BACKGROUND INFORMATION

The National Automatic Merchandising Association (NAMA) “Standard for the Sanitary Design and Construction of Food and Beverage Vending Machines” is a voluntary standard governing the sanitary design and construction of food and beverage vending machines and related dispensing equipment.

The standard was initiated in 1959 and first became effective in 1961. The original publication and succeeding revisions were developed by NAMA’s advisory committee, the Automatic Merchandising Health – Industry Council (AMHIC) and adopted by NAMA as its official Standard. Section 100 further discusses the purpose and scope of the Standard.

The standard is the basic criterion for a vending machine evaluation, certification and listing under the NAMA Vending Machine Evaluation Program. NAMA’s “Vending Machine Evaluation Program Administrative Policies” govern all operations of the Evaluation Program. A separate publication, the “AMHIC Organization Plan Procedures”, contains guidelines for the development and revisions of the Standard.

ACCESS TO RECORDS

Single copies of this Standard, the “AMHIC Organization Plan Procedures” and NAMA’s “Vending Machine Evaluation Program Administrative Policies” are available without charge from NAMA with participation in the Machine Evaluation Program. The 1961 Standard and all succeeding revisions may be examined at NAMA headquarters during business hours.

RIGHT OF APPEAL

Any organization or individual not in agreement with any requirement contained in or omitted from the Standard may file a written statement with NAMA. Procedures for investigation, review and other action on such appeals are covered in the Administrative Policies for Vending Machine Evaluation Program.

National Automatic Merchandising Association
20 N. Wacker Drive, Suite 3500
Chicago, Illinois 60606-3120
Phone: 312.346.0370 Fax: 312.704.4140
Website: www.vending.org
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This Standard contains basic requirements for vending machines covered by the National Automatic Merchandising Association (NAMA) under its Vending Machine Evaluation Program for food and beverage vending machines within the limitations given below and in the Scope section of the principles, research, records of tests and field experience and an appreciation of the problems of manufacture, installation and use derived from consultation with and information obtained from manufacturers, users, regulatory agencies and others having specialized experience. These requirements are subject to revisions as further experience and investigations may show is necessary or desirable.

NAMA, in performing its functions in accordance with its objectives, does not assume or undertake to discharge any responsibility of the manufacturer or any other party. The opinions and findings of NAMA represent its professional judgement given with due consideration to the necessary limitation of practical operation and state of the art at the time NAMA Standard is processed. NAMA shall not be responsible to anyone for the use of or reliance upon this Standard by anyone. NAMA shall not incur and obligation or liability for damages, including consequential damages, arising out of or in connection with the use, interpretation of, or reliance upon this Standard.

This NAMA Standard provides basic criteria to insure sanitation and protection of the public health; Provisions for safety have not been included in this Standard because governmental agencies or other national standards-setting organizations provide safety requirements.

The observance of the requirements of this Standard by a manufacturer is one of the conditions of the continued coverage of the manufacturer’s equipment.

Equipment which complies with the text of this Standard will not necessarily be judged to comply with the Standard if, when examined and tested, it is found to have other features which impair the level of sanitation and public health protection contemplated by these requirements.

Participation in NAMA standards development activities by regulatory agencies representatives (federal, state or local) shall not constitute their agency’s endorsement of NAMA or any of its standards.
Table of Contents

Table of Contents ........................................... i

List of Tables .................................................... iv

100 PURPOSE AND SCOPE ....................................... 1

100 Purpose of the Standard ................. 1
101 Contents of the Standard .......... 1
102 Evaluation Criterion ................. 1
103 Scope .................................................. 1
104 Alternate Materials, Design or Construction .......... 1
105 Manufacturer’s Recourse .......... 1

200 DEFINITIONS .............................................. 2

300 CABINET EXTERIOR ....................................... 8

300 Cabinet Shell and Frame ............... 8
300.1 Cabinet Design ...................... 8
300.2 Cabinet Materials .................. 8
300.3 Cabinet Finish ..................... 8
300.4 Cabinet Fabrication ............... 8
300.5 Two-Piece, Field Assembled Cabinets .......... 8
301 Cabinet Doors and Panels .......... 8
301.1 Door Construction, Mounting and Closure ............. 8
301.2 Door Tracks and Guides .......... 9
302 VEND OPENINGS FOR BULK FOOD VENDING MACHINES .......... 9
302.1 Protection Of Vending Stage, Dispensing Nozzles And Chutes .......... 9
303 OTHER CABINET OPENINGS ............. 10
303.1 Ventilation Openings .......... 10
303.2 Service Connection Openings .......... 10
303.3 Shipping Bolt Holes .......... 11
303.4 Miscellaneous Openings .......... 11
304 CABINET ELEVATION AND MOVABILITY ..... 11
304.1 Design Options .............. 11
304.2 Legs, Feet and Levelers .......... 11
304.3 Side Panels .................. 12
304.5 Kick Plates .................. 12
305 DISCONNECTION SAFEGUARDS FOR MACHINES VENDING POTENTIALLY HAZARDOUS FOOD .......... 12

400 CABINET INTERIOR – FOOD CONTACT SURFACES AND COMPONENTS .......... 13

400 Design and Construction of Food Contact Surfaces .......... 13
400.1 General Requirements .......... 13
400.2 Access for Cleaning and Inspection .......... 13

401 MATERIALS FOR FOOD CONTACT SURFACES ....................................... 13
401.1 General Requirements .......... 13
401.2 Compliance Required .......... 13
401.3 Food Contact Material Finish .......... 13

402 FABRICATION AND ASSEMBLY OF FOOD CONTACT SURFACES .......... 13
402.1 Threaded Surfaces .............. 13
402.2 Welding and Soldering .......... 13
402.3 Internal Angles and Corners .......... 14
402.4 Gaskets .......... 14

403 DESIGN REQUIREMENTS FOR IN-PLACE CLEANING .......... 14
404 DESIGN REQUIREMENTS FOR NON-PRESSURIZED FOOD CONTAINERS .......... 14
404.1 General .......... 14
404.2 Cover Design .......... 14
404.3 Port Openings .......... 14
404.4 Other Openings .......... 15

405 DESIGN REQUIREMENTS FOR NON-PRESSURIZED WATER CONTAINERS .......... 15
405.1 Fixed Containers .......... 15
405.2 Portable Urns and Containers .......... 15

406 OPENING DEVICES .......... 15
406.1 Food Contact Materials .......... 15
406.2 Removability .......... 15
406.3 Cleanability .......... 15
406.4 Protection of Opener .......... 15

407 ICEMAKER SYSTEMS .......... 15
407.1 Accessibility .......... 15
407.2 Design, Construction and Materials .......... 15
407.3 Water Reservoirs .......... 15
407.4 Water Tubing .......... 16
407.5 Ice Storage Hoppers .......... 16
407.6 Icemaker Harvesters .......... 16
407.7 Ice Dispensing Chutes .......... 16
407.8 Water Filters .......... 16

408 ICE BAGGING SYSTEMS .......... 16

500 CABINET INTERIOR - NON-FOOD CONTACT SURFACES AND COMPONENTS ....................................... 17

500 Design and Construction of Non-Food Contact Surfaces .......... 17
500.1 General Requirements .......... 17

501 MATERIAL REQUIREMENTS .......... 17
501.1 Non-Food Contact Surfaces .......... 17
501.2 Non-Food Contact Material Finish .......... 17

502 FABRICATION AND ASSEMBLY REQUIREMENTS OF NON-FOOD CONTACT SURFACES .......... 17
NAMA Construction Standard - 2013

502.1 General Requirements...................... 17
502.2 Joints and Seams.............................. 17
502.3 Draw Fasteners or Devices............... 18
502.4 Angles, Channels, Gussets or Hollow Sections ... 18
502.5 Reinforcing and Framing..................... 18
502.6 Gaskets...................................... 18
502.7 Hinges...................................... 18
503 INSTALLATION OF FIXTURES AND COMPONENTS........... 18
  503.1 Design and placement......................... 18
  503.2 Access.................................... 18
  503.3 Mounting.................................. 18
504 CUP TURRETS AND MAGAZINES................. 18
  504.1 Design.................................... 18
  504.2 Protection of Cups and Containers ......... 18
505 REFRIGERATION COMPONENTS.................. 18
  505.1 Evaporator Protection......................... 18
  505.2 Separation of Condensing Unit............. 19
506 SHELVES, APRONS AND SPLASH PANELS......... 19
  506.1 Construction and Installations ............ 19
  506.2 Size and Location........................... 19
507 COLLECTION OF SPILLAGE, DRAINAGE AND LEAKAGE.... 19
  507.1 General.................................... 19
  507.2 Shelf and Drain Pan Construction........... 19
  507.3 Drains and Drain Outlet Construction........ 19
508 WASTE CONTAINERS AND CONTROLS.......... 20
  508.1 General.................................... 20
  508.2 Waste Container Construction.............. 20
  508.3 Bulk Beverage Dispensing Machines ....... 20
  508.4 Directly Connected Machines.............. 20
  508.5 Use of Waste Containers.................... 20
  508.6 Cutoff Controls............................. 20

600 WATER SUPPLY AND WATER SUPPLY PROTECTION........... 21

600 WATER SUPPLY................................ 21
601 METHODS OF INSTALLATION..................... 21
602 WATER SUPPLY PROTECTION..................... 21
  602.1 General.................................... 21
  602.2 Backflow Prevention........................ 21
  602.3 Air Gapped Machines......................... 21
  602.4 Hot Beverage Controlled Location Vending Machines........ 21
  602.5 Backflow Prevention on Carbonated Vending Machines........ 22
603 MATERIALS.................................. 22
  603.1 Prohibited Materials........................ 22
604 WATER BATH COMPARTMENTS.................... 22
605 WATER FILTERS – DESIGN AND CONSTRUCTION..... 22
  605.1 Design..................................... 22
  605.2 Self-Draining Construction Filter........... 22

700 TEMPERATURE REQUIREMENTS AND CONTROLS.................. 23

700 DESIGN AND PERFORMANCE REQUIREMENTS FOR MACHINES VENDING POTENTIALLY HAZARDOUS FOOD........................ 23
  700.1 Refrigeration and Heating Design Requirements........................................ 23
  700.2 Refrigeration and Heating Performance Requirements................................... 23
701 AUTOMATIC SHUTOFF CONTROLS..................... 23
  701.1 Design Requirements.......................... 23
  701.2 Field Evaluation................................ 24
  701.3 Accessibility Requirements................... 24
  701.4 Manual/Automatic Reset – Location........... 25
702 EQUIPMENT PERFORMANCE TESTING.................. 25
  702.1 Required Refrigerating and Heating Tests........................................... 25
  702.2 Temperature Test............................. 25
  702.3 Test Procedures.............................. 25
703 TEST RECORD REQUIREMENT....................... 26
  703.1 Reporting Test Results......................... 26
  703.2 Certification & Calibration of Testing Equipment....................................... 26
704 THERMOMETERS.................................. 27

800 SAFETY AND MISCELLANEOUS REQUIREMENTS.................. 28

800 PROTECTION AGAINST GLASS BREAKAGE............. 28
  801 MACHINE STABILITY................................ 28
  802 ANCHORING CARBON DIOXIDE (CO₂) CYLINDERS................. 28
  803 SANITATION INSTRUCTIONS REQUIRED............ 28
  803.1 For Refrigerated Machines...................... 28
  803.2 For Lobster Habitat Machines............... 28
  804 PRODUCT COOLING BY IMMERSION................. 28
  805 CLEANING RECORD RETAINER...................... 28
  806 MACHINE MODEL IDENTIFICATION.................. 29
  806.1 Location..................................... 29
  806.2 Small Machines............................... 29

900 Water Vending Machines............................. 30

900 SCOPE......................................... 30
  900.1 Water dispensing units........................ 30
  900.2 Water vending machines....................... 30
  900.3 Water vending machines....................... 30
901 REQUIREMENTS CROSS-REFERENCED................ 30
902 EXTERIOR CABINET AND DISPENSING PLATFORM........... 30
  902.1 Vending Stage Doors........................... 30
  902.2 Dispensing Nozzle Protection................... 30
903 CABINET MARKINGS AND CLAIMS..................... 30
  903.1 Supply Connection Warning.................... 30
  903.2 Filtration-Only Machines....................... 31
<table>
<thead>
<tr>
<th>Section</th>
<th>Description</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>903.3</td>
<td>Use of Term “Purified”</td>
<td>31</td>
</tr>
<tr>
<td>903.4</td>
<td>Use of Term “High Alkaline” Machines</td>
<td>31</td>
</tr>
<tr>
<td>903.5</td>
<td>Water Dispensing Unit</td>
<td>31</td>
</tr>
<tr>
<td>903.6</td>
<td>Certification of Machines</td>
<td>31</td>
</tr>
<tr>
<td>903.7</td>
<td>Consumer Information</td>
<td>31</td>
</tr>
<tr>
<td>903.8</td>
<td></td>
<td>31</td>
</tr>
<tr>
<td>904</td>
<td>Water Contact Components and Surfaces</td>
<td>31</td>
</tr>
<tr>
<td>904.1</td>
<td>Water Tank Vents</td>
<td>31</td>
</tr>
<tr>
<td>904.2</td>
<td>In-Place Cleaning Provisions</td>
<td>31</td>
</tr>
<tr>
<td>904.3</td>
<td>In-Place Cleaning Instructions</td>
<td>32</td>
</tr>
<tr>
<td>904.4</td>
<td>Water Contact Materials</td>
<td>32</td>
</tr>
<tr>
<td>905</td>
<td>Sequence of Procedures</td>
<td>32</td>
</tr>
<tr>
<td>905.1</td>
<td>Disinfection</td>
<td>32</td>
</tr>
<tr>
<td>905.2</td>
<td>Remineralization Systems</td>
<td>32</td>
</tr>
<tr>
<td>905.3</td>
<td>Blend-Back Systems</td>
<td>32</td>
</tr>
<tr>
<td>905.4</td>
<td>Exceptions</td>
<td>32</td>
</tr>
<tr>
<td>906</td>
<td>Non-Food Contact Surfaces and Components</td>
<td>32</td>
</tr>
<tr>
<td>907</td>
<td>Sewer Connections</td>
<td>33</td>
</tr>
<tr>
<td>907.1</td>
<td>Internal Air Gaps</td>
<td>33</td>
</tr>
<tr>
<td>908</td>
<td>Water Supply Protection</td>
<td>33</td>
</tr>
<tr>
<td>908.1</td>
<td>Bottle Washers</td>
<td>33</td>
</tr>
<tr>
<td>909</td>
<td>Cutoff Controls and Sensors</td>
<td>33</td>
</tr>
<tr>
<td>909.1</td>
<td>Waste Container Controls</td>
<td>33</td>
</tr>
<tr>
<td>909.2</td>
<td>Disinfection Monitoring</td>
<td>33</td>
</tr>
<tr>
<td>909.3</td>
<td>Alkaline Monitoring</td>
<td>34</td>
</tr>
<tr>
<td>909.4</td>
<td>Dosage Performance</td>
<td>34</td>
</tr>
<tr>
<td>909.5</td>
<td>Conductivity Sensing for Purified Water</td>
<td>34</td>
</tr>
<tr>
<td>910</td>
<td>Machine Performance Testing</td>
<td>34</td>
</tr>
<tr>
<td>910.1</td>
<td>Component Performance Testing</td>
<td>34</td>
</tr>
<tr>
<td>910.2</td>
<td>Machine Performance Testing</td>
<td>34</td>
</tr>
<tr>
<td>911</td>
<td>Sanitation and Servicing Procedures</td>
<td>35</td>
</tr>
<tr>
<td>911.1</td>
<td>Machine Installation</td>
<td>35</td>
</tr>
<tr>
<td>911.2</td>
<td>In-Place Cleaning and Maintenance</td>
<td>36</td>
</tr>
<tr>
<td>911.3</td>
<td>Replace/Replenishment Schedule</td>
<td>36</td>
</tr>
<tr>
<td>911.4</td>
<td>UV or Other Disinfection System Servicing</td>
<td>36</td>
</tr>
<tr>
<td>911.5</td>
<td>Control Settings</td>
<td>36</td>
</tr>
<tr>
<td>911.6</td>
<td>Parts Replacement/Replenishment</td>
<td>36</td>
</tr>
<tr>
<td>911.7</td>
<td>Vended Water Testing</td>
<td>36</td>
</tr>
<tr>
<td>912</td>
<td>Advertising Claims</td>
<td>36</td>
</tr>
<tr>
<td>912.1</td>
<td>General</td>
<td>36</td>
</tr>
<tr>
<td>912.2</td>
<td>Health Claims</td>
<td>37</td>
</tr>
<tr>
<td>Appendix A</td>
<td></td>
<td>38</td>
</tr>
<tr>
<td>Appendix B</td>
<td></td>
<td>39</td>
</tr>
<tr>
<td>Appendix C</td>
<td></td>
<td>42</td>
</tr>
<tr>
<td>Appendix D</td>
<td></td>
<td>44</td>
</tr>
<tr>
<td>Index</td>
<td></td>
<td>46</td>
</tr>
</tbody>
</table>
## List of Tables

Table 700.1 Temperature Requirements ............................................................................................................ 23  
Table 700.2 Design Recovery Time Requirements .............................................................................................. 24  
Table 700.3 Test Environment .................................................................................................................................. 26  
Table 700.4 Pull Down Recovery Temp. & Time .................................................................................................. 26  
Table 900.1 Drinking Water Criteria ..................................................................................................................... 35  
Table 900.2 Purified Water Criteria ....................................................................................................................... 35  
Table 200 Interaction of PH and $A_w$ for control of spores in FOOD heat-treated to destroy vegetative cells and subsequently PACKAGED ................................................................................................. 43  
Table 201 Interaction of PH and $A_w$ for control of vegetative cells and spores in FOOD not heat-treated or heat-treated but not PACKAGED ........................................................................................................ 43  
Table D Backflow Preventor Types ......................................................................................................................... 45
100 PURPOSE AND SCOPE

100 Purpose of the Standard
This “Standard for the Sanitary Design and Construction of Food and Beverage Vending Machines” has been developed by the Automatic Merchandising Health-Industry Council (AMHIC) and adopted by the National Automatic Merchandising Association (NAMA) to determine the eligibility of evaluated vending machines for a Letter of Compliance as awarded under the NAMA Vending Machine Evaluation Program.

101 Contents of the Standard
This Standard contains all of the machine design and construction requirements contained in the publication “U.S. Public Health Service, FDA, 2009 Food Code” (referred to hereinafter as the Code). In addition, the Standard contains safety, testing and added design requirements deemed advisable by AMHIC and NAMA and not inconsistent with the aims of the Code. In the event that a conflict develops between this Standard and the Code, the provisions of the Code shall govern.

102 Evaluation Criterion
Automatic food and beverage machines accepted for testing and evaluation under the NAMA Vending Machine Evaluation Program shall meet all applicable requirements of the Standard before being awarded a Letter of Compliance.

103 Scope
The requirements of this Standard are intended to apply only to those vending machines and controlled location vending machines defined herein.

104 Alternate Materials, Design or Construction
It is intended that this Standard shall allow and encourage freedom for inventive genius and new developments. When machines are developed with design, construction or materials not covered by provisions of this Standard, but which, in the opinion of the manufacturer, meet the intended objectives of the Code, they may be submitted to NAMA for evaluation by a Public Health Consultant. The Public Health Consultant shall have the responsibility to determine if new materials, design or construction conforms to provisions of this Standard. If, in the opinion of the Consultant, the submitted machine conforms to the Standard, the Consultant shall proceed with the evaluation. If the machine is not covered by the Standard, the Consultant shall request clarification from AMHIC through NAMA procedures contained in the “Vending Machine Evaluation Program Administrative Policies”.

105 Manufacturer’s Recourse
The NAMA “Standard for the Sanitary Design and Construction of Food and Beverage Vending Machines” provides a due process and appeal mechanism for any manufacturer aggrieved as a consequence of any program requirement, Consultant judgment or administrative determination.
200 DEFINITIONS

**200 Accessible**
Accessible means readily exposed for cleaning and inspection with the use of simple tools, such as a screwdriver, pliers, open-end wrench or Allen wrench.

**201 Readily Accessible**
Readily accessible means exposed or easily exposed for cleaning and inspection, without the use of tools.

**202 Air Break (Water Distribution System)**
Air Break (Water Distribution System) means the unobstructed vertical distance between the supply line opening and the top level of the receptacle’s overflow standpipe or relief port which is below the maximum flood level rim of the receptacle.

**203 Air Gap (Water Distribution System)**
Air Gap (Water Distribution System) means the unobstructed vertical distance through the free atmosphere between the lowest opening from any pipe or faucet supplying water to a tank, plumbing fixture or other device and the maximum flood level rim of the receptacle.

**204 Automatic Shutoff Assembly**
On machines that vend perishable food, the automatic shutoff assembly also known as “Health Switch” shall mean the Automatic Sensor, the Automatic Control and wiring harness.

**205 Automatic Control**
The health control shall mean that portion of the automatic shutoff assembly, which either electronically or mechanically disables vending in the event the temperature should deviate from the specified limits.

**206 Automatic Sensor**
The automatic sensor shall mean that portion of the automatic shutoff assembly, which is used to measure the food storage compartment temperature in hottest or coldest location whichever is applicable.

**207 Backflow**
Backflow means the undesirable reversal of flow of water or other liquid, mixture or substance into the distribution pipes of the drinking water supply by either backpressure or backspihonage.

**207.1 Backpressure**
Backpressure means a backflow condition which may occur in a drinking water distribution system when pressure from the in-machine water is higher than in the drinking water supply, causing a reversal of flow into the drinking water supply line.

**207.2 Backspihonage**
Backspihonage means a backflow condition, which may occur in the drinking water distribution system when a negative (sub-atmospheric) pressure causes a reversal of flow into the drinking water supply line.

**208 Bulk Food**
Bulk food means food which when dispensed to the customer is not commercially packaged, wrapped or similarly protected.

**209 Cleaning**
Cleaning means the physical removal of residues of foods and other soiling materials.

**210 Certified Laboratory**
Certified laboratory means a laboratory, which is approved by the USEPA or the State or is ISO 17025 accredited.
211 **Easily Cleanable**
Easily cleanable means readily accessible and of such material, finish and fabrication that residue may be completely removed by normal cleaning methods.

212 **Closed**
Closed means fabricated with no openings exceeding 1.0 mm (1/32 inch) in width.

213 **Condensing Unit**
Condensing unit means that part of the refrigeration system located downstream from the compressor discharge and upstream from the liquid refrigerant line, which converts compressed gas refrigerant to liquid by mechanically induced heat transfer. The term “condensing unit” shall not include the evaporator or lines.

214 **Contaminant (Water Distribution System)**
Any Toxic material, such as a solid, liquid, or gas, if introduced to a potable water supply would cause it to be unsafe for human or animal consumption.

215 **Controlled Location Vending Machine**
Controlled location vending machine means a limited service vending machine which:
A. Does not dispense potentially hazardous food,
B. is designed so that it can be filled and maintained in a sanitary manner by persons at the location, and
C. is intended for, and used at, locations which protect against environmental contamination.

216 **Corrosion Resistant Material**
Corrosion resistant material means a material, which under prolonged contact with food, cleaning compounds and sanitizing solutions maintains its original surface characteristics.

217 **Cross Connection Hazards (Water Distribution System)**
Cross Connection Hazards (Water Distribution System) means any connection between the potable water supply and a source of pollution or contamination. This connection may be temporary or permanent, potential or actual, indirect or direct.

218 **Deionization (DI) or ion exchange**
Deionization (DI) or ion exchange means a process of passing water through anionic or cationic food-grade resins for the purpose of chemically combining and removing/reducing dissolved solids.

219 **Dry Cleaning**
Dry Cleaning means cleaning, vacuuming, wiping or dusting by dry methods.

220 **Durable**
Durable means the capacity to maintain physical and functional characteristics over prolonged periods of normal use, which includes field servicing and field or shop maintenance.

221 **Employee**
Employee means any operator or any person employed by the operator who works with any food to be dispensed through vending machines, or who comes in contact with food contact surfaces of containers, equipment, utensils or packaging materials used in connection with vending machine operations, or who otherwise services or maintains one or more such machines.

222 **Filtration-Only Machine**
Filtration-only machine means a water vending machine, which provides taste, odor, turbidity and disinfection treatment but not a reduction in total dissolved solids.
223  Food  
Food means any raw, cooked or processed edible substance, ice, water, beverage or ingredient used or intended for human consumption.

224  Food Contact Surfaces  
Food contact surface means the surfaces of equipment and utensils with which food normally comes in contact, or those surfaces from which food may drain, drip or splash into food or onto surfaces normally in contact with food.

225  Hazard  
Hazard means a biological, chemical, or physical property that may cause an unacceptable consumer health risk.

226  Hazard, High (Water Distribution Systems)  
Any actual or potential threat of contamination to the potable water supply is considered a health hazard. Such materials entering the water supply are considered toxic or a contaminant.

227  Hazard, Low (Water Distribution Systems)  
Any actual or potential threat of pollution to the potable water supply is considered a low hazard. A low hazard should be considered something “aesthetically objectionable.” Examples may include steam, air, food, or beverages.

228  Hermetically Sealed Container  
Hermetically sealed container means a container, which is designed and intended to be secure against the entry of microorganisms and to maintain the commercial sterility of its contents after processing.

229  In-Place Cleaning and Sanitizing  
In-place cleaning and sanitizing means a method for cleaning and sanitizing the surfaces of the equipment in their assembled form by circulating a detergent solution, water rinse and sanitizing solution over the surfaces.

230  Letter of Compliance  
Letter of compliance means a written statement by the NAMA Public Health Consultant to the manufacturer which certifies that the manufacturer’s vending machine complies with the requirements of the NAMA Construction Standard and the Public Health Service Model Code. This Letter identifies the type of vending machine by product vended, model number and date the Consultant issued the initial certification.

231  mg/L  
mg/L means milligrams per liter, which is the metric equivalent of parts per million.

232  Non-Food Contact Surfaces  
Non-Food contact surfaces means all surfaces other than those defined as “food contact surfaces”.

233  Operator  
Operator means any person who by contract, agreement, or ownership is legally responsible for furnishing, installing, servicing, operating or maintaining one or more vending machines.

234  Packaged Food  
Packaged food means food which when dispensed to the customer, is bottled, canned, cartoned, wrapped or otherwise similarly protected.
235 Pollutant (Water Distribution System)
An impairment to a degree which does not create a health hazard, but does adversely and unreasonably affect the water for domestic use. Pollutant will make the water look, smell and taste bad, but illness or death will not result.

236 Potentially Hazardous Food (Time/Temperature Control for Safety Food).

236.1 Potentially hazardous food (time/temperature control for safety food)
Means a FOOD that requires time/temperature control for safety (TCS) to limit pathogenic microorganism growth or toxin formation as defined in the most recent version of the FDA Food Code (see Appendix C)

237 ppm
ppm means parts per million.

238 Public Health Consultant (Consultant)
Public Health Consultant (Consultant) means a person retained by NAMA for the purpose of performing evaluations under the Vending Machine Evaluation Program.

239 Radiation Dosage
Radiation dosage means radiation intensity at 254 nanometer (nm) wavelength multiplied by time.

240 Removable
Removable means capable of being detached from the main unit with the use of simple tools such as a screwdriver, pliers, open-end wrench or Allen wrench.

241 Readily Removable
Readily removable means capable of being detached from the main unit without the use of tools.

242 Reverse Osmosis (RO)
Reverse Osmosis (RO) means a process that reverses, by application of pressure, the flow of water in a natural process of osmosis so that water passes from the concentrated to the dilute solution through a semipermeable membrane.

243 Sanitization
Sanitization means the application of cumulative heat or chemicals on cleaned food-contact surfaces that when evaluated for efficacy is sufficient to yield a reduction of 5 logs, which is equal to 99.999% reduction of representative disease microorganisms of public health importance.

244 Sealed
Sealed means fabricated without openings to prevent the entry of moisture.

245 Self-Closing
Self-Closing means capable of closing without manual assistance from any position by the use of springs, gravity or other means.

246 Single Service Articles
Single service articles means cups, containers, lids, closures, plates, knives, spoons, stirrers, paddles, straws, napkins, wrapping materials, toothpicks and similar materials that are designed and constructed to be used once and discarded.

247 Slacked Frozen Food Vending Machine
Slacked frozen food vending machine means a vending machine designed to hold slacked frozen food that is not ready-to-eat without first applying a re-heating process to it.
248 Slacking
Slacking means the process of moderating the temperature of a pre-cooked frozen food, such as allowing a food to gradually increase from a temperature of -23°C (-10°F) to -4°C (25°F) to facilitate even heat penetration during the re-heating process.

249 Smooth
Smooth means a surface free of pits and inclusions, and having cleanability at least equal to a Number 3 (100 grit) finish on stainless steel for food contact surfaces and commercial grade hot-rolled steel free of visible scale for non-food contact surfaces.

250 TDS
TDS means total dissolved solids.

251 Temperature Measuring Device (TMD)
Temperature measuring device (TMD) means a thermometer, thermocouple, thermistor or other device that indicates the temperature of food, air or water.

252 Toxic
Toxic means having an adverse physiological effect on humans.

253 Ultraviolet (UV)
Ultraviolet (UV) means ultraviolet energy within the 254 nanometers (nm) band of the electromagnetic spectrum.

254 Ultraviolet Disinfection
Ultraviolet disinfection means exposure to a dosage of UV energy of at least 16,000 microwatt seconds per square centimeter (16,000 µWs/cm²) at 254 nanometers (nm).

255 Vended Drinking Water
Vended drinking water means water intended for human consumption which has been processed by a water vending machine to reduce or remove turbidity, odors, and off tastes and which disinfects the water. Such water shall meet all applicable requirements of the U.S. Environmental Protection Agency Primary and Secondary Drinking Water Standards set forth in 40 CFR, 141 and 143.

256 Vended High Alkaline Water
Vended high alkaline water means water intended for human consumption produced by a vending machine through electrolysis, liquid or solid chemical injection or other processes. With a pH range of 8.5 to 10.

257 Vended Purified Water
Vended purified water means water intended for human consumption produced by a vending machine through distillation, ion-exchange, reverse osmosis, or other processes. The processed water shall meet all applicable requirements for purified water as specified in the Pharmacopoeia of the United States of America, 20th Edition, 1980.

258 Vending Machine
Vending machine means any self-service device which, upon insertion of a coin, paper currency, token, card, key, or upon receipt of payment by other means, dispenses unit servings of food either in bulk or in packages without the necessity of replenishing the device between each vending operation. It shall also include self-service dispensers equipped for coin, paper currency, token, card or key operation and optional manual operation. Unless otherwise stated, vending machine includes controlled location vending machines.
259 Water Vending Machine
Water vending machine means a water-connected vending machine designed to dispense drinking water, purified water and/or other water products. Such machine shall be designed to reduce or remove turbidity, off-tastes and odors and to provide disinfection treatment. A process for total dissolved solids reduction or removal may also be used.

260 Water Dispensing Unit
Water dispensing unit means a water-connected vending machine designed only to dispense water products. The unit contains no treatment or disinfection equipment.

261 Water Dispensing Unit (Enhanced)
Enhanced water dispensing unit means a water-connected vending machine that contains some treatment devices such as UV disinfection and final water polishing filter.

262 Wet Cleaning
Wet Cleaning means cleaning with water, detergents or other liquid.
300 CABINET EXTERIOR

300 Cabinet Shell and Frame

300.1 Cabinet Design
The exterior of the vending machine cabinet shall be designed to facilitate cleaning and to minimize the entrance of insects and rodents and other pests.

300.2 Cabinet Materials
All materials used in the construction of vending machines and integral parts shall be of such type, gauge and durability as to provide a machine of sturdy construction, so designed, fabricated and finished as to facilitate their being kept clean and capable of withstanding:
A. The effect of the environment under normal use conditions;
B. Corrosive action caused by repeated cleaning and polishing using normal procedures;
C. Corrosive action of food wastes which may come in contact with material;
D. Normal wear from food vending, field servicing and field or shop maintenance; and
E. Penetration of the exterior materials by insects, rodents and other pests.

300.3 Cabinet Finish
The cabinet exterior shall be corrosion resistant. Paint, enamel, plastic coatings and equivalent finishes may be applied to improve cleanability or prevent corrosion. Surfaces to be so finished shall be properly prepared to effect satisfactory bonding.

300.4 Cabinet Fabrication
The cabinet exterior shall be constructed to be easily cleanable and to protect food from contamination by insects, rodents, dust and moisture seepage as may be encountered in the intended use environment. All exposed joints, seams and edges on the cabinet exterior and other integral parts shall be welded, soldered, fastened, trimmed, filled, gasketed or hinged in a manner consistent with good engineering, manufacturing and sanitation practices.

300.5 Two-Piece, Field Assembled Cabinets
Cabinets consisting of a base and upper section which are shipped separately for field assembly shall be accompanied by a gasket kit with installation instructions, whose proper use will prevent moisture seepage, dust, insect and rodent entry where the cabinets are joined. Other closing methods, e.g., mastics or flanges, which provide equivalent protection, are acceptable.

301 Cabinet Doors and Panels

301.1 Door Construction, Mounting and Closure
Cabinet doors opening directly into food or food container compartments shall be constructed and mounted to maintain alignment and closed under use conditions to prevent the entrance of moisture seepage, dust, insects and rodents. The space between door and cabinet in closed, locked position shall not exceed 1.6 mm (1/16 inch) at any point along the interface. Gasketing shall be provided, if necessary, to meet this requirement. A door closure meeting this specification shall be considered to prevent moisture and dust entry if:
A. Effective gasketing is used; or
B. The interface surfaces are at least 12.7 mm (1/2 inch) wide; or
C. Jambs or flanges are used to form an L-shaped entry path to the interface.
301.2 Door Tracks and Guides
Bottom tracks and guides for doors and panels shall be fabricated so as to minimize the collection of food particles and other foreign matter and shall be shallow and wide enough to be easily cleanable. The following are examples of design features complying with this requirement.

A. Bottom Tracks and Guides.
Shall be clear open slots, continuous or at intervals; or clean-out holes at the ends or terminating at least 12.7 mm (1/2 inch) short of the framing at each end

B. Side Tracks and Guides.
Shall be removable for cleaning or shall be made shallow and wide enough to be easily cleaned in place

C. Channel Sections.
Shall be readily removable for cleaning.

302 Vend Openings for Bulk Food Vending Machines
All customer service openings to chutes and nozzles of all bulk food vending machines shall be designed and constructed to minimize the entrance of dust, seepage and other contaminants and to protect against entrance of insects and rodents. Such openings shall be designed and constructed to minimize customer handling of food contact surfaces or cup rim contact surfaces.

302.1 Protection Of Vending Stage, Dispensing Nozzles And Chutes
A. Vending Stage.
1) The vending stage shall be protected from dust, insects, rodents and other pests by a self-closing door or panel if there are openings into the cabinet interior at the outlet end of dispensing nozzles or chutes.
2) Doors or panels shall fit and close so that no opening larger than 1.6 mm (1/16 inch) exists.
3) The vending stage need not be equipped with a self-closing door or panel if the stage is designed with a mechanism that makes the dispensing nozzles or chutes inaccessible when the machine is not vending. The vending stage drain shall also be equipped with a device, which will preclude the entrance of insects, rodents and other pests.
4) The cup filling area or platform of controlled location vending machines shall not require a door or cover if there is no opening into the cabinet interior at that point other than for dispensing nozzles or trapped waste tubing.
5) Unattended location refrigerated display cases that utilize the cabinet doors as the customer access point shall be equipped with self closing doors, and cannot have a stay open position on the hinge.

B. Dispensing Nozzles and Chutes
Protection of dispensing nozzles and chutes shall be accomplished by one or more of the following:
1) Recessing or elevating the orifice to minimize the possibility of contamination;
2) placing vending stage components, such as baffles or drip aprons, in such a manner as to afford effective protection; or
3) employing other means demonstrated to be satisfactory.

C. Vending Stage Design for Bulk Food
The vending stage area shall be:
1) Designed to divert condensation or other moisture (non-food) from the normal filling position of the container receiving the food or beverage.
2) Constructed without open seams and shall be easily cleanable or readily removable for cleaning and inspection.

D. Vending Chute, Flaps or Closures
The vending chute or similar dispensing aperture on the outside of ball gum, nut,
popcorn, chip and similar bulk food vending machines shall be protected at the outlet end by a self-closing flap; or similar closure which protects the food-contact surface of such chute or aperture from contamination by normal manual contact, dust, insects and rodents. Such flaps shall fit snugly in the closed position so that no cracks or openings larger than 1.6 mm (1/16 inch) exist.

E. Packaged Food Delivery Doors and Lids
Horizontal, vertical or sloping doors and lids which open directly into packaged food compartments shall be constructed and mounted to minimize the entrance of dust and foreign matter from the door or lid into food areas when the door or lid is opened for food loading or delivery. Such doors or lids opening to the outside for customer service shall be self-closing by mechanical or gravity means. If necessary, flanges or other diversion devices shall be used at the hinge line to provide protection to interior food areas.

F. Packaged Confection Vending Machines
The dispensing tray or compartment of packaged candy, cookie, pastry and similar product vending machines shall be closed with a rodent-proof cover. Such a cover is not required in machines, which are otherwise equipped with a baffle or other closure in the dispensing chute, which effectively precludes rodent entry into the food storage zone.

303 Other Cabinet Openings

303.1 Ventilation Openings

A. Louvers and Flaps
Louvers and flaps, where used, shall be separated sufficiently to facilitate periodic removal of accumulated dust and dirt by the use of brushes, vacuum or other cleaning methods. Louvers and flaps shall be drip deflecting.

B. Screening Required Accessibility and Screening Required
All ventilation openings into vending machines shall be accessible for cleaning and shall be cleanable. Perforated sheet metal or other materials with equivalent cleaning and insect and rodent exclusion properties are acceptable.

C. Screen Size
Screening material size:
1) For openings into food and container storage spaces shall not be less than 16 mesh (16 strands per 25.4 mm [1 inch]) or equivalent.
2) For continuous forced draft exhaust openings shall not be less than 12 mesh (12 strands per 25.4 mm [1 inch]).
3) For compressor compartments shall not be less than 4 mesh (4 strands per 25.4 mm [1 inch]) or equivalent. If the compressor compartment contains openings into the food compartment such as a drain line from the evaporator, then those openings shall be further protected with screening equivalent to the size noted in item 1 above or other effective exclusion methods like a p-trap on the drain line.

D. Screening Exemption
Static or non-forced air condensing units may be mounted on the cabinet exterior when they do not create potential insect or rodent harborage. They shall not require screening.

303.2 Service Connection Openings

A. Closures Required
All service connections through an exterior wall of the machine, including water, gas, electrical and refrigeration connections shall be closed to prevent the entrance of insects, rodents and other pests.

B. Closing Methods
Grommets, plugs, clamps, or other effective closures may be used. The closure may be
shipped with the machine in packet form rather than in the installed position if the opening is not used until the point of installation.

303.3 Shipping Bolt Holes
Where shipping bolt holes are used, such holes shall be closed by use of grommets, plugs, durable tapes or reusable bolts provided by the manufacturer. Such closures shall be easily identifiable or adequately described in the service manual for their intended use.

303.4 Miscellaneous Openings
A. Closures Required
Miscellaneous openings into the cabinet, such as those for optional service connections, shall be provided with effective closures by the manufacturer. Closures shall be easily identifiable, properly marked or adequately described in the service manual for their intended use.

B. Closure Exemptions
The requirements of Item 303.2 do not apply to coin apertures, coin returns or crown pullers, nor to other openings of 1.6 mm (1/16 inch) or less which may be necessary for label inserts or similar functional purposes.

304 Cabinet Elevation and Movability

304.1 Design Options
One or more of the following design features shall be utilized to facilitate cleaning under and around a vending machine:
A. A machine to be moved shall not exceed 36.6 kg (80 pounds); or
B. A machine designed to be sealed to the floor or counter to prevent seepage underneath shall have the sealing method to be used described in detail in the installation manual. If the method requires the application of a mastic, gasket or other impervious material to meet this requirement, such material shall be provided with the machine; or
C. A machine mounted on legs or continuous side panels shall have an unobstructed space of at least 152.4 mm (6 inches) between the floor and the bottom of the machine or any component of the machine, except for the side panels or legs; or
D. A machine mounted on casters, rollers or gliders which permit it to be moved by one person; or
E. A machine designed for counter use mounted on legs or continuous side panels shall have an unobstructed space of at least 10 centimeters (4 inches) between the counter and the bottom of the machine or any component of the machine, except for the side panels or legs. The clearance space between the table and TABLE-MOUNTED EQUIPMENT may be:

1) 7.5 centimeters (3 inches) if the horizontal distance of the table top under the EQUIPMENT is no more than 50 centimeters (20 inches) from the point of access for cleaning; or
2) 5 centimeters (2 inches) if the horizontal distance of the table top under the EQUIPMENT is no more than 7.5 centimeters (3 inches) from the point of access or cleaning

304.2 Legs, Feet and Levelers
A. Where legs and feet are used for cabinet elevation, the materials and design employed shall provide ample support with a minimum of cross bracing.
B. They shall be fastened to the cabinet and shaped where they contact the floor to minimize the accumulation of dirt and prevent the harborage of insect, rodents and other pests.
C. All openings to hollow sections shall be closed.

D. Legs and feet shall be of simple design with no exposed threads.

E. Gussets shall be assembled to the equipment to ensure easy cleanability and eliminate insect harborage.

F. The resultant assembly shall have no recessed areas or spaces.

G. If levelers are used, threads shall be protected against soil, or the threads through the bottom edge of the side panels shall be easily cleanable.

### 304.3 Side Panels

Where the bottom of the side panel is turned inward to form a channel, such channel shall not be more than 50.8 mm (2 inches) in width and shall be closed to permit cleaning under the machine and to preclude the collection of debris.

### 304.5 Kick Plates

If kick plates are provided on machines meeting the requirements of Items 304.1.3) or 304.1.5), they shall be readily removable to permit access to the space beneath for inspection and cleaning. Kick plates shall be capable of being opened or removed without opening the machine cabinet door.

### 305 Disconnection Safeguards For Machines Vending Potentially Hazardous Food

All service connections to utilities, including water, gas, and electric shall be of a type, which will discourage their unauthorized or unintentional disconnection.
400 CABINET INTERIOR – FOOD CONTACT SURFACES AND COMPONENTS

400 Design and Construction of Food Contact Surfaces

400.1 General Requirements
Food contact surfaces and components shall be designed to be easily cleanable and to provide protection of vended foods against contamination.

400.2 Access for Cleaning and Inspection
All food containers, valves, pipes, tubes, fittings, chutes, faucets, discharge nozzles and other food contact components, unless designed for in-place cleaning, shall be readily accessible and easily disassembled for cleaning and inspection. When disassembled, all food contact surfaces shall be visible for inspection and cleaning.

401 Materials for Food Contact Surfaces

401.1 General Requirements
Materials used as food contact surfaces shall be smooth, durable, non-toxic, corrosion resistant, nonabsorbent and capable of withstanding repeated cleaning and sanitizing by normal procedures. Materials, which are worked during fabrication, may require additional treatment following fabrication to render them corrosion resistant. Food contact materials shall not impart an odor, color, taste or contribute to the adulteration of food.

401.2 Compliance Required
The Public Health Consultant shall evaluate all materials to preclude the use of any material, which may contaminate vended products for which the machine was designed to dispense. All food contact materials shall be safe and nontoxic in the use context. Where any material of unknown toxicity is used, the Public Health Consultant shall require the manufacturer to submit toxicological data in evidence of its conformity to applicable FDA standards. The U.S. Food and Drug Administration’s "Food Additives Amendment", 21 CFR 170-189, shall be the basis for acceptability of all food contact surfaces.

401.3 Food Contact Material Finish
The finish of all food contact surfaces shall be smooth and free from breaks, corrosion, open seams, cracks, crevices, and chipped surfaces. Paint, enamel and similar substances shall not be used as a finish on food contact surfaces. This shall not prohibit the use of materials resulting from future advancements in technology provided the requirements of this Section are met.

402 Fabrication and Assembly of Food Contact Surfaces

402.1 Threaded Surfaces
All food contact surfaces of vending machines shall be designed to preclude contact between food and V-type threaded surfaces; provided that, in design applications where such contact is unavoidable (e.g. ice makers) exposed threads shall be minimized.

402.2 Welding and Soldering
Welded and soldered areas shall be smooth, corrosion resistant, nontoxic and easily cleanable. Solder shall be free of cadmium, antimony, bismuth, or other toxic materials. Solder and flux containing lead in excess of 0.2% may not be used on surfaces that contact food. Whenever solder or weld material is used to fill seams or to round out angles or corners it shall be securely bonded to the adjoining material so that it will not chip or
crack. The resulting surface shall be smooth. Flux and catalytic material shall be removed.

402.3 Internal Angles and Corners
Internal angles or corners of food contact surfaces shall be smooth and have a continuous radius. The radii shall not be less than 3mm (1/8") to ensure adequate cleaning, maintenance and, where applicable, products flow.

402.4 Gaskets
When gaskets are used in a food contact application, the material shall comply with Item 401.1 and be easily cleanable. Gasket retaining grooves shall be easily cleanable.

403 Design Requirements for In-Place Cleaning
In machines with food contact surfaces that are not readily removable, in-place cleaning of such surfaces may be permitted, provided the following requirements are met:
A. The food contact surfaces are arranged so that cleaning and sanitizing solutions can be circulated throughout the fixed system;
B. Such solutions shall contact all food contact surfaces;
C. The system is self-draining or otherwise capable of being completely evacuated; and
D. The cleaning procedures result in thoroughly clean and sanitized equipment.
E. The in-place cleaning procedure shall be validated by subjecting the method to the challenge procedures as specified in NSF Standard 25 section 6.1 and annex A. Such test shall be performed by a certified laboratory and the results submitted to the Public Health Consultant.

404 Design Requirements for Non-Pressurized Food Containers

404.1 General
The openings into all non-pressurized containers used for the storage of bulk food and ingredients shall be designed to prevent contamination from reaching the interior of the containers. This may require the use of covers or aprons. If covers are used they must comply with the requirements of Item 404.2.

404.2 Cover Design
If covers are necessary to comply with Item 404.1 they shall meet the following requirements:
A. Covers shall be removable for cleaning;
B. The covers having hinges or pivots shall be designed to minimize the accumulation of liquid or debris on their surfaces, be readily removable and easily cleanable;
C. The covers shall be flanged to overlap the container opening;
D. The covers shall be sloped to provide drainage from the cover surfaces to prevent the collection of condensation, moisture or splash;
E. The cover shall be considered adequate if domed, curved, angled, tilted, or slanted to minimize the collection of liquid spillage or condensation;
F. Concave covers or cover areas shall not be used;
G. If covers are in sections, flanges shall overlap at all joints and be constructed to prevent the entrance of condensation or other contaminants into the product storage area.

404.3 Port Openings
Any port opening through the cover shall be flanged upward at least 4.8 mm (3/16 inch) and shall be provided with an overlapping cover flanged downward.
404.4 Other Openings
Pipes, thermometers, rotary shafts, equipment and other functional parts extending into non-pressurized containers shall be installed to exclude condensation, drippage and dust.

405 Design Requirements for Non-Pressurized Water Containers

405.1 Fixed Containers
Fixed containers, which are not a part of the enclosed water system, such as water float tanks and reservoirs for the storage of ingredient water shall be designed and fabricated to conform to all requirements for food contact surfaces included in Items 400, 401 and 402.

405.2 Portable Urns and Containers
Portable urns and containers used for ingredient water, including controlled location vending machine decanters and carafes provided by the machine manufacturer, shall be designed and maintained as food contact surfaces, conforming to all applicable requirements of Items 400, 401 and 402.

406 Opening Devices

406.1 Food Contact Materials
Opening devices installed by the manufacturer as integral parts of the vending machine cabinet, either external or internal, and which come into contact with the food or the food contact surfaces of containers, shall be constructed of smooth, non-toxic, corrosion resistant, and non-absorbent materials.

406.2 Removability
Opening devices that come into contact with food or food contact surfaces during use shall be readily removable.

406.3 Cleanability
The opening device and its housing which are subject to food splash, spray or spillage during use shall be constructed to be easily cleanable.

406.4 Protection of Opener
Those parts of multi-use opening devices which come into contact with the food or food contact surfaces of the container shall be reasonably protected from customer contact, dust, insects, rodents and other contamination.

407 Icemaker Systems
For the purpose of this section, the "icemaker system" shall include the water reservoir, ice storage hopper, icemaker harvester unit, ice dispensing chute and water and melt-water tubing.

407.1 Accessibility
All parts of the icemaker system shall meet the applicable requirements of Item 400.2.

407.2 Design, Construction and Materials
Parts of the icemaker system which come into contact with water or ice shall meet all applicable requirements of this Standard for food contact surfaces. V-type threads are acceptable where necessary for proper functioning with exposed threads minimized as specified in Item 402.1.

407.3 Water Reservoirs
All reservoirs and reservoir components shall meet applicable requirements of Item 405 inclusive together with the following:
A. The water shall be supplied to icemaker reservoirs through an approved air gap as specified in Item 602.3 or other appropriate backflow prevention device as specified in Item 600.
B. Reservoir interiors shall be readily accessible for inspection and cleaning without the need to remove any intervening component not associated with the water reservoir.
C. Reservoirs shall be removable from their in-use position.
D. Reservoir floats and assemblies, which come into contact with water, shall be
smooth, corrosion resistant and easily cleanable.

E. Outlet tubing shall be removable from the reservoir base.

F. Standpipes in the reservoir, other than those forming an integral part of the side wall, or connected to the side wall, shall be positioned away from side walls to permit manual cleaning of the reservoir interior.

G. Reservoirs shall be cylindrical or have corners with at least 3.2 mm (1/8 inch) radius.

**407.4 Water Tubing**

All water and melt water tubing in the icemaker system shall be removable.

**407.5 Ice Storage Hoppers**

Ice storage hoppers shall be:
A. Readily accessible, and all internal components readily removable; and
B. Located with sufficient overhead clearance to allow manual cleaning and inspection; or
C. Shall pivot outward to permit such cleaning and inspection; or
D. Shall be readily removable.

**407.6 Icemaker Harvesters**

Icemaker harvesters shall be designed so that all water and ice contact surfaces are accessible for cleaning.

**407.7 Ice Dispensing Chutes**

Ice dispensing chutes shall be designed to be readily removable or readily accessible for inspection and cleaning. The ice contact surfaces shall be smooth and free from design features, which might result in water retention or bacteria buildup.

**407.8 Water Filters**

Water filters supplied inside the machine by the manufacturer shall be located a sufficient distance above the cabinet floor to allow sanitary replacement of elements, provided that filters with throwaway shells are exempt if element exchange can be done in a sanitary manner.

**408 Ice bagging systems**

Automated ice bagging systems that utilize a blower fan to hold bag open during filling shall be equipped with a filter on the inlet side of the fan to prevent contamination and foreign objects from being deposited in the bag.
500 CABINET INTERIOR - NON-FOOD CONTACT SURFACES
AND COMPONENTS

500 Design and Construction of Non-Food Contact Surfaces

500.1 General Requirements
The non-food contact surfaces of the interior of vending machines shall be designed and constructed to be easily cleanable, to minimize inaccessible areas and to provide protection of vended foods against contamination.

A. Wet Cleaned Surfaces
Where food splash, spillage or waste may be deposited or adhere to the surface, such surface shall be capable of being easily cleaned by wet cleaning methods.

B. Dry Cleaned Surfaces
Where dust, dry food or dry ingredient material may collect but not adhere to a surface, such surface shall be capable of being easily cleaned by dry cleaning methods.

501 Material Requirements
All materials used for non-food contact surfaces and components shall be durable and easily cleanable.

501.1 Non-Food Contact Surfaces
Non-food contact surfaces shall be smooth, non-absorbent and easily cleanable. Materials in contact with packaged food shall resist harmful physical and chemical changes resulting from storage compartment temperatures, humidity, product loading and vending. Changes in color caused by heat and similar changes, which do not create adulteration or cleaning problems, are not intended for coverage under this Section.

501.2 Non-Food Contact Material Finish
The finish of all non-food contact surfaces shall be smooth, non-absorbent and easily cleanable. Paint, enamel, plastic coating or equivalent finishes may be applied to non-food contact surfaces to improve their cleanability or prevent corrosion. Non-wearing, non-corrosion resistant surfaces shall be rendered corrosion resistant by the application of such finishes. Surfaces to be so finished shall be properly prepared to effect satisfactory bonding. The surface coating used shall, under normal use, not chip or flake onto food contact surfaces. Lead-based paint or other coatings containing more than 0.06% lead by weight shall not be used.

502 Fabrication and Assembly Requirements of Non-Food Contact Surfaces

502.1 General Requirements
The interior of the vending machine cabinet shall be fabricated to be easily cleanable, minimize inaccessible areas and provide protection of vended foods against contamination.

502.2 Joints and Seams
All exposed joints and seams which under normal vending and servicing operation are subject to food spillage shall be sealed or be constructed to be easily accessible for cleaning and to facilitate maintenance operations. Non-shrinking mastic type compounds, solder and other effective fillers which form a secure durable bond with the adjoining materials may be used to fill nonfood contact joints and seams. The resultant surface shall be easily cleanable. Solder, if used, shall contain not more than 0.2% lead.
502.3 Draw Fasteners or Devices
Screws, rivets, nuts, bolts, metal clips and similar devices, if of a low profile, may be used in joining non-food contact surfaces.

502.4 Angles, Channels, Gussets or Hollow Sections
Angles, channels, gussets or hollow sections shall be installed to minimize the accumulation of dirt, spillage or waste materials. Hollow sections in bulk food machines shall be completely closed.

502.5 Reinforcing and Framing
Reinforcing and framing members shall be located and attached in such a manner as to be easily cleanable. Channels that form hollow sections shall be closed at each end. These channels may be open at each end if they are readily accessible along the entire channel length for cleaning.

502.6 Gaskets
Gaskets used to effect a tight fit between interior doors, lids or panels, and component surfaces shall be made of resilient material and shall be chemically stable and nonabsorbent. Exposed surfaces of gaskets shall be easily cleanable. Hollow or spongy-center gaskets shall be sealed where exposed to splash or spillage in normal operation.

502.7 Hinges
Hinges that are designed to be used in applications that are subject to splash or spillage during normal operation shall be easily cleanable.

503 Installation of Fixtures and Components

503.1 Design and placement
Cabinet fixtures and components shall be designed, installed and protected to minimize the deposit and retention of splash, spillage, condensation and seepage encountered in normal machine operation.

503.2 Access
The placement of fixtures and components within the machine cabinet shall take into consideration the needs of each such fixture or component for cleaning, loading and servicing.

503.3 Mounting
Where necessary to provide access to areas which in normal operation are subject to splash or spillage, any intervening component mounting, suspension or anchoring member shall be pivoted, hinged or on tracks, or the intervening component shall be easily removable.

504 Cup Turrets and Magazines

504.1 Design
Magazines shall be designed so that cups, bowls or other containers may be replenished directly from the original package without handling food contact surfaces.

504.2 Protection of Cups and Containers
Cup turrets and magazines shall protect all unpackaged cups and containers from manual contact, splash and spillage. Cup and container storage turrets or magazines shall have a fitted overlapping lid or cover.

505 Refrigeration Components

505.1 Evaporator Protection
Refrigeration evaporator coils exposed to splash or spillage shall be fin less and located to be easily and thoroughly cleaned by brushing. If an evaporator blower or fin type evaporator is used, it shall be protected by its location or by shielding against spilled food or beverage under normal use conditions.
505.2 Separation of Condensing Unit
In vending machines with an integral condensing unit, such unit shall be sealed from a food and container storage space located below it, or, if the space is above the condensing unit, separated from such space by a dust proof barrier. Drain tubes from the food storage compartment are permitted.

506 Shelves, Aprons and Splash Panels

506.1 Construction and Installations
All shelves, aprons, splash panels, false bottoms and similar fixtures, whether fixed or removable, shall be constructed and installed to be easily cleanable.

506.2 Size and Location
Where shelves or aprons are used in normal operation to channel spillage or leakage to waste containers or pans, their size and location shall prevent splash or overflow onto surrounding surfaces.

507 Collection of Spillage, Drainage and Leakage

507.1 General
Vending machines having hot water tanks, reservoirs, or other drinking water receptacles or dispensing packaged liquid foods from which leakage may occur shall be provided with a means for retention of drainage without contamination of the food products within the machine.

507.2 Shelf and Drain Pan Construction
Where shelves or pans are used to collect accidental spillage or leakage, the back and sides shall be turned up a minimum of 25.4 mm (1 inch) and closed throughout the length to permit retention of wastes. Pans, drains or surfaces, which come in contact with drainage or spillage, shall be easily cleanable and corrosion resistant.

507.3 Drains and Drain Outlet Construction
A. When drains are used, the drainage surface shall be sloped to the drain opening.
B. All drains shall be of sufficient size to permit rapid drainage of liquid under normal use conditions to prevent overflow.
C. All drains that do not terminate in closed areas shall be effectively protected against the entrance of insects and rodents by the use of a 16 mesh (16 strands per 25.4 mm [1 inch]) screen or effective trap. If screens are used on drains, they shall be readily removable for cleaning.
D. The product storage compartment within vending machines dispensing packaged liquid foods from which leakage may occur or condensate collect shall be self-draining or provided with a drain outlet that permits complete draining of the compartment.
E. Overflow drains from reservoirs, heater tanks and other potable water receptacles shall not be interconnected with other drain tubing and shall be effectively air gapped (see Appendix D Backflow Hazards).
F. If liquid wastes, which originate within the machine, are discharged into a sewerage system, the point of discharge shall be through an air gap not less than 50.8 mm (2 inches).
508 Waste Containers and Controls

508.1 General
All vending machines dispensing liquid food in bulk, except as provided under Item 508.3, shall be provided with containers for the collection of drip, spillage, overflow or other internal wastes.

508.2 Waste Container Construction
Containers used for the storage or collection of liquid waste within a vending machine shall be leak proof, readily removable, easily cleanable and corrosion resistant. In water vending machines, which utilize the bottom of the cabinet interior as an internal sump, the sump shall be readily accessible and corrosion resistant.

508.3 Bulk Beverage Dispensing Machines
Bulk beverage dispensing machines, which generate no internal liquid wastes, shall be equipped with readily removable drip pans at the dispensing platform in lieu of internal waste containers.

508.4 Directly Connected Machines
Machines directly connected to a water supply shall be equipped with at least two independently operated flow controls to prevent the continuous flow of water should any one of the flow control devices fail.

508.5 Use of Waste Containers
Waste containers within a vending machine may be used for the collection and storage of coffee grounds, coffee containers, filter paper tapes and similar solid materials provided the storage container for such waste materials complies with all other applicable requirements of Item 508.

508.6 Cutoff Controls
Bulk beverage and water vending machines which are required to have an internal waste container under Item 508.1 shall be equipped with an automatic shutoff device at the waste container or other devices or valves which will place the machine out of operation before the waste container overflows. The shutoff device or other control shall:
A. Render the machine incapable of vending until the container has been emptied;
B. Be located so that only the operator can reactivate the machine;
C. Be set at a point which allows removal of the container without spillage or in the case of water vending machines which utilize the bottom of the cabinet interior as an internal sump, be set at a point which prevents water overflow into the cabinet interior;
D. Prevent water or liquid product from continuously running in the event of the failure of any high level or other flow control device in the liquid product or water system.
600 WATER SUPPLY AND WATER SUPPLY PROTECTION

600 Water Supply
Water supplied to vending machines shall be from an approved drinking water supply.

601 Methods of Installation
All water piping, connections and fittings directly connected to a drinking water supply shall be installed in accordance with applicable state or local regulations for drinking water supplies. These regulations include, but are not limited to, the model plumbing codes of The Building Officials and Code Administrators and The International Plumbing Code.

602 Water Supply Protection

602.1 General
The drinking water supply to vending machines shall be protected from backsiphonage and backpressure from in-machine water, beverage and liquid waste.

602.2 Backflow Prevention
Unless connected to a drinking water supply through an air gap, all vending machines connected to a drinking water supply shall be equipped with an appropriate ASSE approved backflow preventor based on the level of hazard posed by the machine (See Appendix D “Backflow Hazards”).

602.3 Air Gapped Machines
In vending machines connected to a drinking water supply utilizing an air gap or air break shall use the following methods:

A. Air Gap
The air gap shall be at least twice the diameter of the supply pipe unless the supply pipe is 13 mm (1/2 inch) diameter or less. Then an unobstructed vertical distance through the free atmosphere of at least 25.4 mm (1 inch) between the supply line opening and the top rim of the water tank, reservoir or receptacle shall be provided.

B. Air Break
In conformance with ASME A112.1.2-2001 a minimum of 39 mm (1 ½ inches) between the supply line opening and the top level of the receptacle’s overflow standpipe shall be provided as long as the overflow standpipe has a cross-sectional area of five (5) times that of the supply pipe and shall terminate above the top rim of the waste container, water bath or other receiving container.

602.4 Hot Beverage Controlled Location Vending Machines
Hot Beverage Controlled Location Vending Machines may utilize "pour-through" design features provided that the external water filling port or drawer covers are secured to the machine. Water decanters provided by the manufacturer shall meet the materials and construction requirements for food contact surfaces.
602.5 Backflow Prevention on Carbonated Vending Machines
Vending machines with internal carbonators, intended to be connected to a drinking water supply under pressure, shall have one of the following located on the water supply upstream of the CO₂ injection system:
A. An air gap meeting the standard for minimum air gaps as defined in 602.3; or
B. A device that conforms to ANSI/ASSE Standard #1022, Backflow preventor for Carbonated Beverage Dispensers; or
C. A device that conforms to ANSI/ASSE Standard #1032, Dual Check Valve Type Backflow preventor for Carbonated Beverage Dispensers – Post Mix Type with an externally installed vented backflow preventor for carbonated beverage dispensers on the water supply.

602.6 Backflow Preventor Protection
A screen of at least 100 mesh (minimum 100 strands per 25.4 mm [1 in]) shall be installed in the supply line immediately upstream of all check valve type backflow preventors used for drinking water supply protection. The screen shall be accessible and removable for cleaning or replacement.

603 Materials
In carbonated beverage vending machines there shall be no potentially toxic tubing or other components in contact with the product water downstream from, and including, the backflow prevention device or the machine connection to the drinking water supply line.

603.1 Prohibited Materials
Tubing and components capable of forming toxic substances as a result of interaction with carbon dioxide or carbonated water, including but not limited to, copper, lead, cadmium, antimony, zinc and their alloys shall not be used.

604 Water Bath Compartments
Where water tubing or other product containers are submerged in atmospheric water bath compartments for heat exchange or other purposes, such tubing and containers shall be of one-piece construction below the overflow level of the water bath.

605 Water Filters – Design and Construction

605.1 Design
Water filters installed by the manufacturer shall be disposable or of a type that is readily accessible for periodic cleaning and sanitizing of reusable (multi-use) parts and replacement of the active element.

605.2 Self-Draining Construction Filter
Cartridges and element chambers shall be capable of being completely drained in the installed position or shall be removable to permit cleaning of water contact surfaces when the active element is replaced or refilled.
700 TEMPERATURE REQUIREMENTS AND CONTROLS

700 Design and Performance
Requirements For Machines Vending Potentially Hazardous Food

700.1 Refrigeration and Heating Design Requirements
A. Vending machines storing and dispensing potentially hazardous food shall have adequate refrigerating and/or heating units, insulation and controls necessary to maintain the air temperature in the food storage compartment at a temperature compliant with the Food and Drug Administration’s 2009 Food Code.
B. In single compartment machines vending both potentially hazardous and non-potentially hazardous food, areas not provided with an automatic shutoff control shall be clearly marked with labels, lights or other means that will alert the route person not to stock potentially hazardous food in those areas.
C. Unattended location refrigerated display cases designed to display potentially hazardous food (time/temperature control for safety food) shall be equipped with a lockout device which will restrict the access to the food if the equipment fails to maintain temperature per Section 700.2

700.2 Refrigeration and Heating Performance Requirements
When submitted to the tests in Item 702 vending machines storing and dispensing potentially hazardous food shall maintain the air temperature in the food storage compartment under high or low temperatures, as applicable, in the use environment for which they are designed as noted in Table 700.1 Temperature Requirements

<table>
<thead>
<tr>
<th>Product Type</th>
<th>Temperature Requirement*</th>
</tr>
</thead>
<tbody>
<tr>
<td>Frozen</td>
<td>-18°C (0°F) or lower</td>
</tr>
<tr>
<td>Slacked</td>
<td>-4°C (25°F) or lower</td>
</tr>
<tr>
<td>Refrigerated</td>
<td>5°C (41°F) or lower</td>
</tr>
<tr>
<td>Heated</td>
<td>57°C (135°F) or higher</td>
</tr>
</tbody>
</table>

Table 700.1 Temperature Requirements
* The food storage compartment temperature may deviate from its design requirement for a maximum of 15 minutes without activation of the automatic shutoff control after which it shall deactivate the machine’s vending mechanism.

701 Automatic Shutoff Controls

701.1 Design Requirements
A. An automatic shutoff control shall be designed and installed to deactivate the vending mechanism, or otherwise prevent consumer access to potentially hazardous foods, whenever the machine does not maintain the temperature in the food storage compartment as noted in Table 700.1.
B. The temperature shut-off requirement shall not apply after machine filling, servicing or defrost cycle for the length of time noted in Table 700.2.
C. Unattended location refrigerated display cases with doors shall have a means to detect the difference between servicing the machine and a vend operation. The recovery period shall not apply to vend operations.
D. Any mode setting, which enables the 30-minute exception rule for stocking of the unit shall be automatically canceled after one cycle without human intervention.
E. The automatic shutoff control on unattended location refrigerated display cases shall not prevent the door from closing in the event the control is activated while the door is open.
### Table 700.2 Design Recovery Time Requirements

<table>
<thead>
<tr>
<th>Product Type</th>
<th>Length of Time</th>
</tr>
</thead>
<tbody>
<tr>
<td>Frozen</td>
<td>75 minutes</td>
</tr>
<tr>
<td>Slacked</td>
<td>75 minutes</td>
</tr>
<tr>
<td>Refrigerated</td>
<td>30 minutes</td>
</tr>
<tr>
<td>Heated</td>
<td>120 minutes</td>
</tr>
</tbody>
</table>

**701.2 Field Evaluation**

The manufacturer shall provide a written procedure to permit field-testing of the automatic shutoff control. This procedure may be a part of the operator's manual or a label in the vending machine. At the time of initial machine evaluation, this procedure is to be verified and approved by the NAMA Public Health Consultant.

**701.3 Accessibility Requirements**

Vending machines shall meet the following accessibility requirements to permit field-testing of the automatic shutoff assembly by inspection and operation personnel:

**A. In machines with mechanical controls:**

1) If the Health control sensor can be tested in its fixed position, any intervening component that must be removed to gain access to the sensor shall be readily removable and the sensor shall be accessible.

2) If the health control sensor must be removed from its fixed position to test, both the intervening components that must be removed to gain access to the sensor and the sensor itself shall be readily removable.

3) In both cases, the intervening component and the health control sensor shall be so located that the total time for access, removal, testing and replacement is equal to or less than the time normally required to service the machine.

**B. In machines with electronic controls:**

1) A visual output and written procedure for testing the automatic sensor temperature shall be provided.

2) To demonstrate that the automatic shutoff control will disable the vending mechanism or otherwise prevent consumer access to potentially hazardous foods, disconnect the sensor from the control. Access to disconnecting the sensor from the control shall be readily accessible and without having to open the door to the food storage compartment. *Note opening and closing the door to the food storage compartment on a machine with electronic controls will activate the service mode (see item 701) and delay deactivation of the vending mode. Extended exposure to ambient air temperature is detrimental to the product stored in the machine.*

**C. Alternative Methods**

The manufacturer may demonstrate to the Public Health Consultant alternative methods of testing both the Automatic Control and Sensor other than those described here. Such methods shall be deemed acceptable, if:

1) The temperature output of the sensor can be verified.

2) The Automatic Shutoff control disables the vending or otherwise prevent consumer access to potentially hazardous foods.

3) The test procedure requires opening the door to the food storage compartment and the entire procedure does not exceed 10 minutes (see open door test).

4) All components needed to gain access for the test procedure are readily removable.
701.4 Manual/Automatic Reset – Location
If the machine has either a manual or automatic reset device for the automatic shutoff control, it shall be located inside the locked vending machine or shall be otherwise protected, so that only an authorized person can reactivate the machine by opening and closing the food compartment door.

702 Equipment Performance Testing
The manufacturer shall conduct tests, under specified conditions at the time of initial machine evaluation or whenever deemed necessary by the NAMA Public Health Consultant. These tests shall demonstrate that the machine will maintain the required air temperature in the food storage compartment within the variance as specified in Item 700.2. The automatic shutoff control will deactivate the vending mechanism or otherwise prevent consumer access to potentially hazardous foods when the temperature in the compartment deviates from the design criteria specified in Table 700.1, except during the recovery period or defrost cycle as specified in Table 700.2.

702.1 Required Refrigerating and Heating Tests
The following tests shall be conducted:
A. 24 hour Performance Test
B. Temperature Recovery (Open Door) Test
C. Compressor Failure Test
D. Power Interruption Test
E. Simulated Customer Selection Test

702.2 Temperature Test
A. The air temperature in the food storage compartment shall be monitored with thermocouples positioned to ensure that all areas maintain the air temperature as specified in Item 700.2. See Figure 700.1 for an example of minimum coverage within the food storage compartment.

B. The thermocouples shall be accurate to ±0.5°C (±1°F).
C. The interval between recording temperatures at each thermocouple shall not exceed 1 minute.

Figure 700.1 Sensor Placement

702.3 Test Procedures
A. 24 hour Performance Test
1) The test shall be conducted for a minimum of 24 hours under full-load conditions using a typical product, for which the vending machine or refrigeration equipment was designed, in an ambient room temperature as noted in Table 700.3.
2) The vertical temperature gradient in the test chamber as measured six (6) inches from the floor and six (6) inches above the top of the vending machine shall not exceed 3°C (5°F).
3) Acceptance of the test results shall be dependent on:
   a) Proper monitoring of the food storage compartment as noted in Item 702.2.A.
   b) The average temperature of any point monitored must meet the required temperature in Table 700.1 for the 24 hour test (excluding defrost cycles).
Table 700.3 Test Environment

B. Temperature Recovery (Open Door) Test
1) The test shall be conducted at ambient room temperature of 23°C ±1°C (73°F±2°F), under no-load conditions.
2) The test shall start after the temperature in the food compartment has stabilized as noted in Table 700.4.
3) The door shall be opened at a 90° angle for 10 minutes ±30 seconds and then closed.
4) The food-compartment temperature shall reach the stabilized temperature within the recovery period noted in Table 700.4.

<table>
<thead>
<tr>
<th>Product Type</th>
<th>Ambient Air</th>
<th>Relative Humidity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Frozen</td>
<td>38°C ±1°C (100°F±2°F)</td>
<td>25% ±5%</td>
</tr>
<tr>
<td>Slacked</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Refrigerated</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Heated</td>
<td>10°C ±1°C (50°F ±2°F)</td>
<td>N/A</td>
</tr>
</tbody>
</table>

Table 700.4 Pull Down Recovery Temp. & Time

C. Compressor Failure Test
1) The refrigeration or heating system of the test machine shall be disabled by unplugging the compressor or heating mechanism, whichever is applicable.
2) The shutoff control shall deactivate the vending mechanism or otherwise prevent consumer access to potentially hazardous foods within 15 minutes after the air temperature of the food-storage compartment exceeds the required temperature noted in Table 700.1.

D. Power Interruption Test
1) The electrical power to the machine shall be disconnected.
2) 15 minutes after the air temperature of the food storage compartment exceeds the temperature noted in Table 700.1 the power to the machine shall be restored.
3) The automatic shutoff mechanism shall deactivate the vending mechanism of the machine or otherwise prevent consumer access to potentially hazardous foods.

E. Simulated Vend Test
Unattended location refrigerated display cases with door access to the food shall
1) Have the door opened at 5 minute intervals during a one hour period.
2) The door shall be opened at a 90° angle for 30 seconds and then closed.
3) The test shall not activate the recovery exemptions stated in 701.1.

703 Test Record Requirement

703.1 Reporting Test Results
Charts demonstrating food storage compartment and shut-off control response temperatures shall be made a permanent part of the records of the NAMA Public Health Consultant.

703.2 Certification & Calibration of Testing Equipment
A. Thermometers and data collection equipment used to conduct the performance tests as outlined in section 702 shall be calibrated against a thermometer that has been certified by the National Institute of Standards and Technology (NIST).
B. The calibration shall be in the range of -23°C (–10°F) to 74°C (165°F).
C. Calibrations shall include both the instrument and any interchangeable probes used with that instrument.

D. Each piece shall be separately identified in the calibration records with serial numbers or owner’s equipment numbers.

E. Whenever charts or data are submitted to the Public Health Consultant as proof of compliance as outlined in Item 703.1 they shall be accompanied by certification records of the test equipment used to obtain the readings.

F. Equipment used for testing shall have been calibrated no more than 12 months prior to the test date.

704 Thermometers

A thermometer or electronic temperature sensor, accurate to ±1.5°C (±3°F) shall be provided to indicate the air temperature of the warmest part of the food storage compartment of refrigerated machines, or the coldest part of the food storage compartment of heated machines, whichever is applicable. The thermometer or temperature sensor display shall be located to allow easy viewing without having to open the food storage compartment and protected against breakage.
800 SAFETY AND MISCELLANEOUS REQUIREMENTS

800 Protection Against Glass Breakage

Glass and similar materials used in lights and panels which may shatter or splinter when broken shall not be used where breakage fragments could enter bulk food or fall onto food contact surfaces, unless protected by removable and cleanable shatter-resistant enclosures, shields or other devices.

801 Machine Stability

All vending machines, other than those intended for counter, table, wall or pedestal mounting, shall meet the applicable requirements governing stability contained in Underwriters Laboratories (UL) Standard 541 or UL Standard 751.

802 Anchoring Carbon Dioxide (CO₂) Cylinders

All carbon dioxide (CO₂) cylinders installed in vending machines shall be anchored by durable straps, chains or clamps which will hold cylinders in place so they will not tip or fall. Other equally effective anchoring devices are permissible.

803 Sanitation Instructions Required

The manufacturer shall provide a set of printed sanitation instructions for operation and maintenance of the machine.

803.1 For Refrigerated Machines

Procedures for field testing temperature cutoff controls shall be provided. Field testing instructions may be in brochure, card or chart form, or may be incorporated into the service manual. Such instructions shall be submitted to the NAMA Public Health Consultant, who shall determine their adequacy in meeting the requirements of this Standard.

803.2 For Lobster Habitat Machines

Procedures for the care and monitoring water conditions shall be included. They shall contain at least the following:

A. Preparation of the water before adding lobsters to the tank.
   1) De-chlorination
   2) Temperature
   3) Salinity and essential mineral content
B. Proper use of test kits and acceptable limits.
   1) Salinity
   2) Ammonia
   3) Nitrate
   4) Nitrite
   5) pH
C. Water and filter maintenance.
   1) How and when to add or change all or some of the water.
   2) How to maintain a viable biofilter.
D. Loading limit (number of lobsters that can be supported).

804 Product Cooling by Immersion

Product cooling by complete or partial submersion in a liquid cooling medium, including ice, is not permitted. Drinking water, soft drink syrup and other liquids, which are circulated through refrigerated water baths for cooling, are exempt from this prohibition, provided the submerged piping or tubing is of continuous, one piece construction subject to materials in Item 401.1.

805 Cleaning Record Retainer

A clip, holder or other device for holding a cleaning record shall be provided in each vending machine having food contact surfaces.
806 Machine Model Identification

806.1 Location
For the convenience of inspection and service personnel, the manufacturer shall post the company name and the machine model designation in one of the following locations:
A. On the cabinet front; or
B. Inside the display area visible through the front; or
C. Prominently visible inside the cabinet

806.2 Small Machines
This requirement shall not apply to small machines, such as ballgum, piece candy, or tabletop vending machines, when the data plate can be readily seen under normal operating conditions.
900 Water Vending Machines

900 Scope
This Section applies to water dispensing units and water vending machines. Section 900 is not intended to cover vending machines whose principal vended products are hot or cold beverages.

900.1 Water dispensing units
Water dispensing units are designed to dispense water products but contain no treatment or disinfection equipment.

900.2 Water vending machines
Water vending machines are designed to produce drinking, purified or other water products when connected to a community or non-community public water supply as defined by the U.S. Environmental Protection Agency (USEPA). Water supplied from these systems shall be potable as determined by the appropriate regulatory authority.

900.3 Water vending machines
Water vending machines shall employ treatment processes, which result in the reduction or removal of turbidity, odors, off-tastes and disinfection. Processes for dissolved solids reduction or removal including, but not limited to, deionization and reverse osmosis may also be used.

901 Requirements Cross-Referenced
Unless otherwise stated in Section 900, all requirements and definitions contained in Sections 100 through 800 of this Standard shall apply equally to water dispensing units and water vending machines where applicable.

902 Exterior Cabinet and Dispensing Platform
All applicable requirements of Section 300, inclusive, shall be met in addition to the following:

902.1 Vending Stage Doors
Vending stage doors of water dispensing units and water vending machines shall meet the requirements of Item 302 and shall be evaluated using the largest size and type of container a customer may be reasonably expected to present, consistent with the machine’s coinage and vend cycle.

902.2 Dispensing Nozzle Protection
The water dispensing nozzle in water dispensing units and water vending machines shall be guarded, recessed or otherwise constructed to protect the nozzle from contact by customers or containers during normal operation as set forth in Item 302.

903 Cabinet Markings and Claims
The water dispensing unit or water vending machine cabinet shall be void of written or graphic material that states or implies a degree of water quality beyond the normal capability of the machine or suggests a source other than actual source.

903.1 Supply Connection Warning
All water dispensing units and water dispensing machines shall have a permanent and legible marking stating, "This Machine Intended for Connection to Inspected, Approved Water Systems Only" or equivalent wording, and shall be affixed to the external cabinet at or near the water inlet connection.
903.2 Filtration-Only Machines
The warning statement in Item 903.1 on filtration-only water vending machines shall state "This Machine Intended for Connection to Inspected, Approved Water Systems Containing 500 ppm of TDS or Less," or equivalent wording.

903.3 Use of Term “Purified”
A water vending machine marked by the manufacturer with the term “purified” shall produce water meeting the definition contained in Item 257.

903.4 Use of Term “High Alkaline” Machines
A water vending machine marked by the manufacturer with the term “high alkaline” shall produce water meeting the definition contained in Item 256 and the additional criteria in 903.7, 909.3.

903.5 Water Dispensing Unit
Water dispensing units shall have a permanent and legible marking “Water dispensing unit only.” or equivalent wording shall be affixed to the front of the cabinet.

903.6 Certification of Machines
The "Letter of Compliance" for a water dispensing unit or water vending machine issued under the NAMA Vending Machine Evaluation Program shall carry qualifications designated in Items 903.2, 903.3, 903.4 or 903.5 as appropriate. In addition, water vending machines with remote treatment systems shall be identified as such on the “Letter of Compliance”.

903.7 Consumer Information
The following messages shall be permanently affixed on water dispensing units or water vending machines as applicable:
A. At or near the vending platform, a reminder to “Use Clean, Sanitized Containers”, and
B. At or near the appropriate product selector, a concise explanation of the difference between drinking and purified water where both products are dispensed.
C. High alkaline machines shall have
   1) A statement of how the water is produced, by electrolysis or chemical (liquid or solid)
   2) When produced by electrolysis a recommended container type (opaque) and list an expiration date.
   3) Advisory on recommended storage
   4) Labeling of the type of water expected i.e. level of pH.

904 Water Contact Components and Surfaces
Internal water tubes and piping, tanks, mineral solution containers and processing components such as filters, DI or RO units, UV systems and fittings in water vending machines shall meet all applicable requirements of Section 400 in addition to the following:

904.1 Water Tank Vents
When used, water tank vent openings shall be flanged upward at least 4.8 mm (3/16 inch) and shall be protected against contamination of the tank contents by screening of not less than 16 mesh (16 strands per 25.4 mm [1 inch]) or by other equivalent methods.

904.2 In-Place Cleaning Provisions
All fixed, in-machine water contact tubing and components, including the UV flow-through system, shall be designed to permit the in-place circulation of sanitizing solutions when exchangeable processing components are removed provided, that waste water tubing, collectors and internal piping normally under supply line pressure are exempt from this requirement.
904.3 In-Place Cleaning Instructions
The manufacturer's "Servicing and Sanitation Procedures" shall clearly describe the recommended procedure for in-place cleaning of the fixed water system and the sanitizing solutions to be used in water vending machines.

904.4 Water Contact Materials
All water contact parts, materials and ingredients used in water dispensing units or water vending machines, or recommended for replacement or replenishment, shall meet the following requirements:
A. The manufacturer shall submit a certification from the supplier, formulator or fabricator for each water contact surface or part used or recommended for replacement use in the machine certifying compliance with 21 CFR, 170-189, Food Additives Amendment in the context of its use.
B. Materials listed in 21 CFR, 182 as generally recognized as safe (G.R.A.S.) shall be listed by the manufacturer but shall not require a supplier certification.
C. Certifications shall also be provided for replacement component materials, such as filter cartridges and reverse osmosis membranes, including those provided or recommended for the machine.
D. Ion exchange resins mineral mixes and similar ingredients provided or recommended for use in water vending machine shall be certified by the supplier to be food-grade and safe for the intended use.

905 Sequence of Procedures

905.1 Disinfection
All water processed through a water vending machine shall be disinfected as the last treatment step prior to being dispensed.
A. Machines utilizing ultraviolet disinfection shall be exposed to a minimum dosage of 16,000 μWs/cm² of ultraviolet energy at 254nm.
B. Machines utilizing another means of disinfection shall meet the minimum performance requirements specified by the manufacturer and shall be required to demonstrate its effectiveness.

905.2 Remineralization Systems
On machines manufactured after January 1985, if mineral solutions are to be introduced into the product water, the minerals shall be added upstream from the disinfection system.

905.3 Blend-Back Systems
Unless water added to purified water for remineralization has been previously disinfected, such as "blend-back" water, the water shall be introduced upstream from the disinfection unit.

905.4 Exceptions
Closed system carbonation and dispensing units are exempt from the above disinfection requirement.

906 Non-Food Contact Surfaces and Components
Section 500 contains requirements for non-food contact surfaces and components which, except for Items 504 and 505, are applicable to water dispensing units and water vending machines.
**Section 900 Water Vending Machines**

**907 Sewer Connections**

Water dispensing units and water vending machines, which require a sewer connection for process wastewater disposal, shall meet Item 507.3.6 and the following:

**907.1 Internal Air Gaps**

Where process waste water is collected within the machine for pumping or gravity flow to an outside drain, the waste line from the processing unit shall terminate at least 50.8 mm (2 inches) above the top rim of the retention vessel. Additionally, the waste line from the machine shall be discharged through a minimum 50.8 mm (2-inch) air gap.

**908 Water Supply Protection**

Section 600 contains water supply protection requirements that apply to water vending machines, including direct reference to Item 602.

**908.1 Bottle Washers**

Bottle washers shall not be an integral part of the water vending machine.

**909 Cutoff Controls and Sensors**

Water vending machines shall be equipped with sensors and/or controls that will prevent vending in the event of failure of any process or function that would:

A. Interrupt the disinfection process;
B. Result in vended water quality less than claimed; or
C. Cause waste container or sump pit overflow. Inactivation of vending is not required if an automatic recycling or switching mode is used to correct the failure noted in Item 2 above.

**909.1 Waste Container Controls**

Internal machine containers or sumps for the collection of spillage and overflow from the dispensing platform shall meet the requirements of Item 508.

**909.2 Disinfection Monitoring**

The vending mechanism shall inactivate if the disinfection system fails to perform as designed. Where ultraviolet light is used as the disinfection system, the vending mechanism shall be deactivated if the UV lamp is missing, burns out or fractures. The intensity of the effective radiation shall be monitored by one of the following methods:

**A. Intensity Sensing-Automatic Controls**

The machine shall be equipped with a sensor to inactivate the vending mechanism if the intensity of effective radiation at 254 nanometers falls below the intensity required to provide a minimum dosage of 16,000-microwatt seconds per square centimeter (µWs/cm²) based on the UV system manufacturer's recommended flow rate.

**B. Intensity Sensing-Manual Controls**

The machine's UV lamp assembly shall be designed to permit intensity testing with a portable meter while precluding direct eye exposure to radiation during the test. Manufacturers who elect this option shall post in each machine on or adjacent to the UV assembly a permanent instruction label specifying:

1) A safe test procedure, with appropriate warnings;  
2) A minimum intensity level of 16,000 µWs/cm² at 254 nm wave length shall be maintained for the life of the lamp;  
3) A lamp replacement policy consistent with the frequency recommended by the lamp manufacturer but in no case greater than 12 months. A renewable record for entering "Lamp Installed" and "Lamp Tested" dates shall be posted near the UV assembly.
909.3 Alkaline Monitoring
For high alkaline machines:
A. A pH sensor shall be placed at the nozzle to insure the first gallon meets the stated quality
B. The pH sensor shall be calibrated every 3 months.

909.4 Dosage Performance
At the time of NAMA evaluation, the manufacturer shall provide data for the Public Health Consultant confirming that:
A. The flow rate does not exceed the manufacturer’s rated flow for that disinfection system; and
B. The dosage level is adequate to effectively disinfect the product water. In systems using UV disinfection, the minimum radiation dosage (intensity x time) is equal to or greater than 16,000 μWs/cm² at 254 nm within one centimeter of the source.

909.5 Conductivity Sensing for Purified Water
In machines which dispense purified water, conductivity sensors or other effective controls which recycle or redirect water to another component, or shut off vending of purified water, shall be provided to preclude dispensing water that fails to meet a 10ppm (approx. 20 microsiemens) maximum TDS standard.

910 Machine Performance Testing
At initial evaluation and at each annual re-evaluation under the NAMA Vending Machine Evaluation Program, the applicant for certification of a water vending machine shall provide or demonstrate, in the presence of the Public Health Consultant, the tests, test results and written information required in this subsection. Separate data and tests shall be required for models that differ in any process, component, material or product flow sequence that could materially affect quality or safety.

910.1 Component Performance Testing
A. To support a certification request and any claims made in cabinet labeling and advertising, the manufacturer may submit performance test data from the supplier of an individual component demonstrating its ability to remove turbidity, tastes and odors; reduce TDS; provide germicidal treatment; sense conductivity; redirect water flow; shut off vending; or any test data that are required to meet Section 900.
B. Each machine shall demonstrate compliance with water pressure, flow rate, volume and component type or model by providing performance data from the supplier. Absent such performance data, the manufacturer shall be required to provide tests on an individual component whose performance could affect compliance with Section 900 requirements.

910.2 Machine Performance Testing
A. Test Required
For initial certification, and required re-certifications, the manufacturer shall demonstrate that the machine is able to produce output water of the appropriate quality. This shall be done by providing a water quality and bacterial analysis of the incoming water, and each type of water output, for the test of each machine for which certification is requested.
B. Incoming Water
The following tests, as a minimum, shall be conducted on a sample of product water collected on the incoming water: Turbidity, TDS, total coliform, chloride, sulfate and lead.
C. Output: Drinking Water
The following tests, as a minimum, shall be conducted on two samples: the first sample shall be collected at the start of a 250 gallon test cycle and the second sample shall be collected at the end of the 250 gallon cycle. The samples shall be tested for turbidity, total dissolved solids, total coliform, chloride, sulfate and lead. The maximum allowable levels for drinking water are as follows:

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Maximum Allowable Level</th>
</tr>
</thead>
<tbody>
<tr>
<td>Turbidity</td>
<td>One turbidity unit (NTU)</td>
</tr>
<tr>
<td>Total Dissolved Solids</td>
<td>500 mg/l</td>
</tr>
<tr>
<td>Total Coliform</td>
<td>0 per 100 ml</td>
</tr>
<tr>
<td>Chloride</td>
<td>250 mg/l</td>
</tr>
<tr>
<td>Sulfate</td>
<td>250 mg/l</td>
</tr>
<tr>
<td>Lead</td>
<td>0.015 mg/l</td>
</tr>
</tbody>
</table>

Table 900.1 Drinking Water Criteria

D. Output: Purified Water
The following tests, as a minimum, shall be conducted on two samples: the first sample shall be collected at the start of a 250 gallon test cycle and the second sample shall be collected at the end of the 250 gallon cycle. The samples shall be tested for turbidity, total dissolved solids, total coliform, chloride, and sulfate. The maximum allowable levels for purified water are as follows:

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Maximum Allowable Level</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total Dissolved Solids</td>
<td>10 mg/l</td>
</tr>
<tr>
<td>Total Coliform</td>
<td>0 per 100 ml</td>
</tr>
<tr>
<td>Chloride</td>
<td>0 mg/l</td>
</tr>
<tr>
<td>Sulfate</td>
<td>0 mg/l</td>
</tr>
</tbody>
</table>

Table 900.2 Purified Water Criteria

E. Analysis of Samples
Laboratory analysis shall be performed by a certified laboratory qualified for water analysis.

F. Qualifications for Certification
1) Vended “Drinking Water” samples shall meet the applicable quality and bacteria standards contained in the USEPA Primary and Secondary Drinking Water Standards. Additionally, a comparison of supply and vended water shall reflect a measurable quality improvement consistent with the test machine’s labeling and advertising claims.
2) Vended “Purified Water” samples shall meet the applicable quality and bacteria standards contained in the Pharmacopoeia of the United States.

911 Sanitation and Servicing Procedures
As a qualification for certification and NAMA Listing of a water vending machine, the NAMA Public Health Consultant shall review the manufacturer's "Sanitation and Servicing Procedures" for compliance with the requirements listed below. In addition, the NAMA Public Health Consultant may also consider other items necessary to meet the consumer protection intent expressed in Section 900 and other applicable parts of this Standard. With each water vending machine or machine group, the manufacturer shall provide, separately or permanently posted in the machine, a copy of the “Sanitation and Servicing Procedures”. Such procedures shall include, but not be limited to the following:

911.1 Machine Installation
A. A water supply connection warning as specified in Items 903.1 or 903.2.
B. A warning to check for grounding continuity.
C. Instructions for air-gapped sewer connection if the machine connected to a sewer.
911.2 In-Place Cleaning and Maintenance
A. Step-by-step instructions covering in-place sanitizing procedures along with recommended sanitizing solutions, their concentrations and potential suppliers.
B. Logical, sequential steps for routine internal and external cleaning, including recommended cleaning solutions, their concentrations, and potential suppliers.
C. The service manual shall include instructions that stipulate the water vending machine shall be serviced once every calendar month or as close to 30 days as possible.

911.3 Replace/Replenishment Schedule
A. A recommended maximum number of vends, sensor reading or water flow schedule for servicing/replacing filter elements, RO membranes, DI resins, UV lamps and other components with finite effectiveness.
B. Sanitation instructions for the safe handling of such replaceable materials, as applicable.
C. Trouble shooting guidelines for isolating malfunctions indicated by water quality test results.

911.4 UV or Other Disinfection System Servicing
A. Frequency of UV bulb replacement.
B. Type of UV test meter and testing methods for radiation intensity (unless in-machine sensors are provided).
C. Procedures and frequency for UV system cleaning to maintain an intensity of 16,000 μWs/cm² at 254 nm.
D. Other servicing needs for non-UV disinfection systems as determined by the NAMA Public Health Consultant.

911.5 Control Settings
Instruction in proper control setting, as necessary, to produce vended water of the quality claimed.

911.6 Parts Replacement/Replenishment
A. Frequencies for replacement or replenishment of filter element membranes and resins based on vend volumes that are consistent with suppliers’ recommendations.
B. Warnings against the use of such components that are not identical to the original material or equivalent in function and non-toxicity.

911.7 Vended Water Testing
A recommended semiannual frequency for sampling vended water for total coliform and an every service visit frequency for testing product waters for conductivity, taste, odor and turbidity.

912 Advertising Claims

912.1 General
Consumer health protection for patrons of water vending machines is the primary goal of this Section and other relevant parts of this Standard. Due to the potential for misleading the machine user through machine labeling, or the absence of labeling or advertising, it is the intent of this Standard and the NAMA certification/listing program to exclude from certification any water dispensing unit or water vending machine model when the manufacturer labels, fails to label, advertises or otherwise makes quality or safety claims that, in the opinion of the NAMA Public Health Consultant and NAMA, are misleading, deceitful or fraudulent.
912.1 Health Claims
To make a health claim a manufacturer shall do the following:
A. Claims can be made that are equal to but do not exceed those of the components used within the machine; and
B. Manufacturers of Water vending machines which make claims that the treatment component of the machine removes or reduces health contaminants that may be found in the water supply, shall provide documentation to NAMA the treatment components having contact with product water have been third party tested by an accredited laboratory in accordance with the applicable American National Standard Institute/NSF International (ANSI/NSF) Standards.
C. Copies of this documentation must be submitted to the Public Health Consultant that substantiate the claims being made; and
D. Cannot reference in the advertising that it meets US EPA standards for drinking water or use of the word EPA.

* U.S. Environmental Protection Agency (EPA) has provided the preceding clarification concerning advertising claims water vending manufacturers can make.
Appendix A

AMERICANS WITH DISABILITIES ACT

Accessibility Information
Pertaining to
Food and Beverage Vending Machines

The Code of Federal Regulations 28, Part 36, which includes the ADA Accessibility Guidelines for Buildings and Facilities, spells out the requirements of Title III of the Americans with disabilities Act, also known as Public Law 101-336. The act requires that as of January 26, 1992, all public areas must be readily accessible and usable by persons with disabilities.

The following information is being provided to assist vending machine manufacturers meet these Guidelines. There are two important issues that need to be looked at with regards to vending machines. First, all dimensions relate to approaching a vending machine by a person in a wheel chair. Second, all operating controls of the machine must be at, or below 48 inches (1220 mm) maximum and the low side reach shall be 15 inches (380 mm) minimum above the floor.

ADA legislation does not provide a means of certifying any type of equipment as meeting their specified guidelines. Therefore, should you be requested to provide a statement to a vending operator indicating your machines comply with ADA requirement for accessibility, we suggest you provide them with a letter stating that to the best of your knowledge and based on information supplied to you by NAMA, your trade association, the machines you manufacturer meet ADA requirements.

Should you have any questions pertaining to the ADA and how it relates to your vending machines, please do not hesitate to call the Director of Technical Services at NAMA headquarters in Chicago for assistance.
Appendix B

Specifications For Personal Cup Option
For Hot Beverages Vending Machines

November, 2000

National Automatic Merchandising Association
20 N. Wacker Drive, Suite 3500
Chicago, IL  60606-3102
312-346-0370
FAX 312-704-4140
Website:  www.vending.org
Specifications For Personal Cup Option
For Hot Beverages Vending Machines
Introduction

In response to the concern for the amount of solid waste being generated in this country, the NAMA Automatic Merchandising Health-Industry Council, who oversees and provides technical assistance to the NAMA Vending Machine Evaluation program, was asked to review the feasibility of a customer using their own ceramic cup to obtain a hot beverage from a vending machine. As a result of this request, this specification was developed for use by vending machine manufacturers who wish to offer the option of using a personal ceramic cup in their hot beverage machines.

Manufacturers are reminded that whenever an accessory piece of equipment is developed for their Listed vending machines, the accessory unit is also required to be evaluated by your respective Public Health Consultant prior to making the accessory available for general sale. The intent of this is not specifically covered in the NAMA Construction Standard. Please feel free to contact your Public Health Consultant should you have any questions as you work on this accessory devise.

Personal Cup Option Specifications

When designing a hot beverage cupless vending accessory for a vending machine, the following specifications shall be considered:

A. When making all measurements and adjustments to your cup delivery mechanism use a 10 oz ceramic cup measuring three and one half (3 ½) inches high with a three (3) inch diameter as the standard. See Figure 1. Such a cup can be obtained from NAMA to aid you in your design work.

B. All stated measurements are made by measuring from the BOTTOM of the cup to the top of the cup.
C. From a point one and one quarter (1 ¼“) inches to two one half (2 ½“) inches from the cup bottom, there shall be only MINIMAL point-to-point contact from any of the cup delivery or vending stage parts with sides of the cup. See Figure 2.

D. From a point two and one half (2 ½”) inches from the bottom of the cup to the top of the cup, there shall be NO contact between any of the cup delivery or vending stage parts with any part of the cup. See Figure 2.

![Figure 2](image-url)

**Public Health Implications**

With regards to the public health aspects of cupless vending, there is a remote possibility that staphylococcus and/or streptococcus bacteria could be deposited from the mouth of a customer onto the sides of a cup.

However, since the environment on the side of the cup or on parts of the cup delivery and/or vending stage are NOT conducive sustaining bacteria in a viable state, the transfer from the cup to the machine and back to another cup is unlikely. In any case, the above design specifications have taken this remote possibility into consideration.
Appendix C

Potentially hazardous food (time/temperature control for safety food)

Includes:
A. An animal FOOD that is raw or heat-treated; a plant FOOD that is heat-treated or consists of raw seed sprouts, cut melons, or garlic-in-oil mixtures that are not modified in a way that results in mixtures that do not support pathogenic microorganism growth or toxin formation; and
B. Except as specified in Subparagraph 235.3.D of this definition, a FOOD that because of the interaction of its A_w and pH values is designated as Product Assessment Required (PA) in Table 200 or 201 of this definition:

Potentially hazardous food (time/temperature control for safety food)

Does not include:
A. An air-cooled hard-boiled EGG with shell intact, or an EGG with shell intact that is not hard-boiled, but has been pasteurized to destroy all viable salmonellae;
B. A FOOD in an unopened HERMETICALLY SEALED CONTAINER that is commercially processed to achieve and maintain commercial sterility under conditions of non-refrigerated storage and distribution;
C. A FOOD that because of its pH or A_w value, or interaction of A_w and pH values, is designated as a non-PHF/non-TCS FOOD in Table 200 or 201 of this definition;
D. A FOOD that is designated as Product Assessment Required (PA) in Table 200 or 201 of this definition and has undergone a Product Assessment showing that the growth or toxin formation of pathogenic microorganisms that are reasonably likely to occur in that FOOD Is precluded due to:
   1) Intrinsic factors including added or natural characteristics of the FOOD such as preservatives, antimicrobials, humectants, acidulants, or nutrients,
   2) Extrinsic factors including environmental or operational factors that affect the FOOD such as packaging, modified atmosphere such as REDUCED OXYGEN PACKAGING, shelf life and use, or temperature range of storage and use, or
   3) A combination of intrinsic and extrinsic factors; or
E. A FOOD that does not support the growth or toxin formation of pathogenic microorganisms in accordance with one of the Subparagraphs 235.3.A - 235.3.D of this definition even though the FOOD may contain a pathogenic microorganism or chemical or physical contaminant at a level sufficient to cause illness or injury.
Table 200 Interaction of $pH$ and $A_w$ for control of spores in FOOD heat-treated to destroy vegetative cells and subsequently PACKAGED

<table>
<thead>
<tr>
<th>$A_w$ values</th>
<th>PH values</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt;0.92</td>
<td>4.6 or less</td>
</tr>
<tr>
<td>&gt;0.92 - .95</td>
<td>Non-PHF*/non-TCS FOOD**</td>
</tr>
<tr>
<td>&gt;0.95</td>
<td>Non-PHS/non-TCS FOOD</td>
</tr>
</tbody>
</table>

* PHF means POTENTIALLY HAZARDOUS FOOD  
** TCS FOOD means TIME/TEMPERATURE CONTROL FOR SAFETY FOOD  
*** PA means Product Assessment required

Table 201 Interaction of $pH$ and $A_w$ for control of vegetative cells and spores in FOOD not heat-treated or heat-treated but not PACKAGED

<table>
<thead>
<tr>
<th>$A_w$ values</th>
<th>PH values</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt; 0.88</td>
<td>&lt; 4.2</td>
</tr>
<tr>
<td>0.88 – 0.90</td>
<td>4.2 - 4.6</td>
</tr>
<tr>
<td>&gt; 0.90 – 0.92</td>
<td>non-PHF/ non-TCS FOOD **</td>
</tr>
<tr>
<td>&gt; 0.92</td>
<td>non-PHF/ non-TCS FOOD</td>
</tr>
</tbody>
</table>

* PHF means POTENTIALLY HAZARDOUS FOOD  
** TCS FOOD means TIME/TEMPERATURE CONTROL FOR SAFETY FOOD  
*** PA means Product Assessment required
Appendix D

Backflow Hazards

A vending machine connected to an approved drinking water supply may pose an actual or potential hazard to the water supply if not protected from either of two types of backflow: back-pressure or backsiphonage. Not all connections pose the same level of hazard but all potential hazards are treated as actual hazards.

The level of hazard (high or low) can be determined by what substances that can flow into the drinking water supply in the event there is a reversal of flow.

A low hazard is one in which the affected water contains a pollutant (see definition 234). An example of a low hazard would be a coffee machine, where in the event of backflow situation only water with coffee would enter the drinking water supply.

A high hazard is one in which the affected water contains a contaminant (see definition 213). An example of a high hazard would be the cross-connection of the reject water from a Reverse Osmosis Unit and the sump water discharge in a water vending machine. Since the RO reject water is a direct route to the drinking water supply and the sump water can contain unknown toxic substances this is a potentially high hazard.

Not all backflow preventors are constructed the same. Each ASSE approved backflow preventor has been tested to a specific standard. Some can be used to prevent backflow from both backpressure and backsiphonage while the water is under constant pressure, others may only be designed for intermittent pressure or designed to prevent one type of backflow like backsiphonage. Still other backflow preventors are designed for special applications, such as carbonated beverage dispensing where the concern is not only to prevent the backflow but also to make sure the backflow preventor will not add any toxic elements to the water. Table D list some of the common types on backflow preventors.
### Table D Backflow Preventor Types

<table>
<thead>
<tr>
<th>ASSE Standard</th>
<th>Type</th>
<th>Back-pressure</th>
<th>Back-siphonage</th>
<th>Hazard Level</th>
</tr>
</thead>
<tbody>
<tr>
<td>1001</td>
<td>Applied Atmospheric Type Vacuum Breakers (for intermittent pressure conditions)</td>
<td>No</td>
<td>Yes</td>
<td>Low</td>
</tr>
<tr>
<td>1011</td>
<td>Hose Connection Vacuum Breaker (for intermittent Pressure)</td>
<td>No</td>
<td>Yes</td>
<td>Low</td>
</tr>
<tr>
<td>1012</td>
<td>Dual Check Valve with Intermediate Atmospheric Vent</td>
<td>No</td>
<td>Yes</td>
<td>Low</td>
</tr>
<tr>
<td>1013</td>
<td>Reduced Pressure Principle Back Pressure Backflow Preventor</td>
<td>Yes</td>
<td>Yes</td>
<td>High</td>
</tr>
<tr>
<td>1020</td>
<td>Pressure Vacuum Breaker Assembly (for continuous pressure conditions)</td>
<td>Yes</td>
<td>Yes</td>
<td>Low</td>
</tr>
<tr>
<td>1022</td>
<td>Triple Check Valve Backflow Preventor for Carbonated Beverage Machines.</td>
<td>Yes</td>
<td>Yes</td>
<td>High</td>
</tr>
<tr>
<td>1024</td>
<td>Dual Check Valve Type Backflow Preventors</td>
<td>No</td>
<td>Yes</td>
<td>Low</td>
</tr>
<tr>
<td>1032</td>
<td>Dual Check Valve Type Backflow Preventor for Carbonated Beverage</td>
<td>Yes</td>
<td>Yes</td>
<td>Low</td>
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</table>
Index

<table>
<thead>
<tr>
<th>Topic</th>
<th>Page</th>
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<tbody>
<tr>
<td>2009 Food Code</td>
<td>1</td>
</tr>
<tr>
<td>Accessible</td>
<td>2</td>
</tr>
<tr>
<td>Air Break</td>
<td>2</td>
</tr>
<tr>
<td>definition</td>
<td>2</td>
</tr>
<tr>
<td>air gap</td>
<td>2, 15, 19, 33</td>
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<td>Automatic Shutoff Assembly</td>
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<td>Backflow</td>
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<td>21</td>
</tr>
<tr>
<td>air gapped machines</td>
<td>21</td>
</tr>
<tr>
<td>approved devices</td>
<td>21, 45</td>
</tr>
<tr>
<td>carbonated vending machines</td>
<td>22</td>
</tr>
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<td>22</td>
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<tr>
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<td>protecting backflow preventor with screen</td>
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<tr>
<td>Contaminant (Water Distribution System)</td>
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<td>disinfection</td>
<td>30</td>
</tr>
<tr>
<td>dispensing nozzles</td>
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<td>dissolved solids</td>
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<td>Door Tracks and Guides</td>
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<td>evaporator coils</td>
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<tr>
<td>In-place cleaning and sanitizing</td>
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<tr>
<td>Operator</td>
<td>4</td>
</tr>
<tr>
<td>pans</td>
<td>19</td>
</tr>
</tbody>
</table>
Index

pH..........................................................34
Pharmacopoeia........................................35
Pollutant (Water Distribution System)...........5
Potentially Hazardous Food (Time/Temperature
Control for Safety Food)..........................5
ppm..........................................................5, 31
Product cooling.........................................28
Public.......................................................36
Public Health Consultant1, 4, 5, 13, 25, 26, 28, 34, 35,
36
purified ...................................................31
Purified Water ...........................................35
Removable
definition..............................................5
resins.......................................................32
reverse osmosis .........................................5, 30, 44
reverse osmosis membranes ..........................32
RO ..........................................................5, 31, 36
Sanitization
definition..............................................5
Screen Size...............................................10
screening ..................................................31
Screening Exemption ..................................10
Screening Required .................................10
Sealed
definition..............................................5
seams ........................................................8, 17
Self-Closing
definition..............................................5
shelves ......................................................19
Slacked frozen food
definition..............................................5
slacking
definition..............................................6
Smooth
definition..............................................6
Solder.......................................................17
spillage ....................................................20
Standpipes ................................................16
sulfate .....................................................34
sum.........................................................20
TDS ..........................................................6, 31, 34
definition.................................................6
TMD ..........................................................6
definition.................................................6
total coliform...........................................34, 36
Total Dissolved Solids ...............................35
toxic
definition.............................................6
Toxic (Water Distribution Systems).................6
turbidity...................................................30, 35, 36
ultraviolet disinfection ...............................32
definition.................................................6
Underwriters Laboratories ............................28
USEPA.....................................................30
UV ..........................................................6, 31, 33, 34, 36
Vended drinking water
definition..............................................6
Vended High Alkaline Water .........................6
Vended Purified Water
definition..............................................6
vending chute ...........................................9
vending machine
definition..............................................6
Vending Stage ..........................................9
cup filling ...............................................9
doors or panels ........................................9
Drain ......................................................9
self closing ..............................................9
Ventilation Openings ................................10
V-type threaded surfaces .............................13
water baths ..............................................28
Water Distribution Systems
Air Break..................................................2
Air Gap ....................................................2
Backflow ..................................................2
backflow hazards explained .........................44
Backpressure ...........................................2
Backsiphonage.........................................2
Contaminant ............................................3
Cross Connection Hazards ..........................3
Hazard .....................................................4
High Hazard ............................................4
Level Of Hazard .......................................44
Low Hazard ............................................4
Pollutant ..................................................5
Table of backflow preventor types ..................45
Toxic .......................................................6
water reservoir .........................................15
Water Supply Protection ............................21
water tank vent .........................................31
wavelength ...............................................5
Wet Cleaned Surfaces ................................17
with 21 CFR, 170-189 .................................32