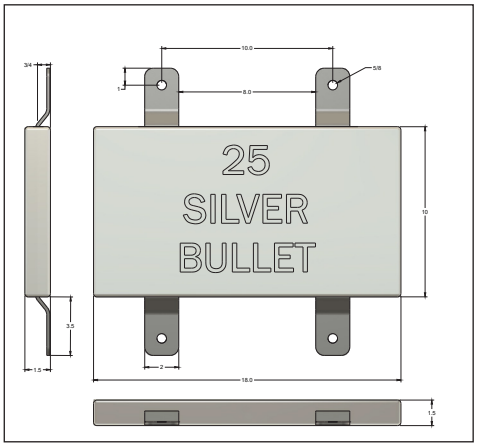
Silver Bullet® Al Anodes

Bulk Aluminum Anode for Marine Piles

DESCRIPTION

Silver Bullet aluminum anodes are a cost effective and environmentally friendly solution for protection of submerged pile sections and have been specifically designed for use with Vector's Galvashield® Jacket Systems. The 25 lb. (11.3 kg) mil-spec aluminum alloy will provide over 20 years of protection to most concrete and steel piles without contributing to marine life zinc toxicity. The modular design allows for additional Silver Bullet anodes to be added to extend the service life of the pile system.



Galvashield Silver Bullet 25 lb. (11.3 kg) bulk aluminum anode.

APPLICATIONS

The Silver Bullet Al anode is most effective in seawater and brackish waters with salinity greater than 4 psu:

Typical applications include the galvanic protection of:

- reinforced concrete piles
- prestressed concrete piles
- jacketed steel pipe and H-piles

Alternative design services are available for steel piling and fresh water systems.

** As with all galvanic protection systems, service life extension is dependent upon proper design by a competent engineer and a number of factors including reinforcing steel surface area, length of pile, concrete resistivity, water salinity, alloy composition, temperature, anode mass, and anode shape.*

FEATURES AND BENEFITS

- **Versatile** - can be used with all Galvashield Jacket Systems.
- **Low maintenance** - requires no external power source or system monitoring.
- **User friendly** - secured to the surface of the structure. No costly concrete removal work required.
- **Efficient** - higher current density than zinc.
- **Light weight** - nearly half the weight of a standard bulk zinc anode.
- **Site support** - on-site training and technical service available from factory-trained cathodic protection technicians.
- **Measurable** - anode performance can be easily monitored if required.
- **Long Lasting** - 20+ year designed service life* for most piles.
- **Replaceable** – new Silver Bullet anodes can be easily swapped in once they have reached the end of their service life.
- **Minimal downtime** - system can be generally installed without major disruption of operations.
- **Environmentally friendly** - aluminum bulk anodes are not considered toxic to marine life by the EPA.

DESIGN CRITERIA

STEP 1: PILE SIZE AND LENGTH The total surface area of steel to be protected by the anode is a function of the reinforcement pattern, concrete cover thickness, concrete resistivity, pile size, and submerged length. Larger and longer piles will require more anode mass to achieve the designed service life.

STEP 2: PILE CONTINUITY The next step is to determine if pile-to-pile continuity exists. If pile steel is tied to or touches the pile cap steel, adjacent piles may be electrically continuous with each other. Pile-to-pile continuity must be accounted for in the design of the cathodic protection system, as adjacent piles can draw current from the galvanic protection system and reduce its expected service life.

STEP 3: WATER SALINITY After the physical parameters of the piles are determined, an understanding of water salinity is essential to ensure proper anode alloy selection.

STEP 4: ANODE QUANTITY The mass required for the intended service life must be determined. Vector recommends that the anodes be sized to achieve a minimum 20-year service life at a galvanic current density of 0.5 to 1.0 mA/ft^2 (5 to 10 mA/m^2) of steel surface area.

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SPECIFICATION CLAUSE

Contact Vector Corrosion Technologies for assistance in developing job-specific specifications.

HOW IT WORKS

When two dissimilar metals are coupled together in an electrolyte, the metal with the higher potential for corrosion (more electronegative) will corrode in preference to the more noble metal. In concrete applications, the Galvashield Jacket and Silver Bullet anodes will corrode in favour of the reinforcing steel, thus providing corrosion protection.

INSTALLATION INSTRUCTIONS

The Silver Bullet aluminum anode has been specifically designed for use with Vector's Galvashield® Jacket systems for concrete and steel piles. Please refer to the Galvashield Jacket System Technical Datasheet for installation instructions and structure preparation. An electrical connection must be made to the reinforcing steel that is to be protected. In order for the system to work properly, the steel reinforcement must be electrically continuous to be protected. The Silver Bullet Aluminum Anode is installed below the low tide line a minimum of 1 foot below the bottom of the jacket. To monitor the system, all wiring from the zinc anodes and the bulk anode is run up inside the jacket to the junction box.

The Silver Bullet Al Anode is placed onto the pile and secured according to the engineer. To complete the installation, the lead wires from the anodes in the jacket, Silver Bullet anode(s) and reinforcing steel are connected, and the system becomes operational. The continuous flow of current from the anodes provides galvanic corrosion protection to the reinforcing steel.

PRECAUTIONS

Silver Bullet Al Anodes must be exposed to salt or brackish water to keep the anodes active.

Galvashield DAS Jackets may be part of an overall structure rehabilitation program to extend the service of life of corroding columns and piles. Where structural damage exists, consult a structural engineer.

Galvashield DAS Jackets may be used in conjunction with Vector's extensive line of galvanic corrosion protection products to protect other portions of the structure. For more information on corrosion mitigation strategies and options, contact Vector Corrosion Technologies at Vector-Corrosion.com/contact-us.

HEALTH AND SAFETY

Portland cement concrete and mortar should be handled with suitable gloves and other personal protective equipment in accordance with standard procedures for handling cementitious materials.

ABOUT VECTOR

Vector Corrosion Technologies takes pride in offering technically advanced, cost effective corrosion protection solutions to extend the service life and improve the durability of concrete and masonry structures around the world. Vector has earned numerous project awards and patents for product innovation and is committed to a safe, healthy and sustainable environment.

For additional information on concrete preservation and sustainability, visit **WeSaveStructures.Info.** For additional information or technical support, please contact any Vector office or our extensive network of international distributors.

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