

Chapter Ind 41

BOILER AND UNFIRED PRESSURE VESSEL CODE

<p>Ind 41.01 Scope Ind 41.02 Definitions Ind 41.03 Safety regulations Ind 41.04 Reporting of accidents and major repairs Ind 41.05 Reporting boiler and unfired pressure vessel locations Ind 41.06 Identification of boilers and unfired pressure vessels Ind 41.08 Certificate of competency as inspector Ind 41.11 Boiler blow-down equipment Ind 41.12 Vessels supplied through pressure reducing valves Ind 41.20 Periodic inspections required Ind 41.21 Vessels exempt from periodic inspections Ind 41.22 Preparation for internal inspections Ind 41.23 Insurance company inspections Ind 41.24 Inspections by cities Ind 41.25 Companies or corporations allowed to make inspections Ind 41.26 Reporting of inspections Ind 41.27 Inspection report forms Ind 41.28 Inspection certificates Ind 41.50 A.S.M.E. code vessels Ind 41.51 Wisconsin special vessels Ind 41.52 Interstate commerce commission vessels Ind 41.53 Non-code vessels Ind 41.54 Low water fuel cut-off for hot water heating boilers Ind 41.60 Application Ind 41.61 Maximum allowable working pressures Ind 41.62 Code constructed vessels Ind 41.63 Pressure calculations for shells Ind 41.64 Pressure calculations for flat heads and flat surfaces Ind 41.65 Pressure calculations for dished heads Ind 41.66 Dished head restrictions</p>	<p>Ind 41.67 Pressure calculation for furnaces and circular flues Ind 41.68 Boiler plate thickness Ind 41.69 Other methods of installing safety devices and other appliances Ind 41.70 Factor of safety Ind 41.71 Strength of materials Ind 41.72 Shearing strength of rivets Ind 41.73 Efficiency of joint Ind 41.74 Ligament between parallel tube holes Ind 41.75 Ligaments between diagonal tube holes Ind 41.76 Maximum pressure for cast iron boilers Ind 41.77 Safety or relief valves required on boilers Ind 41.78 Safety valves for low pressure steam, miniature and power boilers Ind 41.79 Water-relief valves for hot water boilers Ind 41.80 Thermometers for hot water boilers Ind 41.81 Water glass Ind 41.82 Gage cocks Ind 41.83 Water column piping Ind 41.84 Pressure gages Ind 41.85 Stop valves on pressure discharge outlets Ind 41.86 Steam mains Ind 41.87 Bottom blow-off or drain Ind 41.88 Feed pipe Ind 41.89 Combustion regulators for boilers Ind 41.90 Flanged connections Ind 41.91 Washout and inspection openings Ind 41.92 Manholes Ind 41.93 Maintenance Ind 41.94 Threaded openings Ind 41.95 Boiler setting and installation Ind 41.96 Access and firing doors Ind 41.97 Water tube boiler doors Ind 41.98 Low-water cut-off and water feeder Ind 41.99 Pressure relief devices required for unfired pressure vessels</p>
--	---

History: Chapters Ind 41 and 42 as they existed on April 30, 1961 were repealed and new chapters Ind 41 and 42 are created effective May 1, 1961.

INDUSTRIAL COMMISSION

PART I

SCOPE

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

Note. Section 101.01 (1), 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 shall 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-(4) 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 liquefied petroleum gas, anhydrous ammonia, and refrigerants shall be subject only to the provisions of this code found under Part V "New Installations", Part VII "Repairs, Additions, Alterations, and Special Rules", and Part VIII "Second Hand Boilers and Second Hand Unfired Pressure Vessels."

(3) The provisions of this code do not apply to air eliminators, scraper traps, and similar devices on the pumping and dispensing equipment or systems used in the transportation, storage, or distribution of flammable liquids.

History: Cr. Register, April, 1961, No. 64, eff. 5-1-61.

PART II

DEFINITIONS

Ind 41.02 Definitions. (1) A.S.M.E. BOILER AND UNFIRED PRESSURE VESSEL CODES are those published by the American Society of Mechanical Engineers.

(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;
- 42 inches overall length of outside to outside of heads at center;
- 20 square feet water heating surface;
- 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 who has passed a prescribed industrial commission examination.

(4) **EXISTING INSTALLATION.** Boiler and unfired pressure vessels placed in operation or contracted for prior to January 1, 1957.

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

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

(7) **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 and at temperatures not exceeding 250 F. (A boiler exceeding these limits shall be classified as a power boiler.)

(8) **INSPECTOR, AUTHORIZED OR QUALIFIED.** (a) *Field inspector.* A boiler or unfired pressure vessel inspector who holds a valid certificate of competency.

(b) *Shop inspector.* A boiler or unfired pressure vessel inspector who is employed by a city or state which has adopted the A.S.M.E. boiler and pressure vessel code, or who is employed by an insurance company, and who when performing shop inspections in Wisconsin holds a Wisconsin certificate of competency.

(9) **INTERNAL INSPECTION.** One made when the boiler or unfired pressure vessel is shut down and handholes and manholes or other inspection openings are opened or removed for inspection of the interior.

(10) **MAJOR REPAIR.** One upon which the strength of the boiler or vessel depends.

(11) **NEW INSTALLATION, BOILER OR UNFIRED PRESSURE VESSEL.** One placed in operation or contracted for after January 1, 1957.

(12) **NON-STANDARD BOILER OR NON-STANDARD UNFIRED PRESSURE VESSEL.** One not bearing a valid Wisconsin stamping, nor the A.S.M.E. stamping, nor the National Board stamping, nor the Interstate Commerce Commission stamping, nor the stamping of the A.P.I.-A.S.M.E., nor any stamping authorized by other applicable codes.

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

(14) **SECOND HAND VESSEL.** A boiler or unfired pressure vessel when both location and ownership have been changed subsequent to the original installation.

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

History: Cr. Register, April, 1961, No. 64, eff. 5-1-61.

Cr NOTE

PART III

GENERAL RULES

Ind 41.03 Safety regulations. (1) No boiler or unfired pressure vessel shall be operated at a pressure in excess of the allowable working pressure stated on its current inspection certificate.

(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 inspection.

(3) Boiler and unfired 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.

History: Cr. Register, April, 1961, No. 64, eff. 5-1-61.

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

(2) The owner, user, or his agent shall report any major repairs of a boiler or unfired pressure vessel as provided in Part VII—"Repairs, Additions, Alterations and Special Rules."

History: Cr. Register, April, 1961, No. 64, eff. 5-1-61.

Ind 41.05 Reporting boiler and unfired pressure vessel locations. (1) The owner or user of any boiler or unfired pressure vessel shall report the location of such vessels unless either of the following conditions are met:

(a) The vessels are exempt from periodic inspections. See section Ind 41.21.

(b) The vessels are subjected to periodic inspection by the industrial commission, a city, an insurance company, or a company authorized to make its own inspections.

History: Cr. Register, April, 1961, No. 64, eff. 5-1-61.

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

History: Cr. Register, April, 1961, No. 64, eff. 5-1-61.

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

(2) **ELIGIBILITY.** (a) The applicant for a certificate of competency as a boiler or unfired pressure vessel inspector shall be an employee 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

*Am
Reg
Jan 1965*

endeavors: construction, repairing, inspecting, operating engineer in charge of high pressure steam boilers or unfired pressure vessels.

(c) A degree in mechanical engineering may be accepted as the equivalent of two 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 chapter Ind 69, Wis. Adm. Code.

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

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

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

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

(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 industrial commission to a boiler or unfired 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 industrial commission.

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 industrial commission to review his qualifications as an inspector.

History: Cr. Register, April, 1961, No. 64, eff. 5-1-61.

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.

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, 1957 edition, will meet the requirements of this section. Other methods of designing blow-off equipment may be used if approved by the industrial commission.

(Available for inspection at the office of the industrial commission and the secretary of state's office and the office of the revisor of statutes or may be procured for personal use from the National Board of Boiler and Pressure Vessel Inspectors, 1155 N. High Street, Columbus, Ohio.)

History: Cr. Register, April, 1961, No. 64, eff. 5-1-61.

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 unfired 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:

$$RVC = \frac{1}{2} \times OC \times VSPA.$$

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

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

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

Note. Most pressure reducing valves are arranged with a valved by-pass which also acts as a potential steam source hazard in case the by-pass is left open. Where such valved by-pass is used, the following formula shall be used to determine the steam flow rate through the by-pass:

$$RVC = \frac{1}{2} \times OC \times BPA.$$

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

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

BPA = By-pass pipe area, sq. inch. (See Table 2)

The larger of the relief valve capacities calculated by the above two formulas shall be used for selecting the relief valve for the vessel.

Example:

Suppose a high pressure boiler operating at 125 psi distributes steam to a series of 40 psi A.S.M.E. constructed retorts through a 1½ inch size pressure reducing valve provided with a glove-valved 1 inch by-pass. Determine the proper A.S.M.E. relief valve protection for the retorts. Utilizing data in Tables and the first of the two formulas above:

$$W = \frac{1}{2} \times 7200 \times 2.04 = 4896 \text{ lbs. steam per hour.}$$

Checking the by-pass steam flow according to the second formula gives:

$$W = \frac{1}{2} \times 7200 \times 0.86 = 3100 \text{ lbs. steam per hour.}$$

The potential steam flow through the pressure reducing valve is 4896 lbs. per hour rated capacity or 4896 × 1000 or 4,896,000 Btu per hour.

Am Reg Jan 1966

TABLE 1

ORIFICE RELIEVING CAPACITIES, LB. PER HR. PER SQ. IN., FOR DETERMINING THE PROPER SIZE OF RELIEF VALVES USED ON LOW PRESSURE SIDE OF REDUCING VALVES

Outlet Pressure, psi	Pressure-reducing valve inlet pressure, psi								
	125	100	85	75	60	50	40	30	25
110	4550								
100	5690								
85	6640	4070							
75	7050	4980	3150						
60	7200	5750	4540	3520					
50	7200	5920	5000	4230	2680				
40	7200	5920	5140	4630	3480	2470			
30	7200	5920	5140	4630	3860	3140	2210		
25	7200	5920	5140	4630	3860	3340	2580	1485	
15	7200	5920	5140	4630	3860	3340	2830	2320	1800
10	7200	5920	5140	4630	3860	3340	2830	2320	2060
5	7200	5920	5140	4630	3860	3340	2830	2320	2060

TABLE 2

INTERNAL PIPE AREA

Nominal pipe size, inches	STANDARD		
	Actual external diameter, inches	Approx. internal diameter, inches	Approx. internal area square inches
3/8	0.675	0.49	0.19
1/2	0.840	0.62	0.30
3/4	1.050	0.82	0.53
1	1.315	1.05	0.86
1 1/4	1.660	1.38	1.50
1 1/2	1.900	1.61	2.04
2	2.375	2.07	3.36
2 1/2	2.875	2.47	4.78
3	3.5	3.07	7.39
3 1/2	4.0	3.55	9.89
4	4.5	4.03	12.73
5	5.563	5.05	19.99
6	6.625	6.07	28.89
8	8.625	8.07	51.15
10	10.750	10.19	81.55
12	12.750	12.09	114.80

Note. In applying these rules, the area of the pipe is always based upon standard weight pipe and the inlet size of the pressure-reducing valve.

History: Cr. Register, April, 1961, No. 64, eff. 5-1-61.

PART IV

INSPECTIONS

Ind 41.20 Periodic inspections required. (1) INSPECTION OF BOILERS. Except as regulated in Ind 41.21, boilers shall be subjected to either a regular internal or external inspection at least once every 12 months by a qualified inspector.

(2) INSPECTION OF UNFIRED PRESSURE VESSELS. Except as regulated in Ind 41.21, unfired pressure vessels shall be subjected to a regular internal or external inspection at least once every 24 months by a qualified inspector.

(3) WHEN INTERNAL INSPECTION IS NOT POSSIBLE. Where an internal inspection is not possible because of the construction of the boiler or pressure vessel, an external inspection will be acceptable.

(4) EXTENSION OF PERIOD BETWEEN INSPECTIONS. If operating conditions require, longer periods between inspections of boilers and unfired pressure vessels may be approved by the industrial commission upon a written request for an extension.

History: Cr. Register, April, 1961, No. 64, eff. 5-1-61.

Ind 41.21 Vessels exempt from periodic inspections. The following boilers and unfired pressure vessels will not be subject to periodic inspection, but in individual cases any such vessel will be subject to inspection by or on order of the commission upon complaint of any person or upon initiative of the commission when there is reasonable cause to suspect that the construction, installation, maintenance or operation of the vessel is not in keeping with the general purpose and intent of this code:

(1) Boilers or unfired pressure vessels which receive regular inspections by United States government inspectors.

(2) Steam boilers or unfired pressure vessels having an internal or external operating pressure not exceeding 15 psi with no limitations to size. Hot water boilers and their expansion tanks having an internal operating pressure not exceeding 30 psi with no limitations to size.

(3) Boilers used exclusively for agricultural purposes.

(4) Miniature boilers.

(5) Unfired pressure vessels having an inside diameter not exceeding 6 inches with no limitation to pressure.

(6) Unfired pressure vessels having a volume of less than 5 cubic feet and an operating pressure of less than 250 psi.

(7) Unfired pressure vessels with a volume of less than 1½ cubic feet with no limit on pressure.

(8) Unfired pressure vessels which are used in accordance with the regulations of the interstate commerce commission.

(9) Air receivers having a volume not to exceed 12 cubic feet and an operating pressure of less than 225 psi.

(10) Hot water supply boilers and hot water storage tanks.

(11) Vessels used for the storage or processing of cold water including those with air cushions.

History: Cr. Register, April, 1961, No. 64, eff. 5-1-61.

Ind 41.22 Preparation for internal inspections. The owner or user of a boiler or an unfired pressure vessel subject to inspection shall prepare the vessel for internal inspection after due notice from the inspector. To prepare a vessel for an internal inspection, all handhole, manhole plates and washout plugs shall be removed. The shell and heads shall be thoroughly cleaned and exposed when so requested. Each steam boiler shall be thoroughly drained of hot water and the combustion chamber and furnace cleaned out before an internal inspection is made.

History: Cr. Register, April, 1961, No. 64, eff. 5-1-61.

Ind 41.23 Insurance company inspections. Periodic inspections of boilers and unfired pressure vessels by insurance companies may be accepted by the industrial commission under the following conditions:

(1) The boiler and pressure vessel inspectors employed by the insurance company shall hold certificates of competency issued by the industrial commission.

(2) The insurance company shall report inspections of boilers and unfired pressure vessels to the industrial commission as required in section Ind 41.26.

(3) The inspection procedures used by the insurance company shall conform to the regulations of this code.

(4) The insurance company shall report to the industrial commission within 30 days when insurance coverage is started or discontinued on a boiler or unfired pressure vessel. The reason for discontinuing the coverage shall be given on the report.

History: Cr. Register, April, 1961, No. 64, eff. 5-1-61.

Ind 41.24 Inspections by cities. Periodic inspections of boiler and unfired pressure vessels by cities of the first class may be accepted by the industrial commission under the following conditions:

(1) The boiler and pressure vessel inspectors employed by the city shall hold certificates of competency issued by the industrial commission.

(2) The city shall keep a record of such periodic inspections.

(3) The inspection procedures used by the city shall conform to the regulations of this code.

History: Cr. Register, April, 1961, No. 64, eff. 5-1-61.

Ind 41.25 Companies or corporations allowed to make inspections. Periodic inspections by companies or corporations of boilers or unfired pressure vessels which they own or operate may be accepted by the industrial commission under the following conditions:

(1) The boiler and pressure vessel inspectors employed by the company or corporation shall hold certificates of competency issued by the industrial commission.

(2) The company or corporation shall report inspections of boilers and unfired pressure vessels to the industrial commission as required in section Ind 41.26.

(3) The inspection procedures used by the company or corporation shall conform to the regulations of this code.

History: Cr. Register, April, 1961, No. 64, eff. 5-1-61.

Ind 41.26 Reporting of inspections. (1) Reports of periodic internal inspections shall be sent to the industrial commission within 30 days from the date of the inspection.

(2) External inspections shall be reported only when either of the following conditions is found:

(a) An internal inspection is not possible because of the construction of the vessel. In such cases the first inspection shall be reported to the commission in the same manner as an internal inspection. The report shall be marked "external" and the reason for making an external inspection instead of an internal shall be given.

(b) When violations of this code or unsafe conditions involving the safety of the vessel are found. This report shall be made on A.S.M.E. Form P-6 and shall explain the violation or unsafe condition with references to code section numbers. A copy of the recommendations to the owner or user of the vessel shall accompany the report to the commission.

History: Cr. Register, April, 1961, No. 64, eff. 5-1-61.

Ind 41.27 Inspection report forms. (1) **FIRST INTERNAL INSPECTION.** The first internal inspection (or external if internal is not possible) of a boiler or pressure vessel which conforms to the A.S.M.E. Code shall be reported on A.S.M.E. Form P-6. If the boiler or pressure vessel does not conform to the A.S.M.E. Code Form P-5 shall be used. The first inspection report shall be as complete as possible and shall contain the maximum allowable working pressure, number of safety valves and their settings and capacities, and the known violations of this code.

(2) **SUBSEQUENT INSPECTIONS.** After the report of the first internal or external inspection has been sent to the commission, the subsequent reports may be copies of the report of inspection made to the owner or user of the vessel. Such reports shall show the location identifying number or description, safe working pressure, and safety or relief valve setting of the boiler or unfired pressure vessel. Such report shall give recommendations for correction of known violations of this code.

(3) **MULTIPLE VESSELS ON A SINGLE REPORT.** A group of unfired pressure vessels of the same design and use that are interconnected or are operated so as to form a unit, machine, or apparatus may be included in a single report. The report shall contain the number, description, and use of the vessels.

History: Cr. Register, April, 1961, No. 64, eff. 5-1-61.

Am Reg June 1966

Ind 41.28 Inspection certificates. (1) After each periodic internal inspection, the city, insurance company, or company or corporation shall issue an inspection certificate to the owner or user of the boiler or unfired pressure vessel.

(2) The inspection certificate shall give the maximum allowable working pressure for the vessel. Such pressure shall be determined using the regulations of the code.

(3) The inspection certificate shall be valid until the next required periodic inspection.

(4) The inspection certificate shall be kept on file by the owner or user of the boiler or unfired pressure vessel and shall be available when called for by a deputy of the industrial commission.

(5) For unfired pressure vessels, the inspection report made to owner or user may be used as the inspection certificate if the report is so marked.

History: Cr. Register, April, 1961, No. 64, eff. 5-1-61.

PART V

NEW INSTALLATIONS ORIGINAL CONSTRUCTION

Am

Ind 41.50 A.S.M.E. Code vessels. (1) Except as regulated in Wis. Adm. Code sections Ind 41.51, 41.52, and 41.53, boilers and unfired pressure vessels installed after the effective date of this section (Ind

Register, August, 1964, No. 104
Boiler and Unfired Pressure Vessel Code

41.50) shall be constructed and installed in accordance with the following sections of the A.S.M.E. boiler and pressure vessel code:

(a) Section I	Power boilers	1962 Edition	As amended to Jan. 1, 1964
(b) Section II	Material specifications	1962 Edition	As amended to Jan. 1, 1964
(c) Section IV	Low pressure heating boilers	1962 Edition	As amended to Jan. 1, 1964
(d) Section VIII	Unfired Pressure Vessels	1962 Edition	As amended to Jan. 1, 1964
(e) Section IX	Welding qualifications	1962 Edition	As amended to Jan. 1, 1964
(f)	A.S.M.E. Code cases	1962 Edition	As amended to Jan. 1, 1964

Note 1. Copies of the above publication are available for inspection at the office of the industrial commission, secretary of state's office, and the office of the revisor of statutes or they may be procured for personal use from the American Society of Mechanical Engineers, 29 West 39th Street, New York 18, N. Y.

Note 2. Because the A.S.M.E. references are subject to revision and amendment, this section of the code will be amended at intervals. It is recommended that holders of this code subscribe to the upkeep service available from the Revisor of Statutes, State Capitol, Madison, Wisconsin.

History: Cr. Register, April, 1961, No. 64, eff. 5-1-61; r. and recr. Register, December, 1962, No. 84, eff. 1-1-63; am. Register, August, 1964, No. 104, eff. 9-1-64.

Ind 41.51 Wisconsin special vessels. (1) Where it is not possible or practical to construct a boiler or unfired pressure vessel in strict compliance with the A.S.M.E. codes listed in section Ind 41.50, the industrial commission may grant a modification to the owner or user to permit the installation of the vessel as a Wisconsin special within the state of Wisconsin under the following conditions:

(a) When the method of designing or constructing the vessel is not covered by the A.S.M.E. codes, the commission may approve the installation of the vessel if adequate proof of comparable safety of the design or construction is shown.

1. Complete plans, calculations, and specifications in duplicate shall be submitted to and approved by the commission before the vessel is installed.

2. The vessel shall be stamped "Wisconsin Special".

3. All other applicable requirements of the A.S.M.E. codes listed in section Ind 41.50 shall be met.

(b) When the vessel is to be built by an owner for his own use, the commission may waive the stamping required by the A.S.M.E. codes listed in section Ind 41.50.

1. Complete plans, calculations, and specifications in duplicate shall be submitted to and approved by the commission before the vessel is installed.

2. The vessel shall be stamped "Wisconsin Special".

3. All other applicable requirements of the A.S.M.E. codes listed in section Ind 41.50 shall be met.

(c) When a small number of vessels is to be built by a manufacturer, the commission may waive the stamping required by the A.S.M.E. codes listed in section Ind 41.50.

1. Complete plans, calculations, and specifications in duplicate shall be submitted to and approved by the commission before the vessel is installed.

2. The vessel shall be stamped "Wisconsin Special".

3. All other applicable requirements of the A.S.M.E. codes listed in section Ind 41.50 shall be met.

(2) The provisions of this section shall not apply to Wisconsin special vessels accepted by the industrial commission before the effective date of this section.

History: Cr. Register, April, 1961, No. 64, eff. 5-1-61.

Ind 41.52 Interstate commerce commission vessels. (1) Unfired pressure vessels carrying the stamping of the I.C.C. will be considered comparable to a vessel meeting the requirements of section Ind 41.50. When such vessels are used in the state of Wisconsin, it shall be the responsibility of the owner of the vessels to have the construction records of the vessels available for inspection by the industrial commission.

History: Cr. Register, April, 1961, No. 64, eff. 5-1-61.

Ind 41.53 Non-Code vessels. (1) The following vessels will only be required to meet the pressure-relief device requirements of the A.S.M.E. codes listed in section Ind 41.50.

(a) Water heating apparatus, such as range boilers or tanks having a self-contained gas, oil, or electric heating unit used exclusively for hot water service provided such apparatus carries a seal of approval from a testing agency recognized nationally and by the commission. The term "hot water service" shall be construed to mean a system in which the hot water is used for general cleaning purposes as in the bath, the laundry, and in the kitchen.

1. This exception shall not apply when the apparatus is used as a hot water heating boiler.

(b) Vessels for containing water under pressure for domestic supply including those having an air space for expansion.

(c) Hot water storage tanks, when heated indirectly by circulating either steam at or below 15 psig, or by hot water at or below 30 psig through a coil or heat exchanger, and the storage water temperature does not exceed 200 F.

(d) Pressure vessels used for water conditioning and filtration.

(e) The vessels listed in paragraphs (b), (c) and (d) of this section shall be identified by stamping showing the manufacturer's name, a serial number, the allowable working pressure, and the year fabricated.

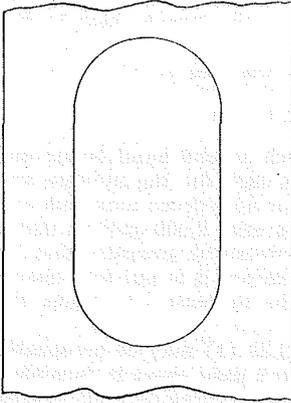
History: Cr. Register, April, 1961, No. 64, eff. 5-1-61.

Ind 41.54 Low water fuel cut-off for hot water heating boilers. Every automatically fired hot water heating boiler installed after the effective date of this section with a heat input of more than 200,000 Btu per hour shall be provided with an automatic low-water fuel cut-off so located as to automatically cut off the fuel supply when the surface of the water falls to the lowest safe water line. The lowest safe water line shall be at or above the height required on a corresponding steam boiler.

History: Cr. Register, April, 1961, No. 64, eff. 5-1-61.

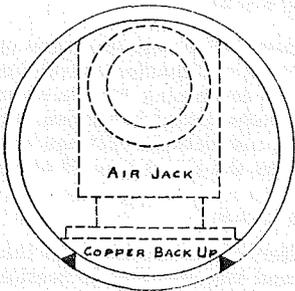
Fig. 21

ACCEPTED "WINDOW" PATCH FOR WATER TUBE
BOILER TUBES



This type of patch may be used if necessary to seal a hole cut in a water wall tube to provide access for welding the back side of a circum. joint or to replace a small sharp bag.

Window patches shall comply with provisions of sections Ind 41.50 and Ind 41.51 of this code. Patch shall be cut from tube of same size and thickness as the one being repaired.



When practicable, a removable copper backup recessed as shown to provide complete weld penetration through the tube wall and held in place by a removable air jack shall be used during the welding operation.

Ind 42.28 Vessels from other states. Second hand pressure vessels previously operated in other states shall meet the requirements of section Ind 42.26.

History: Cr. Register, April, 1961, No. 64, eff. 5-1-61.

Ind 42.29 Lap seam boilers. Second hand boilers which have lap seam construction and which are larger than 36 inches in diameter shall be limited to a maximum allowable working pressure of not more than 15 pounds per square inch.

History: Cr. Register, April, 1961, No. 64, eff. 5-1-61.

Ind 42.30 Prohibited boilers. The installation of second hand boilers which have the longitudinal joint exposed to the intense heat of the furnace is prohibited.

Note. The locomotive or inside welt strap will not be considered as strengthening or changing the original type of boiler joint.

History: Cr. Register, April, 1961, No. 64, eff. 5-1-61.

Am
Reg
Jan
1966

Ind 42.31 Inspection and testing. (1) Each second hand boiler and unfired pressure vessel exclusive of vessels used for the storage and transportation of liquefied petroleum gases or anhydrous ammonia and all the refrigerant containing vessels of less than 2,000 gallons water capacity shall be inspected and given a hydrostatic pressure test by an authorized inspector at its new location before it is put into operation. The hydrostatic test pressure shall be at least 1½ times the working pressure of the vessel.

(2) The vessels excluded in section Ind 42.31 (1) may be acceptable for use provided a copy of the manufacturer's data sheet is furnished to the industrial commission for each vessel indicating that it was manufactured originally to the requirements of section Ind 41.50. If a vessel has been repaired since its fabrication, a copy of the new manufacturer's data report shall be furnished to the industrial commission.

(3) For unfired pressure vessels where a hydrostatic test, in the opinion of the industrial commission, is not possible or desirable, the industrial commission may accept alternate means to determine the safety of the vessel for its intended use.

History: Cr. Register, April, 1961, No. 64, eff. 5-1-61.

Ind 42.32 Installation. All second hand pressure vessels exclusive of vessels used for the storage and transportation of liquefied petroleum gases, anhydrous ammonia, and all refrigerant containing vessels when re-installed shall comply with the A.S.M.E. codes listed in section Ind 41.50 in regard to fittings, appliances, valves, connections, settings and supports. (The excluded vessels are subject to the provisions of other applicable administrative codes.)

History: Cr. Register, April, 1961, No. 64, eff. 5-1-61.

Ind 42.33 Portable boilers. A portable boiler, when brought into this state for use, shall be given the inspection and test specified in section Ind 42.31 and the allowable working pressure shall be calculated using sections Ind 41.60 through Ind 41.99 unless it meets either of the following requirements:

(1) The boiler was constructed and stamped according to section Ind 42.26 code constructed vessels.

(2) The boiler is insured by a boiler insurance company.

History: Cr. Register, April, 1961, No. 64, eff. 5-1-61.