

Embedded galvanic anode units for corrosion control

Description

Galvashield® CC embedded galvanic anode units are used to control on-going corrosion and to prevent the initiation of new corrosion activity in concrete structures. Galvashield® CC anodes are alkali-activated (Type 2A), and consist of a sacrificial zinc anode core that is activated by the surrounding specially formulated precast cementitious mortar. The cylindrical unit, available in a variety of standard sizes, is quickly and easily installed into concrete that is mechanically sound but has ongoing corrosion activity. Once installed, the zinc anode corrodes preferentially to the surrounding rebar, thereby providing galvanic corrosion control to the adjacent reinforcing steel. Custom size units are available for specific project needs.

Applications

- Balconies
- Columns and beams
- Bridge decks
- Parking garages
- Piers and wharfs
- Prestressed concrete
- Post-tensioning anchors

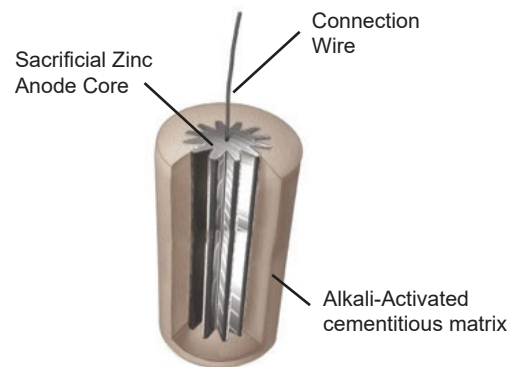
Features and Benefits

- Proven technology - Galvashield® is the original embedded galvanic anode with an extensive 20-year track record - supported by independent test program.
- Focused protection - discrete anodes can be installed to provide corrosion protection in areas with high corrosion potentials or active corrosion.
- Economical - save money by only protecting the remaining chloride-contaminated (unrepaired) areas.
- Versatile - effective in chloride-contaminated and carbonated concrete. Can be used for both conventionally reinforced and prestressed or post-tensioned concrete.
- User friendly - installation is quick and easy.
- Low maintenance - requires no external power source or system monitoring.
- Measurable - anode performance can be easily monitored if required.
- Long lasting - 10 to 30 year service life* reduces the need for future repairs.

**As with all galvanic protection systems, service life is dependent upon a number of factors including reinforcing steel density, concrete conductivity, chloride concentration, humidity and anode spacing.*

Specification

Embedded galvanic anodes shall be Galvashield® CC (specify product number, ie. CC2 or CC4), as supplied by Parchem. Galvashield® CC is a pre-manufactured unit consisting of zinc in compliance with ASTM B418-95a Type I cast around an integral bright steel tie wire for making connection to the reinforcing steel and encased in an activated cementitious mortar with pH of 14 or greater. The cementitious mortar around the zinc anode shall contain no chlorides or other corrosive constituents detrimental to the reinforcing steel as per ACI 222R..



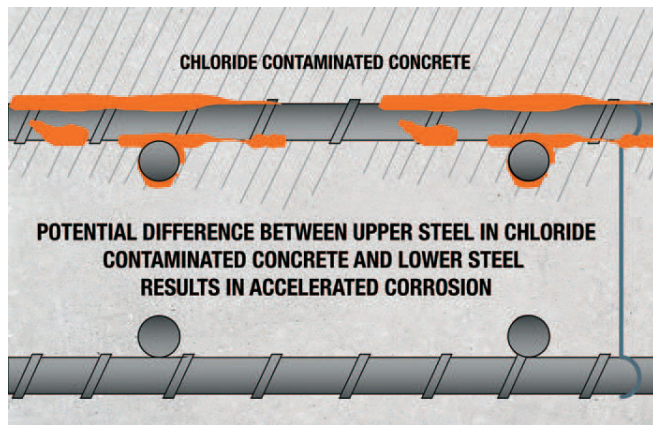
Cut-away of Galvashield CC

Level of protection	Description	Galvashield CC
Corrosion Prevention	Preventing new corrosion activity from initiating	✓
Corrosion Control	Significantly reducing ongoing corrosion activity	✓
Cathodic Protection	Highest level of protection intended to stop on-going corrosion activity	

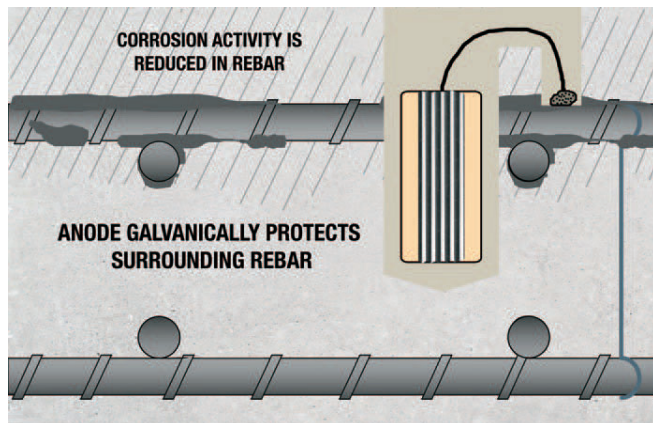
How It Works

When two dissimilar metals are coupled together in an electrolyte, the metal with the higher potential for corrosion (more electronegative) will corrode in preference to the more noble metal. In concrete repair applications, the zinc core of the Galvashield CC unit will corrode in favor of the reinforcing steel, thus providing corrosion control to the adjacent reinforcing steel.

Galvashield® CC2 & CC4



Chloride contamination causes corrosion in reinforced concrete



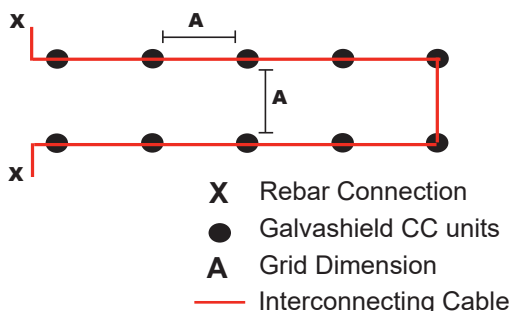
Galvashield® CC mitigates active corrosion

Design Criteria

Standard Units

Unit type	Unit size diameter x length	Minimum hole size diameter x length
Galvashield CC2	32 x 75 mm	38 x 105 mm
Galvashield CC4	36 x 100 mm	42 x 130 mm

Note: Hole dia size can be adjusted depending on the standard bit size available.



Anode Spacing* for Low to Moderate Risk (Chloride Content < 0.8% or Carbonated Concrete)

Galvashield	CC2	CC4
Steel density ratio (steel surface area/ concrete surface area)	Maximum grid dimensions (mm)*	Maximum grid dimensions (mm)*
< 0.3	650mm	700mm
0.31 - 0.6	475mm	675mm
0.61 - 0.90	375mm	550mm
0.91 - 1.20	325mm	475mm
1.21 - 1.50	300mm	425mm
0.51 - 1.80	250mm	375mm
1.81 - 2.10	225mm	350mm

Anode Spacing* for High Corrosion Risk (Chloride Content 0.8% to 1.5%)

Galvashield	CC2	CC4
Steel density ratio (steel surface area/ concrete surface area)	Maximum grid dimensions (mm)*	Maximum grid dimensions (mm)*
< 0.3	475mm	600mm
0.31 - 0.6	325mm	475mm
0.61 - 0.90	275mm	375mm
0.91 - 1.20	250mm	325mm
1.21 - 1.50	225mm	300mm
0.51 - 1.80	200mm	275mm
1.81 - 2.10	175mm	250mm

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

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

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

Installation Instructions

The location and spacing of the Galvashield® CC units shall be as specified by the engineer. The anodes can be installed and connected to the steel individually or up to 20 anodes connected to a common header wire with two reinforcement connections. Using a rebar locator, locate all existing steel within the area designated for protection and mark areas to drill unit installation holes. When possible, units should be installed a minimum of 100 mm from the reinforcing grid.

Individual Connection

Drill a single 12mm rebar connection hole per anode unit location. Sawcut a groove approximately 6mm wide by 12mm deep into the concrete to interconnect the rebar connection hole and anode connection hole. Reinforcing steel connections should be made using the Vector Rebar Connection Kit. After cleaning out the hole, place the



Galvashield® CC2 & CC4

weighted end of the steel connector into the drilled hole until the steel coil contacts the reinforcing steel. Feed the steel connector wire through the Vector Setting Tool and set into place by striking with a hammer. Verify continuity between unit locations and rebar connections with a multimeter. A resistance of 1 ohm or less is acceptable. Drill holes as per the dimensions listed above to accommodate the anodes.

Presoak the units for a minimum of 10 to a maximum of 20 minutes in a shallow water bath. Remove the anodes from the bath and connect the steel lead wire from the anode to the tail of the Vector Rebar Connector using the supplied sealed connectors. Fosroc Renderoc HB40 or Fosroc Construction Grout, (or other suitable mortar as recommended by Fosroc) should be used to install the still wet units into presoaked (saturated-surface dry) holes. Place the mixed embedding mortar into the bottom 2/3 of each hole and slowly press in the unit allowing the mortar to fill the annular space ensuring there are no air voids between the unit and the parent concrete. The minimum unit cover depth shall be 20mm.

Place wires into grooves and top off unit holes and saw cuts flush to the concrete surface with embedding mortar. Embedding mortar should be wet cured or cured with a curing compound and protected from traffic for 24 hours.

Series Connection

A single circuit shall contain no more than 20 Galvashield® CC units. Reinforcing steel connections should be made using the Vector Rebar Connection and Anode Connection Kit or the Galvashield® CC Rivet Connector Pack.

When using Vector Anode Connection Kit, drill a minimum of two 12mm rebar connection holes per string of anodes and sawcut a groove 6mm by 12mm linking the rebar connection holes to the anode connection holes. Install the rebar connectors as detailed above. The wire and connectors supplied in the Vector Anode Connection Kit will be used to link rebar connections to the anode units.

If using Galvashield® CC Rivet Connectors chip 50mm holes to expose rebar in two locations. If using the Galvashield® CC Rivet Connector Kits, electrical connection to the steel shall be established by drilling a 5 - 7mm deep hole into the steel using the 3.5mm drill bit provided. 3.2mm stainless steel pop rivets are used to connect the connection wire to the steel. The connection shall be insulated by a neutral cure sealant or epoxy.

Saw cut a single continuous groove approximately 6mm wide by 12mm deep into the concrete to interconnect rebar connection holes and anode connection holes. Connect the units directly to the rebar connection wire using the supplied wire connectors. Presoak anode units and install with a suitable Fosroc mortar as detailed above.

Limitations

Galvashield CC units are not intended to address or repair structural damage. Where structural damage exists, consult a structural engineer.

Galvashield CC anodes are designed to provide galvanic corrosion control. Corrosion control products significantly reduce or stop on-going corrosion. Concrete repairs should be completed using Galvashield XP type units around the boundary of the patch prior to installing Galvashield CC units in the remaining unrepaired areas.

Supply

Galvashield CC2: Galvashield CC4: (supplied in 30 units per box)	FC312028-UNIT FC312032-UNIT
Rebar Connection kit: (20 rebar connectors per box)	FC312072-UNIT
Anode Connection kit: 15.2m insulation cable 25 wire connectors	Included in Galvashield CC units pack
Galvashield CC Setting Tool: (1 unit per box)	FC312170-UNIT
Galvashield CC Rivet Connector Pack: (5 stainless steel rivets, 2 drill bits, 23 wire connectors, 14m insulated wire)	FC312171-UNIT

Note: Custom solutions are available based on project requirements.

Storage

Galvashield CC have 12 months shelf life.

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

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.

