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Calibration and maintenance of the manually operated micrometer

Scope

The manually operated micrometer is commonly used when performing caliper (thickness) measurement tests on paper, paperboard, linerboard, corrugated board, and solid fiberboard.

Caliper of corrugated board and its components are critical in assuring board quality and physical properties. Caliper is important to paper mills because it is used to control the process related to sheet density and other quality attributes. In the corrugated plant, caliper is used to control quality of board through the combining and converting process. The caliper test is relatively simple to perform, but is susceptible to serious errors if the instrument is not properly maintained.

Purpose

This Technical Information Paper outlines the procedures used to calibrate and clean the anvils. It also provides a list of things to avoid when maintaining the manually operated micrometer. This TIP does not discuss repair procedures for the manually operated micrometers, calibration procedures for motorized instruments, or calibration procedures for instruments with electronic digital indicators.

Safely precautions

There are no safety precautions.

Components of the manually operated micrometer

The manually operated micrometer consists of the following:

1. A mechanical dial indicator.
2. A movable foot that serves as the upper anvil.
3. A rigid base that serves as the lower anvil and holds the instrument together.
4. A spring loaded actuator lever that raises and lowers the upper anvil and applies a preset amount of pressure of 55 kPa (8 psi) to the test specimen during testing.
5. A gauge zero adjustment set screw located directly below the dial in the rigid base.

Calibration check procedure

1. Raise upper anvil by pressing the actuator lever down.
2. Insert certified gauge block between anvils.
3. Lower the upper platen until it is bearing against the gauge block and release the actuator lever.

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4. Observe the reading on dial indicator. The reading should correspond to the thickness of the certified gauge block.
5. Record the difference between the gauge block and the indicator reading, if any.
6. Repeat this procedure using additional gauge blocks of varying thickness representative of the range of material typically checked with the micrometer. For singlewall board a typical range might be 1.3, 2.5, and 5 mm (0.05, 0.10, and 0.20 in.) thick.
7. If the difference between indicator and the gauge block is greater than 12.7 micrometers (0.0005 in.) for any or all of the checks, the micrometer should be cleaned and adjusted.
8. If calibration cannot be successfully achieved after cleaning and adjusting, the micrometer should be repaired by a trained instrument technician.

Cleaning and adjustment procedure

1. Raise the upper anvil by pressing the actuator lever down.
2. With upper anvil raised, inspect the surfaces of both anvils for any sign of foreign matter such as dirt.
3. Insert a clean piece of paper between the anvils and release the actuator lever so that normal pressure is being applied.
4. Move the paper back and forth in a circular motion several times to remove the foreign matter from the anvils.
5. Raise the upper anvil and remove the paper.
6. Lower the upper anvil and check the indicator reading. If reading is zero recheck the calibration; if not, proceed with next step and adjust indicator to zero.
7. Locate the slotted set screw directly below the dial on the rigid frame. Carefully loosen the set screw.
8. Rotate dial indicator housing until pointer is indicating zero.
9. Gently tighten the set screw.
10. Recheck micrometer calibration.

Typical cautions when cleaning and adjusting the micrometer

1. Do not clean the anvils with water or soap.
2. Do not oil the micrometer.
3. If the upper anvil travel is slow or appears impaired, the micrometer should be repaired by a trained instrument technician.
4. When adjusting the dial indicator, loosen only the slotted set screw. All other socket head screw are preset and should not be moved.
5. Gauge blocks should be kept clean, handled with care, and stored in their protective case at all times when not in use.

Keywords

Calibration, Maintenance, Micrometers

Additional information

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