

Embedded Galvanic Anode Units with 2G Technology™

Description

The Galvashield XP range of embedded galvanic anode units utilise an innovative zinc anode core design surrounded by an enhanced formulated cement-based mortar to provide corrosion mitigation to reinforced concrete structures. The anode units are alkali-activated (Type A) with an internal pH of 14 or greater to keep the zinc active over the life of the anode while being non-corrosive to reinforcing steel. The anode units utilise 2G Technology™ to provide higher current output. Once installed, the zinc anode corrodes preferentially to the adjacent reinforcing steel, thereby providing galvanic corrosion prevention or corrosion control.

Applications

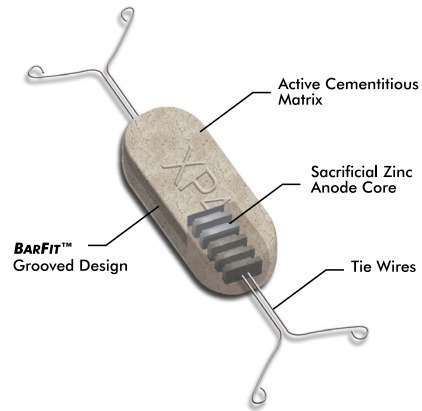
- Mitigates incipient anode formation (halo effect) in patch repair applications
- Bridge widening and other structure modifications
- Slab replacements, expansion joint repairs and other interfaces between new and existing concrete
- Repair of prestressed and post-tensioned concrete
- Chloride contaminated or carbonated concrete

Advantages

- Proven technology - Galvashield has an extensive 10 year track record in the field
- Type A anode - alkali-activated to maintain activity of zinc while being non-corrosive to reinforcing steel
- Cast zinc core - provides high anode utilisation in addition to a secure long-term connection between the zinc and the lead wires
- Integral steel lead wires - allows for quick and convenient anode installation. Provides dependable steel-to-steel contact with no intermediate materials such as galvanising (which can corrode over time) that may compromise the long-term electrical connection
- BarFit™ design - grooved edges on Galvashield XP2 and XP4 anode units assist with secure anode placement
- Economical - provides localised protection where it is needed the most, at the interface of the repair and the remaining contaminated concrete
- Versatile - can be used for both conventionally reinforced and prestressed or post-tensioned concrete
- Low maintenance - requires no external power source or system monitoring
- Long lasting - 10 to 20 year service life* reduces the need for future repairs

*As with all galvanic protection systems, service life and performance is dependent upon a number of factors

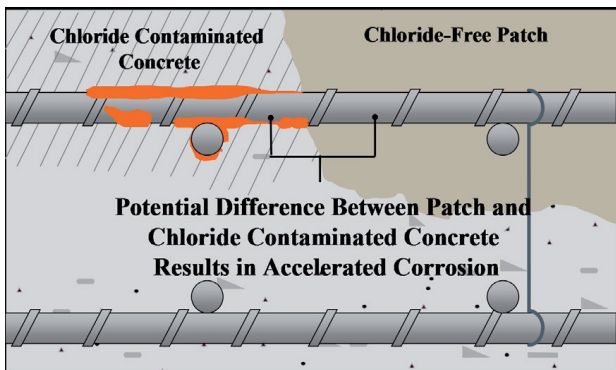
including reinforcing steel density, concrete conductivity, chloride concentration, humidity and anode spacing.



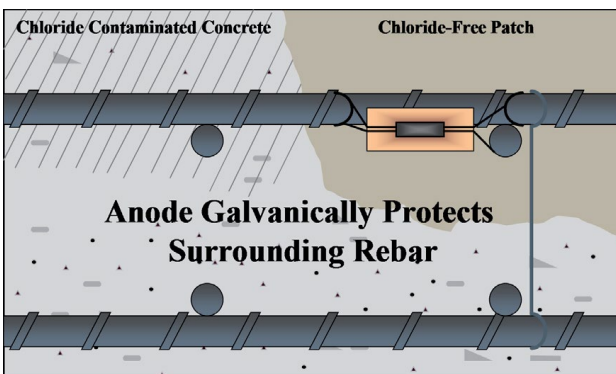
Level of Protection	Description	Galvashield
Corrosion Prevention	Mitigates initiation of new corrosion activity	XP/XPT XP2/XP4
Corrosion Control	Reduces ongoing corrosion activity	XP2/XP4
Cathodic Protection	Reduce or eliminate ongoing corrosion activity	

Specification Clause

Embedded galvanic anodes shall be pre-manufactured with [add zinc mass] of zinc in compliance with ASTM B6 Special High Grade cast around a pair of steel tie wires in compliance with bright annealed ASTM A82 and encased in a highly alkaline cementitious shell with a pH of 14 or greater. The cementitious shell shall contain no added sulphate nor shall it contain chloride, bromide or other constituents that are corrosive to reinforcing steel. Anode units shall be supplied with integral unspliced wires with loop ties for tying to the reinforcing steel.



“Ring Anode” Corrosion (without Galvashield XP)



Galvashield XP prevents “Ring Anode” Corrosion

How does it work?

When two dissimilar metals are coupled together in an electrolyte (in this case concrete), the metal with the higher potential for corrosion (zinc) will corrode in preference to the more noble metal (reinforcing steel). Galvashield XP-type anodes are embedded in concrete repairs to provide corrosion prevention or corrosion control to the reinforcing steel in the adjacent area.

Product Comparison

Product Name	Anode Class	Anode Dimension (nominal)	Zinc Mass (g)
Galvashield XPT	Type AP	25mm x 125mm x 25mm	60
Galvashield XP	Type AP	65mm (dia.) x 30mm	60
Galvashield XP2	Type AC	65mm x 80mm x 30mm	100
Galvashield XP4	Type AC	65mm x 120mm x 30mm	160

Anode Class

First Letter Activation Method (A-Alkali)
Second Letter Application (P-Corrosion Prevention)
 (C-Corrosion Control)

Application Instructions

Installation

Concrete shall be removed from around and behind all corroding rebar in accordance with good concrete repair practice such as ACRA guideline HB84-2006, Section 6. Exposed reinforcing steel should be cleaned to remove all residual rust and concrete residue.

The anode units and repair material should be installed immediately following preparation and cleaning of the steel reinforcement. The location and spacing of the units shall be as specified by the designer (refer to design criteria). The units can be placed around the perimeter of the repair or on a grid pattern to protect a second layer of steel if required.

Securely fasten the anode units from the side or beneath the exposed rebar as close as practical to the surrounding concrete (preferably within 100 mm) while ensuring that enough space remains to fully encapsulate the unit in the repair. The minimum cover of the repair material over the units should be 20 mm.

When required, the steel reinforcement, other than where the anodes are attached, should be primed immediately following attachment of the Galvashield XP with a 135 micron (wft) continuous coating of Nitoprime Zincrich.

Over painting with the bonding agent or reinforcement primer, onto the surface of the Galvashield XP unit must be avoided.

Anode-to-steel continuity and steel-to-steel continuity within the patch should be verified with an appropriate meter; discontinuous steel should be tied to continuous bars using steel tie wire and re-tested. A value between 0 and 1 ohm should be achieved.

Repair Materials

For optimum performance, use a repair material with resistivity less than 15,000 ohm-cm. If a higher resistivity repair material is to be used or if the resistivity of the material is unknown, pack Renderoc HB40 or HB70 between the anode unit and the substrate to provide an ionically conductive path to the substrate.

Prior to placing the repair material, pre-wet the concrete substrate and the anode units to achieve a saturated surface dry condition, then complete the repair. Do not soak the anode units for greater than 20 minutes.

Precautions

Galvashield XP-type anode units are intended to provide localised corrosion prevention or corrosion control and do not address or repair structural or concrete damage. Where structural damage exists, consult a structural engineer. To provide protection to a broader area, install Galvashield CC anode units on a grid pattern or consult Parchem for further product recommendations.

Galvashield® XP Range

Supply

Galvashield XP	20 units per box	5.2 kg
Galvashield XPT	30 units per box	6.4 kg
Galvashield XP2	20 units per box	5.9 kg
Galvashield XP4	20 units per box	9.5 kg

Storage

Store in dry conditions in the original unopened box. Avoid extremes of temperature and humidity.

Design Criteria

Maximum Anode Spacing for Low to Moderate Corrosion Risk (Chloride Content < 0.8% or Carbonated Concrete)			
Protection Level	Corrosion Prevention		Corrosion Control
Galvashield Anode	XP or XPT	XP2	XP4
Steel Density Ratio	Anode spacing (mm)	Anode spacing (mm)	Anode spacing (mm)
<0.3	750	750	750
0.31 - 0.6	600	700	700
0.61 - 0.9	500	650	550
0.91 - 1.2	450	550	450
1.21 - 1.5	400	500	425
1.51 - 1.8	350	450	375
1.81 - 2.1 3	300	425	350
Maximum Anode Spacing for High Corrosion Risk (Chloride Content 0.8% to 1.5%)			
Protection Level	Corrosion Prevention		Corrosion Control
Galvashield Anode	XP or XPT	XP2	XP4
Steel Density Ratio	Anode spacing (mm)	Anode spacing (mm)	Anode spacing (mm)
<0.3	600	750	600
0.31 - 0.6	500	600	500
0.61 - 0.9	400	500	400
0.91 - 1.2	350	450	350
1.21 - 1.5	250	400	250
1.51 - 1.8	200	350	200
1.81 - 2.1	175	300	150

For extremely high corrosion risk applications (> 1.5% Chloride), contact Parchem for assistance.

Note: Chloride content is based on percent by weight of cement.

*Maximum grid dimensions are based on typical conditions. Spacing should be reduced as appropriate for severe environments or to extend the expected service life of the anode.

Important notice

A Safety Data Sheet (SDS) and Technical Data Sheet (TDS) are available from the Parchem website or upon request from the nearest Parchem sales office. Read the SDS and TDS carefully prior to use as application or performance data may change from time to time. In emergency, contact any Poisons Information Centre (phone 13 11 26 within Australia) or a doctor for advice.

Product disclaimer

This Technical Data Sheet (TDS) summarises our best knowledge of the product, including how to use and apply the product based on the information available at the time. You should read this TDS carefully and consider the information in the context of how the product will be used, including in conjunction with any other product and the type of surfaces to, and the manner in which, the product will be applied. Our responsibility for products sold is subject to our standard terms and conditions of sale. Parchem does not accept any liability either directly or indirectly for any losses suffered in connection with the use or application of the product whether or not in accordance with any advice, specification, recommendation or information given by it.

Shelf life

12 months.

Health and Safety

As with all cement-based materials, contact with moisture can release alkalis which may be harmful to exposed skin. Galvashield XP should be handled with suitable gloves and other personal protective equipment in accordance with standard procedures for handling cementitious materials. Additional safety information is included in the Material Safety Data Sheet.

