BUILDING TRUST

PRODUCT DATA SHEET

Sika® Galvashield XP

EMBEDDED GALVANIC ANODES FOR CORROSION PREVENTION

PRODUCT DESCRIPTION

Sika® Galvashield® XP Compact /XPT/XP2/XP4 embedded galvanic anodes are used in concrete rehabilitation to prevent the formation of new corrosion sites adjacent to completed patch repairs. Sika® Galvashield® XP Compact/XPT/XP2/XP4 anodes consist of a sacrificial zinc core that is activated by the surrounding specially formulated cementitious mortar. The Galvashield® XP range of anpdes utilize the contractor friendly "One-and-Done" single wire connection. Once installed, the zinc core corrodes preferentially to the surrounding rebar, thereby providing galvanic corrosion prevention to the adjacent reinforcing steel and mitigating ‘ Incipient Anode’ formation.

USES

- Patch repairs
- Joints between new and existing concrete
- Slab replacement
- Expansion joint repair
- Repair of epoxy-coated rebar
- XPT/XP2/XP4 anodes for chloride contaminated concrete
- XP Compact anode for carbonated concrete
- Mitigates ring anode formation (halo effect) in concrete repairs

CHARACTERISTICS / ADVANTAGES

- Proven technology - supported by independent test program.
- Focused protection - provides localized corrosion protection where it is needed the most, at the interface of the repair and the remaining contaminated concrete.
- Economical - low cost method of providing galvanic corrosion prevention to extend the initiation of reinforcement corrosion around patch repairs.
- Versatile - effective in chloride-contaminated and carbonated concrete containing chlorides. Can be used for both conventionally reinforced and prestressed or post-tensioned concrete.
- One-and-Done connection - Innovative single wire connection can be installed up to 2 x faster than the traditional two wire connection.
- Low maintenance – requires no external power source or system monitoring.
- Grooved edges on Galvashield® XP2 and XP4 anodes assist with secure anode placement.
- CSP-3 Surface profile - Raised ridges provide increased surface profile to promote mechanical bond with repair mortars & concrete.
- Measurable – anode performance can be easily monitored if required.
- Does not cause hydrogen embrittlement.
- Long lasting – 10 to 20 year service life* reduces the need for future repairs.
- Full System – can be used in conjunction with Sika® FerroGard® and Sikagard® technology to offer a full corrosion management system.

* 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

PRODUCT INFORMATION

Packaging

Galvashield® XP Compact	50 units per box	6.8kg box
Galvashield® XPT	50 units per box	9.1kg box
Galvashield® XP2	40 units per box	10.2kg box
Galvashield® XP4	30 units per box	12.0kg box

Shelf Life

24 months

Storage Conditions

Store in original unopened, sealed and undamaged packaging in dry and cool conditions.

Dimensions

Product Name	Anode Class	Anode Dimension (nominal)	Zinc Mass (g)
Galvashield® XP Compact	Type 1A-P	25 mm x 31 mm x 64 mm	40
Galvashield® XPT	Type 1A-P	25 mm x 25 mm x 125 mm	60
Galvashield® XP2	Type 1A-C	32 mm x 34 mm x 100 mm	100
Galvashield® XP4	Type 1A-C	35 mm x 40 mm x 130 mm	160

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

TECHNICAL INFORMATION

Design Considerations

Table 1
Maximum Anode Spacing for Low to Moderate Corrosion Risk (Chloride Content < 0.8% or Carbonated Concrete)

Protection level	Corrosion Prevention		Corrosion Control	
Galvashield Anode Steel Density Ratio*	XPT	XP2	XP2	XP4
	mm	mm	mm	mm
<0.3	750	750	600	750
0.31 - 0.6	600	700	500	700
0.61 - 0.9	500	650	400	550
0.91 - 1.2	450	550	350	450
1.21 - 1.5	400	500	250	425
1.51 - 1.8	350	450	200	375
1.81 - 2.1	300	425	175	350

* Steel surface area/concrete surface area.

Table 2
Maximum Anode Spacing for High Corrosion Risk (Chloride Content 0.8% to 1.5%)

Protection Level	Corrosion Prevention		Corrosion Control
Galvashield Anode Steel Density Ratio *	XPT / XP Compact	XP2	XP4
	mm	mm	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

Maximum anode spacing is based on low to moderate chlorides, typically less than 1% by wt of cement. Spacing should be reduced as appropriate for chlorides >1% and/or continuously wet substrates to extend the expected service life of the anode. Where stirrups in beams or columns are exposed, place a Sika® Galvashield® XPT/XP2/XP4 anode at each stirrup location.

* Steel surface area/concrete surface area.

Sika® Galvashield® XP Compact

Used in carbonated concrete If environmental constraints preclude the use of abrasive or water blasting preparation techniques and where corrosion has been induced by carbonation and ingressed chlorides are not present. Sika® Galvashield® XP Compact galvanic anodes shall be installed to cover a zone within the repair area of 0.1 m2 (300 mm centres) per anode per layer of steel. The anodes should be placed as central as possible within the 0.1 m^2 zone (s). Each repair area shall have a minm of 1No Sika® Galvashield® XP Compact galvanic anode.

Level of Protection

Level of Protection	Description	Galvashield® XP Compact/XPT	Galvashield® XP2/XP4
Corrosion Prevention 0.2 – 2mA/m^2	Preventing new corrosion activity from initiating	Y	Y
Corrosion Control 1 – 7mA/m^2	Significantly reducing or stopping on-going corrosion activity		Y
Cathodic Protection 2 – 20mA/m^2	Highest level of protection intended to stop on-going corrosion activity		

SYSTEM INFORMATION

System Structure	Sika® Galvashield® XP's are part of a Concrete Repair System in accordance with the guidelines of BS EN 1504-9 Sika® MonoTop-610: Bonding primer and reinforcement coating Sika® MonoTop-612: R4 Hand and wet spray applied repair mortar Sika® MonoTop-614F: R4 pourable repair mortar Sika® MonoTop-615: R3 Hand and wet spray applied high build repair mortar Sika® MonoTop-630 Rapid: R4 Hand applied repair mortar Sika® MonoTop-412N: R4 Hand and wet spray applied, low resistivity, repair mortar for repair and embedment SikaCem® 133 Gunite range: R4 Dry spray applied repair mortar Sika® MonoTop-620: Smoothing coat Sika® FerroGard®-903+: Corrosion inhibitor Sika® Galvashield® Embedment Mortar: Mortar for embedding Galvashield® XP Compact/XPT/XP2/XP4

APPLICATION INSTRUCTIONS

APPLICATION

Substrate Quality and Preparation

Concrete

Break out the concrete from around and behind the reinforcement steel in accordance with the requirements of the Product Data Sheet for the appropriate BS EN 1504-3 Classification Concrete Repair Mortar.

Steel reinforcement (Chloride induced corrosion)

Rust, scale, mortar, concrete, dust and other loose and deleterious material which reduces bond or contributes to corrosion shall be removed to a minimum standard of SA2½.. Reference should also be made to BS EN1504-10:2003 for specific requirements.

Steel reinforcement (Carbonation induced corrosion)

Rust, scale, mortar, concrete, dust and other loose and deleterious material which reduces bond or contributes to corrosion shall be removed to a minimum standard of C St 3 as defined in BS 7079: Part A1.The whole circumference of the exposed reinforcement shall be uniformly cleaned except where structural considerations prevent it. Final surface condition should have a faint metallic sheen finish.

Unless the cleaning is carried out immediately before application of the reinforcement corrosion protection coating, the reinforcement shall be protected against further contamination.

Steel preparation maybe carried out by removing loose rust by very thorough scraping, hand or machine wire brushing, abrasive paper/cloth, grinding or other appropriate techniques to achieve the required final surface condition.

Method and choice of cleaning shall take into account bar congestion, contact between bars, proximity to concrete substrate etc.

Extra preparation of the steel should be carried out in the area of the anode tie wire connection to provide a bright steel finish to ensure a good electrical connection. Alternatively drill a small hole in the reinforcement at both ends of the anode position to accept a mild steel self tapping screw & wrap the anode tie wires around the screws.

After removal of the rust to the required standard. Clean the steel reinforcement with a dry clean brush.

Bonding Primer/Reinforcement Coating

Bonding primer:

When a bonding primer is required apply Sika® MonoTop-610 or SikaTop® Armatec-110 EpoCem®.

Reinforcement coating:

Where a reinforcement coating is required apply Sika® MonoTop-610 or SikaTop® Armatec-110 EpoCem® .

When Sika® MonoTop-610 or SikaTop® Armatec 110 EpoCem is used as a reinforcement coating or bonding primer it is important to not allow the coating to get inbetween the connection wire and steel and act as an insulator from the zinc core.

Application Method

The location and spacing of the anodes shall be as specified by the designer (for more information refer to Design Criteria above). Anodes are typically tied on the side or beneath the exposed reinforcement as close as practical to the edge of the surrounding concrete making sure that enough space is left to fully encapsulate the anode with the Sika Embedment Mortar or Sika Monotop 412N repair mortar.

Minimum cover over the anodes/embedment mortar

must be 20 mm or minimum thickness of the Concrete Repair Material for trafficked areas, 10 mm or minimum thickness of the Concrete Repair Material for non-trafficked areas.
A 20mm minimum clearance on sides adjacent to repair edge should be maintained. Where chloride contaminated concrete remains in contact with reinforcement, place Sika® Galvashield® XPT/XP2/XP4 anodes along length of reinforcement or in grid pattern at spacings recommended in Table 1 & Table 2.
Pre-wet the Sika® Galvashield® anode in a similar manner to the concrete substrate prior to the application of a repair mortar.
After pre-soaking anodes use water to mix embedment mortar or concrete repair mortar. If water is to be disposed neutralise with an acid first.
Securely fasten the anode to prepared reinforcing steel using a suitable wire twisting tool to eliminate free movement, and to ensure a good electrical connection.
Steel continuity within the patch should be verified with an appropriate continuity meter. If discontinuous steel is present, re-establish continuity with steel tie wires.
Following the anode installation, electrical connection between the anode tie wires and the clean reinforcing bar should be confirmed with an appropriate continuity meter. A value of between 0.1 – 1.0 Ohm shall be achieved.
With the anodes securely in position, begin the repair process by packing the embedment mortar between the anode and the substrate to provide a conductive path to the substrate.
Allow embedment mortar to sufficiently harden around Sika® Galvashield® XP Compact /XPT/XP2/XP4 anode before applying concrete repair mortar. If using Sika Monotop 412N, both embedment and repair can be carried out in one pass, providing layer thickness does not exceed maximum layer thickness of repair mortar.
Complete repair with the appropriate BS EN 1504-3 Classification Concrete Repair Mortar and where applicable a cementitious bonding primer.

LIMITATIONS

- Sika® Galvashield® XP Compact /XPT/XP2/XP4 anodes are not suitable for use with epoxy and polyester repair mortars or bonding primers, as these are non conductive
- Sika® Galvashield® XP Compact /XPT/XP2/XP4 anodes are not intended to address or repair structural damage. Where structural damage exists, consult a structural engineer.
- Sika® Galvashield® XP Compact /XPT/XP2/XP4 anodes are designed to provide localized galvanic corrosion prevention. To provide galvanic corrosion control over a broader area, Sika® Galvashield® XPT/XP2/XP4 anodes can be used in conjunction with Sika® Galvashield® CC anodes placed in a grid pattern in the remaining sound but contaminated concrete. For more information on corrosion mitigation strategies, contact Sika Technical Department.
- Caution should be exercised when selecting corrosion mitigation systems for posttensioned, prestressed or otherwise highly stressed steel.

VALUE BASE

All technical data stated in this Product Data Sheet are based on laboratory tests. Actual measured data may vary due to circumstances beyond our control.

LOCAL RESTRICTIONS

Please note that as a result of specific local regulations the performance of this product may vary from country to country. Please consult the local Product Data Sheet for the exact description of the application fields.

ECOLOGY, HEALTH AND SAFETY

For information and advice on the safe handling, storage and disposal of chemical products, users shall refer to the most recent Material Safety Data Sheet containing physical, ecological, toxicological and other safety-related data.

LEGAL NOTES

The information, and, in particular, the recommendations relating to the application and end-use of Sika products, are given in good faith based on Sika's current knowledge and experience of the products when properly stored, handled and applied under normal conditions in accordance with Sika's recommendations. In practice, the differences in materials, substrates and actual site conditions are such that no warranty in respect of merchantability or of fitness for a particular purpose, nor any liability arising out of any legal relationship whatsoever, can be inferred either from this information, or from any written recommendations, or from any other advice offered. The user of the product must test the product's suitability for the intended application and purpose. Sika reserves the right to change the properties of its products. The proprietary rights of third parties must be observed. All orders are accepted subject to our current terms of sale and delivery. Users must always refer to the most recent issue of the local Product Data Sheet for the product concerned, copies of which will be supplied on request.

SIKA LIMITED
Watchmead
Welwyn Garden City
Hertfordshire, AL7 1BQ
Tel: 01707 394444
Web: www.sika.co.uk
Twitter: @SikaLimited