

Galvashield® CC

constructive solutions

Embedded Sacrificial Anodes for Corrosion Control in Reinforced Concrete

Description

Galvashield CC galvanic anodes are used to control ongoing corrosion and to prevent the initiation of new corrosion activity in reinforced concrete structures. Galvashield CC consists of a sacrificial zinc core activated within a specially formulated 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 existing or potential corrosion activity. Once installed the zinc core corrodes preferentially to the surrounding steel providing active protection.

Typical applications

- Bridge Decks
- Carparks
- Columns and Beams
- Prestressed Concrete
- Balconies
- Post tensioning anchors
- Tunnels

Advantages

- **Proven Technology** - Supported by independent test programs. British Board of Agreement and Concrete Innovations Appraisal Service (USA).
- **Zero Maintenance** - Requires no external power source.
- **Measurable** - Anode performance can easily be monitored if required.
- **Focused Protection** - Discrete anodes can be installed to provide corrosion control in areas with ongoing corrosion activity.
- **Versatile** - Effective in chloride contaminated and carbonated concrete. Can be used for conventionally reinforced and prestressed/post tensioned concrete.
- **Up to 20 years life** - Reduces the need for future repairs.

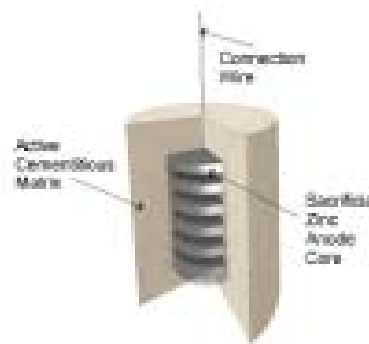
How does it work?

Galvashield anodes work on the principle of sacrificial protection. When two dissimilar metals are placed in an electrolyte (in this case within concrete) the most active metal (zinc) will sacrifice itself in favour of the more noble (less active) reinforcing steel. Galvashield CC anodes are bedded into holes, cored/drilled into reinforced concrete where existing or potential corrosion activity has been identified, but where concrete is still sound (no cracking/spalling). The individual anodes are joined together to form a protective grid over the highlighted area. Once installed they will provide

Cathodic Prevention /Corrosion Control/Cathodic Protection to the reinforcing steel, preventing further corrosion causing structural deterioration.

Standard compliance/certification

Independently certified performance. British Board of Agreement (BBA) Certificate (No. 04/4140)



Level of Protection	Description	Galvashield CC
Cathodic Prevention	Preventing new corrosion activity from initiating	✓
Corrosion Control	Significantly reduce ongoing corrosion activity	✓
Cathodic Protection	Highest level of protection, intended to stop ongoing corrosion	*

*Dependant upon CC design and structure

Specification clause

The sacrificial anode shall be Galvashield CC, a sacrificial metal surrounded by a highly alkaline cementitious mortar, which has a pore solution pH sufficiently high for corrosion of the anode to occur and for passive film formation on the anode to be avoided as described in patent no WO94/29486PCT.

Anode types

Galvashield CC45 - Short unit for use in concrete of restricted depth.

Galvashield CC65 - Standard unit for use in areas of moderate steel density.

Galvashield CC100 - Larger unit for use in areas of higher steel density and output requirement.

Galvashield CC135 - Slim-fit unit for use in areas of congested reinforcement.

Galvashield® CC

Table 1: Anode dimensions

Type	Unit size diameter x length (mm)	Minimum hole dimensions diameter x length (mm)
CC45	46 x 45	50 x 75
CC65	46 x 62	50 x 90
CC100	46 x 100	50 x 130
CC135	29 x 135	32 x 165

Application instructions

Preparation

A survey of the structure is recommended prior to application. This should be carried out by a competent body and include the position/depth of steel, chloride levels, carbonation depth and half-cell mapping. Check continuity of the steel. Any loss of continuity will require additional electrical connections or restoration by other effective means.

Establish the position of the steel reinforcement and mark out an appropriate grid for anode locations. Take care to avoid locating anodes immediately over the steel reinforcement.

Drill suitably sized holes at the marked locations in accordance with Table 1. Take care to avoid cutting any steel reinforcement.

Drill additional 50mm diameter holes at the end of each anode chain to facilitate electrical connections to the steel reinforcement. A maximum of 10 anodes shall be connected in any one chain.

Link drilled holes by a minimum 4mm wide x 15mm deep saw cut to allow for the recessing of electrical wiring.

Establish electrical connection by drilling a 5-10mm deep hole into the steel reinforcement using the 3.5mm diameter drill bit supplied. Fix the wire in place using the 3.2mm stainless steel rivet provided. Insulate the connection with Galvashield Sealant.

Design tables

Table 2. Galvashield CC45

Steel surface area per m ² concrete	Grid dimension (A)	Units per m ² of concrete
< 0.4	450mm	5
0.41 - 0.48	400mm	6

Table 3. Galvashield CC65 & CC135

Steel surface area per m ² concrete	Grid dimension (A)	Units per m ² of concrete
< 0.4	600mm	3
0.41 - 0.54	500mm	4
0.55 - 0.67	450mm	5
0.68 - 0.80	400mm	6
0.81 - 0.94	380mm	7
0.95 - 1.07	355mm	8
1.08 - 1.2	335mm	9

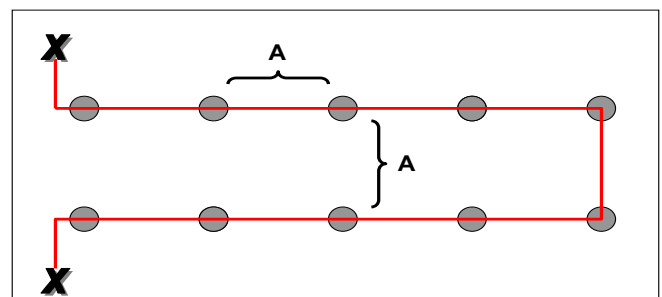
Table 4. Galvashield CC100

Steel surface area per m ² concrete	Grid dimension (A)	Units per m ² of concrete
0.55 - 0.94	500mm	4
0.95 - 1.17	450mm	5
1.18 - 1.41	400mm	6
1.42 - 1.64	380mm	7
1.65 - 1.88	335mm	8
1.89 - 2.11	355mm	9

Note: All steel within the zone of influence should be considered when determining anode spacing.

Units per m² are approximate. For greater steel densities consult Fosroc.

Typical Galvashield CC layout



- X** Rebar Connection
- A** Grid Dimension
- Galvashield CC Unit
- Interconnecting Cable

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Installation

Please consult the Galvashield CC Installation Guide for further information before installation.

Pre-soak the required number of Galvashield CC units in clean water for a minimum of 10 and a maximum of 20 minutes. Pre-soak holes and saw cuts with water ensuring pooled water is removed prior to installation. Units should be installed whilst still wet.

Galvashield CC Bedding Mortar should be mixed using a Fosroc Mixing Paddle on a slow speed (400/500 rpm) drill. Add between 0.8 - 0.9 litres of drinking quality water to the mixing drum. Add the complete 5kg pack of Galvashield CC Bedding Mortar whilst mixing. Continue mixing for 3 minutes until a smooth, even consistency is obtained. Part bags shall not be used.

Connect individual pre-soaked Galvashield CC units to the electrical wiring using the connectors supplied. Check the continuity of each individual Galvashield CC unit with the steel reinforcement during installation. A value between 0.1 - 1 Ohm shall be achieved in each case.

The Galvashield CC units shall be embedded into the pre-drilled holes using Galvashield CC Bedding Mortar. A maximum of 10 anodes shall be connected in any one chain. Cover to the embedded Galvashield CC units shall be a minimum of 25mm.

Recess all interconnecting wiring into the saw cuts. The saw cuts and drilled holes shall be made good with Galvashield CC Bedding Mortar.

Repair materials

Galvashield CC should be used in conjunction with Fosroc's extensive range of compatible cementitious repair mortars and acrylic bonding/curing agents.

Galvanic protection within patch repairs can be established by the use of Galvashield XP, a sacrificial anode system attached directly to the steel reinforcement via cast in tie wires (please refer to the Galvashield XP data sheet).

Limitations

Galvashield CC is not suitable for use with epoxy or polyester repair mortars and primers, as these materials are non-conductive.

Supply

Galvashield CC is supplied in boxes of 20 units, complete with an accessory pack. This includes:

- 20m of interconnecting wire
- 25 wire connectors
- 5 x 3.2mm stainless steel rivets
- 2 x 3.5mm drill bits
- 1 x 60ml cartridge of Galvashield Sealant

Galvashield CC Bedding Mortar is supplied in 5kg bags. 1 bag is typically sufficient for between 10-20 units, dependent on unit size.

Storage

Galvashield CC

Store in cool/dry conditions in the original unopened box. Shelf life 12 months - see package instructions for details.

Galvashield CC Bedding Mortar

Shelf life 12 months if stored in unopened bags in cool dry internal conditions. If stored at high temperatures and/or high humidity conditions the shelf life may be reduced to less than 6 months.

Disposal

All wastewater used to pre-soak Galvashield CC units must be mixed with a cementitious material before disposal. Once cured dispose in accordance with local regulations.

Health and safety

Galvashield CC should be handled using protective gloves and other personal protective equipment, as per regulations for handling cementitious materials.



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Important note

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