



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

This standard is issued under the fixed designation F918; the number immediately following the designation indicates the year of original adoption or, in the case of revision, the year of last revision. A number in parentheses indicates the year of last reappraisal. A superscript epsilon (ε) indicates an editorial change since the last revision or reappraisal.

This standard has been approved for use by agencies of the U.S. 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 values stated in inch-pound units are to be regarded as standard. The values given in parentheses are mathematical conversions to SI units that are provided for information only and are not considered standard.

1.3 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 Facilities

2.2 NSTA Standard:

NSTA Pre-Shipping Test Procedures³

¹ This specification is under the jurisdiction of ASTM Committee F26 on Food Service Equipment and is the direct responsibility of Subcommittee F26.03 on Storage and Dispensing Equipment.

Current edition approved Aug. 1, 2015. Published September 2015. Originally approved in 1985. Last previous edition approved in 2009 as F918–09. DOI: 10.1520/F0918-15.

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.

2.3 ANSI/NSF International Standards:

NSF Standard 18 Manual Food and Beverage Dispensing Equipment⁴

NSF Standard 51 Plastic Materials and Components Used in Food Equipment⁴

2.4 ANSI/UL Standards:

UL Standard 471 Commercial Refrigerators and Freezers⁵

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

⁵ Available from UL LLC, 1655 Scott Blvd., Santa Clara, CA 95050; 333 Pflugsten 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.

4. Classification

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

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.

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.

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 to maintain the beverage temperature within the specified 33 to 40°F limits shall constitute failure of the test.

11.3 Pull-Down Test:

11.3.1 *Significance*—The purpose of this test is to ensure that the dispenser model being tested is capable of reaching a specific beverage temperature in a given time period.

11.3.2 *Procedure*—Fill the dispenser model being tested to rated capacity with the applicable test beverage. The temperature of the beverage at the start of the test shall be at least 72°F. Perform the test in a $72 \pm 2^\circ\text{F}$ ambient temperature with at least 50 % relative humidity. Operate the dispenser until the temperature of the beverage, as measured in the bowl or in a sample drawn from the valve, reaches 40°F or below. Determine the precise time by plotting the beverage temperature versus time at regular intervals during the test run. The total volume of samples drawn during the test shall not exceed 10 % of the rated capacity of the bowl. On Style B and Style C units, measure the time for each bowl to reach the required 40°F or below temperature pull-down time.

11.4 Energy Consumption Test:

11.4.1 *Significance*—The purpose of this test is to determine an energy consumption for the dispenser model being tested.

11.4.2 *Procedure*—By means of a kWh meter, record the energy consumed to maintain the required beverage temperature in kW/8-h period, starting with and including the pull-down test of 11.3.

11.5 Maximum Ambient Temperature and High Humidity Test:

11.5.1 *Significance*—The purpose of this test is to ensure that the dispenser will function properly in an environment of high ambient temperature and high humidity.

11.5.2 *Procedure*—Fill the unit to rated capacity with the tap water. Stabilize the temperature of the water at $80 \pm 2^\circ\text{F}$, and operate the dispenser in ambient temperatures of $104 \pm 2^\circ\text{F}$ and not less than 35 % relative humidity. Continue the test run until the water temperature is stabilized and the unit is under control of the temperature control. Record the temperature of the water, and do not let exceed 45°F. Any evidence of overloading on the compressor motor during the test run, as indicated by excessive unit heating, or any shutdown caused by the motor overload protective device, shall constitute failure of the test.

11.6 Bowl Impact Test:

11.6.1 *Significance*—The purpose of this test is to ensure that the dispenser bowl has the necessary impact resistance.

11.6.2 *Procedure*—Drop a sample bowl of each design from a height of 36 in. onto a concrete surface at least three times to cover three different points of impact: (1) the bottom of the bowl which normally rests on the base of the dispenser, (2) the top rim which normally supports the cover, and (3) any of the four corners if applicable. Failure to withstand any impact without cracking or other damage shall be cause for rejection of the lot.

11.7 Operation Production Performance Test:

11.7.1 *Significance*—The purpose of this test is to ensure that each dispenser has been manufactured properly and that all components are operating satisfactorily.

11.7.2 *Procedure*—Test each dispenser by filling to $\frac{1}{3}$ of its rated bowl capacity with tap water. Measure the time to refrigeration compressor cut-out and record. Measure the water temperature at cut-out and check against the manufacturer's standard criteria. Any units that fail to meet the test requirements of this standard shall be rejected.

12. Sampling and Inspection

12.1 *Sampling*—When specified in the contract or purchase order, perform sampling for inspection in accordance with ANSI Z1.4.

12.2 *End Item Testing*—Test one dispenser of the model to be tested, selected at random, in accordance with the tests of 11.3 – 11.7. Test each dispenser of the model to be tested in accordance with the test in 11.7.

12.3 *Quality Conformance Inspection*—The manufacturing organization shall have an effective quality audit system.

12.4 *Component and Material Inspection*—Inspect incoming components and materials to the design parameters as specified on drawings or purchase documents, or both.

13. Product Marking

13.1 Each dispenser shall be provided with an identification plate or adjacent plate(s) securely affixed to the item, in compliance with ANSI/UL No. 471 and ANSI 969.

14. Manuals

14.1 Format and content of applicable manuals shall be as indicated in Specification F760.

15. Packaging and Packing Marking

15.1 The complete dispenser shall be packaged in accordance with the supplier's standard practice.

15.2 The packaging shall meet the requirements of NSTA Pre-Shipping Test procedures.

15.3 The package shall be marked showing the name of the product, model number, serial number, and manufacturer's name.

SUPPLEMENTARY REQUIREMENTS
FOR
FEDERAL AND MILITARY PROCUREMENT

Where provisions of this supplement conflict with the main body of the standard, this supplement shall prevail.

S1. Manual

S1.1 A manual complying with Specification **F760** and this supplement shall be provided.

S2. First Article Inspection

S2.1 When required, the first article inspection shall be performed on one unit. The first article may be either a first production item or a standard production item from the supplier's current inventory, provided the item meets the requirements of the standard and is representative of the design, construction, and manufacturing technique applicable to the remaining items to be furnished under the contract.

S3. Label Plates

S3.1 Beverage dispensers shall be provided with data-name plates and instruction plates.

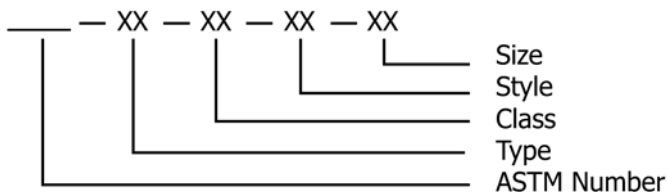
S3.1.1 *Data-name Plates*—Dispensers shall be provided with data-name plates readily visible to the operator during normal operating use and so as to not adversely affect the life and utility of the unit. Plates shall be attached to the front of the unit in such a manner as to meet the applicable National Sanitation Foundation International sanitary requirements for this equipment. In addition to the manufacturer data plate, the plate shall contain the following information, which shall be stamped, engraved, or applied by photosensitive means:

- National Stock Number
- Government Approved Manual Number

S3.1.2 *Instruction Plate*—An instruction plate shall be made of corrosion-resisting metal and shall be attached to the front of the beverage dispenser. The instruction plate shall bear instructions for start-up, operation, shut-down, and preventative maintenance.

S4. Part Identifying Number

S4.1 The following part identifying numbering procedure is for government purposes and does not constitute a requirement for the contractor. The PINs to be used for items acquired to this document are created as follows:



The following is an example of the PIN for an item in accordance with Specification F918 – 90, type II, class A, style B, size 1:

F918 – 90 – II – A – B – 1

S5. Preservation, Packaging and Package Marking

S5.1 When other than commercial practice or conformance to Practice **D3951** is desired, the preservation, packaging and package marking requirements shall be stated in the purchase order or contract.

S6. Human Factors Criteria

S6.1 Human factors engineering criteria, principles, and practices, as defined in Practice **F1166**, shall be used in the design of all beverage dispensers.

S7. Manufacturer's Certification

S7.1 If the manufacturer has successfully furnished the same equipment on a previous contract within the past three years further inspection will not be required. The manufacturer shall certify in writing that the equipment to be furnished is the same as that previously furnished and approved, and that no major design changes have been made to the equipment.

S8. Naval Shipboard Requirements

S8.1 *Power Compatibility*—Unless otherwise specified, all types of beverage dispensers shall operate on nominal 115 Volt, single phase, 60 Hertz, 3-wire alternating current as specified in MIL-STD-1399/300.

S8.2 *Access*—Beverage dispensers for naval surface vessels shall pass through a 26-in. (660-mm) wide by 66-in. (1676-mm) shipboard hatch without major disassembly. Dispensers for submarines shall pass through a 25-in. (635-mm) diameter circular hatch without major disassembly. When establishing accessibility requirements, both physical and visual access must be provided along with access for any tools, test equipment or replacement parts needed.

S8.3 *Mounting*—Beverage dispensers shall be provided with holes for mounting. The frame shall be provided with four symmetrically spaced, drilled or threaded bosses or retaining nuts for this purpose. Mounting bolt size shall be 3/8 in. (9.5 mm) minimum for dresser mounting. Beverage dispensers shall be provided with four type 300 series stainless steel round legs, each a minimum 1 in. (25.4 mm) in diameter, 4 in. (102 mm) in length, for securing dispenser to dresser.

S8.4 *Environmental Suitability*—Beverage dispensers shall be capable of withstanding ships' vibration and motion. Controls, switches, moving parts, and electrical circuits shall operate under shipboard conditions without malfunction, binding, excessive looseness, or damage. (See S8.6.3.)

S8.5 *Inclined Operation*—Beverage dispensers shall operate satisfactorily on surface ships when inclined at an angle of 15° each side of the vertical in each of two vertical planes at right angles to each other, with no spillage of fluid or product. For submarines the angle of inclination shall be 30°.

S8.6 *Quality Assurance Provisions:*

S8.6.1 *EMI Control Tests*—When specified, beverage dispensers shall be tested by the contractor in accordance with requirements of MIL-STD-461 for surface ships and submarines. The first article or the initial production unit, as applicable, shall be tested. The contractor shall furnish written certification that the equipment meets the requirements of MIL-STD-461. Nonconformance with the requirements specified shall constitute failure of the test.

S8.6.2 *Inclined Operational Test*—The beverage dispenser shall be bolted to a test platform similar to shipboard installation and inclined at an angle of 15° (30° for submarine dispensers). The dispenser shall be filled with 75 % product, then be operated for 60 s each at each side of the vertical in

each of two vertical planes at right angles to each other. Any nonconformance with specified requirements of S8.5 shall constitute failure of this test.

S8.6.3 *Shipboard Environmental Test*—When specified, the beverage dispenser under normal operating conditions, shall be tested in accordance with MIL-STD-167/1, type I equipment. The dispenser shall be secured to the test machine in the same manner that it will be secured on shipboard. Failure of the machine to perform its function during or after testing, or meeting the requirements of S8.4, shall constitute failure of this test. The government reserves the right to witness all tests of beverage dispensers procured for naval shipboard use, whether performed by the supplier or an independent testing agency.

ASTM International takes no position respecting the validity of any patent rights asserted in connection with any item mentioned in this standard. Users of this standard are expressly advised that determination of the validity of any such patent rights, and the risk of infringement of such rights, are entirely their own responsibility.

This standard is subject to revision at any time by the responsible technical committee and must be reviewed every five years and if not revised, either reapproved or withdrawn. Your comments are invited either for revision of this standard or for additional standards and should be addressed to ASTM International Headquarters. Your comments will receive careful consideration at a meeting of the responsible technical committee, which you may attend. If you feel that your comments have not received a fair hearing you should make your views known to the ASTM Committee on Standards, at the address shown below.

This standard is copyrighted by ASTM International, 100 Barr Harbor Drive, PO Box C700, West Conshohocken, PA 19428-2959, United States. Individual reprints (single or multiple copies) of this standard may be obtained by contacting ASTM at the above address or at 610-832-9585 (phone), 610-832-9555 (fax), or service@astm.org (e-mail); or through the ASTM website (www.astm.org). Permission rights to photocopy the standard may also be secured from the Copyright Clearance Center, 222 Rosewood Drive, Danvers, MA 01923, Tel: (978) 646-2600; <http://www.copyright.com/>