HS28 Pressure Vessel
Safety: Boiler
Management Program
1.0 **INTRODUCTION**

The purpose of this program is to outline the roles, responsibilities, requirements and actions required to provide practical assurance against University owned or leased boilers from being or becoming defective. Furthermore, this program establishes the minimum design, construction, alteration, maintenance, repair, inspection and testing requirements to comply with the following:

- NYS Code Rule Part 4 Construction, Installation, and Maintenance of Low Pressure Boilers
- NYS Code Rule Part 14 Construction, Installation, and Maintenance of High Pressure Boilers
- ASME Boiler and Pressure Vessel Code
- Authorized Inspection Agency

New York City and other jurisdictions may have additional local requirements for boiler owner(s). Contact local authorized inspection agency for more information.

2.0 **SCOPE**

This program applies to the Ithaca Campus, Geneva Campus, and NYC Cornell Club. This program does not cover Weill Medical College.

3.0 **ROLES AND RESPONSIBILITIES**

3.1 Environment Health and Safety

3.1.1 Assess regulatory requirements, and identify applicable regulations to develop, implement and maintain the Boiler Maintenance Management Program.

3.1.2 Communicate regulatory changes, program requirements, and revisions to stakeholders.

3.1.3 Notify the Department of Labor of boiler related incident. For specifics see section 12.1 Incident Reporting.

3.1.4 Verify each unit has a process for qualifying competent persons performing boiler operations, maintenance, or repairs.

3.2 Boiler Owner

3.2.1 Develop a maintenance plan for each boiler’s preventative maintenance, inspection, and testing requirements in accordance with programmatic and manufacturer requirements.

3.2.2 Ensure boiler’s maintenance plan is implemented into the University’s Computerized Maintenance Management System (CMMS), or Property Management Company’s equivalent, and the maintenance requirements are executed in the required intervals.

3.2.3 If boiler conditions, or operating pressure, creates a danger to health and safety, and cannot be controlled or shutdown safely the facility shall be evacuated by engaging the buildings alarm system.

3.3 Authorized Inspection Agency

3.3.1 Provide no less than 15 days notification of inspection and perform periodic inspections as required by NYS Department of Labor to ensure compliance with applicable boiler code and regulations.

3.3.2 Provide certified boiler inspector whose competence has been certified by the commissioner and who lawfully possesses a valid certificate of competence.

3.3.3 Provide inspection report of each boiler inspected which details all applicable violations or considerations to the boiler’s owner.

3.4 Property Management Company
3.4.1 Inspection, testing, maintenance, and cleanliness of the facility’s boiler(s) and supporting systems as required by contract.

3.5 Building Coordinator, Facility Manager, or Equivalent
3.5.1 Per the boiler’s maintenance plan, immediately report any abnormal noises, conditions or defects observed.
3.5.2 Provide all boiler inspection documentation and manufacturer manuals to facility’s respective CMMS program manager.

3.6 Facilities Maintenance Management, Plant Manager, or Equivalent
3.6.1 Enforce all programmatic and regulatory boiler requirements.
3.6.2 Maintain an inventory of all known installed boilers on CMMS or equivalent.
3.6.3 Develop boiler maintenance plan as outlined in section 10 and integrate maintenance plan into CMMS or equivalent.
3.6.4 Provide competent personnel for periodic boiler inspections to disassemble, reassemble, test, adjust, and operate or for handling any part of the boiler, under the supervision of the inspector.
3.6.5 Provide competent personnel or contractors to perform boiler maintenance and repairs.
3.6.6 Manage boiler NYS Jurisdiction Numbers installation, per section 4.3.

3.7 Boiler Mechanic and Operator
3.7.1 Perform applicable periodic operations, testing and inspections activities outlined in section 7.0 Boiler Inspection and 8.0 Boiler Operations.
3.7.2 Boiler inspection reports and past certificate of inspections shall be retained as described in section 12.1 and 12.2.
3.7.3 Complete boiler’s Maintenance and Repair Log per section 9.3 at the completion of each maintenance, and repair task.
3.7.4 Per the boiler’s maintenance plan, immediately report any abnormal noises, conditions or defects observed.
3.7.5 If boiler conditions, or operating pressure, creates a danger to health and safety, and cannot be controlled or shutdown safely the facility shall be evacuated by engaging the buildings alarm system.

4.0 DESIGN, CONSTRUCTION, AND INSTALLATION
All boilers shall be designed, constructed, and installed in accordance with the manufacturer, American Society of Mechanical Engineers Boiler and Pressure Vessel Code, NYS Department of Labor, International Building Code as adopted by NYS, and National Fire Protection Agency requirements.

4.1 Boilers shall be designed and constructed in accordance with ASME CSD-1, and either Section I or IV of the ASME Boiler and Pressure Vessel Code as applicable. Boiler shall bear the appropriate ASME Certification Mark and or name plate.
4.2 Boilers with output greater than or equal to 100,000 BTU shall be inspected by a certified boiler inspector prior to being placed in-service.
4.3 All new boilers with output greater than or equal to 100,000 BTU shall receive a NYS Jurisdiction Number assigned to boilers by a certified boiler inspector.
4.4 NYS Jurisdiction Numbers shall be of metal construction, securely attached to a metal plate and affixed to the front of the boiler or front of boiler settings.
4.4.1 Numbers shall not be less than two inches in height, except for miniature boilers, which shall not be less than one inch in height.
4.5 In no case shall these Jurisdiction Numbers be removed until the boiler is permanently decommissioned.
4.5.1 No person except an inspector shall deface, remove, or mark any identification number.

4.6 Secondhand boilers. The installation of boiler components, which were used by a previous owner, is prohibited unless after such inspection and tests as deemed necessary a certified boiler inspector shall find such components safe for the use intended. On request of the owner, the certified boiler inspector shall state such finding in a signed and dated writing delivered to the owner.

5.0 **ALTERATIONS**

5.1 No Alterations shall be performed without prior approval from the Stamp holder’s authorized inspector, who shall determine if alterations are necessary, and inspect the object before granting approval.

6.0 **WELDED REPAIRS**

6.1 Repairs shall be performed by an organization in possession of a valid National Board or New York State Repair Certificate of Authorization and/or a valid ASME Certificate of Authorization.

7.0 **GENERAL REQUIREMENTS**

7.1 Access

7.1.1 Boilers, their controls and their immediate surroundings shall be free of unnecessary obstruction, unrelated equipment and stored materials. Boilers must remain accessible at all times to authorized personnel.

7.1.2 Permanent means of access for boiler operators and mechanic shall be installed as required by NYS Department of Labor.

7.2 No person shall knowingly install a defective boiler or boiler component. Standard boilers and components shall be presumed free from defects unless the contrary shall be established by competent evidence or determined by a certified boiler inspector after inspection.

7.3 Safety Appliances

7.3.1 No person shall remove or tamper with any safety appliance prescribed by this Part except for the purpose of making repairs.

7.3.2 No person shall in any manner load the safety valve to a greater pressure than allowed by the certificate of inspection.

7.3.3 No shutoff of any description shall be placed between the safety or relief valve and the boiler, or on discharge pipes between such valves and the atmosphere.

7.3.4 Repairs performed on safety valves and safety relief valves by other than the manufacturer must be performed by an organization in possession of a current National Board VR Certificate of Authorization.

7.4 Manual emergency shutoff valves, emergency push button devices, and other emergency shutdown functions shall be prominently marked, labeled of their function and readily accessible.

7.5 The water gage on a steam boiler shall be accessible without the use of tools and the water gage and pressure gage on a steam boiler and the thermometer and pressure gage on a water boiler shall be visible.

7.6 A fuel cutout switch, if installed, shall be set or adjusted, so that it will shut off the fuel supply before the water drops lower than one-quarter inch above the lowest visible level of the gage glass.

8.0 **INSPECTION**

No boiler shall be operated until an internal and external inspection has been made by the commissioner or an authorized inspection agency. There shall be regular inspections of every boiler subject to the provisions of this program at intervals no less frequent than as described in Appendix 1: REQUIRED FREQUENCY OF BOILER INSPECTIONS PERFORMED BY THE COMMISSIONER OR AUTHORIZED INSPECTION AGENCY

8.1 **Inspection Preparation.** The owner shall prepare a boiler for internal inspection or hydrostatic pressure tests on a date specified by the commissioner or authorized inspection agency. Unless the
owner agrees to a shorter period, such inspection shall be made not less than 15 days after notice thereof.

Unless the inspector advises to the contrary, the owner shall prepare a boiler for internal inspection in the following manner:

8.1.1 The boiler shall be shut down by the normal shut down procedure.
8.1.2 All hazardous energy and fuel sources to the boiler shall be locked, tagged, and verified to ensure hazardous energy and fuel sources have been isolated from the boiler.
8.1.3 If performing bodily entry into the boiler for any reason the University’s confined space requirements are applicable.
8.1.4 Water shall be drawn off and the boiler thoroughly washed.
8.1.5 All manhole and handhole plates and washout plugs in the water column connection shall be removed and the furnace and combustion chambers thoroughly cooled and cleaned.
8.1.6 All grates of internally fired boilers shall be removed.
8.1.7 At each inspection, brickwork and insulation shall be removed as required by the inspector.
8.1.8 The steam gage shall be removed for testing when there is evidence that its operation has been inaccurate and faulty.
8.1.9 All leaks of steam or hot water into the boiler shall be stopped.

8.2 Hydrostatic test preparations. The owner shall prepare a boiler for hydrostatic pressure test when required or requested by certified boiler inspector.

8.3 Certificate of Inspection. Shall be issued by the certified boiler inspector for the operation of a boiler at the completion of a satisfactory inspection and the boiler is found to be in compliance.

8.4 Inspection Report. The certified boiler inspector shall complete the required Inspection Report and provide a copy to the commissioner, and boiler owner.

8.4.1 A boiler inspector who upon inspection of a boiler finds the boiler or its components thereof to be so defective as to render repairs impractical shall report his findings to the commissioner. The commissioner in his discretion may order such boiler or components condemned and marked as condemned in such manner as his regulations may provide. A condemned boiler or component shall be immediately and permanently discontinued from service.

8.5 Portable boilers. The owner of a portable boiler shall report the location of the boiler to the commissioner or to the insurance company insuring such boiler 30 days prior to the expiration of the certificate of inspection.

9.0 BOILER OPERATIONS

9.1 All operators and technicians shall show evidence of the completion of training on boiler operations. At a minimum this training must include fundamental operating principles, types of equipment, operation and control systems, maintenance and safety, pollution control, monitoring and site-specific operator training.

9.2 Boilers in operation shall have regular operation and testing of every boiler subject to the provisions of this program at intervals no less frequent than as described in Appendix 2: REQUIRED INSPECTION, TESTING, OR VERIFICATION OF BOILER COMPONENTS AND SAFETY DEVICES PERFORMED BY BOILER OPERATORS.

9.3 The boiler operator shall keep logs of their activities on the boiler and its respective components they are responsible for operating, testing, and inspecting.

9.3.1 Boiler Log(s) or equivalent shall encompass all applicable the requirements of the Required Inspection, Testing, or Verification of Boiler Components and Safety Devices table.

9.3.2 Boiler Operations and Testing Logs shall be available for review and inspection by the New York State boiler inspector and the Authorized Inspection Agency.

9.4 No boiler shall be operated at a pressure in excess of the working pressure specified in the most recent inspection certificate.

9.5 A boiler showing any defects affecting safety shall be immediately discontinued from service and the NYS boiler inspector or Authorized Inspection Agency shall be notified.
9.6 No rebuilt portable boiler shall be operated unless the manufacturer has filed with the commissioner a copy of the manufacturer's data covering its construction and the name of the original owner.

9.7 Any boiler that has been recommended for condemnation shall be immediately discontinued from service. The commissioner shall be promptly notified of such action and shall re-inspect the boiler for final action.

9.7.1 Boilers that have been condemned shall have been distinctly stamped as required by the NYS Department of Labor.

10.0 BOILER MAINTENANCE

10.1 There shall be routine maintenance of every boiler subject to the provisions of this program at intervals no less frequent than the code, and manufacturer requirements.

10.2 Develop a maintenance plan for each boiler’s preventative maintenance, testing, and inspection requirements in accordance with programmatic and manufacturer requirements.

10.3 All maintenance activities shall be logged per the boiler maintenance program.

11.0 NOTIFICATIONS AND REPORTING

11.1 When an injury, or property-damaging incident occurs resulting in excess of $1,000 a representative from Environment Health and Safety shall report the incident to the commissioner within 24 hours. When an incident resulting in a fatality or property-damaging incident occurs resulting in excess of $25,000, a representative from Environment Health and Safety shall report the incident to the commissioner immediately by telephone, and confirmed by registered mail within 24 hours.

11.1.1 Contact Information: NYS Division of Safety & Health Boiler Safety Bureau

11.2 The Certified Boiler Inspector shall be notified under the following circumstances:

11.2.1 Prior to alterations or installation of a boiler.

11.2.2 Prior to operations of an altered or new boiler.

11.2.3 When an incident occurs as described in section 11.1.

12.0 LOGS, RECORDS, AND DOCUMENT CONTROL

12.1 The Certificate of Inspection shall be conspicuously posted in the boiler room or engine room. The Certificate of Inspection for a portable boiler shall be on the premises where the boiler is being operated and shall be available at all times.

12.1.1 Past boiler Certificate of Inspection shall be uploaded to CMMS.

12.2 Boiler Inspection Reports shall be uploaded to the CMMS.

12.3 Boiler Operation and Test Logs will be maintained at the location of the boiler, on the CMMS, or equivalent for a minimum of five years.

12.4 Boiler Maintenance Logs will be maintained at the location of the boiler, on the CMMS, or equivalent for a minimum of five years.

12.5 A copy of the boiler’s maintenance plan, and owner manual or equivalent will be maintained at the location of the boiler.

12.6 Boiler logs and maintenance plan shall be made available to the certified boiler inspector, or Authorized Inspection Agency immediately upon request.

13.0 DEFINITIONS

- **Alteration** means a change in a boiler that substantially alters the original design and that requires consideration of the effect of the change on the original design. *Alteration* does not include the addition to a boiler of nozzles smaller than an unreinforced opening size.

- **Approved** means, in respect to a device or material: in compliance with a subsisting resolution of approval adopted by the commissioner; in respect to action by the commissioner: made the subject of a resolution of approval.
• **ASME Code** means the boiler and pressure vessel code published by the American Society of Mechanical Engineers.

• **Authorized Inspection Agency** For new construction, is an Authorized Inspection Agency is an entity that meets the qualification and definition described in [NB-360, National Board Acceptance of Authorized Inspection Agencies (AIA) Accredited by the American Society of Mechanical Engineers (ASME)](https://example.com/nb-360). For in-service inspection, an Authorized Inspection Agency is either a jurisdiction as defined in the National Board Constitution or an entity that is accredited in accordance with [NB-369, Accreditation of Authorized Inspection Agencies (AIA) Performing Inservice or Repair/Alteration Inspection Activities](https://example.com/nb-369).

• **Boiler** means a closed vessel in which water is heated, steam is generated, steam is superheated, or any combination thereof, under pressure or vacuum for use externally to itself by the application of heat from combustible fuels, electricity, nuclear energy, or any other source, but shall not include a device or apparatus used solely to heat water for a hot water supply system. The term boiler shall include the apparatus used by which heat is generated, and all controls and devices related to such apparatus or to the closed vessel. The term boiler also shall include fired units for heating or vaporizing liquids other than water where these units are separate from processing systems and are complete within themselves.

• **Competent person** is one who is capable of identifying existing and predictable hazards in the surroundings or working conditions which are unsanitary, hazardous, or dangerous to employees, and who has authorization to take prompt corrective measures to eliminate them.

• **Component** means a constituent part of a boiler assembly.

• **Computerized Maintenance Management System (CMMS)** is a software package designed to maintain a computer database for an organization's maintenance system (e.g. Maximo).

• **Commissioner** means the Commissioner of Labor of the State of New York.

• **Defect** means a condition which may directly or indirectly cause a boiler to be or become a source of danger to any person by reason of fire, explosion, leakage, electricity or ionizing radiation.

• **Defective boiler** means one which as an assembly includes a defect, or a boiler which is not provided with all required controls and devices in good operating condition.

• **External inspection** means an inspection made while the boiler is in operation.

• **Hydronic boiler** means a boiler in which no steam is generated, from which hot water is circulated for heating purposes and then returned to the boiler, and which operates at a pressure not exceeding 160 psi or a temperature of 250° Fahrenheit at or near the boiler outlet.

• **Inspector or Certified Boiler Inspector** means a boiler inspector who holds a valid certificate of competency issued by the NYS department of labor.

• **Installed** means, in respect to a heating system boiler as a vessel: placed in a fixed operating location and connected to the heat distribution system. The term does not include a reassembly not involving a change of location.

• **Internal inspection** means an inspection made when the boiler is shut down and handholes and manholes or other inspection openings are opened or removed for inspection of the interior as required by the inspector.

• **Installed** means, in respect to a heating system boiler as a vessel: placed in a fixed operating location and connected to the heat distribution system. The term does not include a reassembly not involving a change of location.

• **Low pressure boiler** means a boiler producing steam or vapor at a gage pressure of 15 pounds per square inch or less, or producing hot water at a gage pressure not exceeding 160 pounds per square inch, or at a temperature not exceeding 250 degrees Fahrenheit.

• **Maximum allowable working pressure** means the maximum gage pressure permissible at the top of a completed vessel in its operating position for a designated temperature.
• **Maximum allowable working temperature** means the maximum temperature at or near the outlet of a hot water boiler, measured in degrees Fahrenheit, at which the boiler may be safely operated.

• **Miniature boiler** means a power boiler or high temperature water boiler which does not exceed any of the following limits:
  (1) 16 inches inside diameter of shell;
  (2) 20 square feet of heating surface, except for electric boilers;
  (3) 5 cubic feet gross volume exclusive of casing and insulation; and
  (4) 100 psi maximum allowable working pressure.

• **National Board** means the National Board of Boiler and Pressure Vessel Inspectors, Columbus, Ohio.

• **Owner** means the owner or lessee of a boiler.

• **Portable boiler** means an internally fired boiler primarily intended for temporary location and whose construction and usage is of a movable nature.

• **Property Management Company** is a third party who is contractually required to perform necessary daily operations and maintenance of a real estate investment. Each contract may vary contact, contact Cornell Real Estate for inquiries.

• **Qualified person** is one who, by possession of a recognized degree, certificate, or professional standing, or who by extensive knowledge, training, and experience, has successfully demonstrated his ability to solve or resolve problems relating to the subject matter, the work, or the project.

• **Relief valve** means an automatic pressure relieving device actuated by the static pressure upstream of the valve which opens further with the increase in pressure over the opening pressure. **Note:** A relief valve is used primarily for liquid service.

• **Repair** means work necessary to restore a boiler to a safe operating condition.

• **Safe** means without defect.

• **Safe boiler** means a boiler, which is not defective.

• **Safety relief valve** means an automatic pressure actuated relieving device suitable for use as either a safety valve or a relief valve, depending upon application.

• **Safety valve** means an automatic pressure relieving device actuated by the static pressure upstream of the valve and characterized by full-opening pop action. **Note:** A safety valve is used for gas or vapor service.

• **Secondhand vessel** means a boiler that has changed location subsequent to the original installation.

### 14.0 REFERENCES

- New York State Uniform and Fire Prevention and Building Codes
- NYS Code Rule Part 4 Construction, Installation, and Maintenance of Low Pressure Boilers
- NYS Code Rule Part 14 Construction, Installation, and Maintenance of High Pressure Boilers
- ASME Boiler and Pressure Vessel Code
- ASME CSD-1 Controls and Safety Devices for Automatically Fired Boilers
- Authorized Inspection Agency Publications
- United States Environmental Protection Agency Standards for Hazardous Air Pollutants, Generally Available Control Technologies
- New York State Department of Environmental Conservation Reasonably Available Control Technologies
- National Board of Boiler and Pressure Vessel Inspectors Code
- National Fire Protection Association Codes/Standards 31, 54, 85

### 15.0 DOCUMENT HISTORY

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### APPENDIX 1: REQUIRED FREQUENCY OF BOILER INSPECTIONS PERFORMED BY THE COMMISSIONER OR AUTHORIZED INSPECTION AGENCY

<table>
<thead>
<tr>
<th>Inspection/Test</th>
<th>HIGH PRESSURE STEAM (Steam Pressure &gt; 15 psig)</th>
<th>LOW PRESSURE STEAM (Steam Pressure ≤ 15 psig)</th>
<th>LOW PRESSURE HYDRONIC (Water Pressure ≤ 160 psig; Temp ≤ 250 °F)</th>
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<tr>
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### APPENDIX 2: REQUIRED INSPECTION TESTING OR VERIFICATION OF BOILER COMPONENTS AND SAFETY DEVICES

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<th>Inspection/Test</th>
<th>HIGH PRESSURE STEAM (Steam Pressure &gt; 15 psig)</th>
<th>LOW PRESSURE STEAM (Steam Pressure ≤ 15 psig)</th>
<th>LOW PRESSURE HYDRONIC (Water Pressure ≤ 160 psig; Temp ≤ 250 °F)</th>
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<td>Quarterly</td>
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<td>Low Water Cut Off Blow-Down Gage Glass</td>
<td>Daily</td>
<td>Weekly</td>
<td>Quarterly</td>
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<td>Low Water Cut Off Quick Drain Test</td>
<td>Daily</td>
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<td>Quarterly</td>
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<tr>
<td>Observational Inspections/Recording of Condition</td>
<td>Daily</td>
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<td>Low Water Cut Off Slow Drain Test</td>
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<td>Test Combustion Safety Controls and Interlocks</td>
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<td>Inspect, Clean, Test Fuel Systems</td>
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*Testing frequency can be biennial when approved by the Authorized Inspection Agency
**Authorized Inspection Agency requirement above and beyond Code