

MATERIAL SAFETY DATA SHEET



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Product Name: SierraPine® MDF

Date Prepared: 04/05/11

1. Composite Panel Product and Company Identification

Product Identifier: Unfinished medium density fiberboard (MDF) panels.

MANUFACTURER:
SierraPine
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Roseville, CA 95661

CONTACT INFORMATION:
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This MSDS is applicable for the following products manufactured by SierraPine facilities: Med40™, Medite 313™, Medite™, Medite 3D™, M48™, and FibrLite.

2. Composition/Information on Ingredients

	<u>Wt %</u>	<u>CAS Registry #</u>
Polymerized Urea Formaldehyde Resin	.01 - 16	9011-05-6
Methylene-diphenyl-diisocyanate (MDI)	0 – 5	101-68-8
OSHA HAZARDOUS COMPONENTS (29 CFR 1910.1200):		
<u>EXPOSURE LIMITS</u>		
Formaldehyde CAS Registry # 50-00-0		OSHA PEL – TWA: 0.75 PPM OSHA PEL – STEL: 2 PPM ACGIH TLV – Ceiling: 0.30 PPM
Wood Dust/Ligno-cellulosic fiber ^{1,2}		OSHA PEL – TWA 15.0 mg/m ³ (total dust) ³ 5.0 mg/m ³ (respirable fraction)
Wood Dust/Ligno-cellulosic fiber, Inhalable Fraction ³		ACGIH TLV – TWA: 1.0 mg/m ³
Methylene-diphenyl-diisocyanate (MDI) ⁴		OSHA PEL – TWA: .2 PPM ACGIH TLV – TWA: .005 PPM

1. In *AFL-CIO v. OSHA* 965 F. 2d 962 (11th Cir. 1992), the court overturned OSHA's 1989 Air Contaminants Rule, including the specific PELs for wood dust that OSHA had established at that time. The 1989 PELs were: TWA – 5.0 mg/m³; STEL (15 min.) – 10.0 mg/m³. These were total dust test based limits.³ A common practice since 1989 has been to meet and exceed the lower 1989 limits which were supported by the wood products industry.

2. Wood dust is now officially regulated as an organic dust under the Particulates Not Otherwise Regulated (PNOR) or Inert or Nuisance Dust categories at PELs noted in the Composition/Information on Ingredients section of this MSDS. However, a number of states have incorporated provisions of the 1989 standard in their state plans. Additionally, OSHA has announced that it may cite companies under the OSH Act General Duty Clause under appropriate circumstances for non-compliance with the 1989 PELs.

3. Considerable debate continues to surround the inhalable-to-total dust conversion factor. ACGIH has proposed to use a ratio of 2.5 “for interpreting studies with exposure measurements based on total dust sampling” for purposes of defining a TLV for inhalable dust. However, a recent NIOSH paper states “In the case of exposures to wood dust, several studies with side-by-side sampling have revealed that inhalable sampling will increase the apparent dustiness of an atmosphere by between 150 and 400%, with an average closer to the higher end of this range.” [citing Harper (2002), Martin (1998), Tatum (2001), among others].

4. This ingredient is the polymerized form of MDI resin. There is no detectable MDI monomer in the product as purchased.

3. HAZARDS IDENTIFICATION

EMERGENCY OVERVIEW:

The product may release small quantities of formaldehyde in gaseous form. Emissions decrease through time as the panels age. Manual or mechanical cutting or abrasion processes performed on the product can result in generation of ligno-cellulosic fibers.

POTENTIAL HEALTH EFFECTS:

ACUTE

INHALATION:

Gaseous formaldehyde may cause temporary irritation to nose and throat. Some reports suggest that formaldehyde may cause respiratory sensitization, such as asthma, and that pre-existing respiratory disorders may be aggravated by exposure.

Ligno-cellulosic fibers may cause nasal dryness, irritation and obstruction. Coughing, wheezing, sneezing, sinusitis and prolonged colds have also been reported.

EYE CONTACT:

Gaseous formaldehyde may cause temporary irritation or a burning sensation. Ligno-cellulosic fibers can cause mechanical irritation.

SKIN CONTACT:

Both formaldehyde solutions (liquid) and various species of ligno-cellulosic fibers may evoke allergic contact dermatitis in sensitized individuals.

INGESTION:

Not likely to occur.

CHRONIC

Some reports suggest that formaldehyde may cause respiratory sensitization, such as asthma, and that pre-existing respiratory disorders may be aggravated by exposure. Other studies show no impact on respiratory sensitization. International Agency for Research on Cancer (IARC) classifies formaldehyde as a carcinogen to humans (Group 1). This classification is based primarily on IARC's evaluation of increased risk in the occurrence of cancers in the nasopharyngeal cavity (NPC) associated with occupational exposure to formaldehyde. The National Toxicology Program (NTP) includes formaldehyde in its Annual Report on carcinogens. OSHA regulates formaldehyde as a potential cancer agent.

In studies involving rats, formaldehyde has been shown to cause nasal cancer after long-term exposure to very high concentrations (14+ PPM), far above those normally found in the workplace.

Ligno-cellulosic fibers, depending on species, may cause respiratory sensitization and/or irritation. IARC classifies wood dust as a carcinogen to humans (Group 1). This classification is based primarily on IARC's evaluation of increased risk in the occurrence of adenocarcinomas of the nasal cavities and paranasal sinuses associated with exposure to wood dust. IARC 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. The National Toxicology Program (NTP) includes wood dust in its Annual Report on carcinogens.

HMIS Ratings: Health: 1 Fire: 0 Physical Hazard: 0
Hazard Scale: 0 = *Minimal* 1 = *Slight* 2 = *Moderate* 3 = *Serious* 4 = *Severe*

4. FIRST AID MEASURES

INHALATION:

Ligno-cellulosic fibers may cause unpleasant obstruction in the nasal passages, resulting in dryness of nose, dry cough, sneezing and headaches. Remove to fresh

air. Get medical attention if irritation persists, severe coughing or breathing difficulty occurs.

EYE CONTACT:

Ligno-cellulosic fibers may cause mechanical irritation. Treat dust in eye as foreign object. Flush eyes with large amounts of water. Remove to fresh air. If irritation persists, get medical attention.

SKIN CONTACT:

Wash affected areas with soap and water. Get medical attention if rash or irritation persists or dermatitis occurs.

INGESTION:

Not Applicable.

5. FIRE FIGHTING MEASURES

FIRE FIGHTING HAZARD:

Wood is classified as a Class A combustible material.

FLASHPOINT AND METHOD:

Not Applicable.

FLAMMABLE LIMITS:

LFL: Ligno-cellulosic fibers: 40 grams per cubic meter of air

AUTOIGNITION TEMPERATURE:

- 1) 275 C (527 F): Source: Textbook of Wood Technology 4th Edition, A.J. Panshin & Carl de Zeeuw, 1980, McGraw-Hill Book Company New York, NY.
200 C (392 F): Source: Principles of Fire Protection, Arthur E. Cote and Percy
- 2) Bugbee, 1988, National Fire Protection Association, Quincy, MA.
- 3) It is difficult to identify the specific ignition temperature of wood because of the large number of variables involved. Source: Essentials of Fire Fighting 4th Fourth Edition, 1998, Edited by Richard Hall and Barbara Adams, Fire Protection Publications, Oklahoma State University, Stillwater, OK.
- 4) Ignition of wood takes place when wood is subject to sufficient heat and in atmospheres that have sufficient oxygen. Ignition can be of two types: piloted or unpiloted. Piloted ignition occurs in the presence of an ignition source (such as a spark or flame). Unpiloted ignition is ignition that occurs where no pilot source is available. The surface temperature of wood materials has been measured somewhere between 300 C and 400 C (572 F to 752 F) prior to piloted ignition. Unpiloted ignition depends on special circumstances that result in different

ranges of ignition temperatures. At this time, it is not possible to give specific ignition data that apply to a broad range of cases. With convection heating of wood, unpiloted ignition has been reported as low as 270 C (518 F) and as high as 470 C (878 F). Source: Wood Handbook Wood as an Engineering Material, 1999, Forest Products Laboratory, U.S. Department of Agriculture, Madison, WI.

FIRE FIGHTING INSTRUCTIONS:

Fire fighting procedures for extinguishing a Class A fire should be followed.

Source: Essentials of Fire Fighting 4th Fourth Edition, 1998, Edited by Richard Hall and Barbara Adams, Fire Protection Publications, Oklahoma State University, Stillwater, OK.

- 1) When extinguishing a fire in a ligno-cellulosic fibers or fiber pile care needs to be taken. A direct stream of water, into the pile from a hose, could cause the burning material to become airborne creating a risk in spreading the fire to other areas. Source: Handbook of Industrial Loss Prevention, 1967, Factory Mutual Engineering Corporation, McGraw-Hill Book Company New York, NY.

- 2) Water is used to quench the burning material below its ignition temperature. The addition of Class A foams (sometimes referred to as wet water) may enhance water's ability to extinguish Class A fires, particularly those that are deep seated in bulk materials (such as piles of hay bales, sawdust piles, etc.). This is because the Class A foam agent reduces the water's surface tension, allowing it to penetrate more easily into piles of material. Class A fires are difficult to extinguish using oxygen-exclusion methods like CO₂ flooding or coating with foam because these methods do not provide the cooling effect needed for total extinguishment. Source: Essentials of Fire Fighting 4th Fourth Edition, 1998, Edited by Richard Hall and Barbara Adams, Fire Protection Publications Oklahoma State University, Stillwater, OK.

FIRE FIGHTING EQUIPMENT:

Use recommended Class A fire fighting equipment when fighting an incipient fire.

Source: Essentials of Fire Fighting 4th Fourth Edition, Edited by Richard Hall and Barbara Adams, Fire Protection Publications, Oklahoma State University, Stillwater, OK.

UNUSUAL FIRE OR EXPLOSION HAZARDS:

Sawing, sanding or machining can produce ligno-cellulosic fibers as a by-product that may present an explosion hazard.

NFPA Rating for Wood Dust (Scale 0-4):

Health = 1

Fire = 1

Reactivity = 0

Refer to the National Fire Protection Association's standard 664 "Standard for the Prevention of Fires and Explosions in Wood Processing and Woodworking Facilities"

for more details on wood dust explosions. Copies of this standard are available from the NFPA web site www.nfpa.org)

6. ACCIDENTAL RELEASE MEASURES

LAND SPILL:

Generally not applicable to panel products, however if a spill occurs the applicable federal, provincial, state, and local regulations must be followed.

WATER SPILL:

Generally not applicable to panel products, however if a spill occurs the applicable federal, provincial, state and local regulations must be followed.

7. HANDLING AND STORAGE

STORAGE:

This product should not be stored where exposure to water could occur or near a source of ignition. Avoid storing in areas of high relative humidity and temperature. High temperature and inadequate ventilation could allow concentrations of gaseous formaldehyde in the storage area. Adequate ventilation of the storage area will help reduce the build-up of the gaseous formaldehyde. It is recommended to store product in an area of relative humidity and temperature that approximates end use.

Refer to the Composite Panel Association (CPA) Technical Bulletin titled *"Storage and Handling of Particleboard and MDF"* for further information. Available on website www.pbmdf.com

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

ENGINEERING CONTROLS:

Certain activities of the re-manufacturing process of this product could possibly produce ligno-cellulosic fibers or gaseous formaldehyde. Provide adequate general and local exhaust ventilation to keep airborne contaminant concentration levels below the applicable levels.

PERSONAL PROTECTIVE EQUIPMENT (PPE)

RESPIRATOR:

Wear NIOSH/MSHA approved respirator when the allowable exposure limits may be exceeded.

PROTECTIVE CLOTHING:

Wear side shield safety glasses during the re-manufacturing of this product. Other protective equipment such as gloves and outer garments may be needed depending on dust conditions.

GENERAL HYGIENE:

Practice proper personal hygiene.

9. PHYSICAL AND CHEMICAL PROPERTIES

Physical Description: light to dark colored solid, color and odor are dependent on the wood species.

Boiling Point: not applicable	pH: not applicable
Evaporation Rate: not applicable	Solubility in Water (% by weight): Insoluble
Freezing Point: not applicable	Specific Gravity: generally < 1
Melting Point: not applicable	Vapor Density: not applicable
Molecular Formula: not applicable	Vapor Pressure: not applicable
Molecular Weight: not applicable	Viscosity: not applicable
Oil-Water Distribution Coefficient: not applicable	% Volatile by volume (70°F): not applicable

10. STABILITY AND REACTIVITY

STABILITY:

Stable under normal conditions.

REACTIVITY:

Avoid product contact with open flame and any temperature sources that could induce thermal decomposition. Avoid product contact with oxidizing agents, drying oils and strong acids. For further information on the reactivity of wood products, refer to Chapter 17 of the Wood Handbook (Wood Handbook Wood as an Engineering Material, 1999, Forest Products Laboratory, U.S. Department of Agriculture, Madison, WI

HAZARDOUS DECOMPOSITION:

Thermal and/or thermal-oxidative decomposition can produce irritating and toxic fumes and gases, including carbon monoxide, hydrogen cyanide, polynuclear aromatic hydrocarbons, aldehydes and organic acids.

HAZARDOUS POLYMERIZATION:
Will not occur.

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.

Wood dust (generated from sawing, sanding or machining the product) may cause nasal dryness, irritation, coughing and sinusitis. National Toxicology Program (NTP) and the International Agency for Research on Cancer (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 produce mild results; human eye, 1 ppm/6 minutes produced mild results. Toxicity studies: human inhalation TC_{LO} of 17 mg/m³ for 30 minutes produced eye and pulmonary results; human inhalation TC_{LO} of 300 ug/m³ produced nose and central nervous system results; LC₅₀ (rat, inhalation = 1000 mg/m³, 30 minutes; LC₅₀ (mice, inhalation = 400 mg/m³, 120 minutes.

Exposure to gaseous formaldehyde at elevated levels 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 that 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. Sources: OSHA Regulated Hazardous Substances. Government Institutes, Inc., February 1990; Registry of Toxic Effects of Chemical Substances (RTECS), national Institute for Occupational Safety and Health, Canadian Centre for Occupational Health and Safety, CCINFO May 1995.

Additional Toxicity Date: See acute and chronic health effects provided in Section 3: Hazard identification.

Target Organs: See acute and chronic health effects provided in Section 3: Hazard Identification.

12. ECOLOGICAL INFORMATION

Ecotoxicity

A. General Product Information

Not available for product in purchased form. See Component Analysis.

B. Component Analysis – Aquatic Toxicity Formaldehyde (50-00-0)

Test & Species

Test & Species	Concentration	Conditions
96 Hr LC ₅₀ fathead minnow	24.1 mg/L	flow through
96 Hr LC ₅₀ bluegill	0.10 mg/L	flow through
5 min EC ₅₀ photobacterium phosphorium	9.0 mg/L	
15 min EC ₅₀ photobacterium phosphorium	7.26 mg/L	
25 min EC ₅₀ photobacterium phosphorium	6.81 mg/L	
96 Hr EC ₅₀ water flea	20 mg/L	

Environmental Fate

Not available for product in purchased form.

13. DISPOSAL CONSIDERATIONS

General Product Information

This panel product is recyclable. It is the user's responsibility to determine at the time of disposal whether your product meets any applicable criteria for hazardous waste disposal. Disposal must follow applicable federal, provincial, state and local regulations.

EPA Waste Number & Descriptions

This product in purchased form is not considered hazardous waste under federal hazardous waste regulations 40 CFR 261. If the product is altered by processing, use or contamination, waste can be tested using methods described in 40 CFR 261 to determine whether the altered product meets the criteria for hazardous waste.

State, provincial and local requirements for waste disposal may be different than U.S. federal regulations.

Disposal Instructions

If disposed or discarded in its purchased form, ordinary trash collection is acceptable. It is the user's responsibility to determine at the time of disposal whether your product meets RCRA criteria for hazardous waste. Follow applicable federal, state, provincial and local regulations.

14. TRANSPORT INFORMATION

Department of Transportation (DOT): This product is not a DOT hazardous material.

It is the purchaser's responsibility to see if this product meets any regulations depending on their location.

15. REGULATORY INFORMATION

US Federal Regulations

A. General Product Information

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

HUD: The Department of Housing and Urban Development (HUD) regulation 24 CFR 3280 sets emission standards and provides for 3rd party certification of particleboard and MDF formaldehyde emissions.

ANSI A208.2-2009 MEDIUM DENSITY FIBERBOARD (MDF): This industry-consensus standard limits formaldehyde emissions from MDF. SierraPine[®] Med40 MDF is voluntarily manufactured and certified to this standard of formaldehyde emissions.

B. Component Analysis

This material contains one or more of the following chemicals required to be identified under SARA Section 302 (40 CFR 355 Appendix A), SARA Section 313 (40 CFR 372.65) and/or CERCLA (40 CFR 302.4).

Formaldehyde (50-00-0)

SARA 302: 500lb. TPQ

CERCLA: 100lb final RQ; 45.4 kg final RQ

State Regulations

Component Analysis – State

The following components appear on one or more of the following state hazardous substances lists and may also appear on similar lists in states not on the chart:

Component	CAS	CA	MA	MN	NJ	PA	RI
Formaldehyde	50-00-0	yes	yes	yes	yes	yes	yes
Wood dust, all soft and hard woods	none	no	no	yes	no	yes	yes

Additional Regulatory Information

Component Analysis – WHMIS IDL

No components are listed in the WHMIS IDL.

Component Analysis – Inventory

Component	CAS#	TSCA	CAN	EEC
Formaldehyde	50-00-0	yes	DSL	EINECS

16. OTHER INFORMATION

DEFINITIONS OF ACRONYMS:

ACGIH: American Conference of Governmental Industrial Hygienists
ANSI: American National Standards Institute
C: Ceiling Limit
CAS: Chemical Abstract Services Number
CERCLA: Comprehensive Environmental Response Compensation & Liability Act
CFR : Code of Federal Regulations
CWA : Clean Water Act
DOT: Department of Transportation
EC₅₀: Effective concentration that inhibits endpoints for 50% of control population
EPA: Environmental Protection Agency
FDA: Food and Drug Administration
HCS: Hazard Communication Standard
HMIS: Hazard Material Information System
IARC: International Agency for Research on Cancer
LC_{LO} Lowest lethal concentration of a substance
LC₅₀ Concentration of a material expected to kill 50% of an animal test group
LD_{LO} Lowest lethal dose of a material
LD₅₀ Dose of a material expected to kill 50% of an animal test group

LEL: Lower Explosive Limit
LFL: Lower Flammability Limit
MSHA: Mining Safety and Health Administration
NA: Not Applicable
NFPA: National Fire Protection Association
NIOSH: National Institute for Occupational Safety and Health, U.S. Public Health Service, U.S. Department of Health and Human Services
NPRI: Canadian National Pollution Release Inventory
NTP: National Toxicology Program
OSHA: Occupational Safety and Health Administration, U.S. Department of Labor
PEL: Permissible Exposure Limit
PPE: Personal Protective Equipment
RCRA: Resource Conservation and Recovery Act
RQ: Reportable Quantity
SARA: Superfund Amendments and Reauthorization Act
STEL: Short Term Exposure Limit
STP: Standard Temperature and Pressure
TC_{Lo}: Lowest concentration in air resulting in a toxic effect
TDG: Canadian Transportation of Dangerous Goods
TLV: Threshold Limit Value
TSCA: Toxic Substances Control Act
TWA: Time-weighted Average
UFL: Upper Flammable Limit
WHMIS: Workplace Hazardous Material Information System

DISCLAIMER:

This information was believed to be accurate at the time of preparation, and compiled from sources believed to be reliable. Products and/or articles manufactured from this product may have characteristics that are significantly different; therefore, it is the user's responsibility to investigate and understand other pertinent information and to comply with all applicable laws and regulations. There is no warranty of any kind, express or implied, concerning product or merchantability or fitness thereof for any purpose. Buyer assumes all risk of use, storage and handling of the product in compliance with applicable Federal, State and local laws and regulations. SierraPine, a California limited partnership, will not be liable for claims relating to any party's use of or reliance on information and data contained herein regardless of whether it is claimed the information and data are inaccurate, incomplete or otherwise misleading.