TECHNI/TIPS

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NOTES ON OIL CONSUMPTION

The amount of oil consumed varies tremendously from engine to engine, make, and operator. For example, a Cummins engine with 15,000 or 20,000 miles with properly seated rings, with range in consumption from 250 miles per qt. to as high as 700 or 800 miles per qt. The Cummins factory people will not consider an oil consumption complaint on a warranty engine unless the consumption is greater than 250 miles per quart. The reason for this variation is because of the wideness of their piston ring specifications. If an engine has "soft" rings, consumption will be at the 300 mile per qt. range. If the engine has all "hard" rings, then the consumption will be at the 800 mile per qt. range. If the normal mix of hard and soft rings exists, the consumption will be in the middle of the range.

What amount actually constitutes high oil consumption? A carefully driven passenger car should use between a pint and a quart in 1000 miles. However, a large truck operated at a good rate of speed may use 3 or 4 quarts of oil in a 1000 mile run, and this would still not be considered excessive consumption.

There are only two ways that crankcase oil can be consumed: It can leak externally or it can leak internally and be burned. Considering external leakage, where can the oil go? Anywhere there is a seam or coupling. Large external leaks are usually apparent, but small leaks may be more difficult to find. If the engine is extremely dirty, strategic spots can be wiped off and checked after the engine is run. A common spot is the oil filter. Very often the cover is not secured or a gasket is not installed. Front and rear crankshaft seal leaks are also common but somewhat more difficult to diagnose.

Internal leakage is not quite so simple to determine. Oil may be entering the combustion chamber through the intake system. If it is getting past the intake valve guides, this can be checked by squirting a small amount of gasoline around the intake valve stems while the engine is idling (only on in-line engines, not modern V-8s). If the engine speeds up, the valve guide clearance is a probable source of the oil consumption. Some vehicles are equipped with a vacuum booster fuel pump. If the diaphragm is cracked, oil will be drawn into the intake. This can be checked by operating the windshield wiper. If the wiper slows up noticeably at full throttle, there is probably a leak. Another check is to inspect inside of the line from the vacuum pump to the manifold for signs of oil. It should be completely dry.

One of the common causes of oil getting past the piston is worn bearings. Worn bearings allow an excessive amount of oil to be thrown on the cylinder walls, more than the rings can control. Consequently, oil is scraped into the combustion chamber and there may be carbonizing and plugging of the rings. Too much oil through the bearings can be detected by using a bearing pressure leak detector.

Worn or faulty rings which allow oil to get by, can be checked by running a compression test. After checking compression, put an ounce of heavy oil through the spark plug hole and check compression again. If the pressure increases, then the rings are in poor condition. There are other conditions such as worn pistons and cylinder walls or misalignment which will allow oil past the- piston. If all the above are in good condition, the single factor that governs consumption is viscosity. A light oil will get past the rings easier and faster than heavy oil. So, fuel dilution which thins out the oil may be an important factor in consumption.

Some of these things cannot be discovered short of tearing down the engine, but you should be able to tell if any quantity of oil is being consumed by the condition of the spark plugs. They would be black and shiny, or oily and sludge-covered if oil was being burned. In diesels, the injectors may be covered with carbon or they may require cleaning much sooner than normal. Oil economy always goes down under conditions of high speed and/or heavy load. Other factors that affect oil consumption are overall mechanical condition and cooling system condition.

Overfilling can also cause high oil consumption. It may be due to wrong markings on the dipstick or to carelessness. Wrong markings can be checked by careful measurement of the crankcase, by draining completely and refilling one quart at a time and checking the dipstick.

A Grand Rapids, Michigan trucking company uses a computer to control fleet maintenance costs. The following figures were extracted from one of their reports. Actually, there are many columns, but only the fleet number, the miles, and the miles per quart were extracted.

SUMMARY OF VEHICLE COSTS

FLEET	MILES	MPQ
177	3158304	115.35
184	1899780	17.94
881	13453597	318.14
882	206761	814.02
883		.00
884	163	11.64
887	24033818	106.71
888	22160388	239.17
889	5505786	191.34
890	21497486	115.22
891	21649689	232.01
892	14095104	269.40
893	12252290	269.33
894	21236442	373.37
895	19120937	272.72
896	25830132	158.16
901	10177026	283.86
902	7832141	331.53
907	10314225	383.39
909	6144208	132.50

Fleet tractors identical as to make, model, and year. Note that only one of their fleet got as high as 814 miles per quart, and the average in the above fleet is 244 miles per quart.

In a Buick Dealer Service Information Bulletin some time ago, Buick engines make the following statements:

"A gasoline engine depends upon oil to lubricate the internal parts. If an engine burned as much as one drop of oil on every firing stroke, then it would use more than a quart every two miles. Such consumption is unheard of in the automotive field, but all efficient engines use some oil. If they did not, they would quickly wear out.

The rate of consumption depends upon the quality and viscosity of the oil, the speed at which the engine is operated, the temperature, and the amount of dilution and oxidation which takes place. These last two conditions are frequently misleading. As an example, a car that has run 1000 miles or more in city operation may have consumed a normal amount of oil, yet actually measures up to the full mark due to dilution in the crankcase. The car then might be driven at high speed on the highway, the dilution elements boil off rapidly, and the car appears to use two quarts of oil in a hundred miles.

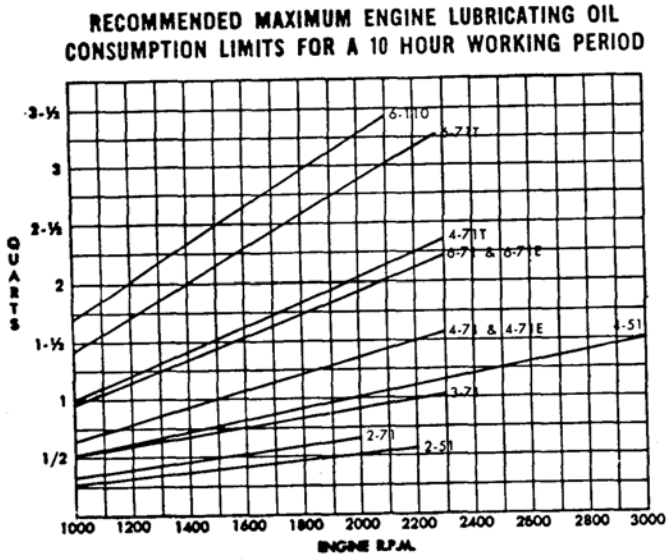
Car owners should expect increased oil consumption at high speeds. For instance, it is a proven fact that an automotive engine may use seven times more oil at 70 than it will at 40 miles per hour. No standard rate of consumption can be established because under various combinations of the conditions mentioned above, one engine might use a quart in 1500 miles and another use a quart in 750 miles and yet both engines might be entirely normal.

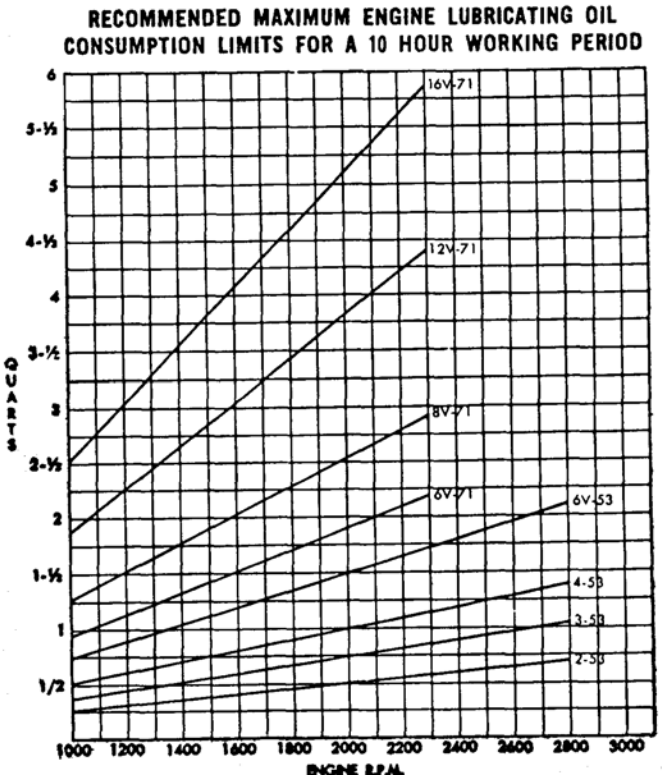
New engines require considerable running before the piston rings and cylinder walls become `conditioned', and during this time they use oil more rapidly than later. An engine's oil economy should not be judged until it has run at least 4000 miles."

While the Buick Engineering Department is commenting specifically on automotive engines, essentially the same thing would hold true for heavy-duty truck and other engines. The heavy-duty engines operating at higher temperatures probably would not have similar fuel dilution, but all other comments apply.

The Detroit Diesel Allison Division of General Motors published an article on oil consumption, including the charts shown below. These indicate the maximum consumption rates for their various engines. Anything below these rates should not be considered excessive.

As the new low emission engines enter the picture, oil consumption will be lowered. The "dry" engines are designed to lower the amount of oil that passes into the combustion chamber and thus lower the emissions from the engine due to oil burning. This lower consumption will help the environment but will place more severe demands on engine oils since less make up oil will be required.





LUBRICATION ENGINEERS,® Inc.
300 Bailey Ave, Fort Worth, TX 76107 | 817-834-6321 | 800-537-7683
fax 817-834-2341 | http://www.le-inc.com