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Examination Standard for Gas Safety Control Cocks

Class Number 7420

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Foreword

This standard is intended to verify that the products and services described will meet stated conditions of performance, safety and quality useful to the ends of property conservation. The purpose of this standard is to present the criteria for examination of various types of products and services.

Examination in accordance with this standard shall demonstrate compliance and verify that quality control in manufacturing shall ensure a consistent and reliable product.

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1. INTRODUCTION

1.1 Purpose

1.1.1 This standard states testing and certification requirements for gas safety control cocks.

1.1.2 Testing and certification criteria may include, but are not limited to, performance requirements, marking requirements, examination of manufacturing facility(ies), audit of quality assurance procedures, and a surveillance program.

1.2 Scope

1.2.1 This standard applies to any component intended to or for use in providing an independent checking passageway which can be open only when the main gas passageway to the burner is closed.

1.3 Basis for Requirements

1.3.1 The requirements of this standard are based on experience, research and testing, and/or the standards of other organizations. The advice of manufacturers, users, trade associations, jurisdictions and/or loss control specialists was also considered.

1.3.2 The requirements of this standard reflect tests and practices used to examine characteristics of gas safety control cocks for the purpose of obtaining certification. Gas safety control cocks having characteristics not anticipated by this standard may be certified if performance equal, or superior, to that required by this standard is demonstrated.

1.4 Basis for Certification

Certification is based upon satisfactory evaluation of the product and the manufacturer in the following major areas:

1.4.1 Examination and tests on production samples shall be performed to evaluate:

- The suitability of the product;
- The performance of the product as specified by the manufacturer and required for certification; and as far as practical,
- The durability and reliability of the product.

1.4.2 An examination of the manufacturing facilities and audit of quality control procedures may be made to evaluate the manufacturer's ability to consistently produce the product which is examined and tested, and the marking procedures used to identify the product. Subsequent surveillance may be required by the certification agency in accordance with the certification scheme to ensure ongoing compliance.

1.5 Basis for Continued Certification

The basis for continual certification may include, but is not limited to, the following based upon the certification scheme and requirements of the certification agency:

- Production or availability of the product as currently certified;
- The continued use of acceptable quality assurance procedures;
- Satisfactory field experience;
- Compliance with the terms stipulated by the certification;
- Satisfactory re-examination of production samples for continued conformity to requirements; and
- Satisfactory surveillance audits conducted as part of the certification agency's product surveillance program.

1.6 Effective Date

The effective date of this certification standard mandates that all products tested for certification after the effective date shall satisfy the requirements of this standard.

The effective date of this Standard is eighteen (18) months after the publication date of the standard for compliance with all requirements.

1.7 System of Units

Units of measurement used in this Standard are United States (U.S.) customary units. These are followed by their arithmetic equivalents in International System (SI) units, enclosed in parentheses. The first value stated shall be regarded as the requirement. The converted equivalent value may be approximate. Conversion of U.S. customary units is in accordance with ANSI/IEEE/ASTM SI 10.

Two units (liter and bar), outside of but recognized by SI, are commonly used in international fire protection and are used in this Standard.

1.8 Normative References

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements of this document. For dated references, only the cited edition applies.

ANSI/IEEE/ASTM SI 10, *American National Standard for Metric Practice*

2. GENERAL INFORMATION

2.1 Product Information

2.1.1 The primary function of a gas safety control cock is to provide an independent checking passageway which can be open only when the main gas passageway to the burner is closed.

A typical gas safety control cock has two main gas connections and two checking connections arranged so that a hole in the plug can provide a passageway between either the main gas connections or between the checking connections but not between a checking connection and a main gas connection. For example, in turning the handle to shut off the main gas connections and open a passageway between the checking connections, all connections must be shut off before a passageway is opened between the checking connections.

2.2 Certification Application Requirements

The manufacturer shall provide the following preliminary information with any request for certification consideration:

- A complete list of all models, types, sizes, and options for the products or services being submitted for certification consideration;
- General assembly drawings, complete set of manufacturing drawings, materials list, anticipated marking format, piping and nameplate format, brochures, sales literature, spec. sheets, installation, operation and maintenance procedures; and
- The number and location of manufacturing facilities.
- All documents shall identify the manufacturer's name, document number or other form of reference, title, date of last revision, and revision level. All documents shall be provided with English translation.

2.3 Requirements for Samples for Examination

2.3.1 Following authorization of a certification examination, the manufacturer shall submit samples for examination and testing based on the following:

- Sample requirements to be determined by the certification agency

2.3.2 Requirements for samples may vary depending on design features, results of prior or similar testing, and results of any foregoing tests.

2.3.3 The manufacturer shall submit samples representative of production. Any decision to use data generated using prototypes is at the discretion of the certification agency.

3. GENERAL REQUIREMENTS

3.1 Review of Documentation

3.1.1 During the initial investigation and prior to physical testing, the manufacturer's specifications and details shall be reviewed to assess the ease and practicality of installation and use. The certification examination results may further define the limits of the final certification.

3.2 Physical or Structural Features

3.2.1 The design shall be such as to lend itself to installation in the usual gas safety control system.

a) Certification covers cocks up to and including 8 in. (203 mm) iron pipe size for the two main gas connections and ⅛ in. (3 mm) to ¾ in. (20 mm) iron pipe size for the two checking connections; the recommended iron pipe sizes for the checking connections being ⅛ in. (3 mm) up to and including 1 in. (25 mm) cocks, ¼ in. (6 mm) for 1¼ to 5 in. (32 to 127 mm) cocks, and ¾ in. (20 mm) for 6 and 8 in. (150 and 203 mm) cocks.

b) The handle shall be attached to the plug so that the handle will be in line with the main gas connections when these are fully open and at right angles to them when the checking connections are fully open. Rotation of the handle and plug (preferably clockwise) to close the gas connections shall be limited by suitable stops to a quarter turn. If the handle and plug are not integral, the plug position shall be further identified by an external mark on the top of, or by the distinctive shape of, the external part of the plug. Also, the handle shall be pinned or otherwise secured to the plug so that the handle can be secured in the correct position only and to minimize the possibility of unauthorized removal.

3.2.2 The materials, and especially the lubricant used, must be suitable for the intended application.

a) Certification is limited to applications handling gases (manufactured, natural and LP) for which lubricants are considered suitable.

b) Where lubrication or adjustment is critical, adequate instructions should be supplied with each cock.

3.3 Markings

3.3.1 Marking on the product or, if not possible due to size, on its packaging or label accompanying the product, shall include the following information:

- Name and address of the manufacturer or marking traceable to the manufacturer;
- Date of manufacture or code traceable to date of manufacture or lot identification;
- Model number, size, pressure rating, capacity, etc., as appropriate.

When hazard warnings are needed, the markings should be universally recognizable.

3.3.2 The model or type identification shall correspond with the manufacturer's catalog designation and shall uniquely identify the certification agency's mark of conformity.

3.3.3 The certification agency's mark of conformity shall be displayed visibly and permanently on the product and/or packaging as appropriate and in accordance with the requirements of the certification agency. The manufacturer shall exercise control of this mark as specified by the certification agency and the certification scheme.

3.3.4 All markings shall be legible and durable.

3.4 Manufacturer's Installation and Operation Instructions

The manufacturer shall provide the user with:

- Instructions for the installation, maintenance, and operation of the product;
- Facilities for repair of the product and supply replacement parts; and
- Services to ensure proper installation, inspection, or maintenance for products of such nature that it would not be reasonable to expect the average user to be able to provide such installation, inspection, or maintenance.

3.5 Calibration

3.5.1 Each piece of equipment used to verify the test parameters shall be calibrated within an interval determined on the basis of stability, purpose, and usage. A copy of the calibration certificate for each piece of test equipment is required. The certificate shall indicate that the calibration was performed against working standards whose calibration is certified and traceable to an acceptable reference standard and certified by an ISO/IEC 17025 accredited calibration laboratory. The test equipment shall be clearly identified by label or sticker showing the last date of the calibration and the next due date. A copy of the service provider's accreditation certificate as an ISO/IEC 17025 accredited calibration laboratory should be available.

3.5.2 When the inspection equipment and/or environment is not suitable for labels or stickers, other methods such as etching of control numbers on the measuring device are allowed, provided documentation is maintained on the calibration status of thus equipment.

4. PERFORMANCE REQUIREMENTS

4.1 Shut-Off and Leakage

4.1.1 Leakage shall not exceed 0.1 f^3h (0.002 m^3h) from any gas connection.

4.1.2 With maximum rated (or less) gas or air pressure applied to a main gas connection and:

a. With the handle fully turned to open a passageway between the main gas connections, leakage measured at each checking connection shall not exceed 0.1 f^3h (0.002 m^3h).

b. With the passageway between the main gas connections partially closed, leakage measured at each checking connection shall not exceed 0.1 f^3h (0.002 m^3h).

c. There must be a handle position or range of handle positions where shut-off of main gas connections and shut-off of checking connections overlap and leakage from the pressurized connection to any other connection shall not exceed 0.1 f^3h (0.002 m^3h). This overlap may be determined by applying pressure to a main and a checking connection either alternately or at the same time.

d. With the handle turned to partially open, a passageway between the checking connections, leakage measured at both (sum of leakages) checking connections or as measured at the unpressurized main connection shall not exceed 0.1 f^3h (0.002 m^3h).

e. With the handle fully turned to open a passageway between the checking connections, leakage measured at both (sum of leakages) checking connections or measured at the unpressurized main connection shall not exceed 0.1 f^3h (0.002 m^3h).

f. There shall be no leakage at the top or bottom of the plug.

4.1.3 The tests indicated in 4.2.2 will be repeated with pressure applied to the other gas main connection; and to each of the checking connections. As considered necessary, the indicated tests will be varied by applying pressure alternately or simultaneously to a main and a checking connection.

4.2 Durability

4.2.1 The cock shall operate reliably and with no significant change in operating characteristics during and after 1,000 operational cycles at rated pressure.

4.2.2 The cock shall be cycled, from fully opened to fully closed, for not less than 1,000 operations by alternate application and removal of the actuating medium. Cycling shall be at the rated pressure. There shall be no operational failure during the test.

a. At the conclusion of the test, the seat leakage rate shall be measured as noted in Section 4.1.2 above. The leak rate shall not have increased more than 25 percent of the leakage rate recorded in Section 4.1.2 above, and shall not be greater than the limit noted in 4.1.2. If there was zero initial leakage then leakage at the conclusion of the test shall not be greater than 10 percent of the limit noted in 4.1.2.

b. If the leak rate has increased more than 25 percent, or is more than 10 percent for the zero leakage cock, and is less than the stated limit, the cock shall be subjected to additional 5,000 operational cycles and assessed as follows:

1) The leak rate stabilizes (stabilization shall be achieve when leak rate measurements at 3,000, 4,000 and 5,000 cycles are the same) in which case the cock is acceptable or

2) If the leakage rate is still increasing, not stabilized, or leakage exceeds the stated limit in which case the cock is considered to be a failure.

4.3 Handle Force

4.3.1 A maximum force of not more than 50 ft-lbs (0.22kN) shall be required to turn the handle. This test is to be conducted before and after the tests described in Section 4.2.

5. OPERATIONS REQUIREMENTS

5.1 Demonstrated Quality Control Program

5.1.1 A quality assurance program is required to assure that subsequent gas safety control cocks produced by the manufacturer shall present the same quality and reliability as the specific gas safety control cocks examined. Design quality, conformance to design, and performance are the areas of primary concern.

- Design quality is determined during the examination and tests, and may be documented in the certification report.
- Continued conformance to this Standard is verified by the certifier's surveillance program.
- Quality of performance is determined by field performance and by periodic re-examination and testing.

5.1.2 The manufacturer shall demonstrate a quality assurance program which specifies controls for at least the following areas:

- Existence of corporate quality assurance guidelines;
- Incoming quality assurance, including testing;
- In-process quality assurance, including testing;
- Final inspection and tests;
- Equipment calibration;
- Drawing and change control;
- Packaging and shipping; and
- Handling and disposition of non-conforming materials.

5.1.3 Documentation/Manual

There should be an authoritative collection of procedures/policies. It should provide an accurate description of the quality management system while serving as a permanent reference for implementation and maintenance of that system. The system should require that sufficient records are maintained to demonstrate achievement of the required quality and verify operation of the quality system.

5.1.4 Records

To assure adequate traceability of materials and products, the manufacturer shall maintain a record of all quality assurance tests performed, for a minimum period of two years from the date of manufacture.

5.1.5 Drawing and Change Control

- The manufacturer shall establish a system of product configuration control that shall allow no unauthorized changes to the product. Changes to critical documents, identified in the certification report, must be reported to, and authorized by the certification agency prior to implementation for production.
- Records of all revisions to all certified products shall be maintained.

5.2 Surveillance Audit

5.2.1 An audit of the manufacturing facility may be part of the certification agency's surveillance requirements verify implementation of the quality assurance program. Its purpose is to determine that the manufacturer's equipment, procedures, and quality program are maintained to ensure a uniform product consistent with that which was tested and certified.

5.2.2 Certified products or services shall be produced or provided at, or provided from, location(s) disclosed as part of the certification examination. Manufacture of products bearing a certification mark is not permitted at any other location prior to disclosure to the certification agency.

5.3 Manufacturer's Responsibilities

The manufacturer shall notify the certification agency of changes in product construction, components, raw materials, physical characteristics, coatings, component formulation or quality assurance procedures prior to implementation.