PHOENIX FLY ASH

CLASS C POZZOLAN

Salt River Materials Group

100% American™

Salt River Materials Group (SRMG) Class C fly ash meets all chemical and physical requirements of the current ASTM Specification C 618 Coal Fly Ash for use in Concrete. Phoenix Class C Fly Ash is collected and processed at the Coronado Generating Station near St. Johns, Arizona.

Introduction

Fly ash, a by-product from the combustion of pulverized coal, is widely used as a pozzolanic and/or cementitious ingredient in hydraulic cement concrete. Due to the physical and chemical properties of fly ash, many desirable concrete properties are improved. Class C fly ash also possesses cementitious value due to reactive consistuents within the fly ash.

Proportioning

Under normal conditions, Class C fly ash is used to replace 15-35% of portland cement by weight. Replacement rates outside of this normal range have been used successfully for more specialized conditions. Phoenix Class C fly ash can also be added without cement reduction to achieve desired mix characteristics. Throughout the range of fly ash percentages, proper testing can provide proportions and material combinations yielding competitive strengths at various age requirements.

Strength, Set Time and Pumping Ability

Strengths of concrete properly proportioned with Class C fly ash can be designed to closely match those of equivalent cement-only mixes due to the cementitious characteristics of the fly ash. In fact, due the secondary pozzolanic reaction, fly ash mixes with similar 28-day compressive strengths generally achieve 10-20% higher strengths at ages beyond 28 days.

Concrete set times utilizing chemical admixtures and 15-35% Class C fly ash can be impacted. Proper testing can provide the materials combinations and proportions to yield adequate set times. Due to the spherical particle shape of fly ash, the ball bearing effect whereby the use of fly ash in concrete lubricates the mix, superior pumping ability is achieved, even in mixes utilizing very angular materials or high in coarse aggregate content.

Durability

Research has shown that Class C fly ashes can result in similar levels of resistance to sulfate attack and alkali-silica reactivity mitigation as Class F fly ash, utilizing higher ash content and specific proportioning. In applications where potential for durability problems exists, thorough testing of all mix ingredients should be conducted to ensure that sound, durable concrete can be produced using Class C fly ash.

Water Demand

The use of Class C fly ash in normal proportions typically provides mixes with a lower water demand for a given workability. This translates directly into increased strength and durability, reduced potential for shrinkage, reduced segregation, and most importantly, lower permeability.

Environmental Benefits

Fly ash is specifically listed in the Federal Register as a recycled material to be given preference under the Resource Conservation and Recovery Act (RCRA). The specification and use of fly ash in concrete, concrete and mortar products, and packaged goods highlights one of the greatest recycling efforts on record.

Salt River Materials Group (SRMG) Phoenix Fly Ash is considered by the U.S. Green Building Council (USGBC) as a 100% pre-consumer industrial by-product that can be recycled in new concrete, masonry, pre-cast and soil stabilization projects.

Coronado Generating Station Fly Ash Facility

Average Results								
	ASTM C 618 Class F						ASTM C 618 Class C	
Chemical Analysis	Specification	Cholla	Four Corners	San Juan	Gallup	Escalante	Coronado	Specification
Calcium Oxide, CaO_2	NA	3.60	2.54	4.03	3.11	3.70	23.30	NA
Silicon Dioxide, SiO_2	NA	58.91	61.53	57.83	59.05	59.49	38.14	NA
Aluminum Oxide, Al_2O_3	NA	23.33	23.97	25.04	24.71	23.29	17.88	NA
Ferric Oxide, Fe_2O_3	NA	6.49	4.24	4.20	3.96	5.68	6.16	NA
SiO_2+Al_2O_3+Fe_2O_3	70.0% Min	88.83	89.73	87.07	87.72	88.45	62.18	50 .0 - 70.0%
Magnesium Oxide, MgO	NA	1.19	1.18	1.26	1.03	1.28	4.18	NA
Sulfur Trioxide, SO_3	5.0% Max	0.35	0.20	0.37	0.36	0.27	2.17	5.0% Max
Moisture content	3.0% Max	0.08	0.06	0.06	0.05	0.06	0.09	3.0% Max
Loss on Ignition	6.0% Max	0.37	0.27	0.67	0.55	0.21	0.67	6.0% Max
Available alkalies as Na_2O		0.53	0.49	0.63	0.55	0.48	1.04	
Total alkalies as Na_2O		1.76	2.01	2.36	2.15	1.77	2.93	
Physical Analysis								
Fineness, +325 Sieve	34% Max	23	24	20	24	22	12	34.0% Max
Variation from average	5% Max	0.08	-0.09	-0.11	-0.16	0.17	1.42	5.0% Max
Density, g/cm³		2.21	1.96	2.03	2.00	2.14	2.64	NA
Variation from average	5% Max	0	0	0	0	0.02	0.65	5.0% Max
Strength Activity Index w/ Cement								
7 Day, % of control		80	80	80	80	81	100	NA
28 Day, % of control	75% Min	88	87	85	84	88	105	75% Min
Water Requirement, % of control	105% Max	96	96	96	97	96	95	105% Max
Soundness	0.8% Max	-0.02%	-0.02%	-0.02%	-0.02%	-0.02%	0.01%	0.8% Max

Mission Statement

Creating Opportunities and Solutions with Quality Products and Exceptional People

Values

Profitability The Right Way...
Integrity, Accountability, Excellence

SRMG
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PHOENIXCEMENT
100% AMERICAN™

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