**Vector®**

**Ebonex®**

Discrete Cathodic Protection Anodes for Reinforced Concrete Structures and Steel Framed Buildings

**Description**

Ebonex is a discrete Impressed Current Cathodic Protection (ICCP) anode, specifically designed to protect reinforced concrete and steel-framed structures from corrosion. The anode utilizes an innovative ceramic/titanium composite, combined with an integral gas venting system. The anode system includes Ebofix grout, a high density, acid buffering grout used for long-term performance. Ebonex discrete anodes are available in a range of sizes to provide excellent design flexibility. Ebonex discrete anodes are capable of exceeding the 100mV potential shift requirement for effective Cathodic Protection, as defined in NACE (National Association of Corrosion Engineers) standard RP0290 and the European Standard EN12696 - Cathodic Protection of Steel in Concrete.

**Applications**

- Bridges
- Tunnels
- Parking garages
- Heritage structures
- Marine structures
- Steel framed buildings

**Features and Benefits**

- **Gas venting** - no buildup of anodic gases. Can be installed under fiber-reinforced polymer (FRP) strengthening systems, membranes, and coatings.
- **Embedded installation** - no added dead weight or increase to physical dimensions of structure from thick overlays.
- **Long lasting** - longest life expectancy of any discrete CP anode - in excess of 50 years depending upon design.
- **Highest level of protection** - capable of satisfying the 100mV depolarization criteria for effective cathodic protection.
- **Proven technology** - field verified performance.
- **Cost competitive** - compared to other types of ICCP anodes.
- **Deep installation** - addresses multi-levels of steel and difficult access.
- **High operating current** - suitable for use in areas of high steel density.
- **Versatile** - can be used in many sectors within the construction industry.

**Specification**

Where indicated, cathodic protection to reinforced concrete elements shall be provided by Ebonex discrete composite anodes as supplied by Vector Corrosion Technologies. Ebonex anodes shall be maintained at current densities of up to 900mA/m² (of anode surface), for the specified design life. The Ebonex discrete anodes shall be gas vented and shall be grouted in place using Ebofix grout, a thixotropic high density, acid buffering grout used for long-term performance.

**How It Works**

Ebonex works by distributing sufficient electrical current to overcome ongoing corrosion in the structure. Ebonex anodes are connected to an external DC power supply, which provides the electrical current that mitigates corrosion activity. The anodes are connected to the positive (+) terminal. According to industry standards, an ICCP system is considered to be providing cathodic protection when the steel is sufficiently polarized to result in a 100mV depolarization.

**Level of Protection**

<table>
<thead>
<tr>
<th>Description</th>
<th>Ebonex®</th>
</tr>
</thead>
<tbody>
<tr>
<td>Corrosion Prevention Mitigates initiation of new corrosion activity</td>
<td></td>
</tr>
<tr>
<td>Corrosion Control Reduces on-going corrosion activity</td>
<td></td>
</tr>
<tr>
<td>Cathodic Protection Reduce or eliminate on-going corrosion activity</td>
<td></td>
</tr>
</tbody>
</table>

**Anode Diameter**

<table>
<thead>
<tr>
<th>Anode Diameter</th>
<th>Current rating per 100 mm Anode length** (mA)</th>
</tr>
</thead>
<tbody>
<tr>
<td>8mm Ebonex</td>
<td>2.0</td>
</tr>
<tr>
<td>10mm Ebonex</td>
<td>2.8</td>
</tr>
<tr>
<td>12mm Ebonex Plus, 18mm Ebonex</td>
<td>5.1</td>
</tr>
<tr>
<td>18mm Ebonex Plus, 28 Ebonex</td>
<td>7.9</td>
</tr>
</tbody>
</table>

**Installation Instructions**

**Preparation**

Ebonex discrete anodes are installed in pre-drilled holes 4 to 8 mm larger than the nominal anode diameter and typically no further than 600 mm apart. The holes and Ebonex discrete anodes should be located to minimize their proximity to the steel reinforcement in order to provide an even current distribution to the steel within the structure.

**Ebonex anodes with electrical connectors**
Precautions
In chloride contaminated structures, particular attention should be paid to the control of applied voltage. Potentials greater than 7 volts should not be applied to the titanium connecting wires. Performance of the Ebonex discrete anode is dependent upon the correct design, installation and maintenance of the cathodic protection system. For further information consult the local Vector office.

Packaging

<table>
<thead>
<tr>
<th>Component</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ebonex discrete anode</td>
<td>Anode with 500 mm tail wire (packaging varies depending upon the anode dimensions)</td>
</tr>
<tr>
<td>Ebofix grout</td>
<td>10 kg bags</td>
</tr>
<tr>
<td>Wire pack</td>
<td>Titanium feeder wire 40 m x 1.5 mm diameter</td>
</tr>
<tr>
<td>Crimping pack</td>
<td>80 titanium crimps</td>
</tr>
<tr>
<td>Connectors</td>
<td>50 electrical connectors</td>
</tr>
<tr>
<td>Venting pack</td>
<td>20 m PVC tube plus 40 connecting T-pieces</td>
</tr>
<tr>
<td>Crimping tool</td>
<td>Crimping tool plus plattens</td>
</tr>
</tbody>
</table>

Storage
Store both the Ebonex discrete anodes and Ebofix grout in dry conditions in their original unopened packaging. Ebofix grout has a shelf life of 12 months.

Health and Safety
There are no known health hazards associated with Ebonex discrete anodes. Ebofix grout is alkaline and should not come into contact with the skin and eyes. Avoid inhalation of dust during mixing. Gloves, goggles and dust mask should be worn. If contact with skin occurs, wash with water. Splashes to eyes should be washed immediately with plenty of clean water and medical advice sought. Ebonex discrete anodes and Ebofix grout are non-flammable.

Related Documents
A range of related Ebonex documents are available. For more information, contact Vector Corrosion Technologies.

About Vector
Vector Corrosion Technologies takes pride in offering technically advanced, cost effective corrosion protection solutions to extend the service life and improve the durability of concrete and masonry structures around the world. Vector has earned numerous project awards and patents for product innovation and is committed to a safe, healthy and sustainable environment. For additional information or technical support, please contact any Vector office or our extensive network of international distributors.

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