

CR 83-70

# 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 Building & Htg, Vent & A/C Code - Foam Plastics were duly approved and adopted by this department on 11/14/83.  
(Subject) (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 9:00 am in the city of Madison, this 14<sup>th</sup> day of November A.D. 1983.

Howard S. Bellman  
Secretary

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NOV 15 1983  
8:15 am  
Revisor of Statutes  
Bureau

# 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  creates;  amends;  repeals and recreates; and  repeals and adopts rules of Wisconsin Administrative Code chapter(s):

Ind. 50-64 Building & Heating, Ventilating & Air Conditioning Code  
(Number) Foam Plastics  
(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 14<sup>th</sup>  
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 (Ind 51.06)

**Relating to:** Building and Heating, Ventilating and Air  
Conditioning Code - Foam Plastics

**Clearinghouse Rule No.:** 83-70

Administrative rules to renumber s. Ind 51.07 (3); to amend 51.27 (7a); to repeal and recreate ss. Ind 51.06, 51.27 (15); to create ss. Ind 51.01 (3a), (57b), (58a), (58b), 51.07 (3) (b), 51.27 (16), 54.23 relating to the use of foam plastics in public buildings and places of employment.

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ANALYSIS OF RULES

The proposed rules update and expand the current foam plastic-related requirements of the Building and Heating, Ventilating and Air Conditioning Code. The rules establish material qualifications, package labeling requirements, fire protection (thermal barrier) requirements and the use of fire suppression systems when foam plastics are used.

The rules specify permitted applications of foam plastics in exterior uses, interior uses, roofing, attics/crawl spaces, doors and shutters, siding backer board, decorative trim, refrigerated facilities and bulk vegetable storage. The rules also permit manufacturers to obtain specific material approvals for products and components. Lastly, several nationally recognized test standards for foam plastics are adopted by reference.

The proposed rules were developed in conjunction with the Thermal Insulation and Refrigerated Facilities Sub-Committees of the Project Committee for Plastics in Construction and the Building Code Advisory Review Board. The following is a listing of the members of the sub-committees and the Review Board:

Thermal Insulation Sub-Committee

- Carl Bauman, C. Bauman and Associates, Inc.
- Donald Belles, D. Belles, Inc.
- Robert Chase, Chase Panel Systems
- Ted Clark, Clark Tectonics, Inc.
- John W. Dalton, Celotex Corporation
- E. William Fairweather, BASF Wyandotte Corporation
- Jarvis J. Gafford, Celotex Corporation
- Michael Garty, Sprinkman Sons Incorporated
- Donald Grieb, Donald Grieb Associates
- Donald Huempfer, Midwest Plastics Incorporated
- Robert Lee Knighten, Inryco, Inc.
- George Sayre, WisCold, Inc.
- Charles Kugel, Factory Mutual Engineering Association
- Cliff Lewis, Insulcrete Company
- John Maletz, J. Maletz Architect, Inc.
- Robert Murphy, Sandra Corporation
- Dave Osborne, Conserv Products, Inc.

Refrigerated Facilities Sub-Committee

- Carl Bauman, C. Bauman and Associates, Ltd.
- Robert Chase, Chase Panel Systems
- Ted Clark, Clark Tectonics, Inc.
- John W. Dalton, Celotex Corporation
- Jarvis J. Gafford, Celotex Corporation
- Michael Garty, Sprinkman Sons Corporation
- George Sayre, WisCold, Inc.
- Charles Kugel, Factory Mutual Engineering Association
- John Maletz, J. Maletz Architect, Inc.
- John Prasse, Dow Chemical USA
- T. V. Roberts, Plymouth Foam Plastics

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

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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 51.01 (3a), (57b), (58a) and (58b) are created to read:

Ind 51.01 (3a) "Approved diversified tests" mean fire tests which evaluate materials or construction assemblies representative of actual end use applications.

Note: Approved diversified tests may include, but are not limited to, ASTM E84-81a - Test for Surface Burning Characteristics of Building Materials, ASTM E119-81 - Fire Tests of Building Construction and Materials, ASTM D1929 - 1977 - Standard Test Method for the Ignition Properties of Plastics, FM 4880 - Factory Mutual Building Corner Fire Test, PICC 401-1980 - Enclosed Room Corner Test and UL 1040 - Outline of Investigation of Insulated Wall Construction, January, 1980.

Ind 51.01 (57b) "Foam plastic" means a manufactured organic material used as a building material, insulation or sound-absorbing material.

Ind 51.01 (58a) "Freestanding freezer and cooler" means equipment with an aggregate floor area of less than 400 square feet used to provide a controlled environment at 50°F. or less for storing, displaying or merchandising of products. The freezers and coolers are installed in a building or structure for weather protection and do not rely upon the building or structure for lateral or vertical support, except for the floor load.

Note: Freezers and coolers which do not meet this definition are considered refrigerated facilities. See s. Ind 51.06 (7) (a) for additional requirements.

Ind 51.01 (58b) "Freezer Warehouse" means a building or structure designed and operated at a temperature of 32° F. or below and adapted to the reception and storage of goods, products and merchandise.

SECTION 2. Ind 51.06 is repealed and recreated to read:

Ind 51.06 FOAM PLASTICS. (1) SCOPE. The requirements of this section shall apply to the use of foam plastics in building construction.

(2) FLAME SPREAD AND SMOKE DEVELOPED CRITERIA. Except as otherwise provided, all foam plastic and foam plastic cores in manufactured assemblies used in building construction, shall have a flame spread rating of not more than 75 and a smoke developed rating of not more than 450 when tested in the maximum thickness intended for use in accordance with ASTM E84-81a.

(3) THERMAL BARRIER. (a) Except as provided in subs. (4), (5), (6) and (7), foam plastics shall be separated from the interior of a building by an approved thermal barrier of 1/2 inch gypsum wallboard or equivalent thermal barrier material which will limit the average temperature rise of its unexposed surface to not more than 250°F. after 15 minutes of fire exposure as specified in the ASTM E119-81 standard time temperature curve or the equivalent using the Small Scale Horizontal Exposure Furnace, with samples for the test having a minimum length and width of 3 feet by 3 feet.

(b) The thermal barrier shall be installed in such a manner that it will remain in place for at least 15 minutes based upon approved diversified tests.

(4) EXTERIOR APPLICATIONS. The following requirements shall apply to all exterior uses of foam plastics unless specifically approved as specified in sub. (7):

(a) Masonry or Concrete Components. Foam plastics may be used without the thermal barrier specified in sub. (3) regardless of the class of construction, when the foam plastic is protected by a minimum of one inch thickness of masonry or concrete in a wall or floor system;

(b) Noncombustible Hourly Rated and Combustible Hourly Rated Construction. Foam plastics may be used within the cavity or as an element of a noncombustible hourly rated or combustible hourly rated system or assembly provided:

1. The system or assembly meets the requirements of s. Ind 51.04 for time-rated construction;

2. a. Except as provided in subpar b., a thermal barrier as specified in sub (3) is provided;

b. The thermal barrier may be omitted for exterior walls provided that the foam plastic insulation does not exceed 4 inches in thickness, has a flame spread rating of 25 or less, and is covered by a thickness of not less than 0.032 inch aluminum or corrosion-resistant sheet steel having a base metal thickness of 0.016 inches and the wall height does not exceed 50 feet and the entire building or that portion of the building enclosed by the walls is protected with an automatic fire sprinkler system; and

3. a. Except as provided in subpar. b., the exterior side of the assembly or system is covered with a cladding material meeting the requirements for noncombustible construction, and the wall assembly shall not propagate flame over the surface or through the core when subjected to a full scale test with the assembly in its end use condition or when subjected to an approved diversified test;

b. The exterior coating, facing or cladding material for walls may be of other than noncombustible material provided that the foam plastic core, coating, facing and cladding, each when tested individually shall have a flame spread of 25 or less and a smoke developed rating of 450 or less when tested in accordance with ASTM E84-81a; facing, coating, cladding and core material shall be fastened to each other to prohibit failure in bond as a result of temperature which may be experienced in a building fire, or from winds or other conditions; and the wall assembly shall not propagate flame over the surface or through the core when subjected to a full scale test with the assembly in its end use condition or when subjected to an approved diversified test.

(c) Noncombustible 0-Hour (NC-0) Rated Construction. Foam plastics may be used within the cavity or as an element of noncombustible 0-hour (NC-0) rated construction provided the following conditions are satisfied:

1. The foam plastic core material has a flame spread of 25 or less and a smoke developed rating of 450 or less when tested in accordance with ASTM E-84-81a;

2. a. Except as provided in subpar b., a thermal barrier as specified in sub. (3) is provided;

b. The thermal barrier may be omitted for exterior walls provided that the foam plastic insulation does not exceed 4 inches in thickness, and is covered by a thickness of not less than 0.032 inch aluminum or corrosion-resistant sheet steel having a base metal thickness of 0.016 inches and the wall height does not exceed 50 feet and the entire building or that portion of the building enclosed by the walls is protected with an automatic fire sprinkler system; and

3. a. The exterior side of the assembly or system is covered with a cladding material meeting the requirements for noncombustible construction as specified in s. Ind 51.01 (86);

b. The exterior coating, facing or cladding material for walls may be of other than noncombustible material provided that the coating, facing and cladding, shall have a flame spread of 25 or less and a smoke developed rating of 450 or less when tested in accordance with ASTM E-84-81a;

c. The facing, coating, cladding and core material shall be fastened to each other to prohibit failure in bond as a result of temperature which may be experienced in a building fire, or from winds or other conditions; and

d. The wall assembly shall not propagate flame over the surface or through the core when subjected to a full scale test with the assembly in its end use condition or when subjected to an approved diversified test.

Note: Light-transmitting plastic veneer or combustible veneer materials conforming to the requirements of this paragraph need not meet the height and area limitations for light-transmitting plastics (see s. Ind 51.065).

(d) Combustible Nonrated Construction. Foam plastic insulation may be used within the cavity or as an element of combustible nonrated construction (0) provided the following conditions are satisfied:

1. The distance to a property line or other building on the same property meets the requirements of Table 51.03-A;

2. Thermal barriers as specified in sub. (3) are provided; and

3. The exterior side of the assembly or system is covered with a cladding material meeting the requirements for combustible construction as specified in Table 51.03-A.

(e) Roofing. Foam plastic may be used as part of a class A, B or C or unclassified roof covering as specified in s. Ind 51.05. The foam plastic:

1. Shall not be limited as to smoke development rating;

2. Shall not be limited as to flame spread rating if it is a component of a factory-made composite insulation or assembly and the roof system complies with the calorimeter requirements of FM 4450, Approval Standard for Class I Insulated Steel Roof Decks, Revised August 5, 1977, or UL 1256, Outline of Investigation for Roof Deck Construction, October, 1979;

3. May be installed without a protective thermal barrier if the foam plastic has a flame spread rating of 75 or less when tested at the maximum thickness intended for use and the roof system complies with the calorimeter requirements of FM 4450, Approval Standard for Class I Insulated Steel Roof Decks, Revised August 5, 1977, or UL 1256, Outline of Investigation for Roof Deck Construction, October, 1979; and

4. May be installed without a protective thermal barrier if the foam plastic has a flame spread rating of 75 or less when tested at the maximum thickness intended for use and the foam plastic is separated from the building interior by minimum of one inch thickness of masonry or concrete or a minimum of 1/2 inch thickness plywood bonded with exterior glue and properly edge supported, or equivalent.

(5) OTHER APPLICATIONS. (a) Interior construction. Foam plastic may be used as an element of or attached to interior construction components, including walls, partitions, floor/ceiling assemblies and similar components that divide interior spaces within the building, as follows:

1. Within the cavity or as an element of a noncombustible hourly rated or combustible hourly rated system or assembly provided the system or assembly meets the requirements of s. Ind 51.04 for time-rated construction for at least one hour with a fire exposure on both sides of the system or assembly; or

2. Within the cavity or as an element of noncombustible 0-hour (NC-0) rated construction or combustible nonrated construction (0) provided the foam plastic is protected on both sides by a thermal barrier as specified in sub (3).

(b) Attics and Crawl Spaces. 1. Attics may be insulated with unprotected foam plastic provided the ceiling between the attic and the occupied space is covered by 1/2-inch gypsum wallboard or equivalent and the attic space is not used for storage or air handling purposes.

2. Crawl space walls may be insulated with unprotected foam plastic provided the floor between the crawl space and the occupied space consist of at least 3/4-inch tongue and groove plywood sheathing or equivalent, and the crawl space is not used for storage or air handling purposes.

3. Foam plastic shall be protected by a thermal barrier as specified in sub. (4) when the foam plastic is installed in an attic or crawl space and the area is used for storage or air handling purposes.

(c) Doors and Shutters. 1. a. Except as provided in subpar. b., where doors and shutters are permitted without a fire-resistive rating, foam plastic having a flame-spread rating of 75 or less may be used as a core material when the facing is metal having a minimum thickness of 0.032-inch aluminum or sheet steel having a minimum thickness of 0.0160 inch.

b. Foam plastic core sectional overhead doors covered by at least 1/8" thick hardboard may be used wherever nonrated combustible doors are permitted.

2. A thermal barrier is not required for doors and shutters meeting the requirements specified in subd. 1.

(d) Siding Backer Board. Foam plastic not more than 1/2 inch thick may be used as siding backer board provided it is separated from the interior of the building by not less than 2 inches of mineral fiber insulation or equivalent in lieu of the thermal barrier or when applied as insulation when residing over existing wall construction.

(e) Decorative Trim. Foam plastic used as decorative trim shall conform with the provisions of s. Ind 51.07.

(f) Protection from Ultraviolet Light. Foam plastic insulation installed on the exterior of buildings above grade shall be permanently covered or protected to prevent degradation caused by exposure to ultraviolet light.

(6) SPECIFIC APPLICATIONS. (a) Refrigerated Facilities. 1. Except as provided in subd. 2., foam plastic installed and meeting the requirements of sub. (2) when tested in a thickness of 4 inches may be used in thicknesses up to 10 inches in cold storage rooms, refrigerated food processing rooms, ice plants and similar areas. The foam plastic for refrigerated rooms within a building shall be protected on both sides by a thermal barrier as specified in sub. (3).

2. Except as provided in subd. 3., foam plastic insulation may be used without the thermal barrier when the foam plastic has a flame-spread rating of 25 or less when tested as specified in subd. 1., is covered by not less than 0.032 inch of aluminum or corrosion-resistant steel having a base metal thickness not less than 0.016 inch at any point and is protected by an automatic fire sprinkler system. When a cooler or freezer module is located within a building, both the cooler or freezer module and that part of the building in which the module is located shall be protected by an automatic fire sprinkler system.

3. a. Foam plastics may be used in a thickness up to 4 inches in freestanding coolers or freezers having an aggregate floor area less than 400 square feet without a thermal barrier and without an automatic fire sprinkler system; or

b. Freezer warehouses may be constructed without automatic fire sprinkler system protection provided the freezer warehouse is equipped with a complete approved smoke detection system throughout and the system is connected to a constantly attended station; the freezer warehouse is separated from all other use areas of the building (i.e., offices, loading docks, nonrefrigerated storage, mechanical rooms) by at least 2-hour fire-resistive rated construction; the freezer warehouse is located to provide at least a 30 foot separation to any property line or other building on the same property; and the foam plastic material complies with the provisions of s. Ind 51.06 (7).

Note: See s. Ind 52.015 for additional rules pertaining to automatic fire sprinkler systems.

(b) Bulk Vegetable Storage. Buildings used exclusively for the bulk storage of vegetables shall have the foam plastic insulation protected on the occupied side by 5/8-inch exterior grade plywood, or equivalent.

(7) SPECIFIC MATERIALS APPROVAL. Foam plastic not meeting the requirements of this section may be approved by the department for specific application based on the submittal and written acceptance of data from approved diversified tests.

Note: See s. Ind 50.19 for additional information pertaining to product approval.

SECTION 3. Ind 51.07 (3) is renumbered (3) (a).

SECTION 4. Ind 51.07 (3) (b) is created to read:

Ind 51.07 (3) (b) In addition to the other requirements of this section, foam plastic used as interior trim and incidental finish shall also comply with the following:

1. The minimum density is 20 pounds per cubic foot;
2. The maximum thickness of the trim is 1/2 inch and the maximum width is 4 inches;
3. The trim constitutes no more than 10 percent of the area of any wall or ceiling; and
4. The flame-spread rating does not exceed 75 when tested in accordance with ASTM E-84 and the smoke developed rating is not limited.

SECTION 5. Ind 51.27 (7a) is amended to read:

Ind 51.27 (7a) National Fire Protection Association, Batterymarch Park, Quincy, Mass. 02269; STANDARD FOR PORTABLE FIRE EXTINGUISHERS, NFPA No. ~~40-1978~~ 10-1981; STANDARD FOR THE INSTALLATION OF SPRINKLER SYSTEMS, NFPA No. 13-1980; STANDARD FOR THE CARE AND MAINTENANCE OF SPRINKLER SYSTEMS, NFPA No. 13A-1981; STANDARD FOR THE INSTALLATION OF CENTRIFUGAL FIRE PUMPS, NFPA No. 20-1980; STANDARD FOR WATER TANKS FOR PRIVATE FIRE PROTECTION, NFPA No. ~~22-1978~~ 22-1981; STANDARD FOR OUTSIDE PROTECTION, NFPA No. ~~24-1977~~ 24-1981; STANDARD FOR THE INSTALLATION OF OIL-BURNING EQUIPMENT, NFPA No. 31-1978; NATIONAL FUEL GAS CODE, NFPA No. ~~54-1974~~ 54-1980; STANDARD FOR CENTRAL STATION PROTECTIVE SIGNALING SYSTEMS, NFPA No. ~~71-1977~~ 71-1982; STANDARD FOR THE INSTALLATION, MAINTENANCE AND USE OF LOCAL PROTECTIVE SIGNALING SYSTEMS FOR GUARD'S TOUR, FIRE ALARM AND SUPERVISORY SERVICE, NFPA No. 72A-1979; STANDARD FOR AUXILIARY PROTECTIVE SIGNALING SYSTEMS, NFPA No. 72B-1979; STANDARD FOR REMOTE STATION PROTECTIVE SIGNALING SYSTEMS, NFPA No. ~~72C-1975~~ 72C-1982; STANDARD FOR PROPRIETARY PROTECTIVE SIGNALING SYSTEMS, NFPA No. 72D-1979; STANDARD ON AUTOMATIC FIRE DETECTORS, NFPA No. ~~72E-1978~~ 72E-1982; STANDARD FOR HOUSEHOLD FIRE WARNING EQUIPMENT, NFPA No. 74-1980; MANUAL ON CLEARANCES FOR HEAT PRODUCING APPLIANCES, NFPA No. 89M-1976; STANDARD FOR THE INSTALLATION OF AIR CONDITIONING AND VENTILATING SYSTEMS, NFPA No. 90A-1981; STANDARD FOR CHIMNEYS, FIREPLACES AND VENTS, NFPA No. 211-1980.

SECTION 6. Ind 51.27 (15) is repealed and recreated to read:

Ind 51.27 (15) Underwriters Laboratories Inc., 333 Pfingsten Road, Northbrook, Illinois 60062, FACTORY-MADE AIR DUCTS AND CONNECTORS, UL STANDARD No. 181-1981, sixth edition including revisions dated September 16, 1981; OUTLINE OF INVESTIGATION FOR ROOF DECK CONSTRUCTION, UL No. 1256, June 15, 1979.

SECTION 7. Ind 51.27 (16) is created to read:

Ind 51.27 (16) Factory Mutual, Inc., 1151 Boston-Providence Turnpike, Norwood, Mass. 02062, APPROVAL STANDARD FOR CLASS I INSULATED STEEL DECK ROOFS, FM Standard 4450, Revised August 5, 1977.

SECTION 8. Ind 54.23 is created to read:

Ind 54.23 FREEZER WAREHOUSES. Freezer warehouses complying with the requirements of s. Ind 51.06 (7) (a) 3. b. may be designed and constructed with the allowable increase in floor area as specified in s. Ind 54.01 (2) (a) and with the allowable increase in exit distance as specified in s. Ind 54.02 (4) (b) without being protected by a complete automatic fire sprinkler system.

Note: See s. Ind 52.015 for additional requirements pertaining to automatic fire sprinkler systems.

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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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