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ASME A112.4.1-1993

Water Heater Relief Valve Drain Tubes

AN AMERICAN NATIONAL STANDARD

The American Society of Mechanical Engineers

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The American Society of Mechanical Engineers

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FOREWORD

(This Foreword is not part of ASME A112.4.1-1993.)

There are potential hazards associated with heating of water in a closed vessel, as the potential for excessive temperature or pressure development within such closed systems is always present. In order to reduce the hazards associated with water heating, two special amendments have been added to the plumbing codes and standards over the past few decades which have resulted in much safer installations. The first requirement was that which involved the installation of a high limit control in the water heating assembly, which deactivates the fuel gas control mechanism if the water heating device exceeds a specific temperature. The second requirement involved the installation of a temperature and pressure relief valve, which is designed to open to atmosphere if the water temperature or pressure within a vessel exceeds the defined specifications of the valve. Properly inspected and maintained, these devices provide the "state-of-the-art" in water heater safety.

It should be known, however, that the effectiveness of the relief valve is based upon its ability to relief the hot water or steam as quickly, yet as safely, as possible. Typically, for the safety of the building inhabitants, a pipe or tubing is installed at the outlet of the relief valve to direct the hot water or steam flow to a safe point. However, the installation of the drain must not create a hazard. The installation of any drain piping or tubing downstream of the relief valve must provide for the free passage of steam or hot water discharge. The drain tubing should not be trapped. The drain should be of full nominal size of the relief valve outlet and should not be discharged where the outlet could freeze. No threads should exist on the terminal end of the relief valve drain tube.

For many years, relief valve drains were field-fabricated from metallic piping. With the increasing use of plastics and the need for more expedient installations of plumbing components, the ASME Panel 4 undertook the task of developing criteria for the performance of water heater relief valve drains. The ASME A112 Main Committee approved the Standard and it was subsequently adopted as an American National Standard by the American National Standards Institute on November 12, 1993.

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Standardization of Plumbing Materials and Equipment

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WATER HEATER RELIEF VALVE DRAIN TUBES

1 SCOPE, PURPOSE, AND REFERENCE STANDARDS

1.1 Scope

This Standard covers the test methods and performance requirements applicable to water heater relief valve drain (or runoff) tubes for use with listed relief valves having a steam rating of 100,000 Btu per hour (Btuh) or less.

1.2 Purpose

This Standard shall serve as a uniform reference document for use by manufacturers, inspectors, contractors, and installers to identify criteria applicable to water heater relief valve drain tubes.

1.3 Reference Standards

The following reference standards shall be used to evaluate the product, and are cited herein. Unless indicated, the latest edition of these standards shall be applicable for certification to this Standard.

ASME/ANSI B1.20.1-1983, Pipe Threads (Except Dryseal)

ANSI Z21.22-1986, Water Heater Relief Valves

2 GENERAL REQUIREMENTS

2.1 Size

The drain tube shall have a minimum inside diameter of 0.75 in. and a minimum length of 48 in..

2.2 Material

The material which is used in the composition of the drain tube shall be capable of withstanding the temperature tests cited in Section 3 without collapse or permanent distortion. Materials shall be corrosion resisting.

2.3 Joints

Any joints within the tube shall be firmly affixed and shall withstand the temperature tests without separation or leakage. Assembly of the drain tube to the relief valve shall be possible by hand-tightening only. Connecting threads shall comply with ASME/ANSI B1.20.1 for 0.75 (¾) in. pipe threads.

2.4 Installation Instructions

Installation instructions, including post-installation relief valve testing procedures, shall be provided with the unit. A permanent tag or label relating to the relief valve test procedures shall be provided with the device.

2.5 Marking and Identification

2.5.1 The manufacturer's name or trademark shall be permanently marked on the drain tube.

2.5.2 For products intended for other than OEM applications, the limitations of installation for the drain tube shall be permanently marked on the tube in lettering not less than 0.125 in. in height. For example: "HAND-TIGHTEN ONLY", "USE ONLY ON T & P VALVES WITH 100,000 BTUH OR LESS RATING" or "NO PIPE SEALANTS".

3 TEST METHODS AND PERFORMANCE REQUIREMENTS

3.1 Temperature Test

3.1.1 Test Equipment. A steam generating source capable of producing 100,000 Btuh at 15 psig pressure and 250°F temperature shall be used to conduct this test. The steam source shall be fitted with instruments which measure pressure and temperature. The steam source shall be connected to a 0.75 (¾) in. relief valve which complies with ANSI Z21.22. The relief valve shall be mounted horizontally and the drain tube shall be installed in a downward position. For drain tubes intended for installation in relief valve locations in the top of a water

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heater, the test assembly shall be installed with the relief valve in a horizontal position and the drain tube connected and tested accordingly.

3.1.2 Test Method. Prior to connecting this test, the inside diameter and length of the drain tube shall be measured and recorded. A thermocouple shall be attached to the outside surface of the drain tube within 3 ± 0.5 in. of the relief valve in order to measure the equilibrium temperature. The steam generator shall be activated and the relief valve shall be manually locked in an open position. Steam discharge conditions of 100,000 Btuh, pressure ratings of 15 psig, and temperature valves of 250°F shall be established. When the thermocouple on the drain tube assembly indicates equilibrium temperature has been attained, the test shall continue for 15 minutes. After 15 minutes, the steam generator shall be deactivated and the drain tube shall be allowed to cool. The drain tube shall be evaluated against its original baseline dimensions.

3.1.3 Performance Requirements. The drain tube shall maintain its original inside diameter and shall not exceed ± 0.25 in. from its original length.

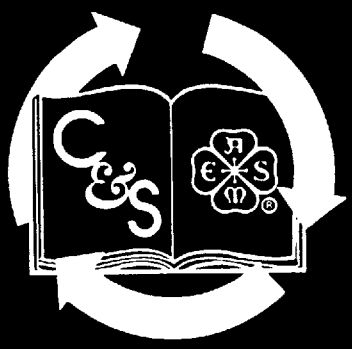
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ASME STANDARDS RELATED TO PLUMBING

Air Gaps in Plumbing Systems A112.1.2-1991
Performance Standard and Installation Procedures for Stainless Steel Drainage Systems for Sanitary Storm and Chemical Applications, Above and Below Ground A112.3.1-1993
Water Heater Relief Valve Drain Tubes A112.4.1-1993
Supports for Off-the-Floor Plumbing Fixtures for Public Use A112.6.1M-1990
Backwater Valves ..... A112.14.1-1975(R1990)
Plumbing Fixture Fittings A112.18.1M-1989
Enameled Cast Iron Plumbing Fixtures A112.19.1M-1987
Vitreous China Plumbing Fixtures A112.19.2M-1990
Stainless Steel Plumbing Fixtures (Designed for Residential Use) A112.19.3M-1987
Porcelain Enameled Formed Steel Plumbing Fixtures A112.19.4M-1984
Trim for Water-Closet Bowls, Tanks, and Urinals ..... A112.19.5-1979(R1990)
Hydraulic Requirements for Water Closets and Urinals A112.19.6-1990
Whirlpool Bathtub Appliances A112.19.7M-1987
Suction Fittings for Use in Swimming Pools, Wading Pools, Spas, Hot Tubs, and Whirlpool Bathtub Appliances A112.19.8M-1987
Non-vitreous Ceramic Plumbing Fixtures A112.19.9M-1991
Floor Drains A112.21.1M-1991
Roof Drains A112.21.2M-1983
Hydrants for Utility and Maintenance Use A112.21.3M-1985
Water Hammer Arresters A112.26.1M-1984
Cleanouts A112.36.2M-1991

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