

Kent & East Sussex Railway

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Wakefield 'Eureka' Lubricators



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Version: 1 Date: 02/09/2014

Description

The Wakefield 'Eureka' Sight Feed Lubricator is of the hydrostatic type. The one piece lubricator is of cast iron and incorporates the condensing chamber, the oil reservoir, and the sight-feed chamber. Passages within the body of the lubricator inter-connect each of these areas. Cast integral with the body are two lugs used for mounting the lubricator in the cab of the locomotive.

A filler plug is screwed into a projecting boss on the front of the body to allow for filling the oil reservoir. The position of the filler is such that the top of the threaded hole is the level to which the lubricator is to be filled. A drain plug is situated on the lower front of the body to allow for the oil reservoir to be drained. Screwed into the base of the reservoir is the pressure-relief valve. This relief valve consists of a body, cap-nut, spring, and valve. The spring is compressed between the valve and the cap-nut sufficient to keep the valve shut when under normal operating conditions.

A water control-valve, situated within the base of the body, isolates the supply from the condensing chamber entering the oil reservoir. The water control-valve consists of: a housing, spindle, seat, handle, gland packing, gland nut, and a non-return ball valve. The seat incorporates the non-return ball valve. This ball valve, fitted to prevent the possibility of oil passing into the condensing chamber, is housed between a pin fitted through the seat and a plug which is screwed into the top of the seat. The seat is screwed into the body of the lubricator beneath the passage from the condensing chamber. Below the seat is the housing through which the spindle is screwed. A face on the spindle mates with the seat. The gland packing, follower, and gland-nut seal against water loss past the spindle. The handle locates on flats machined on the lower end of the spindle and is secured by a set screw.

An oil regulating valve, fitted within the base of the sight-feed chamber, regulates oil supply from the lubricator. The valve assembly is similar to the water valve, except that a sight-feed nipple is screwed into the valve seat and secures the non-return ball valve.

The sight-feed chamber can incorporate two sight glasses, each of which is mounted on opposite sides of the sight-feed nipple such that the tip of the nipple is visible by viewing through one of the sight glasses. A fibre washer is interposed between the glass and the housing, and a rubber packing is fitted over the glass. A sight glass follower is screwed into the housing to bear against and compress the rubber packing to form a steam-tight seal. A drain plug is incorporated in the lower side portion of the sight-feed chamber to enable the chamber to be drained.

Principle of Operation

Steam enters the condensing chamber and condenses into water, filling the passage down to the water valve. Steam also flows along the passage to the delivery pipe, some of which condenses in the 'dead-leg' that is the sight-feed chamber. When the water valve is opened, water enters the bottom of the oil reservoir, displaces the oil and causes it to rise and fill the oil passage down to the oil regulating valve.

When the oil regulation valve is opened, the oil – which is now subjected to boiler pressure plus that due to the head of water acting upon the oil in the reservoir – is forced up through the feed nipple and into the water in the sight-feed chamber. The drop of oil rises up through the water in the passage above the sight-feed chamber and, upon reaching the surface, is carried away by the action of the steam passing along the delivery pipe to the steam chest.

Operating Instructions

Warning:

1. This type of lubricator is subjected to steam at boiler pressure. It can burn unprotected skin. Take care during filling and setting the lubricator.
2. Do not remove the oil filler or drain plugs without first isolating the steam supply and reducing the pressure within the oil reservoir.

Filling

Prior to filling the lubricator make sure that:

1. The oil regulating valve and water valve are shut.
2. The steam supply valves are shut off.

If the engine is in steam, wait until the steam pressure within the lubricator has dissipated through the steam chest before continuing.

To Fill

1. If no pipework is connected to the oil reservoir drain, and if practical to do so place a bucket or similar suitable container under the reservoir drain plug.
2. Slowly open the drain plug. Allow any remaining steam pressure to slowly escape and drain of the water into the bucket.

Note: If the lubricator is cold, not all the water may drain away. This is because of the airlock created within the oil reservoir. Removal of the oil filler-plug will destroy this airlock and allow the water to drain away.

3. Slacken and carefully remove the oil filler plug.
4. Shut the oil-reservoir drain plug after all the water has drained from the oil reservoir.

5. Using the correct grade of cylinder oil, fill the lubricator to just below the filler opening.

Note: If sufficient oil is not available to accomplish this, top-up the reservoir with clean water. This ensures the lubricator will function immediately when required.

6. Clean the seating faces on the oil filler plug and lubricator body before refitting the plug.

Setting

Set the lubricator to work about ten minutes before the engine is due to start work.

To set

1. Open the main steam supply valves.
2. Allow approximately five minutes for the steam to condense in the reservoir and sight-feed chamber.
3. Fully open the water control valve.
4. Slowly open the oil regulating-valve.
5. Through the sight glass, observe the rate of the oil feed. Regulate this feed to approximately one drop every twenty seconds (unless otherwise specified).

Shutting off

After the engine has finished its turn of duty and prior to refilling:

1. Close the oil regulating valve.
2. Close the water control valve.
3. Close the steam supply valves.

Caution

In the event of freezing weather conditions it is necessary to drain all water from the reservoir and sight feed chambers to prevent frost damage.

Maintenance

The only maintenance necessary is the periodical internal cleaning of the sight glasses and oil reservoir.

Sight Glass Cleaning

The water within the sight feed chamber can sometimes become cloudy, usually as a result of closing the steam supply valve while the oil regulating valve is still open. In this event the sight glass can be drained and cleaned as follows.

1. Close the oil regulating valve, water control valve and steam supply valve.
2. Slowly open the sight feed chamber drain plug to allow the water and steam to drain off.

3. Being careful to avoid contact with the steam escaping from the sight-feed chamber drain, slowly open the steam supply valve. Allow the steam to blow through long enough only to clean the interior of the sight glasses.
4. Close the sight feed chamber drain plug.
5. Before re-setting the lubricator, allow sufficient time for the steam to condense and the sight feed chamber to refill with water.

Oil Reservoir Cleaning

Over a period of time, sludge and dirt can accumulate within the oil reservoir which may lead to blockages and inefficient operation of the lubricator. To prevent this occurring regular cleaning of the oil reservoir, by blowing it through with steam, is required. This is achieved as follows:

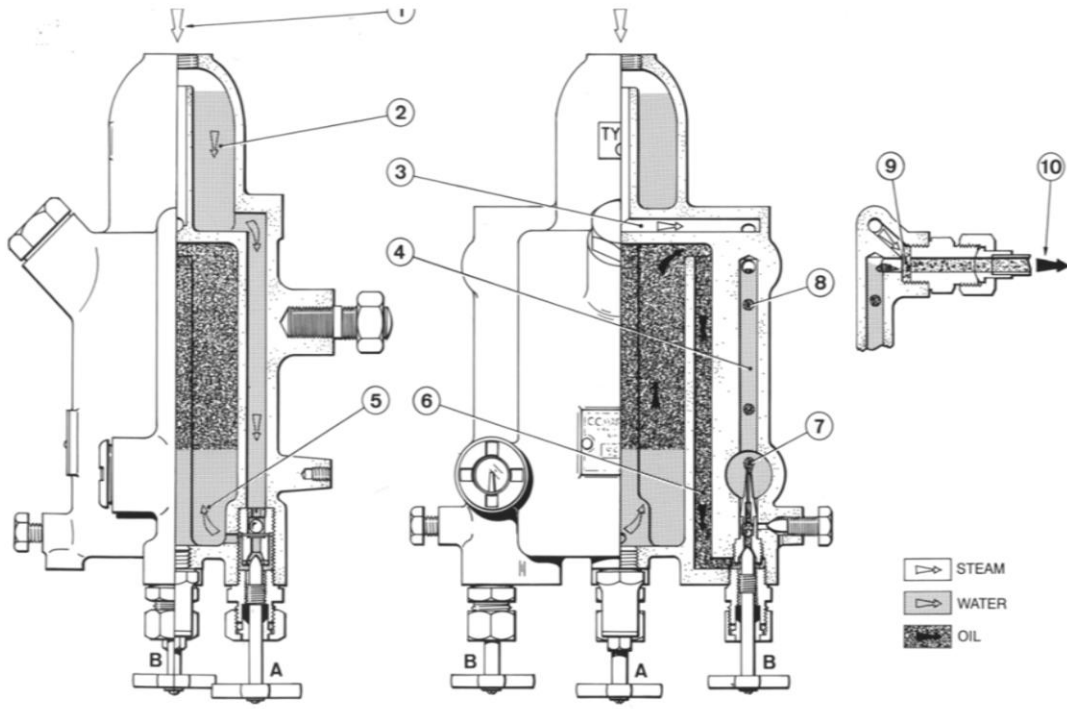
1. Close the oil regulating valve, water control valve and the steam supply valve and allow sufficient time for the pressure within the lubricator to dissipate.
2. Open the water control valve and carefully open the oil reservoir drain plug to drain off the oil and water from the reservoir.
3. Being careful to avoid steam escaping from the oil reservoir drain, slowly open the steam valve.
4. Allow sufficient time for the steam to blow through and clean the oil reservoir prior to shutting of the steam supply valve and closing the oil reservoir valve.

Erratic Oil Feed

If the feed from the lubricator is erratic when the engine is stationary, it may be the result of an obstruction in the oil feed to the sight feed nipple. It may be possible to clear this obstruction, by slightly increasing the differential pressure of the oil feed and so force away the blockage. Increasing this pressure is achieved as follows.

1. Close down the lubricator by shutting off the oil regulating valve, water control valve and steam valve.
2. Allow the steam pressure in the feed supply pipe to the steam chest to dissipate,
3. Drain the sight feed chamber of the affected oil feed.
4. With the drain of this sight feed chamber open; fully open the affected oil regulating valve.
5. Open the water control valve fully and taking care to avoid contact with steam escaping from the drain plug of the sight glass chamber, slightly open the steam valve.

The effect of the above procedure is to slightly reduce the pressure in the sight feed chamber, thus increasing the hydrostatic pressure of the oil. If this fails to clear the obstruction, open and shut the regulating valve three or four times. If the obstruction still fails to clear, it will be necessary to close down the lubricator, drain the oil reservoir, and removal of the oil regulating valve and the sight feed nipple assembly by the shed fitting staff for attention and cleaning.



Steam enters the lubricator.
 Condensate is formed in the Condensing Chamber and the passage to the Water Control Valve.
 Steam passes through the Steam Passage to the point of delivery in the steam chest.
 Condensate is formed in the Sight-feed Chamber.
 When the Water Control Valve (A) is opened, water passes into the Oil Reservoir.
 The oil is displaced by the water and passes into the Oil Passage, and down to the Oil Regulating Valve (B).

7. The head of water in the Condensing Chamber exerts a pressure on the oil, over and above the steam pressure applied to the lubricator. This causes the oil to flow from the Sight-feed Nipple when the Oil Regulating Valve (B) is opened.
 8. Oil rises through the water in the Sight-feed Chamber.
 9. The oil, when it reaches the surface of the water, is broken up into globules by the action of the steam flow.
 10. The oil is carried in the steam flow to the point of delivery in the steam chest.

