

Passivation of Activated Carbon in Ash

HEADWATERS DEVELOPED THE CONCEPT OF CARBON PASSIVATION TECHNOLOGY

over 15 years ago to deal with unburned carbon in ash resulting from low NOx burners. The original technology was deployed at power plants to treat ash with 3% to 6% unburned carbon. Activated carbon is more adsorptive than unburned carbon and can significantly interfere with air entrainment in concrete at levels as low as 0.1% in ash. This second generation technology has been developed to deal with the more adsorptive and low levels of activated carbon.

The injection of Powdered Activated Carbon (PAC) upstream of the particulate collection systems (ESP or bag house) can result in fly ash quality deterioration. PAC in ash interferes with the Air Entrainment Agent (AEA) ability to entrain air in concrete. Fly ash containing undesirable levels of carbon must be treated prior to its use in ready mixed concrete. The RestoreAir technology is used to treat fly ash at the power plant prior to ash delivery to customers. The technology uses a low dosage of liquid reagent to passivate the carbon surfaces and reduce their ability to adsorb air entrainment agents in concrete. Carbon is not removed, but its effect on air entrainment is neutralized. The technology has been successfully demonstrated on class C and F ashes containing the most common PACs.

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Fly ash containing undesirable levels of carbon must be treated prior to its use in ready mixed concrete. Headwaters developed the concept of carbon passivation technology over 15 years ago; this second-generation technology has been developed to deal with more adsorptive and lower levels of activated carbon in fly ash.
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AEA adsorption potential for quality assurance testing or to determine reagent dosage for treatment.

• Reformulated Reagent.

RestoreAir 2.2 is formulated with a tamed dose-response to handle variations in PAC content or native carbon in the fly ash. Additionally, this reagent has a lower viscosity and better low temperature handling than the first generation.

Advanced Systems.

The mechanical components include ash flow control synchronized with real-time mass flow measurement and pressure regulated reagent injection system to provide uniform distribution of reagent in ash.

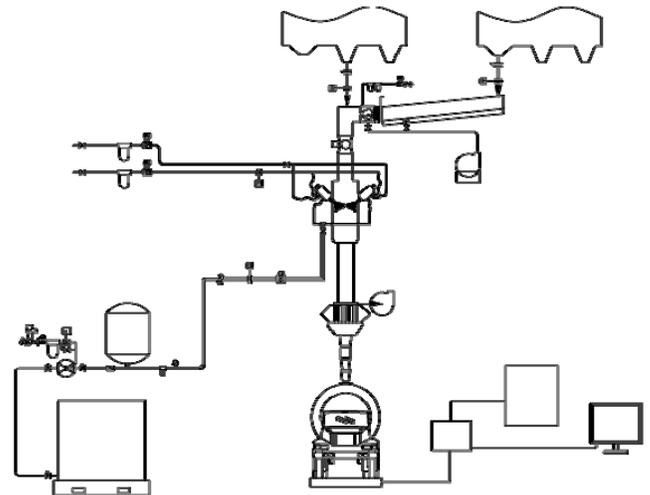
RestoreAir systems can be customized to site specific conditions and constraints. Power plant units with low PAC injection rates and manageable variability can deploy a basic system whereas swing-load units, those using aggressive PACs can result in varying ash quality and would require the more robust and advanced features of the RestoreAir technology.



Fly Ash	Initial Foam Index	RestoreAir 2.2 Dosage (lb/ton)	Final Foam Index
C	30	0.4	19
	52	1.1	20
	96	2.4	20
F	48	0.9	22
	90	2.1	22
	115	3.2	22

RestoreAir includes many proprietary and patent-pending features:

- **New Sensor.** The technology uses a specifically developed sensor to measure the adsorption capacity of ash with low activated carbon content. Unlike the traditional foam index test, this diagnostic test/sensor is not subjective and can be automated to provide real-time on-line measurements of ash



For more information or answers to questions about the use of fly ash in specific applications, contact your nearest Headwaters Resources Technical Sales Representative or call 1-888-236-6236.