



## Medium-Density Fiberboard

## Material Safety Data Sheet

### 1. Product Identification

**Product**

Medium-Density Fiberboard

Synonyms: MDF, Fiberboard. This MSDS is applicable for all Flakeboard MDF including specialty products such as moisture-resistant and flame-retardant.

### 2. Hazardous Ingredients/Identity Information

| Name         | CAS#    | Percent        | Agency        | Exposure Limits  | Comments |
|--------------|---------|----------------|---------------|--|----------|
| Formaldehyde | 50-00-0 | <0.1 by weight | OSHA<br>ACGIH | PEL-TWA 0.75 ppm<br>PEL-STEL 2 ppm<br>TLV-Ceiling 0.3 ppm* |          |

\* Based on sensory exposure

### 3. Hazard Identification

**Appearance and Odor:** Straw yellow (light brown). No distinctive odor. Flame-retardant and moisture-resistant products may have red and green color additives, respectively.

**Primary Health Hazards:** Wood dust and formaldehyde vapor.

**Primary Route(s) of Exposure:**

- Ingestion:
- Skin:
- Inhalation:
- Eye:

**Medical Conditions Generally Aggravated by Exposure:** Wood dust or formaldehyde may aggravate pre-existing respiratory conditions or allergies.

**Signs and Symptoms of Exposure (Wood Dust):**

**Acute:** Wood dust can cause eye irritation. Certain species of wood dust can elicit allergic contact dermatitis in sensitized individuals. Wood dust may cause respiratory irritation, nasal dryness, coughing, sneezing, wheezing as a result of inhalation.

**Chronic:** Wood dust, depending on the species, may cause allergic contact dermatitis and respiratory sensitization with prolonged, repetitive contact or exposure to elevated dust levels. Prolonged exposure to wood dust has been reported by some observers to be associated with nasal cancer.

**Carcinogenicity Listings (Wood Dust):**

- NTP: Known Human Carcinogen
- IARC Monographs: Group 1 – Carcinogenic to Humans
- OSHA Regulated: Not listed

**NTP:** According to its *Tenth Report on Carcinogens*, NTP states, "Wood dust is known to be a human carcinogen based on sufficient evidence of carcinogenicity from studies in humans. An association between wood dust exposure and cancer of the nose has been observed in many case reports, cohort studies, and case-control studies that specifically addressed nasal cancer. Strong and consistent associations with cancer of the nasal cavities and paranasal sinuses were observed both in studies of people whose occupations are associated with wood dust exposure and in studies that directly estimated wood dust exposure."

### 3. Hazard Identification (cont'd.)

**IARC - Group 1:** Carcinogenic to humans; sufficient evidence of carcinogenicity. This classification is primarily based on studies showing an association between occupational exposure to wood dust and adenocarcinoma of the nasal cavities and paranasal sinuses. IARC did not find sufficient evidence of an association between occupational exposure to wood dust and cancers of the oropharynx, hypopharynx, lung, lymphatic and hematopoietic systems, stomach, colon or rectum.

**Signs and Symptoms of Exposure (Formaldehyde):**

**Acute:** May cause temporary irritation of skin, eyes, or respiratory system. May cause sensitization in susceptible individuals.

**Chronic:** Numerous epidemiological studies have failed to demonstrate a relationship between formaldehyde exposure and nasal cancer or pulmonary diseases such as emphysema or lung cancer. Universities Associated for Research and Education in Pathology Inc. (UAREP) concluded that there was no "convincing evidence" that formaldehyde exposure causes cancer in humans. Rats exposed to 14 ppm of formaldehyde for 24 months in the laboratory developed nasal cancer. Exposure of 6 ppm did not result in statistically significant levels. The NCI epidemiology study of 26,000 workers found little evidence linking formaldehyde exposure to cancer. Formaldehyde is classified by OSHA and NTP as a probable or potential carcinogen. IARC has classified formaldehyde as carcinogenic to humans.

**Carcinogenicity Listings (Formaldehyde):**

- ☒ NTP: Reasonably Anticipated to be a Human Carcinogen
- ☒ IARC Monographs: Group 1 – Carcinogenic to Humans
- ☒ OSHA Regulated: Formaldehyde Gas

**IARC - Group 1:** Carcinogenic to humans. A working group of IARC has determined that there is sufficient evidence that formaldehyde causes nasopharyngeal cancer in humans, a rare cancer in developed countries.

### 4. Emergency and First-Aid Procedures

**Ingestion:** NAP

**Eye Contact:** Wash material out with clean running water.

**Skin Contact:** If skin abraded, seek proper first aid or medical treatment.

**Skin Absorption:** NAP

**Inhalation:** Remove to fresh air. If irritation or other symptoms persist, consult a physician.

**Note to Physician:** None

### 5. Fire and Explosion Data

**Flash Point (Method Used):** NAP

**Flammable Limits:** LFL = Wood dust: 40 grams per cubic meter of air. UFL = NAP

**Extinguishing Media:** Water spray; carbon dioxide

**Autoignition Temperature:** 425° – 475°F

**Special Firefighting Procedures:** Fire fighting procedures for wood products are well known.

**Unusual Fire and Explosion Hazards:** Medium-density fiberboard is not an explosion hazard. Sawing, sanding, or machining MDF could result in the by-product wood dust. Wood dust may present a strong to severe explosion hazard if a dust cloud contacts an ignition source.

**NFPA Rating (Scale 0-4):** Health = 0 Fire = 1 Reactivity = 0

### 6. Accidental Release Measures

**Steps to be Taken In Case Material Is Released or Spilled:** Not applicable for product in purchased form. Dust generated from sawing, sanding, drilling or routing this product may be vacuumed or shoveled for recovery or disposal. Wood dust clean-up and disposal activities should be accomplished in a manner to minimize creation of airborne dust.

## 7. Handling and Storage

**Precautions to be Taken In Handling and Storage:** Provide adequate ventilation to reduce the possible build-up of formaldehyde vapors.

## 8. Exposure Control Measures, Personal Protection

**Engineering Controls:** Due to the explosive potential of wood dust when suspended in air, precautions should be taken during sanding, sawing or machining of wood products to prevent sparks or other ignition sources in ventilation equipment. Use of totally enclosed motors is recommended. Provide local exhaust as necessary to meet OSHA requirements for formaldehyde and wood dust exposure.

**Personal Protective Equipment:**

**RESPIRATORY PROTECTION:** Wear NIOSH/MSHA approved respirator when the permissible exposure limits to formaldehyde and/or wood dust may be exceeded.

**EYE PROTECTION:** Recommend goggles or safety glasses as conditions indicate when sawing, sanding or machining wood products.

**SKIN PROTECTION:** Protective equipment such as gloves and outer garments may be needed to reduce skin contact.

## 9. Physical/Chemical Properties

**Physical Description:** A panel product manufactured from ligno-cellulosic fibers combined with a synthetic resin or other suitable binder.

|   |           |
|---|-----------|
| <b>Boiling Point (@ 760 mm Hg):</b>           | NAP       |
| <b>Evaporation Rate (Butyl acetate = 1):</b>  | NAP       |
| <b>Freezing Point:</b>                        | NAP       |
| <b>Melting Point:</b>                         | NAP       |
| <b>Molecular Formula:</b>                     | NAP       |
| <b>Molecular Weight:</b>                      | NAP       |
| <b>Oil-water distribution coefficient:</b>    | NAP       |
| <b>Odor threshold:</b>                        | NAP       |
| <b>pH:</b>                                    | NAP       |
| <b>Solubility in Water (% by weight):</b>     | Insoluble |
| <b>Specific Gravity (H<sub>2</sub>O = 1):</b> | <1        |
| <b>Vapor Density (air = 1; 1 atm):</b>        | NAP       |
| <b>Vapor Pressure (mm Hg):</b>                | NAP       |
| <b>Viscosity:</b>                             | NAP       |
| <b>% Volatile by Volume [@ 70°F (21°C)]:</b>  | 0         |

## 10. Stability and Reactivity

**Stability:**  Unstable  Stable

**Conditions to Avoid:** High relative humidity and high temperature increase the rate of emission of formaldehyde from medium-density fiberboard.

**Incompatibility (Materials to Avoid):** Strong oxidizing agents, strong acids

**Hazardous Decomposition or By-Products:** Thermal and/or thermal-oxidative decomposition can produce irritating and toxic fumes and gases, including carbon monoxide, aldehydes and organic acids.

**Hazardous Polymerization:**  May occur  Will not occur

**Sensitivity to Mechanical Impact:** NAP

**Sensitivity to Static Discharge:** NAP

## 11. Toxicological Information

**Wood Dust:**

Wood dust (softwood or hardwood): OSHA Hazard Rating = 3.3; moderately toxic with probable oral lethal dose to humans being 0.5-5 g/kg (about 1 pound for a 70 kg or 150 pound person). Source: *OSHA Regulated Hazardous Substances*, Government Institutes, Inc., February 1990.

## 11. Toxicological Information (cont'd.)

Wood dust – generated from sawing, sanding or machining the product – may cause nasal dryness, irritation, coughing and sinusitis. NTP and IARC classify wood dust as a human carcinogen (IARC Group 1). This classification is based primarily on increased risk in the occurrence of adenocarcinomas of the nasal cavities and paranasal sinuses associated with exposure to wood dust. The evaluation did not find sufficient evidence to associate cancers of the oropharynx, hypopharynx, lung, lymphatic and hematopoietic systems, stomach, colon or rectum with exposure to wood dust.

### **Formaldehyde:**

OSHA Hazard Rating = 3 for local and systemic acute and chronic exposures; highly toxic. Irritation studies: human skin, 150 ug/3 days, intermittent exposure produced mild results; human eye, 1 ppm/6 minutes produced mild results. Toxicity studies: human inhalation TC<sub>Lo</sub> of 8 ppm reported, but response not specified; human inhalation TC<sub>Lo</sub> of 17 mg/m<sup>3</sup> for 30 minutes produced eye and pulmonary results; human inhalation TC<sub>Lo</sub> of 300 ug/m<sup>3</sup> produced nose and central nervous system results; LC<sub>50</sub> (rat, inhalation) = 1,000 mg/m<sup>3</sup>, 30 minutes; LC<sub>50</sub> (mice, inhalation) = 400 mg/m<sup>3</sup>, 2 hours.

Exposure to gaseous formaldehyde may cause temporary irritation to the nose and throat as well as lead to respiratory disorders. However, in a thorough review of sensory/respiratory irritation studies of formaldehyde from the standpoint of occupational exposure, an expert panel has observed exposure up to concentrations of 0.3 ppm failed to produce irritation. With regard to respiratory disorders, studies have concluded the threshold for long-term chronic pulmonary effects is between 0.4 and 3 ppm and for chronic obstructive pulmonary disease is 2 ppm. Pre-existing respiratory disorders may be aggravated by exposure.

Epidemiology studies of workers exposed to formaldehyde have failed to consistently identify an association between formaldehyde exposure and cancer. In animal studies, rats and mice exposed to high levels of formaldehyde developed nasal cancer while hamsters did not. These exposure levels are far above those levels normally found in the workplace. Formaldehyde is classified by IARC as carcinogenic to humans (Group 1). A working group of IARC has determined that there is sufficient evidence that formaldehyde causes nasopharyngeal cancer in humans, a rare cancer in developed countries. NTP included formaldehyde in the annual report on carcinogens. OSHA regulates formaldehyde as a potential carcinogen for exposures exceeding 0.5 ppm.

Source: *OSHA Regulated Hazardous Substances*, Government Institutes, Inc., February 1990; Registry of Toxic Effects of Chemical Substances (RTECS), National Institute for Occupational Safety and Health (provided by Canadian Centre for Occupational Health and Safety, CCINFO May 1995).

## 12. Ecological Information

No information available at this time.

## 13. Disposal Considerations

**Waste Disposal Method:** Incinerate or landfill in accordance with local, state, and federal regulations. This product is not considered hazardous waste under federal hazardous waste regulations 40 CFR 261. Please be advised, however, state and local requirements for waste disposal may be different than federal regulations. Dry land disposal is acceptable in most states if disposed of or discarded in its purchased form. It is, however, the user's responsibility to determine at the time of disposal whether the product meets EPA RCRA criteria for hazardous waste.

## 14. Transport Information

Not regulated as a hazardous material by the U.S. Department of Transportation.

## 15. Regulatory Information

**TSCA:** This product complies with TSCA inventory requirements.

**CERCLA:** NAP

**DSL:** NAP

## 15. Regulatory Information (cont'd.)

**OSHA:** Wood products are not hazardous under the criteria of the federal OSHA Hazard Communication Standard 29 CFR 1910.1200. However, formaldehyde emissions from this product and wood dust generated by sawing, sanding or machining this product may be hazardous.

### **STATE RIGHT-TO-KNOW:**

Minnesota: Minnesota Statutes, 1984, Section 144.495 and 325F.181 require that all particleboard and medium-density fiberboard used in newly constructed housing units or sold to the public as building materials in Minnesota meet the HUD Formaldehyde Emission Standard for Particleboard, 24 CFR Sections 3280.308 and 3280.406. Furniture and furnishings not normally permanently affixed to a housing unit are not considered "building materials" and are excluded.

New Jersey: Under certain conditions, this product may release free formaldehyde vapor at concentrations at or above 0.1 parts per million (ppm) but less than 0.5 ppm. Formaldehyde is a substance which appears on New Jersey's *Environmental Hazardous Substance List*.

Pennsylvania: Under certain conditions, this product may release free formaldehyde vapor at concentrations at or above 0.1 parts per million (ppm) but less than 0.5 ppm. Wood dust may be generated by sawing, sanding or machining this product. Formaldehyde and wood dust are substances which appear on Pennsylvania's *Appendix A – Hazardous Substance Lists*.

California: California's Safe Drinking Water and Toxic Enforcement Act of 1986 (Initiative Measure, Proposition 65): Title 22 California Code of Regulations requires that a clear and reasonable warning be given before exposure to chemicals listed by the State as causing cancer or reproductive toxicity. Formaldehyde is on California's list of chemicals known to the State to cause cancer.

**SARA 313 Information:** None

**SARA 311/312 Hazard Category:** NAP

**FDA:** NAP

**WHMIS Classification:** This product is not considered a controlled product.

## 16. Additional Information

**Date Prepared:** 9/20/87

**Date Revised:** 9/08/2006

**Prepared By:** Flakeboard America Limited

**Flakeboard MSDS available on:** [www.flakeboard.com](http://www.flakeboard.com)

**User's Responsibility:** The information contained in this Material Safety Data Sheet is based on the experience of occupational health and safety professionals and comes from sources believed to be accurate or otherwise technically correct. It is the user's responsibility to determine if the product is suitable for its proposed application(s) and to follow necessary safety precautions. The user has the responsibility to make sure that this sheet is the most up-to-date issue.

### **Definition of Common Terms:**

|       |   |   |
|-------|---|---|
| ACGIH | = | American Conference of Governmental Industrial Hygienists                       |
| C     | = | Ceiling Limit   |
| CAS#  | = | Chemical Abstracts System Number  |
| DOT   | = | U. S. Department of Transportation  |
| DSL   | = | Domestic Substance List   |
| EC50  | = | Effective concentration that inhibits the endpoint to 50% of control population |
| EPA   | = | U.S. Environmental Protection Agency  |
| IARC  | = | International Agency for Research on Cancer                                     |
| IATA  | = | International Air Transport Association   |
| IMDG  | = | International Maritime Dangerous Goods  |
| LCLo  | = | Lowest concentration in air resulting in death                                  |
| LC50  | = | Concentration in air resulting in death to 50% of experimental animals          |
| LDLo  | = | Lowest dose resulting in death  |
| LD50  | = | Administered dose resulting in death to 50% of experimental animals             |
| LEL   | = | Lower Explosive Limit   |
| LFL   | = | Lower Flammable Limit   |
| MSHA  | = | Mining Safety and Health Administration   |

## 16. Additional Information (cont'd.)

|       |   |   |
|-------|---|---|
| NAP   | = | Not Applicable  |
| NAV   | = | Not Available   |
| NIOSH | = | National Institute for Occupational Safety and Health   |
| NPRI  | = | Canadian National Pollution Release Inventory           |
| NTP   | = | National Toxicology Program                             |
| OSHA  | = | Occupational Safety and Health Administration           |
| PEL   | = | Permissible Exposure Limit                              |
| RCRA  | = | Resource Conservation and Recovery Act                  |
| STEL  | = | Short-Term Exposure Limit (15 minutes)                  |
| TCLo  | = | Lowest concentration in air resulting in a toxic effect |
| TDG   | = | Canadian Transportation of Dangerous Goods              |
| TDLo  | = | Lowest dose resulting in a toxic effect                 |
| TLV   | = | Threshold Limit Value                                   |
| TSCA  | = | Toxic Substance Control Act                             |
| TWA   | = | Time-Weighted Average (8 hours)                         |
| UFL   | = | Upper Flammable Limit                                   |
| WHMIS | = | Workplace Hazardous Materials Information System        |