ELECTRO-MOTIVE DIVISION • GENERAL MOTORS CORPORATION

SERVICE DEPARTMENT

MAINTENANCE INSTRUCTION

LUBRICATING OIL SPECIFICATIONS DIESEL ENGINE AND GOVERNOR-EMD AND CDED

The necessity for correctly lubricating the moving parts of any piece of apparatus is so apparent that further comment should be unnecessary. This instruction is therefore confined to listing specifications for particular lubricants which we have learned from experience are best suited to the application.

DIESEL ENGINE

OIL QUALITY

It should be recognized that the only real measure of quality in a lubricating oil is its actual performance in the diesel engine. This is so because of the impossibility of establishing limits on all physical or chemical properties of oils which can affect their performance in the engine.

The responsibility for recommending and consistently furnishing a suitable heavy-duty oil must rest with the individual oil supplier.

OIL TYPE

An SAE #40 heavy-duty additive type lubricating oil, which conforms to the following specifications, should be used in all engine applications.

Physical Properties	ASTM Designation	Limits
Saybolt Universal	D88 or D446	
1. Seconds at 100° F.		1350 Maximum
2. Seconds at 210° F.		70 Minimum 85 Maximum
Viscosity Index	D567	35 Minimum 75 Maximum
Flash Point, ° F.	D92	420° Minimum
Fire Point, ° F.	D92	475° Minimum
Pour Point, ° F.	D97	40° Maximum
Zinc		10 ppm Maximum

The oil should be a heavy-duty additive type having a high resistance to oxidation, a low tendency toward the formation of carbon deposits, and shall be noncorrosive to silver metal at 285° F. The silver corrosion evaluation should be made according to EMD laboratory test method #L.O. 201 (latest revision).

*This bulletin is revised and supersedes previous issues of this number.

We strongly recommend that zinc dithiophosphate or similar additives not be present in the engine lubricating oil. Oils containing more than 10 ppm zinc are considered excessively contaminated with zinc dithiophosphate additive and should not be used since they may not satisfactorily lubricate the reciprocating bearings used in these engines.

MIXING OF OILS

Our recommendation against mixing different kinds or brands of heavy-duty oils is substantially supported by numerous recorded cases where various mixtures of incompatible oils were detrimental to engine operation. Unfortunately, expensive failures or abnormally high wear rates caused by incompatible oil mixtures cannot be predicted by laboratory procedures.

The mixture of oils usually results in a lubricant that is less stable than any of its constituents. Sludge and lacquer formation caused by this instability results in excessive wear and in shorter oil and filter life.

Ordinary laboratory techniques cannot be used to analyze samples of lube oil mixtures because it is impossible to establish a starting base line condition against which to measure the level of oil deterioration. As a result, problems caused by unsatisfactory lubrication are difficult to diagnose when using an oil mixture.

OIL CHANGES

Engines intended for export, marine, industrial, or other special installations are often treated with rust preventive material which need not be removed. Oil meeting the specifications given should be used when placing the units in service. This oil should be changed and the lubricating system maintained as specified in the applicable Scheduled Maintenance Program. Laboratory analysis may dictate oil changes at shorter intervals than those specified in the Scheduled Maintenance Program.

The oil change intervals prescribed in the applicable Scheduled Maintenance Program are based on average operating conditions. When oil change intervals are extended, serious and costly engine problems usually result. This occurs when the heavy-duty lubricating oil loses its detergent-dispersant properties, allowing partially oxidized oil and other contaminants to form deposits in the engine.

Replacing old oil with a fresh charge of heavy-duty oil in a contaminated engine will result in the new oil picking up some of these deposits and rapidly losing its detergency and dispersancy. With the oil losing these properties quickly, and with continued operation, the deposits will become progressively worse and will ultimately lead to serious engine problems.

Laboratory analysis should not be used as the only guide to the condition of a lubricating oil. Of equal importance is the condition of the engine, which could be poor even though the oil appears satisfactory. Both engine and oil condition should be considered when attempting to arrive at oil change intervals beyond those recommended.

FILTER CHANGES

Oil filter element replacements should be made as specified in the applicable Scheduled Maintenance Program, unless a laboratory lube oil analysis dictates earlier replacement.

Where highly dispersant oils are employed, carbonaceous matter may be suspended so finely in the oil that it is essentially unfilterable. In such situations, it might appear that an extension of the filter element replacement interval would be practical. Caution should be exercised when contemplating such action. Filter materials have not yet been developed to tolerate prolonged exposure to lube oil without deterioration and possible disintegration of the filter elements.

OIL DILUTION

Engines found to have lubricating oil diluted with fuel oil should be serviced in the following manner:

1. From 0 to 3% dilution

   Within this range there is generally no need for concern or corrective action.

2. From 3% to 5% dilution

   Engine operation may continue until the next scheduled shutdown, provided total dilution does not exceed 5%. However, repairs should be made as soon as practical.

3. Above 5% dilution

   When dilution exceeds 5%, the engine should be removed from service until the fuel leak is repaired and the oil is changed.

GOVERNOR

An SAE 20W-40 oil which will meet American Petroleum Institute (A.P.I.) Engine Performance Evaluation DG or MS is recommended for all governor applications. The oil selected should conform to the following specifications:

Properties	Minimum	Maximum	Typical
Viscosity, ASTM D88* or D2161*			
at 0° F	-	25,000	20,000
at 210° F	71.0	75.0	73.0
Viscosity Index, ASTM D567*	125	-	132

*Latest Revision

Litho in U.S.A.