SPS 384 Plumbing Products Update

3 Continuing Education Hours

This course has been approved for the following credential types: Commercial Plumbing Inspector Certification; Cross Connection Control Tester Registration; Journeyman Plumber License; Journeyman Plumber-Restricted Appliance License; Journeyman Plumber-Restricted Service License; Master Plumber License; Master Plumber-Restricted Service License; UDC Plumbing Inspector Certification; Utility Contractor License

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Plumbing Products – SPS 384

SPS 384.01 Scope. (1) The provisions of this chapter govern the quality and installation of materials, fixtures, appliances, appurtenances, and equipment relating to plumbing.

(2) A department interpretation of the requirements in this chapter shall supersede any differing interpretation by a lower level jurisdiction. A department decision on the application of the requirements in this chapter shall supersede any differing decision by a lower level jurisdiction.

SPS 384.02 Penalties. Penalties for violations of this chapter shall be assessed in accordance with s. 145.12, Stats.

SPS 384.10 Department approval. No fixture, appliance, appurtenance, material, device or product may be sold for use in a plumbing system or may be installed in a plumbing system, unless it is of a type conforming to the standards or specifications of chs. SPS 382 to 384 and ch. 145, Stats.

(1) ALTERNATE OR EXPERIMENTAL PRODUCT APPROVAL. If it is alleged that the approval of a fixture, appliance, appurtenance, material, device or product under this section would result in an adverse health effect or potentially adverse health effect on the waters of the state, the department may require an alternate or experimental product approval under s. SPS 384.50.

(2) PRODUCT REVIEW AND APPROVAL.

(a) 1. Each type of plumbing product which falls into one of the categories specified in Table 384.10 shall be approved by the department in accordance with this subsection before the product may be sold for use in a plumbing system or installed in a plumbing system.

2. Specifications and plans or drawings for each type of product shall be submitted to the department for review. The submittal shall be accompanied by sufficient data and information to determine if the product and its performance comply with the provisions of chs. SPS 382 to 384 and ch. 145, Stats.

(b) 1. The department may require that a submitter of a product for review have the product tested and its performance certified by an approved testing laboratory.

2. The department may consult with the technical advisory committee for guidance in the review of submittals under this subsection.

(c) If, upon review, the department determines that a product conforms to the provisions of chs. SPS 382 to 384 and ch. 145, Stats., the department shall issue an approval in writing. The department may impose specific conditions in granting an approval. Violations of the conditions under which an approval is granted shall constitute a violation of this chapter.

(d) If, upon review, the department determines that a product does not conform to provisions of chs. SPS 382 to 384 and ch. 145, Stats., the request for approval shall be denied in writing.
(e) The department shall review and make a determination on an application for a product approval within 40 business days of receipt of all fees, plans, drawings, specifications and other information required to complete the review.
(f) If an approved plumbing product is modified or additional assertions of function or performance are made, the approval shall be considered null and void, unless the change is submitted to the department for review and the approval is reaffirmed.
(g) Approvals for plumbing products issued by the department prior to November 1, 1985, shall expire 30 months after the effective date of this section.
(h) Approvals for plumbing products issued by the department after November 1, 1985, shall expire at the end of the 60th month after the date of approval issuance

Table 384.10
SUBMITTALS TO DEPARTMENT

Product Categories
1. Bottled-water vending machines that are not listed by a certification body accredited by the American National Standards Institute
2. Chemical or biochemical treatments for POWTS
3. Health care plumbing and laboratory appliances
4. Physical restoration processes for POWTS
5. Prefabricated holding or treatment components for POWTS
6. Prefabricated plumbing
7. Wastewater treatment devices used to meet the requirements in s. SPS 382.70
8. Water treatment devices that make a contaminant reduction claim which is not certified by a certification body accredited by the American National Standards Institute
9. Water treatment devices that are not certified to a standard which covers material safety, by a certification body accredited by the American National Standards Institute

(3) VOLUNTARY POWTS COMPONENT MANUAL REVIEW.
(a) The department may issue an approval, upon request and review, for specific methods or technologies that are proposed to be utilized as POWTS holding, treatment or dispersal components which conform to the standards or specifications referenced in chs. SPS 381 to 384, but do not require approval under sub. (2) or s. SPS 384.50.
(b) Each request for approval shall be made on a form provided by the department. Note: See ch. SPS 384 Appendix for a reprint of the form and addresses of the department where the form may be obtained.
(c) The submittal shall be accompanied by sufficient data and information to determine if the method or technology complies with the provisions of chs. SPS 381 to 384. The submittal shall include all of the following:
1. Plans and specifications.
2. Theory of operation.
3. Testing protocol.
4. Testing data.
5. Limits of reliable operation.
6. Installation requirements and procedures.
7. Inspection checklist and worksheet.
8. Inspection requirements and procedures.
9. Operation and maintenance requirements.

10. Operation and maintenance schedule.
11. Operation and maintenance checklist and worksheet.
12. Other information requested by the department.

(d) 1. The department shall review an initial application submitted under this subsection with input from a technical advisory committee.

2. The members on the technical advisory committee under subd. 1. shall be appointed by the department for staggered 3−year terms and shall include representatives of all of the following groups or organizations:

a. A representative of the department of natural resources familiar with large scale POWTS systems to serve as a nonvoting member.
b. A representative of a governmental unit responsible for the regulation of POWTS.
c. A POWTS designer.
d. A member of the academic or scientific community.
e. A journeyman or master plumber involved in POWTS installation.
f. A professional soil scientist or certified soil tester.
g. A POWTS component manufacturer.
h. An at−large member.
i. A representative from the department of safety and professional services familiar with POWTS approval to serve as a nonvoting member.

(e) 1. After review by the technical advisory committee under par. (d) but prior to issuing an approval under par. (f), the department shall seek public comments on new submittals under this subsection.

2. The department shall provide an opportunity for public comment under subd. 1. for a minimum of 14 days. Note: Notices to seek public comment are posted on the department's website at dsps.wi.gov.

3. If the department receives a significant amount of public comment under subd. 2., the department may elect to recognize the specific method or technology through the rule−making process under ch. 227, Stats.

(f) 1. If, upon review, the department determines that the method or technology conforms to the provisions of chs. SPS 381 to 384, the department shall issue an approval in writing.

2. The department may impose specific conditions in granting an approval, including a provision to provide training to POWTS installers and POWTS inspectors.

3. Violations of the conditions under which an approval is granted shall constitute a violation of this chapter.

(g) If, upon review, the department determines that the method or technology does not conform to the provisions of chs. SPS 381 to 384, the request for approval shall be denied in writing.

(h) The department shall review and make a determination on an application for a method or technology approval within 3 months of receipt of all fees, plans, drawings, specifications and other information required to complete the review, unless the department elects to review the method or technology as part of the rule−making process under ch. 227, Stats.

(i) If an approved method or technology is modified or additional assertions of function or performance are made, the approval shall be considered null and void, unless the change is submitted to the department for review and the approval is reaffirmed.

(4) REVOCATION. The department may revoke any approval issued under this section for any false statements or misrepresentation of facts on which the approval was based, or as a result of the product's failure, or if data indicate a health hazard or threat to the waters of the state.

(5) LIMITATIONS. An approval of a plumbing product by the department may not be construed as an assumption of any responsibility for defects in design, construction or performance of any product nor for any damages that may result. All products shall be installed in accordance with the manufacturer's printed instructions and as specified in chs. SPS 382 to 384. If there is a conflict between the manufacturer's printed instructions and requirements of chs. SPS 382 to 384, the requirements of chs. SPS 382 to 384 shall take precedence.

(6) FEES. Fees for product approval review shall be submitted in accordance with s. SPS 302.66

EXAM QUESTIONS

1. The provisions of SPS 384 govern the quality and installation of which of the following?
    a. Fixtures
    b. Appliances
    c. Equipment relating to plumbing
    d. All of the above

2. With regards to product approval, specifications and plans or drawings for each type of product shall be submitted to the department for review.
    a. True
    b. False

3. The department shall review and make a determination on an application for a product approval within ___ business days of receipt of all fees, plans, drawings, specifications and other information required to complete the review.
    a. 10
    b. 20
    c. 30
    d. 40

4. Approvals for plumbing products issued by the department prior to _____, shall expire 30 months after the effective date of this section.
    a. November 1, 1985
    b. November 1, 1995
    c. December 31, 1985
    d. December 31, 1995

5. The submittal shall be accompanied by sufficient data and information to determine if the method or technology complies with the provisions of chs. SPS 381 to 384.Submittal for approval may include which of the following:
    a. Theory of operation
    b. Testing data
    c. Inspection checklist and worksheet
    d. All of the above

6. The members on the technical advisory committee under subd. 1. shall be appointed by the department for staggered _____ terms
    a. 1-year
    b. 2-year
    c. 3-year
    d. 4-year

7. If, upon review, the department determines that the method or technology does not conform to the outlined provisions, the request for approval shall be denied _____.
    a. Via email
    b. By verbal announcement
    c. In writing
    d. None of the above

8. Fees for product approval review shall be submitted in accordance with _____.
    a. ASSE 1013
    b. s. SPS 302.66
    c. ASTM D2235
    d. CAN/CSA B64.1.1

SPS 384.11 Appurtenance, device fixture, material, and method listings. Appurtenances, devices, fixtures, materials and methods shall conform to the referenced standard in Table 384.11. Appurtenances, devices, fixtures, materials, and methods shall be listed by a nationally recognized, ANSI accredited, third party agency acceptable to the department. Appurtenances, devices, fixtures, materials, and methods that do not conform to the listed standards may achieve code compliance via Alternate or Experimental approvals in accordance with s. SPS 384.50.

Table 384.11
Appurtenances, Devices, Fixtures, Materials and Methods

Appurtenance, Device, Fixture, Material or Method	Referenced Standard(s)[a]
Appurtenances, Devices and Fixtures	
1. Automatic Clothes Washers, Residential	ASSE 1007
2. Bathtubs, Enameled Cast Iron	ASME A112.19.1/CSA B45.2
3. Bathtubs, Plastic	CSA B45.5/IAPMO Z124
4. Bathtubs, Porcelain Enameled Formed Steel	ASME A112.19.4M
5. Bidets, Vitreous and Non–Vitreous China	ASME A112.19.2/CSA B45.1
6. Dishwashing Machines, Household Electric	AHAM DW–2
7. Dishwashing Machines, Commercial	ASSE 1004
8. Dishwashing Machines, Residential	ASSE 1006
9. Drinking Fountains	ASME A112.19.2/CSA B45.1
10. Faucets and Showerheads	ASME A112.18.1/CSA B125.1
11. Food Waste Grinders, Residential	ASSE 1008
12. Ice Making Equipment, Automatic	NSF 12
13. Lavatories, Enameled Cast iron	ASME A112.19.1/CSA B45.2
14. Lavatories, Integral to Cultured Marble Vanity Tops	CSA B45.5–17/IAPMO Z124
15. Lavatories, Plastic	CSA B45.5–17/IAPMO Z124
16. Lavatories, Porcelain	ASME A112.19.4M
17. Lavatories, Stainless Steel	ASME A112.19.3/CSA B45.4
18. Lavatories, Vitreous China	ASME A112.19.2/CSA B45.1
19. Macerating Toilet Systems and Waste Pumping Systems for Plumbing Fixtures	ASME A112.3.4/CSA B45.9
20. Personal Hygiene Devices for Water Closets (Bidet Seats)	ASME A112.4.2/CSA B45.16
21. Showers, Prefabricated Plastic	CSA B45.5/IAPMO Z124
22. Sinks, Enameled Cast Iron	ASME A112.19.1/CSA B45.2
23. Sinks, Plastic	CSA B45.5/IAPMO Z124
24. Sinks, Porcelain Enameled Formed Steel	ASME A112.19.4M
25. Sinks, Stainless Steel	ASME A112.19.3/CSA B45.4
26. Sinks, Vitreous China	ASME A112.19.2/CSA B45.1
27. Supports, Floor Affixed for Off–the–Floor Plumbing Fixtures for Public Use	ASME A112.6.1M
28. Supports, Framing Affixed, Off–the–Floor Plumbing Fixtures	ASME A112.6.2
29. Urinals, Plastic	CSA B45.5/IAPMO Z124
30. Urinals, Vitreous China	ASME A112.19.2/CSA B45.1
31. Water Closets, Plastic	CSA B45.5/IAPMO Z124
32. Water Closets, Vitreous China	ASME A112.19.2/CSA B45.1
Connections, Fittings, Joints and Valves	
33. Connectors, Flexible	A112.18.6/CSA B125.6
34. Connectors, Resilient, Between Reinforced Concrete Manhole Structures and Corrugated Dual– and Triple–Wall PE and PP Pipes, Standard Specification for	ASTM F2510/F2510M
35. Connectors, Resilient, Between Reinforced Concrete Manhole Structures, Pipes and Laterals, Standard Specification for	ASTM C923/C923M

36. Connectors, Resilient, Between Reinforced Concrete On–Site Wastewater Tanks and Pipes, Standard Specification for	ASTM C1644
37. Connectors, Resilient, Storm Drain Resilient Connectors Between Reinforced Concrete Storm Sewer Structures, Pipes and Laterals, Standard Specification for	ASTM C1478
38. Fittings, Acrylonitrile Butadiene Styrene (ABS)	ASTM D2468, ASTM D3311, ASTM F409
39. Fittings, Appurtenances or Valves for use in CPVC or CPVC Systems, Specially Engineered	ASTM F1970
40. Fittings, Cast Bronze	ASME B16.15, ASME B16.24
41. Fittings, Cast Copper Alloy	ASME B16.18, ASME B16.23, ASME B16.26
42. Fittings, Cast Iron	ASME B16.1, ASME B16.4, ASME B16.12, ASME B16.45
43. Fittings, Chlorinated Polyvinyl Chloride (CPVC)	ASTM F437, ASTM F438, ASTM F439
44. Fittings, Cold Expansion Fittings with PEX Reinforcing Rings for Use with Cross–linked Polyethylene (PEX) and Polyethylene of Raised Temperature (PE–RT) Tubing	ASTM F1960
45. Fittings, Cold–Expansion with Metal Compression–Sleeves for Crosslinked Polyethylene (PEX) Pipe and SDR9 Polyethylene of Raised Temperature (PE–RT) Pipe	ASTM F2080
46. Fittings, Copper	ASME B16.22, ASME B16.29
47. Fittings, Crosslinked Polyethylene (PEX)	ASTM F1807
48. Fittings, Ductile Iron and Gray Iron	AWWA C110, AWWA C153, ASME B16.42
49. Fittings, Gray Iron Pipe Flanges and Flanged Fitting Classes 25, 125 and 250	ASME B16.1
50. Fittings, Gray Iron Threaded Fitting Classes 125 and 250	ASME B16.4
51. Fittings, Malleable Iron[b]	ASME B16.3
52. Fittings, Metric– and Inch–Sized Fittings for PEX Pipe	ASTM F2829/F2829M
53. Fittings, Polyethylene (PE)	ASTM D2609, ASTM D2683, ASTM D3261
54. Fittings, Polyvinyl Chloride (PVC)	ASTM D2464, ASTM D2466, ASTM D2467, ASTM D3311, ASTM F409, ASTM F1336, ASTM F1866
55. Fittings, Polyvinyl Chloride (PVC) Gasketed Sewer	ASTM F1336
56. Fittings, Push–Fit[c,d]	ASSE 1061
57. Fittings, Push–Fit PEX Mechanical Fittings for PEX Tubing	ASTM F2854
58. Fittings, Stainless Steel	ASTM A403/A403M, ASTM A774/A774M
59. Fittings, Standard Specification for Electrofusion Type Polyethylene Fittings for Outside Diameter Controlled Polyethylene and PEX Pipe and Tubing	ASTM F1055–16a
60. Fittings, Steel[c]	ASME B16.5, ASME B16.9, ASME B16.11, ASME B16.28
61. Fittings, Styrene–Rubber (SR)	ASTM D2852
62. Food Waste Grinders, Commercial	ASSE 1009
63. Gaskets, Rubber for Cast Iron Soil Pipe and Fittings	ASTM C564, CISPI 301, FM 1680

64. Insert Fittings, Metal, for PE–AL–PE and Cross-linked PEX–AL–PEX Composite Pressure Pipe, Standard Specification for	ASTM D1974
65. Insert Fittings, Metal, Utilizing a Copper Crimp Ring for SDR9 PEX and SDR9 PEX–AL–PEX Tubing, Standard Specification for	ASTM F2434
66. Insert Fittings, Metal Press with Factory Assembled Stainless Steel Press Sleeve for SDR9 Cross–linked Polyethylene (PEX) Tubing and SDR9 Polyethylene of Raised Temperature (PE– RT) Tubing	ASTM F3347
67. Insert Fittings, Plastic, for SDR9 PEX and PE–RT Tubing	ASTM F2735
68. Insert Fittings, Plastic Press with Factory Assembled Stainless Steel Press Sleeve for SDR9 Cross–linked Polyethylene (PEX) Tubing and SDR9 Polyethylene of Raised Temperature (PE– RT) Tubing	ASTM F3348
69. Insert Fittings, Plastic Utilizing a Copper Crimp Ring, or Alternate Stainless Steel Clamps for SDR9 Crosslinked Polyethylene (PEX) Tubing and SDR9 Polyethylene of Raised Temperature (PE–RT) Tubing	ASTM F2159
70. Insert Fittings, Stainless Steel Clamps for Securing SDR9 Cross–linked Polyethylene (PEX) Tubing and SDR9 Polyethylene of Raised Temperature (PE–RT) to Metal Insert and Plastic Insert Fittings	ASTM F2098
71. Joints, for Concrete Gravity Flow Sewer Pipe Using Rubber Gaskets, Standard Specification for	ASTM C1628
72. Joints for Concrete Pipe and Manholes, Using Rubber Gaskets	ASTM C443/C443M
73. Joints for Concrete Pipe, Manholes and Precast Box Sections Using Preformed Flexible Joint Sealants	ASTM C990/C990M
74.Joints for Drain and Sewer Plastic Pipes Using Flexible Elastomeric Seals	ASTM D3212
75. Joints, for Concrete Gravity Flow Sewer Pipe Using Rubber Gaskets, Standard Specification for	ASTM C1628
76. Joints, Plastic Pressure Pipes Using Flexible Elastomeric Seals	ASTM D3139
77. Joints, Rubber–Gasket Joints for Ductile–Iron Pressure Pipe and Fittings	AWWA C111/A21.11
78. Joints, Threaded[f]	ASME B1.20.1
79. Primers for Use in Solvent Cement Joints of PVC Plastic Pipe and Fittings, Standard Specification for	ASTM F656
80. Solder	ASTM B32
81. Solvent cement, ABS	ASTM D2235
82. Solvent cement, CPVC	ASTM F493
83. Solvent cement, PVC	ASTM D2564
84. Solvent cements for Transition Joints Between ABS and PVC Non–Pressure Piping Components, Standard Specification for	ASTM D3138
85. Unions, Dielectric	ASSE 1079
86. Valves, Air Admittance (AAVs)	ASSE 1050, ASSE 1051

87. Valves, Automatic Temperature Control Mixing	ASSE 1069
88. Valves, Backwater	ASME A112.14.1, CSA B181.0:21 (section 5.6)
89. Valves, Crosslinked polyethylene (PEX) Water Distribution Tubing Systems	NSF 359
90. Valves, Flush and spuds for water closets, urinals, and tanks	ASME A112.19.5/CSA B45.15
91. Valves, Flushing Devices, Pressurized for Plumbing Fixtures	ASSE 1037/ASME A112.1037/CSA B125.37
92. Valves, Pressure Balancing Thermostatic Control	ASSE 1016/ASME A112.1016/CSA B125.16
93. Valves, Relief and Automatic Shutoff Devices for Hot Water Supply Systems	ANSI Z21.22/CSA 4.4
94. Valves, Temperature Actuated Mixing for Hot Water Distribution Systems	ASSE 1017
95. Valves, Trap Primer	ASSE 1018
96. Valves, Trap Seal Primer – Drainage Types and Electric Design Types	ASSE 1044
97. Valves, Water Pressure Reducing for Potable Water Supply Systems	ASSE 1003
98. Water Hammer Arrestors	ASSE 1010
99. Water Meters	AWWA C700, AWWA C701, AWWA C702, AWWA C704, AWWA C706, AWWA C707, AWWA C708, AWWA C710
Cross Connection Control	
100. Anti–siphon Fill Valves (Ballcocks) for Gravity Water Closet Flush Tanks	ASSE 1002/ASME A112.1002/CSA B125.12
101. Atmospheric Type Vacuum Breakers (AVB)	ASSE 1001, CSA B64.1.1
102. Backflow Preventers for Beverage Dispensing Equipment	ASSE 1022
103. Backflow Preventers for Hand–Held Showers	ASSE 1014, ASME A112.18.1/CSA B125.1, ASME A112.18.3
104. Backflow Preventers with Integral Pressure Reducing Boiler Feed Valve and Intermediate Atmospheric Vent Style for Domestic and Light Commercial Water Distribution Systems[g]	ASSE 1081
105. Backflow Preventers with Intermediate Atmospheric Vents	ASSE 1012
106. Backflow Protection Devices and Systems in Plumbing Fixture Fittings	ASME A112.18.3
107. Chemical Dispensing Systems	ASSE 1055
108. Double Check Backflow Prevention Assemblies and Double Check Fire Protection Backflow Prevention Assemblies (DC and DCF)	ASSE 1015, CSA B64.5
109. Double Check Detector Fire Protection Backflow Prevention Assemblies (DCDA and DCDA–II)	ASSE 1048
110. Double Check Valve Backflow Preventers (DCVA)	CSA B64.5
111. Dual Check Backflow Preventers (DuC)	ASSE 1024, CSA B64.6
112. Dual Check Backflow Preventers in Freeze Resistant Type Wall Hydrants	ASSE 1053
113 Dual Check Valve Backflow Preventers with Atmospheric Ports (DCAP)	CSA B64.3
114. Dual Check Valve Type Backflow Preventors for Carbonated Beverage Dispensers, Post–Mix Type	ASSE 1032
115. Hose Connection Backflow Preventers (HCVB)	ASSE 1052, ASSE 1011, CSA B64.2

116. Laboratory Faucet Backflow Preventers (LFVB)	ASSE 1035, CSA B64.7
117. Pipe Applied Atmospheric Vacuum Breakers (AVB)	ASSE 1001, CSA B64.1.1
118. Pressure Vacuum Breaker Assemblies (PVBA/PVB)	ASSE 1020, CSA B64.1.2
119. Reduced Pressure Detector Fire Protection Backflow Prevention Assemblies (RPDA and RPDA–II)	ASSE 1047
120. Reduced Pressure Principal Backflow Preventers and Reduced Pressure Fire Protection Principal Backflow Preventers (RP and RPF)	ASSE 1013, CSA B64.4
121. Sanitary Yard Hydrants, Freeze Resistant	ASSE 1057
122. Spill Resistant Vacuum Breakers (SVB)	ASSE 1056
123. Vacuum Breaker Wall Hydrants, Freeze Resistant Automatic Draining Type	ASSE 1019
Drainage	
124. Floor and Trench Drains	ASME A112.6.3
125. Roof, Deck and Balcony Drains[h]	ASME A112.6.4
126. Siphonic Roof Drains[h]	ASME A112.6.9, ASTM F2021
127. Trap Seal Protection for Floor Drains, Barrier Type	ASSE 1072
128. Vacuum Waste Collection Systems	CSA B45.13/IAPMO Z1700
Materials	
129. Brazing Filler Metal	AWS A5.8M/A5.8
130. Drinking Water System Components	NSF 372
131. Drinking Water System Components – Health Effects	NSF 61
132. Food Equipment Materials	NSF 51
133. Plastics Piping System Components and Related Materials	NSF 14
134. Safing	ASTM C1306/C1306M, ASTM D4068
135. Sheet Copper	ASTM B152/B152M
136. Surface Bonding Mortar, Standard Specification for Packaged, Dry, Combined Materials for[i]	ASTM C887
Methods	
137. Capillary Joints by Soldering Copper and Copper Alloy Tube and Fittings, Standard Practice for Making	ASTM B828
138. CPVC/PVC, One–Step Method (solvent cement only)	ASTM F3328
139. Flaring Polyolefin Pipe and Tubing, Standard Practice for	ASTM D3140
140. Geomembranes and Related Materials, Index Puncture Resistance of	ASTM D4833
141. Geotextile, Determining Apparent Opening Size of a	ASTM D4751
142. Geotextiles, Grab Breaking Load and Elongation of	ASTM D4632
143. Geotextiles, Trapezoid Tearing Strength of	ASTM D4533
144. Grease Interceptors with FOG Sensing and Alarm Devices, Testing and Certification for	PDI–G 102

145. Heat Fusion Joining of Polyethylene Pipe and Fittings, Standard Practice for	ASTM F2620
146. Heat Fusion Joining of Polyolefin Pipe and Fittings	ASTM D2657
147. Hydro Mechanical Grease Interceptors with Appendix of Installation and Maintenance, Testing and Rating Procedure for	PDI–G 101
148. Installation of Thermoplastic Pipe and Corrugated Pipe in Septic Tank Leach Fields, Standard Practice for	ASTM F481
149. Maxim–Horizontal Directional Drilling for Placement of Polyethylene Pipe or Conduit Under Obstacles, Including River Crossings, Standard Guide for Use of	ASTM F1962
150. Measurement of Hydraulic Characteristics of Hydrodynamic Stormwater Separators and Underground Settling Devices, Standard Test Method for	ASTM C1745/C1745M
151. PVC, Making Solvent Cemented Joints	ASTM D2855
152. Safe Handling of Solvent Cements, Primers and Cleaners Used for Joining Thermoplastic Pipe and Fittings, Standard Practice for	ASTM F402
153. Siphonic Roof Drainage, Plumbing Engineering & Design Standard	ASPE 45
Pools	
154. Equipment and Chemicals for Swimming Pools, Hot Tubs, and Other Recreational Water Facilities	NSF/ANSI/CAN 50
155. Water Heater, Pools and Tubs, Electric	UL 1261
Wastewater Treatment	
156. Aggregate, stone	ASTM C33/C33M
157. Drainfield Trench Product Sizing for Gravity Dispersal Onsite Wastewater Treatment and Dispersal Systems	NSF 240
158. Evaluation of Components and Devices Used in Wastewater Treatment Systems	NSF 46
159. Filter Sand	ASTM C33/C33M
160. FOG (Fats, Oils and Greases) Disposal Systems	ASME A112.14.6
161. Grease Interceptors	CSA B481 Series
162. Grease Interceptors, Corrugated HDPE	ASTM F2649
163. Grease Interceptors, Hydromechanical	ASME A112.14.3
164. Grease Interceptors, Precast Concrete	ASTM C163
165. Grease Removal Devices	ASME A112.14.4
166. Leaching chambers	ASTM F2418, ASTM F2787, ASTM F2922, ASTM F3430
167. Non–Liquid Saturated Treatment Systems	NSF 41
168. Onsite Residential and Commercial Water Reuse Treatment Systems	NSF 350
169. Onsite Residential and Commercial Greywater Treatment Systems for Subsurface Discharge	NSF 350–1
170. Prefabricated Grease Interceptors	IAPMO Z1001

171. Prefabricated Septic Tanks and Sewage Holding Tanks, Design, Material and Manufacturing Requirements for	CSA B66.16
172. Residential Wastewater Treatment Systems	NSF 40
173. Residential Wastewater Treatment Systems – Nitrogen Reduction	NSF 245
174. Septic Tanks, Precast Concrete	ASTM C1227
175. Water Quality Units, Corrugated HDPE	ASTM F2737–11
Water Heating	
176. Heat Exchanger, Single Wall Heat Transfer Fluid[b]	Category Code: HT–1
177. Water Heater, Commercial Storage Tank, Electric	UL 1453
178. Water Heater, Instantaneous, Electric	UL 499
179. Water Heater, Pools and Tubs, Electric	UL/ANSI 1261
180. Water Heater, Relief Valves	ANSI Z21.22/CSA 4.4
181. Water Heater, Relief Valve Drain Tubes	ASME A112.4.1
182. Water Heater, Residential Storage Tank, Electric	UL 174
183. Water Heater, Solid Fuel	UL 2523
184. Water Heater, Storage Tank, Oil Fueled	UL 732
185. Water Heater, Storage Tank ≥ 75,000 BTU/hr., Gas Fueled	ANSI Z21.10.1/CSA 4.1
186. Water Heater, Storage Tank and Instantaneous > 75,000 BTU/hr., Gas Fueled	ANSI Z21.10.3/CSA 4.3
187. Water Temperature Limiting Devices	ASSE 1070
Water Treatment Devices & Chemicals	
188. Drinking Water Distillation Systems	NSF 62
189. Drinking Water Treatment Chemicals – Health Effects	NSF 60
190. Drinking Water Treatment Units – Aesthetic Effects	NSF 42
191. Drinking Water Treatment Units – Health Effects	NSF 53
192. Residential Cation Exchange Water Softeners	NSF 44
193. Reverse Osmosis Drinking Water Treatment Systems	NSF 58
194. Ultraviolet Microbiological Water Treatment Systems	NSF 55

a. The specific standard edition adopted is specified in s. SPS 381.20.

b. NSF Registration Guidelines for Proprietary Substances and Nonfood Compounds. The NSF Nonfood Compounds Registration Program is a continuation of the USDA product approval and listing program, which is based on meeting regulatory requirements including FDA 21 CFR for appropriate use, ingredient, and labeling: https://info.nsf.org/usda/psnclistings.asp.

c. Nominal size ≤ 2–in. CTS.

d. May not be used in temperature/pressure relief valve drain lines unless they are tested and rated for excessive conditions of 210°F (98.9°C) and 150.0 psig (1034 kPa), per ASME A112.4.1 or ASTM F877.

e. Steel and malleable iron fittings used in a water supply system shall be galvanized in accordance with ASTM A123/A123M j = https://info.nsf.org/usda/psnclistings.asp.

f. Threaded joints shall only be used on pipe of sch. 80 or heavier.

g. Closed loop boiler feed only, standard does not require NSF/ANSI 372 or NSF/ANSI/CAN–61 conformance.

h. Design shall conform to ASPE 45–2018.

i. Portland, Type II.

SPS 384.12 Identification. Each length of pipe and each pipe fitting, trap, fixture, material, device and product to be used in plumbing shall be marked as required by the applicable standard specified by reference in this chapter or as specified by rule in this chapter. SPS 281 to 387

SPS 384.13 Penetrations of fire-resistive assemblies. Penetrations of fire-resistive assemblies, such as walls and floor-ceiling systems, by plumbing systems or plumbing materials shall be protected in accordance with requirements of chs. SPS 361 to 366.

SPS 384.14 Chemical or biochemical treatments for private sewage systems. Chemical or biochemical treatments for private sewage systems shall function and perform in accordance with the assertions submitted to the department. Chemical or biochemical treatments for private sewage systems may not directly or indirectly adversely affect bacterial action in the systems, soil hydraulic conductivity in the absorption areas, or groundwater quality beneath the systems.
SPS 384.15 Health care plumbing appliances.

SPS 384.15 Health care Plumbing Appliances. Health care plumbing appliances shall function and perform in accordance with the drain, vent, water supply and backflow protection requirements of ch. SPS 382.

SPS 384.20 Plumbing fixtures, appliances and equipment. (1) DESIGN AND CONSTRUCTION. All plumbing fixtures, appliances and equipment shall be designed and constructed to:

a. Ensure durability, proper service and sanitation;
b. Be free from defects;
c. Be free from concealed fouling surfaces;
d. Not require undue efforts in cleaning and operating; and
e. Prevent nonpotable liquids, solids or gasses from being introduced into a potable water supply system through cross−connections.

(2) MATERIALS. (a) Plumbing fixtures shall have smooth surfaces that are impervious to water.

(b) All plumbing fixture fittings which are end-point devices, covered by the scope of NSF 61, section 9 and installed to supply water intended for human ingestion, shall conform to NSF 61, section 9.

(3) WATER CONSERVING FAUCETS, SPOUTS AND PLUMBING FIXTURES. Water conserving faucets, spouts and plumbing fixtures which meet or exceed the water conservation requirements established in par. (b) shall be installed as specified in par. (a).

(a) 1. All lavatory faucets, shower heads, urinals, urinal flushing devices, water closets and water closet flushing devices shall conform to par. (b).

2. All faucets installed on kitchen sinks of dwelling units and living units shall conform to par. (b) 4.

(b) 1. 'General.' Flow control or flow restricting devices shall be installed on the water inlet side or shall be an integral part of the faucet, spout or fixture. A flow controlling or restricting aerator shall be considered to be an integral part of a faucet or spout.

2. 'Lavatory faucet.' a. The maximum discharge rate of lavatory faucets shall be 2.2 U.S. gallons per minute at a 60 psig flowing supply pressure.

b. Lavatory faucets that are of the metering type shall allow a maximum of 0.25 U.S. gallons per metering cycle at an 80 psig flowing supply pressure.

(3) 'Shower heads.' The maximum discharge rate of shower heads shall be 2.5 U.S. gallons per minute at an 80 psig flowing supply pressure.

(4) 'Sink faucets.' The maximum discharge rate of sink faucets shall be 2.2 U.S. gallons per minute at 80 psig flowing supply pressure.

(5) 'Urinals.' Urinals shall function properly with a maximum of one U.S. gallon per flush at an 80 psig flowing supply pressure.

(6) 'Urinal flushing devices.' The flushing cycle for urinal flushing devices shall discharge a maximum of one U.S. gallon per flush per fixture use at static test pressure of 20 psig and 80 psig.

(7) 'Water closets.' Water closets shall function properly with a maximum of 1.6 U.S. gallons per flush over the range of static test pressure specified in Table 384.20.

(8) 'Water closet flushing devices.' The flushing cycle for water closet flushing devices shall discharge a maximum of 1.6 U.S. gallons over the range of static test pressures specified in Table 384.20.

Table 384.20
STATIC TEST PRESSURES FOR WATER CLOSETS AND WATER CLOSET FLUSHING DEVICES

Tank Type	Flushometer Type	Flushometer Type
	Siphonic	Blowout
20 to 80 psig	25 to 80 psig	35 to 80 psig

EXAM QUESTIONS

9. Appurtenances, devices, fixtures, materials and methods shall conform to the referenced standard in Table _____.
    a. 383.11
    b. 384. 11
    c. 385.11
    d. 386.11

10. _____is the reference standard for Dishwashing Machines, Residential.
    a. ASSE 1002
    b. ASSE 1004
    c. ASSE 1006
    d. ASME A112.19.2/CSA B64.5

11. All plumbing fixtures, appliances and equipment shall be designed and constructed to:
    a. Ensure durability, proper service and sanitation
    b. Be free from defects
    c. Not require undue efforts in cleaning and operating
    d. All of the above

12. Materials used in plumbing fixtures shall have smooth surfaces that absorb water.
    a. True
    b. False

13. The maximum discharge rate of lavatory faucets shall be ___ U.S. gallons per minute at a 60 psig flowing supply pressure.
    a. 1.8
    b. 2.0
    c. 2.1
    d. 2.2

14. The maximum discharge rate of sink faucets shall be 2.2 U.S. gallons per minute at ___ psig flowing supply pressure.
    a. 50
    b. 60
    c. 70
    d. 80

15. Water closets shall function properly with a maximum of ___ U.S. gallons per flush over the range of static test pressure specified in Table 384.20.
    a. 1.2
    b. 1.4
    c. 1.5
    d. 1.6

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(4) GENERAL REQUIREMENTS. (a) *Fixture outlets.* 1. The outlet passageway of a fixture shall be free from impairments and of sufficient size to insure proper discharge of the fixture contents under normal conditions.

2. The outlet connection of a fixture which directly connects to the drain system shall be an air and watertight joint.

(b) *Installation of fixtures.* 1. 'Access for cleaning.' Plumbing fixtures shall be so installed as to afford easy access for cleaning both the fixture and the area around it.

2. 'Securing wall mounted fixtures.' Wall mounted fixtures shall be rigidly supported by a hanger which is attached to structural members so that the load is not transmitted to the fixture drain connection or any other part of the plumbing system. The hanger for a wall mounted water closet shall conform to ASME A112.6.1M.

3. 'Water supply protection.' The water supply pipes and fittings within every plumbing fixture shall be so installed as to prevent backflow.

4. 'Design of overflow.' A fixture which is provided with an overflow outlet shall be designed and installed so that standing water in the fixture cannot rise in the overflow when the fixture's stopper is closed, and so that no water remains in the overflow when the fixture is empty.

5. 'Connection of overflows.' The overflow from any fixture shall discharge into the drain system on the inlet or fixture side of the trap.

6. 'Overflows in flush tanks.' Flush tanks shall be provided with overflows discharging to the fixture served and shall be of sufficient size to prevent flooding the tank at the maximum rate at which the tanks are supplied with water.

7. ‘Strainers.’ All plumbing fixtures other than water closets, clinic sinks, trap standard service sinks with flush rims, urinals, standpipes and waste sinks shall be provided with strainers, cross bars or pop−up stoppers which restrict the clear opening of the waste outlet.

8. ‘Flushometer valves.’ Flushometer valves shall be equipped with vacuum breakers which conform to ASSE 1001. Flushometer valves may not be used where the water pressure is insufficient to properly operate them. When the valve is operated, it shall complete the cycle of operation automatically, opening fully and closing positively under the water supply pressure. Each flushometer shall be provided with a means for regulating the flow through it.

9. ‘Safing.’ a. The floor of all site−constructed shower stalls and shower rooms shall be protected with a safing material installed beneath the finished floor of the entire enclosure or room and upward along the sides to a minimum of 6 inches above the curb or maximum water level of the room or enclosure. The corners of the enclosure or room shall be safed to a height of 6 feet and at least 3 inches in each direction from the corners.

b. All floor drains or other similar fixtures shall be installed with a safing material extending a minimum of 12 inches from the fixture.

c. The safing material shall conform to s. SPS 384.30 (6).

d. The safing material shall be properly drained.

e. All installations directly over an unexcavated portion of a building are exempt from this subdivision.

EXAM QUESTIONS

16. True or false? The water supply pipes and fittings within every plumbing fixture shall be so installed as to prevent backflow.
    a. True
    b. False

17. All plumbing fixtures other than water closets, clinic sinks, trap standard service sinks with flush rims, urinals, standpipes and waste sinks shall be provided with _____, cross bars or pop−up stoppers which restrict the clear opening of the waste outlet.
    a. Water supply protection
    b. Strainers
    c. Flushometer valves
    d. Safing

18. All floor drains or other similar fixtures shall be installed with a safing material extending a minimum of ___ inches from the fixture.
    a. 12
    b. 14
    c. 16
    d. 18

19. The safing material shall conform to _____.
    a. CAN/CSA B137.9
    b. AWWA C115
    c. s. SPS 384.30 (6)
    d. ASTM D2737

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(5) PLUMBING FIXTURES AND PLUMBING APPLIANCES. (a) *Automatic clothes washers*. Residential type automatic clothes washers shall conform to ASSE 1007 or an approved cross connection method outlined in Table 382.41−1.

(b) *Bathtubs*. 1. a. Enameled cast iron bathtubs shall conform to ASME A112.19.1/CSA B45.2.

b. Porcelain enameled formed steel bathtubs shall conform to ASME A112.19.4M.

Plastic bathtubs shall conform to CSA B45.5/IAPMO Z124.

2. Bathtubs shall have waste outlets and overflows at least $1^1/_2$ inches in diameter. A closing device shall be provided on the waste outlet.

3. All whirlpool piping for bathtubs shall drain by gravity to the trap serving the bathtub.

4. All waterways of the whirlpool pump for a bathtub shall drain by gravity to the trap serving the bathtub.

(c) *Bidets*. Vitreous china bidets shall conform to the material requirements in ASME A112.19.2/CSA B45.1.

1. A bidet may not be located closer than 15 inches from its center to any side wall, partition, vanity or other obstruction, nor closer than 30 inches center to center from a water closet.

2. Bidets with submerged inlet fittings shall be protected by vacuum breakers which conform to ASSE 1001 or CAN/CSA B64.1.1.

(d) *Chemical dispensing systems*. Chemical dispensing systems shall conform to ASSE 1055.

(e) *Dishwashing machines*. 1. Residential type dishwashing machines shall conform to ASSE 1006 or an approved cross connection method outlined in Table 382.41−1.

2. Commercial type dishwashing machines shall conform to ASSE 1004.

(f) *Drinking fountains*. 1. Drinking fountains and water coolers shall conform to ARI 1010 or ASME A112.19.2.

2. Drinking fountains may not be installed in toilet rooms.

3. The water supply for drinking fountains shall be provided with an adjustable valve fitted with a loose key or an automatic self−closing valve permitting regulation of the rate of flow of water. The water supply issuing from the nozzle shall be of sufficient volume and height so that persons using the fountain need not come in direct contact with the nozzle or orifice.

4. A drinking fountain may not have a waste outlet less than 1¼ inches in diameter.

(g) *Floor drains*. 1. Floor drains shall be provided with removable strainers of sufficient strength to carry the anticipated loads.

2. The floor drain shall be so constructed that it can be cleaned, and the drain inlet shall be accessible at all times.

3. Floor drains shall be of a size to efficiently serve the intended purpose. The floor drain outlet shall not be less than 2 inches in diameter.

(h) *Food waste grinder*s. 1. Residential type food waste grinders shall conform to ASSE 1008. Commercial type food waste grinders shall conform to ASSE 1009 or an approved cross connection method outlined in Table 382.41-1.

2. Food waste grinders shall be connected to a drain of sufficient size to serve the unit, but not less than 1 ½ inches in diameter.

3. All food waste grinders shall be provided with an adequate supply of cold water at a sufficient flow rate to insure proper functioning of the unit.

(i) *Laundry trays*. Each compartment of a laundry tray shall be provided with a waste outlet not less than 1 ½ inches in diameter.

(j) *Lavatories*. 1. a. Enameled cast iron lavatories shall con-form to ASME A112.19.1M.

b. Vitreous china lavatories shall conform to ASME A112.19.2M.

c. Stainless steel lavatories shall conform to ASME A112.19.3.

d. Porcelain enameled formed steel lavatories shall conform to ASME A112.19.4.

e. Plastic lavatories shall conform to ANSI Z124.3.

2. Cultured marble vanity tops with an integral lavatory shall conform to ANSI Z124.3.

3. Lavatories shall have waste outlets not less than 1¼ inches in diameter.

(k) *POWTS design packages and POWTS components.* POWTS design packages and POWTS components shall function and perform in accordance with assertions submitted to and approved by the department under s. SPS 384.10.

(l) *Showers*. 1. Prefabricated plastic showers and shower compartments shall conform to ANSI A124.1.2.

2. Except for combination bathtub−shower units, waste outlets serving showers shall be at least 2 inches in diameter and shall have removable strainers of sufficient strength for the anticipated loads.

3. Where a waste outlet serves more than one shower space or shower head, the waste outlet shall be at least 2 inches in diameter and the waste outlet shall be so located and the floor so pitched that waste water from one shower does not flow over the floor area serving another shower.

4. All shower compartments, regardless of shape, shall have a minimum finished interior of 900 square inches and shall be capable of encompassing a circle with a diameter of 30 inches. The minimum required area and dimension shall be measured in a horizontal plane 24 inches above the top of the threshold and may not extend beyond the centerline of the threshold. The minimum area and dimensions shall be maintained to a point 70 inches above the shower waste outlet with no protrusions other than the fixture valve or valves, showerheads, soap dishes, retractable seats and safety grab bars or rails.

EXAM QUESTIONS

20. True or false? All whirlpool piping for bathtubs shall drain by gravity to the trap serving the bathtub.
    a. True
    b. False

21. _____ bathtubs shall conform to ASME A112.19.4M.
    a. Enameled Cast iron
    b. Porcelain enameled Formed steel
    c. Plastic
    d. All of the above

22. A bidet may not be located closer than ___ inches from its center to any side wall, partition, vanity or other obstruction, nor closer than ___ inches center to center from a water closet.
    a. 15, 30
    b. 10, 20
    c. 15, 20
    d. 10, 30

23. True or false? Residential type dishwashing machines and commercial type dishwashing machines shall both conform to ASSE 1006.
    a. True
    b. False

24. True or false? Drinking fountains may be installed in toilet rooms.
    a. True
    b. False

25. The floor drain outlet shall not be less than ___ inches in diameter.
    a. 2
    b. 3
    c. 4
    d. 5

26. _____ lavatories shall conform to ASME A112.19.2M.
    a. Stainless steel
    b. Porcelain
    c. Plastic
    d. Vitreous china

27. All shower compartments, regardless of shape, shall have a minimum finished interior of _____ square inches and shall be capable of encompassing a circle with a diameter of 30 inches.
    a. 900
    b. 1000
    c. 1200
    d. 1500

(m) *Sinks*. 1. a. Enameled cast iron sinks shall conform to ASME A112.19.1M.

b. Vitreous china sinks shall conform to ASME A112.19.2.

c. Stainless steel sinks shall conform to ASME A112.19.3.

d. Porcelain enameled formed steel sinks shall conform to ASME A112.19.4.

e. Plastic sinks shall conform to ANSI Z124.6.

2. Sinks shall be provided with waste outlets not less than 1½ inches in diameter.

(n) *Urinals*. 1. a. Vitreous china urinals shall conform to ASME A112.19.2.

b. Plastic urinals shall conform to ANSI Z124.9.

2. A urinal may not be located closer than 15 inches from its center to any side wall, partition, vanity or other obstruction, nor closer than 30 inches center to center, between urinals.

3. Stall type urinals shall be set into the floor and the floor shall be pitched toward the fixture.

4. Automatic siphon urinal flush tanks may not be installed.

5. Pressurized flushing devices to serve urinals shall conform to ASSE 1037.

(o) *Water closets*. 1. a. Vitreous china water closets shall conform to ASME A112.19.2.

b. Plastic water closets shall conform to ANSI Z124.4.

2. Except as permitted in subd. 3., all water closets required to be provided in public buildings and places of employment shall be of an elongated bowl type, and provided with either:

a. Hinged, open−front seats without covers; or
b. Hinged, closed−front seats, without covers, which are encased with a continuous plastic sleeve capable of providing a clean surface for every user.

3. a. Water closets provided in day care centers, individual living units or sleeping units of residential occupancies may be of a round−bowl type with a hinged, closed front seat with or without a cover.

b. Water closets provided in prisons or correctional institutions may be of a round−bowl type, with or without a seat or cover.

4. A water closet may not be located closer than 15 inches from its center to any side wall, partition, vanity, or other obstruction, nor closer than 30 inches center to center, between water closets. There shall be at least 24 inches clearance in front of a water closet to any wall, fixture or door.

5. No person may install or maintain pan, plunger, offset washout, washout, long hopper, frostproof and other types of water closets having invisible seals or unventilated spaces or walls not thoroughly cleansed at each flushing.

6. Each water closet shall be individually equipped with a flushing device. Pressurized flushing devices shall conform to ASSE 1037. All flushing devices shall be readily accessible for maintenance and repair. Ballcocks and fill valves shall be of the anti−siphon type and shall conform to ASSE 1002. The critical level mark on the ballcock and fill valve shall be located at least one inch above the full opening of the overflow pipe.

(p) *Water heaters.* 1. All water heating equipment shall be tested and listed by a nationally recognized, ANSI accredited, third party listing agency acceptable to the department under the appropriate standard listed in Table 384.20−1m.

2. If a dual use (combined potable water and space heating) system requires water for space heating > 125_F, then an ASSE 1017 compliant thermostatic mixing valve shall be installed to limit the initial temperature of water supplied to the potable hot water distribution system to 3 125_F.

3. Drain valves equal to or larger than 3/4 inch NPS with male GHT outlets, shall be installed at the lowest point of each water heater and hot water storage tank.

4. Water heaters shall be accessible for inspection, service, maintenance, and replacement.

5. Water heaters shall be indelibly labeled as required by the applicable standard listed in Table 384.20−1m.

6. The initial temperature of water from tankless type water heaters installed for one− and 2−family dwelling use shall be 3 125_F.

7. Water heaters and storage tanks installed for residential hot water shall have the maximum working pressure indelibly marked on the tank exterior, so it is easily visible after installation.

8. Hot water supply systems shall be equipped with automatic temperature controls capable of adjustments from the lowest to the highest acceptable temperature settings for the intended use.

Table 384.20–1m
Water Heating Standards

Water Heating Type	Standard
One– and 2–Family Dwelling Storage Tank, Electric	UL/ANSI 174 (STANDARD FOR SAFETY Household Electric Storage Tank Water Heaters)
Storage Tank, Oil Fueled	UL/ANSI 732 (STANDARD FOR SAFETY Oil–Fired Storage Tank Water Heaters)
Storage Tank ≤ 75,000 BTU/hr., Gas Fueled	CSA/ANSI Z21.10.1/CSA 4.1 (Gas water heaters, volume I, storage water heaters with input ratings of 75,000 BTU per hour or less)
Storage Tank and Instantaneous > 75,000 BTU/hr., Gas Fueled	CSA/ANSI Z21.10.3/CSA 4.3 (Gas–fired water heaters, volume III, storage water heaters with input ratings above 75,000 BTU per hour, circulating and instantaneous)
Commercial Storage Tank, Electric	UL/ANSI 1453 (STANDARD FOR SAFETY Electric Booster and Commercial Storage Tank Water Heaters)
Solid Fuel	UL/ANSI 2523 (STANDARD FOR SAFETY Solid Fuel–Fired Hydronic Heating Appliances, Water Heaters, and Boilers)
Instantaneous, Electric	UL/ANSI 499 (STANDARD FOR SAFETY Electric Heating Appliances)
Pools and Tubs, Electric	UL/ANSI 1261 (STANDARD FOR SAFETY Electric Water Heaters for Pools and Tubs)
Relief Valve Drain Tubes	ASME/ANSI A112.4.1 (Water Heater Relief Valve Drain Tubes)
Relief Valves	ANSI Z21.22/CSA 4.4 (Relief valves for hot water)
Single Wall Heat Transfer Fluid[a]	Category Code: HT–1

a. NSF registration guidelines for proprietary substances and nonfood compounds. The NSF nonfood compounds registration program is a continuation of the USDA product approval and listing program, which is based on meeting regulatory requirements including FDA 21 CFR for appropriate use, ingredient, and labeling: https://info.nsf.org/usda/psnclistings.asp.

(q) *Water meters.* A water meter which is used pursuant to s. SPS 383.54 (2) shall conform to AWWA C700, AWWA C701, AWWA C702, AWWA C704, AWWA C706, AWWA C707, AWWA C708, or AWWA C710.

(r) *Water treatment devices.* 1. Water softeners shall conform to NSF−44.

2. a. Except as provided in subd. 2. b., water treatment devices shall function and perform in accordance with the assertions submitted to the department under s. SPS 384.10, relating to rendering inactive or removing contaminants.

b. A water treatment device which injects a water treatment compound into a water supply system shall maintain the compound concentration in the system over the working flow rate range and pressure range of the device.

3. Except as specified in subd. 4., water treatment compounds introduced into the water supply system by a water treatment device shall be listed as an acceptable drinking water additive by a listing agency approved by the department. Listing agencies approved by the department shall include:

a. United States environmental protection agency;
b. United States food and drug administration; and
c. National sanitation foundation.

4. A water supply system shall be protected from backflow when unlisted water treatment compounds, which may affect the potability of the water, are introduced into the system. The department shall determine the method of backflow protection. Water supply outlets for human use or consumption may not be installed downstream of the introduction of an unlisted water treatment compound.

5. Water treatment devices designed for contaminated water supplies shall be labeled to identify the following information:

a. The name of the manufacturer of the device;
b. The device's trade name; and
c. The device's model number.

(s) Other plumbing fixtures, appliances and equipment. Plumbing fixtures, appliances and equipment not specifically covered in this subsection shall conform to the applicable performance standards of this chapter and chs. SPS 382 and 383.

(6) FAUCETS, SPOUTS AND FIXTURE SUPPLY CONNECTORS. (a) Except for circular and semi−circular wash fountains, all faucets and showerheads shall conform to ASME A112.18.1 or CAN/ CSA B125.

(b) Circular and semi−circular wash fountains shall conform to the working pressure, burst pressure, discharge rate and product marking requirements of ASME A112.18.1 or CAN/CSA B125.

(c) Flexible fixture supply connectors shall conform to ASME A112.18.6-2017/CSA B125.6-17 and all of the following:

1. Be installed only in locations accessible for service and replacement pursuant to s. SPS 381.01 (2).
2. Be permanently and legibly marked with the following information:
a. Manufacturer’s name or trademark.
b. “For use with water in accessible locations only.” This requirement is not applicable to flexible connectors integral to an ASME A112.8.1/CSA B125.1 compliant faucet.
c. Flexible connectors intended only for cold water applications shall include “Only for use with cold water.” This requirement is not applicable to flexible connectors integral to an ASME A112.8.1/CSA B125.1 compliant fixture.

(d) Hand−held showers, faucets, and fixture fittings with integral backflow protection hose connection outlets shall conform to ASME 112.18.1/CSA B125.1 or shall have an ASME A112.18.3 backflow prevention device.

EXAM QUESTIONS

28. _____ sinks shall conform to ANSI Z124.6.
    a. Enameled cast iron
    b. Vitreous china
    c. Plastic
    d. Stainless steel

29. True or false? Automatic siphon urinal flush tanks may be installed.
    a. True
    b. False

30. Water closets provided in _____ may be of a round−bowl type, with a hinged, closed front seat with or without a seat or cover.
    a. Day care centers
    b. Individual living units
    c. Sleeping units of residential occupancies
    d. All of the above

31. Water heaters shall be accessible for what purpose?
    a. Inspection
    b. Service/Maintenance
    c. Replacement
    d. All of the above

32. The initial temperature of water from tankless type water heaters installed for one- and 2-family swelling use shall be less than or equal to _____.
    a. 125 °F
    b. 200 °F
    c. 210 °F
    d. 212 °F

33. Except as specified in subd. 4., water treatment compounds introduced into the water supply system by a water treatment device shall be listed as an acceptable drinking water additive by a listing agency approved by the department. Listing agencies approve by the department shall include:
    a. United States Department of Agriculture
    b. National Sanitation Foundation
    c. General Services Administration
    d. None of the above

34. Water treatment devices designed for contaminated water supplies shall be labeled to identify the following information:
    a. The name of the manufacturer of the device
    b. The device's trade name
    c. The device's model number
    d. All of the above

35. Hand−held showers, faucets, and fixture fittings with integral backflow protection hose connection outlets shall conform to _____ or shall have an ASME A112.18.3 backflow prevention device.
    a. ASME A112.18.1/CSA B125.1
    b. ASTM F402

c. ASSE 1014
d. ASSE 1022

SPS 384.25 POWTS holding components or treatment components. (1) GENERAL. All POWTS holding components or treatment components shall conform to the requirements of this section.

(2) WATER TIGHTNESS. (a) *General*. Tank assemblies, including fittings and access openings, shall be manufactured to be water tight as required under this subsection.

(b) *Concrete tanks.* 1. Where concrete tanks are required to have covers, the tanks shall meet one of the following requirements:

a. Withstand a vacuum of at least 2 inches of mercury for 60 minutes, without loss of pressure.
b. Hold water for one hour, without leakage after the tank has been filled with water to the top of the cover and let stand for 24 hours, then refilled to the top of the cover.

2. Concrete tanks that are not required to have a cover shall hold water for one hour, without leakage after the tank has been filled with water and let stand for 24 hours, then refilled to the highest liquid level required to be held in the tank.

(c) *Steel tanks.* 1. Steel tanks that are required to have a cover shall be capable of withstanding one of the following requirements:

a. An internal air pressure of at least 5 psig for 15 minutes, without loss of pressure.
b. An internal water pressure of at least 5 psig for 60 minutes, without loss of pressure.

2. Steel tanks that are not required to have a cover shall be capable of holding water after being filled to their inlet or outlet, whichever is higher, for 24 hours without loss of water.

(d) *Tanks constructed of materials other than concrete or steel.* 1. Tanks constructed of materials other than concrete or steel that are required to have a cover shall be capable of withstanding one of the following requirements:

a. A vacuum of at least 2 inches of mercury for 60 minutes, without loss of pressure.
b. An internal air pressure of at least 5 psig for 15 minutes, without loss of pressure.
c. An internal water pressure of at least 5 psig for 60 minutes, without loss of pressure.

2. Tanks constructed of materials other than concrete or steel that are not required to have a cover shall be capable of holding water after being filled to their inlet or outlet, whichever is higher, for one hour without loss of water.

(3) STRENGTH. Tank assemblies, including fittings and access openings, shall be capable of withstanding loads and pressures that the tanks are intended to encounter and remain watertight.

(4) PROTECTION FROM ELEMENTS. (a) *Concrete tanks.* 1. The interior of a concrete tank assembly, including fittings and access openings, shall have a protective coating or be constructed of material, above the lowest liquid level expected in the tank, that will inhibit the deterioration of the concrete due to internal environmental effects.

2. Under subd. 1., concrete with a water cement ratio not exceeding 0.45 shall be considered resistant to deterioration due to internal environmental effects.

(b) *Steel tanks.* 1. Steel tank assemblies, including fittings and access openings, shall have a protective coating that will inhibit the deterioration of the steel due to internal and external environ-mental effects.

2. Steel tank assemblies, including fittings and access openings, installed underground shall be provided with cathodic protection in accordance with UL Standard 1746 or STI−P 3.

(c) *Tanks constructed of materials other than concrete or steel.* Tank assemblies, including fittings and access openings, constructed of materials other than concrete or steel shall be protected against deterioration due to internal and external environmental effects.

(5) VENTING. (a) Each tank, except camping unit transfer containers, shall be provided with a means of venting gases formed inside of the tank to the atmosphere.

(b) The tank vent shall terminate in accordance with s. SPS 382.31 (16).

(6) PIPE CONNECTION. All pipe connection openings to a tank shall be designed to allow connections in accordance with s. SPS 384.40.

EXAM QUESTIONS

36. True or false? Steel tanks that are not required to have a cover shall be capable of holding water after being filled to their inlet or outlet, whichever is higher, for 24 hours without loss of water.
    a. True
    b. False

37. For concrete tanks, Under subd. 1., concrete with a water cement ratio not exceeding _____ shall be considered resistant to deterioration due to internal environmental effects.
    a. 0.15
    b. 0.20
    c. 0.30
    d. 0.45

38. Camping unit transfer containers do not need to be provided with a means of venting gases formed inside of the tank to the atmosphere.
    a. True
    b. False

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(7) ACCESS. (a) Each covered tank shall be provided with one or more openings of sufficient size and located in such a manner to provide a means for inspection or required servicing or maintenance of the tank.

(b) Manhole openings shall be at least 23 inches in the least dimension.

(c) Anaerobic treatment tanks located below ground shall have a manhole opening over the inlet of the most upstream compartment, in each compartment, and over all treatment apparatuses and pumps.

(d) 1. Except as provided in subd. 2., manhole openings for anaerobic treatment tanks located below ground shall extend to a distance not greater than 6 inches below finished grade.

2. Manhole openings over all anaerobic treatment apparatuses and pumps shall extend to at least 4 inches above finished grade.

(e) Servicing and maintenance openings for holding components shall comply with all of the following:

1. Extend to at least 4 inches above finished grade.
2. Be at least 23 inches in the least dimension and be located above pumps or siphons located in the holding component.

(f) Inspection openings for tanks located below ground shall extend at least to the finished grade.

(g) Inspection, servicing and maintenance openings shall terminate with a means that prevents entrance of deleterious materials.

(h) Covers located at or above ground for openings larger than 8 inches in diameter shall be provided with locking devices or other effective measures to prevent unauthorized access.

(8) WARNING LABEL. (a) Covers for all tank openings larger than 8 inches in diameter shall be provided with a permanent warning label indicating the dangers of entering the tank, in accordance with this subsection.

(b) The warning label shall be securely attached and made of a noncorrosive metal or plastic bearing the legend 'DO NOT ENTER WITHOUT PROPER EQUIPMENT' or 'DANGEROUS GASES EXIST IN TANK' or similar language.

(c) The label shall be rectangular in shape with minimum dimensions of 4 by 5 inches.

(d) The wording on the label shall be a minimum of ½ inch in height and be either indented or raised.

(9) DOSING APPARATUS. (a) Pumps for POWTS used to disperse air, treated wastewater or final effluent shall be rated by the pump manufacturer for such use.

(b) Siphons for POWTS shall be rated by the siphon manufacturer for wastewater use.

(c) All other dosing apparatus for POWTS shall be constructed of corrosive resistant materials and designed to perform as intended.

(10) ALARM SYSTEM. All pump and alarm controls for POWTS shall be specifically designed by the manufacturer for such use.

(11) TANK LABEL. (a) *Anaerobic treatment tanks.* Each treatment tank which has an anaerobic treatment compartment shall be labeled with a permanent label located near an inlet or outlet opening of the tank. The label shall be embossed, impressed, or securely attached to the tank. The label shall include all of the following information:

1. Name or trademark of the manufacturer.
2. Capacity of each compartment of the tank or the manufacturer's model number.

(b) *Aerobic treatment tanks.* 1. Each aerobic treatment tank complying with NSF Standard 40 and listed by a nationally recognized ANSI accredited third party certified listing agency acceptable to the department shall be provided with 2 label plates. The labels shall conform with all of the following:

a. Label plates shall be inscribed to be easily read and understood, and be securely attached.
b. One label plate shall be attached to the front of the electrical control box and the second label plate shall be attached to the aeration equipment assembly, tank, or riser at a location normally subject to access during inspection of the unit.
c. Each label plate shall include name or trademark of the manufacturer, model number, and rated daily flow capacity of the unit.

(c) *Other treatment, holding and combination treatment−holding tanks.* Except as required in par. (a) or (b), each treatment tank and holding tank shall be labeled with a permanent label located near an inlet or outlet opening. The label shall be embossed, impressed, or securely attached to the tank. The label shall include all of the following information:

1. Name or trademark of the manufacturer.
2. Capacity of each compartment of the tank or the manufacturer's model number.

(12) OTHER TREATMENT COMPONENTS. A treatment component not specifically covered in this section may not be sold for use in a POWTS or may not be installed in a POWTS, unless it has received department approval and conforms to the applicable performance standards of this chapter and chs. SPS 382 and 383, and ch. 145, Stats.

EXAM QUESTIONS

39. Manhole openings shall be at least ___ inches in the least dimension.
    a. 23
    b. 24
    c. 25
    d. 26

40. Manhole covers located at or above ground for openings larger than ___ inches in diameter shall be provided with locking devices or other effective measures to prevent unauthorized access.
    a. 2
    b. 4
    c. 6
    d. 8

41. The warning label for a tank shall be _____ in shape with minimum dimensions of 4 by 5 inches.
    a. Circular
    b. Triangular
    c. Rectangular
    d. Any of the above

42. Each aerobic treatment tank complying with NSF Standard 40 and listed by a nationally recognized ANSI accredited third party certified listing agency acceptable to the department shall be provided with ___ label plate(s).
    a. 1
    b. 2

c. 3
d. 4

43. The label shall be embossed, impressed, or securely attached to the tank, and shall include the name of the manufacture and the _____.
    a. Company's phone number
    b. Company's address
    c. Manufacturer's model number
    d. All of the above

SPS 384.30 Plumbing materials. (1) GENERAL. When designing a plumbing system, due consideration shall be given to sizing, working pressure, temperature and material, compatibility of a plumbing system with the water and wastewater to be conveyed, and the environment in which the plumbing system is to be installed.

(2) SANITARY DRAIN AND VENT SYSTEMS AND POWTS INSPECTION AND OBSERVATION PIPING. Sanitary drain systems and vent systems and POWTS inspection and observation piping shall be of such material and workmanship as set forth in this subsection.

(a) *Above ground drain and vent pipe.* Except as provided in s. SPS 382.33 (2), drain pipe and vent pipe installed above ground shall conform to one of the standards listed in Table 384.30−1.

(b) *Underground drain and vent pipe.* Except as provided in par. (d), drain pipe and vent pipe installed underground shall con-form to one of the standards listed in Table 384.30−2.

(c) *Sanitary building sewer pipe.* Sanitary building sewer pipe shall conform to one of the standards listed in Table 384.30−3.

(d) *Treated wastewater piping.* 1. Nonpressurized, nonperforated drain piping conveying treated wastewater from a POWTS treatment or holding component to a POWTS treatment or holding component, distribution cell or dispersal zone shall conform to one of the standards listed in Table 384.30−3.

2. Nonpressurized perforated drain piping conveying treated wastewater in a POWTS soil treatment or dispersal component shall conform to one of the standards listed in Table 384.30−4.

3. Pressurized perforated drain piping conveying treated wastewater in a POWTS treatment or dispersal component shall conform to one of the standards listed in Table 384.30−5 and shall be perforated in accordance with the POWTS design.

(e) *Pressurized drain pipe.* Except as provided in par. (d) 3., pressurized drain pipe shall conform to one of the standards listed in Table 384.30−5 and shall be rated for the working pressure and temperature to which it will be subjected for a specific installation.

(f) *Chemical drain and vent pipe.* Drain systems and vent systems for chemical wastes shall be of approved corrosion resistant material. The manufacturer of the pipe shall indicate to the department the material's suitability for the concentrations of chemicals involved.

(g) *Catch basins, interceptors and sumps.* Catch basins, interceptors and sumps shall be constructed in a watertight manner of precast reinforced concrete, reinforced monolithic concrete, cast iron, coated 12−gauge steel, vitrified clay, fiberglass, plastic or other approved materials.

(h) *Manholes.* Manholes shall be constructed in a watertight manner of precast reinforced concrete, reinforced monolithic concrete, brick or block, fiberglass or other approved materials. Fiberglass manholes may be approved for use in traffic areas if the top section of the manhole is not made of fiberglass.

(i) *Service suction lines.* A service suction line or pump dis-charge line serving a holding tank for cleaning purposes shall con-form to one of the standards listed in Table 384.30−5. Joints and connections for suction lines shall conform to s. SPS 384.40. The use of mechanical joints shall be in accordance with the recommendations and instructions specified by the manufacturer.

(j) *POWTS inspection and observation pipe.* A POWTS inspection and observation pipe shall conform to at least one of the standards listed in Table 384.30−1.

Table 384.30−1
ABOVE GROUND DRAIN AND VENT PIPE AND TUBING

Material	**Standard**
Acrylonitrile butadiene styrene (ABS)	ASTM D1527; ASTM D2661;
Acrylonitrile butadiene styrene (ABS) coextruded	ASTM F628
Brass	ASTM B43
Cast iron	ASTM A74; ASTM A888; CISPI 301
Copper	ASTM B42; ASTM B88; ASTM B306
Ductile Iron	AWWA C115/A21.15; AWWA C151/A21.51
Galvanized steel	ASTM A53
Polyethylene (PE)	ASTM F1901
Polypropylene	ASTM F1412
Polyvinyl chloride (PVC)	ASTM D2665; ASTM D1785; ASTM F891[b]; AWWA C900
Polyvinylidene fluoride (PVDF)	ASTM F1673
Stainless steel (316L)	ASME A112.3.1; ASME B36.19 / B36.19M; ASTM A269/A269M; ASTM A312/A312M; ASTM A450/A450M; ASTM A778/A778M; AWWA C220
Stainless steel (304)	ASME A112.3.1; ASME B36.19 / B36.19M; ASTM A269/A269M; ASTM A312/A312M; ASTM A450/A450M; ASTM A778/A778M; AWWA C220
Synthetic rubber hose[a]	AHAM DW−1

Table 384.30−2
UNDERGROUND DRAIN AND VENT PIPE AND TUBING

Material	Standard
Acrylonitrile butadiene styrene (ABS)	ASTM D1527; ASTM D2661; ASTM F628
Acrylonitrile butadiene styrene (ABS) coextruded	ASTM F628
Brass	ASTM B43
Cast iron	ASTM A74; ASTM A888; CISPI 301
Chlorinated Poly Vinyl Chloride (CPVC)[d]	ASTM D2846/D2846M; ASTM F441/F441M; ASTM F442/F442M; ASTM F2618
Copper[a]	ASTM B42; ASTM B88
Ductile iron	AWWA C115/A21.15; AWWA C151/A21.51
Polyvinyl chloride (PVC)	ASTM D1785; ASTM D2665; ASTM D3034[b]; ASTM F891[c] AWWA C900
Stainless steel[d]	ASME A112.3.1; ASME B36.19 / B36.19M; ASTM A269/A269M; ASTM A312/A312M; ASTM A450/A450M; ASTM A778/A778M; AWWA C220

a. Copper tubing, type M, may not be installed underground.
b. Limited to pipe with a SDR of 26 or less.
c. Limited to pipe weight of schedule 40.
d. Type 304 may not be installed underground.

Table 384.30−3
SANITARY BUILDING SEWER PIPE AND TUBING

Material	Standard
Acrylonitrile butadiene styrene (ABS)[a]	ASTMD1527; ASTM D2661; ASTM D2751
Acrylonitrile butadiene styrene (ABS) coextruded	ASTM F628
Acrylonitrile butadiene styrene (ABS) composite[a]	ASTM D2680
Brass	ASTM B43
Cast iron	ASTM A74; ASTM A888; CISPI 301
Chlorinated polyvinyl chloride (CPVC)[c]	ASTM F441/F441M; ASTM F442/F442M; ASTM F2618; ASTM D2846
Concrete	ASTM C14; ASTM C76
Copper[b]	ASTM B42; ASTM B88
Ductile iron	AWWA C115/A21.15; AWWA C151/A21.51
Polyethylene (PE)	ASTM F714; ASTM F894; ASTM F2763/F2763M
Polyvinyl chloride (PVC)[a]	ASTM D1785; ASTM D2665; ASTM D2729;

	ASTM D3034; ASTM F794; ASTM F891; ANSI/AWWA C900
Polypropylene (PP)	ASTM F1412; ASTM F2764/F2764M
PVC Corrugated Sewer Pipe With a Smooth Interior and Fittings[a]	ASTM F949
PVC Large−Diameter Plastic Gravity Sewer Pipe and Fittings[a]	ASTM F679
PVC Profile Gravity Sewer Pipe and Fittings Based on Controlled Inside Diameter[a]	ASTM F794
Type PS−46 and Type PS−1 15 PVC Plastic Gravity Flow Sewer Pipe and Fittings[a]	ASTM F789
Stainless steel (316L)	ASME A112.3.1; ASME B36.19 / B36.19M; ASTM A269/A269M; ASTM A312/A312M; ASTM A450/A450M; ASTM A778/A778M; AWWA C220
Vitrified clay (extra strength)	ASTM C700

a. Thermoplastic sewer pipe shall be installed in accordance with ASTM D2321.
b. Copper tubing, type M, may not be installed underground.

Table 384.30−4
PERFORATED EFFLUENT DISTRIBUTION PIPING FOR NONPRESSURIZED SOIL ABSORPTION SYSTEMS

Material	Standard
Acrylonitrile butadiene styrene (ABS)	ASTM D1527; ASTM D2661; ASTM D2751
Acrylonitrile butadiene styrene (ABS) coextruded	ASTM F628
Acrylonitrile butadiene styrene (ABS) composite	ASTM D2680
Brass	ASTM B43
Cast iron	ASTM A74; ASTM A888; CISPI 301
Chlorinated polyvinyl chloride (CPVC)	ASTM F2618
Ductile iron	AWWA C115/A21.51; AWWA C151/A21.15
Polyethylene (PE)[a]	ASTM F667/F667M; ASTM F810
Polyvinyl chloride (PVC)[a]	ASTM D2729; ASTM D3034; ASTM F891
Vitrified clay (extra	ASTM C4; ASTM C700

a. The pipe shall have 2 rows, and only 2 rows, of perforations parallel to the axis of the pipe and 120_ + 5_ apart. The perforations shall be at the nominal 4 and 8 o'clock positions when the pipe is installed

Table 384.30−5
PRESSURIZED DRAIN PIPE AND TUBING AND SERVICE SUCTION LINES

Material	Standard
Acrylonitrile butadiene styrene (ABS)[a]	ASTM D1527; ASTM D2661;

Acrylonitrile butadiene (ABS)[a] coextruded	ASTM F628
Brass	ASTM B43
Chlorinated Poly (Vinyl Chloride) (CPVC)[a]	ASTM D2846; ASTM F441/F441M; ASTM F442/F442M
Concrete	ASTM C14; ASTM C76
Copper[b]	ASTM B42; ASTM B88; ASTM B306
Ductile iron	AWWA C115/A21.15; AWWA C151/A21.51
Galvanized steel	ASTM A53
Polyethylene Pressure Pipe and Fitting, 4 in. through 63 in., for Water Distribution	AWWA C906
Polyethylene (PE) Pressure Pipe and Tubing, 1/2 in. through 3 in.	AWWA C901
Polyvinyl chloride (PVC)[a]	ASTM D1785; ASTM D2241; ASTM D2665; AWWA C900
Stainless Steel (316L)	ASME A112.3.1; ANSI B36.19M; ASTM A269; A312/A312M; ASTM A450; ASTM A778/778M; AWWA C220

a. Thermoplastic sewer pipe shall be installed in accordance with ASTM D2774.
b. Copper tubing, type M, may not be installed underground.

EXAM QUESTIONS

44. True or false? When designing a plumbing system, no consideration should be given to the environment in which the plumbing system is to be installed.
    a. True
    b. False

45. _____ shall be constructed in a watertight manner of precast reinforced concrete, reinforced monolithic concrete, cast iron, coated 12−gauge steel, vitrified clay, fiberglass, plastic or other approved materials.
    a. Catch basins
    b. Interceptors
    c. Sumps
    d. All of the above

46._____ is the standard for Brass, with regards to Above Ground Drain and Vent Pipe and Tubing.
    a. ASTM D1527
    b. ASTM A53
    c. ASTM B43
    d. AHAM DW–1

47.Copper, with regards to Underground Drain and Vent Pipe and Tubing, is governed by standard _____.
    a. ASTM D2680
    b. ASTM B42; ASTM B88
    c. ASTM F949; ASTM F679
    d. AWWA C906

48. True or false? Acrylonitrile butadiene styrene (ABS) composite complies by standard ASTM D2680 with regard to Table 384.30–3.
    a. True
    b. False

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(3) STORM AND CLEAR WATER DRAIN AND VENT SYSTEMS. Storm and clear water drain and vent systems shall be of such material and workmanship as set forth in this subsection.

(a) *Above ground drain and vent pipe.* Drain pipe and vent pipe installed above ground and inside a building shall conform to one of the standards listed in Table 384.30−1, except black steel pipe conforming to ASTM A53 may be used for storm water conductors. Black steel conductors may not be embedded in concrete or masonry.

(b) *Underground drain and vent pipe.* Drain pipe and vent pipe installed underground shall conform to one of the standards listed in Table 384.30−2.

(c) *Storm building sewer pipe.* Storm building sewer pipe shall conform to one of the standards listed in Table 384.30−6.

(d) *Subsoil drain pipe.* Subsoil drains shall be open jointed, horizontally split, or perforated pipe conforming to one of the standards listed in Table 384.30−7.

(e) *Roof drains.* 1. Roof drains shall be provided with removable strainers of sufficient strength to carry the anticipated loads.

2. Roof drains shall be so constructed that the drains can be cleaned and the drain inlets accessible at all time.

3. Roof drains shall be sized in accordance with s. SPS 382.36 and the drain outlet shall not be less than $2^1/_2$ inches in diameter.

(f) *Area drain inlets.* Area drain inlets shall be constructed in a watertight manner of precast concrete, reinforced monolithic concrete, brick or block, cast iron, coated 12 gauge steel, vitrified clay, fiberglass or other approved materials.

Table 384.30−6
STORM BUILDING SEWER PIPE AND TUBING

Material	Standard
Acrylonitrile butadiene styrene (ABS)[a]	ASTM D1527; ASTM D2661; ASTM D2751
Acrylonitrile butadiene styrene (ABS)[a] coextruded	ASTM F628
Acrylonitrile butadiene styrene (ABS)[a] composite	ASTM D2680
Brass	ASTM B43
Cast iron	ASTM A74; ASTM A888; CISPI 301
Chlorinated polyvinyl chloride (CPVC)	ASTM F2618
Concrete, circular	ASTM C14; ASTM C76
Concrete, elliptical	ASTM C507/C507M
Copper[b]	ASTM B42; ASTM B88
Ductile iron	AWWA C115/A21.15; AWWA C151/A21.15
Polyethylene (PE)	ASTM F714; ASTM F2763/F2763M
Polypropylene (PP)	ASTM F1412; ASTM F2764/F2764M; ASTM F2881/F2881M
Polyvinyl chloride (PVC)[a]	ASTM D1785; ASTM D2665; ASTM D3034; ASTM F891
PVC Corrugated Sewer Pipe With a Smooth Interior and Fittings	ASTM F949
PVC Large−Diameter Plastic Gravity Sewer Pipe and Fittings	ASTM F679
PVC Profile Gravity Sewer Pipe and Fittings Based on Controlled Inside Diameter	ASTM F794
Stainless steel (316L)	ASME A112.3.1; ASME B36.19 / B36.19M; ASTM A269/A269M; ASTM A312/A312M; ASTM A450/A450M; ASTM A778/A778M; AWWA C220
Type PS−46 and Type PS−1 15 PVC Plastic Gravity Flow Sewer Pipe and Fittings	ASTM F789
Vitrified clay	ASTM C700

a. Thermoplastic sewer pipe shall be installed in accordance with ASTM D2774.
b. Copper tubing, type M, may not be installed underground

(4) WATER SUPPLY SYSTEMS. Water supply systems shall be of such material and workmanship as set forth in this subsection. All materials in contact with water, in a water supply system, shall be suitable for use with the water within the system. All pipes and pipe fittings for water supply systems shall be made of a material that contains a weighted average of not more than 0.25 percent
lead in the wetted surface material.

(a) *Water quality.* A water supply system shall be resistive to corrosive action and degrading action from the water being conveyed. Potable water storage tanks shall conform to s. NR 812.33.

(b) *Soil and groundwater.* The installation of water supply systems shall be prohibited in soil and groundwater that is contaminated with solvents, fuels, organic compounds or other detrimental materials which will cause permeation, corrosion, degradation, or structural failure of the piping material.

1. Where detrimental conditions are suspected, a chemical analysis of the soil and groundwater conditions shall be required to ascertain the acceptability of the proposed water supply system materials for the specific installation.

2. Where a detrimental condition exists, no underground water supply system may be installed until the detrimental condition can be:

a. Eliminated and the source of the condition can be eliminated;
b. Identified and the pipe and joining method can be proven resistant to the detrimental condition; or
c. Avoided by choosing an alternate route that will not be affected by the detrimental condition.

(c) *Certification of plastic pipe.* Plastic pipe for a water supply system shall be certified for potable water contact by a nationally recognized listing agency acceptable to the department. **Note:** For a listing of nationally recognized agencies acceptable to the department,
see ch. SPS 384 Appendix A−384.11.

(d) *Water services and private water mains.* 1. Water service pipe and private water mains shall conform to one of the standards listed in Table 384.30−7. Pipe and tubing for water services and private water mains shall have a minimum working pressure of 150 psig at 73.4_F.

2. A local governmental unit may by ordinance restrict the types of materials for water services and private water mains which are to be located within or beneath an area subject to an easement for a highway, street or public service right−of−way. Before adopting an ordinance restricting the types of materials for water services, the local governmental unit shall submit a copy of the proposed ordinance to the department for review and approval.

3. Materials for combination water services and combination private water mains shall comply with NFPA 24 and the provisions specified in par. (d).

(e) *Water distribution pipe.* 1. Except as provided in subd. 2. or 3., water distribution pipe shall have a minimum working pressure of 100 psig at 180_F and shall conform to one of the standards listed in Table 384.30−8

2. Cold water distribution pipe installed underground shall have a minimum working pressure of 150 psig at 73.4_F and shall conform to one of the standards listed in Table 384.30−7 or 384.30−8.
Note: Portions of a water supply system that supply water to a water−based fire
protection system are to also conform to chs. SPS 361 to 365.
Note: See ch. SPS 384 Appendix for further explanation. 3. Pipe and tubing for cold water distribution systems downstream of water treatment devices designed to serve fixtures, appliances and devices that provide <1 gpm

at each outlet shall conform to one of the standards listed in Table 384.30−8 or 384.30−11, and shall have a minimum working pressure of 100 psig at 73.4_F.

4. Plastic pipe and tubing for water distribution systems downstream of water treatment devices designed to serve fixtures, appliances and devices that provide <1 gpm at each outlet shall be marked at intervals not to exceed 4 feet with the following information:

a. The manufacturer's name.
b. The trade designation of the pipe or tubing.
c. The type of material.
d. The minimum working temperature and pressure of the pipe or tubing.
e. The mark of the certifying agency.

(f) *Used piping.* Piping which has been used for any other purpose than conveying potable water may not be used for water supply systems.

Table 384.30−7
PIPE AND TUBING FOR WATER SERVICES AND PRIVATE WATER MAINS

Material	**Standard**
Acrylonitrile butadiene styrene (ABS)	ASTM D1527; ASTM D2282
Brass	ASTM B43
Chlorinated Poly (Vinyl Chloride) (CPVC)[a]	ASTM D2846; ASTM F441/F441M; ASTM F442/F442M
Chlorinated polyvinyl chloride composite (CPVC/Al/ CPVC)	ASTM F2855
Copper[b,c]	ASTM B42; ASTM B75; ASTM B88; ASTM B135; ASTM B251; ASTM B302; ASTM B447
Crosslinked Polyethylene/ Aluminum/Crosslinked Polyethylene (PEX/A1/PEX)	CAN/CSA B137.10; ASTM F1281
Crosslinked polyethylene (PEX)	ASTM F876; ASTM F877; AWWA C904
Ductile iron	AWWA C115/A21.15; AWWA C151/A21.51
Galvanized steel	ASTM A53
Polyethylene (PE)[a]	ASTM D2239; ASTM D2737; ASTM D2104; ASTM D2447; ASTM D3035; AWWA C906; AWWA C901
Polyethylene/Aluminum/Polyethylene	CAN/CSA B137.9
Polyethylene/Aluminum/ Polyethylene (PE−AL−PE) Composite Pressure Pipe	ASTM F1282
Polyethylene raised temperature (PE−RT)	ASTM F2769
Polyethylene raised temperature/al/polyethylene	ASTM F3346

raised temperature (PE−RT/Al/PE−RT)	
Polypropylene (PP−RCT)	ASTM F2389
Polyvinyl chloride (PVC)	ASTM D1785; ASTM D2241; AWWA C900
Stainless steel (316L)	ASME B36.19/B36.19M; ASTM A269; ASTM A270; ASTM A312; ASTM A358/A358M; ASTM A450; ASTM A554; ASTM A778/A778M

a. Plastic water service systems shall be installed in accordance with ASTM D2774.
b. Copper tubing, type M, may not be installed underground.
c. Copper pipe or tubing shall not be installed if the pH of the water to be conveyed is 6.5 or less.
d. May not be threaded.

Table 384.30−8
WATER DISTRIBUTION PIPE AND TUBING

Material	Standard
Brass	ASTM B43
Cast iron	AWWA C115/A21.15
Chlorinated Poly (Vinyl Chloride) (CPVC)[a]	ASTM D2846; ASTM F441/441[c]; ASTM F442/442M[d]
Chlorinated polyvinyl chloride composite (CPVC/Al/CPVC)	ASTM F2855
Copper[b,c]	ASTM B42; ASTM B75; ASTM B88; ASTM B135; ASTM B251; ASTM B302; ASTM B447
Crosslinked Polyethylene/ Aluminum/Crosslinked Polyethylene	CAN/CSA B137.10; ASTM F1281
Crosslinked polyethylene (PEX)[a]	ASTM F876; ASTM F877; AWWA C904
Ductile iron	AWWA C115/A21.15; AWWA C151//A21.51
Galvanized steel	ASTM A53
Polyethylene/Aluminum/Polyethylene	CAN/CSA B137.9
Polyethylene/Aluminum/ Polyethylene (PE−AL−PE) Composite Pressure Pipe	ASTM F1282
Stainless Steel (316L)	ASME B36.19M; ASTM A269; ASTM A270; ASTM A312; ASTM A358/A358M; ASTM A450; ASTM A554; ASTM A778/A778M

a. Plastic pipe and tubing installed underground shall be in accordance with ASTM D2774.
b. Copper tubing, type M, may not be installed underground.
c. Use is limited to pipe 21/2 inches or less in diameter for sch 80 and 1 inch or less in diameter for sch 40.
d. Use is limited to pipe with a SDR 11 or less.
e. Copper pipe or tubing shall not be installed if the pH of the water to be conveyed is 6.5 or less.
f. Use is limited to cold water distribution only.
g. May not be threaded.

EXAM QUESTIONS

49. True or false? In an above ground drain and vent pipe, black steel conductors may not be embedded in concrete or masonry.
    a. True
    b. False

50. Roof drains shall be sized in accordance with s. SPS 382.36 and the drain outlet shall not be less than _____ inches in diameter.
    a. 2 1/2
    b. 3
    c. $3^1/_2$
    d. 4

51. According to Table 384.30 6, the standard for PVC Profile Gravity Sewer Pipe and Fittings Based on Controlled Inside Diameter is _____.
    a. ASTM F494
    b. ASTM F679
    c. ASTM F794
    d. ASTM D2680

52. All pipes and pipe fittings for water supply systems shall be made of a material that contains a weighted average of not more than _____ percent [lead] in the wetted surface material.
    a. 0.10
    b. 0.15
    c. 0.20
    d. 0.25

53. Pipe and tubing for water services and private water mains shall have a minimum working pressure of ___ psig at 73.4ºF.
    a. 150
    b. 200
    c. 250
    d. 300

54. Pipe and tubing for cold water distribution systems downstream of water treatment devices designed to serve fixtures, appliances and devices that provide <1 gpm at each outlet shall have a minimum working pressure of ___ psig at 73.4ºF.
    a. 100
    b. 150
    c. 200
    d. 250

(5) PIPE FITTINGS AND VALVES. (a) *Fittings.* Pipe fittings shall conform to the pipe material standards listed in this chapter or one of the standards listed in Table 384.30−10. Threaded drain pipe fittings shall be of the recessed drainage type.

(b) *Water supply valves.* 1. Control valves for water services and private water mains shall be designed and constructed to withstand a minimum pressure of 125 psig at 73.4ºF.

2. Control valves for water distribution systems shall be designed and constructed to withstand a minimum pressure of 100 psig at 180ºF.

3. Except for a valve integral to a device, a control valve which serves 2 or more plumbing fixtures shall have, with the valve in a fully open position, a flow through passageway of not less than one nominal pipe size smaller than the nominal size of the piping connecting to the valve.

4. A control valve which serves 2 or more plumbing fixtures may not be a globe type valve.

(c) *Special fittings and valves.* 1. Water hammer arrestors shall conform to ASME A112.26.1 or ASSE 1010.

2. Relief valves and automatic gas shutoff devices for hot water supply systems shall conform to ANSI Z21.22.

3. Backwater valves shall conform to ASME A112.14.1, CAN/CSA B181.1 or CAN/CSA B181.2.

4. Pipe applied atmospheric type vacuum breakers shall conform to ASSE 1001, and CAN/CSA B64.1.1.

5. Water pressure reducing valves and strainers for water pressure reducing valves for domestic water supply systems shall conform to ASSE 1003.

6. Hose connection vacuum breakers shall conform to ASSE 1011 or CAN/CSA B64.2.

7. Backflow preventers with intermediate atmospheric vent shall conform to ASSE 1012 and dual check type atmospheric port backflow preventers shall conform to CAN/CSA B64.3.

8. Reduced pressure backflow preventers and reduced pressure fire protection principle backflow preventers, or backflow preventers, reduced pressure principle type (RP) shall conform with ASSE 1013 or CAN/CSA B64.4.

9. Double check backflow prevention assemblies shall con-form to ASSE 1015 or CAN/CSA B64.5.

10. Individual thermostatic, pressure balancing, and combination pressure balancing and thermostatic control valves serving individual showers shall conform to ASSE 1016 or CAN/CSA B125.

11. Trap seal primer valves, water fed shall conform to ASSE 1018.

12. Vacuum breaker wall hydrants, freeze resistant automatic draining type shall conform to ASSE 1019, types A, B, or C.

13. Pressure vacuum breaker assemblies shall conform to ASSE 1020 or CAN/CSA B64.1.2.

14. Laboratory faucet backflow preventers shall conform to ASSE 1035 and laboratory faucet type vacuum breakers shall con-form to CAN/CSA B64.7.

15. Reduced pressure detector fire protection, backflow prevention assemblies shall conform to ASSE 1047.

16. Double check detector assembly backflow preventers shall conform to ASSE 1048.

17. Back siphonage backflow vacuum breakers shall conform to ASSE 1056.

18. Hose connection backflow preventers shall conform to ASSE 1052.

19. Backflow preventers for carbonated beverage machines shall conform to ASSE 1022.

20. Dual check backflow preventers in freeze resistant types of wall hydrants shall conform to ASSE 1053.

21. Trap seal primer valves, drainage and electric types, shall conform to ASSE 1044

(d) *Pipe saddles.* Pipe saddles shall be installed in accordance with the instructions of the saddle manufacturer and conform to all of the following limitations:

1. Pipe saddles may be installed on private interceptor main sewers, building sewers, underground drain and vent pipe and tubing, and where otherwise approved by the department.
2. A saddle for drain piping shall have a radius in accordance with s. SPS 382.30 (8) (a).
3. The material of the saddle shall be compatible with the materials of the pipes which are to be connected to the saddle.
4. The hole in the pipe which is to receive the saddle shall be drilled or cored to match the saddle outlet.
5. Straps or clamps which wrap around the pipe and saddle shall be provided by the manufacturer of the saddle.
6. Saddles shall be installed with straps or clamps which wrap around the pipe and saddle.
7. Proper hangers or bedding shall be provided to maintain alignment between the opening in the pipe and the saddle.

EXAM QUESTIONS

55. True or False? In regards to pipe fittings, Threaded drain pipe fittings shall be of the recessed drainage type.
    a. True
    b. False

56. Control valves for water services and private water mains shall be designed and constructed to withstand a minimum pressure of ___ psig at 73.4ºF.
    a. 125
    b. 150
    c. 175
    d. 200

57. True or false? A control valve which serves 2 or more plumbing fixtures may not be a globe type valve.
    a. True
    b. False

58. True or false? Vacuum breaker wall hydrants, freeze resistant automatic draining type shall conform to ASSE 1019, only type A.
    a. True

b. False

59. Reduced pressure detector fire protection, backflow prevention assemblies shall conform to _____.
a. ASTM F1281
b. AWWA C900
c. ASSE 1022
d. ASSE 1047

60. Backflow preventers for carbonated beverage machines shall conform to _____.
a. ASTM F1281
b. AWWA C900
c. ASSE 1022
d. CAN/CSA B 137.9

Table 384.30−11
Pipe And Tubing For Water Distribution Systems Downstream Of Treatment Devices Designed To Serve Fixtures, Appliances And Devices That Provide ≤1 Gpm At Each Outlet

Material	Standard
Copper[b,c]	ASTM B42; ASTM B88
Polyethylene (PE)[a]	NSF 51; NSF 61
Polypropylene (PP)[a]	NSF 51; NSF 61
Polyvinylidene fluoride (PVDF)[a]	NSF 51; NSF 61
Polyvinyl chloride (PVC)[a]	NSF 51; NSF 61

a These materials are approved for cold water use only.
b Copper tubing, Type M, shall not be installed underground.
c Copper pipe or tubing shall not be installed if the pH of the water to be conveyed is 6.5 or less.

(6) SPECIAL MATERIALS. (a) *Sheet lead.* Sheet lead for the following uses may not weigh less than indicated in subds. 1. and 2.

1. Site−fabricated flashings for vent pipes, 3 pounds per square foot; and
2. Prefabricated flashings for vent pipes, 2½ pounds per square foot.

(b)*Traps and fixture drain connection fittings.* 1. Copper or tubular brass traps and fixture drain connection fittings shall be at least of 20 gage material.
2. Plastic tubular traps, continuous wastes, and trap adapters shall comply with s. SPS 384.40 (1) (a).

(c) *Sheet copper.* Sheet copper for the following uses may not weigh less than indicated in subds. 1. and 2. and shall conform to ASTM B152.

1. Flashing for vent pipes, 8 ounces per square foot; and
2. Flush tank linings, 10 ounces per square foot.

(d) *Cleanout plugs.* Cleanout plugs shall be of brass or plastic. Brass cleanout plugs shall be used with metallic piping only and shall conform to ASTM A74. Plastic cleanout plugs shall conform to the requirements of sub. (5) (a).

(e) *Flush pipes and fittings.* Flush pipes and fittings shall be of nonferrous material and shall conform to ASME A112.19.5.

(f) *Safing material.* Safing materials shall be waterproof when subjected to 2 feet of hydrostatic head when tested in accordance with ASTM C1306 or ASTM D4068. The material shall be recognized by the manufacturer for use as a safing material.

(g) *Geotextile fabrics.* Geotextile fabric used in a POWTS to prevent backfill material from entering the distribution cell shall meet the requirements listed in Table 384.30−12.

Table 384.30−12
GEOTEXTILE FABRICS

Property	**Test Method**	**Minimum Average Roll Value**
Grab Tensile, lbs.	ASTM D4632	35 lbs., minimum
Gram Elongations, %	ASTM D4632	50%, minimum
Puncture, lbs.	ASTM D4833	10 lbs., minimum
Trapezoidal tear, lbs.	ASTM D4533	11 lbs., minimum
AOS, US Sieve #	ASTM D4751	20 US sieve #, minimum
AOS, US Sieve #	ASTM D4751	70 US sieve #, minimum

(h) *Leaching chambers.* Leaching chambers for distribution cell components of POWTS or stormwater subsurface infiltration systems shall meet all of the following requirements:

1. Constructed of corrosion resistant materials.
2. Designed to prevent soil surrounding the chamber from entering the chamber.
3. Capable of withstanding pressures that the leaching chamber is intended to encounter.

(i) *Stone aggregate.* Stone aggregate which is used as a filtering medium or to create a distribution cell in a treatment or dispersal component of a POWTS or stormwater subsurface infiltration system shall meet all of the following requirements:

1. Conform to ASTM Standard C33 for coarse aggregate prior to washing.
2. Be washed to remove fine material.
3. Be ½ to 2½ inch in size.
4. Have a hardness value of at least 3 on Moh's Scale of Hardness.

(j) *Sand.* Sand that is placed as a filtering medium in a storm-water subsurface infiltration system shall conform to ASTM Standard C33 for fine aggregate.

(k) *Synthetic aggregate.* Synthetic aggregate that is used as a filtering medium or to create a distribution cell in a treatment or dispersal component of a POWTS or stormwater subsurface infiltration system shall meet all of the following requirements:

1. Be made from inert materials.
2. Be ½ inch to 2½ inches in size.
3. Be made of material that will not contaminate groundwater.
4. Be recognized by the manufacturer for use as a filtering media or a material to create a distribution cell.

EXAM QUESTIONS

61. According to table 384.30−11, NSF 51; NSF 61 is the standard for _____.
    a. Polyethylene
    b. Polypropylene
    c. Polyvinyl chloride
    d. All of the above

62. Copper or tubular brass traps and fixture drain connection fittings shall be at least of ___ gage material.
    a. 20
    b. 22
    c. 26
    d. 30

63. Cleanout plugs shall be of brass or _____.
    a. Glass
    b. Copper
    c. Plastic
    d. Iron

64. True or false? Flush pipes and fittings shall be of nonferrous material and shall conform to ASME A112.19.5.
    a. True
    b. False

65. According to Geotextile Fabrics, the Minimum Average Roll Value for Grab Tensile is ___ lbs.
    a. 35
    b. 36
    c. 38
    d. 40

66. Leaching chambers for distribution cell components of POWTS or stormwater subsurface infiltration systems shall be _____.
    a. Constructed of corrosion resistant materials
    b. Designed to prevent soil surrounding the chamber from entering the chamber
    c. Capable of withstanding pressures that the leaching chamber is intended to encounter
    d. All of the above

67. Stone aggregate which is used as a filtering medium or to create a distribution cell in a treatment or dispersal component of a POWTS shall have a hardness value of at least___ on Moh's Scale of Hardness.
    a. 3
    b. 4
    c. 5
    d. 6

SPS 384.40 Joints and connections. (1) GENERAL. (a) *Tightness*. Joints and connections in the plumbing system shall be watertight and gastight as required by test or system design, whichever is greater, or as required by the adopted product standard or department approval.

(b) *Preparation of pipe ends.* Pipe ends shall be prepared in accordance with the applicable pipe standard or the pipe or fitting manufacturer's instructions.

(c) *Prohibited joints and connections.* Unless otherwise permitted in this chapter or ch. SPS 382 or 383, all of the following types of joints and connections shall be prohibited:

1. Cement or concrete joints.
2. Mastic or hot poured bituminous joints.
3. Elastomeric rolling o−rings between different diameter pipes.
4. Solvent cement joints between different types of plastic pipe other than ABS and PVC in non−pressurized systems.
5. Roll grooving of galvanized steel pipe.

(2) ABS PLASTIC PIPE. Joints between acrylonitrile butadiene styrene plastic pipe or fittings shall be installed in accordance with pars. (a) to (c).

(a) *Mechanical joints.* Mechanical joints shall be installed in accordance with the manufacturer's instructions.

1. 'Drain and vent systems.' Mechanical push−on joints for drain and vent systems shall conform to ASTM D3212.
2. 'Water supply systems.' Mechanical push−on joints and mechanical compression−type joints for water supply systems which use a flexible elastomeric seal shall be suitable for potable water.

(b) *Solvent cemented joints.* Solvent cemented joints shall be made in accordance with ASTM D2235 and its appendix, ASTM D2661 or ASTM F628.

1. Joint surfaces shall be clean and free of moisture.
2. Solvent cement conforming to ASTM D2235 shall be applied to all joint surfaces and the joint shall be made while the cement is wet.
3. Solvent cement shall be handled in accordance with ASTM F402.
4. Solvent cement used on pipes and fittings of a water supply system shall conform to NSF 14 and shall be certified by a nationally recognized testing agency as to conforming to NSF 14. The container for the solvent cement shall bear the certification mark of the testing agency.

(c) *Threaded joints.* Threaded joints shall only be used on pipes of schedule 80 or heavier. Threaded joints shall conform to ASME B1.20.1. The pipe shall be threaded with dies specifically designed for plastic pipe. Thread lubricant or tape approved for such use shall be applied to the male threads only.

(3) BLACK STEEL PIPE. Joints between black steel pipe or fittings shall be in accordance with pars. (a) to (d).

(a) *Threaded joints.* Threaded joints shall conform to ASME B1.20.1. Pipe joint compound or tape shall be used on the male threads only.

(b) *Mechanical joints.* Mechanical joints shall be installed in accordance with the manufacturer's instructions.

(c) *Caulked joints.* Caulked joints shall only be used for drain or vent piping. Caulked joints for hub and spigot piping and fittings shall be firmly packed with oakum or hemp. Molten lead shall be poured in one operation not less than one inch deep and not to extend more than $^{1}/_{8}$ inch below the rim of the pipe, and caulked tight. Paint, varnish or other coatings may not be used on the joining material until after the joint has been tested and approved.

1. Caulked joints for drain piping shall be used only in a vertical position.

2. Caulked joints for vent piping may be used for piping in a vertical or horizontal position.

(d) *Welded joints.* Joints between black steel pipe or fittings may be welded.

(4) BRASS PIPE. Joints between brass pipe or fittings shall be in accordance with the provisions of pars. (a) to (d).

(a) *Brazed joints.* All joint surfaces to be brazed shall be cleaned bright by other than chemical means. Brazing filler metal conforming to AWS A5.8 or other approved material shall be used. The joining of water supply piping shall be made with lead−free materials. Solders and fluxes containing in excess of 0.2% lead shall not be used.

(b) *Mechanical joints.* Mechanical joints shall be installed in accordance with the manufacturer's instructions. Mechanical push−on joints and mechanical compression type joints for water supply systems which use flexible elastomeric seals shall be suit-able for potable water.

(c) *Soldered joints.* All joint surfaces to be soldered shall be cleaned bright by other than chemical means. A nontoxic flux shall be applied to all joint surfaces. Solder conforming to ASTM B32 or other approved material shall be used. The joining of water supply piping shall be made with lead−free materials. Solders and fluxes containing in excess of 0.2% lead shall not be used.

(d) *Threaded joints.* Threaded joints shall conform to ASME B1.20.1. Pipe joint compound or tape shall be used on the male threads only.

(5) CAST IRON PIPE. Joints between cast iron pipe or fittings shall be installed in accordance with pars. (a) and (b).

(a) *Caulked joints*. 1. 'Drain and vent systems.' Caulked joints for hub and spigot pipe of drain and vent systems shall be firmly packed with oakum or hemp. Molten lead shall be poured in one operation not less than one inch deep and not to extend more than $^1/_8$ inch below the rim of the pipe, and caulked tight. Paint, varnish or other coatings may not be used on the joining material until after the joint has been tested and approved.

2. 'Water supply systems.' Joints for bell and spigot pipe of water supply systems shall be firmly packed with treated paper rope. Molten lead shall be poured in one operation to a depth of 2½ inches.

(b) *Mechanical joints.* 1. `Drain and vent systems.' a. Mechanical push−on joints for drain and vent systems shall have gaskets which conform to ASTM C564.

b. Mechanical sleeve joints for drain and vent systems shall have a rubber sealing sleeve conforming to ASTM C564, CISPI 310 or FM 1680. Where a stainless steel band assembly is used, the band assembly shall conform to CISPI 310 or FM 1680. Mechanical joints shall be installed in accordance with the manufacturer's instructions.

2. 'Water supply systems.' Mechanical push−on joints and mechanical compression type joints for water supply systems shall conform to AWWA C111/A21.11. Lead tipped gaskets may not be used.

(c) *Threaded joints.* Threaded joints shall conform to ASME B1.20.1. Pipe joint compound or tape shall be used on the male threads only.

EXAM QUESTIONS

68. Unless otherwise permitted in this chapter or ch. SPS 382 or 383, _____ are prohibited.
    a. Cement or concrete joints.
    b. Mastic or hot poured bituminous joints.
    c. Roll grooving of galvanized steel pipes
    d. All of the above

69. True or false? Solvent cement conforming to ASTM D2235 shall be applied to all joint surfaces and the joint shall be made while the cement is dry.
    a. True
    b. False

70. Threaded joints shall only be used on pipes of schedule ___ or heavier.
    a. 80
    b. 85
    c. 90
    d. 95

71. Molten lead shall be poured in one operation not less than ___ inch(es) deep and not to extend more than $^{1}/_{8}$ inch below the rim of the pipe, and caulked tight.
    a. 1
    b. 1 ½
    c. 2
    d. 2 ½

72. Caulked joints for drain piping shall be used in a _____ position.
    a. Horizontal only
    b. Vertical only
    c. Horizontal or vertical
    d. Perpendicular

73. Solders and fluxes containing in excess of ___% lead shall not be used.
    a. 0.01
    b. 0.02
    c. 0.10
    d. 0.20

74. True or false? Pipe joint compound or tape shall be used on the male threads only.
    a. True
    b. False

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(6) CPVC PLASTIC PIPE. Joints between chlorinated polyvinyl chloride plastic pipe or fittings shall be installed in accordance with the provisions of pars. (a) to (c).

(a) *Mechanical joints.* Mechanical joints shall be installed in accordance with the manufacturer's instructions. Mechanical push−on type joints which use flexible elastomeric seals shall be suitable for potable water.

(b) *Solvent cemented joints.* Solvent cemented joints shall be made in accordance with ASTM D2846, ASTM F493, or ASTM F3328-18.

1. Joint surfaces shall be clean and free of moisture. Cleaner, primer and cement shall be installed in accordance with the manufacturer's instructions for use of the solvent cement.
2. Solvent cement conforming to ASTM F493 shall be applied to all joint surfaces and the joint shall be made while the cement is wet.
3. Solvent cement shall be handled in accordance with ASTM F402.
4. Primer and solvent cement used on pipes and fittings of a water supply system shall conform to NSF 14 and shall be certified by a nationally recognized testing agency as to conforming to NSF 14. The containers for the primer and the solvent cement shall bear the certification mark of the testing agency.

(c) *Threaded joints.* Threaded joints shall only be used on pipes of schedule 80 or heavier. Threaded joints shall conform to ASME B1.20.1. The pipe shall be threaded with dies specifically designed for plastic pipe. Thread lubricant or tape approved for such use shall be applied to the male threads only.

(7) CONCRETE PIPE. (a) *Circular pipe.* Joints between circular concrete pipe or fittings shall be made by use of an elastomeric seal conforming to ASTM C443 or C990.

(b) *Elliptical pipe.* Joints between elliptical concrete pipe or fittings shall be made by use of materials conforming to ASTM C887 Type II or ASTM C990.

(8) COPPER PIPE AND TUBING. Joints between copper pipe, tubing or fittings shall be installed in accordance with pars. (a) to (e).

(a) *Brazed joints.* All joint surfaces to be brazed shall be cleaned bright by other than chemical means. Brazing filler metal conforming to AWS A5.8, NSF/ANSI 61, annex G, or other approved material shall be used. The joining of water supply piping shall be made with lead−free materials.

(b) *Flared joints.* Flared joints may be used on annealed tubing for water supply systems and shall be made by the use of a tool designed for that operation.

(c) *Mechanical joints.* Mechanical joints shall be installed in accordance with the manufacturer's instructions. Mechanical push−on joints and mechanical compression type joints for water supply systems which use flexible elastomeric seals shall be suitable for potable water.

(d) *Soldered joints.* All joint surfaces to be soldered shall be made in accordance with ASTM B828. Flux approved by NSF for use in potable water systems shall be applied to all joint surfaces. Solder conforming to ASTM B32, NSF/ANSI 61, annex G, or other approved material shall be used. The joining of water supply piping shall be made with lead−free materials.

(e) *Threaded joints.* Threaded joints shall conform to ASME B1.20.1. Pipe joint compound or tape shall be used on the male threads only.

(9) DUCTILE IRON PIPE. (a) *Mechanical joints.* Mechanical push−on joints and mechanical compression type joints for water supply systems shall conform to AWWA C111. Lead tipped gaskets may not be used.

(b) Threaded joints. Threaded joints shall conform to ASME B1.20.1. Pipe joint compound or tape shall be used on the male threads only.

EXAM QUESTIONS

75. Solvent cement shall be handled in accordance with _____.
    a. AWWA C111

b. ASTM C923
c. ASTM F402
d. ASME B1.20.1

76. Joints between elliptical concrete pipe or fittings shall be made by use of materials conforming to ASTM C887 _____ or ASTM C990.
    a. Type I
    b. Type II
    c. Type III
    d. Type IV

77. True or false? With regards to mechanical joints, lead tipped gaskets may not be used.
    a. True
    b. False

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(10) GALVANIZED STEEL PIPE. Joints between galvanized steel pipe or fittings or between galvanized steel pipe and cast iron fittings shall be installed in accordance with pars. (a) to (c).

(a) *Threaded joints.* Threaded joints shall conform to ASME B1.20.1. Pipe joint compound or tape shall be used on the male threads only.

(b) *Mechanical joints.* Mechanical joints shall be installed in accordance with the manufacturer's instructions. Mechanical push−on joints and mechanical compression type joints for water supply systems which use flexible elastomeric seals shall be suitable for potable water.

(c) *Caulked joints.* Caulked joints shall only be used for drain or vent piping. Caulked joints for hub and spigot piping and fittings shall be firmly packed with oakum or hemp. Molten lead shall be poured in one operation not less than one inch deep and not to extend more than $^{1}/_{8}$ inch below the rim of the pipe, and caulked tight. Paint, varnish or other coatings may not be used on the joining material until after the joint has been tested and approved.

1. Caulked joints for drain piping shall be used only for piping in a vertical position.
2. Caulked joints for vent piping may be used for piping in a vertical or horizontal position.

(11) LEAD PIPE. Joints between lead pipe or fittings shall be installed in accordance with pars. (a) and (b).

(a) *Burned joints.* Burned joints shall be uniformly fused together into one continuous piece. The thickness of the joint shall be at least as thick as the lead being joined. The filler metal shall be of the same material as the pipe.

(b) *Wiped joints.* A wiped joint shall be full wiped, having an exposed surface on each side of the joint not less than ¾ inch and shall be at least $^{3}/_{8}$ inch thick at the thickest point.

(12) PE PLASTIC PIPE AND TUBING. Joints between polyethylene plastic pipe, tubing or fittings shall be in accordance with pars. (a) to (c).

(a) *Flared joints.* Flared joints shall be made by use of a tool designed for that operation. Flared joints shall be made in accordance with ASTM D3140.

(b) *Heat fusion joints.* Heat fusion joints shall be made in accordance with ASTM D2657. Heat fusion joints shall be of a socket fusion type.

1. Joint surfaces to be fused shall be clean and free of moisture.
2. All joint surfaces shall be heated to the temperature recommended by the pipe or fitting manufacturer and joined.
3. The joint shall be undisturbed until cool.

(c) *Mechanical joints.* Mechanical joints may be installed in accordance with the manufacturer's instructions. Mechanical push−on joints and mechanical compression type joints which use flexible elastomeric seals shall be suitable for potable water.

(13) PEX PLASTIC TUBING. Joints between crosslinked polyethylene plastic pipe, tubing or fittings shall be made in accordance with the manufacturer's instructions.

(14) PVC PLASTIC PIPE. Joints between polyvinyl chloride plastic pipe or fittings shall be in accordance with pars. (a) to (c).

(a) *Mechanical joints.* Mechanical joints shall be installed in accordance with the manufacturer's instructions.
1. `Drain and vent systems.' Mechanical push−on joints for drain and vent systems shall conform to ASTM D3212.
2. `Water supply systems.' Mechanical push−on joints and mechanical compression type joints for water supply systems which use flexible elastomeric seals shall be suitable for potable water.

(b) *Solvent cemented joints.* Solvent cemented joints shall be made in accordance with ASTM D2855 or ASTM F3328.18.

1. Joint surfaces shall be clean and free of moisture. A primer conforming to ASTM F656 shall be applied to all joint surfaces.
2. Solvent cement conforming to ASTM D2564 shall be applied to all joint surfaces and the joint shall be made while the cement is wet.
3. Solvent cement shall be handled in accordance with ASTM F402.
4. Primer and solvent cement used on pipes and fittings of a water supply system shall conform to NSF 14 and shall be certified by a nationally recognized testing agency as to conforming to NSF 14. The containers for the primer and the solvent cement shall bear the certification mark of the testing agency.

(c) *Threaded joints.* Threaded joints shall only be used on pipes of schedule 80 or heavier. Threaded joints shall conform to ASME B1.20.1. The pipe shall be threaded with dies specifically designed for plastic pipe. Thread lubricant or tape approved for such use shall be applied to the male threads only.

(15) STAINLESS STEEL. Joints between stainless steel pipe or fittings shall be installed in accordance with the provisions of pars. (a) to (c).

(a) *Mechanical joints.* Mechanical joints shall be installed in accordance with the manufacturer's instructions. Mechanical push−on type joints which use flexible elastomeric seals shall be suitable for potable water.

(b) *Threaded joints.* Threaded joints shall conform to ANSI B1.20.1. Pipe joint compound or tape shall be used on the male threads only.

(c) *Welded joints.* Joints between stainless steel pipe or fittings may be welded.

(16) JOINTS BETWEEN PIPE AND FITTINGS OF DIFFERENT MATERIALS. Dielectric unions shall be installed at the point of connection of dissimilar metal piping materials. Dielectric unions shall conform to ASSE 1079.

(17) CONNECTION OF FIXTURES. Flanged fixtures which have integral traps shall be mechanically fastened to the drain piping by means of a compatible fitting. The joint between the fixture and the fitting shall be sealed with a watertight gasket or setting compound.

(18) CONNECTION OF PIPE TO CONCRETE STRUCTURES. Joints between concrete structures and piping shall be made with mechanical joints in conformance with ASTM C923, ASTM C564 or as otherwise permitted by local authority. Openings for pipe connections that are installed with mechanical joints conforming to ASTM C564 shall have an inside diameter of that required for cast iron pipe in conformance with ASTM A74.

EXAM QUESTIONS

78. Caulked joints for vent piping may be used for piping in a _____ position.
    a. Vertical only
    b. Horizontal only
    c. Vertical or horizontal
    d. Perpendicular

79. True or false? Burned joints shall be uniformly fused together into one continuous piece.
    a. True
    b. False

80. With regards to burned joints, the filler metal shall be of _____ as the pipe.
    a. Different material
    b. The same material
    c. The same class of material
    d. Any of the above

81. A wiped joint shall be full wiped, having an exposed surface on each side of the joint not less than ___ inch(es) and shall be at least $^{3}/_{8}$ inch thick at the thickest point.
    a. ¾
    b. 1
    c. 1 ½
    d. 1 ¾

82. Threaded joints shall conform to _____.
    a. ASTM D3188
    b. ASTM D2657
    c. ASME B1.20.1
    d. ASME B3.1.40

83. True or false? Joints between stainless steel pipe or fittings may be welded.
    a. True
    b. False

84. Dielectric unions _____ installed at the point of connection of dissimilar metal piping materials.
    a. Can sometimes be
    b. Must never be

c. Shall be
d. None of the above

85. True or false? Flanged fixtures which have integral traps shall be mechanically fastened to the drain piping by means of a compatible fitting.
    a. True
    b. False

86. Openings for pipe connections that are installed with mechanical joints conforming to ASTM C564 shall have an inside diameter of that required for cast iron pipe in conformance with _____.
    a. CAN/CSA B137.10
    b. ASTM F876
    c. ASTM A74
    d. AWWA C115

SPS 384.50 Alternate approvals and experimental approvals. (1) GENERAL. The provisions of chs. SPS 382 to 384 are not intended to prevent the use of a plumbing material or product not specifically addressed therein if the plumbing material or product has been approved by the department.

(2) ALTERNATE APPROVAL. (a) Plumbing materials or products determined by the department to comply with the intent of chs. SPS 382 to 384 and ch. 145, Stats., and not approved under s. SPS 384.10, shall be issued an alternate approval. Alternate approvals shall be issued by the department in writing.

(b) The department may require the submission of any information deemed necessary for review. Sufficient evidence shall be submitted to the department to substantiate:

1. Assertions of function and performance; and
2. Compliance with the intent of chs. SPS 382 to 384 and ch. 145, Stats.

(c) The department shall review and make a determination on an application for alternate approval within 3 months of receipt of all information and fees required to complete the review.

(d) The department may impose specific conditions in issuing an alternate approval, including an expiration date for the alternate approval. Violations of the conditions under which an alternate approval is issued shall constitute a violation of this chapter.

(e) If, upon review, the department determines that a plumbing material or product does not comply with the intent of chs. SPS 382 to 384 and ch. 145, Stats., the request for alternate approval shall be denied in writing.

(3) EXPERIMENTAL APPROVAL. (a) The department may allow the installation of a plumbing material or product for the purpose of proving compliance with the intent of chs. SPS 382 to 384 and ch. 145, Stats.

(b) An experimental approval shall be required for each plumbing material or product to be installed for the purpose of proving compliance with the intent of chs. SPS 382 to 384 and ch. 145, Stats. A separate experimental approval shall be obtained for each project where such a product is to be used. Experimental approvals shall be issued by the department in writing. Experimental approvals shall be denied by the department in writing.

(c) The department may require the submission of any information deemed necessary for review.

(d) The department may limit the number of applications it will accept for experimental approval of products.

(e) The department shall review and make a determination on an application for experimental approval within 6 months of receipt of all information and fees required to complete the review.

(f) The department may impose specific conditions in issuing an experimental approval. Violations of the conditions under which an experimental approval is issued shall constitute a violation of this chapter.

(g) If the department issues an experimental approval:

1. Plans detailing the installation of the plumbing material or product shall be submitted to the department in accordance with s. SPS 382.20 (4) or 383.22.
2. A copy of the experimental approval shall be attached to the submitted plans and approved plans.
3. A letter of consent from the owner of the installation shall be attached to the submitted plans and approved plans. The letter shall acknowledge that the owner has received and read a copy of the experimental approval and s. SPS 384.50.
4. The completed installation shall be inspected for compliance with the approved plans by the department. A report on the completed installation shall be written by the department.
5. A written report, from the party who was issued the experimental approval, shall be submitted to the department detailing the function and performance of the installed plumbing material or product. The report shall be completed at time intervals specified by the department, but not less than once a year.
6. On−site inspections shall be performed by the department at time intervals specified by the department, but not less than once a year. A report on the inspection shall be written by the department. The department may assess a fee for the inspection.
7. Five years after the date of the completed installation the department shall within 6 months order the removal of the plumbing material or product, issue an approval, or renew the experimental approval for another 5−year period to obtain additional information to determine the result of the experiment.

(h) If chs. SPS 382 to 384 or ch. 145, Stats., are revised to include or permit an experimental plumbing material or product to conform with the intent of chs. SPS 382 to 384 and ch. 145, Stats., the department shall waive the requirements of par. (f) as to that material or product.

(4) MODIFICATIONS. If a plumbing material or product with an alternate or experimental approval or the installation of an experimentally approved plumbing material or product is modified or additional assertions of function or performance are made, the alternate or experimental approval shall be considered null and void, unless the product is resubmitted to the department for review and the approval is reaffirmed.

(5) REVOCATION. The department may revoke an alternate or experimental approval issued under this section for any false statements or misrepresentations of facts or data on which the alternate or experimental approval was based or as a result of product failure.

(6) LIMITATIONS. An alternate or experimental approval of a plumbing material or product issued by the department may not be construed as an assumption of any responsibility for defects design, construction, or performance of any plumbing material or product nor for any damages that may result.

(7) FEES. Fees for the review of a plumbing material or product under this section and any required on−site inspections shall be submitted in accordance with ch. SPS 302.

EXAM QUESTIONS

87. The department shall review and make a determination on an application for alternate approval within _____ of receipt of all information and fees required to complete the review.
    a. 14 days
    b. 1 month
    c. 2 months
    d. 3 months

88. The department shall review and make a determination on an application for experimental approval within _____ of receipt of all information and fees required to complete the review.
    a. 1 month
    b. 2 months
    c. 3 months
    d. 6 months

89. On−site inspections shall be performed by the department at time intervals specified by the department, but not less than _____.
    a. Every two months
    b. Every three months
    c. Every six months
    d. Every year

90. True or false? With an experimental approval, the completed installation shall be inspected for compliance with the approved plans by the department.
    a. True
    b. False