BUMPER 2 BUMPER

ENGINE LIFE

A GUIDE CREATED BY:
TBS FACTORING SERVICE

BUMPER 2 BUMPER

ENGINE LIFE

...CREATED BY TBS FACTORING SERVICE

TBS Factoring Service, LLC is a leading provider of freight-bill factoring to growth-oriented companies in the transportation industry. Founded in 2004, the Oklahoma City-based company currently serves nearly 4,000 clients nationwide with simple and flexible cash-flow solutions.

TBS Factoring is a key part of a family owned, one-stop shop for independent trucking services that also includes Truckers Bookkeeping Service, formed in 1968 to provide independent truckers with permitting, DOT compliance and fuel tax reporting services, and TBS Insurance Agency, founded in 1998 to provide truck insurance nationwide. In 2013, TBS Capital Funding joined the TBS Family, expanding our service offering to include general factoring. In 2015, Elite Dispatch Service was formed to provide logistics services for motor carriers nationwide.

The TBS family ownership group has more than 50 years of experience serving independent truckers. Our clients receive outstanding service from a seasoned and dependable staff.
TBS Factoring Service is among the most highly regarded freight-factoring companies in the USA.

LET'S BE FRIENDS

TABLE OF CONTENTS

BUMPER 2 BUMPER

ENGINE LIFE

You can tell a lot about mechanics by the way they take care of their tools — and your rig may be the most expensive tool you'll ever own. Staying roadworthy is more than just a good business practice; your livelihood depends on it. We have created this series of free handy reference guides to help you keep your rig revved and ready to make you money from bumper to bumper.

Well-planned preventive maintenance (PM) is essential to efficient truck fleet operation. An integral part of the PM program should be careful attention to the truck engine and the cooling system.

Safe travels!

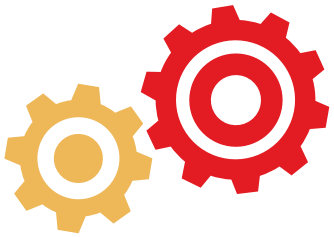
HOW TO EXTEND OIL CHANGE INTERVALS

Smart operation can extend your change intervals from 15,000 miles to 25,000 miles. That extension over the million miles of an engine's expected lifetime will save big money. The total savings from adding 10,000 miles to change intervals over 1 million miles would amount to $7,800.00. The three key steps in your PM program to extend intervals and guard against lube deterioration are:

- Use good filtration practices
- Choose the right oil grade
- Get routine oil analysis

CHAPTER #1

C12H23



The primary purpose of engine oil (chemical formula C12H23) is to stop metal from touching metal. When metal surfaces come in contact, they grind together causing friction. That creates heat, stress and wear. Engine oil is used to reduce friction by creating a slick film between metal parts that allows them to glide over one another. Consequently, engine longevity begins with choosing the appropriate engine oil that is right for the engine and operating conditions.

An oil's viscosity (a measure of its resistance to flow), along with the pressure and speed of movement, determines the thickness of the oil film between two moving surfaces. This, in turn, determines the ability of the oil film to keep the surfaces apart, the rate heat is generated by friction and the rate the oil flows between the surfaces to convey the heat away.

Oil should have a viscosity at the operating temperature that is correct for maintaining a fluid film between the engine surfaces. Engine oils are commonly referred to as "thick" (having a high viscosity) or "thin" (having a low viscosity). Changes in engine oil's viscosity can affect the oil's lubricating (protecting) ability. If too thin or too thick, more friction and drag will be created, resulting in premature wear and failure.

LIFE BLOOD OF THE ENGINE

Oil circulates through the engine, performing critical functions necessary to maintain engine performance and maximize its useful service life. Engine oil has four core jobs:

1. Control soot from combustion by-products, which can lead to oil thickening, premature filter clogging and engine wear.
2. Have the appropriate viscosity to influence both low and high temperature protection and fuel economy.
3. Prevent or minimize friction and wear that is caused by corrosion, metal contact and contaminants.
4. Control deposits or keep the engine as clean as possible, especially in critical areas of the engine, such as upper piston surfaces and the valve deck.

CHAPTER #2

OIL CLASSIFICATION

Engine oils are classified and rated in order to establish quality levels and appropriate applications for those oils. For automotive applications in the U.S., engine oils are generally classified by their API (American Petroleum Institute) and SAE (Society of Automotive Engineers) ratings. Under the API classification system, oils designed for gasoline engines are indentified by an “S.” Oils appropriate for diesel engines are indicated by a “C.” The API certification mark and service symbol also mean the oil meets performance requirements set by U.S. and international vehicle and engine manufacturers and the lubricant industry.

The SAE rating specifies the viscosity of an oil to flow at certain temperatures. The higher the number, the thicker the oil. There are two common types of SAE classifications: monograde and multigrade. A monograde oil (also called single grade), such as SAE 30, is designed to be used within a defined temperature range. Multigrade oils are formulated to give the oil the flexibility to lubricate effectively over a wider temperature range than monograde oils.

SYNTHETIC OILS

Synthetic engine oils are formed by a variety of chemical processes that modify the oil molecules to a structure that will better resist degradation at high engine temperatures than conventional oils. This leads to long oil life and reduced deposits, sludge and varnish formation.

Synthetic oils also have a lower viscosity and thicken less at cold temperatures, which allows them to flow quickly under cold climate conditions. Moreover, synthetic engine oils typically have more stable viscosity control and provide better protection when the engine is running under high temperature and high stress conditions, such as high speeds and heavy towing.

OIL CLASSIFICATION (CONTINUED...)

Take the multigrade SAE 10W-30 oil by way of example. The “W” stands for “winter” and indicates that the oil meets certain viscosity requirements for operation in low temperature. The number in front of the “W” indicates the low temperature viscosity. This number refers to the viscosity of the oil when the engine is cold, and indicates the oil’s performance when the engine is starting up. The thinner the oil when cold, the quicker it moves around the engine and the faster it protects vital engine components.

The second number, “30,” is the high temperature viscosity. When comparing viscosity numbers, a higher number will not flow as easily as a low number.

Some motor oils may also contain a resource conserving rating or an energy conserving rating from the International Lubricant Standardization and Approval Committee (ILSAC) — a joint effort of U.S. and Japanese automobile manufacturers. These designations apply to oils intended for gasoline engines for light duty vehicles.

FOUR LETHAL OIL CONTAMINANTS

1. **Fuel Dilution** — Fuel dilution is caused by frequent starts, fuel injector problems, excessive idling, cold running and leakage.
2. **Water** — Water is one of the most destructive contaminants. Condensation in the crankcase is caused by long idling in wintertime. Emulsified water mops up soot, sludge and dead additives, and when mobilized by flowing oil can knock out filters and restrict oil flow to bearings, pistons and valve deck.
3. **Glycol** — Glycol enters diesel engine motor oils as a result of defective seals, blown head gaskets, cracked cylinder heads and corrosion.
4. **Soot** — Soot reaches the engine by various means of blow-by during engine operation.

CHAPTER #3

OIL ANALYSIS

A tool that can be very helpful with engine maintenance is used oil analysis. This analysis is a quick, non-destructive way to gauge the health of an engine by providing important information about the condition of the internal parts of an engine.

Monitoring engine wear serves as an early warning system of potential engine problems. Through diagnostic oil analysis, hidden or emerging potential problems or failures can be identified and then the appropriate preventive maintenance or repairs can be done while they are small, rather than wait for costly catastrophic failures.

OIL ANALYSIS ON THE ROAD

An alternative to using an oil analysis laboratory or doing your own instant analysis is on-site analysis services.

- Speedco locations are equipped with on-site computerized oil analyzers that provide information about engine and transmission wear and operating condition within minutes.
- Apache Oil Company, in southeast Houston, provides an oil analysis service that also provides data about the condition of the engine, transmission and power steering system for advanced warning of hidden or emerging problems in minutes.

OIL ANALYSIS (CONTINUED....)

With the knowledge gained from a consistent oil analysis program, a truck operator can:

- Help optimize oil drain intervals.
- Lower repair bills.
- Help increase equipment reliability and life.
- Minimize unscheduled downtime.
- More precisely track operating efficiency and maintenance practices.

The combination of all this contributes to helping lower total operating costs. In addition, a used oil analysis program can provide support in the event of a warranty dispute. Knowing oil condition history provides additional input as to what has been happening with oil, and to some extent, engine-wear-related problems. Having such information might also add resale value to the vehicle.

WHAT ABOUT NEW ENGINES?

New engines exhibit levels of contaminants that remain from initial construction of the radiator, oil cooler and EGR cooler - so even when an engine is relatively new, oil analysis is important for proper maintenance. If you plan to go with extended intervals, it is imperative to know the miles on the oil, total hours engine has run and where contaminants come from.

A good analysis report will cost $30 to $50 – it's a wise investment for the life of your engine.

CHAPTER #4

SAMPLING PROCESS

Oil analysis involves sampling and examining oil for various properties and materials to monitor wear and contamination (from such things as water, coolant, fuel and dirt) in an engine. This is done on a regular basis to establish a baseline of normal wear and to help indicate when abnormal wear or contamination is occurring.

Oil that has been inside an engine for a period of time reflects the possible condition of that assembly. Oil is in contact with the mechanical components as wear metallic trace particles enter the oil. These particles are so small that they remain in suspension. Products of the engine's combustion process will also become trapped in the circulating oil. Any externally caused contamination enters the oil as well.

Consequently, the oil becomes a working history of the engine. By identifying and measuring these impurities, an indication of the rate of wear and of any excessive contamination can be obtained.

UNDERSTAND THE REPORTS

When the oil analysis is received, it is important to fully understand the findings. Consult with the oil analysis provider if unsure of anything. In general, oil contamination is the number one cause of lubrication-related failures. Therefore, lab reports involving coolant, dirt, fuel and, in some cases, soot contamination should get full attention. If a sample indicated a critical issue, typically the laboratory will contact the customer. Be aware that oil and lubricant analysis programs differ in many aspects, including tests available, interpretations and reports, turnaround time, price and more. Therefore, adequate time and effort needs to be invested in order to choose the program that best serves your requirements and needs.

SAMPLING PROCESS (CONTINUED....)

When taking an oil sample, the best practice is to take a sample in the same manner each time as this keeps the results consistent. All paperwork that accompanies each sample needs to be as complete as possible because this information is critical to providing a complete and accurate analysis report. Be sure to note if any oil was added between oil drains and what type was used.

Once a lab receives an oil sample, it typically takes 24 to 72 hours before the data is ready for reporting. Obviously, the longer it takes to get the sample to the lab the longer it takes to get the analysis back. Too often, truck operators accumulate several samples before sending them to the lab for analysis to save on shipping costs. In the long run, however, the value of the testing is lost due to this type of delay.

CHOOSING A USED OIL ANALYSIS PROVIDER

Selecting an oil analysis service is a strategic decision that requires a number of considerations. Some of these are:

- Does the provider offer a complete array of services, including training?
- Is the provider familiar with your industry?
- How long has the provider been in business?
- Is the provider known for being a quality and reliable supplier?
- Does the provider have knowledgeable technical support?
- How user-friendly is the program?
- Are a variety of management features available?

CHAPTER #5

COOLING SYSTEM

The cooling system is probably the least-maintained system of an engine. Industry estimates show that about 40 percent of all engine problems can be traced to abnormal coolant conditions.

Here again, good cooling system performance begins with the appropriate coolant type and then continues with regular monitoring and maintenance. The objective is to help reduce engine maintenance costs because abnormal coolant conditions can be corrected before they become an issue.

Coolant analysis can detect conditions such as corrosion, additive dropout, silica gel, improper levels of supplemental additives and other conditions which lead to cooling system failure. Properly maintained cooling systems and coolant allow the coolant to absorb the heat from the engine and release the heat through the radiator. If any of the components in the cooling system are not at optimum, the efficiency of the cooling system is diminished, eventually leading to engine damage or failure.

INSTANT FLUID ANALYSIS

Instant lubricant diagnostics can serve as a stopgap between lab analysis cycles, plus can offer a lower cost, quick method for determining a fluid's condition on the spot. Instant analysis kits can determine the condition of motor oils, differential fluids, automatic and manual transmission fluids, brake fluids, power steering fluids and gear oils, as well as antifreeze and coolants.

Typically, these kits are straightforward to use, and no tools or special knowledge is required. The kits use chromatographic methods to provide a measure of additive depletion and the level of sludge or debris in a lubricant.

COOLANT TYPES

Coolant comes in a range of colors — green, pink, red, blue, yellow, orange and brown. Coolant color is important because it is an indicator as to the kind of coolant it is and how it is to be maintained. Each type of coolant is different and needs to be maintained in a different way. This is particularly important for both conventional fully formulated coolant and extended life coolant (ELC). Mixing technologies and not maintaining them correctly can lead to cooling system problems. If a coolant becomes diluted with a different type of coolant, its ability to provide cooling system protection is diminished.

ELCs offer some advantages over fully formulated coolants. The primary advantage is that ELCs remain effective for a greater length of time and miles, and this provides potential maintenance savings. ELCs also provide excellent high temperature protection and heat transfer, plus protect cooling system components by maximizing water pump life and helping to reduce hard-water-scale deposits and silicate gel (green goo).

In general, extended life coolants utilize organic additive technology (OAT) corrosion inhibitors with nitrite and molybdate that protect cylinder liners from pitting and corrosion damage. Additionally, ELC eliminates the need for supplemental coolant additives.

Typical coolant maintenance for conventional fully formulated coolants requires checking the freeze point of the coolant and the additive or inhibitor level at each maintenance service of the vehicle. For ELCs, checking the freeze point is required at each maintenance and checking the inhibitor level annually is recommended.

INSTANT ANALYSIS KIT

Here is how it works:

- A drop of the sample oil or lubricant is placed on a thin layer of specialized paper
- As the fluid percolates through the paper, it creates bands or zones of different colors
- Certain colors indicate that something in the lubricant has changed
- Compare the colors to a diagnostic chart for analysis

INDEPENDENTS CHOOSE TBS

TBS Factoring Solutions will fuel your cash flow … upfront and fast!
Our most popular program offers a low non-recourse flat rate discount.
Fuel Advances are available on any load we factor.
Fast and friendly service – nothing could be easier.

VISIT
TBSFACTORING.COM

CALL
800-207-7661
SE HABLA ESPAÑOL

LOWEST RATES

- Low Flat Rates
- No Reserves
- Free Credit Checks
- Easy Application
- Fuel Advances
- Fuel Card
- MC & Permits
- Insurance

OTHER PROGRAMS AVAILABLE

INTERNATIONAL FACTORING ASSOCIATION

Commercial Finance Association Member