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**American National Standard
for Plastic Water Closet Bowls and Tanks**



Secretariat
**International Association of
Plumbing and Mechanical Officials**

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American National Standard

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Foreword (This Foreword is not a part of American National Standard for Plastic Water Closet Bowls and Tanks)

Production of gel-coated glass-fiber reinforced Plastic Plumbing Fixtures began in 1956. The immediate need for standard specifications was answered by the issuance, in 1959, of Commercial Standards CS 221-59 for bathtubs and CS 222-59 for shower receptors. These standards served as the basis of product acceptance by the Federal Housing Administration (FHA) and code writing agencies.

In 1962 the development of a needed industry standard was undertaken by the NAHB Research Institute and a Reinforced Plastics Industry Advisory Board with the cooperation and assistance of the Society of the Plastics Industry. In July 1963, the NAHB Research Institute issued a new standard for tub-shower units which constituted an extensive revision of CS 221-59 and was the first performance-type standard for such products.

In December 1965, the NAHB Research Foundation, Inc., continuing the work of the NAHB Research Institute, issued a revised standard for bathtub units and a standard for shower receptors and stalls. These standards were considered by those most interested to be worthy of approval as an American National Standard, and the need for their application nationally was self-evident. Accordingly, they were submitted to the Standards Institute in 1965 and approved on April 5, 1967 as American National Standard for Gel-Coated Glass-Fiber Reinforced Polyester Resin Bathtub Units, Z124.1-1967 and Gel-Coated Fiberglass Reinforced Polyester Resin Shower Receptors and Shower Stalls, Z124.2-1967.

The sponsor also asked for the establishment of an American National Standards Committee, which was approved as American National Standards Committee Z124.

In October 1978, the International Association of Plumbing and Mechanical Officials (IAPMO) assumed the secretariat's position to continue the work already in progress.

The continuation of work resulted in the revision and updating of Z124.1 for Plastic Bathtubs and Z124.2 for Plastic Shower Receptors and Shower Stalls.

A new standard for Plastic Lavatories, which had been started by a Task Group in early 1975, was also completed and forwarded to American National Standards Institute in September 1979. The formal adoption date was May 21, 1980, and resulted in American National Standard Z124.3 for Plastic Lavatories.

At the request of HUD, a Task Committee developed a standard for Plastic Water Closet Bowls and Tanks. It was completed and forwarded to ANSI and formally adopted May 30, 1983, as American National Standard Z124.4.

The Standard for Plastic Toilet (Water Closet) Seats which was started in November 8, 1983 was completed and forwarded to the American National Standards Institute on February 15, 1989. The formal adoption date was August 24, 1989 and resulted in American National Standards Institute, Standard Z124.5 for Plastic Toilet (Water Closets) Seats.

The Standard for Plastic Sinks which was started in April 1986 was completed and forwarded to American National Standards Institute on July 1989. The formal adoption date was December 13, 1990 and resulted in American National Standard Z124.6 for Plastic Sinks.

The Standard for Plastic Bathtub Liners which was started in 1985 was completed and forwarded to the American National Standards Institute in June, 1990. The formal adoption date was October, 1990 and resulted in American National Standards Institute, Standard Z124.8 for Plastic Bathtub Liners.

The Standard for Plastic Urinal Fixtures which was started in November, 1990 was completed and forwarded to the American National Standard Institute in November, 1993. The formal adoption date was January 25, 1994 and resulted in American National Standards Institute

Standard Z124.9 for Plastic Urinal Fixtures.

Other standards which are appropriate for the scope of the Z124 can also be proposed for development, and suggestions for improvement of these Z124 standards are always welcome. They should be sent to the American National Standards Institute, 11 West 42nd Street, New York, NY 10036.

The Z124 Committee had grown from the original 1962 Committee of eleven industry members to a consensus Committee of thirty-four members.

This standard was processed and approved for submittal to ANSI by American National Standards Committee on Synthetic Organic Materials in Plumbing Fixtures, Z124. Committee approval of the standard does not necessarily imply that all Committee members voted for its approval. At the time it approved this standard, the Z124 Committee had the following members:

Charles Gross, Chairman

Steve Rouleau, Vice Chairman

<i>Organization Represented</i>	<i>Name of Representative</i>
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PSI Testing Lab	P. Medwig
P.W. Meikle Consultants	P. Meikle
SGS US Testing Co.	D. Holloway
	J. Simmons (Alt.)

<i>Organization Represented</i>	<i>Name of Representative</i>
Spartech	J.L. Payne
Taylor Industries	B. W. Taylor
Underwriters Lab	M. Carroll
Waterless Co.	K. Reichardt

AMERICAN NATIONAL STANDARD FOR PLASTIC WATER CLOSET BOWLS AND TANKS

1. Scope and purpose

1.1 Scope. This standard covers physical requirements and test methods for performance, and dimensions, in addition to general requirements of materials, workmanship and finish of plastic water closets bowls, tanks, tank covers or combinations of same.

The materials and equipment which are listed to conduct the tests in this standard are provided for reference in determining compliance with this voluntary standard. Materials and equipment of similar design, composition, and specification shall also be permitted to conduct these tests.

1.2 Purpose. The purpose of this standard is to establish minimum requirements for plastic water closet bowls, tanks, tank covers, or combinations of same. Conformance to this standard and test procedures herein shall indicate acceptability of a plastic water closet, bowls, tanks, tank covers, or combinations of same as a plumbing fixture.

1.3 Normative references. The following standards contain provisions which through reference in this text, constitute provisions of this American National Standard. At the time of publication, the editions indicated were valid. All standards are subject to revisions, and parties to agreements based on this American National Standard are encouraged to investigate the possibility of applying most recent editions of the standards indicated below.

ASME A112.19.2-03, *Vitreous china plumbing fixtures and hydraulic requirements for water closets and urinals*

ASME A112.19.5-99, *Trim for water closet bowls, tanks & urinals*

ASSE 1002-99, Performance requirements for anti-siphon fill valves (ballcocks) for gravity water closet flush tanks

ANSI A117.1-03, *Accessible and usable buildings and facilities*

ASTM D 570-98, *Water absorption of plastics*

ASTM D 883-00, *Standard terminology of terms relating to plastics*

ASTM D 1729-96(03), *Visual appraisal of colors and color differences of diffusely-illuminated opaque materials*

ASTM D 2244-05, *Standard practice for calculation of*

color tolerances and color differences from instrumentally measured color coordinates

ASTM D 2565-99, *Standard practice for xenon-arc exposure of plastics intended for outdoor applications*

CIE, *CIE publication no. 15 (E-1.3.1) 1971/(TC-1.3) 1978: u.s. national committee cie national bureau of standards washington, d.c. 20234*

2. General requirements

2.1 Materials

2.1.1 Composition. The units shall be made of suitable commercial grades of plastic resins and such other filling, coloring, reinforcing, and coating materials as will meet the performance requirements of this standard.

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

2.1.3 Supporting structure. The material of the supporting structure integral with the unit and its attachment shall be adequate to meet the performance requirements of this standard.

2.2 Dimensional requirements

2.2.1 Dimensions. Dimensional requirements for plastic water closet bowls and tanks shall be as specified for vitreous china water closets bowls and tanks in ASME A112.19.2, Section 3.

2.2.2 Warpage. Fixtures shall not exceed the warpage tolerance specified in ASME A112.19.2, Section 2.4.

2.2.3 Trap seal. The depth of seals for integral traps in water closet bowls shall be not less than 50 mm (2.0 in.)

2.3 Selection of units for testing. Units to be inspected and tested shall be from finished goods inventory.

2.3.1 Flat samples. If satisfactory flat specimens for testing cannot be obtained from the unit being tested, flat samples of the approximate thickness shall be provided by the manufacturer and certified as having been made from the same materials and by the same process.

2.4 Installation instructions. Units shall be furnished with installation instructions, unless intended to be installed by the manufacturer.

2.5 Care and maintenance instructions. Each unit shall be supplied with a removable copy of the manufacturer's written care and maintenance instructions affixed to the unit in a conspicuous location. The instructions shall also state, "To be removed only by the occupant."

2.6 Identification.

2.6.1 Permanent marking. Each fixture or each fixture component, if the fixture is comprised of two or more components, shall be marked with the manufacturer's name or registered trademark, or in the case of private labeling, of the customer for whom the unit was manufactured. This mark shall be legible and permanent. This mark shall be located so as to be visible after the fixture is installed.

2.6.2 Compliance with standard. Each fixture shall be marked in a location determined by the manufacturer with the designation ANSI Z124.4 to signify compliance with this standard.

2.6.3 Water consumption. A water closet and its packaging shall be labeled in accordance with its average water consumption for the classifications cited in ASME A112.19.2.

2.7 Concealed tanks. Tanks intended for "behind the wall" (concealed) locations shall be required to meet only the following performance tests: 4.1, 4.4.2 (if the shank supply is located below the water line), 4.5.4, 5.6 and 5.7.

2.8 Spud sizes. Spud connections shall comply with ASME A112.19.5.

2.9 Handicap/physically challenged installations. See ANSI A117.1.

2.10 Closet seats. Where water closet seats are provided with the unit, the seat shall comply with ANSI Z124.5.

2.11. Sanitary and hydraulic performance of water closet tanks and bowls. Water closets shall meet the hydraulic performance requirements for waste removal and water consumption as set forth in ASME A112.19.2, Section 5.

3. Workmanship and finish

3.1 Unit preparation.¹ The unit shall be installed according to manufacturer's directions to simulate conditions of permanent installation, excluding fittings and piping. The tests required in Section 3 shall be conducted on surfaces which will be visible after installation. The unit shall be washed with a standard liquid detergent² and water solution, rinsed with clear water, and dried³ prior to the application of ink and standard dirt⁴ as specified in 3.3.1 and 3.4.1. All tests shall be run at an ambient temperature of $23 \pm 3^\circ \text{C}$ ($75 \pm 5^\circ \text{F}$) unless otherwise specified.

3.2 Method of inspection of unit surface. The surface of the unit shall be visually inspected for defects and blemishes from a distance of between one and two feet after being inked in accordance with the Ink Test (3.3.1) or, if subjected to the sub-surface porosity test, after being soiled with stan-

dard dirt (3.4.1). The light source shall be equivalent to an illumination intensity, near the surface to be inspected, of $1616 \pm 540 \text{ lx}$ (150 ± 50 foot candles).

3.3 Surface characteristics

3.3.1 Test method. The surface of the unit shall be rubbed with a sponge and a 50% solution of tap water and water soluble black or blue black ink after unit has been washed and dried as described in 3.1. When inspecting colored units, a contrasting colored ink shall be used. The ink shall be rinsed from the surface of the unit and shall be dried before inspecting for defects or blemishes by the procedure specified in 3.2.

3.3.2 Performance requirement. The units shall be free from cracks, chipped areas, blisters and large specks (larger than $1/16''$) (1.6 mm). See definitions under Table 1. The number and size of molding irregularities and certain other defects or blemishes shall not exceed those given in Table 1.

3.4 Subsurface porosity

3.4.1 Test method. Any finish surfaces suspected of having subsurface porosity shall be subjected to the standard dirt test. Two areas of the unit approximately 0.01 m^2 (16 in^2) each, shall be conditioned by rubbing these areas for 25 cycles with 600 grit wet silicon carbide abrasive paper.⁵ For tanks, one area shall be located on the cover of the tank and one on the outside front of the tank. For bowls, one area shall be located on the back slope of the flushing surface and one on the front of the pedestal. Following the abrasion, these areas shall be rinsed with tap water, dried and soiled by the application of standard dirt. Five (5) grams of standard dirt shall be applied to each area and the dirt shall be rubbed with dampened chamois and heavy thumb pressure in a circular motion for 25 cycles. The dirt shall be allowed to dry for 1 hour. The areas shall then be washed by rubbing with a clean, dampened chamois and standard liquid detergent. Visual inspection shall be made by the procedure in 3.2.

¹ All reagents and chemicals in this specification have varying degrees of acute and chronic toxicity when entering the body through inhalation, ingestions, or skin absorption. You should be aware of these toxic effects and take precautions (e.g. gloves, ventilation, respirator) to avoid harmful exposure. The Material Safety Data Sheet (MSDS) for these chemicals and reagents will be reviewed and precautions will be taken as required.

² Standard liquid detergent consists of, by volume: 8.0% tetrapotassium pyrophosphate (Monsanto TKPP was used); 7.0% ethoxylated-alkyl-phenol (Monsanto Sterox NJ or Rohm & Haas Triton X-100 were used); 8.0% sodium-xylensulfonate (Stepan Chem. Co., Stepan SXS was used); 1.5% butyl cellosolve (2-butoxy ethanol); 75.5% water.

³ To hasten drying, surfaces shall be permitted to be wiped with a clean chamois leather or a clean absorbent, lint-free material (for this test only).

⁴ Standard dirt consists of: 20 parts carbon black (pigment grade), 20 parts iron black (iron oxide, black), 20 parts calcium stearate, 5 parts 30W motor oil, 1 part wetting agent (Triton X-100, Rohm & Haas, or the equivalent), and 44 parts tap water. All parts are to be measured by weight.

⁵ "A" weight wet or dry 600-grit silicon carbide abrasive paper manufactured by 3M Company was used in preparing this test.