



Ship Type: All Trade Area: Worldwide

Bulletin 454 - 02/06 - Mould Growth on Heat Treated Pallets - Worldwide

The Club has been made aware of an increase in the number of reported problems with mould on dunnage aboard vessels arriving in the Port of Philadelphia over the last several weeks. It appears the February 1, 2006 implementation of the International Plant Protection Convention regulations may be directly related to the increased mould problems.

All of the dunnage showing problems has been heat treated. It appears that the problem relates to relatively green dunnage and that the mould problem may increase where this dunnage is compressed due to heavy loads. The compression of the dunnage causes the moisture contained in the dunnage to come to the surface allowing the mould to start growing. Stevedores in Philadelphia have not been willing to handle cargo that has been in contact with the mould, causing significant delays and increased costs related to retaining environmental remediation companies to assist with the discharge.

The heating of green pallet materials during the heat sterilisation process, leads to an increase in the rate of moisture evaporation after the material has been removed from the heat treatment chamber. The warm, saturated wood surface leads to ideal mould growing conditions.

Many customers of heat treated pallets believe that the heat sterilization process not only eliminates insects in the wood but also prevents mould. While the heat sterilization process does kill mould, it does not prevent further potential for mould growth. In fact, heat sterilization can actually lead to ideal mould growing conditions.

Optimal conditions for mould growth include wood surfaces with a moisture content of twenty-five percent or greater, air temperatures from 66 to 90 degrees F and storage areas with little to no air movement. To prevent mould it is vital to keep the moisture content of the surface of wood to no more than 20%. This typically means the average moisture content of the pallet should be in the range of 30-35%. This moisture content must be maintained throughout shipping and storage.

There are many ways to dry the surface of wood to 20% moisture content in the treatment process. Air-drying assembled pallets typically take approximately 20 to 60 days depending on the air temperatures, humidity levels and air-flow. The initial moisture content and specific gravity of the material also affects the drying rate. To accelerate the drying process a forced air system could be used. Forced air drying systems similar to fan shed drying used for "white" lumber can typically reduce air-drying times by one half. Kiln drying pallets to the average moisture content of 30% can also be done. Trials have shown that green hardwood pallets can typically be dried to an average of 30% moisture content in five days with minimal degrade. Kiln drying can also be done in many heat treatment chambers after the heat sterilization phase; however, venting capacity is required in these systems.

Chemical treatment can also be used to prevent mould growth on green pallets. Common mildicides include copper-8-quinolinolate and copper naphthanate. Chemical treatment is typically applied by dipping or spraying the pallets and can prevent mould growth from one to three months. Chlorine bleach can also be used to remove and prevent mould on wood. The concentration of chlorine bleach can vary greatly and its effectiveness as a mould preventative is more limited than many copper based chemicals. Many pallet customers, such as the medical supply industry and the grocery industry, may not be willing to accept chemically treated pallets.

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Case study of heat treatment and mould control of wood pallets by Brian Bond – Department of Wood Science and Forest Products, Virginia Polytechnic Institute and State University, USA.
www.agctr.lsu.edu/enr/palletsanitation/articles/Brian_Bond_Case_Studies.pdf.