1.0 Purpose:

1.1 The purpose of this Test Method is to detail the procedure for evaluating floatability of plastic labels used for PET bottles. This method will apply to all label types, including pressure sensitive, wrap-around, closure and shrink sleeve label constructions.

1.2 This test method shall be the default Multi-Color method for evaluating sink/float performance per caustic floatability and shall only be superseded by customer-specific methods when required.

2.0 Scope/Responsibilities:

2.1 Research & Development is responsible for the management of this test procedure.

3.0 Definitions/Acronyms:

N/A

4.0 Associated Documents, Forms and Records:

APR PET-S-05 **Labels, Closures and Attachments Floatability Test**

5.0 Materials and Test Conditions:

5.1 Test Labels
- 5.1.1 Wrap-around, 0.6% by weight per test
- 5.1.2 Sleeve/Stretch, 3% by weight per test
- 5.1.3 Adhered, 20% surface area per test
- 5.1.4 Closure, 15% by weight per test

5.2 PET Flake
- 5.2.1 Ground flake about 1 cm (3/8 inch) in size
- 5.2.2 Quantity dependent on number of tests to be run

5.3 Glass Beakers
- 5.3.1 Use appropriate size for batch size

5.4 Hot Plate capable of heating to 100 ˚C

5.5 Scale or Balance

5.6 Thermometer

5.7 Strainer – non-aluminum, fine mesh

5.8 Graduated cylinder, 1000 mL

5.9 Caustic (NaOH)

6.0 Procedure:

6.1 Apply label sample to PET container.

6.1.1 For pressure sensitive label constructions, the sample should be allowed to set up for at least 24 hours.

6.2 Cut up labels into 1 cm (3/8 inch) squares.

6.3 Weigh the cut labels and record exact weight.

6.4 Prepare a wash solution of Triton X-100 (0.3% by weight) and caustic (1.0% by weight).

6.4.1 Triton X-100 – 6.0 g per 2,000 mL water

6.4.1.1 Triton X-100 must be dissolved in warm water before adding the caustic.

6.4.2 NaOH – 20 g per 2,000 mL water

6.5 Wash each sample separately at a ratio of 1:4 (1 gram per 4 mL of solution).

6.6 Wash in highly agitated (1000 rpm) solution at 88 ± 2˚C (190˚F) for 15 minutes.

6.7 After 15 minutes of washing, stop agitation, remove agitator and remove from heat.

6.8 Let mixture of solids and solution stand for five minutes to allow floatable materials to float. Skim off floatables.

6.9 Separate non-floating solids from wash solution by pouring mixture through a strainer.

6.10 Transfer non-floating solids to room temperature rinse water at a 1:4 ratio (1 gram non-floating solids per 4 mL water).

6.11 Let stand for five minutes to allow remaining label pieces to float to the surface. Skim off floatables.

6.12 Transfer PET flakes to strainer and rinse in cold running tap water while vigorously stirring for 10 minutes using a manual stirring rod.

6.13 Drain and air dry.

6.14 Examine without magnification and remove all visual labels from the test sample.

6.15 Calculate and report the percentage of label removed during the sink float procedure.

7.0 Interpretation:

7.1 The APR method suggests that greater than 95% of typical polyolefin labels are removed by this procedure. Addition separation is expected during elutriation.

1.0 Purpose:

1.1 The purpose of this Test Method is to detail the procedure for evaluating ink bleed of plastic and/or paper labels used for PET bottles. This method will apply to all label types, including pressure sensitive, wrap-around and shrink sleeve label constructions.

1.2 This test method shall be the default Multi-Color method for evaluating ink bleed performance per caustic bath testing and shall only be superseded by customer-specific methods when required.

2.0 Scope/Responsibilities:

2.1 Research & Development is responsible for the management of this test procedure.

3.0 Definitions/Acronyms:

N/A

4.0 Associated Documents, Forms and Records:

APR PET-S-01 **Bleeding Label Test**

5.0 Materials and Test Conditions:

5.1 Test Labels
- 5.1.1 Wrap-around, 0.6% by weight per test
- 5.1.2 Sleeve/Stretch, 3% by weight per test
- 5.1.3 Adhered, 20% surface area per test

5.2 PET Flake
- 5.2.1 Ground flake about 1 cm (3/8 inch) in size
- 5.2.2 Quantity dependent on number of tests to be run

5.3 Glass Beakers
- 5.3.1 Use appropriate size for batch size

5.4 Hot Plate capable of heating to 100 ˚C

5.5 Scale or Balance

5.6 Thermometer

5.7 Strainer – non-aluminum, fine mesh

5.8 Graduated cylinder, 1000 mL

5.9 Caustic (NaOH)

6.0 Procedure:

6.1 Apply label sample to PET container.

6.1.1 For pressure sensitive label constructions, the label should be allowed to set up for at least 24 hours.

6.2 Cut up labels into 1 cm (3/8 inch) squares.

6.3 Weigh the cut labels and record exact weight.

6.4 Prepare a wash solution of Triton X-100 (0.3% by weight) and caustic (1.0% by weight).

6.4.1 Triton X-100 – 6.0 g per 2,000 mL water

6.4.1.1 Triton X-100 must be dissolved in warm water before adding the caustic.

6.4.2 NaOH – 20 g per 2,000 mL water

6.5 Wash each sample separately at a ratio of 1:4 (1 gram per 4 mL of solution).

6.6 Wash in highly agitated (1000 rpm) solution at 88 ± 2˚C (190˚F) for 15 minutes.

6.7 After 15 minutes of washing, stop agitation, remove agitator and remove from heat.

6.8 Let mixture of solids and solution stand for five minutes to allow floatable materials to float. Skim off floatables.

6.9 Separate non-floating solids from wash solution by pouring mixture through a strainer.

6.10 Transfer non-floating solids to room temperature rinse water at a 1:4 ratio (1 gram non-floating solids per 4 mL water).

6.11 Let stand for five minutes to allow remaining label pieces to float to the surface. Skim off floatables.

6.12 Transfer PET flakes to strainer and rinse in cold running tap water while vigorously stirring for 10 minutes using a manual stirring rod.

6.13 Drain and air dry.

6.14 Examine without magnification and remove all remaining labels from the PET flake.

6.15 Evaluate PET flakes

6.15.1 Perform color analysis on each sample tested (sample PET flake and control PET flake) using the following format:

6.15.1.1 Take 5 measurements on each sample.

6.15.1.2 Record L*, a*, b* values.

6.15.1.3 Report all L*, a*, b* values and averages of the 5 measurements.

6.16 Although the APR does not provide quantitative guidelines for evaluation of the wash water, strongly discolored water is expected to be unacceptable. Provide documentation of the wash after (picture) for reporting.

7.0 Interpretation:

7.1 The following guidelines (comparison to control) for the flake:

7.1.1 L* shift less than 5 units

7.1.2 a* shift less than 2 units.

7.1.3 b* shift less than 2 units, absolute b* value less than 3.0.