

DEPT. OF INDUSTRY, LABOR & HUMAN RELATIONS 1

Chapter Ind 41

BOILER AND PRESSURE VESSEL CODE

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PART I

SCOPE

Ind 41.01 Scope. (1) The provisions of this code apply to boilers and pressure vessels in use at places of employment and in public buildings.

Note: Section 101.01 (2), Wis. Stats., provides that the phrase "place of employment" means and includes every place, whether indoors or

out or underground and the premises appurtenant thereto where either temporarily or permanently any industry, trade or business is carried on, or where any process or operation, directly or indirectly related to any industry, trade or business, is carried on, and where any person is, directly or indirectly, employed by another for direct or indirect gain or profit, but does not include any place where persons are employed in (a) private domestic service which does not involve the use of mechanical power or (b) farming. The term "farming" includes those activities specified in section 102.04 (3), and also includes the transportation of farm products, supplies or equipment directly to the farm by the operator of said farm or his employees for use thereon, if such activities are directly or indirectly for the purpose of producing commodities for market, or as an accessory to such production.

(2) Vessels used for the storage and transportation of flammable liquids, liquefied petroleum gas, anhydrous ammonia, and refrigerants shall be subject to the provisions of this code, unless covered by other Wisconsin administrative codes or federal codes.

History: Cr. Register, April, 1961, No. 64, eff. 5-1-74; r. and recr., Register, May, 1974, No. 221, eff. 6-1-74.

PART II DEFINITIONS

Ind 41.02 Definitions. (1) ASME BOILER AND PRESSURE VESSEL CODES are those published by the American Society of Mechanical Engineers and will hereinafter be referred to as ASME.

(2) **BOILER.** A closed vessel intended for use in heating water or for the application of heat to generate steam or other vapor to be used externally to itself.

(a) *Low pressure boiler.* A boiler on which the safety valves are set at pressures not exceeding 15 psig.

(b) *Miniature boiler.* A boiler on which the safety valve is set at over 15 psig and that does not exceed the following limits:

16 inch inside diameter of shell;

5 cubic feet gross volume;

100 psi maximum allowable working pressure.

(c) *Portable boiler.* An internally fired boiler primarily intended for temporary location and whose construction and usage is obviously of a portable nature.

(d) *Power boiler.* A boiler on which the safety valves are set at a pressure of more than 15 psig and that exceeds the dimensions of a miniature boiler.

(3) **CERTIFICATE OF COMPETENCY.** A certificate issued to a boiler or pressure vessel inspector by the department.

(4) **CONDEMNED.** A boiler or pressure vessel declared to be unsafe and has an applied stamping designating its condemnation.

(5) **DEPARTMENT.** Means the department of industry, labor and human relations.

(6) **EXISTING INSTALLATION.** Boiler and pressure vessels placed in operation or contracted for prior to January 1, 1957. (See part VI.)

(7) **EXTERNAL INSPECTION.** One made while boiler or vessel is in operation.

(8) **FUSION WELDING.** The melting together of filler metal and base metal, or of base metal only, which results in coalescence.

(9) **HOT WATER HEATING BOILER AND HOT WATER SUPPLY BOILER.** A boiler completely filled with water that furnishes hot water to be used externally to itself at pressures not exceeding 160 psig or at temperatures not exceeding 250° F. (A boiler exceeding either of these limits shall be classified as a power boiler.)

(10) **INSPECTOR, AUTHORIZED OR QUALIFIED.**

(a) *Field inspector.* A boiler or pressure vessel inspector who holds a valid certificate of competency issued by the department.

(b) *Shop inspector.* A boiler or pressure vessel inspector who is holding the necessary commissions and employed by a city or a state which has adopted the ASME boiler and pressure vessel code, or who is employed by an insurance company and who, when performing shop inspections in Wisconsin, holds a certificate of competency issued by the department.

(11) **INTERNAL INSPECTION.** One made when the boiler or pressure vessel 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.

(12) **NON-STANDARD BOILER OR NON-STANDARD PRESSURE VESSEL.** One not bearing a valid Wisconsin stamping, nor the ASME stamping, nor the National Board stamping, nor the U.S. Department of Transportation stamping, nor the stamping of the API-ASME, nor any stamping authorized by other applicable codes.

(13) **OWNER OR USER.** Any person, firm, or corporation owning or operating a boiler or pressure vessel.

(14) **PRESSURE VESSEL.** A vessel that obtains its pressure from an external source or from an indirect application of heat.

(15) **REPAIR, MAJOR REPAIR, AND ALTERATION.**

(a) *Repair.* Work necessary to return a boiler or pressure vessel to a safe satisfactory condition.

(b) *Major repair.* A repair upon which the strength of a boiler or pressure vessel will depend.

(c) *Alteration.* A change in a boiler or pressure vessel that substantially alters the original design requiring consideration of the effect of the change on the original design. It is not intended that the addition of nozzles smaller than an unreinforced opening size be considered an alteration.

(16) **SECONDHAND VESSEL.** A boiler or pressure vessel when both location and ownership have been changed subsequent to the original installation.

Note: For further explanation of definitions, see the current edition of the ASME Code—Section VIII—Scope.

History: Cr. Register, April, 1961, No. 64, eff. 5-1-61; am. (2) (b), (7), (10), Register, January, 1966, No. 121, eff. 2-1-66; am. (3), (4), (8) (a) and (b), (9), (10), (11), (12), (13), (14), (15), and cr (16), Register, October, 1970, No. 178, eff. 11-1-70; r. and recr., Register, May, 1974, No. 221, eff. 6-1-74.

PART III GENERAL RULES

Ind 41.03 Safety regulations. (1) No boiler or pressure vessel shall be operated at a pressure in excess of the maximum operating pressure stated on its current certificate of operation.

(2) No unauthorized person shall remove or tamper with any connected safety device nor shall any person adjust a connected safety valve to a greater relieving pressure than that allowed for the vessel as stated on its current certificate of operation.

(3) Boiler and pressure vessels shall be so installed that there will be sufficient room between the vessel and any ceiling, wall, partition, or floor to facilitate the connection and operation of valves, pipes, and other appurtenances and shall be installed in a manner that will not block any inspection opening.

History: Cr. Register, April, 1961, No. 64, eff. 5-1-61; a.m. (3), Register, January, 1966, No. 121, eff. 2-1-66; a.m., Register, February, 1971, No. 182, eff. 3-1-71.

Ind 41.04 Reporting accidents, repairs, major repairs, and alterations. (1) Whenever a boiler or pressure vessel fails and causes injury to any person, the owner or user shall report the facts involved to the department within the following 24 hours. The owner or user shall not remove or disturb the boiler or pressure vessel or any of its parts nor permit any such removal or disturbance prior to receiving authorization from the department, except for the purpose of saving human life or further property damage.

(2) The owner or user shall report any repairs, major repairs, or alterations of a boiler or pressure vessel as required in chapter Ind 42. The owner or user shall also report conversions to other fuels.

History: Cr. Register, April, 1961, No. 64, eff. 5-1-61; a.m. Register, February, 1971, No. 182, eff. 3-1-71; r. and recr., Register, May, 1974, No. 221, eff. 6-1-74.

Ind 41.05 Reports required for installations of boilers and pressure vessels. (1) The owner or user of any new or used boiler or pressure vessel, except as regulated in section Ind 41.21, shall file Form SB-257 with the department before operating the boiler or pressure vessel, unless the boiler or pressure vessel is installed in a city of the first class and the city has filed Form SB-257 or its equivalent with the department.

INSTALLATION REGISTRATION

SB-257 (11/71)

State of Wisconsin
Department of Industry, Labor & Human Relations
INDUSTRIAL SAFETY AND BUILDINGS DIVISION

Complete appropriate portion

Installing Contractor shall prepare this form in triplicate and distribute as follows:

White — Attach Registration Fee of \$5.00, making check payable to Wisconsin Department of Industry, Labor & Human Relations. Send to Industrial Safety & Buildings Division, Box 2209, Madison, Wisconsin 53701.

Yellow — Send to Owner who shall POST IT IN A CONSPICUOUS PLACE.

Pink — Retain for file

BOILER		PRESSURE VESSEL	
Mfgd By		Diameter	
<input type="checkbox"/> Power <input type="checkbox"/> Heating <input type="checkbox"/> Miniature			
<input type="checkbox"/> New <input type="checkbox"/> Used		Mfr's Data Report	Length
		<input type="checkbox"/> Yes <input type="checkbox"/> No	
Heating Surface		Waterwalls	<input type="checkbox"/> New <input type="checkbox"/> Used

Name of User or Owner			Location of Installation		
Street Address			Wis. Registration No.		Natl. Board No.
City	State	Zip	ASME Mfgr Serial No.		Other No.
Safety Valves—Settings		Capacity	P S I G		
1.	_____	_____	Maximum Allowable Pressure _____		
2.	_____	_____	Hydrostatic Test Pressure _____		
3.	_____	_____	Date Tested _____		
Authorized Inspector		Wis. Comm. No.	Employer		Date Inspected
Name of Installing Contractor		Street Address	City	State	Zip Code
Date Installation Completed	Signature of Installer			Title	Date Registered

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(2) For required registration fees for installations outside a city of the first class, see Wis. Adm. Code Chapter Ind 69, Fee Schedule.

History: Cr. Register, April, 1961, No. 64, eff. 5-1-61; am. Register, February, 1971, No. 182, eff. 3-1-71; r. and recr., Register, May, 1974, No. 221, eff. 6-1-74.

Ind 41.06 Identification of boilers and pressure vessels. (1) The owner or user of a boiler or pressure vessel shall number each vessel in some permanent manner and in an accessible location.

(2) Boilers and pressure vessels subject to periodic inspections (see Ind 41.20) shall be identified by a registration number supplied by the department. The registration number shall be affixed by an authorized inspector. The state tag shall be attached to the vessel at a location which can be easily viewed.

History: Cr. Register, April, 1961, No. 64, eff. 5-1-61; r. and recr. Register, February, 1971, No. 182, eff. 3-1-71; am. (2), Register, May, 1974, No. 221, eff. 6-1-74.

Ind 41.08 Certificate of competency as inspector. (1) **CERTIFICATE REQUIRED.** An inspection report covering a boiler or pressure vessel may be recognized and accepted only when the inspector holds a valid certificate of competency issued by the department.

(2) **ELIGIBILITY.** (a) The applicant for a certificate of competency as a boiler or pressure vessel inspector shall be an employe of the state, a municipality, an insurance company, or a corporation or company authorized to make its own inspections.

(b) The applicant shall be at least 25 years of age. He shall have had at least 3 years of experience in one or more of the following endeavors: construction, repairing, inspecting, or operating engineer in charge of high pressure steam boilers or pressure vessels.

(c) A degree in mechanical engineering may be accepted as the equivalent of 2 years practical experience.

(d) The applicant's employer shall certify that applicant's statement of experience is correct.

(3) **APPLICATIONS AND RENEWALS.** (a) Fees for examination and reciprocal certificates of competency shall be submitted with applications and in the amount specified in Wis. Adm. Code chapter Ind 69.

(b) Renewal fees shall be submitted with the request for renewal and in the amount specified in chapter Ind 69.

(c) A request for renewal shall be filed with the department on or before January 1 of the calendar year for which the certificate is to be valid.

(d) Applications for examinations and applications for renewals by employes of the state and employes of the city of Milwaukee require no fee.

(4) **EXAMINATIONS.** (a) Certificates of competency for a boiler or pressure vessel inspector may be issued by the department to eligible applicants passing the examinations prescribed by and conducted by the department.

(b) Holders of certificates, who do not apply for renewal in any 3 year period may be required to pass a scheduled examination.

(5) ANNULMENTS AND REVOCATIONS. (a) A certificate becomes invalid when the holder terminates his employment with the employer of record at the time of issue. A renewal may be obtained under the provisions of this section provided applicant meets eligibility requirements.

(b) A certificate may be annulled or revoked when incompetency or negligence is determined after investigation.

(6) RECIPROCAL COMMISSIONS. (a) A reciprocal certificate of competency may be granted by the department to a boiler or pressure vessel inspector under the following conditions:

1. The inspector shall be employed by a boiler insurance company licensed to do business in Wisconsin. The boiler insurance company shall make the application for a reciprocal commission to the department.

2. The inspector shall hold a commission issued by the National Board of Boiler and Pressure Vessel Inspectors or a certificate of competency from a city or state which has adopted the A.S.M.E. Boiler and Pressure Vessel Code and which holds a written examination similar to that required by Wisconsin.

3. The inspector shall appear before an examining board appointed by the department to review his qualifications as an inspector.

History: Cr. Register, April, 1961, No. 64, eff. 5-1-61; r. and rec. Register, February, 1971, No. 182, eff. 3-1-71; am. (1), (3) (c), (4) (a), (6) (a) 1. and 3., Register, May, 1974, No. 221, eff. 6-1-74.

Ind 41.10 Adoption of standards. (1) Pursuant to section 227.025, Wis. Stats., the attorney general and the revisor of statutes have consented to the incorporation by reference of the following standards. Copies of the standards in reference are on file in the offices of the department, the secretary of state and the revisor of statutes, or they may be procured for personal use from the following publishers:

(a) The American Society of Mechanical Engineers, United Engineering Center, 345 East 47th Street, New York, New York 10017.

			As Amended by Summer & Winter Addenda	As Amended by Summer & Winter Addenda
1. Section	I	Power Boilers, 1971 Edition -----	1971	1972
2. Section	II	Material Specifications, 1971 Edition, Parts A, B and C	1971	1972 (Parts A & B only)
3. Section	III	Nuclear Power Plant Components, 1971 Edition -----	1971	1972
4. Section	IV	Heating Boilers, 1971 Edition -----	1971	1972
5. Section	V	Nondestructive Ex- amination, 1971 Edi- tion -----	1971	1972 (winter only)

		As Amended by Summer & Winter Addenda	As Amended by Summer & Winter Addenda
6. Section VIII	Pressure Vessels, 1971 Edition, Divi- sions 1 and 2 -----	1971	1972
7. Section IX	Welding Qualifica- tions, 1971 Edition -	1971	1972
8. Section X	Fiberglass-Rein- forced Plastic Pres- sure Vessels, 1971 Edition -----	1971 (summer only)	1972 (winter only)
9. Section XI	Rules for Inservice Inspection of Nu- clear Reactor Cool- ant Systems, 1971 Edition -----	1971	1972
10. Nuclear Power Piping (ANSI B31.7), 1969 Edition, including Ad- dendas 1970 B31.7a-1971, B31.7b- 1971, and 1971 Addenda B31.7c- 1971			

History: Cr. Register, May, 1974, No. 221, eff. 6-1-74.

Ind 41.11 Boiler blow-down equipment. (1) The blow-down from a boiler or boilers that enters a sewer system or blow-down which is considered a hazard to life or property shall pass through some form of blow-off equipment that will reduce pressure and temperature as required hereinafter.

(2) The temperature of the water leaving the blow-off equipment shall not exceed 140 F.

(3) The pressure of the blow-down leaving any type of blow-off equipment shall not exceed 5 psi.

(4) The blow-off piping and fittings between the boiler and the blow-off tank shall comply with sections Ind 41.50 and Ind 41.51 of this code.

(5) The tank shall be designed in accordance with sections Ind 41.50 and Ind 41.51 of this code for a working pressure of at least one-fourth the maximum working pressure of the boiler to which it is connected.

(6) All blow-off equipment, except centrifugal blow-down separators, shall be fitted with openings to facilitate cleaning and inspection and shall have:

(a) A pressure gauge graduated from 0-25 psi,

(b) A thermometer well located near the water outlet connection and in contact with the retained water in the tank,

(c) A gauge glass at least ½ inch in diameter. The lower connection to the glass shall be at a point about 6 inches below the water line; the upper connection about 6 inches above,

- (d) A drain connection at least 2-inch standard pipe size,
- (e) Connections designed so that freezing will not close the inlet, the outlet, or the vent,
- (f) Vent piping, full size, piped to the outside atmosphere and discharged to a safe location.

Note: Blow-off equipment designed in accordance with the boiler blow-off equipment code issued by the National Board of Boiler and Pressure Vessel Inspectors, 1968 edition, will meet the requirements of this section. Other methods of designing blow-off equipment may be used if approved by the department.

History: Cr. Register, April, 1961, No. 64, eff. 5-1-61; r. and recr. (6), Register, May, 1974, No. 221, eff. 6-1-74.

Ind 41.12 Vessels supplied through pressure reducing valves. (1)
 The following formula shall be used for determining the sizes of safety and relief valves on pressure vessels such as pressure cookers, indirect hot water heaters, equipment in heating systems, etc., which are supplied through pressure reducing valves from boilers carrying a higher steam pressure. Where a pressure reducing valve is supplied by a boiler, the capacity of the safety valve or valves on the low pressure side of the system need not exceed the capacity of the boiler.

$$RVC = \frac{1}{3} \times OC \times VSPA$$

Where RVC = relief valve capacity, lbs. of steam per hour.

OC = orifice capacity, lbs. of steam per hour per sq. in. (See Table 1.)

VSPA = valve size pipe area, sq. in. (See Table 2.)

TABLE 1.—ORIFICE RELIEVING CAPACITIES, POUNDS PER SQUARE INCH

Outlet pres., psig	Pressure-reducing valve inlet pressure, psig																
	400	350	300	250	200	175	150	125	100	85	75	60	50	40	30	25	
250	21000	17100	10800	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	
200	21350	18250	15350	10900	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	
175	21350	18250	16000	12500	7250	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	
150	21350	18250	16200	13400	9540	6750	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	
125	21350	18250	16200	13600	10800	8780	6220	-----	-----	-----	-----	-----	-----	-----	-----	-----	
110	21350	18250	16200	13600	11000	9460	7420	4550	-----	-----	-----	-----	-----	-----	-----	-----	
100	21350	18250	16200	13600	11000	9760	7970	5680	-----	-----	-----	-----	-----	-----	-----	-----	
85	21350	18250	16200	13600	11000	9760	8480	6640	4070	-----	-----	-----	-----	-----	-----	-----	
75	21350	18250	16200	13600	11000	9760	8480	7050	4980	3150	-----	-----	-----	-----	-----	-----	
60	21350	18250	16200	13600	11000	9760	8480	7200	5750	4540	3520	-----	-----	-----	-----	-----	
50	21350	18250	16200	13600	11000	9760	8480	7200	5920	5000	4230	2680	-----	-----	-----	-----	
40	21350	18250	16200	13600	11000	9760	8480	7200	5920	5140	4630	3480	2470	-----	-----	-----	
30	21350	18250	16200	13600	11000	9760	8480	7200	5920	5140	4630	3860	3140	2210	-----	-----	
25	21350	18250	16200	13600	11000	9760	8480	7200	5920	5140	4630	3860	3340	2580	1485	-----	
15	21350	18250	16200	13600	11000	9760	8480	7200	5920	5140	4630	3860	3340	2830	2320	1800	-----
10	21350	18250	16200	13600	11000	9760	8480	7200	5920	5140	4630	3860	3340	2830	2320	2060	-----
5	21350	18250	16200	13600	11000	9760	8480	7200	5920	5140	4630	3860	3340	2830	2320	2060	-----

NOTE: The following formulas shall be used in connection with this table to calculate the required relieving capacity of safety valves installed on the low-pressure side of pressure-reducing valves. Use the formula that requires the larger relieving capacity.

$$W = \frac{1}{2} AC \text{ or } W = \frac{1}{2} A^1 C$$

where: W = required safety valve relieving capacity.

A = internal area of the pipe size of the pressure-reducing valve (use pipe areas of Table 2).

A¹ = internal area of the pipe size of the by-pass line around the pressure-reducing valve.

C = orifice relieving capacity, pounds of steam per hour per square inch for the given inlet and outlet pressures of the pressure-reducing valve (from this Table).