

## Safety Data Sheet

### Section 1 Identification of the Substance and of the Supplier

#### 1.1 Product Identifier

<b>Product Name/Identification:</b>	ASTM Class C Fly Ash
<b>Synonyms:</b>	Coal Fly Ash, Pozzolan
<b>Product Code:</b>	N/A
<b>Formula:</b>	UVCB Substance

#### 1.2 Relevant Identified Uses of the Substance or Mixture and Uses Advised Against

<b>Relevant Identified Uses:</b>	Cement Replacement, Concrete Additive, Inert Filler
<b>Uses Advised Against:</b>	Any uses not meeting appropriate engineering specifications

#### 1.3 Details of the Supplier of the SDS

<b>Manufacturer/Supplier:</b>	Headwaters Resources, Inc.
<b>Street Address:</b>	10701 South Riverfront Parkway
<b>City, State and Zip Code:</b>	South Jordan, UT 84095
<b>Customer Service Telephone:</b>	801.984.9400
<b>Website Address:</b>	flyash.com

#### 1.4 Emergency Telephone Number

<b>Emergency Phone Number:</b>	877.347.8096
<b>Hours Available:</b>	24 hours/7 days a week

### Section 2 Hazards Identification

#### 2.1 Classification of the Substance

- GHS Classification(s) according to OSHA Hazard Communication Standard (29 CFR 1910.1200)
- STOT-SE Category 3 (Respiratory Irritation)
- STOT-RE Category 2

### 2.2 Label Elements

Labeling according to 29 CFR 1910.1200 Appendices A, B and C*	
Hazard Pictogram(s)	
Signal Word	Danger
Hazard Statement(s)	May cause respiratory irritation. May cause damage to lungs after repeated/prolonged exposure via inhalation.
Precautionary Statement(s)	Do not breathe dust. Use outdoors or in a well ventilated area. If inhaled: Remove to fresh air and keep comfortable for breathing. Get medical advice/attention if you feel unwell. Store in a secure area. Dispose of product in accordance with local/national regulations.

\* Fly ash and other coal combustion products (CCPs) are UVCB substances (substance of unknown or variable composition or biological). Various CCPs, noted as Ashes; Ash; Ash residues; Ashes, residues, bottom; bottom ash; bottom ash residues; waste solids, ashes under TSCA are defined by the US EPA as: "The residuum from the burning of a combination of carbonaceous materials. The following elements may be present as oxides: aluminum, calcium, iron, magnesium, nickel, phosphorus, potassium, silicon, sulfur, titanium, and vanadium. Ashes including fly ash and fluidized bed combustion ash are identified by CAS number 68131-74-8. The exact composition of the ash is dependent on the fuel source and flue 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.

### 2.3 Other Hazards

Listed Carcinogens: Respirable Crystalline Silica

IARC: Yes      NTP: Yes      OSHA: No      Other: No

## Section 3 Composition/Information on Ingredients

Substance	CAS No.	Percentage (%)	GHS Classification
Calcium Aluminosilicates	Various: See note 1	70-95	Single Exposure STOT, Category 3
Crystalline Silica	14808-60-7	<10	Repeat Dose STOT, Category 2
Silica, crystalline respirable (RCS)	14808-60-7	See note 2	Repeat Dose STOT, Category 2
Calcium oxide (CaO)	1305-78-8	<3%	Skin Irritant Category 2 Eye irritant Category 2B

Substance	CAS No.	Percentage (%)	GHS Classification
Manganese dioxide (MnO <sub>2</sub> )	1313-13-9	<2%	Skin Irritant Category 2 Eye irritant Category 2B
Phosphorus pentoxide (P <sub>2</sub> O <sub>5</sub> )	1314-56-3	<2%	Skin Irritant Category 2 Eye irritant Category 2B
Potassium oxide (K <sub>2</sub> O)	12136-45-7	<2%	Skin Irritant Category 2 Eye irritant Category 2B
Magnesium sulfate	7487-88-9	<2%	Skin Irritant Category 2 Eye irritant Category 2B

1. Calcium aluminosilicates may be in the form of aluminosilicate glass, pozzolans (CAS# 71243-67-9), tricalcium aluminate (C<sub>3</sub>A), or calcium sulfoaluminate (C<sub>4</sub>A<sub>3</sub>S). The form is dependent on the source of the coal and/or the process used to create the CCP. Pulverized coal combustion would be more likely to create high levels of pozzolans. Calcium aluminosilicates may have inclusions of calcium, titanium, iron, potassium, phosphorus, magnesium and other metal oxides.
2. RSC in the CCP has not been determined.

**Section 4  
First Aid Measures**

**4.1 Description of First Aid Measures**

<b>Inhalation</b>	If product is inhaled and irritation of the nose or coughing occurs, remove person to fresh air. Get medical advice/attention if respiratory symptoms persist.
<b>Skin Contact</b>	If skin exposure occurs, wash with soap and water.
<b>Eye Contact</b>	If product gets into the eye, rinse cautiously with water for at least 15 minutes. Remove contact lenses, if present and easy to do. Seek medical attention/advice if irritation occurs or persists.
<b>Ingestion</b>	No specific first aid measures are required.

**4.2 Most Important Health Effects, Both Acute and Delayed**

<b>Acute Effects</b>	Direct exposure may cause respiratory irritation, eye irritation and skin irritation. The product dust can dry and irritate the skin and cause dermatitis and can irritate eyes and skin through mechanical abrasion.
<b>Chronic Effects</b>	Chronic exposure may cause lung damage from repeated exposure. Chronic inhalation of dusts containing respirable crystalline silica may result in silicosis.

**4.3 Indication of Any Immediate Medical Attention and Special Treatment Needed**

Seek first aid or call a doctor or Poison Control Center if contact with eyes occurs and irritation remains after rinsing.

**Section 5  
Firefighting Measures**

**5.1 Extinguishing Media**

<b>Suitable Extinguishing Media</b>	Product is not flammable. Use extinguishing media appropriate for surrounding fire.
<b>Unsuitable Extinguishing Media</b>	Not applicable; the product is not flammable.

**5.2 Special Hazards Arising From the Substance or Mixture**

<b>Hazardous Combustion Products</b>	None known.
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**5.3 Advice for Firefighters**

<b>Special Protective Equipment and Precautions for Firefighters</b>	As with any fire, wear self-contained breathing apparatus (NIOSH-approved or equivalent) and full protective gear.
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**Section 6  
Accidental Release Measures**

**6.1 Personal Precautions, Protective Equipment and Emergency Procedures**

**6.1.1 Personal Precautions/Protective Equipment**

See Section 8.2.2 "Personal Protective Equipment". For concentrations exceeding Occupational Exposure Levels (OELs), use a self-contained breathing apparatus (SCBA).

**6.1.2 Emergency Procedures**

Use scooping, water spraying/flushing/misting or ventilated vacuum cleaning systems to clean up spills. Do not use pressurized air.

**6.2 Environmental Precautions**

Prevent contamination of drains or waterways and dispose of according to local and national regulations.

**6.3 Methods and Material for Containment and Cleaning Up**

Do not use brooms or compressed air to clean surfaces. Use dust collection vacuum and extraction systems.

Large spills of dry product should be removed by a vacuum system. Dampened material should be removed by mechanical means and recycled or disposed of according to local and national regulations.

See Sections 8 and 13 for additional information on exposure controls and disposal.

**Section 7  
Handling and Storage**

**7.1 Precautions for Safe Handling**

Practice good housekeeping. Use adequate exhaust ventilation, dust collection and/or water mist to maintain airborne dust concentrations below permissible exposure limits. (Note: respirable crystalline silica dust may be in the air without a visible dust cloud.)

Do not permit dust to collect on walls, floors, sills, ledges, machinery, or equipment. Maintain and test ventilation and dust collection equipment. In cases of insufficient ventilation, wear a NIOSH-approved respirator for silica dust when handling or disposing dust from this product. Avoid contact with skin and eyes. Wash or vacuum clothing that has become dusty. Avoid eating, smoking, or drinking while handling the material.

**7.2 Conditions for Safe Storage, Including Any Incompatibilities**

Minimize dust produced during loading and unloading.

**Section 8  
Exposure Controls/Personal Protection**

**8.1 Control Parameters**

OCCUPATIONAL EXPOSURE LIMITS					
SUBSTANCE		OSHA PEL TWA (mg/m <sup>3</sup> )	NIOSH REL TWA (mg/m <sup>3</sup> )	ACGIH TLV TWA (mg/m <sup>3</sup> )	CA - OSHA PEL (mg/m <sup>3</sup> )
Calcium oxide		5	2	2	2
Particulates Not Otherwise Regulated	Total	15	15	-	10
	Respirable	5	5	-	5
Crystalline Silica	Total Quartz	30 ÷ (%SiO <sub>2</sub> +2) (Total Quartz)	-	-	0.3
	Respirable Crystalline Silica	10 ÷ (%SiO <sub>2</sub> +2)	0.05	0.025 (α-quartz & cristobalite)	0.1
	Cristobalite	-	0.05	0.025 (α-quartz & cristobalite)	0.05 (respirable)
Manganese dioxide (as manganese compounds)	Total	5 (Ceiling)	1 3 (STEL)	0.1	0.2
	Respirable	-	-	0.02	-

**8.2 Exposure Controls**

**8.2.1 Engineering Controls**

Provide ventilation to maintain the ambient workplace atmosphere below the occupational exposure limit(s). Use general and local exhaust ventilation and dust collection systems as necessary to minimize exposure.

**8.2.2 Personal Protective Equipment (PPE)**

<b>Respiratory protection:</b>	Wear a NIOSH-approved particulate respirator if exposure to airborne particulates is unavoidable and where occupational exposure limits may be exceeded. If airborne exposures are anticipated to exceed applicable PELs or TLVs, a self-contained breathing apparatus or airline respirator is recommended.
<b>Eye and face protection:</b>	If eye contact is possible, wear protective glasses with side shields or dust goggles, as appropriate. Avoid contact lenses.
<b>Hand and skin protection:</b>	Wear gloves and protective clothing. Wash hands with soap and water after contact with material.

**Section 9  
Physical and Chemical Properties**

**9.1 Information on Basic Physical and Chemical Properties**

Property: Value	Property: Value
<b>Appearance (physical state, color, etc.):</b> Fine tan/ gray particulate	<b>Upper/Lower Flammability or Explosive Limits:</b> Not applicable
<b>Odor:</b> Odorless <sup>1</sup>	<b>Vapor Pressure (Pa):</b> Not applicable
<b>Odor Threshold:</b> Not applicable	<b>Vapor Density:</b> Not applicable
<b>pH in Water (25°C):</b> 10-12 <sup>2</sup>	<b>Specific Gravity:</b> 2.2 - 2.8
<b>Melting Point/Freezing Point (°C):</b> Not applicable	<b>Water Solubility:</b> Slight
<b>Initial Boiling Point and Boiling Range (°C):</b> Not applicable	<b>Partition Coefficient: n-octane/water:</b> Not determined
<b>Flash Point (°C):</b> Not determined	<b>Auto Ignition Temperature (°C):</b> Not applicable
<b>Evaporation Rate:</b> Not applicable	<b>Decomposition Temperature (°C):</b> Not determined
<b>Flammability (solid, gas):</b> Not combustible	<b>Viscosity:</b> Not applicable

<sup>1</sup> The use of urea or aqueous ammonia injected into the flue gas to reduce nitrogen oxides (NOx) emissions may result in the presence of ammonium sulfate or ammonium bisulfate in the ash at less than 0.1%. When ash containing these substances becomes wet under high pH (>9), free ammonia gas may be released, resulting in objectionable/nuisance ammonia odor and potential exposure to ammonia gas especially in confined spaces.

<sup>2</sup> This is the typical range.

**9.2 Other Information**

None.

**Section 10  
Stability and Reactivity****10.1 Reactivity**

The material is an inert, inorganic material primarily composed of elemental oxides.

**10.2 Chemical stability**

The material is stable under normal use conditions.

**10.3 Possibility of Hazardous Reactions**

The material is a relatively stable, inert material. Polymerization will not occur. However, when ash containing added ammonia becomes wet under high pH (>9), free ammonia gas may be released, resulting in an objectionable/nuisance ammonia odor and potential exposure to ammonia gas, especially in confined spaces.

**10.4 Conditions to Avoid**

Product can become airborne in moderate winds. Dry material should be stored in silos. Materials stored out of doors should be covered or maintained in a damp condition.

**10.5 Incompatible Materials**

None known.

**10.6 Hazardous Decomposition Products**

None known.

**Section 11  
Toxicological Information****11.1 Information on Toxicological Effects**

Endpoint	Data
Acute oral toxicity	LD50 > 2000 mg/kg
Acute dermal toxicity	LD50 > 2000 mg/kg
Acute inhalation toxicity	LC50 > 5.0 mg/L
Skin corrosion/irritation	Not irritating to skin.
Eye damage/irritation	Slight but reversible eye irritation.

Endpoint	Data
Respiratory/skin sensitization	Not a respiratory or dermal sensitizer.
Germ cell mutagenicity	Not mutagenic in <i>in vitro</i> and <i>in vivo</i> assays with or without metabolic activation.
Carcinogenicity	Not available. Respirable crystalline silica has been identified as a carcinogen by NTP and IARC.
Reproductive toxicity	An animal study with a CCP has indicated some effects on male and female reproductive organs and parameters without a clear dose response, while studies with other CCPs have not shown reproductive effects. Therefore, there is not enough evidence available to classify according to reproductive toxicity. No developmental toxicity has been observed in available animal studies.
STOT-SE	No specific target organ toxicity after a single exposure to the substance is expected; however, presence as a nuisance dust may result in respiratory irritation.
STOT-RE	NOAEC = 4.2 mg/m <sup>3</sup> fly ash dust; as no effects were observed at the highest dose tested during the 180-day inhalation study, it is not possible to assess the level at which toxicologically significant effects may occur.  Repeated inhalation exposures to high levels of respirable crystalline silica may result in lung damage (i.e., silicosis).
Aspiration Hazard	Not applicable based on product form.

**Section 12  
Ecological Information**

**12.1 Toxicity**

Coal Ash CAS# 68131-74-8	
Toxicity to fish	LC50 >100 mg/L
Toxicity to invertebrates	Data indicates that the test substance is not toxic to <i>Daphnia magna</i> (EC50 undetermined)
Toxicity to algae and plants	EC50 = 10 mg/L

Calcium oxide CAS# 1305-78-8	
Toxicity to fish	LC50 = 50.6 mg/L  The findings were closely related to the pH of the test solutions; therefore, pH is considered to be the main reason for the effects.



<b>Toxicity to invertebrates</b>	EC50 = 49.1 mg/L The findings were closely related to the pH of the test solutions; therefore, pH is considered to be the main reason for the effects.
<b>Toxicity to algae and plants</b>	NOEC =48 mg/L @ 72 hours based on Ca(OH) <sub>2</sub> The initial pH of the test medium was not directly related to the biologically relevant effects. The formation of precipitates is likely the result of the reaction between CO <sub>2</sub> dissolved in the medium.

**12.2 Persistence and Degradability**

Not relevant for inorganic materials.

**12.3 Bioaccumulative Potential**

No data available.

**12.4 Mobility in Soil**

No data available.

**12.5 Results of PBT and vPvB Assessment**

No data available.

**12.6 Other Adverse Effects**

None known.

**Section 13  
Disposal Considerations**

See Sections 7 and 8 above for safe handling and use, including appropriate hygienic practices.

Dispose of all waste product and containers in accordance with federal, state and local regulations.

**Section 14  
Transport Information**

<b>Regulatory entity:</b> U.S. DOT	Shipping Name:	Not Regulated
	Hazard Class:	Not Regulated
	ID Number:	Not Regulated
	Packing Group:	Not Regulated

**Section 15  
Regulatory Information**

**15.1 Safety, Health and Environmental Regulations/Legislation Specific for the Mixture**

- **TSCA Inventory Status**

All components are listed on the TSCA Inventory.

- **California Proposition 65**

The following substances are known to the State of California to be carcinogens and/or reproductive toxicants:

- Respirable crystalline silica
- Titanium dioxide (airborne particles)

- **State Right-to-Know (RTK)**

Component	CAS	MA <sup>1,2</sup>	NJ <sup>3,4</sup>	PA <sup>5</sup>	RI <sup>6</sup>
Ammonium bisulfate	7803-63-6	No	Yes	No	No
Ammonium sulfate	7783-20-2	Yes	No	Yes	No
Calcium oxide	1305-78-8	Yes	Yes	Yes	No
Iron oxide	1309-37-1	Yes	Yes	Yes	No
Magnesium oxide	1309-48-4	No	Yes	No	No
Phosphorus pentoxide (or phosphorus oxide)	1314-56-3	Yes	Yes	Yes	No
Potassium oxide	12136-45-7	No	Yes	No	No
Silica-crystalline (SiO <sub>2</sub> ), quartz	14808-60-7	Yes	Yes	Yes	No
Titanium dioxide	13463-67-7	Yes	Yes	Yes	No

<sup>1</sup> Massachusetts Department of Public Health, no date

<sup>2</sup> 189th General Court of The Commonwealth of Massachusetts, no date

<sup>3</sup> New Jersey Department of Health and Senior Services, 2010a

<sup>4</sup> New Jersey Department of Health, 2010b

<sup>5</sup> Pennsylvania Code, 1986

<sup>6</sup> Rhode Island Department of Labor and Training, no date

- **Coal ash is not a SARA 313 substance.**

Coal ash is required for SARA Tier II (311/312) reporting when in sufficient quantities. Trace elements in coal ash should be considered in TRI reporting.

**Section 16**

**Other Information, Including Date of Preparation or Last Revision**

**16.1 Indication of Changes**

Date of preparation or last revision: May 25, 2015

**16.2 Abbreviations and Acronyms**

ACGIH:	American Conference of Industrial Hygienists	PA:	Pennsylvania
ANSI:	American National Standards Institute	Pa:	Paschal
CA:	California	PBT:	Persistent, Toxic and Bioaccumulative
CAA:	Clean Air Act	PEL:	Permissible exposure limit
CAS:	Chemical Abstract Services	PPE:	Personal Protective Equipment
CCP:	Coal Combustion Product	REL:	Recommended exposure limit
CFR:	Code of Federal Regulations	RI:	Rhode Island
EPA:	Environmental Protection Agency	RCS:	Respirable Crystalline Silica
GHS:	Globally Harmonized System of Classification and Labeling	RTK:	Right-to-Know
HMIS:	Hazardous Materials Identification System	SARA:	Superfund Amendments and Reauthorization Act
IARC:	International Agency for Research on Cancer	SCBA:	Self-contained breathing apparatus
LC50:	Concentration resulting in the mortality of 50% of an animal population	SDS:	Safety Data Sheet
LD50:	Dose resulting in the mortality of 50% of an animal population	STEL:	Short-term exposure limit
LEL:	Lower explosive limit	STOT-RE:	Specific target organ toxicity-repeated exposure
MA:	Massachusetts	STOT-SE:	Specific target organ toxicity-single exposure
NA:	Not Applicable	TLV:	Threshold limit value
NJ:	New Jersey	TSCA:	Toxic Substances Control Act
NOEC:	No observed effect concentration	TWA:	Time-weighted average
NIOSH:	National Institute of Occupational Safety and Health	UEL:	Upper explosive limit
NOx:	Nitrogen oxides	UVCB:	Unknown or Variable Composition/Biological
NTP:	US National Toxicology Program	U.S.:	United States
OEL:	Occupational Exposure Limit	U.S. DOT:	United States of Department of Transportation
OSHA:	Occupational Safety and Health Administration	vPvB:	Very Persistent and Very Bioaccumulative

**16.3 Other Hazards**

**Table 1: Class C Fly Ash**

Hazardous Materials Identification System (HMIS)			Degree of hazard (0 = Low; 4= Extreme)
<b>Health:</b> 1*	<b>Flammability:</b> 0	<b>Reactivity:</b> 1	<b>Personal Protection:</b>

\* Chronic Health Effects

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**DISCLAIMER:**

*This SDS has been prepared in accordance with the Hazard Communication Rule 29 CFR 1910.1200. Information herein is based on data considered to be accurate as of date prepared. No warranty or representation, express or implied, is made as to the accuracy or completeness of this data and safety information. No responsibility can be assumed for any damage or injury resulting from abnormal use, failure to adhere to recommended practices, or from any hazards inherent in the nature of the product.*

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