ANSI Z21.20-2005

American National Standard For

Automatic Gas Ignition Systems And Components

AMERICAN NATIONAL STANDARD
Z21.20-2005

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Preface

This publication represents a basic standard for safe operation, substantial and durable construction, and acceptable performance of an automatic gas ignition system and components. It is the result of years of experience in the manufacture, testing, installation, maintenance, inspection and research on automatic gas ignition system and components designed for utilization of gas. There are risks of injury to persons inherent in appliances that, if completely eliminated, would defeat the utility of the appliance. The provisions in this standard are intended to help reduce such risks while retaining the normal operation of the appliance.

Nothing in this standard is to be considered in any way as indicating a measure of quality beyond compliance with the provisions it contains. It is designed to allow compliance of automatic gas ignition systems and components, the safety construction and performance of which may exceed the various provisions specified herein. In its preparation, full recognition has been given to possibilities of improvement through ingenuity of design. As progress takes place, revisions may become necessary. When they are believed desirable, recommendations or suggestions should be forwarded to the Chairman of Accredited Standards Committee Z21/83, 8501 East Pleasant Valley Road, Cleveland, Ohio 44131.

Safe and satisfactory operation of an automatic gas ignition system and components depends to a great extent upon its proper installation, use and maintenance. It should be installed, as applicable, in accordance with the *National Fuel Gas Code, ANSI Z223.1*, manufacturers' installation instruction and local municipal codes.

Users of this American National Standard are advised that the devices, products and activities within its scope may be subject to regulation at the Federal, state or local level. Users are strongly urged to investigate this possibility through appropriate channels. In the event of a conflict with this standard, the Federal, state or local regulation should be followed.

CAUTION NOTICE: This American National Standard may be revised or withdrawn at any time. The procedures of the American National Standards Institute, Inc., require that action be taken to reaffirm, revise or withdraw this standard no later than five (5) years from the date of approval. Purchasers of American National Standards may receive current information on all standards by calling or writing the American National Standards Institute, Inc., 11 West 42nd Street, New York, N.Y. 10036, (212) 642-4900.

EFFECTIVE DATE: An organization using this standard for product evaluation as a part of its certification program will normally establish the date by which all products certified by that organization should comply with this standard.

History Of The Development Of Standard For Automatic Gas Ignition Systems And Components

(This History is informative and is not part of the standard.)

In September 1930, a representative of the National Gas Appliance Manufacturers Association appeared before American Standards Association Sectional Committee Z21 requesting recognition of the various accessories used on, or in conjunction with, gas appliances. A special committee was appointed to study this problem, which resulted in the formation of the Subcommittee on Listing Requirements for Gas, Pressure, and Temperature Control Accessories in May 1931. This sub-committee was assigned the task of developing standards for various types of gas appliance control accessories.

At the first meeting of this group in March 1932, the general scope of its assignment was considered and, as there were a number of distinct types of accessories to be dealt with, representative subgroups were appointed to draft standards for specific classes of accessories.

One of these subgroups, formed in May 1932, was the Subcommittee on Listing Requirements for Thermostat and Thermostatic Pilots. A draft standard covering automatic devices to prevent the escape of unburned gas was developed by this group and was distributed to the industry for review and comment in early 1934. The draft standard was reconsidered in April 1934, in conjunction with the comments received, and was adopted with minor revisions. The resultant draft standard was approved by the Z21 Committee at its June 1934 meeting. This first edition of this standard, entitled Listing Requirements for Automatic Devices Designed to Prevent Escape of Unburned Gas, was subsequently approved as American Standard by the American Standards Association in 1935.

With the second edition of the standard, approved as American Standard in 1940, the standard was strengthened, which included changing the term "automatic devices to prevent escape of unburned gas" to "automatic pilots" in the title of the standard. Following the procedure outlined above, the third edition of this standard was approved as American Standard in 1951.

Developments in the industry, such as direct electric ignition of main burner gas and electric ignition of pilot burner as, prompted the subcommittee to prepare extensive revisions to the standard. These revisions, including a change in the designation of these devices from "automatic pilots" to "automatic burner ignition and safety shutoff devices," were endorsed by the Z21 Committee and the fourth edition of the standard, entitled American Standard Listing Requirements for Automatic Burner Ignition and Safety Shutoff Devices, was subsequently approved as American Standard in 1963.

On August 24, 1966, the American Standards Association, Inc., was reconstituted as the United States of America Standards Institute and, consequently, the fifth edition of the automatic burner ignition and safety shutoff device standard, which included revisions deemed necessary in line with industry developments, was approved as USA Standard in 1968.

On October 6, 1969, the United States of America Standards Institute was renamed the American National Standards Institute, Inc.

The subcommittee then restructured the standard in a manner intended to establish that ignition systems will reliably perform, as specified by the manufacturer of the device, under expected use conditions. Consequently, the sixth edition of the standard, under the new title of American National Standard for Automatic Gas Ignition Systems and Components, was approved as American National Standard in 1971.

Subsequent editions of the standard were approved as American National Standard by the American National Standards Institute in 1975, 1979, 1985, 1989, 1993, 1997 and 2000.

Following the procedures outlined above, the Z21/83 Committee adopted further revisions to this standard, Z21.20, in line with industry developments. This, the fourteenth edition of the automatic ignition system standard, was approved as an American National Standard by the American National Standards Institute, Inc., on March 9, 2005.

Previous editions of the automatic ignition systems standard, and addenda thereto, approved by ANSI or its predecessor organizations are as follows:

Z21.20-1935		
Z21.20-1940		
Z21.20-1951		
Z21.20-1963	Z21.20a-1966	Z21.20b-1967
Z21.20-1968		
Z21.20-1971	Z21.20a-1973	Z21.20b-1974
Z21.20-1975	Z21.20a-1977	Z21.20b-1978
Z21.20-1979	Z21.20a-1979	Z21.20b-1982
Z21.20-1985	Z21.20a-1987	Z21.20b-1988
Z21.20-1989	Z21.20a-1991	Z21.20b-1992
Z21.20-1993	Z21.20a-1994	Z21.20b-1995
Z21.20-1997	Z21.20a-1998	Z21.20b-1999
Z21.20-2000	Z21.20a-2000	Z21.20b-2001

NOTE: This edition of Z21.20 incorporates changes to the 2000 edition of Z21.20, and addenda thereto. Changes, other than editorial, are denoted by a vertical line in the margin.

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Standard For Automatic Gas Ignition Systems And Components

Part I: Construction

1.1 Scope

1.1.1 This standard applies to newly produced automatic gas ignition systems (see Part IV, Definitions) and components constructed entirely of new, unused parts and materials.

An automatic gas ignition system shall perform the following functions:

a. Ignite the gas at the main burner(s), or at the pilot burner(s) so it can ignite the main burner(s);

b. Prove the presence of either the ignition source, the main burner flame, or both; and

c. Automatically act to shut off the gas supply to the main burner(s), or to the pilot and the main burner(s), when the supervised flame or ignition source is not proved.

Components submitted for examination under this standard shall perform one or more of the above functions.

1.1.2 This standard applies to automatic gas ignition systems which also serve as oxygen depletion safety shutoff (ODS) systems (see Part IV, Definitions).

1.1.3 This standard covers automatic gas ignition systems and components intended primarily for use with gas appliances having inputs of 400,000 Btu/hr (117 228 W) or less per individual combustion chamber.

1.1.4 This standard applies to automatic gas ignition systems and components for use with one or more of the following gases:

a. Natural;

b. Manufactured;

c. Mixed;

d. Liquefied petroleum; and

e. LP gas-air mixtures.

1.1.5 Compliance of an automatic gas ignition system or component with this standard does not imply that such a system or component of such a system is acceptable for use on gas appliances without supplemental tests with the device(s) applied to the particular appliance design.

1.1.6 Each component of an automatic gas ignition system shall be capable of operation throughout a temperature range of 32°F (0°C) to 125°F (51.5°C) unless either higher, lower, or both higher and lower temperatures are specified by the manufacturer.

1.1.7 The tests specified herein are to verify performance within the manufacturer's specified maximum and minimum timings where applicable:

a. Pilot Flame-Establishing Period;

b. Flame Failure Response Time;

c. Flame Failure Reignition Time;

d. Recycle Time;

e. Lockout Time;

f. Purge Time;

g. Ignition Activation Period;

h. Igniter Proving Time;

i. Trial For Ignition Period;

j. Valve Sequence Period; and

k. Automatic Restart Time.

The above terms are defined in Part IV, Definitions.

1.1.8 If a value for measurement as given in this standard is followed by an equivalent value in other units, the first stated value is to be regarded as the specification.

1.1.9 All references to psi throughout this standard are to be considered gage pressures unless otherwise specified.

1.1.10 Exhibit A, List of Reference Standards, contains a list of standards specifically referenced in this standard and sources from which they may be obtained.

1.2 Data Furnished By Manufacturer

The manufacturer shall furnish the following, as appropriate, for use by the testing agency in examining automatic gas ignition systems or components under this standard:

a. Specification of intended ignition source and whether ignition source is intended for direct exposure to flame envelopment.

b. Applicable timing specified in 1.1.7.

c. The electrical rating of switches, relays, etc.