



AD1

Abrasion & corrosion resistant lining compound

"Enhancing the performance of our customers plant and equipment."

FOR USE IN POWER STATIONS



Abrasive wear is one of the greatest problems to be overcome by the maintenance engineer in power stations, coal preparation plants and many other industrial situations where abrasive materials are handled.

AD1 is a specially formulated epoxy resin with a calcined bauxite filler, developed expressly to assist the engineer in such circumstances. Bauxite is one of the hardest natural materials known and a selection of graded sizes are used to form a well filled composite material. The

resin bonds the particles of bauxite together to create a hardwearing liner when applied to coal chutes, banks, cyclones, PF pipework and similar items. Until the AD1 sets it is comparatively soft and completely pliable, so that it can be used to line special shapes where other forms of lining would be too costly or difficult to apply. In pneumatic transportation systems- such as PF pipework - the rate of erosion can be very high due to tight radius bends necessary for pipework layout and the velocities required for transportation. Velocities in excess of 20m/ s create the greatest erosion problems when combined with impingement angles above 10°.

Two types of wear occur on metal surfaces: a ductile material suffers a cutting action from abrasive particle impaction whereas a brittle material suffers deformation and pieces of material breaking away. Both types create valleys and ridges in homogeneous materials resulting in concentrated erosion, so that holes ultimately appear.

AD1 has a hard material embedded in a resilient bonding agent, which absorbs impaction and wears evenly over a larger area, resulting in longer life for a given thickness of lining. The flexibility of the material is such that these areas of erosion can be filled in and molded to shape,

laboratory tests have shown that AD1 has more that double the life of mild steel and 61% of the life of ni-hard cast iron. The tests were carried out on 1/2" diameter samples, but in practice it is found that it has a life of 90% that of ni-hard. This is due to the heavy concentration of erosion in the "valleys" on ni-hard while the erosion on AD1 is more evenly spread.

AD1 has approximately the same density as aluminum and only 1/3 rd that of ni-hard. This gives it the added advantage that a 10mm mild steel pipe lined with AD1 is between 65% and 70% of the weight of an equivalent pipe with ni-hard liner. In changing over to lined pipework existing support steelwork need not be modified and strengthened since pipes lined with AD1 are lighter.

In top outlet casings and classifiers of P.C. mills AD1 has been used successfully to triple the running hours obtained, so reducing man hours spent on maintenance and, more importantly reducing overall plant downtime. The life of the mill top casing has been extended to coincide with the major overhaul of the mill, thus eliminating two intermediate shutdowns. Repairs, when required, are very low cost, since the old AD1 lining does not have to be

removed. Cleaning and inspection need only be carried out before applying new material. Repairs can cost as little as 20% of the cost of the original item.



Enhancing Performance

FOR CIVIL ENGINEERING APPLICATIONS

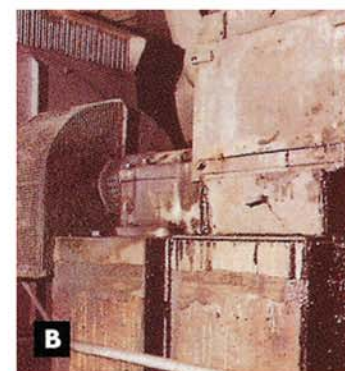
AD1 lining Compound has a very high compressive strength. A mean value of 73 N/mm² was obtained in tests carried out at Manchester University.

where a rough, wear resistant floor is required, AD1 lining Compound is ideal. photo (A) is the fuel store floor in a modern nuclear power station where heavy loads are transported on fork-lift trucks with small diameter solid wheels. The AD1 floor can withstand the heavy point of loading and crushing action of the wheels. The material had to pass stringent decontamination tests for this application. The 3.3kv switchroom floor was also lined with 6mm AD1 to eliminate the same problem of high point loading and surface crushing. The cable race floor was built up as necessary and completely sealed with AD1 resins. A special formulation was used to achieve the required colouring, see photo (C).

photo (B) is a concrete plinth which had been breaking up periodically with the excessive vibrations being sustained on a pulverised fuel

tube ball mill drive assembly. The concrete was dressed back to sound material and the AD1 was poured up to a depth of 12" to reinstate the plinth to the original height. 24 hours later the maintenance department were able to commence reassembly and alignment of the drive assembly and the AD1 was 100% cured when the unit was returned to service. The P.F. mill has now been in service for numerous years with satisfactory results. It has also been noted that the drive assembly runs considerably quieter due to the resilience of the AD1 compound absorbing vibration.

Concrete hoppers where the reinforcing bars were exposed due to heavy impact erosion have been refurbished with AD1 lining compound up to 75mm thick and are still satisfactory after numerous years in service. In addition the glazed finish eliminated 'hang up', hence providing maximum bunker capacity. Concrete surface repairs, grouting and bedding of construction piles are some of the other applications where AD1 compound has been used successfully in civil engineering.



FOR COAL PREPARATION

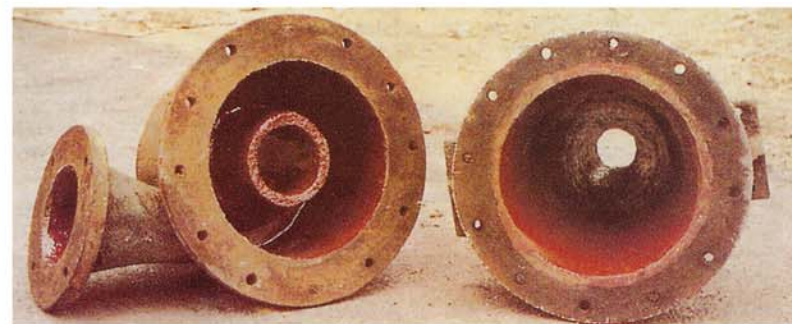
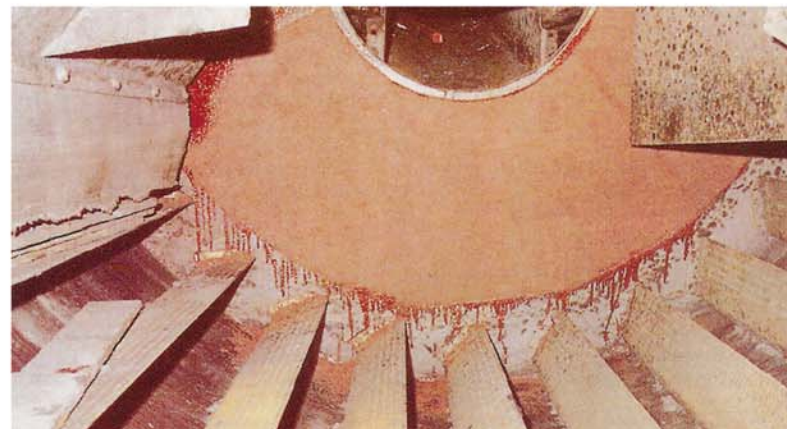


AD1 lining compound is used extensively throughout the mining industry in the protection of Coal Preparation plants against corrosion and erosion.

There are various applications of the product such as:

- 1) AD1 Resin only (i.e. aggregate free) for corrosion protection.
- 2) AD1 lining Compound (unglazed) for corrosion protection where mild erosion may be experienced such as a low volume of fines in suspension. The lining is generally applied 6mm thick.
- 3) AD1 lining Compound with a glaze finish which is mainly used where erosion rather than corrosion are the criteria. The application is usually 6mm thick, but can be increased to any desired thickness to

The application most commonly used in the mining industry is 6mm thick with a glaze finish. The lining provides almost triple the life of that obtained from the equivalent thickness of unglazed AD1 where erosion is the greatest problem. The handling of magnetite is one of the greatest problems experienced in coal preparation plants. Many years of service have now been obtained in head tanks, magnetic separator chutes, vacuum drum filled troughs and pipework handling magnetite, which have been lined with AD1 lining Compound. Excellent erosion protection has been provided in slurry tanks, wash boxes, drum separators, underpans and launders with 6mm of AD1 lining in cyclones and other items suffering from severe erosion conditions, the lining application varies in thickness to replace eroded metal and refurbish the items to the original dimensions to prevent interference with the designed performance.





FOR GENERAL APPLICATIONS



AD1 lining Compound has been used in many industries to combat erosion and corrosion. The applications vary from corrosion protection of road tanker chassis to the protection of sewage pipework, and erosion resistant lining of underpans and chutes in the gypsum industry to pump casing linings in the chemical industry. Some industries which have benefited from the use of AD1 Lining Compound are:

- The Steel Industry
- Transport
- Sewage
- Cement
- Sand Quarries
- Aluminum Smelting
- Paper
- Chemical
- Power

AD1 lining Compound is such a versatile material and being a moldable composition is an ideal standby in maintenance department stores.



"Enhancing the performance of our customers plant and equipment."



Enhancing Performance

Abrasion & Corrosion Resistant Lining Compound

AD 1 TECHNICAL INFORMATION

PACKAGING

AD1 Compound is supplied in 381b (17.2Kg). single packs or on fifty pack pallets (Approx 900Kg). AD1 Resin/Hardener is supplied in two-tin sets:

- A. 2.5 litre pack (3Kg approx per pack)
- B. 10 litre pack (12Kg approx per pack)
- C. 500 litre pallet packs (650Kg approx per pallet)

COVERAGE

Each pack of AD1 Compound will cover 1 square metre at 6mm thick.

Each 2.5 litre pack of Resin/Hardener will completely glaze 1 square metre of 6mm thick laid compound. Less is required for thicker deposits. please consult our technical department.

For corrosion resistance each 2.5 litre pack of Resin/Hardener will cover 7 to 12 square metres of plain steel surface, depending on application temperature.

TEMPERATURE LIMITATION /CURING TIMES

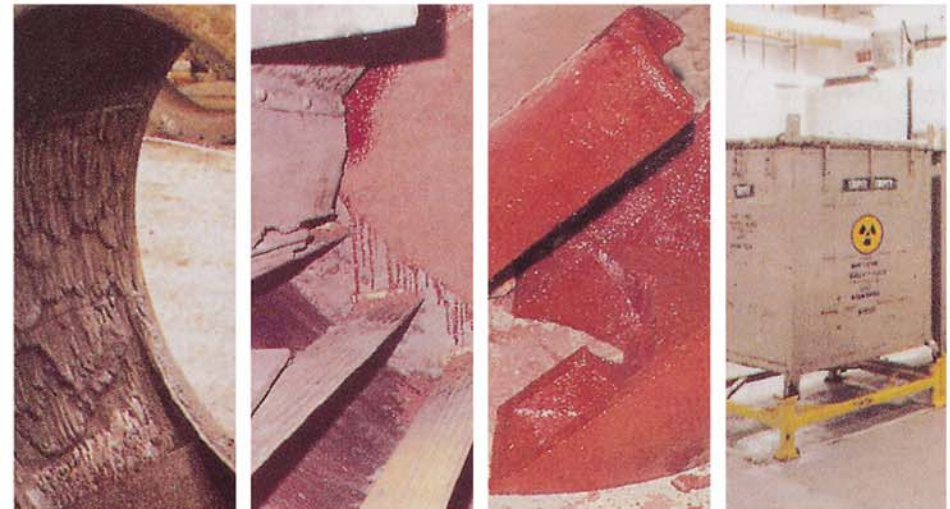
AD1 compound is suitable for applications up to 100°C.

The Compound will harden in 4 hours at 21°C; at 32°C in approx 2 hours. plant lined can be operated 12 hours after lining. Approx 95% cure is attained after 24 hours and maximum curing is achieved in 7 days.

DENSITY

AD1 glazed Compound has a density of 2.275g/cc.

For complete application instructions see separate data sheet or instructions included with the pack.



"Developing solutions"

AD1 TECHNICAL INFORMATION

CHEMICAL RESISTANCE OF AD 1 RESIN

(Test pieces were cured for 7 days and immersed in a solution at ambient temperature. Inspections were carried out after 3, 6 and 12 months.)

Acetic Acid (up to 10%)	G	Cyclohexanol	U	Magnesium Chloride	G	Sodium Bisulphite	F
Acetic Acid (above 10%)	P	Detergent Solution 5%	G	Mineral Oil	G	Sodium Dichromate	F
Alum	E	Ethylene Glycol	U	Nitric Acid 10%	F	Sodium Hydroxide 40%	E
Ammonium Bisulphate	F	Ferric Chloride	F	Nitric Acid 30%	P	Sodium Nitrate	G
Ammonium Chloride	G	Ferric Sulphate	G	Paraffin	G	Sodium Phosphate	G
Ammonium Nitrate	G	Formic Acid (up to 10%)	P	Petrol	F	Sodium Sulphite	F
Ammonium Sulphate (10% soln)	E	Formic Acid (above 10%)	U	phenol	P	Sulphuric Acid 10%	G
Animal Fats	G	Formaldehyde (37%)	G	Phosphoric Acid 10%	F	Sulphuric Acid 30%	G
Benzene	P	Glucose	G	Potassium Cyanide	U	Sulphuric Acid (above 30%)	U
Butanol	P	Glycerine	G	Potassium Dichromate	F	Toluene	P
Carbonic Acid	G	Hydrochloric Acid 10%	E	Potassium Hydroxide 10%	G	Triethanolamine	G
Carbon tetrachloride	U	Hydrochloric Acid 20%	G	Potassium Nitrate	G	Turpentine	P
Chlorine Gas	U	Hydrochloric Acid 30%	F	Potassium Sulphate	G	Zinc Chloride	F
Chrome Plating Solution	U	Hydrofluoric Acid 20%	P	Sea Water	E	Zinc Sulphate	F
Copper Sulphate	F	Lactic Acid 5%	P	Sewage	G		
Creosote	U	Lead Nitrate	G	Sodium Bisulphate	G		

E - Excellent, virtually unaffected.

G - Good, some discolouration of surface due to slight attack.

F - Fair, suitable for limited contact only.

P - Poor, severe attack, suitable only for intermittent contact splashing which must be removed quickly.

U - Unsuitable, severely attacked or disintegrated.

All information is based on results gained from experience and tests and is believed to be accurate, but is given without acceptance of liability for loss or damage attributable to reliance thereon as conditions of use lie outside our control. No statements shall be incorporated in any contract unless expressly agreed in writing, nor construed as recommending the use of any product in conflict of any patent.



Enhancing Performance



The Greenbank Group UK

Incorporating:

Greenbank Terotech

Greenbank Materials Handling

GAIM

Head Office:

Hartshorne Road

Woodville

Derbyshire DE11 7GT

United Kingdom

Tel: +44 (0)870 607 8880

Fax: +44 (0)870 607 8889

Web: www.greenbankgroup.com

Email: info@greenbankgroup.com



INVESTOR IN PEOPLE

