

NEW ZEALAND GOVERNMENT RAILWAYS	HYDROSTATIC AND MECHANICAL LUBRICATORS	CODE No. 49	
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(a) HYDROSTATIC LUBRICATORS.

(1) Application:-

Hydrostatic lubricators must be erected so that the feeds are clearly visible and a uniform fall of not less than $\frac{3}{4}$ in. per foot is provided for the delivery pipes.

The lubricator steam pipe should be 1 in. external diameter copper pipe No.12, S.W.G., and the delivery pipes $\frac{1}{2}$ in. external diameter copper pipe No.14, S.W.G

(2) Repairs:-

When locomotives are shopped for class "A" repairs, hydrostatic lubricators are to be dismantled and overhauled.

Castings are to be cleaned and the residue removed from the reservoirs. Delivery valves and choke-valves must be reground and resealed, and filling plugs refaced if necessary. Internal oilways, equalizing pipes, and atomizing holes in choke-valves must be blown out and all carbon deposit removed.

(3) Testing:-

After repairs have been completed hydrostatic lubricators must be assembled and-subjected to bench tests to determine fractures in the interior walls. The feed valves must be closed, and air connected to the drain valve in the oil-reservoir. Air escaping from the delivery pipe nipples denotes a fracture in the wall between the oil reservoir and the sight-feed chamber, a defect that necessitates the scrapping of the lubricator. In such cases, all detachable fittings that are in good order must be removed and forwarded to Reclaim Department.

All hydrostatic lubricators must be tested when assembled in position after an overhaul, with the boilers at working pressure. The method of testing is as follows:-

- (a) Open drain-valve of sight-feed chamber, drain out the water, and close drain-valve again.
- (b) Fill oil reservoir with cylinder oil.
- (c) Open water-valve full open and open steam valves on turret and on lubricator condenser.
- (d) Adjust feeds, and if feeds are sluggish or do not respond to adjustment, close all feed regulating-valves and water-valve.
- (e) Open drain-valve of sight-feed chamber and close steam-valve. If the lubricator is defective, the pressure stored in the oil reservoir will blow a foamy mass of oil out through the sight-feed drains.

Feeds and chokes are to be blown out when engine-drivers report that lubricators are not feeding efficiently, and if these operations do not remedy the defects, the lubricators must be subjected to the, test outlined above.

(4) Operation:-

After the lubricators have been filled with oil and the filling-plugs replaced, the water valves must be opened to compensate for the expansion of the oil whilst heating.

The rate of feed required varies according to the type of lubricator, and the size of the orifices in the feed nozzles. Assuming that all four feeds are in use, and the sizes of the orifices are such that a pint of cylinder oil contains 1,500 drops, the following table is given as a guide to the quantity of oil required for efficient lubrication

RATE OF FEED (4-feed valves)	NUMBER OF PINTS OF OIL CONSUMED		
	In 4 Hours.	In 8 Hours.	In 12 Hours.
1 drop per 2 mins.	0.32	0.64	0.96
1 drop per min.	0.64	1.28	1.92
2 drops per min.	1.28	2.56	3.84
3 drops per min.	1.92	3.84	5.76
4 drops per min.	2.56	5.12	7.68

Care must be exercised to ensure that all valves on lubricators, including the steam valve, are closed before engines are put away.

(b) MECHANICAL LUBRICATORS.

(1) Operation

Mechanical lubricators on locomotives are operated by ratchet drives connected to the motion-gear propelling the eccentrics that in turn impart a reciprocating motion to the pump plungers.

When the plungers are at the outer end of the stroke oil flows into the pump barrel through the ports, and as soon as the ports are covered by the plungers on the return stroke, the oil in the pump barrel is forced through the outlets to the anti-carbonizers. Four feed-valves which are connected to the cylinders and valves through the anti-carbonizers are provided in each lubricator.

The rate of food is controlled by regulating-plugs, which, if screwed hard down on the plungers, permit the pumps to work at full capacity, each full turn outwards decreasing the oil feed by one-fifth, five full turns outwards cutting off the oil

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feed altogether.

In addition to the regulating-plug feed adjustment, the rate of feed can be varied by altering the position of the connecting-rod between the ratchet and the motion-gear. On no account must adjustments be made to the position of the ratchet gear by locomotive crews after the feed has been regulated by the Locomotive Depot staff.

Oil from the lubricators is pumped through to the anti-carbonizers, where it is atomized before entering the valves and cylinders.

For the anti-carbonizers to function efficiently, the steam supply to the lubricator must be kept on all the time the locomotive is working, when drifting as well as when the regulator is open;

(2) Oil-supply:-

Steam is delivered to the lubricator-reservoirs at low pressure, to provide the oil with the required fluidity.

The regulator-plugs controlling the oil-supply must be set by the Locomotive Depot staff, the rate of feed varying according to the class of locomotive fitted.

The quantity of oil required for any class of locomotive on any district should not exceed 1½ pints per 100 miles. Oil gauges are provided, and the quantity of oil in any lubricator must never exceed 7 pints, which is indicated by the gauges showing the oil reservoirs slightly more than three-fourths full. The oil level must never be permitted to recede below the ports in the pump barrel.

The lids of mechanical lubricators are to be sealed, and on no account must the seals be broken other than by Locomotive Depot staff for the purpose of adjusting the regulator-plugs and executing minor repairs. The oil-supply must be replenished through the filling-plugs provided in the lubricator-lids:

(3) Repairs:-

Mechanical lubricators must be dismantled and overhauled when locomotives provided with this apparatus are shopped for class "A" repairs.

The castings are to be cleaned thoroughly and all residue removed from the oil reservoirs. Plungers, regulating-plugs, screens, and eccentrics are to be cleaned and overhauled and all valves reground and resealed. Oil delivery-pipes must be blown out, examined, and annealed before reassembly.

When a lubricator is not functioning correctly the Engine-driver shall make an entry to this effect in the Loco. 54 register, and the repairs are to be undertaken by the Depot staff as soon as possible. Repairs to lubricators must not be attempted by locomotive crews unless it is absolutely necessary.

(4) Testing:-

When the lubricators have been overhauled and reassembled on the locomotives, the oil regulating-plugs must be screwed down and the oil reservoirs filled with the requisite quantity of oil. The ratchet wheels should be worked by hand until oil appears at the test-plugs. This ensures that the lubricators are pumping efficiently, and after the ratchet wheels have been rotated another six or seven times so that the delivery pipes are filled to capacity, the regulating-plugs may be adjusted under actual service conditions.

Engine-drivers shall perform the following tests approximately once each month, to ensure that the check-valves in the anti-carbonizers and in the lubricators are functioning correctly

- (a) Place the engine in mid-gear and blow steam back through the anti-carbonizers.
- (b) Release the test-plugs, and if steam escapes through the plug-holes, the ball-joints in the anti-carbonizers require attention.
- (c) Remove the filling-plug in the lubricator-lid, and if the oil in the reservoir is foamy, the check-valves in the lubricator require attention.

If the above tests reveal that the check-valves require reseating, the repairs must be booked for immediate attention.

(5) Inspections:-

Locomotive Foremen must arrange frequent inspections to ensure that the lubricators on locomotives under their supervision are maintained in good working order, and that defects reported by locomotive crews receive prompt attention, so that increases in oil consumption due to defective lubricators are frustrated.