Recommended Rules for the Care and Operation of Heating Boilers
VI

RECOMMENDED RULES FOR THE CARE AND OPERATION OF HEATING BOILERS

ASME Boiler and Pressure Vessel Committee on Heating Boilers
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* The 2015 Edition of Section III is the last edition in which Section III, Division 1, Subsection NH, Class 1 Components in Elevated Temperature Service, will be published. The requirements located within Subsection NH have been moved to Section III, Division 5, Subsection HB, Subpart B for the elevated temperature construction of Class A components.
INTERPRETATIONS

Interpretations of the Code have historically been posted in January and July at http://cstools.asme.org/interpretations.cfm. Interpretations issued during the previous two calendar years are included with the publication of the applicable Section of the Code in the 2015 Edition. Interpretations of Section III, Divisions 1 and 2 and Section III Appendices are included with Subsection NCA.

Following the 2015 Edition, interpretations will not be included in editions; they will be issued in real time in ASME’s Interpretations Database at http://go.asme.org/Interpretations. Historical BPVC interpretations may also be found in the Database.

CODE CASES

The Boiler and Pressure Vessel Code committees meet regularly to consider proposed additions and revisions to the Code and to formulate Cases to clarify the intent of existing requirements or provide, when the need is urgent, rules for materials or constructions not covered by existing Code rules. Those Cases that have been adopted will appear in the appropriate 2015 Code Cases book: “Boilers and Pressure Vessels” or “Nuclear Components.” Supplements will be sent or made available automatically to the purchasers of the Code Cases books up to the publication of the 2017 Code.
In 1911, The American Society of Mechanical Engineers established the Boiler and Pressure Vessel Committee to formulate standard rules for the construction of steam boilers and other pressure vessels. In 2009, the Boiler and Pressure Vessel Committee was superseded by the following committees:

(a) Committee on Power Boilers (I)
(b) Committee on Materials (II)
(c) Committee on Construction of Nuclear Facility Components (III)
(d) Committee on Heating Boilers (IV)
(e) Committee on Nondestructive Examination (V)
(f) Committee on Pressure Vessels (VIII)
(g) Committee on Welding, Brazing, and Fusing (IX)
(h) Committee on Fiber-Reinforced Plastic Pressure Vessels (X)
(i) Committee on Nuclear Inservice Inspection (XI)
(j) Committee on Transport Tanks (XII)
(k) Technical Oversight Management Committee (TOMC)

Where reference is made to “the Committee” in this Foreword, each of these committees is included individually and collectively.

The Committee’s function is to establish rules of safety relating only to pressure integrity, which govern the construction** of boilers, pressure vessels, transport tanks, and nuclear components, and the inservice inspection of nuclear components and transport tanks. The Committee also interprets these rules when questions arise regarding their intent. The technical consistency of the Sections of the Code and coordination of standards development activities of the Committees is supported and guided by the Technical Oversight Management Committee. This Code does not address other safety issues relating to the construction of boilers, pressure vessels, transport tanks, or nuclear components, or the inservice inspection of nuclear components or transport tanks. Users of the Code should refer to the pertinent codes, standards, laws, regulations, or other relevant documents for safety issues other than those relating to pressure integrity. Except for Sections XI and XII, and with a few other exceptions, the rules do not, of practical necessity, reflect the likelihood and consequences of deterioration in service related to specific service fluids or external operating environments. In formulating the rules, the Committee considers the needs of users, manufacturers, and inspectors of pressure vessels. The objective of the rules is to afford reasonably certain protection of life and property, and to provide a margin for deterioration in service to give a reasonably long, safe period of usefulness. Advancements in design and materials and evidence of experience have been recognized.

This Code contains mandatory requirements, specific prohibitions, and nonmandatory guidance for construction activities and inservice inspection and testing activities. The Code does not address all aspects of these activities and those aspects that are not specifically addressed should not be considered prohibited. The Code is not a handbook and cannot replace education, experience, and the use of engineering judgment. The phrase engineering judgement refers to technical judgments made by knowledgeable engineers experienced in the application of the Code. Engineering judgments must be consistent with Code philosophy, and such judgments must never be used to overrule mandatory requirements or specific prohibitions of the Code.

The Committee recognizes that tools and techniques used for design and analysis change as technology progresses and expects engineers to use good judgment in the application of these tools. The designer is responsible for complying with Code rules and demonstrating compliance with Code equations when such equations are mandatory. The Code neither requires nor prohibits the use of computers for the design or analysis of components constructed to the

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* The information contained in this Foreword is not part of this American National Standard (ANS) and has not been processed in accordance with ANSI’s requirements for an ANS. Therefore, this Foreword may contain material that has not been subjected to public review or a consensus process. In addition, it does not contain requirements necessary for conformance to the Code.

** Construction, as used in this Foreword, is an all-inclusive term comprising materials, design, fabrication, examination, inspection, testing, certification, and pressure relief.
requirements of the Code. However, designers and engineers using computer programs for design or analysis are cau-
tioned that they are responsible for all technical assumptions inherent in the programs they use and the application of
these programs to their design.

The rules established by the Committee are not to be interpreted as approving, recommending, or endorsing any pro-
prietary or specific design, or as limiting in any way the manufacturer's freedom to choose any method of design or any
form of construction that conforms to the Code rules.

The Committee meets regularly to consider revisions of the rules, new rules as dictated by technological development,
Code Cases, and requests for interpretations. Only the Committee has the authority to provide official interpretations of
this Code. Requests for revisions, new rules, Code Cases, or interpretations shall be addressed to the Secretary in writing
and shall give full particulars in order to receive consideration and action (see Submittal of Technical Inquiries to the
Boiler and Pressure Vessel Standards Committees). Proposed revisions to the Code resulting from inquiries will be pre-
sented to the Committee for appropriate action. The action of the Committee becomes effective only after confirmation
by ballot of the Committee and approval by ASME. Proposed revisions to the Code approved by the Committee are sub-
mitted to the American National Standards Institute (ANSI) and published at http://go.asme.org/BPVCPublicReview to
invite comments from all interested persons. After public review and final approval by ASME, revisions are published at
regular intervals in Editions of the Code.

The Committee does not rule on whether a component shall or shall not be constructed to the provisions of the Code.
The scope of each Section has been established to identify the components and parameters considered by the Committee
in formulating the Code rules.

Questions or issues regarding compliance of a specific component with the Code rules are to be directed to the ASME
Certificate Holder (Manufacturer). Inquiries concerning the interpretation of the Code are to be directed to the Commit-
tee. ASME is to be notified should questions arise concerning improper use of an ASME Certification Mark.

When required by context in this Section, the singular shall be interpreted as the plural, and vice versa, and the fem-
inine, masculine, or neuter gender shall be treated as such other gender as appropriate.
STATEMENT OF POLICY ON THE USE OF THE CERTIFICATION MARK AND CODE AUTHORIZATION IN ADVERTISING

ASME has established procedures to authorize qualified organizations to perform various activities in accordance with the requirements of the ASME Boiler and Pressure Vessel Code. It is the aim of the Society to provide recognition of organizations so authorized. An organization holding authorization to perform various activities in accordance with the requirements of the Code may state this capability in its advertising literature.

Organizations that are authorized to use the Certification Mark for marking items or constructions that have been constructed and inspected in compliance with the ASME Boiler and Pressure Vessel Code are issued Certificates of Authorization. It is the aim of the Society to maintain the standing of the Certification Mark for the benefit of the users, the enforcement jurisdictions, and the holders of the Certification Mark who comply with all requirements.

Based on these objectives, the following policy has been established on the usage in advertising of facsimiles of the Certification Mark, Certificates of Authorization, and reference to Code construction. The American Society of Mechanical Engineers does not "approve," "certify," "rate," or "endorse" any item, construction, or activity and there shall be no statements or implications that might so indicate. An organization holding the Certification Mark and/or a Certificate of Authorization may state in advertising literature that items, constructions, or activities "are built (produced or performed) or activities conducted in accordance with the requirements of the ASME Boiler and Pressure Vessel Code," or "meet the requirements of the ASME Boiler and Pressure Vessel Code." An ASME corporate logo shall not be used by any organization other than ASME.

The Certification Mark shall be used only for stamping and nameplates as specifically provided in the Code. However, facsimiles may be used for the purpose of fostering the use of such construction. Such usage may be by an association or a society, or by a holder of the Certification Mark who may also use the facsimile in advertising to show that clearly specified items will carry the Certification Mark. General usage is permitted only when all of a manufacturer’s items are constructed under the rules.

STATEMENT OF POLICY ON THE USE OF ASME MARKING TO IDENTIFY MANUFACTURED ITEMS

The ASME Boiler and Pressure Vessel Code provides rules for the construction of boilers, pressure vessels, and nuclear components. This includes requirements for materials, design, fabrication, examination, inspection, and stamping. Items constructed in accordance with all of the applicable rules of the Code are identified with the official Certification Mark described in the governing Section of the Code.

Markings such as "ASME," "ASME Standard," or any other marking including "ASME" or the Certification Mark shall not be used on any item that is not constructed in accordance with all of the applicable requirements of the Code.

Items shall not be described on ASME Data Report Forms nor on similar forms referring to ASME that tend to imply that all Code requirements have been met when, in fact, they have not been. Data Report Forms covering items not fully complying with ASME requirements should not refer to ASME or they should clearly identify all exceptions to the ASME requirements.
SUBMITTAL OF TECHNICAL INQUIRIES TO THE BOILER AND PRESSURE VESSEL STANDARDS COMMITTEES

1 INTRODUCTION

(a) The following information provides guidance to Code users for submitting technical inquiries to the committees. See Guideline on the Approval of New Materials Under the ASME Boiler and Pressure Vessel Code in Section II, Parts C and D for additional requirements for requests involving adding new materials to the Code. Technical inquiries include requests for revisions or additions to the Code rules, requests for Code Cases, and requests for Code Interpretations, as described below.

(1) Code Revisions. Code revisions are considered to accommodate technological developments, address administrative requirements, incorporate Code Cases, or to clarify Code intent.

(2) Code Cases. Code Cases represent alternatives or additions to existing Code rules. Code Cases are written as a question and reply, and are usually intended to be incorporated into the Code at a later date. When used, Code Cases prescribe mandatory requirements in the same sense as the text of the Code. However, users are cautioned that not all jurisdictions or owners automatically accept Code Cases. The most common applications for Code Cases are:
   
   (-a) to permit early implementation of an approved Code revision based on an urgent need
   (-b) to permit the use of a new material for Code construction
   (-c) to gain experience with new materials or alternative rules prior to incorporation directly into the Code

(3) Code Interpretations. Code Interpretations provide clarification of the meaning of existing rules in the Code, and are also presented in question and reply format. Interpretations do not introduce new requirements. In cases where existing Code text does not fully convey the meaning that was intended, and revision of the rules is required to support an interpretation, an Intent Interpretation will be issued and the Code will be revised.

(b) The Code rules, Code Cases, and Code Interpretations established by the committees are not to be considered as approving, recommending, certifying, or endorsing any proprietary or specific design, or as limiting in any way the freedom of manufacturers, constructors, or owners to choose any method of design or any form of construction that conforms to the Code rules.

(c) Inquiries that do not comply with these provisions or that do not provide sufficient information for a committee’s full understanding may result in the request being returned to the inquirer with no action.

2 INQUIRY FORMAT

Submittals to a committee shall include:

(a) Purpose. Specify one of the following:
   
   (1) revision of present Code rules
   (2) new or additional Code rules
   (3) Code Case
   (4) Code Interpretation

(b) Background. Provide the information needed for the committee’s understanding of the inquiry, being sure to include reference to the applicable Code Section, Division, edition, addenda (if applicable), paragraphs, figures, and tables. Preferably, provide a copy of the specific referenced portions of the Code.

(c) Presentations. The inquirer may desire or be asked to attend a meeting of the committee to make a formal presentation or to answer questions from the committee members with regard to the inquiry. Attendance at a committee meeting shall be at the expense of the inquirer. The inquirer’s attendance or lack of attendance at a meeting shall not be a basis for acceptance or rejection of the inquiry by the committee.
3 CODE REVISIONS OR ADDITIONS

Requests for Code revisions or additions shall provide the following:

(a) Proposed Revisions or Additions. For revisions, identify the rules of the Code that require revision and submit a copy of the appropriate rules as they appear in the Code, marked up with the proposed revision. For additions, provide the recommended wording referenced to the existing Code rules.

(b) Statement of Need. Provide a brief explanation of the need for the revision or addition.

(c) Background Information. Provide background information to support the revision or addition, including any data or changes in technology that form the basis for the request that will allow the committee to adequately evaluate the proposed revision or addition. Sketches, tables, figures, and graphs should be submitted as appropriate. When applicable, identify any pertinent paragraph in the Code that would be affected by the revision or addition and identify paragraphs in the Code that reference the paragraphs that are to be revised or added.

4 CODE CASES

Requests for Code Cases shall provide a Statement of Need and Background Information similar to that defined in 3(b) and 3(c), respectively, for Code revisions or additions. The urgency of the Code Case (e.g., project underway or imminent, new procedure, etc.) must be defined and it must be confirmed that the request is in connection with equipment that will bear the Certification Mark, with the exception of Section XI applications. The proposed Code Case should identify the Code Section and Division, and be written as a Question and a Reply in the same format as existing Code Cases. Requests for Code Cases should also indicate the applicable Code editions and addenda (if applicable) to which the proposed Code Case applies.

5 CODE INTERPRETATIONS

(a) Requests for Code Interpretations shall provide the following:

(1) Inquiry. Provide a condensed and precise question, omitting superfluous background information and, when possible, composed in such a way that a “yes” or a “no” Reply, with brief provisos if needed, is acceptable. The question should be technically and editorially correct.

(2) Reply. Provide a proposed Reply that will clearly and concisely answer the Inquiry question. Preferably, the Reply should be “yes” or “no,” with brief provisos if needed.

(3) Background Information. Provide any background information that will assist the committee in understanding the proposed Inquiry and Reply.

(b) Requests for Code Interpretations must be limited to an interpretation of a particular requirement in the Code or a Code Case. The committee cannot consider consulting type requests such as the following:

(1) a review of calculations, design drawings, welding qualifications, or descriptions of equipment or parts to determine compliance with Code requirements;

(2) a request for assistance in performing any Code-prescribed functions relating to, but not limited to, material selection, designs, calculations, fabrication, inspection, pressure testing, or installation;

(3) a request seeking the rationale for Code requirements.

6 SUBMITTALS

Submittals to and responses from the committees shall meet the following:

(a) Submittal. Inquiries from Code users shall be in English and preferably be submitted in typewritten form; however, legible handwritten inquiries will also be considered. They shall include the name, address, telephone number, fax number, and e-mail address, if available, of the inquirer and be mailed to the following address:

Secretary
ASME Boiler and Pressure Vessel Committee
Two Park Avenue
New York, NY 10016-5990

As an alternative, inquiries may be submitted via e-mail to: SecretaryBPV@asme.org or via our online tool at http://go.asme.org/InterpretationRequest.

(b) Response. The Secretary of the appropriate committee shall acknowledge receipt of each properly prepared inquiry and shall provide a written response to the inquirer upon completion of the requested action by the committee.
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January 1, 2015

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- **J. A. Kapp**: J.
- **J. Keltjens**: J.
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- **K. Asahina**: J.
- **D. Barker**: D.
- **A. M. Clayton**: A.
- **J. E. Didlake Jr.**: J.
- **T. A. Duffy**: T.
- **B. L. Haroldsen**: B.
- **J. K. Hayashi**: K.
- **D. Hilding**: D.
- **K. W. King**: K.
- **R. Kitamura**: R.

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- **J. K. Hayashi**: K.
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- **R. Kitamura**: R.

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- **B. L. Haroldsen**: B.
- **J. K. Hayashi**: K.
- **D. Hilding**: D.
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- **R. Brown**: W.
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- **A. H. Honza**: A.
- **J. A. Kapp**: J.
- **J. Keltjens**: J.
- **A. K. Khare**: A.
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- **J. Penso**: J.
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- **J. K. Hayashi**: K.
- **D. Hilding**: D.
- **K. W. King**: K.
- **R. Kitamura**: R.
### Executive Committee (BPV XI)

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### China International Working Group (BPV XI)

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### Subgroup on Evaluation Standards (SG-ES) (BPV XI)

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### Task Group on Evaluation of Beyond Design Basis Events (SG-ES) (BPV XI)

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### Working Group on Flaw Evaluation (SG-ES) (BPV XI)

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### Task Group on Evaluation Procedures for Degraded Buried Pipe (WG-PFE) (BPV XI)

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### Working Group on Operating Plant Criteria (SG-ES) (BPV XI)

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### Working Group on Pipe Flaw Evaluation (SG-ES) (BPV XI)

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Subgroup on Nondestructive Examination (SG-NDE) (BPV XI)

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G. C. Park
J. M. Shuping
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SUMMARY OF CHANGES

After publication of the 2015 Edition, Errata to the BPV Code may be posted on the ASME Web site to provide corrections to incorrectly published items, or to correct typographical or grammatical errors in the BPV Code. Such Errata shall be used on the date posted.

Information regarding Special Notices and Errata is published by ASME at http://go.asme.org/BPVCerrata.

Changes given below are identified on the pages by a margin note, (15), placed next to the affected area.

The Record Numbers listed below are explained in more detail in “List of Changes in Record Number Order” following this Summary of Changes.

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### LIST OF CHANGES IN RECORD NUMBER ORDER

<table>
<thead>
<tr>
<th>Record Number</th>
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<tr>
<td>13-860</td>
<td>In the Foreword, the subtitle has been deleted and replaced with an ANSI disclaimer as a footnote</td>
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</table>
CROSS-REFERENCING AND STYLISTIC CHANGES IN THE BOILER AND PRESSURE VESSEL CODE

There have been structural and stylistic changes to BPVC, starting with the 2011 Addenda, that should be noted to aid navigating the contents. The following is an overview of the changes:

**Subparagraph Breakdowns/Nested Lists Hierarchy**
- First-level breakdowns are designated as (a), (b), (c), etc., as in the past.
- Second-level breakdowns are designated as (1), (2), (3), etc., as in the past.
- Third-level breakdowns are now designated as (-a), (-b), (-c), etc.
- Fourth-level breakdowns are now designated as (-1), (-2), (-3), etc.
- Fifth-level breakdowns are now designated as (+a), (+b), (+c), etc.
- Sixth-level breakdowns are now designated as (+1), (+2), etc.

**Footnotes**
With the exception of those included in the front matter (roman-numbered pages), all footnotes are treated as endnotes. The endnotes are referenced in numeric order and appear at the end of each BPVC section/subsection.

**Submittal of Technical Inquiries to the Boiler and Pressure Vessel Standards Committees**

*Submittal of Technical Inquiries to the Boiler and Pressure Vessel Standards Committees* has been moved to the front matter. This information now appears in all Boiler Code Sections (except for Code Case books).

**Cross-References**

It is our intention to establish cross-reference link functionality in the current edition and moving forward. To facilitate this, cross-reference style has changed. Cross-references within a subsection or subarticle will not include the designator/identifier of that subsection/subarticle. Examples follow:
- **(Sub-)Paragraph Cross-References.** The cross-references to subparagraph breakdowns will follow the hierarchy of the designators under which the breakdown appears.  
  - If subparagraph (-a) appears in X.1(c)(1) and is referenced in X.1(c)(1), it will be referenced as (-a).
  - If subparagraph (-a) appears in X.1(c)(1) but is referenced in X.1(c)(2), it will be referenced as (+-a).
  - If subparagraph (-a) appears in X.1(c)(1) but is referenced in X.1(e)(1), it will be referenced as (+c)(1)(-a).
  - If subparagraph (-a) appears in X.1(c)(1) but is referenced in X.2(c)(2), it will be referenced as X.1(c)(1)(-a).
- **Equation Cross-References.** The cross-references to equations will follow the same logic. For example, if eq. (1) appears in X.1(a)(1) but is referenced in X.1(b), it will be referenced as eq. (a)(1)(1). If eq. (1) appears in X.1(a)(1) but is referenced in a different subsection/subarticle/paragraph, it will be referenced as eq. X.1(a)(1)(1).
SECTION 1
GENERAL

1.01 SCOPE
This portion of the rules is intended to cover general descriptions, terminology, and basic fundamentals of heating boilers, controls, and automatic fuel burning equipment. Because of the wide variety of makes and types of equipment in use, it is general in scope.

1.02 USE OF ILLUSTRATIONS
The illustrations used in this Section have been selected to show typical examples of the equipment referred to in the text and are not intended to endorse or recommend any one manufacturer’s product; nor are the illustrations intended to be used as design criteria or as examples of preferred configurations of equipment.

1.03 MANUFACTURER’S INFORMATION
For detailed information on any specific unit, the Manufacturer’s information should be consulted.

1.04 REFERENCE TO SECTION IV
The boilers discussed in this Section will be those limited to the operating ranges of Section IV, Heating Boilers, of the ASME Boiler and Pressure Vessel Code as follows:
(a) steam boilers for operation at pressure not exceeding 15 psi (100 kPa)
(b) hot water heating and hot water supply boilers for operation at pressures not exceeding 160 psi (1 100 kPa) and/or temperatures not to exceed 250°F (120°C)

1.05 GLOSSARY OF TERMS
For terms relating to boiler design, refer to Section IV, Heating Boilers, Appendix E, Terminology. For terms relating to boiler water treatment, refer to 9.12, Glossary of Water Treatment Terms.

A. Boilers and General Terms
absolute pressure: pressure above zero pressure, the sum of the gage and atmospheric pressures.
accumulator (steam): a pressure vessel containing water and steam that is used to store the heat of steam for use at a later period and at some lower pressure.
air purge: the removal of undesired matter by replacement with air.
air vent: a valve opening in the top of the highest drum of a boiler or pressure vessel for venting air. Also a device, manual or automatic, that will effect the removal of air from a steam or hot water heating system. It is usually located at the highest point in the system.
allowable working pressure: the maximum pressure for which the boiler was designed and constructed.
altitude gage: a pressure gage calibrated in feet, indicating the height of the water in the system above the gage; usually found as combination pressure, altitude, and temperature gage.
ambient temperature: the temperature of the air surrounding the equipment.
baffle: a plate or wall for deflecting gases or liquids.
base: support for boiler.
beaded tube end: the rounded exposed end of a rolled tube when the tube metal is formed over against the sheet in which the tube is rolled.
belled tube end: see flared tube end.
bellows seal: a seal in the shape of a bellows used to prevent air or gas leakage.
blind nipple: a nipple, or a short piece of piping or tube, closed at one end.
blowdown: the difference between the opening and closing pressures of a safety or safety relief valve.
blowoff valve: a valve or cock in the bottom and/or near the water line of a boiler, that, when opened, permits free passage of scale and sediment during the blowoff operation.
boiler: a pressure vessel that incorporates a fuel input device or mechanism to heat water for space heating or other purposes or to convert water into steam for use in an external distribution system.
watertube: a boiler in which the tubes contain water and steam, the heat being applied to the outside surface.