



OIL CONSIDERATION TO LENGTHEN ENGINE LIFE

Farm Machinery Fact Sheet FM-19

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Perhaps nothing will add to the life of an automobile, truck, tractor or other fuel-powered farm machine more than proper lubrication, and that means oil. But crankcase lubricating motor oil is not just oil. It is made up of a petroleum product plus many additives. These include the following: 1) detergents that act like soap in cleaning off the carbon, 2) foam depressants that keep the foam down when the engine revolves at a high rpm, 3) oxidation inhibitors that slow down corrosive action and avoid rust, 4) dispersants that keep the heavy particles in suspension with the oil so they don't settle out and remain when the oil is drained out, and 5) an anti-wear agent that provides chemical polishing to lower the wear rate. Actually, oil is about one-third additives.

Today there are many oil additives on the market. But we feel that the best general advice is to avoid them. It is very difficult for a farmer, home owner, or lay person to chemically formulate a proper balance between the oil stock and needed additives. This requires a chemical analysis under controlled conditions of a chemical oil engineer and laboratory testing.

Individuals should be cautious in purchasing oils formulated for a specific purpose and sold on a door-to-door demonstrational basis. The American Petroleum Institute or the API will mark the oil can with its specification of oil quality and use.

The oil companies spend millions of dollars in research to improve their oils. As one oil engineer said,

“If there is any product known that will improve oil performance, we will be the first to include it in our oil.”

A good tool to have and use on any farm is a tractor and farm implement lubrication guide giving service instructions. Also very important for any machine is your operator's manual. Check the recommendations in it for type of oil and instructions for changing the oil. Follow these instructions. If you don't, the result will be costly.

Remember that oil filters, air cleaners and tune-ups are a lot cheaper than overhauls. A wise practice is to change the oil filter with every other oil change. It usually pays to buy oil filters by the case and to put in new air cleaners frequently. It is important to observe the oil gauge to make sure that you have good oil pressure. Normally, the pressure should go high when

you start and then drop down a little when the engine warms up.

Because the oil often doesn't get hot enough in winter to remove the water, there is a tendency for water to condense. Usually, you should plan to change oil more frequently in winter than in the summer. But when operating under dusty conditions, you will need to change the oil even more frequently. Use judgment about where and how the engine is being operated to determine when to change oil. Your best guide is to note the manufacturer's recommendation as to the maximum time for changing oil, then adjust for conditions that may require more frequent changing.

Don't expect to tell when oil needs changing by looking at it. The appearance of the oil is not a satisfactory indicator. The oil in a diesel engine will be black almost immediately since it holds the carbon particles in suspension.

"But with so many different designations of oil on the market, how do I know which one to use?" That question bothers many people.

The American Petroleum Institute and other organizations have worked together in developing new designations designed to clarify oil specifications. They better define the oil qualities so that the engine manufacturers, the petroleum industry and the users may all understand for what operating conditions a particular type of engine crankcase oil is most suited. These letter designations indicate the type of service for which the maker recommends his oil. You must rely on his integrity since the designation does not of itself guarantee that the oil meets any standard specification of performance.

The following are the new API service classifications and the somewhat similar old designations indicated in parentheses:

SA (ML) - The lowest grade, to be used in air cleaners and for oiling parts. It is not to be used in autos.

SB (MM) - Used for lawn mower engines, household pumps, etc., but for auto use only under ideal conditions such as highway driving at 40-55 miles an hour.

SC (MS) - Used extensively in 1964-1967 model passenger cars and trucks to control high and low temperature deposits, wear, rust, and corrosion.

SD (MS) - Provides more protection than SC oil. Beginning with 1968 model passenger cars and trucks, it meets the engine manufacturer's warranties. It is designed to withstand the hard use of a lot of starts and stops in the gasoline engine. It has corrosion control, oxidation inhibitor and antiwear qualities.

SE - Designed for service typical of gasoline engines in passenger cars and some trucks beginning with 1972 and certain 1971 models operating under engine manufacturers' warranties. Oils designed for this service provide more protection against oil oxidation, high temperature engine deposits, rust and corrosion in gasoline engines than oils which are satisfactory for API Engine Service Classifications SD or SC and may be used when either of these classifications is recommended. It meets the high demands of the modern day automobile that runs hotter than ever because of high horsepower, air conditioning, automatic transmission, emission controls, trailer towing and

sustained high speed interstate travel.

SF - Meets the requirements for unleaded or low lead gasoline. May be used when service classification SE is recommended.

CA (DG) - Used mostly for diesel engines with a lot of strain and stress on the bearings and connecting rods. It would be good for autos that are fairly new without a lot of carbon deposits.

CB (DM) - Is a good moderate duty oil for diesel engine service, occasionally used for gasoline engines in mild service. It is suitable for new autos pulling a load such as a trailer or for a gas truck or older truck.

CC (DM) - Used for lightly supercharged diesel engines and certain heavy-duty gasoline engines such as farm tractors for moderate to severe duty.

CD (DS) - Is required for fully supercharged farm diesel tractors and some heavy-duty gasoline tractors. It is too severe for most autos. It is used under severe diesel operation involving high-speed, heavy-duty operation or a lot of starting and stopping and a heavy load. Remember that the water temperature on a diesel tractor runs at about 200°F. This oil is designed to help protect against sulfuric acid developing from the high sulfur content in the fuel when operated intermittently and under low temperature. If put in an older auto, it will clean the engine and may cause the engine to use oil. It may also cause carbon lodging in the oil lines.

These designations and your engine manufacturer's recommendations can serve as good guides in choosing the oil for the operating conditions you require. However, it is usually wise to stay with the same brand and designation of oil so that you get the same combination of additives each time.

In selecting the proper grade (weight, body, viscosity) of oil to use, remember the purpose of the lubricating oil. It must act like a lot of tiny ball bearings to prevent the metal parts from making contact or creating heat. It must be light enough to lubricate the rocker arms, tappets, etc. when the engine first starts. Yet, it must be heavy enough to provide the necessary bearing clearance when the engine is hot. Since all oil thins out as it heats, you must select an oil that is heavy enough not to allow the metal to contact when the engine is hot.

Keep in mind that the engine crankcase oil must be thin enough to splash on the cylinder walls and flow through the oil lines to various parts of the engine. Yet it must have enough body to keep the metal surfaces from rubbing together and causing excessive wear.

The weight or grade of oil is indicated by SAE viscosity designations: 5W, 10, 10W, 20, 20W, 30, 40 and 50. The "W" designation signifies oil designed for winter use. It indicates the pour point or the ability for oil to be liquid under cold conditions.

Multi-viscosity oil, such as 10W-40, has the characteristic of a 10-weight oil when cold and a 40-weight oil when hot. In past years, we had problems with the multiviscosity oil thinning more than we desired when under high temperature. It was necessary to add a thickening agent. Now, most manufacturers of automobiles and machinery recommend its use.

The multi-viscosity oils do cost more, however. Usually, the single-viscosity oil is recommended for temperatures above 32°F and for heavy-duty engines, especially for diesels that have no problem with cold weather starting. A multiviscosity oil must be changed more frequently, as the viscosity improves additive tends to break down.

The engine manufacturers are most concerned that the multi-viscosity oil be thin enough to provide ample lubrication at the lower starting temperatures. They are not so concerned about using oil which is slightly heavier at the engine operating temperatures. That is why the operator's manual will usually indicate using a 10W-40 or 20W-50 multi-viscosity oil if you have been using a 20-grade single-viscosity oil.

Today, under many different operating conditions and different types of fuel, a number of demands are placed upon engine crankcase oil. The oil is expected to do each of the following jobs:

- Remain fluid enough for the engine to be started easily.
- Retain enough body to reduce friction and wear between surfaces.
- Remove heat caused by friction.
- Provide a seal against escaping gases.
- Keep the engine clean - keep carbon and sludge forming materials in suspension so they will be removed when the oil is drained.
- Provide protection against rusting and attack by acids.

Through continuous improvement in the refining process and use of additives, the petroleum companies are striving to provide oils to meet these demands. However, they face a tremendous challenge of continuous change.

“Even now, trying to keep up with all the different tractors and their lubrication requirements is a nightmare. To do it, I have to rely on our Farm Engineering and Lubrication Guide Book. As changes are made in requirements and in the oils themselves, we receive supplemental pages to cover them,” said Sterling Jardine, a local oil distributor.

The machinery dealer also shares in part the dilemma of the oil dealer. Vince Butters, a Case tractor dealer in Logan, expressed it when he said, “I wish we could have just one standard oil for all these tractors. I am getting tired of having to keep six barrels of different oil on hand.”

You, the farmer, are caught in a similar situation and you must rely largely on either your equipment dealer or an oil company for information regarding what specific oil to use for the engines of your different tractors, trucks and other equipment. Your lubrication problem is compounded by the fact that any machine usually takes a number of different types of lubrication oils and greases for the different parts. It is particularly important that you select motor oil with care. If you ruin a tractor engine because of improper lubrication, it could cost \$15,000 to rebuild. The machinery companies will not warranty this condition.

With some makes of equipment you are also caught in a monopoly cost bind. Here is how it

works. The equipment manufacturer contracts with an oil company to formulate oil to retain specifications under the manufacturer's brand name. Then the warranty for a new piece of equipment specifies that you must use that particular brand. But you find that it can only be purchased through the franchised equipment dealers who usually charge 50 to 60 cents more per gallon than oil of identical quality and formulation that could be purchased directly from an oil company.

Even though oil costs may seem high, you need to be particularly cautious about trying to save money by buying your oil on sale at drug and department stores. In many instances, stores selling oil at a discount are selling oil of the SA or SB service classification. These are suitable for an air cleaner, but not for your car, truck or tractor under modern service requirements.

Another caution: Don't try to get by with just one motor oil if you have different ages and types of equipment. Some farmers who buy a new unit mistakenly decide to use the oil recommended for use in it in their older engines as well. These usually have an accumulation of carbon in the cylinders, pistons and valves. The higher detergency cuts the carbon deposits and causes the engine to use oil. The loosened carbon may also plug the lines and result in serious engine damage.

In the final analysis, you are the one who must select the oil of the right type (API service classification) and grade (SAE viscosity) to meet your particular operating conditions. If you want to get the best possible service from your engines, pay close attention to the oil recommendations in your operator's manual.

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