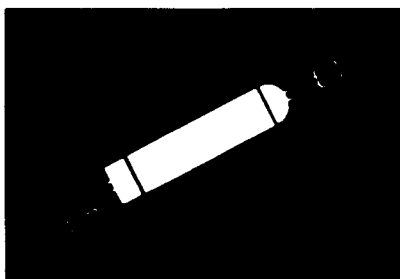




**Field Maintenance Manual No. 1**

# **Lubrication**



## **Rockwell Recommended**

- **Practices**
- **Specifications**
- **Lubricants**
- **Capacities**
- **Change Intervals**

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## INTRODUCTION

The efficiency and life of mechanical equipment is as dependent upon proper lubrication as it is upon proper engineering design. All mechanical components rely on lubrication to:

1. provide a lubricating film between the moving parts to reduce friction.
2. help cool the contacting sliding parts.
3. keep dirt and wear particles away from the mating parts.

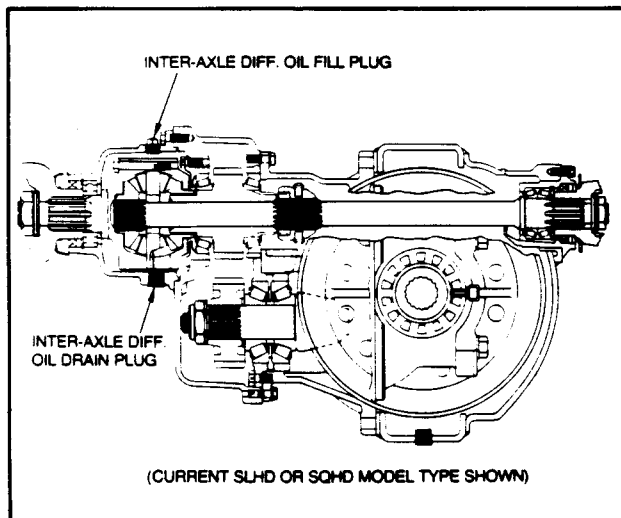
Proper lubrication depends upon using the right type of lubricant, at the proper intervals and filling to the specified capacities. Past experience has shown that many service problems can be traced to an improper lubricant or to incorrect lubrication procedures.

All of the Rockwell recommended lubrication practices, specifications and most of the product capacities are covered in this manual. It is essential to follow these procedures for adequate and proper lubrication of Rockwell components.

## RECOMMENDED LUBRICATION PRACTICES

### NEW AND RECONDITIONED AXLE SERVICE

Drain and flush the factory-fill axle lubricant of a new or reconditioned axle after the first 1,000 miles (1,600 km) but never later than 3,000 miles (4,800 km). Drain the lubricant (while the unit is still warm) from the carrier/housing, and, if a drain plug is employed, from the inter-axle differential assembly of the forward carrier of tandem axles. Flush axle with clean GL-5 axle lubricant of the same viscosity as used in service. **Do not** flush axles with solvent such as kerosene.

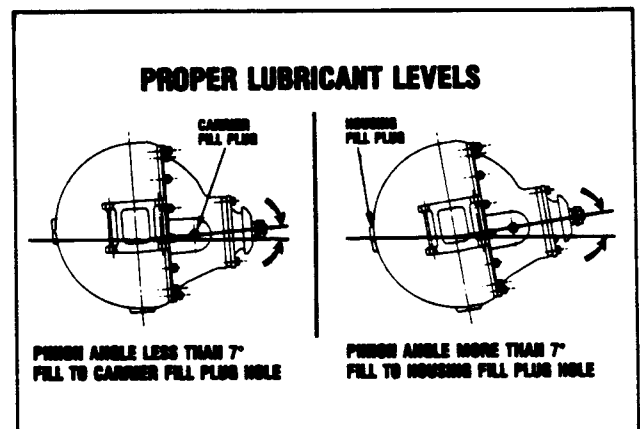


**IMPORTANT:** The design of certain Rockwell forward/rear tandem axle carriers such as the LHD, QHD, TDD, UDD AND FDD models include separate cast housings to enclose their respective inter-axle differential assemblies. Baffles and dams are incorporated in these cast housings to maintain a reservoir of lubricant but may also trap wear particles and debris. Therefore, it is important to always purge the lubricant that is

retained in these inter-axle differential assemblies whenever the axle lubricant is changed, initially, at scheduled intervals, or at overhauls. For this purpose these types of carriers employ separate oil drain and fill holes located in either the inter-axle differential cover or the inter-axle differential housing.

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.).

Fill axles to bottom of level hole (in carrier or housing) with specified lubricant with the vehicle on level ground. If the 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.



**IMPORTANT:** The angle of the drive pinion, as mounted under the vehicle, will determine which oil fill/level plug hole should be used.

Except for "Top Mounted" or pinion inverted type carriers, use the following information to locate the fill/level hole.

Measure the drive pinion angle—if angle is less than 7° (above horizontal) use the hole located in the side of carrier. If the angle is more than 7° (above horizontal) use the hole located in the axle housing bowl. Note: Some axle models may have only one lube fill hole which is located in the housing bowl. With these models use this lube filler hole for all pinion angles. On axles employing "Top Mounted" or pinion inverted type carriers, the fill/level hole is always located in the axle housing bowl. Some axle models have a small tapped and plugged hole located near, but below the housing lubricant level hole. This smaller hole has been provided for the use of a lubricant temperature indicator only and **must not be used as a fill or level hole.**

After filling the axle with lubricant drive the vehicle, unloaded, for one (1) or two (2) miles (1.6 to 3.2 km) at speeds not to exceed 25 miles per hour (40 kph) to thoroughly circulate the lubricant throughout the axle and carrier assemblies.

### REGULAR AXLE SERVICE

Follow "New and Reconditioned Axle" procedures except for initial 1000–3000 mile (1600–4800 km) drain and flush instructions. Change lubricant at recommended intervals.

### LUBRICANT CHANGE SCHEDULE

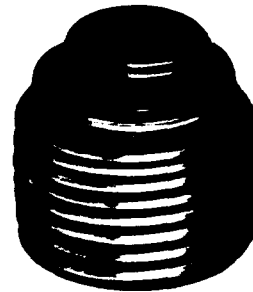
There are very practical reasons for recommending lubricant changes. Fluid lubricants serve more than one purpose. They not only lubricate but they transport chemically reactive additives, they wash away minute wear particles, serve as a corrosion inhibitor and also act as a heat transfer medium. Draining 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 reassured 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 magnetic drain plug maintenance. Lubricant changes should be made as climatic temperatures demand regardless of vehicle mileage or established change schedule. Refer to pages 8 through 24 for recommended lubricants and change intervals of specific equipment being serviced.

**IMPORTANT: 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 200°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. Refer to pages 6 and 7 for detailed information on recommended lubricants and temperature ranges.**

### MAGNETIC DRAIN PLUGS



Any drive axle, while it is working, generates small metal 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 internal components will wear at a much faster rate than normal.

Magnetic drain plugs perform the vital function of trapping these small metallic particles that circulate in the lubricant. The magnet must be strong enough to firmly hold the particles under service conditions. We recommend plugs having a minimum pickup capacity of 1.5 pounds (0.7 kg.) of low carbon steel in plate or bar form.

Magnets will rapidly lose effectiveness if excessive material is allowed to collect on the element. It is recommended that the plugs be changed or cleaned between lubrication intervals. The plugs can be reused if they maintain the minimum pickup capacity. Spare clean plugs should be kept on hand for replacement if required.

**NOTE:** For maximum protection against wear particles it is desirable that magnetic plugs be employed at all oil drain hole locations. Further, magnetic plugs can be used at fill or level hole locations if clearance allows. However, the use of a magnetic drain plug in the axle housing is specifically recommended.

## TEMPERATURE INDICATORS

Many Rockwell axles have a tapped hole in the housing for the installation of a lubricant temperature indicator. The installation and use of an indicator will aid in reducing the failure of critical axle parts as a result of overheated lubricant. The indicator is particularly useful in through-drive tandem units where severe operating conditions and mismatched or unequally inflated tires may cause a sudden and dangerously high change in lubricant temperature.

Rockwell axles may operate above 190°F. (88°C.) without damage. However, when the lubrication temperature reaches 250°F. (121°C.) the vehicle should be immediately stopped and checked for the cause of overheating.

## SEALS

The purpose of seals and gaskets is to keep lubricant in and dirt out of the component. Worn or damaged seals, usually caused by improper installation or extreme hot or cold temperature, will leak and result in low lubricant levels. It is recommended that periodic inspections for seal leakage be made, especially during cold weather. Keep in mind that many lubricants are colorless or semi-transparent, and are difficult to see on the exterior of the axle. Always replace faulty seals with proper tools and installation techniques.

## TRACTION EQUALIZER® ADDITIVES

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 special additives. Occasionally it

is found, however, that the traction equalizer will tend to slip and produce irregular intervals of sharp 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.

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

For axles equipped with Rockwell Traction Equalizers, the following are approved additives, quantities and lube change intervals:

- Additives (typically referred to as "Limited Slip Friction Modifiers" by lubricant suppliers):

1. For all GL-5 gear oils (mineral oil or synthetic) other than Mobil, add any one of the following materials:

Elco #2 — The Elco Corporation  
Lubrizol #6178 — Lubrizol Corporation  
Hi-Tec E-336 — Edwin Cooper, Inc.

The R-170 series axle requires 43 pints (20.3 litres) of lubricant. With a Rockwell Traction Equalizer, this same axle requires 40 pints (18.9 litres) of lubricant and 3 pints (1.4 litres) of one of the above additives.

2. For Mobilube HD (mineral oil) and Mobilube SHC (synthetic) use:

Mobil #204 — Mobil Oil Corporation

When using Mobilubes in the R-170 series axle with a Rockwell Traction Equalizer, use 41 pints (19.3 litres) of lubricant and 2 pints (.9 litres) of Mobil #204 additive.

- Lubrication change interval:

The original, factory-installed, drive axle lubricant should be replaced with approved lubricants and the above recommended additives. Thereafter, the recommended lubrication change interval (including additive), on axles equipped with Rockwell Traction Equalizers, should be no more than 50,000 miles (80,000 km).

# ROCKWELL RECOMMENDED LUBRICANTS

## PROPER LUBRICANTS

Improper lubricants or lubricants with the wrong additives are a major cause of gear set failures. Rockwell hypoid or amboid gear sets require lubricants that have an API-GL-5 grade and are approved under military specification MIL-L-2105C. Transfer case gearing and worm gearing require an API-GL-1 or 2 grade of lubricant. Gear lube not meeting these requirements will not provide adequate service life and premature failures of the gears will occur. It is important that the following lubrication specifications be adhered to.

**IMPORTANT: 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.**

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

Lubricant suppliers may obtain copies of any referenced Rockwell Material Specifications by writing to Rockwell International, 2135 West Maple Road, Troy, Michigan 48084.

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

| ROCKWELL LUBRICANT SPECIFICATIONS | DESCRIPTION                          | CROSS REFERENCE  | MINIMUM OUTSIDE TEMPERATURE | MAXIMUM OUTSIDE TEMPERATURE |
|-----------------------------------|--------------------------------------|--|-----------------------------|-----------------------------|
| 0-62*                             | Mineral Oil                          | GL-1, S.A.E. 90  | +10°F (-12.2°C)             | ..                          |
| 0-63*                             | Mineral Oil                          | GL-1, S.A.E. 140   | +40°F (+4.4°C)              | ..                          |
| 0-72*                             | Worm Gear Oil                        | GL-2, S.A.E. 90  | +10°F (-12.2°C)             | ..                          |
| 0-73*                             | Worm Gear Oil                        | GL-2, S.A.E. 140   | +40°F (+4.4°C)              | ..                          |
| 0-74*                             | Spring Seat Oil                      | GL-2, S.A.E. 250   | —                           | ..                          |
| 0-76-A                            | Hypoid Gear Oil                      | GL-5, S.A.E. 85W/140   | +10°F (-12.2°C)             | ..                          |
| 0-76-B                            | Hypoid Gear Oil                      | GL-5, S.A.E. 80W/140   | -15°F (-26.1°C)             | ..                          |
| 0-76-D                            | Hypoid Gear Oil                      | GL-5, S.A.E. 80W/90  | -15°F (-26.1°C)             | ..                          |
| 0-76-E                            | Hypoid Gear Oil                      | GL-5, S.A.E. 75W/90  | -40°F (-40.0°C)             | ..                          |
| 0-76-J                            | Hypoid Gear Oil                      | GL-5, S.A.E. 75W   | -40°F (-40°C)               | +35°F (+1.6°C)              |
| 0-76-L                            | Hypoid Gear Oil                      | GL-5, S.A.E. 75W/140   | -40°F (-40°C)               | ..                          |
| 0-616***                          | Anchor Pin Grease                    | Non-Melting Grease with Bentone Thickeners NLGI Grade No. 2  | —                           | —                           |
| 0-616-A                           | Special Brake Grease                 | NLGI Grade No. 1   | -40°F (-40°C)               | ..                          |
| 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   | —                           | —                           |
| 0-622***                          | Drive Unit Output Bearing Pre-Grease | 3.5% hydroxy lithium stearate grease NLGI Grade No. 000 Approved Material Mobil Mobilux EP023                      | —                           | —                           |
| 0-634-B***                        | Universal Joint Grease               | 12-hydroxy lithium stearate grease with 7% to 9% polyethylene and molybdenum disulfide additives. NLGI Grade No. 2 | —                           | —                           |
| 0-637***                          | Special Rust Preventing Brake Grease | Metallic based, temperature resistant, anti-seizing compound   | —                           | —                           |
| 0-645***                          | Special Low Temperature Brake Grease | Approved Material Mobil 28   | -40°F (-40°C)               | —                           |

\*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 for oils and greases. Axle sump temperature must never exceed 250°F (+121°C).

\*\*\*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 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. All substitute products are subject to Rockwell approval.

## 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 temperature—lower than the minimum given for the "Standard" lubricant.

The proper viscosity of oil for the specific component shall be selected from the "Outside Temperature" columns on the "Recommended Lubricants" chart. Where more than one lubricant can be selected from this table, the higher viscosity oil should be used.

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

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.

## SINGLE GRADE LUBRICANTS

High viscosity single grade oils S.A.E. 140 or S.A.E. 90 should only be used in warm climates where no cold weather is encountered.

Low viscosity single grade oils such as S.A.E. 75W should only be used in cold climates where no warm weather is encountered.

Refer to the Recommended Lubricants chart for temperature limitations of each grade of oil.

## MULTIGRADE LUBRICANTS

Multigrade oil must be used where vehicles operate in both cold and warm weather between oil changes. If multigrade oils are used, the complete specification, including viscosity stability in service, of each viscosity grade listed must be met. Refer to the Rec-

ommended Lubricants chart for temperature limitations of each grade of oil.

## GEAR LUBRICANTS FOR LOW TEMPERATURE OPERATIONS

**IMPORTANT:** For drive units utilizing the low temperature lubricants, oil seals and gasket materials must be in excellent condition to insure against the loss of these lower viscosity oils.

Use oils that meet all the requirements of Rockwell Specification 0-76-J or 0-76-L.

Further, the use of thinning agents, i.e., kerosene, gasoline or any other dilutants that lower the viscosity of the lubricant IS NOT PERMISSIBLE.

Refer to the Recommended Lubricants chart for temperature limitations of each grade of oil.

## SYNTHETIC LUBRICANTS

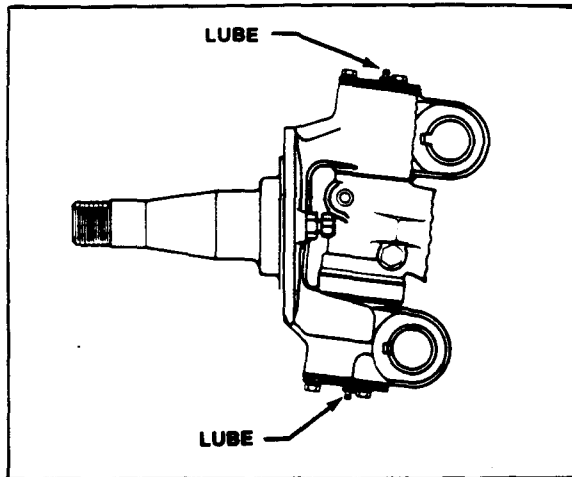
Synthetic lubricants may be used in drive axles, provided they meet all of the requirements of Rockwell specifications 0-76-A, 0-76-B, 0-76-D, 0-76-E, 0-76-J or 0-76-L.

**IMPORTANT:** Synthetic lubricants must be compatible with standard commercial seals used in the axle assembly (drive unit and wheel ends), otherwise special seals must be installed. Contact your Rockwell representative for information on synthetic lubricants.

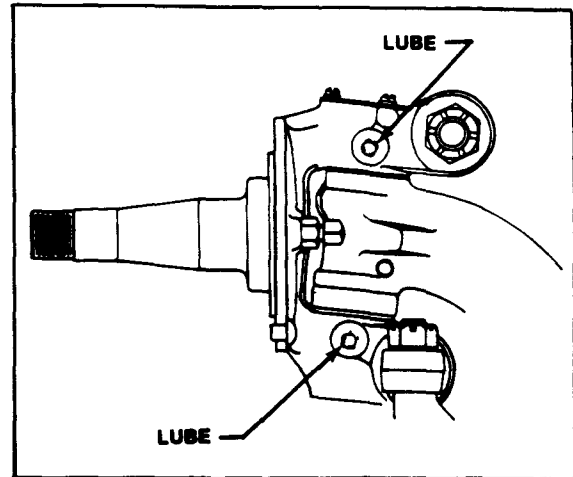
# LUBRICANT SPECIFICATIONS AND CHANGE INTERVALS

**NOTE:** The illustrations used in the following sections are typical examples and may not necessarily show all lubrication points for all models discussed.

## 1. FRONT NON-DRIVING AXLES



**SEALED KNUCKLE PIN**



**CONVENTIONAL KNUCKLE PIN**

### LUBRICANTS:

0-617-A or 0-617-B — All knuckle pins, bushings, cross tube end assemblies, drag link ball sockets and wheel bearings.

Refer to Recommended Lubricants on pages 6 and 7.

### LUBE INTERVALS:

The following are minimum recommended intervals. More frequent lubrication will prolong product life.

#### • Knuckle Pins and Bushings:

Conventional (standard) straight and tapered pin models (FC, FD, FF, FH, FL and FQ-900, 901, 903 or 970 Series; 16900, 16930, 16931, FAE-951 and 952, FU-910, 930 and 935 Series)—3,000 miles (4,800 km.).

Sealed knuckle pin models (FD, FF, FG and FL-921, 930, 931, 932, 933, 934, 951 and 971 Series; and the 17100 axle)—50,000 miles (80,500 km.) or 12 months, whichever comes first.

“Easy-Steer” models (FF and FG-941 and 943—in regular common carrier on-highway service only)—Grease when axle is new, and again after a 4,000 mile (6,500 km.) break-in period only.

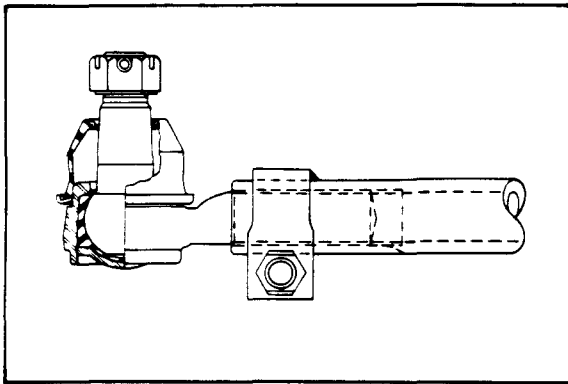
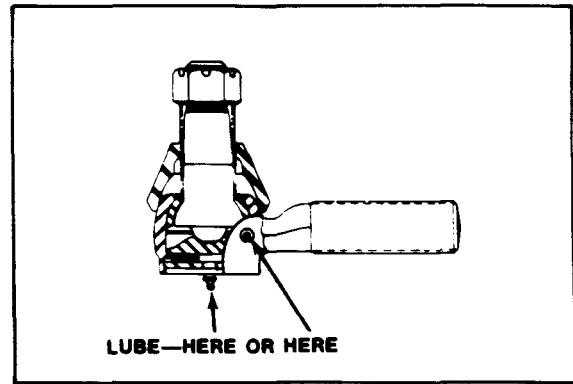
**IMPORTANT:** The recommended greasing procedures must be followed. Refer to page 9.

Also greasable cross tube end assemblies used in “Easy-Steer” axles must still be greased every 50,000 miles (80,500 km.) or 12 months, whichever comes first.

If periodic knuckle pin greasing is **desired** with on-highway “Easy Steer” models, follow the 50,000 mile sealed knuckle pin interval.

“Easy-Steer” models (FD, FF, FG, and FL-941, 942, 943 and 944 Series in on/off highway service)—grease every 50,000 miles (80,500 km.) or 12 months, whichever comes first.



**PERMANENTLY LUBRICATED****GREASABLE CROSS TUBE END**

- Cross Tube End Assemblies:

Greasable type—50,000 miles (80,500 km.) or 12 months, whichever comes first.

Permanently lubricated non-greasable type do not require lubrication, however, periodic inspection of the sealing boot is recommended at 96,000 mile (154,000 km.) intervals.

- Wheel Bearings:

Refer to page 12

### **LUBE PROCEDURES:**

- Models with Conventional Straight and Tapered Knuckle Pins:

To assure proper purging of old grease and contamination from upper and lower bushings, the wheels should be raised off the ground while greasing the knuckle. After this has been done and the tires are lowered to the ground the lower bushing should be re-greased to purge and fill the thrust bearing.

- Models with Sealed Knuckle Pins:

These assemblies should be greased with the tires on the ground. Apply grease pressure until new grease is seen purging from the thrust bearing seal and from the upper shim pack area.

- Tie Rod Ends:

Apply grease pressure until new grease is seen purging from the boot area.

- "Easy-Steer" (On-Highway) Models:

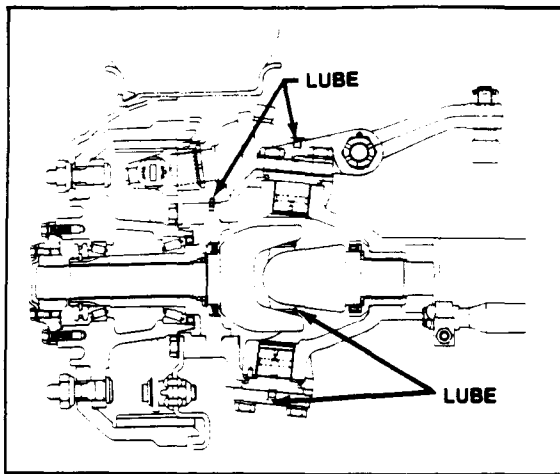
Before the new axle is placed in service, grease knuckles as in sealed king pin procedure above. After a 4,000 mile (6,500 km.) break-in period the knuckles should be carefully re-greased as follows:

- With the tires off the ground, slowly feed grease into each bushing area while turning the wheels from extreme right to left and back again (lock to lock). This will eliminate small air pockets and improve grease distribution.
- Lower tires to ground and re-grease both top and bottom bushings, taking care to thoroughly lubricate the thrust bearings.

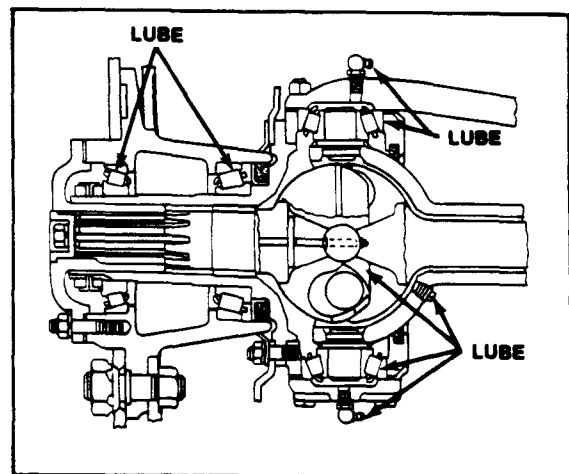
- "Easy-Steer" (On/Off Highway) Models:

Follow sealed knuckle pin procedures above.

## 2. FRONT DRIVE STEERING AXLES



**CARDAN UNIVERSAL JOINT**



**CONSTANT VELOCITY UNIVERSAL JOINT**

### LUBRICANTS:

- 0-617-A or 0-617-B — All universal joints (Cardan and Constant Velocity), knuckle bushings or bearings, cross tube end assemblies, axle shaft thrust washers, and wheel bearings.
- Drive units (differentials)—

The lubricants that are used for differentials in all Rockwell drive axles must be SAE designation API-GL-5 that are approved under military specification MIL-L-2105C. The oil viscosity used depends on the outside temperature the axle is operated in. See Rockwell Recommended Lubricants on pages 6 and 7. Use one of the following lubricants as required by outside temperature:

0-76-A, 0-76-B, 0-76-D, 0-76-E, 0-76-J or 0-76-L.

### LUBE INTERVALS:

- All steering universal joints, knuckle bearings or bushings:

The frequency of lubricant changes depends upon individual operating conditions, speed and loads. Change whenever seals are replaced, when brakes are relined, at 30,000 mile (48,000 km.) or 2,000 hour intervals. If yearly mileage is less than 30,000 miles or 2,000 hours of operation, change twice a year (spring and fall).

- Crosstube end assemblies:

Standard greasable type—3,000 miles (4,800 km.) or 200 hours of operation.

- Drive units (differentials):

25,000 to 30,000 miles (40,000 to 48,000 km.) or 1600 to 2000 hours of operation when yearly use is in excess of 60,000 miles (96,500 km.) or 4000 hours. Otherwise change twice a year (spring and fall).

- Wheel bearings—refer to page 12.
- Universal joints and drive lines—refer to page 24.

### LUBE PROCEDURES

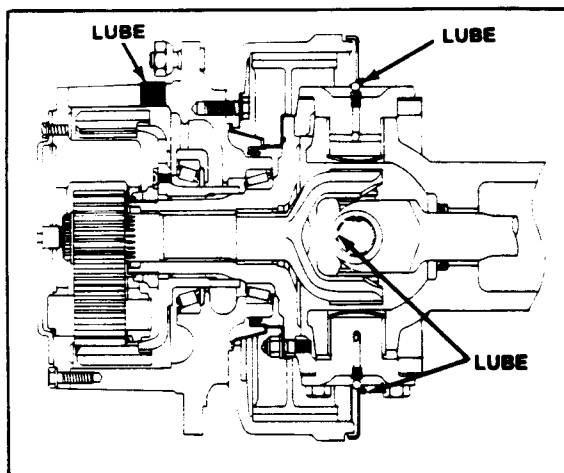
- Cardan steering joints.
  1. Check for looseness.
  2. Apply grease until new grease purges from all seals.
  3. If grease does not purge at seals, manipulate the U-Joint until purging occurs.

4. If above is not successful, remove cup or joint and check old grease. If grease appears rusty, gritty or burnt, replace the complete universal joint.

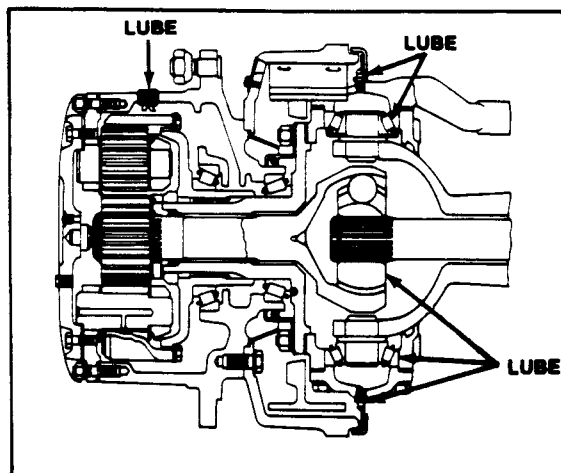
- Constant velocity steering joints:

To apply new grease, remove axle shaft from housing, then clean old grease from universal joint and re-pack, by hand, with new grease.

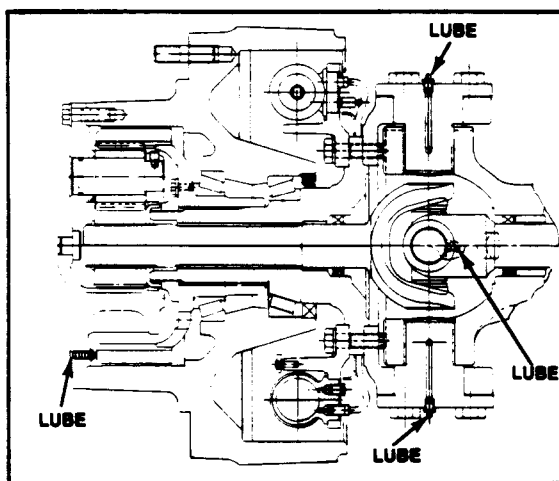
### 3. PLANETARY AXLES



**OLD DESIGN WHEEL END WITH  
CARDAN UNIVERSAL JOINT**



**OLD DESIGN WHEEL END WITH  
CONSTANT VELOCITY  
UNIVERSAL JOINT**



**NEW DESIGN WHEEL END WITH  
CARDAN UNIVERSAL JOINT  
AND ONE PIECE SPIDER/COVER**

#### LUBRICANTS:

- 0-617-A or 0-617-B — All steering universal joints (Cardan and Constant Velocity types), knuckle sleeves, bearings and bushings, crosstube end assemblies, yokes and flanges.
- Wheel end gearing, bearings and drive units (differentials):

The lubricants that are used for wheel end gearing, bearings and differentials in all Rockwell planetary axles must be SAE designation API-GL-5 that are approved under military specification MIL-L-2105C. The oil viscosity used depends on the outside temperature the axle is operated in. See Rockwell Recommended Lubricants on pages 6 and 7. Use one of the following lubricants, as required by outside temperature, in Rockwell planetary axles with or without a common wheel end, axle housing oil level:

0-76-A, 0-76-B, 0-76-D, 0-76-E, 0-76-J or 0-76-L.

**IMPORTANT:** Planetary axles with Dura-Disc<sup>®</sup> Wet Disc Brakes, see Rockwell Field Maintenance Manual No. 4L for brake coolant specifications.

### LUBE INTERVALS:

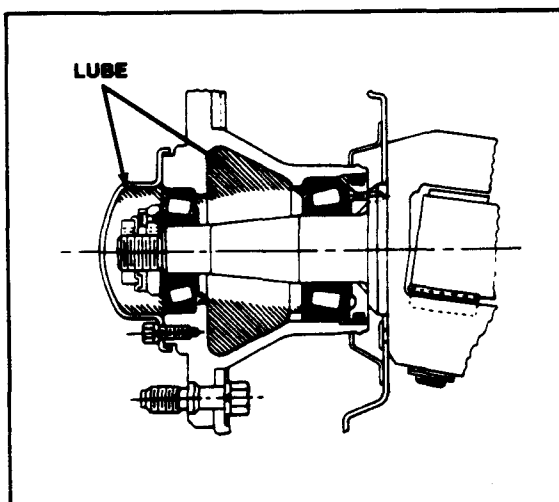
- Cardan steering Joints—every 200 hours of operation.
- Constant velocity steering joints—every 1000 to 1500 hours of operation or twice a year (spring and fall).
- Knuckle Bearings and Bushings:  
Change whenever seals are replaced, brakes are relined or every 100 to 200 hours of normal operation; but as often as once a day in severe operations.
- Wheel end gearing, bearings and drive units (differentials):  
Change whenever seals are replaced, brakes are relined or every 1000 to 1500 hours of operation or twice a year (spring and fall).
- Universal Joints and Drive Lines:  
Refer to item 9 on page 24.

### LUBE PROCEDURES:

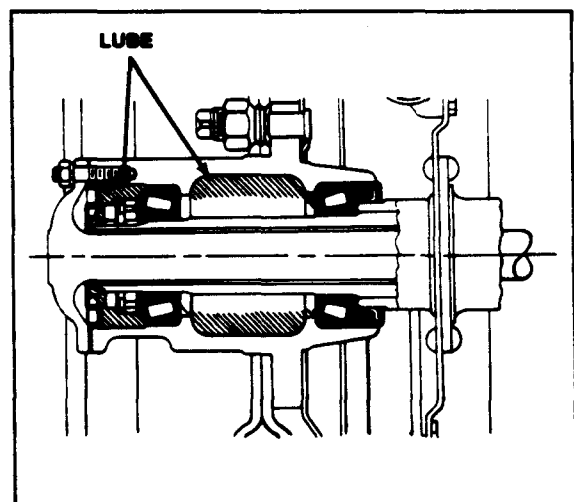
- Cardan steering joints:
  1. Check for looseness.
  2. Apply grease until new grease purges from all seals.
  3. If grease does not purge at seals, manipulate U-joint until purging occurs.
  4. If above is not successful, remove cup or joint and check old grease. If grease appears rusty, gritty or burnt, replace the complete universal joint.
- Constant velocity steering joints:  
To apply new grease, remove axle shaft from housing, then clean old grease from universal joint and re-pack, by hand, with new grease.
- Planetary wheel ends:  
Fill hubs through "Fill/Drain" oil hole located at top and drain from same hole rotated to the bottom. Fill until lubricant appears at "Oil Level" hole.

## 4. WHEEL BEARINGS

### • GREASE LUBRICATED



**NON-DRIVE AXLE  
HUB ASSEMBLY**



**DRIVE AXLE  
HUB ASSEMBLY**

**LUBRICANTS:**

Standard—0-617-A (Preferred)  
 Optional—0-617-B (Acceptable)

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

Refer to Recommended Lubricants on Pages 6 and 7.

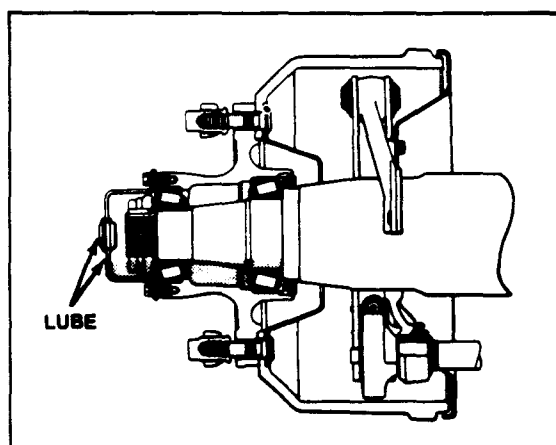
**LUBE INTERVALS:**

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

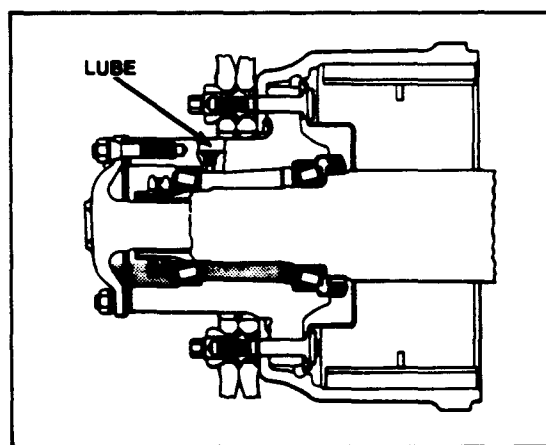
For low mileage trailer operations, i.e., Container and Piggyback, grease may not need changing until every 50,000 miles (80,500 km) or two years. However, check grease twice a year (spring and fall) for contamination and change if required

**LUBE PROCEDURES:**

1. At rebuild time, before installing wheel bearings onto the spindle, coat the bearing journals with a film of grease to deter fretting corrosion.
2. Pack bearing with pressure packer, if possible. If a packer is not available, pack the bearing by hand, forcing the grease in the cavities between the rollers and cage from the large end of the cone.
3. Pack the hub between the two bearing cups with grease to the level of the cups' smallest diameter.

**• OIL LUBRICATED**

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



**DRIVE AXLE HUB ASSEMBLY**

**LUBRICANTS:**

0-76-D, 0-76-E, 0-76-J or 0-76-L. (Also 0-76-A or 0-76-B if drive axle has a common hub/axle housing oil level and axle requires these lubes for proper operation.)

Refer to Recommended Lubricants on pages 6 and 7.

## LUBRICATION

### LUBE INTERVALS:

Check every 1000 miles (1600 km) and change whenever oil becomes contaminated, drive unit lube is changed, seals are replaced, brakes relined or at least once a year.

### LUBE PROCEDURES:

The following will assure that oil lubricated wheel bearings are initially lubricated after servicing and before vehicle is put back into operation.

- All Axles:

Wipe a film of oil on the inner shoulder of the spindle to prevent rust behind the inner bearing cone.

- Drive Axle Hubs With Oil Fill Holes:

Pour one pint (0.473 liters) of oil (same as used in drive unit) directly into each hub.

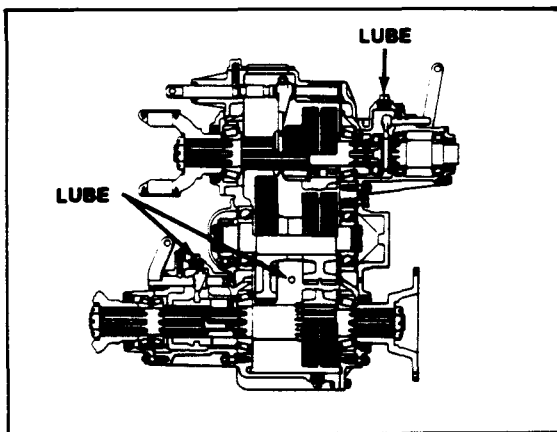
- Drive Axle Hubs Without Oil Fill Holes:

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 the oil to flow into the 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 all the hub cavities to fill. Approximately one pint (0.473 liters) of oil will be trapped in each hub cavity. With the vehicle back on level surface add the appropriate amount of drive unit lubrication back into the carrier or housing bowl to bring the oil up to the proper level, approximately two pints (0.946 liters).

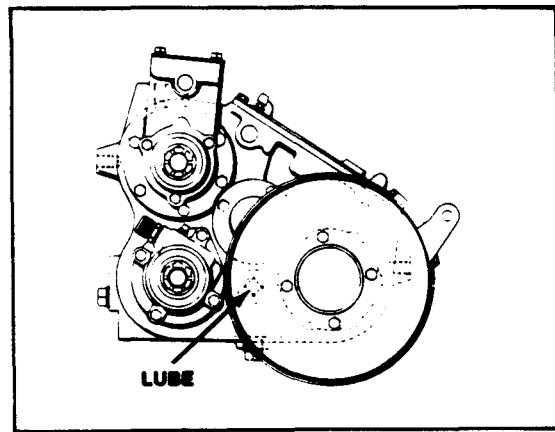
- Trailer Axle Hubs:

Fill the hub with oil to the bottom edge of the plug hole in cap.

## 5. TRANSFER CASES



**TRANSFER CASE—3 SHAFT DESIGN**



**TRANSFER CASE—4 SHAFT DESIGN**

### LUBRICANTS:

Standard—0-62 or 0-63

Optional—0-76 Series

Refer to Recommended Lubricants on pages 6 and 7.

### LUBE INTERVALS:

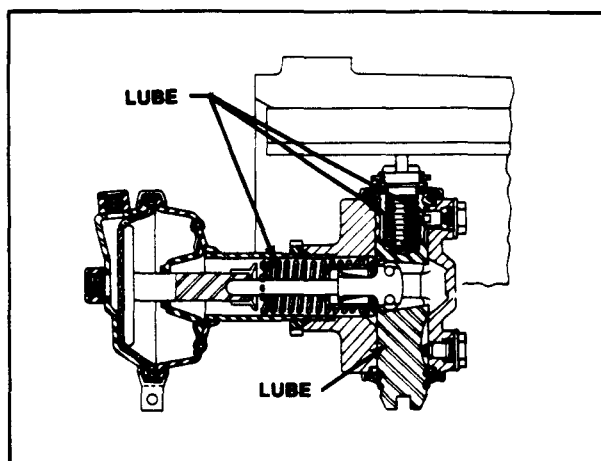
Check every 1000 miles (1600 km). Drain and fill every 12,000 to 25,000 miles (19,000 to 40,000 km).

**LUBE PROCEDURES:**

Pour recommended amount of lubricant, less two pints, through filler hole. Add one pint of oil each to the power take off and de-clutch assemblies if used. If transfer case is not mounted under vehicle do not fill unit to specified level until after installation.

**6. BRAKES**

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



**STOPMASTER WEDGE BRAKE  
AND AIR CHAMBER**

**LUBRICANTS:**

0-616-A

A high temperature water-proof grease, NLGI Grade No. 1, is recommended for lubricating the brake actuation system. It should be a smooth textured corrosion resistant grease free of fillers and abrasives. It should maintain a satisfactory softness under normal parking and storage temperatures. The following greases meet all of these conditions:

Texaco Thermotex EP #1 or Shell Darina #1

A suitable grease can also be obtained under Rockwell Part No. A-1779-W-283.

**Cold Weather Operation — 0-645**

Vehicles operating in extremely cold weather (below  $-40^{\circ}\text{F}$ ) may require a grease conforming to this Rockwell specification (Part No. 2297-X-4574). The following grease meets this specification.

Mobil 28

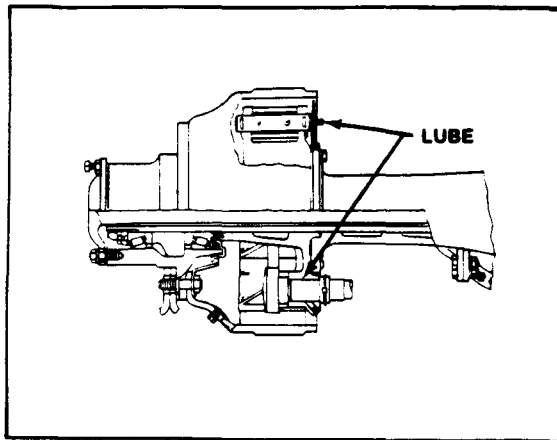
Refer to Recommended Lubricants on pages 6 and 7.

**LUBE INTERVALS:**

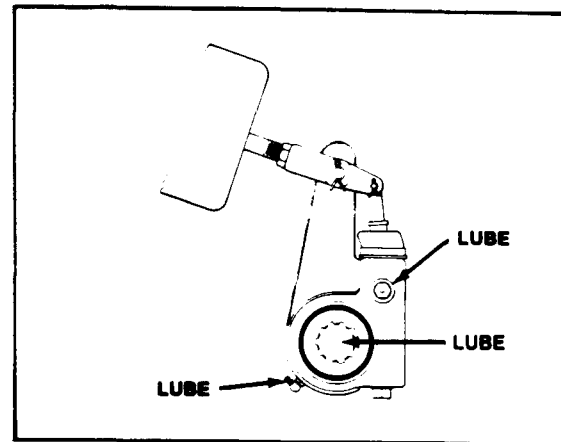
- **On-highway**—Change whenever seals are replaced, when brakes are relined or at 100,000 miles (160,000 km).
- **Off-highway**—Change every 12 months (maximum), whenever seals are replaced or when brakes are relined. However, the change interval may be shorter depending on severity of operations. This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

## LUBRICATION

### • CAM-MASTER CAM BRAKES (On-Highway and Off-Highway)



**"P" TYPE S CAM BRAKE**



**AUTOMATIC SLACK ADJUSTER**

#### LUBRICANTS:

0-617-A or 0-617-B

Manual slack adjusters, camshaft roller journals, metal or nylon camshaft bushings.

0-616

Anchor pins (where specified).

0-616-A

Automatic slack adjusters internal parts.

Cold Weather Operation — 0-645

Extreme cold weather grease, for automatic slack adjuster internal parts. (See Stopmaster Lubricants)

0-637

Worm wheel and camshaft splines. A metallic based, temperature resistant anti-seizing compound. The following grease meets this specification:

Southwest SA 8249496

Refer to Recommended Lubricants on pages 6 and 7.

#### LUBE INTERVALS:

##### • On Highway

Brakes—Every 50,000 miles (80,000 km) or every six months depending on severity of service. For brakes with extended lube features on regular common carrier type vehicles and the "Q" Series brakes change every 100,000 miles (160,000 km).

Automatic slack adjusters—Every chassis lube interval, every brake assembly lube interval, at reline or at least every 25,000 miles (40,000 km) or three months, whichever comes first.

##### • Off Highway

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

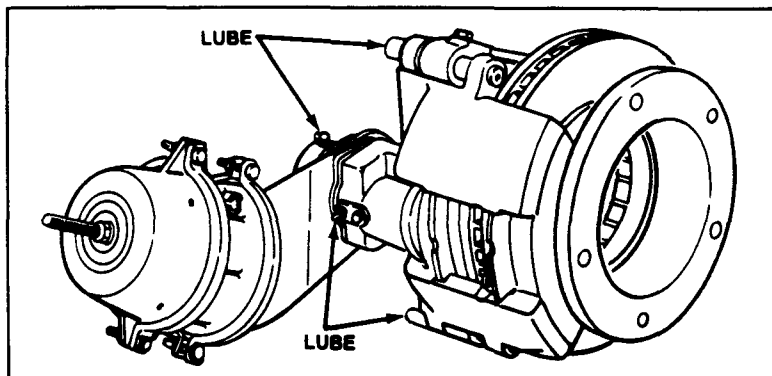
#### LUBE PROCEDURES:

- Care must be exercised when lubricating camshaft bushings and anchor pins. Over lubrication could cause lubrication saturation of brake linings and possible safety problems.



- For off-highway brakes (20¼", 22" or 26" in diameter) the use of meter type fittings which have a maximum of 40 lb. (18.14 kg) pressure relief at shut off is recommended.
- Lubricate current model automatic slack adjusters through grease fitting until old grease is purged and new grease emerges through the pressure relief fitting. On models without pressure relief fitting the pawl assembly must be removed to allow old grease to be purged through the pawl slot.

## • DURA-MASTER AIR DISC BRAKES



### LUBRICANTS:

0-616-A

Internal parts of brake caliper and automatic slack adjuster. (See Stopmaster Lubricants)

0-637

Slide pins, slide pin retainers, powershaft and slack adjuster worm wheel splines. (See Cam-Master Lubricants)

Cold Weather Operation — 0-645

Extreme cold weather use for internal parts of brake caliper and automatic slack adjuster. (See Stopmaster Lubricants)

Refer to Recommended Lubricants on pages 6 and 7.

### LUBE INTERVALS:

- Automatic slack adjuster:  
25,000 miles (40,000 km) or every three months and/or at regular chassis lube intervals.
- Brake actuating components (caliper):  
50,000 miles (80,000 km) or every six months.
- Caliper slide pins, slide pin retainers, powershaft and slack adjuster worm wheel splines:  
At brake reline and caliper overhaul.

### LUBE PROCEDURES:

At regular lube intervals lubricate caliper actuating components and slack adjuster through grease fittings until lube purges through pressure relief fittings.

At brake reline or caliper overhaul with wheel removed, use the following procedures:

#### Caliper Assembly

1. Insert the appropriate Rockwell slack adjuster template or a .060"–.090" gauge between the brake piston and inboard lining.
2. Apply grease through the slack adjuster fitting until grease purges at the pressure relief fitting.

## LUBRICATION

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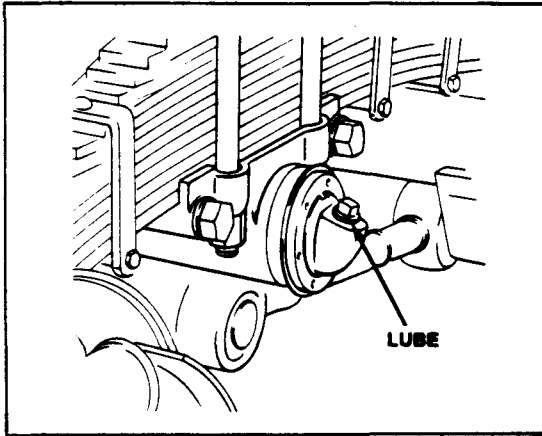
3. Hold down the pressure relief fitting and continue applying grease until it purges through the power-shaft cap seal. Discontinue grease gun pressure and wipe off all excessive grease from the caliper assembly.

### Automatic Slack Adjuster Assembly

1. Apply grease through the slack adjuster fitting until grease purges from the pressure relief capscrew in the side of the slack housing. Discontinue grease gun pressure.
2. Wipe off all excessive grease from the slack adjuster housing.

## 7. SPRING SEATS

### • BUSHING TYPE (METAL, NYLON AND DELRIN)



#### LUBRICANT:

Standard — 0-74  
Optional — 0-73

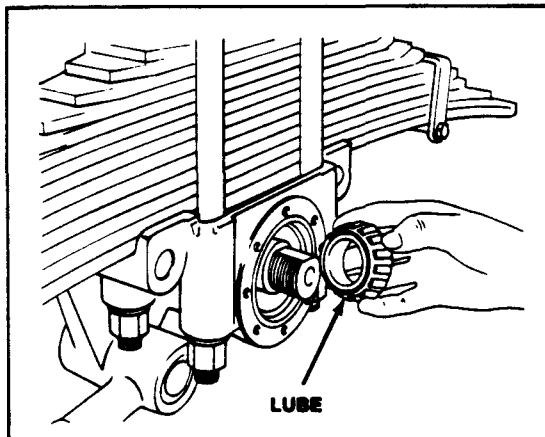
Use 0-73 (S.A.E. Grade 140) if 0-74 (S.A.E. Grade 250) is not available. However it will be necessary to check oil levels more frequently when using the lighter grade 140 lubricant.

Refer to Recommended Lubricants on pages 6 and 7.

#### LUBE INTERVALS:

As required. Keep reservoir filled with specified oil.

### • ROLLER BEARING TYPE



**LUBRICANT:**

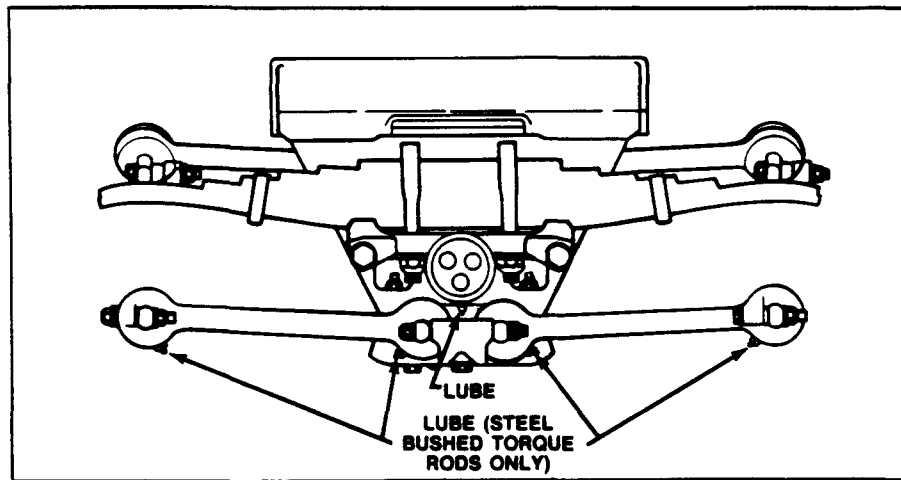
0-617-B

Refer to Recommended Lubricants on pages 6 and 7.

**LUBE INTERVALS:**

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).

• **AC-6W 6-ROD BRONZE BUSHING TYPE SPRING SEATS AND STEEL BUSHED TORQUE RODS**

**LUBRICANT:**

0-617-A

Refer to Recommended Lubricants on pages 6 and 7.

**LUBE INTERVALS:**

The spring seat assembly should be lubricated regularly, with frequency depending upon the type of service and conditions under which the vehicle operates. The suggested lubrication interval for units in continuous use is monthly. However, if unit is used in more extreme weather and road conditions shorter intervals may be necessary.

The lubrication interval for steel bushed torque rods, if used, would be the same as for the spring seat assembly (at least once a month).

**8. DRIVE UNITS (DIFFERENTIALS) — HYPOID, AMBOID AND SPIRAL BEVEL GEARS — SINGLE AND DOUBLE REDUCTION**

**LUBRICANTS:**

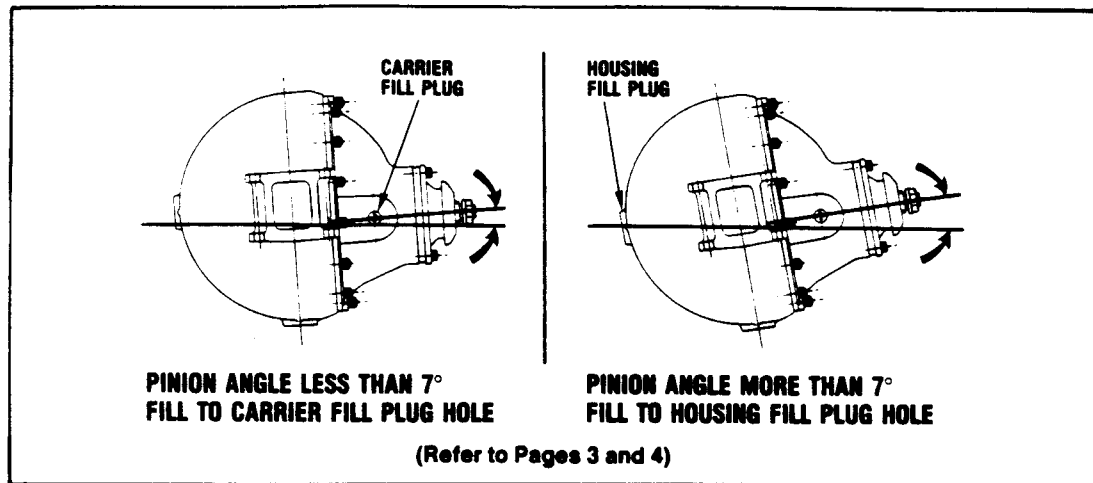
• **Drive Unit Gearing**

The lubricants that are used for differentials in all Rockwell drive axles must be SAE designation API-GL-5 that are approved under military specification MIL-L-2105C. The oil viscosity used depends on the outside temperature the axle is operated in. See Rockwell Recommended Lubricants on pages 6 and 7. Use one of the following lubricants as required by outside temperature:

0-76-A, 0-76-B, 0-76-D, 0-76-E, 0-76-J or 0-76-L.

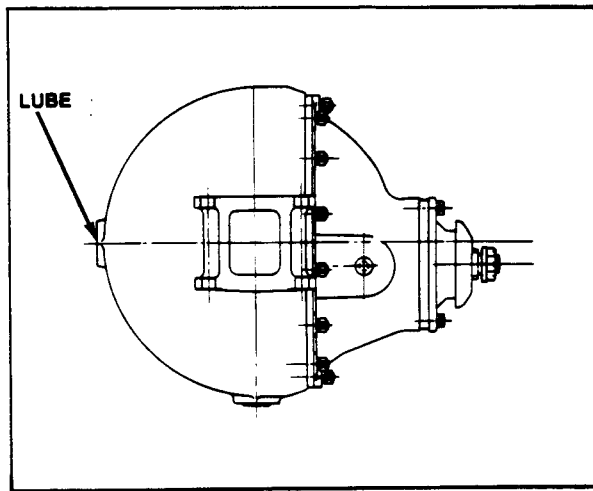
(Continued on page 22)

# **FRONT MOUNTED SINGLE REDUCTION (Single Axles or Rear/Rear Tandem Axles)**

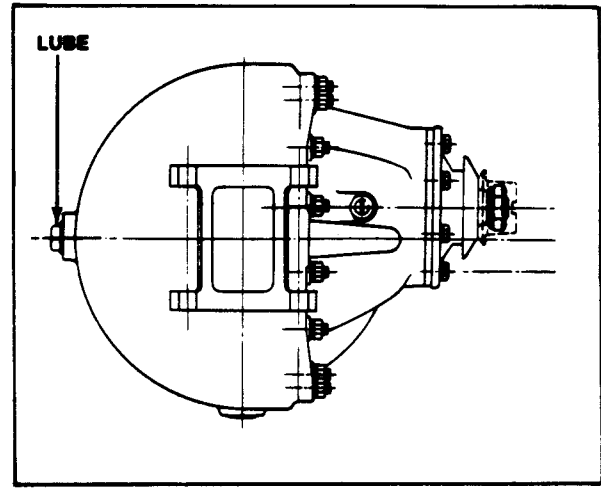


## **AMBOID AND HYPOID GEARING**

### **FRONT MOUNTED SINGLE REDUCTION-PLANETARY AXLE APPLICATION**

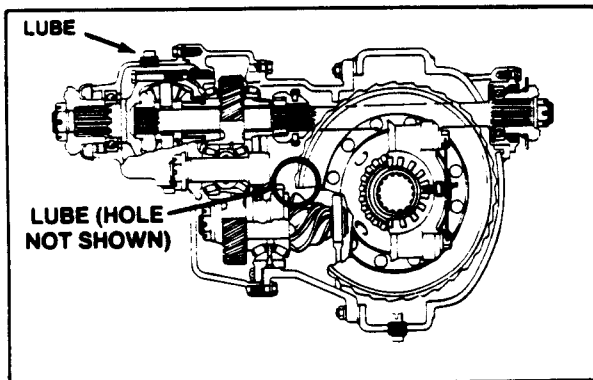


**HYPOID GEARING-PINION STANDARD**

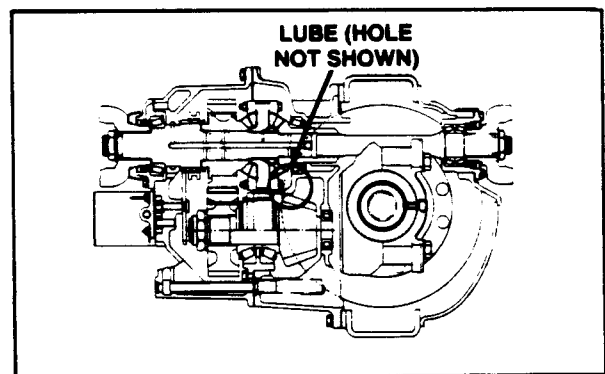


**HYPOID GEARING-PINION INVERTED**

### **FRONT MOUNTED SINGLE REDUCTION TANDEM AXLES (FORWARD/REAR AXLES)**

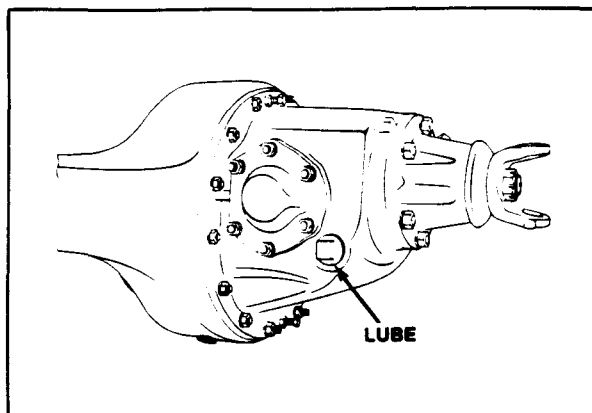


**HYPOID GEARING WITH INTER-AXLE DIFF.**

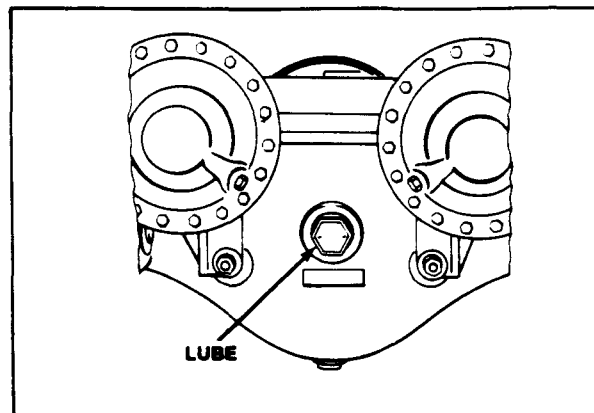


**HYPOID GEARING WITH INTER-AXLE  
DIFF. AND PUMP FORCED LUBRICATION**

# FRONT MOUNTED DOUBLE REDUCTION AND 2 SPEED AXLES

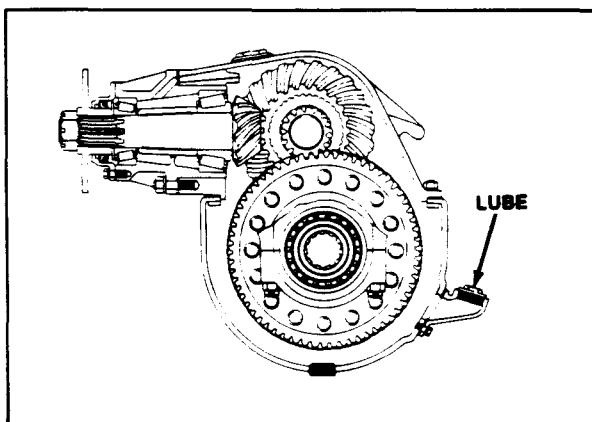


FILL HOLE IN CARRIER

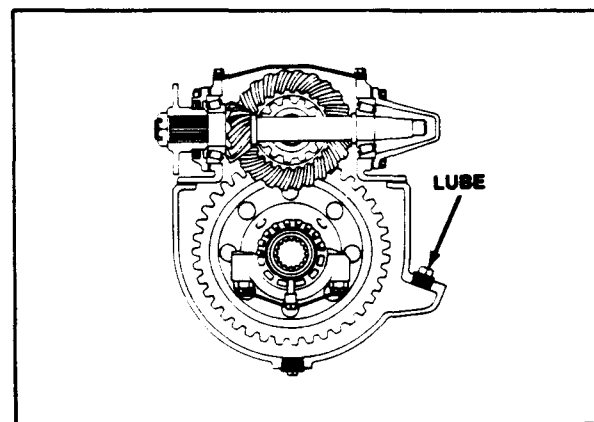


FILL HOLE IN HOUSING

## TOP MOUNTED DOUBLE REDUCTION (SINGLE AXLES OR REAR/REAR OF TANDEM)

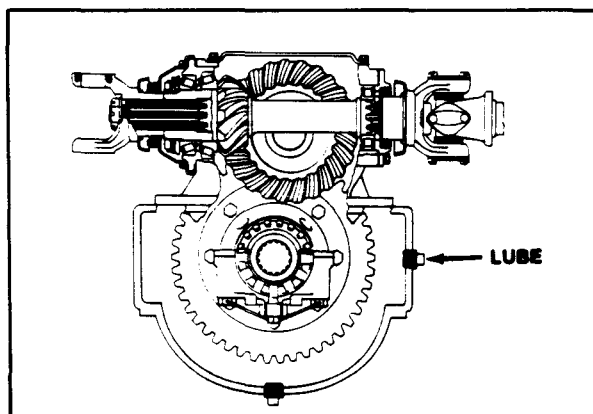


HYPOID AND SPIRAL BEVEL GEARING

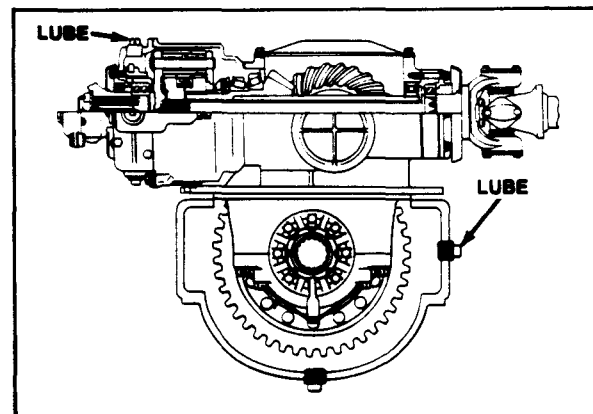


HYPOID AND SPIRAL BEVEL GEARING

## TOP MOUNTED DOUBLE REDUCTION TANDEM AXLES (FORWARD/REAR AXLES)



HYPOID GEARING WITHOUT  
INTER-AXLE DIFFERENTIAL



HYPOID GEARING WITH  
INTER-AXLE DIFFERENTIAL

- Output bearings (two tapered bearing design only)

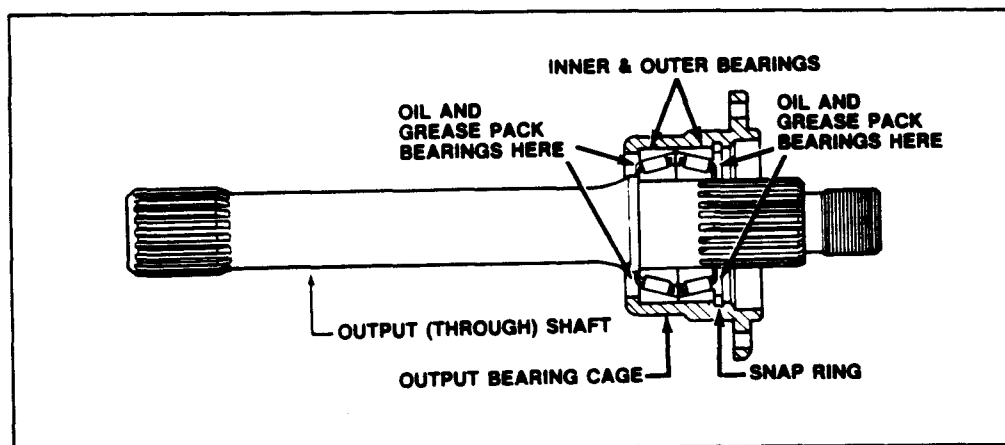
Same as listed on page 19 plus 0-622. Refer to the following intervals and procedures.

### LUBE INTERVALS:

- All new and reconditioned units—Drain and refill initial fill lubricant after the first 1000 miles (1600 km) but never later than 3000 miles (4800 km). Drain the lubricant while the unit is still warm from the carrier, housing and if a drain plug is employed, from the inter-axle differential of the forward carrier of tandem axles.
- Heavy duty on-highway, on/off-highway and off-highway service—Check levels every 1000 miles (1600 km). Drain and refill to bottom of filler hole or top of filler neck every 25,000 to 30,000 miles (40,000 to 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 service—Change every 100,000 miles (160,000 km) or once a year if yearly mileage is less than 100,000 miles (160,000 km).
- Output bearings (two tapered bearing design only) — at overhaul time only, the output bearings must first be coated with oil then packed with 0-622 grease. Refer to following lube procedures.
- Oil filter—Replace the oil filter of units employing a pump forced lubrication system every time the oil is changed.
- Oil pump (SQHP only—on and off highway models)—  
New units: Pre-lubricate oil pump gears with 2 oz. (56 gr) of recommended axle lubricant through the oil pump to filter passage.  
Reconditioned units: Pack the pump cavity with grease (0-622) before installing pump cover.

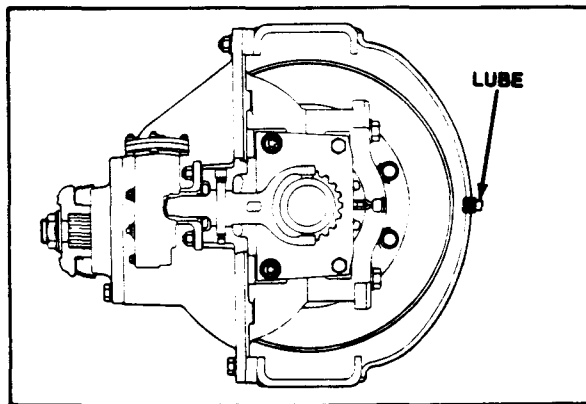
### LUBE PROCEDURES:

- After filling drive unit and/or housing with lubricant add two extra pints (0.946 liters) of same lubricant to axles employing inter-axle differentials of the type that can be directly filled through a top filler hole. Refer to capacities on page 27. Drive the vehicle, unloaded, for one or two miles (1.6 to 3.2 km) at speeds not to exceed 25 miles per hour (40 kph) to thoroughly circulate the lubricant throughout the axle and carrier assemblies.
- Output bearing (two tapered bearing design only.)



1. Reassemble the output shaft and bearing cage assembly, dry, without coating the parts with lubricant.
2. Adjust output bearings to the correct preload or end play specifications.
3. After bearings are adjusted, squirt oil through the inner and outer openings of the bearing cage to coat bearings. Use the same recommended GL-5 lubricant used in the axle.
4. After oiling, pack both the inner and outer bearings with 0-622 grease. Use a suitable grease gun with a flexible nozzle to pack the bearing cavities through the inner and outer openings of the bearing cage.

• **HYPOID/PLANETARY TWO SPEED GEARING (600 and 601 Series)**



**LUBRICANTS:**

The lubricants that are used for differentials in all Rockwell drive axles must be SAE designation API-GL-5 that are approved under military specification MIL-L-2105C. The oil viscosity used depends on the outside temperature the axle is operated in. See Rockwell Recommended Lubricants on pages 6 and 7. Use one of the following lubricants as required by outside temperature:

0-76-A, 0-76-B, 0-76-D, 0-76-E, 0-76-J or 0-76-L.

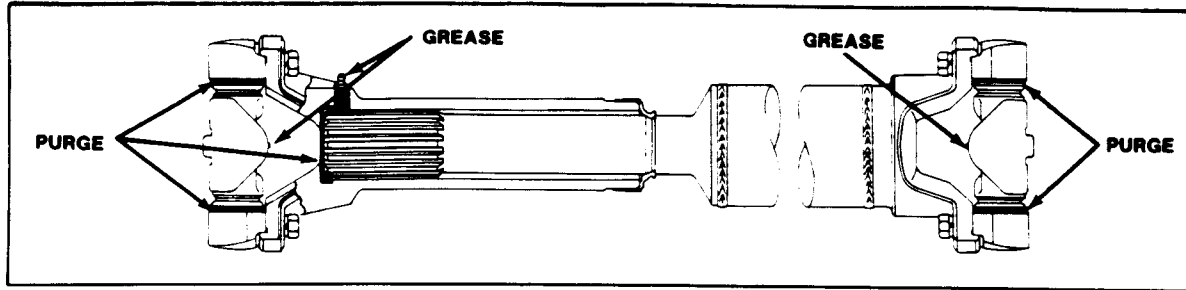
**LUBE INTERVALS:**

- All new and reconditioned units — Drain and refill initial fill lubricant after the first 1000 miles (1600 km) but never later than 3000 miles (4800 km). Drain the lubricant while the unit is still warm from the carrier and housing.
- Heavy duty on-highway, on/off-highway and off-highway service—Check levels every 1000 miles (1600 km). Drain and refill to bottom of filler hole or top of filler neck every 25,000 to 30,000 miles (40,000 to 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 service—Change every 100,000 (160,000 km) or once a year if yearly mileage is less than 100,000 miles (160,000 km).

**LUBE PROCEDURES:**

Except for Inter-axle Differential information use same procedures as for "Hypoid, Amboid and Spiral Bevel Gears" on page 22.

## 9. DRIVE LINE UNIVERSAL JOINTS, SLIP YOKES, SPLINES



DRIVE LINE "U" JOINT AND SLIP YOKE

### LUBRICANTS:

0-634-B

Refer to Recommended Lubricants on pages 6 and 7.

### LUBE INTERVALS:

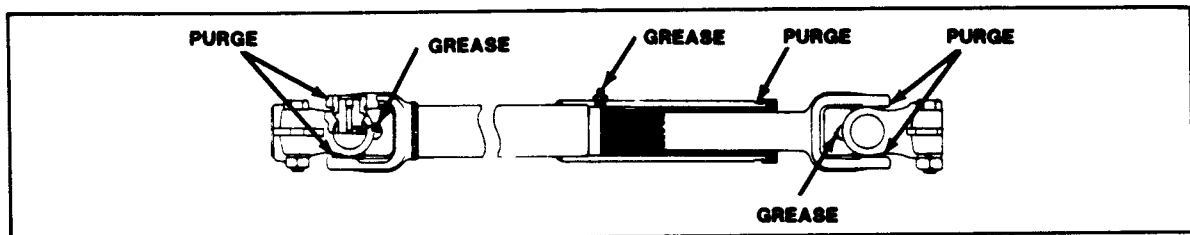
The frequency of lubricant change depends upon individual operating conditions, speeds and loads.

- On highway  
"X-TRA-LIFE" universal joints and shafts—50,000 miles (80,000 km) maximum. Non "X-TRA-LIFE" universal joints and shafts—16,000 miles (25,600 km) maximum.
- Off highway  
Change intervals will differ greatly and be determined largely upon the type of machinery being used, type of operation and severity of service. The lubricant change interval could be, for example, one day maximum or three months maximum. This can be determined by initially scheduling daily or weekly inspections of the universal joints, shaft and slip yoke parts. Check seals, bearings, splines, etc., and check condition of grease or for lack of grease. Also check to make sure that grease purges from all four bearing and seal positions of the cross.

### LUBE PROCEDURES:

- Universal Joints:
  1. Check for looseness
  2. Apply grease until new grease purges from all seals.
  3. If grease does not purge at seals, manipulate the U-joint until purging occurs.
  4. If above is not successful, remove cup or joint and check old grease. If grease appears rusty, gritty or burnt, replace the complete universal joint.
- 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.

## 10. STEERING SHAFT UNIVERSAL JOINTS



STEERING SHAFT UNIVERSAL JOINT



**LUBRICANTS:**

0-617-A or 0-617-B

Refer to Recommended Lubricants on pages 6 and 7.

**LUBE INTERVALS:**

Every 30,000 miles (48,000 km) if yearly mileage is over 30,000 miles, otherwise twice yearly (spring and fall).

## LUBRICANT CAPACITIES OF ROCKWELL COMPONENTS

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. If the pinion shaft angle is something other than listed or the specific axle lube capacity is not given, refer to the guide lines mentioned on page 3 and 4 ("Proper Lubricant Levels") for pinion angle versus proper fill plug hole to be used. After determining the proper plug hole, fill the axle with the specified lubricant to bottom of that hole.

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.

**NOTE:** For the best distribution of lubricant and to assure that axle wheel end components are "wet" before putting the vehicle back into service, tilt the axle from side to side after filling with oil. Keep the axle in each tilted position for one minute to allow all wheel cavities to fill.

### SINGLE AXLES† REFERENCE ONLY

| MODEL | CAPACITY<br>U.S. Pints | CAPACITY<br>Litres | MODEL | CAPACITY<br>U.S. Pints | CAPACITY<br>Litres | MODEL    | CAPACITY<br>U.S. Pints | CAPACITY<br>Litres |
|-------|------------------------|--------------------|-------|------------------------|--------------------|----------|------------------------|--------------------|
| A-150 | 5½                     | 2.5*               | F-58  | 15                     | 7.0                | F-580    | 15                     | 7.0                |
| B-100 | 10                     | 4.5                | F-75  | 9                      | 4.0                | F-583    | 15                     | 7.0                |
| B-140 | 12                     | 5.5                | F-77  | 10                     | 4.5                | F-2090   | 12                     | 5.5                |
| B-150 | 3½                     | 1.5                | F-100 | 13                     | 6.0                | F-3100   | 16                     | 7.5                |
| C-100 | 12½                    | 6.0                | F-106 | 13                     | 6.0                | F-3110   | 26                     | 12.5               |
| D-100 | 12½                    | 6.0                | F-120 | 15                     | 7.0                | F-3200   | 22                     | 10.5               |
| D-140 | 12½                    | 6.0                | F-121 | 15                     | 7.0                | F-4700   | 40                     | 19.0               |
| E-100 | 15                     | 7.0                | F-140 | 14                     | 6.5                | F-4710   | 32                     | 15.0               |
| E-105 | 12½                    | 6.0                | F-200 | 12                     | 5.5                | F-7900   | 40                     | 19.0               |
| E-150 | 9                      | 4.0                | F-223 | 16                     | 7.5                | F-7910   | 32                     | 15.0               |
| E-300 | 13*                    | 6.0*               | F-233 | 23                     | 11.0               | FS-4711  | 32                     | 15.0               |
| E-350 | 22*                    | 10.5*              | F-234 | 23                     | 11.0               | FDS-75   | 14                     | 6.5                |
| E-370 | 22*                    | 10.5*              | F-235 | 23                     | 11.0               | FDS-85   | 15                     | 7.0                |
| F-30  | 6                      | 3.0                | F-300 | 16                     | 7.5                | FDS-90   | 14                     | 6.5                |
| F-35  | 7                      | 3.5                | F-337 | 24                     | 11.5               | FDS-750  | 7                      | 3.0                |
| F-37  | 7                      | 3.5                | F-340 | 16*                    | 7.5*               | FDS-1600 | 23                     | 11.0               |
| F-38  | 10                     | 4.5                | F-400 | 16                     | 7.5                | FDS-1800 | 35                     | 16.5               |
| F-46  | 10                     | 4.5                | F-409 | 28                     | 13.0               | FDS-1805 | 35                     | 16.5               |
| F-50  | 10                     | 4.5                | F-501 | 10                     | 4.5                | FDS-2100 | 35                     | 16.5               |
| F-53  | 12                     | 5.5                | F-544 | 10                     | 4.5                | G-161    | 21                     | 10.0               |
| F-54  | 11                     | 5.0                | F-551 | 11                     | 5.0                | G-340    | 24*                    | 11.0*              |
| F-56  | 14                     | 6.5                | F-552 | 11                     | 5.0                |          |                        |                    |

\* 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 19-23.

SINGLE AXLE<sup>†</sup> (CONT.)

| MODEL   | CAPACITY<br>U.S. Pints | CAPACITY<br>Litres | MODEL  | CAPACITY<br>U.S. Pints | CAPACITY<br>Litres | MODEL | CAPACITY<br>U.S. Pints | CAPACITY<br>Litres |
|---------|------------------------|--------------------|--------|------------------------|--------------------|-------|------------------------|--------------------|
| G-341   | 22*                    | 10.5*              | RT-240 | 32*                    | 15.0*              | 53300 | 15                     | 7.0                |
| G-361   | 21*                    | 10.0*              | RT-340 | 32*                    | 15.0*              | 53500 | 6                      | 3.0                |
| H-100   | 20                     | 9.5                | R-100  | 30                     | 14.0               | 53521 | 9                      | 4.5                |
| H-140   | 21                     | 10.0               | R-140  | 28                     | 13.0               | 53547 | 9                      | 4.5                |
| H-150   | 11                     | 5.0                | R-155  | 28                     | 13.0               | 53600 | 7                      | 3.25               |
| H-162   | 20                     | 9.5                | R-160  | 28                     | 13.0               | 53625 | 4 <sup>3/4</sup>       | 2.25               |
| H-170   | 27*                    | 12.5*              | R-163  | 34                     | 16.0               | 54400 | 15                     | 7.0                |
| H-172   | 27                     | 12.5               | R-170  | 43                     | 20.3               | 55400 | 20                     | 9.5                |
| H-200   | 28*                    | 13.0*              | R-200  | 36*                    | 17.0*              | 55600 | 20                     | 9.5                |
| H-240   | 22*                    | 10.5*              | R-230  | 36*                    | 17.0*              | 56219 | 22                     | 10.5               |
| H-262   | 23                     | 11.0               | R-230§ | 45*                    | 21.0*              | 56400 | 20                     | 10.5               |
| H-300   | 26*                    | 12.5*              | R-255  | 28                     | 13.0               | 56410 | 20                     | 10.5               |
| H-340   | 22*                    | 10.5*              | R-270  | 55                     | 26.0               | 56434 | 13                     | 6.0                |
| H-350   | 24*                    | 11.5*              | R-300  | 34*                    | 16.0*              | 56450 | 26                     | 12.0               |
| H-360   | 24*                    | 11.5*              | R-330  | 35*                    | 16.5*              | 56461 | 26                     | 12.0               |
| H-370   | 24*                    | 11.5*              | R-330§ | 44*                    | 20.5*              | 58200 | 21                     | 10.0               |
| L-100   | 23                     | 10.5               | R-355  | 28                     | 13.0               | 58300 | 21                     | 10.0               |
| L-140   | 24                     | 11.5               | R-390  | 60*                    | 28.0*              | 58415 | 26                     | 12.0               |
| L-155   | 24                     | 11.5               | R-2090 | 10                     | 4.5                | 58822 | 22                     | 10.5               |
| L-172   | 27                     | 12.5               | R-3100 | 20                     | 9.5                | 59722 | 26                     | 12.0               |
| L-200   | 31*                    | 14.5*              | S-170  | 43                     | 20.3               | 65300 | 14                     | 6.5                |
| L-240   | 22*                    | 10.5*              | S-200  | 38*                    | 18.0*              | 65356 | 23                     | 11.0               |
| L-300   | 29*                    | 13.5*              | S-270  | 55                     | 26.0               | 65400 | 17                     | 8.0                |
| L-340   | 22*                    | 10.5*              | S-300  | 39*                    | 18.5*              | 65456 | 17                     | 8.0                |
| L-350   | 24*                    | 11.5*              | U-140  | 24                     | 11.5               | 65700 | 12                     | 5.5                |
| L-370   | 32*                    | 15.0*              | U-170  | 43                     | 20.3               | 66700 | 20                     | 9.5                |
| L-600   | 35                     | 16.5               | U-200  | 38*                    | 18.0*              | 67000 | 20                     | 9.5                |
| LT-200  | 31*                    | 14.5*              | U-240  | 38*                    | 18.0*              | 68700 | 20                     | 9.5                |
| LT-300  | 29*                    | 13.5*              | U-270  | 55                     | 26.0               | 72200 | 15*                    | 7.0*               |
| M-172   | 27                     | 12.5               | U-300  | 39*                    | 18.5*              | 72300 | 21*                    | 10.0*              |
| QT-140  | 24                     | 11.5               | U-340  | 39*                    | 18.5*              | 73300 | 8*                     | 4.0*               |
| QT-200  | 31*                    | 14.5*              | W-170  | 43                     | 20.3               | 74400 | 9*                     | 4.5*               |
| QT-230§ | 44*                    | 21.0*              | W-270  | 55                     | 26.0               | 74878 | 12*                    | 5.5*               |
| QT-240  | 34*                    | 16.0*              | W-464  | 28                     | 13.0               | 75300 | 20*                    | 9.5*               |
| QT-300  | 29*                    | 13.5*              | 46-R   | 10                     | 4.5                | 75357 | 20*                    | 9.5*               |
| QT-330§ | 44*                    | 21.0*              | 1300   | 16                     | 7.5                | 75400 | 20*                    | 9.5*               |
| QT-340  | 32*                    | 15.0*              | 1700   | 16                     | 7.5                | 75700 | 24*                    | 11.55*             |
| Q-100   | 31                     | 14.5               | 59000  | 26                     | 12.0               | 76400 | 18*                    | 8.5*               |
| Q-145   | 24                     | 11.5               | 63000  | 8                      | 4.0                | 76700 | 26*                    | 12.0*              |
| Q-200   | 34*                    | 16.0*              | 64800  | 9                      | 4.5                | 76784 | 26*                    | 12.0*              |
| Q-245   | 34*                    | 16.0*              | 65200  | 10                     | 4.5                | 76790 | 28*                    | 13.0*              |
| Q-300   | 32*                    | 15.0*              | 1900   | 16                     | 7.5                | 78000 | 20*                    | 9.5*               |
| Q-345   | 32*                    | 15.0*              | 7578   | 28                     | 13.0               | 79000 | 24*                    | 11.5*              |
| Q-350   | 34*                    | 16.0*              | 7579   | 28                     | 13.0               | 79721 | 24*                    | 11.5               |
| Q-370   | 34*                    | 16.0*              | 7580   | 28                     | 13.0               | 93440 | 20*                    | 9.5*               |
| Q-380   | 36*                    | 17.0*              | 7581   | 28                     | 13.0               | 94440 | 20*                    | 9.5*               |
| Q-390   | 36*                    | 17.0*              | 7582   | 28                     | 13.0               | 96710 | 25*                    | 12.0*              |
| RL-170  | 48                     | 22.5               | 51500  | 3 <sup>1/2</sup>       | 1.5                | 98415 | 41*                    | 19.0*              |

\*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 19-23. §Housing over 6<sup>1/2</sup>" (165 mm) deep overall.

# TANDEM AXLE† REFERENCE ONLY

| MODEL     | CAPACITY<br>U.S. Pints | CAPACITY<br>Litres | MODEL        | CAPACITY<br>U.S. Pints | CAPACITY<br>Litres |
|-----------|------------------------|--------------------|--------------|------------------------|--------------------|
| SD-353    | 24                     | 11.5               | SQR-100      |                        |                    |
| SD-454    | 26                     | 12.0               | forward      | 36                     | 17.0               |
| SD-472    | 28                     | 13.0               | rear         | 33                     | 15.6               |
| SD-473    | 28                     | 13.0               | SQR-100P     |                        |                    |
| SD-3000   | 19                     | 9.0                | forward      | 38                     | 18.0               |
| SD-3010   | 19                     | 9.0                | rear         | 33                     | 15.6               |
| SD-3020   | 31                     | 14.5               | SQTT-335     | *44                    | *21.0              |
| ●SDHD     | ‡16                    | ‡7.0               | SR-170       |                        |                    |
| SFD-75    | 16                     | 7.0                | forward      | 55                     | 26.0               |
| SFD-157   | 9                      | 4.25               | rear         | 43                     | 23.3               |
| SFD-375   | 23                     | 11.0               | SR-270 & 280 |                        |                    |
| SFD-450   | 36                     | 17.0               | forward      | 55                     | 26.0               |
| SFD-460   | 29                     | 13.5               | rear         | 55                     | 26.0               |
| SFD-3020  | 31                     | 14.5               | SRD          | 22                     | 10.5               |
| SFD-4600  | 28                     | 13.0               | SRDD         | ‡20½                   | ‡10.0              |
| SFD-4700  | 28                     | 13.0               | SRHD         |                        |                    |
| SFDD-3020 | ‡31                    | ‡14.5              | forward      | 39                     | 18.5               |
| SFDD-4600 | ‡28                    | ‡13.0              | rear         | 36                     | 17.0               |
| SFDD-4640 | ‡34½                   | ‡16.0              | SRT-235      | *45                    | *21.0              |
| SFDD-4700 | ‡28                    | ‡13.0              | SRT-335      | *44                    | *20.5              |
| ●SFHD     |                        |                    | SSHD         |                        |                    |
| forward   | ‡17                    | ‡8.0               | forward      | 34                     | 16.0               |
| rear      | 16½                    | 7.5                | rear         | 28                     | 13.0               |
| ●SHHD     | ‡26                    | ‡12.0              | SSHP         |                        |                    |
| SL-100    |                        |                    | forward      | 34                     | 16.0               |
| forward   | 40                     | 18.9               | rear         | 28                     | 13.0               |
| rear      | 37                     | 17.5               | ST-170       |                        |                    |
| SL-100P   |                        |                    | forward      | 55                     | 26.0               |
| forward   | 42                     | 19.9               | rear         | 43                     | 23.3               |
| rear      | 37                     | 17.5               | ST-270 & 280 |                        |                    |
| SLD       | 28                     | 13.0               | forward      | 55                     | 26.0               |
| SLDD      | ‡28                    | ‡13.0              | rear         | 55                     | 26.0               |
| ●SLHD     |                        |                    | STHD         |                        |                    |
| forward   | ‡32½                   | ‡15.25             | forward      | 34                     | 16.0               |
| rear      | 32                     | 15.0               | rear         | 28                     | 13.0               |
| SQ-100    |                        |                    | SU-170       |                        |                    |
| forward   | 40                     | 18.9               | forward      | 55                     | 26.0               |
| rear      | 37                     | 17.5               | rear         | 43                     | 23.3               |
| SQ-100P   |                        |                    | SU-270 & 280 |                        |                    |
| forward   | 42                     | 19.9               | forward      | 55                     | 26.0               |
| rear      | 37                     | 17.5               | rear         | 55                     | 26.0               |
| SQD       | 22                     | 10.5               | SUHD         |                        |                    |
| SQDD      | ‡22                    | ‡10.5              | forward      | 34                     | 16.0               |
| ●SQHD     |                        |                    | rear         | 28                     | 13.0               |
| forward   | ‡34                    | ‡16.0              | SUDD         | ‡33                    | ‡15.5              |
| rear      | 31                     | 14.5               | SW-170       |                        |                    |
| SQHP      |                        |                    | forward      | 55                     | 26.0               |
| forward   | 40                     | 19.0               | rear         | 43                     | 23.3               |
| rear      | 36                     | 17.0               | SW-270 & 280 |                        |                    |
|           |                        |                    | forward      | 55                     | 26.0               |
|           |                        |                    | rear         | 55                     | 26.0               |

‡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. †For correct lubricant specifications, see Pages 19-23.\* 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 for drive units only. **DO NOT FILL THE AXLE THROUGH THE DRIVE UNIT OR HOUSING BOWL ONLY.**

| MODEL SERIES          | OUTER ENDS                  | HOUSING BOWL        | OUTER ENDS              | HOUSING BOWL    | MODEL SERIES                           | OUTER ENDS                  | HOUSING BOWL        | OUTER ENDS              | HOUSING BOWL         |
|-----------------------|-----------------------------|---------------------|-------------------------|-----------------|--|-----------------------------|---------------------|-------------------------|----------------------|
| Original/New          | Capacity Per End U.S. Pints | Capacity U.S. Pints | Capacity Per End Litres | Capacity Litres | Original/New                           | Capacity Per End U.S. Pints | Capacity U.S. Pints | Capacity Per End Litres | Capacity Litres      |
| PR-53                 | 3                           | 33                  | 1.5                     | 15.5            | PR-253/<br>PRLC-1756,7                 | 13                          | 39                  | 6.0                     | 18.5                 |
| PR-60/PRS-165         | 3                           | 27                  | 1.5                     | 12.5            | PR-256/<br>PRM-1314,5                  | 18                          | 44                  | 8.5                     | 20.5                 |
| PS-100                | 3½                          | 20                  | 1.75                    | 9.5             | PRM-1615                               | 18                          | 44                  | 8.5                     | 20.5                 |
| PR-100                | 3½                          | 22                  | 1.75                    | 10.5            | PS-260/<br>PSM-1044,5                  | 8                           | 44                  | 3.75                    | 20.5                 |
| PSC-593               | 4                           | 28                  | 2.00                    | 13.25           | PR-270/<br>PRLC-823                    | 18                          | 44                  | 8.5                     | 20.5                 |
| PSC-594               | 4                           | 28                  | 2.00                    | 13.25           | PS-270/<br>PSM-1614                    | 8                           | 44                  | 3.75                    | 20.5                 |
| PSM-594               | 4                           | 28                  | 2.00                    | 13.25           | PS-310                                 | 14                          | 36                  | 6.5                     | 17.0                 |
| PR-108/<br>PRLC-614   | 7                           | 29                  | 3.25                    | 13.5            | PR-350/<br>PRC-3795,6                  | 28                          | 48                  | 13.0                    | 22.5                 |
| PR-111                | 4¾                          | 27                  | 2.00                    | 12.5            | PR-400/<br>PRC-1925                    | 16                          | 32                  | 7.5                     | 15.0                 |
| PR-112/<br>PRLC-344   | 6                           | 44                  | 2.75                    | 20.5            | PR-500                                 | 28                          | 56                  | 13.0                    | 26.5                 |
| PR-145                | 5                           | 32                  | 2.5                     | 15.0            | PS-500/<br>PSC-4564                    | 29                          | 58                  | 13.5                    | 27.5                 |
| PS-150                | 5                           | 22                  | 2.5                     | 10.5            | PR-501                                 | 28                          | 64                  | 13.0                    | 30.0                 |
| PR-150/<br>PRM-672,3  | 5                           | 29                  | 2.5                     | 13.5            | PR-502/<br>PRC-4805                    | 31                          | 62                  | 14.5                    | 29.0                 |
| PR-151/<br>PRM-672,3  | 8                           | 30                  | 3.75                    | 14.0            | PR-700                                 | 30                          | 64                  | 14.0                    | 30.0                 |
| PR-153/<br>PRM-672,3  | 7½                          | 31                  | 3.5                     | 14.5            | SPRC-1357<br>forward<br>rear           | 14<br>14                    | 36<br>36            | 6.62<br>6.62            | 17.0<br>17.0         |
| PS-200                | 6                           | 38                  | 2.75                    | 18.0            | SPRC-1736<br>forward<br>rear           | 15<br>15                    | 36<br>36            | 7.0<br>7.0              | 17.0<br>17.0         |
| PR-200                | 6                           | 40                  | 2.75                    | 19.0            | SPRC-4806<br>forward<br>rear           | 32<br>32                    | 72<br>72            | 15.0<br>15.0            | 34.0<br>34.0         |
| PR-205/<br>PRM-676,7  | 7                           | 46                  | 3.25                    | 21.5            | EPRC-1356<br>forward<br>middle<br>rear | 14<br>14<br>14              | 32<br>32<br>32      | 6.5<br>6.5<br>6.5       | 15.0<br>15.0<br>15.0 |
| PR-207/<br>PRM-676,7  | 6                           | 45                  | 2.75                    | 21.0            |  |                             |                     |                         |                      |
| PR-208/<br>PRM-676,7  | 8                           | 43                  | 3.75                    | 20.0            |  |                             |                     |                         |                      |
| PR-209/<br>PRLC-675   | 5                           | 56                  | 2.5                     | 26.5            |  |                             |                     |                         |                      |
| PR-250/<br>PRM-1756,7 | 13                          | 43                  | 6.0                     | 20.0            |  |                             |                     |                         |                      |
| PS-250/<br>PSM-826    | 6                           | 42                  | 2.75                    | 19.5            |  |                             |                     |                         |                      |
| PR-251/<br>PRM-1756,7 | 12                          | 42                  | 5.5                     | 19.5            |  |                             |                     |                         |                      |

† For correct lubricant specification, see Pages 11 and 12.

**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<br>U.S. Pints | CAPACITY<br>Litres | MODEL    | CAPACITY<br>U.S. Pints | CAPACITY<br>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                |

† For correct lubricant specifications, see Page 14.



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