



STANDARD

ANSI/ASHRAE Standard 32.1-2017
(Supersedes ANSI/ASHRAE Standard 32.1-2010)

Methods of Testing for Rating Refrigerated Vending Machines for Sealed Beverages

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NOTE

Approved addenda, errata, or interpretations for this standard can be downloaded free of charge from the ASHRAE website at www.ashrae.org/technology.

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FOREWORD

First published in 1982, ASHRAE Standard 32.1 has been periodically updated to respond to changes in machine and package design. Key changes in the 2017 edition are as follows:

- Updated scope and definitions to emphasize intended application to refrigerated beverage vending machines and combination machines.
- Removed distinctions between zone-cooled (typically solid-front) machines and fully cooled (typically glass-front) machines, as these distinctions are not necessary for conducting the test.
- Updated references to other documents, including the methodology for measuring refrigerated volume.
- Enhanced instrumentation calibration and accuracy requirements.
- Removed the 90°F (32.2°C) ambient condition for the energy consumption test and designated the 75°F (23.9°C) ambient condition as the singular test condition.
- Clarified test setup requirements, including ambient temperature measurement location, beverage temperature locations, test package construction, and sensor wire installation.
- Incorporated minimum functionality requirements that must be included and the controls that are permitted in the vending machine under test.
- Clarified the method for calculating integrated average temperature.

In addition, various editorial changes have been implemented to improve clarity.

1. PURPOSE

The purpose of this standard is to specify methods of testing for rating the capacity and efficiency of self-contained, mechanically refrigerated vending machines for sealed beverages.

2. SCOPE

This standard

- a. establishes uniform methods of testing for determining laboratory performance of refrigerated beverage vending machines;
- b. applies to refrigerated beverage vending machines and combination machines;
- c. does not apply to climate-controlled snack vending machines, frozen-food vending machines, refrigerated-

food-served-hot vending machines, or hot-beverage vending machines;

- d. lists and defines the terms used in the methods of testing;
- e. defines standard sealed-beverage storage capacity; and
- f. establishes test conditions for rating.

3. DEFINITIONS

active mode: the state of normal operation of the vending machine where the cooling system is active, merchandising is active, and the vending machine is ready to vend products.

basic model: all vending machines of a given type with electrical characteristics that are essentially identical and without any differing physical or functional characteristics that affect performance and energy consumption.

bottle or can: a container in which a beverage is sealed.

energy management system: a control device (including software) or set of control devices that allow for adjustment of the operation of refrigerated vending machines with the intent of reducing energy consumption as compared to active-mode operation, based on environmental and other operational variables in the vending location.

full loading: sealed beverages placed in conformance with Section 5.2 of this standard.

instantaneous average next-to-vend beverage temperature: the average of all standard test packages in the next-to-vend beverage positions at a given time.

integrated average temperature: the average temperature of all standard test package measurements in the next-to-vend beverage positions taken over the duration of the test.

low-power mode: the reduced power state of a refrigerated beverage vending machine during extended periods of inactivity.

product: items available for sale from a vending machine, including sealed beverages.

product storage rack: that portion of the machine into which sealed beverages or other packages are placed for vending.

recovery time: the time taken by a vending machine when tested according to Section 7.3 to cool sealed beverages to the desired vending temperature.

refrigerated volume: the gross volume of the refrigerated space.

sealed beverage: bottle, can, or other closed container containing liquid beverage.

stabilized operation: the operating condition at which all test values would be repetitive (or cyclic) if the machine were operated for an extended period of time.

standard sealed beverage: the sealed beverage to be used in testing the beverage vending machine.

standard test package: a standard sealed beverage container of the size and shape for which the vending machine is designed, altered to include a temperature measuring instrument at its center of mass. The package may be of a different