INTRODUCTION

This guideline is intended as a source of information for employees, employers, physicians, industrial hygienists, and other occupational health professionals who may have a need for such information. It does not attempt to present all data; rather, it presents pertinent information and data in summary form.

APPLICABILITY

The general guidelines contained in this document apply to wood dust. Physical and chemical properties of several specific compounds are provided for illustrative purposes.

SUBSTANCE IDENTIFICATION

HARDWOOD

Synonyms: Oak, beech, mahogany, maple, and walnut (not inclusive)

Appearance and odor: Not applicable

SOFT WOOD

Synonyms: Pine, spruce, conifers (not inclusive)

Appearance and odor: Not applicable

PERMISSIBLE EXPOSURE LIMIT (PEL)

The current ACGIH recommended Threshold Limit Values (TLVs) are 1 milligram of hardwood dust per cubic meter of air (mg/m³) and 4 mg/M³ for softwood averaged over an eight-hour work shift (as respirable dust).

HEALTH HAZARD INFORMATION

HARDWOOD DUST

Routes of Exposure - Hardwood dust exposure is industrially encountered by inhalation, skin, and eye contact.

Effects of overexposure

1. Short-term Exposure: Inhalation of hardwood dusts may cause irritation of the mucous membranes of the upper respiratory tract and coughing or hoarseness. Skin contact may cause allergic dermatitis. Eye contact may result in irritation and inflammation of the conjunctiva and lacrimation. These dusts may accumulate in the lung.
2. Long-term Exposure: The occurrence of occupational asthma is more prevalent with hardwoods and exotics, including mahogany, teak, rosewood, and walnut. Chronic exposure to concentrations above 5 mg/m³ produces inflammation of the middle ear, prolonged colds and headaches. OSHA lists hardwood dust as a potential cancer producing agent.

3. Reporting Signs and Symptoms: A physician should be contacted if anyone develops any signs or symptoms and suspects that they are caused by exposure to hardwood dust.

**Recommended Medical Surveillance**

Medical surveillance should be made available to all workers occupationally exposed to hardwood dust.

1. Initial Medical Examination: A complete medical history and physical examination to detect preexisting conditions that might predispose the exposed employee to an increased risk and to establish a baseline for future health monitoring. Examinations of the respiratory system should be stressed and any history of allergies should be noted.

2. Periodic Medical Examination: Medical examinations should be repeated on an annual basis.

**Emergency Medical Care**

Contact emergency medical help. Move the individual to fresh air and establish respiration. If skin contact leads to irritation, rinse with running water. Following eye contact, flush eyes with water for at least 15 minutes.

**Summary of Toxicology**

The toxicity of wood dust is relatively low. The recommended TLV for hardwoods is 1 mg/m³. The primary effect of exposure to hardwood dust is as an irritant to the respiratory tract, skin, and eyes. Secondary effects can occur in the form of allergic reactions to fungi, toxins, or other allergens that may be found in certain species. A fungus present in the bark of maple trees may produce a form of pneumonitis. IARC has concluded that there is sufficient evidence that nasal cancers have been caused by employment in the furniture making industry. Studies by various research groups have claimed substantial evidence that hardwood dust is a suspect carcinogen. These health risks are aggravated by cigarette smoking.

**SOFTWOOD DUST**

**Routes of Exposure** - Softwood dust exposure is industrially encountered by inhalation, skin, and eye contact.

**Effects of Overexposure**

1. Short-term Exposure: Inhalation of softwood dusts may cause irritation of the mucous membranes of the upper respiratory tract and coughing or hoarseness. Skin contact may cause allergic dermatitis. However, this is less common in softwoods than hardwoods, with the exception of Western Red Cedar. Eye contact may result in irritation and inflammation of the conjunctiva and lacrimation. These dusts may accumulate in the lung.

2. Long-term Exposure: Chronic inhalation of softwood dust may cause occupational asthma, primarily with Red and Lebanon Cedars. Chronic exposure to concentrations above 5 mg/m³ produces inflammation of the middle ear, prolonged colds and headaches.
3. Reporting Signs and Symptoms: A physician should be contacted if anyone developed any signs or symptoms and suspects that they are caused by exposure to wood dust.

**Recommended Medical Surveillance**

Medical surveillance should be made available to all workers occupationally exposed to wood dust.

1. Initial Medical Examination: A complete medical history and physical examination to detect preexisting conditions that might predispose the exposed employee to an increased risk and to establish a baseline for future health monitoring. Examination of the respiratory system should be stressed and any history of allergies should be noted.

2. Periodic Medical Examination: Medical examinations should be repeated on an annual basis.

**Emergency Medical Care**

Contact emergency medical help. Move the individual to fresh air and establish respiration. If skin contact leads to irritation, rinse with running water. Following eye contact, flush eyes with water for at least 15 minutes.

**Summary of Toxicology**

The toxicity of wood dust is relatively low. The recommended TLV for softwoods is TWA 5 mg/m$^3$ with a short-term Exposure Limit of 10 mg/m$^3$. The primary effect of exposure to softwood dust is as an irritant to the respiratory tract, and eyes. Secondary effects can occur in the form of allergic reactions to fungi, toxins, or other allergens that may be found in certain species (Example: mold in redwood). The dust from softwoods in the pulp and paper industry presents a fire and explosion hazard. Workers in the furniture and cabinet-making industries are at an increased risk of development of nasal adenocarcinomas. However, this work usually involves the use of hardwoods. Carpenters and joiners working with softwoods have a possible increased risk of developing Hodgkin's disease.

**MONITORING AND MEASUREMENT PROCEDURES**

**Eight-Hour Exposure Evaluation** - Measurements to determine employee exposure are best taken so that the average eight-hour exposure is based on a single eight-hour sample or on two four-hour samples. Several short-time interval samples (up to 30 minutes) may also be used to determine the average exposure level. Air samples should be taken in the employee's breathing zone (air that would most nearly represent that inhaled by the employee).

**Ceiling Evaluation** - Measurements to determine employee ceiling exposure are best taken during periods of maximum expected airborne concentrations of wood dust. Each measurement should consist of a fifteen (15) minute sample or series of consecutive samples totaling fifteen (15) minutes in the employee's breathing zone (air that would most nearly represent that inhaled by the employee). A minimum of three (3) measurements should be taken on one work shift and the highest of all measurements taken is an estimate of the employee's exposure.

**Method**

STORAGE, CLEAN-UP, AND DISPOSAL

All work areas should be well-ventilated, with machinery used next to an exhaust hood.

Respiratory protective equipment (masks) should be worn.

Ignition sources should be eliminated to prevent dust cloud explosions.

REFERENCES

American Conference of Governmental Industrial Hygienists Inc.: Documentation of the Threshold Limit Values for Substances in the Workroom Air, 4th ed., Cincinnati, OH, 1984-5.


By providing the above information, the Tennessee Department of Labor does not assume liability for its accuracy, and the employer is not relieved from any duty, responsibility, or liability imposed by law.