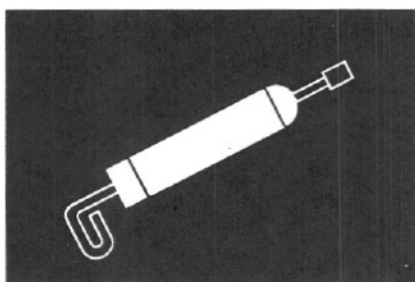


Lubrication



Rockwell Recommended

- Practices
- Specifications
- Lubricants
- Capacities



Rockwell International

...where science gets down to business

INTRODUCTION

The efficiency and life of mechanical equipment is as dependent on proper lubrication as on proper engineering design. The importance of proper lubrication is increased because of greater gear tooth and bearing pressures and higher speeds in present day vehicles. For this reason, we are vitally interested in promoting widespread usage of the best possible lubricants for our products.

It is advisable to consider the reputation of the refiner or vendor when selecting a lubricant. He is responsible for the quality and correct application of his product. A high quality lubricant incorrectly applied may greatly reduce the maximum service built into our product. Past experience has proven that a large portion of service problems can be traced to an improper lubricant or to an incorrect lubricant application.

Our purpose in compiling these specifications is to provide a guide to aid in the selection of a lubricant which will render the most satisfactory service.

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RECOMMENDED LUBRICATION PRACTICES

NEW AND RECONDITIONED AXLE SERVICE

With new axles, the original drive axle lubricant should be drained at 1,000 miles (1,600 km.) but no later than 3,000 miles (4,800 km.). Drain the lubricant initially used in the assembly while the assembly is still warm. Axles *should not* be flushed with any solvent such as kerosene. All new axles should be checked for correct oil level before being placed into service.

Also, change the oil filter of drive units employing a pump forced lubrication system. Initially the filter should be changed at the same time as the oil, or 1,000-3,000 miles, (1,600-4,800 km.).

For reconditioned axles, follow the same procedures as above after overhaul.

Fill axle housings to bottom of level hole (in carrier and/or housing) with specified lubricant with the vehicle on level ground. If the new or reconditioned axle employs an inter-axle differential of the type that can be directly filled through a top filler plug hole, pour an additional 2 U.S. pints (0.946 liters) of the same lubricant into the inter-axle differential housing.

REGULAR AXLE SERVICE

When the inter-axle differential housing employs a filler and drain plug, servicing the unit is done at the same time and in the same manner as the axle housings. Completely drain the lubricant while the unit is warm. Whenever the inter-axle differential housing has been drained, always add an additional 2 U.S. pints (0.946 liters) of specified lubricant directly into the inter-axle differential housing.

Some newer model axles have a small tapped and plugged hole located near and below the housing lubricant level hole. This smaller hole has been provided for the use of a lubricant temperature indicator only and should not be used as a fill or level hole.

Jack up all four wheels of the assembly and run at 25 M.P.H. (40 kph) in high transmission gear for five minutes to thoroughly circulate the lubricant throughout the assembly. Be sure brakes are fully released.

LUBRICANT CHANGE SCHEDULE

There are very practical reasons for recommending lubricant changes. Fluid lubricants serve more than one purpose. They not only lubricate but they transport chemically reactive additives, they wash away minute

wear particles, serve as a corrosion inhibitor and also act as a heat transfer medium. Draining and refilling with a fresh supply assists in eliminating both magnetic and non magnetic wear particles which may not have been trapped by a magnetic plug. Exposure to heat and use may also alter the desirable performance properties which are assured through a lubricant change.

A regular schedule for changing the axle lubricant in a particular vehicle and operation can be accurately determined by analysis of samples taken from the assembly at specified intervals or mileages. The lubricant supplier frequently makes available his laboratory facilities for determining the useful life of his product under actual service conditions. The finally recommended schedule may be correlated, for economic reasons, with lubricant changes governed by climatic conditions and magnet drain plug maintenance. Lubricant changes should be made as climatic temperatures demand, regardless of vehicle mileage or established change schedule.

If it is desirable to select an arbitrary lubricant change schedule, we recommend changing the lubricant at 25,000 to 30,000 mile intervals (40,000-48,000 km.) when the yearly mileage accumulation is in excess of 60,000 miles (96,000 km.). When yearly mileage accumulation is less than 60,000 miles (96,000 km.), we recommend changing the lubricant twice yearly (spring and fall) irrespective of mileage.

When the drive unit employs an oil filter, the filter should be replaced every time the oil is changed or at least every 50,000 miles (80,000 km.).

The normal operating temperature of compounded lubricants during the summer season is approximately 160° F to 220° F (71°C-104°C). The chemicals and additives that give these lubricants increased load carrying capacity oxidize faster at temperatures above 220° F (104°C), contributing to more rapid lubricant deterioration. For this reason, lubricants of this type that operate continuously at high temperatures must be changed more frequently to realize the inherent advantages they offer.

MAGNETIC DRAIN PLUGS

Any drive axle, while it is working, generates wear particles at a fairly steady rate. These wear particles are very fine but hard. If these hard wear particles are allowed to circulate in the lubricant, the anti-friction bearings will wear at a faster rate than they would if the hard wear particles were removed as they are generated.

Magnetic drain plugs perform the vital function of trapping these small metallic particles that circulate in the lubricant, through the gears and bearings, causing rapid wear and premature failure. The magnet must be strong enough to firmly hold the particles under service conditions. We recommend plugs with elements having a minimum pickup capacity of 2 pounds (1 kg.) of low carbon steel in plate or bar form.

Magnets will rapidly lose effectiveness as collected material bridges the gap between the two poles. Change plugs before this occurs. It may be necessary to change plugs one or more times between complete lubrication changes. The removed plugs can be cleaned and re-used.

NOTE: For maximum protection against wear particles it is desirable that magnetic plugs be employed at any drain, fill or level hole location of the drive unit. However, the use of a magnetic drain plug in the axle housing is specifically recommended.

TEMPERATURE INDICATOR

Many Rockwell tandem axles, particularly the larger ones, have a 1/2" (12.7 mm) pipe tap hole for the installation of a lubricant temperature thermocouple. We recommend indicators be installed in these axles, especially hypoid thru-drive units. A sudden upward change in lubricant temperature may indicate tire or mechanical trouble that can be corrected, avoiding expensive repair. When the lubricant temperature reaches 250°F (121°C), the vehicle should be immediately stopped to find the cause of overheating.

TRACTION EQUALIZER ADDITIVE

Traction equalizers are employed by many drive units to maintain an appreciable amount of wheel end traction in all operating conditions while still allowing the vehicle to negotiate turns smoothly. This is accomplished with the ability of the traction equalizer to slip above a certain torque value, and remain rigid below this torque value.

Rockwell Traction Equalizers will normally operate with oils not having the addition of special additives. Occasionally it is found, however, that the traction equalizer will tend to slip in a jerking pattern, producing irregular intervals of sharp audible noises. This generally occurs when the vehicle is operating at low speeds on fairly sharp turns. This slip-stick condition can often be corrected by the addition of certain "friction modifiers" which reduce the static coefficient of friction to a value equal to or lower than the sliding coefficient.

*Suitable concentrated additives that can be added to conventional E.P. oils are available from some oil suppliers. Also, many suppliers market E.P. oils already containing friction modifiers for "limited slip differentials".

These friction modifiers generally deteriorate faster than the conventional E.P. additives, and the lubricant change schedule should be shortened when these are used.

***NOTE:** Our experience indicates that the following additives perform adequately: Add Elco #2 Friction Modifier one ounce (.03 liters) of additive for each pint (.47 liters) of lube capacity or Lubrizol #797 or #762 one ounce (.03 liters) of additive for each pint (.47 liters) of lube capacity.

ROCKWELL RECOMMENDED LUBRICANTS

OIL VISCOSITIES

For service purposes and the convenience of description in this Field Maintenance Manual the term "Standard" indicates a lubricant of proper viscosity for average temperature conditions during the spring, summer, and fall in the continental United States (except for Alaska), and a part of the continental United States during winter.

"Optional" viscosity lubricants should be used whenever vehicles are parked at outside temperatures lower than the minimum given for the "Standard" lubricant.

The proper viscosity of oil for the specific component shall be selected from the following table, on page 6, of ambient temperatures. Where more than one lubricant can be selected from this table, the higher viscosity oil should be used.

LUBRICATION

Experience has shown that the use of an S.A.E. 140 viscosity grade lubricant (Rockwell specifications 0-63, 0-73, 0-76, 0-76-A and 0-76-B) will result in longer gear life.

Lubricant * Specifications	Minimum Outside Temperature	Maximum Outside Temperature
0-62**	+10° F (-12.2° C)	---***
0-63**	+40° F (+4.4° C)	---***
0-72**	+10° F (-12.2° C)	---***
0-73**	+40° F (+4.4° C)	---***
0-74**	Spring seat application - no upper or lower limit.	
0-76	+40° F (+4.4° C)	---***
0-76-A	+10° F (-12.2° C)	---***
0-76-B	-15° F (-26.1° C)	---***
0-76-C	+10° F (-12.2° C)	---***
0-76-D	-15° F (-26.1° C)	---***
0-76-F	-15° F (-26.1° C)	+70° F (+21.1° C)
0-76-J	-40° F (-40° C)	+35° F (+1.6° C)

* Refer to page 7 for lubricant cross reference.

**These lubricants are never to be used in axles employing hypoid, amboid, spiral bevel or planetary gearing.

***There is no upper limit on these outside temperatures, but the axle sump temperature MUST NEVER EXCEED 250° F (+121° C).

Unusual temperature or operating conditions may require other or more specific lubricant recommendations. Rockwell will review these circumstances, upon request, and make optional gear oil or grease recommendations. It is essential that all details of vehicle operation, loads, area temperature, etc., are clearly and completely stated when applying to our Engineering Department for an optional lubricant recommendation.

Multigrade Lubricants

Multigrade lubricants may be used provided that the complete specification (including viscosity stability in service) of each viscosity grade listed are met.

Synthetic Lubricants

Synthetic lubricants may be used in drive axles provided they meet all of the requirements of Rockwell-Standard specifications 0-76, 0-76-A, 0-76-B, 0-76-C, 0-76-D, 0-76-F or 0-76-J.

CAUTION: THE SYNTHETIC LUBRICANT MUST BE COMPATIBLE WITH STANDARD COMMERCIAL SEALS USED IN THE AXLE (PINION AND WHEEL END), OTHERWISE SPECIAL SEALS MUST BE INSTALLED. FURTHER, THE SPECIAL SEALS USED MUST PASS ROCKWELL MATERIAL SPECIFICATION J-11 WHEN TESTED IN THE SYNTHETIC LUBRICANT.

LUBRICANT CROSS REFERENCE

As a quick guide to Rockwell Material Specifications, the following are very brief descriptions of the various recommended lubricants and specific cross references. They are not meant to replace the complete specifications, or to serve in their places.

ROCKWELL LUBRICANT SPECIFICATION	DESCRIPTION	CROSS REFERENCE
0-62	Mineral Oil	GL-1, S.A.E. 90
0-63	Mineral Oil	GL-1, S.A.E. 140
0-72	Worm Gear Oil	GL-2, S.A.E. 90
0-73	Worm Gear Oil	GL-2, S.A.E. 140
0-74	Spring Seat Oil	GL-2, S.A.E. 250
0-76	Hypoid Gear Oil	GL-5, S.A.E. 140
0-76-A	Hypoid Gear Oil	GL-5, S.A.E. 85W/140
0-76-B	Hypoid Gear Oil	GL-5, S.A.E. 80W/140
0-76-C	Hypoid Gear Oil	GL-5, S.A.E. 85W/90
0-76-D	Hypoid Gear Oil	GL-5, S.A.E. 80W/90
0-76-F	Hypoid Gear Oil	GL-5, S.A.E. 80W
0-76-J	Hypoid Gear Oil	GL-5, S.A.E. 75W
0-616*	Anchor Pin Grease	Non-Melting Grease with Bentone Thickeners NLGI Grade No. 2
0-616-A*	Special Stopmaster Grease	NLGI Grade No. 1 (Refer to FMM #4R)
0-617-A*	Chassis Grease	6% 12-hydroxy lithium stearate grease NLGI Grade No. 1
0-617-B*	Chassis Grease	8% 12-hydroxy lithium stearate grease NLGI Grade No. 2
0-634-A*	Universal Joint Grease	6% 12-Hydroxy Lithium Stearate Grease with EP properties. NLGI Grade No. 1
0-634-B*	Universal Joint Grease	8% 12-Hydroxy Lithium Stearate Grease with EP properties. NLGI Grade No. 2

**Our grease recommendations are based on commercial products that have given satisfactory results in normal operation. However, there are many proprietary grease products on the market which will perform satisfactorily, and may be preferable because of supply problems, common usage for other truck components, etc. Where such products are recommended by reputable grease suppliers for the specific lubrication of our components, Rockwell has no objections, provided that these substitute products are equal or better than the Rockwell recommendations in lubrication properties, water resistance, corrosion protection, high and low temperature characteristics, oxidation stability, shear stability, etc.*

The lubricant supplier may obtain copies of any of the referenced Rockwell Material Specifications by writing to the following address: Technical Communications, Rockwell International, 2135 West Maple Road, Troy, Michigan 48084.

In all cases the lubricant supplier assumes all responsibility for the performance of his product and for product and patent liability.

IMPORTANT: Refer to introduction on Page 2 for remarks concerning suppliers.

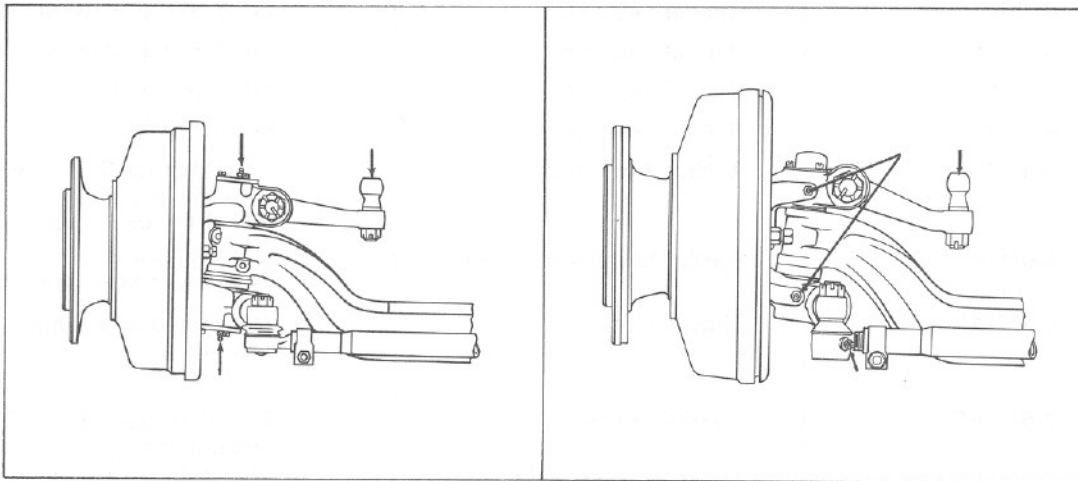
ROCKWELL RECOMMENDED LUBRICANT SPECIFICATIONS AND CHANGE INTERVALS

Specifications of lubricants and change intervals recommended by Rockwell are as follows:

1. FRONT NON-DRIVING AXLES

Standard (straight and taper) knuckle pins, sealed knuckle pins, bushings (metal and nylon), standard steering cross tube end (tie rod) assemblies, and drag link ball sockets.

NOTE: Permanently lubricated tie rod ends do not require lubrication, however, periodic inspection at 96,000 mile (153,600 km) intervals is recommended.



**SEALED KNUCKLE PIN AND
PERMANENTLY LUBRICATED TIE
ROD END DESIGN
(DO NOT RAISE WHEEL END OFF
GROUND FOR GREASING)**

**STANDARD KNUCKLE PIN
AND TIE ROD
END DESIGN
(RAISE WHEEL END OFF
GROUND FOR GREASING)**

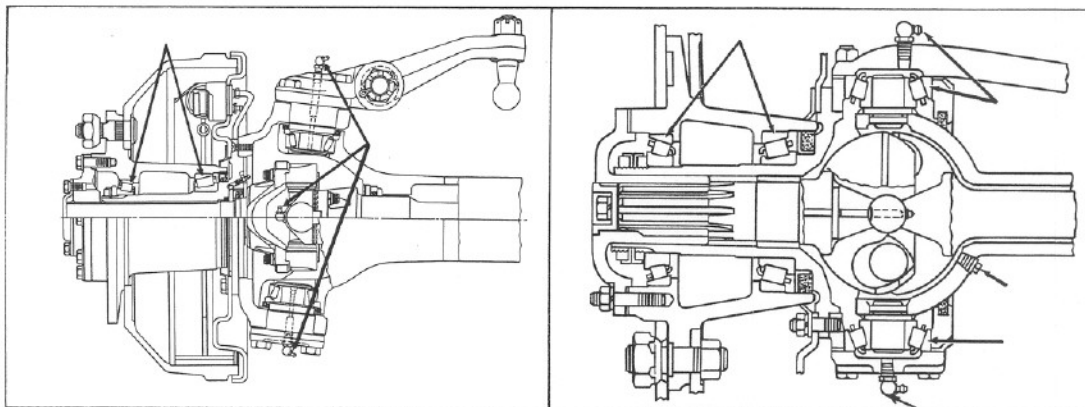
LUBRICANT: 0-617-A or 0-617-B

CHANGE INTERVAL: Standard axles every 3,000 miles (4,800 km). Axles employing sealed knuckle pins every 24,000 miles (38,000 km).

IMPORTANT: Pressure gun should be held on fittings until new grease appears. This will assure that all the old contaminated grease has been forced out. On sealed knuckle pins, it is not necessary to exceed 4,000 psi (280 kg/cm²). However, our experience indicates that the best distribution of new lubricant and the best purging of old lubricant is obtained when approximately 4,000 psi (280 kg/cm²) pressure is applied at the grease gun nozzle. Thus, using a 40 to 1 booster, the air should be limited to 100 psi (7 kg/cm²); using a 50 to 1 booster, the air should be limited to 80 psi (5.6 kg/cm²). Appreciably higher or lower pressures are not recommended.

2. FRONT DRIVE STEERING AXLE WHEEL ENDS

Universal joints, bearings, bushings and knuckle pins.



**CARDAN
UNIVERSAL JOINT**

**CONSTANT VELOCITY
UNIVERSAL JOINT**

LUBRICANT: 0-617-A or 0-617-B.

CHANGE INTERVAL: The frequency of lubricant changes depends upon individual operating conditions, speed and loads. Change whenever seals are replaced or when brakes are relined or at 30,000 miles (48,000 km). If yearly mileage is less than 30,000 miles (48,000 km) change twice a year (spring and fall).

Lubrication Procedure For Cardan Universal Joints:

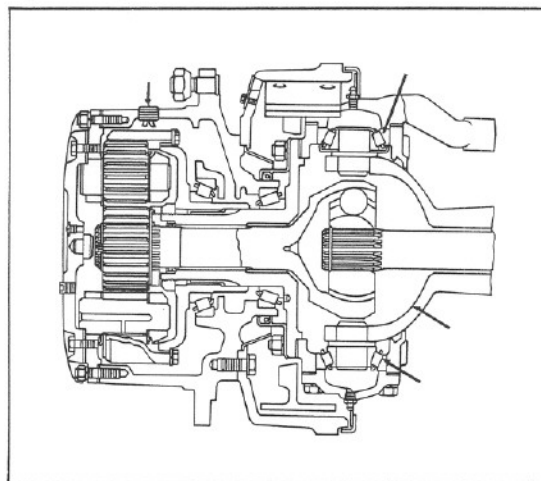
1. Check for looseness.
2. Apply grease.
3. Observe lube purging from all seals until new grease comes out.
4. If grease does not purge, manipulate the "U" joint until purging occurs.
5. If the above is not successful, remove cup or joint and check old grease. If rusty, gritty or burn, replace the complete universal joint.

3. PLANETARY AXLE WHEEL ENDS

(Steering, Rigid and SPR)

A. WHEEL BEARINGS AND GEARING

An API-GL-5 lubricant is recommended for all planetary wheel bearings and gearing. The following Rockwell specifications are recommended for planetary axles with or without a common wheel end/housing bowl oil level.



**PLANETARY STEERING
AXLE WHEEL END**

LUBRICATION

LUBRICANT: standard 0-76-C or 0-76-D } Refer to page 5
optional 0-76-F or 0-76-J } "Oil Viscosities"

IMPORTANT: Do not use lubricants with viscosity grades above 90 in planetary wheel ends with a common wheel end/axle housing oil level. Lubricants with viscosity grades above 90 must be limited to the housing bowl of axles without a common wheel end/axle housing oil level.

CHANGE INTERVAL: All planetary axles — change whenever seals are replaced, brakes are relined or when drive unit lubricant is changed or every 1,000 to 1,500 hours of operation or twice a year (spring and fall).

B. KNUCKLE BEARINGS AND BUSHINGS

LUBRICANT: 0-617-A or 0-617-B

CHANGE INTERVAL: Change whenever seals are replaced, brakes are relined or about every 100-200 hours for normal operations, but as often as once a day in severe operations.

C. CARDAN UNIVERSAL JOINT

LUBRICANT: 0-617-A or 0-617-B

CHANGE INTERVAL: The U-joint should be greased approximately every 200 hours.

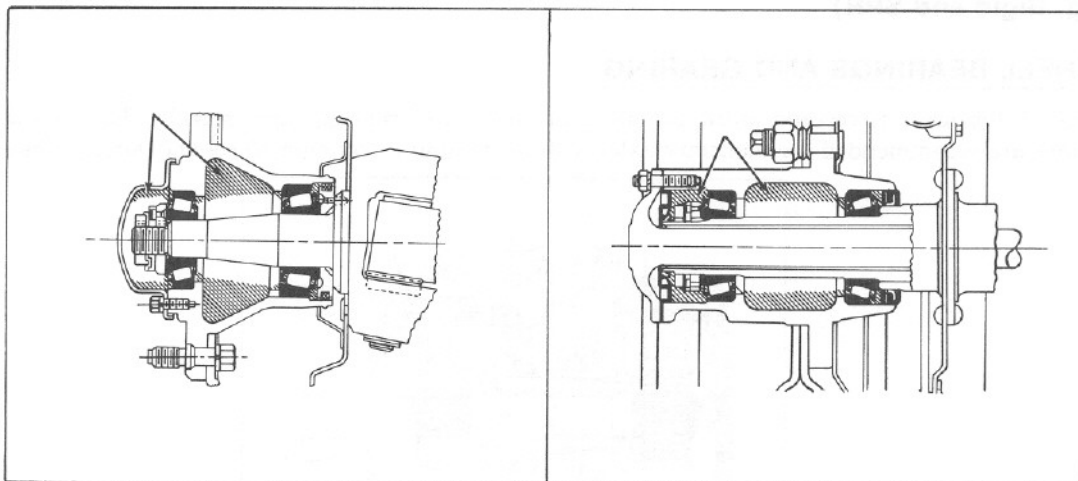
D. CONSTANT VELOCITY JOINT

LUBRICANT: 0-617-A or 0-617-B

CHANGE INTERVAL: Lubricate the axle shaft universal joint every 1,000 to 1,500 hours of operation or twice a year (spring and fall).

4. WHEEL BEARINGS

A. GREASE LUBRICATED



**NON-DRIVE AXLE
HUB ASSEMBLY**

**DRIVE AXLE
HUB ASSEMBLY**

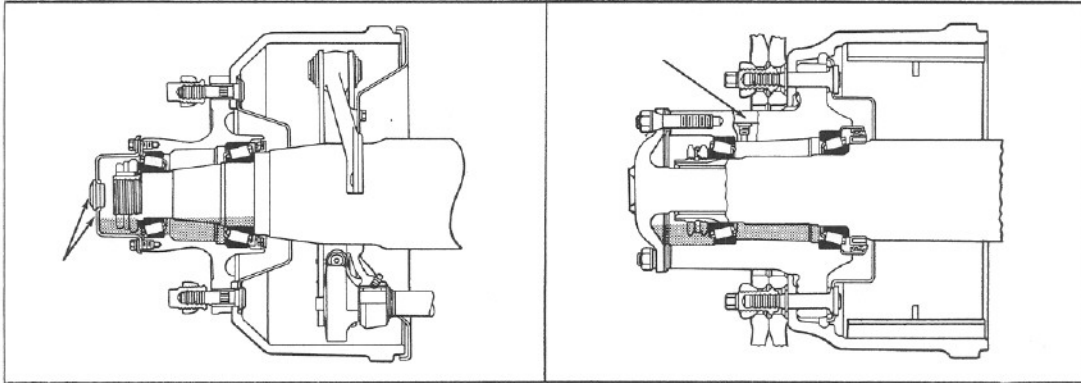
LUBRICANT: 0-617-A (preferred) or 0-617-B (acceptable)

APPLICATION NOTE: 0-617-A has a consistency which is preferred to take advantage of slumping characteristic, and for insurance against possibility of fretting corrosion in wheel bearings. 0-617-B has a consistency which may be preferred for ease of packing wheel bearings.

CHANGE INTERVAL: The frequency of lubricant changes depends upon individual operating conditions, speed and loads. Change whenever seals are replaced or when brakes are relined or at 30,000 miles (48,000 km). If yearly mileage is less than 30,000 miles (48,000 km) change twice a year (spring and fall).

IMPORTANT: At rebuild time, before installing wheel bearings onto spindle, coat bearing journals with a film of grease to deter fretting corrosion.

B. OIL LUBRICATED



**NON-DRIVE AXLE HUB ASSEMBLY
TRAILER SHOWN**

DRIVE AXLE HUB ASSEMBLY

LUBRICANT: standard 0-76-C or 0-76-D } Refer to Page 5
 optional 0-76-F or 0-76-J } "Oil Viscosities"

Also 0-76, 0-76-A or 0-76-B if drive axle employs oil lubricated hubs with a common hub/axle housing oil level and axle requires 0-76, 0-76-A or 0-76-B for proper operation.

CHANGE INTERVAL: Check every 1000 miles (1,600 km) and change whenever seals are replaced or when brakes are relined, or at least once a year.

IMPORTANT: Use the following procedures to assure that oil lubricated wheel bearings of drive axles are initially lubricated after servicing and before vehicle is put back into operation:

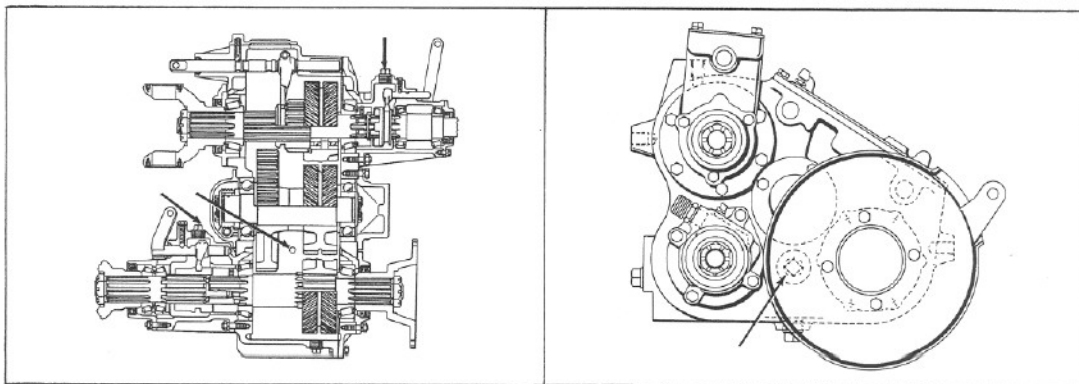
- **HUBS WITH OIL FILL HOLES** – Pour one (1) pint (0.473 liters) of oil (same as used in drive unit) directly into each hub.
- **HUBS WITHOUT OIL FILL HOLES** – Pour the specific amount of recommended drive unit lubricant through the carrier or housing bowl oil fill hole.

Next, tilt the vehicle to the right and to the left enough to allow oil to flow into hub cavities. This may be accomplished by jacking up the axle from each end. Keep the axle in each tilted position for one minute to allow hub cavities to fill. Approximately one pint (0.473 liters) of oil will be trapped in each hub cavity.

With the vehicle on a level surface add the appropriate amount of drive unit lubricant back into the carrier or housing bowl to bring the oil level back up to the correct point, approximately two (2) pints (0.946 liters).

5. TRANSFER CASES AND TORQUE DIVIDERS

LUBRICANT: standard 0-63 } Refer to page 5
 optional 0-62 } "Oil viscosities"



TRANSFER CASE— 3 SHAFT DESIGN

TRANSFER CASE— 4 SHAFT DESIGN

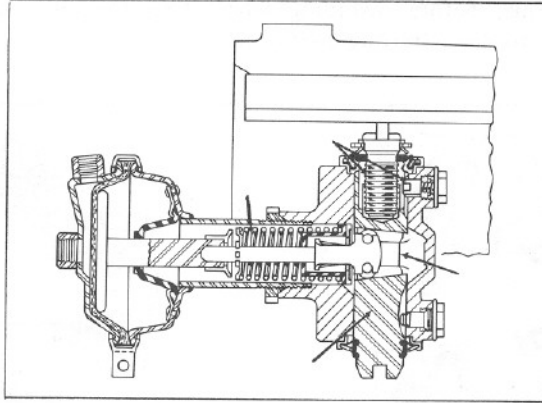
LUBRICATION

CHANGE INTERVAL: Transfer Cases—check every 1,000 miles (1,600 km). } Drain and refill every 12,000 miles
Torque Dividers—check every 1,000 miles (1,600 km). } to 25,000 miles (19,000-40,000 km).

6. BRAKES

A. STOPMASTER WEDGE BRAKES AND CHAMBERS (On-Highway and Off-Highway)

STOPMASTER WEDGE BRAKE AND AIR CHAMBER



LUBRICANT: 0-616-A

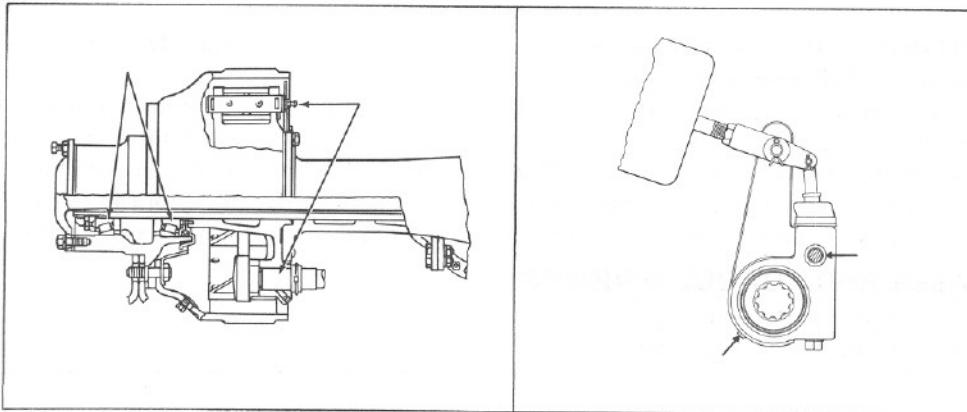
CHANGE INTERVAL: On-Highway — Change whenever seals are replaced or when brakes are relined or at 100,000 miles (160,000 km).
Off-Highway — Change grease every 12 months (maximum), whenever seals are replaced and when brakes are relined. However, the change interval may be shorter than 12 months depending on the severity of service operation. This can be determined by initially scheduling an inspection of internal parts and lubricant every 2 months until the first 12 month period is up. At each inspection look for contaminated or hardened grease or for the lack of grease.

B. CAM-MASTER BRAKES (On-Highway and Off-Highway)

LUBRICANT: Manual slack adjusters, camshaft roller journals, *camshaft bushings, metal and nylon — O-617-A or O-617-B

*Anchor pins (where specified) — O-616 or O-616A

Automatic Slack Adjusters — O-616-A



"P" TYPE S CAM BRAKE

AUTOMATIC SLACK ADJUSTER

CHANGE INTERVAL: On-Highway — Every 50,000 miles (80,000 km) or every 6 months for all components depending on severity of service.

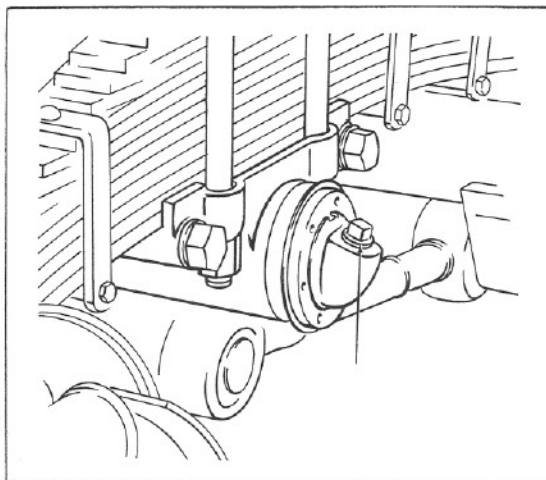
For brakes with extended lube feature used on regular common carrier type on-highway vehicles and the "Q" series brakes—change every 100,000 miles (160,000 km).

Off-Highway — For all components, change grease every 4 months (maximum), whenever seals are replaced and when brakes are relined. However, the change interval may be shorter than 4 months depending on the severity of service operation. This can be determined by initially scheduling an inspection of internal parts and lubricant every 2 weeks until the first 4 month period is up. At each inspection look for contaminated or hardened grease or for the lack of grease.

IMPORTANT: With automatic slack adjusters, remove pawl assembly first and lubricate through fitting until all old grease is purged and new grease is seen coming out through pawl slot.

CAUTION: Care must be exercised when lubricating cam shaft bushings and anchor pins. Over-lubrication could cause lubrication saturation of brake linings and a possible safety problem.

7. SPRING SEAT—BUSHING TYPE, METAL, NYLON AND DELRIN

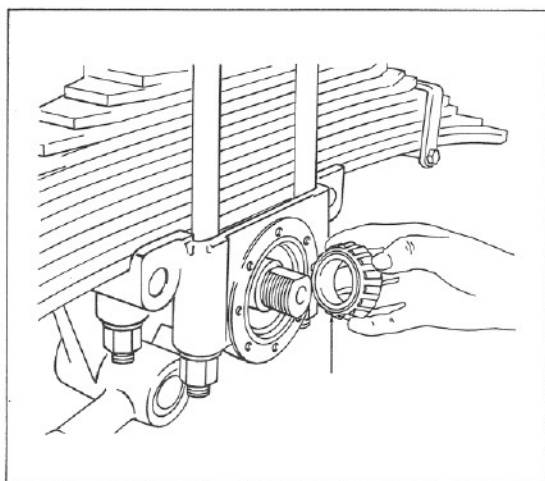


LUBRICANT: 0-74*

CHANGE INTERVAL: As required—keep reservoir filled with specified oil.

*NOTE: Use 0-73 (S.A.E. Grade 140) if 0-74 (S.A.E. Grade 250) is not available. However, check oil level more frequently when using lighter grade.

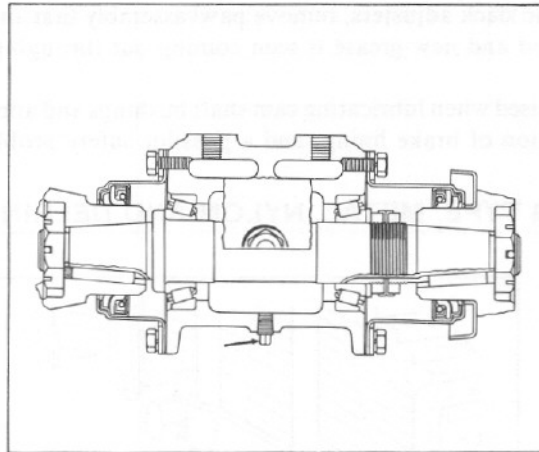
8. SPRING SEAT—ROLLER BEARING TYPE



LUBRICANT: 0-617-B

CHANGE INTERVAL: Whenever wheel bearings are lubricated or at 30,000 miles (48,000 km). If yearly mileage is less than 30,000 miles (48,000 km) change twice a year (spring and fall).

9. PILLOW BLOCKS



SBD-700, SBD-760 unit type.

LUBRICANT: Use same lubricant as in drive unit. Capacity-1 pint (0.473 liters).

CHANGE INTERVAL: Check every 1,000 miles (1,600 km). Drain and refill every 12,000 to 25,000 miles (19,000-40,000 km).

SBD-1000, SBD-1055, SBD-1500 and SBD-1555 integral type

LUBRICANT: Use same lubricant as in drive unit. Capacity-½ pint (0.236 liters).

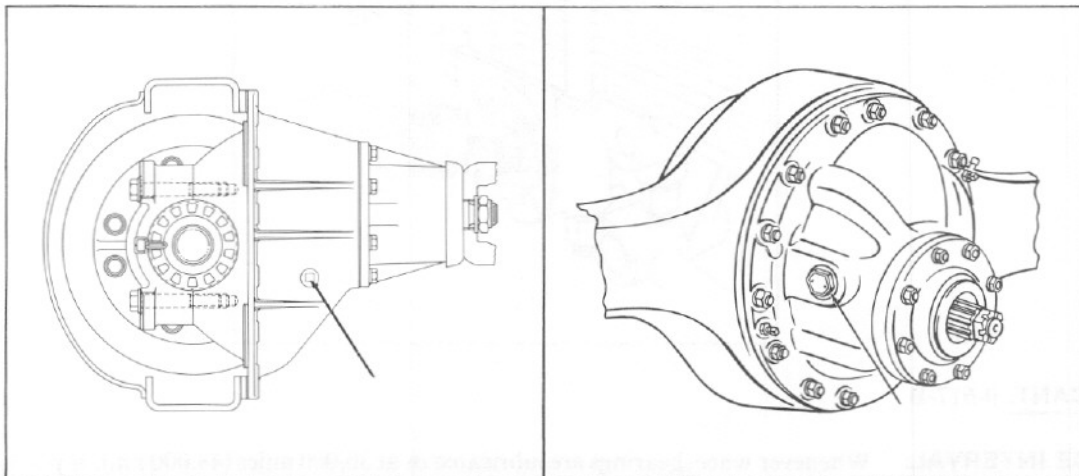
CHANGE INTERVAL: Drain and refill at each overhaul.

10. DRIVE UNITS (DIFFERENTIALS)

A. HYPOID GEARS, AMBOID GEARS AND SPIRAL BEVEL GEARS—SINGLE AND DOUBLE REDUCTION

The design of hypoid gear teeth, which mesh with a sliding action, enables them to withstand higher unit pressures. Therefore, the lubricant should have extreme pressure properties. Only lubricants with the S.A.E. designation API-GL-5 meet these requirements and are recommended for hypoid, amboid and spiral bevel gears.

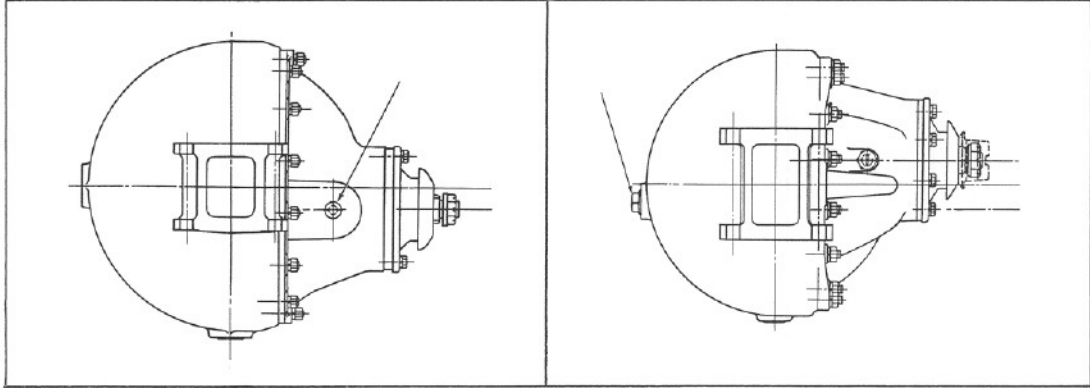
FRONT MOUNTED SINGLE REDUCTION



AMBOID GEARING

HYPOID GEARING

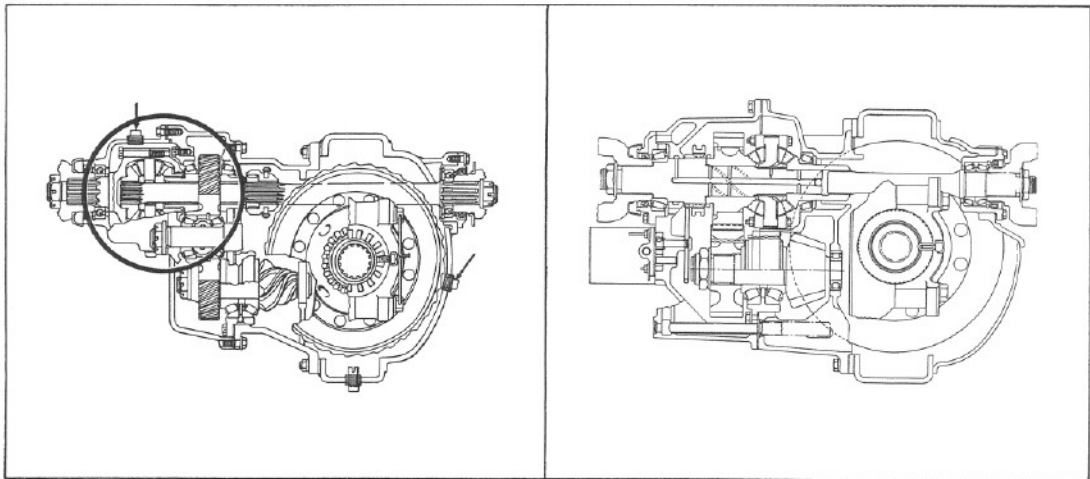
Hypoid—Single Reduction Planetary Axle Application



PINION STANDARD

PINION INVERTED

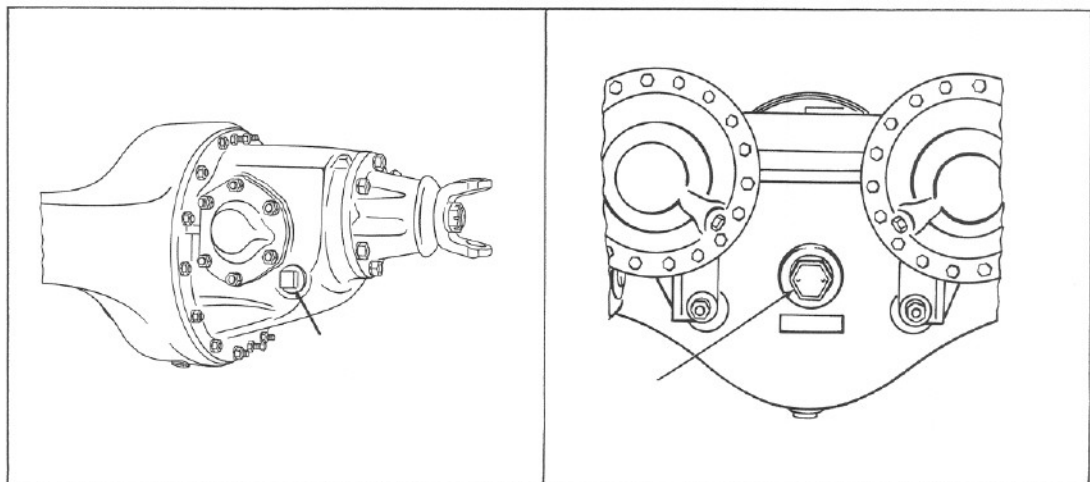
FRONT MOUNTED SINGLE REDUCTION TANDEM AXLES



FORWARD/REAR AXLE INTER-AXLE DIFF.

FORWARD/REAR AXLE-INTER-AXLE
DIFF. PUMP FORCED LUBRICATION

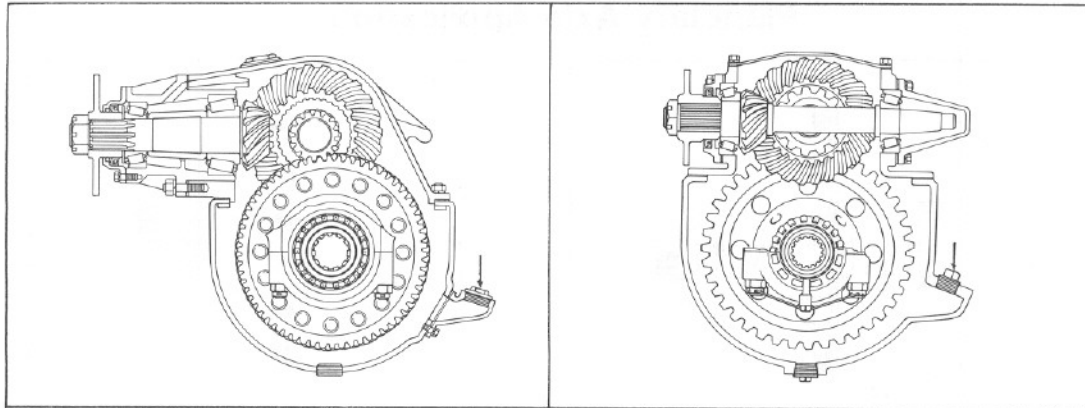
FRONT MOUNTED DOUBLE REDUCTION AND 2 SPEED AXLES



PLUG IN CARRIER

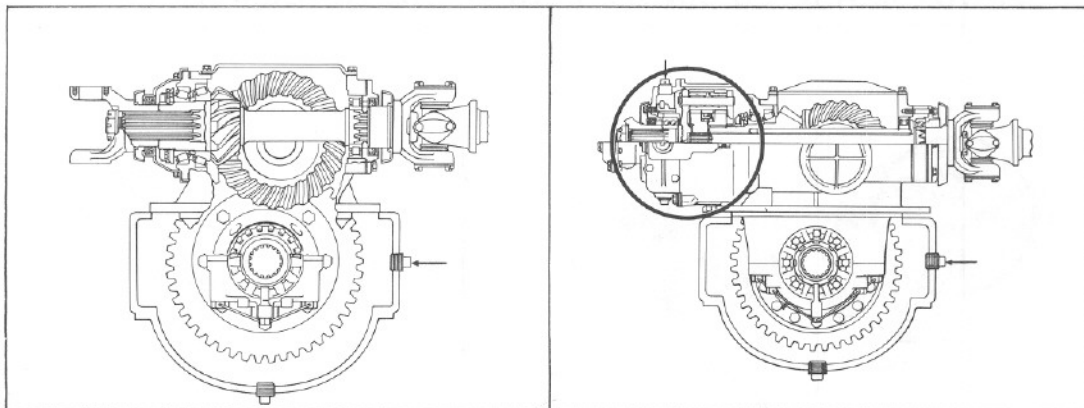
PLUG IN HOUSING

TOP MOUNTED DOUBLE REDUCTION SINGLE AXLES OR REAR/REAR OF TANDEM



SPIRAL BEVEL GEARING

TOP MOUNTED DOUBLE REDUCTION TANDEM AXLES



HYPOID GEARING WITHOUT INTER-AXLE DIFFERENTIAL

HYPOID GEARING WITH INTER-AXLE DIFFERENTIAL

LUBRICANT: standard 0-76, 0-76-A or 0-76-B } Refer to page 5
 optional 0-76-C, 0-76-D, 0-76-F or 0-76-J } "Oil Viscosities"

CHANGE INTERVAL: Heavy duty on-highway, on/off-highway and off-highway service — check every 1,000 miles (1,600 km). Drain and refill to top of filler neck or bottom of tapped hole every 25,000 to 30,000 miles (40,000–48,000 km) when yearly mileage is in excess of 60,000 miles (96,000 km). If yearly mileage is less than 60,000 miles (96,000 km) change twice a year (spring and fall). Regular Common Carrier Type Duty-On-Highway Vehicles — Change every 50,000 miles (80,000 km) when yearly mileage is in excess of 100,000 miles (160,000 km). If yearly mileage is less than 100,000 miles (160,000 km) change twice a year (spring and fall) irrespective of mileage.

Oil Filter

Replace the oil filter of drive units employing a pump forced lubrication system every time the oil is changed or at least every 50,000 miles (80,000 km) maximum.

Oil Pump

New units — Pre-lubricate oil pump gears with 2 oz. of recommended axle lubricant through the oil pump to filter passage.

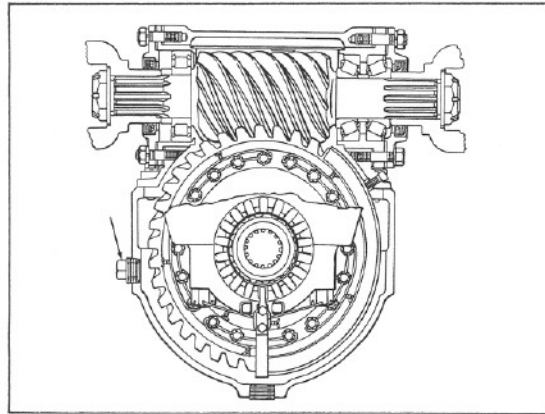
Reconditioned units — Pack the pump cavity with grease (O-617-A or O-617-B) before installing pump cover.

NOTE: Add two (2) extra pints (0.946 liters) of lubricant to axles employing inter-axle differentials of the type that can be directly filled through a top filler plug hole. Refer to "Capacities" on page 20.

B. WORM GEARS

An API-GL-2 lubricant is recommended for worm gear drive units.

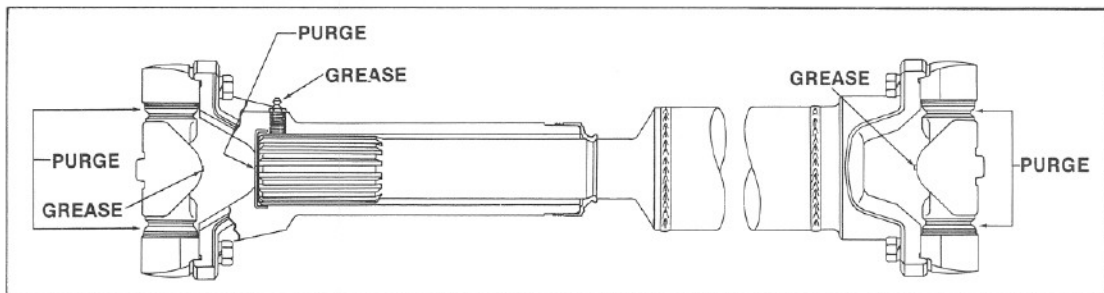
Extreme pressure gear lubricants, which depend upon chemical reaction with the metal for the extreme pressure characteristics, are not to be used with worm gears, unless they also meet Rockwell material specifications 0-72 or 0-73.



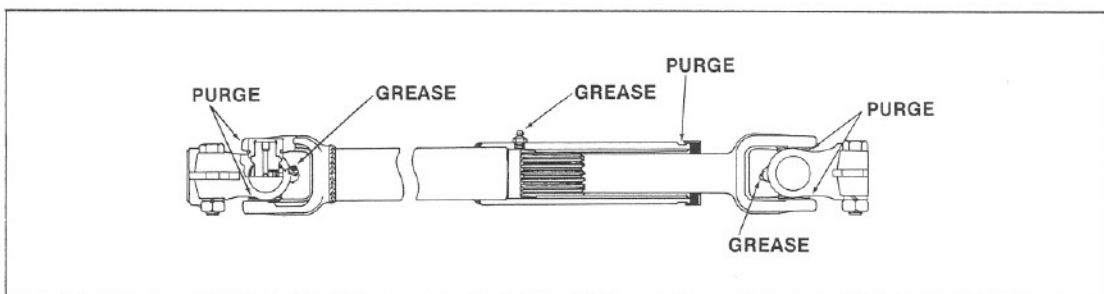
LUBRICANT: standard 0-73 } Refer to Page 5
optional 0-72 } "Oil Viscosities"

CHANGE INTERVAL: Check every 1,000 miles (1,600 km). Drain and refill to top of filler neck or bottom of tapped hole every 25,000 to 30,000 miles (40,000-48,000 km) when yearly mileage is in excess of 60,000 miles (96,000 km). If yearly mileage is less than 60,000 miles (96,000 km) change twice a year (spring and fall).

11. DRIVE LINE UNIVERSAL JOINTS, SLIP YOKES, SPLINES AND STEERING SHAFT UNIVERSAL JOINTS



DRIVE LINE "U" JOINT AND SLIP YOKE



STEERING SHAFT UNIVERSAL JOINT

LUBRICANT: O-634-A or O-634-B (Refer to Page 7)

CHANGE INTERVAL: The frequency of lubricant changes depends upon individual operating conditions, speed and loads.

On-Highway — Change grease as follows: Rockwell "X-TRA LIFE" universal joints and shafts — 50,000 miles maximum (80,000 km). Rockwell non "X-TRA LIFE" universal joints and shafts — 16,000 miles maximum (25,600 km).

Off-Highway — The change interval will differ greatly and be determined largely on the type of vehicle or machinery being used, type of operation and severity of service. The lubricant change interval could be, for example, one (1) day maximum or three (3) months maximum. This can be determined by initially scheduling daily or weekly inspections of universal joint, shaft and slip yoke parts. Check seals, bearings, splines etc., and check condition of grease in the assemblies by purging with new grease. Look for contaminated or hardened grease or for the lack of grease. Also check to make sure grease purges from all four (4) bearing and seal positions of the cross.

Lubrication Procedures for Universal Joints:

1. Check for looseness.
2. Apply grease.
3. Observe lube purging from all seals until new grease comes out.
4. If grease does not purge, manipulate the "U" joint until purging occurs.
5. If the above is not successful, remove cup or joint and check old grease. If rusty, gritty or burnt, replace the complete universal joint.

Lubrication Procedures for Slip Yokes and Splines:

1. Check for looseness or sideplay.
2. Apply grease until purging takes place at air hole in end of slip yoke.

LUBRICANT CAPACITIES OF ROCKWELL AXLES

Lubricant capacities are given as a guide only. All measurements are taken still filled, with the pinion shaft on the horizontal centerline (unless otherwise stated ●), to top of filler neck on earlier models and bottom of the tapped level hole on later models.

The lubricant capacities of two similar axles in the same series may vary considerably due to design changes and the vehicle manufacturer's installation. The actual service capacity may be accurately determined by carefully measuring the amount of specified lubricant necessary to fill the assembly to the correct level and measuring the lubricant again as it is drained from the unit. The vehicle should be on a level floor when this inspection is made.

†SINGLE AXLES REFERENCE ONLY

MODEL	CAPACITY U.S. Pints	CAPACITY Litres	MODEL	CAPACITY U.S. Pints	CAPACITY Litres	MODEL	CAPACITY U.S. Pints	CAPACITY Litres
A-150	5½	2.5*	F-50	10	4.5	F-400	16	7.5
B-100	10	4.5	F-53	12	5.5	F-409	28	13.0
B-140	12	5.5	F-54	11	5.0	F-501	10	4.5
B-150	3½	1.5	F-56	14	6.5	F-544	10	4.5
C-100	12½	6.0	F-58	15	7.0	F-551	11	5.0
D-100	12½	6.0	F-75	9	4.0	F-552	11	5.0
D-140	12½	6.0	F-77	10	4.5	F-580	15	7.0
E-100	15	7.0	F-100	13	6.0	F-583	15	7.0
E-105	12½	6.0	F-106	13	6.0	F-2090	12	5.5
E-150	9	4.0	F-140	14	6.5	F-3100	16	7.5
E-300	13*	6.0*	F-200	12	5.5	F-3110	26	12.5
E-350	22*	10.5*	F-223	16	7.5	F-3200	22	10.5
E-370	22*	10.5*	F-233	23	11.0	F-4700	40	19.0
F-30	6	3.0	F-234	23	11.0	F-4710	32	15.0
F-35	7	3.5	F-235	23	11.0	F-7900	40	19.0
F-37	7	3.5	F-300	16	7.5	F-7910	32	15.0
F-38	10	4.5	F-337	24	11.5	FS-4711	32	15.0
F-46	10	4.5	F-340	16*	7.5*	FDS-75	14	6.5

* Add one pint (0.47 liters) of lubricant to pinion cage when new or reconditioned drive unit is installed.

† For correct lubricant specification, see Pages 5-7 & 14. § Housing cover 6½" (165 mm) deep overall.

†SINGLE AXLES—Continued
REFERENCE ONLY

MODEL	CAPACITY U.S. Pints	CAPACITY Litres	MODEL	CAPACITY U.S. Pints	CAPACITY Litres	MODEL	CAPACITY U.S. Pints	CAPACITY Litres
FDS-85	15	7.0	Q-300	32*	15.0*	53625	4¾	2.25
FDS-90	14	6.5	Q-345	32*	15.0*	54400	15	7.0
FDS-750	7	3.0	Q-350	34*	16.0*	55400	20	9.5
FDS-1600	23	11.0	Q-370	34*	16.0*	55600	20	9.5
FDS-1800	35	16.5	Q-380	36*	17.0*	56219	22	10.5
FDS-1805	35	16.5	Q-390	36*	17.0*	56400	20	10.5
G-161	21	10.0	RT-240	32*	15.0*	56410	20	10.5
G-340	24*	11.0*	RT-340	32*	15.0*	56434	13	6.0
G-341	22*	10.5*	R-100	30	14.0	56450	26	12.0
G-361	21*	10.0*	R-140	28	13.0	56461	26	12.0
H-100	20	9.5	R-160	28	13.0	58200	21	10.0
H-140	21	10.0	R-163	34	16.0	58300	21	10.0
H-150	11	5.0	R-170	43	20.0	58415	26	12.0
H-162	20	9.5	R-200	36*	17.0*	58822	22	10.5
H-170	27	12.5*	R-230	36*	17.0*	59722	26	12.0
H-172	27	12.5	R-230§	45*	21.0*	65300	14	6.5
H-200	28*	13.0*	R-300	34*	16.0*	65356	23	11.0
H-240	22*	10.5	R-330	35*	16.5*	65400	17	8.0
H-262	23	11.0	R-330 §	44*	20.5*	65456	17	8.0
H-300	26*	12.5*	R-390	60*	28.0*	65700	12	5.5
H-340	22*	10.5*	R-2090	10	4.5	66700	20	9.5
H-350	24*	11.5*	R-3100	20	9.5	67000	20	9.5
H-360	24*	11.5*	S-200	38*	18.0*	68700	20	9.5
H-370	24*	11.5*	S-300	39*	18.5*	72200	15*	7.0*
L-100	23	10.5	U-140	24	11.5	72300	21*	10.0*
L-140	24	11.5	U-200	38*	18.0*	73300	8*	4.0*
L-155	24	11.5	U-240	38*	18.0*	74400	9*	4.5*
L-172	27	12.5	U-300	39*	18.5*	74878	12*	5.5*
L-200	31*	14.5*	U-340	39*	18.5*	75300	20*	9.5*
L-240	22*	10.5*	46-R	10	4.5	75357	20*	9.5*
L-300	29*	13.5*	1300	16	7.5	75400	20*	9.5*
L-340	22*	10.5*	1700	16	7.5	75700	24*	11.55*
L-350	24*	11.5*	59000	26	12.0	76400	18*	8.5*
L-370	32*	15.0*	63000	8	4.0	76700	26*	12.0*
L-600	35	16.5	64800	9	4.5	76784	26*	12.0*
LT-200	31*	14.5*	65200	10	4.5	76790	28*	13.0*
LT-300	29*	13.5*	1900	16	7.5	78000	20*	9.5*
QT-140	24	11.5	7578	28	13.0	79000	24*	11.5*
QT-200	31*	14.5*	7579	28	13.0	79721	24*	11.5*
QT-230 §	44*	21.0*	7580	28	13.0	93440	20*	9.5*
QT-240	34*	16.0*	7581	28	13.0	94440	20*	9.5*
QT-300	29*	13.5*	7582	28	13.0	96710	25*	12.0*
QT-330 §	44*	21.0*	51500	3½	1.5	98415	41*	19.0*
QT-340	32*	15.0*	53300	15	7.0			
Q-100	31	14.5	53500	6	3.0			
Q-145	24	11.5	53521	9	4.5			
Q-200	34*	16.0*	53547	9	4.5			
Q-245	34*	16.0*	53600	7	3.25			

* Add one pint (0.47 liters) of lubricant to pinion cage when new or reconditioned drive unit is installed.

† For correct lubricant specification, see Pages 5-7 & 14. § Housing over 6½" (165 mm) deep overall.

†TANDEM AXLES

REFERENCE ONLY

MODEL	CAPACITY U.S. Pints	CAPACITY Litres	MODEL	CAPACITY U.S. Pints	CAPACITY Litres
▲ SBD-700	7	3.25	SQDD	‡22	‡ 10.5
▲ SBD-760	5	2.5	●SQHD		
▲ SBD-1000	8	3.75	forward	‡34	‡ 16.0
▲ SBD-1055	19	9.0	rear	31	14.5
▲ SBD-1500	12	5.5	SQHP		
▲ SBD-1555	26	12.0	forward	40	19.0
SD-353	24	11.5	rear	36	17.0
SD-454	26	12.0	SQTT-335	*44	*21.0
SD-472	28	13.0	SQW	33	15.5
SD-473	28	13.0	SQW	§40	§19.0
SD-3000	19	9.0	SRD	22	10.5
SD-3010	19	9.0	SRDD	‡22	‡10.5
SD-3020	31	14.5	SRHD		
●SDHD	‡16	‡7.0	forward	39	18.5
SFD-75	16	7.0	rear	36	17.0
SFD-157	9	4.25	SRT-235	*45	*21.0
SFD-375	23	11.0	SRT-335	*44	*20.5
SFD-450	36	17.0	SSHD		
SFD-460	29	13.5	forward	34	16.0
SFD-3020	31	14.5	rear	28	13.0
SFD-4600	28	13.0	SUHD		
SFD-4700	28	13.0	forward	34	16.0
SFDD-3020	‡31	‡14.5	rear	28	13.0
SFDD-4600	‡28	‡13.0	SUDD		
SFDD-4700	‡28	‡13.0	forward	‡46	‡ 21.5
●SFHD			rear	44	20.5
forward	‡17	‡8.0	SW-456	28	13.0
rear	16½	7.5	SW-457	28	13.0
●SHHD	‡26	‡ 12.0	SW-460	28	13.0
SLD	28	13.0	SW-3000	19	9.0
SLDD	‡28	‡ 13.0	SW-3002	17	8.0
●SLHD			SW-3010	14	6.5
forward	‡32½	‡ 15.25	SW-3013	23	11.0
rear	32	15.0	SW-3020	28	13.0
SQD	22	10.5	SW-3022	27	12.5
			SW-3456	24	11.5
			SW-3458	33	15.5

▲ Refer to page 14, item 9, "pillow blocks." ‡ Add two pints (1 liter) of lubricant to inter-axle differential housing when new or reconditioned drive unit is installed in addition to specified amount of lubricant in housing. ● Pinion shaft 6° above horizontal centerline. § Housing over 6½" (165 mm) deep overall. † For correct lubricant specification, see Pages 5-7 & 14. * Add one pint (0.47 liters) of lubricant to pinion cage when new or reconditioned drive unit is installed.

† PLANETARY STEERING AND RIGID AXLES

REFERENCE ONLY

IMPORTANT: To assure that the wheel ends of planetary axles with a common wheel end/housing bowl oil level are initially lubricated, fill each wheel end directly with the specific amount of lubricant listed in the following chart before vehicle is put back into operation. Use the amount listed under housing bowl center for drive units only. DO NOT FILL THE AXLE THROUGH THE DRIVE UNIT OR HOUSING BOWL ONLY.

MODEL	OUTER ENDS	HOUSING BOWL	OUTER ENDS	HOUSING BOWL	MODEL	OUTER ENDS	HOUSING BOWL	OUTER ENDS	HOUSING BOWL
	Capacity Per End U.S. Pints	Capacity U.S. Pints	Capacity Per End Litres	Capacity Litres		Capacity Per End U.S. Pints	Capacity U.S. Pints	Capacity Per End Litres	Capacity Litres
PR-53 Series	3	33	1.5	15.5	PR-250 Series	13	43	6.0	20.0
PR-60 Series	3	27	1.5	12.5	PS-250 Series	6	42	2.75	19.5
PS-100 Series	3½	20	1.75	9.5	PR-251 Series	12	42	5.5	19.5
PR-100 Series	3½	22	1.75	10.5	PR-253 Series	13	39	6.0	18.5
PR-108 Series	7	29	3.25	13.5	PR-256 Series	18	44	8.5	20.5
PR-111 Series	4¾	27	2.00	12.5	PS-260 Series	8	44	3.75	20.5
PR-112 Series	6	44	2.75	20.5	PR-270 Series	18	44	8.5	20.5
PR-145 Series	5	32	2.5	15.0	PS-270 Series	8	44	3.75	20.5
PS-150 Series	5	22	2.5	10.5	PS-310 Series	14	36	6.5	17.0
PR-150 Series	5	29	2.5	13.5	PR-350 Series	28	48	13.0	22.5
PR-151 Series	8	30	3.75	14.0	PR-400 Series	16	32	7.5	15.0
PR-153 Series	7½	31	3.5	14.5	PR-500 Series	28	56	13.0	26.5
PS-200 Series	6	38	2.75	18.0	PS-500 Series	29	58	13.5	27.5
PR-200 Series	6	40	2.75	19.0	PR-501 Series	28	64	13.0	30.0
PR-205 Series	7	46	3.25	21.5	PR-502 Series	31	62	14.5	29.0
PR-207 Series	6	45	2.75	21.0	PR-700 Series	30	64	14.0	30.0
PR-208 Series	8	43	3.75	20.0					
PR-209 Series	5	56	2.5	26.5					

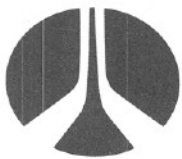
† For correct lubricant specification, see Pages 5-7, 9 & 14.

†TRANSFER CASES

REFERENCE ONLY

The capacities of Transfer Cases are given in the vertical position. Transfer Cases may be mounted at various approved angles by the vehicle manufacturer and normally should be filled to the top of the filler neck or bottom of the tapped hole. Capacities will vary depending upon the angle of mounting and should be obtained from the vehicle manufacturer.

MODEL	CAPACITY U.S. Pints	CAPACITY Litres	MODEL	CAPACITY U.S. Pints	CAPACITY Litres
T-32	4	2.0	T-152	5	2.5
T-50	8½	4.0	T-154	9½	4.5
T-59	2	1.0	T-167	10	4.75
T-70	24	11.5	T-179	1½	.75
T-73	24	11.5	T-180	2	1.0
T-76	4	2.0	T-212	2	1.0
T-77	7	3.25	T-221	4	2.0
T-79	6	2.75	T-223	5	2.5
T-96	7	3.25	T-226	6½	3.0
T-98	46	21.5	T-228-D	21	10.0
T-99	2½	1.25	T-228-PD	24	11.5
T-136	14	6.5	T-236	22	10.5
T-138	14	6.5	T-282	19	9.0



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