

### Description

Duoguard 500 is a discrete anode applied as a remedial measure to reinforced concrete structures suffering attack from chloride salts.

The Duoguard 500 anode is a dual technology anode based on the use of a sacrificial metal in both an impressed current role and a sacrificial anode role. Initially an impressed current is driven from the Duoguard 500 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 500 anode is connected to the steel to act as a sacrificial anode in a long term preventative role.



### Features

- Simple, single unit
- Straight-forward installation
- No long term power supply needed
- Targeted application
- Small size 110 mm long x 18 mm diameter
- Large charge capacity > 450 kC\*
- High impressed current density >1000 mA/m<sup>2</sup>\*
- Long life, up to 50 year Ah capacity\*

### Advantages

- No long term maintenance
- Rapid inhibition of steel corrosion eliminates 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 summarized as follows:

Duoguard 500 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/sqm concrete surface, at a spacing of 350-500mm between anodes.

Duoguard 500 anodes are typically installed into pre-drilled holes of dimensions 30mm dia x 150mm deep, using an embedding mortar, Ducrete SD mortar (see separate data sheet).

The individual Duoguard units are then connected electrically to a feeder wire which runs to the D5A temporary power supply. The D5A power supply is typically activated for 1 week during which time the Duoguard 500 anodes distribute ~50-500kC/sqm steel surface.

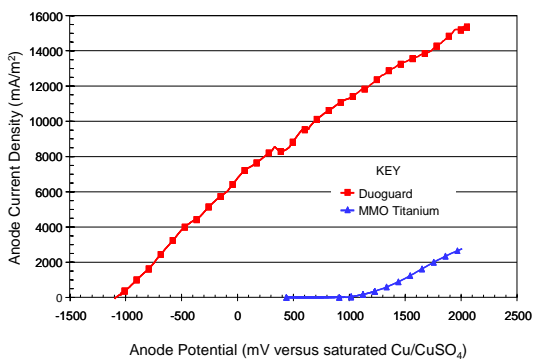
After 1 week the feeder wire is removed from the D5A temporary power supply and connected to the reinforcing steel. The Duoguard 500 units are now operating in galvanic mode, maintaining the steel in a passive state.

The size of each treated area on a structure may vary to suit client requirements.

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

**Technical Data**

The Duoguard 500 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 prototype Duoguard anode is shown below and demonstrates the high current densities from the anode possible at low voltages.



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

**Product Data**

Packaging : 25 units per box  
 Storage : Store dry. Do not allow contact with oxidizing materials.

**Specification Clause**

The discrete anode shall be Duoguard 500, a sacrificial alloy anode with an integral titanium electrical connection which can operate in both impressed current distribution and sacrificial anode modes. The Duoguard 500 anode shall be embedded in Duocrete SD mortar.

**Ancillary Materials**

The following ancillary materials are also available from CPT Ltd;

- Duocrete SD embedding mortar
- Manganese dioxide reference electrodes
- Monitoring equipment

**Limitations**

In order that suitable current flow and lifetime be achieved from the Duoguard 500 anode, certain practical considerations should be taken into account.

Patch repair material cover to the Duoguard 500 unit must be a minimum of 20mm. When installed in a patch repair, the resistivity of the patch 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 500 unit and should thus be pre-treated.

During installation, electrical shorts between the Duoguard 500 anode and other metal components should 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.

**Contact details**

For technical and sales support please contact us at;

E-mail: [nigeld@cp-tech.co.uk](mailto:nigeld@cp-tech.co.uk)

Concrete Preservation Technologies Ltd  
 6 William Lee Buildings  
 Nottingham Science and Technology Park  
 University Boulevard  
 Nottingham  
 England  
 NG7 2RQ

Tel: +44 (0)870 7495131  
 Fax: +44 (0)870 7945132

Or contact Nigel Davison direct on  
 +44 (0)784 0800910