

Hydraulic Fluids Procedures

- ◆ Vickers/Eaton 35VQ25A
- ◆ Parker/Denison T6H20C
- ◆ Denison P46
- ◆ Vickers/Eaton 104-C
- ◆ In-Vehicle Evaluations for Fuels and Lubricants

Vickers/Eaton 35VQ25A (D 6973)

Specifications

This procedure covers anti-wear hydraulic fluid (Form M-2952-S).

Objective

The objective of this procedure is to evaluate the anti-wear characteristics of hydraulic oil by means of weight loss on the cam ring and the vanes of a Model 35VQ25A pump.

Procedure fixture

A vane pump is driven by a variable speed plastic drive motor. Associated flow control, reservoir and heat exchanger equipment combine to provide substantial flexibility for various operating conditions.

Procedure parameters

Procedure duration is 50 hours per cartridge with a pump outlet pressure of 3,000 psi and an inlet oil temperature of 203°F.

The first three, or four out of five cartridges, must pass (less than 90 mg combined weight loss).

Denison P46 (Obsolete, but still available)

Specifications

This procedure covers Denison HF-O high-performance fluid suitable for both axial-flow piston pumps and vane pumps.

Objective

The objective of this procedure is to determine the effect of a hydraulic fluid on flow, deposits, and wear in a Denison 46 series piston pump.

Procedure fixture

A Cummins L-10 diesel engine equipped with a speed-increasing gearbox coupled with a 46 series pump, a 46 series motor, and a Denison charge pump are employed as the major items.

Procedure parameters

Procedure duration is 100 hours. Piston pump outlet pressure is 5,000 psi. Two temperature stages are run, one for 60 hours at 160°F and one for 40 hours at 210°F.

Vickers/Eaton 104-C

Specifications

The Vickers/Eaton 104-C vane pump is used for several ATF and hydraulic fluid testing applications.

Objective

This test is used to screen for fluid anti-wear characteristics using a vane pump.

Example: ASTM D 7043 procedure

Procedure Fixture

Electric motor driven pump stand with temperature and output pressure control. Has data logging and flow monitoring.

Procedure parameter

Operational parameters vary by test procedures used.

Parker/Denison T6H20C

Specifications

This procedure covers Denison HF-O high performance fluid suitable for both axial-flow piston pumps and vane pumps.

Objective

The objective of this procedure is to determine the effect of a hydraulic fluid on flow, deposits, wear, and filter plugging in a T6h20C hybrid pump under cyclic conditions.

Procedure fixture

Parker/Denison T6H20C certified test stand is used; electric motor driver, cyclic pressure conditions, Parker/Denison pre-measured hybrid test pumps, computer-controlled with automated high-speed data logging.

Procedure parameters

Dry and wet, phase of 608 hours total length, 1700 rpm at pump shaft, outlet pressures from 0 to 300 bar, fluid temperature from 80 to 110 degrees C.

In-Vehicle Evaluations for Fuels and Lubricants

Fuel Injector Plugging

Current production vehicles equipped with MPFI systems have encountered injector plugging problems that have been associated with the use of gasolines that do not contain adequate amounts of detergents. In severe cases this problem can render a vehicle inoperative. The major effort of this procedure is to reproduce fuel injector plugging under controlled conditions and assess the effect of fuel additives as they relate to injector "clean-up" and "keep-clean." The keep-clean Procedure is now available as an ASTM Procedure (D 5598).

Evaluations of injector flows and spray patterns are conducted during the procedure. In addition, subjective evaluations of vehicle driveability and performance can also be performed. Fuel injector spray patterns can be photo-documented to provide a visual record of procedure results.

Intake System Deposits

Various vehicle procedure programs are conducted in order to assess the affect of fuels and fuel additives on intake and combustion system deposits, and particularly on intake valve deposits. The ability of unleaded gasolines to control intake valve deposit formation can be evaluated with fleet Procedures, the most popular of which is the SwRI-BMW NA 10,000-Mile Intake Valve Deposit and ASTM D 5500 Procedures.

Road Evaluations for Turbocharger Engine Oils

The usage of turbocharger-equipped vehicles has led to the development of highly specialized engine lubricants. SwRI developed an over-the-road, in-service Procedure to evaluate the performance of new oils as they relate to turbo and engine component wear.

Vehicle Driveability and Performance Testing

SAE and CRC-type vehicle driveability and performance procedures are used to measure vehicle operation as it relates to the evaluation of fuels, additives, and vehicle components. On-site track facilities, trained personnel, and specialized equipment necessary for the procedures are immediately available.

Vehicle Octane Requirement and ORI evaluations

Fleet programs for octane requirement and octane requirement increase are conducted as an assessment of engine operating parameters as related to fuel octane number and combustion requirements. The CRC-E 15 road procedure method is used for these evaluations, and the prescribed reference fuels are kept on inventory at SwRI.

In-Service Fleet and Field Procedure Evaluations

SwRI routinely provides its clients a broad base of commercial fleets to evaluate fuels, lubricants, hardware, and aftermarket components. These evaluations are tailored, in many instances, to meet specific research and marketing requirements of the industry. These fleets include heavy- and light-duty commercial trucks, buses, taxis, municipal police, and individually-owned vehicles.

Intake Valve Sticking Evaluations

Vehicle procedure programs are conducted to assess the effect of fuels and fuel additives on intake valve sticking. The ability of fuels to prevent intake valve stem deposits from causing the intake valves to stick at cold temperatures (-20°C) can be evaluated.

Combustion Chamber Deposit Evaluations

Fleet studies are conducted evaluating the tendency of various fuels to form deposits on the piston tops and cylinder head combustion chambers of various automobile engines. The capability of fuel additives to remove previously formed combustion chamber deposits can also be evaluated. The deposit levels are determined by both thickness and weight following cylinder head removal.

Mileage Accumulation Dynamometers

For rapid, cost-effective automotive testing, SwRI offers around-the-clock mileage accumulation at speeds up to 100 mph. To complement its fleet testing capabilities, the Institute has installed twelve mileage accumulation dynamometers (MADs) that accommodate most cars and light trucks up to 7,000 pounds. Virtually any transient or steady-state driving cycle can be accurately reproduced in this facility. Using this equipment, SwRI can evaluate the durability and performance of various automotive fluids, fuels, components, and emissions control systems.

