

DuoGuard™ Hybrid Anode™

The DuoGuard hybrid anode range is applied as a remedial measure to reinforced concrete structures suffering chloride-induced steel corrosion.

HOW IT WORKS

The DuoGuard hybrid anode is a dual technology anode based on the use of a sacrificial metal in both an impressed current and sacrificial anode role. Initially an impressed current is driven from the DuoGuard anode to the steel using a temporary power supply. In the process corroding sites on the steel are moved to the surface of the installed anode. This occurs because the treatment generates inhibitive hydroxide ions at the steel and aggressive chloride ions are drawn from the concrete to the installed anode. At the end of the brief impressed current treatment the DuoGuard anode is connected to the steel to act as a sacrificial anode in a long term preventative role.



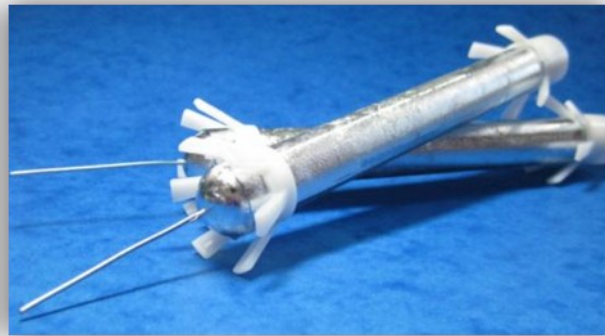
DuoGuard™ 175



DuoGuard™ 350



DuoGuard™ 500



DuoGuard™ 750



DuoGuard™ 750

DuoGuard™ Hybrid Anode™

Features

- Simple, single unit
- Straight-forward installation
- No long term power supply needed
- Targeted application
- A variety of sizes to suit the structure
- Large charge capacity > 125 to 450 kC*
- High impressed current density > 1000 mA/m²*
- Long life, up to 50 years*

Advantages

- Rapidly halts steel corrosion to eliminate further concrete spalling
- Short on-site treatment minimises structure downtime during application
- Minimal long term costs
- Performance can be monitored
- Accidental electrical shorts easily broken
- Cost-effective corrosion control solution

Application

Application shall be in accordance with the 'Installation Guidelines' and is summarised as follows:

DuoGuard anodes are installed following guidelines in EN12696:2000 and CEN/TS 14038-1:2004(E). The anode units are typically applied at a density of 4-9 units/m² concrete surface, at a spacing of 350-500 mm between anodes.

DuoGuard anodes are typically installed into pre-drilled holes of 30 mm diameter using **DuoCrete SD** embedding mortar.

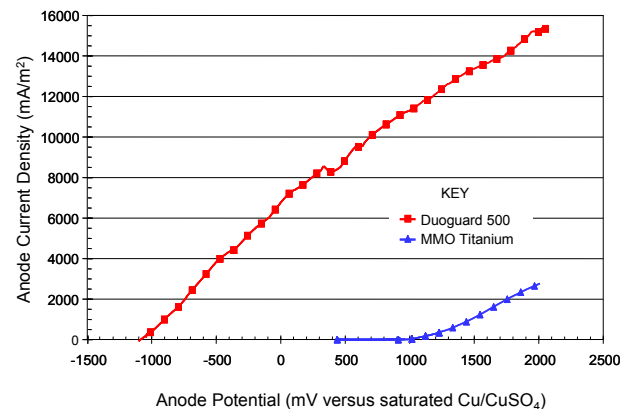
The individual DuoGuard units are then connected electrically to a feeder wire which runs to the temporary power supply for the impressed current phase of the treatment (typically 1 week) during which time the DuoGuard anodes distribute ~50-500 kC/sqm steel surface.

After 1 week the feeder wire is removed from the temporary power supply and connected to the reinforcing steel. The DuoGuard units are now operating in galvanic mode, maintaining the steel in a passive state.

The size of each treated area on a structure may be varied to suit the client's requirements.

Technical Data

The DuoGuard anode offers the significant advantage of running at relatively low driving voltages in impressed current mode versus the commonly used MMO anode. A polarisation curve for a DuoGuard™ 500 anode is shown below and demonstrates the high current densities possible at low drive voltages.



The lifetime of the unit can be estimated from knowledge of the anode composition and total current requirement: a unit of 110 x 18 mm can offer a lifetime of up to 50 years*.

*dependent on local site conditions, including chloride concentration, concrete properties, humidity and temperature.

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Product Data

DuoGuard™ Dimensions

DuoGuard 175: 37 mm long x 18 mm diameter
DuoGuard 350: 77 mm long x 18 mm diameter
DuoGuard 500: 110 mm long x 18 mm diameter
DuoGuard 750: 165 mm long x 18 mm diameter
DuoGuard 1000: 220 mm long x 18 mm diameter

Quantity of anodes per box: 25

Storage : Store dry. Do not allow contact with oxidizing materials.

Specification Clause

The discrete anode shall be DuoGuard, a sacrificial alloy anode with an integral titanium electrical connection which can operate in both impressed current distribution and sacrificial anode modes. The DuoGuard anode shall be embedded in DuoCrete SD mortar.

Ancillary Material

The following ancillary materials are also available from CPT Ltd;

- DuoCrete SD embedding mortar
- MN15 Manganese dioxide reference electrodes
- Monitoring equipment

Limitations

In order that suitable current flow and lifetime be achieved from the DuoGuard anode, certain practical considerations should be taken into account.

The patch repair material cover for the DuoGuard unit must be a minimum depth of 20 mm. When installed in a patch repair, the resistivity of the repair material should be in the range 50-200% of the parent concrete.

Any discontinuous steel should be either electrically bonded to or electrically isolated from the system negative.

Any cracks or delaminations in the concrete which affect ionic current flow will affect performance of the DuoGuard unit and should thus be pre-treated.

During installation, electrical shorts between the DuoGuard anode and other metal components must be avoided.

The time to achieve passivity will be dependent on site conditions. Depolarisation of treated steel will be slower in moist conditions

Health and Safety

Protective clothing must be worn. Wear gloves and eye protection at all times.

Design of the DuoGuard system should be undertaken by a competent designer.

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