Washington State Department of Labor & Industries

Pre-Inspection Checklist for High Pressure Boilers

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Notice: This checklist reflects the most common violations our field inspectors encounter when performing an inspection on a hot water heating or hot water supply boiler installation. We recommend boiler industry personnel have access to a current set of applicable codebooks/jurisdictional laws, such as ASME Boiler Code Section IV, National Board Inspection Code (NBIC), Chapter 296-104 WAC and Chapter 70.79 RCW of the State of Washington Boiler and Unfired Pressure Vessel Laws.

Reference	Administration and General Requirements	Compliance Yes	Compliance No
RCW 18.27 & RCW 18.106	Contractors must be registered with the Department of Labor and Industries before installing/reinstalling and making repairs or modifications to any boiler.	☐	☐
RCW 70.79.320	Once the installation/reinstallation is complete the owner or user shall not operate the boiler until a Certificate of Inspection has been issued.	☐	☐
WAC 296-104-020	A Boiler/Pressure Vessel Installation or Reinstallation Permit form must be submitted to the Boiler Section prior to making the installation/reinstallation of any boiler.	☐	☐
WAC 296-104-255 & WAC 296-104-271	The minimum clearance for low pressure steam boilers is determined by the BTU input. This information is specified in the reference WACs. A clearance variance acceptable to the manufacturer and owner may be submitted to the inspector for approval.	☐	☐
WAC 296-104-200	All high-pressure boilers shall be constructed, stamped, and installed in accordance with ASME Section I.	☐	☐
WAC 296-104-302	All boilers installed or refitted after December 1998, shall be equipped with suitable primary safety controls, safety limit switches, and burners and electrical elements as required by a nationally or internationally recognized standard.	☐	☐
WAC 296-104-303	A manually operated remote shutdown switch or circuit breaker should be located outside the boiler room door and marked for easy identification.	☐	☐
RCW 79.79.350 & WAC 296-104-700	The owner/user is responsible for fees. All inspection, permit and certificate fees must be submitted to the Dept. before a “Certificate of Inspection” is issued and the boiler is lawful to operate.	☐	☐

Reference	Instruments, Fittings, and Controls	Compliance Yes	No
ASME Section I PG-60.1	Boilers with an MAWP of 400 psi or less require at least one gage glass.	☐	☐
ASME Section I PG-60.1.1	Boilers with an MAWP over 400 psi require at least two gage glasses.	☐	☐
ASME Section I PG-60.1	The lowest visible part of the water gage glass shall be at least 2 in. above the lowest permissible water level, as determined by the boiler manufacturer.	☐	☐
ASME Section I PG-60.1	Tubular or transparent gages that rely on observing the steam-water interface and consist of multiple sections shall have a minimum of 1 in. overlap of the visible portions.	☐	☐
ASME Section I PG-60.1.6	Each water gage glass shall be fitted with a drain cock or valve having an unrestricted drain opening of not less than ¼ in. diameter to facilitate cleaning.	☐	☐
ASME Section I PG-60.1.6	When the boiler operating pressure exceeds 100 psi the glass shall be furnished with a connection to install a valve drain to a safe discharge point.	☐	☐
ASME Section I PG-60.1.6	Each water gage glass shall be equipped with a top and bottom shutoff valve of such through-flow construction as to prevent stoppage by deposits of sediments.	☐	☐
ASME Section I PG-60.1.6	Straight-run globe valves shall not be used on such connections.	☐	☐
ASME Section I PG-60.1.6	The pressure–temperature rating of such valves shall be at least equal to that of the lowest set pressure of any safety valve on the boiler drum and the corresponding saturated-steam temperature.	☐	☐
ASME Section I PG-60.2.1	The water column shall be so mounted that it will maintain its correct position relative to the normal waterline under operating conditions.	☐	☐
ASME Section I PG-60.2.3	The water column shall be fitted with a connection for a drain cock or drain valve to install a pipe of at least NPS ¾ to a safe point of discharge.	☐	☐
ASME Section I PG-60.3.4	Connections from the boiler to the water column shall be at least NPS 1. Connections for gage glasses connected directly to the boiler shall be at least NPS ½. Connections from the boiler to the remote level indicator shall be at least NPS ¾ to and including the isolation valve and from there to the remote level indicator at least ½ in. O.D. tubing. These connections shall be completely independent of other connections for any function other than water level indication.	☐	☐

Reference	Instruments, Fittings, and Controls (Continued)	Compliance Yes	No
ASME Section I PG-60.3.5	For pressures of 400 psi or more, lower connections to drums for water columns and remote level indicators shall be provided with shield, sleeves, or other suitable means to reduce the effect of temperature differentials in the shells or heads.	☐	☐
ASME Section I PG-60.3.6	The steam and water connections to a water column or a water gage glass shall be such that they are readily accessible for internal inspection and cleaning.	☐	☐
ASME Section I PG-60.3.7	Shutoff valves shall not be used in the pipe connections between a boiler and a water column or between a boiler and the shutoff valves required for the gage glass, unless they are either outside-screw-and-yoke or lever-lifting type gate valves or stopcocks with lever permanently fastened thereto and marked in line with their passage.	☐	☐
ASME Section I PG-60.4	Gage cocks are not required.	☐	☐
ASME Section I PG-60.6.1	Each boiler shall have a pressure gage so located that it can be easily read. The pressure gage shall be installed so that it shall at all times indicate the pressure in the boiler.	☐	☐
ASME Section I PG-60.6.1	A valve or cock shall be placed in the gage connection adjacent to the gage.	☐	☐
ASME Section I PG-60.6.1	For a steam boiler the gage or connection shall contain a siphon or equivalent device, which will develop and maintain a water seal that will prevent steam from entering the gage tube.	☐	☐
ASME Section I PG-60.6.1	Pressure gage connections to the boiler, except the siphon, if used, shall not be less than NPS ¼ but where steel or wrought iron pipe or tubing is used, they shall not be less than ½ inch inside diameter.	☐	☐
ASME Section I PG-60.6.1	The graduated dial of the pressure gage shall be approximately double the pressure at which the safety valve is set, but in no case to less than 1 ½ times this pressure.	☐	☐

Reference	Installation Requirements	Compliance Yes	Compliance No
ASME Section I PG-61.1	Boilers having more than 500 sq. ft of water-heating surface shall have at least two means of feeding water. Each source of feeding shall be capable of supplying water to the boiler at a pressure of 3% higher than the highest setting of any safety valve on the boiler.	☐	☐
ASME Section I PG-61.3	For boilers having a water-heating surface of not more than 100 sq. ft the feed connection to the boiler shall not be smaller than NPS ½.	☐	☐
ASME Section I PG-61.3	For boilers having water heating surface more than 100 sq. ft the feed connection to the boiler shall not be less than NPS ¾.	☐	☐
WAC 296-104-301	All automatically fired high pressure steam boilers shall be equipped with two low-water fuel cutoffs, one of which shall be provided with a manual reset device and independent of the feed water controller.	☐	☐
WAC 269-104-301	All automatically fire high pressure steam boiler shall be equipped with two high steam pressure control, the highest of which shall be provided with a manual reset.	☐	☐
ASME Section I PG-67.1	Each boiler shall have at least one safety valve or safety relief valve and if it has more than 500 sq. ft of bare tube water heating surface, or if an electric boiler has a power input more than 1100 kW, it shall have two or more safety valves or safety relief valves.	☐	☐
ASME Section I PG-71.2	The safety valve or safety relief valve or valves shall be connected to the boiler independent of any other connection, and attached as close as possible to the boiler or the normal steam flow path, without any unnecessary intervening pipe or fitting	☐	☐
ASME Section I PG-71.2	Every safety valve or safety relief valve shall be connected so as to stand in an upright position, with spindle vertical.	☐	☐
ASME Section I PG-71.3	The opening or connection between the boiler and the safety valve or safety relief valve shall have at least the area of the valve inlet.	☐	☐
ASME Section I PG-71.3	No valve of any description shall be placed between the required safety valve or safety relief valve or valves and the boiler, or on the discharge pipe between the safety valve or safety relief valve and the atmosphere.	☐	☐
ASME Section I PG-71.3	When a discharge pipe is used, the cross sectional area shall be not less than the full area of the valve outlet or of the total of the areas of the valve outlets, discharging there into.	☐	☐

Reference	Installation Requirements (Continued)	Compliance Yes	Compliance No
ASME Section I PG-71.3	The discharge pipe shall be as short and straight as possible and so arranged as to avoid undue stresses on the valve or valves.	☐	☐
ASME Section I PG-109.1	Boiler external piping may be installed by welding by a manufacturer or contractor other than the Manufacturer of the boiler provided such organization has been issued a Certificate of Authorization to use the "S," "PP," or "A" symbol stamp. The organizations, which fabricate or install such piping, shall furnish proper code certification for it including a Manufacturers' Data Report Form P-4A.	☐	☐
ASME Section I PG-109.4	Mechanically assembled boiler external piping which contains no pressure boundary welds may be assembled by a non-stamp holder. Note that the responsibility for documentation and hydrostatic testing of a mechanically assembled boiler external piping must be assumed by a holder of a valid "S," "A," or "PP" stamp. Form P-4B, Manufacturers' Data Report for Field Installed Mechanically Assembled Piping, shall be used to record all field installed mechanically assembled boiler external piping. Form P-4B shall be used only for piping which contains no welded joints.	☐	☐

Note: Make certain that all items listed above are in compliance prior to requesting an inspection on a new or reinstalled boiler.