Ford Motor Company

FORD LABORATORY TEST METHOD BJ 001-03

METHOD OF DETERMINING LUBRICATION AND ANTI-WEAR PROPERTIES OF HYDRAULIC FLUIDS

Application

This procedure describes a method of gauging the protection of a petroleum-based hydraulic fluid against corrosion, oxidation and physical wear. For modifications to cover water-oil emulsion and water glycol hydraulic fluids, contact Ford Motor Company, Manufacturing Processes Laboratory, 24500 Glendale, Redford, MI 48239, Tel. (313) 592-2396.

Abstract

A test fluid is circulated by a pump of prescribed capacity at a specified pressure, flow and temperature. The magnitude of metallic wear on the interior pre-weighed pump components as determined by weight loss over a given time period is a method of gauging the lubrication and anti-wear properties of the test fluid. Changes in the fluid, as a result of pumping, are a measure of oxidation of the fluid. Changes in pump components, other than by wear, may be a measure of corrosion.

Apparatus Required

Hydraulic Pump
75 L/minute at 1800 R.P.M. vane type V124-Vickers.

Electric Motor
1800 R.P.M., 15 H.P. minimum.

Reservoir
95 L capacity, stainless steel elevated above pump.

Pressure Relief Valve
Adjustable - 0 - 13.8 MPa

Flow Meter

Heat Exchanger

Temperature Sensing and Regulating Device

Date	Action	Revisions
2001 07 23	Revised	Editorial – no technical change A. Cockman
1992 05 05		

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Replaceable Type Filer, Gages and Associated Pipe
To assemble a closed loop hydraulic circuit.

(See test stand diagram - Figure 1)

Analytical Balance
Precision of +/- 0.1 mg

Materials Required

Trichloroethane
M5B58A Caution: TLV = 350 ppm - Refer to Industrial Hygiene Bulletin No. 14.

Acetone
Caution: Low flash point. Refer to Fire Control Bulletin No. 18.

Methanol
Absolute. Caution: Low flash point. Refer to Fire Control Bulletin No. 18.

Test Condition

Duration
1000 h continuous or until apparent excessive wear as determined by high noise level, excessive drive motor current, or low flow dictates termination of test.

Pressure
6.9 MPa.

Pump R.P.M.
1800 R.P.M, shaft speed, basic less slippage of electric drive motor.

Reservoir Capacity
95 L capacity. Fill to be limited to one time pump volume on a per minute basis, i.e. 75 L/min = 75 L reservoir fill.

Temperature
66 +/- 1 °C initial reservoir. The reservoir oil temperature may increase to 74 °C as the 1000 h test termination period approaches. (If the test fluid oxidizes, heat exchange heat transfer may be reduced by oxide deposits.)

Conditioning and Test Conditions

All test values indicated herein are based on material conditioned in a controlled atmosphere of 23 +/- 2 °C and 50 +/- 5 % relative humidity for not less than 24 h prior to testing and tested under the same conditions unless otherwise specified.

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