CSA B44.9:23/ASME A17.9-2023
National Standard of Canada
American National Standard

Elevator buffers

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CSA B44.9:23/ASME A17.9-2023
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Title: *Elevator buffers*

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ASME/CSA Standard

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Elevator buffers

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Preface

This is the first edition of CSA B44.9/ASME A17.9, *Elevator buffers*.

The purpose of this Standard is to provide requirements for elevator buffers primarily for conformity assessment purposes. This Standard arose from the need to have identical Canadian and U.S. requirements for this equipment, thereby enabling manufacturers to have their products approved for use in Canada or the United States.

Users of this Standard are reminded that additional and site-specific requirements may be specified by federal, provincial/territorial, state, municipal, local, or other authority, or by a project owner. This Standard should not be considered a replacement for the requirements contained in any
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This Standard was prepared by the CSA/ASME Joint Subcommittee on Elevator Buffers, under the jurisdiction of the CSA Technical Committee on the Elevator Safety Code, the CSA Strategic Steering Committee on Mechanical and Industrial Equipment Safety, and the ASME A17 Standards Committee. It is the intent of these committees to maintain a single harmonized Standard by coordinating their procedures for revising and interpreting this Standard. To this end, interpretations and revisions of this Standard will not be issued without the approval of both the CSA Technical Committee on the Elevator Safety Code and the ASME A17 Standards Committee.

This Standard has been developed in compliance with Standards Council of Canada requirements for National Standards of Canada. It has been published as a National Standard of Canada by CSA Group. This Standard has been approved by the American National Standards Institute (ANSI) as an American National Standard.

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Revisions are made periodically to the Standard to incorporate changes that appear necessary or desirable, as demonstrated by the experience gained from the application of the procedures, and in order to conform to developments in the elevator art. Approved revisions will be published periodically. The Committee welcomes proposals for revisions to this Standard. Such proposals should be as specific as possible: citing the Section number(s), the proposed wording, and a detailed description of the reasons for the proposal including any pertinent documentation.

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Edition: Cite the applicable edition and supplement of the Standard for which the interpretation is being requested.

Question: Phrase the question as a request for an interpretation of a specific requirement suitable for general understanding and use, not as a request for an approval of a proprietary design or situation. The question shall be phrased, where possible, to permit a specific "yes" or "no" answer. The inquirer may also include any plans or drawings that are necessary to explain the question; however, they should not contain proprietary names or information.

Requests that are not in this format will be rewritten in this format by the Committee prior to being answered, which may inadvertently change the intent of the original request.

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3) *This publication was developed by consensus, which is defined by* CSA Policy governing standardization — Code of good practice for standardization *as "substantial agreement. Consensus implies much more than a simple majority, but not necessarily unanimity". It is consistent with this definition that a member may be included in the Technical Committee list and yet not be in full agreement with all clauses of this Standard.*

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CSA B44.9:23/ASME A17.9-2023
Elevator buffers

1 Scope

1.1 Inclusions

This Standard covers mechanical requirements of construction, marking, and type testing requirements for oil buffers and elastomeric buffers intended to be installed in passenger and freight elevators in accordance with ASME A17.1/CSA B44.

1.2 Exclusions

This Standard does not cover spring buffers or electrical components as part of the buffer assemblies.

1.3 Dual measurements

The values given in SI units are the units of record for the purposes of this Standard. The values given in parentheses are for information and comparison only.

1.4 Terminology

In this Standard, “shall” is used to express a requirement, i.e., a provision that the user is obliged to satisfy in order to comply with the Standard; “should” is used to express a recommendation or that which is advised but not required; and “may” is used to express an option or that which is permissible within the limits of the Standard.

Notes accompanying clauses do not include requirements or alternative requirements; the purpose of a note accompanying a clause is to separate from the text explanatory or informative material.

Notes to tables and figures are considered part of the table or figure and may be written as requirements.

2 Reference publications

This Standard refers to the following publications, and where such reference is made, it shall be to the edition listed below, including all amendments published thereto. Where “latest edition” is used, it shall mean the most recent edition in publication on the date this document is published.

ASME (American Society of Mechanical Engineers)/CSA Group

ASME A17.1/CSA B44 – latest edition
Safety code for elevators and escalators

3 Definitions

The following definitions shall apply in this Standard:

Buffer — a device designed to stop a descending car or counterweight beyond its normal limit of travel by storing or by absorbing and dissipating the kinetic energy of the car or counterweight.

Elastomeric buffer — an energy-accumulation-type buffer with non-linear characteristics (such as a polyurethane buffer) using resilient materials to cushion the impact force of the descending car or counterweight.

Oil buffer — a buffer using oil as a medium that absorbs and dissipates the kinetic energy of the descending car or counterweight.

Gas spring-return oil buffer — an oil buffer using the pressure of a compressed gas to return the buffer plunger or piston to its fully extended position.

Mechanical spring-return oil buffer — an oil buffer using the force of the compressed mechanical spring or springs to return the buffer plunger or piston to its fully extended position.

Oil buffer stroke — the oil-displacing movement of the buffer plunger or piston, excluding the travel of the buffer plunger accelerating device.

4 Construction

4.1 Oil buffer

4.1.1 Stroke

The minimum stroke of oil buffers shall be in accordance with ASME A17.1/CSA B44 Requirement 2.22.4.1 and Table 2.22.4.1.

4.1.2 Retardation

Oil buffers shall develop an average retardation in accordance with ASME A17.1/CSA B44 Requirement 2.22.4.2.

4.1.3 Factor of safety for oil-buffer parts

The factor of safety of parts of oil buffers shall be in accordance with ASME A17.1/CSA B44 Requirement 2.22.4.3.

4.1.4 Slenderness ratio for members under compression as columns

The slenderness ratio (L/R) for members of oil buffers under compression as columns shall be in accordance with ASME A17.1/CSA B44 Requirement 2.22.4.4.

4.1.5 Plunger requirements

4.1.5.1 Plunger return requirements

Oil buffers shall be designed such that the plunger returns to the extended position in accordance with ASME A17.1/CSA B44 Requirement 2.22.4.5.1.

4.1.5.2 Plunger lateral movement requirements

The clearance between the plunger and the cylinder in spring-return-type or gravity-return-type oil buffers shall be in accordance with ASME A17.1/CSA B44 Requirement 2.22.4.5.2.

4.1.6 Means for determining oil level

Oil buffers shall be provided with means for determining that the oil level is within the maximum and minimum allowable limits in accordance with ASME A17.1/CSA B44 Requirement 2.22.4.6.

4.1.7 Buffer oil requirements

Oils used in oil buffers shall be in accordance with ASME A17.1/CSA B44 Requirement 2.22.4.9.

4.2 Elastomeric buffers

4.2.1 Retardation

Buffers retardation limitations shall be in accordance with ASME A17.1/CSA B44 Requirement 2.22.5.1.

4.2.2 Return speed

Upon activation (compression) of the buffer, the return speed of the car or counterweight shall be in accordance with ASME A17.1/CSA B44 Requirement 2.22.5.2.

4.2.3 Deformation

There shall be no permanent deformation of the buffer after actuation in accordance with ASME A17.1/CSA B44 Requirement 2.22.5.3.

4.2.4 Full compression

For elastomeric buffers, “full compression” shall have the meaning described in ASME A17.1/CSA B44 Requirement 2.22.5.4.

5 Marking and literature requirements

5.1 Oil buffer data plate

Oil buffers shall have a permanently attached data plate that complies with ASME A17.1/CSA B44 Requirement 8.13.1 and is marked by the manufacturer including

a) the maximum and minimum loads and the maximum striking speeds for which the buffer has been rated for use;
b) the permissible range in viscosity of the buffer oil to be used, stated in Saybolt Universal Seconds at 38 °C (100 °F);
c) the viscosity index number of the oil to be used;
d) the pour point in degrees Celsius (Fahrenheit) of the oil to be used;
e) the stroke of the buffer in millimetres (inches);
f) the composition of the gas, if used;
g) the name, trademark, or file number by which the organization that manufactured the product can be identified;
h) indication of certification, which shall include CSA B44.9/ASME A17.9;
i) the wording “this buffer is evaluated for mechanical performance only”; and
j) the manufacturer’s designation of type or model assigned to the buffer.

5.2 Oil buffer drawings

Oil buffers shall be provided with separate drawings for the following:

a) the exact construction of the buffer;

b) all dimensions of each part;
c) all pertinent information concerning materials, clearances, and tolerances;
d) installation instructions for oil buffers when required in accordance with Clause 6.1.4; and
e) data plate with required markings in accordance with Clause 5.1.

5.3 Elastomeric buffer data plate

Elastomeric buffers shall be provided with a marking plate that complies with ASME A17.1/CSA B44 Requirement 8.13.3. The buffer marking plate shall include the following data provided in a legible and permanent manner:

a) the maximum and minimum loads and the maximum striking speeds for which the buffer has been rated for use in conformance with ASME A17.1/CSA B44 Requirement 2.22;
b) the name, trademark, or file number by which the organization that manufactured the product can be identified;
c) specific conditions of use (where applicable) for elastomeric buffers (see ASME A17.1/CSA B44 Requirement 2.22.1.1.5);
d) the maximum stroke (compression) of the buffer;
e) indication of certification, which shall include CSA B44.9/ASME A17.9; and
f) the manufacturer's designation of type or model assigned to the buffer.

5.4 Elastomeric buffer drawings

Elastomeric buffers shall be provided with separate drawings for the following:

a) the exact construction of the buffer;
b) all dimensions of each part;
c) all pertinent information concerning materials, clearances, and tolerances; and
d) all conditions of use as specified by the elastomeric buffers manufacturer. Such conditions include, but are not limited to, temperature, humidity, or other environmental and life-cycle conditions that might affect buffer performance.

6 Tests

6.1 Tests for oil buffers

6.1.1 General

A type test on an oil buffer shall be acceptable for similarly designed buffers, provided the longest stroke of the type is subjected to the type test and the load range of the buffer is within the maximum and minimum range for the oil portings of the given buffer.

6.1.2 Test sample

Tests shall be made on a buffer of each type or design to be installed. The buffer test shall be on a production model or a buffer identical to the model to be produced. Each buffer shall conform to the documents submitted and have the following oil portings:

a) the porting having the range of the maximum loads for which the buffer is designed; and
b) the porting having the range of the minimum loads for which the buffer is designed.