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STANDARD**

**ANSI
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1993**



AUTOMATIC INTERMITTENT PILOT IGNITION SYSTEMS FOR FIELD INSTALLATION

Secretariat



American Gas Association

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PREFACE

This publication represents a basic standard for safe operation, substantial and durable construction, and acceptable performance for automatic intermittent pilot ignition systems for field installation. It is the result of years of experience in the utilization of gas, supplemented by extensive research.

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 intermittent pilot ignition systems for field installation, the 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 should be forwarded to the Chairman of Accredited Standards Committee Z21, 8501 East Pleasant Valley Road, Cleveland, Ohio 44131.

Safe and satisfactory operation of an automatic intermittent pilot ignition system for field installation depends to a great extent upon its proper installation, and it should be installed in accordance with the National Fuel Gas Code, ANSI Z223.1, manufacturers' installation instructions and local municipal codes.

Users of this American National Standard are advised that the devices/products/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CAUTION NOTICE: This American National Standard may be revised or withdrawn at any time.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 INTERMITTENT PILOT IGNITION SYSTEMS FOR FIELD INSTALLATION

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

At its April 12, 1978 meeting, American National Standards Committee Z21 considered retrofit measures for gas-fired appliances for the purpose of fuel conservation which were suggested by the Federal Energy Administration (now Department of Energy). The Z21 Committee referred these suggested retrofit measures to its appropriate Z21 standards developing groups for consideration.

At its February 22, 1979 meeting, the Z21 Gas Appliance Thermostat and Automatic Gas Ignition Systems Working Committee considered the Federal Energy Administration's suggestion of field installing electric ignition systems to replace continuous pilots on already installed gas appliances.

After due consideration, the Working Committee agreed that a standard for retrofit ignition systems should be developed but, for reasons of safety, limited the scope of the standard to intermittent pilot ignition systems adapted to existing continuous pilots on listed gas-fired heating appliances and boilers equipped with atmospheric burners and not of the direct vent type.

The Working Committee assigned the preparation of the draft standard to an ad hoc working group comprised of members of the Standards Review Task Group of the Controls Division of the Gas Appliance Manufacturers Association and representatives of utilities and certifying agencies.

At its April 11, 1979 meeting, the Z21 Committee concurred with its Working Committee's efforts to develop a draft standard for intermittent pilot ignition systems for field installation.

By letter ballots of September 11, 1979 the Working Committee and the Z21 Control Devices Subcommittee approved the first draft of the standard which was distributed for review and comment during October 1979.

The Working Committee, at its December 13-14, 1979 meeting, reconsidered the draft standard in light of comments received and

returned it to the ad hoc working group with the recommendation that the standard be expanded to differentiate between those ignition systems for installation on appliances using natural gas and those for installation on appliances using liquefied petroleum gases.

A second draft of the proposed standard, modified as noted above, was approved by letter ballot by the Working Committee and the Control Devices Subcommittee and redistributed for review and comment during September 1980.

At its October 1, 1980 meeting, the Working Committee considered the second draft of the standard in light of comments received and, with minor modifications, submitted the revised standard to the Control Devices Subcommittee which, by letter ballot dated December 5, 1980, recommended it to the Z21 Committee. The Z21 Committee in a letter ballot dated December 31, 1980 approved the proposed standard, as modified, for submittal to the American National Standards Institute.

This, the first edition of the standard for automatic intermittent pilot ignition systems for field installation, was subsequently approved as American National Standard by the American National Standards Institute, Inc., on November 3, 1981.

This, the second edition of the standard for automatic intermittent pilot ignition systems for field installation, was subsequently approved as American National Standard by the American National Standards Institute, Inc., on January 13, 1993.

Previous editions of this standard and addenda thereto, which have been approved by the American National Standards Institute or its predecessor organizations are as follows:

Z21.71-1981 Z21.71a-1985 Z21.71b-1989

NOTE: This 1993 edition of Z21.71 incorporates changes to the 1981 edition of Z21.71, and addenda thereto. Changes, other than editorial, are denoted by a vertical line in the margin.

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**AMERICAN NATIONAL STANDARD FOR
AUTOMATIC INTERMITTENT PILOT IGNITION
SYSTEMS FOR FIELD INSTALLATION**

PART I

CONSTRUCTION

1.1 SCOPE

1.1.1 This standard applies to the construction and installation procedures for newly produced automatic intermittent pilot ignition systems (see Part II, Definitions), hereinafter referred to as “systems,” constructed entirely of new, unused parts and materials and designed to be adapted to existing continuous pilot burners on listed forced air heating appliances and boilers equipped with atmospheric burners.

1.1.2 This standard does not apply to a system for use on appliances equipped with power burners or to direct vent appliances.

1.1.3 Systems covered by this standard shall be comprised of at least:

- a. Pilot igniter(s) and cable(s);
- b. Pilot flame sensor(s);
- c. Associated system control;
- d. Two automatic valves in series, controlling main burner gas;
- e. Associated system wiring; and
- f. Pressure regulator(s).

1.2 GENERAL CONSTRUCTION

1.2.1 Ignition system components shall comply with the applicable provisions of the Standard for Automatic Gas Ignition Systems and Components, ANSI Z21.20.

1.2.2 Automatic valves shall comply with the applicable provisions of the Standard for Automatic Valves for Gas Appliances, ANSI Z21.21.

1.2.3 Manual valves shall comply with the applicable provisions of the Standard for Manually Operated Gas Valves for Appliances, Appliance Connector Valves and Hose End Valves, ANSI Z21.15.

1.2.4 Pressure regulators shall comply with the applicable provisions of the Standard for Gas Appliance Pressure Regulators, ANSI Z21.18, and shall be equipped with a vent limiting device.

1.2.5 Pilot gas filters shall comply with the applicable provisions of the Standard for Pilot Gas Filters, ANSI Z21.35.

1.2.6 The construction of systems, whether specifically covered in this standard or not, shall be in accordance with reasonable concepts of safety, substantiality and durability. Component parts shall be well-fitted and not show signs of becoming warped, bent, broken or otherwise damaged during any of the tests specified.

1.2.7 Every part of the system shall be constructed so that when installed in accordance with the manufacturer's instructions, it will be secure against displacement and will maintain a fixed relationship between essential parts under normal and reasonable conditions of handling and usage.

1.2.8 All parts that may be contacted during normal adjustment or servicing shall be free from sharp projections or edges and projective screw ends.

1.2.9 The design of the system shall be such that when the system is installed in accordance with the manufacturer's installation instructions, any connection to the controls of the related appliance shall not adversely affect the operation of that appliance.

1.2.10 All electrical equipment, wiring and accessories supplied for use with the system shall be submitted for examination.

1.3 MATERIALS

The manufacturer shall supply evidence acceptable to the testing agency that all materials have been evaluated and found to be suitable for their intended usage. Test data based on ASTM or other appropriate test procedures, certifications or historical data may be submitted for this purpose. The evidence shall show that the materials have been evaluated, as appropriate for resistance to moisture, corrosion and the effects of fuel gases, including the sulfur compounds therein, and that non-metallic diaphragm and seal materials are suitably resistant to the effects of ozone.

1.4 OPERATION

1.4.1 Under normal operating conditions, the sequence of operation of the system when installed in accordance with the manufacturer's installation instructions shall be:

- a. Upon a call for heat, the pilot shall be established and proven before gas is allowed to flow to the main burner; and
- b. When the call for heat has been satisfied, both main burner and pilot burner gas shall be shut off. The main burner gas shall be shut off by means of two automatic valves in series.

1.4.2 When the pilot is not proved the system shall provide for automatic shutoff of:

- a. The main burner gas; and
- b. The pilot burner gas for use with gases having a specific gravity greater than 1.0.

1.4.3 In the event of a pilot outage during an operating cycle, the system shall provide for automatic shutoff of main burner gas and either act to reestablish the pilot in 0.8 second or less, or be provided with a mechanical or electrical interlocking means to prevent the flow of gas to the main burner(s) when the pilot ignition means is energized.

1.5 ELECTRICAL EQUIPMENT AND WIRING

1.5.1 The provisions of this section apply to all wiring and electrical components unless otherwise specified.

Wiring to be done in the field between the system and the related appliance or its other accessories shall be covered by the system manufacturer's installation instructions.

1.5.2 Electrical equipment and wiring supplied for use with and as a part of the system shall be of approved types and shall be judged with respect to their suitability for the particular usage or shall be tested as integral parts of the system.

Electrical equipment and wiring listed or certified by a nationally recognized testing agency qualified to certify or list electrical equipment or wiring shall be deemed to be of approved types.

1.5.3 Strain relief shall be provided for all conductors leaving an electrical enclosure. High tension leads attached to a terminal accessible from outside the electrical enclosure need not be strain relieved.

1.5.4 Electrical connections which need to be disconnected to service any component shall be made in such a manner that they may be disconnected and reconnected without breaking a soldered connection and without breaking or cutting the wire(s).

1.5.5 Connection points shall be identifiable.

1.5.6 Detachable plug connections shall not be used in circuits when disconnection of the circuit may allow unsafe operation of the system.

1.5.7 Conductors or terminals for line voltage intended for connection to an external grounded (neutral) supply conductor shall be identified (e.g., finished a white or gray color, given a metallic-plated coating substantially white in color, or ribbed). All other line-voltage conductors shall be finished in colors other than white or natural gray.

Any conductor intended solely for grounding (earthing) purposes shall be identified by a covering finished in continuous green color or a continuous green color with one or more yellow stripes, unless it be bare. Conductors having such coloring shall not be used for other than grounding (earthing) purposes.

1.5.8 A single-pole switch in safety controls shall not be wired in a neutral or grounded line.

1.5.9 A switch or similar component shall be mounted securely and prevented from turning.