

CHEBOYGAN COUNTY DEPARTMENT OF BUILDING SAFETY

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RESIDENTIAL BUILDING CODE HANDOUT

REFERENCES: 2009 Michigan Residential Code

This plan review compliance list reflects many, but not necessarily all, of the building code requirements that pertain to a single family dwelling. Please take the time to read through each of these items to determine which requirements may apply to your construction project. For your convenience, we have provided a check-off box in front of each item to help you identify those that may be applicable. The section number at the beginning of each item is the applicable building code section. *If you are uncertain or need assistance regarding any of these items, please call our office at (231) 627-8813 between 8:00 and 10:00 a.m. Monday through Friday.* It is our desire to resolve potential problems before finding them when inspecting. For some items, we found it difficult to explain the requirements in a few words. In those cases, we have given only a brief indication of the code requirement and suggest you call for more specific information as it may apply to your project. We look forward to working with you as your construction project proceeds.

ADMINISTRATION

Section R105 – Permits

R105.1 – Building Permits Required: Any owner or authorized agent who intends to construct, enlarge, alter, repair, move, demolish or change the occupancy of a building or structure, or to erect, install, enlarge, alter, repair, remove, convert or replace any electrical, gas, mechanical or plumbing system, the installation of which is regulated by this code, or to cause any such work to be done, shall first make application to the building official and obtain the required permit.

R105.2 – Work Exempt: **Please contact Office.**

R105.7 – Placement of Permit: Please post permit at the site at an easy accessible and visible area.

Section R106 – Construction Documents

R106.1 – Submittal Documents: Please provide (2) or more sets with each application for a permit.
Contact Office for a complete list of all requirements based upon type of project.

Section R109 – Inspections

R109.3 – Inspection Request: Permit holder or their agent shall notify office for all necessary inspections. **Please contact Office for required inspections.**

R109.4 – Approval Required: Work shall not be done beyond the point of each successive inspection without first obtaining the approval of the building official.

BUILDING PLANNING

Section R302 – Fire-Resistant Construction

R302.1 – Exterior Walls: Construction, projections, openings and penetrations of exterior walls of dwellings and accessory buildings shall comply with Table R302.1. **Contact Office for code requirements or reference code book.**

R302.5.1 – Opening Protection: Openings from a private garage directly into a room used for sleeping purposes shall not be permitted. Other openings between the garage and residence shall be equipped with solid wood doors not less than 1-3/8 inches in thickness, solid or honeycomb core steel doors not less than 1-3/8 inches thick, or 20-minute fire-rated doors.

R302.6 – Dwellings/Garage Fire Separation: The garage shall be separated as required by Table R302.6

R302.7 – Under Stair Protection: Enclosed accessible space under stairs shall have walls, under-stair surface and any soffits protected on the enclosed side with ½-inch gypsum board.

Section R303 – Light, Ventilation and Heating

R303.1 – Habitable Rooms: All habitable rooms shall have an aggregate glazing area of not less than 8 percent of the floor area of such rooms. Natural ventilation shall be through windows, doors, louvers or other approved openings to the outdoor air. Such opening shall be provided with ready access or shall otherwise be readily controllable by the building occupants. The minimum openable area to the outdoors shall be 4 percent of the floor area being ventilated.

R303.3 – Bathrooms: Bathrooms, water closet compartments and other similar rooms shall be provided with aggregate glazing area in windows of not less than 3 square feet one-half of which must be openable.

R303.6 – Stairway Illumination: All interior and exterior stairways shall be provided with a means to illuminate the stairs, including the landings and treads. **Please contact Office or reference code book.**

R303.8 – Required Heating: **(Contact Office for requirements)** The installation of one or more portable space heaters shall not be used to achieve compliance with this section.

Section R304 – Minimum Room Areas

R304.1 – Minimum Area: Every dwelling unit shall have at least one habitable room that shall have not less than 120 square feet of gross floor area.

R304.2 – Other Rooms: Other habitable rooms shall have a floor area of not less than 70 square feet.

R304.3 – Minimum Dimensions: Habitable room shall not be less than 7 feet in any horizontal dimension.

Section R305 – Ceiling Height

R305.1 – Minimum Height: Habitable rooms, hallways, corridors, bathrooms, toilet rooms, laundry rooms and basements shall have a ceiling of not less than 7 feet. The required height shall be measured from the finish floor to the lowest projection from the ceiling. **Check with Office for exceptions.**

Section R306 – Sanitation

R306.1 – Sanitary Facilities: Every dwelling unit shall be provided with a water closet, lavatory, bathtub or shower and an automatic clothes washer connection.

R306.2 – Kitchen: Each dwelling unit shall be provided with a kitchen area and every kitchen area shall be provided with a sink.

R306.3 – Sewage Disposal: All plumbing fixtures shall be connected to a sanitary sewer or to an approved private sewage disposal system.

R306.4 – Water Supply to Fixtures: All plumbing fixtures shall be connected to an approved water supply. Kitchen sinks, lavatories, bathtubs, showers, bidets, laundry tubs and washing machine outlets shall be provided with hot and cold water.

Section R308 – Glazing

R308.4 - Hazardous Locations: **Contact Office for code requirements or reference code book.**

Section R309 – Garages and Carports

R309.1 – Floor Surface: Garage floor surfaces shall be of approved noncombustible material. The area of floor used for parking of automobiles or other vehicles shall be sloped to facilitate the movement of liquids to a drain or toward the main vehicle entry doorway.

Section R310 – Emergency Escape and Rescue Openings

R310.1 – Emergency Escape and Rescue Required: Basements, habitable attics and every sleeping room shall have at least one operable emergency escape and rescue opening. Where basements contain one or more sleeping rooms, emergency egress and rescue openings shall be required in each sleeping room. Where emergency escape and rescue openings are provided they shall have a sill height of not more than 44 inches above the floor. Where a door opening having a threshold below adjacent ground elevation serves as an emergency escape and rescue opening and is provided with a bulkhead enclosure, the bulkhead enclosure shall comply with Section R310.3. The net clear opening dimensions required by this section shall be obtained by the normal operation of the emergency escape and rescue opening from the inside. Emergency escape and rescue openings with a finished sill height below the adjacent ground elevation shall be provided with a window well in accordance with Section R310.2. Emergency escape and rescue openings shall open directly into a public way, or to a yard or court that opens to a public way. Exception: Basements used only to house mechanical equipment and not exceeding total floor area of 200 square feet.

R310.1.1 – Minimum Opening Area: All emergency escape and rescue openings shall have a minimum net clear opening of 5.7 square feet. Exception: Grade floor openings shall have a minimum net clear opening of 5 square feet.

R310.1.2 – Minimum Opening Height: The minimum net clear opening height shall be 24 inches.

R310.1.3 – Minimum Opening Width: The minimum net clear opening width shall be 20 inches.

R310.2 – Window Wells: The minimum horizontal area of the window well shall be 9 square feet, with a minimum horizontal projection and width of 36 inches. The area of the window well shall allow the emergency escape and rescue opening to be fully opened.

R310.2.1 – Ladder and Steps: Window wells with a vertical depth greater than 44 inches shall be equipped with a permanently affixed ladder or steps usable with the window in the fully open position. Ladders or steps required by this section shall not be required to comply with Sections R311.5 and R311.6. Ladders or rungs shall have an inside width of at least 12 inches, shall project at least 3 inches from the wall and shall be spaced not more than 18 inches on center vertically for the full height of the window well.

Section R311 – Means of Egress

R311.2 – Egress Door: At least one egress door shall be provided for each dwelling unit. The egress door shall be side-hinged, and shall provide a minimum clear width of 32 inches when measured between the face of the door and the stop, with the door open 90 degrees. The minimum clear height

of the door opening shall not be less than 78 inches in height measured from the top of the threshold to the bottom of the stop. Other doors shall not be required to comply with these minimum dimensions. Egress doors shall be readily openable from inside the dwelling without the use of a key or special knowledge or effort.

R311.2.1 – Interior Doors: Interior doors shall be not less than 24 inches in width and 6 feet, 6 inches in height.

R311.3 – Floors and Landings at Exterior Doors: There shall be a landing or floor on each side of each exterior door. The width of each landing shall not be less than the door served. Every landing shall have a minimum dimension of 36 inches measured in the direction of travel. Exterior landings shall be permitted to have a slope not to exceed $\frac{1}{4}$ units vertical in 12 units horizontal. Exception: Exterior balconies less than 60 square feet and only accessible from a door are permitted to have a landing less than 36 inches measured in the direction of travel.

R311.6 – Hallways: The minimum width of a hallway shall not be less than 3 feet.

R311.7.1 – Width: Stairways shall not be less than 36 inches in clear width at all points above the permitted handrail height and below the required headroom height. Handrails shall not project more than 4.5 inches on either side of the stairway and the minimum clear width of the stairway at and below the handrail height, including treads and landings, shall not be less than 31.5 inches where a handrail is installed on one side and 27 inches where handrails are provided on both sides. Exception: The width of spiral stairways shall be in accordance with Section R311.7.9.1.

R311.7.2 – Headroom: The minimum headroom in all parts of the stairway shall not be less than 6 feet 8 inches measured vertically from the sloped line adjoining the tread nosing or from the floor surface of the landing or platform on that portion of the stairway.

R311.7.4.1 – Riser Height: The maximum riser height shall be 8-1/4 inches. The riser shall be measured vertically between leading edges of the adjacent treads. The greatest riser height within any flight of stairs shall not exceed the smallest by more than 3/8 inch.

R311.7.4.2 – Tread Depth: The minimum tread depth shall be 9 inches. The tread depth shall be measured horizontally between the vertical planes of the foremost projection of adjacent treads and at a right angle to the tread's leading edge. The greatest tread depth within any flight of stairs shall not exceed the smallest by more than 3/8 inch. Winder treads shall have a minimum tread depth of 10 inches measured as above at a point 12 inches from the side where the treads are narrower. Winder treads shall have a minimum tread depth of 6 inches at any point. Within any flight of stairs, the greatest winder tread depth at the 12-inch walk line shall not exceed the smallest by more than 3/8 inch.

R311.7.4.3 – Profile: The radius of curvature at the nosing shall be no greater than 9/16 inch. A nosing not less than 3/4 inch but not more than 1-1/4 inch shall be provided on stairways with solid risers. The greatest nosing projection shall not exceed the smallest nosing projection by more than 3/8 inch between two stories, including the nosing at the level of floors and landings. Beveling of nosings shall not exceed 1/2 inch. Risers shall be vertical or sloped under the tread from the underside of the nosing above at an angle not more than 30 degrees (0.51 rad) from the vertical. Open risers are permitted, provided that the opening between treads does not permit the passage of a 4-inch diameter sphere. Exceptions: 1) A nosing is not required where the tread depth is a minimum of 11 inches. 2) The opening between adjacent treads is not limited on stairs with a total rise of 30 inches or less. See code book for additional language.

R311.7.5 – Landings for Stairways: There shall be a floor or landing at the top and bottom of each stairway. A flight of stairs shall not have a vertical rise larger than 12 feet between floor levels or landings. The width of each landing shall not be less than the width of the stairway served. Every landing shall have a minimum dimension of 36 inches measured in the direction of travel. Exception: A floor or landing is not required at the top of an interior flight of stairs, including stairs in an enclosed garage, provided a door does not swing over the stairs.

R311.7.6 – Stairway Walking Surface: The walking surface of treads and landings of stairways shall be sloped no steeper than one unit vertical in 48 inches horizontal (2-percent slope).

R311.7.7 – Handrails: Handrails shall be provided on at least one side of each continuous run of treads or flight with four or more risers.

R311.7.7.1 – Height: Handrail height, measured vertically from the sloped plane adjoining the tread nosing, or finish surface of ramp slope, shall be not less than 34 inches and not more than 38 inches. Exceptions: 1) The use of a volute, turnout or starting easing shall be allowed over the lowest tread; 2) When handrail fittings or bendings are used to provide continuous transition between flights, the transition from handrail to guardrail, or used at the start of a flight, the handrail height at the fittings or bendings shall be permitted to exceed the maximum height.

R311.7.7.2 – Continuity: Handrails for stairways shall be continuous for the full length of the flight, from a point directly above the top riser of the flight to a point directly above the lowest riser of the flight. Handrail ends shall be returned or shall terminate in newel posts or safety terminals. Handrails adjacent to a wall shall have a space of not less than 1-1/2 inch between the wall and the handrails. Exceptions: 1) Handrails shall be permitted to be interrupted by a newel post at the turn. 2) The use of a volute, turnout, starting easing or starting newel shall be allowed over the lowest tread.

R311.7.7.3 – Handrail Grip Size: All required handrails shall be of one of the following types or provide equivalent graspability.

- 1) Type I: Handrails with a circular cross section shall have an outside diameter of at least 1-1/4 inches and not greater than 2 inches. If the handrail is not circular it shall have a perimeter dimension of at least 4 inches and not greater than 6-1/4 inches with a maximum cross section of dimension of 2-1/4 inches. Edges shall have a minimum radius of 0.01 inch.
- 2) Type II: Handrails with a perimeter greater than 6-1/4 inches shall provide a graspable finger recess area on both sides of the profile. The finger recess shall begin within a distance of 3/4 inch measured vertically from the tallest portion of the profile and achieve a depth of at least 5/16 inch within 7/8 inch below the widest portion of the profile. This required depth shall continue for at least 3/8 inch to a level that is not less than 1-3/4 inches below the tallest portion of the profile. The minimum width of the handrail above the recess shall be 1-1/4 inches to a maximum of 2-3/4 inches. Edges shall have a minimum radius of 0.01 inch.

Please contact Office for approved alternative handrail profile shapes for equivalent graspability.

R311.8.3 – Handrails Required: Handrails shall be provided on at least one side of all ramps exceeding a slope of one unit vertical in 12 units horizontal (8.33-percent slope).

R311.8.3.1 – Height: Handrail height, measured above the finished surface of the ramp slope, shall be not less than 34 inches and not more than 38 inches.

R311.8.3.2 – Grip Size: Handrails on ramps shall comply with Section R311.7.7.3.

R311.8.3.3 – Continuity: Handrails where required on ramps shall be continuous for the full length of the ramp. Handrail ends shall be returned or shall terminate in newel posts or safety terminals.

Handrails adjacent to a wall shall have a space of not less than 1.5 inches between the wall and the handrails.

Section R312 - Guards

R312.1 – Where Required: Guards shall be located along open-sided walking surfaces, including stairs, ramps and landings, that are located more than 30 inches measured vertically to the floor or grade below at any point within 36 inches horizontally to the edge of the open side. Insect screening shall not be considered as a guard.

R312.2 – Height: Required guards at open-sided walking surfaces, including stairs, porches, balconies or landings, shall be not less than 36 inches high measured vertically above the adjacent walking surface, adjacent fixed seating or the line connecting the leading edges of the treads. Exceptions: 1) Guards on the open sides of stairs have a height not less than 34 inches measured vertically from a line connecting the leading edges of the treads; 2) Where the top of the guard also serves as a handrail on the open sides of stairs, the top of the guard shall not be less than 34 inches and not more than 38 inches measured vertically from a line connecting the leading edges of the treads.

R312.3 – Opening Limitations: Required guards shall not have openings from the walkway surface to the required guard height which allow passage of a sphere 4 inches in diameter. Exceptions: 1) The triangular openings at the open side of a stair, formed by the riser, tread and bottom rail of a guard shall not allow passage of a sphere 6 inches in diameter. 2) Guards on the open sides of stairs shall not have openings which allow passage of a sphere 4-3/8 in diameter.

Section R314 – Smoke Alarms

R314.1 – Smoke Detection and Notification: All smoke alarms shall be listed in accordance with UL 217 and installed in accordance with the provisions of this code and the household fire warning equipment provisions of NFPA 72.

R314.3 – Location: Smoke alarms shall be installed in the following locations:

1. In each sleeping room.
2. Outside each separate sleeping area in the immediate vicinity of the bedrooms.
3. On each additional story of the dwelling, including basements and habitable attics but not including crawl spaces and uninhabitable attics. In dwellings or 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 that the lower level is less than one full story below the upper level.

When more than one smoke alarm is required to be installed within an individual dwelling unit the alarm devices shall be interconnected in such a manner that the actuation of one alarm will activate all of the alarms in the individual unit.

Section R315 – Carbon Monoxide Alarms

R315.1 - Carbon Monoxide Alarms: For new construction, an approved carbon monoxide alarm shall be installed outside of each separate sleeping area in the vicinity of the bedrooms in dwelling units within which fuel-fired appliances are installed and in dwelling units that have attached garages.

R315.2 - Where Required in Existing Dwellings: Where work requiring a building permit occurs in existing dwellings that have attached garages or in existing dwellings within which fuel-fired appliances exist, carbon monoxide alarms shall be provided in accordance with section R315.1.

R315.3 - Alarm Requirements: Single station carbon monoxide alarms shall be listed as complying with UL 2034 and shall be installed in accordance with this code and the manufacturer's installation instructions.

Section R316 – Foam Plastic

R316.4 – Thermal Barrier: Unless otherwise allowed in Section R316.5 or Section R316.6, foam plastic shall be separated from the interior of a building by an approved thermal barrier of minimum 0.5 inch gypsum wallboard or an approved finish material equivalent to a thermal barrier material that will limit the average temperature rise of the unexposed surface to no more than 250°F (139°C) after 15 minutes of fire exposure complying with the ASTM E 119 or UL 263 standard time temperature curve. The thermal barrier shall be installed in such a manner that it will remain in place for 15 minutes based on NFPA 286 with the acceptance criteria of Section R302.9.4, FM 4880, UL 1040 or UL 1715.

R316.5.4 – Crawl Spaces: The thermal barrier specified in Section R316.4 is not required where all the following apply:

- 1) Crawlspace access is required by Section R408.4.
- 2) Entry is made only for purposes of repairs or maintenance.
- 3) The foam plastic insulation is protected against ignition using one of the following ignition barrier materials:
 - 3.1. 1 1/2-inch-thick (38 mm) mineral fiber insulation;
 - 3.2. 1/4-inch-thick (6.4 mm) wood structural panels;
 - 3.3. 3/8-inch (9.5 mm) particleboard;
 - 3.4. 1/4-inch (6.4 mm) hardboard;
 - 3.5. 3/8-inch (9.5 mm) gypsum board; or
 - 3.6. Corrosion-resistant steel having a base metal thickness of 0.016 inch (0.41 mm).

The above ignition barrier is not required where the foam plastic insulation has been tested in accordance with Section R316.6.

Section R317 – Protection of Wood and Wood Based Products Against Decay

R317.1 – Location Required: **Contact Office for locations or reference code book.**

R317.3.1 – Fasteners for Preservative-Treated Wood: Fasteners for preservative-treated wood shall be of hot-dipped zinc-coated galvanized steel, stainless steel, silicon bronze or copper. Coating types and weights for connectors in contact with preservative-treated woods shall be in accordance with the connector manufacturer's recommendations. In the absence of manufacturer's recommendations, a minimum of ASTM A 653 type G185 zinc-coated galvanized steel, or equivalent, shall be used.

Exceptions: 1) One-half-inch diameter or greater steel bolts. 2) Fasteners other than nails and timber rivets shall be permitted to be of mechanically deposited zinc coated steel with coating weights in accordance with ASTM B 695, Class 55 minimum.

Section R319 – Site Address

R319.1 – Address Numbers: Buildings shall have approved address numbers, building numbers or approved building identification placed in a position that is plainly legible and visible from the street or road fronting the property. These numbers shall contrast with their background. Address numbers shall be Arabic numbers or alphabetical letters. Numbers shall be a minimum of 4 inches high with a minimum stroke width of 1/2 inch. Where access is by means of a private road and the building address cannot be viewed from the public way, a monument, pole or other sign or means shall be used to identify the structure.

FOUNDATIONS

Section R401 - General

R401.2 – Requirements: Foundation construction shall be capable of accommodating all loads according to Section R301 and of transmitting the resulting loads to the supporting soil. Fill soils that support footings and foundations shall be designed, installed and tested in accordance with accepted

engineering practice. Gravel fill used as footings for wood and precast concrete foundations shall comply with Section R403.

R401.3 – Drainage: Surface drainage shall be diverted to a storm sewer conveyance or other approved point of collection that does not create a hazard. Lots shall be graded to drain surface water away from foundation walls. The grade shall fall a minimum of 6 inches within the first 10 feet. Exception: Where lot lines, walls, slopes or other physical barriers prohibit 6 inches of fall within 10 feet, drains or swales shall be constructed to ensure drainage away from the structure. Impervious surfaces within 10 feet of the building foundation shall be sloped a minimum of 2 percent away from the building.

Section R402 - Materials

R402.1 – Wood Foundations: **Please contact Office for code requirements or reference code book.**

Section R403 - Footings

R403.1 – General: Footings shall be supported on undisturbed natural soils or engineered fill.

R403.1.1 – Minimum Size: **Please contact Office for code requirements or reference code book.**

R403.1.4 – Minimum Depth: All exterior footings and foundation systems shall extend 42 inches below actual grade. **(Contact Office for exceptions)**

R403.1.4.1 – Frost Protection: Protection of freestanding accessory structures with an area of 600 square feet or less, of light-framed construction, with an eave height of 10 feet or less shall not be required. Footing shall be placed on undisturbed natural soils or engineered fill with a load bearing minimum capacity of 1,500 PSF. Minimum width shall be 12 inches and depth 12 inches. **Please contact Office for code requirements or reference code book.**

R403.1.6 – Foundation Anchorage: Sill plates and walls supported directly on continuous foundations shall be anchored to the foundation in accordance with this section. Wood sole plates at exterior walls on monolithic slabs and all wood sill plates shall be anchored to the foundation with anchor bolts spaced a maximum of 6 feet on center. Bolts shall be at least 1/2 inch in diameter and shall extend a minimum of 7 inches into concrete or grouted cells of concrete masonry units. A nut and washer shall be tightened on each anchor bolt. There shall be a minimum of two bolts per plate section with one bolt located not more than 12 inches or less than seven bolt diameters from each end of the plate section. Interior bearing wall sole plates on monolithic slab foundation that are not part of a braced wall panel shall be positively anchored with approved fasteners. Sills plates and sole plates shall be protected against decay and termites where required by Sections R317 and R318. Cold-formed steel framing systems shall be fastened to wood sill plates or anchored directly to the foundation as required in Section R505.3.1 or R603.3.1. Exceptions: 1) Foundation anchorage, spaced as required to provide equivalent anchorage to 1/2-inch-diameter anchor bolts. 2) Walls 24 inches total length or shorter connecting offset braced wall panels shall be anchored to the foundation with a minimum of one anchor bolt located in the center third of the plate section and shall be attached to adjacent braced wall panels at corners as shown in figure R602.10.4.4(1). 3) Connection of walls 12 inches total length or shorter connecting offset braced wall panels to the foundation without anchor bolts shall be permitted. The wall shall be attached to adjacent braced panels at corners as shown in Figure R602.10.4.4(1).

Section R404 – Foundation and Retaining Walls

R404.1 – Concrete and Masonry Foundation Walls: **Please reference code book for table or contact Office.**

R404.1.2.3.6.1 – Stay-In-Place Forms: Stay-in-place concrete forms shall comply with this section.

- 1) Surface burning characteristics. The flame-spread index and smoke-developed index of forming material, other than foam plastic, left exposed on the interior shall comply with Section R302. The surface burning characteristics of foam plastic used in insulating concrete forms shall comply with Section R316.3.
- 2) Interior covering. Stay-in-place forms constructed of rigid foam plastic shall be protected on the interior of the building as required by Section R316. Where gypsum board is used to protect the foam plastic, it shall be installed with a mechanical fastening system. Use of adhesives in addition to mechanical fasteners is permitted.
- 3) Exterior wall covering. Stay-in-place forms constructed of rigid foam plastics shall be protected from sunlight and physical damage by the application of an approved exterior wall covering complying with this code. Exterior surfaces of other stay-in-place forming systems shall be protected in accordance with this code.
- 4) Termite hazards. In areas where hazard of termite damage is very heavy in accordance with Figure R301.2(6), foam plastic insulation shall be permitted below grade on foundation walls in accordance with one of the following conditions:
 - 4.1 Where in addition to the requirements in Section R318.1, an approved method of protecting the foam plastic and structure from subterranean termite damage is provided.
 - 4.2 The structural members of walls, floors, ceilings and roofs are entirely of noncombustible materials or pressure-preservative-treated wood.
 - 4.3 On the interior side of basement walls.

Section R405 – Foundation Drainage

R405.1 – Concrete or Masonry Foundations: Drains shall be provided around all concrete or masonry foundations that retain earth and enclose habitable or usable spaces located below grade. Reference code for installation requirements. Exception: A drainage system is not required when foundation is installed on well-drained ground or sand-gravel mixture soils.

Section R406 – Foundation Waterproofing and Dampproofing

R406.1 – Concrete and Masonry Foundation Dampproofing: Except where required by Section R406.2 to be waterproofed, foundation walls that retain earth and enclose interior spaces and floors below grade shall be dampproofed from the top of the footing to the finished grade. **All crawl spaces require dampproofing.** Masonry walls shall have not less than 3/8 inch portland cement parging applied to the exterior of the wall. The parging shall be dampproofed in accordance with one of the following:

1. Bituminous coating.
2. 3 pounds per square yard (1.63 kg/m²) of acrylic modified cement.
3. 1/8-inch (3.2 mm) coat of surface-bonding cement complying with ASTM C 887.
4. Any material permitted for waterproofing in Section R406.2.
5. Other approved methods or materials.

Exception: Parging of unit masonry walls is not required where a material is approved for direct application to the masonry.

Concrete walls shall be dampproofed by applying any one of the above listed dampproofing materials or any one of the waterproofing materials listed in Section R406.2 to the exterior of the wall.

R406.2 – Concrete and Masonry Foundation Waterproofing: In areas where a high water table or other severe soil-water conditions are known to exist, exterior foundation walls that retain earth and enclose interior spaces and floors below grade shall be waterproofed from the top of the footing to the finished grade. Walls shall be waterproofed in accordance with one of the following:

1. 2-ply hot-mopped felts.
2. 55 pound (25 kg) roll roofing.
3. 6-mil (0.15 mm) polyvinyl chloride.
4. 6-mil (0.15 mm) polyethylene.
5. 40-mil (1 mm) polymer-modified asphalt.

6. 60-mil (1.5 mm) flexible polymer cement.
7. 1/8 inch (3 mm) cement-based, fiber-reinforced, waterproof coating.
8. 60-mil (0.22 mm) solvent-free liquid-applied synthetic rubber.

Exception: Organic-solvent-based products such as hydrocarbons, chlorinated hydrocarbons, ketones and esters shall not be used for ICF walls with expanded polystyrene form material. Use of plastic roofing cements, acrylic coatings, latex coatings, mortars and parings to seal ICF walls is permitted. Cold-setting asphalt or hot asphalt shall conform to type C of ASTM D 449. Hot asphalt shall be applied at a temperature of less than 200°F (93°C).

All joints in membrane waterproofing shall be lapped and sealed with an adhesive compatible with the membrane.

Section R408 – Under-Floor Space

R408.1 – Ventilation: The under-floor space between the bottom of the floor joists and the earth under any building (except space occupied by a basement) shall have ventilation openings through foundation walls or exterior walls. The minimum net area of ventilation openings shall not be less than 1 square foot (0.0929 m²) for each 150 square feet (14 m²) of under-floor space area, unless the ground surface is covered by a Class 1 vapor retarder material. When a Class 1 vapor retarder material is used, the minimum net area of ventilation openings shall not be less than 1 square foot for each 1,500 square feet of under-floor space area. One such ventilating opening shall be within 3 feet of each corner of the building.

R408.3 – Unvented Crawl Space: Ventilation openings in under-floor spaces specified in Sections R408.1 and R408.2 shall not be required where:

1. Exposed earth is covered with a continuous Class 1 vapor retarder. Joints of the vapor retarder shall overlap by 6 inches (152 mm) and shall be sealed or taped. The edges of the vapor retarder shall extend at least 6 inches (152 mm) up the stem wall and shall be attached and sealed to the stem wall; and
2. One of the following is provided for the under-floor space:
 - 2.1. Continuously operated mechanical exhaust ventilation at a rate equal to 1 cfm (0.47 L/s) for each 50 square feet (4.7 m²) of crawlspace floor area, including an air pathway to the common area (such as a duct or transfer grille), and perimeter walls insulated in accordance with Section N1102.2.9;
 - 2.2. Conditioned air supply sized to deliver at a rate equal to 1 cfm (0.47 L/s) for each 50 square feet (4.7 m²) of under-floor area, including a return air pathway to the common area (such as a duct or transfer grille), and perimeter walls insulated in accordance with Section N1102.2.9;
 - 2.3. Plenum in existing structures complying with Section M1601.5, if under-floor space is used as a plenum.

R408.4 – Access: Access openings through the floor shall be a minimum of 18 inches by 24 inches. Openings through a perimeter wall shall be not less than 16 inches by 24 inches.

FLOORS

Section R501 - General

R501.2 – Requirements: Floor construction shall be capable of accommodating all loads according to Section R301 and of transmitting the resulting loads to the supporting structural elements.

WALL CONSTRUCTION

Section R601 - General

R601.2 – Requirements: Wall construction shall be capable of accommodating all loads imposed according to Section R301 and of transmitting the resulting loads to the supporting structural elements.

Section R612 – Exterior Windows and Doors

R612.1 – General: This section prescribes performance and construction requirements for exterior window and doors installed in walls. Windows and doors shall be installed and flashed in accordance with the fenestration manufacturer's written installation instructions. Window and door openings shall be flashed in accordance with Section R703.8. Written installation instructions shall be provided by the fenestration manufacturer for each window or door.

R612.2 – Window Sills: In dwelling units, where the opening of an operable window is located more than 72 inches above the finished grade or surface below, the lowest part of the clear opening of the window shall be a minimum of 24 inches above the finished floor of the room in which the window is located. Operable sections of windows shall not permit openings that allow passage of a 4 inch diameter sphere where such openings are located within 24 inches of the finished floor. Exceptions: 1) Windows whose openings will not allow a 4-inch-diameter sphere to pass through the opening when the opening is in its largest opened position. 2) Openings that are provided with window fall prevention devices that comply with Section R612.3. 3) Openings that are provided with fall prevention devices that comply with ASTM F 2090. 4) Windows that are provided with opening limiting devices that comply with Section R612.4.

ROOF-CEILING CONSTRUCTION

Section R801 - General

R801.2 – Requirements: Roof and ceiling construction shall be capable of accommodating all loads imposed according to Section R301 and of transmitting the resulting loads to the supporting structural elements.

Section R802 – Wood Roof Framing

R802.10.1 – Truss Design Drawings: Truss design drawings, prepared in conformance with Section R802.10.1, shall be provided to the building official and approved prior to installation.

R802.10.5 – Truss to Wall Connection: Trusses shall be connected to wall plates by the use of approved connectors having a resistance to uplift of not less than 175 pounds (779 N) and shall be installed in accordance with the manufacturer's specifications. For roof assemblies subject to wind uplift pressures of 20 pounds per square foot (960 Pa) or greater, as established in Table R301.2(2), adjusted for height and exposure per Table R301.2(3), see Section R802.11.

Section R806 – Roof Ventilation

R806.1 – Ventilation Required: Enclosed attics and enclosed rafter spaces formed where ceilings are applied directly to the underside of roof rafters shall have cross ventilation for each separate space by ventilating openings protected against the entrance of rain or snow. Ventilation openings shall have a least dimension of 1/16 inch minimum and ¼ inch maximum. Ventilation openings having a least dimension larger than ¼ inch shall be provided with corrosion-resistant wire cloth screening, hardware cloth, or similar material with openings having a least dimension of 1/16 inch minimum and ¼ inch maximum. Openings in roof framing members shall conform to the requirements of Section R802.7.

R806.2 – Minimum Area: The total net free ventilating area shall not be less than 1/150 of the area of the space ventilated except that reduction of the total area to 1/300 is permitted provided that at least 50 percent and not more than 80 percent of the required ventilating area is provided by ventilators located in the upper portion of the space to be ventilated at least 3 feet above the eave or cornice vents with the balance of the required ventilation provided by eave or cornice vents. As an alternative, the net free cross-ventilation area may be reduced to 1/300 when a Class I or II vapor retarder is installed on the warm-in-winter side of the ceiling.

R806.4 – Unvented Attic Assemblies: **Please contact Office for code requirements or reference code book.**

Section R807 – Attic Access

R807.1 – Attic Access: Buildings with combustible ceiling or roof construction shall have an attic access opening to attic areas that exceed 30 square feet (2.8 m²) and have a vertical height of 30 inches (762 mm) or greater. The vertical height shall be measured from the top of the ceiling framing members to the underside of the roof framing members.

The rough-framed opening shall not be less than 22 inches by 30 inches (559 mm by 762 mm) and shall be located in a hallway or other readily accessible location. When located in a wall, the opening shall be minimum of 22 inches wide by 30 inches high. When the access is located in a ceiling, minimum unobstructed headroom in the attic space shall be 30 inches at some point above the access measured vertically from the bottom of ceiling framing members. See Section M1305.1.3 for access requirements where mechanical equipment is located in attics.

ROOF ASSEMBLIES

Section R905 – Requirements for Roof Coverings

R905.1 – Roof Covering Application: Roof coverings shall be applied in accordance with the applicable provisions of this section and the manufacturer's installation instructions.

CHIMNEYS AND FIREPLACES

Section R1001 – Masonry Fireplaces

R1001.1 – General: Masonry fireplaces shall be constructed in accordance with this section and the applicable provisions of Chapters 3 and 4. **Please contact Office or reference building code for building requirements.**

ENERGY EFFICIENCY

2009 Michigan Uniform Energy Code, effective March 9, 2011