

Basic Residential Building Planning & Common Code Mistakes

DESIGN CRITERIA:

Buildings and structures must be built to safely support all loads as provided by the International Residential Code. The minimum design loads required for structures are listed in the following table:

Snow Load ⁽¹⁾	Wind Speed (mph)	Seismic Design Cat.	Frost Line Depth	Winter Design Temp.
30" to 35"	60	"A"	42"	0°F

Note 1: 30" at elevations under 1700 feet
35" at elevations over 1700 feet

LIGHT, VENTILATION & HEATING

All habitable rooms must be provided with windows that are a minimum of 8% of the floor area, with an openable area of at least 4%.

Each bedroom must have at least one emergency/escape window with a minimum opening area of 5.7 sq. ft. with a minimum clear height of not less than 24 inches and a clear width of 20-inches. The window must be not more than 44-inches above the floor.

Like habitable rooms, bathrooms are also required to be provided with natural light and ventilation. When natural light & ventilation are not assessable, mechanical ventilation and artificial light can be used. When mechanical ventilation is used, air must be moved at a minimum of 50cfm to outside air. Air ventilated from a bathroom or kitchen cannot be discharged into an attic area.

LIGHTING OUTLETS:

At least one wall switched-controlled lighting outlet must be installed in the living, cooking, sleeping and bathroom areas.

At least one wall switched light outlet must also be installed in all hallways, stairway, and attached and detached garages when supplied by electric power.

A wall switched light, or an automatically controlled light, must be installed to provide illumination on the exterior side of each door opening (except garage doors).

An attic or storage area must be illuminated by as switched lighting outlet when the area contains equipment that may require servicing.

POWER DISTRIBUTION:

Electrical receptacles must be installed in every room of a dwelling unit.

REQUIRED BRANCH CIRCUITS:

- Two or more 20-amp circuits must be provided to serve receptacles in the kitchen, pantry or breakfast /dining area.
- Countertop receptacles must be installed so that no point along the countertop is more than 24-inches from an outlet and not more than 20-inches above the countertop.
- Receptacles for specific built-in appliances (disposal, dishwasher, trash compactor, refrigerator) cannot utilize these two required circuits.
 - Outlets that serve the countertops, including islands, and receptacles for specific built-in appliances (disposal, dishwasher, trash compactor, refrigerator) must be **GFCI and Arc-fault protected**
 - One 20-amp GFCI circuit is required for the laundry area.
 - One 20-amp GFCI circuit to supply outlets in the bathroom. At least one GFCI outlet must be installed within 36-inches of the outside edge of the sink basin.
 - Other required branch circuits are required based on the total computed load. Outlets from these circuits are required to be installed at the following locations:
 - ❖ Outdoor GFCI outlets must be installed at the front and back of each dwelling unit.
 - ❖ Laundry areas shall have at least one GFCI outlet.
 - ❖ Unfinished basements and garages shall have at least one GFCI protected outlet.
 - ❖ Hallways of 10 feet or longer shall have at least one receptacle.
 - ❖ Furnace and HVAC equipment

Arc-fault circuit interrupters shall protect all branch circuits that supply power to kitchens,

bedrooms, family rooms, dens, hallways, closets, laundry areas,

All wall receptacles must be installed so that no point along any wall space greater than 2-feet in width is more than 6-feet from an outlet. (12' apart)

There is no height requirement for placement of the outlets except that any receptacle installed over 5 ½ feet from the floor and outlets installed in a floor are not counted towards the minimum required.

STAIRWAYS:

All interior and exterior stairways must be illuminated, including the landings and treads.

Installing a light in the vicinity of each landing can illuminate the stairways. Stairs to a basement must have a light near the bottom of the stairs.

A 3-way light switch must be installed at the top AND bottom of each set of stairs.

Minimum stairway width is 36-inches. A stairway must have minimum headroom of 6'8" as measured from the tread nose.

A 36-inch minimum landing is required at all exterior doors. The landing must not be more than 1 ½-inch below the threshold for swinging doors or 7 ¾-inches for sliding doors.

The maximum riser height is 8 ¼-inches and the minimum tread depth is 9-inches. A 1 – 1 ½ -inch nosing must be provided of stairways with solid risers.

Handrails: The Code requires that a 1 ¼" to 2" diameter handrail, not less than 34" and 38" in height, be provided on at least one side of any stairway that has four or more risers, including basement steps from the outside.

A handrail must be continuous from top to bottom. The ends of the handrail must not be more than 1 ½" from the wall edge.

Guard Rails: Stairways, stair risers, porches, decks, and balconies located more than 30-inches above the floor shall have guards not less than 36" in height installed on the entire structure. (34" for stairs 30" or more above the floor)

These guards and stair rails must be constructed such that the spindles, rails, or other type of ornamental pattern will not allow a 4-inch sphere to pass through it. A 6-inch sphere cannot pass through the open area formed by the riser, tread, and bottom of the rail.

REQUIRED HEATING:

All habitable areas of a dwelling must have fixed means to maintain the dwelling at 68°F.

INSULATION REQUIREMENTS:

Maximum U-Factor:

Windows & Doors	Skylights
0.35	0.50

Minimum Insulation R-Value:

Roof / Ceiling	Framed Walls	Mass Walls	Basement Walls
R-49	R-21	R-15	R-11

Crawl Spaces	Slab Perimeter	Floors
R-20	R-13 (4')	R-21

MOISTURE VAPOR RETARDERS:

In all framed walls, floors, and roof/ceiling assemblies that form the outside of the structure, a vapor barrier shall be installed on the warm in winter side of the insulation.

MINIMUM ROOM AREAS:

Every dwelling unit shall have at least one room that has not less than 120 Sq. Ft of gross floor area. All other rooms must be at least 70 sq. ft. of gross floor area. There is no minimum floor area for a kitchen.

All habitable rooms, including basements, must not be less than 6-feet 8-inches in height, *as measured from the finished floor to the finished ceiling.* Beams, girders, ducts and other obstructions may project to within 6-feet four-inches.

EMERGENCY ESCAPE OPENINGS:

Any basement with habitable space must have at least one 36" emergency escape door. **This door cannot open into an attached garage.** A door may exit into a garage, but there then must be a second door to provide the emergency exit from the basement.

Each sleeping area (bedroom), including those located in a basement, shall have at least one openable emergency escape and rescue opening. At a minimum, this opening must be 20" wide and 24" high. *THESE DOORS OR WINDOWS MUST EXIT DIRECTLY TO AN OPEN AREA OUTSIDE THE BUILDING.*

When this opening is located below-grade, an approved exit ladder must be installed.

EGRESS:

Hallways: The minimum width of a hallway is three (3) feet.

Doors: At least one side-hinged door must be installed that is not less than three (3) feet in width and 6-feet 8-inches in height that exits to a clear and open area. Other doors that may be installed are not required to meet this requirement.

A 36" landing, not more than 1 1/2" lower than the top of the threshold, shall exist on the exterior of each door.

BASIC FRAMING:

Footings:

- Light Frame construction: 24" wide / 6" thick.
- Light Frame w Brick Veneer: 27" wide / 9" thick.
- Solid grouted or concrete basement walls: 36" wide / 13" thick

Headers that span 60-inches or more over a load bearing wall typically require two (2) jack studs. Garage door headers that support a load bearing wall with a floor above require engineered LVL beams.

Floor joist systems that are not constructed of dimensional lumber (engineered beams) must be provided with a 1/2-inch gypsum wallboard membrane, 5/8-inch wood structural panel membrane or equivalent on the underside of the floor framing member or with other approved fire protection methods.

Anchor bolts are required to be installed in the middle third of the sill plate.

SANITATION:

Each dwelling unit must have a kitchen area provided with a sink.

Unless a dwelling is served by a vault privy (outhouse) and a portable water supply does not exist, every dwelling unit must be provided with at least one toilet, a bathroom sink, and a bathtub or shower.

All plumbing fixtures must be connected to an approved sewage or sewer system.

GARAGES & CARPORTS:

Openings from a garage or carport directly into a room used for sleeping are strictly prohibited. Other openings between the

garage and the residence shall be equipped with solid 1 3/8" wood doors or hollow steel doors rated at a 20-minute fire rating or better.

Windows are not permitted to exist in a wall separating a garage from a residence.

Duct work is permitted to penetrate a wall between a garage and the residence when the ducts are # 26 gauge sheet metal and the openings are sealed with a fire-stopping material.

An attached garage must be separated from the residence, and its attic area, by a wall constructed of 1/2" gypsum board applied on the garage side.

When the garage is located below a habitable room the ceiling of the garage must be 5/8" Type X gypsum board. The structures that supports a garage ceiling, the outside walls, must also be protected by 1/2" drywall.

Carports must be open on at least two (2) sides. A carport that is not open on at least two sides is considered a garage.

Any fuel burning appliances located in a garage must be located so that the source of ignition is not less than 18-inches from the floor of the garage. This includes wood & oil burners and gas furnaces.

SMOKE & CARBON MONOXIDE ALARMS:

All smoke and carbon monoxide alarms must be hard wired and interconnected in such a manner that when one alarm is activated, all alarms in the dwelling will also be activated.

Smoke and carbon monoxide alarms are required to be placed in each sleeping room, just outside of the sleeping area in the vicinity of the bedrooms, and an additional alarm on each floor level of the dwelling, including the basement.

Carbon monoxide alarms are only required in dwellings that are heated or cooled by fuel-burning appliances or if the dwelling has an attached garage. IF a fuel-burning appliance is located in a bedroom, a Co2 alarm is required in that bedroom.