High Temperature End-face Friction Wear Testing Machine

(Picture just for reference)

1. Introduction

KASON-MMU-10G high temperature end surface friction wear test machine, is the newly developed multi-function friction wear test machine, its main use and function in addition to the United States FALEX6 # multi-function sample test machine similar (Multi-Specimen Test Machine), but also integrated the high temperature end surface, high temperature plate wear performance. It is the development and development of a variety of high temperature resistant materials, high temperature coating, high grade series hydraulic oil, internal combustion engine oil, gear oil necessary simulation evaluation test machine. The machine can be under

a certain contact pressure, Forms of friction with a rolling, sliding, or sliding composite motion, With a stepless speed control system, Under very low speed or high speed conditions, Used to assess the friction and wear properties of lubricants, metals, plastics, coatings, rubber, ceramics and other materials, For example, low-speed selling plate (with large and small plates, Single needle and three needles) friction function, four-ball long wear resistance and four-ball rolling contact fatigue, ball-bronze three-piece lubrication performance, and push washer, ball-disk, mud wear, rubber seal lip sealing moment and adhesive friction performance test, high temperature end surface has been widely used in major scientific research institutes. In the tribology in various professional technology fields, petrochemical, machinery, energy, metallurgy, aerospace, colleges, universities, research institutes (institutes) and other departments have a wide application prospects

2.Main technical specifications of the test machine:

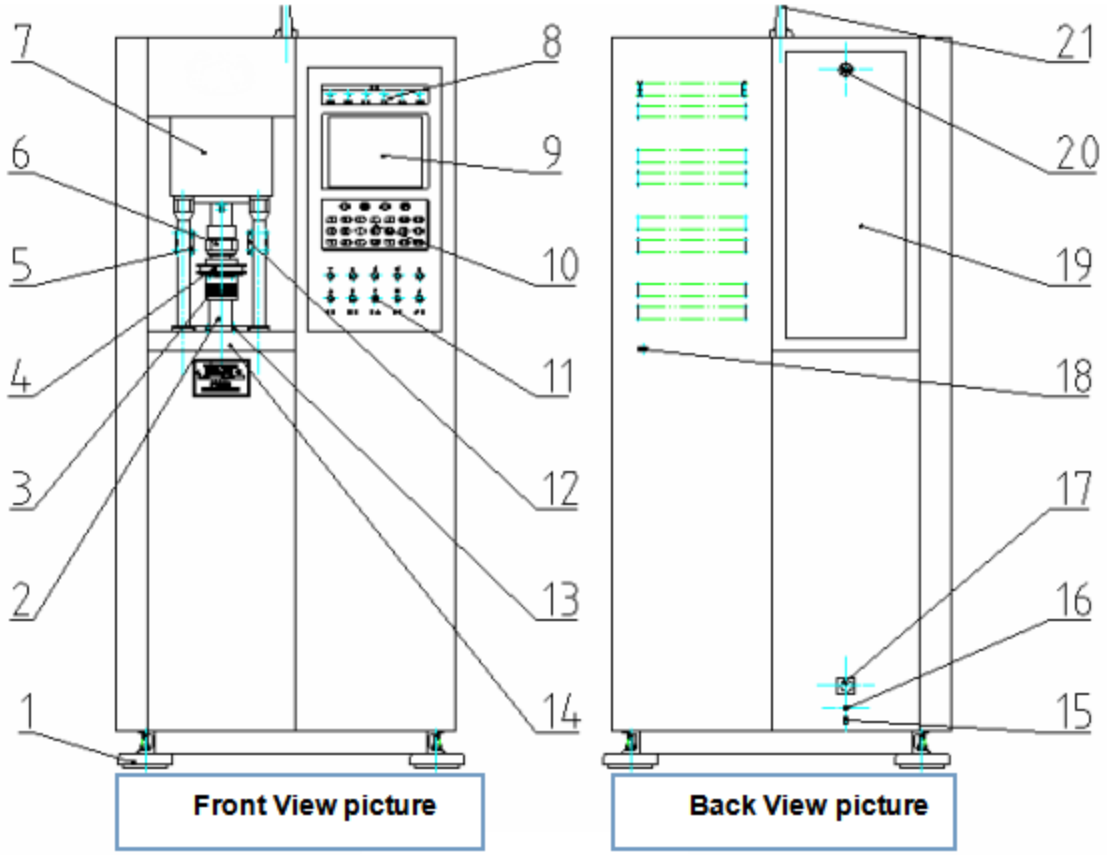
Model	KASON-MMU-10G
Testing force	
Test force range	40n~10000n
Test force indication accuracy	4 % of the maximum test force , the relative error of the indication value does not exceed ±1%, and the relative error of the repeatability of the indication value does not exceed 1% ; below 4 % of the maximum test force , the error of the indication value does not exceed ±5n, and the relative error of the indication value does not exceed ± 5n . The repeatability error is no more than 5n.
Test force indication zero point sense	±1.5n
Test force automatic loading rate	500n/min
The test force automatically maintains the relative error of the indication value for a long time	±1%
Friction torque	
Determine the maximum friction moment	10n.m

Relative error of friction torque indication	±2%
Friction load sensor	500n
Friction arm distance	50mm
Spindle continuously variable speed range	
Spindle speed range	200r /min～2800r/min
Spindle speed error	±1%
Testing machine heating system	
Measuring temperature range	Room temperature～800 ℃
K type thermocouple	2 pieces (with barrel heating furnace)
Temperature control accuracy	±2℃
Testing machine spindle taper	1:7
Testing machine spindle control	Manual control , time control , speed (cycle) control , friction torque control
Testing machine time display and control range	1s～999 hours
Time setting range	1s ～9999min
Rpm setting range	1 ～ 9999999
Testing machine main motor output maximum torque	5n.m

3.Overview of friction pairs of testing machines

The appearance of the machine is shown in Figure 1. In the picture: 1 shock absorber, 2 force shaft, 3 bearing seat, 4 torque wheel, 5 oil tank heater socket, 6 test oil box, 7 spindle seat, 8 alarm indicator light, 9 color LCD screen, 10 Operation keyboard, 11 operation buttons, 12 platinum thermal resistance temperature sensor socket, 13 stop pin, 14 workbench, 15 grounding sign, 16 grounding screw, 17 power socket, 18 computer serial interface, 19 rear door, 20 door lock, 21 lifting ring screws. In addition, there is a door on each side, which is closed with two locks respectively. Open the left door and you can see that there is a motor and a friction sensor behind the spindle seat. The motor drives the spindle through the synchronous belt and the main and driven pulleys. The upper end of the spindle is equipped with a speed measuring gear, and a magnetoelectric sensor is installed next to the speed measuring gear. Speed sensor. Under the machine base is a strong electric control device on the left and a loading cylinder on the right. The bottom of the cylinder is equipped with an electro-hydraulic servo valve and a solenoid valve. Open the right door and you can see the oil source at the bottom. On the fuel tank cover is the motor on the left, the valve body on the

right, and the air filter in the front right corner. On the left side of the valve body is the pressure line oil filter, on the right side are the pressure gauge and pressure gauge switch, and in the middle is the pilot relief valve. A solenoid valve is installed on the right end face of the valve body. A level gauge is installed on the front of the tank. Open the right door and you can see the electrical control device on the left and the frequency converter on the right.



3.1 Test force application and measurement system

During the test, the upper sample is installed at the lower end of the spindle, the lower sample is fixed with the lower sample holder, the lower sample holder is placed on the torque wheel, and the oil box on the lower sample holder is made of corrosion-resistant material. The torque wheel is placed on the thrust ball bearing, and the thrust ball bearing is placed on the bearing seat. The bearing seat is fixed on the booster shaft through screws. The booster shaft is guided by a linear bearing and supported by a load sensor. During the test, the hydraulic system is used to load from bottom to top, and the upper specimen rotates with the spindle. The spindle rotation is driven by a three-phase AC motor and synchronous belt as well as a frequency converter. The spindle speed and number of revolutions are measured by a magnetoelectric speed sensor and a speed measuring gear mounted on the spindle. The friction force generated by the test is transmitted to the friction sensor through the torque

wheel and wire rope for measurement.

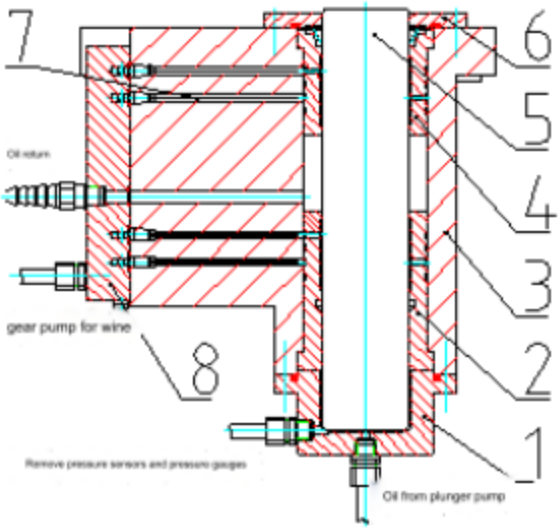


Figure 2 Cylinder piston part

3.2 Cylinder piston part

As shown in Figure 2, in order to reduce the friction between the cylinder plugs and improve the accuracy of the test force, the piston of the machine is supported by two sets of upper and lower hydrostatic bearings. The oil from the gear pump is distributed through the diverter block into 8 channels, 4 channels for the upper and lower channels. After being throttled and decompressed by the capillary tube, it enters the 4 static pressure oil chambers of the upper and lower bearings respectively. When the pressure in each oil chamber is equal, the piston is kept in position. At the center position, it is separated from the bearing by an oil film, so the friction force is very small. Oil from the plunger pump can push up the piston, thereby applying a load between the upper and lower specimens. The pressure and load are indicated and measured by the pressure gauge and pressure sensor respectively. In the picture: 1-cylinder bottom, 2-lower bearing, 3-cylinder, 4-upper bearing, 5-piston, 6-cylinder cover, 7-capillary tube, 8-diverting block.

3.3 Oil source part

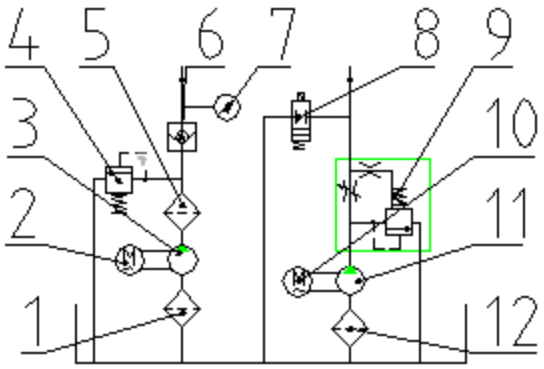


Figure 3 Oil source schematic diagram

As shown in Figure 3, the engine oil source has two sets, sharing one oil tank. One set is a static oil source supplied by a gear pump, consisting of 1-7; the other set is a loading oil source supplied by a plunger pump, consisting of 8-12. The motor (2) drives the gear pump (3) to press the hydraulic oil through the mesh filter (1), the paper filter (5) and the one-way valve (6) into the diverter block of the piston part of the oil cylinder. The static pressure is regulated by the relief valve (4) and indicated by the pressure gauge (7). The motor (10) drives the plunger pump (11) to press the hydraulic oil into the oil cylinder through the mesh filter (12). The overflow throttle valve (9) is used to adjust the rising rate of the piston, and the solenoid valve (8) is used to quickly unload.

3.4 Load control device

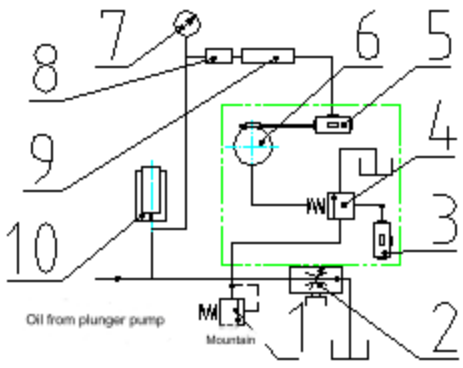


Figure 4 Load control principle diagram

As shown in Figure 4, the oil from the plunger pump enters the loading cylinder (10) all the way, enters the relief valve (4) all the way back to the oil tank, and returns to the oil tank through the manual throttle valve (2). The overflow valve (1) is for safety valve. The reversible motor (3), relief valve (4), AC servo motor (5) and worm gear nut screw reduction device (6)

form a load control device. This device is actually an externally controlled direct-acting relief valve. When loading, the AC servo motor (5) changes the spring force of the valve through the worm gear nut screw reduction device (6), which can change the hydraulic loading system pressure. The pressure is indicated by the pressure gauge (7), thereby changing the test force. The size of the test force is measured by the pressure sensor (8). When the size of the test force is equal to the given value, the AC servo control system (9) can keep the test force stable. The reversible motor (3) puts the valve core of the relief valve (4) in a micro-motion state to keep the valve core action flexible. Manual throttle valve (2) for manual loading and unloading.

3.5 Friction measurement system

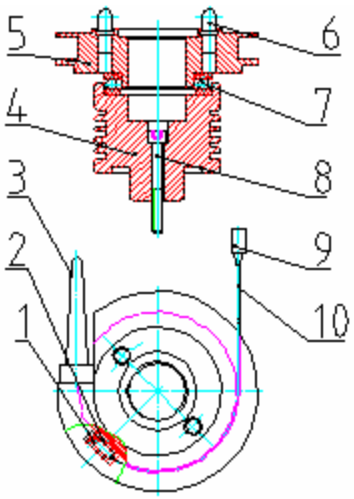
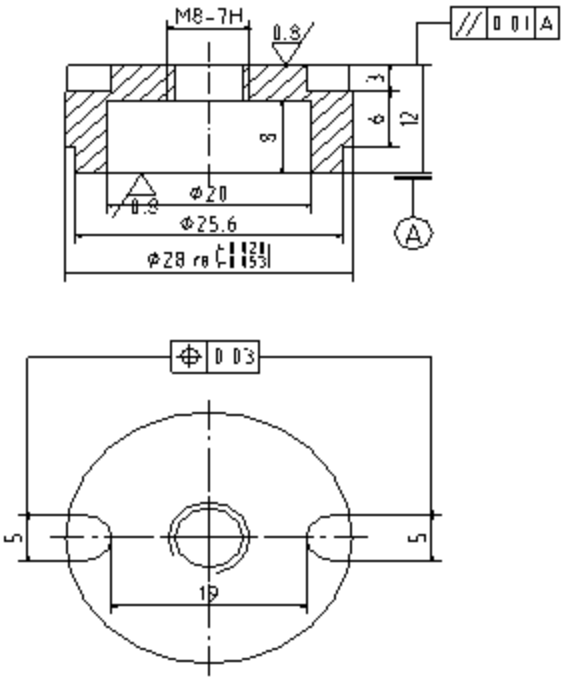
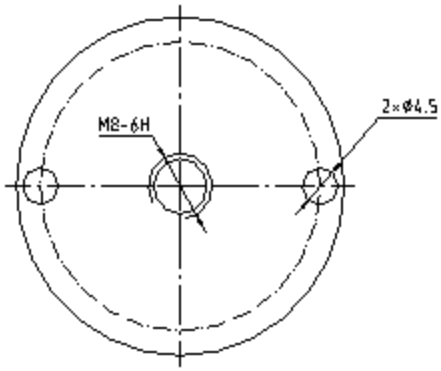


Figure 5 Torque wheel and bearing seat

The friction pair of this machine is two circular specimens. During the test, the upper specimen is installed on the lower end of the main shaft and rotates with the main shaft. The lower specimen is placed on the test oil box, which is placed on the torque wheel, and the torque wheel is placed on the On the thrust ball bearing, the thrust ball bearing is placed on the bearing seat, and the bearing seat is fixed on the thrust shaft through screws. The structure of the torque wheel and bearing seat is shown in Figure 5. In the picture: 1 pin, 2 pull block, 3 push rod, 4 bearing seat, 5 torque wheel, 6 transmission pin, 7 thrust ball bearing (raceway direction is the same), 8 screws, 9 connecting nuts, 10 wire rope. When measuring

friction, you need to insert the pin connecting the torque wheel and the wire rope, and transfer the friction force to the friction sensor through the wire rope and connecting nut for measurement.





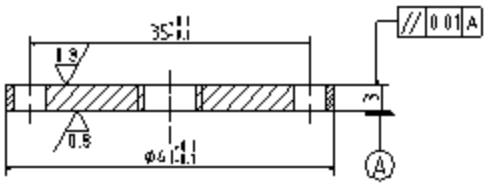


Figure 6 Dimensional drawing of the upper sample Fig. 7 Dimensional drawing of the lower sample

4. Features of this machine

1. The loading cylinder adopts a static pressure cylinder, and the piston of the machine is supported by two sets of upper and lower static pressure bearings. Low friction and high test force accuracy;

2. The AC servo control system controls the stability of the test force, and the test force indication value is highly accurate;

3. The control system is an embedded system based on ARM microprocessor and true color 10.4-inch TFT LCD screen, with stable performance and advanced technology. The appearance design of the whole machine meets the requirements of aesthetic art and ergonomics, and is beautiful and simple to operate.

5. Main configuration list

category	No.:	name	Quantity	Remark
product	1	Host	1 set	
Technical documents	1	user's manual	1 suit	
	2	Certificate of Compliance	1 suit	
	3	Packing List	1 suit	
	4	Speed control system manual	1 suit	
appendix	1	Assembled oil tank	1 set	
	2	Thrust ball bearings (only steel balls and cages)	D8108 1 piece	The thrust rings are respectively on the bearing seat and oil box.
	3	Upper and lower samples	5 each	
	4	power cable	1 set	
	5	Decorative screw plug	4 pcs	
tool	1	Allen wrench	S3 1pc	
	2	Lifting screws	4 pcs	
spare parts	1	Filter element	2 pcs	
other	1	Computer (with 17-inch LCD monitor)	1 set	
	2	printer	1 set	

中标华信(北京)认证中心
CSHCC.CN

Authentication Certificate of Quality Management System

Registration No.19922Q01072R0S

This is to certify that

Jinan Kason Testing Equipment Co., Ltd.

Unified Social Credit Code：9137010458994939X0

Registered/Production Address：No. 4715, Jingshi West Road, Huaiyin District, Jinan City, Shandong Province

Office Address：Room 2-1108, Harmony Square, Huaiyin District, Jinan City

Is in conformity with：

GB/T 19001-2016/ISO 9001:2015

The certificate is valid for the following scope：

Assembly and sales of testing machines

This certificate should be used effectively with the legal requirements of the administrative license, qualification license, compulsory certification, which the certification scope involved. In the case that the organization regularly receives surveillance assessments, the certificate shall be valid when used together with the Quick Response Code.

Date of Issue：2022-07-19
Date of Expiry：2025-07-18
Date of Initial Certification：2022-07-19

General Manager

MEMBER OF MULTILATERAL RECOGNITION ARRANGEMENT IAF
CNAS
中国认可
国际互认
管理体系
MANAGEMENT SYSTEM
CNAS C182-M

China Standard Huaxin (Beijing) Certification Center Co.,Ltd.

Address of Certification Authority：5 Floor,YuQuan Building,No.3 Shijingshan Road,Shijingshan District,Beijing Tel：010-88255986 P.C.：100049
Note：The detailed information is available on the Certification and Accreditation Administration of the People's Republic of China offical website (www.cnca.gov.cn) the authority's website(www.cshcc.cn) and the Quick Response Code on the left.

MACHINERY DIRECTIVE ATIESTATION OF CONFORMITY

Technical file of the company mentioned below has been inspected and audit has been completed successfully.

2006/42/EC Machinery Directive Annex VIII has been taken as references for these processes.

Company Name	: **Jinan Kason Testing Equipment Co., Ltd.**
Company Address	: No.4715, Jingshi West Road, Huaiyin District, Jinan, Shandong, China
Related Directives and Annex	: **2006/42/EC Machinery Directive/Annex VIII**
Related Standards	: **EN ISO 12100:2010; EN 60204-1:2018**
Product Name	: **Testing Machine**
Report No and Date	: TCF-JKTE230605-MD
Product Brand/Model/Type	: WDS-1, WDS-2, WDS-3, WDS-5, WDS-10, WDS-20, WDS-30, WDS-50, WDS- 100, WDS-200, WDS-300, WDW-1E, WDW-2E, WDW-3E, WDW-5E, WDW- 10E, WDW-20E, WDW-30E, WDW-50E, WDW-100E, WDW-200E, WDW- 300E, WDW-500E, WDW-600E, WDW-1000E, ETM103, ETM203, ETM303, ETM503, ETM104, ETM204, ETM304, ETM504, ETM105, WE-300D, WE-600D, WE- 1000D, WE-2000D, HUT305S, HUT605S, HUT105S, HUT126S, WEW- 300D, WEW-600D, WEW-1000D, WEW-1200D, WEW-2000D, WEW-3000D, HUT305E, HUT605E, HUT105E, HUT126E, HUT-A306E, HUT-A206E, WAW- 300D, WAW-600D, WAW-1000D, WAW-1200E, WAW-2000E, WAW-3000, WAW-2000A, WAW-3000A, WAW-4000A, HUT-A206W, HUT-A306W, HUT- A406W, HUT305W, HUT605W, HUT105W, HUT126W, WAL, LAW, HUT-L, JB- 300, JB-300B, JB-500B, JBS- 300, JBS-500, JBW-300, JBW-500, JBDW-300, JBDW-500, CST-50, VU-2Y, VU- 1S, DWC-40, DWC-60, DWC-80, DWC-100, DWC-196, YES-1000, YES-2000, YES-3000, YAW-1000, YAW-300, YAW-2000, YAW-3000, YAW-5000, NDS- 200, NDS-500, NDS-1000, NDS-2000, NDW-200, NDW-500, NDW-1000, NDW-2000, NDW-3000, NDW-5000, NDW-10000, EZ-1, EZ-3, EZ-10, JWJ-10, TLS, TLW, HWS, PLS-20, PLS-50, PLS-100, PLS-300, PLS-500, PLS-1000, KASON-1, RDJ-10, RDJ-20, RDJ-50, RDJ-100, DWTT- 20000, DWTT-30000, DWTT-40000, DWTT-50000, DWTT-80000, DWTT- 100000, PIT-302, PIT-302M, PIT-502, PIT-502M, PIT-302T, PIT-502T, PIT-302W, PIT-302TW, PIT-502W, PIT-502TW, PIT302CW, PIT452CW, PIT602CW, PIT752CW, PIT302CT, PIT452CT, PIT602CT, PIT752CT, PITD302W, PITD502W, PITD302T, PITD502T, PITD302CW, PITD302CT, PITD452CW, PITD452CT, PITD752CW, PITD752CT, PITD302G, HCT106, HCT206, HCT306, KSCTM, HYJ, HEZ-3, HEZ- 5, HEZ-10, HEZ-20, KSBT-10, KASON 370.02, KASON 370.05, KASON 370.10, KASON 370.25, KASON 370.50, MMW, GBW-60B, GBS-60B, HUT, ETM, XNR, GW-40, GW-50, MRS, MMU, MRH, GBW, GW, LSW, HBT, GLY, GCJ-1000, GWQ-1000, GNZ-1000, GQR-1000, GJR-300, GSS-1000, GMS-100, GTW-500, GQC-5, GGG-100, HR-150A, HRD-150, HRS-150, XHR, HB, HVS, HV, HBRV, W-20, HBA-1, LHT, Q-2A, MP-2, XQ-2B, XD-30M, 4XCE, 4XB, JSZ, MOPAO, MPT, P, MP, BG, LBG-32, MPJ-35, Q-Z, Q-100B, SQ, Q-3A, QG-4, LSQ, LDQ, GTQ-5000A, GTQ-5000B, DTQ, ZXQ, 4XC, HST, KASON, KS, KSCUT, HTR, HTPR, HTB, HSTR-45S, HTV, HTMV, HTBRV, METRPRESS, MPJ
Certificate Number	: **M.2023.206.C86313**
Initial Assessment Date	: 07.06.2023
Registration Date	: 08.06.2023
Reissue Date/No	: -
Expiry Date	: **07.06.2028**

UDEM International Certification Auditing Training Centre Industry and Trade Inc. Co.

The validity of the certificate can be checked through www.udem.com.tr. Upon completion of EC declaration of conformity,it is used solely at the manufacturer's responsibility. This certificate remains the property of UDEM International Certification Auditing Training Centre Industry and Trade Inc. Co. to whom it must be returned upon request. The above named firm must keep a copy of this certificate for 15 years from the registration of certificate. This certificate only covers the product(s) stated above and UDEM must be noticed in case of any changes on the product(s)

Address: Mutlukent Mahallesi 2073 Sokak (Eski 93 Sokak) No:10 Çankaya – Ankara – TURKEY
Phone: +90 0312 443 03 90 **Fax:** +90 0312 443 03 76
E-mail: info@udem.com.tr www.udem.com.tr

FOCUS IN MATERIAL TEST

KASONTEST®

JINAN KASON TESTING
EQUIPMENT Co, LTD.
DuandianIndustrial Park , Jingshi Road, Jinan City,China.
P: +86 15910081986
E: admin@jnkason.com I W: www.syjlab.com