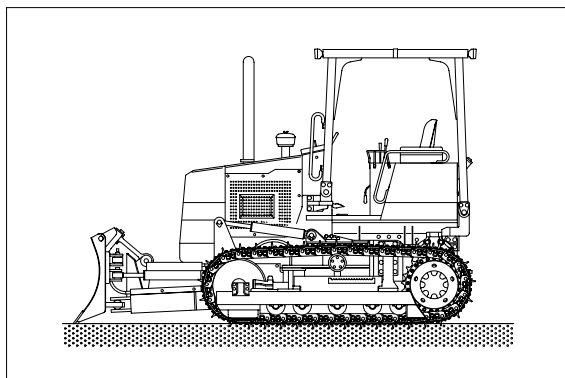
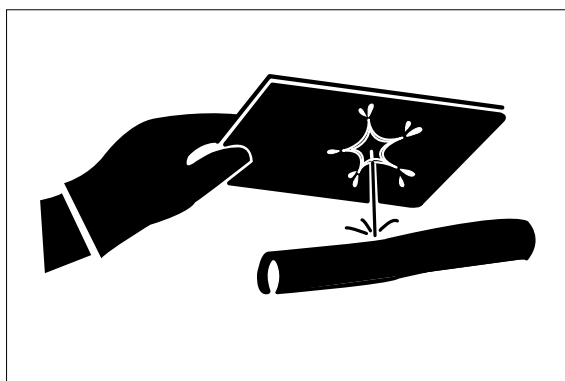


GROUP 3 TESTS AND ADJUSTMENTS

1. DOZER HYDRAULIC SYSTEM

⚠ Sudden movement of the machine or release of oil under pressure can cause injury to persons on or near the machine. To prevent possible injury, do the procedure that follows before testing and adjusting the hydraulic system.

- (1) Move the machine to a smooth horizontal location. Move away from working machines and personnel and lower dozer blade to the ground.
- (2) Permit only one operator on the machine. Keep all other personnel either away from the machine or in view of the operator.
- (3) Activate the parking brake.
- (4) Stop the engine.
- (5) Move the attachment control levers to all positions to release the pressure in the hydraulic system.
- (6) Carefully loosen the breather cap on the hydraulic tank to release the pressure in the tank.
- (7) Make sure all hydraulic pressure is released before any fitting, hose or component is loosened, tightened, removed or adjusted.
- (8) Tighten the breather cap on the hydraulic tank.
- (9) The pressure in the system has now been released and lines or components can be removed.



1) PROCEDURE

When defining a hydraulic system problem, the following procedure should be followed. First, do Visual Checks. If the problem has not been identified when Visual Checks are completed, do Operational Checks.

If the problem is still not fully understood, do Instrument Test. This procedure will help identify hydraulic system problems. As soon as the problem is defined, go to Troubleshooting. The Troubleshooting section will list the probable causes of a known problem. Since there maybe more than one cause for a problem, the Troubleshooting section may suggest specific inspections or instrument tests be done. These inspections and tests will help identify which of the causes is most probable.

During a diagnosis of the hydraulic system, remember that correct oil flow and pressure are necessary for correct operation. The output of the pump(Oil flow) increases as the engine speed increases and decreases when engine speed is decreased. Oil pressure is caused by resistance to the flow of oil.

※ Service equipment and tool

- Stop watch
- Magnet
- Digital thermometer
- mm(Inch) ruler for basic tests to measure

(1) Drift rates in the hydraulic circuits

Circuit drift is caused by leakage past cylinder pistons, control valve spools, load check valves or makeup valves.

Excessive drift can be caused by problem with any one or combination of components.

(2) Cycle times in the hydraulic circuits

Cycle times that are longer than shown in the charts are the result of leakage, pump wear and/or pump speed(rpm). If the basic operation checks indicate excessive circuit leakage, then pressure tests are needed to determine which components have a problem.

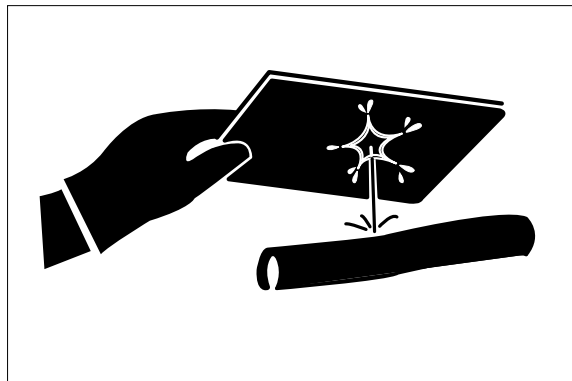
2) VISUAL CHECKS

A visual inspection of the hydraulic system and its components is the first step when identifying a problem. Stop the engine and lower the blade to the ground. To remove the tank breather cap, slowly turn the breather cap until it is loose. If oil comes out, let the tank pressure lower before the breather cap is removed. Make the following inspections :



⚠ Do not check for leaks with your hands.

Pin hole(Very small) leaks can result in a high velocity oil stream that will be invisible close to the hose. This oil can penetrate the skin and cause personal injury. Use cardboard or paper to locate pin hole leaks.



- (1) Check all hydraulic oil line connections for damage and leaks.
- (2) Follow all hydraulic oil lines from the cylinder connections to the valve connections. Check the lines and connections for damage and leaks.
- (3) Check the control valves for leaks.
- (4) Check the pump and connections for damage and leaks.
- (5) Follow the pump lines to the tank and valves. Check the lines and tank for damage and leaks.
- (6) Check tank oil level.
- (7) Use a clear bottle or container to get an oil sample from the tank immediately after the machine is stopped. Check for air bubbles in the oil sample.
- (8) Remove the hydraulic oil filter and check for particles removed from the oil by the hydraulic oil filter. A magnet will separate ferrous particles from nonferrous particles(Piston rings, O-rings, seals, etc.).
- (9) Inspect control linkage for bent, broken or damaged components.

2. LIFT CYLINDER ROD DRIFT TEST

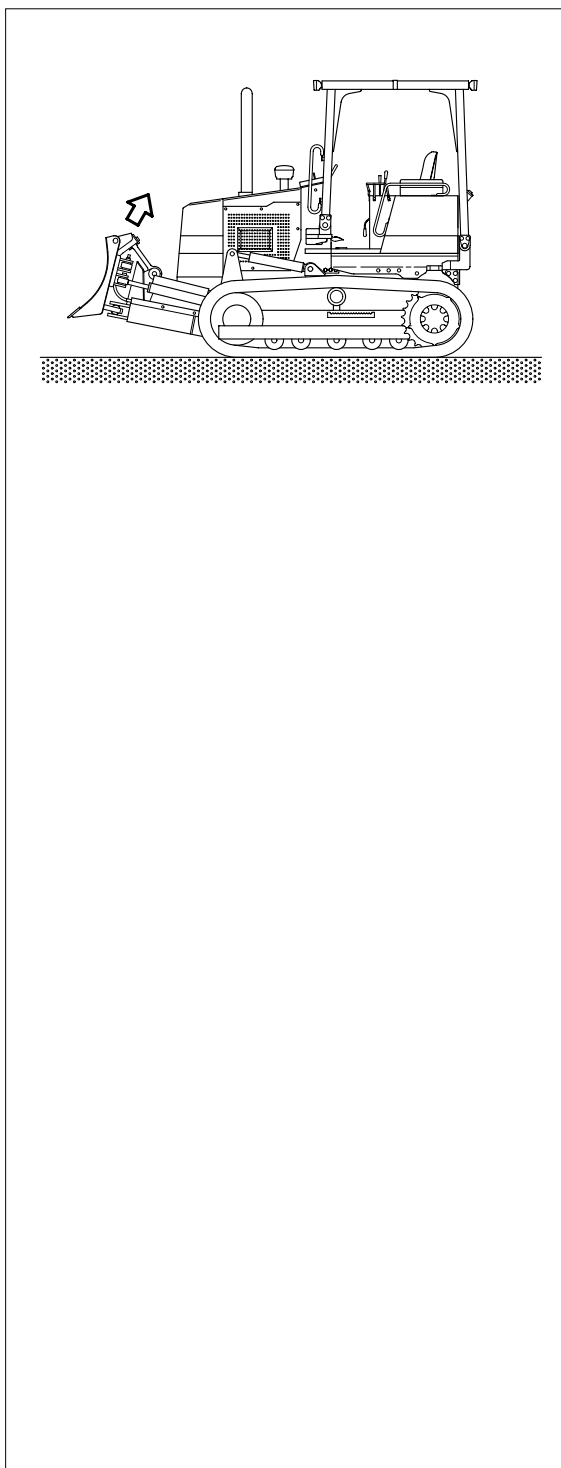
- The drift rates will change with different conditions of the hydraulic components as well as with the operation, hydraulic oil temperature, etc. Before measuring drift on the cylinder rod, the cylinders must be extended at least five times. Measure rod drift using the following procedure.

- 1) The oil in the hydraulic system must be at operating temperature of 50°C(122°F).
 - 2) Lift the dozer blade maximum height position. With the attachment control lever in HOLD position, stop the engine.
 - 3) Measure the length of the lift cylinder rods and make a record of the measurements.
 - 4) Measure the distance(And check the time) that the cylinders extend with the chart.
- ※ **The drift distances in the charts are for new machines.**

Oil temperature	About 50°C(122°F)
Max permissible drift	20mm(0.79in)
Time interval	5 minute

Too much lift cylinder rod drift is caused by

- 1) Loose oil line connections and condition of the oil hoses between the control valve and the rod ends of the lift cylinders.
- 2) Leakage around the piston seals in the lift cylinders.
- 3) Leakage in the control valve(Worn valve section and spool valve and/or makeup valve not on its seat).



- When there is too much drift with the hydraulic oil temperature below 50°C (122° F), and there is no leak in the lines to the lift cylinders, make another test.

- 1) Start the engine. Move the control lever to the LOWER position. When the rods from the lift cylinders are extended and the front of the track is off the ground, stop the engine.
- 2) Disconnect the oil lines from the rod end of each lift cylinder.
- 3) When only a very small amount of oil comes from the open oil line connection on the lift cylinder, the seals on the piston are not the cause of too much cylinder rod drift.

※ **When the piston seals in the lift cylinders are not the cause of too much drift, the control valve is the cause(Check valve not on its seat and/or worn valve spool and valve section).**



3. TILT CYLINDER ROD DRIFT TEST

- Measure tilt cylinder rod drift using the following procedure

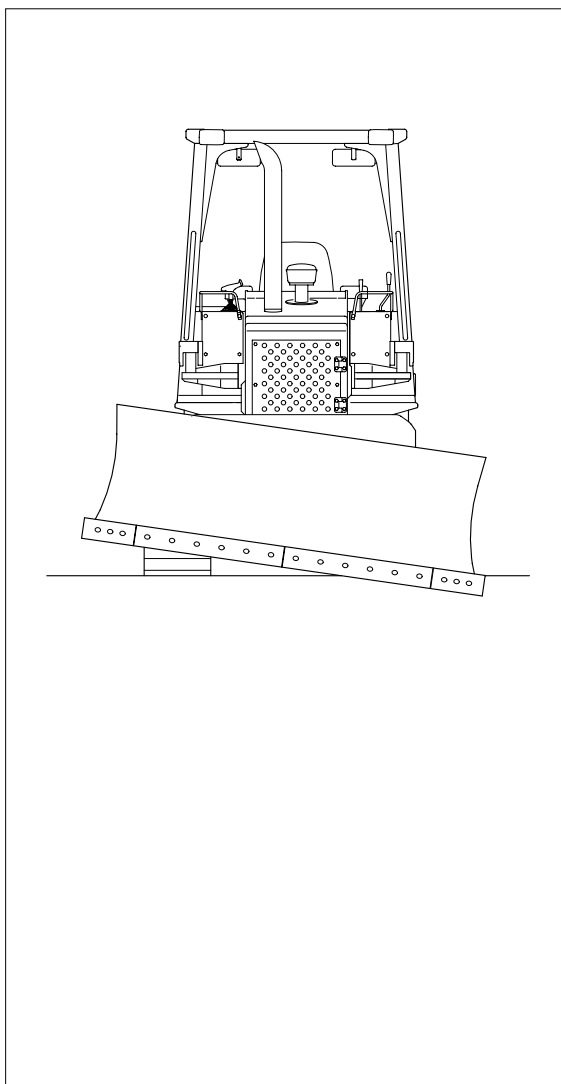
- 1) Full retract tilt cylinder.
- 2) Lower dozer blade to lift the front idlers off the ground. With the lift and tilt control valves in HOLD position, stop the engine.
- 3) Measure the distance(And check the time) that the tilt cylinder extends with the chart.

※ **The drift distances in the chart are for new machines.**

Oil temperature	About 50°C(122°F)
Max permissible drift	20mm(0.79in)
Time interval	5 minute

Too much lift cylinder rod drift is caused by

- 1) Loose oil line connections and condition of the oil hoses between the control valve and the rod end of the tilt cylinder.
- 2) Leakage around the piston seals in the lift cylinder.
- 3) Leakage in the control valve(Worn valve section and spool valve).



4. CYCLE TIME TEST

- **SPECIFICATION**

Oil temperature ----- 50°C(122°F)

Engine speed ----- High idle

Function	Operating conditions	Maximum cycle time(Seconds)
Dozer blade raise	Blade flat on ground to full height.	2.92 ± 0.4