The durAnode4 is the result of constant development of cathodic protection and it contains some unique features.

All exposed parts are made of titanium to ensure high durability, and may be completely hidden. Thus it can also be used in historic buildings to protect steel girders and places where weight and dimension of structures are important, such as car parks or other types of bridges. It may also be used for hot spot protection, which can reduce the costs without reducing the protection levels.

It consists of a titanium anode head and an active anode of MMO coated titanium.

<table>
<thead>
<tr>
<th>Colour</th>
<th>Resistance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Green</td>
<td>100 Ohm</td>
</tr>
<tr>
<td>Red</td>
<td>220 Ohm</td>
</tr>
<tr>
<td>Blue</td>
<td>510 Ohm</td>
</tr>
<tr>
<td>Black</td>
<td>1000 Ohm</td>
</tr>
<tr>
<td>Yellow</td>
<td>2000 Ohm</td>
</tr>
</tbody>
</table>

The size of the resistor is shown by the coloured ring.

durAnode4 standard with yellow cap that protects the head during embedding.
Important features of the anode head
- By using a built-in resistor an adjustable and optimal current output and distribution can be established.
- This resistor, combined with a relatively small sized anode area, prevents major differences in current output, and allows a higher average current density than for a system with large anodes and no pre-resistor.
- The pre-resistor prevents short circuit of all anodes on a string in case of one single short circuit, and offsets the output in concrete at varying conductivity and this reduces the number of zones.
- Several durAnodes may be connected on a single feeder wire, reducing the installation work by using a screw of Titanium that penetrates the insulation and makes a connection to the feeder wire. This means that the wire should not be stripped but just placed in the anode head.

Specification for titanium anode head
Nominal head diameter: 8 mm
Nominal head length: 38 mm (others can be provided)
Composition: ASTM B348 grade 2 titanium
Description: Threaded internal in the upper end for the penetrating screw. Stub designed for welding to MMO coated perforated tube

Important features of the active anode
- The active anode may be made in any length from 100 mm to several metres, and is micromesh folded to form an ø7-8 mm tube.
- By using the micromesh the electrical conductance between the primary anode and the grout is improved compared to a massive rod. Also as there is mortar on the inside of the tube the amount of buffering capacity of the grout is effectively doubled.

Specification for active anode
Nominal tube diameter: 8 mm, tolerance ±1 mm
Standard lengths: 100 mm to 550 mm (others can be provided), tolerance ±2% of length
Composition: ASTM B265-08B grade 1 titanium
Coating composition: Mixed Metal Oxide (MMO)
Resistance: 0.22 ohm per linear meter
Operating voltage: In theory the operating voltage of titanium in chloride contaminated concrete is approx 10V. In practice the max. voltage is 5-6V.

Further Information
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Design life
From Lida® De Nora literature (DNOx CP Lida® 10-07) which gives a maximum current rating of 110 mA/m² for anode surface area (equivalent to approx. 5.3 mA per m of ribbon length).

From Lida® literature life expectancy of the anode is greater than 100 years at 110mA/m². At 450mA/m² life expectancy is greater than 25 years.

Current output
FORCE Technology recommends a maximum short time current density of 450mA/m² and 5V maximum voltage. This maximum output equates to 2.4 mA per 100 mm of active length. FORCE Technology has a specially formulated grout with very good flow ability and shrinkage properties and this is used as part of the durAnode system. It should be noted that the current output of the anode is strongly affected by the resistance of the concrete and the maximum voltage of 5V often limits the anode output.