Shear Stability Tester

Test Method

Lubricants are often subjected to mechanical shearing, for example in automotive engines. This shearing causes lubricants to lose their viscosity. When subjected to sufficiently large number of cycles of shear, viscosity may drop below acceptable levels and may call of replacement failing which surfaces may become prone to higher wear. Even lubricants that have consistent viscosity through a wide temperature range (high viscosity index) may still be susceptible to loss of viscosity when subjected the mechanical shearing.

Shear Stability Tester

As the name suggests, the Shear Stability Tester is an instrument used to determine an oils ability to retain its viscosity over a number of cycles of shear. The test oil is first measured for its initial viscosity after which it is subjected to shearing in intervals of 30 cycles. Viscosity is measured and compared to the oils initial viscosity following 30, 90 and 120 cycles. Oils that show a lower drop in viscosity over the duration of test are said to have better shear stability than oils that exhibit a relatively higher drop

Instrument Hardware and Electronics

The Shear Stability Tester is a floor standing, electro mechanical instrument. It has a frame that holds a fluid reservoir, a double plunger pump with an electric motor drive, an atomization chamber with a diesel injector spray nozzle and a fluid cooling vessel, amongst other electronics and mechanical components.

The frame is designed to be sufficiently rigid to avoid deformations and vibrations that may interfere with the test under normal operation. The fluid reservoir, which is open on the top has a fluid capacity of 250 ml. The reservoir is fitted with an internal fluid distributor plate. This plate reduces the tendency of fluid channeling. The reservoir also has a port for a thermometer which is used to measure fluid temperature. The outlet from the reservoir is equipped with a cone type three-way stopcock with a non-exchangeable solid plug. Transparent tubing connects the stopcock to the inlet port of the pump.

The drive consists of a motor that drives the shaft of the double-plunger injection pump at the required rpm. The pump injects oil through two outlet pipes, combined to form single high pressure tubing with the oil pressure measured by a pressure gauge before it is atomized by a nozzle injector. The pump has a venting screw and another screw to adjust flow rate.

Fluid exits the pump and into high pressure steel tubing which is connected to a nozzle. The line also has a glycerol filled pressure gauge connected to it, to measure fluid pressure. It is separated from the line using a pressure snubber or needle valve to suitably dampen pressure surges.

Pressurized fluid exits the nozzle and enters the atomization chamber, which is designed to minimize foaming. The oil then flows to a distributor plate made of stainless steel having slots on the circumference. This distributor plate is located on the top face of the cooling chamber. The circumferential slots directs sheared oil such that it flows on to the walls of the glass tube.

Oil from the cooling chamber then flows into the oil reservoir. There is also a stopcock between the cooling chamber and the reservoir that allows users to stop the mixing of sheared oil with the oil in the reservoir which is necessary during the cleaning procedure.

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Oil temperature is measured by a suspended thermocouple in the center of the fluid reservoir. The bottom of fluid reservoir is connected by a transparent tube to a three-way stop cock made of solid plug. One outlet of the stop cock is connected to the injector pump and the other to a drain.

Fluid cooling vessel is used to maintain the specified temperature of the test fluid as indicated at the outlet of the fluid reservoir. The cooling reservoir requires an inlet of water with the ability to control flow rate. The instrument also includes a stroke counter to set test duration.

Specifications

Conforms to the specifications of:
ASTM D6278, D7109; IP 294; DIN 51382;
CEC L-14-93
Injector Nozzle: Bosch DN 8 S2
Nozzle Holder: Bosch KD 43 SA 53/15
Diesel Injection Fuel Pump: Bosch PE 2A 90D 300/3S 2266
Electric Motor: 1.1/925 ±25 Kw/RPM
Dead Volume: 20 ±5 mL
Injector breaking pressure: 175 bar
Flow Rate: 170 ±5 mL/min
Oil Temperature: Ambient (20 to 25) to 30 to 35°C
Electrical Requirements:
*415V / 60Hz / 3Ph / 1.5HP
*415V / 50Hz / 3Ph / 1.5HP

* Other voltages available upon request

Included Accessories

Thermometer
Operation and Maintenance Manual
Preset Revolution Counter
Tool Kit

Ordering Information

Catalog No.	
K95701	Shear Stability Tester, 415V 60 Hz, 3 Phase
K95791	Shear Stability Tester, 415V 50 Hz, 3 Phase
	Accessories
K95791-1	Sound Proof Wooden Cabinet
K95791-2	Nozzle Test Apparatus

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