

Technical Specifications

PolyStone Creations Technical Specifications

1. Scope and Purpose

1.1 Scope: This standard covers requirements and test methods for minimum performance pertaining to structure, water resistance, colorfastness, stain resistance, product maintenance, and other significant properties, along with general requirements of materials, workmanship and finish of PolyStone products. Our products are manufactured by creating a mold to the specifications of your project. Any architectural application can be considered for use in PolyStone. Design limitations are few.

The materials and equipment which are listed as having been used to conduct testing procedures in this standard are provided solely for informational reference. Materials and equipment of similar design, composition and specifications may also be used to conduct these test procedures.

1.2 Purpose: The purpose of this standard is to establish generally acceptable performance standards for PolyStone materials. Its purpose is also to serve as a guide for our customers to promote understanding regarding materials, manufacture, and installation of our products.

This standard and test procedures contained herein deal with the acceptability of PolyStone materials for use in countertops. Other applications may have additional requirements.

2. General Requirements

2.1 Materials

2.1.1 Reinforcing Materials (when used). The reinforcing material shall be of grades suitable to produce the performance required in this standard.

2.1.2 Resin & gelcoat: Resins & gelcoats used shall be of suitable grades to meet the performance requirements of this standard.

2.1.3 Fillers and Pigments: Suitable grade fillers and pigments may be used in the surface or substrates.

2.1.4 Finish: The finished surface of the unit shall be of a quality which meets all of the applicable requirements of the standard.

2.1.5 Supporting Structure: The material of the supporting structure integral with the countertop material shall be adequate to meet the performance requirements of this standard.

2.2 Dimensional Tolerances: The finished trim dimensional tolerances shall be the customer's stated dimensional tolerances.

2.3 Products for testing: Products to be inspected and tested shall be taken from finished goods inventory.

2.4 Care and Maintenance Instructions: The manufacturer shall make available a copy of the manufacturer's written care and maintenance instructions to the end user.

3. Workmanship and Finish

3.1 Unit Preparation: The product shall be washed with a standard liquid detergent and water solution ("Dawn" brand dish washing detergent, 10% by volume and ordinary tap water 90% by volume as used for this), rinsed with clear water and dried (for the purposes of this test only, the unit may be wiped dry using a chamois leather of a clean absorbent, lint free material to hasten drying) prior to the application of ink and standard dirt as specified in 3.3.1 and 3.4.1.

3.2 Method of Inspection of Product Surface: The surface of the product shall be inspected with the unaided eye for defects and blemishes from a distance of between 1 and 2 feet (304.8 and 609.6 mm) after being inked or soiled in accordance with the ink test (see 3.3.1) and the standard dirt test (see 3.4.1). The light source shall be equivalent to an illumination intensity near the surface to be inspected of 150 +/- 50 foot-candles (1615 +/- 540 lux).

3.3 Surface Test

3.3.1 Test Method: Rub the entire finished surface of the unit with a sponge and a 50% solution of tap water and solution of tap water and water soluble black or blue-black ink after the unit has been washed and dried as described in 3.1. When inspection colored units, use a contrasting colored ink. Rinse the surface of the unit and dry before inspection. Surfaces having pinholes shall be tested for subsurface porosity as described in 3.4.

3.3.2 Performance Requirements: The finished surfaces of units shall be free from cracks, chipped areas and blisters. The number of size of molding and other defects or blemishes shall not exceed those given in Table 2. Such defects shall be determined by inspections as specified in 3.2 after surface conditioning and applications of ink as specified in 3.3.1.

3.4 Subsurface Test

3.4.1 Test Method: One area of the product, approximately 16 sq. in. (0.1 sq. m) shall be conditioned by rubbing for 25 cycles with normal hand pressure using a 600 grit wet silicon carbide abrasive paper ("A" weight 600 grit wet or dry abrasive paper manufactured by 3-M Company was used in preparing this test method). Following the

abrasion, the conditioned areas shall be rinsed with tap water, dried and soiled by application of standard dirt (Standard dirt consists of: 20 parts cadmium stearate; 5 parts 30W motor oil; 1 part wetting agent (Rohm & Haas Triton X-100 was used); and 44 parts tap water. All parts to be measured by weight). Apply about 5 grams of standard dirt to the conditioned area and rub dirt with dampened chamois skin and heavy thumb pressure in circular motion for 25 cycles. After the dirt is allowed to dry for at least one hour, the conditioned area shall then be washed by rubbing with a clean, dampened chamois and standard liquid detergent, before visual inspection.

3.4.2 Performance Requirements: There shall be no visible void larger than 1/16 in. (1.6 mm) in diameter below the original finish surface. The maximum allowable number of voids smaller than 1/16 in. (1.6 mm) for the conditioned area shall be four (4).

4. Structural Integrity for Product

4.2.1 Impact Tests

4.2.2 Point Impact

4.2.2.1 Test Method: A 1-1/2 in. (38.1 mm) diameter, 1/2 lb. (0.225 kg) steel ball shall be dropped from a height of 24 in. (610 mm) to impact on each of four different areas on the test specimen.

4.2.2.2 Performance Requirement: The unit shall not show any cracks or chips after inking is described in 3.3.1. +/- 5 degrees C) (An Atlas Xenon Arc Fade-Ometer was used in preparing this test method). Humidity need not be controlled. One specimen shall be retained as a control specimen.

5.1.2 Performance Requirement: Tested specimens shall not show any cracking, crazing blistering, or significant change of surface texture when compared with control specimen when using a light source as specified in section 3.2. In the case of a conflict, examination shall be made by the method stated in ASTM D 2244 and the average color difference between tested specimens and the untested specimen shall be no more than +/- 2 CIE units. In the case of failure, two more specimens shall be tested and shall pass.

5.2 Stain Resistance Test

5.2.1 Test Method. Manufacturer shall supply suitable flat specimen(s). Specimen(s) shall be conditioned by wet scrubbing with a standard scouring compound (325 Mesh Feldspar was used in preparing this test method) and cheesecloth using 20 scrub cycles. Apply approximately 2 drops each of the liquid reagents listed in Table 3 and a similar amount of the solid reagents to the test specimen(s). Conduct one test with each reagent uncovered and the other with the reagent covered with a small watch glass to prevent evaporation at a temperature of 73.4 +/- 3.6 degrees F (23 +/- 2 degrees C) and a relative humidity of 50% +/-5%. At the end of sixteen hours, remove the excess reagent with a paper towel. The stained specimen(s) staining shall be in accordance

with 3.2. Each stain, both covered and uncovered, shall be given a number of accordance with 5.2.1.1 through 5.2.1.5.

Table 3

Reagents Used In Stain Resistance Test

Black Crayon

Black Liquid Shoe Polish

Gentian Violet Solution

Beet Juice – Juice from Del Monte Sliced Beets (not pickled) was used undiluted in preparing this test)

Grape Juice – Welch’s 100% Pure Grape Juice (purple) was used in preparing this test.

Lipstick – (contrasting color) Avon lipstick was used in preparing this test method.

Hair Dye - (contrasting color) Miss Clairol hair dye was used in preparing this test.

Mercurochrome Solution, 2%

Wet Tea Bag – Lipton’s Tea Bags (Orange pekoe and pekoe cut black tea) were used in this test.)

5.2.1.1 Wash the specimen with tap water and cheesecloth or soft bristle brush using 20 scrub cycles with normal hand pressure. Dry by blotting. A stain shall be defined as a change in surface texture or a change in color. Specimens not staining at this point shall have a rating of : 1- Non-staining.

5.2.1.2 Stains present after initial wash with water shall be washed with alcohol (commercial rubbing alcohol) or naphtha (lighter fluid) using cheesecloth or soft bristle brush for 20 cycles using normal had pressure. The specimens shall be washed with tap water and dried by blotting. Specimens not staining at this point shall have a rating of: 2 – Removable by alcohol or naphtha.

5.2.1.3 Stains present after the aforementioned cleanings shall be scrubbed 20 scrub cycles with a standard scouring powder and wet cheesecloth or soft bristle brush using normal hand pressure. The specimens shall be washed with tap water and dried by blotting. Reduction in gloss due to scrubbing with standard scouring powder does not constitute staining. Specimens whose stain is removed by the standard scouring powder shall have a rating of: 3 – Removable by first application of scouring powder.

5.2.1.4 Stains present after the aforementioned cleanings shall be scrubbed an additional 40 scrub cycles with standard scouring powder and wet cheesecloth or soft bristle brush using normal hand pressure. Wash with tap water and dry by blotting. Reduction of gloss due to scrubbing with standard scouring powder does not constitute staining. Specimens whose stain is removed by this additional cleaning shall have a rating of: 4 – Removable by two standard scouring powder scrubblings.

5.2.1.5 Any specimen with stain remaining after the aforementioned cleanings shall have a rating of: 5. Any specimen with stain remaining after the above cleanings shall be tested to determine the depth of staining. Cut through the affected area and sand lightly (600 grit) until stain is removed. Measure depth to the nearest 0.001 in. (.025 mm).

5.2.2 Performance Requirement: The maximum stain resistance rating is the sum of all the individual stain ratings for each of the covered and uncovered stain areas. The maximum all the individual stain ratings for each of the covered and uncovered stain areas. The maximum allowable total rating shall be 64. The maximum allowable thickness of material to be removed to eliminate the stain shall be 0.005 in. (.127 mm).

5.3 Cigarette Burn Test

5.3.1 Test Method: Select three brands of cigarettes (Winston, Kent and Marlboro cigarettes were used for this test). Light one from freshly opened packages of three brands. Place the cigarettes on the specimen(s) with lighted end approximately 1 in. (25.4 mm) in from the edge. Allow the cigarettes to burn for 120 +/- 2 seconds. Remove the cigarettes and allow the burned areas to cool. Wipe the burn areas with clean cheesecloth or soft bristle brush. If a visible stain remains, sand the stained area with 400 grit wet or dry sandpaper and water until the stain is removed.

5.3.2 Performance Requirement: There shall be no ignition or progressive glow of the surface during or after the contact with the lighted cigarettes. Any resulting damage shall not impair the serviceability of the unit and shall be restorable, using abrasives and polishing compound to approximate the original finish.

5.4 Chemical Resistance Test

5.4.1 Test Method: Apply Approximately 2 drops of each of the following liquid reagents to the surface finish:

Naphtha – Varnish makers & painters naphtha was used in preparing this test.

Ethyl alcohol

Amyl acetate

Household ammonia solution, 10%

Citric acid solution, 10%

Urea, 6.0% (urine)

Hydrogen peroxide, 3% in water

Concentrated sodium hypochlorite solution – Clorox was used in preparing this test

Phenol solution, 5% in water – Lysol was used in preparing this test.

Toluene

Ethyl acetate

Lye solution, 1% to 2% in water – Drano was used in preparing this test

Acetone

Trisodium phosphate, 5% on water

Vinegar

Pine oil

Suitable flat specimen(s) shall be cut from the sample material and conditioned as shown in 3.1. Conduct one test with each reagent uncovered and the other with reagent covered with specimens to remain for a total of 16 hours. At the end of 16 hours at a temperature of 74.3 +/- 3.6 degrees F (23 +/- 2 degrees C) and a relative humidity of 50 +/- 5% before rating.

5.4.2 Performance Requirement: The surface finish shall be unaffected by the reagents except for superficial surface changes which are removable by sanding with 600 grit wet or dry sandpaper and water. Any resulting damage shall not impair the serviceability of the product, and shall be easily repairable by using abrasive and polishing compounds to approximate the original finish.

5.5 Heated Pan Test

5.5.1 Test Method: A test area 10 +/- 1 inch (254 +/- 25 mm) in diameter, shall be marked on the test specimen. An aluminum disk 6 +/- .25 inches (150 +/- 6 mm) in diameter and 1/4 +/- 1/32 inch (7 +/- 1 mm) thick shall be heated for 15 +/- 0.5 minutes in an oven maintained at 365 +/- 10 degrees F (185 +/- degrees C) shall be placed on the test area and allowed to remain for 10 +/- 0.5 minutes, after which it shall be removed. This procedure shall be repeated two more times (for a total of three times) on the same test area. The specimen shall then be allowed to remain at room temperature for four hours

and inspected for any surface deterioration such as cracking, crazing, discoloration, or other surface effects.

5.5.2 Performance Requirements: There shall be no cracking, crazing or blistering. Any discoloration shall be removable using abrasives and polishing compound to approximate the original finish serviceability. In case of conflict, examination shall be made by the method of ASTM D 2244, and the average color difference, after abrading and polishing, shall be no more than +/- 2 CIE units.

5.6 High Temperature Resistance Test

5.6.1 Test Apparatus: The test apparatus shall include:

1. A flat-bottom vessel in accordance with Figure 3-8
2. Hot plate or equivalent
3. Bath Wax
4. Dial thermometer reading from 212 degrees to 483 degrees F (100 degrees to 250 degrees C) in 2 degree gradations, or the equivalent. Mercury-filled glass thermometers shall not be used.
5. Tongs to lift heating vessel.
6. Overhead white fluorescent lights with bulb(s) positioned parallel to the line of sight and providing an intensity of 75 to 100 foot-candles (807 to 1076 lux) on the specimen surface.

5.6.2 Test Procedure: Test specimens shall be prepared at least 8 x 8 inches (203.2 x 203.2 mm) ½ inch (6.3 mm) thick. The test specimen shall be examined prior to the test and condition of the color and surface texture shall be noted. The heating vessel shall be filled to ½ inch (12.7 mm) from the rim with bath wax. The wax shall be heated until it reaches a temperature of 365 degrees F (185 degrees C). Care should be taken to not overheat the wax, as fire can result. Using the tongs, the vessel shall be removed from the hot plate and the wax allowed to cool to 356 degrees +/- 1.8 degrees F (180 +/- 1 degree C). Then the vessel shall be placed, using the tongs, on the test specimen and allow it to remain in place for 20 minutes. The vessel shall then be removed with the tongs and the test specimen allowed to stabilize at room temperature for at least 24 hours. The specimen shall then be wiped with naphtha and SD-3A ethyl alcohol to remove residual wax. The conditioned specimen shall be examined by placing it, without pre-inspection, on a table and then viewed at an eye-to-specimen distance of approximately 30 to 36 inches (772 to 914.4 mm) and at an angle of approximately 45 degrees to 75 degrees from the horizontal (table surface). The specimen shall be rotated in the plane of the table and viewed from all directions. Direct sunlight or other angle

light sources, which will accentuate or minimize the effect, shall be avoided. Observations shall be recorded.

5.6.3 Performance Requirement: The specimen shall be examined for blisters, crazing, whitening or cracking. The resistance to high temperature shall be reported as one of the following:

1. No effect – No change in color or surface texture
2. Slight effect – A change in color or surface texture only visible at certain angles or directions.
3. Moderate effect – A change in color or surface texture visible from all angles and directions, but does not appreciably alter the original condition of the specimen.
4. Severe Effect – A change in color or surface texture which obviously and markedly alters the original condition of the specimen.

6.0 Additional Material Tests

6.1 Water Resistance Test

6.1.1 Test Method: Clamp a 12" x 12" specimen at a 2 degree angle from the horizontal. Impinge a stream of water on the surface 1-1/2 inches from the edge at 190 +/- 3 degrees F (88 +/- 2 degrees c) for 1-1/2 minutes followed immediately at the same point with cold water at 70 +/- 3 degrees F (21 +/- 2 degrees C) for 1.5 minutes. Test shall continue for 250 consecutive cycles without pause between cycles at water flows of 1 +/- 0.2 gallons per minute (3.785 +/- 0.8 L/minute).

6.1.2 Performance Requirements: No cracking, blistering or peeling shall be permissible. Inspection for cracking and crazing shall be made using an ink solution as described in 3.3.

Appendix

Non-mandatory

There are sufficient performance based tests in the standard to fairly characterize any PolyStone material for the use in a countertop, shower surround, wall panel, window sill, or other similar application.

It is felt, however that there may be some opportunity to further characterize the physical properties of the material.

In an effort to achieve standardization of results, it is recommended that where further physical characterization of the material is obtained, the following test methods shall be used.

A.1 Flexural Strength Test

A.1.1 Test Method: A sample of material shall be prepared from normal manufactured material. The test sample shall be prepared to a ½ in. (12.7 mm) nominal thickness. The sample shall then be tested in accordance with ASTM D 790 – 86.

A.1.2 Performance Requirement: Record result

A.2 Flexural Modulus Test

A.2.1 Test Method: A sample of material shall be prepared from normal manufactured material. The test sample shall be prepared to a ½ in. (12.7 mm) nominal thickness. The sample material shall then be tested in accordance with ASTM D 790 – 86.

A.2.2 Performance Requirement: Record result

A.3 Tensile Modulus Test:

A.3.1 Test Method: A sample of material shall be prepared from normal manufactured material, and from a molded material. Test samples shall be prepared as a Type 2 “dog bone” sample. The samples shall then be tested in accordance with ASTM D 638-90.

A.3.2 Performance Requirement: Record result

A.4 Tensile Elongation Test

A.4.1 Test Method: A sample of material shall be prepared from normal manufactured material. The test sample shall be prepared as a Type 2 “dog bone” sample. The sample shall then be tested in accordance with ASTM D 638-90.

A.4.2 Performance Requirement: Record Result

A.5 Thermal Expansion Test

A.5.1 Test Method: A sample of material shall be prepared and tested in accordance with ASTM D 696 – 79. Coefficient of thermal expansion shall be calculated in accordance with ASTM 696 – 79.

A.5.2 Performance Requirement: Record Result

A.6 Fire and Smoke Test.

(TBA) PolyStone (all colors) pass the F.A.R. 25.853 (a) burn test.