

Health and Safety Information for Fly Ash and Furnace Bottom Ash (FBA), including cenospheres

Sustainable solutions for construction specialists

June 2011



Fly Ash and FBA are widely used in construction. Ash is virtually inert and non toxic, but care is required in its handling. This datasheet explains the health and safety profile of these materials and the safe working procedures necessary to avoid risk.

1. Identification of the Substance/Preparation and of the Company Undertaking

1.1 Identification of the substance/preparation

An odourless grey powder mainly insoluble in water. This datasheet applies to the following products:

- Fly Ash S
- Fly Ash N

1.2 Use of the substance/preparation

Used mainly as an addition to Portland cements.

1.3 Company identification

ScotAsh Limited
Longannet Power Station
Kincardine, Fife
FK10 4AA
email: info@scotash.co.uk

1.4 Emergency telephone

01259 730110

2. Hazard identification

2.1 Hazard characterisation

There is no known significant content of hazardous substances other than those risks that apply to any non-toxic dust. Fly Ash is not considered to be especially hazardous, but should be handled in accordance with good occupational hygiene and safety practices.

2.2 Primary route(s) of entry

Inhalation, Skin and Eyes: Yes

Ingestion: No, except in accidental cases

2.3 Human health

Inhalation: There is no clinical evidence of a significant risk of harm to the respiratory tract or lungs.

Eyes: If dust remains in contact with the eye then irritation will occur.

Skin: Current information suggests that there is no epidemiological evidence of a significant health risk associated with fly ash. However, when moist it is moderately alkaline and may contain small quantities of chromium (vi). Prolonged or repeated contact can cause abrasion, irritation and allergic dermatitis'

Ingestion: Unlikely to be a problem, no known adverse health effects on gastrointestinal system.



The packaging team at ScotAsh

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3. Composition/Information on Ingredients

3.1 Chemical composition

Fly ash is the by-product produced primarily from the combustion of pulverised coal in electricity generation power station boilers. The principal constituent of fly ash is a vitrified mixture of silicates and aluminates with small quantities of ferro-silicates, ferro-aluminates, alkalis, calcium oxide, magnesium oxide, sulfates and chlorides.

4. First Aid Measures

When contacting a physician, take this safety datasheet with you.

4.1 After significant accidental inhalation

Move person to fresh air. Dust in throat and nasal passages should clear spontaneously. Contact a physician if irritation persists or later develops or if discomfort, coughing or other symptoms do not subside.

4.2 After contact with eyes

Do not rub eyes, as additional cornea damage is possible by mechanical stress. Remove any contact lenses and open the eyelid(s) widely to flush eye(s) immediately by thoroughly rinsing with plenty of clean water for at least 45 minutes to remove all particles. If possible, use isotonic water (0.9% NaCl). Contact a specialist of occupational medicine or an eye specialist.

4.3 After skin contact

For dry fly ash, remove and rinse abundantly with water. Remove contaminated clothing, footwear; watches, etc, and clean thoroughly before re-using them. Seek medical treatment in all cases of irritation or burns.

4.4 After significant accidental ingestion

Do not induce vomiting. If person is conscious, wash out mouth with water and give plenty of water to drink. Get immediate medical attention or contact anti poison centre.

5. Fire-fighting Measures

5.1 Flashpoint and method

Fly ash is non-combustible and non-explosive and will not facilitate nor support combustion of other materials.

5.2 Extinguishing media

All types of extinguishing media are suitable.

5.3 Fire fighting equipment

Fly ash poses no fire-related hazards. No need for specialist protective equipment for fire fighters.

5.4 Combustion products – None.

5.5 Flammable limits: Lower explosion limit LEL – Upper explosion limit UEL – Not applicable.

6. Accidental Release Measures

6.1 Personal protective measures

Wear protective equipment as described under Heading 8 and follow the advice for safe handling and use given under Heading 7. Emergency procedures are not required.

6.2 Environment protection measures

Do not wash fly ash down sewage and drainage systems or into bodies of water (eg, streams).

6.3 Methods for cleaning up

Recover the spillage in a dry state if possible.

Dry fly ash: Use methods that do not cause airborne dispersion such as:

Vacuum cleaner (Industrial portable units, equipped with high efficiency particulate filters (HEPA filter) or equivalent technique).

Wipe up the dust by mopping, wet brushing or water sprays or hoses (fine mist to avoid the dust becoming airborne) and remove slurry. If not possible, remove by slurring with water (see Wet fly ash).

When wet cleaning or vacuum cleaning is not possible and only dry cleaning with brushes can be done, ensure that the workers wear appropriate personal protective equipment and prevent dust from spreading. Avoid inhalation of fly ash and contact with skin. Place spilled materials into a container before disposal as described under Heading 13.

Wet fly ash: Clean up wet fly ash and place in a container before disposal as described under Heading 13.

7. Handling and Storage

Do not handle or store near food and beverages or smoking materials.

7.1 Handling

Avoid creating airborne dust wherever possible. Where dust is generated



then engineering control measures should be considered to minimise airborne dust concentration.

7.2 Storage

Bulk fly ash should be stored in silos that are waterproof, dry (internal condensation minimised), clean and protected from contamination.

Engulfment hazard: To prevent burial or suffocation, do not enter a confined space, such as a silo, bin, bulk truck, or other storage container or vessel that stores or contains fly ash without taking the proper security measures. Fly ash can build up or adhere to the walls of a confined space. The fly ash can release, collapse or fall unexpectedly.

8. Protection Controls/Personal Protection

8.1 Exposure limit values (Workplace Exposure Limits (WEL)

WEL 8hr Time Weighted Average (TWA):

Total inhalable dust 10mg/m³

Respirable dust 4mg/m³

These figures are considered to be safe in view of the low percentage of crystalline silica present in the respirable fraction.

8.2 Exposure controls

8.2.1 Occupational exposure controls

General: Avoid creating airborne dust wherever possible. Where dust is generated then engineering control measures should be considered to minimise airborne dust concentration. Immediately after working with fly ash or fly ash containing materials, workers should wash or shower or use skin moisturisers. Remove contaminated clothing, footwear; watches, etc, and clean thoroughly before re-using them.

Respiratory protection: When a person is exposed to dust above exposure limits, use appropriate respiratory protection. It should be adapted to the dust

Protective



Another c



Personal Equipment should be worn when handling fly ash products



consignment of fly ash product is ready for delivery from our Fife headquarters

level and conform to the relevant EN standard. Suitable respiratory protection should be worn to ensure that personal exposure is less than the WEL.

Eye protection: Wear approved glasses or safety goggles according to EN 166 when handling dry or wet fly ash to prevent contact with eyes.

Skin protection: Use impervious, abrasion and alkali resistant gloves (made of low soluble Cr (VI) containing material), internally lined with cotton, boots, closed long-sleeved protective clothing and additionally skin care products (including barrier creams) to protect the skin from prolonged contact with wet fly ash.

8.2.2 Environmental exposure controls

According to available technology.

9. Physical and Chemical Properties

9.1 General information

Dry fly ash is a finely ground inorganic material (odourless, grey powder)

9.2 Physical data

Odour	Virtually none	
Particle Density (Specific Gravity)	1.8 to 2.4	
Solubility in water	Less than 2%	
Bulk Density	1.1 to 1.7 g/cm ³	
Alkalinity (pH)	9 to 12 when damp	
Boiling point/Boiling range	N/A	
Melting point/Melting range	N/A	
Flash Point	N/A	
Flammability & Auto Flammability	N/A	
Oxidising Properties	N/A	
Vapour Pressure	N/A	
Dielectric Constant	1.9 - 2.6	
EC Number	Ash Residues	268-627-4
	Cenospheres	300-212-6
CAS Number	Ash Residues	68131-74-8
	Cenospheres	93924-19-7
ACX Number	X1014150-5	

Basic Oxide Composition

Component	Average % by weight	Component	Average % by weight
SiO ₂	45-51	K ₂ O	1-5
Al ₂ O ₃	27-32	Na ₂ O	0.8-1.7
Fe ₂ O ₃	7-11	TiO ₂	0.8-1.1
CaO	1-5	*SO ₃	0.3-1.3
MgO	1-4	Cl	0.05-0.15

* Water soluble

10. Stability and Reactivity

10.1 Stability

Dry fly ash is stable as long as they are stored properly (see Heading 7) and compatible with most other building materials.

10.2 Hazardous decomposition products

Fly ash will not decompose into other hazardous by-products and does not polymerise.

11. Toxicological Information

11.1 Acute effects

Eye contact: Direct contact with fly ash may cause corneal damage by

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mechanical stress, immediate or delayed irritation or inflammation. Direct contact by larger amounts of fly ash may cause effects ranging from moderate eye irritation (eg, conjunctivitis or blepharitis) to ulceration.

Skin contact: Fly ash might cause irritant contact dermatitis in susceptible individuals.

Acute dermal toxicity: Limit test, rabbit, 24 hours contact, 2 000 mg/kg body weight – no lethality [Reference (2)].

Ingestion: Swallowing large quantities may cause irritation to the gastrointestinal tract.

Inhalation: The inhalation of small amounts of fly ash is unlikely to cause any significant reaction. Coughing, sneezing, and shortness of breath may occur following exposures in excess of occupational exposure limits.

11.2 Chronic effects

Extensive testing has shown fly ash to be non-toxic.

Carcinogenicity: A causal association between fly ash exposure and cancer has not been established [Reference (1)].

11.3 Medical conditions aggravated by exposure

Inhaling fly ash dust may aggravate existing respiratory system disease(s) and/or medical conditions such as emphysema or asthma and/or existing skin and/or eye conditions.

12. Ecological Information

12.1 Ecotoxicity

The product is not expected to be hazardous to the environment (LC50 aquatic toxicity not determined). The addition of large amounts of fly ash to water may, however, cause a rise in pH and may therefore be toxic to aquatic life under certain circumstances.

12.2 Mobility

Dry fly ash is not volatile but might become airborne during handling operations.

12.3 Persistence and degradability/Bio accumulative potential/Results of PBT assessment/Other adverse effects

Not relevant as fly ash is an inorganic material.

13. Disposal Considerations

13.1 Fly ash that has exceeded its shelf life

Disposal should be in accordance with current local and national legislation. Dispose of surplus product in a place authorised to accept builders' waste (non-hazardous materials landfill). Keep out of the reach of children.

13.2 Unused residue or dry spillage

Pick up dry. Mark the containers. Possibly reuse depending upon shelf life considerations and the requirement to avoid dust exposure.

13.3 Slurries

Avoid entry in sewage and drainage systems or into bodies of water (eg, streams) and dispose of as indicated in 13.4.

13.4 After addition of water

Dispose of according to the local legislation. Avoid entry into the sewage water system. Not classified as hazardous for transport.

14. Transport Information

Fly ash is not covered by the international regulation on the transport of dangerous goods (IMDG, IATA, ADR/RID) and therefore no classification is required. No special precautions are needed apart from those mentioned under Heading 8.

15. Regulatory Information

15.1 Classification and labelling of fly ash according to 1999/45/EC

Classification: Not classified

Risk phrases

Contains chromium (VI) may cause an allergic reaction
Contact with fly ash when present in a wet mixture with Portland cement may cause irritation dermatitis or burns

Safety phrases

Keep out of reach of children



Sales & Quality Manager Chris Bennett with another ScotAsh shipment

Do not breathe dust
Avoid contact with skin and eyes
In case of contact with eyes, rinse immediately with plenty of water and seek medical advice
Wear suitable protective clothing, gloves and eye/face protection

15.2 National legislation/requirements

CONIAC Health Hazard Information Sheet No. 26 (CEMENT)
Health and Safety at Work etc Act 1974
Control of Substances Hazardous to Health (Regulations)
HSE Guidance Notes EH26 (Occupational Skin Diseases – Health and Safety Precautions)
HSE Guidance Note EH40 (Workplace Exposure Limits)
Any authorised manual on First Aid by St. John's/St. Andrew's/Red Cross
Manual Handling Operations Regulations
Environmental Protection Act

16. Other Information

References

- (1) Portland Cement Dust - Hazard assessment document EH75/7, UK Health and Safety Executive, 2006. Available from: <http://www.hse.gov.uk/pubns/web/portlandCement.pdf>
- (2) Observations on the effects of skin irritation caused by cement, Kietzman et al, *Dermatosen*, 47, 5, 184-189 (1999).
- (3) European Commission's Scientific Committee on Toxicology, Ecotoxicology and the Environment (SCTEE) opinion of the risks to health from Cr (VI) in cement (European Commission, 2002).
- (4) Epidemiological assessment of the occurrence of allergic dermatitis in workers in the construction industry related to the content of Cr (VI) in Cement, NIOH, Page 11, 2003.

The information on this datasheet reflects the currently available knowledge and is reliable provided that the product is used under the prescribed conditions and in accordance with the application specified on the packaging and/or in the technical guidance literature. Any other use of the product, including the use of the product in combination with any other product or any other process, is the responsibility of the user. It is implicit that the user is responsible for determining appropriate safety measures and for applying the legislation covering his own activities.

To contact ScotAsh please telephone, fax or visit our website

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