**2006-011: Treatments for wood packaging material - revised Annex to ISPM 15**

| **Comm. no.**  | **Para. no.**  | **Comment type**  | **Comment**  | **Explanation**  | **Language**  | **Country**  |
| --- | --- | --- | --- | --- | --- | --- |
| 1. | *G*  | Editorial  | We agree with all the document contents and changes made |  | English  | Sierra Leone  |
| 2. | *G*  | Substantive  |  | It should be clarified why in this draft annex to ISPM 15 treatment codes for heat treatments using conventional steam or dry kiln heat chamber is HT, and the code DH is proposed for dielectric heating, which is also a heat treatment. Besides this, Annex 2 to ISPM 15 includes only the codes HT and MB, and if code DH is adopted, Annex 2 should be revised to include it.  | English  | COSAVE,Chile, Brazil, Paraguay, Argentina, Uruguay |
| 3. | *G*  | Substantive  |  | Regarding paragraph 34: although not open for comments, it should be modified in line with section 4.1 of ISPM 15 and for consistency with [18] and [23] of this draft. For both heat treatments it is stated that the treatment providers should be approved by the NPPO (see para 18 and 23). There is no such requirement expressed for providers of methyl bromide treatments. For consistency this should also be stated for this treatment, e.g. in para 34. Instead of: "NPPOs should ensure that the following factors are appropriately addressed by those involved in the application of methyl bromide treatment under this standard:", it would be better to write "The NPPO should approve the treatment provider. When approving and auditing a treatment provider, the NPPO should ensure that the following factors are appropriately addressed:".  | English  | EPPO, Georgia, Norway, European Union, Russian Federation, Belarus  |
| 4. | *G*  | Substantive  | Guidelines prescribed in the draft annex are straight forward and easy to understand | The proposed draft Annex has been reviewed and found to provide adequate guidance enable NPPO to evaluate the effectiveness of treatment of wood packaging material used in international trade and to ensure compliance with ISPM 15.  | English  | Ghana  |
| 5. | *10*  | Substantive  | For methyl bromide treatment, the removal of bark must be carried out before treatment as the presence of bark on the wood may affect treatment efficacy. For heat treatments, the removal of bark may be carried out before or after treatment. If diameter limitations are recommended Where a maximum dimension is specified for certain heat treatments (e.g. dielectric heating) any bark remaining must be included in the dimension measurement. | "Diameter" would only apply to round wood and so is not applicable. Also, for treatments it is not appropriate to refer to "recommended", but rather say "specified".  | English  | EPPO, Georgia, Norway, European Union, Russian Federation, Belarus |
| 6. | *10*  | Technical  | For methyl bromide treatment, the removal of bark must be carried out before treatment as the presence of bark on the wood may affect treatment efficacy. For heat treatments, the removal of bark may be carried out before or after treatment. If diameter limitations are recommended for certain heat treatments (e.g. dielectric heating) any bark remaining must be included in the dimension measurement. | No explanations are given for any other requirements elsewhere in the standard. This information is not necessary here and can be deleted.  | English  | United States of America  |
| 7. | *13*  | Editorial  | NPPOs should ensure that the treatment temperature is monitored by treatment providers 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 sources or processes applied, the moisture content and the initial temperature distribution in the wood. When using dielectric radiation as a heating source, the coldest part of the wood usually is the surface. | Term used throughout the standard.  | English  | EPPO, Georgia, Norway, European Union, Russian Federation, Belarus |
| 8. | *13*  | Technical  | NPPOs should ensure that the treatment temperature is monitored by providers 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 sources or processes applied, the moisture content and the initial temperature distribution in the wood. When using dielectric radiation as a heating source, the coldest part of the wood usually is the surface. In some situations (e.g. dielectric heating of frozen pieces of wood of larger size) the core may be the coldest part of the wood.  | Explanation on "the coldest part of the wood usually is the surface" and further information on the exceptions. This is additional technical guidance addressed to treatment providers/NPPO to ensure monitoring process is adequate (and as already stated in paragraph 13 to ensure target temperature is reached). This practical example ( in problematic case of thick frozen wood) may lead to another temperature/heating pattern when using DH (coldest part is the core).  | English  | EPPO, Georgia, Norway, European Union, Russian Federation, Belarus |
| 9. | *16*  | Editorial  | 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 wood and other substantial parameters (such as species, thickness of 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. | Better English.  | English  | EPPO, Georgia, Norway, European Union, Russian Federation, Belarus |
| 10. | *18*  | Substantive  | Treatment providers should be approved by the NPPO. The following factors are provided as examples that shouldmay be considered by the NPPO when evaluating the capability of aone type of heat chamber to meet the heat treatment requirements: | Paras (18) and (19) were initially developed as guidelines to be used by the NPPOs in countries that may not have expertise with heat chambers. We agree with their inclusion here but we object to the use of "should" because it has the effect of creating an expectation for compliance, when the initial object was advisory and less mandatory. In using "should be considered", some existing heat chambers may not meet these requirements and may be excluded or the manufacturer may be required to perform expensive changes to a heat chamber in order to achieve compliance with Annex 1 language. We feel that the items detailed in (19) are not all inclusive of the many varied situations that will be seen in heat chambers around the world and for this reason alone this section must be advisory in nature and not have an expectation for compliance. This Annex is not describing all possible types of heat chambers; it is describing some factors that may be considered in looking at heat chambers.  | English  | United States of America  |
| 11. | *18*  | Technical  | Treatment providers should be approved by the NPPO. NPPO's should consider the following factors which may be required for a heat chamber to meet the treatement requirementsThe following factors should be considered by the NPPO when evaluating the capability of a heat chamber to meet the heat treatment requirements: | In an effort to avoid mis-interpretation, the suggested re-wording clarifies that the various components of the evaluation of a kiln are not all mandatory.  | English  | Canada  |
| 12. | *19*  | Substantive  | 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 into the chamber in a manner that ensures adequate air flow around and through the wood stack.
3. Air deflectors in the chamber area and spacers are used as required to ensure adequate air flow.
4. Fans are used to circulate air during treatment, and air flow from fans is sufficient to ensure the core temperature of the wood is maintained at the specified level for the required duration.
5. The coldest location within the chamber is identified for each load and temperature sensors placed there, either in the wood or in the chamber.
6. 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 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 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 to ensure that 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 drawn to external influences to the wood such as nails or metal insertions which may lead to incorrect measurements.
7. 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 take into account the species, moisture content and thickness of wood being treated. A minimum of two temperature sensors are used in chambers treating wood packaging according to treatment schedules.
8. If the air flow in the chamber is routinely reversed during treatment, an increased number of temperature sensors may be used to account for a possible change in the location of the coldest area.
9. Temperature sensors and data recording equipment are calibrated in accordance with the manufacturer’s instructions at a frequency specified by the NPPO.
10. Temperatures are monitored and recorded during each treatment to ensure that the prescribed minimum temperature is maintained for the required period of time. If minimum temperatures are not maintained, the treatment is restarted or the treatment time extended and the temperatures raised to ensure that all wood is treated to meet the requirements. During the treatment period, the frequency of temperature readings is sufficient to ensure that treatment failures can be detected. (To replace the last sentence " During the treatment period etc" with "Temperature readings can be recorded at a minimum of every 30 minutes until the specified core temperature is reached and held at all measuring points in the chamber. During the treatment period, temperature reading can be recorded at a minimum of every 5 minutes."
11. For purposes of auditing, the treatment provider keeps records of heat treatments and calibrations for a period of time specified by the NPPO.
 | The existing last sentence in point 10 is not clear and very subjective as to what is considered "sufficient reading frequency". For clarity, it is proposed to replace the last sentence with the two proposed sentences as indicated and to set a minimum requirement on the frequency of the recording of the temperature. Setting a time interval where the probe temperature is recorded will provde a timely information of what is happening inside the chamber where the operator can use a reference during treatment or even after treatment. Eg before reaching the required temperature, erratic temperature readings would be an indication of malfunction in the operating elements of the chamber. The existing paragraph 19, point 10 did not specify at which point the temperature should be recorded during treatment period. It can be taken as referring to the point where all probes reached the required temp and then another temp is recorded after 30 min. If this is so interpretated, then the temp readings in between the exposure period may not be monitored to flag out any malfunction. Setting a time interval of recording the temp provides specific and detailed information to detect malfunctions such as probes reading only 56 dgC all throughout the 30 min, probes reading above maximum capacity of the heater or probes not recording after reaching the minimum required temp prior to completion of exposure period.  | English  | Singapore  |
| 13. | *19*  | Substantive  | 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 into the chamber in a manner that ensures adequate air flow around and through the wood stack.
3. Air deflectors in the chamber area and spacers are used as required to ensure adequate air flow.
4. Fans are used to circulate air during treatment, and air flow from fans is sufficient to ensure the core temperature of the wood is maintained at the specified level for the required duration.
5. The coldest location within the chamber is identified for each load and temperature sensors placed there, either in the wood or in the chamber.
6. 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 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 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 to ensure that 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 drawn to external influences to the wood such as nails or metal insertions which may lead to incorrect measurements.
7. 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 take into account the species, moisture content and thickness of wood being treated. A minimum of two temperature sensors are used in chambers treating wood packaging according to treatment schedules.
8. If the air flow in the chamber is routinely reversed during treatment, an increased number of temperature sensors may be used to account for a possible change in the location of the coldest area.
9. Temperature sensors and data recording equipment are calibrated in accordance with the manufacturer’s instructions at a frequency specified by the NPPO.
10. 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 temperatures are is not maintained, corrective action (e.g. the treatment is restarted or the treatment time extended and if necessary, the temperatures raised) to ensure that all wood is treated according to meet the heat treatment requirements (30 continuous minutes in 56oC). During the treatment period, the frequency of temperature readings is sufficient to ensure that treatment failures can be detected.
11. For purposes of auditing, the treatment provider keeps records of heat treatments and calibrations for a period of time specified by the NPPO.
 | - Bullet 10. Improved clarity of the text and to stress that whenever during the treatment the temperature drops below 56°C, the measurement of 30 continuous minutes must start again from the moment the temperature comes back to 56°C. This may require a complete restart of the treatment or only extending its time, but in each case some kind of corrective action is needed.  | English  | EPPO, Georgia, Norway, European Union, Russian Federation, Belarus |
| 14. | *19*  | Substantive  | 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 into the chamber in a manner that ensures adequate air flow around and through the wood stack.
3. Air deflectors in the chamber area and spacers are used as required to ensure adequate air flow.
4. Fans are used to circulate air during treatment, and air flow from fans is sufficient to ensure the core temperature of the wood is maintained at the specified level for the required duration.
5. The coldest location within the chamber is identified for each load and temperature sensors placed there, either in the wood or in the chamber.
6. 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 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 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 to ensure that 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 drawn to external influences to the wood such as nails or metal insertions which may lead to incorrect measurements.
7. 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 take into account the species, moisture content and thickness of wood being treated. At least A minimum of two temperature sensors are recommended used in chambers treating wood packaging according to treatment schedules.
8. If the air flow in the chamber is routinely reversed during treatment, an increased number of temperature sensors may be used to account for a possible change in the location of the coldest area.
9. Temperature sensors and data recording equipment are calibrated in accordance with the manufacturer’s instructions at a frequency specified by the NPPO.
10. Temperatures are monitored and recorded during each treatment to ensure that the prescribed minimum temperature is maintained for the required period of time. If minimum temperatures are not maintained, the treatment is restarted or the treatment time extended and the temperatures raised to ensure that all wood is treated to meet the requirements. During the treatment period, the frequency of temperature readings is sufficient to ensure that treatment failures can be detected.
11. For purposes of auditing, the treatment provider keeps records of heat treatments and calibrations for a period of time specified by the NPPO.
 | For consistency with the indent 6 of para19.  | English  | Japan  |
| 15. | *19*  | Substantive  | 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 into the chamber in a manner that ensures adequate air flow around and through the wood stack.
3. Air deflectors in the chamber area and spacers are used as required to ensure adequate air flow.
4. Fans are used to circulate air during treatment, and air flow from fans is sufficient to ensure the core temperature of the wood is maintained at the specified level for the required duration.
5. The coldest location within the chamber is identified for each load and temperature sensors placed there, either in the wood or in the chamber.
6. 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 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 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 to ensure that 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 drawn to external influences to the wood such as nails or metal insertions which may lead to incorrect measurements.
7. 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 take into account the species, moisture content and thickness of wood being treated. A minimum of two temperature sensors are used in chambers treating wood packaging according to treatment schedules.
8. If the air flow in the chamber is routinely reversed during treatment, an increased number of temperature sensors may be used to account for a possible change in the location of the coldest area.
9. Temperature sensors and data recording equipment are calibrated in accordance with the manufacturer’s instructions at a frequency specified by the NPPO.
10. 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 temperatures are is not maintained, corrective action is taken (i.e. the treatment is restarted or the treatment time extended and if necessary, the temperatures raised) to ensure that all wood is treated according to meet the heat treatment requirements (30 continuous minutes at 56oC). During the treatment period, the frequency of temperature readings is sufficient to ensure that treatment failures can be detected.
11. For purposes of auditing, the treatment provider keeps records of heat treatments and calibrations for a period of time specified by the NPPO.
 | - Bullet 10. Improved clarity of the text and to stress that whenever during the treatment the temperature drops below 56°C, the measurement of 30 continuous minutes must start again from the moment the temperature comes back to 56°C. This may require a complete restart of the treatment or only extending its time, but in each case some kind of corrective action is needed.  | English  | European Union  |
| 16. | *19*  | Technical  | 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 into the chamber in a manner that ensures adequate air flow around and through the wood stack.
3. Air deflectors in the chamber area and spacers in the timber stack are used as required to ensure adequate air flow.
4. Fans are used to circulate air during treatment, and air flow from fans is sufficient to ensure the core temperature of the wood is maintained at the specified level for the required duration.
5. The coldest location within the chamber is identified for each load and temperature sensors placed there, either in the wood or in the chamber.
6. 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 temperatures. The use of multiple temperature sensors are used to 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 to ensureing that 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 drawn to external influences to the wood such as nails or metal insertions which may lead to incorrect measurements.
7. 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 take into account the species, moisture content and thickness of wood being treated. A minimum of two temperature sensors are used for monitoring air temperature in chambers treating wood packaging according to treatment schedules.
8. If the air flow in the chamber is routinely reversed during treatment, an increased number of temperature sensors may be used needed to account for a possible change in the location of the coldest area.
9. Temperature sensors and data recording equipment are calibrated in accordance with the manufacturer’s instructions at a frequency specified by the NPPO.
10. Temperatures are monitored and recorded during each treatment to ensure that the prescribed minimum temperature is maintained for the required period of time. If minimum temperatures are not maintained, the treatment is restarted or the treatment time extended and the temperatures raised to ensure that all wood is treated to meet the requirements. During the treatment period, the frequency of temperature readings is sufficient to ensure that treatment failures can be detected.
11. For purposes of auditing, the treatment provider keeps records of heat treatments and calibrations for a period of time specified by the NPPO.
 | - Bullet 3: Useful explanation of where the spacers are used, compare with "air deflectors in the chamber area". - Bullet 6: Correct level of obligation and simplification. - Bullet 7: More precise description. - Bullet 8: Better wording  | English  | EPPO, Georgia, Norway, European Union, Russian Federation, Belarus |
| 17. | *20*  | Substantive  | **Heat treatment using dielectric radiation (dielectric heating, treatment code for the mark: HT-DH)** | Dielectric radiation is also one of the heat treatment methods. So, it is more clear th use a treatment code of the mark: HT-DH.  | English  | Korea, Republic of  |
| 18. | *20*  | Technical  | **Heat treatment using dielectric radiation (dielectric heating, (treatment code for the mark: DH)** | Dielectric radiation does not exist. The name of the heating effect of electromagnetic radiation of specific frequency on the dipoles (of water) is "dielectric heating".  | English  | EPPO, Georgia, Norway, European Union, Russian Federation, Belarus |
| 19. | *21*  | Editorial  | Dielectric heating is a process that is caused by a dielectric radiation. Where dielectric heating is used (e.g. using microwaves), wood packaging material composed of wood not exceeding 20 cm1 when measured across the smallest dimension of the piece or the stack must be heated to achieve a minimum temperature of 60 °C for 1 minute throughout the entire profile of the wood (including its surface). The prescribed temperature must be reached within 30 minutes from the start of the treatment2. | Consistency with paragraph 15.  | English  | EPPO, Georgia, Norway, European Union, Russian Federation, Belarus |
| 20. | *21*  | Substantive  | Dielectric heating is a process that is caused by a dielectric radiation. Where dielectric heating is used (e.g. using microwaves), wood packaging material composed of wood not exceeding 20 cm1 when measured across the smallest dimension of the piece or the stack must be heated to achieve a minimum temperature of 60 °C for 1 continuous minute throughout the profile of the wood (including its surface). The prescribed temperature must be reached within 30 minutes from the start of the treatment2. | To clarify. This paragraph does not explain if it is possible to achieve 60 C continuosly or not for 1 minute.  | English  | COSAVE, Chile, Paraguay, Argentina, Uruguay, Brazil  |
| 21. | *21*  | Substantive  | Dielectric heating is a process that is caused by a dielectric radiation. Where dielectric heating is used (e.g. using microwaves), wood packaging material composed of wood not exceeding 20 cm1 when measured across the smallest dimension of the piece or the stack must be heated the fundamental requirement is to achieve a minimum temperature of 60 °C for 1 minute throughout the profile of the wood (including its surface). The prescribed temperature must be reached within 30 minutes from the start of the treatment2. | The 20 cm limit is based on the efficacy data currently available, but there is no special reason to limit thickness. In theory, if it increases irradiated energy, the wood can reach at the prescribed temperature regardless of its thickness. The thickness limit is not set in heat treatment using a conventional steam or dry kiln heat chamber. The current 20 cm limit can be changed anytime through additional studies. Therefore it is not necessary to set the 20cm limit in this draft appendix.  | English  | Korea, Republic of  |
| 22. | *21*  | Technical  | Dielectric heating is a process that is caused by a dielectricelectromagnetic radiation (e.g. microwaves). Where dielectric heating with microwaves is used (e.g. using microwaves), wood packaging material composed of wood not exceeding 20 cm1 when measured across the smallest dimension of the piece or the stack must be heated to achieve a minimum temperature of 60 °C for 1 minute throughout the profile of the wood (including its surface). The prescribed temperature must be reached within 30 minutes from the start of the treatment2. | See explanation to paragraph [20]. Microwaves are actually only one of the categories of the electromagnetic radiation of specified frequency range (0.3 GHz-300 GHz) causing the effect of dielectric heating. “With microwaves” - currently the requirement of 20 cm applies only to the microwave treatment.  | English  | EPPO, Georgia, Norway, European Union, Russian Federation, Belarus |
| 23. | *23*  | Substantive  | The NPPO should approve and audit the treatment provider. When approving and auditing a treatment provider, the NPPO should ensure that the following factors are appropriately addressed: | NPPO should audit treatment providers for better implementation of ISPM 15  | English  | COSAVE, Chile, Brazil, Paraguay, Argentina, Uruguay  |
| 24. | *23*  | Substantive  | The NPPO should approve the treatment provider. The following factors are provided as examples that the NPPO may consider Wwhen approving and auditing a treatment provider., the NPPO should ensure that the following factors are appropriately addressed: | This describes factors that the NPPO may consider but it does not address all possibilities.  | English  | United States of America  |
| 25. | *24*  | Editorial  | 1. Irrespective of whether dielectric heat treatment is conducted as a batch process or as a continuous (conveyor) process, the treatment is monitored on the wood where the temperature is likely to be the coldest (normally on the surface). For measuring the surface temperature, at least two temperature sensors are used. The operator treatment provider has initially validated that the wood temperatures reach or exceed 60 °C for 1 minute throughout the entire profile of the wood (including its surface).
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.
3. Temperature sensors and data recording equipment are calibrated in accordance with the manufacturer’s instructions at a frequency specified by the NPPO.
4. For purposes of auditing, the treatment provider keeps records of heat treatments and calibrations for a period of time specified by the NPPO.
 | 24.1. Consistency - term used throughout the standard.  | English  | EPPO, Georgia, Norway, European Union, Russian Federation, Belarus  |
| 26. | *24*  | Substantive  | 1. Irrespective of whether dielectric heat treatment heating is conducted as a batch process or as a continuous (conveyor) process, the treatment is monitored on the wood where the temperature is likely to be the coldest (normally on the surface). For measuring the surface temperature, at least two temperature sensors are used. The operator 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).
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.
3. Temperature sensors and data recording equipment are calibrated in accordance with the manufacturer’s instructions at a frequency specified by the NPPO.
4. For purposes of auditing, the treatment provider keeps records of heat treatments and calibrations for a period of time specified by the NPPO.
 | Dielectric heating is the process caused by dielectric radiation according to paragraph 21. "Continuous": To clarify. This paragraph does not explain if it is possible to achieve 60 C continuously or not for 1 minute.  | English  | COSAVE, Chile, Paraguay, Argentina, Uruguay  |
| 27. | *24*  | Substantive  | 1. Irrespective of whether dielectric heat treatment is conducted as a batch process or as a continuous (conveyor) process, the treatment is monitored on the wood where the temperature is likely to be the coldest (normally on the surface). For measuring the surface temperature, at least two temperature sensors are used. The operator 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).
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.
3. Temperature sensors and data recording equipment are calibrated in accordance with the manufacturer’s instructions at a frequency specified by the NPPO.
4. For purposes of auditing, the treatment provider keeps records of heat treatments and calibrations for a period of time specified by the NPPO.
 | To clarify. This paragraph does not explain if it is possible to achieve the temperature of 60 C consinuosly or not for 1 minute.  | English  | Brazil  |
| 28. | *24*  | Technical  | 1. Irrespective of whether dielectric heat treatment is conducted as a batch process or as a continuous (conveyor) process, the treatment is monitored on the wood where the temperature is likely to be the coldest (normally on the surface) to ensure the target temperature is maintained(normally on the surface). For measuring the surface temperature, at least two temperature sensors are used. to ensure that any failure of a temperature sensor is detected. The operator has initially validated that the wood temperatures reach or exceed 60 °C for 1 minute throughout the entire profile of the wood (including its surface).
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.
3. Temperature sensors and data recording equipment are calibrated in accordance with the manufacturer’s instructions at a frequency specified by the NPPO.
4. For purposes of auditing, the treatment provider keeps records of heat treatments and calibrations for a period of time specified by the NPPO.
 | 24.1 "Surface temperature":The objective is to maintain the minimum temperature of 60° C/1 minute throughout the entire profile, assumption on what are the coldest parts is not appropriate as data is available showing that e.g. for treatments of frozen wood the core may be the coldest. Monitoring of the treatment need to be focused on the temperature throughout the entire profile of the wood not on one place on/in the wood. 24.1. " Multiple temperature sensors": consistency with paragraph 19/6 and HT.  | English  | EPPO, Georgia, Norway, European Union, Russian Federation, Belarus |
| 29. | *24*  | Technical  | 1. Irrespective of whether dielectric heat treatment is conducted as a batch process or as a continuous (conveyor) process, the treatment is monitored on 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 surface temperature, at least two temperature sensors are used. to ensure that any failure of a temperature sensor is detected. The operator has initially validated that the wood temperatures reach or exceed 60 °C for 1 minute throughout the entire profile of the wood (including its surface).
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.
3. Temperature sensors and data recording equipment are calibrated in accordance with the manufacturer’s instructions at a frequency specified by the NPPO.
4. For purposes of auditing, the treatment provider keeps records of heat treatments and calibrations for a period of time specified by the NPPO.
 | - "to ensure the target ...": to emphasise that the aim of the measurement is to maintain the temperature at the required level; - "surface temperature":The objective is to maintain the minimum temperature of 60° C/1 minute throughout the entire profile, assumption on what are the coldest parts is not appropriate as data is available showing that e.g. for treatments of frozen wood the core may be the coldest. Monitoring of the treatment needs to be focused on the temperature throughout the entire profile of the wood not on one place on/in the wood; - "to ensure that any failure...": explanation for the use of multiple sensors.  | English  | European Union  |
| 30. | *27*  | Editorial  | 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.methyl bromide The fumigation of Wwood packaging material fumigated with methyl bromide must be in accordance with a schedule, specified or approved by the NPPO, that achieves the minimum concentration-time product4(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 (see footnote to Table 1). This CT must be achieved throughout the profile of 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 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. | It's the treatment that must be in accordance with the schedule.  | English  | EPPO, Georgia, Norway, European Union, Russian Federation, Belarus |
| 31. | *27*  | Editorial  | 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 wWood packaging material fumigated with methyl bromide must be in accordance with a schedule, specified or approved by the NPPO, that achieves the minimum concentration-time product4 (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 (see footnote to Table 1). This CT must be achieved throughout the profile of 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 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. | It's the treatment that must be in accordance with the schedule.  | English  | European Union  |
| 32. | *27*  | Substantive  | Treatment providers should be approved and audited by the NPPO.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. Wood packaging material fumigated with methyl bromide must be in accordance with a schedule, specified or approved by the NPPO, that achieves the minimum concentration-time product4 (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 (see footnote to Table 1). This CT must be achieved throughout the profile of 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 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. | Text added to be consistent with specifications given in paragraphs 18 and 23 for other treatments Text deleted: The additional time is not specified. It could be difficult for the NPPO to control the use of the additional time by the treatment provider, that with the current wording may be 1, 2, or more hours.  | English  | COSAVE, Chile, Paraguay, Argentina, Uruguay  |
| 33. | *27*  | Substantive  | 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. Wood packaging material fumigated with methyl bromide must be in accordance with a schedule, specified or approved by the NPPO, that achieves the minimum concentration-time product4 (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 (see footnote to Table 1). This CT must be achieved throughout the profile of 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 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 dosing 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. | Methyl bromide treatment begins at the dosing of fumigation.  | English  | Japan  |
| 34. | *27*  | Substantive  | 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. Wood packaging material fumigated with methyl bromide must be in accordance with a schedule, specified or approved by the NPPO, that achieves the minimum concentration-time product4 (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 (see footnote to Table 1). This CT must be achieved throughout the profile of 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 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. | The inclusion of this sentence does not provide additional guidelines to the NPPO. The additional time is not specified. It could be difficult for the NPPO to control the use, by the treatment provider, of the additional time, that with the current wording may be 1, 2, 3, 4 hours???  | English  | Brazil  |
| 35. | *35*  | Editorial  | 1. Fans are used as appropriate during the gas distribution phase of fumigation to ensure that equilibrium is reached and positioned to ensure that the fumigant is rapidly and effectively distributed throughout the fumigation enclosure (preferably within the first 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 are 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 are laid on the floor.
5. 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.
6. 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.
7. The concentration of methyl bromide is always measured at a location furthest from the insertion point of the gas, as well as at other locations (e.g. at front bottom, centre middle and top back), to confirm that the uniform distribution of the gas (equilibrium) throughout the chamber is reached. Treatment time is not calculated until the equilibrium has been reached. Similar to point#1 - define equilibrium for clarity.
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. To replace this sentence with " The minimum ambient temperature that the fumigation enclosure is expected to experience over the duration of the treatment should be used to calculate the dosage of the fumigant.
11. Wood packaging material to be fumigated is not wrapped or coated in materials impervious to the fumigant.
12. 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.
13. For purposes of auditing, the treatment provider keeps records of methyl bromide treatments and calibrations for a period of time specified by the NPPO.
 | F  | English  | Singapore  |
| 36. | *35*  | Editorial  | Examples are provided below: 1. Fans are used as appropriate during the gas distribution phase of fumigation to ensure that equilibrium is reached and positioned to ensure that the fumigant is rapidly and effectively distributed throughout the fumigation enclosure (preferably within the first 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 are 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 are laid on the floor.
5. 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.
6. 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.
7. The concentration of methyl bromide is always measured at a location furthest from the insertion point of the gas, as well as at other locations (e.g. at front bottom, centre middle and top back), to confirm that the uniform distribution of the gas (equilibrium) throughout the chamber is reached. Treatment time is not calculated until the equilibrium has been 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.
11. Wood packaging material to be fumigated is not wrapped or coated in materials impervious to the fumigant.
12. 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.
13. For purposes of auditing, the treatment provider keeps records of methyl bromide treatments and calibrations for a period of time specified by the NPPO.
 | Makes it clear that these are examples of options.  | English  | United States of America  |
| 37. | *35*  | Substantive  | 1. Fans are used as appropriate during the gas distribution phase of fumigation to ensure that equilibrium is reached and positioned to ensure that the fumigant is rapidly and effectively distributed throughout the fumigation enclosure (preferably within the first hour of application). How does this standard define equilibrium in terms of concentration reading?
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 are 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 are laid on the floor.
5. 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.
6. 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.
7. The concentration of methyl bromide is always measured at a location furthest from the insertion point of the gas, as well as at other locations (e.g. at front bottom, centre middle and top back), to confirm that the uniform distribution of the gas (equilibrium) throughout the chamber is reached. Treatment time is not calculated until the equilibrium has been reached. Same as point#1- this standard should define the requirements of equilibrium for clarity.
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. To replace this sentence with " The minimum ambient temperature that the fumigation enclosure is expected to experience over the duration of the treatment should be used to calculate the dosage of the fumigant.
11. Wood packaging material to be fumigated is not wrapped or coated in materials impervious to the fumigant.
12. 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.
13. For purposes of auditing, the treatment provider keeps records of methyl bromide treatments and calibrations for a period of time specified by the NPPO.
 | or Point #1: The proposed standard should specify & describe the parameters to set equilibrium. It can be in terms of percentage or standard variation. Otherwise it becomes arbitrary. For Point# 7: Similar to Point#1; the proposed standard should be specifc on the parameters required for equilibrium for clarity. For Point#10: Basing the dosage on the initial temperature of the product or ambient air prior to or at the start of the fumigation is not accurate as ambient temperature coudl change during the duration/exposure periof of the fumigation. Thus, dosage shoudl be based on the expected minimum/lowest temperature expected to occur during the exposure/treatment period.  | English  | Singapore  |
| 38. | *35*  | Substantive  | 1. Fans are used as appropriate during the gas distribution phase of fumigation to ensure that equilibrium is reached and positioned to ensure that the fumigant is rapidly and effectively distributed throughout the fumigation enclosure (preferably within the first 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 are 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 are laid on the floor.
5. 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.
6. 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.
7. The concentration of methyl bromide is always measured at a location furthest from the insertion point of the gas, as well as at other locations (e.g. at front bottom, centre middle and top back), to confirm that the uniform distribution of the gas (equilibrium) throughout the chamber is reached. Treatment time is not calculated until the equilibrium has been 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.
11. Wood packaging material to be fumigated is not wrapped or coated in materials impervious to the fumigant.
12. 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.
13. For purposes of auditing, the treatment provider keeps records of methyl bromide treatments and calibrations for a period of time specified by the NPPO.
 | The following two factors should be required by methyl bromide treatment; the minimum CT over 24 hours and minimum final concentration after 24 hours from the beginning of the dosing. Therefore, it is not necessary to start to calculate the treatment time until the equillbruium has been rearched.  | English  | Japan  |
| 39. | *38*  | Technical  | Footnote 1This 20 cm limit is based on the efficacy data currently available. | Delete this footnote. It does not provide useful information and is not technically justified in all cases. If suggestion made to delete part of paragraph 21 that includes the 20 cm wording is accepted, this footnote would no longer be necessary.  | English  | United States of America  |