Chapter Ind 41

SCOPE, GENERAL RULES, NEW AND EXISTING INSTALLATIONS

Note: Chapters Ind 41 and 42 as they existed on April 30, 1961 were repealed and new Chapters 41 and 42 were created effective May 1, 1961.

PART I
SCOPE AND DEFINITIONS

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

Note: Section 101.01 (2), 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 employed in private domestic service which does not involve the use of mechanical power or farming. "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 employes 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. When used with relation to building codes, "place of employment" does not include a previously constructed building used as a community-based residential facility as defined in section 50.01 (1) which serves 20 or fewer unrelated residents, except for the purposes of section 101.11.

(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; am. (1), Register, May, 1978, No. 269, eff. 6-1-78.

Ind 41.02 Definitions. The definitions of this section shall be applicable throughout this code.

(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.

(1a) *Alteration.* For the purposes of this code, "alteration" means 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. (Also see "repair.")

(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 miniature boiler is a power boiler or high temperature water boiler which does not exceed any of the following limits:

1. 16 inches inside diameter of shell;

2. 20 square feet heating surface (not applicable to electric boilers);

3. 5 cubic feet gross volume exclusive of casing and insulation;

4. 100 psi maximum allowable working pressure.

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.

History: Cr. Register, April, 1961, No. 64, eff. 5-1-61; r. and recr, 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; am. (2) (b) and (5) (a), r. (6) (a) 3, Register, May, 1978, No. 269, eff. 6-1-78.

Ind 41.10 Adoption of standards. (1) The standards, amendments and errata issued by the American Society of Mechanical Engineers as listed in table 41.10-A are hereby incorporated by reference into this code.

(2) Pursuant to section 227.025, Wisconsin Statutes, consent has been granted to incorporate by reference the rules contained in the standards, amendments and errata listed in table 41.10-A.

(a) Copies are on file in the offices of the department, the secretary of state and the revisor of statutes.

(b) Copies may be procured for personal use from the American Society of Mechanical Engineers, United Engineering Center, 345 East 47th St., New York, New York 10017.

TABLE 41.10-A

			As amended by Summer Addenda issued June 30th and Winter Addenda issued December 31st of each respective year: S-Summer; W-Winter.		
			1974	1975	1976
1. Section	I	Power Boilers, 1974 Edition	S W	S W	S
2. Section	II	Material Specifications, 1974 Edition			
	a.	Part A — Ferrous Material	S W	S W	S
	b.	Part B — Nonferrous Material	S W	S W	S
	c.	Part C — Welding Rods, Electrodes, and Filler Metals	— —	S W	S
3. Section	III	Nuclear Power Plant Components, Division 1, 1974 Edition			
	a.	Subsection NA — General Requirements	S W	S W	S
	b.	Subsection NB — Class 1 Components	S W	S W	S
	c.	Subsection NC — Class 2 Components	S W	S W	S
	d.	Subsection ND — Class 3 Components	S W	S W	S
	e.	Subsection NE — Class MC Components	S W	S W	S
	f.	Subsection NF — Components Supports	— W	S W	S
	g.	Subsection NG — Core Support Structures	S W	S W	S
4. Section	IV	Heating Boilers, 1974 Edition	S W	S W	S
5. Section	V	Nondestructive Examination, 1974 Edition	S W	S W	S
6. Section	VIII	Pressure Vessels, 1974 Edition			
	a.	Division 1	S W	S W	S
	b.	Division 2	S W	S W	S
7. Section	IX	Welding and Brazing Qualifications, 1974 Edition	S W	S W	S
8. Section	X	Fiberglass Reinforced Plastic Pressure Vessels, 1974 Edition	S W	S W	—
9. Section	XI	Rules for Inservice Inspection of Nuclear Power Plant Components, 1974 Edition	S W	S W	S

History: Cr. Register, May, 1974, No. 221, eff. 6-1-74; r. and recr. Register, April, 1975, No. 232, eff. 5-1-75; r. and recr. table Register, May, 1976, No. 245, eff. 6-1-76; r. and recr. table, Register, March, 1977, No. 255, eff. 4-1-77.

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.

Ind 41.55 Pressure gauges for air receivers. (1) Air receivers shall be equipped with an indicating pressure gauge so located as to be readily visible.

(2) The dial of the pressure gauge shall be graduated to approximately double the pressure at which the safety valve is set, but not less than one and one-half times that pressure.

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

PART VI

EXISTING INSTALLATIONS

Ind 41.60 Application. (1) The provisions of sections Ind 41.60 through Ind 41.99 shall apply to boilers installed prior to January 1, 1957.

(2) Pressure vessels installed prior to January 1, 1957 shall meet the requirements of section Ind 41.99, pressure relief devices for pressure vessels.

History: Cr. Register, April, 1961, No. 64, eff. 5–1–61; am. (2), Register, May, 1974, No. 221, eff. 6–1–74.

Ind 41.61 Maximum allowable working pressures. (1) The maximum allowable working pressure on a boiler is the safe pressure at which the boiler may be operated as determined by the provisions of sections Ind. 41.60 through Ind 41.99, inclusive, of this code.

(2) No boiler shall be operated at a pressure in excess of the maximum allowable working pressure for such boiler.

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

Ind 41.62 Code constructed vessels. Any boiler that has been constructed and stamped in accordance with the rules and regulations of the A.S.M.E. boiler and pressure vessel code, or other recognized codes, or has the standard stamping of another state that has adopted the standard of construction of the A.S.M.E. boiler and pressure vessel code, shall be allowed and may be operated at the maximum working pressure stamped on its shell providing the vessel is unaltered, in good working order, and not deteriorated by age or corrosion. For unstamped boilers, the operating pressure shall be determined by using sections Ind 41.63 through Ind 41.76, inclusive.

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

Ind 41.63 Pressure calculations for shells. The maximum allowable working pressure to be allowed on the shell of a boiler shall be determined from the following formula:

$$P = \frac{T.S. \times t \times E}{R \times F.S.}$$

where P = maximum allowable working pressure, pounds per square inch,
T.S. = tensile strength of shell plate, pounds per square inch,
t = minimum thickness of shell plates, inches,
E = efficiency of longitudinal joint—method of determining which is given in section Ind 41.73,
R = inside radius of the outside course of the shell,
F.S. = lowest factor of safety allowed by section Ind 41.70.

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

Ind 41.64 Pressure calculations for flat heads and flat surfaces. The maximum allowable working pressure on flat surfaces of boilers shall be determined by the following formula:

$$P = \frac{T.S. \times t^2}{0.5 \times d^2 \times F.S.}$$

where P = maximum allowable working pressure, pounds per square inch,
T.S. = tensile strength of plate, pounds per square inch,
t = thickness of plate, inches,
d = diameter of head or shortest unsupported span of head or maximum pitch between stays, inches,
F.S. = lowest factor of safety allowed by section Ind 41.70.

Note. No allowance will be made for the holding power of flanges.

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

Ind 41.65 Pressure calculations for dished heads. The maximum allowable working pressure on unstayed dished heads shall be determined by the following formula:

Pressure on concave side (plus head)

$$P = \frac{2 \times T.S. \times E \times t}{8.33 \times L}$$

Pressure on convex side (minus head)

$$P = \frac{2 \times T.S. \times E \times t \times 0.6}{8.33 \times L}$$

where t = thickness of plate, inches,
P = maximum allowable working pressure pounds per square inch,
T.S. = tensile strength pounds per square inch,
L = radius to which the head is dished, measure on the concave side of the head, inches,
E = efficiency of weakest joint used in forming the head (exclusive of the joint to the shell) for seamless heads, E = 1.00.

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

Ind 41.66 Dished head restrictions. Dished heads without skirts or flanges shall not be used for any pressure.

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

Ind 41.67 Pressure calculation for furnaces and circular flues. The maximum allowable working pressure on furnaces of vertical boilers and circular flues shall be determined as indicated in sections Ind 41.50 and Ind 41.51 of this code.

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

Ind 41.68 Boiler plate thickness. (1) The minimum thickness of any boiler plate under pressure shall be ¼ inch except that boiler plate in stayed surfaces shall be $\frac{5}{16}$ inch thick minimum.

(2) Seamless shells for miniature boilers may be constructed of $\frac{1}{8}$ such boiler plate.

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