Techniques for Measuring Ammonia in Fly Ash, Mortar, and Concrete

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ABSTRACT

The presence of ammonia in fly ash, that is being used in mortar and concrete, is an increasing concern in the U.S. mainly due to the installation SCR systems. When the SCR catalyst is new, contamination of the fly ash with ammonia is generally not a concern. However, as the catalyst in the SCR ages and becomes less efficient, the ammonia slip increases and results in a greater amount of ammonium salt being precipitated on the fly ash. The increase in ammonia concentration is compounded by variability that can occur on a day-to-day basis. When marketing ammonia-laden fly ash for use in mortar and concrete it is imperative that the concentration of ammonia is known. However, there currently is no widely accepted or “standard” method for ammonia measurement in fly ash. This paper describes two methods that have been developed and used by the University of Kentucky CAER and Boral Materials Technologies, Inc. One of the methods uses gas detection tubes and can provide an accurate determination within five to ten minutes. Thus it is suitable as a rapid field technique. The other method employs a gas-sensing electrode and requires a longer period of time to complete the measurement. However, the latter method can also be used to determine the quantity of ammonia in fresh mortar and concrete.