



Standard Specification for Noncarbonated Mechanically Refrigerated Beverage Dispenser (Visible Product)¹

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This standard has been approved for use by agencies of the Department of Defense.

1. Scope

1.1 This specification covers counter-top model noncarbonated beverage dispensers that are mechanically refrigerated and have rigid, transparent, impact-resistant containers to afford a visual display of the beverage dispensed. The beverage dispensers covered by this specification are intended to circulate, cool, and dispense noncarbonated beverages such as pulpy juices, frozen concentrates, and syrup drinks.

1.2 The following safety hazard caveat pertains only to the test method portion, Section 11, of this specification: *This standard does not purport to address all of the safety concerns, if any, associated with its use. It is the responsibility of the user of this standard to establish appropriate safety and health practices and determine the applicability of regulatory limitations prior to use.*

2. Referenced Documents

2.1 ASTM Standards:²

D3951 Practice for Commercial Packaging
F760 Specification for Food Service Equipment Manuals
F1166 Practice for Human Engineering Design for Marine Systems, Equipment, and Facilities³

2.2 NSTA Standard:

NSTA Pre-Shipping Test Procedures³

2.3 ANSI/NSF International Standards:

NSF Standard No. 18, Manual Food and Beverage Dispensing Equipment⁴

NSF Standard No. 51, Plastic Materials and Components Used in Food Equipment⁴

2.4 ANSI/UL Standards:

UL Standard No. 471, Commercial Refrigerators and Freezers⁵

UL Standard No. 969, Marking and Labeling Systems⁵

2.5 ANSI Standard:

ANSI Z1.4, Sampling Procedures and Tables for Inspection by Attributes⁶

2.6 Military Standards:

MIL-STD-167/1 Mechanical Vibrations of Shipboard Equipment Type I—Environmental and Type II—Internally Excited

MIL-STD-461 Requirements For the Control of Electromagnetic Interference Characteristics of Subsystems and Equipment

MIL-STD-1399/300 Interface Standard for Shipboard Systems, Section 300A, Electric Power, Alternating Current

3. Terminology

3.1 Definitions:

3.1.1 *aeration system*—a type of circulation system that causes the beverage to cascade across the top and down the sides of the bowl interior incorporating air into the beverage.

3.1.2 *beverage dispenser*—a beverage dispenser is a commercial appliance designed to deliver a beverage.

3.1.3 *circulation system*—the system that moves the beverage within the bowl to ensure proper cooling and mixing.

3.1.4 *whippers*—a mechanical device used to beat air into a beverage so as to change its properties from a liquid drink to a frothy drink.

4. Classification

4.1 *General*—The beverage dispensers shall be of the following types, classes, styles, sizes, and electrical ratings:

⁵ Available from the Underwriters Laboratories Inc., 1655 Scott Blvd., Santa Clara, CA 95050; 333 Pfingsten Road, Northbrook, IL 60062; 1285 Walt Whitman Road, Melville, L.I., NY 11746; or 2602 Tampa East Blvd., Tampa, FL 33619.

⁶ Available from American National Standards Institute, 11 W. 42nd St., 13th Floor, New York, NY 10036.

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² For referenced ASTM standards, visit the ASTM website, www.astm.org, or contact ASTM Customer Service at service@astm.org. For *Annual Book of ASTM Standards* volume information, refer to the standard's Document Summary page on the ASTM website.

³ Available from National Safe Transit Association, 6022 West Touhy Ave., Chicago, IL 60648.

⁴ Available from National Sanitation Foundation, NSF Building, Ann Arbor, MI 48105.

4.2 Types:

4.2.1 *Type I*—Dispenser with circulation system and with overhead spray type aeration system (for syrup drinks and other nonfoaming beverages).

4.2.2 *Type II*—Dispenser with circulation system but without aeration system (for pulpy fruit juices and other beverages not suitable for aeration).

4.3 Classes:

4.3.1 *Class A*—Without whippers.

4.3.2 *Class B*—With whippers.

4.4 Styles:

4.4.1 *Style A*—Single Bowl.

4.4.1.1 *Size 1*—Capacity up to and including 5 gal.

4.4.1.2 *Size 2*—Capacity of more than 5 up to and including 8 gal.

4.4.1.3 *Size 3*—Capacity of more than 8 up to and including 12 gal.

4.4.1.4 *Size 4*—Capacity of more than 12 gal.

4.4.2 *Style B*—Twin bowl or twin compartment.

4.4.2.1 *Size 1*—Capacity up to 5 gal per bowl or compartment.

4.4.2.2 *Size 2*—Capacity of more than 5 gal per bowl or compartment.

4.4.3 *Style C*—Triple bowl or triple compartment.

4.4.3.1 *Size 1*—Capacity up to 5 gal per bowl or compartment.

4.5 *Electrical Rating*—Nominal 115 v, single-phase, 60 Hz.

5. Ordering Information

5.1 Procurement documents should specify the following information:

5.1.1 Title, number, and date of this specification.

5.1.2 Type, class, style, and size of dispenser (see Section 4).

5.1.3 Special requirements should be included.

5.1.4 When federal/military procurement is required, review and implement the applicable supplementary requirements (see S1 through S8).

6. Materials and Manufacture

6.1 *Materials*—Materials used in the dispenser shall be as specified herein, and the dispenser shall be fabricated of materials acceptable under ANSI/NSF Standards 18 and 51.

NOTE 1—Evidence of compliance with ANSI/NSF 18, ANSI/NSF 51, and ANSI/UL 471 is as follows: (a) *ANSI/NSF*—Listing of the dispenser in the current edition of the ANSI/NSF “Listing of Food Service Equipment” and display of the ANSI/NSF seal on the finished dispenser. (b) *ANSI/UL*—Acceptable evidence of meeting the requirements of ANSI/UL 471 shall be the ANSI/UL label, or listing mark, indicating that the dispenser has been tested and conforms to the requirements of ANSI/UL 471.

7. Physical Requirements

7.1 Design:

7.1.1 The beverage dispenser shall consist essentially of a base that contains a complete refrigeration system and supports a rigid, transparent, impact resistant, bowl-type beverage container(s) with cover(s). Each dispenser shall be equipped

with an electrically powered beverage circulation system, a dispensing valve, and the controls and appurtenances specified as follows:

7.1.1.1 Style A units shall be equipped with one bowl and one or more dispensing valves.

7.1.1.2 Style B units shall be equipped with two bowls or compartments, each with at least one dispensing valve and each with a circulation system.

7.1.1.3 Style C units shall be equipped with three bowls or compartments, each with at least one dispensing valve and each with a circulation system.

7.1.2 The dispenser shall be designed to comply with the requirements of ANSI/UL Standard 471 and NSF Standard 18. (Note 1).

7.2 *Base Assembly*—The base assembly shall be designed and constructed to house the refrigeration system and to support the container bowl(s), dispensing valve(s), and drip tray(s). The base assembly shall be equipped with panels to provide access to the components therein.

7.3 *Refrigeration System*—The refrigeration system shall have sufficient capacity to meet the performance requirements defined in Section 8. The refrigeration system on each dispenser shall be properly dehydrated and charged prior to shipment.

7.4 *Circulation System*—Each bowl or compartment shall be equipped with either a spray and circulation system (Type I), or a circulation system only (Type II). The circulation systems shall impart a sufficient motion to the stored beverage to prevent settlement of beverage constituents, and to assist in maintaining a required uniform beverage temperature throughout the bowl and particularly at the inlet to the dispensing port.

7.5 *Bowls*—Bowls and covers shall be fabricated of a rigid, impact-resistant, transparent material. The bowls shall have sufficient net volume, exclusive of space occupied by the cooling dome or plate and mixing system components, to meet the capacity requirements applicable to the size specified. Bowls shall be furnished and installed with parts required to provide leak-tight containers. Bowls shall not crack or break when tested as specified in 11.7.2.

7.6 *Dispensing Valves*—The bowl on Style A units and each bowl or compartment on Style B and Style C units shall be equipped with at least one self-closing dispensing valve. Valves shall be designed to permit thorough cleaning of all fluid passages and parts exposed to the beverage.

7.7 *Drip Tray*—Each dispenser shall be equipped with a drip tray having a readily removable perforated, slotted, or wire cover. The drip tray may have provisions for draining the splash and drippings into a drain.

7.8 *Temperature Control*—Each dispenser shall be equipped with a temperature control to control automatically the refrigeration system to maintain the beverage within the temperature range specified in Section 8.

7.9 *Switches*—Style A dispensers shall be equipped with at least one on-off switch to control the power supply to the dispenser. Style B and Style C units shall be equipped with an independent on-off switch for the mixing system in each bowl

or compartment, plus an additional main power supply or compressor motor switch.

7.10 *Miscellaneous*—The dispenser base shall be provided with protectors to prevent damage to the surface on which it rests. The dispenser shall be easily assembled on location without tools and be ready for operation when connected to the electrical supply.

7.11 *Electrical Requirements*—The dispensers shall be designed for operation on a nominal 115 V ± 10 %, single-phase, 60 Hz current. Each dispenser shall be equipped with a flexible power supply cord with suitable plug.

7.12 *Standard Product*—The dispenser delivered under this specification shall be the manufacturer’s standard product. Parts and assemblies for each dispenser model furnished by a particular manufacturer under this specification shall be interchangeable.

8. Performance Requirements

8.1 *Performance Design Requirements*—Each dispenser shall refrigerate the beverage and maintain the stored beverage in a constant state of motion or circulation to prevent settlement of beverage constituents.

8.1.1 *Operational Requirement*—The refrigeration system shall be capable of automatically maintaining the beverage within the limits of 33 to 40°F inclusive when the dispenser is filled to the manufacturer’s rate capacity, and is operating in an ambient temperature of 90 ± 2°F.

8.1.2 *Pull-Down Requirement*—The dispenser shall be capable of reducing the temperature of the beverage when filled to rated capacity from 72°F to not over 40°F in not more than the pull-down time specified in **Table 1** when operating in an ambient temperature of 72 ± 2°F and 50 % relative humidity.

8.1.3 *Maximum Operating Requirement*—The dispensers shall, in addition, operate in an ambient temperature of 104 ± 2°F without activating the protective overload device and with beverage temperature not exceeding 45°F. The dispensers shall operate in a room temperature of 90 ± 2°F and at least 50 % relative humidity for 4 h minimum without deleterious effect on the operation of the dispenser or the beverage. The beverage shall be maintained at a temperature of 40°F or lower.

9. Dimensions

9.1 The dispenser shall be designed for counter mounting. The distance from the front edge of the dispenser base

(exclusive of drip tray) to the rearmost extension of the dispenser shall not exceed 23 in. The height of the dispenser, measured from the counter to the top of the cover, shall not exceed 30 in., except when its empty weight precludes its NSF classification as portable equipment.

10. Workmanship, Finish, and Appearance

10.1 *Finish*—Dispenser finishes shall be free from discoloration and stains.

10.2 *Workmanship*—All components and assemblies of the dispenser shall be free from dirt and other extraneous material such as burrs, slivers, rough die, tool and grind marks, dents, and cracks. Castings and molded parts, if used, shall be free of sand, fins, pits, blowholes, and sprues. External surfaces shall meet the ANSI/UL Sharp Edge Test.

NOTE 2—Although paragraph 10.2 requires subjective judgments, its inclusion is considered important as a guide in evaluating and manufacturing equipment.

10.2.1 *Metal Fabrication*—Metal used in the fabrication of the dispensers shall be free from visually apparent defects. Forming and shearing shall not cause damage to the metal, and the metal shall be free from trimming marks.

10.2.2 *Welding*—The surfaces of parts to be welded shall be free from rust, scale, paint, grease, and other foreign matter. Welds shall be smooth and free from cracks, burn holes, undercuts, or incomplete fusion. All scale and flux shall be removed from the finish weld area.

10.2.3 *Fastening Devices*—Holes punched or drilled shall be free of burrs. Threaded fasteners shall not be broken, cracked or stripped, and shall be drawn tight. Rivets, when used, shall fill the hole completely, and the heads shall be in full contact with the surface of the member.

11. Test Methods

11.1 Prior to conducting the following tests, operate the dispenser to be tested for a period of time deemed necessary by the manufacturer for proper run-in and adjustment. During this run-in period, check the unit for noise and vibration, proper valve action, and satisfactory spray and circulation performance, plus any other appropriate operational tests. Use tap water as the test beverage.

11.2 *Performance Test:*

11.2.1 *Significance*—The purpose of this test is to ensure that the dispenser model being tested has the capability to maintain the proper beverage temperature.

11.2.2 *Procedure*—Fill the dispenser model being tested to rated capacity with the tap water. The temperature of the water shall be at least 50°F at the start of the test. Operate the dispenser in an ambient temperature of 90 ± 2°F until the beverage attains a temperature stabilized in the range of 33 to 40°F. Continue the test run for at least 2 h and check for temperature at intervals not exceeding 5 min; except during the last 15 min, check the temperature each minute. The temperature sensing method shall be with a thermocouple or thermometer properly immersed in the water. On Style B and Style C units, check each bowl or compartment alternately at the specified intervals during the test run. Failure of the dispenser

TABLE 1 Refrigeration System Requirements^A

Dispenser Size		Pull-down time hours (maximum)
Style	Size	
A	1	2.0
A	2	2.0
A	3	2.5
A	4	3.0
B	1	2.5
B	2	3.0
C	1	3.0

^A Pull-down time is based on 72 ± 2°F ambient temperature, at least 50 % relative humidity, not less than 72°F initial beverage temperature, and not more than 40°F final beverage temperature.