

# What is Pulverised Fuel Ash (PFA)?

## What is Fly Ash?

PFA is Pulverised Fuel Ash, subsequently referred to as fly ash, generated from the combustion of pulverised hard coal in electricity generating coal-fired power stations. It is collected from the exhaust gas stream of the furnace either in electrostatic precipitators (ESPs) or sometimes in a filter (bag house). It differs from Furnace Bottom Ash (FBA) by having a much finer particle size, which means that it does not fall to the bottom of the furnace but rather exits with the exhaust gases - hence the name fly ash. It is mainly derived from the inorganic component of the coal (sand, clay, shales etc) but also contains residual carbon from unburnt fuel (described as LOI).

The residual carbon content is usually expressed as the loss on ignition or LOI, which describes the analytical method of determination. Ash differs in characteristics depending on the type of coal, the method used to prepare it for ignition (e.g. pulverised fuel) and the operating conditions of the boiler. However, beneficial use can be made of ~100% of the ash produced if RockTron technology is applied. (See glossary for more details)

## Schematic of fly ash production and collection in a coal fired power station

In excess of 500+ million tonnes p.a. of fly ash has been generated globally since 2005 and this figure has risen with the demand for energy in developing countries. Despite the significant advantages the minerals composing fly ash have to offer the industry, utilisation of this resource to date has remained relatively low due to the lack of processes able to purify and separate the individual component minerals.

Reasons for the low utilisation are principally:

### Residual Carbon Content

European specifications for the use of fly ash in concrete, for example, require that the residual carbon content is no more than 7%. RockTron has had independent research conducted to demonstrate that (high residual) carbon does indeed have a detrimental effect on concrete. This is the reason why RockTron's Alpha cement constituent has a typical residual carbon content of 2%. Generally, it is becoming increasingly more difficult to meet the <7% target from Power Station ash, particularly with the advent of burning low ash coal and use of low NOx burners. This high residual carbon ash is usually stockpiled.

### Seasonality

Many European power stations generate more ash during the winter months when energy demand is at its highest, whereas the construction industry is at its working peak during the summer months. Consequently, demand for materials, including PFA, outstrips supply during the summer months. The reverse is true during the winter months when ash is stockpiled. RockTron's unique process is able to treat this stockpiled material as well as freshly produced fly ash, thus maintaining constant supply and consistent high quality irrespective of the seasons.

## The RockTron Process

- Recovers cenospheres continuously and to a quality not matched by any other.
- Recovers all of the unburnt carbon at 92-96% purity with increased surface area for proven use as coke (coal without volatiles).
- Recovers spherical magnetite for use in advanced polymers and electronic applications.
- Produces alumino-silicate glass spheres for high grade cement substitution and fillers for polymers, coatings, adhesives and markets seeking light weight and strong materials.

Market Acceptance - historically, acceptance of fly ash for use in the construction industry has not been universal, principally because of difficulties with supply, availability and inconsistencies with quality and colour. There is now a need to increase utilisation, particularly with the advent of economic and environmental drivers such as CO2 reduction measures, higher landfill duty and the implementation of bonds for remediation of stockpiled sites. RockTron delivers on all requirements.

#### Composition of Fly Ash

The composition of a typical UK PFA consists predominantly of alumino-silicates, carbon, iron oxides and alkali metal oxides.

For Example:

For more information about PFA [click here](#)