

# INSTALLATION GUIDELINES

## RollAnode

Zinc sacrificial anodes for corrosion control of steel in concrete



## Installation procedures

The RollAnode is a discrete zinc-anode which will be imbedded in an ionic conductive paste during the application. *This anode can be supplied in any requested length and diameter matching the designed zinc weight of the project.*

System monitoring can be performed according to international standard EN ISO 12696. Monitoring equipment can be supplied by your distributor together with the anodes on request.

Be aware that monitoring equipment designed for an impressed current CP-system is not always compatible with a CP-system based on galvanic anodes, specifically when current-densities are monitored.

## Repare the spalled and cracked concrete (if necessary)

Prior to installing the anodes the concrete should be prepared in the following manner (*please check manufacturer's spec of the repair mortar*):

## Procedure

1. Check accessibility of the construction and take precautions if necessary
2. Repair the spalled and cracked concrete if necessary
3. Localize the reinforcement
4. Check electric continuity of the reinforcement
5. If required, perform additional potential mapping of the reinforcement to indicate the degree and extend of expected corrosion
6. Install the Discrete Galvanic Anode
7. Make electric connections of the reinforcement with the anode
8. Check electric connections with a resistance meter
9. Patch/finish the concrete

It is recommended to keep up a log-book in which all steps are described and checked. Situations which differ from the installation procedures must be indicated accurately in the log-book and checked and signed by the supervisor prior to proceed.

If certain situations are unclear regarding the proper handling of the anodes, we recommend contacting your distributor before proceeding with the installation. Each step of the installation procedure is described in detail below.

1. Remove all deteriorated concrete, dirt, oil, grease, and all bond-inhibiting materials.

2. Preparation work should be done by high pressure water blast, scabbler, or other appropriate mechanical means to obtain an exposed aggregate surface with a minimum surface profile of 2mm for proper mortar adhesion.

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**3.** Steel reinforcement should be thoroughly prepared by mechanical cleaning to remove all traces of rust at least there where the anodes are installed. Where corrosion has occurred due to the presence of chlorides, the steel should be high pressure washed with clean water after mechanical cleaning.

## Borehole diameter

We recommend a borehole diameter of at least 4 mm larger than the RollAnode diameter. However, a diameter 5-8 mm wider can make installation easier. The contractor should verify the optimal borehole size through testing prior to application.

After drilling, clean the holes thoroughly using compressed air or water to remove all dust and debris. Ensure the holes are completely clean before applying the paste and installing the anode.



## Check electric continuity of the reinforcement

After making the right connection check the electric resistance of the connection using a digital multimeter. Switch the multimeter to the resistance position ( $\Omega$ ) and measure the resistance. The criterion for this is less than 1  $\Omega$  (DC-) resistance.

Instead of making the contact directly on the connection strip, it could be checked by making contact with the current distributor bar of the anode and the reinforcement.

## Additional potential mapping (if required)

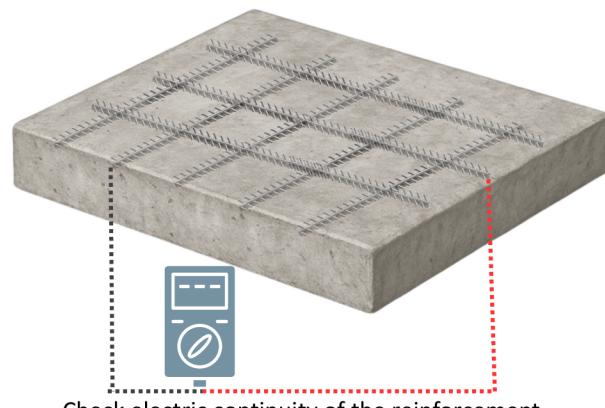
*If a selective approach is desired due to economic reasons potential mapping of all concrete elements involved should be considered.*

*During mapping the values are logged as computer-tables and later on, with special software, processed as corrosion-graphics. This type of software analyses potential-values and gradients and calculates for each measuring location the possible chance of active corrosion. After the interpretation the results are presented as colour-cards. By using this measuring method hundreds of square meters of concrete surface per hour can be mapped and processed.*

*For further information about this technique and making the right interpretations, please contact us or your local distributor.*

## Localize the reinforcement (if necessary)

The best and easy way in localizing the reinforcement is by use of a rebar locator, which accurately locates reinforcing bars and welded wire meshes. Some rebar locators also measure the concrete cover and determines the diameter of the bars. A list of suppliers can be forwarded by your distributor upon request.



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## Install the RollAnode

When the area is repaired and clean find appropriated locations between the bars for drilling the holes with a distance as mentioned in design and spec.

Drill holes in the concrete to the recommended diameter and to a depth equal to the anode length plus 15 - 40 mm. Before inserting the anode, fill approximately two-thirds of the hole with the supplied ZAP paste. Insert the anode and press it firmly until the paste fully surrounds it. Do not fill the remaining space with paste - leave sufficient room to cover the hole with mortar.

## Connect anode to reinforcement

Durable connections with the reinforcement can be realised in different ways:

1. By using powder actuated or gas-driven fastening tools. Pre-drilling holes in the concrete cover will make the handling of these type of tools more accurate.
2. By welding. We can supply standard weldable groundings with M6 studs which can be directly welded onto the reinforcement with use of portable welding equipment.



## Check electric connections with a resistance meter

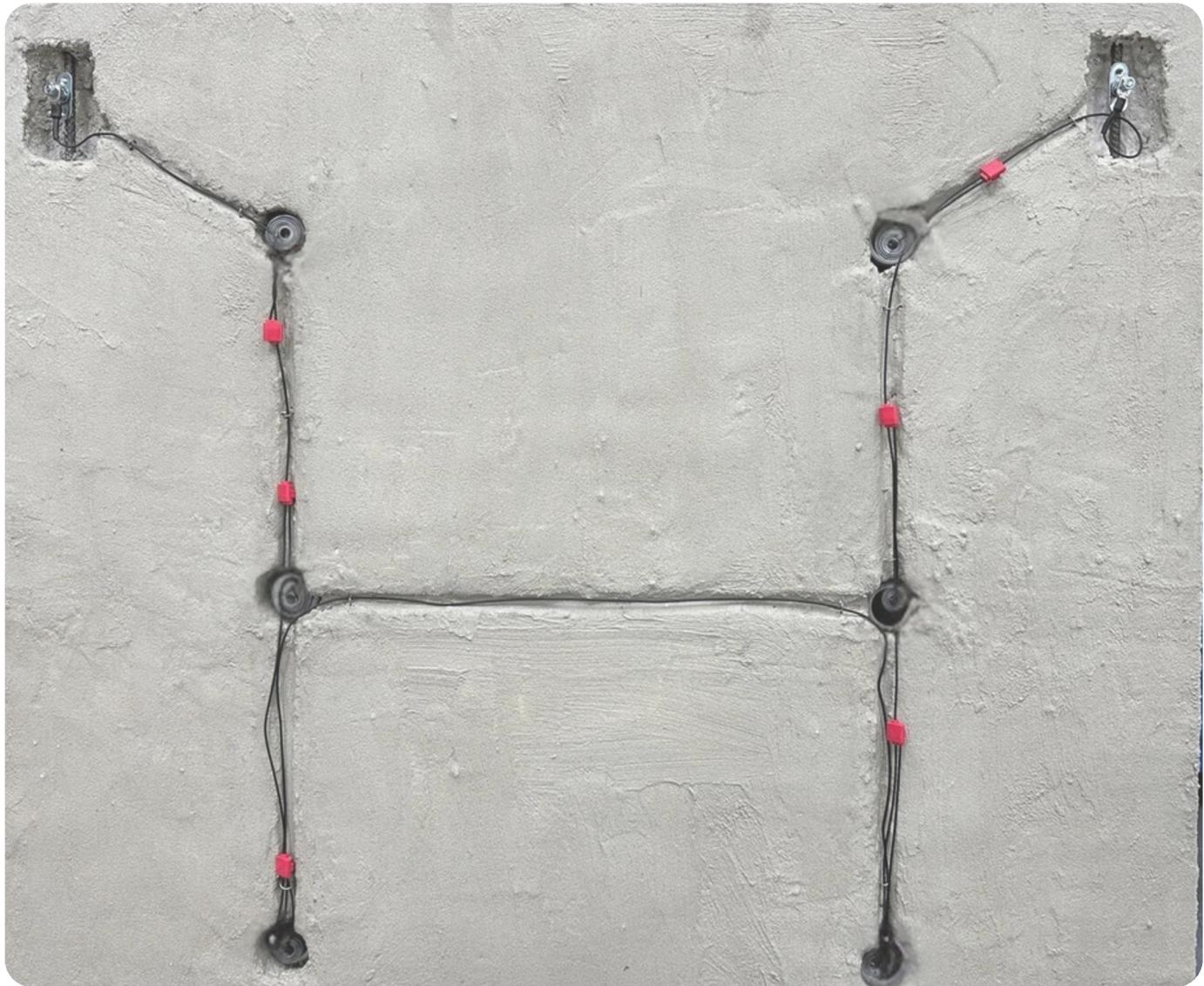
Each electric connection of the anode with the rebar is checked in a similar way as described above. Instead of making the contact with alligator clips directly on the connections, it could be checked by making contact directly with the current distributor bar of the anode and the reinforcement.



## Interconnect all the anodes

Connect all anodes using suitable wire clamps or other durable connection methods. Apply heat shrink tubing to protect the connections and ensure long-term durability. For more details, refer to our Guidelines for Cables in CP Systems.

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As shown above, a complete zone installation with 6 RollAnodes and 2 negative (rebar) connections.

We always recommend using at least two rebar connections per zone. The configuration depends on whether a main stringer cable is used or if each RollAnode is connected in series. Be aware that in series connections are more susceptible to failure over time, as a single faulty link can interrupt the entire circuit.

### Patch the concrete

In most cases, the anode holes are finished with mortar to keep everything covered and sealed, preventing any moisture ingress. If necessary, caps can be installed on the holes to allow for future removal or replacement of the anodes. There are no specific requirements for how or with what type of mortar the RollAnodes should be covered; this applies only to the cover itself.

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## Recommendations

We always recommend performing an installation test zone with the anodes before application if it is a contractors first application.

There are many different application methods, and each contractor may have their own approach. For applying the mortar and paste into the boreholes, a variety of machines or specialized caulking guns for these applications are available, which can be very useful.

## Monitoring

If required reference electrodes (RE) which are suitable for concrete are applied for monitoring purposes. Reference electrodes can be supplied together with the anodes upon request. For proper data storage and data interpretations contact your supplier or refer the international standard EN/ISO12696.



## Pitfalls

Not or insufficiently cleaning of the boreholes may cause poor adhesion of the mortar (electrolyte) in the boreholes. As a result, the system may work less effectively due to higher electrolytic resistance.

The same issue can occur with insufficient filling of the boreholes with mortar. In some cases, parts of the Galvex Anode may not have contact with the electrolyte at all. Make sure that the whole surface of the Galvex anode comes in contact with the mortar so it has a good electrolytic contact with the concrete.

All technical data stated in this Technical Data Sheet are based on laboratory tests. Actual measured data may vary due to circumstances beyond our control. The information, and, in particular, the recommendations relating to the application and end-use of CorrPRE's products, are given in good faith based on CorrPRE's current knowledge and experience of the products when properly stored, handled and applied under normal conditions in accordance with CorrPRE's recommendations.

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