MERCURY MerCruiser service bulletin

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☐ WARRANTY INFORMATION ☑ SERVICE INFORMATION

Gasoline and Diesel Engine Propeller Selection

Models

All new or used Sterndrive, Ski or Inboard gasoline engines and diesel Sterndrive and Inboard engines.

Engine Wide-Open-Throttle (WOT) RPM Range

IMPORTANT: The installed propeller on a power package must allow the engine to run near the maximum rpm of the engine's specified wide-open-throttle (WOT) rpm range to avoid engine damage.

It is the responsibility of the boat manufacturer and/or the selling dealer to equip the power package with the correct propeller. Select a propeller that will allow the engine to operate near the maximum rpm of the engine's specified wide-open-throttle (WOT) rpm range.

Example for gas engine: Near 4800 on engine with a WOT rpm range of 4400-4800.

Example for diesel engine: Near 3800 on engine with a WOT rpm range of 3600-3800.

Operating an engine with a propeller that does not allow it to operate near the maximum rpm of the engine's specified WOT range can cause damage to it even if the engine is not operated at WOT. Prolonged operation under this condition can cause piston and/or valve damage. Also, using a propeller that allows engine to operate above the specified maximum rpm will cause higher than normal wear and/or damage.

NOTE: *Engines equipped with a rev-limiter must not be operated against the rev-limiter continuously.*

Propeller Testing and Selection

IMPORTANT: Use an accurate service tachometer (not the boat's tachometer) to verify engine rpm. On D-Tronic model diesels, the service scan tool can be used to verify engine rpm. On gasoline Thunderbolt V models or standard diesel models, a photo or strobe type tachometer can be used to measure crankshaft speed accurately.

NOTE: *On carburetor engines with Thunderbolt V ignition, tachometers are not able to give the true engine rpm when it is at the rev-limiter. Tachometers count the spark impulses in an ignition system. When the engine is at the rev-limiter, the Thunderbolt V ignition module removes spark impulses to certain cylinders to lower the engine's rpm. Use the next higher pitch propeller to get below the rev-limiter.*

During propeller testing, the boat should be loaded with the following guidelines: Half-full fuel tank(s), full water tank(s) and 4 people. Locate the people in the seats at the helm and in the seats at the stern.

190 lb (86 kg) = 1 person (includes gear brought onboard by them).
6 lb (2.721 kg) = 1 US gal gasoline (L = 0.72 kg).
7.2 lb (3.265 kg) = 1 US gal Number 2 diesel fuel (L = 0.86 kg).
8.3 lb (3.764 kg) = 1 US gal water (L = 1 kg).

By propping the power package this way, it helps ensure that the engine rpm does not fall below the specified range with a full load aboard. Using a propeller with a higher pitch may give slightly more speed and fuel economy, but generally, this will cause the engine rpm to be on the low side or even below the specified WOT rpm of the engine, which can damage the engine.

IMPORTANT: On sterndrive models, do not use excessive Power Trim angle when determining correct propeller pitch.

NOTE: *Engines with a rev-limiter may appear to have an ignition misfire. When the engine rpm returns to within the specified WOT rpm range, the ignition misfire will disappear.*

MCM Sterndrive engines: A 2-inch pitch change gives about a 200-300 rpm change (when using the same type of propeller).

On MIE inboard or ski engines, 1-inch pitch or diameter change gives about 150 rpm change.

Example: Changing from a 21-inch pitch to a 19-inch pitch propeller increases engine rpm at WOT. Switching from a 19-inch pitch to a 21-inch pitch propeller decreases engine rpm. On inboard or ski engines, a change in propeller diameter or cupping a propeller will also change engine rpm.

Because of the many variables of boat design, only testing will determine the best propeller for a particular application. Just because a certain size propeller is used on a given model boat does not mean all boats like that model can use the same propeller pitch. The load added to the boat by the boat owner can require a propeller change to get the engine back near the maximum rpm of the engine's specified wide-open-throttle (WOT) rpm range.

For better acceleration when pulling up a water skier, use the next lower pitch propeller. Do not exceed maximum WOT engine rpm when using this lower pitch propeller. When cruising, use the higher pitch propeller.

After initial propeller selection, the following common factors may cause a loss of engine rpm and require that the propeller be changed to a lower pitch:

Warmer weather and greater humidity.

Increased load or weight (additional passengers, pulling skiers).

A dirty boat bottom.

Operating in a higher elevation.

It is also important to tell the boat owner that their maximum WOT engine rpm should be checked after they have 50 hours on the engine. By this time, the engine has gone through its' break-in period.