

Four Ball Friction Testing Machine

KASONTTEST[®]



(Picture just for reference)

1.Application

This machine mainly uses the form of sliding friction to evaluate the bearing capacity of lubricant under extremely high point contact pressure conditions. There are three indexes including maximum non-clamping load PB, sintering load PD and comprehensive wear value ZMZ. The machine can also do lubricant long - time wear resistance test, measurement of friction coefficient, record friction and temperature curve.

2. Standard

GB/T12583-98 Lubricants -- Determination of extreme pressure properties (four-ball machine method)

GB3142-82 Lubricants -- Determination of bearing capacity (four-ball method)

SH/T0189-92 Lubricating oil -- Determination of anti-wear properties (four-ball machine method)

SH/T0202-92 Test method for extreme pressure performance of greases (four-ball machine method)

SH/T0204-92 Test method for wear resistance of greases (four-ball machine method)

3. Main technical parameters

Item	Name	Technical parameters
1	Test force range (stepless adjustable)	60N~10kN
2	Relative error of test force indication value	±1%
3	Friction test range	0~300N
4	Friction test error	±3%
5	Spindle speed range (stepless adjustable)	200~2000r/min
6	Spindle speed error	±5 r/min
7	Friction pair temperature control range	RT~75°C
8	Friction pair temperature control error	±2°C
9	Test time control range	1s~999h
10	Spindle speed control range	1~99999999
11	Test steel balls	φ12.7mm
12	Overall dimension	1200*870*1700 (mm)
13	weight	600kg

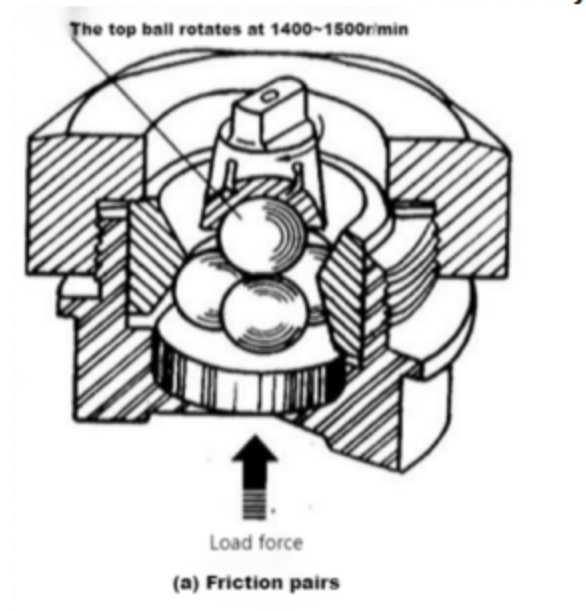
4. Working conditions

- a) The room temperature ranges from 10 to 35°C;
- b) Relative humidity is not more than 80%;
- c) in the surrounding environment without vibration, corrosive media and strong electromagnetic field interference;
- d) The fluctuation range of the power supply voltage should not exceed $\pm 10\%$ 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;
- e) Install correctly on a solid foundation with a levelness not exceeding 0.2/1000.

5. Basic configuration

- 5.1. Testing machine host
- 5.2. Full digital electrical measurement amplification control system and liquid crystal display system: real-time display test force, friction, speed, test revolution, time, temperature.
- 5.3. Load sensor.
- 5.4. Computer data processing software based on WINDOWS
- 5.5. Computer: Dell or Lenovo brand computer
- 5.6. Printer: HP color A4 printer
- 5.7. High precision measuring microscope: Shanghai Optical Instrument Factory 15J, magnification 25X
- 5.8. High temperature platinum resistance sensor 2 PCS
- 5.9. Friction pair for test:
 - a) 2 sets of oil boxes for high-temperature friction pairs;
 - b) 2 sets of oil boxes for friction pair at room temperature;
 - c) Special steel balls for four-ball machine 200 grains

6. Functions of measurement and control system and test software



- (1) Implement the national standard GB/T12583-1998 (lubricant extreme pressure performance test method), ZB E 34007-87 (four-ball method anti-wear test method) and other test methods;
- (2) Friction force, peak value and load, the accuracy is $\pm 1\%$ of the indicated value starting at 20% of each range, and can be automatically calibrated;
- (3) Real-time display of motor revolutions (speed) and test duration;
- (4) With multiple protection functions: friction, load, motor revolutions, etc.;
- (5) Real-time recording of friction-time and load-time test curves, high-speed sampling;
- (6) Using variable structure PID control algorithm to adjust the loading process, constant speed control error $\leq 5\%$, pressure holding control error $\leq 0.5\%$;
- (7) When the test force is greater than a certain upper limit, the system will automatically enter the overload protection, and take certain measures in time to ensure the safety of the testing machine;
- (8) The test data adopts the data file management method, which can save all test data and curves, and the format of the printed test report meets the requirements of the national standard.

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