service bulletin

mercruiser
STERN DRIVES/INBOARD ENGINES

NUMBER: 80-7
DATE: 3/25/80

CIRCULATE TO:
SERVICE MANAGER
PARTS MANAGER
MECHANICS

CORROSION TROUBLESHOOTING

(Attach Bulletin Reference Sticker to Section 10 Index Page of Your Service Manual.)

The first signs of corrosion are paint blistering (starting on sharp edges) below the water line with white corrosion products forming on these exposed metal areas. As the corrosion becomes more advanced, the exposed metal areas start eroding away, thus causing pitting of the metal.

If these signs appear on the underwater parts of the drive unit, use the following troubleshooting chart to help find cause of corrosion and its remedy.

IMPORTANT: Paint blistering and white corrosion products, that form on sharp edges below the water line, should not be confused with calcareous (calcium carbonate) deposits which usually form uniformly over the entire surface (painted and unpainted) when the unit is receiving adequate cathodic protection. The deposits are related in part to the calcium and magnesium concentration levels in the water.

Corrosion on underwater parts

Zinc anode(s) consumed (no longer affording protection)	Replace anode(s) when 2/3 consumed. (NOTE: If MerCruiser anode heads on transom mounting bolts have white powder on surface, replace them.)
Stainless steel propeller has been installed (increasing corrosion potential).	Add MerCathode or additional zinc anodes.
Standard zinc and/or additional zinc not grounded to drive unit	Provide good ground to drive unit (ground path must continue to negative (-) battery terminal).
MerCathode System not functioning	Check fuse in controller (if applicable).
	Check power to controller.
	Check for loose connection at controller. If equipped with bullet type connectors, check these connections for continuity.

Continued

(Continued, Over)

Continued

Continued from Preceding Page

1. Is boat connected to dockside power? If so, disconnect power and note if reading increases. If reading increases, it may be necessary to install a Quicksilver Isolator to allow MerCathode System to provide protection.

2. A reading of 8.6 (860 millivolts equivalent) can be accepted, if the drive has a stainless or bronze propeller.

3. A steel hull will require more protection than is available from a MerCathode System.

4. The aluminum drives or an aluminum hull may require additional paint, or the aluminum hull size may be beyond the capacity of MerCathode to protect.

If the meter (tester) gets pegged (while set on the proper scale), check for stray current entering the water by disconnecting shore power and all accessories (one at a time) until an acceptable reading is reached. Correct the source of the stray current.

Check for breaks in wire to anode and reference electrode.

Check ground between controller ground (-) terminal and drive.

Check potential reading. If reading is less than 9.0 (900 millivolts equivalent), check the following (1-2-3-4):

Loss of continuity (ground) between underwater parts and negative (-) battery terminal	Provide good ground.
Shore power hook-up causing overload on zincs and/or MerCathode	Disconnect shore power or install Quicksilver Isolator.
Paint is heavily abraided (more exposed aluminum requires more protection than available with trim tab).	Prime and repaint and/or install Quicksilver MerCathode or additional zinc.
Drive is painted with an anti-fouling paint which contains copper or mercury.	Only (TBTA) Tri-Butyl-Tin-Adipate base anti-fouling paint should be used.
Unpainted metal hull requires more protection than zinc and/or MerCathode can provide.	Paint hull with (TBTA) Tri-Butyl-Tin-Adipate base anti-fouling paint. DO NOT use copper or mercury bearing paints.
Zinc anode(s) painted	Remove paint or replace zinc.
Drive unit tilted as far out of water as possible (the zinc is no longer in water, so that it cannot provide protection)	Provide good ground to drive and all underwater parts. Leave drive in down position or install additional zinc (below water line) or install Quicksilver MerCathode.

Continued

Continued from Preceding Page

Stray current corrosion (if an electric current flowing along a metallic conductor leaves the metal for a water path, it will cause ionization of the metal, and an area of rapid corrosion is created)	With a MerCathode tester in the water, disconnect electrical components (one at a time) until tester indicates stray current has been eliminated. Eliminate or repair electrical fault.
Power Trim cylinders only corroded	Provide ground between trim cylinders and drive unit to receive protection from zinc or MerCathode; all underwater parts must maintain a good ground path to battery negative (-) terminal.
Multiple batteries wired incorrectly	Make sure wiring is done in approved manner.
Battery charger which uses shore base power (110v) improperly connected to batteries	Make sure charger is connected properly.
Corrosion in area of exhaust outlets (accumulated exhaust gas deposits on the drive exterior may promote paint blister and corrosion)	Deposits can be removed with marine or automotive wax which will also help protect the finish.
Corrosion continues after unit is removed from water (salt crystals remain on the surface and high humidity causes the electrolyte to form).	Wash exterior and flush interior with fresh water. (Closed Cooling System will protect internal surface of engine block.)
Corrosion and/or salt buildup between mating parts	Exclude moisture from between mating parts with Quicksilver Perfect Seal.
Stainless steel shaft is corroding. (Fish line or other material tightly wrapped around shaft will eliminate oxygen from its surface, thus allowing corrosion.) This is known as crevice corrosion.	Remove foreign material from shaft.
Stainless steel propeller or shaft is corroding. [Fouling deposits (marine growth) or burying stainless in sand or silt for a long period of time may cause breakdown of protective oxide film, and rapid corrosion will occur.]	Remove fouling deposits and prevent wetted surfaces from being covered by sand and/or silt.
Aluminum is corroding in area where lubrication is applied. (Lubricants containing graphite compounds create a galvanic cell which causes aluminum to corrode.)	Use only approved Quicksilver Lubricants.

DO NOT:

Never clean an aluminum casting with a wire brush. (Steel particles become entrapped in the aluminum surface and set up small galvanic cells.)	Use nylon or bristle brush.
Never use magnesium anodes (this may overprotect aluminum).	Use only zinc anodes.