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KN-2509 Timken Load Tester

Overview

KN-2509 Timken load tester is one of the most widely recognized testers for evaluating the load carrying capacity of extreme pressure lubricants. This tester evaluates fluid lubricants and greases containing extreme-pressure additives. Applicable Standard: ***ASTM D2509-93 Standard Test Method for Measurement of Load-Carrying Capacity of Lubricating Grease (Timken Method)*** and ***ASTM D2782-94 Standard Test Method for Measurement of Extreme-Pressure Properties of Lubricating Fluids (Timken Method)***.

Working conditions

1. At room temperature within 10-35 ° C, Relative humidity ≤80%;
2. the surrounding no vibration, no corrosive media and no strong magnetic field interference in the environment;
3. The fluctuation range of the supply voltage shall not exceed ± 10% of the rated voltage;
4. Install horizontally on a solid basis.

Technical parameters

1. Max. test force: 5000N
2. Accuracy for test force: ±1%
3. Max. friction force: 300N
4. Accuracy for friction force: ±2%
5. Spindle speed range: 100~3000r/min
6. Spindle speed error: ±2%
7. Spindle speed display range: 0-9999999
8. Time display range: 0~9999s or min
9. Test temperature: Ambient~300℃
10. Temperature control accuracy: ±2%
11. Dimension: 1000*700*1470mm
12. Weight: 700kg

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KN-2783 Manual Four ball Wear Tester

Overview

KN-2783 Manual Four ball Wear Tester is used to test the Wear Preventive (WP) and Extreme Pressure (EP) characteristics of greases and lubricating oils in sliding steel-on-steel applications. It conforms to the ***ASTM D2783, ASTM D2266 and ASTM D4172 Standard Test Method for Wear Preventive Characteristics of Lubricating Fluid (Four-Ball Method)***.The tester adopts sliding friction, under the high point contact pressure, to evaluate the carrying capacity of the lubricant. It includes the maximum nonseizure load PB, sintering load PD and composite wear value ZMZ three items indexes. The tested is also used for the long-time abrasion resistance tests, to measure the friction coefficient.

Features

1. Large screen panel operation.
2. Equipped with tool cabinet.

Technical parameters

1. Test force range (stepless): 60N-10kN
2. Test force display value relative error: ±1%
3. Test force long-time-kept value error: ±1% F.S
4. Friction force measurement range: 0-300N
5. Friction force measurement error: ±3%
6. Main axis rotate speed range (stepless): 200-2000r/min
7. Main axis rotate speed range error: ±10 r/min
8. Friction pair temperature controlling range: Room temperature~200℃
9. Friction pair temperature controlling error:±2℃
10. Test time controlling range: 1 s-99 h
11. Main axis rotate speed controlling range: 1-9999999r
12. Net weight: About 400kg
13. Test steel ball: Φ12.7mm

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KN-2783Z Automatic Four Ball Wear Tester

Overview

KN-2783Z Automatic Four Ball Wear Tester is used to test the Wear Preventive (WP) and Extreme Pressure (EP) characteristics of greases and lubricating oils in sliding steel-on-steel applications. It conforms to the ***ASTM D2783, ASTM D2266 and ASTM D4172 Standard Test Method for Wear Preventive Characteristics of Lubricating Fluid (Four-Ball Method)***.The tester adopts sliding friction, under the high point contact pressure, to evaluate the carrying capacity of the lubricant. It includes the maximum no seizure load PB, sintering load PD and composite wear value ZMZ three items indexes. The tested is also used for the long-time abrasion resistance tests, to measure the friction coefficient.

Working Condition

1. Temperature range:10~35℃
2. Related humidity≤80%
3. There is no vibration around, no corrosive medium and no electromagnetic field interference
4. The fluctuation range of the power supply voltage should not exceed ±10% of the rated voltage. The fluctuation range of the frequency should not exceed 2% of the rated frequency. The unbalanced voltage of the three-phase voltage should not exceed 10V.
5. Install the tester on a stable basis, the level should not exceed 0.2/1000.

Technical parameters

1. Test force range (stepless adjustable) 10N~10kN
2. Test force display value relative error ±1%
3. Test force long-time-kept value error ±1%F.S
4. Friction force measurement range 0~300N
5. Friction force measurement error ±2%
6. Main axis rotate speed range (stepless) 200~2000r/min
7. Main axis rotate speed range error ±10 r/min
8. Friction pair temperature controlling range Ambient~200oC
9. Friction pair temperature controlling error ±2oC
10. Test time controlling range 1s~99h
11. Computer displays recorded friction-time, friction coefficient-time, test force-time curve
12. Main axis rotate speed controlling range 1~9999999
13. Net dimension 980mm×750mm×1640mm
14. Net weight About 500kg
15. Test steel ball ϕ 12.7mm

KN-6079 Lubricity Using the High-Frequency Reciprocating Rig（HFRR）

Overview

According to ***ASTM D6079 Standard Test Method for Evaluating Lubricity of Diesel Fuels by the High-Frequency Reciprocating Rig (HFRR)***, used for the lubrication performance evaluation test of diesel engine fuel(including diesel fuel containing lubrication performance modifiers). The operation of the automatic constant temperature and humidity system is simple and easy, and the corresponding control area can be activated by clicking on the main control interface. No other operation steps are required. After the test is completed, the sampling data in the experimental process is closed and stored, and the operator's operation steps are reduced. Increased efficiency.

Features

1. Electromagnetic actuator: Energy conversation, stable and high control precision (no vibration and thrust is easy to control)
2. Push rod design: Push rod design adopts composite and custom made slide way, it features no transverse interference, high straightness of reciprocating motion displacement, stable displacement and good repeatability
3. Oil box design: Oil box design adopts 2ml marked line, convenience to add the oil
4. Steel ball chuck: Steel ball chuck is convenience to dismantle
5. Heater: Heater adopts PTC ceramic chip, it features uniform heating, safe, long service life no replacement
6. Sample Steel ball: Diameter: 6mm, material conforms to ANSIE-52100 28^{th} grade steel of ANSIB3.12, HRC: 58-66, Ra < 0.05μm
7. Test piece: Round steel which conforms to AISIE-52100 Standard HV30:190-210, Ra < 0.02μm
8. The whole system is installed to a steel pedestal to reduce the inner extra vibration

Software main function

1. While process monitoring of each parameter and data sampling period storage
2. Set the test parameter: Stroke length, reciprocating frequency, friction, test temperature and test time. It also can do the course setting to each parameter.
3. Control the mechanical part running time, it can keep monitoring the stroke length, reciprocating

frequency and sample temperature. When the temperature is at set value, the test will start till it reaches to the test time

4. Record and display the measuring result: Friction average value, oil film value and relevant curve
5. It can do the microscope communication to the wear scar measurement, call the wear picture and data directly to generate the test result and print
6. Wear scar measuring system Magnification: 100 times, Accuracy: 1μm, Computer captures the wear scar picture, measure the scar size and save the data. There is communication interface.

Technical Parameters

1. Reciprocating frequency: 10~60Hz, Accuracy: 1Hz
2. Reciprocating stroke: 0.01~2.5mm, Accuracy: 0.001mm
3. Test temperature: Room temperature~200℃, Accuracy:2℃
4. Load: 0.1~1kg
5. Maximum friction: 30N
6. Test ball: Diameter: 6mm, material conforms to ANSIE-52100 28th grade steel ANSIB3.12
7. HRC: 58-66, Ra < 0.05μm
8. Test piece: Round steel which conforms to AISIE-52100 standard HV30:190-210, Ra < 0.02μm
9. Oil bath area: 600±100mm^2
10. Wear scar measuring system: Microscope, Magnification: 100 times, Division: 1μm
11. Constant Temperature and constant humidity chamber:
    - Temperature control range: 23~30℃, ±0.1℃
    - Temperature control accuracy: ±2℃
    - Humidity control range: 40~70%, Humidity display accuracy:±1%
    - Humidity control accuracy≤3%RH
12. Ambient Temperature: 5~35℃
13. Ambient humidity: 20~80%

Test condition parameter

1. Reciprocating displacement/mm 1.0±0.02
2. Reciprocating frequency/Hz 50±1
3. Applied load/g 200±1
4. Oil sample volume/ml 2±0.2
5. Sample temperature/℃ 60±2
6. Test time/min 75±0.1

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KN-51350-6 Apparatus for Shear Stability of Lubricating Oils Containing Polymers

Overview

KN-51350-6 Apparatus for Shear Stability of Lubricating Oils Containing Polymers conforms to ***DIN 51350-6. Testing of lubricants - Testing in the Shell four-ball tester - Part 6: Determination of shear stability of lubricating oils containing polymers***. The apparatus is used for the determination of the shear stability in the Shell four-ball tester of lubricating oils containing polymers.

The tapered roller shearing system is a system for assessing the viscosity shear stability of a transmission lubricant. The equipment is a standard four-ball extrusion tester with a constant temperature device. Its composition consists of: embedded body, mandrel, tapered roller friction pair, tapered roller bearing, and temperature control instrument

The tapered roller bearing tester (KRL) is a mechanical shear stress caused by the lubricating oil under the test conditions similar to the gearbox, resulting in permanent viscosity loss and movement according to the test lubricant before and after the test. The rate of decrease in viscosity is indicative of the shear stability of the lubricating oil. This test method evolved from the sixth part of the German standard DIN 51350, also known as KRL (German Kugel Rollen Lager abbreviated) or CEC L-45-99.

Features

1. Computer controlled
2. Fully meets the standard requirements
3. Auto lift, hydraulic control and automatic temperature controller
4. Be able to do four ball wear test

Technical Parameters

1. Rotating speed range: 0~1500RPM
2. Number of revolutions: 0~2000000
3. Test load: 0~5000N
4. Temperature: -10~100℃

KN-FZG Relative Scuffing Load Carrying Capacity Tester

Overview

KN-FZG Relative Scuffing Load Carrying Capacity Tester conforms to ***ISO 14635-1 Gears – FZG test procedures—Part 1: FZG test method A/8, 3/90 for relative scuffing load-carrying capacity of oils*** and ***ISO 14635-2 – FZG test method A10/16,6R/90 for relative scuffing load-carrying capacity of lubricants with high EP performance***. The types of gear failures which may be influenced by the lubricant in use are scuffing, low-speed wear and the gear-surface fatigue phenomena known as micropitting and pitting. In the gear design process, these gear damages are taken into consideration by the use of specific lubricant and service-related characteristic values. For an accurate, field-related selection of these values, adequate lubricant test procedures are required. The FZG test procedures described in this and other parts of ISO 14635 can be regarded as tools for the determination of the lubricant-related characteristic values to be introduced into the load-carrying capacity calculation of gears.

FZG test method A/8, 3/90 for the relative scuffing load-carrying capacity of oils described in this part of ISO 14635 is typical for the majority of applications in industrial and marine gears. ISO 14635-2 will be related to the relative scuffing load-carrying capacity of oils of very high EP properties, as used for the lubrication of automotive driveline components.

Features & Functions (see Fig.1)

The tester contains the main host and the electric control cabinet, and the two parts are separate.

The main host adopts a dynamic closed-loop structure (or power flow closed structure), and the loading method adopts the method of hanging weights on the loading rod.

The main host is a horizontal structure and should be placed on a level ground. The lower part is the machine base. The upper plane of the base equipped with two gear cases. In the middle of the two gear ceases are two sets of parallel rotating shafts and torsion shafts, as well as a loading clutch and a torque measuring clutch. The left one is the test gear case. A pair of high-precision test gears of different sizes are installed in the case. The left case cover and top cover of the test gear case can be opened to facilitate loading and unloading of the test gears. The right is the transmission gear case, and a pair of high-precision transmission gears of different sizes are also installed in the case. Each gear is mounted on a different shaft in the form of key joint, and each shaft where the gear is mounted is supported by

two pairs of deep groove ball bearings and mounted on the left and right gearboxes, on the right side of the transmission gearbox. It is the driving motor of the testing machine, with compact structure, high precision and stable performance.

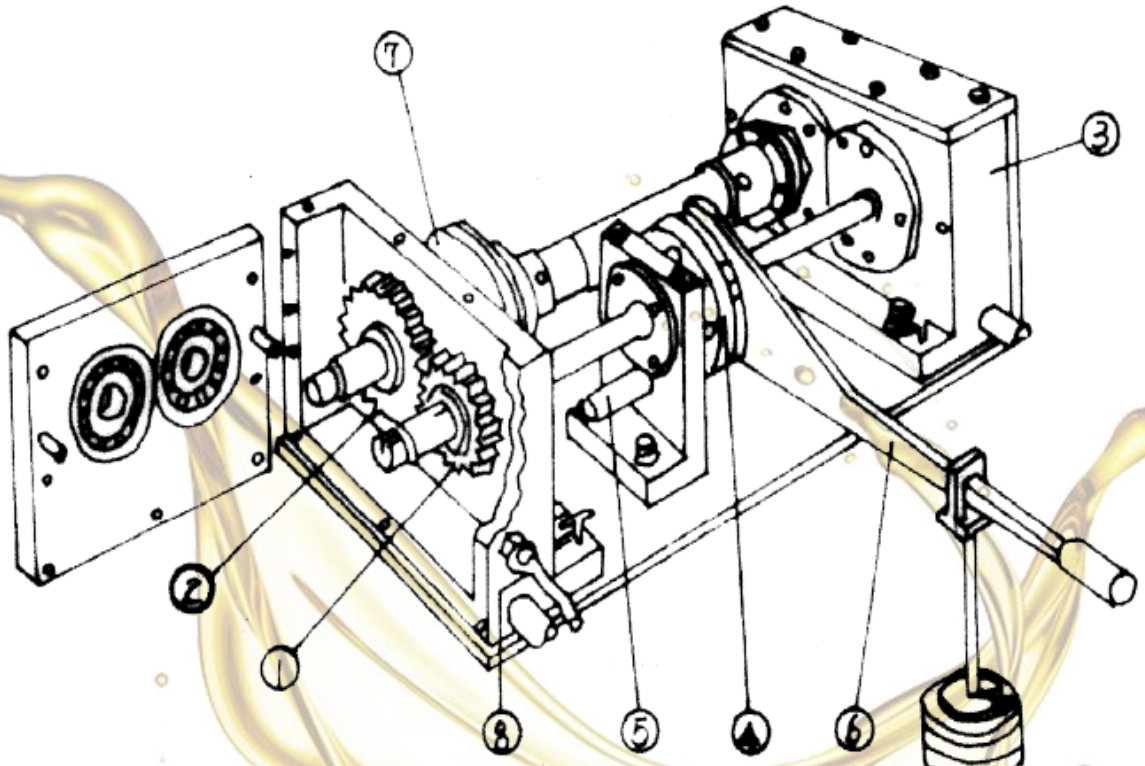

Fig.1 Loading Device

1. Small test gear
2. Big test gear
3. Transmission gear case
4. Loading clutch
5. Fixed pin
6. Lever arm with weights
7. Torque measuring clutch
8. Temperature sensor

Loading method, see Fig.1

The loading rod is hung on the sheave of the loading clutch. After adding weights, tighten the two sheaves on the loading clutch by tightening the nut of the loading clutch, then, remove the weights and the loading rod. The torque value can be read out on the torque measuring clutch.

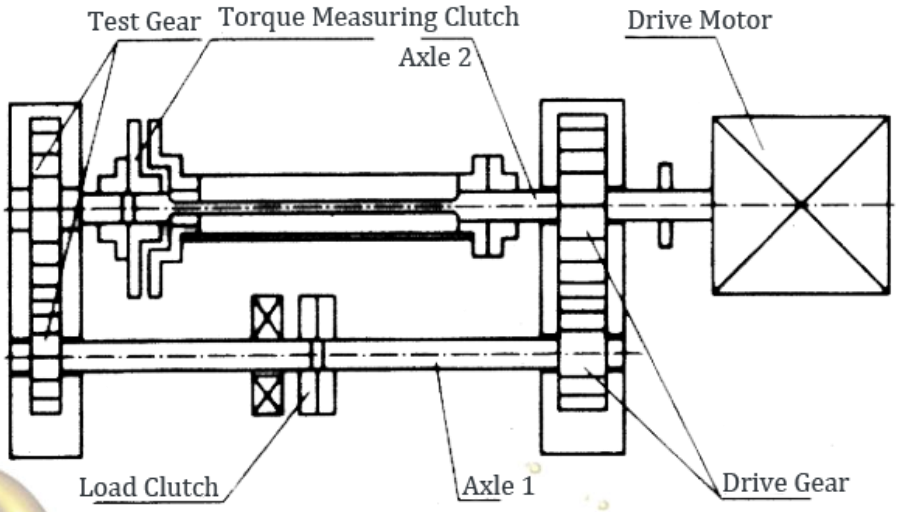

Fig.2 Transmission

The drive motor YD132M-4/2 is a two-speed motor, which drives the transmission gear through the shaft to transmit the torque to the test gear. The test gear is in a test gear case, which can contain different liquid test medium, and the test gear part is immersed in the test medium for testing.

Electric cabinet and control panel

The electric control cabinet has four parts, namely the control cabinet body, the control panel, the strong current system and the weak current system. Taking the control cabinet as the structural frame, the control panel above the cabinet is easy to operate, and the inside of the cabinet is equipped with a strong current system. There is a rear door of the control cabinet, and the internal system of the control cabinet can be seen by opening the door, which is convenient for installation, debugging and maintenance.

The control panel has three parts, namely upper, middle and lower parts, as shown in Fig.3. The lower part of the panel is the control switch and alarm. In the middle of the panel are heating, cooling and motor speed selection switches. The upper part of the panel is equipped with temperature controller, time controller and revolution controller. The time display and control unit can select the control time within the range of 1s~9999min. There is a **CLEAR** button below the control unit, which can clear the digital display window.

The number of revolutions display and control unit can select the control revolution speed in the range of 1~99999999.

The temperature controller can control the test oil temperature of the test gear case, and be able to control the opening and closing of the cooling water valve according to the temperature setting.

Fig.3 Electric cabinet and control panel

Torque measuring clutch

The torque measurement clutch device is shown in Fig.4, which mainly includes: small connecting flange (1), large connecting flange (2), torque shaft (3) inside the outer tube (4), indicating flange (5) with Vernier caliper scale (6) and scale (7) on the large connecting flange (2). After loading, the elastic shaft (3) in the closed-loop system of the tester is twisted and deformed, and the "torque" can be read out through the vernier caliper.

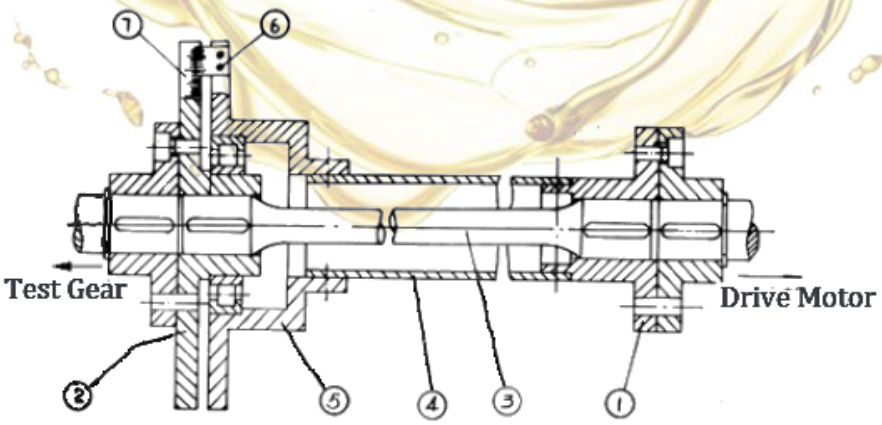

Fig.4 Torque measuring clutch

1. Small flange
2. Big flange
3. Torsion bar
4. Outer tube
5. Indicating flange with vernier caliper
6. Vernier caliper
7. Scale

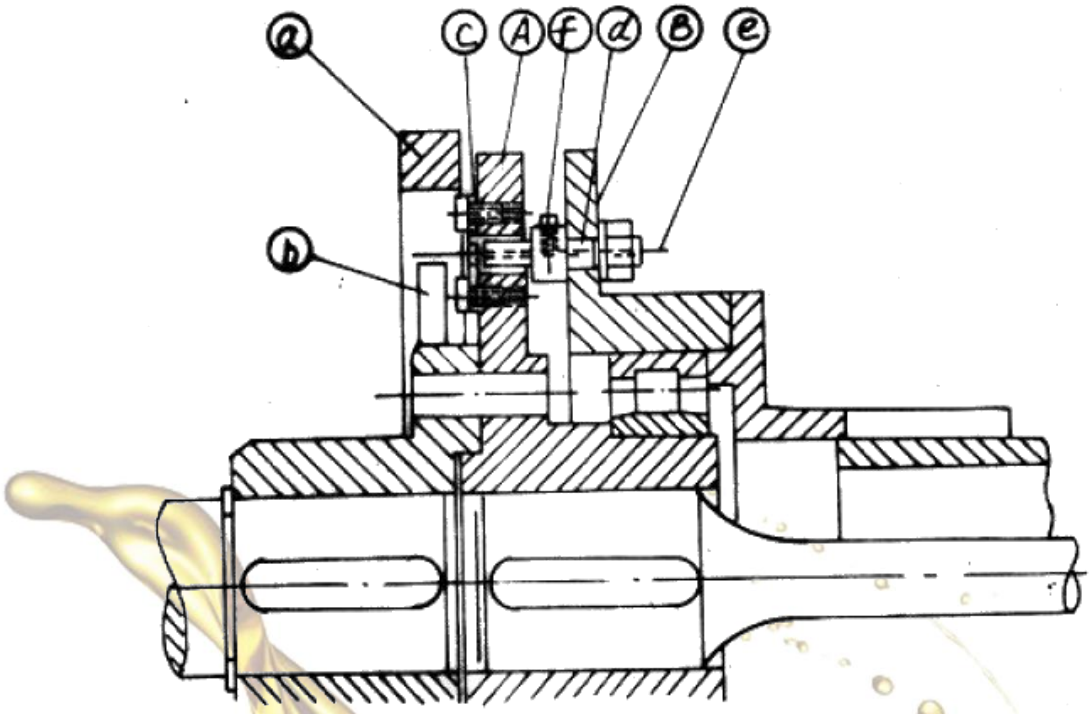

Fig.5 Gear tooth broken control element

This tester has the gear tooth broken control device, see Fig.5

During the test, if the gear is broken or the load on the gear increases abnormally, the overload automatic protection device will automatically stop the test.

The protection device includes Copper ring (a), flat spring (b), shear sheet (c), pinhole (d) and shear pin (e).

The copper ring (a) is mounted on the bottom plate of the testing machine, but it is insulated from the bottom plate of the testing machine. After loading, adjust the position of the pinhole on the groove of the torque measuring clutch (B), so that it is fixed in the appropriate position corresponding to the shear hole (d). In this position, the shear pin can pass through the shear plate and pinhole. While doing this work, press down the flat spring (b) with the needle (the flat spring is out of the copper ring) and hold the shear pin in place with the screw (f).

If the torque changes abnormally, the indicating flange (5) and the large flange on the torque measuring clutch will rotate relative to each other, thus shearing the shearing needle, the flat spring (b) immediately hits the copper ring (a) and closes A contact of the control circuit is opened, and the drive motor stops immediately.

Main technical parameters

1. Maximum torque: 1k.Nm
2. Maximum load class: Grade 13
3. Temperature accuracy: ±2℃
4. Drive motor power: 6.5kW (8kW)
5. Revolution speed: 1450rpm / 2880rpm
6. Test gear case capacity: 1.25L (The part from the center line of the shaft to the bottom of the case)
7. Heating power: 0.5kW*3=1.5kW
8. Test time control range: 1s~9999min
9. The number of revolution range: 9999999
10. Main host Dimension: 1390*750*1082mm
11. Control cabinet dimension: 510*510*1040mm
12. Test gear:

    Modules: 4.5

    Number of teeth: Z_b=24, Z_s=16

    Modification coefficient: X_b=-0.5, X_s=0.08532

    Engaging angle: 22°26’

    Central moment: 91.5mm

    Accuracy grade: 5

Standard Configuration

1. Main host: 1 set
2. Control cabinet: 1 set
3. Dedicated tools: 1 set
4. Lever arm and weights: 1 set
5. Oil spray source (optional)
6. Cooling system (optional)
7. A-type test gear (optional)