

# ScotAsh Furnace Bottom Ash

## Sustainable solutions for construction specialists

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ScotAsh FBA has been used as backfill for bridge abutments in Clackmannanshire and Fife and in the manufacture of lightweight building blocks

### Description

Furnace Bottom Ash (FBA) is the 'coarse' ash fraction produced in the furnaces of coal-fired power stations when pulverised coal is fed into the boilers and burnt at high temperatures and pressures.

Once combustion has taken place, the finer particles of Pulverised Fuel Ash (PFA) are carried out in the flue gases and captured in the precipitators.

The coarser material (FBA) drops to the bottom of the boiler into a hopper. It is then removed by high-pressure water and pumped into storage lagoons, where it can be dredged, stockpiled and allowed to drain.

Chemically, FBA has similar properties to Pulverised Fuel Ash with the three predominant elements being silica, aluminum and iron, the oxides of which together account for approximately 85% of the material. There can be a small percentage of carbon particulate resulting from incomplete combustion, but the percentage is low.

Physically, the material is predominantly between 37.5mm and 150mm in size and can be regarded as a free-draining, granular material, that is non-susceptible to frost heave. ScotAsh can screen the material to less than 6mm in size.

### Specification

Due to the fact FBA is a by-product of the combustion of coal, the properties can demonstrate a slight degree of variation. However, it does meet a number of specifications

Furnace Bottom Ash provides a sustainable alternative to various aggregates, saving natural resources, as well as energy and CO<sub>2</sub> emissions used in processing

including the Specification for Highways Works (SHW).

The SHW allows the use of FBA as:

- Class 1A Well Graded Granular Material
- Class 6E Selected Granular Fill Material for Stabilisation with cement to form capping
- 6F1 Selected granular material for fine capping.

The other main specification that can be used to control Furnace Bottom Ash is: BS EN 13055-1 – Lightweight aggregate for concrete, mortar and grouts.

### Quality Assurance

ScotAsh products are manufactured under a total Quality Management System (QMS) that complies with the requirements of BS EN ISO 9001. The QMS is registered and audited by BSI.



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## Properties and Advantages of ScotAsh FBA

ScotAsh FBA has unique properties, which are summarised below.

### General

Because ScotAsh FBA comes purely from the burning of pulverised coal, the material is extremely clean with no contamination from other ashes, with very low dioxin, sulfate and carbon levels.

In fact Longannet and Cockerzie Power Stations use 'Gas for start up and support' not oil. This ensures no contamination of the FBA with hydrocarbons. This is particularly important when using it for a lightweight aggregate in blocks or concrete and when using it as a growing media.

### Grading

Due to the variation that can occur with by-products, an up-to-date particle size distribution can be obtained from ScotAsh.

Although the general size changes, all our FBA is extremely clean and 'Well graded'. This offers a number of advantages:

- A well-graded material is very easy to compact, therefore allowing benefits when using it as a fill material
- A material that is low on fine material and is therefore non-susceptible to frost heave

- Because of the lack of very fine material ScotAsh FBA is particularly free draining, giving additional benefits when using it as a fill material or using it as a base for growing turf or grass
- It is relatively easy to handle in most weather conditions.

### Density

ScotAsh FBA is particularly light and this can offer a number of benefits including low-density fill and 'value per tonne'.

### Chemical Properties

Please contact ScotAsh for up-to-date information.

## Applications

Furnace Bottom Ash (FBA) is a very versatile material with a multitude of uses. These can include:

### Lightweight Aggregate

The main market for FBA is as an aggregate in the manufacture of lightweight products for use in the building industry.

Indeed the demand for lightweight blocks for use in houses and industrial units is growing as a result of health and safety regulations relating to 'safe handling' on sites, and new rules relating to thermal insulation as specified under Part H of the Building Standard (Scotland) Regulations.

One of the main advantages of ScotAsh FBA is that fair faced blocks can be produced once the ash is screened.

As a lightweight aggregate Furnace Bottom Ash has been used successfully in Foamed Concrete for Trench Fill.

### Lightweight Fill Material

FBA has been used successfully as a structural lightweight fill material for many years.

It is particularly sought when settlement of the sub-grade is of concern in embankments on soft or poor ground conditions.

Furthermore, the design of abutments



ScotAsh FBA is used as a surface for turf laying

can be 'slimmed down' to take into account its lower density, resulting in potentially substantial savings of concrete.

### Drainage/Growing Media

The use of FBA as a free draining base and growing media has been given wider recognition over recent years.

Golf courses have, in particular, made use of these properties as a base for fairways and greens.

The requirement for housing developers to provide a grassed garden has led to further demand for FBA, as it can be placed easily and used to even out any irregularities in the sub-soil.

This then provides an ideal level surface on which to lay turf.

### Horse Arena Surface

Equestrian centres and horse arenas often require materials that are free draining and lightweight. When used on its own or mixed with sand or 'chopped rubber', FBA provides an excellent surface for indoor and outdoor arenas.

## Acceptable Granular Materials

Furnace Bottom Ash has been used successfully as a sub-base material and a granular capping material for road construction.

Also, when using PFA to construct a lightweight embankment, FBA is often used as a Granular Starter Layer:

Under the Specification for Highway Works, FBA can also be used as a Class 6E Selected Granular Fill Material for Stabilisation with cement.

## Health & Safety

FBA is not considered to be hazardous to health but it should be handled in accordance with good occupational hygiene and safety practices.

High concentrations of dust may cause irritation. It is recommended that Personal Protective Equipment is worn which includes eye protection, hand and skin protection and a dust mask.

To contact ScotAsh please telephone, fax or visit our website

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