



Low-emission equipment maintenance recommendations

By Pete Fernald

A common question for today's low emission outdoor power equipment is "Does it require more maintenance?" For the operator concerned with proper equipment maintenance there is little additional work required.

But the operator who bases his maintenance on what he's done, or more correctly not done, in the past is in for an expensive awakening! He's gotten away with it up until now, but today's low-emission engines are far less forgiving and have a narrower margin of tolerance for abuse.

Today's CARB/EPA engines run at significantly higher operating temperatures.

These are "air cooled" engines so to run properly cylinder fins must be free of debris to dissipate the heat of higher operating temperatures.

Equally important is the cooling air intake area. In a typical modern trimmer, for example, this is the area under the crankcase and above the fuel tank. It's also an area where oil/fuel mix can accumulate if fueled by a careless operator. This sticky mix will combine with debris and effectively plug the intake. Engine temperatures will then rise and the engine will eventually fail. Cleaning cylinder fins and this intake area is critical and must become a regular part of your maintenance procedure!

What is often seen in the above high-

temperature scenario is a piston with stuck rings due to oil breakdown and burning onto the surface of the piston. The engine manufacturer is often blamed, but the culprit is the oil. Using modern high-temperature low-emission oil can prevent this failure.

Engine manufacturers are routinely asked "What oil should I use?" Manufacturers cannot require use of our brand of oil, but we can specify and require use of a particular ratio and grade (in this case, JASO FC or FD; ISO EG-D). At the same time, no reputable engine manufacturer is going to offer "bad oil." There are lots of general purpose oils available, but most are multi-purpose and do not excel in any one area. They are designed to work in a variety of engines and

do an acceptable job in average conditions and with lower engine operating temperatures. Very few are certified to carry these JASO and FC ratings.

Oils designed for use in outboards typically do not have additive packages capable of handling some of the operating temperatures encountered with 2-stroke trimmers, chain saws, etc. Unless expressly stated as certified to meet our ISO and JASO ratings, these oils should be avoided.

Selecting spark plugs

Today's higher engine operating temperatures dictate use of very specific spark plug heat ranges. Years past, you could be two or three heat ranges off with little or no problem. Today, with some high-temperature engines, even one range too hot may be too much. The days of "screws in and starts—must be interchangeable!" are over. Always

use the manufacturer's recommended spark plug heat range. If you must change brands, consult the plug manufacturer's cross-reference chart for the proper plug number.

One additional point: Do not assume a plug with a given heat range number is the same heat range as a competitor's with the same number. For example, the higher the number on a Champion spark plug, the hotter the plug. On an NGK, it is the opposite (higher number is cooler). Also, two different plug types that have the same heat range number may not be the same temperature. Always consult the application guide for that particular plug brand.

One could write a book about all of the fuel changes over the past 15-20 years! It's not going to get any better in the foreseeable future. The first and a significant concern is fuel shelf life. Over several decades, petroleum refineries have developed more and

more exotic processes to extract a higher percentage of gasoline per barrel of crude oil. As the profit is in gasoline, this is where petroleum research has been focused. With this "stretching" of gallons per barrel, there has been a penalty and that is shorter shelf life, especially in hot, humid climates.

Most manufacturers recommend a maximum storage period of 30 days in the heat of the season. Our dealers in very hot and humid areas recommend 1 week as the maximum period fuel can be stored. This is also very true for exposed, above ground fuel tanks due to internal tank temperatures.

Fuel stabilizers such as Sta-Bil and SeaFoam can be used to slow this oxidation process down. Old, stale fuel? It will NOT work! These products only work with fresh fuel. Use of a good fuel stabilizer can eliminate spring startup issues and is highly recommended.

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How much octane do I need? Most handheld equipment does not need high octane fuel. Medium-to-large chain saws and large backpack blowers have a slightly higher octane requirement and a few require premium unleaded. We frequently see dealerships and larger commercial users using premium unleaded. They've learned that these fuels tend to use higher quality components and give better performance with fewer complaints.

Always buy fuel from a name-brand dealer. Cut-rate stations sell fuel cheaper because they buy at lower cost. They are able to buy at lower cost because these fuels are often low-grade, old or do not meet higher standards of the name brand stations.

Every developed and most Third World countries are actively developing a domestic ethanol fuel program as a means to extend the available supply of vehicular fuel. OPE engine manufacturers recommend a maximum alcohol limit of 10%, yet several states are trying to get federal approval of a 20% minimum (E20).

All alcohols contain a high percentage of oxygen, but gasoline has none. Ethanol (the "E" in E20) is 37.6% oxygen and Methanol is 49.9%. Use of higher ratios of alcohol has exactly the same effect on internal engine temperatures as leaning out the carburetor.

A 20% ratio (E20) can quickly lead to engine seizure if the engine is run at WOT with a heavy workload.

Alcohol is not particularly compatible with gasoline and can easily separate out when combined with water; even in the form of condensation. When alcohol combines with water, it is heavier than gasoline and settles to the bottom of the tank (phase separation).

Alcohol is a very effective degreasing agent and can wash the critical oil film from internal engine components. It can also

attack magnesium and diecast aluminum components ("vehicular cancer" is the term used by General Motors). Soft parts such as fuel tubes, gaskets and diaphragms today can withstand ratios in the 10~15% range, but may deteriorate quickly at higher alcohol ratios such as E85.

Open containers

One additional fuel issue many commercial users fail to recognize is that of leaving a fuel container open. For an engine to start,

Getting the full benefit from today's low-emission engines requires a bit more attention to maintenance, but the reward is a longer-lasting and more trouble-free engine. If you are not familiar with the maintenance required, consult your Owners' Manual or pay a visit to your local servicing dealer.

fuel must vaporize to form a flammable gas. If a fuel container is left open, these "light end" components that make gas vaporize are boiled away and the fuel is effectively dead (worthless, hard to or no starting in high temperatures, etc.)

Another issue of major significance with an open fuel container is emissions. A modern CARB/EPA 2-stroke has approximately 1/8 the emissions output of its pre-CARB/EPA counterpart. Today, a major contributor to overall emissions is an open fuel container or spilled fuel.

Air filter maintenance

Proper air filter maintenance is critical to the operation and overall life of any engine. Lack of air filter maintenance can be catastrophic for today's low-emission hand-held two stroke engines. Just as the motorcycle industry found with the change from 2-stroke to 4-stroke dirt bikes, 4-stroke engines in a dirty or dusty environment must have a very effective air filter system and it must be maintained frequently and properly!

A 4-stroke has many heavily-loaded points such as pushrod to follower or rocker arm contact. A small amount of debris inside can quickly increase valve clearance to the point the engine may not start or run properly. Conversely, the same engine with proper air filter maintenance will seldom require any adjustment.

Another factor few people consider with air filters is resistance and resultant deterioration if run for prolonged periods without cleaning. As an example, a flat foam element air filter has little or no resistance when clean. As it starts to clog, it is moving around as the engine strains to suck in clean air. Over time, this filter can lift and bypass. Eventually, it can start to deteriorate and in extreme cases can be sucked into the engine!

An effective maintenance program and use of prefilters if available can add years to engine life. Many manufacturers offer foam prefilters or perhaps the filter itself is foam. Carrying a spare in the field can keep the engine running at maximum efficiency and give you longest possible life. Use of good filter oil on that foam filter or prefilter is another proven motorcycle tip that can extend primary filter and engine life even in extreme dusty areas. ■

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