ASME A112.19.8a-2008

Addenda to ASME A112.19.8-2007

Suction Fittings for Use in Swimming Pools, Wading Pools, Spas, and Hot Tubs

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Following approval by the ASME A112 Committee and ASME, and after public review, ASME A112.19.8a-2008 was approved by the American National Standards Institute on August 11, 2008.

Addenda to the 2007 edition of ASME A112.19.8 are issued in the form of replacement pages. Revisions, additions, and deletions are incorporated directly into the affected pages. It is advisable, however, that this page, the Addenda title and coyright pages, and all replaced pages be retained for reference.

SUMMARY OF CHANGES

This is the first Addenda to be published to ASME A112.19.8-2007.

Replace or insert the pages listed. Changes given below are identified on the pages by a margin note, **(a08)**, placed next to the affected area. The pages not listed are the reverse sides of the listed pages and contain no changes.

Page	*Location*	*Change*
1, 2	1.4	Revised
5–8.1	3.2	Revised in its entirety
	3.3	First paragraph revised
	3.3.1	Last paragraph revised
	3.4	Second sentence revised
	3.5.1	Last sentence revised
	3.5.2	First sentence revised
	3.6.1	First sentence revised
	3.7	Title revised
	3.7.1	Subparagraphs (a), (b), and (c) revised
	3.8.1	Second and third lines revised
	3.8.2	First sentence revised
	3.9	Added
17, 18	7.1.1	Subparagraphs (a) and (b) corrected by errata

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SUCTION FITTINGS FOR USE IN SWIMMING POOLS, WADING POOLS, SPAS, AND HOT TUBS

1 GENERAL

1.1 Scope

1.1.1 General Requirements. This Standard establishes materials, testing, and marking requirements for suction fittings that are designed to be totally submerged for use in swimming pools, wading pools, spas, and hot tubs, as well as other aquatic facilities.

1.1.2 Definition. Suction fittings shall be defined as all components, including the sump and/or body, cover/grate, and hardware.

1.1.3 Compliance. Demonstration of compliance for this Standard is merely an indication that the product meets performance requirements and specifications contained in this Standard.

1.1.4 Revisions. The provisions of this Standard shall not be construed to prevent the use of any alternate material or method of construction provided any such alternate meets the full intent of the standard.

1.1.5 Exclusions

1.1.5.1 Skimmers shall be excluded from evaluation to this Standard.

1.1.5.2 Vacuum connection covers shall be excluded from evaluation to this Standard.

1.1.6 Types of Suction Fittings

1.1.6.1 General. A manufacturer or designer of any suction outlet cover/grate shall indicate under which Type the cover/grate is listed.

1.1.6.2 Field Fabricated Outlets. All nonmanufactured suction outlets constructed in the field with individual components shall be considered as "Field Fabricated Outlets."

1.1.6.3 Venturi Outlets. All venturi activated indirect-suction outlets or venturi activated debris collection systems shall be considered as "Venturi Outlets."

1.1.6.4 Swim Jet Combination Fittings. All swim jet combination fittings that combine suction and discharge into one housing, creating a high velocity, high volume stream of water to swim, jog, or walk against, as well as massage, shall be considered "Swim Jet Combination Fittings."

1.1.6.5 Submerged Suction Outlets. All other suction outlets for use in swimming pools, wading pools, spas, and hot tubs, as well as all other aquatic facilities, shall be considered as "Submerged Suction Outlets."

1.1.7 Single or Multiple Usage

1.1.7.1 Cover/grates that pass the body entrapment portion of this Standard as well as meeting all other requirements in this Standard shall be permanently marked "For Single or Multiple Drain Use," "For Single Drain Use," or "For Multiple Drain Use Only" at the manufacturer's option.

1.1.7.2 Cover/grates that fail the body entrapment portion of this Standard or any other requirements of this Standard may not be certified under this Standard.

1.2 Related Standards

Since the scope of this Standard is directly related to suction fittings, it is important to mention that the fittings themselves represent only one portion of the suction entrapment scenario. Several other standards, including but not limited to, ANSI/NSPI-1, -2, -3, -4, -5, -6, and -8, ANSI/IAF-9, as well as ASME A112.19.17, and ASTM F 2387-04, as outlined in para. 1.4, should be consulted so as to provide coverage for the various other aspects of this potential hazard in swimming pools, wading pools, spas, and hot tubs.

1.3 Units of Measurement

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

1.4 References (a)

The following standards are referenced in this document. Unless otherwise specified, the latest edition shall apply.

ANSI/IAF-9, Aquatic Recreation Facilities
ANSI/NSPI-1, Standard for Public Swimming Pools
ANSI/NSPI-2, Standard for Public Spas
ANSI/NSPI-3, Standard for Permanently Installed Residential Spas
ANSI/NSPI-4, Standard for Aboveground/Onground Residential Swimming Pools

ANSI/NSPI-5, Standard for Residential Inground Swimming Pools
ANSI/NSPI-6, Standard for Residential Portable Spas
ANSI/NSPI-8, Model Barrier Code for Residential Swimming Pools, Spas, and Hot Tubs
Publisher: Association of Pool and Spa Professionals (APSP) [formerly National Spa and Pool Institute (NSPI)], 2111 Eisenhower Avenue, Alexandria, VA 22314

ASME A112.19.17, Manufactured Safety Vacuum Release Systems (SVRS) for Residential and Commercial Swimming Pool, Spa, Hot Tub, and Wading Pool Suction 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

ANSI/ASTM D 638, Standard Test Method for Tensile Properties of Plastics
ASTM D 256, Standard Test Methods for Determining the Izod Pendulum Impact Resistance of Plastics
ASTM D 2444, Standard Practice for Impact Resistance of Thermoplastic Pipe and Fittings by Means of a Tup (Falling Weight)
ASTM D 2466-02, Standard Specification for Poly(Vinyl Chloride) (PVC) Plastic Pipe Fittings, Schedule 40
ASTM F 1498-2000, Standard Specification for Taper Pipe Threads 60° for Thermoplastic Pipe and Fittings
ASTM F 2387-04, Standard Provisional Specification for Manufactured Safety Vacuum Release Systems (SVRS) for Swimming Pools, Spas and Hot Tubs
ASTM G 154, Standard Practices for Operating Fluorescent Light Apparatus for UV Exposure of Nonmetallic Materials
Publisher: ASTM International (ASTM), 100 Barr Harbor Drive, P.O. Box C700, West Conshohocken, PA 19428-2959

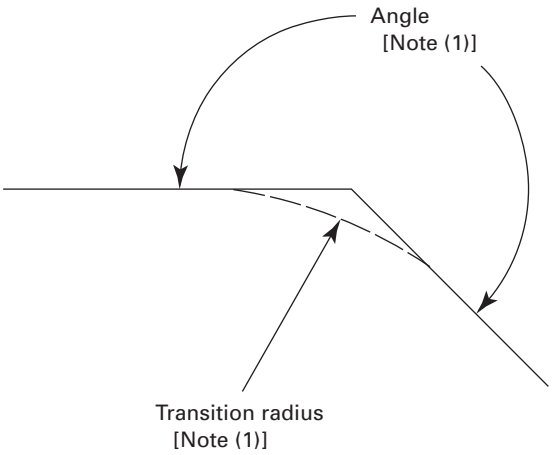
1.5 Definitions

anticlastic: having opposite curvatures, as the surface of a saddle.

anti-vortex: the term anti-vortex has been misused within the industry and largely misunderstood as somehow relating to entrapment prevention. Anti-vortex drain covers were designed to prevent an air-entraining vortex from forming. The term anti-vortex should not be construed to impart any protection and should no longer be referenced in this regard.

applicable body blocking element: a body blocking element that has a mandatory length to width ratio of 1.2777, a maximum size of 18 in. × 23 in. (457 mm × 584 mm), and a minimum size of 9 in. × 11.5 in. (229 mm × 292 mm). Its actual size for test purposes is the smallest size that will completely shadow the suction cover/grate being tested.

Fig. 1 Finger Probe "Edge"



NOTE:
(1) A transition is considered an "edge" when the angle is greater than 180 deg, and the transition radius is less than 0.75 in. (19 mm).

body blocking element: a flat, rectangular shape with radiused corners of approved foam and backing of the torso specimen measuring 18 in. × 23 in. (457 mm × 584 mm) with 4 in. (102 mm) corner radii.

body membrane: a rectangular inextensible isotropic sheet, for example, a 20 mil (0.5 mm) Vinyl sheet, in an 18 in. × 49 in. (457 mm × 1 245 mm) pattern with 4 in. (102 mm) corner radii.

complete system: comprising a pump, suction outlet (and possibly inlet), and connecting piping as specified by manufacturer. No other operating components or valves may be included. Safety devices, vents, suction vacuum release systems, etc., shall be used only as specified by the manufacturer. Nonoperating components such as drains are permitted.

cover: a fitting or device generally placed between the suction piping and the bather. Not used in this document to avoid confusion. See also *cover/grate*.

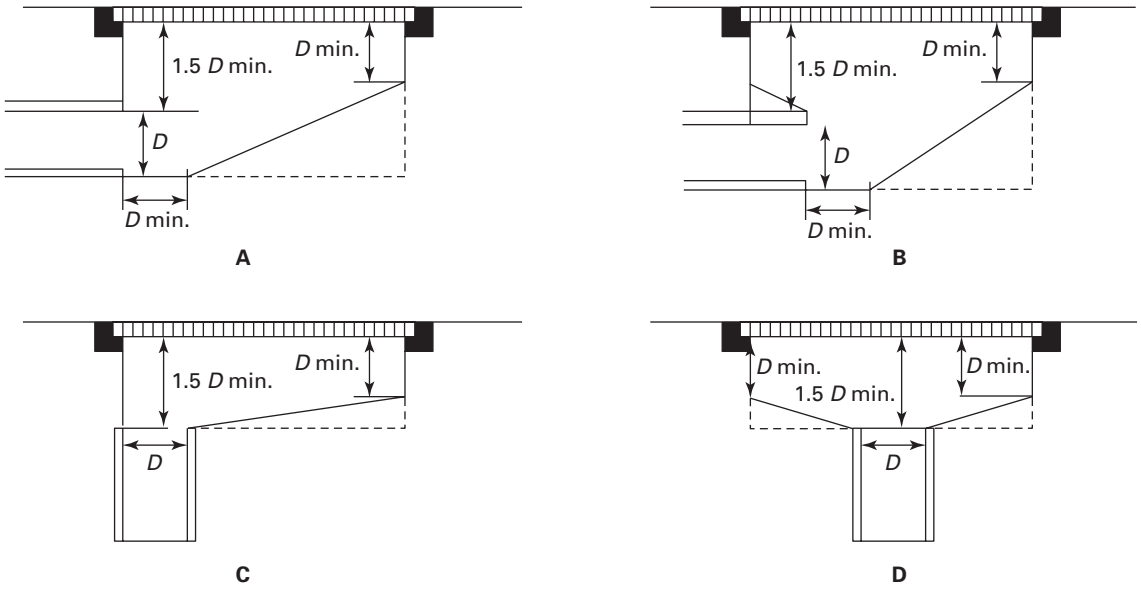
cover/grate: covering fitting or assembly that separates the bather from the suction sump or piping, sometimes referred to as a "grate" or a "cover."

dual blockage: a condition existing when a body membrane is placed to cover one suction outlet completely and any portion of the second suction outlet connected to the same individual suction system.

dual outlets: two suction outlets connected to an individual suction system but separated by a body membrane as a minimum.

edge: the line of intersection between any two surfaces with an intersecting angle greater than 180 deg, measured face to face (see Fig. 1), and having a transitional radius between the two faces of less than 0.75 in. (19 mm).

Fig. 2 Field Built Sump



GENERAL NOTES:
(a) D = inside diameter of pipe.
(b) All dimensions shown are minimums.
(c) A broken line (_ _ _) indicates suggested sump configuration.

3 PHYSICAL TESTING

3.1 General

3.1.1 Certification. All testing and any certification of products to this Standard shall be conducted by a nationally recognized testing laboratory, except for field fabrication suction outlets which shall be certified in accordance with para. 2.3.1.7.

3.1.2 Conditions for Tests and Evaluation. All tests shall be conducted at laboratory room temperature of 73.4°F ± 3°F (23°C ± 2°C) unless specified otherwise herein.

3.1.3 Test Procedure. For the tests covered in section 3, a minimum of six suction fittings shall be tested in each test condition, unless otherwise stated. If the parts are made in different mold cavities, representative samples shall be taken from different mold cavities for a total of six. Testing shall be performed immediately after conditioning, as described in para. 3.1.5.

3.1.4 Test Fixture. The fitting(s) shall be installed in a rigid fixture that is capable of supporting the fitting(s) in a manner similar to the actual installation.

3.1.5 Conditioning. All specimens shall be submerged in water at a temperature of 73.4°F ± 3°F (23°C ± 2°C) for at least 2 hr before testing.

3.1.6 Crack Detection. After each physical test, the unit shall be washed in a standard liquid detergent solution, rinsed with clear water and dried prior to application of ink as specified in para. 3.1.6.1. After inking, the unit shall be visually inspected in accordance with para. 3.1.6.2. To hasten drying, the surface of the unit shall be permitted to be wiped with a clean chamois leather or a clean absorbent lint-free material for this test only.

NOTE: Standard liquid detergent shall consist of (by volume)
(a) Monsanto TKPP, 8.00%
(b) Sterox NJ, 7.00%
(c) Stepan SXS, 8.00%
(d) Butyl Cellosolve, 1.5%
(e) Water, 75.5%

3.1.6.1 Inking Procedure. The entire finished surface of the fitting shall be rubbed with a sponge and a 50% solution of tap water and water-soluble contrasting color ink after the unit has been washed and dried as described in para. 3.1.6. The ink shall be rinsed from the surface and then dried before inspection.

3.1.6.2 Method of Inspection of the Fitting Surface. The surface of the fitting shall be inspected with the unaided eye for defects from a distance of between 1 ft and 2 ft (305 mm and 610 mm). The light source shall be equivalent to an illumination intensity near the surface to be inspected of 150 fc ± 50 fc (1615 lx ± 540 lx).

3.1.7 Performance Requirement. The fitting shall be free from cracks. The presence of seams, flow lines, and knit lines within suction fittings shall be permitted and shall not be considered as cracks. No failures shall occur.

(a) **3.2 Ultraviolet Light Exposure Test**

Either Test Method 1 or Test Method 2 may be utilized.

Test Method 1 is suited for products small enough to fit into the UV test chamber, while Test Method 2 is suitable for all products.

If Test Method 1 is used, then the ultraviolet test as well as all the structural tests, are performed on the complete (as sold) samples.

If Test Method 2 is used, then the ultraviolet test is performed on "dogbone" samples molded per ASTM D 638 from the same resin as the final production samples. The tensile strength and Izod impact tests are performed on two sets of the "dogbone" samples, set A is nonexposed and set B is exposed to the ultraviolet test. In addition, all the applicable structural tests (paras. 3.3 through 3.8) are also performed on the complete (as sold) virgin samples. The performance requirements for those tests, however, will be adjusted per para. 3.2.2.3 of this Standard.

EXCEPTION: Manufactured sumps and other fitting components that are not exposed to natural UV radiation when fully assembled and installed, according to the manufacturer's instruction, shall not be required to be included in the Ultraviolet Light Exposure Test.

3.2.1 Test Method 1. Twelve new fitting specimens shall be exposed to ultraviolet light and water spray in accordance with either

(a) 720 hr of twin enclosed carbon-arc (ASTM G 153, Table X1.1 Cycle 1),

(b) 1,000 hr of xenon-arc (ASTM G 155, Table X3.1 Cycle 1), or

(c) 750 hr of fluorescent (ASTM G 154, Table X2.1 Cycle 1).

3.2.1.1 Test Method 1. Specimens shall be mounted inside the test apparatus, with exposed surfaces of the specimens facing the UV lamps and positioned so they receive exposure approximating a fully assembled and installed cover/grate fitting. After the exposure test, the specimens shall be removed from the test apparatus and rejected if signs of deterioration such as cracking or crazing appear.

Discoloration shall not be cause for rejection. They shall then be retained under conditions of ambient room temperature and atmospheric pressure for not less than 16 hr and not more than 96 hr before being subjected to the following tests:

(a) Deflection Tests

(b) Point Load to Protrusion Test

(c) Shear Load Test

(d) Vacuum and Point Impact Test

(d) Pull Load Test

The intensification factor K shall be 1.0 for UV Test Method 1.

The exposed specimen shall be permitted to be transported from one laboratory to another, provided time requirements are met.

3.2.1.2 Performance Requirement. All the specimens that were subject to the UV Test Method 1 shall comply with all performance requirements of the structural integrity tests in paras. 3.3 through 3.8.

3.2.2 Test Method 2. Samples of the fitting polymeric materials shall be exposed to ultraviolet light in accordance with the options specified in para. 3.2.1(a), (b), or (c), Test Method 1, and then to the tests specified in paras. 3.2.2.1 and 3.2.2.2.

3.2.2.1 Tensile Strength. Samples of virgin material (A) and UV-exposed material (B) shall be evaluated for tensile strength as described in the Standard Test Method for Tensile Properties of Plastics, ANSI/ASTM D 638 (ISO 527-2) using Type 1 specimens of 0.125 in. ± 0.02 in. (3.2 mm ± 0.4 mm) thickness and testing speed of 0.2 in./min (5.1 mm/min) ± 25%. The tensile strength is to be that at the yield point if the material yields, otherwise at break.

3.2.2.2 Izod Impact. Samples of virgin material (A) and UV-exposed material (B) shall be evaluated for impact strength as described in Method A of the Standard Test Methods for Impact Resistance of Plastics and Electrical Insulating Materials, ASTM D 256 or ISO 180, using 0.125-in. (3.2-mm) thick specimen.

3.2.2.3 Performance Requirement. Samples of the material shall retain at least 70% of the unconditioned (virgin) value when the tests indicated in paras. 3.2.2.1 and 3.2.2.2 are performed. An intensification factor K shall be defined as the inverse of the lowest retained proportion. The applicable structural integrity tests, i.e., paras. 3.3, 3.4, 3.5, 3.6, 3.7, and 3.8, will be conducted on the complete (as sold) non-UV exposed samples at loadings equal to the base values multiplied by the intensification factor, K. For example, if 80% of the tensile strength is retained in para. 3.2.2.1, and 85% of the Izod unit energy is retained, then $K = {}^{1}/_{0.80} = 1.25$. This will ensure that adequate strength remains after service aging.

NOTE: In the following paragraphs, the factor K is derived from para. 3.2.1.1 (Test Method 1) or para. 3.2.2.3 (Test Method 2).

3.3 Vertical Load and Deformation Test (a)

Six fittings intended for installation in the floor or wall shall be tested.

A point load machine readable to, at a minimum, 5 lbf (22 N) increments and that is equipped with a 2 in. (51 mm) minimum diameter steel tup with a 2 in. ± ½ in. (51 mm ± 13 mm) radius nose and a tup speed of 0.20 in./min to 0.25 in./min (5.1 mm/min to 6.4 mm/min) shall be used.

3.3.1 Test Method. (a) Using the tup and a 2 in. (51 mm) diameter "Skin Pad" on the face of the tup, and tup speed described in para. 3.3, the six fittings shall be mounted in a horizontal plane and tested. The "Skin

Pad" is a ¼ in. (6.35 mm) thick Buna-N rubber pad of Shore A durometer 60 ± 5 hardness. The tup and pad shall be centered

(a) on the fitting face

(b) at two points midway between the center and edge

(c) at two points between stiffeners, if any

(d) at two points furthest from any support post

A load is applied at each of the above locations until 300 lbf × K ± 10 lbf (1 334 N × K ± 44 N) is reached.

3.3.2 Performance Requirement. Suction fittings shall not permanently deform, crack, or lose any material from the fitting, exclusive of plating or finish.

(a) **3.4 Horizontal Load and Deformation Test**

Fittings to be tested shall be the six as previously tested in para. 3.3. This test is identical to the Vertical Test except that the load is 150 lbf × K ± 5 lbf (667 N × K ± 22 N). This applies only to fittings intended for and marked "Wall Only" or "Wall or Floor."

3.5 Point Load to Excess Test

Fittings to be tested shall be the six as previously tested in paras. 3.3 and 3.4, loaded in the same manner.

(a) **3.5.1 Test Method.** The test equipment to be used shall be the same and positioned as described in para. 3.3, with "Skin Pad." The units shall be subjected to additional loading, with a load speed of 0.20 in./min to 0.25 in./min (5.1 mm/min to 6.4 mm/min) until the tup protrudes through the cover/grate or until a value of 600 lbf × K ± 10 lbf (2 669 N × K ± 44 N) is reached.

(a) **3.5.2 Performance Requirement.** Suction fittings shall not sustain loss of any material from the fitting, exclusive of plating or finish upon protrusion or when a value of 600 lbf × K ± 10 lbf (2 669 N × K ± 44 N) is reached. Permanent deformation shall not be considered a failure.

3.6 Shear Load Test

Six fittings shall be tested. They shall be those from the Ultraviolet Light Exposure Test (para. 3.2). This test shall be applied to all fittings that protrude ½ in. (13 mm) or more from the mounting plane.

(a) **3.6.1 Test Method.** The fitting shall be tested by the application of a 150 lbf × K ± 5 lbf (667 N × K ± 22 N) test load applied 30 deg from the mounting plane by a loading face 2 in.^{2} (645 mm^2) covered with a 2 in. × 2 in. (51 mm × 51 mm) "Skin Pad" on its face. The six fittings shall be tested using the point load machine described in para. 3.3. Three fittings shall be tested with fasteners directly in line with the load to test the fastener's strength, and three shall be tested with the load midway between fasteners for general strength.

3.6.2 Performance Requirement. The cover/grate shall remain in place. The fitting shall not permanently deform, crack, or lose any material exclusive of plating and finish.

3.7 Pressure Differential and Point Impact Test (a)

The same six fittings used in the Shear Load Test (para. 3.6) shall be tested.

3.7.1 Test Method (a)

(a) The fitting to be tested shall be mounted on a horizontal surface and covered with a 20 mil (0.5 mm) plastic material or other suitable material. The fitting outlet shall be connected to a vacuum or pressure (pressure will be required for K factor greater than 1.0) system and it shall be subjected to a 28.5 in. Hg × K (724 mm Hg × K) differential pressure within 60 sec ± 5 sec. The differential shall be sustained for 5 min ± 10 sec.

(b) The vacuum or pressure shall be removed from the system, and the fitting shall be impacted at 15 ft-lbf × K (20.3 J × K) using the test method in ASTM D 2444, with a 5 lb (2.3 kg) steel tup, 2 in. (51 mm) minimum diameter with a 2 in. ± ½ in. (51 mm ± 13 mm) radius nose. The tup shall be dropped from a distance of 3 ft × K (914 mm × K) aligned with the center of the fitting.

(c) The fitting shall be connected to the vacuum or pressure system and again it shall be subjected to the 28.5 in. Hg × K (724 mm Hg × K) differential pressure within 60 sec ± 5 sec. The differential shall be sustained for an additional 5 min ± 10 sec.

(d) After removal from the test fixture, water-soluble contrasting ink shall be applied in accordance with paras. 3.1.6 and 3.1.6.1 and the fitting shall be inspected for cracks, breaks, or fractures in accordance with para. 3.1.6.2.

3.7.2 Performance Requirement. The cover/grate shall remain in place after the test procedures in paras. 3.7.1(a) through (d). The fitting shall not permanently deform, crack, or lose any material from the fitting exclusive of plating and finish.

3.8 Pull Load Test

Pull Load Testing shall be required of all fittings with openings of 0.375 in. (9.53 mm) or more affording a finger grip. The measurements shall be done on the anticlastic surface when required for the hair test, para. 4.1.5.7. The same six fittings used in the Vacuum and Point Impact Test (see para. 3.7) shall be tested.

3.8.1 Test Method. The cover/grate shall be tested by the application of a 150 lbf × K ± 5 lbf (667 N × K ± 22 N) test load to the underside of the cover/grate assembly and perpendicular to the mounting surface that will approximate the load bearing points available to a bather's three fingers directly adjacent to fasteners, and midway between fasteners when the fitting is installed in accordance with the manufacturer's instructions. (a)

3.8.2 Performance Requirement. The cover/grate shall withstand a 150 lbf × K (667 N × K) pulling force. (a)

Fig. 3 Test Tank Pull Mechanism

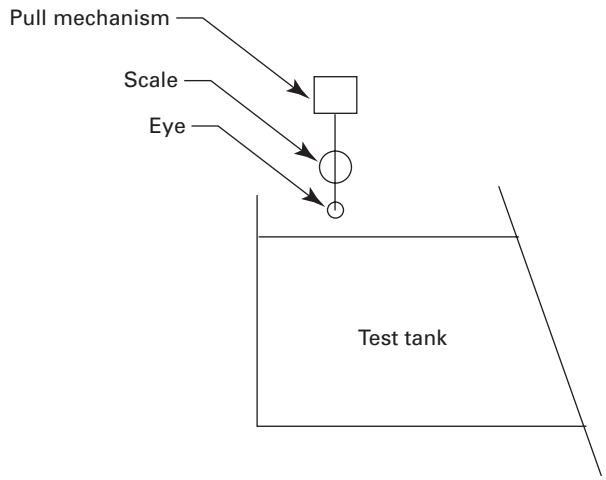
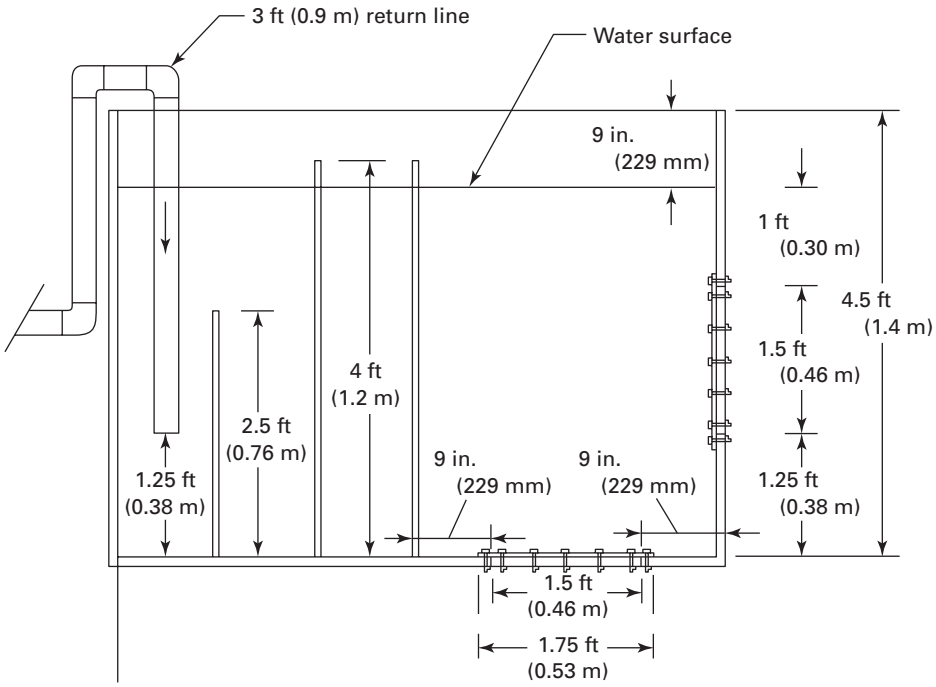


Fig. 4 Test Tank Side View



Distortion under load shall not compromise the fastener(s), loosen the cover/grate, permanently deform, or crack the fitting.

(a) **3.9 Mold Stress Relief Distortion**

3.9.1 Test Method. One sample of the complete (as sold) non-UV exposed fitting is to be placed in a full draft circulating air oven maintained at a uniform temperature of 140°F (60°C). The sample is to remain in the oven for 7 hr. The sample is then to be removed from the oven, and be allowed to return to room temperature.

3.9.2 Performance Requirement. This sample shall be used for the Hair and Body Entrapment Tests to ensure compliance therewith.

4 HAIR ENTRAPMENT

4.1 General

4.1.1 Impedance. Hair drawn into or on suction fittings shall not impede the escape of a bather.

4.1.2 Sample Types. Two types of hair shall be used in this test and separate tests shall be run with each type.

4.1.2.1 Type 1. A full head of natural, fine, straight, blond European, human hair with cuticle on hair stems, 16 in. (406 mm) in length [5.5 oz ± 0.5 oz (155 g ± 15 g)], shall be firmly affixed in a manner approximating the normal distribution of hair with "hook and loop" to a Professional Wig Display Mannequin, Model No. FMH-#1SC, or equivalent, properly weighted to achieve neutral buoyancy under the water. A scale anchoring point shall be provided near the "neck" of the "skull". A fresh sample of hair shall be used for each fitting tested or when tangles in the hair cannot be removed. Hair shall be trimmed evenly.

4.1.2.2 Type 2. Natural, medium to fine, straight, light-brown colored human hair weighing 2 oz ± 0.11 oz (57 g ± 3 g) and having a length of 16 in. (406 mm) shall be affixed to a 1 in. (25 mm) diameter by 12 in. (305 mm) wooden dowel. A method for attaching a scale shall be provided on the opposite end of the dowel. A fresh sample of hair shall be used for each fitting tested or when tangles in the hair cannot be removed. Hair shall be trimmed evenly.

4.1.3 Suction Fitting. Only one new suction fitting shall be required to be tested.

4.1.4 Field Fabricated Outlets. For field fabricated outlets, hair entrapment tests are not required, but velocity through cover/grate openings shall not exceed 1.5 ft/sec (4.675 gpm/in.^{2}) of open area.

4.1.5 Test Equipment

4.1.5.1 Test Tank. The test tank for evaluation of suction fittings for the hair entrapment test shall be in accordance with Figs. 4, 5, and 6. The baffle plates shall be constructed as shown in Fig. 7 and be positioned as shown in Figs. 4 and 5.

4.1.5.2 Pump. A properly grounded pump capable of producing a flow rate of at least 25% greater than the fitting manufacturer's recommended rating of the fitting shall be used. A rate of flow meter with an accuracy of ±3% at the anticipated cover rating shall be installed in the piping system.

4.1.5.3 Pump Inlet. The pump inlet shall be connected to the 16 in. (406 mm) length of Schedule 40 plastic pipe using pipe lengths and adapters as necessary.

4.1.5.4 Scale. A scale accurate within 0.1 lbf (0.45 N) at a tension of 5 lbf (22 N) shall be used to determine pounds of pull against the entrapment.

4.1.5.5 Test Fixture. The hair entrapment test fixture shall be comprised of the test tank (Figs. 4 through 7), the mechanical appurtenances, and the pull mechanism (Fig. 3 and related notes).

4.1.5.6 Mounting Surface. For assemblies where all flow passages are provided by the manufactured

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(a) Small apertures shall be permitted when the centerline of the first articulation joint, located 1.18 in. (30 mm) from the point end of the UL Articulate Probe, cannot be made to pass beyond an edge or pinch point that is located inside the aperture being tested. (See Fig. 1.)

(b) Large aperture(s) shall be permitted when the centerline of the second articulation joint, located 2.36 in. (59.9 mm) from the point end of the UL Articulate Probe, cannot be made to pass beyond an apposed edge or pinch point that is located inside the aperture being tested. (See Fig. 12.)

(c) Edges and pinch points shall be permitted within the aperture and within range of the first articulate joint in accordance with Fig. 12 if they are less than 0.311 in. (7.9 mm) wide, measured parallel to the aperture opening.

(d) Edges and pinch points created by molding lines, engraved text, and symbols shall be permitted within the aperture provided they do not exceed a height of 0.025 in. (0.64 mm).

7 PACKAGING AND INSTALLATION INSTRUCTIONS

7.1 Marking of Suction Fittings

(a) **7.1.1** The fitting shall be permanently marked as follows in a manner that is visible in the installed position and where the text is no smaller than 10 pt (font size 0.1-in. tall):

(a) The following is an example of a typical marking:

EXAMPLE:
For Multiple Drain Use Only
108 GPM — Swim Jet
Life: 7 Years
Wall Only
Quantum 1563-W

(b) The positioning or arrangement of this marking shall be in the following sequence:

(1) the statement "For Single or Multiple Drain Use," "For Single Drain Use," or "For Multiple Drain Use Only."

(2) the lesser of the maximum flow rate in gpm as determined in accordance with para. 2.3.1.4, 4.3, or 5.3.2.

(3) the "Type" of the fitting in accordance with para. 1.1.6.

(4) fitting components shall be marked "Life: X Years" where the manufacturer indicates the appropriate installed life in years. Individual components may be marked with unique life spans.

(5) installation position — "Wall Only," or "Floor Only," or "Wall or Floor" if allowed in both positions.

(6) manufacturer's name or registered trademark.

(7) model designation.

7.1.2 As an alternate to marking field fabricated outlets, the owner of the facility where these fittings will be installed shall be advised in writing by the Registered Design Professional the information called for in paras. 7.1.1(b)(1) through (7).

7.2 Packaging of Suction Fittings

7.2.1 The packaging and installation instructions for manufactured fittings shall contain

(a) information on installation and service including

(1) type designation in accordance with para. 1.1.6, including any requirement for multiple outlets required per pump

(2) instructions not to locate suction outlets on seating areas or on the backrests for such seating areas

(3) instructions stating that when two or more suction fittings are used on a common suction line they shall be separated by a minimum of 3 ft (91.44 cm), or if any are located closer they shall be located on two different planes (i.e., one on the bottom and one on the vertical wall, or one each on two separate vertical walls)

(4) instructions stating that in the event of one suction outlet being completely blocked, the remaining suction outlets serving that system shall have a flow rating capable of the full flow of the pump(s) for the specific suction system

(5) maximum flow rating with head loss curve

(6) acceptable connecting pipe size(s)

(7) mounting position(s)

(8) suction outlet part number(s), and/or model number(s), and detailed field build sump design specifications, when applicable

(9) part number/description list, and "Replace within 'YY' installed years" for all parts

(10) tools required

(11) service and winterizing instructions

(b) a cautionary note not to exceed the maximum allowable flow rate stated on the suction fitting

(c) a note that the suction fitting including fasteners should be observed for damage or tampering before each use of this facility

(d) a statement that missing, broken, or cracked suction fittings shall be replaced before using this facility

(e) a statement that loose suction fittings shall be reattached or replaced before using this facility

(f) a statement "Read, then keep these instructions for future reference"

(g) a cautionary note about increasing flow by increasing pump size

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ASME A112.19.8a-2008

Following approval by the ASME A112 Committee and ASME, and after public review, ASME A112.19.8a-2008 was approved by the American National Standards Institute on August 11, 2008.

Addenda to the 2007 edition of ASME A112.19.8 are issued in the form of replacement pages. Revisions, additions, and deletions are incorporated directly into the affected pages. It is advisable, however, that this page, the Addenda title and coyright pages, and all replaced pages be retained for reference.

SUMMARY OF CHANGES

This is the first Addenda to be published to ASME A112.19.8-2007.

Replace or insert the pages listed. Changes given below are identified on the pages by a margin note, **(a)**, placed next to the affected area. The pages not listed are the reverse sides of the listed pages and contain no changes.

Page	*Location*	*Change*
1, 2	1.4	Revised
5–8.1	3.2	Revised in its entirety
	3.3	First paragraph revised
	3.3.1	Last paragraph revised
	3.4	Second sentence revised
	3.5.1	Last sentence revised
	3.5.2	First sentence revised
	3.6.1	First sentence revised
	3.7	Title revised
	3.7.1	Subparagraphs (a), (b), and (c) revised
	3.8.1	Second and third lines revised
	3.8.2	First sentence revised
	3.9	Added
17, 18	7.1.1	Subparagraphs (a) and (b) corrected by errata

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