BGD 523
Abrasion Tester

INSTRUCTION MANUAL

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ABOUT US

Biuged Laboratory Instruments（Guangzhou）Co. Ltd. is one of leading professional manufacturers of instruments used in the paint, ink and coatings industry in China.

Originally formed in 1963, we have grown to an internationally recognized business with a worldwide customer base which includes the worlds leading paint and coatings manufactures and users. Till now, we have established more than 50 agents or offices in all over the world. We have a team of dedication, high level education, cooperation and strong creativity. Our instruments are of both high quality and high ratio of performance to price so that products are salable to world- wide market.

Our RR&D department continually investigates new product design ideas, in conjunction with the major standards committees, in order to supply up to date instrumentation for the Quality Control of coatings. We always apply the advanced contemporary techniques and experience to our new products.

Our manufacturing department ensures that all our products are built to the highest quality, every instrument undergoing rigorous calibration and testing before it leaves our factory. We also can supply the third side calibration certificate when customer need.

Our service department, which has expanded to meet the increasing demand for maintenance and calibration both in-house and in the field, offers a full range of services

'Quality first and user uppermost' are one of our claims. Our Instruments strive for best in quality and after-sale service. Satisfying your needs are our wishes.

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1.0 Brief Introduction

BGD 523 Rotational Abrasion Tester is applicable to determine abrasion resistance performance of various coatings. It is also used to determine abrasion resistance of paper, plastic, textile fabric, decorations, etc.

The principle of abrasion derived by the test sample, turning on a vertical axis, against the sliding rotation of 2 Abrading Wheels. The wheels are driven by the sample in opposite directions about a horizontal axis displaced tangentially from the axis of the sample One of the abrading wheel rubs the specimen outward toward the periphery and the other wheel, inward to the centre. The area of abrasion from a pattern of crossed arcs of about 30sq.cm

The degree of abrasion for the specimen also depends on the load force（500g,750g or 1000g on each arm）being acted onto the axial of the 2 arms,which has a load pressure of 250g

This instrument adopts programmable control and LCD and has such advantage as flexible, convenient and easy operation, reliable performance.

It confirms to DIN 52347 53109 53754 53799
ISO 5470, 9352, 3573, 4586-2,7784-2
ASTM C217, D1044, D3389,D4060,D5342

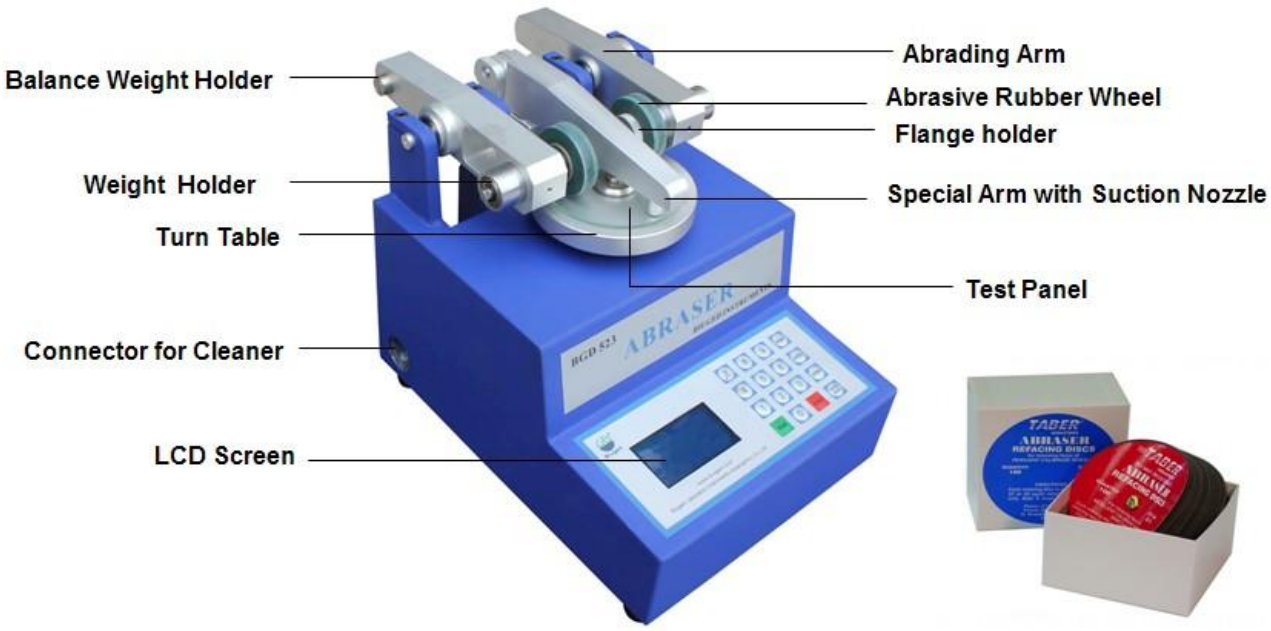
2.0 Main Technical Parameters

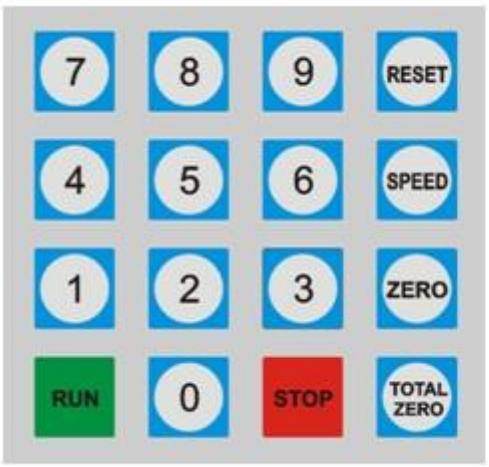
- Specimen turntable speed：60 rpm and 72 rpm（Optional）
- Specimen Size：Φ100mm×Φ8mm（center hole）×3mm
- Dimension of abrasive sheet：Φ50mm×Φ16mm（center hole）×13mm
- Counter：0-9,999 cycles
- Load weight：500g 750g 1000g
- Main motor power：25W
- Power Supply：220V/50Hz
- Overall dimension： 220×280×300（length by width by height）

3.0 Feature

- Can select many different sorts abrasion medium for different tests
- Two different run speed for selection
- LCD display for accurate and convenient setting and monitoring to the whole test.
- Many different weights ensure the different requirements for different load
- Equipped with cleaner to move the loose abradings or any dirt
- Equipped with S-11 Resurfacing medium disc from Taber company
- Equipped with a pair of standard abrasive rubber wheel CS-10 or CS-17 from Taber company
- Equipped with ten balance weights for ensuring the accuracy of abrasion arm weight

4.0 Structure





1～9 ---- Number buttons for inputting "Set cycles"

RUN------ The machine starts to operate.

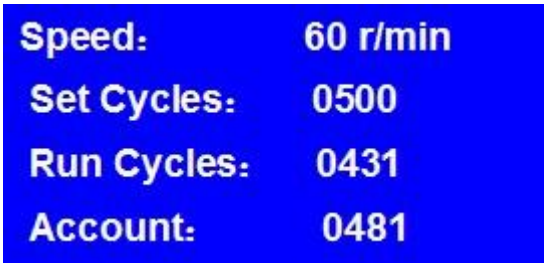
STOP---- The machine stops operating.

RESET--- Cancel setting, resume setting cycles

SPEED----Select suitable run speed

ZERO---- Zero current run cycles

TOTAL ZERO-------- Zero the total run cycles



As the left picture, the operator set a typical test procedure with 500 run cycles（Set Cycles） and run speed is set as 60r/min. Now, the machine has run 481 cycles totally（Account）, but the operator stopped the machine after running 50 cycles, and pressed "ZERO" to clear the current run cycles, then started machine again. So the current run cycles is shown as 431 cycles

5.0 Prepare Test

5.1 Test Panel（Substrate）

Unless otherwise agreed, select the substrate from one of those described in ISO 1514, using, where possible, the same type of material as will be used in practice. The substrate panels shall be plane and free from distortion, otherwise the wear of the coating under test will not be uniform

5.1.1 Shape and dimensions

The shape and dimensions of the test panels shall be such that they can be fitted correctly on the apparatus. They shall have a central hole of diameter 6,35 mm.

NOTE Typical dimensions for a test panel are 100 mm× 100 mm.

5.1.2 Preparation and coating

Unless otherwise agreed, prepare each test panel in accordance with ISO 1514 and then coat it by the specified method with the product or system under test

5.1.3 Drying and conditioning

Dry (or stove) and age, if applicable, each coated test panel for the specified time under the specified conditions.

5.1.4 Thickness of coating

Determine the thickness, in micrometres, of the dried coating by one of the methods specified in ISO 2808.

5.2 Test conditions

Carry out the test at a temperature of (23 ± 2) °C and a relative humidity of (50 ± 5) %, unless otherwise agreed.

5.3 Calibration of the apparatus

Calibrate the apparatus (an example of a calibration procedure is given in Annex B).

5.4 Preparation of the abrading rubber wheels

5.4.1 Check that the abrasive rubber wheels meet the requirements specified as below:

① Two abrasive rubber wheels, each of thickness (12,7 ± 0,1) mm. The wheels shall be mounted on and able to rotate freely about horizontal spindles. Their internal faces shall be (53,0 ± 0,5) mm apart and the hypothetical line through the two spindles shall be (19,1 ± 0,1) mm away from the central axis of the turntable. The external diameter of the wheels shall be (51,6 ± 0,1) mm when new, and in no case less than 44,4 mm.

② The type of wheel shall be chosen by agreement between the interested parties.

③ A slow hardening of the rubber bonding material in this type of wheel may occur. Therefore the hardness shall be checked to agree with the specification given by the manufacturer. Wheels shall not be used after the expiration date marked on them by the manufacturer, or more than one year after their purchase if no expiration date is given.

5.4.2 To ensure that the abrading function of the wheels is maintained at a constant level, prepare the abrasive rubber wheels as prescribed by the manufacturer, following **5.4.2.1** to **5.4.2.4**.

5.4.2.1 Mount the selected abrasive rubber wheels on their respective flange holders, taking care not to touch the abrasive surfaces. Adjust the load on the wheels to the value agreed between the interested parties.

Note: The load weight value of wheels is shown as marking value （The sum of arm and weight self）

5.4.2.2 Mount the resurfacing-medium disc on the turntable. Lower the abrading heads carefully until the wheels rest on the disc. Place the suction nozzle in position and adjust it to a distance of 1 mm above the surface of the disc.

5.4.2.3 Set the counter to zero.

5.4.2.4 Start up the suction and then the turntable. Resurface the wheels by running them for a specified number of cycles against the resurfacing-medium disc.

NOTE：A typical number of cycle is 50.

Resurface the wheels in this manner before testing each specimen and after every 500 cycles, in such away that the abrasive surface is exactly cylindrical and that the edges between the abrasive surface and the side faces are sharp, without any bending radius. Resurface new wheels before the first use.

5.4.3 It is recommended that after resurfacing rubber wheels, the operator should weigh out the current weight of abrading head with palmar balance（please ensure the abrading head rest on the palmar balance levelly）.Check if the reading value is same as the marking value of weight or not . If not, please add balance weights on balance weight holder to do fine-adjustment.

6.0 Test

6.1 Condition the coated test panels at a temperature of (23 ± 2) °C and a relative humidity of (50 ± 5) %, unless otherwise agreed, for a minimum period of 16 h.

6.2 If the surface of the coating is irregular, due to orange peel, brush marks, etc., abrade it for 50 cycles and clean it with lint-free paper prior to the determination. Report this operation, if carried out, in the test report.

6.3 Weigh the conditioned test panel to the nearest 0,1 mg, and record this mass.

6.4 Attach the test panel to the turntable, lower the abrading heads on to the test panel and place the suction nozzles in position.

6.5 Set the counter to zero and start up the suction and then the turntable.

6.6 After a specified number of cycles, remove any loose abradings remaining on the test panel with lint-free paper, reweigh the test panel and record this mass. Inspect the panel to see if wearthrough of the coating has occurred.

6.7 By interrupting the test at intervals, the point of wearthrough can be determined more accurately and the average loss in mass for a given number of cycles can be calculated.

6.8 Repeat **7.2** to **7.6** for two more test panels and record the results.

7.0 Expression of results

7.1 For each test panel, calculate the loss in mass after the agreed number of cycles by subtraction. Calculate the mean loss in mass for all three test panels and report the result to the nearest 1 mg.

NOTE：The loss in mass can also be calculated at each of the intervals at which the test was interrupted.

7.2 Calculate the mean number of cycles required to reach wearthrough of the coating or of the topcoat in a multicoat system.

NOTE：After the wearthrough of the coating, the loss in mass is affected by abrasion of the substrate.

8.0 Warranty

8.1 The machine is warranted in respect of materials and workmanship for 12 months from the date of purchase. Any defective parts within the machine arising during the warranty period, shall be

replaced free of charge subject to our inspection.

8.2 Any defective parts within the machine arising out of the warranty period: shall be replaced at client's expense.

8.3 Under the following conditions, we will not be responsible for the replacement during the warranty period:

- Without invoice or receipt.
- Damaged by wrong assembling or disassembling.
- Damaged by wrong or careless operation.
- Damaged by wrong operating under improper condition.
- Damaged by broken packing during transportation.

9.0 Other Accessories Ordering Information:

BGD 1366---100# Abrading Wheels

BGD 1367---120# Abrading Wheels

BGD 1368---180 # Emery cloth stripe （pack of 100）

CS-10---Taber Abrading Wheels

CS-17---Taber Abrading Wheels

S-11---Resurfacing medium disc（pack of 100）

BGD 2601---Glass Panel with circular hole（pack of 100）

BGD 2328---Aluminum Panel with circular hole（pack of 100）

10.0 Packing List

① Abrasion Tester machine	1 pc
② Resurfacing Medium Disc	10 pcs
③ Cleaner	1 pc
④ Loading Weights	6 pcs/1000g(2pcs)；750g(2pcs)；500g(2pcs)
⑤ Balance Weights	10 pcs/20g(2pcs)；10g(2pcs)；5g(2pcs)；2g(2pcs)；1g(2pcs);
⑥ Electrical power line	1 pc
⑦ Abrasion Rubber Wheels	1 pair （CS-10 or CS-17）or 4 pairs（100# and 120# ,each two）
⑧ Operation Manual	1 pc
⑨ Palmar Balance （Optional）	1 unit
⑩ Circle glass panels	5 pcs

11.0 Others

For more information regarding this product, spares, accessories etc. or if you would like a catalogue listing our full range of products, please contact your local agent or Biuged Instruments at the address on the following page.

Annex B (informative)

Calibration of the apparatus

B.1 General

The accessories needed for calibration, such as calibration panels and the abrasive paper, should preferably be obtained from the manufacturer of the abrasion tester. Usually, zinc panels are delivered as calibration panels by the manufacturer.

B.2 Apparatus

Apparatus as described in clause ISO 7784-2, and in addition the following.

B.2.1 *Two rubber wheels*, each of thickness (12,7 ± 0,1) mm and overall diameter (50,0 ± 0,2) mm, the periphery of which is covered with a rubber strip of thickness 6 mm and hardness (50 ± 5) IRHD (determined in accordance with ISO 48). The wheels shall be mounted on and able to rotate freely about horizontal spindles. Their internal faces shall be (53,0 ± 0,5) mm apart and the hypothetical line through the two spindles shall be (19,1 ± 0,1) mm away from the central axis of the turntable. The mass distribution within the assembly shall be such that each of the wheels exerts a force of (1 ± 0,02) N on the test panel.

B.2.2 *Strips of abrasive paper*, of width (12 ± 0,2) mm and approximate length 175 mm. The grade of abrasive paper shall be P 180 as defined in the P series of the grain size standard published by the Federation of European Producers of Abrasive Products (FEPA).4)

NOTE Self-adhesive abrasive paper is also available from some manufacturers.

B.2.3 *Double-sided adhesive tape*, in strips of width (12 ± 0,2) mm and approximate length 175 mm, for use if self-adhesive abrasive paper is not available.

B.3 Calibration procedure

B.3.1 Condition the abrasive paper, the adhesive tape, if used, and the test panel at a temperature of (23 ± 2) °C and a relative humidity of (50 ± 5) %, unless otherwise agreed, for a minimum period of 16 h.

B.3.2 Attach a conditioned abrasive-paper strip to the circumference of the wheels, using the conditioned adhesive tape, if necessary. Adjust the length of each strip so that it covers the peripheral surface of the wheel without any overlap or gap.

NOTE It is recommended that the strips be cut at an angle of approximately 45° so that the joint is not at right angles to the direction of travel of the wheels (see Figure B.1).

B.3.3 If a new zinc panel is being used, abrade it for 200 cycles of the turntable before use, following the procedure specified in **B.3.5** and **B.3.6**, and then clean it with lint-free paper.

B.3.4 Weigh the conditioned test panel to the nearest 1 mg, and record this mass.

B.3.5 Install a 500 g load on each arm of the abrasion testing machine, attach the test panel to the turntable, lower the abrading heads on to the test panel and place the suction nozzles in position.

B.3.6 Set the counter to zero and start up the suction and then the turntable.

B.3.7 After 500 cycles, clean the test panel with lint-free paper, reweigh the test panel and record this mass.

B.3.8 Carry out **B.3.2** to **B.3.7** twice more, each time with a new strip of abrasive paper.

B.3.9 After the third test, calculate the mean loss in mass for the three calibration runs.

B.3.10 The average loss in mass of the zinc plate should be (110 ± 30) mg. If the average loss in mass is outside this range, check the apparatus and rectify any faults.

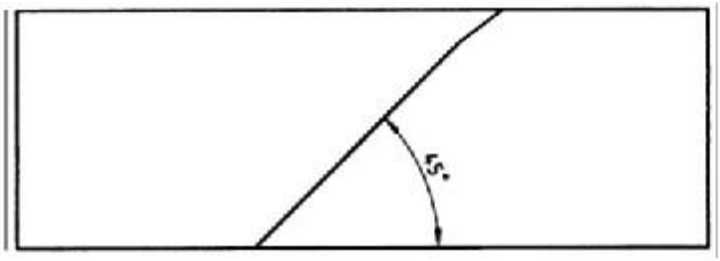


Figure B.1 — Recommended method for joining the ends of the abrasive-paper strip