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Method for evaluating thickness of wet press fabrics

Scope

A method is described for measuring press fabric thickness using a *hand-held* caliper gauge. It is used for large fabrics installed on a paper machine or for smaller laboratory samples. For other characterizations of wet press fabrics refer to:

- TIP 0404-20 “Physical Characterization of Press Fabrics”
- TIP 0404-29 “Porosity Measurements of Press Felts on the Paper Machine (HSPT)”
- TIP 0404-32 “Felt Uniformity Impression Method” (withdrawn in 1998)

Definitions

Thickness, the distance between the upper and lower surfaces of a fabric, measured under a specific pressure.

Caliper Gauge, a measurement device capable of applying a known pressure over a given area (the pressure foot) against a backing surface (the anvil), and recording the distance between the pressure foot and the anvil.

Safety precautions

If the machine is running, this measurement must be done with EXTREME CAUTION.

Personal experience with the machine should be used to determine if the gauge can be held safely and with no danger of losing it through the nip. A rounded edge on a flat pressure foot, or a convex anvil and pressure foot will allow the fabric to travel more smoothly and is highly recommended.

The felt or fabric should be inspected for stringers (base weave yarns hanging out on the edges), holes, tears, or flaps that may grab the instrument. If any of these exist in the area to be measured, the test should not be done on the run. It is further recommended that seamed felts not be tested on the run, since a defective or damaged seam may grab the test instrument. No test should be conducted on the run close to an in-going nip.

Summary of method

A portable gauge, designed to apply a known pressure over a given area, is held in contact with the upper and lower surfaces of a press fabric and a reading of thickness is taken. Multiple samples are averaged.

Significance

The measured thickness of a fabric is greatly influenced by the apparatus and the measurement procedure. A press fabric is a compressible material. Its thickness decreases with increasing pressure. Thickness may vary from location to location, and the measurement is affected by the size and shape of the surface used to apply pressure. In a static measurement the instrument reading may also vary with the rate of the pressure increase and the duration of pressure application. The condition of the felt - such as dry or wet, new or used - will also affect the measurement.

The thickness measurement of this method is meant to be a comparative tool to monitor the fabric and changes in the fabric. It is not meant to be a method to specify a required thickness.

Any of a number of commercially available hand-held thickness gauges with the following recommended design may be used:

- Contact area no less than 1 in² (600 mm²)
- Applied pressure of approximately 0.6 psi (4 kPa)
- Reading: Dial accurate to 0.001 in. (0.02mm)
- Throat depth (for on-machine measurement): at least 12 in. (30 cm)

Method

Slightly different procedures are used for off-machine or on-machine measurements. It is recommended that the same type of caliper gauge be used for on and off machine readings to improve comparison of results.

Off-machine measurement

Examine the sample area to be certain it is level. Some samples tend to curl, and the measurement of curled samples can give erroneous results. If testing a used fabric, the sample area should also be free from any contaminants. For cut specimens, the sample area should be at least 2 × 2 in. (50.8 × 50.8 mm) square or 2 in. (50.8 mm) diameter. Open the gauge and allow the fabric to rest on the anvil. Gently raise and lower the pressure foot several times using the lever on the gauge. Allow the foot to settle on the fabric for about 10 seconds, then record the value to the nearest 0.001 in. (0.02 mm). Report the average reading from 10 sample areas. For used samples that include a portion of the edge which was outside the sheet run and nipped region, make a note of where the measurement was taken. For example, inside or outside the sheet run.

NOTE: For cut specimens, the throat length of the measurement gauge is not critical, and a bench-mounted gauge may be used in place of a hand-held gauge.

On-machine measurement

If the machine is not running at the time of measurement, the same procedure may be used as described above for a whole fabric. Measurements should be made, if possible, 12 in. (30 cm) or more from both the front and back edges of the fabric inside the sheet run. The gauge should be held as level and steady as possible. If the fabric travels through the gauge, the readings will vary and therefore a precise measurement will not be possible. Record the approximate average and range over a 10 second period. Repeat five times.

Keywords

Press felts, Thickness

Additional information

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