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Laboratory Procedure for Home Laundering with Bleach

Foreword

This procedure is based on laundering methods and parameters originally developed as part of various AATCC standards. As a stand-alone laundering protocol, it may be combined with other test methods, including those for appearance and care label verification.

Standard laundering procedures remain consistent to allow valid comparison of results. Standard parameters represent, but may not exactly replicate, current consumer practices, which vary over time and among households. *Alternate* laundering parameters (water level, agitation, temperature, etc.) are listed in AATCC LP1.

1. Purpose and Scope

1.1 This procedure provides standard conditions for home laundering with bleach, using an automatic washing machine. Option 1 is for sodium hypochlorite ("chlorine bleach"). Option 2 is for sodium percarbonate ("non-chlorine bleach").

1.2 This test is applicable to all fabrics and end products suitable for home laundering. It may be used to determine whether a sample is suitable for laundering with chlorine and/or non-chlorine bleach.

2. Principle

2.1 Home laundering procedures with chlorine and non-chlorine bleach are described. Textile samples may be tested for compatibility with one or both types of bleach, but bleaches must not be combined in a single test. The procedures described herein must be combined with an appropriate test method or evaluation procedure to obtain and interpret results.

3. Referenced Documents

3.1 AATCC EP1, Evaluation Procedure for Gray Scale for Color Change (see 19.1).

3.2 AATCC LP1, Laboratory Procedure for Home Laundering: Machine Washing (see 19.1).

3.3 AATCC TM133, Test Method for Colorfastness to Heat: Hot Pressing (see 19.1).

3.4 ASTM D3938, Standard Guide for Determining or Confirming Care Instructions for Apparel and Other Textile Products.

3.5 ASTM E1402, Standard Guide for

Sampling Design.

4. Terminology

4.1 **bleach**, n.—*in home laundering*, a product that will clean, whiten, brighten and aid in the removal of soils and stains from textile materials by oxidation that is inclusive of chlorine and non-chlorine products.

4.2 **chlorine bleach**, n.—a solution of sodium hypochlorite (NaOCl) that will clean, whiten, brighten and aid in the removal of soils and stains from textile materials.

4.3 **laundering**, n.—*of textile materials*, a process intended to remove soils and/or stains by treatment (washing) with an aqueous detergent solution and normally including rinsing, extraction and drying.

4.4 **non-chlorine bleach**, n.—a product that will clean, whiten, brighten and aid in the removal of soils and stains from textile materials without the release the hypochlorite ion in solution.

NOTE: Powdered non-chlorine bleach typically contains sodium percarbonate ($\text{Na}_2\text{CO}_3 \cdot 1.5 \text{H}_2\text{O}_2$) as its active ingredient. Liquid non-chlorine bleach typically contains hydrogen peroxide (H_2O_2) as its active ingredient. When dissolved in water, sodium percarbonate liberates hydrogen peroxide; the chemistry for laundering with both forms of non-chlorine bleach is the same.

5. Safety Precautions

5.1 The safety precautions specified in the method/procedure are ancillary to the testing procedures and are not intended to be all inclusive.

5.2 It is the user's responsibility to reference applicable safety data sheets, use safe and proper techniques, and wear appropriate personal protective equipment in handling materials in this standard.

5.3 Users MUST consult manufacturers for specific details such as equipment operating instructions and other recommendations. Consult and follow all applicable health and safety regulations (e.g., OSHA standards and rules).

6. Limitations

6.1 *Standard* laundering parameters represent, but may not exactly replicate, current consumer practices, which vary over time and among households. Use of alternate laundering parameters may produce different test outcomes.

6.2 Water quality and hardness are not defined in this procedure. Since most laboratories use local water sources for laundering, it is generally impractical to control parameters. In cases of critical testing or unexpected results, additional testing and comparison may help isolate sources of variability.

7. Apparatus and Materials (see 19.2)

7.1 Automatic washing machine (see Table I, 19.3).

7.1.1 Graduated pail, for washing machine water level verification.

7.1.2 Ruler, 1-m, for washing machine water level verification.

7.1.3 Stopwatch or timer, for washing machine agitation speed verification.

7.1.4 Tachometer, for washing machine spin speed verification.

7.2 Tumble dryer (see Table III, 19.3) or facilities for drip/line/flat drying.

7.3 Balance with at least 5.0-kg capacity, for laundering load.

7.4 Laundering ballast Type 3 (see Table IV). Use of alternate ballast material may affect test results.

7.5 Analytical balance, 0.001-g readability, for reagents.

8. Reagents

8.1 1993 AATCC Standard Reference Detergent WITHOUT brightener (WOB, powder) (see 19.1).

8.2 Laundering bleach (see 19.4).

8.2.1 For Option 1 (chlorine bleach): sodium hypochlorite (NaOCl), 5% available chlorine (see 19.5).

8.2.2 For Option 2 (powdered non-chlorine bleach): sodium percarbonate ($\text{Na}_2\text{CO}_3 \cdot 1.5 \text{H}_2\text{O}_2$), >99% (see 19.6).

9. Verification

9.1 Verify washing machine water level before running a test, or at minimum, once a year.

9.1.1 Using a graduated pail, fill machine with room temperature water until it totals the specified volume.

9.1.2 Vertically, (perpendicularly to water surface), submerge a 1-m ruler until it touches the bottom of the machine drum. Using a permanent ink marker, draw a line on the ruler at the point of contact with the surface of the water. Drain water from drum.

9.1.3 Begin cycle, stopping when fill is complete (before agitation begins). Use the marked ruler to verify water level. Ensure ruler is submerged at the same