Safety Data Sheet (SDS)

Weyerhaeuser

Wood Ash

1. Identification

TRADE NAME(S):	Wood Ash (for material sold in the United States)
SYNONYMS:	Biomass Fuel Ash, Wood Boiler Ash, Wood Fly Ash, Fly Ash, CDK Ash, Batch Kiln Ash
PRODUCT USES:	Soil amendment and treatment
CHEMICAL NAME/CLASS:	Chemical Residue; by-product of wood combustion
MANUFACTURER'S NAME:	Weyerhaeuser
ADDRESS:	220 Occidental Ave S., Seattle, WA 98104
EMERGENCY PHONE:	(844) 523-4081 (3E Company)
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INTERNET ACCESS:	see Section 16
DATE PREPARED:	April 22, 2021

2. Hazard(s) Identification

Signal Word(s): **DANGER**

Classification	Hazard Statement(s)	Pictogram
HEALTH HAZARD(S) Carcinogen - Category 1A (H350) * Specific Target Organ Toxicity - Repeated Exposure, Inhalation (Category 1) (H372)	Crystalline silica may cause lung cancer May Cause Damage to The Respiratory System Through Prolonged or Repeated Exposures If Inhaled	
Eye corrosion - Category 1 (H314) * Skin irritant - Category 2 (H314)	Causes skin burns and serious eye damage	

2. Hazard(s) Identification (cont'd.)

Specific Target Organ Toxicity (STOT) (H335) Acute toxicity - Category 4 (H332)	May cause respiratory irritation Corrosive, harmful if swallowed	
PHYSICAL HAZARD(S) Combustible Dust (OSHA Defined Hazard)	Due to variable combustion conditions, wood ash may contain varying amounts of residual combustible dust. If dry and converted to small particles during further processing, handling, or by other means, may form combustible dust concentrations in air.	None

*****Hazard codes (GHS)

HMIS Rating (Scale 0-4):	**Health =**	3*	**Fire =**	1	**Physical Hazard =**	1
NFPA Rating (Scale 0-4):	**Health =**	3	**Fire =**	1	**Reactivity =**	0

Precautionary Statement(s):

Prevention Statements**:**

P202: Do not handle until all safety precautions have been read and understood.
P210: Keep away from sparks flames or other heat sources.
P243: Take precautionary measures against static discharge.
P260, P261 and P262: Avoid breathing dust. In case of inadequate ventilation wear an approved respirator suitable for conditions of use.
P271: Use outdoors or in a well-ventilated area.
P280: Wear appropriate protective equipment for eye and skin exposure.
P362 and P363: Take off contaminated clothing and wash before reuse.

Response Statements:

P304+P340+P313: If inhaled and breathing becomes difficult, remove person to fresh air and keep comfortable for breathing. If symptoms persist, call a doctor or other qualified medical professional.
P333+P313: If skin irritation or rash occurs get medical advice/attention.
P352+P264: If on skin wash with plenty of soap and water.
P362+P364: Take off contaminated clothing and wash before reuse.
P305+P351+P338: If in eyes, rinse cautiously for several minutes. Remove contact lenses if present and easy to do so.

Disposal:

P501: Dispose of in accordance with federal, state, and local regulations.

Ingredients of Unknown Acute Toxicity (>1%): NAP

3. Composition/Information on Ingredients

Ingredient(s)†	CAS#	Wt. %
Wood Char (incompletely burned wood material containing residual Carbon)*	NAV	5-50
Silica (amorphous, non-crystalline) (SiO_2) **	7631-86-9	1-10
Silica (crystalline, quartz) (SiO_2) ***	14808-60-7	<0.1-1
Aluminum Oxide[4]** (Al_2O_3)	1344-28-1	1-10
Calcium Oxide** (CaO)	1305-78-8	30-70
Iron Oxide[5]** (FeO)	1309-37-1	<1-5
Magnesium Oxide[6]** (MgO)	1309-48-4	5-10
Manganese (Mn)	7439-96-5	0.1-1
Potassium Hydroxide (and other potassium compounds such as potassium oxide K_2O) (KOH)**	1310-58-3	<10-30
Sodium Hydroxide (and other sodium compounds) (NaOH)**	1310-73-2	<1-5

† Wood ash is a highly variable material whose composition depends on wood source/mix, combustion type and conditions, amount and composition of any tramp soil material, mixture of different ash streams, solids size distribution and degree of wetting before shipment. Final composition and form can affect health and physical hazards. Although wood ash residual is often wetted before shipment and is also hydrophilic, water was not included in the ingredients as it may evaporate.

* Wood char and ash may contain trace (ppt levels) amounts of dioxin compounds; the non-metallic portion in the char can contain variable but significant residual carbon content which can affect dust combustibility. The non-char portion of the material is true ash from more completely combusted wood containing metals and their oxides.

Common names: [1]Limestone; [2] burnt lime, quicklime [3]potash; [4]alumina; [5]ferric oxide; [6]magnesia.**

Oxide compounds' presence, oxide and hydroxide combinations and corresponding concentrations will vary depending on source and combustion conditions. Some oxides may also exist as their metal carbonates (e.g., calcium carbonate) although the oxides are expected to predominate.

*** Silica in its quartz form may be present if tramp soil material carries over into the combustion process.

4. First Aid Measures

Inhalation: If inhaled, remove person to fresh air and keep comfortable for breathing. Get medical attention if breathing difficulties do not quickly resolve or if exposure was extensive. Chronic injury depends on the duration, level of exposure and makeup of the ash but may cause respiratory irritation.

Eye Contact: If in eyes, rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing. Medical evaluation is recommended if symptoms persist or if exposure was extensive.

Skin Contact: If on skin or hair, rinse off using water or otherwise remove immediately (vacuum, gentle brushing), take off contaminated clothing and wash before reuse. Obtain medical attention for signs or symptoms of persisting skin irritation or any skin damage.

Skin Absorption: Not known to be absorbed through the skin.

Ingestion: Rinse mouth and do not induce vomiting.

Symptoms or Effects:

Acute Symptoms/Effects **–** May cause irritation and corrosive burns to the eyes. As the material becomes wet on contact with moisture such as the eye surface or sweat, it can form a corrosive liquid and cause burning and corrosive damage of the eyes and skin depending on concentration and degree of contact. Airborne wood ash can settle on exposed skin and may cause irritation and corrosive burns. High concentrations of airborne wood ash may cause unpleasant obstruction to the nasal passages, nosebleed, chemical irritation, and possible corrosive burns to the membranes of the upper respiratory tract. Causes skin irritation and possibly corrosive type burns. Prolonged direct contact inside boots and gloves can exacerbate skin damage and lead to ulceration. Ingestion of material can cause severe irritation and burning of the mouth and digestive tract.

Delayed Symptoms/Effects **–** See notation above in Skin Contact regarding trapping of material inside boots or gloves. Significant respiratory system exposure can result in corrosive like burns/damage to the respiratory tract. Chronic exposure to the skin may cause drying and dermatitis. See Section 11 for additional information on potential chronic effects.

5. Fire-fighting Measures

Extinguishing Media and Restrictions: Use fine water mist or fog spray on smoldering wood ash taking care to avoid stirring and causing increased mixing with and exposure to air. Use sand or other noncombustible solids to smother the fire with care if water application not feasible.

Specific Hazards, Anticipated Combustion Products: See Section 10, Stability and Reactivity. Carbon monoxide, carbon dioxide and existing metal oxides listed in Section 3.

Autoignition Temperature: 450° – 5,000°F, (232° – 2760°C) depending upon the degree of incompletely combusted organic material in the ash.

Special Firefighting Equipment/Procedures: Avoid using a high-pressure stream of water directed at smoldering wood ash. This may cause a flare up. Beware of potential combustible dust explosion hazard.

Unusual Fire and Explosion Hazards: Depending on the source, amount of residual combustible material and moisture content, airborne suspensions of ash dust may form a combustible dust hazard and be ignited if sufficient concentration and ignition energy is present.

6. Accidental Release Measures

Steps to be taken in case Material is Released or Spilled: Wood ash may be vacuumed or shoveled after wetting for recovery or disposal. Avoid generating dusty conditions and provide good ventilation. Use NIOSH approved filtering facepiece respirator ("dust mask") in accordance with regulatory requirements if exposure limits are exceeded or if discomfort is experienced. Dry and fine ash dust may pose a combustible dust hazard. Keep ignition sources away from airborne dust clouds.

7. Handling and Storage

Precautions to be Taken in Handling and Storage: When wet, wood ash may become corrosive depending primarily on oxidation state of calcium oxides. Use proper personal protective equipment (gloves and goggles) when handling.

Loading and unloading wood ash may generate excessive airborne ash dust. Barrier cream may protect the skin from drying and provide some protection against corrosivity. Use a NIOSH-approved filtering facepiece respirator ("dust mask") and dust goggles when recommended allowable exposure limits may be exceeded. Care is needed to avoid dust accumulation between the respirator sealing surface and the skin.

Keep bulk and bagged ash dry until used. Stack bagged material in a secure manner to prevent falling. This product may present an engulfment hazard. To prevent burial or suffocation, do not enter a confined space such as a silo, bin, bulk truck, or other storage container or vessel that stores or contains ash. Ash can build up or adhere to the walls of a confined space. The ash can release, collapse, or fall unexpectedly.

Depending on concentration and degree of hydration of any Calcium Oxide, heat may be generated from the chemical reaction of CaO and water. Depending on amount and concentration, significant heat buildup may occur if calcium oxide reacts with water.

Areas of accumulated wood ash may retain heat for extended periods of time. Wood ash should be stored and transported to the extent possible in a covered bin or container.

Dry and fine ash dust may pose a combustible dust hazard. Keep ignition sources away from airborne dust clouds.

8. Exposure Control Measures/Personal Protection

Exposure Limits/Guidelines:

Ingredient(s)	Agency	Exposure Limit(s)	Comments
Wood Ash, as Particulate Not Otherwise Regulated (PNOR, PNOS) [A]	US-OSHA	PEL-TWA 15 mg/m^3 (PNOR)	Total particulate
	US-OSHA	PEL-TWA 5 mg/m^3 (PNOR)	Respirable fraction
	ACGIH	TLV-TWA 10 mg/m^3 (PNOS)	Inhalable
	ACGIH	TLV-TWA 3 mg/m^3 (PNOS)	Respirable fraction
Silica, Crystalline Quartz	OSHA	PEL-TWA 0.05 mg/m^3 (= 50 µg/m^3)	Respirable fraction
	ACGIH	TLV-TWA 0.025 mg/m^3	Respirable fraction

8. Exposure Control Measures/Personal Protection

Calcium Oxide (CaO)	US-OSHA ACGIH	PEL-TWA 5 mg/m^3 2 mg/m^3	Total particulate Total particulate
Aluminum Oxide (Al_2O_3)	US-OSHA US-OSHA ACGIH	PEL-TWA 15 mg/m^3 PEL-TWA 5 mg/m^3 TLV-TWA 1 mg/m^3 (aluminum metal and insoluble compounds)	Total particulate Respirable fraction Respirable fraction
Iron oxide (FeO)	US-OSHA ACGIH	PEL-TWA 10 mg/m^3 TLV-TWA 5 mg/m^3	As iron oxide fume Respirable fraction
Magnesium oxide (MgO)	US-OSHA ACGIH	PEL-TWA 15 mg/m^3 TLV-TWA 10 mg/m^3	Total particulate Inhalable fraction
Manganese (Mn)	US- OSHA ACGIH	PEL 5 mg/m^3 TLV-TWA 0.2 mg/m^3	Ceiling None
Potassium Hydroxide (KOH)**	US-OSHA ACGIH	PEL – NAV TLV - 2 mg/m^3	 Ceiling
Sodium Hydroxide (NaOH)**	US-OSHA ACGIH	PEL 2 mg/m^3 TLV 2 mg/m^3	Ceiling Ceiling

[A] The use of a PNOR or PNOS exposure limit should only be applied in the absence of other compounds with lower exposure limits and the criteria for PNOS (ACGIH) or PNOR (OSHA) should be consulted.

Ventilation:

LOCAL EXHAUST – Provide local exhaust as needed so that exposure limits are met. Ensure that combustible dust aspect is investigated if enclosed systems including conveyors are used to capture and convey ash dust.

MECHANICAL (GENERAL) – Provide general ventilation in processing and storage areas so that exposure limits are met.

SPECIAL – Material may clog ventilation systems, requiring ongoing inspection and cleaning.

Other Engineering Controls: NAP

8. Exposure Control Measures/Personal Protection (cont'd.)

Personal Protective Equipment:

RESPIRATORY PROTECTION – Use NIOSH-approved filtering face piece respirator ("dust mask") or higher level of respiratory protection as indicated and goggles where ventilation is not possible and exposure limits may be exceeded or for additional worker comfort or symptom relief. Following a determination of risk from potential exposures, use respiratory protection in accordance with requirements such as US-OSHA respiratory protection standard 29CFR 1910.134.

PROTECTIVE GLOVES – Cloth, canvas, or leather gloves are recommended when handling the dry product to minimize potential mechanical irritation. If product becomes wet, neoprene, butyl, or nitrile gloves are recommended. Ensure glove interior is kept clean. Discard gloves with contaminated interiors.

EYE PROTECTION – An emergency eye wash fountain should be present near areas of potential eye exposure. Goggles or safety glasses are recommended when handling this product.

OTHER PROTECTIVE CLOTHING OR EQUIPMENT – An emergency shower should be present near areas where extensive skin contact is possible. Protective clothing with long sleeves or disposable outer garments may be desirable in extremely dusty areas.

WORK/HYGIENE PRACTICES – Lightly dampen ash with water mist and carefully sweep, or vacuum areas where wood ash has settled to avoid excessive accumulation. Minimize blowdown or other practices that generate high airborne dust concentrations. The use of barrier skin cream may prevent skin irritation in susceptible individuals. Be aware that irritation may occur where PPE such as goggles or dust masks contact skin surfaces.

9. Physical/Chemical Properties

Appearance: Wood ash is a solid, grey/black or black/tan odorless powder which may contain solidified masses. It is the residual from the burning of a combination of carbonaceous materials.

Odor/Odor Threshold(s):	NAV
pH:	>11-13 (if CaO present in high concentration and wetted)
Melting/Freezing Point:	NAP
Boiling Point (@ 760 mm Hg) and Range:	NAP
Flash Point:	NAP
Evaporation Rate:	NAP
Flammability:	NAP
Lower/Upper Explosive Limits:	NAV
Vapor Pressure (mm Hg):	NAP
Vapor Density (air = 1; 1 atm):	NAP
Relative Density:	NAV
Solubility:	Slightly (<5%)
Partition Coefficient (n-octonal/water):	NAP
Autoignition Temperature:	450° – 5,000°F, (232° – 2760°C)
Decomposition Temperature:	NAV
Viscosity:	NAP
Other Properties:	NAP

10. Stability and Reactivity

Reactivity: Depending on concentration and degree of hydration of any Calcium Oxide, heat may be generated from the chemical reaction of CaO and water. Depending on amount and concentration, significant heat buildup may occur when calcium oxide initially reacts with water.

Hazardous Polymerization: ☐ May occur ☒ Will not occur
Stability: ☐ Unstable ☒ Stable
Conditions to Avoid: Avoid open flames.
Incompatibility (Materials to Avoid): Avoid contact with oxidizing agents and strong acids.
Hazardous Decomposition or By-Products: Carbon monoxide and carbon dioxide.
Sensitivity to Static Discharge: Depending on dryness, particle size, airborne concentration, and amount of residual combustible material (carbon) material, ignition of a dust cloud may occur if sufficient static energy is applied.

11. Toxicological Information

Likely Route(s) of Exposure:

- ☐ Ingestion
- ☒ Skin
- ☒ Inhalation
- ☒ Eye

Signs and Symptoms of Exposure:

Acute Health Hazards: May cause chemical burns to the eyes. A single, short-term inhalation exposure to the dry ash may cause irritation. High concentrations of wood ash may cause unpleasant obstruction to the nasal passages and chemical irritation to the membranes of the upper respiratory tract. Causes skin irritation upon direct contact and from settled airborne dust.

Chronic Health Hazards: Inhalation risk of injury depends on the duration level of exposure and makeup of the ash but may cause dermatitis and lung irritation. Chronic exposure to the skin may cause drying and dermatitis.

Prolonged inhalation of crystalline silica may result in silicosis, a disabling pulmonary fibrosis characterized by fibrotic changes and miliary nodules in the lungs, a dry cough, shortness of breath, emphysema, decreased chest expansion, and increased susceptibility to tuberculosis. Advanced silicosis may result in death due to cardiac failure or destruction of lung tissue. Chronic inhalation of sufficient quantities of crystalline silica may also cause lung cancer.

Carcinogenicity Listing:

☒ NTP:	May contain crystalline silica, known to be a human carcinogen.
☒ IARC Monographs:	May contain crystalline silica, Group 1, carcinogenic to humans.
☒ OSHA Regulated:	29 CFR 1910.1053 Respirable Crystalline Silica

Toxicity Data: None available for product in final form. Individual component information for ingredients listed in Section 3 is described below where available.

Components:

Silica (crystalline, quartz): IARC – Group 1: Carcinogenic to humans; sufficient evidence of carcinogenicity. IARC concluded that "crystalline silica in the form of quartz or cristobalite dust is carcinogenic to humans.

Calcium carbonate (if present): Acute oral toxicity (LD_{50}): 6450 mg/kg, rat.

Calcium oxide: Oral LD_{50}> 2000 mg/kg bw (OECD 425, rat); Dermal LD_{50}> 2500 mg/kg bw (OECD 402, rabbit)

Aluminum oxide: Inhalation rat: lowest published toxic concentration: 200 mg/m^3/5 hour/28 week - intermittent - lung, thorax, or respiration.
Local Effects: Irritation of skin, eyes, and the respiratory system

11. Toxicological Information (cont'd.)

Magnesium oxide: No LD_{50}/LC_{50} information found relating to normal routes of occupational exposure.
Manganese: Oral LD_{50} rat: > 3478 mg/kg
Iron oxide: Oral rat LD_{50}: greater than 10000 mg/kg
Potassium carbonate (if present): Oral rat LD_{50}: 1870 mg/kg.
Target Organs: Skin, eyes, and respiratory system

12. Ecological Information (optional section)

Ecotoxicity: No information available on mixture as generated.
Biopersistance and Degradability: Materials can be used as an amendment to add calcium, potassium, and magnesium to the soil. USDA (1998) reported that trace levels of heavy metals were within normal ranges for plants growing on areas treated with wood ash.
Bioaccumulation: No information available.
Soil Mobility: No information available.
Other Adverse Effects: NAP

13. Disposal Considerations (optional section)

Waste Disposal Method: Dry land disposal is acceptable and is not usually considered a hazardous waste in most states. However, wood ash will become corrosive in the presence of water, due to the calcium, magnesium, and potassium content. Do not dispose in areas of high ground water or where surface runoff is adjacent to waterways. It is, however, the user's responsibility to determine at the time of disposal whether the product meets EPA RCRA criteria for hazardous waste. Follow applicable federal, provincial, and local regulations.

14. Transport Information (optional section)

Mode: (air, land, water) It is the shipper's responsibility to ensure this material is evaluated and treated in accordance with US DOT and/or local transportation requirements.

UN Proper Shipping Name:	NAP
UN/NA ID Number:	NAP
Hazard Class:	NAP
Packing Group:	NAP
Environmental Hazards (Marine Pollutant):	Yes
Special Precautions:	NAP

15. Regulatory Information (optional section)

WHMIS (Canada): Not yet classified since material not commercialized in Canada.
TSCA: Ingredients are listed on the TSCA inventory.
DSL (Canada): NAP
CERCLA: Material has not been assessed per CERCLA lists.
US-OSHA: Wood ash is considered to be a hazardous chemical in accordance with OSHA classification criteria. Since respirable crystalline silica may be present in the material, refer to OSHA standards 1910.1053 (General Industry) and/or 1926.1153 (Construction) if applicable.
STATE RIGHT-TO-KNOW: User should consult local state requirements for listed ingredients.

15. Regulatory Information (optional section cont'd.)

SARA 313 Information:
SARA 311/312 Hazard Category:

Health Hazard: Immediate (acute) health hazard	Yes (see Section 2)
Health Hazard: Delayed (chronic) health hazard	Yes (see Section 2)
Physical hazard: combustible dust	Yes (see Section 2)

16. Other Information

Date Prepared: 04/22/2021
Date Revised: New
Prepared By: Weyerhaeuser Company Health and Safety
Weyerhaeuser SDS available on:
http://www.wy.com/sustainability/environment/product-stewardship/safety-data-sheets/

User's Responsibility: The information contained in this 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 SDS 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
EC#	=	Identifying Number Assigned to Chemicals Contained in the European Inventory of Existing Chemical Substances (EINECS)
EC_{50}	=	Effective Concentration That Inhibits the Endpoint to 50% of Control Population
EPA	=	U.S. Environmental Protection Agency
HMIS	=	Canada-Hazardous Materials Identification System
IARC	=	International Agency for Research on Cancer
IATA	=	International Air Transport Association
IMDG	=	International Maritime Dangerous Goods
LC_{50}	=	Concentration in Air Resulting in Death To 50% of Experimental Animals
LCLo	=	Lowest Concentration in Air Resulting in Death
LD_{50}	=	Administered Dose Resulting in Death to 50% of Experimental Animals
LDLo	=	Lowest Dose Resulting in Death
LEL	=	Lower Explosive Limit
LFL	=	Lower Flammable Limit
MSHA	=	Mine Safety and Health Administration
NAP	=	Not Applicable
NAV	=	Not Available
NIOSH	=	National Institute for Occupational Safety and Health
NFPA	=	National Fire Protection Association
NPRI	=	Canada-National Pollution Release Inventory
NTP	=	National Toxicology Program

16. Other Information (cont'd.)

OEL	=	Occupational Exposure Limit
ON-MOL	=	Ontario Ministry of Labour
OSHA	=	United States Occupational Safety and Health Administration (US-OSHA)
PEL	=	Permissible Exposure Limit
PNOR	=	Particulate Not Otherwise Regulated
PNOS	=	Particulate Not Otherwise Specified
RCRA	=	Resource Conservation and Recovery Act
STEL	=	Short-Term Exposure Limit (15 minutes)
STP	=	Standard Temperature and Pressure
TCLo	=	Lowest Concentration in Air Resulting in a Toxic Effect
TDG	=	Canada-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	=	Canada-Workplace Hazardous Materials Information System

Wood Ash

(US market only)

Danger

Prolonged or repeated inhalation exposure to respirable crystalline silica may cause lung cancer and permanent damage to the respiratory system.

May cause irritation and chemical-like burns to the skin and eyes and respiratory tract irritation.

If product is dry and small particles are suspended in air during processing and handling, may form combustible dust concentrations.

Precautions: Avoid breathing dust and wear appropriate protective equipment to avoid respiratory, skin or eye exposures. Prevent dust release and accumulations to minimize hazards. Do not let material accumulate in gloves, footwear or on skin. Remove contaminated clothing and wash before reuse. Avoid generation of dense dust clouds and keep away from ignition sources.

First Aid:

If in eyes, rinse immediately and cautiously with water for several minutes. Remove contact lenses if present and easy to do. Continue rinsing. Contact a qualified medical professional for advice.

If on skin, gently brush off and wash with soap and water. If skin irritation, rash or chemical-like burn occurs, get medical advice/attention.

Inhalation, if experiencing respiratory symptoms, remove to fresh air. Contact a qualified medical professional for serious or persistent respiratory symptoms.

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Weyerhaeuser

Label for Wood Ash products. See SDS 4/2021 for additional information.