

# CITY OF DE PERE

## Building Inspection



335 South Broadway, De Pere, WI 54115 | 920-339-4053 | [www.deperewi.gov](http://www.deperewi.gov)

### Residential Basement Remodeling

Building plans and permit applications shall be submitted for any alteration project that finishes an area in the basement or creates rooms. The plans will be reviewed to ensure they conform to both the State of Wisconsin and City of De Pere Building Codes.

#### Plan Review

Items that will be reviewed are:

If the alteration involves a bedroom, the plan must show two legal exits. A window exit must be sized in proportion to the size of the room and provide adequate natural light and ventilation. See the State of [Wisconsin building code](#) SPS 321.03(5)(b) & 321.03(6) for more specifics.

If the alteration involves a bathroom, an exhaust fan vented to the outside is required.

#### Plan Submittal

A layout of the area involved drawn to scale or dimensioned.

Indicate location, size and use of room(s).

Indicate size and location of all doors, windows and ceiling heights.

Indicate location of all major appliances (furnace, water heater, electrical panel and fireplace).

Is the furnace direct vent?

Is the water heater direct vent?

Indicate location of all smoke detectors.

#### Estimated Project Cost

The building permit fee is based on the estimated construction cost (excluding HVAC, Plumbing and Electrical).

#### Associated Permits

[Separate permits](#) are required for electrical, heating and plumbing work.

**Electrical Permit:** Single family owner occupied homes may apply for a permit and complete the electrical work within their home. The Homeowner shall sign a "Homeowner Acknowledgment Form". All others are required to have a licensed electrician apply and complete any work within the residence. A licensed electrical contractor is required when working on the main electrical service.

**Clearances for Electrical Services:** The electrical panel may not be located in either a closet or a bathroom per NEC 240.24(D) & (E). Sufficient access and working space shall be provided. A minimum of 36" perpendicular to the front edge of the electrical panel and a minimum width of 30" or the width of the equipment, whichever is greater, NEC 110.26 and NEC 110.26(A)(1).

**Plumbing Permit:** Single family owner occupied homes may apply for a permit and complete the plumbing work within their home. The Homeowner shall sign a "Homeowner Acknowledgment Form". All others are required to have a licensed plumber apply and complete any work within the residence.

**HVAC Permit:** If providing heat supplies and/or cold air returns alter a forced air HVAC system, a permit shall be obtained. Single family owner occupied homes may apply for a permit and complete the HVAC work within their home. The Homeowner shall sign a "Homeowner Acknowledgment Form".

#### Inspections

All building control valves, (i.e. plumbing shut-offs, hammer arrestors, gas valves, cleanouts), heat supply volume duct dampers, and electrical junction boxes shall be accessible when covering the ceiling or walls.

Before any phase of construction is covered or concealed by a subsequent phase of construction, please call 920-339-4053 a minimum of 24 hours in advance to schedule the following inspections:

**Rough-In:** Framing is complete, mechanical work is roughed in and prior to insulation being installed.

**Insulation:** Insulation is installed, prior to walls and ceilings being covered with drywall or other material.

**Final:** Shall be scheduled prior to occupancy.

#### Code Reference

For [municipal code](#) information use the highlighted link or visit our website at [www.deperewi.gov](http://www.deperewi.gov). For UDC code information, please visit the Wisconsin Department of Safety and Professional Services [website](#).

# RESIDENTIAL BASEMENT ALTERATION CODE APPLICATIONS

## 2016 Uniform Dwelling Code Applications to Habitable Space in Basements:

### I. SPS Chapter 321 Construction Standards

#### B-1 SPS 321.03 (5) EXITS FROM BASEMENTS AND GROUND FLOORS.

(a) *General.* All basements and ground floors except for bedrooms shall be provided with at least one exit of the following types:

1. A door to the exterior of the dwelling.
2. A stairway or ramp that leads to the floor above.

(b) *Basements and ground floors used for sleeping.*

1. Basements and ground floors used for sleeping shall be provided with at least two exits.
2. The exits shall be located as far apart as practical.
3. The exits may not be accessed from the same ramp or stairway.
4. In addition to the exit type required under par. (a), the second exit from a basement or ground floor used for sleeping shall be one of the following types:
  - a. A door to the exterior of the dwelling.
  - b. A stairway or ramp that leads to the floor above.
  - c. A stairway that leads to a garage provided that the garage has an exit door other than an overhead door.
  - d. An egress window that complies with section B-2, located in each bedroom.

B-2 SPS 321.03 (6) WINDOWS USED FOR EXITING. Windows which are installed for exit purposes shall comply with the requirements of this subsection.

(a) The window shall be openable from the inside without the use of tools or the removal of a sash. If equipped with a storm or screen, it shall be openable from the inside.

- (b)
1. The nominal size of the net clear window opening shall be at least 20 inches by 24 inches irrespective of height or width. Nominal dimensions shall be determined by rounding up fractions of inches if they are ½-inch or greater or rounding down fractions of inches if they are less than ½-inch.
  2. No portion of the window, including stops, stools, meeting rails and operator arms, shall infringe on the required opening.

(c) The area and dimension requirements may be infringed on by a storm window.

(d) For any window used for exiting, the lowest point of clear opening shall be no more than 60 inches above the floor. If the lowest point of clear opening is more than 46

inches above the floor, a permanent platform or fixture shall be installed such that a flat surface at least 20 inches wide and 9 inches deep is located no more than 46 inches directly below the clear opening. The topmost surface of the platform or fixture shall be no more than 24 inches above the floor. The topmost surface of the platform or fixture shall support a live load of at least 200 pounds. A stair used for the sole purpose of reaching the top of the platform or fixture is exempt from the requirements of s. SPS 321.04.

- (e)
  - 1. An egress window with any point of clear opening below adjacent grade shall be provided with an areaway in accordance with this section.
  - 2. The width of the areaway shall be at least equal to the width of the window.
  - 3. The areaway shall be a minimum of 36 inches measured perpendicular from the outer surface of the below grade wall.
  - 4. If the bottom of the areaway is more than 46 inches below adjacent grade or the top of the areaway enclosure, the areaway shall be provided with a ladder or stair to aid egress. Stairs used to comply with this section are exempt from the requirements of s. SPS 321.04.
  - 5.
    - a. Ladders or other stairs may infringe on the required area of the areaway by a maximum of 6 inches.
    - b. Ladder rungs shall have a minimum inside width of at least 12 inches and shall project at least 3 inches from the wall behind the ladder.
    - c. Ladder rungs shall be able to support a concentrated load of 200 pounds.
    - d. Ladder rungs shall have a maximum rise of 12 inches between rungs and shall extend to within 12 inches of exterior grade.
  - 6. The areaway shall be constructed such that water entering the areaway does not enter the dwelling.
- (f) An egress window under a deck or porch shall discharge through a clear path of at least 36 inches in height and 36 inches in width, and no more than 15 feet in length, to a yard or open space.

**B-3 SPS 321.035 (1) INTERIOR CIRCULATION – DOORS AND OPENINGS.** All doors and openings to the following areas shall be at least 80 inches high and provide either a net clear opening width of 30 inches or be a 32-inch door:

- (a) Except as provided under pars. (b) and (c), all entrances into common use areas.
- (b) At least 50% of the bedrooms in the finished area. If there is only one bedroom the door shall be 32 inches wide.
- (c) At least one full bathroom, including doors or openings to a sink, toilet and tub or shower. If this bathroom is accessible only through a bedroom, the bedroom door shall meet the minimum width requirements of this section.

**B-4 SPS 321.035 (2) INTERIOR CIRCULATION – HALLWAYS.**

(a) Except as allowed under par. (b), the clear width of hallways shall be at least 36 inches.

(b) The following are allowed to infringe on the required clear width of a hallway:

1. Door hardware and finish trim.
2. Handrails may infringe into the minimum width of a hallway up to 4½ inches on each side.
3. Heating registers may infringe into the minimum width of a hallway up to 4½ inches and no part of the register may be more than 38 inches above the floor.
4. Ducts, pipes, light fixtures, structural features, and corner treatments that are within 84 inches of the floor may infringe into the minimum width of a hallway by a maximum of 4½ inches on each side.
5. Unlimited infringements are allowed in a hallway more than 84 inches above the floor.

**B-5 SPS 321.05 (1) NATURAL LIGHT AND VENTILATION.** Each habitable room shall be provided with natural light by means of glazed openings. The area of the glazed openings shall be at least 8% of the net floor area, except under the following circumstances:

- (a) *Exception.* Habitable rooms, other than bedrooms, located in basements or ground floors do not require natural light. Natural light may be obtained from adjoining areas through glazed openings, louvers or other approved methods. Door openings into adjoining areas may not be used to satisfy this requirement. “Net floor area” does not include any area with a ceiling height of less than 5 feet, closets or uninhabitable space.
- (b) *Natural ventilation.* Natural ventilation shall be provided to each habitable room by means of openable doors, skylights or windows. The net area of the openable doors, skylights or windows shall be at least 3.5% of the net floor area of the room. Balanced mechanical ventilation may be provided in lieu of openable exterior doors, skylights or windows provided the system is capable of providing at least one air change per hour of fresh outside air while the room is occupied. Infiltration may not be considered as makeup air for balancing purposes.
- (c) *Exhaust ventilation.* All exhaust ventilation shall terminate outside the building.

**B-6 SPS 321.06 CEILING HEIGHT.** All habitable rooms in the basement including kitchenettes, hallways and bathrooms shall have a ceiling height of at least 7 feet, except as follows:

- (a) Rooms may have ceiling heights of less than 7 feet provided at least 50% of the room’s floor area has a ceiling height of at least 7 feet.
- (b) Beams and girders or other projections may project to no more than 8 inches below the required ceiling height.

B-7 **SPS 321.04 (1-2) STAIRWAYS.**

a) *General.* Except as provided under par. (b), the following stairways shall conform to the requirements of this section:

1. Every interior and exterior stairway attached to, or supported by, any part of the structure covered under this code.
2. Tub access stairs, unless they are an integral part of an approved plumbing product.

(b) *Exceptions.* The following stairways are not required to comply with the requirements of this section:

1. Stairways leading to non-habitable attics or crawl spaces.
2. Non-required stairways connecting the basement directly to the exterior of the structure without communicating with any other part of the structure.

(c) *Width.* Stairways shall measure at least 36 inches in width. Handrails and associated trim may project a maximum of 4 ½ inches into the required width at each side of the stairway. The minimum clear width at and below the handrail, including at treads and landings, may not be less than 31 ½ inches where a handrail is installed on one side, and 27 inches where handrails are provided on both sides.

(d) *Riser height.* Risers may not exceed 8 inches in height measured vertically from tread to tread. At the top and bottom of a flight, measurement shall be taken from the top of the nosing to the finished floor surface unless the finished surface is carpeting, in which case measurement shall be made to the hard surface below the carpeting.

(e) *Tread depth.*

1. *Rectangular treads.* Rectangular treads shall have minimum tread depth of 9 inches measured horizontally from nosing to nosing.
2. *Spiral staircase treads.* Spiral staircase treads shall have a minimum tread depth of 7 inches from nosing to nosing measured at a point 12 inches from the outer edge of the center column.
3. *Winder treads in series.* Two or more winder treads may be placed immediately adjacent to each other anywhere in a stairway provided both of the following conditions are met:
  - a. The winder treads shall have a minimum tread depth of 7 inches measured at a point 12 inches from the narrow end of the tread.
  - b. The depth of the immediately adjoining winder treads shall be equal at a point 12 inches from the narrow end of the tread or the inside face of spindles or balusters.
  - c. Winder treads may not be used on a straight stairway.
4. *Individual winder treads.*
  - a. An individual winder tread may be placed between rectangular treads or at the end of a flight of rectangular treads provided the tread depth is at least 9 inches, when measured at a distance of 12 inches from the narrow end of the tread or from the inside face of the wall.
  - b. There may be more than one individual winder tread in a stairway.

c. Winder treads may not be used on a straight stairway.

(f) *Headroom.* Stairways shall be provided with a minimum headroom clearance of 76 inches measured vertically from a line parallel to the nosing of the treads to the ceiling, soffit or any overhead obstruction directly above that line. The headroom clearance shall be maintained over an intermediate landing. The headroom clearance shall be maintained over a landing that is at the top or bottom of a stairway for a minimum distance of 36 inches in the direction of travel of the stairway.

(g) *Uniformity.* Within a stairway flight, the greatest tread depth may not exceed the smallest tread depth by more than 3/8 inch and the greatest riser height may not exceed the smallest riser height by more than 3/8 inch. The allowed variation in uniformity may not be used to exceed the maximum riser height or to decrease the minimum tread depth.

(h) *Open risers.* Stairways with open risers shall be constructed to prevent the through passage of a sphere with a diameter of 4 inches or larger between any 2 adjacent treads.

(i) *Walking surface.* The walking surface of stair treads and landings shall be a planar surface that is free of lips or protrusions that could present a tripping hazard.

**B-8 SPS 321.04 (3) HANDRAILS AND GUARDS.**

(a) A flight of stairs with more than 3 risers shall be provided with at least one handrail for the full length of the flight.

(b) Guards shall be provided on all open sides of stairs consisting of more than 3 risers and on all open sides of areas that are elevated more than 24 inches above the floor or exterior grade.

**Note:** A handrail provided at 30 to 38 inches above the tread nosing meets the height requirement for a guard on a stairway.

(c) Except as provided in sub. (c)(2), guards shall be constructed to prevent the through-passage of a sphere with a diameter of 4 3/8 inches, when applying a force of 4 pounds.

1. The triangular area formed by the tread, riser, and bottom rail shall have an opening size that prevents the through-passage of a sphere with a diameter of 6 inches, when applying a force of 4 pounds.
2. Rope, cable, or similar materials used in guard infill shall be strung with maximum openings of 3 1/2 inches with vertical supports a maximum of 4 feet apart.

**Note:** In some cases, the vertical supports could be simple cable stays that offer vertical support to the rope or cable span. Structural posts must be supplied to provide the rail with the minimum 200 pound load resistance, as well as to resist the tensile loads exerted by the tightened rope or cable.

(d) 1. Handrails and guards shall be designed and constructed to withstand a 200 pound load applied in any direction.

2. Handrail or guard infill components, balusters, and panel fillers shall withstand a horizontally applied perpendicular load of 50 pounds on any one-foot-square area.

**B-9 SPS 321.085 FIREBLOCKING AND DRAFTSTOPPING.**

(a) *Fireblocking locations.* Fireblocking shall be provided in all of the following locations:

1. In concealed spaces of walls and partitions, including furred spaces, at the ceiling and floor levels.
2. At all interconnections between concealed vertical and horizontal spaces.
3. In concealed spaces between stair stringers at the top and bottom of the run and at any intervening floor level.
4. At all openings around wires, cables, vents, pipes, ducts, chimneys, and fireplaces at ceiling and floor level.

(b) *Fireblocking materials.* Fireblocking shall consist of one of the following:

1. 2-inch nominal lumber.
2. Two layers of 1-inch nominal lumber.
3. One thickness of  $\frac{3}{4}$ -inch nominal plywood or wood structural panel with any joints backed with the same material.
4. One thickness of  $\frac{1}{2}$ -inch gypsum wallboard, face nailed or face screwed to solid wood, with any joints backed with the same material.
5. Fiberglass or mineral wool batt insulation may be used if both of the following conditions are met:
  - a. The least dimension of the opening may not exceed 4 inches.
  - b. The batt shall be installed to fill the entire thickness of the opening or stud cavity.
6. For wires, cables, pipes, and vents only: non-shrinking caulk, putty mortar, or similar material may be used provided that no dimension of the opening exceeds  $\frac{1}{2}$  inch around the penetrating object.
7. For chimneys, fireplaces, and metal vents, fireblocking shall be metal, cement board, or other noncombustible material.

**B-10 SPS 321.09 SMOKE DETECTORS.**

(a) A listed and labeled multiple-station smoke alarm with battery backup shall be installed in all of the following locations:

1. An alarm shall be installed inside each sleeping room (see Figure 7.15).
2. 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.
3. On floor levels that do not contain a sleeping area, an alarm shall be installed in a common area on each floor level.

(b) 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.

**Note:** Wireless interconnectivity is permitted under this paragraph.

(c) 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.

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

(e) 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.

**B-11 SPS 321.097 (1-2) CARBON MONOXIDE ALARMS.**

(a) *Definitions.* "Fuel-burning appliance" has the meaning given in s 101.647 (1) (b), Stats. Fuel-burning appliances include stoves, ovens, grills, clothes dryers, furnaces, boilers, water heaters, fireplaces, and heaters.

(b) *New Construction.*

1. *General.* Listed and labeled carbon monoxide alarms shall be installed and maintained in accordance with s. 101.647 (2) to (6), Stats., in one and two-family dwellings, for which building permit applications were made or construction commenced on or after February 1, 2011. Note: Section 101.647 (2) to (6), Stats., reads:

a. *Installation and safety certification.* The owner of a dwelling shall install any carbon monoxide detector required under this section according to the directions and specifications of the manufacturer of the carbon monoxide detector. A carbon monoxide detector required under this section shall bear an Underwriters Laboratories, Inc., listing mark and may be a device that is combined with a smoke detector.

b. *Requirements.*

1. The owner of a dwelling shall install a functional carbon monoxide detector in the basement of the dwelling and on each floor level except the attic, garage, or storage area of each dwelling unit. A carbon monoxide detector wired to the dwelling's electrical wiring system shall have a backup battery power supply.

2. The occupant of the dwelling unit shall maintain any carbon monoxide detector in that unit. This paragraph does not apply to the owner of a dwelling that has no attached garage, no fireplace, and no fuel-burning appliance.



c. *Tampering prohibited.* No person may tamper with, remove, destroy, disconnect, or remove batteries from an installed carbon monoxide detector, except in the course of inspection, maintenance, or replacement of the detector.

2. *Location.*

a. On floor levels that contain one or more sleeping areas, a carbon monoxide alarm shall be installed outside of the sleeping area, within 21 feet of the centerline of the door opening to any sleeping area and in an exit path from any sleeping area.

b. On floor levels that do not contain a sleeping area, a carbon monoxide alarm shall be installed in a common area on each floor level.

3. *Electrical service and interconnection.*

a. Carbon monoxide alarms shall be continuously powered by the house electrical service, shall have a backup power supply and shall be interconnected so that activation of one alarm will cause activation of all alarms.

b. Dwellings with no electrical service shall be provided with battery-powered carbon monoxide alarms in the locations listed above. Interconnection is not required in these dwellings.

B-12 **SPS 321.11** FOAM PLASTIC.

(a) *General.* Foam plastic insulation shall have a flame-spread rating of 75 or less and a smoke-developed rating of 450 or less when tested in accordance with ASTM E-84.

(b) *Thermal barrier.* Except as provided in par. (c), foam plastic insulation shall be separated from the interior of the dwelling by one of the following thermal barriers:

1. ½-inch gypsum wallboard.
2. ½-inch nominal wood structural panel.
3. ¾-inch sawn lumber with tongue-and-groove or lap joints.
4. 1-inch of masonry or concrete.
5. A product or material shown by an independent laboratory to limit the temperature rise on the unexposed surface to 250°F for 15 minutes when tested in accordance with ASTM E-119.
6. For doors only, sheet metal with a minimum thickness of 26 standard steel gauge or aluminum with a minimum thickness of 0.032 inch.

**Note:** Number 26 standard steel gauge is approximately equal to 0.018-inch.

(c) *Exemptions from thermal barrier requirement.* The following applications of foam plastic do not require a thermal barrier:

1. On overhead garage doors.
2. In the box sill of the basement or ground floor, above the bottom of the floor joists.

(d) Insulation that does not meet the requirements of this section may be approved by the department in accordance with s. SPS 320.18. Approval will be based on tests that evaluate materials or products representative of actual end-use applications.

**B-13 MUN. Zoning 16-4 (a) (g) ROOMS IN BASEMENTS LOCATED IN THE FLOODPLAIN.** The elevation of the lowest point of the foundation shall be at or above the flood protection elevation (which is a point two feet above the regional or base flood elevation). No windows or openings in the basement wall are allowed below the base flood elevation. No rooms used for sleeping purposes in basements located in the floodplain are allowed.

## **II. SPS Chapter 322 Energy Conservation**

**H-1 SPS 322.32 (6) BASEMENT WALLS.**

(a) Walls associated with conditioned basements shall be insulated from the top of the basement wall down to the basement floor.

(b) Walls associated with unconditioned basements shall meet the requirement in par.

(a) unless the floor overhead is insulated in accordance with all applicable insulation and fenestration requirements.

(c) Where the total basement wall is less than 50% below grade, the entire wall area, including the below grade portion is included as part of the area of exterior walls.

**H-2 SPS 322.31 INSULATION CRITERIA.** Basement wall insulation on the exterior of the foundation will not require any additional insulation to the interior foundation or furred walls. The basement would be considered conditioned space per the Energy Analysis calculations that were approved during plan review of the dwelling. If supplemental insulation is used on the interior basement foundation wall or an R-13 cavity fill friction fit (no paper faced insulation) insulation, a sheet polyethylene vapor retarder material is prohibited.

**H-3 322.38 (4) VAPOR RETARDERS BASEMENT AND BELOW GRADE WALLS.** A non-rigid sheet vapor retarder with a perm rating of 0.1 or less is prohibited in all the following:

(a) On a concrete or masonry wall which is below grade to any extent.

(b) On an insulated frame wall constructed in front of a concrete or masonry wall which is below grade to any extent.

**Note:** Rigid foam is allowed behind the wall tightly affixed to the foundation wall or in the stud cavity and is not considered a vapor retarder of 0.1 perm or less.

**H-4 SPS 322.47 (1) EQUIPMENT REQUIREMENTS.** Mechanical ventilation outdoor intakes and exhausts shall have automatic or gravity dampers that close when the ventilation system is not operating.

H-5 **SPS 322.49 LIGHTING EQUIPMENT.** A minimum of 50% of the lamps in permanently installed lighting fixtures shall be high-efficacy lamps (i.e., compact florescent lamps, T-8 or smaller diameter florescent lamps).

H-6 **SPS 322.39 (6) CLOTHES DRYERS.** Clothes dryers shall be vented/exhausted to the outside of the dwelling.

H-7 **SPS 322.10 (11) INSULATION IN CONTACT WITH CAN UNIT LIGHTING.** When insulation used in the ceiling cavity is in contact with any light fixture, the fixture shall be listed and labeled with an "IC-Rating" as being suitable for installation in a cavity where the fixture may be in contact with thermal insulation or combustible materials (see Figure 10.10).

### III. **SPS Chapter 323 Heating and Ventilation**

M-1 **SPS 323.02 (1-3) DESIGN.**

(a) *Heating & cooling system design.* The heating and cooling systems shall be designed to maintain the indoor design temperature at outdoor design conditions.

(b) *Distribution systems.* Distribution systems shall be sized and located to satisfy the heating and cooling loads of each conditioned space.

(c) *Ventilation.*

1. All exhaust vents shall terminate outside the structure. Automatic or gravity dampers that close when the system is not operating shall be provided for outdoor air intake and exhaust.
2. Mechanical ventilation systems shall be balanced.
3. Habitable rooms without openable windows shall be provided with a balanced mechanical ventilation system producing one air change per hour of fresh outside air while the room is occupied.
4. Any room with a toilet, tub, or shower shall be provided with exhaust ventilation capable of exhausting 50 cubic feet per minute on an intermittent basis or 20 cubic feet per minute on a continuous basis. Exhaust shall be vented to the exterior of the dwelling.

M-2 **SPS 323.08 (1-2) DUCTWORK.**

(a) *Duct use.* Ducts designed for the transmission of air shall be used for no other purpose.

(b) *Interior ducts.* All interior ducts shall be constructed in accordance with the following:

1. Supply and return air ducts shall comply with this paragraph except that ducts attached to appliances may be constructed of materials specified in the appliance listing.

2. Ducts connected to furnaces shall be constructed of sheet metal for at least 6 feet from the furnace. Spaces formed by unlined wood joists, studs or wood I-joists with solid webs may be used as return air ducts. Spaces used as return air ducts shall be cut off from all remaining unused portions of the space by tight-fitting stops of sheet metal or of wood joist material. Bridging shall be removed from the joist space.

M-3 **SPS 323.09 DAMPERS, REGISTERS AND GRILLS.**

(a) *Volume and backdraft dampers.*

1. Volume duct dampers shall be provided to permit balancing of the system.
2. Volume dampers shall be provided with access.

**Note:** Acceptable means of access include a manufactured access panel, an air grille used as a cover, a plastic ceiling cap or a damper accessible through an air diffuser or grille.

(b) *Air registers and grilles.*

1. *Supply air registers.* All supply air outlets shall be provided with registers or devices which will provide a uniform distribution of air.
2. *Return air grilles.* Return air grilles shall not be located in bathrooms, kitchens, utility spaces or a confined space in which a draft diverter or draft regulator is located. All other habitable spaces shall have permanent openings to a return air grille equal in area to the supply outlet serving those areas. At least one return air opening shall be provided for each floor.

M-4 **IMC 306.2 & SPS 323.17 (2) CLEARANCES ACCESS AND SERVICE SPACE.** All clearances shall follow manufacturer's requirements per its listing. Rooms containing appliances shall be provided with a door and an unobstructed passageway measuring not less than 24 inches wide and large enough to allow removal of the largest appliance in the space provided, and a level service space of not less than 30 inches deep and the height of the appliance.

M-5 **IMC 303.3 & SPS 323.04 (6) PROHIBITED LOCATIONS.** Fuel-fired appliances shall not be located in, or obtain combustion air from, any of the following rooms or spaces: sleeping rooms, bathrooms, toilet rooms, and storage closets, unless listed for that use and sufficient combustion air is provided from outdoors (if it is not a sealed combustion unit).

#### IV. **2011 National Electrical Code**

E-1 **ELECTRICAL DISTRIBUTION PANEL.** The electrical distribution panel located in the altered area of the basement shall meet the following:

- (1) **NEC 110.3(b) & SPS 316.110(1), *Manufacturer's Requirements.*** Only those breakers that the manufacturer permits in the panel and are listed or classified for use in the panel.

- (2) **NEC 110.22 & 408.4 Labeling.** Branch circuits, feeders, and disconnects shall be legibly and durably marked to indicate their purpose.
- (3) **NEC 110.26 (A) Working Clear Space and Height.** A minimum of 3 feet deep by 30 inches wide in front of the panel and 6 ½ feet above floor or top of the service panel (see Figure 3.16).
- (4) **NEC 110.26 (F) Dedicated Space.** Space above and below the panel shall be free from obstructions such as pipes, ducts, and other equipment.
- (5) **NEC 110.26 (D) Illumination.** Work space shall be illuminated by a light at location or adjacent light source.
- (6) **NEC 230.70 (A) & 240.24 (D)** Service panel shall not be located in a bathroom or in the vicinity of easily ignitable materials such as a clothes closet.
- (7) **NEC 314.20** Panels shall be set back no more than ¼ inch in a non-combustible wall surface such as drywall, and panels shall be set flush or project past a combustible surface such as wood paneling, cabinets, etc.
- (8) **NEC 110.12 (A) & 314.17 (A)** Unused openings (where cables enter) shall be adequately sealed or closed.

E-2 **NEC 408.4 BRANCH CIRCUITS.** All branch circuits and breakers including spares in the panel must be marked and calculated for loads served. As a general rule provide at least one 15 amp circuit for each 600 square feet of finished floor area (10 outlets) and one 20 amp circuit for each 800 square feet of finished floor area ( 13 outlets) – (see Figure 8.10).

E-3 **NEC 210.12 (B) AFCI PROTECTED CIRCUITS.** All 120 volt, 15 and 20 amp branch circuits supplying lights, receptacles and other outlets in family rooms, dining rooms, living rooms, bedrooms, recreation rooms, closets, hallways and other similar rooms shall be protected by a listed arc fault circuit interrupter device. This includes all new smoke and carbon monoxide alarms.

E-4 **NEC 406.12 TAMPER-RESISTANT RECEPTACLES.** All 125 volt, 15 and 20 amp receptacles installed shall be listed tamper-resistant receptacles. No exceptions for receptacles on ceilings, above counters, or behind appliances.

E-5 **NEC 210.52 RECEPTACLE OUTLET SPACING.** At least one wall switch-controlled light fixture shall be installed in every habitable room and all habitable rooms require receptacle outlets be placed in wall spaces 2 feet or more in width and along the wall or railing, such that no space is further than 6 feet from a receptacle (see Figure 8.11).

E-6 **NEC 200.11 & 406.4 (B) RECEPTACLE WIRING.** Shall be wired with the proper polarity and the receptacle shall be rigidly supported at the finished surface.

E-7 **NEC 334.30 & NEC 300.4 (A) NON-METALLIC CABLE WIRING METHODS.** Notches and bored holes within 1 ¼ inches of edge framing requires protection (nail guards). Secure the cable within 12 inches of the box (8 inches if it is a non-metallic box) and secure every 4 ½ feet along a framing member (see Figure 8.33).

- E-8 **NEC 314.29 & 314.20** OUTLET BOXES. Boxes shall be accessible and set back no more than ¼ inch in a noncombustible wall, and set flush or project past a combustible wall surface. All gaps or spaces around the box using a flush cover or faceplate shall be sealed when gaps are greater than 1/8 inch (see Figure 9.9).
- E-9 **NEC 210.8 & 210.11** BATHROOMS. All bathrooms shall be supplied by at least one 20 amp branch circuit that serves only bathroom receptacles. The circuit may serve the lights, fan, and outlets within the bathroom if the circuit serves only one bathroom. There shall be a GFCI protected receptacle outlet adjacent to and within 3 feet of the edge of the sink. All receptacles and outlets in the bathroom shall be GFCI protected.
- E-10 **NEC 406.8 C & 404.4** DEVICE LOCATION. No receptacles within or directly over a bath or shower space. No switches within a wet location of a tub or shower space unless a part of a listed tub or shower assembly (see Figures 10.4 & 10.5).
- E-11 **NEC 210.4 (B) & (D)** MULTI-WIRE BRANCH CIRCUITS. All multi-wire branch circuits (i.e. 14-3, 12-3 cable) need to simultaneously disconnect at the breaker(s) in the panel.
- E-12 **NEC 210.8** GFCI PROTECTION IN UNFINISHED BASEMENT AREA. Receptacles shall be GFCI protected when installed in unfinished rooms of the basement, kitchen or bar countertops and within 6 feet of the outside edge of any sink not in a kitchen. All GFCI receptacles shall be installed in a readily accessible location.
- E-13 **NEC 422.32 & 422.31(B) NEC 210.63.** HVAC AND WATER HEATING DISCONNECTS. If a room or wall is located around equipment, a disconnect shall be provided if it is not within sight of the electrical panel board. There shall also be a GFCI protected receptacle on the same level and within 25 feet of the equipment.
- E-14 **NEC 410.16 (A) (C)** CLOTHES CLOSETS. Keep light fixtures away from storage areas and combustibles. Incandescent fixtures with open or partially enclosed lamps are prohibited (see Figures 10.6, 10.7, & 10.8).
- E-15 **SPS 322** Seal all cables passing through cold air returns of stud or joist cavities.
- E-16 **NEC 314.27 & SPS 316.314 (2)** Standard outlet boxes shall not be the sole support for ceiling fans. Fans weighing less than or equal to 35 pounds may be supported by the listed box. Listed box required where a ceiling fan could be hung. Applies to habitable rooms and kitchens.
- E-17 **NEC 210.52 & 424.19** ELECTRIC BASEBOARD HEAT. Circuit shall be sized for load of the heating unit. Manufacturer's requirements prohibit the location below a receptacle. Disconnecting means shall disconnect all ungrounded circuit conductors and be located within sight from all heating units connected to that disconnect or the branch circuit disconnect shall be capable of being locked in the off position (a thermostat with a marked off position disconnects all ungrounded conductors).

E-18 **NEC 725.154** CLASS 2 CABLES. All low voltage wiring must be UL listed and labeled for in-wall use (speaker wires, cable HDMI cables etc.).

E-19 **NEC 314.29** All junction boxes shall be accessible.

E-20 **NEC 300.4** CABLE PROTECTION. In unfinished portions of the basement: if the cable is run exposed at right angles to the joist, the cable may be secured to the bottom of the joists as long as the conductors are not smaller than two 6 AWG or three 8 AWG. Smaller cables (i.e., 14, 12, 10 AWG) shall be bored through holes or secured to running boards. Cables installed on the wall of unfinished areas shall be protected in conduit or tubing.

## V. **2011 Uniform Plumbing Code**

P-1 **SPS 382.35 (5) (8)** CLEANOUT ACCESS. Provide access to all plumbing cleanouts, water control valves, and hammer arrestors.

P-2 **SPS 384.30 (1) (3)** PROTECTION IN BORED HOLES THROUGH FRAMING MEMBERS. All water piping, drains, and vents that are bored through studs, plates, or joists that are not more than 1 ¼ inches from the member edge shall provide proper protection (nail guards).

P-3 **SPS 384.20 (5) (O)** CLEARANCES. A water closet may not be located closer than 15 inches from its center to any side wall, partition, vanity, or other obstruction, nor closer than 30 inches center to center between water closets. There shall be at least 24 inches in front of the water closet to any wall, fixture, or door (see diagram).

P-4 **SPS 384.20 (5) (L)** SHOWER SIZE. All shower compartments, regardless of shape, shall have a minimum finished interior of 900 square inches and shall be capable of encompassing a circle with a diameter of 30 inches (see diagram).

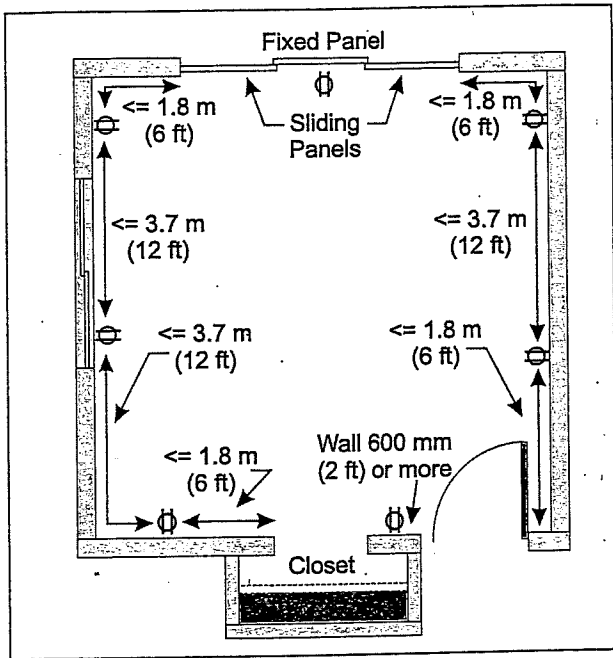


Figure 8.11. Spacing requirements for general use receptacle placement

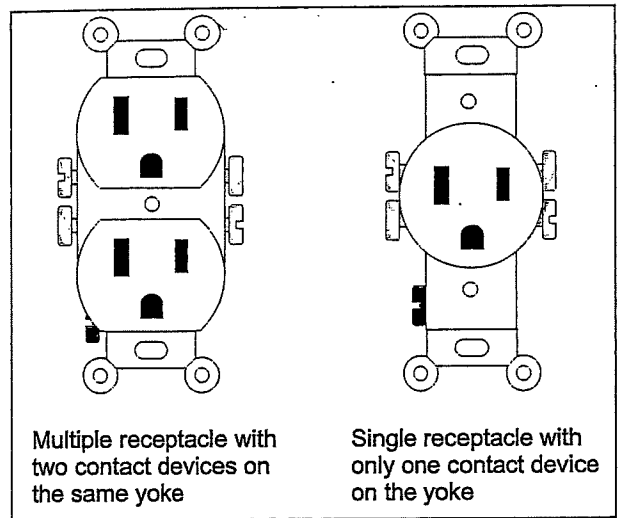
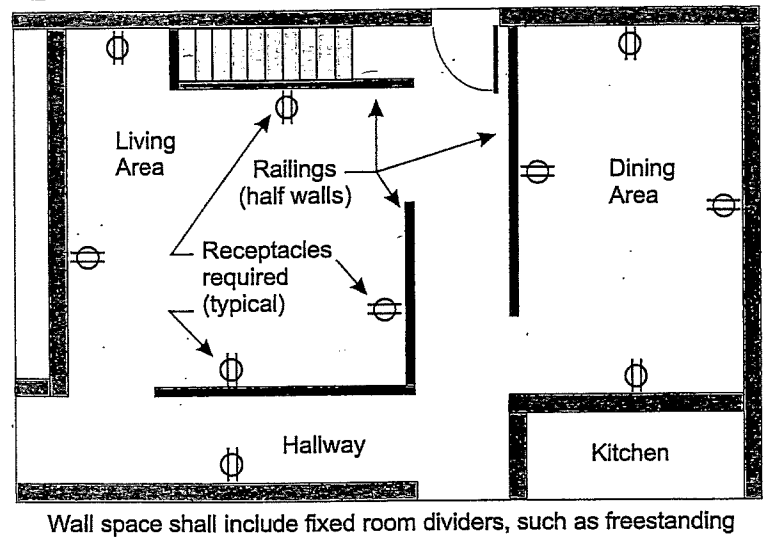


Figure 8.9. Typical 125-volt, 15-ampere receptacles (single and duplex)

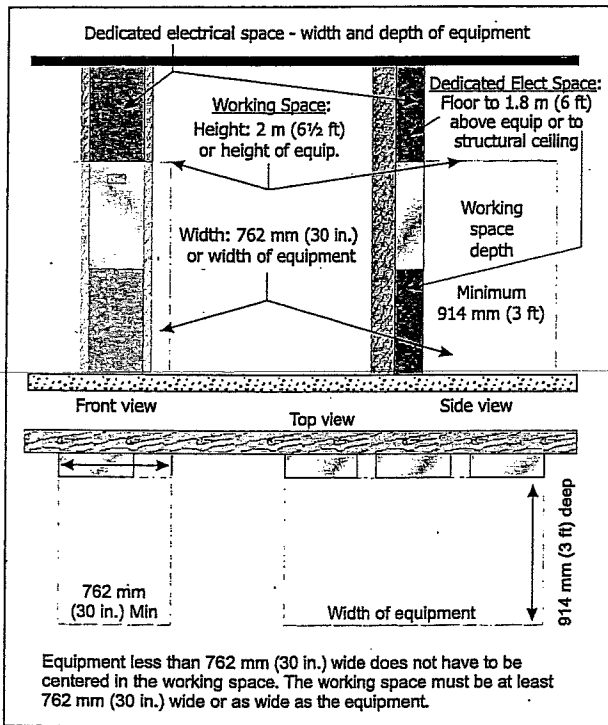


Figure 3.16. Working space at service equipment

Maximum Cord- and Plug-Connected Load to Receptacle		
Circuit rating (amperes)	Receptacle rating (amperes)	Maximum load
15 or 20	15	12
20	20	16
30	30	24

Receptacle Ratings for Various Size Circuits	
Circuit rating (amperes)	Receptacle rating (amperes)
15	Not over 15
20	15 or 20
30	30
40	40 or 50
50	50

Figure 8.10. Receptacle ratings for individual branch circuit and general-purpose branch circuits



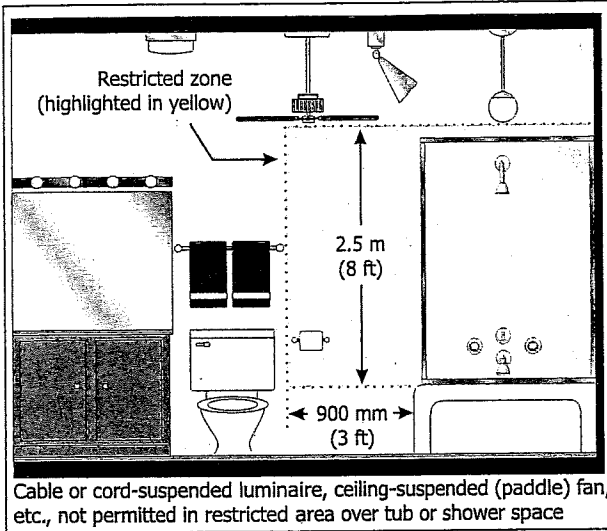


Figure 10.4. Luminaires installed in bathrooms are generally prohibited within the Code-identified tub or shower zone.

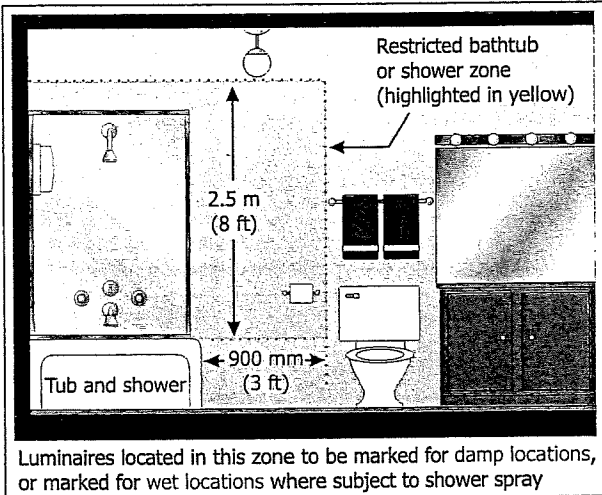


Figure 10.5. Luminaires installed in bathtub or shower zone must be listed for location.

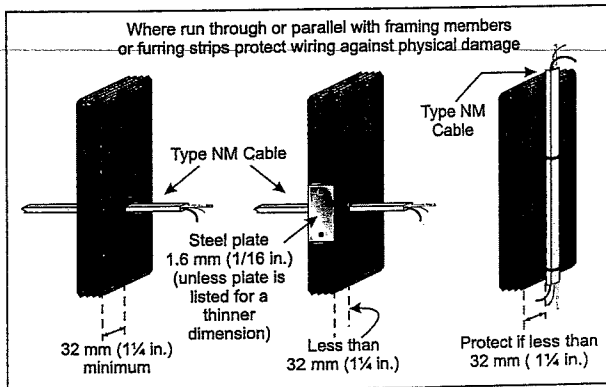


Figure 8.33. Installation and protection of NM cables

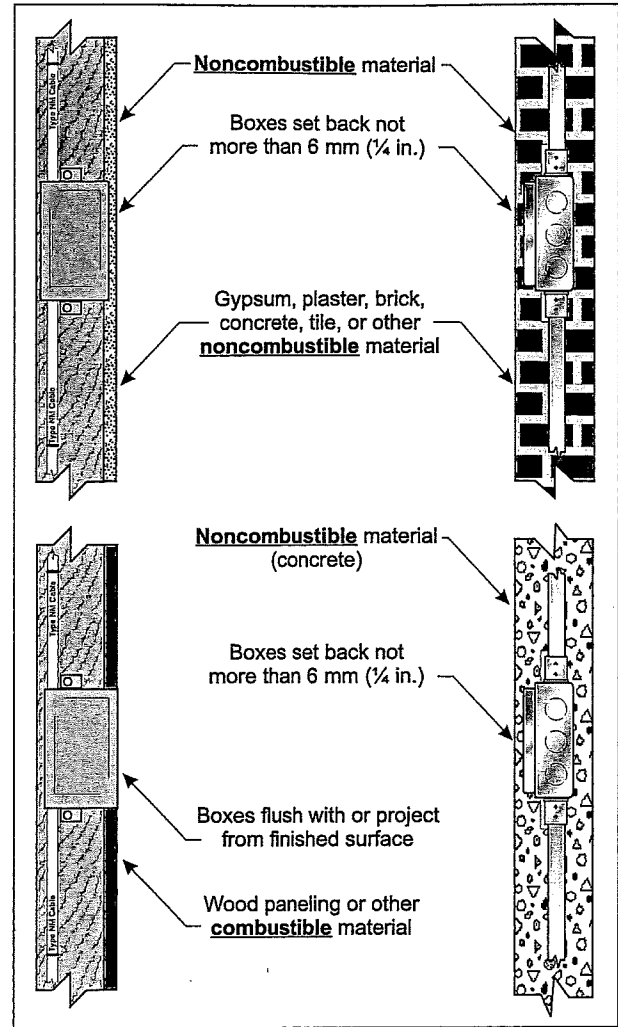


Figure 9.9. Installation requirements for boxes relative to both combustible and noncombustible finished surfaces

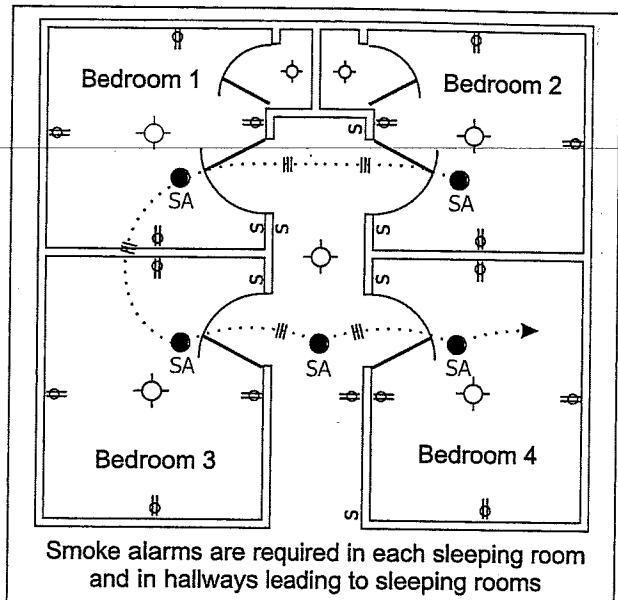


Figure 7.15. Smoke alarms are required in each sleeping room and in each hallway leading to sleeping rooms and must be interlocked.

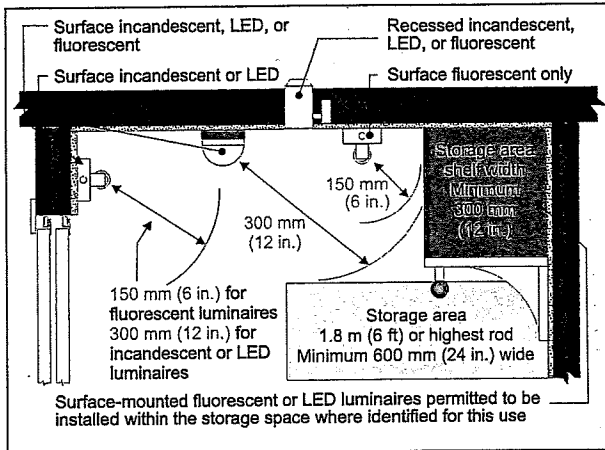


Figure 10.6. Luminaires in clothes closets must be of a certain type and comply with minimum clearance requirements.

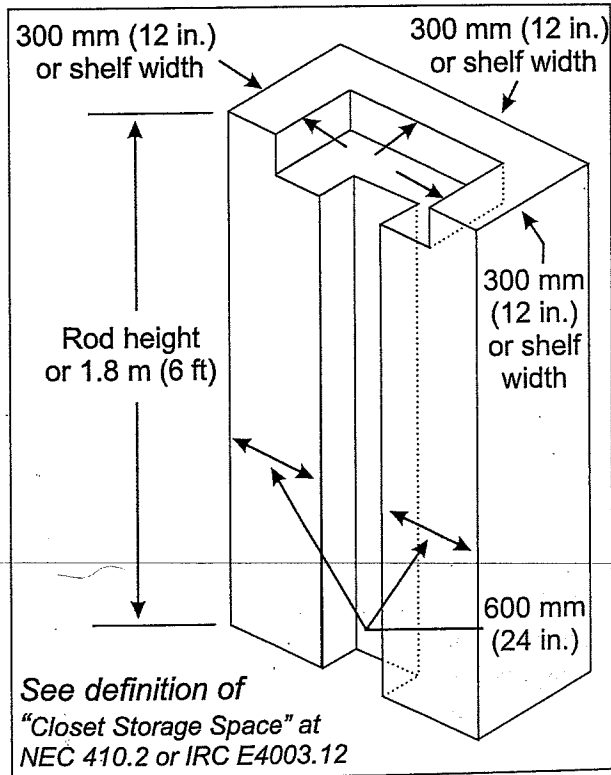


Figure 10.7. Reproduction of NEC Figure 410.2 or IRC Figure 4003.12 for closet storage spaces.

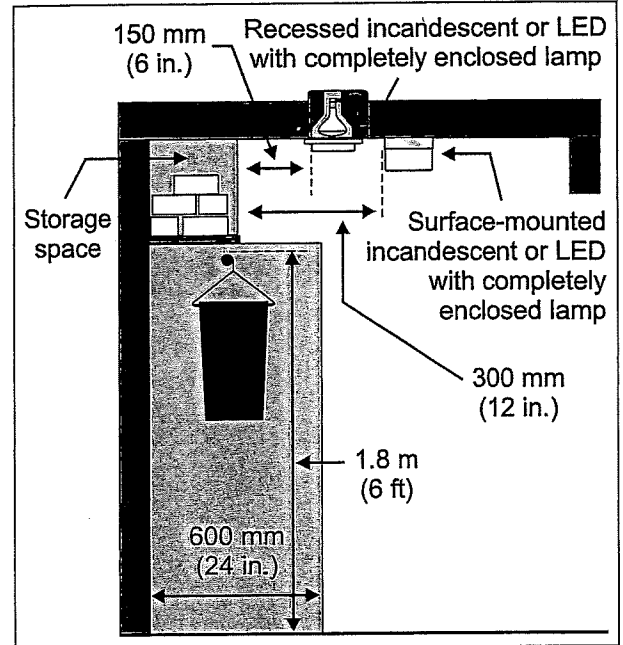


Figure 10.8. Incandescent or LED luminaires installed in clothes closet

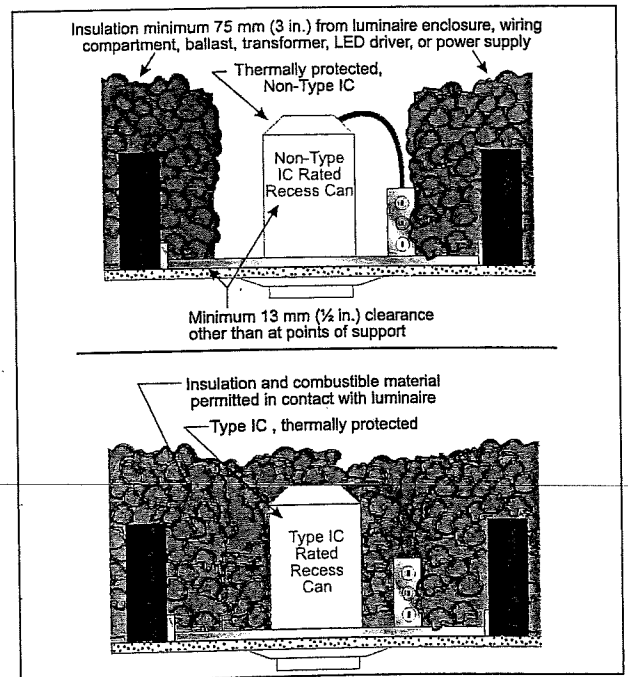


Figure 10.10. Recessed incandescent luminaires generally require clearance from insulation and combustible materials.

A-84.20 (5) SPACING OF PLUMBING FIXTURES (Continued)

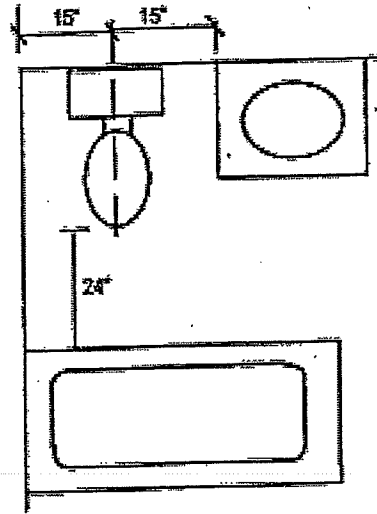


Figure A-84.20-3. Spacing between water closet and tub.

A-84.20 (5) SPACING OF PLUMBING FIXTURES

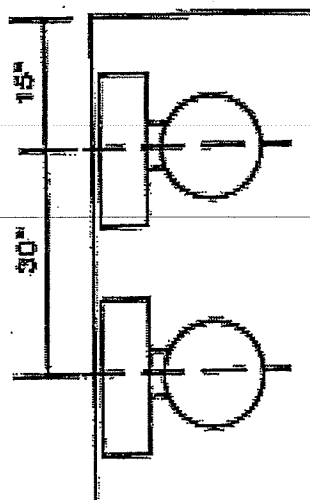
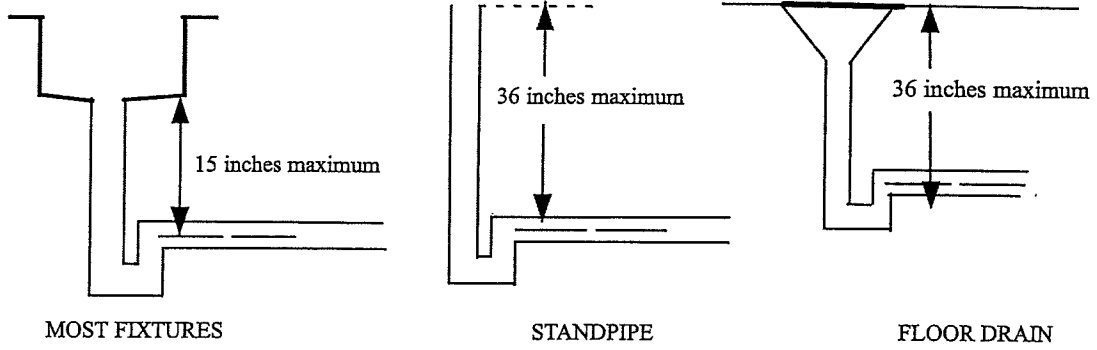


Figure A-84.20-1. Spacing between water closets.

Unofficial Text (See Printed Volume). Current through date and Register shown on Title Page.

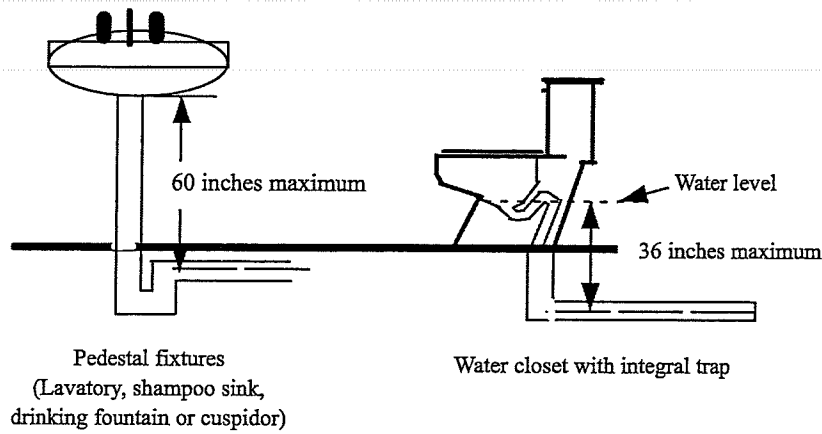
A-82.32 (4) (b) INSTALLATION OF TRAPS.



MOST FIXTURES

STANDPIPE

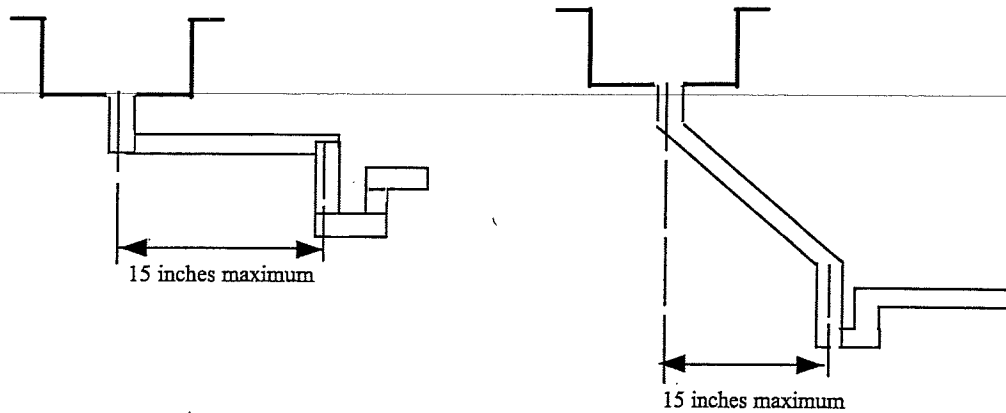
FLOOR DRAIN



Pedestal fixtures  
(Lavatory, shampoo sink,  
drinking fountain or cuspidor)

Water closet with integral trap

VERTICAL DISTANCE BETWEEN FIXTURE DRAIN OUTLET AND TRAP



HORIZONTAL DISTANCE BETWEEN FIXTURE DRAIN OUTLET AND TRAP

It is recommended that tamper-resistant smoke alarms or smoke alarms wired to the building electrical system be installed if there is a problem with battery disconnection. In older manufactured homes, mount smoke alarms only on interior walls and not on ceilings or exterior walls.

### Maintenance Required?

**Batteries:** Change at least once a year or more often if the low-battery warning activates. The National Fire Protection Association recommends that you change your battery twice a year at the same time that you change your clocks.

- Never “borrow” batteries from your smoke alarm to use in any other device.
- Photoelectric bulbs change when the trouble indicator activates.
- Test your alarms monthly by using the test button or as required by the manufacturer.
- Remove the cover and vacuum the alarm yearly to remove any sensor blocking dust.
- Replace all smoke alarms every 10 years or as recommended by the manufacturer.
- Landlords must inform tenants in writing that they are responsible for informing their landlord in writing of any smoke alarm problems such as a dead battery. The landlord has five days to correct the problem.

### Tips to keep your family safe.

- Smoke alarms are not a replacement for fire prevention. Look at your property and your family’s habits for sources of fires and eliminate them. A home safety checklist can be obtained from your local fire department.
- Be sure everyone in your household is familiar with the sound of the alarm.
- Plan and practice a fire escape drill with your family which includes at least two ways out of every room. Identify an outside meeting place where everyone will gather after.
- Call the fire department immediately after you are safely out of the house.
- Keep matches and lighters out of children’s reach and never leave candles unattended.
- Don’t overload outlets or extension cords. Replace or repair frayed electrical cords, sparking outlets or appliances.
- Clean fireplaces yearly and use metal or glass screens.
- Never smoke in bed, dispose of smoking materials in approved containers.
- Store flammable and combustible liquids away from heat sources and in their original containers.

**If the alarm sounds, get out and stay out!**

Smoke and Carbon Monoxide Alarm Requirements Date of building permit or construction	Battery-powered permitted	Building electrical system powered	Building power and battery backup	Interconnection between alarms	Alarms on every floor level	Alarms outside each sleeping area	Alarms in each bedroom
Smoke alarms in one- and 2-family dwellings before 4-1-92	✓				✓		
Smoke alarms in Uniform Dwelling Code after 4-1-92		✓		✓	✓		
Smoke alarms in Uniform Dwelling Code after 12-1-95		✓		✓	✓	✓	
Smoke alarms in Uniform Dwelling Code after 4-1-01			✓	✓	✓	✓	✓
Carbon monoxide alarms before 2-1-11	✓*				✓		
Carbon monoxide alarms after 2-1-11		✓	✓	✓	✓	✓	

\* Battery-powered or plug in.

# Smoke Detectors Save Lives

One and Two Family Dwellings



State of Wisconsin

Department of Safety and Professional Services

For more information:

[Dsps.wi.gov](http://Dsps.wi.gov)

608-266-2112

## Why are Smoke Alarms Necessary?

Most home fires occur between 11:00P.M. and 6:00 A.M. Working smoke alarms detect fire in its early stages and provide your family with critical minutes necessary to reach safety. Deaths from home fires are more frequently due to smoke inhalation and toxic fumes than from burns. Wisconsin fire deaths have been reduced by more than 42% since 1987 (when WI began requiring smoke alarms in older homes.) Unfortunately, about 30% of home fires start in rooms without working smoke alarms.

## WI law requires homes be protected.

Owners must install and maintain the smoke alarms, and tenants must inform owners of any smoke alarm problems.

All smoke alarms used in WI must be Underwriters Laboratories (UL) listed, or equivalent, and must be either of the ionization or photo-electric types. (Heat detectors, which respond slower, may only be used in addition to smoke alarms.)

**Ionization** alarms respond to quick burning fires such as from wood or paper. The alarm sounds when the sensor becomes blocked by smoke particles.

**Photoelectric** alarms respond to slow burning fire such as upholstery or bedding. The alarm sounds when smoke particles break a light beam. Photoelectric alarms are less likely to sound a false alarm.

## What kind of alarm is required?

It depends on when the permit to build your home was issued. Local ordinances may require additional features. In home permitted prior to April 1, 1992, you may use self-contained battery-operated smoke-alarms. For homes permitted after April 1, 1992, refer to the table on back of brochure.

It is *recommended* that:

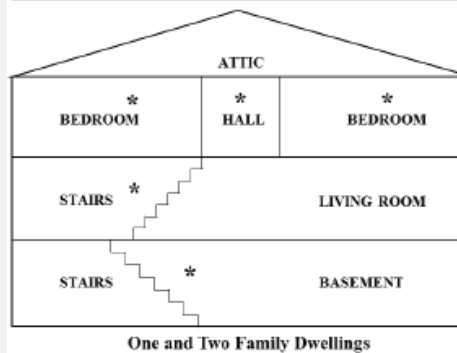
- All smoke alarms in your home be interconnected (if one activates they all sound together) and powered by both a building circuit and batteries to ensure they operate properly in all situations.
- Smoke alarms should be connected to an electrical circuit, but not on a switch, so the loss of power to the alarm is noticed because the lights are not working.

## Where must they be installed?

For one and two family dwellings built before December 1, 1994, owners must install at least one smoke alarm on each floor level of each unit, including the basement. It is *recommended* that:

- Alarms are placed between each sleeping area and the rest of the home, and above the base of any stairs on each floor level.
- Alarms are located in the hall outside the bedroom area and inside each bedroom.
- Bedroom doors should be kept closed when sleeping for additional protection.

[Fig. 2]  
\* MINIMUM SMOKE ALARM PLACEMENT  
See table for additional requirements

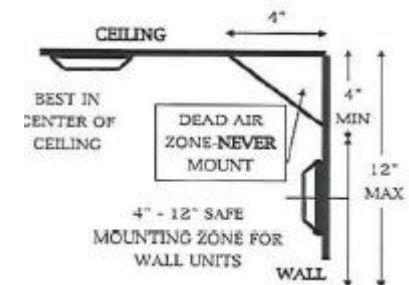


## How should they be installed?

All smoke alarms should be installed per the Manufacturer's instructions.

- Mount on the bottom of any exposed basement ceiling joists.
- Place at least 4" from the wall when installing on the ceiling. The center of the room is best.
- Place between 4 to 12" from the ceiling when installing on a wall. Be sure it is out of the dead air space where the ceiling and wall meet.

[Fig. 1]  
SMOKE ALARM INSTALLATION DIAGRAM  
See manufacturers recommendations



- Install within three feet of the highest part of a peaked or sloped ceiling
- Place at least three feet away from any window, door or air register where drafts could prevent smoke from reaching the alarm.
- Mount away from kitchens where cooking could cause false alarms and subsequent disconnection.
- Do not install where there are extreme temperatures, excess humidity or heavy dust such as in bathrooms, unheated garages or attics.