Resources and Heavy Industry Protection Systems

Asset protection in extreme environments

EpiMax 222

EpiMax 222AR

EpiMax 330

EpiMax 333AR

EpiMax 465

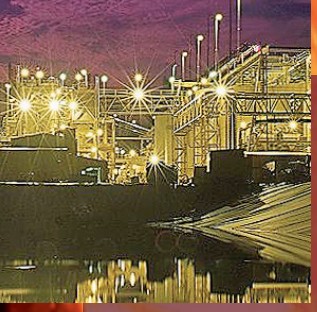
EpiMax 480

EpiMax 480UT

EpiMax 655

FlueGard 225-SQC

EpiMax



What needs to be considered in the selection of a concrete protection system for Extreme Environments?

• Background - what is extreme?

Concrete, carbon steel, even stainless steel, can deteriorate rapidly in many hostile industrial environments. The CAT (corrosive, abrasion and thermally hot) environment in cement plants, steel plants, mineral processing, refineries, smelters, power generation plants, glass plants, waste incinerators and the refractory industry can be very demanding.

For example, the flue gases found in these environments contain SO_3, SO_2, HCl, CO_2, NO_x and particulate matter. They are extremely corrosive and abrasive. And they are hot.

Structures such as bag houses, stacks, fans, ducts, rotary kilns and their foundations require extreme protection.

"Hot corrosion" is a general term for "high temperature corrosion"; it includes high temperature oxidation, sulphidation and carbonization.

New ceramic based alloys are available for these demanding applications.

• Design life - budget compliance

The first important question to ask when selecting a new protection system is - What is the required design life – 2, 5, 10 or 20 years? And, is frequent or regular maintenance feasible?

The CAT environment requires careful consideration. If nothing is done, corrosion will cost in terms of maintenance, down time, and efficiency.

If the wrong solution is chosen, it will again cost in maintenance, down time, and efficiency.

The specification must meet the agreed design life and the intended maintenance-free period.

• Management of surface preparation during application

This is the basic foundation of any protection system. Preparation process must be effective and consistent. Inadequate surface preparation is a leading cause of premature failure.

• Inherent chemical resistance requirement

The particular chemical environment needs to be identified and understood. Steel and concrete are widely used engineering materials. However whilst strong in certain mechanical aspects, unprotected, they are extremely susceptible to a wide variety of chemical attack.

The specification for any protection system must address the specific chemical resistance requirements.

EpiMax offers a range of protection systems engineered for specific project requirements.

• Abrasion resistance

The specification for any protection system must address the abrasion performance requirements including impact and abrasion resistance.

Any protection system applied must exhibit excellent adhesion and have a bond strength that is maintained over the life of the system.

• Thermal resistance

The specification for any protection system must address the thermal performance requirements including impact and abrasion resistance.

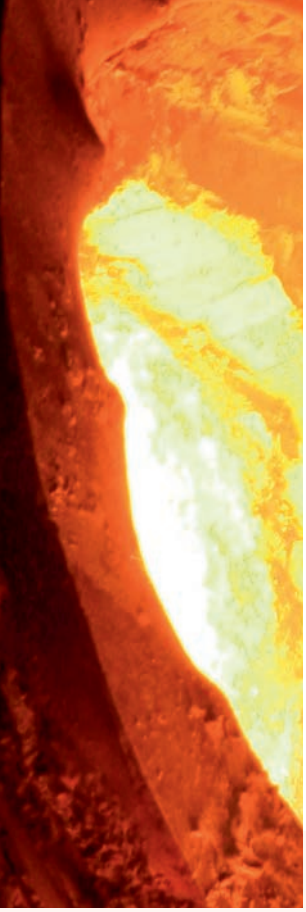
Any protection system applied must exhibit excellent adhesion and have a bond strength that is maintained over the life of the system.

• Practical application characteristics

The particular needs of the structure including the practical aspects of access and application are important considerations in any project.

EpiMax supplies protection systems that can be applied by spray or roller in thicknesses of 150 – 3000 microns per pass. Trowel applied systems can achieve 75 mm thickness.

EpiMax



***Concrete is an excellent** engineering material. It has been used to build all types of structures for many centuries. It has proven to be extremely versatile and exhibits good strength in compression.*

However unprotected concrete has very limited chemical and abrasion resistance.

Concrete structures in the resources and heavy industry sector are subjected to some of the harshest environments known. Many structures in these industries must resist a powerful combination of forces including those of chemical, abrasive impact and thermal action. Processing chemicals can easily penetrate porous, unprotected concrete surfaces. Corrosive chemicals not only penetrate but quickly attack concrete, but if they leak, splash, or spill onto floors, drains, bunds, walls or other concrete infrastructure, premature failure will occur. In addition, chemicals can pass through the concrete slab into the soil below, eventually reaching groundwater under the facility.

Abrasive impact can rapidly damage concrete. Wear on concrete floors, due to lift truck activity, skidding, scraping and sliding is abrasive. It causes a breakdown of the concrete leading to the formation of further abrasive particles which accelerate the damage. High temperatures accelerate the chemical deterioration of concrete. Chemical activity is temperature dependent. In hotter environments, concrete needs even more protection.

EpiMax is your source for the latest proven developments in performance protection systems. This is all we do. Our systems build on break-through technologies (extreme chemically resistant third generation epoxy novolac chemistry, high performance water based chemistry, new polyaspartic chemistry).

At EpiMax we pride ourselves in the chemical technology of the systems we offer, the knowledge value involved in their use and our overall responsiveness.

EpiMax has built its reputation on a construction engineering foundation. Our experience has been forged on an impressive variety of civil, environmental, industrial, mining, defence and general services construction.

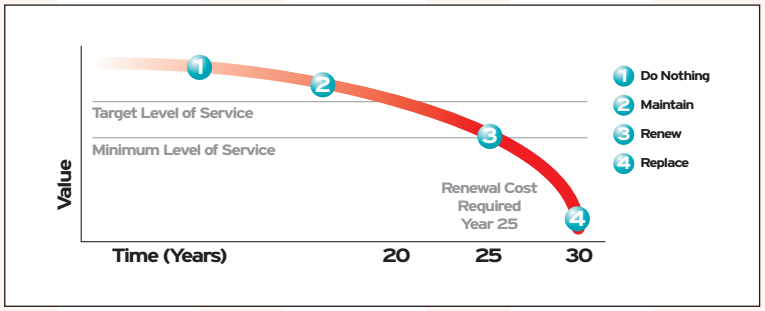
This success has been proven through partnerships with forward-thinking architects, consultants, engineers, application contractors, project managers and materials testing agencies. We believe in teamwork, respect and integrity.

Our primary focus is

- Floor Protection Systems
- Industrial Concrete Protection Systems
- Green Star Protection Systems
- Water and Wastewater Processing Protection Systems
- Foundation Protection Systems
- Extreme CAT (Corrosion, Abrasion and Thermal) Protection Systems

EpiMax: Expertise Applied, Answers Delivered

Typical Asset Depreciation

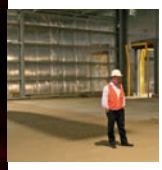


Applications

Typical industries include:

- ***Chemical containment***
- ***Mine maintenance facilities***
- ***Waste processing facilities***
- ***Chemical plants***
- ***Power generation***
- ***Steel plants***
- ***Cement plants***
- ***Smelting operations***
- ***Battery recycling***
- ***Oil and gas industry***
- ***Automotive industry***
- ***Foundries***
- ***Metal refineries***
- ***Waste water treatment facilities***
- ***Glass factories***

Concrete Resurfacing
EpiMax 222



Exceptional two-pack solventless epoxy resurfacing system demonstrating excellent adhesion and general durability.

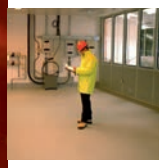
- Trowel application to 5+ mm
- Resistant to a wide range of industrial chemicals
- Tough and abrasion-resistant; excellent for heavy traffic
- Certified traction levels available
- Ideal for maintenance workshops and processing areas

EpiMax 222AR

A two-pack solventless epoxy resurfacing system demonstrating excellent acid resistance and mechanical durability.

- Trowel application to 5+ mm
- Resistant to splashes and spills of mineral acids etc
- Selected for harsh industrial and mining applications
- Certified traction levels available
- Non flammable application

EpiMax 465



This system offers excellent thermal shock resistance and resistance to abrasion, mechanical stress and mid range chemical action. Installation is fast and placement is easy.

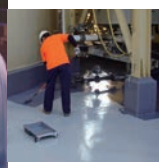
- Typically applied at between 4 – 5 mm
- Fast application – minimal downtime
- Extreme mechanical performance
- Excellent thermal shock resistance
- Good chemical resistance

Concrete Coating
EpiMax 330

New two-pack solventless high build epoxy protection system demonstrating excellent adhesion and general durability.

- Roller or airless spray application to 500 microns
- Resistant to a wide range of industrial chemicals
- High abrasion resistance
- Variable slip resistance available
- Wide range of colours
- Express grade available

EpiMax 333AR



A two-pack high solids novolac coating system demonstrating outstanding chemical resistance and adhesion.

- Roller or airless spray application to 300 microns in two coats
- Highly resistant to splashes and spills of mineral acids etc
- Selected for harsh industrial and mining applications
- Variable slip resistance available in flooring applications
- Potable water approved

EpiMax 655

A two-pack solventless epoxy coating system specially formulated and proven for UHB (ultra high build) application to all forms of concrete structures.

- Fast, airless spray, single coat application to 3000 microns on vertical surfaces
- Resistant to a wide range of industrial chemicals
- Selected for harsh industrial and mining applications
- Modified with high performance ceramic for enhanced abrasion resistance
- Used for high strength resurfacing projects

FlueGard 225-SQC

Exceptional two-pack polymeric alloy systems for corrosive, abrasive environments at high temperature.

- Airless spray application to 500 microns per coat
- Resistant to HCl, SO_3, SO_2, CO_2 and NO_x
- Ultra hard - highest abrasion resistance
- Excellent performance to 225ºC
- Ideal for concrete and steel in hot, corrosive environments

Foundation Protection

EpiMax 480

Precision high strength fast cure non-shrink epoxy based grouting system offering ease of field use. Excellent resistance to vibration and chemicals. Tolerates damp surface application.

- Excellent flow into fine voids – fast and convenient
- Good strength gain
- High mechanical strength
- Dynamic load resistant; creep resistant
- Withstands wide range of chemicals

EpiMax 480UT

Precision high strength ultra long life epoxy based grouting system offering ease of field use. Excellent resistance to vibration and chemicals. Tolerates damp surface application.

- Excellent flow into fine voids - five hour work time
- Suitable for deep pours
- High mechanical strength
- Dynamic load resistant; creep resistant
- Withstands wide range of chemicals

Test Methods

AS/ISO 9239.1 2003
Reaction to Fire Tests for Flooring.
Critical Radiant Flux Energy.

To meet the Building Code of Australia, floor materials and floor coverings meet certain minimum Critical Radiant Flux (CRF) energies, and for non sprinklered buildings, a maximum smoke development rate.

The test method for these tests involves heating the horizontal test sample along its length with a radiant panel and then igniting it at the hot end. The sample is allowed to burn until the flame goes out (extinction). The heat energy measured at the point of extinction is the Critical Heat Flux (CHF), also called the Critical Radiant Flux (CRF) in the Building Code of Australia.

Smoke is measured over the duration of the test. The total amount of light extinction (measured as a percentage) due to the smoke obscuring a light beam in the flue is multiplied by the time of the test to give the result (in percent minutes).

The range of EpiMax Resources and Heavy Industry Flooring Systems have been tested to AS/ISO 9239.1 2003.

AS/NZS 4586:2013
Slip resistance classification of new pedestrian surface materials.

This Standard provides means of classifying flooring systems according to their frictional characteristics when determined in accordance with the test methods included. These test methods enable characteristics of surface materials to be determined in either wet or dry conditions.

The test methods in this Standard shall be used for the classification of pedestrian surface materials for use in either the wet or the dry condition.

The inclining ramp test methods are suitable for measuring the slip resistance of gratings, heavily profiled surfaces and resilient surfaces within the test laboratory environment.

In the field, the most commonly accepted and specified method of measuring slip resistance is by use of the TRL Pendulum Tester incorporating a rubber slider.

The range of EpiMax Resources and Heavy Industry Flooring Systems have been tested to AS/NZS 4586:2013.

HB 198 An introductory guide to the slip resistance of pedestrian surface materials.

This Handbook provides guidelines for the selection of slip-resistant pedestrian surfaces classified in accordance with AS/NZS 4586. It recommends the minimum floor surface classifications for a variety of locations, and includes a commentary on the test methods set out in AS/NZS 4586, as well as information on the consideration of ramped surfaces. Published in conjunction with the CSIRO.

Environmentally sustainable

Resistance to abrasion and impact

Durable

High adhesion

Resistance to chemicals

Resistance to temperature

EpiMax

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