



SOA S-300 (CE) Test Method for Cleaning Effectiveness of Encapsulate Solutions

1. Scope

- 1.1. This test method describes a laboratory procedure used to evaluate the cleaning effectiveness of encapsulate solutions for the Seal of Approval (SOA) program.
- 1.2. This method details procedures for the evaluation of cleaning effectiveness of encapsulate cleaning solutions in removing uniformly applied soil to loop pile carpet.

2. Safety

- 2.1. This practice does not purport to address all the safety concerns, if any, associated with its use. It is the responsibility of the user of this practice to establish appropriate safety and health practices and determine the applicability of regulatory limitations prior to use.

3. References

- 3.1. ASTM D6540 Standard Test Method for Accelerated Soiling of Pile Yarn Floor Coverings
- 3.2. AATCC Evaluation Procedure 2 – Gray Scale for Staining
- 3.3. AATCC Evaluation Procedure 6 – Instrumental Color Measurement
- 3.4. AATCC Evaluation Procedure 7 – Instrumental Assessment of Color Change
- 3.5. SOA Test Carpet Specifications
- 3.6. SOA S-100 Preparation of Solution and Test Method for pH and Optical Brightener
- 3.7. AATCC LP4 Laboratory Procedure for Synthetic Soil

4. Terminology

- 4.1. Encapsulate – absorbent compound
- 4.2. Grade – the number assigned to a test specimen resulting from comparison to a scale

5. Apparatus and Materials

- 5.1. Hexapod tumble tester drum meeting specifications as stated in ASTM D6540
- 5.2. Tape – double-sided pressure sensitive adhesive, 2.0 in. (50 mm) width
- 5.3. Vacuum cleaner – upright-type, SOA-specified vacuum with a rotating brush
- 5.4. Polyamide pellets having a maximum size of 2-3 mm
- 5.5. Weighing scale accurate to 0.01 gram and having a capacity of at least 2000 grams
- 5.6. Chrome alloy ball bearings 9.5 mm (0.375”) diameter
- 5.7. AATCC Standard Soil as specified in AATCC LP4 Laboratory Procedure for Synthetic Soil
- 5.8. AATCC Gray Scale for Staining
- 5.9. Illumination system capable of providing a minimum of 1000 (\pm 50) lux (100 lumens/sq. ft) of north sky light, or equivalent light source.
- 5.10. Conveyor with a minimum bed length of 10 feet and stroke of 7 feet and minimum bed width of 35 inches. Conveyor must be capable of maintaining specified test speed, both forward and reverse. Conveyor must be equipped with brackets to hold the test equipment stationary, exerting no horizontal or vertical force.
- 5.11. Tachometer used to measure conveyor speed in meters/second (feet/second.)
- 5.12. Carpet mounting platform comprised of the same material as test carpet a minimum of 102 mm (4 inches) wider than the head of control extractor mounted to conveyor plate using double sided tape.
- 5.13. 45/0 spectrophotometer with one 25.4 mm (1 inch) or larger viewing aperture.
- 5.14. 45/0 spectrophotometer template comprised of ten (10) viewing locations.
- 5.15. Commercial chemical applicator capable of maintaining spray pressure.
- 5.16. Counter Rotational Brush (CRB) agitator specified by CRI.
- 5.17. Test room – temperature and humidity maintained in standard laboratory conditions, 50% (+/- 5%) relative humidity and 70 (+/- 5) degrees in which all conditioning and testing is done.
- 5.18. Distilled water

6. Test Specimen

- 6.1. Test carpet description: Residential Cut Pile (See SOA Test Carpet Specifications)
- 6.2. Cut six samples of the test carpet to fit the inside wall of the Hexapod tumble tester drum. Test samples are 8.5 inches by 37.4 inches. The long dimension should be parallel to the machine direction.
- 6.3. Mark the test specimen with the test identification number.
- 6.4. Prepare carpet for testing by clipping selvedge edge and vacuuming to remove loose fibers with the control vacuum, using 10 passes at 0.55 m/second (1.8 ft/second)
- 6.5. Condition prepared samples in test room a minimum of 16 hours prior to testing.

7. Preparation of the Soiling Media

- 7.1. Place 3 (+/- 0.05) grams of the AATCC standard soil for each 1000 (+/- 1) grams of polyamide pellets in the Hexapod tumble tester drum.
- 7.2. Mix the soil and pellets in the Hexapod tumble tester drum for 20 minutes to ensure a homogeneous mixture of the soil and polyamide pellets.
- 7.3. The soiled pellets are ready to use.

8. Test Format

- 8.1. Review COC for additional cleaning instructions prior to following the test method below. Follow cleaning instructions provided in the COC if provided. If no cleaning instructions are provided, follow the test method as written.
- 8.2. Using the 45/0 spectrophotometer template and spectrophotometer, measure the ten L_{ab} values and report the average as the initial L_{ab} .
- 8.3. Secure the carpet to the inside wall of the Hexapod tumble tester drum (double-sided tape may be used).
- 8.4. Place 1000 (+/- 2) grams of chrome alloy ball bearings and 250 +/- 0.2 grams of soiled pellets, previously prepared, into the Hexapod tumble tester drum.
- 8.5. Start the Hexapod tumble tester drum and allow it to rotate for 30 minutes.
- 8.6. Remove the test carpets and physically remove any loose pellets from the carpet.
- 8.7. Using the conveyor and vacuum, vacuum the test carpet using 4 passes in the long direction at 1.8 feet per second.
- 8.8. Using the 45/0 spectrophotometer template and spectrophotometer, measure the ten L_{ab} values and report the average as the soiled L_{ab} . Calculate the ΔE between the initial L_{ab} and the soiled L_{ab} . The ΔE shall be 6.8 +/- 0.6 which is the equivalent of 2.0 grade using the AATCC gray scale for color change.
- 8.9. Label the soiled test carpets with the date soiled. All soiled test carpets must be used within 7 days of the soil preparation.
- 8.10. Application of solution (repeat for each of 3 samples)
 - 8.10.1. Prepare solution as described in SOA S-100 Preparation of Solution and Test Method for pH and Optical Brightener.
 - 8.10.2. Place one soiled carpet on the scale and weigh the carpet prior to solution application.
 - 8.10.3. Spray solution evenly across the entire surface of the test carpet until the application rate specified on the COC is achieved. If solution application exceeds the specified application rate, the test carpet is discarded, and a new sample will be prepared.
 - 8.10.4. Allow each treated carpet to dwell 10 (+/- 1) minutes prior to agitation or as specified in the COC.

- 8.11. Agitation of solution
 - 8.11.1. Mount the Counter Rotational Brush (CRB) agitator above the conveyor.
 - 8.11.2. Mount the treated carpet on the carpet mounting platform of the test conveyor.
 - 8.11.3. Make four passes in the long direction at 1.8 feet/second.
 - 8.11.4. Remove the solution treated carpet from the mount and allow to dry in conditioning rack for at least 16 hours, not to exceed 72 hours.
- 8.12. Vacuum solution treated carpet
 - 8.12.1. Mount each solution agitated carpet on the carpet mounting platform of the test conveyor.
 - 8.12.2. Mount the vacuum cleaner above the conveyor.
 - 8.12.3. Make four passes in the long direction at 1.8 feet/second.
 - 8.12.4. Remove the solution cleaned carpet from the mount and condition in the conditioning rack at least 16 hours but not longer than 72 hours.
- 8.13. Clean samples with water only (repeat for each of 3 samples)
- 8.14. Prepare soiled sample as specified in steps 8.2 through 8.9.
- 8.15. Follow steps 8.10 through 8.12 with water only. Apply water at the same application rate as solution.

9. Evaluation

- 9.1. Grade each cleaned carpet sample in accordance with AATCC Evaluation Procedure 2 using the gray scale for staining for each of the 6 test carpets (three cleaned with solution and three cleaned with water.) Compare cleaned samples to an unsoiled carpet sample.
- 9.2. Individual grades for each carpet are determined for the solution cleaned samples.
- 9.3. Individual grades for each carpet are determined for the test samples cleaned with water only.
- 9.4. Steps 9.1 through 9.3 are completed by three different trained technicians.

10. Report

- 10.1. The identifying information for the cleaning solution. (Manufacturer and product name and solution type)
- 10.2. Record date pellets were soiled.
- 10.3. Record Spectrophotometer initial L_{ab} , the soiled L_{ab} and ΔE .
- 10.4. Record the grams of soiled pellets used to achieve the ΔE .
- 10.5. Record date carpet was soiled and cleaned and report date.
- 10.6. The average grade of soiled carpet cleaned with solution.
- 10.7. The average grade of soiled carpet cleaned with water only.
- 10.8. The final result for cleaning effectiveness is the average of the solution grade minus the average of the water only grade.
- 10.9. Any deviations from this test method.