

Prepare Leaded-Gas Engines For Unleaded Gas

EPHRATA (Lancaster) — Leaded gasolines are becoming increasingly rare and may soon be regulated out of existence by the Environmental Protection Agency (EPA). Using unleaded gasoline in an engine designed for leaded fuel may cause mechanical problems over the long run unless preventive measures are taken.

Lead, in the form of tetraethyl lead, serves two main purposes in gasoline. First, by increasing the octane rating, it reduces knock (or "pinging") which limits the power a gasoline engine can produce without damage. Second, lead oxides and lead halides (often visible as white deposits) form a lubricating film on valves and valve seats, reducing wear on these parts. Without lead's lubrication, valves in older engines will eventually burrow down into their seats, an effect called valve recession. Valve recession can use up all of the possible valve lash adjustment of an engine and lead to an unsealed valve and loss of compression. Such a valve will soon burn and possibly fail, causing more serious engine damage. While there are non-lead alternatives to increase the octane rating of unleaded fuels, currently there are no replacements for tetraethyl lead that provide totally effective valve wear protection.

Lead is emitted into the air when it is burned in a fuel and would be a major health hazard if old, higher concentrations were still in use. Lead also disables catalytic converters, which are installed to reduce other dangerous exhaust emissions. This is why catalyst-equipped vehicles are required to use unleaded gasoline. The EPA has been acting to gradually phase out all lead in gasolines and currently limits gasoline lead content to just about the minimum concentration necessary to effectively control valve recession.

Practically all engines manufactured since 1974 have included specially hardened valves and seats designed to reduce wear and valve recession with unleaded gasoline. However, there are some exceptions, especially in the heavy-duty gasoline market. Most pre-1974 engines and those newer ones with specific recommendations for leaded gasoline are likely to have softer valve and seat materials that are prone to valve recession with unleaded gasoline.

The only way to guarantee an older engine's performance of unleaded fuel is to install specially hardened valve seats. Most cylinder heads can be machined to add reliefs around the valve areas for hardened valve seat inserts. The fit, alignment, and sealing of the seats are critical, so this job is best done by a qualified machine shop. The cost of this modification is approximately thirty dollars per cylinder, plus a twenty-five dollar labor charge per cylinder head. So, hardened valve seats for a four cylinder engine would cost about \$165 plus the cost of removing and installing the cylinder head, if necessary.

There are some temporary measures to postpone the valve job just described. Engine failures due to valve recession do not occur overnight, and how long an overhaul can be avoided depends on the type of service, the amount of use, and the quality of maintenance an engine receives. Valve recession is aggravated by high combustion temperatures, which are increased by such factors as high engine speed, improper ignition timing or fuel mixture, and inadequate engine cooling. Here are a few preventive actions a farmer or mechanic can take to stay ahead of the problem:

- Keep the valves adjusted. If an engine has mechanical lash adjustment, check the valve tappet clearances more often than nor-

mal. If the valves should begin to recede, the progress can be monitored and the clearances may be adjusted to compensate. When the clearances cannot be adjusted to the recommended values, it is time for a valve job.

- Run engines at lower speed and resultant loads. Studies indicate that high-speed service with unleaded gasoline can quickly lead to failure in engines designed for leaded fuel.

- Keep the ignition timing properly adjusted. This preventive maintenance procedure will keep engine temperatures in line.

- Keep the carburetor properly adjusted. A lean fuel mixture will greatly increase combustion chamber temperatures, which aggravate valve recession and can also encourage engine knock.

- Maintain the coolant system. This practice helps reduce the chances of engine overheat. Change the antifreeze at least once every two years — or once a year for best results.

The lead-free fuel additives now being marketed promise to boost a fuel's octane rating and provide necessary valve lubrication. However, as the saying goes, let the buyer beware. An engine study sponsored by the EPA and USDA showed that, on typical agricultural machinery engines designed for leaded fuel, the lead

replacement additives reduced, but did not eliminate, valve recession. In quantities the eliminated valve recession, the additives caused increased intake valve deposits, which can also lead to compression loss.

Furthermore, most additives are marketed at a price which may cost as much as \$1.00 for every ten gallons of unleaded fuel treated — so a lead replacement additive can add as much as 10

percent to an engine's total fuel cost, at typical 1988 prices. It is also possible to actually purchase tetraethyl lead, blended into a fuel additive that is even more expensive than the lead replacement additives. Over the long run, money spent on additives at each refueling might be better used to install hardened valve seat inserts, which provide a permanent solution to valve recession.

Public Hunting Land Expansion Legislation

HARRISBURG — Senator Edward Helfrick (R-27) is reintroducing legislation this session to expand public hunting lands by offering reduced-fee hunting licenses to farmers who open their lands for hunting.

Helfrick said that farmers who open 80 acres of land would be eligible for a \$3 dollar reduced-fee license, plus a 75 cent issuing fee. Farmers may keep no more than 20 percent of their total land in safety zones.

In addition to the safety zone limitation, participating farmers must comply with a conservation plan established under the Clean Streams Law of 1937 concerning erosion-control regulations. According to the Senator, these

requirements would ensure that wildlife habitat is preserved for the benefit of both hunters and game.

Senator Helfrick's proposal has received the support of the Pennsylvania Game Commission.

Helfrick introduced identical legislation last session. However, the House Committee on Game and Fisheries gutted the bill, changing it to a land acquisition vehicle.

"I was very disappointed by the Committee's decision to eliminate reduced-fee licenses when they amended the bill," said Helfrick. "But this has not discouraged me from working for the passage of this important legislation this year."

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