



LUBRICATION GROUP

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LUBRICATION

NEW SERVICE CLASSIFICATIONS AND DESIGNATIONS FOR LUBRICATING OILS FOR AUTOMOTIVE TYPE GASOLINE AND DIESEL ENGINES

In the period just prior to World War II, developments in the design of both gasoline and high speed diesel engines and in the services to which they were subjected, resulted in the introduction of new types of crankcase oils. To enable the automotive manufacturers to recommend these new oils, the American Petroleum Institute was asked to define them. This was done and the API definitions of oil types designated "Regular," "Premium" and "Heavy Duty" were published in 1945.

Recently, the automotive and petroleum industries have recognized that the definitions just mentioned had limitations. While satisfactory when established in 1945, the definitions did not provide for the many new developments since the war in engines or in crankcase oils.

To correct this situation, two industry committees worked together; one, the Lubrication Committee of the American Petroleum Institute representing both large and small refiners and marketers, the other from the American Society of Testing Materials on which the major manufacturers of gasoline engines and high speed diesel engines were represented. By this joint effort, a new system of Service Classifications and Designations for Motor Oils for Automotive Type Engines has been developed as a basis for selecting and recommending oils for these engines.

The SAE Viscosity Numbering System is in no way affected by the new API Service Classification System and will be used as before to indicate the proper viscosity grades of oils for any service.

The definitions of service, approved by the API and the supplementary explanations are presented for the information of those who are interested.

BASIS OF THE NEW SERVICE CLASSIFICATIONS

In devising the new Service Classification System, it was recognized that the satisfactory operation of automotive gasoline and high speed

diesel engines is based primarily on the suitable combination of these five factors:

1. Engine Design and Construction
2. Fuel
3. Motor Oil
4. Maintenance Practices
5. Operating Conditions

To begin with, the design and construction of different engines and consequently their lubrication needs vary widely since individual engine manufacturers place emphasis on different engine features. Fuels also vary widely, depending upon the crude oil and refining methods used. Motor oil characteristics and performance depend not only upon crude source and refining methods, but on the special ingredients which may be added to oils in their manufacture. As for the maintenance of engines, naturally it varies from good to poor.

The service conditions under which engines operate are extremely wide and have a major influence upon the character of oil required to give the best performance for any particular combination of engine design and kind of fuel.

To provide a workable guide for the selection of oils suited to various engine designs, service conditions had to be divided into broad classes, based on the most up-to-date knowledge and experience. Obviously, it was impossible to define and include all possible service conditions and it was actually unnecessary because an engine may be operated in a variety of services in any given period.

In the new system, the various classes of service for gasoline and diesel engines are defined and explained. Quite important is the fact that some types of service commonly thought of in the past as being very light are actually quite severe from the lubrication standpoint. This applies especially to passenger cars and light trucks.

Each service class is designated by letters. This provides a convenient means whereby oil companies may indicate what class or classes of service each of their several brands of oil are suitable for. The engine manufacturer may similarly use these letter designations to indicate the service and lubrication requirements of his various engine designs.



DEFINITIONS AND EXPLANATION OF SERVICE CLASSIFICATIONS

The new Service Classification System includes five types of service, three for gasoline engines, two for diesel engines. Each service type is defined and explained below and the corresponding letter designations shown.

GASOLINE AUTOMOTIVE TYPE ENGINES

Service MS

Service typical of gasoline or other spark ignition engines operating under unfavorable or severe types of service conditions, and where there are special lubrication requirements for deposit or bearing corrosion control, due to operating conditions or to fuel or to engine design characteristics.

Service MS normally represents the most severe service conditions encountered in the operation of gasoline and other spark ignition engines. It includes two different types of severe or adverse operating conditions which are as follows:

Start and stop service promotes condensation in engine cylinders and crankcases of water from fuel combustion and also dilution of the oil with unburned fuel; it can promote corrosive wear of cylinders, pistons and rings, also oil ring plugging, varnish deposits and low temperature emulsion type sludge. In passenger cars and other units the severity of this service increases in wintertime as atmospheric temperatures drop, although it is often a year-round problem in taxicabs, delivery trucks and similar operations. The nature of the fuel can influence these troubles. The design of the cooling system and the effectiveness of crankcase ventilation can increase or decrease their severity.

High temperature, severe service promotes oxidation of the lubricating oil. This type of service may cause high temperature varnish and sludge deposits, stuck rings, and scuffing of rings in all types of engines. It may also cause corrosion of some types of bearings. This condition is aggravated by driving long distances at high speed, particularly in hot weather. Under these conditions, the crankcase oil is subjected to relatively high temperatures. The nature of the fuel may have some influence on the severity of this condition, but its relative influence is less under these high engine temperatures than under start and stop conditions. Engine design, especially adequate cooling of oil as well as of pistons, valve guides, and seats, can minimize the effect on the oil.

Service MM

Service typical of gasoline and other spark ignition engines operating under moderate to severe service conditions, but presenting problems of deposit or bearing corrosion control when crankcase oil temperatures are high.

This is a more moderate service condition than Service MS. Vehicles powered by engines which are relatively insensitive to deposit formation when operated at high speeds and under heavy loads are included in this service, particularly when operated with fuels of suitable characteristics. It does not include extensive operation under the severe type of low engine temperature service such as start and stop driving or prolonged idling described under Service MS.

Service ML

Service typical of gasoline and other spark ignition engines operating under light and favorable service conditions, the engines having no special lubrication requirements and having no design characteristics sensitive to deposit formation.

This is the least severe service condition. This type of service includes moderate speed driving most of the time, with no severe low or high engine temperature operation. It also includes operation of vehicles with engines insensitive to sludge, deposit formation or fuel characteristics.

DIESEL AUTOMOTIVE TYPE ENGINES

The severity of diesel engine service with respect to wear and deposit formation depends upon a combination of several factors. First is the power requirement. High continuous power output or overload at high atmospheric temperatures or intermittent power demands at low temperatures represent severe service. By contrast, rated load, continuous or intermittent operation at normal temperatures can be considered normal diesel engine service.

From the standpoint of design, diesel engine speeds are usually lower than gasoline engine speeds but higher temperatures within the engine and greater bearing loads may be expected. The design of the engine and its cooling system, also its installation in any equipment all affect service severity.

In the diesel engine, harmful products of combustion causing wear and deposits on pistons and in the crankcase can be formed from incomplete combustion of any fuel and from some specific fuel components such as



sulphur. The effects of these combustion products and consequently the severity of the service requirements are greatly magnified by low temperature operation and are influenced in varying degree by engine design characteristics.

Service DG

Service typical of diesel engines in any operation where there are no exceptionally severe requirements for wear or deposit control due to fuel or to engine design characteristics.

Rated load, continuous output or intermittent operation under normal temperature conditions can be considered as normal service requirements for service DG. Depending upon individual engine design characteristics, most diesel engine builders have designated maximum fuel sulphur limits for this service classification.

Service DS

Service typical of Diesel engines operating under extremely severe conditions or having design characteristics or using fuel tending to produce abnormal wear or deposits.

The service conditions in this classification are the most severe encountered in the operation of diesel engines. High load operation at high temperatures, design factors or engine installation details causing high temperatures within the engine, constitute severe service, as does intermittent operation at low temperatures since both promote wear and deposit formation. Cooling system design and maintenance practices can aggravate or minimize the severity in either case. The use of high sulphur content fuels increases service severity with respect to wear and deposits in varying degree, depending upon design, maintenance and operating conditions, especially low temperatures. Hence, frequently their use is considered to constitute severe service.

USE OF LETTER DESIGNATIONS

When the letter designations are used to indicate services for which oils may be suitable, it is the intent that they be preceded by the words, "For Service." To illustrate, an oil suitable for moderate service conditions in gasoline engines would be referred to as "For Service MM." If oils are suitable for more than one service, it is appropriate that these oils be referred to with the marks associated with such services. For example, "For Services MS--DG or MS--MM," etc.

CLUTCH RELEASE SLEEVE AND BEARING · LUBRICATION

Clutch release bearing sleeves on all R-line chassis incorporate a lubricator fitting to provide means of lubricating the clutch release bearing, sleeve and fork without their removal from chassis.

R-110 through R-184 chassis have the clutch release sleeve and bearing lubricator fitting located at the bottom of the release bearing sleeve, as illustrated in figure 1. Access to this fitting is gained by removal of the flywheel housing bottom cover.

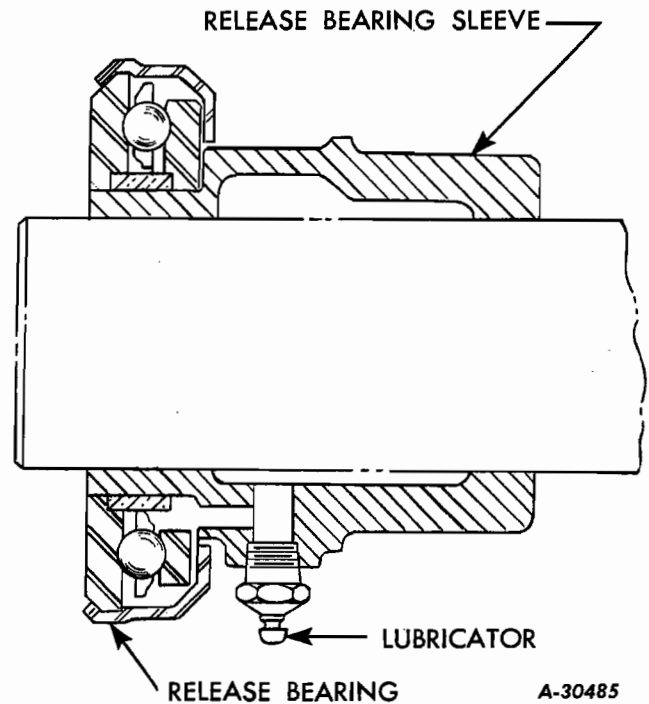


Fig. 1 - Release Bearing, Sleeve and Lubricator

R-185 through RF-210 chassis have the clutch release sleeve and bearing lubricator fitting on the top of the release bearing sleeve (not illustrated). Access to this fitting is gained by removal of the cab floor mat, cab floor transmission cover plate and clutch bell housing inspection plate.

To lubricate, use a low-pressure hand operated grease gun filled with a suitable lubricant comparable to "Lubriplate No. 110", fill lubricant cavity in release sleeve and bearing. **DO NOT OVER-LUBRICATE.** Lubricate every 15,000 to 20,000 miles under normal operating conditions. Under unusual "Stop-and-Go" driving conditions, lubricate every 10,000 miles.



LUBRICATION

GENERAL INSTRUCTIONS

Thorough lubrication at definite intervals with a good lubricant will aid greatly in prolonging the life of the truck and in the reduction of operating expense. The interval between lubrication periods depends entirely upon operating conditions. The loads carried, speed, road and weather conditions all have a bearing on the frequency of lubrication periods.

In the lubrication charts, the mileage recommendations are approximate, being based on average conditions. For some types of operations it will be necessary to figure the lubrication periods upon an hourly basis, and where operating conditions are extremely severe, the truck should be lubricated after every twenty-four hours of operation.

Only lubricants of the best quality, having proper body or viscosity, manufactured by a reputable concern, should be used.

We do not attempt to specify any particular manufacturer's products. High-grade lubricants can be secured from any reputable oil company.

The viscosity numbers used are those adopted by the Society of Automotive Engineers to classify lubricants according to body or thickness and do not cover any other properties.

When changing engine oil, clean and refill air cleaner, also clean oil filter if used.

ENGINE OIL SELECTION

Selection of proper engine lubricating oil demands consideration of two important factors--namely, easy starting during very cold weather, and adequate engine lubrication after the engine is placed in service.

Lighter viscosity oils facilitate cold-weather starting and also provide better immediate lubrication as the engine starts. CAUTION: They do not, however, provide adequate lubrication under sustained higher engine speeds or severe service. Increased oil consumption can also be expected when using lighter viscosity oils. Frequent oil level check must be made when using lighter viscosity oils.

Consideration must therefore be accorded to the cold weather housing facilities for the idle truck, the service in which the truck is engaged, and the selection of higher viscosity oils which have better free-pouring characteristics at low temperatures.

In consideration of the foregoing, the following general recommendations are made:

MODERATE SERVICE--trucks operating in multi-stop or other service where sustained higher engine speeds will not be encountered:

ENGINE	TEMPERATURES			
	90° (F.) and up*	32° (F.) to 90° (F.)	+10° (F.) to 32° (F.)	+10° (F.) to -10° (F.)
SD	SAE-30	SAE-30	SAE-20W	SAE-10W
BD	SAE-40	SAE-40	SAE-20W	SAE-10W
RD	SAE-40	SAE-40	SAE-20W	SAE-10W
R-6602	SAE-40	SAE-40	SAE-20W	SAE-10W
* See Hot Climate - High Speed instructions below.				

For temperatures lower than minus 10° (F.), use SAE-10W and kerosene. (SAE-10W may be safely diluted with colorless kerosene up to 30%). Mix kerosene thoroughly with the oil before adding to the engine. NOTE: Kerosene will evaporate rapidly under crankcase operating temperatures. Because of this fact, more frequent checking of the oil level must be made to avoid operating the engine with low oil level.

Hot Climate - High Speed

For trucks operating on highway, or other services demanding sustained higher engine speeds, use engine lubricating oils having a viscosity of as near SAE-50 as possible (SAE-40 for SD Engines) in keeping with the starting ability. NOTE: High viscosity oils are available which also have very good cold pour characteristics.

ENGINE OIL TYPES

Engine oils are available either as "straight" mineral oil (having nothing added during its manufacture other than possibly a pour-point depressor), or as "additive" oils which have had certain chemicals added during manufacture for the purpose of providing qualities or properties not available in the original oil, either before or after refining.



Under operating conditions, oils tend to undergo chemical changes due to oxidation and form such nonlubricating products as varnish, lacquer, and carbon. Where formation of these undesirable products is excessive when using untreated oils, use of an additive oil may prove beneficial since, through the additive chemicals, formation of those deposits may be minimized or retarded.

"Additive" engine oils are those to which chemicals have been added to alter or modify the characteristics of the oil and are generally referred to as "inhibited" oils or as "detergent" oils. An "inhibited" oil is not necessarily a "detergent" oil. Additive oils having both inhibiting and detergent qualities are classed as "Heavy-Duty Oils." The matching of chemical additives to a base oil is carried out in extensive laboratory engine tests. (Note: The refiners' choice of the base stock to be treated with modern additives is very important. An inferior base oil cannot be transformed into an acceptable oil merely by the use of additives. Not all base oils are equally susceptible to improvement with a given additive, and not all additives are equally effective in the same base oil.)

Additives to engine oils generally serve as (1) corrosion inhibitors or anti-oxidants, (2) as detergents, (3) as pour-point depressants. More fully, these agents are described as follows:

- (1) **CORROSION INHIBITORS OR ANTI-OXIDANTS;** Some of the products of oil or fuel oxidation are corrosive in nature and attack certain of the engine metals such as hard alloy bearings, causing pitting or etching. Engine deposits such as sludge and lacquer result in part from oil oxidation products. Anti-oxidants impart in great degree resistance to corrosion and sludge formation by controlling oil oxidation.
- (2) **DETERGENTS (DISPERSANTS).** Chemicals are added which serve as mild cleaning agents and, as such, tend to clean or wash away lacquer and sludge deposits from pistons, side walls, bearing surfaces, and other interior working surfaces of an engine. The detergent action is the result of the ability of the oil to keep insoluble particles--the products of fuel combustion and oil decomposition--in a finely divided state so that they can be kept in suspension in the oil. Unless these particles are carried in suspension or filtered out, they tend to deposit in piston ring grooves and on other engine interior parts. The detergent dispersive action is not effective with particles of metal, other abrasives, or coarse carbonaceous material.

- (3) **POUR-POINT DEPRESSANTS;** Because mineral oils thicken or congeal at low temperatures, certain chemicals are added to "additive" oils to serve as pour-point depressants or, in other words, to lower or depress the pour point a few degrees. The result is an oil having better flow characteristics at low temperatures which will provide better immediate lubrication upon starting during cold weather because of the fluid state of the oil. The use of the proper engine oil is of utmost importance in obtaining maximum performance and satisfaction. The selection of the proper brand of oil should be based on the reputation of the refiner or marketer.

The American Petroleum Institute and the automotive manufacturers have agreed that engine oils shall now be marketed under three classifications or categories, namely, "Regular Oil," "Premium Oil," and "Heavy-Duty Oil." These are more fully defined as follows:

REGULAR MOTOR OIL: This term shall be used to designate a straight mineral oil. Oils of this type are generally suitable for use in internal-combustion engines under moderate operating conditions. (These oils may and often do contain pour-point depressants.)

PREMIUM MOTOR OIL: This term shall be used to designate an oil having oxidation stability and bearing corrosion preventive properties. Oils of this type are generally suitable for use in internal-combustion engines where operating conditions are such that regular oils do not give satisfactory service.

HEAVY-DUTY MOTOR OIL: This term shall designate an oil having proved oxidation stability, bearing corrosion preventive properties, and detergent-dispersant characteristics. Oils of this type are generally suitable for use in both high-speed Diesel and gasoline engines under heavy-duty service conditions.

Heavy-Duty Oil, if installed in an engine where other-type oils have been used, requires that precautionary measures be taken to prevent loosened particles from clogging oil passages. The following measures represent good, practical advice when changing from any brand of oil to another:

1. Drain and flush engine crankcase.
2. Install new oil filter cartridge and thoroughly clean oil filter sump. (Note: Only absorbent type or edge type (filter disc) filter packs should be used with detergent type oils. Clay or chemically treated filters should not be used as they will remove some of the beneficial additives used in the manufacture of the oil.)



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- It is very important that engine operating temperatures be maintained at an efficient level of 160-180° F. to reduce the possibility of excessive sludge formation.

Certain precautionary measures must also be observed after the detergent type oil is placed in service:

- THE ORIGINAL FILL should be drained after 300-500 miles operation, and the oil filter should be serviced. In new or reconditioned engines this is necessary in order to remove possible abrasives. In other engines, where other-type oils have previously been used, the washing or detergent action of the heavy-duty type oil tends to loosen deposits which, if not removed by draining, may clog the oil pump screen and oil channels.
- THE SECOND FILL should not be used in excess of 1000 miles operation and the oil filter again should be serviced. (Note: If necessary, as judged by the condition of the oil, change at an earlier period.)
- THE THIRD FILL will generally serve for the regularly established drain period. (Note: Color can not be the basis on which oil changes are made; rather, the oil should be changed at periods previously established or as recommended by the oil manufacturer.
- If an engine previously operated on either Regular or Premium-type oils (not Heavy-Duty) had a bad varnish condition, the use of Heavy-Duty Oil, because of its detergent quality, may dissolve some of the varnish and increase running clearances, resulting in an increase in engine noise and a lowering or loss of oil pressure. Should this occur, the cause should be determined and the necessary corrections made to restore the oil pressure.

TRANSMISSIONS

When possible, always drain transmission when truck has come in from a run. With the oil warm a more thorough draining job can be done, especially in cold weather. To drain, unscrew plug at bottom of case and allow sufficient time for all the old oil to run out. Before refilling, flush with light engine oil or light flushing oil, followed by complete draining; this will remove thickened material within the case. Use SCL, EP gear oil or multi-purpose gear lubricant.

CHASSIS

When greasing the chassis, it is good practice to force lubricant into the bearings until all old lubricant is forced out and the new appears. This will flush out any loose dirt or abrasives that may have accumulated and will also assure thorough greasing.

A high-grade viscous chassis lubricant will, except in extreme cases, be satisfactory for year-around use. If gear oil is used to lubricate chassis, SAE-140 is the proper viscosity.

WATER PUMPS

SD engine water pumps are lubricated at assembly and no further lubrication is necessary.

BD and RD engine water pumps should be packed with medium short fiber wheel bearing grease at time of overhaul. Pumps should be periodically (10,000 miles) lubricated. Remove lubricant plug, fill housing using a low-pressure lubricant gun.

WHEEL BEARINGS

Wheel bearings should be carefully lubricated. If too much grease is used there will be the possibility of brake linings becoming soaked.

Rear axle shaft bearings and the cavity in which they are assembled in the L-110 Series trucks are properly lubricated at time of assembly. Pipe plugs are installed in the lubricant fitting holes. It is intended that at 10,000 miles these plugs should be removed, lubricant fittings installed, the bearings lubricated, and the plugs again installed.

Lubricant fittings should not be allowed to remain in place for they may prove an invitation to overlubricate the bearings. The cavity containing the bearing holds approximately one ounce or two cubic inches of lubricant.

NOTE: Excess lubrication will result in damaged oil seals and grease accumulating on brake linings.

CLUTCH RELEASE BEARINGS

The clutch release bearing used in International Motor Trucks, is of prelubricated type and should require no further attention.



PROPELLER SHAFT CENTER BEARINGS (NOT PRE-LUBRICATED TYPE)

Propeller shaft center bearing should not be lubricated with gear oil or chassis lubricant.

Use a medium, short-fibre wheel bearing grease, the technical specifications of which are--cold-milled sodium soap--not calcium--content with a work penetration consistency of 250 that will not break down below 300.

AIR CLEANERS (OIL-TYPE)

The cleaning and servicing of oil type air cleaners depends upon operating conditions as to dust, dirt, etc. Under normal conditions, oil type air cleaners should be removed and serviced every 5000 miles and at earlier intervals under dusty operations--even daily, under severe conditions.

When servicing, remove the oil cup, or reservoir, and clean out old oil and dirt. Wash the filtering mesh, or element, in kerosene then dip in clean oil and allow the excess oil to drain from the element. Use same grade oil as used in the crankcase, and fill cup to the "oil level" indicating beads in the cup.

Air cleaner connections must be maintained in a tight and leak-proof condition; otherwise, uncleaned air will get into the engine.

SINGLE-SPEED HYPOID AXLES (NOT EATON)

Hypoid gearing in these axles requires the use of lubricants with properties enabling them to withstand the higher unit pressures and sliding action characteristic of this type gearing.

The mileage figures, relative to the frequency of lubrication changes, are based upon average vehicle operating conditions, and are not applicable in all cases. The actual conditions under which the vehicle is operated should be the determining factor in establishing lubrication requirements.

Changes to the correct grade of lubricant for Winter or Summer operations are dependent upon climatic conditions and should be made as required regardless of mileage. For average operation, check the lubricant level every 1,000 miles and drain and refill to level of tapped filler hole every 10,000 miles.

To further assure complete lubrication after overhaul, and before the vehicle is placed into heavy slow-speed operation, jack up both rear wheels and run the axle for a short period at speeds equivalent to 25 to 30 m.p.h. Do not allow the wheel on one side to race faster than the wheel on the opposite side.

IMPORTANT: NEVER ADD LUBRICANT TO SINGLE-SPEED HYPOID AXLES, UNLESS IT IS THE SAME MAKE AND GRADE AS THAT WHICH IS ALREADY IN THE AXLES. IF THE SAME MAKE AND GRADE LUBRICANT IS NOT AVAILABLE, DRAIN, FLUSH, AND REFILL WITH LUBRICANT AS PER FOLLOWING INSTRUCTIONS:-

Draining should preferably be done when truck has come in from a run in order that the oil may be well agitated and warmed up. This is particularly desirable in cold weather.

To drain, unscrew plug at bottom of housing and allow sufficient time for all the old oil to run out. Before refilling, we suggest thorough flushing with light engine oil or light flushing oil, followed by complete draining. This will insure removal of any thickened material within the housing.

NOTE: Use SCL, EP gear oil or multi-purpose gear lubricant suitable for hypoid axles and supplied by a reputable refinery. Use SAE-90 for cold climate and SAE-140 for warm climate.

SINGLE-SPEED HYPOID AXLES (EATON ONLY)

Hypoid gear lubricants have been developed primarily for the differential gear case. The lubricant is intended to provide protection against heavy loads and the sliding action characteristic of hypoid ring and pinion gears. Use a hypoid gear lubricant available as Elco Gear Safety "28" or its equivalent. A number of hypoid lubricants are prepared by reputable companies which contain Elco additive concentrates. Viscosity of the hypoid lubricant should be SAE-90. When high atmospheric temperatures (above 100° F.) prevail, SAE-140 may be used.

Check Lubricant Level

Every 1,000 miles, remove filler plug in housing cover and add sufficient lubricant to bring level to filler opening. Install and tighten plug.

Drain and Refill

Every 10,000 miles (see following note) remove housing cover lower screw or plug at bottom of housing and drain lubricant. Drain when unit is hot, preferably immediately after operation. Fill until lubricant level is up to filler opening. Install and tighten plug.

NOTE: The service intervals between lubricant drain periods must always be based upon type of service in which the unit is operated. Rough and unimproved highway operations as well as heavy loads and off-highway operations require more frequent lubricant changes. Sustained high speed and high temperatures



also cause rapid deterioration of the lubricant. Regularly established lubricant change periods should be observed, based upon operation conditions.

TWO-SPEED HYPOID AXLES (EATON)

Hypoid gearing in these axles requires the use of lubricants with properties enabling them to withstand the higher unit pressures and sliding action characteristic of this type gearing.

The mileage figures, relative to the frequency of lubrication changes, are based upon average vehicle operating conditions, and are not applicable in all cases. The actual conditions under which the vehicle is operated should be the determining factor in establishing lubrication requirements.

Changes to the correct grade of lubricant for Winter or Summer operations are dependent upon climatic conditions and should be made as required regardless of mileage. For average operation, check the lubricant level every 1,000 miles and drain and refill to level of tapped filler hole every 10,000 miles.

To further assure complete lubrication after overhaul and before the vehicle is placed into heavy slow speed operation; jack up both rear wheels and run the axle for a short period at speeds equivalent to 25 to 30 m.p.h. Do not allow the wheel on one side to race faster than the wheel on the opposite side.

IMPORTANT:-NEVER ADD LUBRICANT TO TWO-SPEED HYPOID AXLES UNLESS IT IS THE SAME MAKE AND GRADE AS THAT WHICH IS ALREADY IN THE AXLES. IF THE SAME MAKE AND GRADE LUBRICANT IS NOT AVAILABLE, DRAIN, FLUSH, AND REFILL WITH LUBRICANT AS PER FOLLOWING INSTRUCTIONS:-

Fill axle through back filler plug until oil flows from overflow plug. Insert plug. Then add one additional pint of oil using filler hole at top of carrier. This will supply the extra oil required to fill differential and planetary unit. At 1,000 mile intervals, check level of oil in housing.

NOTE: Use a hypoid gear lubricant available as Elco Gear Safety "28" or its equivalent. A number of hypoid lubricants are prepared by reputable companies which contain Elco additive concentrates. Viscosity of the hypoid lubricant should be SAE-90. When high atmospheric temperatures (above 100° F.) prevail, SAE-140 should be used.

DOUBLE-REDUCTION HYPOID AXLES (EATON)

Hypoid gearing in these axles requires the use of lubricants with properties enabling them to withstand the higher unit pressures and sliding action characteristic of this type gearing.

The mileage figures, relative to the frequency of lubrication changes, are based upon average vehicle operating conditions, and are not applicable in all cases. The actual conditions under which the vehicle is operated should be the determining factor in establishing lubrication requirements.

Changes to the correct grade of lubricant for Winter or Summer operations are dependent upon climatic conditions and should be made as required regardless of mileage. For average operation, check the lubricant level every 1,000 miles and drain and refill to level of tapped filler hole every 10,000 miles.

To further assure complete lubrication after overhaul and before the vehicle is placed into heavy slow speed operations: jack up both rear wheels and run the axle for a short period at speeds equivalent to 25 to 30 m.p.h. Do not allow the wheel on one side to race faster than the wheel on the opposite side.

IMPORTANT: NEVER ADD LUBRICANT TO DOUBLE-REDUCTION HYPOID AXLES UNLESS IT IS THE SAME MAKE AND GRADE AS THAT WHICH IS ALREADY IN THE AXLES. IF THE SAME MAKE AND GRADE LUBRICANT IS NOT AVAILABLE, DRAIN, FLUSH, AND REFILL WITH LUBRICANT AS PER FOLLOWING INSTRUCTIONS:-

Fill axle through back filler plug until oil flows from overflow plug. Insert plug. Then add one additional pint of oil using filler hole in pinion cage. This will supply the extra oil required to fill differential and planetary unit. At 1,000 mile intervals, check level of oil in housing and add make-up if needed.

NOTE: Use a hypoid gear lubricant available as Elco Gear Safety "28" or its equivalent. A number of hypoid lubricants are prepared by reputable companies which contain Elco additive concentrates. Viscosity of the hypoid lubricant should be SAE-90. When high atmospheric temperatures (above 100° F.) prevail, SAE-140 should be used.



TIMKEN (S-200, U-200, S-300, U-300) AXLES

Hypoid gearing in these axles requires the use of lubricants with properties enabling them to withstand the higher unit pressures and sliding action characteristic of this type gearing.

The mileage figures, relative to the frequency of lubrication changes, are based upon average vehicle operating conditions, and are not applicable in all cases. The actual conditions, under which the vehicle is operated should be the determining factor in establishing lubrication requirements.

Changes to the correct grade of lubricant for Winter or Summer operations are dependent upon climatic conditions and should be made as required regardless of mileage. For average operation, check the lubricant level every 1,000 miles and drain and refill to level of tapped filler hole every 10,000 miles.

Where an axle has been out of use for a long period, or has been overhauled the lubricant plug on the top of the Hypoid pinion cage should be removed and one pint of lubricant inserted. This provides immediate lubrication for the pinion before oil is thrown up from the axle housing bowl. To further assure complete lubrication after overhaul and before the vehicle is placed into heavy slow speed operation: jack up both rear wheels and run the axle for a short period at speeds equivalent to 25 to 30 m.p.h. Do not allow the wheel on one side to race faster than the wheel on the opposite side.

IMPORTANT: NEVER ADD LUBRICANT TO TIMKEN HYPOID AXLES UNLESS IT IS THE SAME MAKE AND GRADE AS THAT WHICH IS ALREADY IN THE AXLES. IF THE SAME MAKE AND GRADE LUBRICANT IS NOT AVAILABLE, DRAIN, FLUSH, AND REFILL WITH LUBRICANT AS FOLLOWS:-

NOTE: Use SCL, EP gear oil or multi-purpose gear lubricant suitable for hypoid axles and supplied by a reputable refinery. Use SAE-90 for cold climate and SAE-140 for warm climate.



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REAR AXLE LUBRICATION CAPACITIES

IH MODEL	CODE NUMBER	AXLE TYPE	CAPACITY (PINTS)
R-1060	1401	Single-Reduction	4 Pts.
R-1070	1402	Single-Reduction	4 Pts.
R-1165	1433	Single-Reduction	4 Pts.
R-1170	1403	Single-Reduction	3 Pts.
R-1440	1404	Single-Reduction	8 Pts.
RF-1475	1428	Single-Reduction	Each Axle 8 Pts.
R-1470	1405	Single-Reduction	8 Pts.
R-1530	1406	Single-Reduction	11 Pts.
R-1540	1415	Double-Reduction - Eaton	19 Pts.
R-1555	1407	Single-Reduction	20 Pts.
RF-1575	1429	Single-Reduction	Each Axle 11 Pts.
R-1630	1408	Single-Reduction	18 Pts.
R-1640	1416	Double-Reduction	19 Pts.
RF-1670	1430	Single-Reduction . . . . .	. . . . .
R-1731	1419	Double-Reduction - S-200	38 Pts.
R-1741	1409	Single-Reduction . . . . .	. . . . .
R-1810	1420	Double-Reduction - U-200	38 Pts.
R-2465	1410	Two-Speed	13 Pts.
R-2466	1411	Two-Speed	13 Pts.
R-2470	1425	Two-Speed with Timken Diff. . . . .	. . . . .
R-2475	1426	Two-Speed with Timken Diff. . . . .	. . . . .
R-2580	1413	Two-Speed	22 Pts.
R-2585	1412	Two-Speed	20 Pts.
R-2590	1427	Two-Speed with Timken Diff. . . . .	. . . . .
R-2600	1414	Two-Speed	22 Pts.
R-2741	1422	Two-Speed - S-300	37 Pts.
R-2800	1423	Two-Speed - U-300	37 Pts.

TRANSMISSION LUBRICATION CAPACITIES

IH MODEL	CODE NUMBER	TRANSMISSION TYPE	CAPACITY (PINTS)
HDS	1301	3-Speed	3 Pts.
H-41-B	1320	4-Speed	5 Pts.
T-87-D	1302	3-Speed	6 Pts.
T-98	1303	4-Speed	8 Pts.
T-98	1304	4-Speed	8 Pts.
F-51	1307	5-Speed - O.D.Transmission	12 Pts.
F-51-C	1308	5-Speed - Direct-in-Fifth	12 Pts.
F-52	1309	5-Speed - O.D.Transmission	19 Pts.
F-52-C	1310	5-Speed - Direct-in-Fifth	19 Pts.
F-54	1311	5-Speed - O.D.Transmission	24 Pts.
F-54-B	1312	5-Speed - Direct-in-Fifth	24 Pts.
F-55	1313	5-Speed - O.D.Transmission	26 Pts.
F-55-B	1314	5-Speed - Direct-in-Fifth	26 Pts.

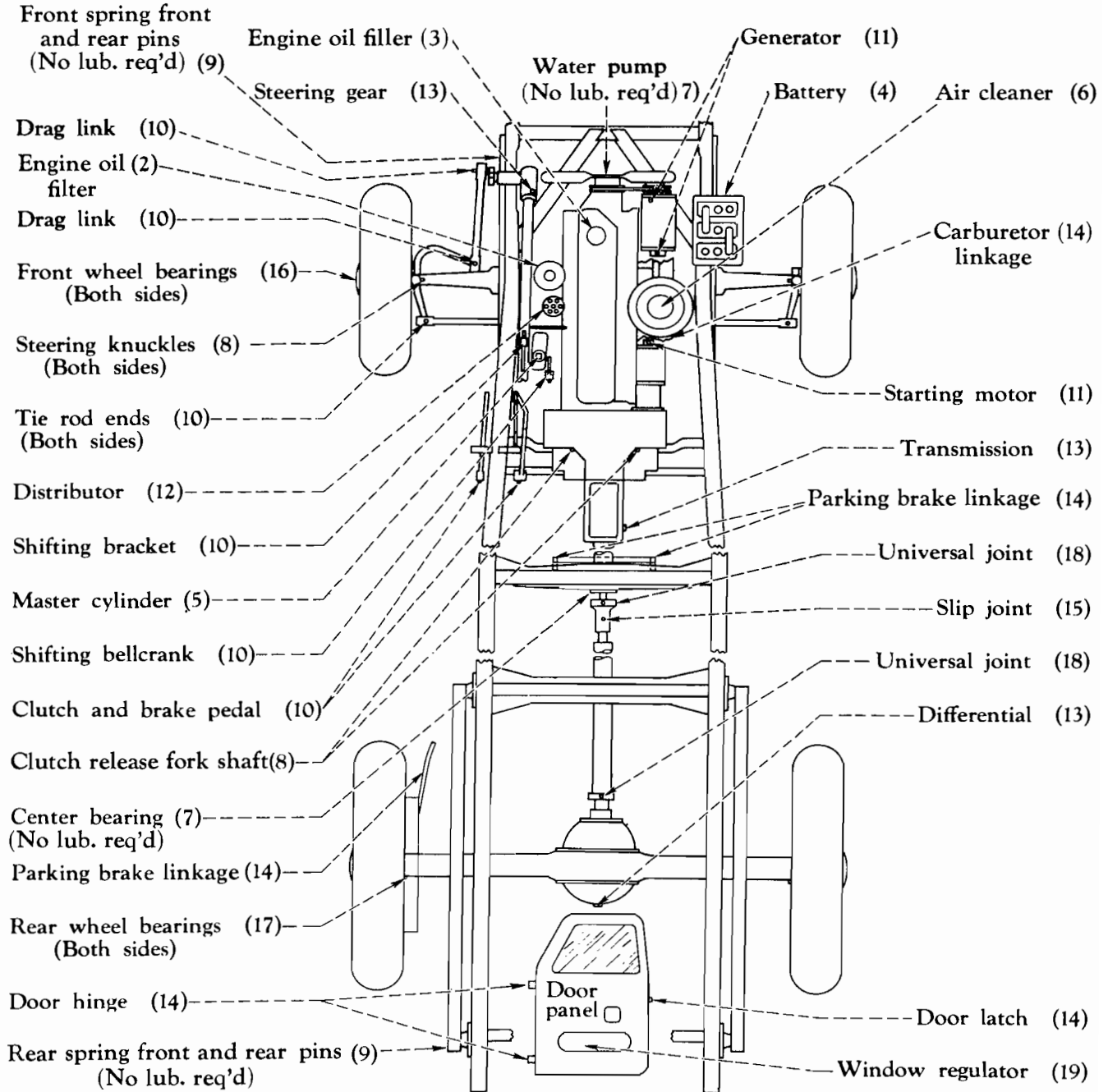
Code numbers are shown on vehicle specification card L-160 trucks and up.



LUBRICATION CHART

L-110 SERIES TRUCKS

(SEE PAGE 2 FOR INSTRUCTIONS)



A-23656

Lubrication periods provide an excellent opportunity to inspect and check for maintenance service that may be needed. Early attention to minor service needs at this inspection will usually prevent serious breakdown later.



LUBRICATION CHART INSTRUCTIONS

L-110 SERIES TRUCKS

DAILY

1. Engine: Keep crankcase filled to correct level with high-grade engine oil. Changing oil regularly will remove accumulated dirt. Cold weather requires frequent oil change because of increased use of choke, also condensation of moisture. Refill capacity, 7 quarts; add 1 quart for oil filter. For trucks in multi-stop, or other services where sustained high engine speeds are not encountered, select oil grade as follows:

TEMPERATURES	OIL GRADE	TEMPERATURES	OIL GRADE
* 90° (F.) and up	SAE-40	10° (F.) to 32° (F.) (above zero)	SAE-20W
32° (F.) to 90° (F.)	SAE-40	Minus 10° (F.) to	
(* See Hot Climate - High Speed instruction following)		10° (F.) above zero.	SAE-10W

Temperatures lower than minus 10° (F.) below zero, use SAE-10W plus kerosene. SAE-10W may be safely diluted with colorless kerosene up to 30 percent; mix thoroughly before adding to engine, and check oil level OFTEN - because kerosene evaporates rapidly at crankcase temperature.
Hot Climate - High Speed: For trucks operating on highway, or other service demanding sustained high engine speeds, use engine oil having a viscosity as near SAE-40 as possible and as starting ability will permit. Note: High viscosity oils are available which also have very good cold-pour characteristics.

PERIODICALLY

2. Engine oil filter: {Change cartridge when oil has darkened. Remove filter cover and cartridge, clean inside of filter - install new cartridge. Run engine for a few minutes and check filter for leaks.
3. Engine oil filler: Remove filler cap, clean element, and dip in engine oil - then drain and replace.
4. Battery: Check water level. If necessary, add pure distilled water to 3/8 inch above plates. Do not overfill.
5. Brake master cylinder: {Check fluid level. Do not allow dirt to enter. If necessary, fill to 3/4 inch from top with a high grade automotive type brake fluid. Do not overfill.
6. Air cleaner: {Remove filter element and wash in kerosene. Clean oil sump and refill to indicated level with clean engine oil, same grade used in crankcase.
7. Water pump:
Propeller shaft center bearing: } Lubricated at factory. Further lubrication not required.

500 TO 1,000 MILES

8. Steering knuckles:
Clutch release fork shaft: } Use a viscous chassis lubricant or SAE-140 gear oil. Do not over-lubricate - too much oil will cause failure of brake and clutch lining.
9. Spring pins: Pins are rubber mounted; lubrication not required.
10. Drag link; tie rod ends:
Shifting bracket:
Shifting bellcrank:
Clutch and brake pedals: } Force a viscous chassis lubricant or SAE-140 gear oil into fittings until old lubricant, dirt, and water are expelled.
11. Generator:
Starting motor: } Put 10 to 20 drops light engine oil in each cup. Do not over-lubricate.
12. Distributor: {Put one drop of light oil on movable contact arm pivot pin. Remove rotor and put two or three drops of light engine oil on felt wick. Apply a light coat of vaseline to distributor cam and contact arm fiber rubbing block. Note: Lubricate distributor shaft at overhaul or at 25,000-mile intervals. Use SAE-20 engine oil. Use sealing compound when replacing lubricant plug.
13. Differential:
Transmission:
Steering gear: } Inspect oil level every 1,000 miles and keep oil up to filler plug, using same make and grade oil as in unit; if same grade oil is not available, drain, flush and use new oil. (Drain and flush twice yearly or every 10,000 miles, preferably in the spring and fall.) SAE-90 cold climate. SAE-140 warm climate. For differential (4 pints), use SCL, EP gear oil or multi-purpose gear lubricant suitable for hypoid axles as supplied by a reputable refinery. Keep breather fittings clean. For transmission (3 pints) and steering gear (1 pint), use SCL, EP gear oil or multi-purpose gear oil, supplied by a reputable refinery.
14. Parking brake linkage:
Carburetor linkage:
Door hinges, door latches: } Lubricate linkage, clevis pins, pivot pins, and sliding surfaces with engine oil. Put suitable lubricant on door latches.

3,000 TO 5,000 MILES

15. Propeller shaft slip joint: Remove plug and install a pressure-gun fitting. Use a viscous chassis lubricant. Force a small amount into joint. Note: Too much pressure will damage oil seal and retainer. Remove fitting and replace plug.

10,000 MILES

16. Front wheel bearings: {Remove wheels, clean and inspect bearings, races and wheel hubs. Repack bearings, using a short fiber wheel bearing grease. Replace wheels and adjust bearings.
17. Rear wheel bearings: {Remove grease plug and install a pressure-gun fitting. Use a viscous chassis lubricant. Force about one oz. into bearing cavity. Note: Too much lubricant will damage brake lining. Remove fitting and replace plug.

15,000 TO 20,000 MILES

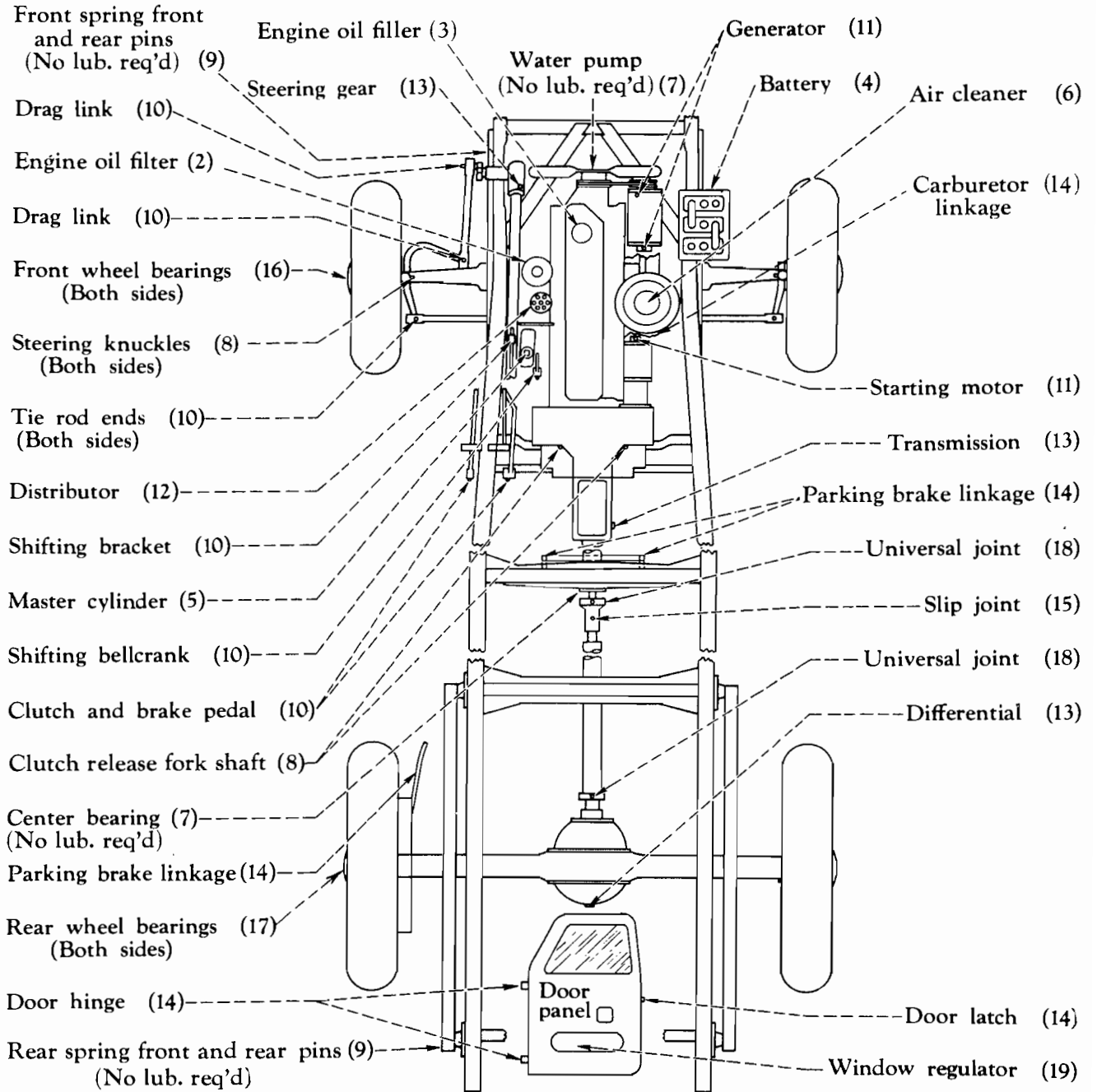
18. Propeller shaft universal joints: {Remove plug, install a pressure-gun fitting and fill (under low pressure). Use SAE-140 gear oil. Remove fitting and replace plug.
19. Window regulator: Remove door panel and lubricate regulator slide. Use a viscous chassis lubricant.



LUBRICATION CHART

L-120 SERIES TRUCKS

(SEE PAGE 4 FOR INSTRUCTIONS)



A-23655

Lubrication periods provide an excellent opportunity to inspect and check for maintenance service that may be needed. Early attention to minor service needs at this inspection will usually prevent serious breakdown later.



LUBRICATION CHART INSTRUCTIONS
L-120 SERIES TRUCKS

DAILY

1. Engine: Keep crankcase filled to correct level with high-grade engine oil. Changing oil regularly will remove accumulated dirt. Cold weather requires frequent oil change because of increased use of choke, also condensation of moisture. Refill capacity, 7 quarts; add 1 quart for oil filter. For trucks in multi-stop, or other services where sustained high engine speeds are not encountered, select oil grade as follows:

TEMPERATURES		OIL GRADE	TEMPERATURES		OIL GRADE
* 90° (F.) and up	.....	SAE-40	10° (F.) to 32° (F.) (above zero)	.....	SAE-20W
32° (F.) to 90° (F.)	.....	SAE-40	Minus 10° (F.) to		
(* See Hot Climate - High Speed instruction following)			10° (F.) above zero.	.....	SAE-10W

Temperatures lower than minus 10° (F.) below zero, use SAE-10W plus kerosene. SAE-10W may be safely diluted with colorless kerosene up to 30 percent; mix thoroughly before adding to engine, and check oil level OFTEN - because kerosene evaporates rapidly at crankcase temperature.
Hot Climate - High Speed: For trucks operating on highway, or other service demanding sustained high engine speeds, use engine oil having a viscosity as near SAE-40 as possible and as starting ability will permit. Note: High viscosity oils are available which also have very good cold-pour characteristics.

PERIODICALLY

2. Engine oil filter: {Change cartridge when oil has darkened. Remove filter cover and cartridge, clean inside of filter - install new cartridge. Run engine for a few minutes and check filter for leaks.
3. Engine oil filler: Remove filler cap, clean element, and dip in engine oil - then drain and replace.
4. Battery: Check water level. If necessary, add pure distilled water to 3/8 inch above plates. Do not overfill.
5. Brake master cylinder: {Check fluid level. Do not allow dirt to enter. If necessary, fill to 3/4 inch from top with a high grade automotive type brake fluid. Do not overfill.
6. Air cleaner: {Remove filter element and wash in kerosene. Clean oil sump and refill to indicated level with clean engine oil, same grade used in crankcase.
7. Water pump:
Propeller shaft center bearing: } Lubricated at factory. Further lubrication not required.

500 TO 1,000 MILES

8. Steering knuckles:
Clutch release fork shaft: } Use a viscous chassis lubricant or SAE-140 gear oil. Do not over-lubricate - too much oil will cause failure of brake and clutch lining.
9. Spring pins: Pins are rubber mounted; lubrication not required.
10. Drag link; rod ends:
Shifting bracket:
Shifting bellcrank:
Clutch and brake pedals: } Force a viscous chassis lubricant or SAE-140 gear oil into fittings until old lubricant, dirt, and water are expelled.
11. Generator:
Starting motor: } Put 10 to 20 drops light engine oil in each cup. Do not over-lubricate.
12. Distributor: {Put one drop of light oil on movable contact arm pivot pin. Remove rotor and put two or three drops of light engine oil on felt wick. Apply a light coat of vaseline to distributor cam and contact arm fiber rubbing block. Note: Lubricate distributor shaft at overhaul or at 25,000-mile intervals. Use SAE-20 engine oil. Use sealing compound when replacing lubricant plug.
13. Differential:
Transmission:
Steering gear: } Inspect oil level every 1,000 miles and keep oil up to filler plug, using same make and grade oil as in unit; if same grade oil is not available, drain, flush and use new oil. (Drain and flush twice yearly or every 10,000 miles, preferably in the spring and fall.) SAE-90 cold climate. SAE-140 warm climate. For differential (4 pints), use SCL, EP gear oil or multi-purpose gear lubricant suitable for hypoid axles as supplied by a reputable refinery. Keep breather fittings clean. For transmission (3 pints) and steering gear (1 pint), use SCL, EP gear oil or multi-purpose gear oil, supplied by a reputable refinery.
14. Parking brake linkage:
Carburetor linkage:
Door hinges, door latches: } Lubricate linkage, clevis pins, pivot pins, and sliding surfaces with engine oil. Put suitable lubricant on door latches.

3,000 TO 5,000 MILES

15. Propeller shaft slip joint: {Remove plug and install a pressure-gun fitting. Use a viscous chassis lubricant. Force a small amount into joint. Note: Too much pressure will damage oil seal and retainer. Remove fitting and replace plug.

10,000 MILES

16. Front wheel bearings: } Remove wheels, clean and inspect bearings, races and wheel hubs. Repack bearings, using a short fiber wheel bearing grease. Replace wheels and adjust bearings.
17. Rear wheel bearings: }

15,000 TO 20,000 MILES

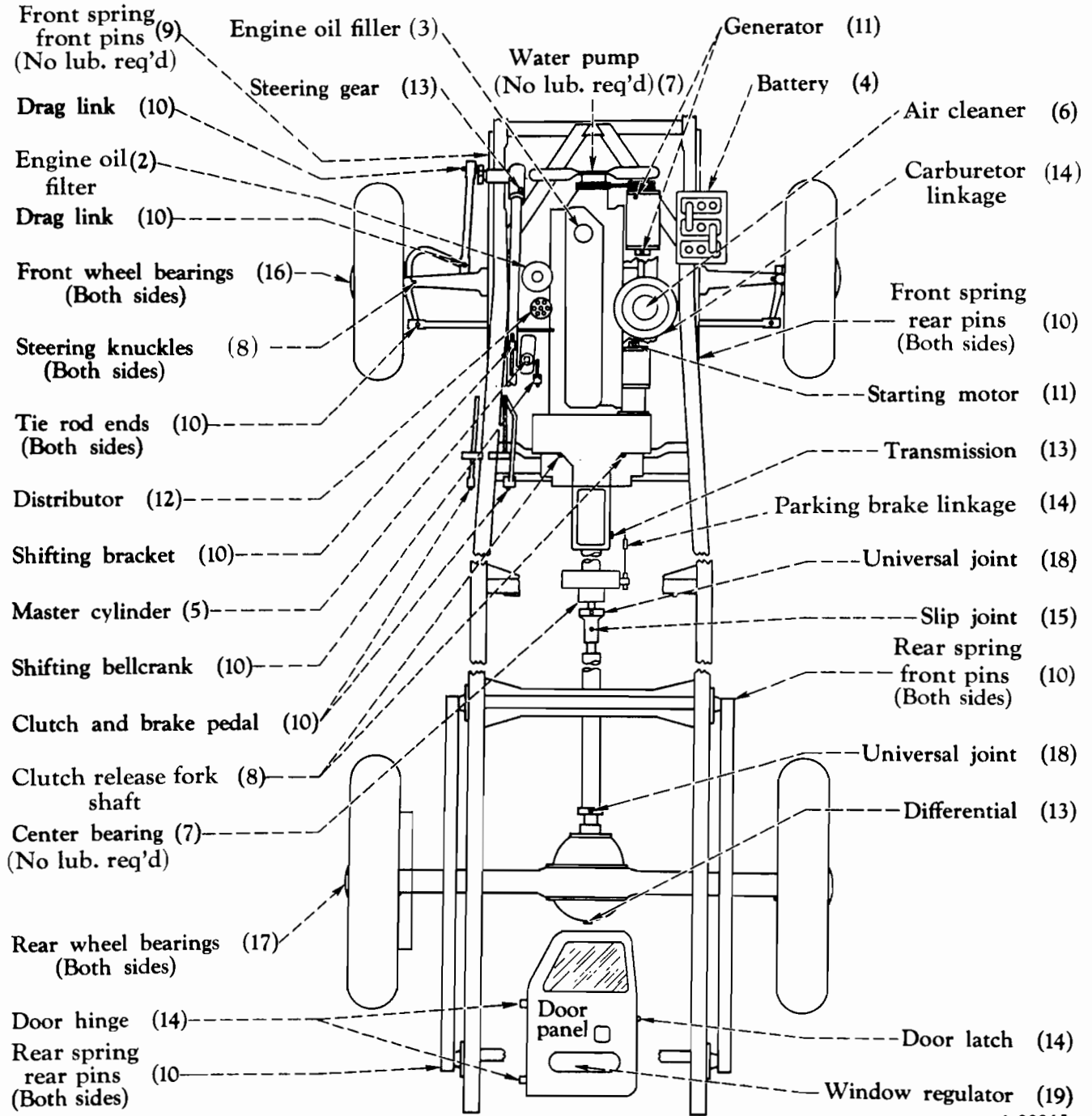
18. Propeller shaft universal joints: {Remove plug, install a pressure-gun fitting and fill (under low pressure). Use SAE-140 gear oil. Remove fitting and replace plug.
19. Window regulator: Remove door panel and lubricate regulator slide. Use a viscous chassis lubricant.



LUBRICATION CHART

L-130 SERIES TRUCKS

(SEE PAGE 6 FOR INSTRUCTIONS)



A-22865



LUBRICATION CHART INSTRUCTIONS

L-130 SERIES TRUCKS

DAILY

1. Engine: Keep crankcase filled to correct level with high-grade engine oil. Changing oil regularly will remove accumulated dirt. Cold weather requires frequent oil change because of increased use of choke, also condensation of moisture. Refill capacity, 7 quarts; add 1 quart for oil filter. For trucks in multi-stop, or other services where sustained high engine speeds are not encountered, select oil grade as follows:

TEMPERATURES	OIL GRADE	TEMPERATURES	OIL GRADE
* 90° (F.) and up	SAE-40	10° (F.) to 32° (F.) (above zero)	SAE-20W
32° (F.) to 90° (F.)	SAE-40	Minus 10° (F.) to	
(* See Hot Climate - High Speed instruction following)		10° (F.) above zero.	SAE-10W

Temperatures lower than minus 10° (F.) below zero, use SAE-10W plus kerosene. SAE-10W may be safely diluted with colorless kerosene up to 30 percent; mix thoroughly before adding to engine, and check oil level OFTEN - because kerosene evaporates rapidly at crankcase temperature.

Hot Climate - High Speed: For trucks operating on highway, or other service demanding sustained high engine speeds, use engine oil having a viscosity as near SAE-40 as possible and as starting ability will permit. Note: High viscosity oils are available which also have very good cold-pour characteristics.

PERIODICALLY

2. Engine oil filter: { Change cartridge when oil has darkened. Remove filter cover and cartridge, clean inside of filter - install new cartridge. Run engine for a few minutes and check filter for leaks.
3. Engine oil filler: Remove filler cap, clean element, and dip in engine oil - then drain and replace.
4. Battery: Check water level. If necessary, add pure distilled water to 3/8 inch above plates. Do not overfill.
5. Brake master cylinder: { Check fluid level. Do not allow dirt to enter. If necessary, fill to 3/4 inch from top with a high grade automotive type brake fluid. Do not overfill.
6. Air cleaner: { Remove filter element and wash in kerosene. Clean oil sump and refill to indicated level with clean engine oil, same grade used in crankcase.
7. Water pump:
Propeller shaft center bearing: } Lubricated at factory. Further lubrication not required.

500 TO 1,000 MILES

8. Steering knuckles:
Clutch release fork shaft: } Use a viscous chassis lubricant or SAE-140 gear oil. Do not over-lubricate - too much oil will cause failure of brake and clutch lining.
9. Front spring front pins: Are rubber mounted; lubrication not required.
10. Front spring rear pins: }
Rear spring - all pins:
Drag link; tie rod ends: } Force a viscous chassis lubricant or SAE-140 gear oil into fittings until old lubricant, dirt, and water are expelled.
Shifting bracket:
Shifting bellcrank:
Clutch and brake pedals: }
11. Generator:
Starting motor: } Put 10 to 20 drops light engine oil in each cup. Do not over-lubricate.
12. Distributor: { Put one drop of light oil on movable contact arm pivot pin. Remove rotor and put two or three drops of light engine oil on felt wick. Apply a light coat of vaseline to distributor cam and contact arm fiber rubbing block. Note: Lubricate distributor shaft at overhaul or at 25,000-mile intervals. Use SAE-20 engine oil. Use sealing compound when replacing lubricant plug.
13. Differential:
Transmission:
Steering gear: } Inspect oil level every 1,000 miles and keep oil up to filler plug, using same make and grade oil as in unit; if same grade oil is not available, drain, flush and use new oil. (Drain and flush twice yearly or every 10,000 miles, preferably in the spring and fall.) SAE-90 cold climate. SAE-140 warm climate. For differential (4 pints), use SCL, EP gear oil or multi-purpose gear lubricant suitable for hypoid axles as supplied by a reputable refinery. Keep breather fittings clean. For 3-speed transmission (6 pints), for 4-speed transmission (5 pints), and steering gear (1 pint), use SCL, EP gear oil or multi-purpose gear oil, supplied by a reputable refinery.
14. Parking brake linkage:
Carburetor linkage:
Door hinges, door latches: } Lubricate linkage, clevis pins, pivot pins, and sliding surfaces with engine oil. Put suitable lubricant on door latches.

3,000 TO 5,000 MILES

15. Propeller shaft slip joint: { Remove plug and install a pressure-gun fitting. Use a viscous chassis lubricant. Force a small amount into joint. Note: Too much pressure will damage oil seal and retainer. Remove fitting and replace plug.

10,000 MILES

16. Front wheel bearings: } Remove wheels, clean and inspect bearings, races and wheel hubs. Repack bearings, using a short fiber wheel bearing grease. Replace wheels and adjust bearings.
17. Rear wheel bearings: }

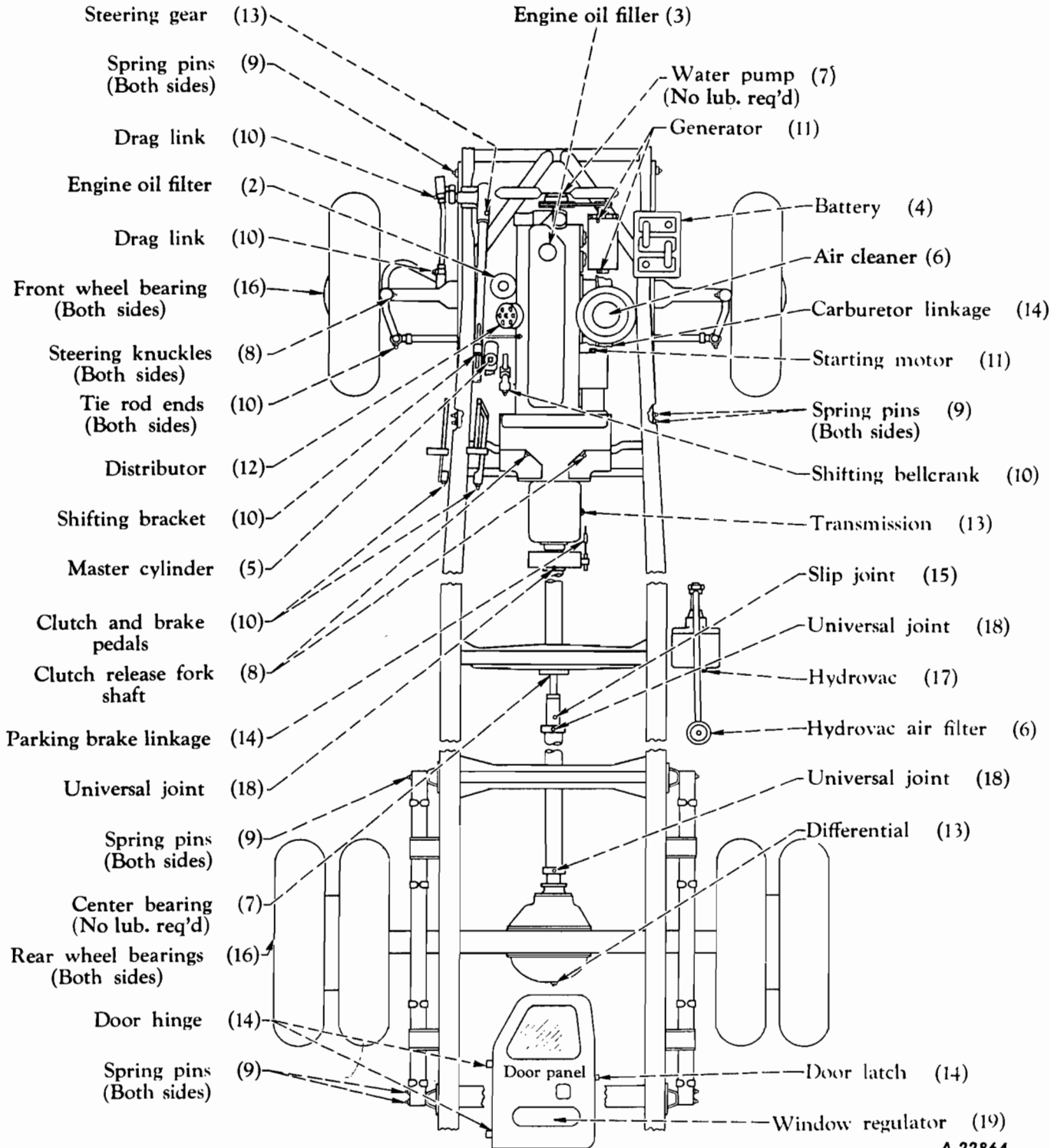
15,000 TO 20,000 MILES

18. Propeller shaft universal joints: { Remove plug, install a pressure-gun fitting and fill (under low pressure). Use SAE-140 gear oil. Remove fitting and replace plug.
19. Window regulator: Remove door panel and lubricate regulator slide. Use a viscous chassis lubricant.



L-LINE MOTOR TRUCK SERVICE MANUAL

LUBRICATION CHART L-150 SERIES TRUCKS



A-22864



LUBRICATION CHART INSTRUCTIONS
L-150 SERIES TRUCKS

DAILY

1. Engine: Keep crankcase filled to correct level with high-grade engine oil. Changing oil regularly will remove accumulated dirt. Cold weather requires frequent oil change because of increased use of choke, also condensation of moisture. Refill capacity, 7 quarts; add 1 quart for oil filter. For trucks in multi-stop, or other services where sustained high engine speeds are not encountered, select oil grade as follows:

TEMPERATURES	OIL GRADE	TEMPERATURES	OIL GRADE
* 90° (F.) and up	SAE-40	10° (F.) to 32° (F.) (above zero)	SAE-20W
32° (F.) to 90° (F.)	SAE-40	Minus 10° (F.) to	
(* See Hot Climate - High Speed instruction following)		10° (F.) above zero.	SAE-10W

Temperatures lower than minus 10° (F.) below zero, use SAE-10W plus kerosene. SAE-10W may be safely diluted with colorless kerosene up to 30 percent; mix thoroughly before adding to engine, and check oil level OFTEN - because kerosene evaporates rapidly at crankcase temperature.

Hot Climate - High Speed: For trucks operating on highway, or other service demanding sustained high engine speeds, use engine oil having a viscosity as near SAE-40 as possible and as starting ability will permit. Note: High viscosity oils are available which also have very good cold-pour characteristics.

PERIODICALLY

2. Engine oil filter: { Change cartridge when oil has darkened. Remove filter cover and cartridge, clean inside of filter - install new cartridge. Run engine for a few minutes and check filter for leaks.
3. Engine oil filler: Remove filler cap, clean element, and dip in engine oil - then drain and replace.
4. Battery: Check wafer level. If necessary, add pure distilled water to 3/8 inch above plates. Do not overfill.
5. Brake master cylinder: { Check fluid level. Do not allow dirt to enter. If necessary, fill to 3/4 inch from top with a high grade automotive type brake fluid. Do not overfill.
6. Engine air cleaner: { For engine air cleaner - remove filter element and wash in kerosene; clean the oil sump and refill to indicated level with clean engine oil, same grade used in crankcase. For hydrovac air cleaner - remove cleaner, dismantle and clean parts in a cleaning solvent and allow to dry; saturate element with a light oil and replace parts.
7. Water pump: } Lubricated at factory. Further lubrication not required.
- Propeller shaft center bearing: }

500 TO 1,000 MILES

8. Steering knuckles: } Use a viscous chassis lubricant or SAE-140 gear oil. Do not over-lubricate - too much oil will cause failure of brake and clutch lining.
- Clutch release fork shaft: }
9. Spring pins: }
10. Drag link; tie rod ends: } Force a viscous chassis lubricant or SAE-140 gear oil into fittings until old lubricant, dirt, and water are expelled.
- Shifting bracket: }
- Shifting bellcrank: }
- Clutch and brake pedals: }
11. Generator: } Put 10 to 20 drops light engine oil in each cup. Do not over-lubricate.
- Starting motor: }
12. Distributor: { Put one drop of light oil on movable contact arm pivot pin. Remove rotor and put two or three drops of light engine oil on felt wick. Apply a light coat of vaseline to distributor cam and contact arm fiber rubbing block. Note: Lubricate distributor shaft at overhaul or at 25,000-mile intervals. Use SAE-20 engine oil. Use sealing compound when replacing lubricant plug.
13. Differential: { Inspect oil level every 1,000 miles and keep oil up to filler plug, using same make and grade oil as in unit; if same grade oil is not available, drain, flush and use new oil. (Drain and flush twice yearly or every 10,000 miles, preferably in the spring and fall.) SAE-90 cold climate. SAE-140 warm climate. For differential (3 pints), use SCL, EP gear oil or multi-purpose gear lubricant suitable for hypoid axles as supplied by a reputable refinery. Keep breather fittings clean. For 4-speed heavy-duty transmission (5 pints), 4-speed synchro-mesh transmission (8 pints) and steering gear (1 pint), use SCL, EP gear oil or multi-purpose gear oil, supplied by a reputable refinery.
- Transmission: }
- Steering gear: }
14. Parking brake linkage: } Lubricate linkage, clevis pins, pivot pins, and sliding surfaces with engine oil. Put suitable lubricant on door latches.
- Carburetor linkage: }
- Door hinges, door latches: }

3,000 TO 5,000 MILES

15. Propeller shaft slip joint: { Remove plug and install a pressure-gun fitting. Use a viscous chassis lubricant. Force a small amount into joint. Note: Too much pressure will damage oil seal and retainer. Remove fitting and replace plug.

10,000 MILES

16. Front wheel bearings: } Remove wheels, clean and inspect bearings, races and wheel hubs. Repack bearings, using a short fiber wheel bearing grease. Replace wheels and adjust bearings.
- Rear wheel bearings: }

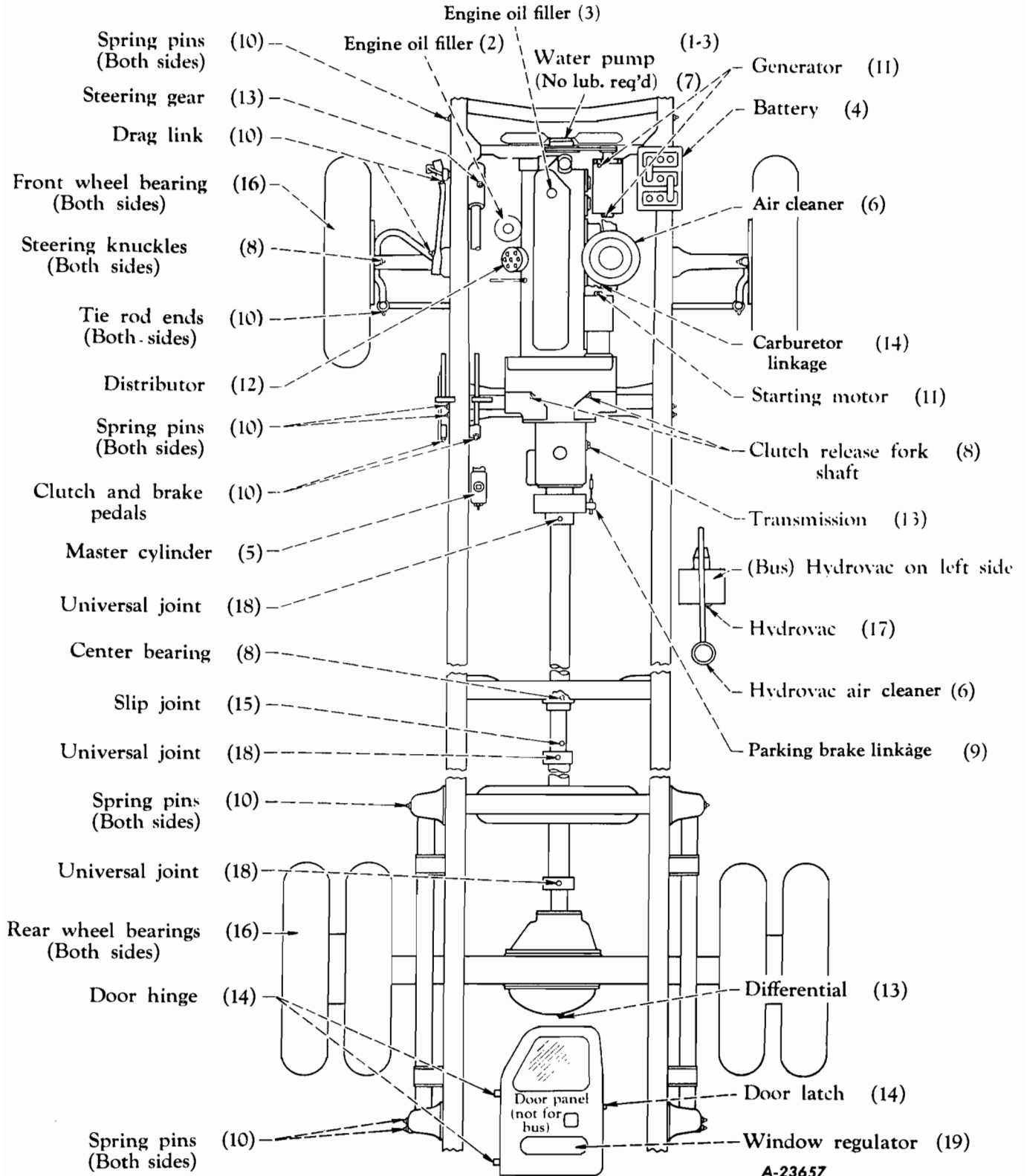
15,000 TO 20,000 MILES

17. Hydrovac: { Must be lubricated every 20,000 miles or once a year, before cold weather sets in. Remove pipe plug (located in air inlet end of cylinder). Use vacuum cylinder oil and add to top level of plug hole. Replace plug.
18. Propeller shaft universal joints: { Remove plug, install a pressure-gun fitting and fill (under low pressure). Use SAE-140 gear oil. Remove fitting and replace plug.
19. Window regulator: Remove door panel and lubricate regulator slide. Use a viscous chassis lubricant.



LUBRICATION CHART

L-160 SERIES TRUCKS



A-23657



LUBRICATION CHART INSTRUCTIONS L-160 SERIES TRUCKS

DAILY

1. Engine: Keep crankcase filled to correct level with high-grade engine oil. Changing oil regularly will remove accumulated dirt. Cold weather requires frequent oil change because of increased use of choke, also condensation of moisture. Refill capacity, 7 quarts; add 1 quart for oil filter. For trucks in multi-stop, or other services where sustained high engine speeds are not encountered, select oil grade as follows:

TEMPERATURES	OIL GRADE	TEMPERATURES	OIL GRADE
* 90° (F.) and up	SAE-40	10° (F.) to 32° (F.) (above zero)	SAE-20W
32° (F.) to 90° (F.)	SAE-40	Minus 10° (F.) to	
(* See Hot Climate - High Speed instruction following)		10° (F.) above zero.	SAE-10W

Temperatures lower than minus 10° (F.) below zero, use SAE-10W plus kerosene. SAE-10W may be safely diluted with colorless kerosene up to 30 percent; mix thoroughly before adding to engine, and check oil level OFTEN - because kerosene evaporates rapidly at crankcase temperature.
Hot Climate - High Speed: For trucks operating on highway, or other service demanding sustained high engine speeds, use engine oil having a viscosity as near SAE-40 as possible and as starting ability will permit. Note: High viscosity oils are available which also have very good cold-pour characteristics.

PERIODICALLY

2. Engine oil filter: { Change cartridge when oil has darkened. Remove filter cover and cartridge, clean inside of filter - install new cartridge. Run engine for a few minutes and check filter for leaks.
3. Engine oil filler: Remove filler cap, clean element, and dip in engine oil - then drain and replace.
4. Battery: Check water level. If necessary, add pure distilled water to 3/8 inch above plates. Do not overfill.
5. Brake master cylinder: { Check fluid level. Do not allow dirt to enter. If necessary, fill to 3/4 inch from top with a high grade automotive type brake fluid. Do not overfill.
6. Hydrovac air cleaner: { For engine air cleaner - remove filter element and wash in kerosene; clean oil sump and refill to indicated level with clean engine oil, same grade used in crankcase. For hydrovac air cleaner - remove cleaner, disassemble and clean parts in a cleaning solvent and allow to dry; saturate element with a light oil and replace parts.
7. Water pump: Lubricated at factory Further lubrication not required.

500 TO 1,000 MILES

8. Steering knuckles: } Use a viscous chassis lubricant or SAE-140 gear oil. Do not over-lubricate. Too much oil on
Clutch release fork shaft: } knuckles, and on clutch shaft cause failure of brake and clutch lining.
Propeller shaft center bearing: }
9. Parking brake linkage: Lubricate linkage, clevis pins, pivot pins, and sliding surfaces with engine oil.
10. Spring pins: } Force a viscous chassis lubricant or SAE-140 gear oil into fittings until old lubricant, dirt and water are
Drag link; tie rod ends: } expelled.
Clutch and brake pedals: }
11. Generator: } Put 10 to 20 drops light engine oil in each cup. Do not over-lubricate.
Starting motor: }
12. Distributor: { Put one drop of light oil on movable contact arm pivot pin. Remove rotor and put two or three drops of light engine oil on felt wick. Apply a light coat of vaseline to distributor cam and contact arm fiber rubbing block. Note: Lubricate distributor shaft at overhaul or at 25,000-mile intervals. Use SAE-20 engine oil. Use sealing compound when replacing lubricant plug.
13. Differential: } Inspect oil level every 1,000 miles and keep oil up to filler plug, using same make and grade oil as in unit; if same
Transmission: } grade oil is not available, drain, flush and use new oil. (Drain and flush twice yearly or every 10,000 miles, preferably in the spring and fall.) SAE-90 cold climate. SAE-140 warm climate. For single reduction axle (8 pints), and
Steering gear: } for two-speed axle (13 pints). Use SCL, EP gear oil or multi-purpose gear lubricant suitable for hypoid axles as supplied by a reputable refinery (not Eaton Axles). For Eaton Axles, use hypoid gear lubricant available as Elco Gear
Electric shift: } Safety "28" or its equivalent (see instructions, section "A"). Keep breather fittings clean. For 4-speed syncro-mesh transmission (8 pints) and steering gear (1 pint), use SCL, EP gear oil or multi-purpose gear oil, supplied by a reputable refinery. For electric shift, inspect oil level every 10,000 miles and keep filled to plug level with SAE-10 oil.
14. Carburetor linkage: } Lubricate linkage, clevis pins, pivot pins, and sliding surfaces with engine oil. Put suitable lubricant on
Door hinges, door latches: } door latches.

3,000 TO 5,000 MILES

15. Propeller shaft slip joint: { Remove plug and install a pressure-gun fitting. Use a viscous chassis lubricant. Force a small amount into joint. Note: Too much pressure will damage oil seal and retainer. Remove fitting and replace plug.

10,000 MILES

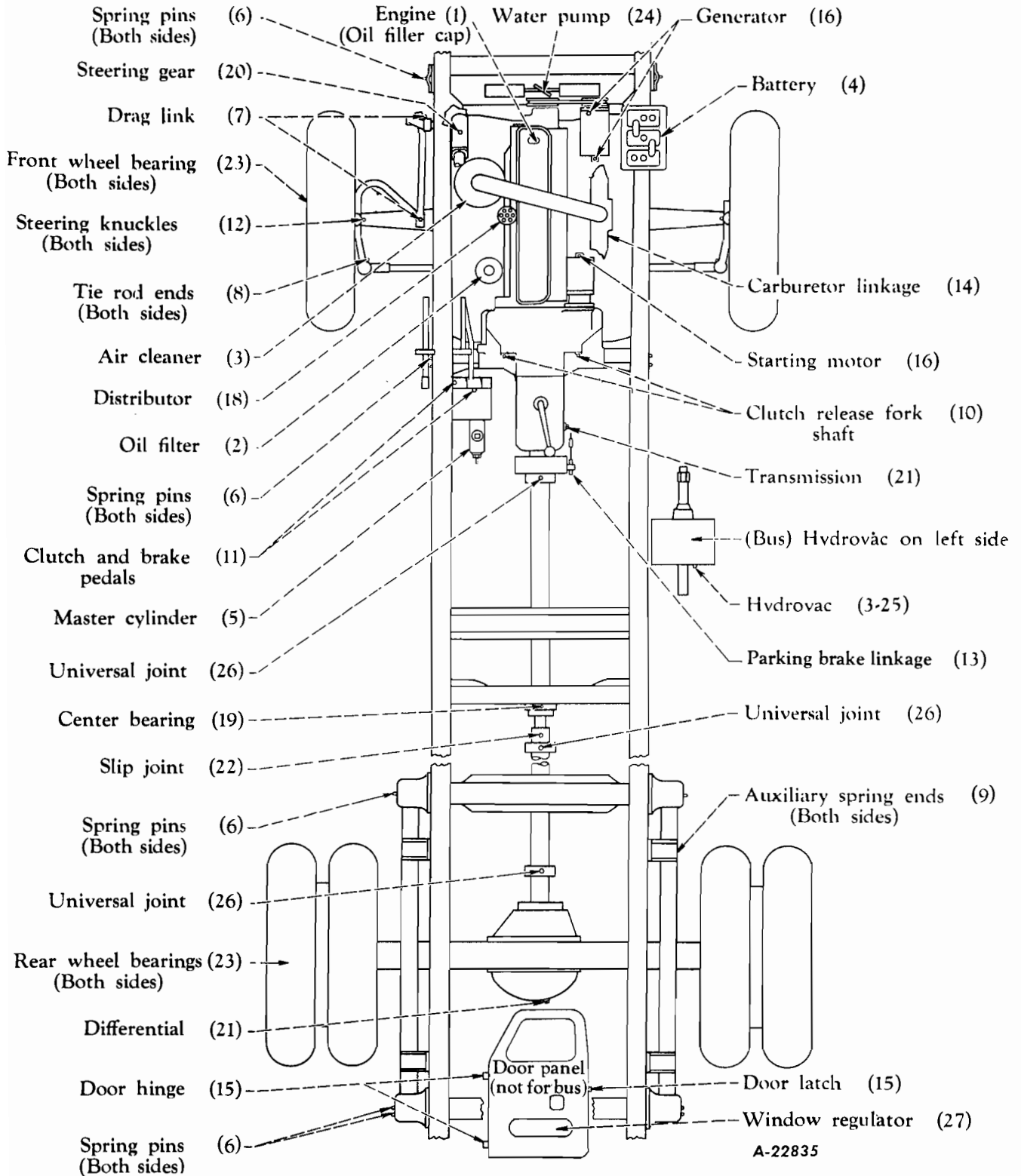
16. Front wheel bearings: } Remove wheels, clean and inspect bearings, races and wheel hubs. Repack bearings, using a short fiber wheel
Rear wheel bearings: } bearing grease. Replace wheels and adjust bearings.

15,000 TO 20,000 MILES

17. Hydrovac: { Must be lubricated every 20,000 miles or once a year, before cold weather sets in. Remove pipe plug (located in air inlet end of cylinder). Use vacuum cylinder oil and add to top level of plug hole. Replace plug.
18. Propeller shaft universal joints: { Remove plug, install a pressure-gun fitting and fill (under low pressure). Use SAE-140 gear oil.
Remove fitting and replace plug.
19. Window regulator: Remove door panel and lubricate regulator slide. Use a viscous chassis lubricant.

LUBRICATION CHART

L-170 SERIES TRUCKS



A-22835



LUBRICATION CHART INSTRUCTIONS L-170 SERIES TRUCKS

DAILY

1. Engine: Keep crankcase filled to correct level with high-grade engine oil. Changing oil regularly will remove accumulated dirt. Cold weather required frequent oil change because of increased use of choke, also condensation of moisture. Refill capacity, quarts; add 1 quart for oil filter. For trucks in multi-stop, or other services where sustained high engine speeds are not encountered, select oil grade as follows:

TEMPERATURES	OIL GRADE	TEMPERATURES	OIL GRADE
* 90° (F.) and up	SAE-40	10° (F.) to 32° (F.) (above zero)	SAE-20W
32° (F.) to 90° (F.)	SAE-40	Minus 10° (F.) to 10° (F.) above zero	SAE-10W

Temperatures lower than minus 10° (F.) below zero, use SAE-10W plus kerosene. SAE-10W may be safely diluted with colorless kerosene up to 30 percent; mix thoroughly before adding to engine, and check oil level OFTEN - because kerosene evaporates rapidly at crankcase temperature.

Hot Climate - High Speed: For trucks operating on highway, or other service demanding sustained high engine speeds, use engine oil having a viscosity as near SAE-50 as possible and as starting ability will permit. Note: High viscosity oils are available which also have very good cold-pour characteristics.

500 TO 1,000 MILES

2. Oil filter: { Change cartridge when oil has darkened. Remove filter cover and cartridge, clean inside of filter - install new cartridge. Run engine for a few minutes and check filter for leaks.
3. Air cleaners: { For engine air cleaner remove reservoir and dispose dirty oil; clean filter and reservoir and refill to oil level mark with clean engine oil, same grade used in crankcase. For hydrovac air cleaner - remove cleaner, dismantle and clean parts in a cleaning solvent and allow to dry; saturate element with a light engine oil and replace parts.
4. Battery: Check water level. If necessary, add pure distilled water to 3/8 inch above plates. Do not overfill.
5. Brake master cylinder: { Check fluid level. Do not allow dirt to enter. If necessary, fill to 3/4 inch from top with a high grade automotive type brake fluid. Do not overfill.
6. Spring pins:
7. Drag links:
8. Tie rods:
9. Auxiliary spring ends: } Force a viscous chassis lubricant or SAE-140 gear oil into fittings until old lubricant, dirt, and water are expelled.
10. Clutch release fork shaft:
11. Clutch and brake pedal:
12. Steering knuckles: } Use a viscous chassis lubricant or SAE-140 gear oil. Do not over-lubricate. Too much oil on knuckles, and on clutch shaft will cause failure of brake and clutch lining.
13. Parking brake linkage:
14. Carburetor linkage:
15. Door hinges, door latches: } Lubricate linkage, clevis pins, pivot pins, and sliding surfaces with engine oil. Put suitable lubricant on door latches.
16. Generator:
17. Starting motor: } Put 10 to 20 drops light engine oil in each cup. Do not over-lubricate.
18. Distributor: { Put one drop of light oil on movable contact arm pivot pin. Remove rotor and put two or three drops of light engine oil on felt wick. Apply a light coat of vaseline to the distributor cam and contact arm fiber rubbing block. NOTE: Lubricate distributor shaft at overhaul or at 25,000-mile intervals. Use SAE-20 engine oil. Use sealing compound when replacing lubricant plug. For distributor with grease cup: Fill cup with SAE-140 gear oil, as required, and turn one turn every 1,000 miles.
19. Propeller shaft center bearing: Use a medium short-fiber wheel bearing grease (sodium-soap type).
20. Steering gear: Remove pipe plug and inspect oil level every 1,000 miles. Use SAE-140 gear oil. Keep housing full of oil.
21. Transmission Refill:

Code No. 1304 - Capacity 8 Pts.	} Inspect oil level every 1,000 miles and keep oil level up to filler plug, using same make and grade oil as in unit; if same grade is not available, drain, flush and use new oil. (Drain and flush twice yearly or every 10,000 miles, preferably in the spring and fall.) SAE-90 cold climate. SAE-140 warm climate. For transmission use SLC, EP gear oil or multi-purpose gear oil supplied by a reputable refinery. For rear axles (not Eaton) use SCL, EP gear oil or multi-purpose gear lubricant suitable for hypoid axles supplied by a reputable refinery. For Eaton axles, use hypoid gear lubricant available as Elco Gear Safety "28" or its equivalent (see instructions, section "A"). *For Electric Shift, inspect oil level every 10,000 miles and keep filled to plug level with SAE-10 oil.
Code No. 1307 - Capacity 12 Pts.	
Code No. 1308 - Capacity 12 Pts.	
Differential Refill:	
Code No. 1405 - Capacity 8 Pts.	
Code No. 1406 - Capacity 11 Pts.	
*Code No. 1411 - Capacity 13 Pts.	
*Code No. 1412 - Capacity 20 Pts.	

3,000 TO 5,000 MILES

22. Propeller shaft slip joint: { Remove plug and install a pressure-gun fitting. Use a viscous chassis lubricant. Force a small amount into joint. Note: Too much pressure will damage oil seal and retainer. Remove fitting and replace plug.
23. Wheel bearings: { Remove wheels, clean and inspect bearings, races and wheel hubs. Repack bearings, using a short fiber wheel bearing grease. Replace wheels and adjust bearings.

10,000 MILES

24. Water pump: { Remove plug and install a pressure gun fitting. Use a short-fiber wheel bearing grease and fill housing (under low pressure).
25. Hydrovac: Inject two ounces vacuum cylinder oil twice yearly or every 10,000 miles, preferably in the spring and fall.

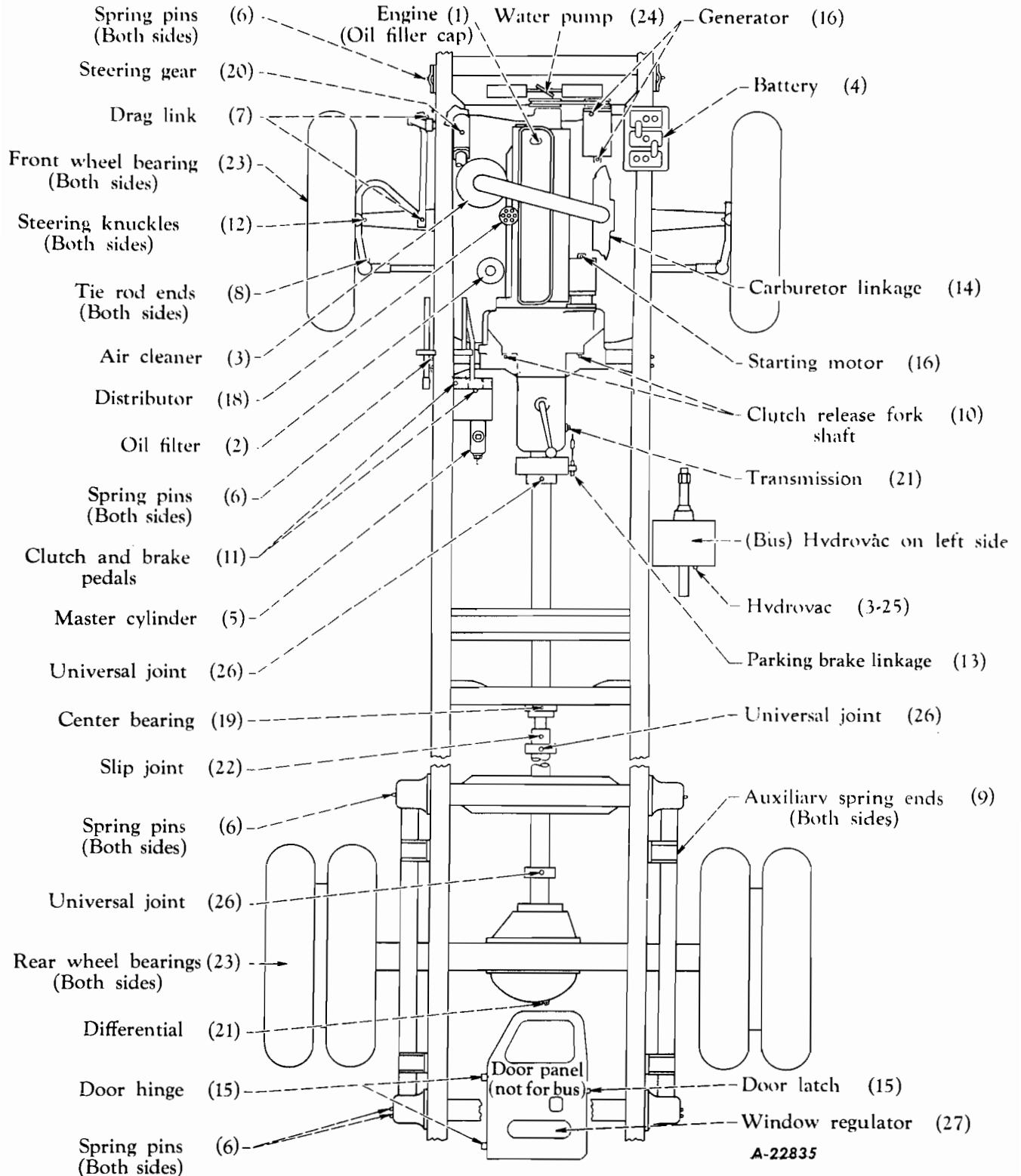
15,000 TO 20,000 MILES

26. Propeller shaft universal joints: { Remove plug, install a pressure-gun fitting and fill (under low pressure). Use SAE-140 gear oil. Remove fitting and replace plug.
27. Window regulator: Remove door panel and lubricate regulator slide. Use a viscous chassis lubricant.



LUBRICATION CHART

L-180, L-181, L-182, L-183, L-184 TRUCKS



A-22835



LUBRICATION CHART INSTRUCTIONS

L-180, L-181, L-182, L-183, L-184 TRUCKS

DAILY

1. Engine: Keep crankcase filled to correct level with high-grade engine oil. Changing oil regularly will remove accumulated dirt. Col weather requires frequent oil change because of increased use of choke, also condensation of moisture. Refill capacity, quarts; add 1 quart for oil filter. For trucks in multi-stop, or other services where sustained high engine speeds are not encountered, select oil grade as follows:

TEMPERATURES	OIL GRADE	TEMPERATURES	OIL GRADE
* 90° (F.) and up	SAE-40	10° (F.) to 32° (F.) (above zero)	SAE-20W
32° (F.) to 90° (F.):	SAE-40	Minus 10° (F.) to	
(* See Hot Climate - High Speed instruction following)		10° (F.) above zero.	SAE-10W

Temperatures lower than minus 10° (F.) below zero, use SAE-10W plus kerosene. SAE-10W may be safely diluted with colorless kerosene up to 30 percent; mix thoroughly before adding to engine, and check oil level OFTEN - because kerosene evaporates rapidly at crankcase temperature.

Hot Climate - High Speed: For trucks operating on highway, or other service demanding sustained high engine speeds, use engine oil having a viscosity as near SAE-40 as possible and as starting ability will permit. Note: High viscosity oils are available which also have very good cold-pour characteristics.

500 TO 1,000 MILES

2. Oil filter: { Change cartridge when oil has darkened. Remove filter cover and cartridge, clean inside of filter - install new cartridge
Run engine for a few minutes and check filter for leaks.
3. Air cleaners: { For engine air cleaner remove reservoir and dispose dirty oil; clean filter and reservoir and refill to oil level mark
with clean engine oil, same grade used in crankcase. For hydrovac air cleaner - remove cleaner, dismantle and clean parts in a cleaning solvent and allow to dry; saturate element with a light engine oil and replace parts.
4. Battery: Check water level. If necessary, add pure distilled water to 3/8 inch above plates. Do not overfill.
5. Brake master cylinder: { Check fluid level. Do not allow dirt to enter. If necessary, fill to 3/4 inch from top with a high grade automotive type brake fluid. Do not overfill.
6. Spring pins: } Force a viscous chassis lubricant or SAE-140 gear oil into fittings until old lubricant, dirt, and water are expelled.
7. Drag links: }
8. Tie rods: }
9. Auxiliary spring ends: }
10. Clutch release fork shaft: }
11. Clutch and brake pedal: }
12. Steering knuckles: } Use a viscous chassis lubricant or SAE-140 gear oil. Do not over-lubricate. Too much oil on knuckles and on clutch shaft will cause failure of brake and clutch lining.
13. Parking brake linkage: }
14. Carburetor linkage: }
15. Door hinges, door latches: } Lubricate linkage, clevis pins, pivot pins, and sliding surfaces with engine oil. Put suitable lubricant on door latches.
16. Generator: }
17. Starting motor: } Put 10 to 20 drops light engine oil in each cup. Do not over-lubricate.
18. Distributor: { Put one drop of light oil on movable contact arm pivot pin. Remove rotor and put two or three drops of light engine oil on felt wick. Apply a light coat of vaseline to the distributor cam and contact arm fiber rubbing block. NOTE: Lubricate distributor shaft at overhaul or at 25,000-mile intervals. Use SAE-20 engine oil. Use sealing compound when replacing lubricant plug. For distributor with grease cup: fill cup with SAE-140 gear oil, as required, and turn one turn every 1,000 miles.
19. Propeller shaft center bearing: Use a medium short-fiber wheel bearing grease (sodium-soap type).
20. Steering gear: Remove pipe plug and inspect oil level every 1,000 miles. Use SAE-140 gear oil. Keep housing full of oil.
21. Transmission Refill: } Inspect oil level every 1,000 miles and keep oil level up to filler plug, using same grade oil as in unit; if same grade is not available, drain, flush and use new oil. (Drain and Code No. 1307 - Capacity 12 Pts. flush twice yearly or every 10,000 miles, preferably in the spring and fall.) SAE-90 cold Code No. 1308 - Capacity 12 Pts. climate. SAE-140 warm climate. For transmission use SLC, EP gear oil or multi-purpose Differential Refill: } gear oil supplied by a reputable refinery. For rear axles (not Eaton) use SCL, EP gear oil or Code No. 1406 - Capacity 11 Pts. multi-purpose gear lubricant suitable for hypoid axles supplied by a reputable refinery. For Code No. 1412 - Capacity 20 Pts. Eaton axles, use hypoid gear lubricant available as Elco Gear Safety "28" or its equivalent (see Code No. 1407 - Capacity 20 Pts. instructions, section "A"). *For Electric Shift, inspect oil level every 10,000 miles and keep Code No. 1413 - Capacity 22 Pts. filled to plug level with SAE-10 oil. Code No. 1415 - Capacity 19 Pts.

3,000 TO 5,000 MILES

22. Propeller shaft slip joint: { Remove plug and install a pressure-gun fitting. Use a viscous chassis lubricant. Force a small amount into joint. Note: Too much pressure will damage oil seal and retainer. Remove fitting and replace plug.
23. Wheel bearings: { Remove wheels, clean and inspect bearings, races and wheel hubs. Repack bearings, using a short fiber wheel bearing grease. Replace wheels and adjust bearings.

10,000 MILES

24. Water pump: { Remove plug and install a pressure gun fitting. Use a short-fiber wheel bearing grease and fill housing (under low pressure).
25. Hydrovac: Inject two ounces vacuum cylinder oil twice yearly or every 10,000 miles, preferably in the spring and fall.

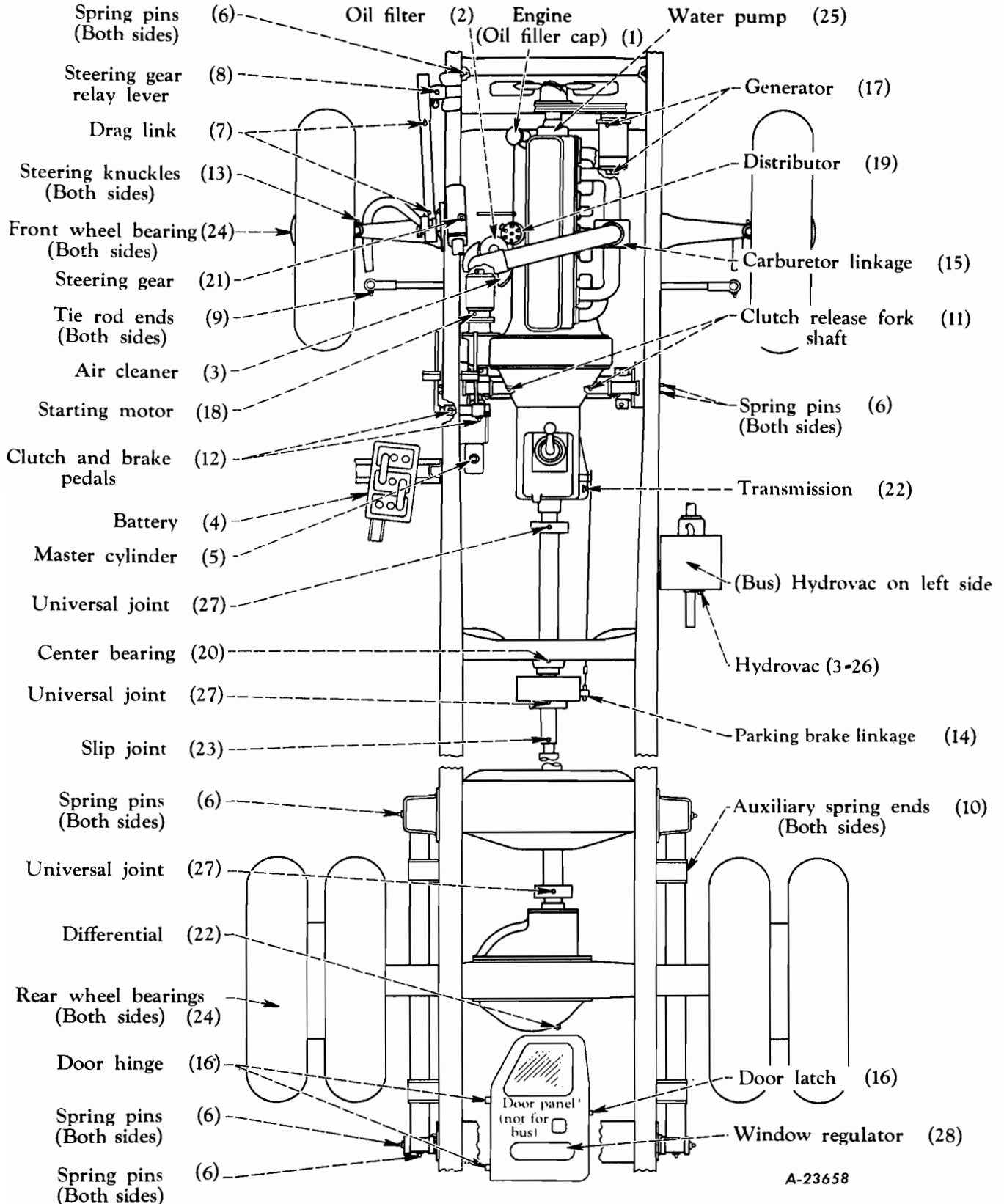
15,000 TO 20,000 MILES

26. Propeller shaft universal joints: { Remove plug, install a pressure-gun fitting and fill (under low pressure). Use SAE-140 gear oil Remove fitting and replace plug.
27. Window regulator: Remove door panel and lubricate regulator slide. Use a viscous chassis lubricant.



LUBRICATION CHART

L-190 SERIES TRUCKS



A-23658



LUBRICATION CHART INSTRUCTIONS

L-190 SERIES TRUCKS

DAILY

1. Engine: Keep crankcase filled to correct level with high-grade engine oil. Changing oil regularly will remove accumulated dirt. Cold weather requires frequent oil change because of increased use of choke, also condensation of moisture. Refill capacity, 7 quarts; add 1 quart for oil filter. For trucks in multi-stop, or other services where sustained high engine speeds are not encountered, select oil grade as follows:

TEMPERATURES	OIL GRADE	TEMPERATURES	OIL GRADE
* 90° (F.) and up	SAE-40	10° (F.) to 32° (F.) (above zero)	SAE-20W
32° (F.) to 90° (F.)	SAE-40	Minus 10° (F.) to	
(* See Hot Climate - High Speed instruction following)		10° (F.) above zero.	SAE-10W

Temperatures lower than minus 10° (F.) below zero, use SAE-10W plus kerosene. SAE-10W may be safely diluted with colorless kerosene up to 30 percent; mix thoroughly before adding to engine, and check oil level OFTEN - because kerosene evaporates rapidly at crankcase temperature.

Hot Climate - High Speed: For trucks operating on highway, or other service demanding sustained high engine speeds, use engine oil having a viscosity as near SAE-40 as possible and as starting ability will permit. Note: High viscosity oils are available which also have very good cold-pour characteristics.

500 TO 1,000 MILES

2. Oil filter: { Change cartridge when oil has darkened. Remove filter cover and cartridge, clean inside of filter - install new cartridge. Run engine for a few minutes and check filter for leaks.
3. Air cleaners: { For engine air cleaner remove reservoir and dispose dirty oil; clean filter and reservoir and refill to oil level mark with clean engine oil, same grade used in crankcase. For hydrovac air cleaner - remove cleaner, dismantle and clean parts in a cleaning solvent and allow to dry; saturate element with a light engine oil and replace parts.
4. Battery: Check water level. If necessary, add pure distilled water to 3/8 inch above plates. Do not overfill.
5. Brake master cylinder: { Check fluid level. Do not allow dirt to enter. If necessary, fill to 3/4 inch from top with a high grade automotive type brake fluid. Do not overfill.
6. Steering gear relay arm: }
7. Spring pins: }
8. Drag links: }
9. Tie rods: }
10. Auxiliary spring ends: }
11. Clutch release fork shaft: }
12. Clutch and brake pedal: }
13. Steering knuckles: }
14. Parking brake linkage: }
15. Carburetor linkage: }
16. Door hinges, door latches: }
17. Generator: }
18. Starting motor: }
19. Distributor: { Put one drop of light oil on movable contact arm pivot pin. Remove rotor and put two or three drops of light engine oil on felt wick. Apply a light coat of vaseline to the distributor cam and contact arm fiber rubbing block. NOTE: Lubricate distributor shaft at overhaul or at 25,000-mile intervals. Use SAE-20 engine oil. Use sealing compound when replacing lubricant plug. For distributor with grease cup: fill cup with SAE-140 gear oil, as required, and turn one turn every 1,000 miles. Put one or two drops of engine oil on governor rotor.
20. Propeller shaft center bearing: Use a medium short-fiber wheel bearing grease (sodium-soap type).
21. Steering gear: Remove pipe plug and inspect oil level every 1,000 miles. Use SAE-140 gear oil. Keep housing full of oil.
22. Transmission Refill: Code No. 1309 - Capacity 19 Pts.
Code No. 1310 - Capacity 19 Pts.
Differential Refill: Code No. 1407 - Capacity 20 Pts.
Code No. 1408 - Capacity 18 Pts.
*Code No. 1413 - Capacity 22 Pts.
*Code No. 1414 - Capacity 22 Pts.
Code No. 1415 - Capacity 19 Pts.
Code No. 1416 - Capacity 19 Pts. } Inspect oil level every 1,000 miles and keep oil level up to filler plug, using same make and grade oil as in unit; if same grade is not available, drain, flush and use new oil. (Drain and flush twice yearly or every 10,000 miles, preferably in the spring and fall.) SAE-90 cold climate. SAE-140 warm climate. For transmission use SCL, EP gear oil or multi-purpose gear oil supplied by a reputable refinery. For rear axles (not Eaton) use SCL, EP gear oil or multi-purpose gear lubricant suitable for hypoid axles supplied by a reputable refinery. For Eaton axles, use hypoid gear lubricant available as Elco Gear Safety "28" or its equivalent (see instructions, section "A"). *For Electric Shift, inspect oil level every 10,000 miles and keep filled to plug level with SAE-10 oil.

3,000 TO 5,000 MILES

23. Propeller shaft slip joint: { Remove plug and install a pressure-gun fitting. Use a viscous chassis lubricant. Force a small amount into joint. Note: Too much pressure will damage oil seal and retainer. Remove fitting and replace plug.
24. Wheel bearings: { Remove wheels, clean and inspect bearings, races and wheel hubs. Repack bearings, using a short fiber wheel bearing grease. Replace wheels and adjust bearings.

10,000 MILES

25. Water pump: { Remove plug and install a pressure gun fitting. Use a short-fiber wheel bearing grease and fill housing (under low pressure)
26. Hydrovac: Inject two ounces vacuum cylinder oil twice yearly or every 10,000 miles, preferably in the spring and fall.

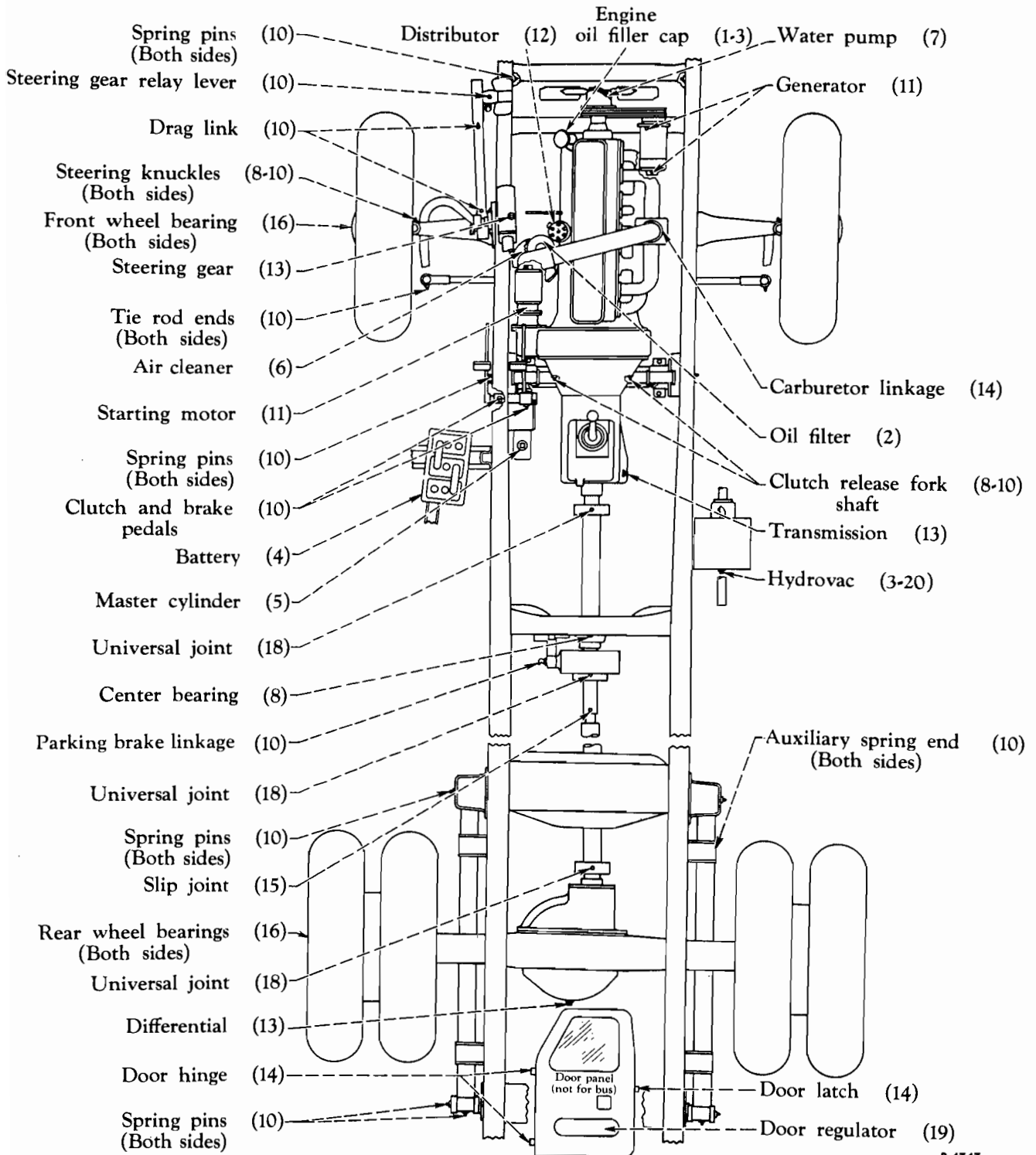
15,000 TO 20,000 MILES

27. Propeller shaft universal joints: { Remove plug, install a pressure-gun fitting and fill (under low pressure). Use SAE-140 gear oil. Remove fitting and replace plug.
28. Window regulator: Remove door panel and lubricate regulator slide. Use a viscous chassis lubricant.



LUBRICATION CHART

L-200 SERIES TRUCKS



B-4747



LUBRICATION CHART INSTRUCTIONS L-200 SERIES TRUCKS

DAILY

1. Engine: Keep crankcase filled to correct level with high-grade engine oil. Changing oil regularly will remove accumulated dirt. Cold weather requires frequent oil change because of increased use of choke, also condensation of moisture. Refill capacity, 7 quarts; add 1 quart for oil filter. For trucks in multi-stop, or other services where sustained high engine speeds are not encountered, select oil grade as follows:

TEMPERATURES	OIL GRADE	TEMPERATURES	OIL GRADE
* 90° (F.) and up	SAE-40	10° (F.) to 32° (F.) (above zero)	SAE-20W
32° (F.) to 90° (F.)	SAE-40	Minus 10° (F.) to	
(* See Hot Climate - High Speed instruction following)		10° (F.) above zero	SAE-10W

Temperatures lower than minus 10° (F.) below zero, use SAE-10W plus kerosene. SAE-10W may be safely diluted with colorless kerosene up to 30 percent; mix thoroughly before adding to engine, and check oil level OFTEN - because kerosene evaporates rapidly at crankcase temperature.

Hot Climate - High Speed: For trucks operating on highway, or other service demanding sustained high engine speeds, use engine oil having a viscosity as near SAE-40 as possible and as starting ability will permit. Note: High viscosity oils are available which also have very good cold-pour characteristics.

500 TO 1,000 MILES

2. Oil filter: { Change cartridge when oil has darkened. Remove filter cover and cartridge, clean inside of filter - install new cartridge. Run engine for a few minutes and check filter for leaks.
3. Air cleaners: { For engine air cleaner remove reservoir and dispose dirty oil; clean filter and reservoir and refill to oil level mark with clean engine oil, same grade used in crankcase. For hydrovac air cleaner - remove cleaner, dismantle and clean parts in a cleaning solvent and allow to dry; saturate element with a light engine oil and replace parts.
4. Battery: Check water level. If necessary, add pure distilled water to 3/8 inch above plates. Do not overfill.
5. Brake master cylinder: { Check fluid level. Do not allow dirt to enter. If necessary, fill to 3/4 inch from top with a high grade automotive type brake fluid. Do not overfill.
6. Steering gear relay arm: {
7. Spring pins: {
8. Drag links: { Force a viscous chassis lubricant or SAE-140 gear oil into fittings until old lubricant, dirt and water are expelled.
9. Tie rods: {
10. Auxiliary spring ends: {
11. Clutch release fork shaft: {
12. Clutch and brake pedal: { Use a viscous chassis lubricant or SAE-140 gear oil. Do not over-lubricate. Too much oil on knuckles, and on clutch shaft will cause failure of brake and clutch lining.
13. Steering knuckles: {
14. Parking brake linkage: {
15. Carburetor linkage: { Lubricate linkage, clevis pins, pivot pins, and sliding surfaces with engine oil. Put suitable lubricant on door latches.
16. Door hinges, door latches: {
17. Generator: {
18. Starting motor: { Put 10 to 20 drops light engine oil in each cup. Do not over-lubricate.
19. Distributor: { Put one drop of light oil on movable contact arm pivot pin. Remove rotor and put two or three drops of light engine oil on felt wick. Apply a light coat of vaseline to the distributor cam and contact arm fiber rubbing block. NOTE: Lubricate distributor shaft at overhaul or at 25,000-mile intervals. Use SAE-20 engine oil. Use sealing compound when replacing lubricant plug. For distributor with grease cup: fill cup with SAE-140 gear oil, as required, and turn one turn every 1,000 miles. Put one or two drops of engine oil on governor rotor.
20. Propeller shaft center bearing: Use a medium short-fiber wheel bearing grease (sodium-soap type).
21. Steering gear: Remove pipe plug and inspect oil level every 1,000 miles. Use SAE-140 gear oil. Keep housing full of oil.
22. Transmission Refill: {

Code No. 1309 - Capacity 19 Pts.	Inspect oil level every 1,000 miles and keep oil level up to filler plug, using same make and grade oil as in unit; if same grade is not available, drain, flush and use new oil. (Drain and flush twice yearly or every 10,000 miles, preferably in the spring and fall.) SAE-90 cold climate. SAE-140 warm climate. For transmission use SCL, EP gear oil or multi-purpose gear oil supplied by a reputable refinery. For rear axles (not Eaton) use SCL, EP gear oil or multi-purpose gear lubricant suitable for hypoid axles supplied by a reputable refinery. For Eaton axles, use hypoid gear lubricant available as Elco Gear Safety "28" or its equivalent (see instructions, section "A"). *For Electric Shift, inspect oil level every 10,000 miles and keep filled to plug level with SAE-10 oil.
Code No. 1310 - Capacity 19 Pts.	
Code No. 1311 - Capacity 24 Pts.	
Code No. 1312 - Capacity 24 Pts.	
Differential Refill:	
Code No. 1408 - Capacity 18 Pts.	
Code No. 1416 - Capacity 19 Pts.	
Code No. 1419 - Capacity 38 Pts.	
*Code No. 1414 - Capacity 22 Pts.	
*Code No. 1422 - Capacity 37 Pts.	

3,000 TO 5,000 MILES

23. Propeller shaft slip joint: { Remove plug and install a pressure-gun fitting. Use a viscous chassis lubricant. Force a small amount into joint. Note: Too much pressure will damage oil seal and retainer. Remove fitting and replace plug.
24. Wheel bearings: { Remove wheels, clean and inspect bearings, races and wheel hubs. Repack bearings, using a short fiber wheel bearing grease. Replace wheels and adjust bearings.

10,000 MILES

25. Water pump: { Remove plug and install a pressure gun fitting. Use a short-fiber wheel bearing grease and fill housing (under low pressure).
26. Hydrovac: Inject two ounces vacuum cylinder oil twice yearly or every 10,000 miles, preferably in the spring and fall.

15,000 TO 20,000 MILES

27. Propeller shaft universal joints: { Remove plug, install a pressure-gun fitting and fill (under low pressure). Use SAE-140 gear oil. Remove fitting and replace plug.
28. Window regulator: Remove door panel and lubricate regulator slide. Use a viscous chassis lubricant.