CHAPTER 2

LUBRICATION AND SERVICE

2-1. SCOPE. This chapter provides instructions for servicing and minor maintenance of the drilling machine. Procedures are included for lubrication of various components. Maintenance procedures are included for items that require periodic replacement, and for items that are subject to become excessively worn.

2-2. GENERAL. The following procedures should be performed as indicated to obtain long life and best performance from the drilling machine.

2-3. ENGINE LUBRICATION.

a. Check the oil level daily before starting the engine. Add oil, if necessary, to bring it to the proper level on the dipstick.

NOTE

If the engine has just been stopped, wait approximately twenty minutes to allow the oil to drain back to the oil pan before checking the oil level.

b. Changing Engine Oil. The oil filter should be replaced each time the oil is changed. The engine oil should be at normal operating temperature when changed to ensure maximum suspension and drainage of minute foreign particles.

NOTE

It is recommended that new engines be started with 100 hour oil change periods. The drain interval may then be gradually increased or decreased based on an oil sample analysis.

filler neck.

b. DRAINING THE COOLANT SYSTEM. The engine coolant is drained by opening the drain cocks in the bottom of the radiator and removing the drain plugs in the engine block.

NOTE

Loosening or removing the radiator cap will speed the draining process.

c. ANTIFREEZE. When freeze protection is required, an ethylene glycol base permanent type antifreeze should be used. An inhibitor is included in this type antifreeze and no additional inhibitors are required on initial filling of the cooling system, if the amount of antifreeze used is as much as 30% of the total capacity of the cooling system.

Solutions of less than 30% concentration do not provide sufficient corrosion protection. Concentrations over 67% adversely affect freeze protection and heat transfer rates (see Figure 2-1).

Inhibitor depletion will occur in ethylene glycol base antifreeze through normal service. The inhibitors should be replenished at approximately 500 hour intervals with a non-chromate inhibitor.

Several brands of permanent antifreeze are available with sealer additives. The specific type of sealers vary with the manufacturer. Antifreeze with sealer additives are NOT recommended for use in engines, because of plugging problems throughout various areas of the cooling system.

d. COOLANT RECOMMENDATIONS. The following recommendations are considered beneficial to trouble free operation of the cooling system.

(1) Always use a properly inhibited coolant.

(2) If freeze protection is required, always use antifreeze with an ethylene glycol base.

(3) Re-inhibit antifreeze with a non-chromate inhibitor.

(4) Always follow the manufacturer's recommendations on inhibitor usage and handling.

(5) Do NOT use soluble oil.

(6) Chromate inhibitors should NEVER be used.

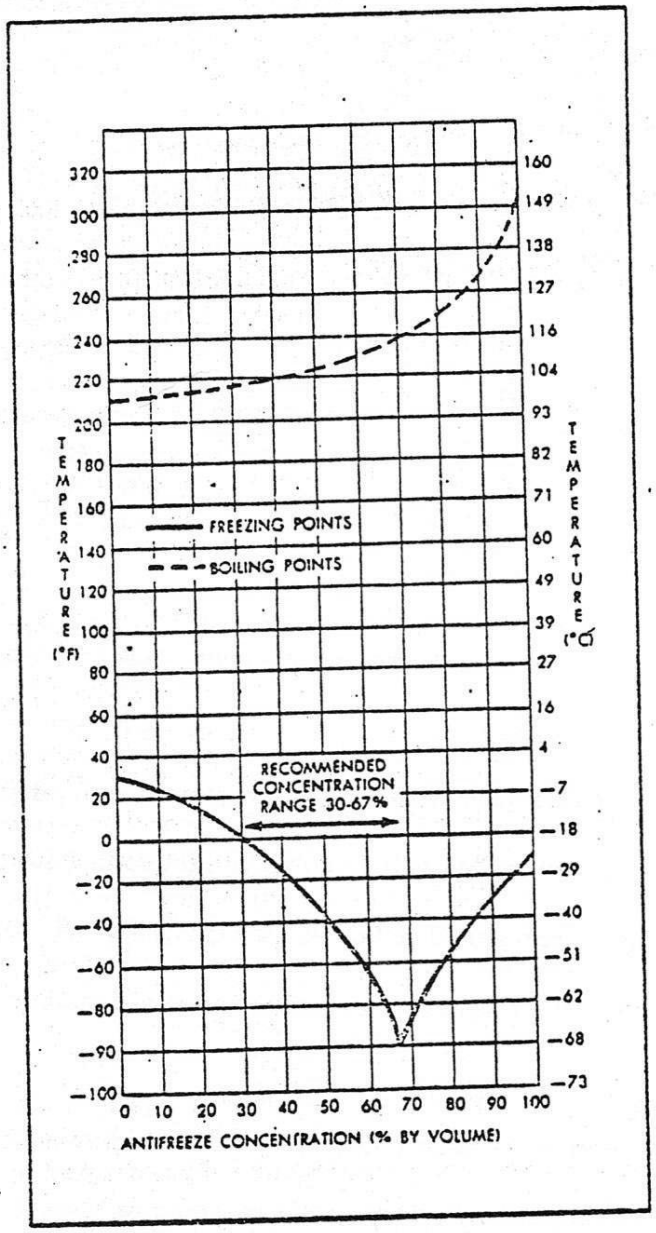

Figure 2.-1 Coolant Boiling and Freezing Temperatures at Sea Level vs. Antifreeze Concentration

(7) Sealer type antifreeze should NOT be used.

(8) Maintain prescribed inhibitor strength.

e. FILLING THE COOLANT SYSTEM. Before starting the engine, close all drain cocks and fill the cooling system.

NOTE

If antifreeze is to be used, determine amount of antifreeze to be used according to the cooling system capacity and the concentration desired. (30% to 67% recommended).

If the capacity of the cooling system is unknown, measure the amount of water necessary to fill the cooling system. Drain the cooling system and refill with the desired amounts of water and antifreeze.

NOTE

The use of clean soft water will eliminate the need for descaling solutions to clean the cooling system. A hard mineral-laden water should be softened with water softener chemicals before it is poured into the cooling system.

f. FLUSHING. The cooling system should be flushed each spring and fall. The flushing operation cleans the system of antifreeze solution in the spring and removes the summer rust inhibitor in the fall, preparing the cooling system for a new solution.

g. INSPECTION. Components of the cooling system should be checked periodically to keep the engine operating at peak efficiency. The thermostat and radiator pressure cap should be checked and replaced if found defective. The cooling system hoses should be inspected and any hose that is abnormally hard or soft should be replaced immediately. Check the hose clamps to make sure they are tight. All external leaks should be corrected as soon as detected. The shroud should be tight against the radiator core to prevent recirculation of air which may lower cooling efficiency. Check the fan and water pump drive belts for proper tension.

h. DRIVE BELT TENSION. Use the adjusting bolt located on the fan mounting bracket, and adjust the belt tension so that a firm push with the thumb midway between the pulleys will deflect the belts 1/2 to 3/4 inch.

NOTE

When more than one belt is used to drive a component, always replace all belts driving the component with a matched set, even though only one belt may be unserviceable. After replacing the belts and adjusting the tension, operate the engine for 15 seconds to seat the belts and readjust the tension. Recheck the belt tension after 1/2 hour of operation, and adjust if necessary.

Thereafter, check the tension of the drive belts after every 50 hours of operation and adjust if necessary.

CAUTION

Too tight a drive belt is destructive to the bearings of the driven part, and a belt that is too loose will slip.

2-4. BATTERY AND ALTERNATOR

a. Battery. The battery is a perishable item which requires periodic servicing. A properly cared for battery will give long and trouble-free service. Perform the following procedures to maintain the battery in a serviceable condition.

(1) Check the level of the electrolyte weekly. Add water if necessary to bring the electrolyte level to the ring below the filler cap in each cell.

CAUTION

Do not overfill the battery. Overfilling can cause poor performance or early failure.

(2) Keep the top of the battery, terminals, and cable clamps clean. When necessary, wash them with a solution of baking soda and water, and rinse with clean water.

CAUTION

Do not allow the soda solution to enter the cells.