American Society of Sanitary Engineering

Performance Requirements for

Water Hammer Arresters

An American National Standard
General Information

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No product may be said to be ASSE approved unless the manufacturer has applied to the ASSE has had his product tested according to the applicable ASSE Standards, and when the product has passed the test, displays the ASSE Seal on the product.

Instructions for receiving the authorization to display the Seal are available from ASSE’s International Office. Organizations wishing to adopt or list any ASSE Standard should print the ASSE Standard number on the cover page first and in equal or larger type to that of the adopting or listing organization.
Foreword

The foreword is not a part of this standard; however it is offered to provide background information.

Water Hammer shock has long been known to be a destructive force in plumbing water supply systems. Water hammer is that condition which defines the destructive forces, pounding noises and vibration caused by the immediate cessation of water flowing in a pipeline. After years of study on this issue, the Plumbing and Drainage Institute published their findings in 1965 in a publication entitled Standard PDI-WH201 “Water Hammer Arresters.”

Water hammer forces can be controlled with a reduction of the intensity of the shock wave. Although some codes permit the use of an air chamber to temper the shock wave, the engineering community generally agrees that the installation of an Engineered Water Hammer Arrester to reduce the shock wave intensity. Air chambers are required to be oversized to be effective. Because they are subject to loss of the air cushion with each dissipation of a shock wave, the chamber must be periodically recharged.

The effective approaches to correction of water hammer are twofold. First, the proper sized engineered water hammer arrester must be selected. Second, the arrester must be properly installed.

This standard outlines the performance requirements for Water Hammer Arresters, and describes those performance requirements in terms of methods of testing applicable to all such units. Equivalent materials to those referenced which are intended to demonstrate compliance with these requirements shall be acceptable with proof of equivalence. Common design, types and sizes are defined or stated throughout this document for the basis of standardization with other industry components. Other designs, types and sizes failing outside the scope of this standard which may comply with the intent of the standard will be treated as special requirements when submitted for analysis.

It is recommended that all devices designed for plumbing systems, especially those which pertain to public health and safety, should be installed by qualified and trained mechanics.

Manufacturers who desire certification to this standard from ASSE shall be required to have their products tested to this standard by an ASSE approved laboratory.

The Plumbing and Drainage Institute also offers a certification program to the manufacturer. Any manufacturer, whether or not a member of the PDI, may have their units tested by a qualified independent laboratory for certification in accordance with PDI certification requirements. For further information on this program, as well as information as to the use of the PDI Certification Mark and participation in its annual visual inspection and physical test program, contact the Plumbing and Drainage Institute at 45 Bristol Dr., Suite 101, S. Easton, MA 02375, Phone: (508) 230-3516, FAX: (508) 230-3529.
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Water Hammer Arresters

Section I

1.0 General

1.1 Application

Water hammer arresters (herein referred to as “device”) are installed on water distribution system piping to prevent detrimental surge pressures within water distribution systems, thereby prolonging the service life of valves, piping, fittings, trim, equipment, appliances, appurtenances, and other devices which are part of the distribution system; and to eliminate noise. This standard addresses the test methods and performance requirements for water hammer arresters.

1.2 Scope

1.2.1 Description

This standard applies only to those devices classified as water hammer arresters having a permanently sealed cushion of water or gas isolated from the water way, and designed to provide continuous protection, without maintenance, against detrimental surge pressures within the water distribution system.

1.2.2 Size Range

The size of the device shall be within the range from Type AA which are used for “point of use” residential appliance applications to Types A through F which are used in applications as defined within Table 1 of this standard.

Table 1

<table>
<thead>
<tr>
<th>Size</th>
<th>Pipe Size</th>
<th>Pipe Length</th>
<th>Total Pressure - Flow + Surge Less Arrester&lt;sup&gt;1&lt;/sup&gt;</th>
<th>Max. Reduced Pressure- Flow + Surge with Arrester&lt;sup&gt;2&lt;/sup&gt;</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>NPS/CTS</td>
<td>DN</td>
<td>feet</td>
<td>m</td>
</tr>
<tr>
<td>AA</td>
<td>½</td>
<td>15</td>
<td>50.0</td>
<td>15.2</td>
</tr>
<tr>
<td>A</td>
<td>½</td>
<td>15</td>
<td>50.0</td>
<td>15.2</td>
</tr>
<tr>
<td>B</td>
<td>¾</td>
<td>20</td>
<td>50.0</td>
<td>15.2</td>
</tr>
<tr>
<td>C</td>
<td>1</td>
<td>25</td>
<td>50.0</td>
<td>15.2</td>
</tr>
<tr>
<td>D</td>
<td>1¼</td>
<td>32</td>
<td>50.0</td>
<td>15.2</td>
</tr>
<tr>
<td>E</td>
<td>1½</td>
<td>40</td>
<td>50.0</td>
<td>15.2</td>
</tr>
<tr>
<td>F</td>
<td>2</td>
<td>50</td>
<td>50.0</td>
<td>15.2</td>
</tr>
</tbody>
</table>

1. Peak pressure shall be defined as the highest average total pressure measured over an average 2.5 millisecond portion of the calibration and performance test periods.

2. The device shall pass the endurance test by completing 10,000 cycles without the reduced pressure exceeding 160.0 psig (1103.2 kPa) maximum pressure plus tolerance.

1.2.3 Pressures

1.2.3.1 Hydrostatic Pressure

These devices shall be designed to withstand a maximum pressure of at least 150.0 psi (1034.3 kPa).