



M AINTENANCE I NSTRUCTION

LUBRICANT SPECIFICATIONS

I. INTRODUCTION

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

II. ALL PURPOSE LUBRICATING OIL

1. Oil Uses

- a. Traction motor armature bearings
- b. Traction motor support bearings
- c. Axle journal bearings
- d. Truck center bearings

2. Oil Properties

<u>Method Of Test</u>	<u>ASTM Designation</u>	<u>Limits</u>
Viscosity - Saybolt Universal	D88 or D446	
a. Seconds at 100° F.		300 Minimum 600 Maximum
b. Seconds at 210° F.		50 Minimum
Flash Point, ° F.	D92	325° Minimum
Pour Point, ° F.	D97	0° Maximum
Tarry Matter, Dirt and Water		0.10% Maximum

3. General Comments

- a. For extremely cold weather operation in some northern areas the maximum pour point must be lowered accordingly. However, we do not believe it advisable to permit the pour point to go above 0° F. even when the weather is warm because this defeats the main advantage of having a single all purpose lubricating oil. Where extremes in temperature are likely to be encountered, it is apparent that two different all purpose oils must be used seasonally.
- b. The lubricating oil may be a straight mineral or a turbine type. The use of oxidation inhibitors is preferred since the oil should have a high resistance to oxidation. The use of additional additives for pour point depression, anti-foam or extreme pressure is entirely optional. No filler or graphites shall be employed in the oil. Depending somewhat on the nature of the lubricating oil employed, the lubricant may be classed either as an SAE #20 or #30.

III. AIR COMPRESSOR LUBRICATING OIL

<u>Method Of Test</u>	<u>ASTM Designation</u>	<u>Limits</u>
Viscosity - Saybolt Universal a. Seconds at 210° F.	D88 or D446	50 Minimum* 70 Maximum
Pour Point	D97	0° F. Maximum*

*The pour point and viscosity limits specified are suitable for average temperature conditions. If low ambient temperatures (zero degrees F. or below) are normally encountered, a lubricant having a lower pour point and viscosity should be used.

Seasonal changes may be required. This precaution is particularly important if locomotives are normally shut down for long periods of time with no provision for keeping the air compressor warm.

The viscosity limitation includes oils which could be classified as SAE #30 or heavy SAE #20. Air compressor lubricating oil should be a straight mineral type product having rust and oxidation inhibitors similar to a turbine type oil. Detergent type oils should not be employed.

IV. AXLE DRIVE GEAR UNITS (SPICER TYPE)**1. Gear Boxes**

The lubricant used in the gear boxes should comply with all the requirements of the Society of Automotive Engineers for SAE90 Mild-Type Extreme Pressure (EP) Gear Lubricant. The oil should be changed at intervals specified in M.I. 1704.

2. Drive Shafts

The lubricant used for the driveshaft assembly should comply with all requirements of the Society of Automotive Engineers for SAE250 Regular Type Gear Lubricant. For further details see M.I. 1704.

V. GENERAL LUBRICATION RECOMMENDATIONS

The following general lubrication information is intended to be used in instances where no other specific Maintenance Instruction Bulletin covering the part is available. Such specific bulletins should be consulted where available, since they provide more detailed information on maintenance periods and requirements. Particular attention is called to applicable Scheduled Maintenance Program Maintenance Instruction which should be used in conjunction with this bulletin.

<u>Item</u>	<u>Lubricant</u>	<u>Remarks</u>
1. Air Compressor Crankcase oil	SAE #20 or #30 oil. See Item III of this MI.	Refer to specific Maintenance Instruction for complete information.
Unloader	Light oil	Oil piston when disassembled.
2. Battery Terminals	Petroleum jelly	Maintain a liberal coating on terminals.

<u>Item</u>	<u>Lubricant</u>	<u>Remarks</u>
3. Bell King type	SAE #10 oil and air engine grease.	Refill reservoir every month. Capacity 1/2 pint. Use air engine grease 8227283 on plunger at assembly.
Viloco	SAE #10 oil and air engine grease.	Add few drops of oil monthly. Use air engine grease 8227283 on plunger at assembly.
4. Blower Traction motor - electric	Calol OHT grease specifically recommended.	Sealed grease bearings. Replace at overhaul or Unit Exchange.
Traction motor - chain drive	SAE #40 oil	Check level and add oil as required.
Traction motor - belt driven	Ball bearing grease	Add small quantity to shaft bearings every 3 months.
5. Dynamic Brake Motor	Calol OHT grease specifically recommended.	Sealed grease bearings. Replace at overhaul or Unit Exchange.
6. Dynamic Brake Blower (Pillow Bearings, FT Locomotive)	Ball bearing grease	Add small quantity to grease fitting every 3 months.
7. Brake Cylinder	Brake cylinder oil	Follow brake manufacturer's recommendations.
8. Brake Slack Adjuster	Graphite grease	Keep the surface lightly coated.
9. Cam Switch (Brake Transfer Switch) Bearings	Low flow, high melt grease (8196884)	Remove pipe plugs where used and apply grease fittings to lubricate at assembly with low flow, high melt lubricant 8196884 or equivalent.
Gear and rack	Non flow, high melt grease (8196886)	Apply to rack and gear upon assembly. Also apply to piston surfaces.
10. Center Bearing-Truck (Phenolic and Metal)	All purpose lubricating oil. See Item II of this MI.	Apply oil to 1/16" above wear plate at truck application. Soak waste in reservoir of switcher locomotives.
11. Contactors (Power)	Light oil and low flow, high melt grease (8196884)	Apply light oil to operating linkage. Wipe up excess. Upon overhaul, apply low flow high melt type grease to air cylinder walls.

<u>Item</u>	<u>Lubricant</u>	<u>Remarks</u>
12. Coupler Retractable (E7 locomotive)	SAE #10 oil	With gear at half travel fill tanks to level of side fillers.
Centering device	Ball bearing grease	Apply grease at fittings as required.
13. Coupling Falk	National Lubricating Grease Institute #3 (N.L.G.I. #3)	With fill opening on horizontal plane, add lubricant until level with vent plug. Capacity depends on coupling size. Lubricant to be nonfluid at 200° F.
Gear type (early D12 gen.)	N.L.G.I. #3 graded grease	Apply grease to gear teeth on assembly.
14. Control Stand Drum type	Light oil	Add several drops of oil to top oil holes weekly.
Contacts	Non flow, high melt electric contact grease (8196886)	Apply grease sparingly to the contacts.
Cam type Movable cams to shafts	Low flow, high melt grease (8196884)	Apply to shafts on re-assembly.
15. Defroster Motor	Sealed grease bearings	Replace bearings at overhaul or Unit Exchange.
16. Diaphragm Centering Device	Ball bearing grease	Lubricate at fittings every month.
17. Dynamotor (Headlight)	Sealed grease bearings	Replace bearing at overhaul or Unit Exchange. No other lubrication required.
18. Engine (Diesel) Crankcase	See M.I. 1752	Capacity depends on engine size. See engine manual.
Water pump		Fill cup on water pump weekly with same oil as used in the engine. See engine manual.
Governor	See M.I. 1752	Maintain oil level at mark on the sight glass. See engine manual.
Linkage	Light oil	Oil sparingly.
Electro-Pneumatic control	Low flow, high melt grease (8196884)	Apply air engine grease to cylinders on assembly.

<u>Item</u>	<u>Lubricant</u>	<u>Remarks</u>
19. Fans - Cooling		
Electric driven		
Grease lubricated	Sealed bearings with Calol OHT grease specifically recommended.	Replace sealed bearings at overhaul or Unit Exchange.
Oil lubricated (early type)	See M.I. 1752	Same oil as used in the engine. Add oil to top of filler pipe.
Mechanical driven		
Grease lubricated	Ball bearing grease	Add small amount of grease monthly.
Oil lubricated	See M.I. 1752	Same oil as used in the engine. Fill to overflow plug. Check level monthly.
20. Fan Drive (Export Locomotive)		
Gear box	SAE #40 oil	Maintain level in sight glass. Replace oil every 3 months.
Rotorseal	Light oil	Every 3 months remove knurled oiler and add 4 to 5 drops oil.
Bearings	Sealed grease	Lower bearings lubricated by splash. Replace sealed bearings at 3 year overhaul.
21. Fan Drive (90°, FT Locomotive)	SAE #40 oil	Change oil every 3 mos. Maintain level between "full" and "low" marks.
Idler	Ball bearing grease	Add small quantity every 3 months.
Jackshaft	Ball bearing grease	Add small quantity every 3 months.
22. Gear Case - Traction Motor	Sinclair Jet Lube TM or equivalent. (Minimum viscosity of oil component is 1750 S.S.U. at 210° F.)	All weather gear lubricant. Maintain lubricant in gear case to prevent bright gear teeth.
Felt seals	SAE #30 oil	Saturate seals on assembly.
23. Generators		
Auxiliary	Sealed grease bearings	Replace packed bearings at overhaul or Unit Exchange.
Main Generator DC (EMD design)	Lubrico M-6 or Texaco Regal Starfax #2	Refer to specific Maintenance Instruction for complete information.

<u>Item</u>	<u>Lubricant</u>	<u>Remarks</u>
24. Hand Brake	Light oil	Apply small amounts as required.
25. Hardware (General)	Light oil	Oil sparingly as necessary.
26. Headlight (Mars)	Ball bearing grease	Add 1 ounce of grease at fitting provided.
27. Heaters (Cooling and Lube Oil Systems)		
Pump motor (ball bearing)	Ball bearing grease	Once a year clean and repack bearings.
Sleeve bearing	SAE #10 oil	Apply oil to sleeve bearings every 3 months.
Drive	Cup grease and SAE #20 oil	Every month apply grease to Zerk fitting. Fill gear case to 2-1/4" below shaft opening or to center of gauge using SAE #20 oil. Add oil as required.
Vapor type 4915		
Water pump	SAE #10-20 oil	Maintain oil level in pump.
Magneto	SAE #50 oil	Every 3 months soak magneto wick on cam follower.
28. Isolation Switch	Low flow, high melt grease (8196884)	Apply electric contact grease sparingly to switch contacts every 3 months.
29. Journal Boxes		
Roller bearing Oil lubricated	All year car oil or oil given in Item II of this M.I.	Maintain to fill plug level or use gauge 8084927 (domestic locomotives) or 8229173 (export locomotives).
Friction bearing	All year car oil or oil given in Item II of this M.I.	Keep waste soaked in oil.
30. Motor		
Traction motor		
Armature bearing		
Sealed grease	Shell Cyprina RA grease only	See specific Maintenance Instruction for complete information on traction motors.
Open grease type	Lubrico M-6 or Regal Starfax #2	
Oil type	All year car oil or oil given in Item II of this M.I.	
Support bearings (Suspension Bearings)	All year car oil or oil given in Item II of this M.I.	

<u>Item</u>	<u>Lubricant</u>	<u>Remarks</u>
30. Motor (Continued)		
Cab heater motor	Sealed grease bearings	Replace at overhaul or Unit Exchange.
Defroster motor	Sealed grease bearings	
Dynamic brake motor	Sealed grease bearings	
Fan motor	Sealed grease bearings	
Traction motor blower	Sealed grease bearings	
Fuel pump motor	Sealed grease bearings	
Train control motor-generator	Sealed grease bearings	
31. Recorder - Speed		
Chicago Pneumatic		
Hydraulic pump	C.P. Recorder Circulating Oil	Maintain at level mark on sight glass.
Gear box	Light grease	Refill at 1 year inspection.
Reversing mechanism	Light grease	Inspect monthly. Add to level of plug opening.
Right angle drive	Light grease	Inspect monthly. Add as required.
Barco		
Recorder instrument	SAE #10 oil	Except SER model which has prelubricated bearings. Maintain oil level as required.
Link shaft	N.L.G.I. #0 grease	Inspect quarterly and lubricate.
Wheel diameter compensator box	SAE #90 oil	Inspect monthly. Add oil if necessary.
Axle drive head	SAE #90 oil	Fill to level of filler opening.
Flexible drive shaft	N.L.G.I. #0 grease	Inspect monthly. Lubricate if required.
32. Regulator - Voltage		
Torque Motor Type		
Sector bearings	Clock oil, similar to sewing machine oil (8067552)	Yearly apply 1 drop of oil to bearings.
Torque motor	Light oil (8198167)	On overhaul or new bearings apply 8198167 oil at assembly. No periodic lubrication required.

<u>Item</u>	<u>Lubricant</u>	<u>Remarks</u>
33. Reverser		
Ball bearings	Low flow, high melt grease (8196884)	Replace pipe plug where used with grease fitting at upper and lower bearing every 3 years.
Drum contacts	8196884 grease	Apply sparingly. Wipe off excess.
Gear and rack	8196884 or 8196886 grease	At overhaul or 3 years, remove cover and apply to rack and pinion.
Air cylinders	8196884 grease	Apply to cylinder walls and piston ring surfaces at overhaul.
34. Shutter Linkage	Light oil	Apply sparingly to moving pins and bearings.
35. Shutter Air Cylinder	8196884 grease	Apply to cylinder walls at overhaul.
36. Shock Absorber	Delco shock absorber fluid	Keep level to filler plug.
37. Throttle Linkage	Light oil	Apply sparingly every 3 months.
38. Windshield Wiper	Low flow, high melt grease (8196884)	Apply to cylinder walls sparingly at overhaul.

VI. LUBRICANT REFERENCE

<u>Name</u>	<u>Part No.</u>	<u>Quantity</u>	<u>Part No.</u>	<u>Quantity</u>
Regal Starfax #2 Grease	8079816	35 lbs.		
Journal Oil	8039278	5 gal.		
Lubrico M-6	8122383	1 qt.	8122384	1 gal.
*N.L.G.I. #3 Grade Grease	8102585	5 lbs.	8102587	35 lbs.
Shock Absorber Fluid	043046	1 gal.		
Clock Oil	8067552	1 gal.		
Speed Recorder Oil	8082436	1 gal.		
Petroleum Jelly	8099452	1 lb.		
Sinclair Jet Lube TM	8188793	35 lbs.	8188794	120 lbs.
Calol OHT Grease	8190451	5 lbs.		
Low Flow, High Melt Grease	8196884	1 lb.		
Non Flow, High Melt Grease	8196886	1 lb.		
Torque Motor Bearing Oil	8198167	6 oz.		
Shell Cyprina RA Grease	8249819	35 lbs.	8249820	120 lbs.
Air Engine Grease	8227283	1 gal.		
Shell Alvania Grease				
Gargoyle A No. 0				
*N.L.G.I. No. 0				
Graphite	8122392	5 lbs.		

*N.L.G.I. stands for National Lubricating Grease Institute.