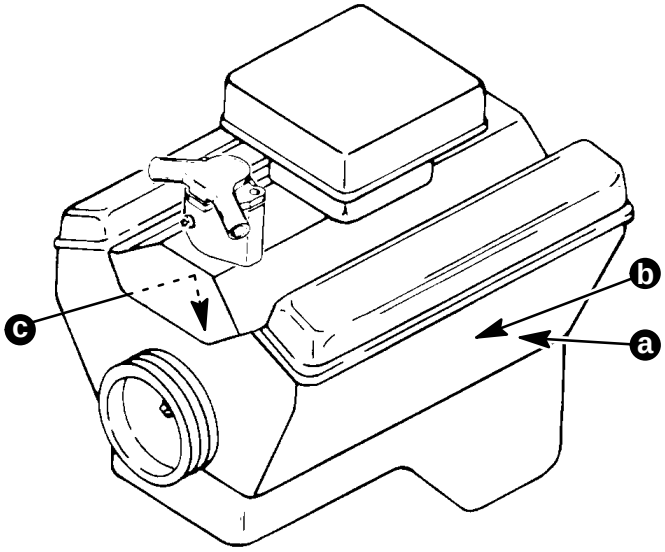
# service bulletin

TO: SERVICE MANAGER ☐ TECHNICIANS ☐
PARTS MANAGER ☐

**No. 87-14**

## Freeze Damage To MerCruiser Engines

Freeze damage to MerCruiser engines is usually identified as a horizontal crack that has one edge of the crack pushed out slightly. A freeze crack in the cylinder block usually happens just below the core plugs or along the upper edge of the cylinder block just below the cylinder head (Figure 1). V-6 and V-8 engines can also crack below the intake manifold in the valley area of the block (Figure 1). Exhaust manifolds and exhaust elbows can also crack from freezing. Heat exchangers, oil coolers, and transmission fluid coolers that freeze can either crack a cooling tube internally or push out the end caps.




a - Below Core Plugs
b - Below Cylinder Head
c - Under Intake Manifold Valley

All MerCruiser engines have the water drained out of the seawater section of the cooling system in the factory test cells upon completion of testing. This is done to ensure that engines will not freeze during shipment or storage.

Because of the precautions taken by Mercury Marine, freeze damage to MerCruiser products is not a defect in material or workmanship and **will not** be covered by our warranty policy.

**IMPORTANT: Core plugs, often called freeze plugs, are not designed to pop out when a block freezes. A core plug is installed to cover a casting hole where sand was removed when the block was cast. The block will normally crack before the core plugs pop out.**

**⚠ CAUTION**

**If power package will not be used for an extended period of time or will be exposed to freezing ambient temperatures, drain water from cooling system, as explained in owners "Operation and Maintenance Manual". Water must be drained to prevent corrosion and freeze damage to engine.**

## Sea Water Pickup Pump Failures - Both Drive Unit Mounted and Belt Driven Engine Mounted

Historically, we receive melted water pump bodies and/or burned impellers for warranty consideration as soon as the boating season starts. Some of these are from new units being prepared for delivery. Each new unit is tested for water flow and pressure before shipment from our factory. Because of the test stands used and precautions taken by Mercury Marine, burned impellers or water pump bodies are not defects in material or workmanship and **will not** be covered by our warranty policy.

Most common causes for these types of failures are:

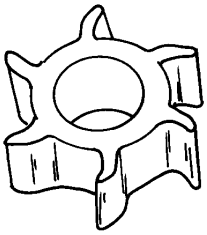
1. Starting engine out of the water without a flush device connected.
2. Improper use of flush device.
3. A marine hazard, such as a plastic bag, covering the seawater inlets in gear housing or thru hull fitting.

## ⚠ CAUTION

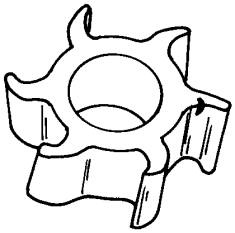
**Water must be supplied to the stern drive or belt driven seawater pickup pump when operating engine out of the water, or pump impeller will be damaged and subsequent overheating damage to engine and drive unit may result.**

Following are some examples of seawater pickup pump impellers that were run without water.

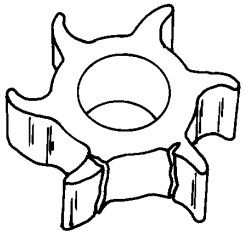
1 - 60 Sec. 1500 RPM Vanes Set and Leading Edges Slightly Burned - Upper Sealing Rings Charred - Lower Scored



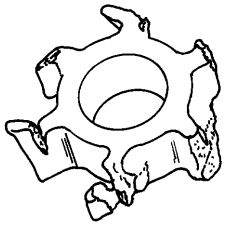
2 - 90 Sec. 1500 RPM Vanes Set and Leading Edges Slightly Burned - Vane at 3 O'Clock Cracked - Leading Edge of Vanes at 5-7 O'Clock Cracked - Lower Sealing Rings Charred - Upper Flat



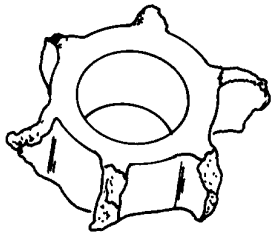
3 - 30 Sec. 2000 RPM Vanes Set and Leading Edges Burned - Two Vanes Broken - Lower Sealing Rings Charred - Upper Flat



4 - 45 Sec. 2000 RPM All Vanes Broken and Charred - Both Sealing Rings Charred



5 - 60 Sec. 2000 RPM Same as Number 4



**IMPORTANT: When running MerCruiser engines out of water the following must be adhered to: Engines with a drive unit seawater pickup pump must have the drive unit pickup hole submerged in water or a flushing device (P/N 44357A2) attached to drive unit. Engines with a belt driven seawater pump should have a garden hose attached directly to the inlet side of the pump.**