

Subject: Smoke Detectors

There is some confusion among DNS inspectors as to where smoke detectors belong.

Most code enforcement inspectors are of the opinion the detectors should be outside the bedroom, within 6' of the door. Some are of the opinion that having the detector only on the inside of the bedroom does not meet code.

Your code seems to be worded in a way that supports installing detectors outside the door at 214-27: *"For floor levels containing a sleeping area, the required detector or alarm shall be installed within 6 feet of the sleeping area."*

However construction inspectors believe the smoke detectors are required to be inside the bedrooms and units installed outside the bedroom door do not meet the code.

The DNS Smoke Alarm brochure seems to say either is okay:

"Either in each sleeping area of each unit or elsewhere in the unit within 6 feet of each sleeping area. If the unit contains 2 or more separate sleeping areas, each sleeping area shall be provided with a smoke alarm."

It obviously doesn't matter to the property owner where the detectors are put as long as a second inspector doesn't come along afterwards demanding they be relocated.

So which does the code require, inside the bedroom or outside?

And if the code doesn't care, then which is most effective in saving lives?

I will have the Association publish the response so more owners are knowledgeable as to what you require.

Thanks

Tim Ballering

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DNS Response: 10/21/2011

Mr. Ballering,

A little more information is required in order to provide you with an accurate answer. We'll try to explain in terms hopefully specific enough to guide you to the correct information.

The placement of smoke alarms (detectors) is governed by several national, state and local codes overlapping in the State of Wisconsin. Further distinctions are made between occupancies in the residential areas. Your letter did not indicate the specific scenario that is causing the conflict that you say inspectors are asking you to change. This is a critical point as the answer will change

based on a number of factors. Further delineation occurs when inspecting old construction vs. new construction. This is why we have maintenance inspectors and new construction inspectors with specialized skills in each respective area. Your letter did not indicate the year built.

The four primary code groups with jurisdiction over smoke alarms are;

Wisconsin State Statues (101.145) covering all residential buildings

International Fire Code (IFC 907.2.10) covers commercial buildings. 3 or more unit apartment buildings are considered under the commercial code

State of Wisconsin Safety and Buildings (Comm14, 21.09, 21.097, 28,) cover one & two family homes

City of Milwaukee Code of Ordinances (214-27) which adopts many of the above codes plus its own provisions.

Additional codes to consider are the **International Building Code** which impacts new commercial buildings and references the IFC. There is also the **International Existing Building Code** which impacts existing commercial buildings and adopts the IFC. DNS's challenge is to develop a consistent policy that incorporates all aspects of the above codes in an infinite number of building designs and occupancy combinations

To get a specific answer, you need to ask three questions. They are; 1) What is the occupancy?

2) When was it built? 3) How is the sleeping room configured? Let's start with State law.

Wisconsin State Statues 101.145(4) defines the year built and location of detectors. Here's the code. REQUIREMENT. The owner of a residential building the initial construction of which is commenced before, on or after May 23, 1978, shall install and maintain a functional smoke detector in the basement and at the head of any stairway on each floor level of the building and shall install a functional smoke detector either in each sleeping area of each unit or elsewhere in the unit within 6 feet of each sleeping area and not in a kitchen.

Wisconsin State Statues 101.145 says (1) (b) defines sleeping area.

(b) "Sleeping area" means the area of the unit in which the bedrooms or sleeping rooms are located. Bedrooms or sleeping rooms separated by another use area such as a kitchen or living room are separate sleeping areas but bedrooms or sleeping rooms separated by a bathroom are not separate sleeping areas.

Of related interest are the maintenance requirements that define specific responsibilities. From **SS. 101.145 (2)**:

(b) The owner of a residential building shall maintain any such smoke detector that is located in a common area of that residential building.

(c) The occupant of a unit in a residential building shall maintain any smoke detector in that unit, except that if an occupant who is not an owner, or a state, county, city, village or town officer, agent or employee charged under statute or municipal ordinance with powers or duties involving inspection of real or personal property, gives written notice to the owner that a smoke detector in the unit is not functional the owner shall provide, within 5 days after receipt of that notice, any maintenance necessary to make that smoke detector functional.

So this statute says that residential units built before, on or after May 23, 1978 (i.e. all buildings), must have one in the basement, head of a stairway on each floor and within 6 feet of every sleeping area. Bedrooms or sleeping room separated by anything other than a bathroom will require another detector within 6 feet of that sleeping room or bedroom. This also makes the smoke alarm (detector) code retroactive and is what we'll call the "basic" level of compliance. This closely follows the **NFPA 1** fire code.

The State is in the process of reorganizing the department of Safety and Commerce into the new Department of Safety and Professional Services. This is another reason why this reply is delayed because some new codes are being added and revised as this was being written.

The buildings you may own come under two primary categories, residential and commercial. Most one & two families are considered regular residential. Three or more units are considered commercial apartments. Condos with three or more units are considered commercial residential. Units with commercial business downstairs and apartments above are considered commercial and are typically in an additional risk category, hence more rules will apply.

Comm 14 is the state code that regulates fire protection systems in commercial buildings. **Comm 14** authorizes communities to use either the **2009 IFC** or the **NFPA 1** code. The **NFPA 1.13.7.2.11** and **1.13.7.2.12** are nearly identical to the **2009 IFC** requirements. Milwaukee will be using the **2009 IFC** code. **Comm 14** further divides the smoke alarm regulations into **Comm 66** which applies to existing commercial buildings.

Let's start by looking at new construction requirements for one-and two family buildings which are split between **State Comm 21.09** and the **2009 IFC** for apartment buildings of three or more units, which is called **R2** occupancy. **R3** occupancy includes two unit buildings under one roof, but separated by a firewall. This is typically a townhouse or row house.

In the State Uniform Dwelling Construction code **Comm 21.09**, only applies to new construction of 1 & 2's after June 1, 1980. Your letter did not state what year the building in question was built, if alterations were done or the number of units. If so, that could trigger compliance with the newer 6/1/1980 code in place of the code that applied when the structure was originally built.

Comm 21.09 Smoke detectors. (1) A listed and labeled multiple-station smoke alarm with battery backup shall be installed in all of the following locations:

(a) An alarm shall be installed inside each sleeping room.

(b) On floor levels that contain one or more sleeping areas, an alarm shall be installed outside of the sleeping rooms, within 21 feet of the centerline of the door opening to any sleeping room and in an exit path from any sleeping room.

(c) On floor levels that do not contain a sleeping area, an alarm shall be installed in a common area on each floor level. Note: Section 50.035 (2), Stats., requires the installation of a complete low voltage, interconnected or radio-transmitting smoke detection system in all community-based residential facilities including those having 8 or fewer beds. Note: Section 101.645 (3), Stats., requires the owner of a dwelling to install a functional smoke detector in the basement of the dwelling and on each floor level except the attic or storage area of each dwelling unit. The occupant of such a dwelling unit shall maintain any smoke detector in that unit, except that if any occupant who is not the owner, or any state, county, city, village or town officer, agent or employee charged under statute or municipal ordinance with powers or duties involving inspection of real or personal property, gives written notice to the owner that the smoke detector is not functional the owner shall provide, within 5 days after receipt of that notice, any maintenance necessary to make that smoke detector functional. Note: Section 101.745 (4), Stats., requires the manufacturer of a manufactured building to install a functional smoke detector in the basement of the dwelling and on each floor level except the attic or storage area of each dwelling unit.

(2) (a) Except for dwellings with no electrical service, smoke detectors required by this section shall be continuously powered by the house electrical service, and shall be interconnected so that activation of one detector will cause activation of all detectors.

(b) Dwellings with no electrical service shall be provided with battery-powered smoke detectors in the locations under sub. (1). Interconnection and battery-backup are not required in these dwellings.

(3) For family living units with one or more communicating split levels or open adjacent levels with less than 5 feet of separation between levels, one smoke detector on the upper level shall suffice for an adjacent lower level, including basements. Where there is an intervening door between one level and the adjacent lower level, smoke detectors shall be installed on each level.

(4) Smoke alarms and detectors shall be maintained in accordance with the manufacturer's specifications.

(5) For envelope dwellings, at least 3 smoke alarms shall be placed in the air passageways. The alarms shall be placed as far apart as possible.

(6) In basements where two required exits are separated by a continuous wall, a smoke detector shall be placed on each side of the wall within 21 feet of each exit.

You can see from the State code for one & two families, it is more technical about the number, location and type of alarm required. It requires them INSIDE the sleep room, IN the exit path from the sleep room (21 ft.), and ON a level that splits more than 5-feet or has an intervening door between levels for homes built after 6/1/1980.

Now we will cover the commercial apartments which are 3 or more units. The first State code requiring smoke detectors in commercial buildings was passed in December of 1978 and became effective 1/1/1979. The Industry Labor and Human Relations code **IND 57.27** defined the Smoke detector, its function, number and location.

IND 57.27 Smoke detection (1) Definitions. (a) Smoke Detector. Smoke detector means a device which detects particles or products of combustion other than heat. (b) Sleeping Area. Sleeping area means the area(s) in which bedrooms or sleeping rooms are located. Bedrooms or sleeping rooms separated by other use areas such as kitchens or living rooms, but not bathrooms, are considered as separate sleeping areas for the purposes of this section. Each individual room or suite of rooms in hotels or motels is considered a separate sleeping area. (2) Number of detectors required and location. All buildings within the scope of this chapter, except hospitals and nursing homes, shall be provided with approved smoke detectors. At least one detector shall be provided at the head of every open stair and at the door leading to every enclosed stair on each floor level, including the basement, and in each sleeping area.

In December, 1981 the State introduced the first requirements for hardwire and interconnectivity of alarms effective 1/1/1983.

IND 57.16 Smoke detection. (1) (c) All smoke detectors in stairways, corridors and other public places in the building shall be directly and permanently wired to a proper unswitched circuit. 1. Such detectors shall be connected to the emergency electrical power system, when the system is required by ch. ILHR 16, Wis. Adm. Code. 2. Such detectors shall be electrically interconnected to the required fire alarm system.

(2) Retroactivity. The provisions of sub. (1) (a) and (b) shall apply to all buildings constructed on or after the effective date of this section and to those buildings previously constructed.

So this measure brings in the hardwired and interconnection requirements to buildings built beginning 1/1/1983. Furthermore it makes retroactive the installation and placement of smoke alarms in ALL commercial buildings since originally adopted in 1978.

In 1998 the State introduced a retroactive code **ILHR 57.165** limiting the number of detectors on a station. It also required placing the detector within 6 feet of the door to the sleeping area.

(2) Retroactivity (a) The provisions of sub. (1)(a) and (b) shall apply to all buildings constructed on or after the effective date of this section and to those previously constructed. (b) 1. If the owner of a building constructed prior to the effective date of this paragraph elects to interconnect the smoke detectors with each other, no more than 6 single station, self-contained, non-latching smoke detectors shall so be interconnected.

March of 1999 (State Register 527) required battery back-up. Prior to the adoption of the International Building code by the State in 2001 the State changed its code **Comm 57.16** to add the provision to have alarms placed **inside** the bedroom and within 6 ft. of the door leading to the sleep area or bedroom.

The State of Wisconsin adopted the International Building Code on September 1, 2001 and began enforcement of it on July 1, 2002. It regulates building codes for new commercial buildings. It also contained codes for fire alarms and existing buildings.

The 2009 IFC (R-2 apartment) and (R-3 townhouse) occupancies covered by the IFC, applies to all new commercial buildings. The retroactive portions areas are listed in **Chapter 46** of the 2009 IFC 4601.1.

Here is the 2009 IFC code as it applies to the R-2 & R-3 occupancies.

IFC 907.2.11.3 Groups R-2, R-3, R-4 and I-1. Single or multiple-station smoke alarms shall be install and maintained in Groups R-2, R-3, R-4 and I-1 regardless of occupant load at all of the following locations:

1. On the ceiling or wall outside of each separate sleeping area in the immediate vicinity of bedrooms.
2. In each room used for sleeping purposes.
3. In each story within a dwelling unit, including basements but not including crawl spaces and uninhabitable attics. In dwellings of dwelling units with split levels and without an intervening door between the adjacent levels, a smoke alarm installed on the upper level shall suffice for the adjacent lower level provided the lower level is less than one full story below the upper level.

907.2.11.3 of the IFC requires that they be interconnected when more than one alarm is required in an individual dwelling unit or sleeping area.

So the IFC requirements for a new unit in a R-2 or R-3 will require one on the wall outside each sleeping area, in each sleeping room, and on each level as well as require if one goes off, they all go off. This is the same requirement that was adopted under the state code effective 6/1/1980 under **Comm 21.09** for new one & two family homes.

Chapter 46 of the IFC (new in 2009) outlines the conditions under which if alterations occur, the units must be upgraded to the 907.2.11.3 standard. Existing commercial buildings (3+ units) still only need one within 6 feet of each sleeping area, one on each floor and one in the basement all of which can be battery operated [per **SS. 01.145(4)**]. 11/7/2011

This is where State **Comm 66** (commercial buildings) comes in and it just took effect 09/01/2011. This is the Wisconsin existing building code and it says.

Comm 66.0503 Smoke alarms. These are department rules in addition to the requirements in IEBC section 503:

(1) No smoke alarm, including an alarm that exists on September 1, 2011, may remain in service for more than that specified by the manufacturer.

(2) The replacement of a smoke alarm that uses a battery as its primary power source shall be a new smoke alarm that complies with UL 217 and either of the following: (a) The alarm is hardwired in accordance with IBC section 907.2.11.4 and has backup power in accordance with that section. (b) *The alarm uses, as its primary power source, a non-replaceable, non-removable battery that is capable of powering the alarm for at least 10 years.*

History: CR 10-103: cr. Register August 2011 No. 668, eff. 9-1-11.

Comm 66 says, as the old battery operated alarms are replaced, you need not hardwire, but can use the 10-year non-replaceable battery type.

Moving on to the City code that deals with smoke alarms it is covered in the Milwaukee Code of City Ordinances **214.27**.

214-27. Smoke Detectors and Smoke Alarms for Residential Dwellings Built Prior to January 1, 1983. 1. DEFINITION. In this section, "residential building" means any one-family dwelling or 2-family dwelling, or any public building which is used for sleeping or lodging purposes and includes any apartment house, rooming house, hotel, children's home, community-based residential facility or dormitory but does not include a hospital or nursing home. 2. NUMBER AND LOCATION. Every dwelling unit in a residential building constructed prior to January 1, 1983 shall be provided with approved listed and labeled smoke detectors or alarms sensing visible or invisible particles of combustion, installed in a manner and location consistent with their listing. A minimum of one smoke detector or alarm shall be installed in the basement and on each floor level except in an unfinished attic or storage area, and not in a kitchen. For floor levels containing a sleeping area, the required detector or alarm shall be installed within **6 feet of the sleeping area**. If a floor level contains 2 or more separate sleeping areas, each sleeping area shall be provided with a smoke detector or alarm. Every residential building other than a one- or 2-family dwelling shall have a functional smoke detector or alarm at the head of every stairway on each floor level in the building.

One & two family buildings built after January 1, 1983 would have been covered under the June 1, 1980 State rules of the Uniform Dwelling Code **Comm 21.09** which was covered earlier. This Milwaukee code now brings residential commercial buildings into an effective date of January 1, 1983.

In summary, no matter when your property was built, you are required to have one smoke alarm within 6 feet of any sleeping area, one on each floor level and one in the basement per state statute. These can be battery operated. In commercial apartments (3 or more) as those detectors end their life span, they must be replaced with a 10-year non-removable, non-replaceable battery type. If the walls are opened in an alteration, the newer alarm standard would be applied to those areas opened.

Commercial apartments built before 12/31/1982 will need to meet the retroactive State code of **SS. 101.145(4)** listed above. Commercial apartments built 1/1/1983 and after require hardwire and interconnectivity alarms in addition to **SS 101.145(4)**. Commercial residential buildings built after March 1999 require an alarm inside the bedroom and outside within 6 feet of the sleeping area.

One & two family buildings built after June 1, 1980 and commercial buildings properly built after IBC and IFC State adoption on July 1, 2002 have to have alarms inside each bedroom, one within 6 feet of each sleeping area, in the common hallway as well as being hardwired and interconnected. This is in sync with current 2009 IFC requirements.

Another factor impacting smoke alarms is their location and type. Smoke alarms placed within 20 ft. of a major cooking appliance require that it be of the "hush button" type which will cancel the audible alarm for a period of time and reset. This is per the Milwaukee Code of Ordinances **214-23**. The distance is measured linearly from the stove to the alarm and ends at a door or a wall.

So the Milwaukee ordinance follows along the lines of the "basic" State Statute law which requires them to be placed in the basement, one each floor level, within 6 ft. of any sleeping area and at the head of every stairway at each floor level. 3 or more unit buildings have additional standards as they are commercial buildings. Year built will determine what type, number and location of alarms.

The Department of Neighborhood Services has distilled these various codes into a brochure about Smoke Alarms (Detectors). It is consistent with the "basic" level of smoke alarm compliance, and with regards to new construction, which will require a detector inside and outside of each sleeping area.

As mentioned earlier, you need to ask three questions. 1) What is the occupancy? 2) When was it built? 3) How is the sleeping room configured? You should get a consistent answer applying these codes.

Here is a link to that brochure for your reference. You should also read the testing requirements for the alarms.

http://city.milwaukee.gov/ImageLibrary/User/tweile/pdf/broc/DNS-147_V11_SmokeAlrmBroWB.pdf

You may also be interested in the Carbon Monoxide Alarm brochure:

http://city.milwaukee.gov/ImageLibrary/User/tweile/pdf/broc/DNS139_CarbonMonoBroD5.pdf

Any questions regarding these matters, feel free to contact me.

Respectfully,

Todd Weiler

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