DISSIMILAR METALS IN CONTACT

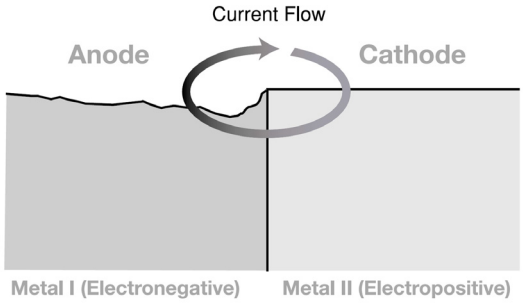
Information on Galvanic Corrosion

Hot-dip galvanized wire mesh is well suited for use in various environments and marine products such as crab traps. However, this wire mesh is sometimes placed in contact with other metals like stainless steel, aluminum, copper, and reinforcing steel.

When two dissimilar metals come into contact in the presence of an electrolyte, such as freshwater or seawater, galvanic corrosion occurs, leading to accelerated deterioration of one metal while the other remains protected.

The Science:
Galvanic corrosion happens because different metals have varying electrical potentials. When two metals with differing electrical potentials are in contact, an electrical current flows between them. The metal with the lower electrical potential (less conductive) becomes the anode and corrodes faster, while the metal with a higher potential (more conductive) serves as the cathode and remains protected. Metals close in the galvanic series have minimal effect on each other, but as the gap widens, the corrosion rate of the anodic metal increases.

The relative surface areas of the metals in contact also play a crucial role in determining the rate of corrosion. A large cathode in contact with a small anode accelerates corrosion at the anode. For example, if galvanized steel wire mesh (anode) is in contact with uncoated reinforcing steel (cathode), the galvanized steel will corrode faster. This is due to the galvanic corrosion process, anode experiences accelerated deterioration in the presence of an electrolyte, such as freshwater or seawater.



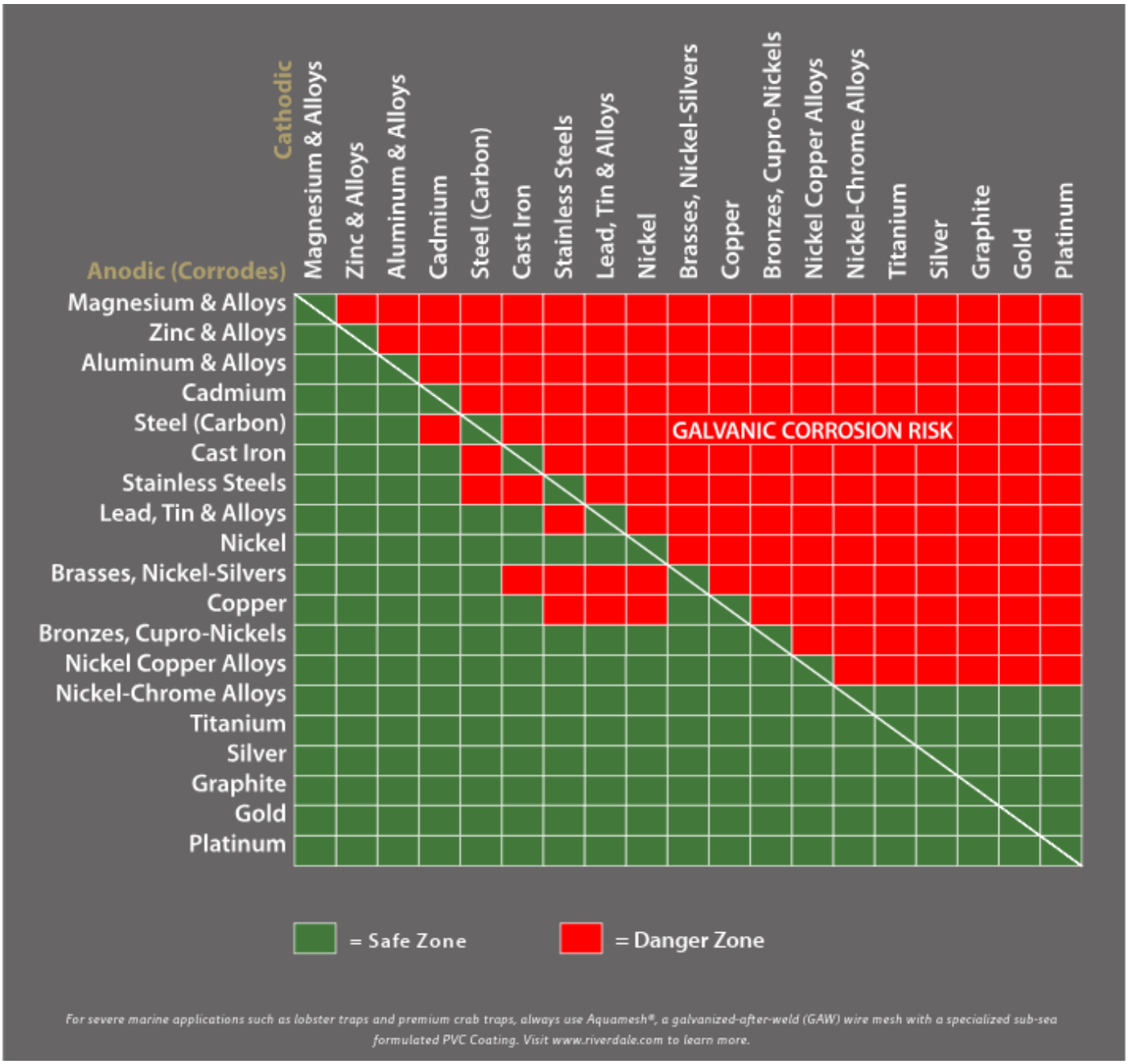
Prevention:
To prevent galvanic corrosion, metals that are far apart in the galvanic series should not encounter each other. The best practice is to avoid direct contact between dissimilar metals to minimize the risk of accelerated corrosion.

Protective methods include:

1. **Sacrificial Protection:** Attach a sacrificial element (like a zinc anode) to the cathodic metal. The sacrificial anode corrodes instead of the more important structure.
2. **Resistance Protection:** Applying insulating coatings, such as PVC, to connected surfaces can increase electrical resistance and reduce galvanic corrosion.

Conclusion:
The best approach to mitigating galvanic corrosion is to avoid the contact of metals that are widely separated in the galvanic series. If contact is unavoidable, using appropriate protective measures—such as sacrificial anodes or insulation—can greatly reduce the risk of corrosion. Understanding the principles of galvanic corrosion and applying protective strategies can help extend the life of dissimilar metals in contact.

Use the table below as a quick guide to select compatible metals. Where two materials meet in a green region the corrosion potential can be thought of as negligible, meaning a good combination. Materials that meet in the red zone however, should be avoided or used with caution.



For severe marine applications such as lobster traps and premium crab traps, always use Aquamesh®, a galvanized-after-weld (GAW) wire mesh with a specialized sub-sea formulated PVC Coating. Visit www.riverdale.com to learn more.