YANMAR MARINE USA CORP.
101 INTERNATIONAL PARKWAY
ADAIRSVILLE, GA
30103
TELEPHONE
(770) 877-9894
FAX
770-877-7565
WEBSITE
WWW.YANMARMARINE.COM

MARINE SERVICE ADVISORY

Advisory Number: MSA: 05-23

DATE: October 5, 2005
TO: All Marine Distributors
SUBJECT: Engine Overheating
MODEL: All Models

FOR DISTRIBUTION TO DEALERS AND OEM BOAT BUILDERS

Periodically we receive complaints of engine overheating and requests for assistance to help diagnose and repair the problem. There are many factors that can cause an engine to overheat so the entire cooling system must be inspected and verified that it is functioning properly. Following are troubleshooting steps that should be followed to pinpoint the root cause of the complaint:

- Verify the complaint
  - Verify the temperature gauge and sending unit are matched and reading correctly.
  - Verify the engine temperature with a handheld manual gauge.
  - Verify that the alarm system is functioning properly and turning on the alarm at the correct temperature.

- Engine coolant
  - Verify the coolant is at the proper level. If low, fill the cooling system with the proper coolant. Pressure check the cooling system and repair any leaks as necessary.
  - Verify the coolant recovery tank is installed properly and functioning correctly.
  - Verify the coolant is the proper type and concentration. The maximum concentration must not exceed a 50/50 mix of water and coolant. In areas where there is not the threat of freezing a leaner mixture of 60/40 water to coolant ratio is acceptable. Operating the engine with a higher than recommended coolant concentration will cause the engine to overheat and may plug up cooling system passages.
  - Yanmar recommends using Yanmar Ultralife Coolant, part number YG30 or an equivalent coolant that meets or exceeds ASTM D3306, D4985, & D6210 specifications. See the appropriate engine Operation Manual for additional recommendations. Do not use tap water to mix with the coolant. Depending on your location tap water may have minerals and other impurities that could harm the cooling system components. Use distilled water only for diluting the coolant.

- Seawater supply
  - Verify there is ample seawater flow. Verify there are no leaks on the suction side of the seawater pump that would introduce air into the system.
  - Verify the through hull seacock is completely open.
  - Check the seawater pickup/strainer for blockages.

- Check the seawater hose routing for kinks and blockages. The suction hose must be a reinforced hose that will not collapse during high speed operation.
- Check the seawater strainer and clean as necessary.
- Check the seawater pump impeller for wear or damage.

- Heat exchanger
  - Check the seawater side of the heat exchanger for blockages, debris, and scale. Flush and clean as necessary.
  - Check the freshwater (coolant) side of the heat exchanger. The coolant should be transparent and clean. If it is cloudy or discolored drain the entire cooling system and flush it with fresh water. Using a concentrated cooling system flush product, flush the cooling system following the directions provided with the flush. Remove the tube bundle from the heat exchanger and have it professionally cleaned to remove any debris or scale. Products such as *RYDLYME Marine*™ (www.rydlymemarine.com) can be used to clean the cooling system (follow manufactures recommendations). Refill the cooling system with new Yanmar Ultralife Coolant mixed to a 50/50 concentration of distilled water and coolant.

- Engine mechanical
  - Check the entire cooling system for leaks. Repair as necessary
  - Check the condition and tension of the drive belt for the freshwater circulating pump. Adjust the tension or replace as necessary.
  - Check the thermostat for proper operation. Check the operating temperature range for the specific engine you're working on in the appropriate Service Manual or the Yanmar Installation Manual.
  - Check the cooling system for the presence of air bubbles while running. If air bubbles are present this could be an indication of compression leaking into the cooling system. Pressure check the cooling system and perform a cylinder compression test to determine the source of the leak.
  - Verify the engine(s) wide open throttle RPM's. If the engines are operated in an over-loaded condition it may cause them to overheat. With the boat fully loaded (full fuel, full fresh water, full holding tank, gear, and passengers) the engine(s) must be able to attain a minimum of 50 to 100 RPM's above rated speed.

- Optional accessories
  - Verify that any optional accessories attached to the engine cooling system (i.e. water heaters) are installed properly. The accessory and plumbing must be installed below the top of the heat exchanger fill neck to prevent air pockets in the cooling system. The plumbing must be routed as direct as possible minimizing hose length, fittings, and sharp bends.

Warranty Coverage – Yanmar Marine will cover reasonable troubleshooting and repair costs for engine overheating complaints if a defect in materials and/or workmanship on the engine is identified during the Yanmar Limited Warranty period. Yanmar warranty does not cover overheating issues that are caused by the following:

- The use of improper coolants and high coolant concentrations
- Improper installations of engines, cooling system plumbing and accessories
- Engine overloading
- Improper maintenance
- Blockages caused by foreign materials

If you have any questions regarding this bulletin please contact the Yanmar Marine USA Customer Support Department at (770) 877-9894.