Filed December 7, 1965
2:50 P.M.

Ind 41, 42

STATE OF WISCONSIN)
) ss.
DEPT. OF INDUSTRIAL COMMISSION)

TO ALL TO WHOM THESE PRESENTS SHALL COME, GREETINGS:

I, Stephen J. Reilly, Executive Secretary of the Industrial Commission of Wisconsin, and custodian of the official records of said Commission, do hereby certify that the attached copy of amendments to Wisconsin Administrative Code Ind 41 and 42 Boilers and Unfired Pressure Vessels was adopted by the Industrial Commission on December 1, 1965.

I further certify that said copy has been compared by me with the original on file in this Commission and that the same is a true copy thereof and of the whole of such original.

IN TESTIMONY WHEREOF, I have hereunto set my hand and affixed the official seal of the department at the Capitol, in the City of Madison, this

7 day of December,

A. D., 1965.

Stephen J. Reilly
Executive Secretary

December 7, 1965

Pursuant to authority vested in the Industrial Commission of Wisconsin by Section 101.01-101.29 Wisconsin Statutes, and pursuant to Chapter 227, the Industrial Commission on December 1, 1965 voted to amend Ind 41 and Ind 42 Boilers and Unfired Pressure Vessels. The amendments are attached.

The amendments shall become effective on the first day of the month following publication in the Wisconsin Administrative Code as provided in Section 227.

INDUSTRIAL COMMISSION OF WISCONSIN

Stephen J. Reilly, Secretary

December 7, 1965

WISCONSIN ADMINISTRATIVE CODE, CHAPTER IND 41

BOILERS AND UNFIRED PRESSURE VESSELS

AMEND Ind 41.02(2)(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 psig maximum allowable working pressure.

AMEND Ind 41.02(7) HOT WATER HEATING BOILER AND HOT WATER SUPPLY — 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.)

AMEND Ind 41.02(10) MAJOR REPAIR — A riveted or welded repair to a boiler drum, unfired pressure vessel drum, or boiler water leg.

CREATE Following Ind 41.02(15) a note: "Note:For further explanation of definitions see the current edition of the A.S.M.E. Code - Section VIII - Scope".

AMEND Ind 41.03(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

(Cont'd)

AMEND Ind 41.03(3) (Cont'd) of valves, pipes, and other appurtenances shall be installed in a manner that will not block any inspection opening.

AMEND 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. 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 = 1/3 x OC x 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)

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

RVC = 1/2 x OC x 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 = Bypass pipe area, sq. inch. (See Table 2.)

(Cont'd)

AMEND Ind 41.12 (Cont'd)

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 $1\frac{1}{2}$ inch size pressure reducing valve provided with a glove-valved 1 inch bypass. 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 = 1/3 x 7200 x 2.04 = 4896 lbs. steam per hour.

Checking the bypass steam flow according to the second formula gives:

W = 1/2 x 7200 x 0.86 - 3100 lbs. steam per hour.

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

AMEND Ind 41.12 (Cont'd)

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	5630								
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

AMEND Ind 41.28 INSPECTION CERTIFICATES (1) After each periodic internal or external 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 on the premises 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 the 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.

AMEND Ind 41.50 A.S.M.E. CODE VESSELS (1) Except as regulated in sections Ind 41.51, Ind 41.52 and Ind 42.53, boilers and unfired pressure vessels installed after the effective date of this section (Ind 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	1965 Edition	As Amended to July 1, 1965
(b)	Section II	Material Specifications	"	"
(c)	Section III	Nuclear Vessels	"	"
(d)	Section IV	Low Pressure Heating Boilers	"	"
(e)	Section VIII	Unfired Pressure Vessels	"	"
(f)	Section IX	Welding Qualifications	"	"
(g)		A.S.M.E. Code Cases	"	"

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 Mechancial Engineers, United Engineering Center, 345 East 47th Street, New York, New York, 10017.

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 53702.

Note 3. Section VII, "Suggested Rules for Care of Boilers" is recommended as a guide for boiler owners and operators.

AMEND Ind 42.31 INSPECTION AND TESTING (1) Every second hand boiler and unfired pressure vessel shall be inspected and given a hydrostatic pressure test at $1\frac{1}{2}$ times the working pressure by an authorized inspector at its new point of installation location before it is placed in operation, except for the following:

(Cont'd)

(a) Vessels used for the storage and transportation of liquefied petroleum gases or anhydrous ammonia.

(b) Vessels containing more than 2,000 gallons of refrigerant.

(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.