

ASME A112.19.19-2006

Vitreous China Nonwater Urinals

AN AMERICAN NATIONAL STANDARD



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Mechanical Engineers**

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FOREWORD

Nonwater urinals were introduced into the United States plumbing fixture marketplace in 1991. A national standard was developed by the International Association of Plumbing and Mechanical Officials (IAPMO) for the fiberglass version of the product, which was the only version available at that time. That standard, ANSI Z124.9, Plastic Urinal Fixtures, remains as a national standard.

Later in the decade, another manufacturer introduced a nonwater urinal of vitreous china manufacture. No ANSI standard existed for that product. In 2002, Project Initiation Request (PIR) 02-22 was submitted to the ASME A112 Committee requesting that a standard be developed for the vitreous china product. On July 29, 2003, at its meeting in San Diego, California, the A112 Standards Committee formed a new Project Team 19.19 to address the request in PIR 02-22. The Project Team immediately began its work on the standard.

This Standard is similar in many respects to that portion of ANSI Z124.9 for plastic nonwater urinals. However, considerable discussion was given to incorporating a test for odors that would be more objective than that contained within the Z124.9 Standard. As a result, the test method for odors that became a part of this Standard relied upon instrumentation to detect odors, if any, rather than the human nose.

Suggestions for the improvement of this Standard will be welcome. They should be sent to The American Society of Mechanical Engineers, Attn: Secretary, A112 Standards Committee, Three Park Avenue, New York, NY 10016-5990.

This Standard was approved as an American National Standard on September 28, 2006.



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Subject:	Cite the applicable paragraph number(s) and the topic of the inquiry.
Edition:	Cite the applicable edition of the Standard for which the interpretation is being requested.
Question:	Phrase the question as a request for an interpretation of a specific requirement suitable for general understanding and use, not as a request for an approval of a proprietary design or situation. The inquirer may also include any plans or drawings that are necessary to explain the question; however, they should not contain proprietary names or information.

Requests that are not in this format will be rewritten by the Committee prior to being answered, which may inadvertently change the intent of the original request.

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VITREOUS CHINA NONWATER URINALS

1 GENERAL

1.1 Scope

This Standard establishes requirements and test methods pertaining to materials, significant dimensions, and functional performance for vitreous china nonwater urinals. The sanitary performance requirements and test procedures apply to all types of nonwater urinals that discharge into gravity waste systems in permanent buildings and structures independent of occupancy.

1.2 Units of Measure

Where values are stated in U.S. Customary units and the International System of Units (SI), the U.S. Customary units shall be considered as the standard.

1.3 References

The following documents form a part of this Standard to the extent specified herein. Unless otherwise specified, the latest edition shall apply.

ANSI/ICC A117.1, Standard Specification for Accessible and Usable Buildings and Facilities

Publisher: The International Code Council (ICC), 5203 Leesburg Pike, Falls Church, VA 22041

ASME A112.6.1M, Floor-Affixed Supports for Off-the-Floor Plumbing Fixtures for Public Use

ASME A112.6.2, Framing-Affixed Supports for Off-the-Floor Water Closets With Concealed Tanks

ASME A112.19.2, Vitreous China Plumbing Fixtures and Hydraulic Requirements for Water Closets and Urinals

ASME A112.19.5, Trim for Water-Closet Bowls, Tanks, and Urinals

ASME A112.19.12, Wall Mounted and Pedestal Mounted, Adjustable and Pivoting Lavatory and Sink Carrier Systems

Publisher: The American Society of Mechanical Engineers (ASME), Three Park Avenue, New York, NY 10016-5990; Order Department: 22 Law Drive, P.O. Box 2300, Fairfield, NJ 07007-2300

UL 969, Marking and Labeling Systems

Publisher: Underwriters Laboratories, Inc. (UL), 333 Pfingsten Road, Northbrook, IL 60062-2096

1.4 Definitions

blister: a raised portion of the surface not greater than $\frac{1}{8}$ in. (3 mm) in maximum dimension.

blister (large): a raised portion of the surface greater than $\frac{1}{8}$ in. (3 mm) in maximum dimension.

bubble: a raised portion of the surface or a sand speck smaller than $\frac{1}{32}$ in. (1 mm) in maximum dimension.

crack: a fracture in either the glaze or the body but neither a dunt nor a craze.

craze: fine cracks in the glaze.

discoloration: a colored spot over $\frac{1}{4}$ in. (6 mm) in maximum dimension or a sufficient number of specks or spots to give the effect of a change in color.

dull or eggshell finish: dead or flat finish, undeveloped glaze, or a semi-glazed finish with numerous very fine pinholes or slightly matted in appearance, not glossy; not to be confused with a satin or matte finish used for decorative purposes.

dunt: a hairline fracture extending through the body and caused by strains set up in the process of manufacture.

exposed body: unglazed portion $\frac{1}{16}$ in. (2 mm) or more in maximum dimension.

finish: texture and condition of surface other than color.

fire check: fine shallow crack in the body not covered with glaze (when covered with glaze so as to be easily cleaned, it is not detrimental).

first quality: first-class ware in conformance with the grade limitations and other requirements of this Standard. Shall also be permitted to be called grade-“A” ware.

fixture: the china piece only, without trim.

flood level: the portion of a plumbing fixture that will spill over when the fixture drain is shut or constricted.

glaze: the smooth, glass-like ceramic coating on a vitreous china surface that imparts impermeability and covers the body.

nonwater consuming urinal: a plumbing fixture that is designed to receive and convey only liquid waste through a trap seal into the gravity drainage system without the use of water for such function.

permanent markings: permanent shall mean fired, cast, sandblasted, etched, stamped, or otherwise not removable except by excessive work or extraordinary means.

pinhole: a small hole in the glazed surface up to and including $\frac{1}{16}$ in. (2 mm) in maximum dimension.

pit: a hole in the glazed surface larger than $\frac{1}{16}$ in. (2 mm) in diameter.

polishing mark: a spot not larger than $\frac{3}{8}$ in. (10 mm) in maximum dimension where some minor blemish has been removed by polishing.

pottery square: a square 2 in. (50 mm) on each side. For grading purposes, it shall be a 2 in. (50 mm) square hole cut in a small sheet of any flexible material, such as rubber or paper, for convenience in sliding over irregular surfaces to determine segregation.

rim: the unobstructed open edge of a fixture.

roughing-in measurement: dimensions from finished wall or floor to center of waste or supply opening or mounting holes.

sanitary: for the purposes of this Standard, indicates an aesthetic condition of cleanliness, not microbiologically clean.

segregation: more than the allowable number of defects in a pottery square.

speck: an area of contrasting color less than $\frac{1}{32}$ in. (1 mm) in maximum dimension. Specks less than $\frac{1}{100}$ in. (0.3 mm) in maximum dimension, unless in sufficient number to form a discoloration, are not counted.

spot: an area of contrasting color $\frac{1}{32}$ in. (1 mm) up to and including $\frac{1}{8}$ in. (3 mm) in maximum dimension.

spot (large): an area of contrasting color greater than $\frac{1}{8}$ in. (3 mm) in maximum dimension.

trap: a fitting, device, or integral fixture portion so designed and constructed as to provide a liquid seal that will prevent the back-passage of sewer gas without materially affecting the flow of sewage or wastewater through it.

trap dip: the highest point of the opening from the well into the trapway.

trap seal depth: the vertical depth of liquid between the highest part of the lower interior surface of a trap and the trap weir.

trim: parts other than china regularly supplied with a fixture, e.g., wall hangers. Trim shall not include fittings (see ASME A112.19.5).

urinal: a plumbing fixture that receives only liquid body wastes and conveys the waste through a trap seal into a gravity drainage system.

visible after installation: any surface that remains visible after the fixture has been installed, not necessarily from a normal standing position.

visible surface: the surface that is readily visible to an observer in a normal standing position after installation of the fixture.

vitreous china: as applied to plumbing fixtures ($\leq 0.5\%$ absorption) compounded of ceramic materials fired at

Table 1 Maximum Allowable Defects for Vitreous China Nonwater-Consuming Urinals

Defect	Maximum Permitted
Warpage	Not noticeably warped
Exposed body	None
Wavy finish	Not more than 4 in. ² (2 600 mm ²)
Pits, blisters, and pinholes	A total of not over 5
Bubbles, specks, and spots	Not over 5 in one pottery square, a total of not over 10

high temperature to form a nonporous body with exposed surfaces coated with ceramic glaze fused to the body.

warpage: a defect in a fixture resulting in a concave or convex gap between the fixture and the adjacent wall or floor.

wavy finish: a defect in the finish having the appearance of numerous runs in the glaze, irregular or mottled.

well: a pocket open at the top, formed inside a urinal bowl at the entrance to the trap.

2 VITREOUS CHINA REQUIREMENTS

2.1 Absorption

The average absorption of the ceramic test samples shall not exceed one-half of 1% (0.5%) when tested in accordance with ASME A112.19.2, para. 7.1.

2.2 Crazing

No crazing shall be permitted when tested in accordance with ASME A112.19.2, para. 7.2.

2.3 Thickness

Vitreous china shall not be less than $\frac{1}{4}$ in. (6 mm) thick at any point, exclusive of glaze.

2.4 Warpage

Vitreous china fixtures shall meet the warpage requirements listed in Table 1 when tested in accordance with ASME A112.19.2, para. 7.3.

2.5 Glazed Surfaces

The glaze shall be thoroughly fused to the fixture body. All exposed surfaces shall be glazed, except those surfaces that are designed to come into contact with walls or floors, and where the fixture is supported in the kiln, as long as such areas are not visible surfaces.

2.6 Finish

All vitreous china fixtures shall be free from defects to the extent specified in Table 1, as applicable, when evaluated in accordance with para. 5.4.

3 GENERAL REQUIREMENTS

3.1 Alternate Material Components

When alternate materials are used as components within a nonwater urinal, the assembly shall conform to applicable material standards for the plumbing application. They shall satisfy this Standard regarding quality, strength, effectiveness, durability, and safety. They shall also be repairable or replaceable within the vitreous china fixture.

3.2 Alternate Materials in Trapways

Where alternate materials are used in a nonwater urinal trapway, the trapway shall comply with the requirements of the auger test specified in para. 5.5.

3.3 Nonstandard Outlet Configurations — Joint Seal Test

When an outlet configuration requires a connection other than a urinal flange, this connection shall not leak when tested in accordance with para. 5.7 and shall be of a design that allows for field repair or replacement.

3.4 Load Tests for Wall-Mounted Fixtures

3.4.1 Load Test for Urinals. All wall-mounted, nonwater urinals shall withstand a load of 50 lbf (0.22 kN) when tested in accordance with para. 5.6.

3.4.2 Off-the-Floor Fixture Supports. Fixture supports, when required, shall comply with ASME A112.6.1M, ASME A112.6.2, or ASME A112.19.12.

3.5 Tolerances and Dimensions

For tolerance and dimension information, reference ASME A112.19.2, para. 3.1.

3.6 Connection to the Drainage System

3.6.1 Nonwater urinals shall have an integral or removable trap with a liquid seal and an outlet assembly for connection to the drainage system. The outlet spud size shall be a minimum of 1½ in. (38 mm) in diameter.

3.7 Urinal Dimensions

Minimum urinal dimensions shall be as specified in Table 2.

4 MARKINGS AND INSTALLATION INSTRUCTIONS

4.1 Permanent Markings on Product

Each fixture meeting this Standard shall be permanently marked as required by this section. Where the fixture is comprised of two or more components, each fixture component that is visible after installation of the fixture shall be permanently marked as required by this section. Acceptable means of applying permanent markings shall include fired on, etching, sand blasting, stamping with a permanent (nonwater soluble) ink, and cast-in

markings. Adhesive labels that comply with UL 969 shall also be considered permanent. The exposure conditions contained in para. 7.1 of UL 969 shall apply, along with the additional exposure to the detergent test specified in Table 7.4 of UL 969.

4.1.1 Manufacturer's Name. The manufacturer's name or registered trademark or, in the case of private labeling, the name of the customer for whom the fixture was manufactured shall be applied so as to be legible, readily identified, and located so as to be visible after installation.

4.1.2 Model Number. The model number of the nonwater urinal shall be applied so as to be legible.

4.1.3 Date of Manufacture. The date of manufacture (casting date) shall be applied so as to be legible.

4.2 Marking Requirements for Product Packaging

All packaging for vitreous china nonwater urinals shall be marked with the manufacturer's name or registered trademark or, in the case of private labeling, the name of the customer for whom the fixture was manufactured and the model number of the fixture.

4.3 Installation Instructions

The manufacturer shall provide installation instructions with the nonwater urinals. Installation instructions shall include care and maintenance information.

4.4 Repair Parts

The manufacturer shall supply information to enable the end user to specify and obtain repair parts for normal maintenance.

5 VITREOUS CHINA AND ALTERNATE MATERIALS TESTS

5.1 Absorption (Boiling) Test

For absorption (boiling) test criteria, reference ASME A112.19.2, para. 7.1.

5.2 Crazeing Test

For crazeing test criteria, reference ASME A112.19.2, para. 7.2.

5.3 Warpage Test

For warpage test criteria, reference ASME A112.19.2, para. 7.3 (see also para. 2.4).

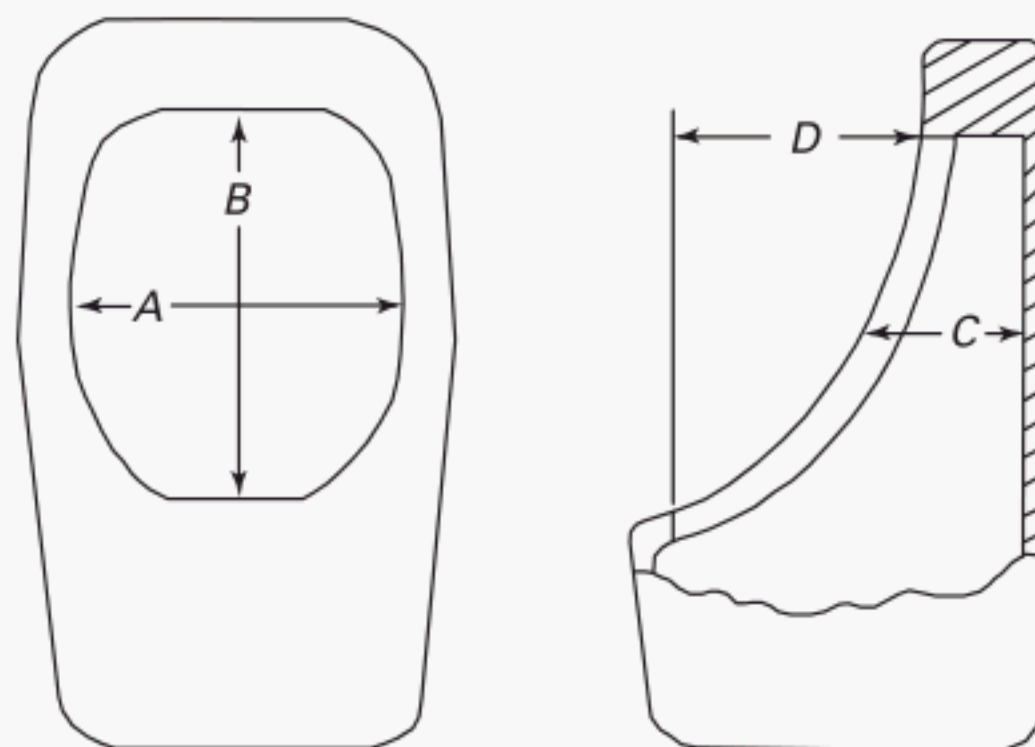
5.4 Evaluation of Surface Finish

For surface finish criteria, reference ASME A112.19.2, para. 7.4 (see also para. 2.6).

5.5 Auger Test

With the cartridge/trap removed, a conventional manual type urinal auger shall be inserted a minimum



**Table 2 Minimum Urinal Dimensions**

Type	Interior Width, A, in. (mm)	Interior Height, B, in. (mm)	Interior Depth, C, in. (mm)		Projection, D, in. (mm)	
			Without Shields	With Shields	Reg.	Ext. Lip
Wall-hanging type	8½ (216)	7½ (191)	3 (76)	7 (178)	6 (152)	8 (203)
Stall type	12 (305)	32 (813)	3 (76)	7 (178)	6 (152)	8 (203)

GENERAL NOTE: A and C shall be measured halfway between the top and bottom of the interior opening.

of 24 in. (610 mm) into the well and through the outlet of the urinal. The auger shall be manually rotated five times for each test cycle. A total of 100 cycles shall be performed by removing, reinserting, and rotating the auger five times for each cycle.

After 100 cycles, the nonwater urinal shall be tested for leakage by pouring water through the trapway, after removal of the auger and replacing the trap. There shall be no water leakage, other than trap outlet spillage.

5.6 Load Tests for Wall-Mounted Fixtures

All wall-mounted fixtures to be tested shall be firmly affixed to a solid test stand in accordance with the manufacturer's installation instructions. The supporting devices shall remain exposed for the duration of this testing for examination. If the manufacturer provides a support device with the fixture, that device shall be employed for this test.

5.6.1 Wall-Mounted Urinals. Urinals shall withstand an applied vertical load of a minimum of 50 lbf (0.22 kN) on the top surface on the front of the fixture lip. In all cases, the test fixture shall withstand the full test load for 10 min without failure or any visible structural damage.

5.7 Joint Seal Test

The joint between the nonstandard outlet configuration and drainage system shall be made in accordance with the manufacturer's instructions and subjected to a hydrostatic pressure of 15 psig (105 kPa gage) for a period of 15 min. There shall be no evidence of leakage.

6 URINAL TESTS

6.1 General

This section presents test methods and performance requirements for all nonwater urinals.

6.2 Selection of Test Urinal and General Instructions

6.2.1 The manufacturer shall provide three samples of the urinal model to be tested. One sample shall be chosen at random by laboratory personnel and tested to all of the requirements specified in this Standard. That urinal is referred to herein as the "test urinal."

6.2.2 The test urinal shall be installed in accordance with instructions within the test enclosure specified in para. 6.5.1.2. Preparations and general instructions for testing shall be as specified in para. 6.2.2.1.

6.2.2.1 The test urinal shall be plumb and the trap and outlet clear. If applicable, the test urinal shall be filled with the manufacturer's specified sealant liquid to the trap weir level before making each test run. If the urinal utilizes a removable cartridge, an unused cartridge supplied by the manufacturer and filled with fluid to the manufacturer's specified level shall be inserted into the urinal in accordance with the manufacturer's instructions.

6.3 Resistance to Stoppage

6.3.1 Test Method. Two unfiltered cigarette pieces shall be deposited into the test urinal. The length of the cigarette pieces shall be 1.5 in. ± 0.25 in. (38 mm ±

6.4 mm) and created by folding an unfiltered cigarette back upon itself such that the cigarette paper tears or breaks apart in approximately one-half lengths. Tap water shall be added to the unit at a flow rate of 1 pint (0.5 L) per min. Cigarette pieces and water shall be alternately added to the test urinal until a total of 20 cigarette pieces and 10 pints of water have been added. The cigarette pieces shall then be removed from the test urinal, and the test shall be conducted five additional times (for a total of six test replicates). Alternate between unfiltered and crumpled unfiltered cigarettes per test so that three tests are conducted using unfiltered cigarettes and three tests are conducted using crumpled unfiltered cigarettes.

6.3.2 Performance Requirement. There shall be no evidence of stoppage or clogging during each test run with cigarette pieces in the fixture and when removed.

6.4 Tightness Test of Removable Trap

6.4.1 Test Method. The trap insert shall be installed and removed 50 times using the extractor tool provided by the manufacturer. This shall be considered one repetition. Upon completion of the extractions and insertions, the trapway shall be subjected to an air-pressure test at the trapway inlet of 1.45 psi (0.1 bar) for a minimum of 15 min. This test shall be repeated for a total of five repetitions of test sets (50 times each).

6.4.2 Performance Requirement. There shall be no pressure loss at any time during the test.

6.5 Evaluation Testing for Ammonia

6.5.1 Test Method

6.5.1.1 Selection of the Urinal-Cleaning Chemical.

Function tests of the test urinal shall be conducted using the specific chemicals and/or cleaners recommended by the manufacturer. The chemical and/or cleaner shall be selected on a random basis from consumer-sized packages provided by the manufacturer.

6.5.1.2 Test Enclosure Configuration and Urinal Mounting

6.5.1.2.1 The test urinal shall be installed in accordance with para. 6.2 within an enclosed area that is set aside for the test. A surround test enclosure shall be provided in a configuration that isolates the test urinal and test regions from laboratory space conditioning air motion, i.e., no draft air motion or exchanges that can disorder the accuracy of the sampling measurements shall be permitted. The test enclosure shall have a single entry door and suitable temperature control that maintains an air temperature between 68°F and 100°F (20°C to 38°C). The door is required to allow entry and exit of personnel for installation of the test urinal and required test instrumentation and conduct of the test, including the monitoring of test instrumentation.

6.5.1.2.2 The enclosure size shall be approximately that of two telephone booths and provide for mounting of and sampling at the test urinal. The enclosure may either be comprised of prefabricated panels for assembly and storage while not in use or, alternatively, a permanent enclosure. The size of the enclosure shall allow for a person of no fewer than 6 ft in height to stand erect within the enclosure. Other dimensions of length and width shall be at the discretion of the testing laboratory but shall allow for the mounting of the test urinal in a manner consistent with the provisions of the applicable plumbing codes. The test urinal, with the required elements of support, shall be mounted at the vertical centerline of a wall panel in the enclosure at a height from the floor as specified by the manufacturer or applicable plumbing code. Adjacent distances to the side walls from the installed test urinal shall be a minimum dimension as specified in the applicable plumbing code for adjacent urinals or walls.

6.5.1.2.3 Discharges of test liquids from the test urinal may either be collected through installed pipe fittings connected to the laboratory drainage system or, alternatively, by other means, such as collection in a tank or similar vessel, the method to be chosen at the discretion of the laboratory.

6.5.1.3 Test Set-Up. The test enclosure shall be located so as to be isolated from disturbances. A maximum-minimum and current temperature recording and indicating instrument shall be installed 1 ft (0.3 m) ± 2 in. (50 mm) above and to the right of the test urinal on a support other than the test urinal.

6.5.1.4 Test Equipment. Test equipment to be used for the evaluation testing shall be the following or an equivalent:

Test Equipment Type	Description
Sampler pump	Dräger Gas Detection Pump Model: Accuro ARSC-F015
Sampler tubes	Dräger Röhrchen Range/Batch: 2-30 ppm/RM-0811
Maximum, minimum, and current temperature recording and indicating instrument	Minimum display resolution of 0.1°F (0.1°C) Accuracy of > ±2°F (±1°C)

6.5.1.5 Preparation of the Test Sample Liquid. The liquid ammonia used to prepare the test sample liquid shall be an unscented commercially available household ammonia. The test sample liquid shall consist of a prepared solution of ammonia and water consisting of a 3% solution of ammonia.

6.5.1.6 Test Procedure. The test urinal shall be inspected and the following items recorded during the period of the test:

- (a) functioning of the unit



- (b) the maximum, minimum, and current air temperature
- (c) the time of day the test unit was cleaned
- (d) the time of day the unit was tested for the detection of ammonia
- (e) the ppm content of the ammonia in the sampled air
- (f) the horizontal distance from the wall upon which the test unit is mounted to the point on the test unit that is the farthest from the wall. This measurement shall be taken at such time as the test urinal is installed and shall be used when establishing the sampling locations as defined in para. 6.5.1.9.

6.5.1.7 Cleaning of Test Urinal. During the test period, the test urinal shall be cleaned only as frequently as specified in para. 6.5.1.10 and only in the manner as specified by the manufacturer's instructions.

6.5.1.8 Test Sample Loadings and Test Measurements

6.5.1.8.1 Test Equipment Measurement Validation. Load the prepared test sample liquid into a 0.25 pint (120 ml) uncovered container placed in the urinal (adjacent to or in the well). Conduct measurement tests at the sampling locations as specified in para. 6.5.1.9 with test equipment as specified in para. 6.5.1.4, and record all measured parameters. Validate the capability of the test equipment to detect the presence of ammonia before proceeding to the vapor detection tests specified in para. 6.5.1.8.2(b). Record the results.

6.5.1.8.2 Ammonia Solution Extraction and Vapor Detection Tests. Three successive tests shall be conducted using the prepared test sample liquid as follows:

- (a) Pour the test sample liquid into the urinal well at a flow rate of 2 pints per min $\pm 10\%$ (950 ml \pm 95 ml) for 0.5 min \pm 5 sec, for a total load of 1 pint (470 ml). Repeat loading at intervals of 4 min \pm 15 sec for a total of three pours. Observe and record if total extraction of the test sample liquids is assured by determining if liquid is remaining visible and collected in the well over each interval.
- (b) Ammonia measurement of vapors shall be taken following the end of each set of the three successive tests as specified above. Sampling shall be taken at the four locations specified in para. 6.5.1.9. The vapor measurement schedule shall be

- (1) 5 min following the set of three introductions of ammonia solution
- (2) 15 min following the set of three introductions of ammonia solution
- (3) 30 min following the set of three introductions of ammonia solution
- (4) 1 hr following the set of three introductions of ammonia solution
- (c) Record the results.
- (d) Repeat the first three tests and measurements two more times without cleaning the urinal.

6.5.1.9 Sampling Locations. Ammonia odor samples shall be taken at the following four locations:

- (a) test urinal front lip: 3.0 in. \pm 0.5 in. (75 mm \pm 12 mm) immediately above the horizontal urinal lip
- (b) test urinal well: 3.0 in. \pm 0.5 in. (75 mm \pm 12 mm) above the lowest point within the well of the urinal
- (c) adult standing-floor to nostril opening: 59 in. \pm 1.5 in. (150 cm \pm 4 cm) at a horizontal distance from the wall upon which the test urinal is mounted equal to the dimension measured in para. 6.5.1.6(f) \pm 1.0 in. (25 mm)
- (d) adult seated-floor to nostril opening: 47 in. \pm 1.5 in. (119 cm \pm 4 cm) at a horizontal distance from the wall upon which the test urinal is mounted equal to the dimension measured in para. 6.5.1.6(f) \pm 1.0 in. (25 mm)

6.5.1.10 Frequency of Testing for Ammonia. The taking of samples for detection of ammonia shall be performed daily for 3 successive days. Three sets of samples shall be taken each day in accordance with para. 6.5.1.8. Cleaning of the test urinal in accordance with para. 6.5.1.7 shall be conducted only between daily testing (i.e., cleaning only between days 1 and 2 and between days 2 and 3). Record the results.

6.5.2 Performance Requirement

6.5.2.1 Extraction of all liquid shall be required in eight of nine solution extraction test sets as specified in para. 6.5.1.8.2 on each of the successive 3 days of tests.

6.5.2.2 All initial ammonia sample readings taken in para. 6.5.1.8.2(b)(1) (5 min after introduction of the test sample liquid) shall not exceed 40% of the ammonia vapor measured under para. 6.5.1.8.1.

6.5.2.3 Ninety-five percent of all of the ammonia sample readings taken in paras. 6.5.1.8.2(b)(2), (3), and (4) shall not exceed 10 ppm at the end of the test periods specified.

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