TECHNICAL BULLETIN TB-001

SURFACE CRACKING

IN ALUMINUM SACRIFICIAL ANODES

Answers to common questions about surface cracks in aluminum anodes.

Why do aluminum anodes develop surface cracks?

Surface cracking is a natural characteristic of large aluminum alloy castings. As molten aluminum cools and solidifies, it shrinks. In larger castings, this shrinkage can create superficial surface cracks as internal stresses are relieved during cooling. These cracks are a characteristic of the casting process and, when within the applicable specification, do not affect the electrochemical performance of the anode.

Are cracked anodes acceptable?

Yes. Purity Casting Alloys manufactures aluminum sacrificial anodes in accordance with MIL-DTL-24779B(SH). Each production lot is inspected to ensure the castings meet the dimensional, chemical, and workmanship requirements of the specification. The specification recognizes that surface irregularities, including cracks, may be present and establishes acceptance criteria for allowable crack depth. Anodes meeting these requirements are considered acceptable for service.

Can the cracks be sealed?

Yes. Where desired, visible surface cracks may be sealed with a suitable coal tar epoxy or equivalent marine-grade coating prior to installation. This is a common field practice that:

- ✓ Seals superficial surface cracks
- ✓ Improves cosmetic appearance
- ✓ Helps prevent debris accumulation

Many projects specify this coating as part of the installation, while others install the anodes uncoated.

Will the cracks continue to grow?

Additional superficial opening of existing cracks may occur during transportation, handling, or installation due to the size and rigidity of aluminum castings. This is not normally an indication of product failure and is not expected to affect the cathodic protection performance of the anode.

How will aluminum anodes look after installation?

Unlike zinc anodes, aluminum sacrificial anodes do not always consume uniformly. During normal operation, aluminum anodes commonly exhibit:

- localized consumption
- pitting
- cavities
- an irregular surface profile

This is normal behavior and does not necessarily indicate improper performance. The effectiveness of a sacrificial anode should be evaluated based on its ability to remain electrically connected and continue providing cathodic protection—not solely on its visual appearance.

What if I have concerns after installation?

Purity Casting Alloys stands behind the quality of its products. If you observe anything that appears unusual during installation or routine inspection, we encourage you to contact us. Our technical team is happy to review photographs and discuss whether the observed condition is consistent with normal service.

> **Surface cracks are a normal casting characteristic and are not, by themselves, an indication of reduced anode performance.**

ENGINEERING NOTE

When manufactured to the applicable specification and properly applied within a cathodic protection system, surface cracks and other characteristics of aluminum sacrificial anodes do not normally reduce the intended corrosion protection performance.