

Dezincification:

Change Your Engine Zincs!

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Our senior engine mechanic, Eddie Jacobs, would like all boat owners to know the importance of regularly changing their engine zincs.

Although most boaters know that shaft and hull zincs warrant replacement on a regular basis, many are not so diligent with the screw-in zincs found on their motor's heat exchanger.

The core of most heat exchangers is made of brass, which is an alloy of copper and zinc. (Whereas bronze is an alloy of copper and tin.)

"Dezincification" occurs when zinc is selectively removed from the brass through the galvanic corrosion process, leaving behind a porous, copper-rich structure that has little mechanical strength.

When this occurs, the remaining metal will begin to take on a reddish appearance initially, followed by more radical changes to its appearance.

This heat exchanger Eddie is holding is showing the tell-tail signs of dezincification. His inspection of the sacrificial engine zinc showed it coated with scale, preventing it from "doing its job". Had this condition been allowed to progress, the metal in the exchanger might have failed, allowing pressurized coolant water to exit into the wet exhaust. The engine then might overheat, causing irreparable damage.



Heat exchanger before cleaning

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How does a zinc anode "do its job"? Zinc is low on the galvanic scale, and will waste away through galvanic corrosion before other metals.

As the zinc anode wastes away it "sacrifices itself" to save the metal it is designed to protect. In the case of a shaft zinc, this sacrificial action protects your bronze propeller and stainless steel shaft, as both metals are higher on the galvanic scale.

However, heat exchangers are usually brass, and the zinc in brass is only slightly harder to liberate than the pure zinc anode.

You need to ensure that the zinc of your sacrificial engine anode can waste away easier than the zinc in the brass heat exchanger. Therefore it imperative that you regularly check the zinc anode on the engine to make sure it is of sufficient mass and has a clean surface. The clean surface promotes an electrical connection to the water, thereby promoting galvanic corrosion of the anode, and therefore protects the heat exchanger.



Heat exchanger after cleaning. Red hue indicates dezincification is taking place.

