and marked in accordance with this standard and that has not been repaired, remanufactured or otherwise altered does not require re-treatment or re-application of the mark throughout the service life of the unit.

4.3.2 Repaired wood packaging material

Repaired wood packaging material is wood packaging material that has had up to approximately one third of its components removed and replaced. NPPOs must ensure that when marked wood packaging material is repaired, only wood treated in accordance with this standard is used for the repair, or wood constructed or fabricated from processed wood material (as described in section 2.1). Where treated wood is used for the repair, each added component must be individually marked in accordance with this standard.

Wood packaging material bearing multiple marks may create problems in determining the origin of the wood packaging material if pests are found associated with it. It is recommended that NPPOs of countries where wood packaging material is repaired limit the number of different marks that may appear on a single unit of wood packaging material. Therefore NPPOs of countries where wood packaging material is repaired may require the repaired wood packaging material to have previous marks obliterated, the unit to be re-treated in accordance with Annex 1, and the mark then applied in accordance with Annex 2. If methyl bromide is used for the re-treatment, the information in the IPPC Recommendation on the *Replacement or reduction of the use of methyl bromide as a phytosanitary measure* (CPM, 2008) should be taken into account.

In circumstances where there is any doubt that all components of a unit of repaired wood packaging material have been treated in accordance with this standard, or the origin of the unit of wood packaging

material or its components is difficult to ascertain, the NPPOs of countries where wood packaging material is repaired should require the repaired wood packaging material to be re-treated, destroyed, or otherwise prevented from moving in international trade as wood packaging material compliant with this standard. In the case of re-treatment, any previous applications of the mark must be permanently obliterated (e.g. by covering with paint or grinding). After re-treatment, the mark must be applied anew in accordance with this standard.

4.3.3 Remanufactured wood packaging material

If a unit of wood packaging material has had more than approximately one third of its components replaced, the unit is considered to be remanufactured. In this process, various components (with additional reworking if necessary) may be combined and then reassembled into further wood packaging material. Remanufactured wood packaging material may therefore incorporate both new and previously used components.

Remanufactured wood packaging material must have any previous applications of the mark permanently obliterated (e.g. by covering with paint or grinding). Remanufactured wood packaging material must be re-treated and the mark must then be applied anew in accordance with this standard.

4.4 Transit

Where consignments moving in transit have wood packaging material that does not meet the requirements of this standard, NPPOs of countries of transit may require measures to ensure that wood packaging material does not present an unacceptable risk. Further guidance on transit arrangements is provided in ISPM 25 (*Consignments in transit*).

4.5 Procedures upon import

Since wood packaging materials are associated with most shipments, including those not considered to be the target of phytosanitary inspections in their own right, cooperation by NPPOs with organizations not usually involved with verification of whether the phytosanitary import requirements have been met is important. For example, cooperation with Customs organizations and other stakeholders will help NPPOs in receiving information on the presence of wood packaging material. This is important to ensure effectiveness in detecting potential non-compliance of wood packaging material.

4.6 Phytosanitary measures for non-compliance at point of entry

Relevant information on non-compliance and emergency action is provided in ISPM 20 (*Guidelines for a phytosanitary import regulatory system*) and in ISPM 13 (*Guidelines for the notification of non-compliance and emergency action*). Taking into account the frequent re-use of wood packaging material, NPPOs should consider that the non-compliance identified may have arisen in the country of production, repair or remanufacture, rather than in the country of export or transit.

Where wood packaging material does not carry the required mark, or the detection of pests provides evidence that the treatment may not have been effective, the NPPO should respond accordingly and, if necessary, an emergency action may be taken. This action may take the form of detention while the situation is being addressed then, as appropriate, removal of non-compliant material, treatment[3], destruction (or other secure disposal) or reshipment. Further examples of appropriate options for actions are provided in Appendix 1. The principle of minimal impact should be pursued in relation to any emergency action taken, distinguishing between the consignment traded and the accompanying wood packaging material. In addition, if emergency action is necessary and methyl bromide is used by the NPPO, relevant aspects of the IPPC Recommendation on *Replacement or reduction of the use of methyl bromide as a phytosanitary measure* (CPM, 2008) should be followed.

The NPPO of the importing country should notify the exporting country, or the manufacturing country where applicable, in cases where live pests are found. In such cases, where a unit of wood packaging

[3] This need not necessarily be a treatment approved in this standard.

material bears more than one mark NPPOs should attempt to determine the origin of the non-compliant component(s) prior to sending a notice of non-compliance. NPPOs are also encouraged to notify cases of missing marks and other cases of non-compliance. Taking into account the provisions of section 4.3.2, it should be noted that the presence of multiple marks on a single unit of wood packaging does not constitute non-compliance.

This revised Annex 1 was adopted by the Thirteenth Session of the Commission on Phytosanitary Measures in April 2018.
The annex is a prescriptive part of the standard.

ANNEX 1: Approved treatments associated with wood packaging material (2018)

The approved treatments may be applied to units of wood packaging material or to pieces of wood that are to be made into wood packaging material.

Use of debarked wood

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:

- 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.

For methyl bromide and sulphuryl fluoride treatments, the removal of bark must be carried out before treatment as the presence of bark on the wood may affect treatment efficacy. For heat treatment, the removal of bark may be carried out before or after treatment. When a dimension limitation is specified for a certain type of heat treatment (e.g. dielectric heating), any bark must be included in the dimension measurement.

Heat treatment

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

NPPOs should ensure that treatment providers monitor the treatment temperature at a location likely to be the coldest, which will be the location taking the longest time to reach the target temperature in the wood, to ensure that the target temperature is maintained for the duration of treatment throughout the batch of wood being treated. The point at which a piece of wood is the coldest may vary depending on the energy source or process applied, the moisture content and the initial temperature distribution in the wood.

When using dielectric heating as a heat source, the coldest part of the wood during treatment is usually the surface. In some situations (e.g. dielectric heating of wood of large dimensions that has been frozen and until the wood has thawed) the core may be the coldest part of the wood.

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

When using conventional heat chamber technology, the fundamental requirement is to achieve a minimum temperature of 56 °C for a minimum duration of 30 continuous minutes throughout the entire profile of the wood (including its core).

This temperature can be measured by inserting temperature sensors in the core of the wood. Alternatively, when using kiln-drying heat chambers or other heat treatment chambers, treatment schedules may be developed based on a series of test treatments during which the core temperature of the wood at various locations inside the heat chamber has been measured and correlated with chamber air temperature, taking into account the moisture content of the wood and other substantial parameters (such as species and thickness of the wood, air flow rate and humidity). The test series must demonstrate that a minimum temperature of 56 °C is maintained for a minimum duration of 30 continuous minutes throughout the entire profile of the wood.

Treatment schedules should be specified or approved by the NPPO.

Treatment providers should be approved by the NPPO. NPPOs should consider the following factors that may be required for a heat chamber to meet the treatment requirements:

- The heat chamber is sealed and well insulated, including insulation in the floor.
- The heat chamber is designed in a manner that permits uniform flow of air around and through the wood stack. Wood to be treated is loaded into the chamber in a manner that ensures adequate air flow around and through the wood stack.
- Air deflectors in the chamber area and spacers in the stack of the wood are used as required to ensure adequate air flow.
- Fans are used to circulate air during treatment, and air flow from these fans is sufficient to ensure the core temperature of the wood is maintained at the specified level for the required duration.
- The coldest location within the chamber is identified for each load and temperature sensors are placed there, either in the wood or in the chamber.
- Where the treatment is monitored using temperature sensors inserted into the wood, at least two temperature sensors are recommended. These temperature sensors should be suitable for measuring wood core temperature. 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 piece of wood and penetrate to the centre of the wood. For shorter boards or pallet blocks, temperature sensors are also inserted in the piece of wood with the largest dimensions in a manner that ensures the temperature at the core is measured. Any holes drilled in the wood to place the temperature sensors are sealed with appropriate material to prevent interference in temperature measurement by convection or conduction. Special attention should be paid to external influences on the wood such as nails or metal insertions that may lead to incorrect measurements.
- Where the treatment schedule is based on monitoring chamber air temperature and is used for treatment of different wood types (e.g. specific species and sizes), the schedule takes into account the species, moisture content and thickness of the wood being treated. At least two temperature sensors are recommended for monitoring the air temperature in the chamber treating wood packaging according to treatment schedules.
- If the air flow in the chamber is routinely reversed during treatment, a greater number of temperature sensors may be needed to account for a possible change in the location of the coldest point.
- Temperature sensors and data recording equipment are calibrated in accordance with the manufacturer's instructions at a frequency specified by the NPPO.
- Temperatures are monitored and recorded during each treatment to ensure that the prescribed minimum temperature is maintained for the required period of time. If the minimum temperature is not maintained, corrective action needs to be taken to ensure that all wood is treated according to heat treatment requirements (30 continuous minutes at 56 °C); for example, the treatment is restarted or the treatment time extended and, if necessary, the temperature raised. During the treatment period, the frequency of temperature readings is sufficient to ensure that treatment failures can be detected.
- For the purpose of auditing, the treatment provider keeps records of heat treatments and calibrations for a period of time specified by the NPPO.

Heat treatment using dielectric heating (treatment code for the mark: DH)

Where dielectric heating (microwaves or radio waves) is used, wood packaging material must be heated to achieve a minimum temperature of 60 °C for 1 continuous minute throughout the entire profile of the wood (including its surface). Treatment providers using dielectric heating must verify that their schedules achieve specified treatment parameters (taking into account the moisture content of the wood, its size and density, and the frequency of microwaves or radio waves).

Treatment schedules should be specified or approved by the NPPO.

Treatment providers should be approved by the NPPO. NPPOs should consider the following factors that may be required for a dielectric heating chamber to meet the treatment requirements:

- Irrespective of whether dielectric heating is conducted as a batch process or as a continuous (conveyor) process, the treatment is monitored in the wood where the temperature is likely to be the coldest (normally on the surface) to ensure the target temperature is maintained. For measuring the temperature, at least two temperature sensors are recommended to ensure that any failure of a temperature sensor is detected.
- The treatment provider has initially validated that the wood temperatures reach or exceed 60 °C for 1 continuous minute throughout the entire profile of the wood (including its surface).
- 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.
- Temperature sensors and data recording equipment are calibrated in accordance with the manufacturer's instructions at a frequency specified by the NPPO.
- For the purpose of auditing, the treatment provider keeps records of heat treatments and calibrations for a period of time specified by the NPPO.

Methyl bromide treatment (treatment code for the mark: MB)

NPPOs are encouraged to promote the use of alternative treatments approved in this standard[4]. Use of methyl bromide should take into account the CPM recommendation on the replacement or reduction of the use of methyl bromide as a phytosanitary measure (CPM, 2008).

Wood packaging material containing a piece of wood exceeding 20 cm in cross-section at its smallest dimension must not be treated with methyl bromide.

The fumigation of wood packaging material with methyl bromide must be in accordance with a schedule specified or approved by the NPPO that achieves the minimum concentration–time product[5] (CT) over 24 hours at the temperature and final residual concentration specified in Table 1. This CT must be achieved throughout the profile of the wood, including its core, although the concentration is measured in the ambient atmosphere. The minimum temperature of the wood and its surrounding atmosphere must not be less than 10 °C and the minimum exposure time must not be less than 24 hours. Monitoring of gas concentrations must be carried out at a minimum at 2, 4 and 24 hours from the beginning of the treatment. In the case of longer exposure times and weaker concentrations, additional measurement of the gas concentrations should be recorded at the end of fumigation.

If the CT is not achieved over 24 hours, corrective action needs to be taken to ensure the CT is reached; for example, the treatment is restarted or the treatment time extended for a maximum of two hours without adding more methyl bromide to achieve the required CT (see the footnote to Table 1).

[4] Contracting parties to the IPPC may also have obligations under the Montreal Protocol on Substances that Deplete the Ozone Layer (UNEP, 2000).

[5] The CT utilized for methyl bromide and sulphuryl fluoride treatments in this standard is the sum of the products of the concentration (g/m^3) and time (h) over the duration of the treatment.

Table 1. Minimum required CT over 24 hours for wood packaging material fumigated with methyl bromide

Temperature (°C)	Minimum required CT ($g \cdot h/m^3$) over 24 h	Minimum final concentration (g/m^3) after 24 h#
21.0 or above	650	24
16.0 – 20.9	800	28
10.0 – 15.9	900	32

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

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

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)

Temperature (°C)	Dosage (g/m^3)	Minimum concentration (g/m^3) at:		
		2 h	4 h	24 h
21.0 or above	48	36	31	24
16.0 – 20.9	56	42	36	28
10.0 – 15.9	64	48	42	32

Treatment providers should be approved by the NPPO. NPPOs should consider the following factors that may be required for methyl bromide fumigation to meet the treatment requirements:

- Fans are used as appropriate during the gas distribution phase of fumigation to ensure equilibrium is reached, and they are positioned to make certain the fumigant is rapidly and effectively distributed throughout the fumigation enclosure (preferably within the first hour of application).
- The fumigation enclosure is not loaded beyond 80% of its volume.
- The fumigation enclosure is well sealed and as gas tight as possible. If fumigation is to be carried out under sheets, these are made of gas-proof material and sealed appropriately at the seams and at floor level.
- The fumigation site floor is impermeable to the fumigant; if it is not, gas-proof sheets are laid on the floor.
- The use of a vaporizer to apply methyl bromide ("hot gassing") in order to fully volatilize the fumigant prior to its entry into the fumigation enclosure is recommended.
- Methyl bromide treatment is not carried out on stacked wood packaging material exceeding 20 cm in cross-section at its smallest dimension. Therefore, stacked wood packaging material may need separators to ensure adequate methyl bromide circulation and penetration.
- The concentration of methyl bromide in the air space is always measured at a location furthest from the insertion point of the gas as well as at other locations throughout the enclosure (e.g. at front bottom, centre middle and back top) to confirm that uniform distribution of the gas is reached. Treatment time is not calculated until uniform distribution has been reached.
- 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 dose rates.
- 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).
- The measured or expected temperature of the product or the ambient air immediately before or during treatment (whichever is the lowest) is used to calculate the methyl bromide dose.

- Wood packaging material to be fumigated is not wrapped or coated in materials impervious to the fumigant.
- Temperature and gas concentration sensors and data recording equipment are calibrated in accordance with the manufacturer's instructions at a frequency specified by the NPPO.
- For the purposes of auditing, the treatment provider keeps records of methyl bromide treatments and calibrations for a period of time specified by the NPPO.

Sulphuryl fluoride treatment (treatment code for the mark: SF)

Wood packaging material containing a piece of wood exceeding 20 cm in cross-section at its smallest dimension must not be treated with sulphuryl fluoride. Wood packaging material with a moisture content higher than 75% (dry basis) must not be treated with sulphuryl fluoride.

The fumigation of wood packaging material with sulphuryl fluoride must be in accordance with a schedule specified or approved by the NPPO that achieves the minimum CT[5] over 24 or 48 hours at the target temperature and final residual concentration specified in Table 3. This CT must be achieved throughout the profile of the wood, including its core, although the concentration is measured in the ambient atmosphere. Small increases in the treatment time (not more than two hours) may be permitted to achieve the required CT if the minimum final concentration is not reached. The minimum temperature of the wood must not be lower than 20 °C and the minimum exposure time must not be less than the time stated for each temperature in Table 3. Monitoring of gas concentration must be carried out at a minimum of 2, 4, 24 and, when appropriate, 48 hours from the beginning of the treatment. In the case of longer exposure times and weaker concentrations, additional measurements of the gas concentrations should be recorded at the end of fumigation.

If the CT is not achieved within a single 24 or 48 hour period (even if the minimum final concentration is achieved), corrective action should be taken. The treatment time may be extended for a maximum of two hours without adding more sulphuryl fluoride, or it may be restarted.

Table 3. Minimum required CT over 24 or 48 hours for wood packaging material fumigated with sulphuryl fluoride

Temperature (°C)	Minimum required CT ($g \cdot h/m^3$)	Minimum final concentration (g/m^3)†
30 or above for 24 h	1 400	41
20 or above for 48 h	3 000	29

† If the minimum final concentration is not achieved after 24 or 48 hours by the end of the treatment, a deviation in the concentration of ~5% is permitted, provided additional treatment time is added at the end of the treatment to achieve the prescribed CT.

One example of a schedule that may be used for achieving the specified requirements is shown in Table 4.

Table 4. Example of a treatment schedule that achieves the minimum required CT for wood packaging material treated with sulphuryl fluoride (initial dosage may need to be higher in conditions of high sorption or leakage)

Temperature (°C)	Minimum required CT ($g \cdot h/m^3$)	Dosage (g/m^3)	Minimum concentration (g/m^3) at:						
			0.5 h	2 h	4 h	12 h	24 h	36 h	48 h
30 or above	1 400	82	87	78	73	58	41	n/a	n/a
20 or above	3 000	120	124	112	104	82	58	41	29

n/a, not applicable.

Treatment providers should be approved by the NPPO. NPPOs should consider the following factors that may be required for sulphuryl fluoride fumigation to meet the treatment requirements:

- Fans are used as appropriate during the gas distribution phase of fumigation to ensure equilibrium is reached, and they are positioned to make certain that the fumigant is rapidly and effectively distributed throughout the fumigation enclosure (preferably within the first hour of application).
- The fumigation enclosure is not loaded beyond 80% of its volume.
- The fumigation enclosure is 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 the seams and at floor level.
- The fumigation site floor is either impermeable to the fumigant or gas-proof sheets are laid on the floor.
- Wood stacks need separators at least every 20 cm to ensure adequate sulphuryl fluoride circulation and penetration.
- When calculating sulphuryl fluoride dosage, compensation is made for any gas mixtures (e.g. carbon dioxide) to ensure that the total amount of pure fumigant applied meets the requirements prescribed in the standard.
- The concentration of sulphuryl fluoride in the air space is always measured at a location furthest from the insertion point of the gas as well as at other locations throughout the enclosure (e.g. at front bottom, centre middle and back top) to confirm that uniform distribution of the gas is reached. Treatment time is not calculated until uniform distribution has been reached.
- Initial dosage and post-treatment product handling procedures take into account likely sulphuryl fluoride sorption by the treated wood packaging material or associated product.
- The measured temperature of the product or the ambient air (whichever is lower) is used to calculate the sulphuryl fluoride dosage, and the temperature of the product must be at least 20 °C (including at the wood core) throughout the duration of the treatment.
- Wood packaging material to be fumigated is not wrapped or coated in materials impervious to the fumigant.
- Temperature and gas concentration sensors and data recording equipment are calibrated in accordance with the manufacturer's instructions at a frequency specified by the NPPO. Instruments used for measuring the concentration of sulphuryl fluoride may be affected by altitude, water vapour, carbon dioxide or temperature. These instruments need to be calibrated specifically for sulphuryl fluoride.
- For the purpose of auditing, the treatment provider keeps records of sulphuryl fluoride treatments and calibrations for a period of time specified by the NPPO.
- Personnel applying fumigation treatment should follow the label requirements for use of sulphuryl fluoride.

Adoption of alternative treatments and revisions of approved treatment schedules

As new technical information becomes available, existing treatments may be reviewed and modified, and alternative treatments or a new treatment schedule for wood packaging material may be adopted by the CPM. 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.

This revised Annex 2 was adopted by the Thirteenth Session of the Commission on Phytosanitary Measures in April 2018.
The annex is a prescriptive part of the standard.

ANNEX 2: The mark and its application (2018)

A mark indicating that wood packaging material has been subjected to approved phytosanitary treatment in accordance with this standard[6] comprises the following required components:

- the symbol
- a country code
- a producer/treatment provider code
- a treatment code using the appropriate abbreviation according to Annex 1 (HT, DH, MB or SF).

Symbol

The design of the symbol (which may have been registered under national, regional or international procedures, as either a trademark or a certification/collective/guarantee mark) must resemble closely that shown in the examples illustrated below and must be presented to the left of the other components.

Country code

The country code must be the International Organization for Standards (ISO) two-letter country code (shown in the examples as "XX"). It must be separated by a hyphen from the producer/treatment provider code.

Producer/treatment provider code

The producer/treatment provider code is a unique code assigned by the NPPO to the producer of the wood packaging material or treatment provider who applies the marks or the entity otherwise responsible to the NPPO for ensuring that appropriately treated wood is used and properly marked (shown in the examples as "000"). The number and order of digits and/or letters are assigned by the NPPO.

Treatment code

The treatment code is an IPPC abbreviation as provided in Annex 1 for the approved measure used and shown in the examples as "YY". The treatment code must appear after the combined country and producer/treatment provider codes. It must appear on a separate line from the country code and producer/treatment provider code, or be separated by a hyphen if presented on the same line as the other codes.

Treatment code	Treatment type
HT	Heat treatment
DH	Dielectric heating
MB	Methyl bromide
SF	Sulphuryl fluoride

Application of the mark

The size, font types used, and position of the mark may vary, but its size must be sufficient to be both visible and legible to inspectors without the use of a visual aid. The mark must be rectangular or square in shape and contained within a border line with a vertical line separating the symbol from the code components. To facilitate the use of stencilling, small gaps in the border, the vertical line, and elsewhere among the components of the mark, may be present.

[6] At import, countries should accept previously produced wood packaging material carrying a mark consistent with earlier versions of this standard.

No other information shall be contained within the border of the mark. If additional marks (e.g. trademarks of the producer, logo of the authorizing body) are considered useful to protect the use of the mark on a national level, such information may be provided adjacent to but outside of the border of the mark.

The mark must be:

- legible
- durable and not transferable
- placed in a location that is visible when the wood packaging is in use, preferably on at least two opposite sides of the wood packaging unit.

The mark must not be hand drawn.

The use of red or orange should be avoided because these colours are used in the labelling of dangerous goods.

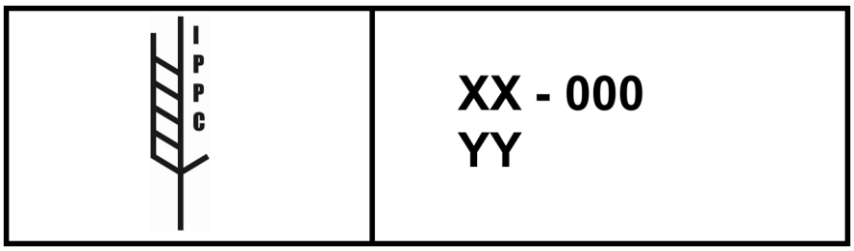
Where various components are integrated into a unit of wood packaging material, the resultant composite unit should be considered as a single unit for marking purposes. On a composite unit of wood packaging material made of both treated wood and processed wood material (where the processed component does not require treatment), it may be appropriate for the mark to appear on the processed wood material components to ensure that the mark is in a visible location and is of a sufficient size. This approach to the application of the mark applies only to composite single units, not to temporary assemblies of wood packaging material.

Special consideration of legible application of the mark to dunnage may be necessary because treated wood for use as dunnage may not be cut to final length until loading of a conveyance takes place. It is important that shippers ensure that all dunnage used to secure or support commodities is treated and displays the mark described in this annex, and that the marks are clear and legible. Small pieces of wood that do not include all the required elements of the mark should not be used for dunnage. Options for marking dunnage appropriately include:

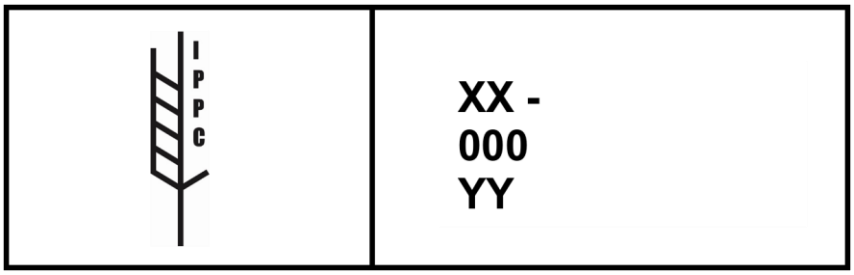
- application of the mark to pieces of wood intended for use as dunnage along their entire length at very short intervals (NB: where very small pieces are subsequently cut for use as dunnage, the cuts should be made so that an entire mark is present on the dunnage used)
- additional application of the mark to treated dunnage in a visible location after cutting, provided that the shipper is authorized in accordance with section 4.

The examples below illustrate some acceptable variants of the required components of the mark that is used to certify that the wood packaging material that bears such a mark has been subjected to an approved treatment. No variations in the symbol should be accepted. Variations in the layout of the mark should be accepted provided that they meet the requirements set out in this annex.

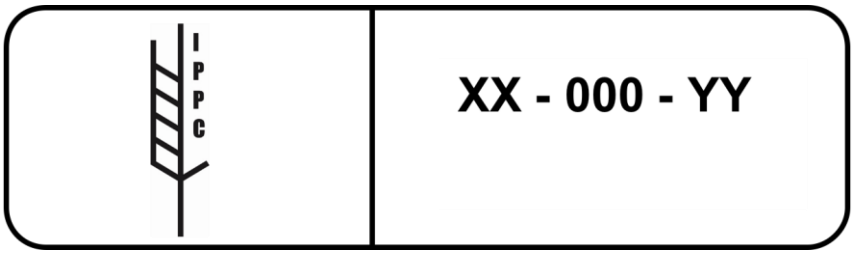
Example 1



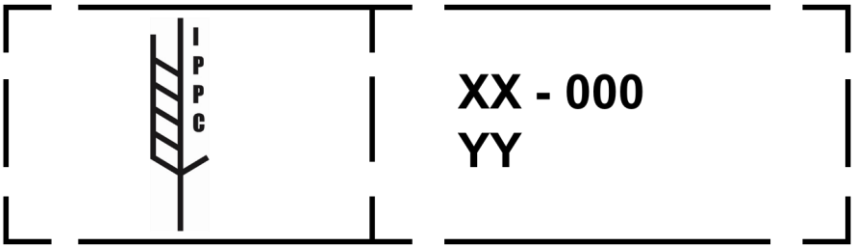
Example 2



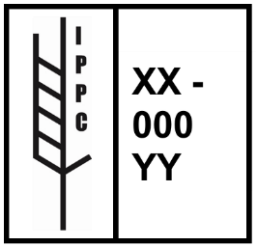
Example 3 (This represents a prospective example of a mark with the border with rounded corners.)



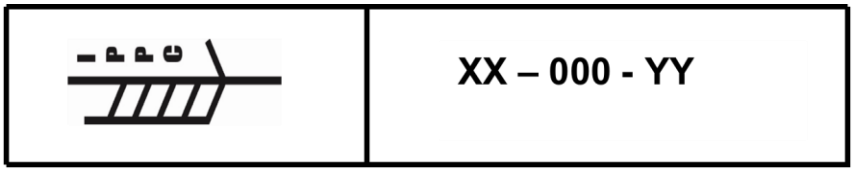
Example 4 (This represents a prospective example of a mark applied by stencilling; small gaps may be present in the border, and the vertical line, and elsewhere among the components of the mark.)



Example 5



Example 6



This appendix is for reference purposes only and is not a prescriptive part of the standard.

APPENDIX 1: Examples of methods of secure disposal of non-compliant wood packaging material

Secure disposal of non-compliant wood packaging material is a risk management option that may be used by the NPPO of the importing country when an emergency action is either not available or is not desirable. The methods listed below are recommended for the secure disposal of non-compliant wood packaging material:

(1) incineration, if permitted

(2) deep burial in sites approved by appropriate authorities (NB: the depth of burial may depend on climatic conditions and the pest intercepted, but is recommended to be at least 2 metres. The material should be covered immediately after burial and should remain buried. Note, also, that deep burial is not a suitable disposal option for wood infested with termites or some root pathogens.)

(3) processing (NB: Chipping should be used *only* if combined with further processing in a manner approved by the NPPO of the importing country for the elimination of pests of concern, e.g. the manufacture of oriented strand board.)

(4) other methods endorsed by the NPPO as effective for the pests of concern

(5) return to exporting country, if appropriate.

In order to minimize the risk of introduction or spread of pests, secure disposal methods where required should be carried out with the least possible delay.

IPPC

The International Plant Protection Convention (IPPC) is an international plant health agreement that aims to protect cultivated and wild plants by preventing the introduction and spread of pests. International travel and trade are greater than ever before. As people and commodities move around the world, organisms that present risks to plants travel with them.

Organization

- There are over 180 contracting parties to the IPPC.
- Each contracting party has a national plant protection organization (NPPO) and an Official IPPC contact point.
- Nine regional plant protection organizations (RPPOs) work to facilitate the implementation of the IPPC in countries.
- IPPC liaises with relevant international organizations to help build regional and national capacities.
- The Secretariat is provided by the Food and Agriculture Organization of the United Nations (FAO).

Food and Agriculture Organization of the United Nations

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