

# RestoreAir®

## Passivation of activated carbon in ash

Boral has successfully deployed carbon passivation technologies at more than 20 coal-fueled power plants. The concept was developed over 15 years ago to deal with unburned carbon in ash resulting from low-NO<sub>x</sub> burners. The original technology was deployed 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. Second-generation technologies, including PACT, have been developed to deal with both unburned carbon and the more adsorptive and low levels of activated carbon.

The injection of powdered activated carbon (PAC) upstream of the particulate collection systems (ESP or baghouse) can result in fly ash quality deterioration. PAC in ash interferes with the air entrainment agent's (AEA's) ability to entrain air in concrete. Fly ash containing undesirable levels of carbon must be treated prior to its use in ready-mixed concrete.

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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### RESTOREAIR® INCLUDES MANY PROPRIETARY FEATURES:

#### New Sensor

The technology uses a specifically developed user-friendly 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 AEA adsorption potential for quality assurance testing or to determine reagent dosage for treatment.

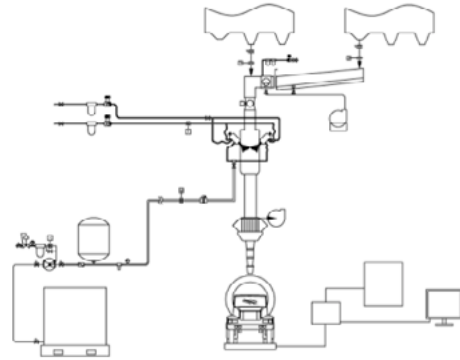
#### Liquid Reagents

RestoreAir® reagents can be formulated to passivate carbons with different adsorption capacities. These reagents also have a tamed dose-response to handle variations in PAC content or native carbon in the fly ash.

#### Advanced Systems

The mechanical components include ash flow control synchronized with real-time mass flow measurement and a 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.



PAC (%wgt of fly ash)	Carbon % by Leco	Foam Index (drops)	Adsorption (mg/g)	Liquid Reagent Treatment (lb/ton)	Foam Index After Treatment (drops)
0.00	0.00	4	0.18	0	4
0.40	0.12	6	0.26	0	6
0.90	0.55	12	0.70	1.22	6
1.30	0.68	16	1.00	1.70	6
2.20	1.44	31	1.68	3.50	6

