

CHAPTER 45-12-03 GENERAL REQUIREMENTS

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45-12-03-01. Inspection of boilers.

The owner or user shall prepare a boiler subject to regular inspections for such inspections or hydrostatic tests when notified by the inspector. The owner or user shall prepare each boiler for internal inspection and shall prepare for and apply the hydrostatic test whenever necessary, on the date specified by the inspector, which may not be less than seven days after the date of notification.

History: Effective June 1, 1994.

General Authority: NDCC 26.1-22.1-14

Law Implemented: NDCC 26.1-22.1-14

45-12-03-01.1. Boiler inspection fees.

The following will be charged for boiler inspections:

1. High pressure boilers.
 - a. Internal inspections.

	Fee
- 50 square feet [4.65 square meters] or less of heating surface	\$80.00

- Over 50 square feet [4.65 square meters] and not over 500 square feet [46.45 square meters]	\$100.00
- Over 500 square feet [46.45 square meters] and not over 4,000 square feet [371.61 square meters]	\$120.00
- Over 4,000 square feet [371.61 square meters] of heating surface	\$150.00
b. External inspections.	
- 50 square feet [4.65 square meters] of heating surface or less; 100 KW or less	\$60.00
- Over 50 square feet [4.65 square meters] of heating surface; over 100 KW	\$80.00
c. Portable oilfield boilers. Internal and external inspections of portable oilfield boilers must be charged inspection fees of seventy-five dollars per hour, including travel time, plus expenses for meals, mileage, and lodging at current state rates.	
2. Low pressure boilers.	
a. Internal inspections.	
- Without manway	\$75.00
- With manway	\$85.00
b. External inspections.	
- Hot water heat and low pressure steam	\$50.00
- Hot water supply	\$35.00
3. Steam traction engines.	
- Internal	\$60.00
- External	\$55.00
- Hydrostatic test	\$70.00
- Ultrasonic survey, per hour	\$60.00
4. Certificate fee, per certificate as required by North Dakota Century Code section 26.1-22.1-10	\$20.00, per year of certificate issued

History: Effective June 1, 1994; amended effective January 1, 2000; October 1, 2002; July 1, 2012.

General Authority: NDCC 26.1-22.1-14

Law Implemented: NDCC 26.1-22.1-14

45-12-03-02. Preparation for internal inspection.

The owner or user shall prepare a boiler for internal inspection in the following manner:

1. Water must be drawn off and the boiler thoroughly washed.

2. All manholes and handhole plates, washout plugs, and plugs in water column connections must be removed, the furnace and combustion chambers thoroughly cooled and cleaned, at the discretion of the inspector.
3. All grates of internally fired boilers must be removed, at the discretion of the inspector.
4. At each annual inspection, brickwork must be removed as required by the inspector in order to determine the condition of the boiler, headers, furnace, supports, or other parts.
5. The steam gauge must be removed for testing, at the discretion of the inspector.
6. Any leakage of steam or hot water into the boiler must be cut off by disconnecting the pipe or valve at the most convenient point.
7. Any low-water fuel cutoff float chamber must be opened and cleaned.
8. Safety concerns such as asbestos and confined space entry must be addressed by the owner to provide for the safety of the inspector. Applicable state or federal regulations must be used to decide if safety measures must be taken.

History: Effective June 1, 1994.

General Authority: NDCC 26.1-22.1-14

Law Implemented: NDCC 26.1-22.1-14

45-12-03-03. Boiler improperly prepared for inspection.

If a boiler has not been properly prepared for an internal inspection or the owner or user fails to comply with the requirements for hydrostatic test as set forth in this article, the inspector may decline to make the inspection or test and withhold the certificate of inspection until the owner or user complies with the requirements.

History: Effective June 1, 1994.

General Authority: NDCC 26.1-22.1-14

Law Implemented: NDCC 26.1-22.1-14

45-12-03-04. Removal of covering to permit inspection.

If the boiler is jacketed so that the longitudinal seams of shells, drums, or domes cannot be seen, enough of the jacketing, setting wall, or other form of casing or housing must be removed, at the discretion of the inspector, so that the size of the rivets, pitch of the rivets, and other data necessary to determine the safety of the boiler may be obtained, provided such information cannot be determined by other means.

History: Effective June 1, 1994.

General Authority: NDCC 26.1-22.1-14

Law Implemented: NDCC 26.1-22.1-14

45-12-03-05. Lap seam crack.

The shell or drum of a boiler in which a lap seam crack is discovered along a longitudinal riveted joint must be immediately discontinued from use. If the boiler is not more than fifteen years of age, a complete new course of the original thickness may be installed at the discretion of the chief inspector. Patching is prohibited. "Lap seam crack" means the typical crack frequently found in lap seams, extending parallel to the longitudinal joint and located either between or adjacent to rivet holes.

History: Effective June 1, 1994.

General Authority: NDCC 26.1-22.1-14

Law Implemented: NDCC 26.1-22.1-14

45-12-03-06. Hydrostatic pressure tests.

A hydrostatic pressure test, when applied to boilers of riveted or welded construction, except locomotive boilers, may not exceed one and one-half times the maximum allowable working pressure. Hydrostatic pressure applied to locomotive boilers may not exceed one and one-quarter times the maximum allowable working pressure. During the hydrostatic pressure test, the safety valve or valves must be removed or each valve disk must be held down by means of a testing clamp and not by applying the additional load to the spring with the compression screw. The minimum temperature of the water used to apply a hydrostatic test must not be less than sixty degrees Fahrenheit [15.6 degrees Celsius], nor shall it exceed one hundred twenty degrees Fahrenheit [49.3 degrees Celsius]. (Note: For all cases involving the question of tightness, the pressure may be equal to the release pressure of the safety valve or valves having the lowest release setting.)

History: Effective June 1, 1994; amended effective January 1, 2000.

General Authority: NDCC 26.1-22.1-14

Law Implemented: NDCC 26.1-22.1-14

45-12-03-07. Automatic low-water fuel cutoff or water-feeding device.

1. Each automatically fired steam or vapor system boiler must be equipped with an automatic low-water cutoff located to automatically cut off the fuel supply when the surface of the water falls to the lowest safe waterline. For other than electric and miniature boilers, each automatically fired steam or vapor system boiler must be equipped with at least two low-water fuel cutoffs, one of which must be readily testable. One low-water fuel cutoff must be set to function ahead of the other. Functioning of the lower of the controls shall cause safety shutdown and lockout. The manual reset may be incorporated into the lower cutoff control. Where a reset device is separate from the low-water fuel cutoff, a means shall be provided to indicate actuation of the low-water fuel cutoff. The manual reset device may be of the instantaneous type or may include a time delay of not more than three minutes after the fuel has been cut off. A system may incorporate a time delay component with the low-water fuel cutoff device to prevent short cycling. A time delay must not exceed the manufacturer's recommended timing, or ninety seconds, whichever is less. A high pressure boiler regularly attended by a full-time operator is not considered as automatically fired, and is not required to be equipped with low-water fuel cutoffs. For other than electric boilers, the primary low-water fuel cutoff for low pressure steam boilers must be a float type that can be readily tested.
2. If a water-feeding device is installed, it must be constructed so that the water inlet valve cannot feed water into the boiler through the float chamber and located to supply requisite feedwater. The lowest safe waterline should not be lower than the lowest visible part of the water glass.
3. Such fuel or feedwater control device may be attached directly to a boiler or to the tapped openings provided for attaching a water glass directly to a boiler, provided that for low pressure boilers such connections from the boiler are nonferrous tees or Ys not less than one-half-inch [12.7-millimeter] pipe size between the boiler and the water glass, so that the water glass is attached directly and as close as possible to the boiler; the straight tapping of the Y or tee to take the water glass fittings, and the side outlet of the Y or tee to take the fuel cutoff or water-feeding device. The ends of all nipples must be reamed to full-size diameter.
4. Designs embodying a float and float bowl must have a vertical straight drainpipe at the lowest point in the water equalizing pipe connections by which the bowl and the equalizing pipe can be flushed and the device tested. This drainpipe and connections must be not less than national pipe standard (NPS) 1.

History: Effective June 1, 1994; amended effective April 1, 1996; January 1, 2000; January 1, 2006.

General Authority: NDCC 26.1-22.1-14

Law Implemented: NDCC 26.1-22.1-14

45-12-03-08. Safety appliances.

1. A person may not remove, tamper with, or render inoperative any safety appliances prescribed by these rules except for the purpose of making repairs. The resetting of safety appliances may not exceed the accepted working pressure of the unit.
2. Repairs or adjustments made to safety or safety relief valves must be done by the manufacturer of the valve or an approved testing facility equipped to do such repairs or adjustments. The resetting of safety valves or safety relief valves may not exceed the accepted working pressure for the unit.
3. An approved testing facility must be one of the following:
 - a. A facility holding a valid certificate of authorization and "VR" symbol stamp issued by the national board of boiler and pressure vessel inspectors.
 - b. An owner or user program for doing adjustments to set pressure or blowdown, or both, to boiler pressure relief valves owned by them, provided the adjusted settings or capacities, or both, and the date of the adjustments are recorded on a metal tag secured to the seal wire. All external adjustments must be sealed showing the identification of the organization making the adjustments. The chief boiler inspector shall review the training, qualifications, and procedures used to implement this program.

History: Effective June 1, 1994; amended effective January 1, 2006.

General Authority: NDCC 26.1-22.1-14

Law Implemented: NDCC 26.1-22.1-14

45-12-03-09. Blowoff tanks.

1. Blowoff piping from a boiler may not discharge directly into a sewer. A blowoff tank, constructed to the provisions of section VIII of the American Society of Mechanical Engineers Code, must be used where conditions do not provide an adequate and safe open discharge.
2. Blowoff tanks hereinafter installed, if of metal, must be designed for a minimum working pressure of fifty pounds per square inch [344.74 kilopascals].
3. The outlet from the blowoff tank must be twice the area of the inlet pipe, and made to extend internally within eight inches [203.2 millimeters] from the bottom of the tank.
4. Vent pipe at least four times the area of the inlet pipe must lead to the outer atmosphere.
5. Vents must be as direct as possible to the outer air and discharge at a safe location. There may be no valve or other possible obstructions such as water pockets between the tank and the discharge end of the vent pipe.
6. All pipe connections between the tank and the boiler must be as direct as possible and must conform to the American Society of Mechanical Engineers Code.
7. For convenience in cleaning the tank, a manhole or an access opening must be provided.
8. If a blowoff tank is not vented as specified above, it must be constructed for a pressure equal to that allowed on the boiler to which it is attached or must be equipped with a safety valve or valves of sufficient capacity to prevent the pressure from exceeding the safe working pressure of the tank.

9. Boiler blowoff systems constructed in accordance with the national board rules and recommendations for the design and construction of boiler blowoff systems must be considered as complying with this section.

History: Effective June 1, 1994.

General Authority: NDCC 26.1-22.1-14

Law Implemented: NDCC 26.1-22.1-14

45-12-03-10. Blowoff piping.

1. The construction of the setting must be done in such a manner that it does not restrict the movement of the blowoff piping.
2. All blowoff piping, when exposed to furnace heat, must be protected by firebrick or other heat-resisting material so constructed that the piping may be readily inspected.
3. Each boiler must have a blowoff pipe, fitted with a valve cock, in direct connection with the lowest water space. Cocks must be of the gland or guard type and suitable for the pressure allowed. The use of globe-type valves is not permitted unless complying with the American Society of Mechanical Engineers Code. When the maximum allowable working pressure exceeds one hundred pounds per square inch gauge [689.48 kilopascals] each blowoff pipe must be provided with two valves or a valve and a cock, such valves and cocks to be of the extra heavy type.
4. When the maximum allowable working pressure exceeds one hundred pounds per square inch gauge [689.48 kilopascals], blowoff piping must be extra heavy from the boiler to the valve or valves and must be run full size without use of reducers or bushings. The piping must be at least extra heavy duty wrought iron or steel and may not be galvanized.
5. All fittings between the boiler and blowoff valve must be steel or extra heavy fittings of malleable iron. In case of renewal of blowoff pipe or fittings, they must be installed in accordance with the rules and regulations for new installations.

History: Effective June 1, 1994.

General Authority: NDCC 26.1-22.1-14

Law Implemented: NDCC 26.1-22.1-14

45-12-03-11. Location of blowoffs and vents.

The discharge of safety valves, blowoff pipes, and other outlets must be located so as to prevent injury to personnel. For high pressure boilers, vents from blowoff tanks, condensate tanks, and the discharge piping from safety valves must be as short and straight as possible and so arranged as to avoid undue stresses on the safety valve or valves. Safety valve discharge piping must be so designed and constructed as to prevent excessive back pressure, while not affecting safety valve capacity and performance.

History: Effective June 1, 1994.

General Authority: NDCC 26.1-22.1-14

Law Implemented: NDCC 26.1-22.1-14

45-12-03-12. Underground installations.

Where necessary to install a blowoff tank underground, it must be enclosed in a concrete or brick pit with a removable cover so that inspection of the entire shell and heads of the tank can be made.

History: Effective June 1, 1994.

General Authority: NDCC 26.1-22.1-14

Law Implemented: NDCC 26.1-22.1-14

45-12-03-13. Supports.

Each boiler must be supported by masonry or structural supports of sufficient strength and rigidity to safely support the boiler and its contents. There must be a minimum of vibration in the boiler and its connecting piping.

History: Effective June 1, 1994.

General Authority: NDCC 26.1-22.1-14

Law Implemented: NDCC 26.1-22.1-14

45-12-03-14. Pressure reducing valves.

1. Where pressure reducing valves are used, one or more relief or safety valves must be provided on the low pressure side of the reducing valve in case the piping or equipment on the low pressure side does not meet the requirements for the full initial pressure. The relief or safety valves must be located adjoining or as close as possible to the reducing valve. Proper protection must be provided to prevent injury or damage caused by the escaping steam from the discharge. Capacity of the relief valves must be such that the pressure rating of the lower pressure piping or equipment shall not be exceeded in case the reducing valve sticks open.
2. The use of hand-controlled bypasses around reducing valves is permissible. The bypass if used around a reducing valve may not be greater in capacity than the reducing valve unless the piping or equipment is adequately protected by relief valves or meets the requirements of the high pressure system.
3. A pressure gauge must be installed on the low pressure side of a reducing valve.
4. All low pressure headers and their outlets must be protected by a safety valve or valves whose combined capacity is equivalent to the total amount of steam that can pass from the high pressure system to the lower pressure system.

History: Effective June 1, 1994.

General Authority: NDCC 26.1-22.1-14

Law Implemented: NDCC 26.1-22.1-14

45-12-03-15. Ladders and runways.

To ensure safe access to batteries of boilers, a steel platform or runway at least eighteen inches [457.2 millimeters] in width must be provided, complete with standard railing and toeboards on either side, across the tops of adjacent boilers. Wherever arrangement and location permit, all runways must provide for two means of egress remotely located with respect to the other and connected to a permanent stairway or fixed ladder leading to the floor level. The inspector shall notify the chief inspector of the owners or users who must provide for these requirements and the chief inspector shall give written notice to the owner or user that the installation be made.

History: Effective June 1, 1994.

General Authority: NDCC 26.1-22.1-14

Law Implemented: NDCC 26.1-22.1-14

45-12-03-16. Boiler logs.

A log must be kept as to all repairs made, unusual incidents, accidents, water tests, amounts, types, and dates of water treatment. Logs for hobby boilers must also include operating hours, operators, fusible plug installation dates, safety valve tests, and apprentice operator training data.

History: Effective June 1, 1994; amended effective July 1, 2012.

General Authority: NDCC 26.1-22.1-14

Law Implemented: NDCC 26.1-22.1-14

45-12-03-17. Major repairs and alterations.

If a major repair or alteration is necessary, an inspector must be called for consultation and advice as to the best method of making such repair or alteration. After such repair or alteration is made, it is subject to the approval of the inspector.

History: Effective June 1, 1994; amended effective October 1, 2002.

General Authority: NDCC 26.1-22.1-14

Law Implemented: NDCC 26.1-22.1-14

45-12-03-18. Same material to be used.

1. No repair to any boiler or steampipe nor any of the connections thereto may be approved which is made in whole or in part of unsuitable material or is unsafe from any cause. Nothing herein may be construed to prevent the use of any boiler constructed of riveted iron or steel plates when the inspector has satisfactory evidence that such boiler or steam generator is equal in strength to and as safe from explosion as boilers constructed of the best quality of materials.
2. Quality of the material used in boiler construction and repair demands critical attention because in performing its function a steam boiler is continually subjected to disruptive stresses. These are due to high internal pressures and to changes in temperature. Disastrous consequences will inevitably follow if the material fails under these stresses.
3. The quality of the material used in the different parts of a boiler should be selected with special reference to the stresses and disruptive influences which each part encounters in service.
4. Galvanized pipe may not be used on any boiler or boiler system subject to this article, as this may cause deterioration of the boiler.
5. Sweated or soldered copper joints may not be used in steam piping and connections.
6. Repair material having a lesser tensile strength than that used in the original construction may not be used.

History: Effective June 1, 1994.

General Authority: NDCC 26.1-22.1-14

Law Implemented: NDCC 26.1-22.1-14

45-12-03-19. Repairs to boilers.

1. **Rejection of repair.** Any riveted or welded repair made to a boiler in North Dakota which does not meet this article's requirements will be cause for rejection of the repair by an inspector.
2. **Rejection of welds.** Any weld found to contain heavy slag inclusions or to be porous or found to be cracked will be reason for rejection of the weld and either part or all of the weld must be removed by grinding or chipping and the weld must be replaced.

History: Effective June 1, 1994; amended effective October 1, 2002.

General Authority: NDCC 26.1-22.1-14

Law Implemented: NDCC 26.1-22.1-14

45-12-03-20. Removal of safety appliances.

1. A person may not attempt to remove or do any work upon a safety appliance, prescribed by these rules, while a boiler is in operation. Should any of these safety appliances be repaired during an outage of a boiler, they must be reinstalled and in proper working order before the object is again placed in service. This provision does not apply to the removal and replacement of a gauge glass.
2. A person may not in any manner load the safety valve or valves to maintain a working pressure in excess of that stated on the certificate of inspection.

History: Effective June 1, 1994.

General Authority: NDCC 26.1-22.1-14

Law Implemented: NDCC 26.1-22.1-14

45-12-03-21. Repairs and renewals of boiler fittings and appliances.

Whenever repairs are made to fittings or appliances or it becomes necessary to replace them, the work must comply with all requirements for new installations.

History: Effective June 1, 1994.

General Authority: NDCC 26.1-22.1-14

Law Implemented: NDCC 26.1-22.1-14

45-12-03-22. Return pump.

Each condensate return pump where practicable must be provided with an automatic water level control set to maintain the water level within the limits of two gauge cocks.

History: Effective June 1, 1994.

General Authority: NDCC 26.1-22.1-14

Law Implemented: NDCC 26.1-22.1-14

45-12-03-23. Shop inspection - Manufacturing - Repairs - Alterations.

Any boiler or pressure vessel being constructed, repaired, or altered in North Dakota must be inspected by an inspector holding a North Dakota reciprocal commission and a national board commission. The boiler inspection program may function as an authorized inspection agency. The boiler inspection program may cooperate with the national board and American society of mechanical engineers in making shop reviews and audits.

History: Effective June 1, 1994; amended effective January 1, 2014.

General Authority: NDCC 26.1-22.1-14

Law Implemented: NDCC 26.1-22.1-14

45-12-03-24. Commissioner to arrange for examinations.

The commissioner shall cause examinations to be conducted at such times as is necessary for the qualification of inspectors.

History: Effective June 1, 1994.

General Authority: NDCC 26.1-22.1-14

Law Implemented: NDCC 26.1-22.1-14

45-12-03-25. Conditions not covered by this article.

1. In any conditions not covered by this article, the American Society of Mechanical Engineers Code for new installations applies.

2. If any section, subsection, sentence, clause, phrase, provision, or exemption of this article is declared unconstitutional or invalid for any reason, such invalidity does not affect the remaining portion of this article.

History: Effective June 1, 1994.

General Authority: NDCC 26.1-22.1-14

Law Implemented: NDCC 26.1-22.1-14

45-12-03-26. Inspection of boilers.

1. Each boiler used or proposed to be used within this state, except boilers exempt in North Dakota Century Code section 26.1-22.1-06, must be thoroughly inspected as to their construction, installation, condition, and operation as follows:
 - a. Power boilers must be inspected annually both internally while not under pressure and externally while under pressure. However, any power boiler or steam generator, the operation of which is an integral part of or a necessary adjunct to other continuous processing operations, must be inspected internally at such intervals as are permitted by the shutting down of the processing operation. The chief boiler inspector may provide for extension of time between internal inspections, but an external inspection must be made, and report submitted, for purposes of issuing a certificate. In all other instances the certificate inspection must be an internal inspection when construction permits.
 - b. Power boilers of one hundred thousand pounds [45359.24 kilograms] per hour or more capacity, which comply with subsection 2 of North Dakota Century Code section 26.1-22.1-07, must be inspected at least once every thirty-six months internally while not under pressure and at least once every twelve months externally while under pressure.
 - c. Steam traction engines must be inspected at least once every twelve months. Inspections must alternate between internal inspections, external inspections, and hydrostatic tests.
 - d. Low pressure steam boilers must be inspected annually. Low pressure steam boilers of steel construction must be inspected alternately internally and externally. The issuance of a certificate must normally be based on the internal inspection.
 - e. Hot water heating and hot water supply boilers must be inspected triennially unless they are located in a nursing home, school, hospital, nursery school, or kindergarten, in which case they must be inspected annually. Internal inspections will be required when deemed necessary by the inspector.
 - f. A grace period of two months beyond the period specified in the above subdivisions may elapse between inspections.
2. Certificate inspections must be made during the period of thirty days prior to and thirty days after the expiration date of the certificate. Noncertificate inspections, when required by the provisions of this section, must be made between certificate inspections. The chief boiler inspector encourages reports to be made at any time adverse conditions are found, or when difficulty is encountered getting cooperation from the owner or user.
3. The inspections required under this section must be made by the chief boiler inspector, or by a deputy inspector, or by a special inspector provided for in this article.
4. If at any time a hydrostatic test is deemed necessary by the inspector, it must be made by the owner or user in the presence of, and under the supervision of the inspector, and must be approved by the inspector.

5. Cast iron boilers must be considered as boilers that do not lend themselves to internal inspections. Internal inspections of electric boilers must be made when deemed necessary by the inspector.

History: Effective June 1, 1994; amended effective April 1, 1996; January 1, 2000; January 1, 2006; April 1, 2010; January 1, 2016.

General Authority: NDCC 26.1-22.1-14

Law Implemented: NDCC 26.1-22.1-14

45-12-03-27. Steam traction engines.

All steam traction engines must conform to at least one of the following: chapter 45-12-04, 45-12-05, 45-12-06, or 45-12-07.

History: Effective June 1, 1994.

General Authority: NDCC 26.1-22.1-14

Law Implemented: NDCC 26.1-22.1-14

45-12-03-28. Safety valves.

1. Boiler safety valves and safety relief valves must be placed on, or as close as physically possible, to the boiler proper.
2. Safety valves or safety relief valves may not be placed on the feedline except when installed to provide control for feedwater pressure or to protect a feed pump against overpressure.

History: Effective June 1, 1994.

General Authority: NDCC 26.1-22.1-14

Law Implemented: NDCC 26.1-22.1-14