TECHNICAL DATASHEET

DuoGuard™

A hybrid anode system which acts to stop and control corrosion of reinforcing steel in concrete.

Uses

DuoGuard is used to provide corrosion protection to sound but contaminated reinforced concrete elements to minimise maintenance and extend the life of structures.

Advantages

- Compact size
- No long term power supply needed
- Large charge capacity > 100 to 900 kC
- High impressed current density >1000 mA/m2*
- Long life with minimal long-term costs
- Rapidly halts steel corrosion to eliminate further concrete spalling
- Suitable for carbonated and chloride contaminated structures
- Pre-mixed bedding mortar in handy cartridges
- Measurable performance
- Up to 50 year service life*

Description

DuoGuard™ is a dual technology hybrid anode™ utilising a sacrificial metal in both an impressed current and galvanic anode role. Initially an impressed current is driven from the DuoGuard anode to the steel using a temporary power supply and 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.

Standards Compliance

BS EN ISO 12696:2016 cathodic protection of steel in concrete.

Application

Design of the DuoGuard system shall be undertaken by a competent designer. Application shall follow the guidelines of BS EN ISO 12696:2016 and DD CEN/TS 14038-2:2011 and shall be in accordance with the Installation Guidelines, summarised as follows:

The anode units are typically installed into pre-drilled holes of 30mm (1¼") diameter, using DuoCrete SD embedding mortar, at a density of 4-9 units/m^2 concrete surface and at a spacing of 350mm (13¾") to 500mmm (20"), depending on local conditions and steel density.

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 anodes distribute ~50-500kC/sqm steel surface.

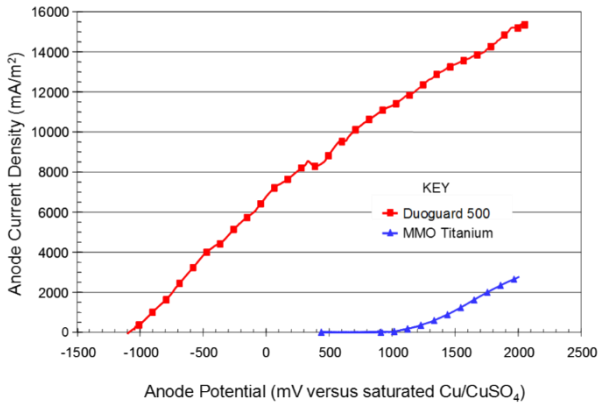
After the impressed current phase the feeder wire is removed from the temporary power supply and connected to the reinforcing steel. The DuoGuard units are now operating in galvanic mode, maintaining the steel in a passive state.

Properties

Product	Diameter	Length	Zinc Weight
DuoGuard 100	18mm (¾")	32mm (1¼")	48g
DuoGuard 175	18mm (¾")	42mm (1⅝")	65g
DuoGuard 350	18mm (¾")	77mm (3")	120g
Duoguard 400	18mm (¾")	95mm (3¾")	160g
DuoGuard 500	18mm (¾")	115mm (4½")	198g
DuoGuard 750	18mm (¾")	170mm (6¾")	280g
DuoGuard 1000	18mm (¾")	223mm (8¾")	370g

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.



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 20mm (⅞"). 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 delamination in the concrete which affect ionic current flow will affect performance of the DuoGuard unit and should be pre-treated. During installation, electrical shorts between the DuoGuard anode and other metal components must be avoided.

*Service life and current density will depend on local site conditions including chloride contamination, concrete properties, humidity and temperature.

Packaging

25 units per tub plus polymeric screw connectors.

Storage

Store dry

Tubs should only be opened when the product is required.

The lid of the tub should be closed at all times when not in use. Do not remove silica gel.

Do not allow contact with oxidizing materials.

Ancillary Materials

DuoCrete SD Mortar

DuoCrete P Mortar

MN15 Manganese dioxide reference electrodes

XLPE coated titanium wire

Monitoring equipment

Precautions - Health and Safety

Health and safety protective clothing, gloves and eye protection must be worn at all times.

Specification Clause

The discrete anode shall be a sacrificial alloy anode with an integral titanium electrical connection which retains the option to operate in both impressed current and sacrificial anode modes. The anode shall be embedded within a drilled hole of maximum 32mm (1 5/16") diameter using a factory pre-mixed backfill mortar of pH<12.8 which remains pliable for a minimum of 48 hours.

Supplied and Distributed by

Duoguard Australia Pty Ltd
Ph -1300782501
www.Duoguard.com.au

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For technical and sales support please contact us at:
Concrete Preservation Technologies
1 Palmer Business Court, Manor House Road, Nottingham, UK, NG10 1LZ
(T) +44 (0) 115 9724 238 (E) general@cp-tech.co.uk
www.cp-tech.co.uk