

## Extended Oil Drain Intervals

Oil service intervals are pre-determined by engine manufacturers (OEM's) and are designed to provide maximum engine protection under a wide variety of conditions. While a majority of equipment owners follow these guidelines there is a growing trend to extend oil service intervals beyond the OEM recommendations; However, Extended Oil Drain Intervals (EODI) are not for everyone. To fully understand the risks involved you must look at the key factors affecting EODI's.

*Engine lubricating oil* is often referred to as the life blood of the engine. This analogy is not made simply because the oil circulates through the engine but more importantly because the oil performs critical functions necessary to maintain engine performance and maximize useful service life. There are two basic types of oil available today: Mineral and Synthetic oils. While these oils are completely different in composition and beyond the scope of this service bulletin, they must still meet the American Petroleum Institutes (API) qualification criteria recommended by the engine manufacturers. There are many suppliers of oil in the market today and not all meet the stringent requirements of the API standard. Insuring your oil meets these requirements and understanding the factors affecting the engine oil is the first step before extending your oil service interval.

*Equipment operating extremes* of Heat, Cold, Idle Time, Airborne Contaminants, and Engine Load adversely affect engine oil. Excessive Heat will break down engine oil and create deposits in the engine adversely affecting engine life. Severe cold will limit the ability of the engine oil to lubricate at start-up and may add unwanted moisture and unburned fuel to the oil. Extended Idle Time can result in increased amounts of unburned fuel entering the oil resulting in oil dilution and inadequate lubrication. Extreme dust conditions may tax even the best air filtration system adding fine contaminants to the oil overloading the additive package that keeps them in suspension. Heavy loads on the engine can produce extra heat putting a greater demand on the cooling system and increasing the importance of cooling system maintenance during EODI's. Off-road operation will likely see more of these extremes than on-highway operation.

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*Engine designs* today are cleaner burning with reduced emissions and make excellent candidates for extended oil drain intervals; However, most customers cannot afford to buy new equipment every year and normally fleets have a mixture of equipment varying in vintage and service life. As piston rings and valve guides wear in the engine, combustion by-products increase. These combustion by-products end up accelerating oil additive depletion and create harmful deposits on internal engine surfaces making the engine less likely to benefit from an EODI.

*Oil filters* remove contaminants from the oil before they generate wear on engine component surfaces. There are filtration products offered in the industry today designed for extended oil drain intervals. While most filters do an excellent job in filtering, the trend of extending oil drain intervals 2 to 3 times the normal service interval has pushed the materials used in the manufacture of filters to the limit. Adhesives, rubber compounds, filter media, and even the steel construction in spin-on filters needs to be designed to meet the extended period of time they are expected to be in service. Before considering an EODI make sure the filter manufacturer will warranty their product when used in this manner.

*Additional considerations* include factors such as the type and quality of fuel being used and other systems' checks and maintenance requirements. The use of bio fuels such as biodiesel or ethanol blended gasoline have a direct impact on the engine oil and its additives. Likewise, the quality of the fuel (*i.e.*, higher sulfur content diesel) will also have a direct impact on the oil and the rate of depletion of its additives. Not to be overlooked, a review of system and safety checks that have become integrated with the engine oil maintenance must be conducted. If the EODI program being considered results in increased time between a technician's access to the equipment, careful and complete review of all other systems (*i.e.*, brakes and coolant) safety inspections and maintenance must be identified and adjusted appropriately.

If after considering all the factors affecting extended oil drain intervals you feel your equipment is a candidate for EODI's you will need to develop a test program to determine what length EODI is right for your equipment. To determine the correct length EODI you must first implement an oil analysis program to develop history on each piece of equipment scheduled for extended oil service. This will allow you to determine if there is any usable life left in the oil. The primary indicators will be silicon (dirt), viscosity (oil film strength), soot (combustion by-product), and Total Base Number (TBN). Most engine manufacturers have oil analysis guidelines. You will want to work with your oil analysis lab to understand your silicon, viscosity, soot, and TBN values based on your particular application. Each piece of equipment will vary and the key is to look for trends in the analysis. If oil analysis indicates you can extend your service interval you then need to move out in steps. Oil analysis should continue at the normal service interval and

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in increments of 20% thereafter until the analysis shows the useful life of the oil deteriorating. Once the maximum limit on the oil is reached the change interval should be set at the mileage of the previous sampling prior to indications of oil deterioration. Example: Normal service interval = 16,000 miles (25,000 km). Oil analysis performed at 16,000 (25,000 km), 19,200 (30,000 km), 22,400 (35,000 km), 25,600 (40,000 km), and 28,800 (45,000 km). If oil analysis indicates problems at 28,800 (45,000 km) the change interval should be backed off to 25,600 miles (40,000 km). This will allow for variables in operation and environment.

Extended oil drain intervals are not without risk and short term cost savings benefits should be balanced equally with engine performance and reliability. With all of the factors affecting the engine oil it is easy to see why OEM's have traditionally been conservative in setting oil drain intervals. If you think your equipment is a candidate for EODI program, do some research. Check with your Filter, Engine, and Oil manufacturer for guidance. If you're not doing oil analysis, start a program. Review your filtration package and most of all understand the potential risks involved. If not properly implemented EODI short term savings are offset by expensive repairs and downtime further down the road. Always dispose of used engine oil and filters properly.

### FOR ADDITIONAL INFORMATION, CONTACT:

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