CR-1214
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OSU Current Report

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SELECTING THE PROPER ENGINE OIL

By Willard Downs
Assistant Professor
Extension Agricultural Engineering

Selecting the proper engine oil is critical to the performance and longevity of modern gasoline and diesel engines, whether in farm or highway service.

Four of the most critical functions of oil in an engine are:

1. To reduce friction and wear between moving parts,
2. To help cool engine parts (engine oil is largely responsible for piston cooling),
3. To seal the cylinder during the combustion stroke, and
4. To keep engine parts clean by reducing the formation of harmful compounds, and by holding any compounds which do form in suspension.

Understanding Oil Ratings and Classifications. Modern oils are blended to meet the specifications of one or more of the following classifications: SAE Viscosity (defined by the Society of Automotive Engineers), the API Service Classification (established by the American Petroleum Institute) or a MIL Specification (Prepared by the Ordinance Department of the Army, Navy and Air Force).

SAE Viscosity. Viscosity is a measure of the thickness or fluidity of an oil at a given temperature. Lighter oils intended for winter use carry a 5W, 10W, or 20W symbol and are rated at 0° F. Heavier oils for warm and hot weather have higher ratings determined at 210° F. Multiviscosity oils are blended to have the viscosity properties of light oils at cold temperatures, and heavier oils at high temperatures. Such oils can give protection at both high and low temperatures, but are primarily intended for use in conditions where extreme temperature fluctuations are a problem. Multi-viscosity oils are not normally recommended for use in warm weather in heavy duty application. Manufacturer's recommendations should be carefully reviewed when selecting any oil, but particularly multi-viscosity oils. The SAE number found on oil containers is only an indication of temperature-viscosity properties, and gives no information about overall quality. The newer API classification does attempt to deal with oil quality and application.

API Designations. This classification system is a joint effort of the API, SAE and ASTM (American Society of Testing and Materials). It more accurately describes qualities and intended applications of specific oils. Common API oil classifications are shown in Table 1.

Military Specifications. The two most common MIL specifications are shown in Table 2. Although these specifications do not govern civilian applications, many users frequently request oils designated under this system because of extensive testing and performance records. Oil manufacturers often identify their containers with the appropriate MIL specification.

Many equipment and engine manufacturers have developed their own blends of oils for use in situations which demand qualities and characteristics not adequately covered under existing specifications. These oils often have special additives to maximize performance and protection under adverse conditions.

OIL Additives. Special oil additives are used in modern oils to help give protection for specific applications. Each additive is included to increase the protection of the oil in a specific area. Typical of such additives are the:

- Anti-Corrosion Additive
- Detergent-Dispersant Additive
- Foam Inhibitor Additive
- Viscosity Index Improver
- Oxidation Inhibitor Additive
- Pour Point Depressant Additive
- Extreme Pressure Additive
- Anti-Rust Additive.

Common Misconceptions about Engine Oils.

Because engine oils are not well understood, many popular misconceptions exist concerning their use and function. Some of the more common are discussed below:

1. Engine oil can often be improved by the addition of "Additives" to the crankcase.
   Good quality engine oils are blended with all additives necessary for their

intended application. In some cases use of additional crankcase additives may actually reduce protection provided by the oil.

2. Oil doesn't wear out.
As oil protects the engine, it absorbs contaminants and its additives are gradually depleted. Accumulations of sludge, varnish and other deposits gradually reduce the ability of oil to offer additional protection and it should be changed. Extremes in weather and severe operating conditions can accelerate this process.

3. Multi-viscosity oils are preferred to single viscosity oils.
As previously suggested, multi-viscosity oils are intended for conditions where temperature extremes are common, or where cold starting is a problem. In hot weather, and under heavy load, single viscosity oils are preferred. In many instances, addition of an engine block heater can provide for cold weather starting, while reducing excessive engine wear between cold, poorly lubricated surfaces.

4. Oil should be drained when cold to insure that all old oil is removed.
It is important that the engine be drained while the oil is still hot, before sludge and other accumulations have had a chance to settle.

5. As long as viscosities are the same, engine oils can be mixed with no adverse effects.
Oils with different MIL Specifications should never be mixed. Oils with similar MIL specifications can be mixed, even though obtained from different manufacturers. Whenever possible, it is good practice to replenish oil levels with the same oil which was originally placed in the engines. Mixing oils of various viscosities, API specifications, etc, is questionable at best, and may cause reduction in the ability of the oil to protect the engine.

6. Black oil means time for an oil change.
The change in color simply means that additives in the oil are cleaning and holding deposits in suspension. In diesel engines, oil should turn black with use if it is working properly. For this reason, color should not be used as an indicator of when to change oils. Intervals suggested by the manufacturer should be observed.

7. Worn out oil is thinner than good oil.
As an oil is gradually oxidized in the engine, it becomes thicker. Thus, a viscosity increase is indicative of contamination or a breakdown in the protective properties. Thinning of the oil is usually a result of dilution, or high temperatures.

8. Light oils are best until consumption rises.
Some highly specialized engines do require special grades and viscosities of oil during the break-in period. However, this is not a safe assumption with all engines. Recommendations in the operators or owner's manual should be observed.

SUMMARY

Appropriate engine oils be selected to maximize the life and performance of complex modern engines. Use reputable brands of oil. Observe manufacturer's recommendations on oil classifications and grades. Drain and change oil at recommended intervals. Avoid mixing oils of different grades and classifications, and be careful of improper use of multi-viscosity oils. Avoid use of unproven additives—select oils which have been properly blended for your particular needs.

A basic understanding of oil classification systems combined with an observation of manufacturer's recommendations and good judgement can take the guess work out of selecting the proper engine oil for your needs.

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