DE NORA LIDA TUBULAR ANODE

IMPRESSED CURRENT CATHODIC PROTECTION

DESCRIPTION

LIDA® anodes utilize an innovative and patented design: a titanium base with a mixed metal oxide conductive coating. This coating forms a solid solution with the titanium substrate and is an excellent electronic conductor. The mixed oxides are formed on the surface through a process of thermal decomposition, creating an oxide film which is typically anhydrous and almost insoluble in acids. Thermal control of this process causes the mixed oxides to recrystallize, further increasing their chemical stability.

These anodes are often referred to as composite anodes. Physically, this term refers to a ductile, corrosion resistant base metal covered with the highly conductive stable film described above. The base metal, titanium, provides the required toughness for the system. The titanium substrate is classified as a "valve metal" or film forming metal. Such metals in their natural state are protected by thin, self-healing, tightly adherent oxide films which are acid resistant and resist the passage of current in the anodic direction. Thus, if an attempt is made to operate a valve metal as an anode, it is necessary to raise the potential of the valve metal surface to a high value in order to pass significant current through the anode.

Then, in order to use titanium as a realistic impressed current anode, the growth of the insulating oxide must be prevented. The electro-conductive film applied to the surface of titanium satisfies this requirement and permits the flow of electrical current at a low and steady voltage. The wear rate of the **LIDA® anodes** is extremely low and uniform. The thickness of the mixed oxide film decreases linearly with time at all points on the surface. The wear rate of the anode is between 3 and 6 milligrams/ampere-year, and is constant over all current densities in general or frequent use.
De Nora LIDA® anodes are resistant to abrasion with a hardness of approximately 6 on the Mohs scale. De Nora mixed metal oxide anodes are available for soil, fresh water, mud and seawater environmently.

These anode systems function reliably in cathodic protection systems in the soil as deep well or shallow groundbeds as well as in natural water applications.

LIDA® anodes for soil application are available in two lengths, and two diameters, to meet a range of current output requirements: 50 and 100 cm (20 and 40 inch) and two diameters, 1.6 and 2.5 cm (.64 and 1.0 inch). They are available as a single-unit assembly, or as a multi-unit assembly on a single cable.

De Nora wire or tubular anodes are also available as canistered anodes, surrounded by carbonaeous backfill to minimize installation time and handling on site.
De Nora mixed metal oxide anodes are also available in wire, rod, mesh, ribbon, and disc form for a variety of impressed current CP applications. According to OSHA Regulations, the precious metal coating and the substrate to which it is applied constitute and "Article." An "Article" is defined as being a manufactured item which is formed with specific shape or design during manufacture which has end-use function dependent in whole or in part upon its shape or design during end-use and which does not release or otherwise result in exposure to a hazardous chemical under normal conditions of use.

An "Article" is specifically excluded from the scope of the Hazard Communication Rule. As such, no MSDS would be required for sale of coated substrates.

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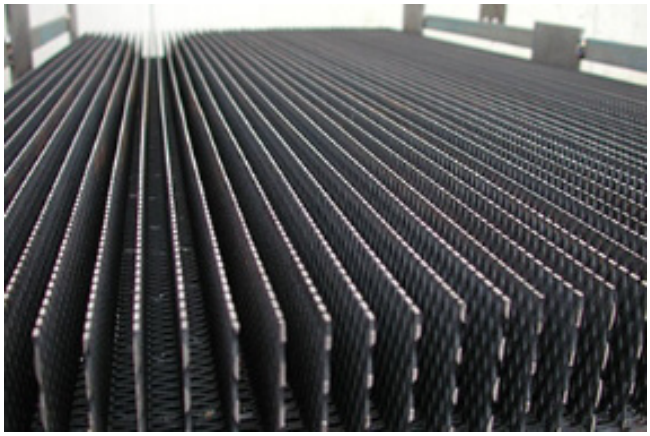
RELIABILITY

In choosing the **De Nora LIDA® tubular anode**, you have selected the most durable and reliable product in the industry for your cathodic protection needs. De Nora LIDA® tubular anode strings are backed by a five-year, no hassle warranty. Design, assembly and installation factors have been carefully considered so that your time and costs are minimized as much as possible. available.



Saving Ease of Installation	Special Services
In many cases, De Nora LIDA® mixed metal oxide tubular anodes offer savings of 15 - 35% over competitive anodes on an installed cost basis.	Farwest offers groundbed design services to customers. Our experienced personnel can assist you in designing the most efficient, cost-effective approach for many unique applications.
De Nora LIDA® anode-cable assemblies are easy to handle, transport and install because of their unique flexibility. It makes your job on-site easier as well.	

QUALITY ASSURANCE

From the application of the coating to the design of the shipping crate, De Nora's attention to quality sets these anodes apart. The coating undergoes stringent quality control examination by SEP, X-ray and adhesion test methods throughout the coating process to assure proper thickness and application. Anode strings are 100%t tested for the quality of electrical conductivity and integrity of the seal. Personal attention to each detail of the quality control process assures you a superior, reliable product. De Nora offers one of the best anode warranties available.

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LIDA CRIMP

Anode to cable sealing at each end

Both ends of the tubular anode are sealed over the insulated cable by applying 50 tons of hydraulic pressure. This crimping process eliminates the need for mastic or resin sealants.

Anode-to-cable electrical connection at center

Electrical connection between the tubular anode and the power cable wire is achieved by sliding the tube onto the cable and crimping a section of the tube at mid-length around a stripped portion of the cable.

Many impressed current anodes are connected to the cable with resin-based seals which may develop cracks or lose adhesion to the cable or anode. Moisture penetration also may occur, resulting in loss of electrical contact. De Nora LIDA® anodes are connected with a special crimping process which improves the life of the tubular anode system. On the surface, the crimp on the ends and in the middle appear the same. Yet they serve different purposes and are made differently. The center crimp makes electrical contact with the cable while the end crimps form a moisture-resistant seal.

ANODE	DIAMETER	LENGTH	WEIGTH	SURFACE AREA
2.5/50	1.00" 2.5cm	19.7" 50cm	0.40lbs / 0.18kg	0.42 ft^2 / 0.039 m^2
2.5/100	1.00" 2.5cm	39.4" 100cm	0.77lbs / 0.35kg	0.84 ft^2 / 0.079 m^2

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