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2018 Homeowners Guide for Finishing Basements and Other Non-Structural Interior Renovations

DEFINITIONS

- ARC-FAULT CIRCUIT-INTERRUPTER (AFCI):** A AFCI is a device intended for protection from the effects of arc-faults (electrical fires) in a circuit by detecting the arcing in the wiring or device plugged into the circuit and tripping.
- CLEANOUT:** An accessible opening in the drainage system used for the removal of possible obstructions.
- COMBUSTION AIR:** The air provided fuel-burning equipment including air for fuel combustion, draft hood dilution and ventilation of the equipment enclosure.
- EMERGENCY EGRESS:** An operable window, door or similar device that provides for a means of escape and access for rescue in the event of an emergency.
- GROUND-FAULT CIRCUIT-INTERRUPTER (GFCI):** A GFCI is a device intended for protection of people (electrical shocks and electrocutions) by tripping when a line to ground fault is detected.
- HABITABLE ROOM:** Any room which meets the requirements of the code for sleeping, living, cooking or dining purposes, excluding such enclosed places as closets, pantries, bath or toilet rooms, hallways, laundries, storage spaces, utility rooms and similar spaces.
- OVERCURRENT:** Any current in excess of the rated current of equipment or the ampacity of a conductor (wire).
- OVERCURRENT-PROTECTION DEVICE (CIRCUIT BREAKER):** A device designed to open and close a circuit by nonautomatic means and to open the circuit automatically on a predetermined overcurrent without damage to itself when properly applied within its rating.
- RECEPTACLE:** A receptacle is a contact device installed at the outlet for the connection of a single attachment plug. A receptacle outlet is where one or more receptacles are installed.

GENERAL BUILDING CODE REQUIREMENTS

ROOM SIZES

Habitable rooms shall have an area of not less than 70 square feet. Habitable rooms shall not be less than 7feet in any horizontal direction.

The minimum width of a hallway shall be not less than 3 feet.

Exception: Kitchens

CEILING HEIGHTS

Habitable space, hallways and portions of basements containing these spaces shall have a ceiling height of not less than 7 feet. Bathrooms, toilet rooms and laundry rooms shall have a ceiling height of not less than 6 feet 8 inches.

Exception: Beams, girders, ducts or other obstructions in basements containing habitable space shall be permitted to project within 6 feet 4 inches of the finished floor

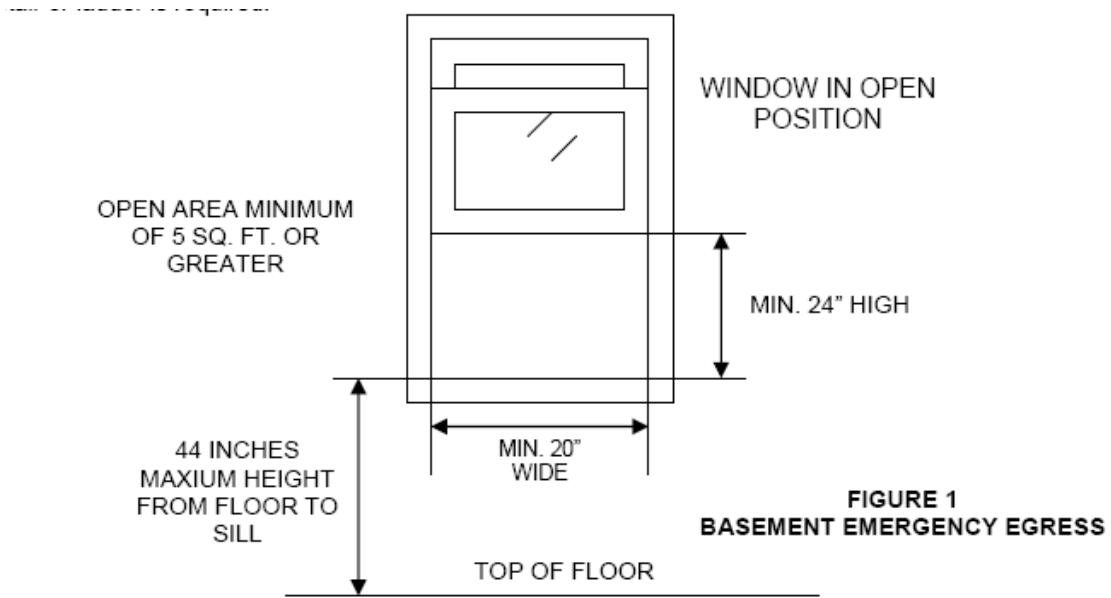
TOILET, BATH AND SHOWER SPACES

Every toilet, bathtub or shower shall be installed in a room, which will afford privacy to the occupant. Bathrooms, toilet compartments and other similar rooms shall be provided with a window area not less than 3 square feet, one-half of which must be openable. The window requirement shall not be required where artificial light and an approved mechanical ventilation system capable of producing 50 cubic feet per minute are provided. Bathroom exhausts shall be vented directly to the outside.

BEDROOMS AND HABITABLE BASEMENTS REQUIRE EMERGENCY EGRESS

Bedrooms and habitable basements emergency egress openings are required. Every bedroom and habitable basement shall have at least one openable window or exterior door approved for emergency egress or rescue. The units must be operable from the inside to a full clear opening (*the tilting and or removal of sashes can be used to obtain the opening requirements*) without the use of a key or tool. Where windows are provided as a means of egress or rescue they shall have a sill height of not more than 44 inches, a minimum net clear opening of 5.0 square feet, a minimum net clear opening height of 24 inches and a minimum net clear opening width of 20 inches (*Note: 24" X 20" does not meet the required 5 sq. ft. opening*). See FIGURE 1.

Where emergency egress windows exit to a window well, the minimum area dimensions of that window well shall be not less than 3 feet by 3feet unobstructed if greater than 44" vertical depth a permanently affixed stair or ladder is required.



**FIGURE 1
BASEMENT EMERGENCY EGRESS**

UNDER STAIR PROTECTION

Enclosed accessible space under stairs shall have walls and soffits protected on the enclosed side with $\frac{1}{2}$ inch gypsum board (drywall).

SMOKE ALARMS

Smoke alarms shall be installed in the basement, in each bedroom, and outside of each separate sleeping area within ten feet of the bedroom(s). When a new smoke alarm is installed they shall be interconnected so that when one alarm is activated all will alarm. Required smoke alarms shall receive their primary power from the building wiring when such wiring is served from a commercial source, and when primary power is interrupted, shall receive power from a battery. Wiring shall be permanent and without a disconnecting switch other than those required for overcurrent protection (circuit breaker).

STAIRWAY ILLUMINATION

Virginia Uniform Statewide Building Code requires that all basement stairs be provided with a means to illuminate the stair, including the landings and treads with an artificial light source located in the immediate vicinity of each landing at the top and bottom of the stair. The control for activation of the lighting should be accessible at the top and bottom of the stair without traversing any step of the stair.

FIRE EXTINGUISHERS

Kitchen areas in basements shall have a fire extinguisher, having a rating of 2-A:10-B:C or an approved equivalent type of fire extinguisher shall be installed in the kitchen area.

CODE REQUIREMENTS FOR WALL CONSTRUCTION

STUDS

Studs may be utility grade or better for non-bearing walls (#3 or better in bearing walls). Stud spacing shall be per TABLE 1. A pressure treated bottom plate is required. A single or double top plate is permitted.

TABLE 1: STUD SPACING

Wall finish material	Stud spacing, inches on center
Drywall	16, 24
Wood veneer, hardwood paneling	16

ATTACHMENT REQUIREMENTS

Wall construction shall be fastened in accordance with TABLE 2.

TABLE 2: FASTENING SCHEDULE

Connection	Nailing Method
Top plate to stud	End nail 2-16d or toe nail 3-8d
Stud to bottom plate	End nail 2-16d or toe nail 3-8d
Bottom plate to floor	Face nail, 6d (concrete nail) @ 16"o. c.

DRILLING AND NOTCHING STUDS

Studs in non-loadbearing walls may be notched to a depth not to exceed 40 percent of a single stud width. Studs may be bored or drilled, provided that the diameter of the resulting hole is no greater than 40 percent of the stud width, the edge of the hole is no closer than 5/8 inch to the edge of the stud, and the hole is not located in the same section as a cut or notch.

Fireblocking

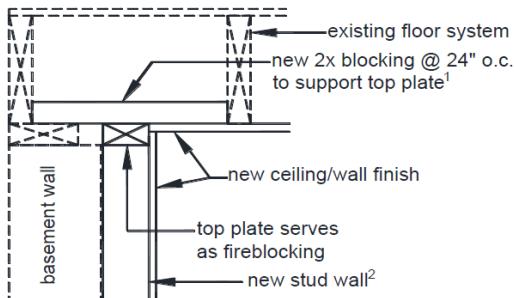
Fireblocking shall be provided to cut off all concealed draft openings and to form an effective fire barrier between stories. Fireblocking shall be provided in the following locations:

1. In concealed spaces of stud walls and partitions, including furred spaces at the ceiling and floor level where the top plate is attached to the underside of the floor joists. **See FIGURE 4.**
2. At all interconnections between concealed vertical and horizontal spaces such as occur at soffits, bulkheads, drop ceilings, etc. **See FIGURE 5.**
3. In concealed spaces of stud walls offset from the basement wall. Horizontal and vertical. **See FIGURE 6.**

4. At gaps and openings around vents, pipes and ducts at the ceiling and floor level.

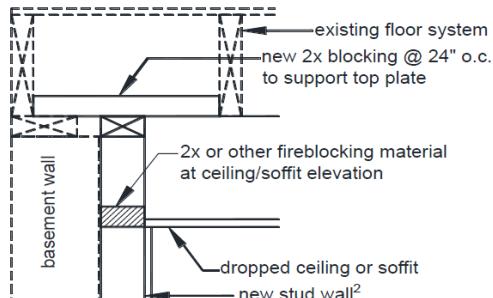
Fireblocking material: Fireblocking shall consist of one of the materials listed below.

1. 1/2" gypsum board.
2. 2x lumber (2x4, 2x6, etc.)
3. Two thickness of 1x lumber (1x4, 1x6, etc) with staggered joints.
4. 3/4" plywood, osb or particleborad with joints backed by 6 inches of the same material.
5. 1/4" cement, cement/fiber board (e.g. Durock).
6. At gaps 1 inch or less, batts or blankets of mineral wool or fiberglass packed tightly to remain in place of approved fireblocking caulk.



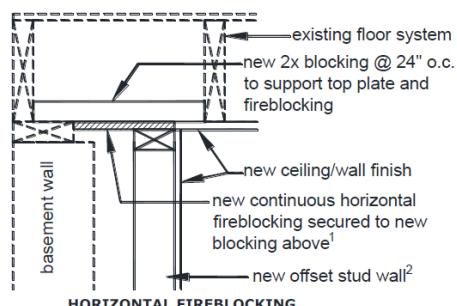
¹ Attach top plate to underside of joists where floor framing is perpendicular to stud wall.
² R-13 insulation should be provided between studs.

FIGURE 4: FIREBLOCKING WITH STUD WALL AGAINST BASEMENT WALL



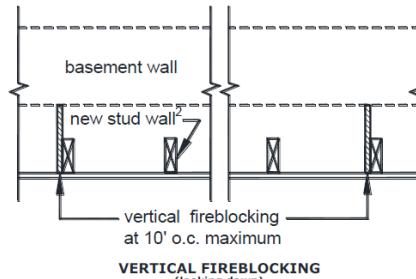
¹ Attach top plate to underside of joists where floor framing is perpendicular to stud wall.
² R-13 insulation should be provided between studs.

FIGURE 5: FIREBLOCKING AT DROP CEILING



¹ Attach top plate and fireblocking to underside of joists where floor framing is perpendicular to stud wall.
² If cavity between basement wall and new stud wall does not contain existing insulation, then R-13 insulation should be installed.

FIGURE 6: FIREBLOCKING WITH OFFSET STUD WALL



CODE REQUIREMENTS FOR FLOOR/CEILING CONSTRUCTION DRILLING AND NOTCHING JOISTS

Notches in the top or bottom of joists shall not exceed one-sixth the depth of the joist and shall not be located in the middle third of the span. Cantilevered (overhanging) joists shall not be notched. Holes drilled or bored in joists shall not be within 2 inches of the top or bottom of joists, and their diameter shall not exceed one-third the depth of the joist.

DRAFTSTOPPING

When there is useable space above and below the concealed space of a floor/ceiling assembly,

draftstopping shall be installed so that the area of the concealed space does not exceed 1,000 square feet. Draftstopping shall divide the concealed space into approximately equal areas. Draftstopping shall be provided in floor/ceiling assemblies under the following circumstances:

1. Ceiling is suspended under the floor framing; or
2. Floor framing is constructed of truss-type open-web or perforated members.
3. The assembly is enclosed by separate floor construction above and separate ceiling construction below.

Draftstopping material shall not be less than $\frac{1}{2}$ inch gypsum board, 3/8-inch wood structural panels or particleboard. Draftstopping shall be installed parallel to the floor framing members. The integrity of all draftstopping shall be maintained.

MECHANICAL CODE REQUIREMENTS **APPLIANCE ACCESS**

Appliances and equipment, such as furnaces and hot water heaters, must remain accessible for inspection, service, repair and replacement without removing permanent construction. The furnace room shall have an opening or door large enough to permit removal of the largest piece of equipment, but not less than 20 inches wide. An unobstructed working space not less than 30 inches wide and not less than 30 inches high shall be provided along the control side of the equipment when the door of the furnace room is open.

COMBUSTION AIR

Fuel-burning appliances shall be supplied with combustion air. Furnace rooms must be provided with two permanent openings to adjacent spaces; one shall be located within 12 inches of the top and one within 12 inches from the bottom of the adjoining wall. Each opening shall have free area equal to a minimum of 1 square inch per 1,000 Btu/h input rating of all appliances installed within the furnace room, but not less than 100 square inches. The openings are not required if a louvered door is provided or the furnace room area is greater than 50 cubic feet per 1,000 Btu/h input rating of all appliances installed in the room. See figure 3.

PLUMBING CODE REQUIREMENTS

PLUMBING FIXTURES

Showers: Hinged shower doors shall open outward. All glass, which encloses a shower, shall be safety glazed. Showerheads shall be water conserving with a maximum flow rate of 2.5 gallons per minute. All shower control valves shall be anti-scald with a hot water limit of 120F.

Lavatories (bathroom sinks): Lavatories shall have waste outlets not less than 1¼ inch in diameter. A strainer, pop-up stopper, crossbar or other device shall be provided to restrict the clear opening of the waste outlet. Faucets shall be water conserving with a maximum flow rate of 2.2 gallons per minute at 60 psi.

Water closets (toilets): water closets shall be water-conserving low consumption at 1.6 gallons per flush and shall be provided with a flush tank or similar device designed and installed to supply water in sufficient quantity and flow to flush the contents of the fixture, to cleanse the fixture and refill the fixture trap.

Bathtubs: Bathtubs shall have outlets and overflows at least 1½ inch in diameter, and the waste outlet shall be equipped with an approved stopper. All bathtubs with showers shall have control valves with anti-scald with a hot water limit of 120F.

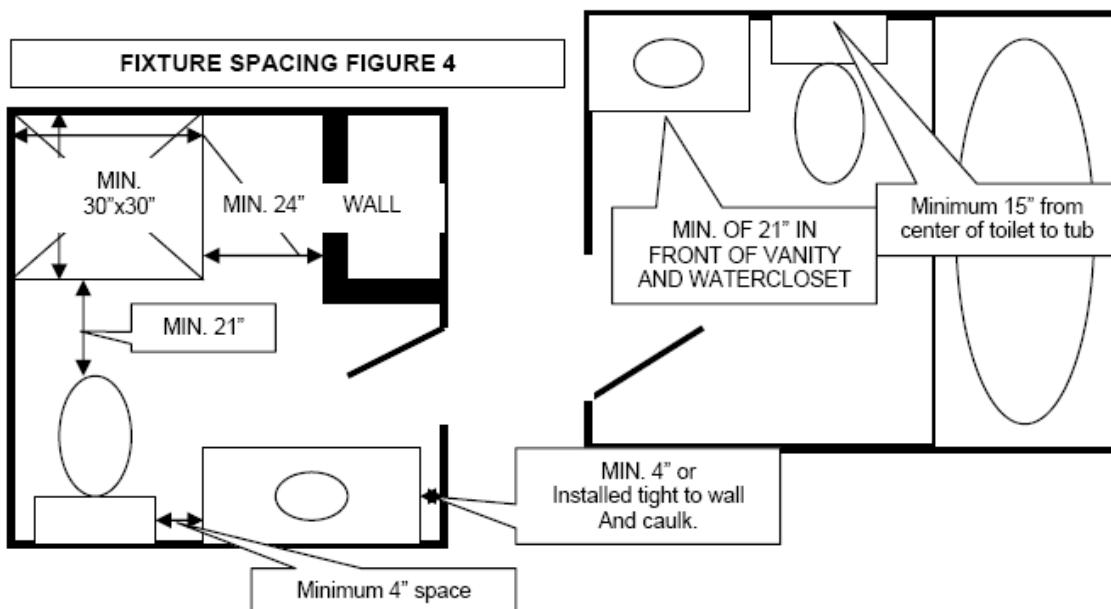
Sinks: Sinks shall be provided with waste outlets not less than 1½ inch in diameter. A strainer, crossbar or other device shall be provided to restrict the clear opening of the waste outlet. Faucets shall be water conserving with a maximum flow rate of 2.2 gallons per minute at 60 psi.

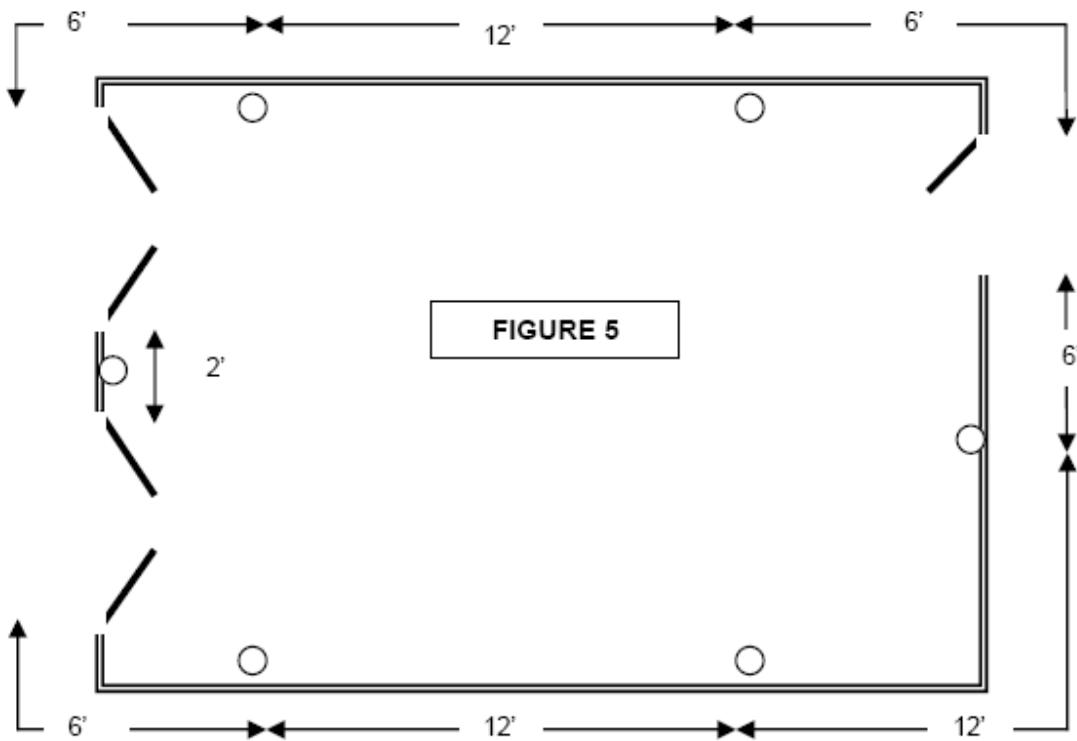
Laundry tubs: Each compartment of a laundry tub shall be provided with a waste outlet not less than 1 ½ inches in diameter and a strainer or crossbar to restrict the clear opening of the waste outlet.

Clothes washers: The discharge of a clothes washer shall be through an air break.

ACCESS

All cleanouts, valves and shut-offs shall be accessible. Minimum clearance in front of cleanouts shall be 18 inches on 3 inches and larger pipes, and 12 inches on smaller pipes. Concealed cleanouts shall be provided with access of sufficient size to permit removal of the cleanout plug and rodding of the system. Cleanout plugs shall not be concealed with any permanent finishing material. Fixtures having concealed tubular traps shall be provided with an access panel or unobstructed utility space 12 inches in the least dimension.





RECEPTACLE DISTRIBUTION

ELECTRICAL CODE REQUIREMENTS

PANELBOARD CLEARANCES

The dimension of the working space in the direction of access to panelboards shall not be less than 36 inches in depth and 30 inches in width. The work space shall be clear and shall extend from the floor or platform to a height of 6 feet 6 inches. In all cases, the workspace shall allow at least a 90-degree opening of panel doors or hinged parts. A dedicated space directly over a panelboard that extends from the panelboard to the ceiling shall be kept clear of unrelated equipment. This required workspace shall not be designated for storage. Panelboards shall not be located in closets or bathrooms. Artificial illumination shall be provided for all working spaces for panelboards.

BRANCH CIRCUITS

A 15 or 20-ampere branch circuit shall be permitted to supply lighting units or other equipment or a combination of both. The rating of any one cord and plug device shall not exceed 80 percent of the branch circuit ampere rating. The rating of any equipment fastened in place shall not exceed 50 percent of the branch circuit ampere rating when also supplying one-chord or plug devices in the same circuit.

A minimum of one 20-ampere branch circuit shall be provided for receptacles located in the laundry area and shall serve only receptacle outlets located in the laundry area.

TABLE 6: CONDUCTOR SIZE

	CIRCUIT RATING		
	15 AMP	20 AMP	30 AMP
Conductors (wire): Min. Size (AGW) Circuit Conductors ¹	14	12	10

¹ These gages are for copper conductors.

RECEPTACLE OUTLETS SPACING & REQUIRED LOCATIONS

General spacing: In every family room, dining room, library, den, bedroom, recreation or similar room, receptacle outlets shall be installed so that no point along the floor line in any wall space is more than 6 feet, measured horizontally, from an outlet in that space, including any wall space 2 feet or more in width and the wall space occupied by fixed panels in exterior walls, but excluding sliding panels in exterior walls. The wall space afforded by fixed room dividers, such as freestanding bar-type counters or railings, shall be included in the 6-foot measurement. A wall space shall be considered a wall unbroken along the floor line by doorways, fireplaces and similar openings. Each wall space that is 2 feet or more in width shall be treated individually and separately from other wall spaces within the room. Where unbroken at the floor line, two or more walls of a room that form a corner shall be considered as a wall space. See FIGURE 5.

Appliances: Appliance receptacle outlets installed for specific appliances, such as laundry equipment, shall be installed within 6 feet of the intended location of the appliance.

Laundry room: At least one receptacle outlet shall be installed to serve laundry appliances.

Bathroom: At least one wall receptacle outlet shall be installed in the bathroom adjacent to each sink location. 20-ampere branch circuit required supplying bathroom receptacle outlets.

Hallways: Hallways of 10 feet or more in length shall have at least one receptacle outlet. The hallway length shall be considered the length measured along the centerline of the hall without passing through a doorway.

GFCI

All single 125 volt, single phase, 15- and 20-ampere receptacles installed in bathrooms or to serve counter top surfaces in bar areas or kitchens, shall have ground-fault circuit-interrupter protection. Each unfinished portion of a basement must have 1 125 volt, single phase, 15- or 20- amp receptacle.

AFCI

Branch circuits that supply 120-volt, single phase, 15-amp and 20-amp outlets installed in kitchens, family rooms, dining rooms, living rooms, parlors, libraries, dens, bedrooms, sun rooms, recreation rooms, closets, hallways, laundry areas and similar rooms or areas shall have arc fault circuit interrupter protection.

Exception: AFCI protection is not required where GFCI protection is required.

RECEPTACLE REQUIREMENTS

Receptacles installed for the attachment of portable cords shall be rated at not less than 15 amperes, 125 volts, or 15 amperes, 250 volts, and shall be of the grounding type.

TAMPER-RESISTANT RECEPTACLES

All 125 volt, 15- and 20-ampere receptacle shall be listed tamper-resistant receptacle.

Exception: receptacles in the following locations shall not be required to be tamper-resistant.

1. Receptacles located 5.5 feet above the floor.
2. Receptacles that are part of a luminaire or appliance.
3. A single receptacle for a single appliance or a duplex receptacle for 2 appliances in the same dedicated place that are not easily moved from one place to another.

FACEPLATES

Faceplates for flush-mounted receptacles shall be installed and shall completely cover the wall opening and seat against the wall surface. Metal faceplates shall be grounded.

LIGHTING OUTLETS

At least one wall-switch-controlled lighting outlet shall be installed in every habitable room, bathroom, and hallway. In rooms other than bathrooms, one or more receptacles controlled by a wall switch shall be considered equivalent to the required lighting outlet.

Recessed portions of lighting fixture enclosures, other than at the points of support, shall be spaced not less than $\frac{1}{2}$ inch from combustible materials unless the fixture is specifically listed for direct contact.

At least one lighting outlet shall be provided in under-floor spaces, utility rooms, spaces used for storage, or contain equipment requiring servicing. The control switch for such lighting outlets shall be located at the point of entry to such spaces. Where equipment requiring servicing is present, the lighting outlet shall be provided at or near such equipment.

LIGHT FIXTURES IN CLOTHES CLOSETS

The types of fixtures installed in clothes closets shall be limited to surface-mounted or recessed incandescent fixtures with completely enclosed lamps, and surface-mounted or recessed fluorescent fixtures. Incandescent fixtures with open or partially enclosed lamps and pendant fixtures or lampholders shall be prohibited. Fixture installations shall be in accordance with one or more of the following:

1. Surface-mounted incandescent fixtures shall be installed on the wall above the door or on the ceiling, provided there is a minimum clearance of 12 inches between the fixture and the nearest point of a storage space.
2. Surface-mounted fluorescent fixtures shall be installed on the wall above the door or on the ceiling, provided there is a minimum clearance of 6 inches between the fixture and the nearest point of a storage space.
3. Recessed incandescent fixtures with a completely enclosed lamp shall be installed in the wall or the ceiling provided there is a minimum clearance of 6 inches between the fixture and the nearest point of a storage space.
4. Recessed fluorescent fixtures shall be installed in the wall or on the ceiling provided there is a minimum clearance of 6 inches between the fixture and the nearest point of a storage space.

