

PCC LIGHTWEIGHT AGGREGATE

The Environmentally Friendly Substitute for Cinders

Coal burning power plants generate more than half of the electricity produced in the United States. As a result, approximately 100 million tons of coal combustion by-products (CCPs) are generated annually in the United States.

Coal Combustion Products (CCPs)

CCPs are generated when coal is crushed, pulverized, and blown into a combustion chamber where it immediately ignites to heat boiler tubes.



Inherent in the coal are mineral impurities that become the coal ash after ignition. Coarse particles of these impurities settle to the bottom of the combustion chamber (bottom ash and boiler slag) while the finer particles (fly ash) remain suspended in the flue gas stream and are collected out of that stream by several methods.



Substitute for Cinders

Processed bottom ash, PCC Lightweight Aggregate, resembles natural cinders mined in northern Arizona in terms of composition, size and shape. Arizona cinders are typically black or red in color while PCC Lightweight Aggregate tends to be medium to dark gray in color. Heavy metals content is similar in both materials. Currently, cinders are utilized in concrete block construction, snow and ice control, blotter for paving projects

and fill applications. PCC Lightweight Aggregate is a viable alternative to cinders; thus providing successful utilization of a solid by-product material, as well as providing an alternative to cinder mining operations.

Potential uses for PCC Lightweight Aggregate:

- Raw feed material for cement plants
- Ice and skid control material
- Lightweight aggregate for concrete and concrete products production
- Flowable fill, structural fill, base material
- Agricultural amendment material
- Blasting grit and roofing granules

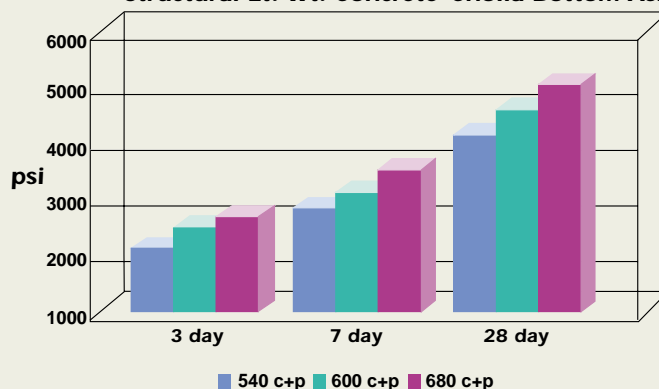
Environmental Benefits- RCRA Classification

The EPA has concluded that CCP's do not warrant regulation as hazardous under Subtitle C of the Resource Conservation and Recovery Act (RCRA). The EPA does not wish to place any unnecessary barriers on the beneficial use of CCP's, such as in construction applications, agricultural amendment and waste stabilization.

REUSE
REDUCE
RECYCLE



ASTM C 330 Concrete Test Results
Structural Lt. Wt. Concrete-Cholla Bottom Ash



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PHOENIXTM CEMENT

PCC Lightweight Aggregate Properties

Generic Description:

Bottom Ash/ Coal Ash/ Coal Combustion Product (CCP). Once processed, it is known as PCC Lightweight Aggregate.

Common Usage:

A solid, lightweight, strong, cinder-like material useful as an aggregate for structural lightweight concrete and concrete block, as a seal coat aggregate, as snow and ice control abrasive material, as blotter material and as aggregate for fill applications. PCC Lightweight Aggregate is an environmentally friendly alternative to cinders.

Appearance/odor:

Light to dark gray porous material of varying textures (consistency of rock to sand) with no distinctive odor.

Chemical Analysis:

Chemical Analysis:	Typical Range
Silicon Dioxide	57-65%
Aluminum Oxide	18-22%
Calcium Oxide	2-6%
Ferric Oxide	3-7%
Magnesium Oxide	0.9-1.3%
Sulfur Trioxide	0.1-1.1%
Sodium Oxide	1-1.2%
Potassium Oxide	1-1.2%

Typical Range

Physical Analysis:

Physical Analysis:	Typical Range
Loss on Ignition	1-4%
Moisture Content	7-14%
Specific Gravity (Apparent)	1.6-2.0
Loose Unit Weight	40-51 pcf

Typical Range

Sieve Analysis:

(% passing-typical)

Sieve Size	Coarse	Intermediate	Fine
3/4"	100	100	100
1/2"	73	100	100
3/8"	51	91	100
#4	9	34	98
#8	9	12	80
#16	8	12	58
#30	8	12	42
#50	7	12	30
#100	6	9	15
#200	3.3	5.3	8

Boiling Point:

> 2000 deg F

Vapor Pressure:

Not applicable

Specific Gravity:

1.41-2.21 (water = 1)

pH:

8.5-11

Flash Point:

None (non-combustible)

Flammable Limits:

LEL: None

UEL: None

Carcinogenicity:

NTP: N

IARC Monographs: Y

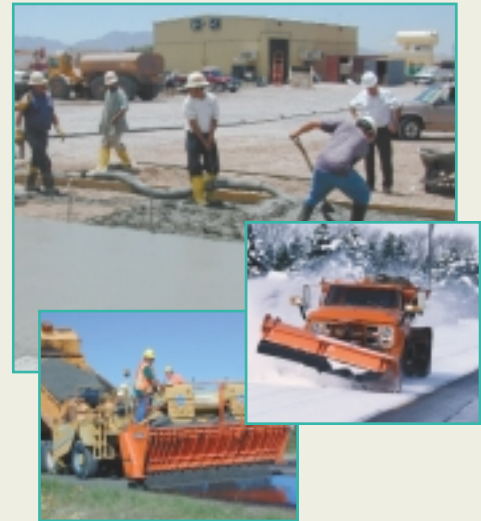
OSHA: Regulated: N

Health & Safety:

Dry coal ash spills are not considered to be immediately hazardous. Proper respiratory protection while in the area of accumulated dry coal ash is advised. If possible, coal ash spills should be cleaned up as soon as practicable. Proper respiratory protection and coveralls should be worn. Work practices that create excessive dust should be evaluated and replaced with ones that are less dusty. When handling moist or wet coal ash, skin protection is required. The alkaline nature of the moist ash can cause skin burns. Boot covering should also be considered.

Hazardous Nature Analysis

	PCC Lightweight Agg.	Cinders	Regulatory Level (mg/l)
TCLP Metals			
Arsenic	ND	ND	5.0
Barium	0.69 mg/l	0.11 mg/l	100.0
Cadmium	ND	ND	1.0
Chromium	ND	ND	5.0
Lead	ND	ND	5.0
Mercury	ND	ND	0.2
Selenium	ND	ND	1.0
Silver	ND	ND	5.0
Inorganics			
Ignitibility	No Ignitibility	No Ignitibility	Flash point <140°
pH	8.71	9.56	>2.0 and <12.5
Total Cyanide	ND	ND	250 (mg/kg)
Sulfide	47 mg/kg	ND	500 (mg/kg)



Phoenix Cement Company is committed to minimizing the impact our operations have on the environment and to environmentally sound utilization of coal by-product materials. Phoenix Cement Company is an entity of the Salt River Pima-Maricopa Indian Community.

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