corrPRE
Special Anodes Manufacturing

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INSTALLATION GUIDELINES

Galvex DI 60 & 100 hybrid

Zinc sacrificial anodes for corrosion control of steel in concrete.

General information

Sacrificial zinc anodes embedded in an ion-conductive self-moistening paste and a conductive geopolymer mortar, for cathodic protection of reinforced concrete structures.

System monitoring can be performed according to international standard EN ISO 12696. Manual or fully automated remote monitoring equipment can be supplied by your supplier together with the anodes on request. Be aware that monitoring equipment designed for impressed current CP systems is also compatible with galvanic CP systems based on zinc sacrificial anodes.

Please note: The anodes are free from toxic or hazardous materials. Nevertheless, we advise using suitable protective measures during installation.

Borehole diameter

We recommend a borehole diameter of at least Ø40mm depending on the type of mortar that is used. But diamters of Ø42-45mm may ease the installation. This should be tested by the contractor before application.

Quick Installation steps

1. Check accessibility of the construction and take precautions if necessary
2. Prepare the concrete surface (large repairs)
3. Localise 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 Galvex DI anodes
7. Connect the reinforcement to the anode
8. Check electrical 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.

Necessities

Tools

- Concrete hammer
- drill Ø40-45mm
- LCR-meter
- Digital multi meter
- Pliers
- Crimping tool
- Blower
- Mortar preparing equipment

Consumables

- Galvex DI Anodes
- Mineral based mortar
- Wire crimps
- Documentation

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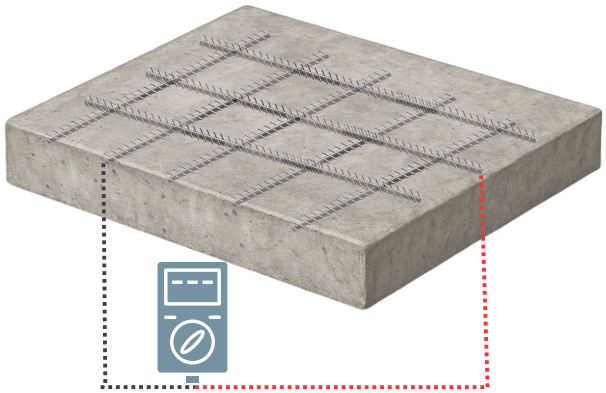
Check electric continuity of the reinforcement

After making the right mechanical connection check the electric continuity of the reinforcement using a digital multimeter. Contact is obtained by using so called alligator clips. Switch the central knob of the multimeter to the resistance position (Ω) and measure the resistance. The criterion for continuity is less than 1 Ω (DC-) resistance. If required, perform additional potential mapping



Check electric continuity of the reinforcement

Localize the reinforcement (if necessary)

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

Operational steps

Make a grid to drill holes according to the CP-design specification.

1. Drill the holes with the specified or tested diameter and depth.
2. After drilling, blow out the boreholes to remove dust and dirt and rinse them thoroughly.
3. Allow the boreholes to dry, but not completely; they should remain slightly moist.
4. Fill the boreholes one-third or half way with a mineral-based mortar to secure the anode in place and to ensure proper electrolytic contact with the concrete.
5. Place the anode into the borehole, press it into the mortar and leave approximately 1 cm space between the end of the borehole and the anode.
6. After placing the Galvex DI, allow the mortar surrounding the anode to cure before closing the hole.
7. Interconnect the Galvex Anodes to each other through the anode wire.
8. Interconnect anode wires with a wire crimp.
9. Attach the wire from the Galvex Anode (or parallel anodes) to the negative steel connection. If monitoring is required, connect it to a junction or monitoring box.
10. Seal the boreholes and slots with a repair mortar.

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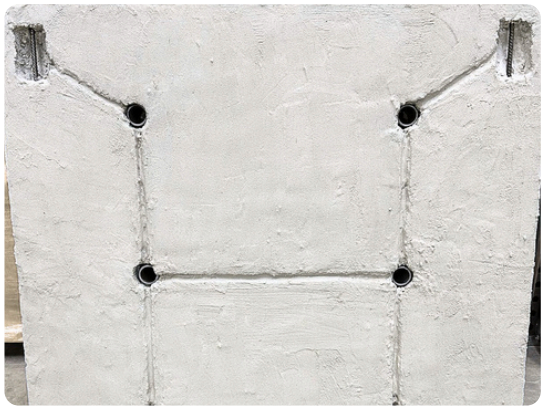
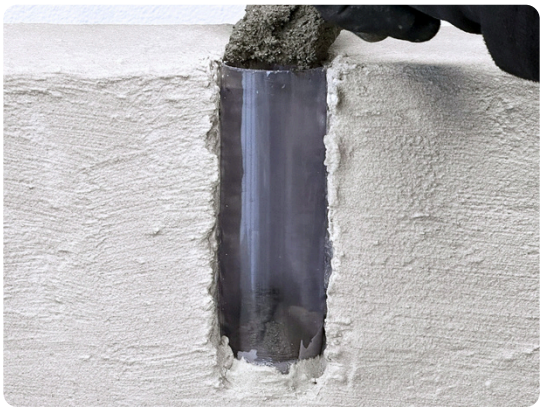


Step 1. Drill holes with the specified diameter *(e.g., Ø40mm)* and depth.

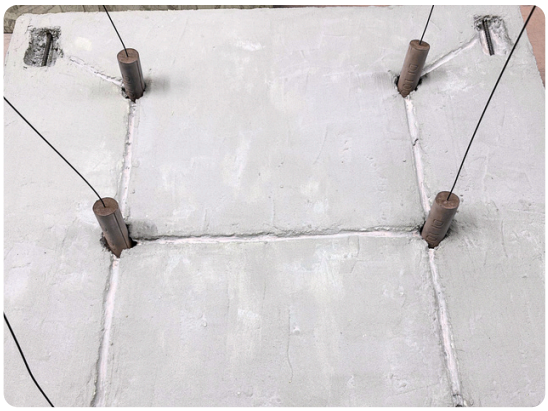
Step 2. Clean boreholes: blow out dust, rinse and keep slightly moist (not dry).



Step 3. Fill with mortar to secure the anode and ensure electrolytic contact.

Step 4. Insert anode into borehole, leaving ~1 cm gap at the end.

Step 5. Allow mortar to cure around the Galvex DI before closing the hole.



Step 6. Place all anodes in the boreholes

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Step 7. Interconnect anodes via anode wire and secure with wire crimps.

Step 8. Use durable connections to the reinforcement.

Connect anode to reinforcement

Durable connections to the reinforcement can be made in several ways:

1. By using powder actuated or gas-driven fastening tools. Pre-drilling holes in the con-crete cover will make the handling of these types of tools more accurate.

2. By welding. Standard weldable grounding studs (M6 or M8) can be supplied, which can be directly welded onto the reinforcement using portable welding equipment.

3. Threaded studs could be welded also directly onto the steel reinforcement bars.

Check electric connections with a resistance meter

Each electrical connection between the anode and the rebar should be checked with a resistance meter. This is very important because if connections have to high of a resistance the anode may fail.

The result of the measurement should always be less then 1 ohm.

Patch the concrete

Use of CP approved mortars.These mortars are specifically tested and certified for cathodic protection applications, ensuring proper conductivity, durability, and long-term compatibility with both the concrete and the anode.

Ensure the mortar in repair spots provides full contact around both the anode and the rebar.

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Recommendations

We always recommend performing an installation test with the anodes before application to verify whether the mortar and the borehole diameter are sufficient. Factors such as the type of concrete or the local climate can affect the performance of the mortar that is used. In some cases, it may be necessary to use a different mortar for a proper installation or even adjust the borehole diameter, for example in soffit installations.

There are many different application methods, and each contractor may have their own approach. For applying the mortar into the boreholes, a variety of machines or specialized caulking guns for mortar 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.

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