

Vector® Galvashield® Galvanic Theory and Application

How Do Galvanic Anodes Work?

When two dissimilar metals are coupled together in an electrolyte, the metal with the higher potential for corrosion (more negative voltage) will corrode in preference to the more noble metal. In concrete repair applications, the zinc core of the galvanic anode will corrode and provide an electrical current to the reinforcing steel that mitigates corrosion activity.

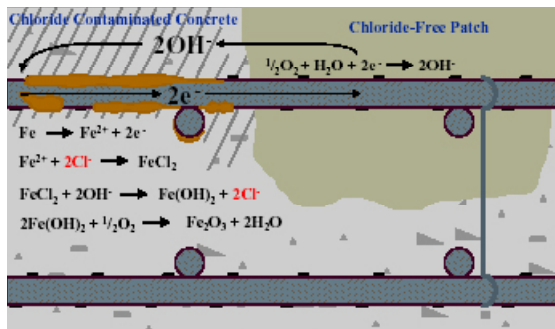
Metal	Volts*
Magnesium	-1.75
Zinc	-1.10
Aluminum alloy (5% Zn)	-1.05
Steel in concrete	-0.20 to -0.35

*Typical potentials measured with respect to copper-copper sulfate electrode.

Corrosion-Induced Repair

If concrete is repaired in accordance with industry guidelines, which require the removal of concrete continues until clean steel is encountered and the cleaning of corrosion by-products from the full circumference of the steel (ICRI Guidelines No. 03730), the process of replacing damaged concrete will generally address areas of the structure with the highest level of corrosion activity.

The new patch repair will protect the reinforcing embedded in the repair zone, but in many cases the remaining concrete will still be chloride-contaminated and/or carbonated. This situation creates a high potential for the formation of new corrosion sites or "hot spots" adjacent to the repair. If this occurs, additional patching may be required in a little as three to five years.

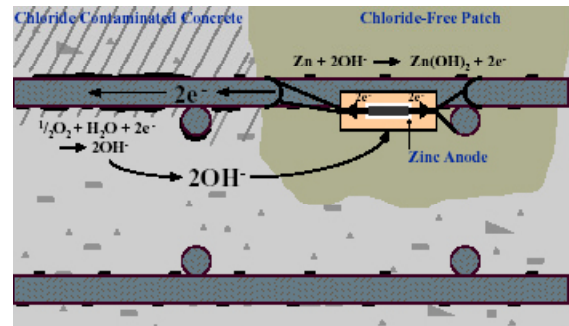


Patch-Accelerated Corrosion Cell

Corrosion Prevention

A localized corrosion prevention strategy is used when the objective is to prevent new corrosion activity from initiating in the sites adjacent to the repairs. Galvashield XP range of embedded galvanic anode units installed around the perimeter of the patch provide a galvanic

current to the steel that mitigates the formation of new corrosion sites on the reinforcing in the adjacent un-repaired areas. The result of this strategy is an economical extension of the service life of the concrete repair.



Patch Containing Galvashield Anode

Corrosion Control

A corrosion control strategy can be utilized when sites of active corrosion remain after concrete removal. To control active corrosion, a higher level of protective current is required than for corrosion prevention. Corrosion control may be preferred when:

- Active corrosion is present beyond the area to be repaired
- The structure is in a severely corrosive environment
- The concrete is highly contaminated with chlorides
- The structure to be protected has a high steel density
- The repair procedures do not require concrete removal to continue until clean steel is encountered

Galvashield XP+ range of embedded galvanic anode units installed around the perimeter of the patch repair are designed to significantly reduce or stop on-going corrosion activity in localized areas adjacent to the patch. If a broader area of corrosion control is desired, Galvashield CC embedded galvanic anode units can be installed on a grid pattern in the remaining unrepaired but contaminated areas.

Level of Protection	Description	Galvashield® XP/XPT	Galvashield® XP2/XP4	Galvashield® CC
Corrosion Prevention	Mitigates initiation of new corrosion activity	●	●	●
Corrosion Control	Reduces on-going corrosion activity		●	●
Cathodic Protection	Reduce or eliminate on-going corrosion activity			

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