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QMY-AP32 ROTATIONAL ABRASION TESTER OPERATING INSTRUCTION

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Brief Introduction

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 conforms to DIN 52347 53109 53754 53799

ISO 5470, 9352, 3573, 4586-2, 7784-2
ASTM C217, D1044, D3389, D4060, D5342

Feature

- ◆ Can select many different sorts abrasion medium for different tests.
- ◆ Specimen turntable speed control options of both 60 rpm and 72 rpm.
- ◆ LCD display for accurate and convenient setting and monitoring to the whole test.
- ◆ Three different precise stainless steel weights(500g, 750g,1000g) ensure the different requirements for different loads. Weights are marked to show total load on each wheel. This marking includes the weight of the abrading arm(250 grams).
- ◆ Abrading arms and fixing sleeve of abrading wheel have been calibrated and balanced before leaving factory.
- ◆ A vacuum system is included and equipped with cleaner to move the loose abrading's or any dirt.
- ◆ A precision vacuum nozzle adjustment control allows the height to be modified for accommodating varying specimen thickness.

- ◆ A Quick Release Mounting Hub permits quick wheel mounting without the need of a locking nut.
- ◆ 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.

Main Technical Parameters

1. Platform speed: 60±2r/min or 72±2r/min
2. Range of count: 0~9,999 times
3. Specimen size requirement: Φ100mm×Φ8mm(center hole)×3mm
4. Load weight: 500g 750g 1000g
5. Main motor power: 25W 220V 50Hz
6. Overall dimension: 220×280×300(length by width by height)
Net Weight: 20kg

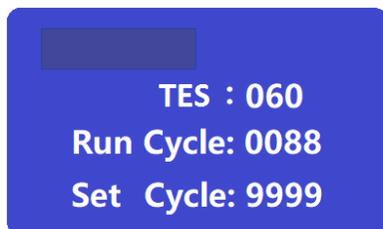
Structure



- STOP: stop machine START: run machine
- CLR: zero run times SET: set testing times
- ←→ : move digit when setting value
- ↑ ↓ : increase or decrease value

The operator set a test procedure with "9,998" run cycles (Set Cycles) and run speed is set as "72r/min". Now, the machine has run "0" cycles totally (Account).

When the tester is stopped, press buttons "↑" and "↓" at the same time to enter the run speed control interface, the value of "TES" shows the current rotation speed. Press button "Start" to run the tester, operator can check whether the actual speed is same as the setting value (60rpm or 72rpm). If there is any difference between the actual value and setting value, operator can adjust the speed adjusting screw on the back of the tester to correct the speed (please check 5.3.1 Correction of Testing speed for details).



Prepare Test

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.

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.

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.

1.3 Drying and conditioning

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

1.4 Thickness of coating

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

2. Test conditions

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

3. Calibration of the apparatus

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

3.1 Correction of Testing speed

3.1.1 When the tester is stopped, press buttons "↑" and "↓" at the same, and the "RPM" would change to "TES".

3.1.2 Press button "Start" to run the tester, and check whether the actual speed (value of TES) is same as the setting value (60rpm or 72rpm). If not, use a small screwdriver to adjust the speed adjusting screw on the left of the back (as shown in the photo below). When the setting speed is 60rpm, adjust the left screw, and when the setting speed is 72rpm, adjust the right one until the value of "TES" exactly the same as the setting speed.

3.1.3 Again, press buttons "↑" and "↓" at the same to return to the initial interface.

4. Preparation of the abrading rubber wheels

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.

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 4.2.1 to 4.2.4.

4.2.1 Mount the selected abrasive rubber wheels (press down the quick release mechanism), taking care not to touch the abrasive surfaces. Adjust the load on the wheels to the value agreed between the interested parties.

Note: The value marked on the wheels is the total load weights (including wheel weight and abrading arm weight)

4.2.2 Mount the resurfacing-medium disc on the turntable. Lower the abrading heads carefully until the wheels rest on the disc. Place down the suction nozzle and adjust the height from suction nozzle to the resurfacing-medium disc as 1mm to 2mm (Use the precision vacuum nozzle adjustment).

Note: When lift up the abrading arm, please press the back screws into the self-lock device, so as to make the abrading arm fixed in the vertical position. If need to lower the abrading arm, please press down to back slightly first.

4.2.3 Connect the machine to power supply and turn on the power switch at the back.

4.2.4 Press "Set" and hold for 3s, and then press "↑" and "↓" to choose the rotational speed. (60rpm & 72rpm can be chosen).

4.2.5 Press "CLR" button to zero the run times as "0"

4.2.6 Set test times as "50" (A standard resurfacing times)

Press "Set" button, the cursor will twinkle at the last two digits of "Set". Now the user can begin to set the test times: Press "↑" and "↓" button to add or reduce value. There are two parts concerning of set times, one is thousands place and hundreds place, the other is single-digit and tens place, the user can move it through "←" and "→" button. The range of set times is: 0-9999 times; Please press "Set" button again after finishing setting, now the cursor would be disappear and the set value is saved.

Note:

- ① If press the "CLR" button of control panel, the cursor will remove behind of the "Run" place and twinkle, if press "CLR" button again, the run times value would be clear to zero.
- ② Ensure the value of "Set Count" has been set before running the machine. The machine wouldn't work if the value of "Set" was zero or the value of "Run" was more than or equal to the value of "Set".
- ③ If run times has arrive set times, the user must zero run times then can restart machine.

4.2.7 Connect the cleaner to the hole at the back of machine and start up the suction, press "Start" button. Resurface the wheels by running them for a specified number of cycles against the resurfacing-medium disc.

NOTE: 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.

Test

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 16h.
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.

3. Weigh the conditioned test panel to the nearest 0.1 mg, and record this mass.
4. Attach the test panel on the turntable and fix it with set screw, lower the abrading heads on to the test panel and place the suction nozzles in position.
5. Adjust the height from suction nozzle to the test panel as 1mm to 2mm (Use the precision vacuum nozzle adjustment).
6. Clear the run times of digital display and set the required times according to 4.2.5
7. Start up the suction and press "Start" to run the machine.
8. 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.
9. 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.
10. Repeat 2 to 6 for two more test panels and record the results.

Expression of results

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.
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.

Warranty

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

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 $(12,7 \pm 0,1)$ mm and overall diameter $(50,0 \pm 0,2)$ 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 $(53,0 \pm 0,5)$ mm apart and the hypothetical line through the two spindles shall be $(19,1 \pm 0,1)$ 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 $(1 \pm 0,02)$ N on the test panel.

B.2.2 Strips of abrasive paper, of width $(12 \pm 0,2)$ 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 $(12 \pm 0,2)$ 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.

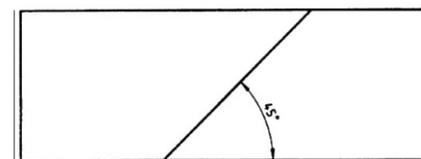


Figure B.1-Recommended method for joining the ends of the abrasive-paper strip