

Heat Sterilization of Wood

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Insects and other pests can travel between countries in pallets and other wood packaging materials through international trade. Because these pests can cause significant ecological damage, their invasion into non-native countries is undesirable. Heat sterilization is currently the most practical and environmentally friendly treatment to kill pests in solid wood materials and prevent their transfer between continents and regions. Consequently, regulations requiring heat sterilization are becoming more common.

Two important questions should be considered in heat sterilizing solid wood materials: First, what temperature–time regime is required to kill a particular pest? Second, how much time is required to heat the center of any wood configuration to the kill temperature? The entomology research on the first question has facilitated the development of international standards for heat sterilization of various solid wood materials. This chapter primarily addresses the second question. It focuses on various factors that should be considered when planning and implementing a heat treatment process using a conventional steam or dry kiln heat chamber, discusses experimentally derived heating times for commonly used wood products, and presents analytical and empirical methods for estimating heating times that can be used as starting points in the development of heat treatment schedules. Current wood packaging material enforcement regulations and several additional practical considerations for heat treatment operations are also presented.

Heat Treatment Standards

The current international standard for heat sterilization of solid wood packaging materials is the International Standard for Phytosanitary Measures (ISPM) 15, “Guidelines for Regulating Wood Packaging Material in International Trade,” which requires heating wood to a minimum core temperature of 56 °C (133 °F) for a minimum of 30 min when using conventional heat chamber technology (IPPC 2002, 2017; APHIS 2004). (Note: In 2013, the Eighth Session of the Commission on Phytosanitary Measures (CPM-8) adopted revised Annex 1 to ISPM 15 to include heat treatment using dielectric heating. Where dielectric heating (microwave or radio waves) is used, wood packaging material must be heated to achieve a minimum temperature of 60 °C (140 °F) for 1 min continuously throughout the entire profile of the wood, including its surfaces.) These guidelines are for all forms of wood packaging material that may serve as a pathway

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