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BALLOT NO. _____ 6 - SARG _____

DRAFT NO. _____ 5 _____

DATE _____ October 22, 2024 _____

WORKING GROUP
CHAIR _____ Brian Traynor _____

SUBJECT
CATEGORY _____ Fiberglass Mat _____

RELATED
METHODS _____ See "Additional Information" _____

CAUTION:

This Test Method may include safety precautions which are believed to be appropriate at the time of publication of the method. The intent of these is to alert the user of the method to safety issues related to such use. The user is responsible for determining that the safety precautions are complete and are appropriate to their use of the method, and for ensuring that suitable safety practices have not changed since publication of the method. This method may require the use, disposal, or both, of chemicals which may present serious health hazards to humans. Procedures for the handling of such substances are set forth on Safety Data Sheets which must be developed by all manufacturers and importers of potentially hazardous chemicals and maintained by all distributors of potentially hazardous chemicals. Prior to the use of this method, the user must determine whether any of the chemicals to be used or disposed of are potentially hazardous and, if so, must follow strictly the procedures specified by both the manufacturer, as well as local, state, and federal authorities for safe use and disposal of these chemicals.

Moisture sensitivity of fiber glass mats
(Five-year review of Official Method T 1014 om-15)
(Underscores, notes, and strikethroughs show changes from Draft 4)

1. Scope

This test method covers the determination of the binder cure strength of fiber glass mat.

2. Applicable documents

- 2.1 TAPPI T 1007 "Sample Location."
- 2.2 TAPPI T 1009 "Tensile Strength and Elongation at Break."

3. Summary

The specimens are submerged for a specified time in a water bath at 180°F (82°C), removed, cooled to room temperature, and tested for tensile strength. The loss in tensile strength resulting from water soaking when compared to non-water-soaked specimens is reported separately and, optionally, as the percent loss in tensile strength.

4. Significance

The purpose of this test method is to determine binder cure strength by measuring the short term sensitivity of the fiber glass mat binder system to hot water.

5. Apparatus and materials

5.1 Constant temperature water bath, capable of maintaining $180 \pm 2^\circ\text{F}$ ($82 \pm 1^\circ\text{C}$) of sufficient volume to properly immerse specimens as collected under TAPPI T 1009.

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NOTE 1: A 360 in.² surface area is not mandatory. However, conducting the test in specimen sets of 10 each reduces time necessary to conduct the test.

5.1.1 The volume of the water bath must be at least 10 liters. When immersed, the specimens shall not be less than 2 in. (50 mm) from the bottom of the bath and must have a minimum 4 in. (102 mm) water depth above the samples. For example, a water bath can have the dimension of 24" L x 12" W x 12" H which can fit seven samples.

5.2 Two sheets of copper, brass or stainless steel rigid wire cloth, with openings of 1/4 in. to 1/2 in. (6.4 mm to 12.7 mm).

5.2.1 The sheets shall be of sufficient size to support and restrain from floating all specimens as collected under TAPPI T 1014, each 3 x 12 in. (76 x 305 mm) placed in a horizontal position with no overlapping, requiring a minimum 360 in.² (2323 cm²).

5.3 Paper cutter, template or sample cutting device, of suitable size to prepare specimens. The cutting apparatus should produce specimens with clean and parallel edges without distorting the specimens.

5.4 Tensile testing machine. TAPPI T 1009 "Tensile Strength and Elongation at Break."

5.5 Flat, non-absorbent, smooth surface of sufficient surface area to support all specimens as collected under TAPPI T 1014, each 3 x 12 in. (76 x 305 mm) such that no two samples overlap. Minimum recommended surface area is 400 in.² (2581 cm²).

5.6 Forceps of sufficient length to retrieve the specimens from the water bath.

6. Calibration of apparatus

The water bath shall be checked for temperature accuracy and uniformity using an appropriate thermometer.

7. Sampling

Sample the fiber glass mat in accordance with TAPPI T 1007 "Sample Location."

8. Test specimens and conditioning

8.1 Define the principal mat direction on which specimens are to be tested. The test may be conducted on either machine direction or cross machine direction specimens.

8.2 Cut specimens, as per TAPPI T 1009, with lean and parallel edges to a length and width tolerance of $\pm 1/32$ in. (0.8 mm) of the selected dimensions. Avoid abnormalities, creases, wrinkles, visible formation defects, etc.

8.3 All specimens testing should be conducted in a conditioning environment of $77^\circ \pm 2^\circ\text{F}$ ($25^\circ \pm 1^\circ\text{C}$) and with a $50 \pm 3\%$ relative humidity in accordance with TAPPI T 1008. Samples not subjected to water immersion shall be equilibrated in these conditions for a minimum of one hour.

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9. Procedure

9.1 Immerse specimen set, placed horizontally between two sheets of wire cloth such that no two specimens overlap, in a water bath that has previously been temperature-stabilized at a temperature of $180 \pm 2^\circ\text{F}$ ($82 \pm 1^\circ\text{C}$) for $10 \pm 1/2$ minutes. The enclosed specimen set should rest in the water bath in accordance with paragraph 5.1.1.

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NOTE 2: With appropriate care, specimens of mat can be placed vertically in a wire mesh basket which would facilitate immersing the desired number of specimens in a water bath of different geometry to that specified.

9.2 Remove all specimens from the water bath as quickly as possible, placing them immediately on a sheet of copper, brass or stainless steel rigid wire cloth, with openings of 1/4 in. to 1/2 in. (6.4 mm to 12.7 mm). No two samples shall overlap. Allow the specimens to equilibrate to room temperature for 3 minutes before testing.

9.3 Determine tensile strength on both the water-soaked and non-water-soaked specimen sets in accordance with TAPPI T 1009 "Tensile Strength and Elongation at Break."

10. Report

10.1 Report the average value of the breaking force of the fiber glass mat to the nearest 0.1 lbf/3 in. (0.006 kN/m) of width, or 0.1 lbf/in. (0.02 kN/m) width.

10.2 The test report should include:

10.2.1 Test instrument used.

10.2.2 Cross head or driven clamp speed.

10.2.3 Specimen size.

10.2.4 Distance between jaws at the start of test.

10.2.5 Number of specimens tested.

10.2.6 The principal mat direction of the specimens tested.

10.2.7 Standard deviation for each specimen set tested.

10.2.8 Ambient laboratory conditions: temperature and relative humidity.

11. Precision

11.1 On the basis of studies made in accordance with TAPPI T 1200 “Interlaboratory Evaluation of Test Methods to Determine TAPPI Repeatability and Reproducibility” test results, each representing an average of 10 determinations from the same sample (commercial 2.0 lbs / 100 square feet fiberglass mat), are expected to agree within the amounts stated below. The study included five laboratories.

11.2	Average machine direction hot wet tensile strength	65.7 lb/3in
	Repeatability	17 % - 11.4 lb/3in
	Reproducibility	18 % - 11.7 lb/3in
11.3	Average cross-machine direction hot wet tensile strength:	42.3 lb/3in
	Repeatability	22 % - 9.1 lb/3in
	Reproducibility	22 % - 9.1 lb/3in

12. Keywords

Fiber glass mats, Moisture sensitivity, Sensitivity

13. Additional information

13.1 Effective date of issue: To be assigned

13.2 Optionally, a comparison between the non-water-soaked specimens and hot-water-treated specimens can be calculated as a percent of tensile strength loss as follows:

$$\text{Percent tensile strength loss} = [(A-B)/A] \times 100$$

where

A = non-water-soaked tensile strength

B = water-soaked tensile strength

13.3 Primary revisions in the 2015 edition included eliminating 10 as the number of specimens and including reference to TAPPI T 1009 for sample collection.

13.3 [Primary revisions in the 2023 edition included giving](#) the option of testing in either MD or CD, [specifying a tighter tolerance for water bath temperature, and referencing TAPPI T 1008 for sample pre-conditioning.](#)

Your comments and suggestions on this procedure are earnestly requested and should be sent to the TAPPI Standards Department. ■

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