

QA/QC Checklist

PENNSYLVANIA STATE UNIVERSITY



Construction Services

DIVISION 23 – HVAC

23 52 00 – Heating Boilers

General Information	Programming/Design	Bidding/Preconstruction	Installation/Construction	Closeout/Warranty
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01 General

1. Verify that EACH boiler contains an ASME label and National Board (not required on cast iron sectional boilers or some smaller wall-hung boilers) registration number.	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
2. Verify that relief valves (water) or safety valves (steam) are installed boilers and that drip pan elbows (with a drain routed to the floor) are installed under safety valves. The safety/relief valve discharge piping should not have any other type of shutoff valve in the piping. The safety/relief valve discharge piping may be directed to the floor (preferably near a drain) and must terminate at least 6” above the floor. If the boiler generates steam in excess of 500 pounds per hour, then the safety valve discharge piping MUST be piped to the outside atmosphere and to a safe point of discharge. Blowoff pipes and other outlets must be located to prevent injury to personnel.	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
3. As required by PSU’s Factory Mutual insurance carrier, verify that TWO (2) low-water cut-offs are installed on each boiler.	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
4. Verify that there are no tripping hazards installed in the boiler room.	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
5. Per IBC Section 1015, Means of Egress, verify that there are two means of egress from the boiler room if the boiler room is greater than 500 sq feet and any individual fuel-fired equipment exceeds 400,000 BTUH input capacity. Where two exists are required, one is permitted to be a fixed ladder or an alternating tread device. The exits shall be separated by a horizontal distance equal to one-half the length of the maximum overall diagonal dimension of the room.	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
6. Verify if the boiler system requires any redundancy or future capacity. If a boiler fails, verify that there is system capacity to maintain building heat.	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
7. Verify if the boiler system (and corresponding pumps, fans, etc) should be on emergency power.	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
8. Verify that boilers have an adequate source of combustion air. If combustion air openings/ductwork contain motorized dampers, verify that they open/close on boiler startup/shutdown.	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
9. Per ASME CSD-1, verify that there are “mushroom type” emergency burner/boiler push-button shut off switches installed at EACH exit door. These switches manually interrupt power to the burner(s) and shut the boiler(s) down in the event of an emergency. The shut down switches shall be clearly labeled.	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
10. Verify if a water softener system and/or chemical pot feeder is required for the particular project. Contact Mark Gephart (mpg4@psu.edu , (814) 777-5070), OPP Lead Water Analyst, to discuss. At a minimum, taps for a chemical pot	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>

feeder should be incorporated into the heating system.					
02 Clearances					
1. Verify that the minimum clearance around each boiler is at least 30". The clearance between boiler modules in a modular system may be reduced to the manufacturer's recommendations if the entire modular boiler system meets the 30-inch clearance requirement around the "assembly". The minimum clearance around a wall-hung boiler must be 30 inches except for the wall mount side.	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
2. Verify that there is a minimum of 72" of clearance between the floor to any overhead obstruction.	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
3. Verify that there is a minimum of 42" of clearance between the top of the boiler proper and the ceiling.	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
4. Verify that there is a minimum of 6" clearance between the highest point of any safety/relief valve, valve, pipe, or fitting and the ceiling.	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
5. For boilers containing platforms or mezzanines, verify that there is a minimum of 84" between the platform and the ceiling.	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
6. Verify that there is sufficient clearance for boiler tube (or section) removal in the future.	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
7. If a boiler has to be replaced in the future, verify that that doorways and aisle ways are wide enough, and ceilings are high enough to accommodate the removal and installation.	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
03 PA Labor & Industry Submittals					
1. The PA Department of Labor and Industry requires that commercial boilers (not fuel-fired water heaters) meet certain criteria and must be permitted and approved for installation by L&I. The required permit is separate from the building permit process. The entire set of requirements is listed on the L&I Boiler Division web site.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2. Prior to construction/installation, a completed INTENT TO INSTALL BOILER (LIBI-302 form) must be submitted and approved by L&I for EACH boiler. The form requires specific information about the boiler so it cannot be submitted until the contractor has the approved submittals for the unit. Send the form(s) along with a check made out to "Commonwealth of PA" (\$29 for one boiler; \$58 for two boilers; \$73 for three or more boilers) to: PA Department of Labor & Industry Boiler Division 651 Boas Street, Room 1606 Harrisburg, PA 17121	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3. When approved, the L&I Boiler Division will return a copy of the INTENT TO INSTALL BOILER form with permission to install the unit noted on the copy. The form will also indicate the state inspector name and phone number to call for the final inspection.	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4. After receiving the approved INTENT TO INSTALL BOILER form, contact Tom Haupt (teh9@psu.edu , (814) 777-8198), OPP Planner/Estimator. Tom will meet with the contractor PRIOR to installation to review the installation for conformance with PA L&I requirements. Tom will also contact the L&I inspector to arrange for inspection and tagging of the boiler(s).	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
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<p>5. If the boiler(s) being installed is made of cast iron, a hydrostatic test must be completed for EACH boiler and a completed copy of the CAST IRON BOILER INSTALLATION REPORT (LIBI-236) report must be submitted to L&I. The hydrostatic test will be conducted at 1½ times the Minimum Allowable Working Pressure for hot water boilers and 45 psi for steam boilers. The test will most likely be performed at the boiler manufacture’s site prior to shipping. However, if the boiler is a cast iron sectional unit that is field assembled, then the test must be conducted after the boiler is erected.</p>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
<p>6. If the project includes the REMOVAL of a boiler or unfired pressure vessel (heat exchangers, expansion tanks, air separators, air tanks, water heaters, chillers, autoclaves, etc.) contact Tom Haupt (teh9@psu.edu, (814) 777-8198), OPP Planner/Estimator. Tom maintains a list of pressure vessels and must be updated any time a pressure vessel is removed or installed.</p>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>

04 Variance

<p>1. If the boiler(s) does not meet the code clearance requirements listed in section 02 Clearances above, a variance must be applied for to PA L&I.</p>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<p>2. Three sets of plans for the installation, drawn on paper that is not less than 18” x 24” in size and to a scale of not less than ¼ “ = 1’, shall be submitted for review. These plans should show the floor plan with all objects in the boiler room. Whenever the minimum overhead clearance (72”) cannot be satisfied, an elevation view showing the breaching and smoke pipe is also required.</p>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<p>3. The INTENT TO INSTALL BOILER form described in section 03 PA Labor and Industry Submittals above shall be completed for EACH boiler along with a check made out to “Commonwealth of PA.”</p>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<p>4. A completed BOILER VARIANCE REQUEST - INDUSTRIAL BOARD PETITION (LIBI-303) must be submitted to L&I for EACH boiler. Send the form(s) along with a SEPARATE check made out to “Commonwealth of PA” in the amount of \$100, along with the other items listed above, to: PA Department of Labor & Industry Boiler Division 651 Boas Street, Room 1606 Harrisburg, PA 17121</p>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<p>5. If the Industrial Board grants the requested variance, the Boiler Division will issue a “plan letter” approving the installation, along with a copy of the Industrial Board Variance approval and two sets of plans. The plan letter, Industrial Board variance and one set of plans must be kept permanently in an accessible location within the boiler room.</p>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>