

Type 1A Embedded Galvanic Anodes for Concrete Repair

Description

The Galvashield® XP range of embedded galvanic anodes are used to mitigate ring anode corrosion when repairing reinforced concrete structures. Designed for optimum performance and ease of installation, the alkali-activated (Type 1A) anodes are comprised of high purity zinc cast around a steel tie wire with an enhanced formulated cement-based mortar with an internal pH of 14 or greater that keeps the zinc active over the life of the anode. The Galvashield® XP range of anodes utilize the contractor-friendly One-and-Done™ single-wire connection. Once installed, the zinc anode corrodes to provide galvanic corrosion prevention or corrosion control to adjacent reinforcing steel.

Applications

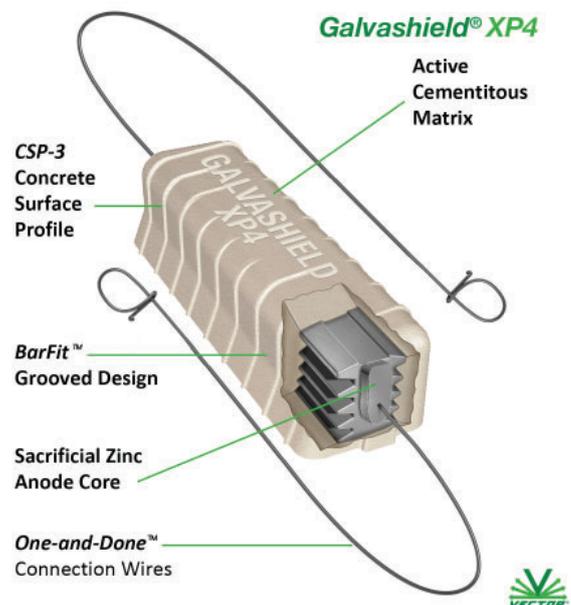
- Mitigates ring anode formation (halo effect) in patch repair applications
- Bridge widening and other structure modifications
- Slab replacements, expansion joint repairs and other interfaces between new and existing concrete
- Repair of prestressed and post-tensioned concrete
- Chloride contaminated or carbonated concrete
- Repair of structures with epoxy-coated rebar
- Extends the life of concrete repairs
- Extends the life of joint repairs

Advantages

- Proven technology - Galvashield® is the original embedded galvanic anode with an extensive 20-year track record.
- Independent testing - indicates concrete repair service life can be extended by more than 400%.
- Type 1A anode - alkali-activated to maintain activity of zinc; meets building code requirements that prohibit intentionally added constituents that are corrosive to reinforcement within repair area.
- One-and-Done™ connection innovative single wire connection can be installed up to 2x faster than the traditional two wire connection, saving 50% on installation labor cost.
- Cast zinc core - provides high anode utilization and a secure long-term connection between the zinc and the integral lead wire.
- BarFit™ design - grooved edges on Galvashield® XP2 and XP4 anodes assist with secure anode placement.

- Steel connection wires - Provides dependable steel-to-steel contact with no intermediate materials such as galvanizing that may compromise the long-term electrical connection.
- Economical - provides localized protection where it is needed the most, at the interface between 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 30-year anode service life* reduces the need for future repairs.
- CSP-3 Surface Profile - raised ridges provide increased surface profile to promote mechanical bond with repair mortars and concrete.

**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 | XPT / XP2 / XP4 |
| Corrosion Control | Reduces ongoing corrosion activity | XP2 / XP4 |

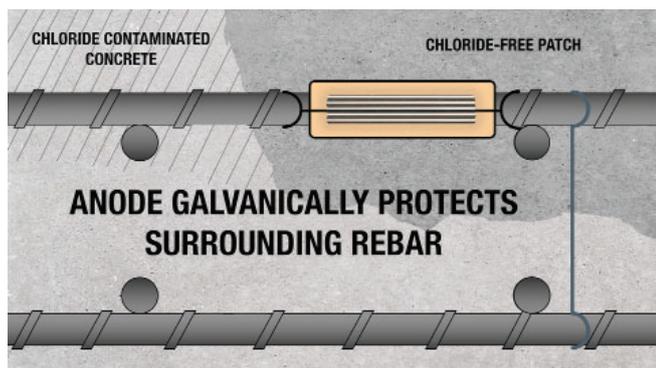
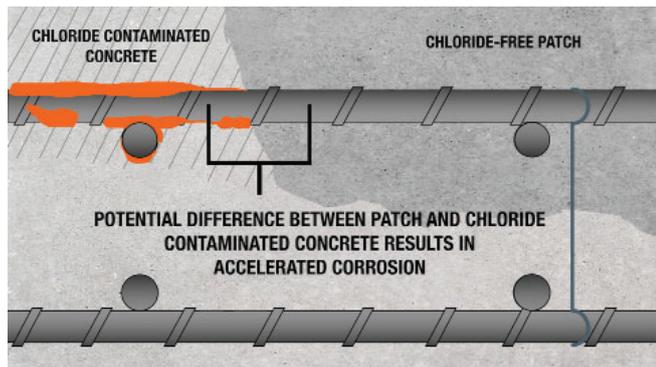
Galvashield® XP One-and-Done™ Range

Specification Clause

Embedded galvanic anodes shall be pre-manufactured with nominal [add zinc mass] of zinc in compliance with ASTM B418 Type II cast around an integral, unspliced, uncoated, non-galvanized double loop steel tie wire and encased in a highly alkaline cementitious shell with a pH of 14 or greater. The anode unit shall contain no intentionally added chloride, bromide or other constituents that are corrosive to reinforcing steel (refer to ACI 562-13, Section 8.4.1).

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.



*“Ring Anode” Corrosion (without Galvashield XP-type anode)
Galvashield XP-type anode prevents “Ring Anode” Corrosion*

Product Comparison

| Anode Name | Anode Type | Nominal Dimension (mm) | Zinc Mass (g) |
|-----------------|------------|------------------------|---------------|
| Galvashield XPT | 1A-P | 25mm x 25mm x 125mm | 60 |
| Galvashield XP2 | 1A-C | 32mm x 34mm x 100mm | 100 |
| Galvashield XP4 | 1A-C | 35mm x 40mm x 130mm | 160 |

Anode Type

- 1 - Installed in Concrete Repairs
- 2 - Installed in Drilled Holes in Sound Concrete
- A - Alkali-activated using High pH
- H - Halide-activated using Corrosive Salts
- 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 SA HB 84:2018, Section 6.4. 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. Wrap the tie wires around the clean reinforcing steel at least one full turn in opposite directions and bring the two free ends together and twist tight. 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-type anode units 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-type anode unit must be avoided.

Anode-to-steel continuity and steel-to-steel continuity within the repair cavity 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.



Galvashield® XP

One-and-Done™ Range

Repair Materials

For optimum performance, use a low resistivity repair material. If a high resistivity repair material is to be used or if the resistivity of the material is unknown, pack Fosroc Renderoc HB40 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.

Limitations

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.

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 | XPT | XP2 | XP4 | XP2 | XP4 |
| Steel Density Ratio | Anode spacing (mm) | Anode spacing (mm) | Anode spacing (mm) | Anode spacing (mm) | Anode spacing (mm) |
| <0.3 | 750 | 750 | 750 | 600 | 750 |
| 0.31 - 0.6 | 600 | 700 | 750 | 500 | 700 |
| 0.61 - 0.9 | 500 | 650 | 750 | 400 | 550 |
| 0.91 - 1.2 | 450 | 550 | 750 | 350 | 450 |
| 1.21 - 1.5 | 400 | 500 | 675 | 250 | 425 |
| 1.51 - 1.8 | 350 | 450 | 600 | 200 | 375 |
| 1.81 - 2.1 | 300 | 425 | 550 | 175 | 350 |

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



Galvashield® XP

One-and-Done™ Range

Supply

| | | | |
|------------------------------|---------------|----------------|-----------------|
| Galvashield XPT One-and-Done | FC312016-UNIT | 50 units / box | 10 units / tray |
| Galvashield XP2 One-and-Done | FC312027-UNIT | 40 units / box | 10 units / tray |
| Galvashield XP4 One-and-Done | FC312026-UNIT | 30 units / box | 6 units / tray |

Galvashield XP anodes must be ordered / purchased in tray lots.

Storage

Galvashield XP anode units have 24 months shelf life.

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

Health and Safety

Handling

Avoid eye contact and repeated or prolonged skin contact. Avoid inhalation of dust. Wear nitrile gloves when handling the anodes.

Keep anodes in their trays at all times, unless they are removed to be installed.

Installation

As with all cement-based materials, contact with water can release alkalis which may be harmful to exposed skin. Galvashield anode units should be handled with suitable gloves and other personal protective equipment in accordance with standard procedures for handling cementitious materials.

Additional safety information for both handling and installation is included in the product Safety Data Sheet.

Important notice

A Safety Data Sheet (SDS) is available from the Fosroc website. 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.



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