

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

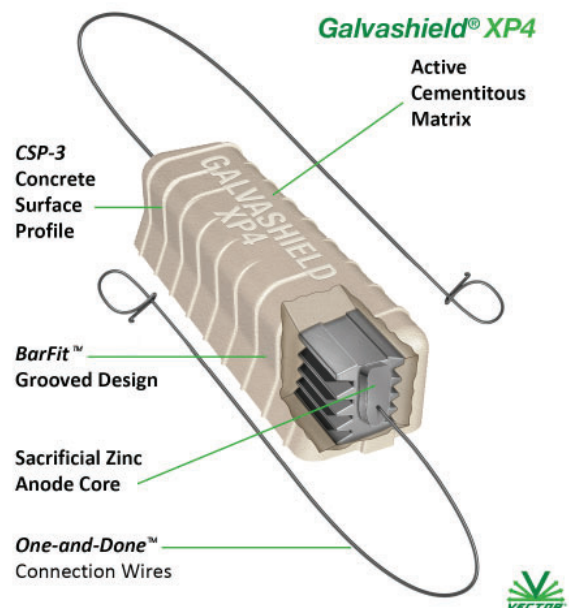
- Mitigates ring anode formation (halo effect) in patch repair applications
- Bridge widening and other structure modifications
- Slab replacements, expansion joint repairs and other interfaces between new and existing concrete
- Repair of prestressed and post-tensioned concrete
- Chloride contaminated 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, XP4 and XPX 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 - 20 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.*



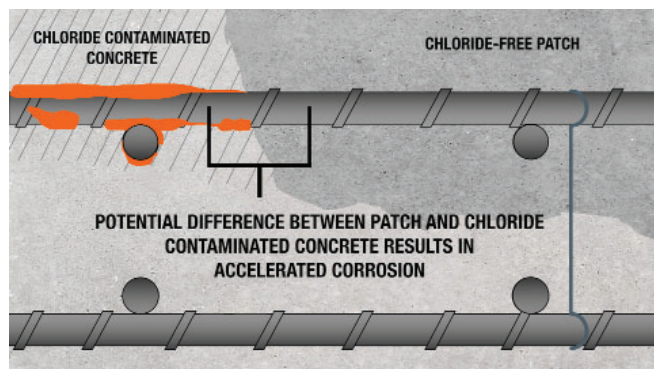
Specification Clause

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).

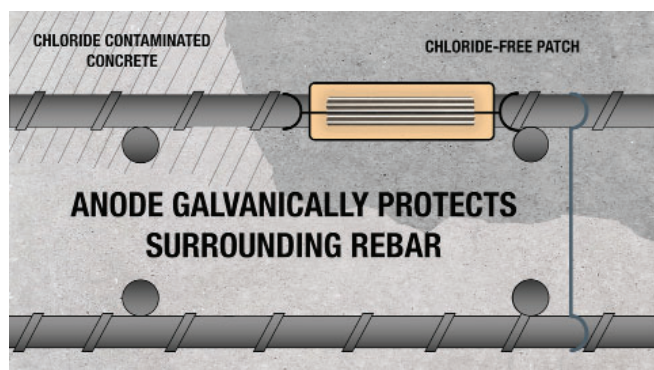
Galvashield® XP One-and-Done™ Range

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

Design Criteria

Corrosion Risk Category	Chloride Level*	Minimum Design Current Density**
Low to Moderate	<0.8%	0.4mA/m ²
High	0.8% - 1.5%	0.8mA/m ²
Extremely High	>1.5%	1.6mA/m ²

*Chloride content is based on percent by weight of cement.

** Minimum design current densities at end of anode design life. Current densities for the XPX and/or environments with average annual temperatures above 20°C (68°F) are double the standard current densities.

Product Comparison

Anode Name	Anode Type	Nominal Dimension (mm)	Zinc Mass (g)
Galvashield XPT	1A-P	24mm x 28mm x 100mm	60
Galvashield XP2	1A-C	32mm x 34mm x 100mm	100
Galvashield XP4	1A-C	35mm x 35mm x 130mm	160
Galvashield XPX	1A-C	35mm x 35mm x 170mm	330

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.



Galvashield® XP

One-and-Done™ Range

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.

Repair Materials

For optimum performance, use a low resistivity repair material such as Renderoc HB40 or Renderoc HB70. 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.

Design Criteria - Anode Spacing

Low to Moderate Corrosion Risk (Chloride Content < 0.8%)			
	XPT	XP2	XP4/XPX
Steel Density Ratio	Anode spacing (mm)	Anode spacing (mm)	Anode spacing (mm)
<0.3	675	700	700
0.31 - 0.6	450	700	700
0.61 - 0.9	350	575	700
0.91 - 1.2	300	475	625
1.21 - 1.5	275	425	550
1.51 - 1.8	250	375	500
1.81 - 2.1	225	350	475

Prior to placing the repair material, pre-wet the concrete substrate 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 anodes are intended to provide localized corrosion mitigation to concrete repair interfaces and joints and do not address or repair structural or concrete damage. Where structural damage exists, consult a structural engineer. To provide protection to broader areas, install Galvashield® CC anodes or Galvashield® Fusion® T2 anodes on a grid pattern or consult Parchem for other product recommendations.

High Corrosion Risk (Chloride Content 0.8% to 1.5%)			
	XPT	XP2	XP4/XPX
Steel Density Ratio	Anode spacing (mm)	Anode spacing (mm)	Anode spacing (mm)
<0.3	450	700	700
0.31 - 0.6	300	475	625
0.61 - 0.9	250	375	500
0.91 - 1.2	200	325	425
1.21 - 1.5	175	275	375
1.51 - 1.8	150	250	350
1.81 - 2.1	125	225	325

Extremely High Corrosion Risk (Chloride Content >1.5%)			
	XPT	XP2	XP4/XPX
Steel Density Ratio	Anode spacing (mm)	Anode spacing (mm)	Anode spacing (mm)
<0.3	300	475	625
0.31 - 0.6	200	325	425
0.61 - 0.9	175	250	350
0.91 - 1.2	150	225	275
1.21 - 1.5	125	175	250
1.51 - 1.8	100	150	225
1.81 - 2.1	n/a	125	200

New Construction and Carbonated Concrete			
	XPT	XP2	XP4/XPX
Steel Density Ratio	Anode spacing (mm)	Anode spacing (mm)	Anode spacing (mm)
<0.3	700	700	700
0.31 - 0.6	700	700	700
0.61 - 0.9	580	700	700
0.91 - 1.2	500	700	700
1.21 - 1.5	440	680	700
1.51 - 1.8	400	600	700
1.81 - 2.1	370	560	700

The anode spacing guidelines are based on achieving the minimum current density for the appropriate corrosion risk category at the end of the anode 20 year design life. In warmer or more corrosive conditions such as marine exposure, Galvashield® XPX is recommended to achieve the specified anode life. Spacing charts are based on an average annual temperature of 10°C.

For more information on the design methodology or receive a custom design, contact Parchem.



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 XPX One-and-Done	FC312017-UNIT	20 units / box	5 units / tray

Galvashield XPX anodes must be ordered / purchased in box 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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