Safety Data Sheet

Fly Ash
Product ID#

Date of issue: 03-28-2016

(Prepared in accordance with OSHA HazCom Standard 29 CFR 1910.1200(g), Rev. 2012 and GHS Rev 03)

SECTION 1: PRODUCT AND COMPANY INFORMATION

Product Identifier

Product Name: Fly ash

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

Synonyms: Biomass Fuel Ash, Wood Boiler Ash, Wood Fly Ash

Recommended Use of the Chemical and Restrictions on Use

Recommended Use: Not available

Restrictions on Use: Not available

Details of the Supplier

Company: Columbia Forest Products
7900 Triad Center Drive, Suite 200
Greensboro, NC 27409
1-800-637-1609

E-mail Address: PDavis@cfpwood.com
www.columbiaforestproducts.com

24 Hour Emergency Phone: Contact: Ang Schramm, Tech Services Mngr.
334-616-7745

SECTION 2: HAZARD IDENTIFICATION

This product is classified as hazardous according to OSHA Hazard Communication Standard 29 CFR 1910.1200 (HazCom 2012).

Classification of the Substance Or Mixture

United States (US)

Classification according to OSHA 29 CFR 1910.1200 HCS

Skin Irritation Category 2
Eye Irritation Category 2
Specific Target Organ Toxicity Single Exposure Category 3: Respiratory Tract Irritation

Note that burns may be thermal or caustic due to the release of heat as a result of the reaction of ash components. Although it is a transient characteristic of fly ash that is removed from a boiler, fly ash may be extremely hot due to retained heat originating from the combustion process. **Temperatures may be high enough to cause serious burns or may damage equipment that contacts the hot fly ash.**

Environmental Hazards: Not required by OSHA Hazard Communication Standard 29 CFR 1910.1200 (HazCom 2012).

Label Elements

Label according to OSHA HCS 2012

Signal word
Warning

Symbols
Exclamation mark

Hazard pictograms

GHS07

Hazard statements
Causes skin irritation
Causes serious eye irritation
May cause respiratory irritation

Precautionary statements

Prevention:
Do not handle until all safety precautions have been read and understood.
Avoid breathing dust.
Wash face, hands and any exposed skin thoroughly after handling.
Wear protective gloves.

Response:
IF exposed or concerned: Get medical advice/attention
IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing
IF ON SKIN: Wash with plenty of soap and water
IF INHALED: Remove victim to fresh air and keep at rest in a position comfortable for breathing

Storage:
Store in a well-ventilated place

Disposal:
Dispose of waste and residues in accordance with local authority requirements.

SECTION 3: COMPOSITION/INFORMATION ON INGREDIENTS

Chemical characterization: Mixture of inorganic oxides (varying from fused or vitrified to fine granular solid).

Description: Fly ash and other coal combustion products (CCPs) are UVCB substances (substance of unknown or variable composition or biological). The exact composition of the ash is dependent on the fuel source and additives composed of a large number of constituents. The classification of the final substance is dependent on the presence of specific identified oxides as well as other trace elements.

Full text of H-phrases: see Section 16

Component	CAS No.	Weight %	Hazard Classification (GHS)
Fly ash, as Particulate Not Otherwise Regulated (PNOR, PNOS)	68131-74-8	1-43 %	Eye Irrit 2 – H319
Calcium carbonate ($CaCO_3$)	471-34-1	45-66 %	Not classified
Potassium carbonate (K_2CO_3)	584-08-7	10-27 %	Skin Irrit 2 – H315 Eye Irrit 2 – H319 STOT SE 3 – H335
Aluminum oxide (Al_2O_3)	1344-28-1	1-5 %	Not classified
Iron oxide	1309-37-1	<1 %	Not classified
Magnesium oxide (MgO)	1309-48-4	1-3 %	Not classified
Manganese (Mn)	7439-96-5	< 1 %	Not classified

SECTION 4: FIRST AID MEASURES

Eye Contact: Exposure to airborne fly ash or ash dust may cause immediate or delayed irritation or inflammation. As the material becomes wet, it will become corrosive and cause burning of the eyes. In case of direct eye contact, immediately rinse eyes thoroughly with plenty of water. If wearing

contact lenses, remove only after initial rinse, and continue rinsing eyes for at least 15 minutes. If irritation occurs or persists, consult a physician.

Skin Contact: Fly ash may cause drying or mechanical abrasion of the skin upon repeated contact. Wash with water and soap as a precaution. If the ash becomes wet, it will become corrosive and cause burning of the skin. If irritation persists, call a physician. Barrier cream may protect the skin from drying and provide some protection against corrosivity. Promptly remove and launder clothing that is dusty or wet with ash. Thoroughly wash skin after exposure to dust or wet ash.

Inhalation: High concentrations of fly ash may cause unpleasant obstruction to the nasal passages and minor chemical irritation to the membranes of the upper respiratory tract. Fly ash deposition in the nasal passages may lead to nosebleed and /or headache. Remove to fresh air. If any trouble breathing, get immediate medical attention. Administer artificial respiration if breathing has ceased. If irritation or symptoms occur or persist, consult a physician

Ingestion: Not a typical exposure route. Rinse mouth and drink a glass of water. Do not induce vomiting unless under the direction of a qualified medical professional or Poison Control Center. If symptoms persist, consult a physician.

Most Important Symptoms/Effects: Itching, Rashes, Irritation.

Notes for the doctor: Any treatment that might be required for overexposure should be directed at the control of symptoms and the clinical conditions.

SECTION 5: FIRE-FIGHTING MEASURES

Suitable Extinguishing Media:
Use sand, fine water mist or fog spray on smoldering fly ash.

Unsuitable Extinguishing Media:
No information available.

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

Firefighting Procedures

Avoid using high pressure stream of water directed at smoldering fly ash. This may cause a flare up or explosion.

Unusual Fire and Explosion Hazard:
Depending on moisture content, and more importantly, particle diameter and airborne concentration, fly ash in a contained area may explode in the presence of an ignition source. Fly ash may similarly deflagrate (combustion without detonation like an explosion) if ignited in an open or loosely contained area. Completely combusted (pure) fly ash is expected to have an extremely low potential for explosion, even under typical dust explosion conditions (i.e., high airborne concentrations in the presence of an ignition source). However, fly ash containing some degree of incompletely combusted matter (as low as 7 % in some instances) is expected to present the potential for explosion when a high airborne dust concentration comes in contact with an ignition source. The LEL for this fly ash product is an unknown variable and is dependent upon the degree of incompletely combusted organic material in the product. Use good housekeeping to prevent accumulations of material. Avoid conditions that generate significant quantities of airborne dust.

Hazardous Products of Combustion:
No information available.

Protection of Firefighters:
Wear full protective clothing and self-contained breathing apparatus (SCBA).

Further Information:
No further information is available

NFPA Rating (Scale 0-4):	Health = 2	Fire = 1	Reactivity = 0
HMIS Rating (Scale 0-4):	Health = 2	Fire = 1	Physical Hazard = 0

SECTION 6: ACCIDENTAL RELEASE MEASURES

Emergency Procedures:
Evacuate personnel to safe areas. Remove all sources of ignition. Take precautionary measures against static discharges and against environmental release.

Personal Precautions and Protective Equipment:
Avoid generating dusty conditions and provide good ventilation. Use NIOSH approved filtering face piece respirator ("dust mask") in accordance with regulatory requirements if exposure limits are exceeded or if discomfort is experienced. Keep personnel away from the clean-up area.

Environmental Precautions:
Avoid pollution of sewers and water.

Methods and Materials for Containment and Clean-up:
All spills should be handled according to site requirements and based on precautions cited in the SDS. In the case of liquids, use proper absorbent materials. For laboratories and small-scale operations, incidental spills within a hood or enclosure should be cleaned by using a HEPA filtered vacuum or wet cleaning methods as appropriate. For large dry or liquid spills or those spills outside enclosure or hood, appropriate emergency response personnel should be notified. In manufacturing and large-scale operations, HEPA vacuuming prior to wet mopping or cleaning is required. Fly ash may be vacuumed or shoveled after wetting for recovery or disposal. See Sections 9 and 10 for additional physical, chemical, and hazard information.

Other Information:
No further information is available.

SECTION 7: HANDLING AND STORAGE

Precautions for Safe Handling:
When wet, fly ash will become corrosive (pH > 13). Use proper personal protective equipment (gloves and goggles) when handling. Loading and unloading fly 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 face piece respirator ("dust mask") and dust goggles when recommended allowable exposure limits may be exceeded. Keep bulk and bagged ash dry until used. Stack bagged material in a secure manner to prevent falling. Bagged ash is heavy and poses risks such as sprains and strains to the back, arms, shoulders and legs during lifting and mixing. Handle with care and use appropriate control measures. 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. Areas of accumulated fly ash may retain heat for extended periods of time. Use caution when stepping into deep accumulations. Fly ash should be stored and transported to the extent possible in a covered bin or container. Properly ground all pneumatic conveyance systems. The potential exists for static build-up and static discharge when moving ash through a plastic, non-conductive, or non-grounded pneumatic conveyance system. The static discharge may result in damage to equipment and or injury to workers. See Section 8 (Exposure Controls) for additional guidance.

Conditions for Safe Storage: Store in a cool, dry, well-ventilated area. .

SECTION 8: EXPOSURE CONTROLS/PERSONAL PROTECTION

Occupational Exposure Guideline

Exposure Limits:

Component	CAS No.	ACGIH	OSHA
Fly ash, as Particulate Not Otherwise Regulated (PNOR, PNOS)[A]	68131-74-8	3 mg/m^3 (Respirable fraction – PNOS) 10 mg/m^3 (Inhalable fraction – PNOS)	15 mg/m^3 (Total particulate – PNOR) 5 mg/m^3 (Respirable fraction – PNOR)
Calcium carbonate ($CaCO_3$)	471-34-1	3 mg/m^3 (Respirable fraction – PNOS) 10 mg/m^3 (Inhalable fraction – PNOS)	15 mg/m^3 (Total particulate – PNOR) 5 mg/m^3 (Respirable fraction – PNOR)
Potassium carbonate (K_2CO_3)	584-08-7	Not listed	Not listed
Aluminum oxide (Al_2O_3)	1344-28-1	1 mg/m^3 (Respirable fraction)	15 mg/m^3 (Total particulate) 5 mg/m^3 (Respirable fraction)
Iron oxide	1309-37-1	5 mg/m^3 (Dust & fume, as Fe)	10 mg/m^3 (As iron oxide fume)
Magnesium oxide (MgO)	1309-48-4	15 mg/m^3 (Inhalable fraction)	15 mg/m^3 (Total particulate)
Manganese (Mn)	7439-96-5	0.2 15 mg/m^3	5 mg/m^3 (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 PNOR (OSHA) or PNOS (ACGIH) should be consulted.

Engineering Controls: Ensure that eyewash stations and safety showers are close to the workstation location. Use explosion-proof, grounded electrical/ventilating/lighting/equipment.

Ventilation:

Local Exhaust – Provide local exhaust as needed so that exposure limits are met. Ventilation to control dust should be considered where potential explosive concentrations and ignition sources are present. The design and operation of any exhaust system should consider the possibility of explosive concentrations of fly ash within the system. See "SPECIAL" section below.

Mechanical (General) : Provide general ventilation in processing and storage areas so that exposure limits are met

Special: Ensure that exhaust ventilation and material transport systems involved in handling this product contain explosion relief vents or suppression systems designed and operated in accordance with applicable standards if the operating conditions justify their use

Eye/Face Protection:	Wear splash-proof safety goggles when handing this material.
Skin Protection:	Body protection, such as a lab coat, gloves, shoe covers, or head cover may be necessary when handling the dry material to minimize potential mechanical irritation. If product becomes wet, neoprene, butyl, or nitrile gloves are recommended. Consult your site safety staff for guidance.
Respiratory Protection:	Use NIOSH approved filtering face piece respirator ("dust mask") or higher levels of respiratory protection as indicated for particulates if there is a potential to exceed the exposure limits or for symptom relief or worker comfort following a determination of risk. Consult your site or corporate health and safety professional for additional guidance.
General Hygiene Considerations:	Dampen ash with water and carefully sweep, or vacuum areas where fly 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. Prevent/avoid contact and wash after handling. Do not eat, drink, or smoke while handling.

Environmental Exposure Control: No data available.

SECTION 9: PHYSICAL AND CHEMICAL PROPERTIES

Appearance

Physical State:	Solid (powder) grey/black or brown/tan powder which may contain solidified masses
Odor threshold:	Odorless

Safety Relevant Basic Data

pH:	> 13
Melting point/freezing point:	Not available
Initial boiling point and boiling range:	Not available
Flash point:	Not available

Evaporation rate:	Not available
Flammability (solid, gas):	Not available
Upper/lower flammability or explosive limits:	Not available
Vapor pressure:	Not applicable
Vapor density:	Not applicable
Relative density:	Not available
Solubility(ies):	Slightly soluble (< 5%)
Partition coefficient: n-octanol/water:	Not available
Viscosity:	None; solid

SECTION 10: STABILITY AND REACTIVITY

Stability: Stable at normal temperature and storages condition.

Conditions to avoid: Avoid areas of excessive heat. Avoid open flames, sparks or other sources of ignition.

Incompatible materials: Oxidizing agents.

Hazardous decomposition products: No information available

Hazardous polymerization: Will not occur.

SECTION 11: TOXICOLOGICAL INFORMATION

Toxicological data have not been determined specifically for this product. Individual component information for ingredients listed in Section 2 is described below if available.

Acute Toxicity

Component	Endpoint	Data
Calcium carbonate	Acute oral toxicity	LD_{50} > 2,000 mg/kg (rats)

Aluminum oxide	Acute oral toxicity	LD_{50} > 10,000 mg/kg (rats)
	Acute inhalation toxicity	LC_{50} > 2.3 mg/L air (4hr, rats)
Manganese	Acute oral toxicity	LD_{50} > 2,000 mg/kg (rats)
	Acute inhalation toxicity	LC_{50} > 5.14 mg/L dust (4hr, rats)
Iron oxide	Acute oral toxicity	LD_{50} > 10,000 mg/kg
Potassium carbonate	Acute oral toxicity	LD_{50} > 2,000 mg/kg (rats)

POTENTIAL HEALTH EFFECTS

Eye Irritation: Exposure to airborne fly ash or ash dust may cause immediate or delayed irritation or inflammation. As the material becomes wet, it will become corrosive and cause burning of the eyes.

Skin Irritation: Fly ash may cause dry skin, discomfort and irritation in susceptible individuals. Once wet, the material becomes corrosive and will cause burning of the skin.

Respiratory Irritation: A single, short-term exposure to the dry powder presents little or no hazard. High concentrations of fly ash may cause unpleasant obstruction to the nasal passages and minor chemical irritation to the membranes of the upper respiratory tract. Fly ash deposition in the nasal passages may lead to nosebleed and/or headache.

Respiratory Sensitization: No data available for the mixture. None of the components of this product are respiratory sensitizers.

Skin Sensitization: No data available for the mixture. None of the components of this product are skin sensitizers.

Chronic Effects

Repeated dose toxicity: No data available for the mixture.

Carcinogenicity: This particular fly ash is not listed as a carcinogen by IARC or NTP—it does not contain crystalline silica.

Mutagenicity: No data available for the mixture. The components of this product are not reported to cause mutagenic effects in humans.

Reproductive Effects: No data available for the mixture.

Target organs: Eyes, skin, respiratory system.

Routes of Exposure: Inhalation, dermal, eye

Signs and Symptoms of Exposure
To the best of our knowledge, the chemical, physical, and toxicological properties have not been thoroughly investigated.

SECTION 12: ECOLOGICAL INFORMATION

Ecotoxicological data have not been determined specifically for this product. The ecological assessment of this material is based on an evaluation of its components. 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 fly ash.

Ecotoxicity (Aquatic and Terrestrial): No data available

Persistence/Degradability: Not relevant for inorganic materials.

Bioaccumulation/Accumulation: No data available

Mobility in Soil: No data available

Results of PBT and vPvB assessment No data available

Other Adverse Effects: No data available

SECTION 13: DISPOSAL CONSIDERATIONS

Waste treatment methods: Dry land disposal is acceptable and is not considered a hazardous waste in most states or provinces including Ontario. However, fly 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, state, and local regulations.

Contaminated Packaging: Disposal must be in accordance with applicable federal, state/provincial, and/or local regulations.

SECTION 14: TRANSPORT INFORMATION

This material is not regulated as a hazardous material by the U.S. Department of Transportation. Not listed as a hazardous material in Canadian Transportation of Dangerous Goods (TDG) regulations.

US DOT (Ground)	Not listed
Proper Shipping Description:	Not applicable
Canadian TDG (Ground)	Not listed
Proper Shipping Description:	Not applicable
ICAO (Air)	No data available
Proper Shipping Description:	No data available
IMDG (Water)	No data available
Proper Shipping Description:	No data available

SECTION 15: REGULATORY INFORMATION

U.S Federal Regulations:

U.S. TSCA: Fly ash and all ingredients of this product are listed on the U.S. Toxic Substances Control Act (TSCA) Chemical Substance Inventory.

SARA 311 Information: This product contains the following substances subject to the reporting requirements of SARA Title III Section 313 and 40 C.F.R. Part 372: Aluminum Oxide – only if in the fibrous form.

SARA 311/312 Hazard Category: This product has been reviewed according to the EPA "Hazard Categories" promulgated under SARA Title III Sections 311 and 312 and is considered, under applicable definitions, to meet the following categories

An immediate (acute) health hazard	Yes
A delayed (chronic) health hazard	Yes
A corrosive Hazard	No
A fire hazard	No
A reactivity hazard	No
A sudden release hazard	No

OSHA: Fly ash and all listed ingredients are considered by OSHA to be hazardous chemicals or irritants and should be included in the employer's hazard communication or WHMIS program

STATE RIGHT-TO-KNOW:

California Prop. 65: This product is not subject to the reporting requirements under California's Proposition 65.

Pennsylvania: This product contains aluminum oxide, iron oxide (ferric oxide), magnesium oxide and manganese, substances that are listed in Pennsylvania

New Jersey : This product contains aluminum oxide, iron oxide (ferric oxide), magnesium oxide and manganese, substances that are listed in New Jersey

International Regulations:

Canada: Fly ash is listed on the DSL inventory and all ingredients of this product are on the DSL

EU-Regulation: No additional information available

SECTION 16: OTHER INFORMATION

Issue date **February 26, 2016**
Revision date **N/A**
Version # **2.0**

HMIS® ratings Health: 2
Flammability: 1
Physical Hazards: 0

Disclaimer This document has been prepared based on data considered to be accurate at date of preparation. No warranty is made as to the accuracy or completeness of the foregoing data and safety information. User is responsible to evaluate all available information when using product for any particular use and to comply with all laws and regulations.

Glossary:
ACGIH - American Conference of Governmental Industrial Hygienists
CAS - Chemical Abstract Service

DOT - Department of Transportation
DSL – Domestic Substance List
EPA - U.S. Environmental Protection Agency
Eye Irrit. 2A – Serious eye damage/eye irritation, Category 2A
GHS - Globally Harmonized System
HEPA - High Efficiency Particulate Arresting
HMIS - (Canada) Hazardous Materials Information System
IARC - International Agency for Research on Cancer, IARC Group 1 or 2A
LC_{50} –Concentration in Air Resulting in Death To 50% of Experimental Animals
LD_{50} - Administered Dose Resulting in Death to 50% of Experimental Animals
LEL – Lower Explosive Limit
NFPA – National Fire Protection Association
NIOSH - National Institute for Occupational Safety and Health
NTP - National Toxicology Program
OSHA – Occupational Safety and Health Administration
PBT - Persistent Bioaccumulative Toxic
PNOR – Particulate Not otherwise Regulated
PNOS – Particulate Not Otherwise Specified
PG - Packing Group
PPE - Personal Protective Equipment
RCRA - Resource Conservation and Recovery Act
Skin Irrit. 2 – Skin corrosion/irritation, Category 2
STOT - Specific Target Organ Toxicity
TDG - Canada-Transportation of Dangerous Goods
TSCA - Toxic Substances Control Act
UN - United Nations
vPvB - Very Persistent and Very Bioaccumulative
WHMIS - (Canada) Workplace Hazardous Materials Information System

HAZARD STATEMENTS IN FULL
H315 Causes skin irritation
H319 Causes serious eye irritation
H335 May cause respiratory irritation