



**NAPPO**

North American Plant Protection Organization  
Organización Norteamericana de Protección a las Plantas

## NAPPO Executive Committee Position Paper

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**Issue: Heat Treatment of Wood and Wood Packaging**

### Approved by:

Greg Wolff  
Executive Committee Member  
Canada

Rebecca A. Bech  
Executive Committee Member  
United States

Javier Trujillo Arriaga  
Executive Committee Member  
Mexico

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### Introduction

Various phytosanitary treatments have been developed in order to reduce the movement of forest quarantine pests associated with the international movement of wood commodities. Heat treatment has long been used to kill pests (insects, fungi, nematodes) living in or on wood commodities. This paper reviews the history of heat as a wood treatment, the scientific basis for its effect on wood pests, the industrial processes by which wood is heat treated and how heat treatment can be incorporated into phytosanitary systems approaches. It is intended to provide guidance to national plant protection organizations in the use of heat treatment in phytosanitary regulations.

### Overview

Since the 1920s scientific studies have reported lethal temperatures for a range of quarantine pests. However, it is often difficult to compare results among studies because of differing test protocols. In the 1990s the temperature–time schedule, 56°C for 30 min, was shown to be effective for treatment of pinewood nematode-infested wood. This temperature-time combination was subsequently recognized to be effective for most quarantine pests and formed the basis for the heat treatment measure in the international wood packaging standard, ISPM 15. Further research has evaluated a wider range of quarantine pests and brought other aspects of heat treatment into focus including sub-lethal effects on pests and microbial

interactions following treatment, variability among pest life stages, and statistical interpretation of test results.

Heat treatment can be applied as a stand-alone phytosanitary measure or is often part of a moisture reduction (kiln drying) process. In situations where high ambient kiln temperatures are utilized and wood moisture is lowered below 20%, wood commodities are exposed to temperatures and times far exceeding 56°C for 30 min and greater phytosanitary security is achieved. Furthermore, heat treatment, when combined with complimentary independent production activities (such as debarking, sawing, and drying) can be considered a component of an integrated measures approach. In combination these measures remove, inactivate or kill pests thereby providing a more effective basis for preventing the entry and establishment of pests associated with the movement of wood commodities.

### **Conclusions and Recommendations**

Heat treatment at a temperature/time combination of 56 °C for 30 minutes applied through the entire profile of wood has been shown to be effective in killing most insects, fungi and nematodes which may be associated with sawn wood commodities. Additional phytosanitary security is gained through high chamber treatment temperatures, sub-lethal effects, and post treatment colonization by saprophytic fungi. Where requirements for treatment are supported by technical justification, international standardization of the requirement based upon 56 °C for 30 minutes would facilitate trade without sacrificing phytosanitary security.