CR 83-66

RULES CERTIFICATE

STATE OF WISCONSIN)
) SS
DEPT. OF INDUSTRY,)
LABOR & HUMAN RELATIONS)

TO ALL TO WHOM THESE PRESENTS SHALL COME, GREETINGS:

I, Howard S. Bellman, Secretary of the Department of Industry, Labor and Human Relations, and custodian of the official records of said department, do hereby certify that the annexed rule(s) relating to Chs Ind 50-64 - Bldg & Htg, Vent & A/C Code Proposed Changes for Energy Conservation (Subject) were duly approved and adopted by this department on 11/14/83 (Date).

I further certify that said copy has been compared by me with the original on file in this department 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 8:00 am in the city of Madison, this 14th day of November A.D. 1983.

Howard S. Bellman
Secretary

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DILHR-ADM-6056(N.04/80)

ORDER OF ADOPTION

Pursuant to authority vested in the Department of Industry, Labor and Human Relations by section(s) 101.02(1),101.02(15)(h)-(j), Stats., the Department of Industry, Labor and Human Relations hereby [X] creates; [X] amends; [X] repeals and recreates; and [ ] repeals and adopts rules of Wisconsin Administrative Code chapter(s):

Ind. 50-64 *(Number)* Building & Heating, Ventilating & Air Conditioning Code Proposed Changes for Energy Conservation *(Title)*

The attached rules shall take effect on the first day of the month following publication in the Wisconsin Administrative Register, pursuant to section 227.026, Stats.

Adopted at Madison, Wisconsin, this 14th day of November, A.D., 1983.

DEPARTMENT OF INDUSTRY, LABOR AND HUMAN RELATIONS

Howard S. Bellman
Secretary

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RULES in FINAL DRAFT FORM

Rule: Chs. Ind 50-64

Relating to: Building & Heating, Ventilating & Air Conditioning Code - Proposed Changes for Energy Conservation

Clearinghouse Rule No.: 83-66

Administrative rules to amend ss. Ind Table 63.20-D, Table 63.20-F, 64.33 (2), 64.37; to repeal and recreate ss. Ind 63.12 (3), Table 63.20-A, Table 63.20-B, Table 63.20-C, Table 63.20-E, 63.22; to create s. Ind 63.001 (3) (c) relating to energy conservation in public buildings and places of employment.

* *

ANALYSIS OF RULES

The proposed rules update and expand the current energy conservation rules of the Building and Heating, Ventilating and Air Conditioning Code. Replacement of heating or cooling equipment and the complete replacement of lighting systems is now subject to the rules of ch. Ind 63. Requirements for slab-on-grade perimeter insulation have been expanded to address heated as well as unheated slabs. References to the ASHRAE standard 90A have been updated and an address has been corrected in various tables dealing with heating and cooling equipment efficiencies. Requirements dealing with pipe and duct insulation have been updated.

The proposed rules were developed in conjunction with the Project Committee for Energy Conservation and the Building Code Advisory Review Board. The following is a listing of the project committee and Review Board members:

Project Committee for Energy Conservation

- Peter Billing, National Forest Products Association
- Albert W. Boehme, Durrant Engineering
- William Boncher, Bricklayers and Allied Craftsmen Union
- Lorch Clevan, Division of State Facilities Management, Department of Administration
- Bert Fredericksen, Bert Fredericksen, Inc.
- Donald D. Gay, Kilgust Mechanical, Inc.
- Harry Hackler, Division of State Energy, Department of Administration
- Robert M. Krubsack, Wisconsin Electric Power Company
- Roger A. Nass, Dolan and Dustin, Inc.
- Gordon Petzold, Leedy and Petzold, Inc.
- William Plummer, H & H Electric, Inc.
- Walter R. Ratai, Walter R. Ratai and Associates
- Richard Walter, Wisconsin Concrete Products Association

Building Code Advisory Review Board

- Sharyl Bisgard, League of Women Voters
- Ronald W. Chiapete, Wisconsin State Fire Chiefs Association
- Victor Halloran, Wisconsin Society of Architects/AIA
- Lee C. Jensen, City of Milwaukee
- James E. Knothe, Wisconsin Society of Professional Engineers
- Marshall Kuhnly, Wisconsin State AFL-CIO
- Michael G. Laskis, State Bar of Wisconsin
- Thomas Lorenz, Master Builders Association of Wisconsin, Inc.
- George J. Mark, Wisconsin Builders Association
- Donald Roth, League of Wisconsin Municipalities
- David J. Schield, Wisconsin Association of Manufacturers and Commerce
- Stephen D. Schlough, Wisconsin Department of Health and Social Services
- Richard C. Schumacher, Wisconsin Chapter, Associated General Contractors of America, Inc.
- William Shea, Building Owners and Manufacturers Association/Income Property Owners Association
- Jahn Tinglum, Wisconsin Department of Public Instruction
- Fred Wegener, Wisconsin Department of Administration, Division of State Facilities Management
- Larry J. Wills, Wisconsin Chapter, Society of Fire Protection Engineers

* *

Pursuant to the authority vested in the state of Wisconsin's Department of Industry, Labor and Human Relations by ss. 101.02 (1) and 101.02 (15) (h) to (j), Stats., the department hereby amends, repeals and recreates and creates rules interpreting ss. 101.02 (15) (h) to (j), Stats., as follows:

SECTION 1. Ind 63.001 (3) (c) is created to read:

Ind 63.001 (3) (c) Heating and cooling equipment replacement and complete lighting system replacement shall comply with the requirements of this chapter.

SECTION 2. Ind 63.12 (3) is repealed and recreated to read:

Ind 63.12 (3) SLAB-ON-GRADE PERIMETER INSULATION. For slab-on-grade floors with or without grade beam, foundation bearing wall or foundation frost wall, the thermal resistance of the insulation around the perimeter of the floor shall not be less than the values shown in Table 63.12-B. The insulation shall extend 48 inches in the vertical or horizontal direction or combination thereof with a total dimension of 48 inches. Slab-on-grade perimeter insulation shall be moisture resistant.

TABLE 63.12-B

PERIMETER INSULATION REQUIREMENTS

Slab-on-grade Perimeter Insulation		Zone 1	Zone 2	Zone 3	Zone 4
R = °F Sq. Ft. Hour / Btu	Unheated Slabs	6.7	6.2	5.9	5.2
	Heated Slabs†	9.3	9.0	8.6	8.2

†Heated slabs have piping, ductwork or other heat distribution system components embedded in or under them.

SECTION 3. Table 63.20-A is repealed and recreated to read:

TABLE 63.20-A

MINIMUM EER AND COP FOR ELECTRIC HEATING, VENTILATING AND AIR-CONDITIONING SYSTEM EQUIPMENT, COOLING MODE†

Standard Rating Capacity	EER	COP
Under 65,000 Btu/hour (19,050 watts)	7.8	2.3
65,000 Btu/hour (19,050 watts) and over	8.2	2.4

†Adopted from Table 6.2, ASHRAE Standard 90A-80, Energy Conservation in New Building Design (The American Society of Heating, Refrigerating and Air-Conditioning Engineers, Inc., 1791 Tullie Circle N.E., Atlanta, Georgia 30329).

SECTION 4. Table 63.20-B is amended to read:

TABLE 63.20-B

HVAC SYSTEM EQUIPMENT STANDARD RATING CONDITIONS† - COOLING††

Item	Temperatures			
	Dry Bulb	Wet Bulb	Inlet	Outlet
Air Entering Equipment °F (°C)	80 (26.7)	67 (19.4)	-	-
Condenser Ambient (Air °F (°C) Cooled)	95 (35.0)	75 (23.9)	-	-
Condenser Water (Water °F (°C) Cooled)	-	-	85 (29.4)	95 (35.0)

† Standard ratings are at sea level.

††Reproduced with permission from ASHRAE Standard ~~90-75~~ 90A-80, Energy Conservation in New Building Design (The American Society of Heating, Refrigerating, and Air-Conditioning Engineers, Inc., ~~345 East 47th St., New York, NY 10017~~ 1791 Tullie Circle, N.E., Atlanta, Georgia 30329).

SECTION 5. Table 63.20-C is repealed and recreated to read:

TABLE 63.20-C

MINIMUM COP FOR HEAT PUMPS, HEATING MODE†

Source and Outdoor Temperature °F	Minimum COP
Air Source (return air 70° F) 47 db/43 wb	2.7
Air Source (return air 70° F) 17 db/15 wb	1.8
Water Source 60° Entering (return air 70° F)	3.0

†Adapted from Table 6.10 ASHRAE Standard 90A-80, Energy Conservation in New Building Design (The American Society of Heating, Refrigerating, and Air Conditioning Engineers, Ind., 1791 Tullie Circle, N.E., Atlanta, Georgia 30329).

SECTION 6. Table 63.20-D is amended to read:

TABLE 63.20-D

MINIMUM COP FOR HEATING, VENTILATING AND AIR-CONDITIONING SYSTEMS, HEAT-OPERATED COOLING EQUIPMENT†

Heat Source	Minimum COP
Direct-fired (gas, oil)	0.48
Indirect-fired (steam, hot water)	0.68

†Adapted from Table ~~6.6~~ 6.7 ASHRAE Standard ~~90-75~~ 90A-80, Energy Conservation in New Building Design (The American Society of Heating, Refrigerating, and Air-Conditioning Engineers, Inc., ~~345 East 47th St., New York, NY 10017~~ 1791 Tullie Circle, N.E., Atlanta, Georgia 30329).

SECTION 7. Table 63.20-E is repealed and recreated to read:

TABLE 63.20-E

MINIMUM COP FOR ELECTRICALLY DRIVEN HEATING, VENTILATING AND AIR-CONDITIONING SYSTEM COMPONENTS†

Component	Condensing Means	Air		Water		Evaporative	
		EER	COP	EER	COP	EER	COP
Self-Contained Water Chillers	Centrifugal	8.0	2.3	13.8	4.0	-	-
	Positive Displacement	8.4	2.5	12.0	3.5	-	-
Condenserless Water Chillers	Positive Displacement	9.9	2.9	12.0	3.5	-	-
Compressor and Condenser Units 65,000 Btu/hour (19,050 watts and over)	Positive Displacement	9.5	2.8	12.5	3.7	12.5	3.7

†Adapted from Tables 6.4 and 6.5 ASHRAE Standard 90A-80, Energy Conservation in New Building Design (The American Society of Heating, Refrigerating and Air-Conditioning Engineers, Inc., 1791 Tullie Circle, N.E., Atlanta, Georgia 30329).

SECTION 8. Table 63.20-F is amended to read:

TABLE 63.20-F

APPLIED HVAC SYSTEM COMPONENTS
STANDARD RATING CONDITIONS† - COOLING††

Item			Centrifugal or Self-Contained Reciprocating Water Chiller	Condenserless Reciprocating Water Chiller
Leaving Chilled Water Temp.		°F	44	44
Entering Chilled Water Temp.		°F	54	54
Leaving Condenser Water Temp.		°F	95	--
Entering Condenser Water Temp.		°F	85	--
Fouling Factor, Water				
Nonferrous Tubes		*	0.0005	0.0005
Steel Tubes		*	0.0010	0.0010
Fouling Factor, Refrigerant		*	0.0000	0.0000
Condenser Ambient (Air or Evap. Cooled)		°F	95 db/75 wb	--
Compressor Saturated Discharge Temp.	Water Cooled (or Evap. Cooled)	°F	--	105
	Air Cooled	°F	--	120

†Standard ratings are at sea level.

* $\frac{\text{°F Sq. Ft. Hour}}{\text{Btu}}$

††Adapted from Table ~~6.3~~ 6.3.1, ASHRAE Standard ~~90-75~~ 90A-80, Energy Conservation in New Building Design (The American Society of Heating, Refrigerating, and Air Conditioning Engineers, Inc., ~~345 East 47th St., New York, NY 10017~~ 1791 Tullie Circle, N.E., Atlanta, Georgia 30329).

SECTION 9. Table 63.22 is repealed and recreated to read:

TABLE 63.22

MINIMUM PIPE INSULATION

(The thicknesses specified in this table are based on insulation having thermal resistance in the range of 4.0 H-Ft^2 - F°/Btu to 4.6 H-Ft^2-F°/Btu per inch of thickness on a flat surface at a mean temperature of 75° F)

Piping System Types	Fluid Temperature Range °F	Insulation Thickness in Inches for Pipe Sizes†					
		Run-Outs†† Up to 2"	1" and less	1-1/4 to 2"	2-1/2 to 4"	5" to 6"	8" and larger
Heating Systems:							
Steam and Hot Water							
High Pressure/Temp	306-450	1-1/2	2-1/2	2-1/2	3	3-1/2	3-1/2
Med. Pressure/Temp	251-305	1-1/2	2	2-1/2	2-1/2	3	3
Low Pressure/Temp	201-250	1	1-1/2	1-1/2	2	2	2
Low Temperature	120-200	1/2	1	1	1-1/2	1-1/2	1-1/2
Steam Condensate (for feed water)	Any	1	1	1-1/2	2	2	2
Cooling Systems:							
Chilled Water	40-55	3/4	3/4	1	1	1-1/2	1-1/2
Refrigerant	Below 40	1	1	1-1/2	1-1/2	1-1/2	1-1/2

†For piping exposed to outdoor ambient temperatures, increase thickness by 1/2 inch.

††Run-outs not exceeding 12 feet in length to individual terminal units.

Note: Also see s. Ind 64.37 for additional requirements.

SECTION 10. Ind 64.33 (2) is amended to read:

Ind 64.33 (2) DUCT INSULATION. ~~Air~~ All underground ducts ~~installed parallel and adjacent to an outside wall~~ shall be insulated ~~in accordance with the requirements of~~ as specified in s. Ind 63.22 (1).

SECTION 11. Ind 64.37 is amended to read:

Ind 64.37 INSULATION. Heating and supply ducts and pipes shall be covered with insulation unless an allowance is made for temperature drop in the system.

Note: Also see s. Ind 63.22 for additional requirements.

* *

EFFECTIVE DATE

Pursuant to s. 227.026 (1) (intro), Stats., these rules shall take effect on the first day of the month following publication in the Wisconsin Administrative Register.

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