

# Plan Review Checklist-2015 International Residential Code

## 1. **CONSTRUCTION DOCUMENTS & COMPLIANCE**

### **TO APPROVED PLANS:** IRC Section R106.

(1) Approved site plans shall be attached to the approved building plans during inspection. (2) Property lines shall be marked. (3) **Setback distances will be measured from the furthest projection of the permitted structure.**

(3) Manufacturer's installation instructions shall be available on the job site at the time of inspection. (4) All work shall be installed in accordance with the approved construction documents. (5) Any changes made during construction that are not in compliance with the approved construction documents shall be resubmitted for approval as an amended set of construction documents. To request approval of revisions complete a "Request to Revise Approved Plan" application and submit to the Mason County Permit Center **along with approved plans and documents detailing the proposed changes.**

## 2. **EGRESS WINDOWS:** IRC Section R311. All sleeping

rooms and basements with habitable space shall have at least one open able emergency escape and rescue opening. Such opening shall open directly into a public street, public alley, yard or court. Emergency escape and rescue openings shall have a minimum net clear opening of 5.7 square feet. Except that grade floor openings shall have a minimum net clear opening of 5 square feet (*see definition below*). The minimum net clear opening height dimension shall be 24". The minimum net clear opening width dimension shall be 20". **The openings shall have a maximum height of not more than 44" measured from the finished floor to the bottom of the clear opening.**

Emergency escape and rescue openings shall be operational from the inside of the room without use of keys or tools or special knowledge. Window wells shall be provided when egress windows have a finished sill height below adjacent ground elevation. The well shall allow the window to be fully opened and provide a minimum horizontal area of 9 sq. ft, with a minimum horizontal projection and width of 36-inches. Window wells with a vertical depth of more than 44" shall be equipped with a permanent ladder. *Grade floor opening definition: A window or other opening located such that the sill height of the opening is not more than 44" above or below the finished ground level adjacent to the opening. Refer to handout for additional information*

## 3. **SMOKE & CARBON MONOXIDE ALARMS:** IRC

Section R314 & WAC R315. All smoke alarms shall be listed in accordance with UL217 and installed in accordance with the provisions of the International Residential Code and the household warning equipment provisions of NFPA 72. Smoke alarms shall be installed in each sleeping room, outside each separate sleeping area in the immediate vicinity of the bedrooms, in napping areas of family child daycare homes, on each additional story of the dwelling including basements and habitable attics. Each story including basements and habitable attics shall have at least one detector. When more than one smoke alarm is required to be installed 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. The alarm shall be clearly audible in all bedrooms over background noise levels with all intervening doors closed. 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. Additions, interior alterations, and repairs shall be provided with smoke alarms as required for new dwellings; the smoke alarms shall be interconnected and hard wired. *Exception: Smoke alarms are not required to be interconnected and hardwired where the alteration or repairs does not result in the removal of interior wall or ceiling finishes exposing the structure, unless there is an attic, crawl space, or basement available which could provide access for hard wiring and interconnection without removal of hard finishes. Repairs to the exterior surfaces of dwellings are exempt from these requirements.*

Carbon monoxide alarms are required in new residential construction, where dwelling has **either or both** of the following conditions exist (1) the dwelling contains a fuel-fired appliance. (2) the dwelling has an attached garage with an opening that communicates with the residence. Carbon monoxide alarms shall be listed in accordance with UL 2034. Combination carbon monoxide and smoke alarms shall be listed in accordance with UL 2034 and UL 217. Detectors shall be installed outside of each separate sleeping room in the immediate vicinity outside of the bedroom in the dwelling and on each level of the dwelling in accordance with manufacturer's specifications. **Where a fuel burning appliance is located within a bedroom or its attached bathroom, a carbon monoxide alarm shall be installed within the bedroom.**

4. **SAFETY GLAZING :** R308.1 Each pane of glass installed in a hazardous location shall be provided with a manufacturer's designation specifying who applied the designation, designating the type of glass and the safety glazing standard. The designation shall be visible in the final installation and shall be acid etched, sand-blasted, ceramic fired, laser etched, embossed or on that cannot be removed without being destroyed. R308.4.1 Hazardous locations. The following shall be considered specific hazardous locations for the purposes of glazing:

Glazing in all fixed and operable panels of swinging, sliding and bi-fold doors.

### *Exceptions:*

*Glazed openings of a size through which a 3-inch diameter (76 mm) sphere is unable to pass.*

*Decorative glazing.*

R308.4.2. Glazing in an individual fixed or operable panel adjacent to a door shall be considered to be a hazardous location where the bottom exposed edge of the glazing is less than 60 inches above the floor or walking surface and

it meets either of the following conditions: (1) Where the glazing is within 24 inches of either side of the door in the plane of the door in a closed position. (2) Where the glazing is on a wall perpendicular to the plane of the door in a closed position and within 24 inches of the hinge side of an in-swinging door.

*Exceptions:*

1. *Decorative glazing.*
2. *When there is an intervening wall or other permanent barrier between the door and the glazing.*
3. *Glazing where access through the door is to a closet or storage area 3-ft or less in depth.*
4. *Glazing that is adjacent to the fixed panel of patio doors.*

R308.4.3. Glazing in an individual fixed or operable panel that meets all of the following conditions:

1. The exposed area of an individual pane is larger than 9 square feet; and
2. The bottom edge of the glazing is less than 18 inches above the floor; and
3. The top edge of the glazing is more than 36 inches above the floor; and
4. One or more walking surfaces are within 36 inches, measured horizontally and in a straight line, of the glazing.

*Exceptions:*

1. *Decorative glazing.*
2. *When a horizontal rail is installed on the accessible side(s) of the glazing 34 to 38 inches above the walking surface. The rail shall be capable of withstanding a horizontal load of 50 pounds per linear foot without contacting the glass and be a minimum of 1 1/2 inches (38 mm) in cross sectional height.*
3. *Outboard panes in insulating glass units and other multiple glazed panels when the bottom edge of the glass is 25 feet or more above grade, a roof, walking surfaces or other horizontal [within 45 degrees of horizontal] surface adjacent to the glass exterior.*

R308.4.4. All glazing in guards and railings regardless of area or height above a walking surface, including structural baluster panels and nonstructural infill panels shall be considered to be a hazardous area location. Glass used as a handrail assembly or a *guard* section shall be firmly supported on all edges. As an option glazing not supported on all edges shall be approved subject to detailed construction documents, detailed shop drawings, and analysis or test data assuring safe performance for the specific installation prepared by a registered design professional shall be required. (ref IBC2403)

R308.4.4.1 Structural glass baluster panels. Guards with structural glass baluster panels shall be installed with an attached top rail or handrail. The top rail or handrail shall be supported by a minimum of three glass baluster panels, or shall be otherwise supported to remain in place should on glass baluster panel fail.

*Exception: An attached top rail or handrail is not required where the glass baluster panes are laminated glass with two or more glass plies of equal thickness and of the same glass type.*

R308.4.5. Glazing and wet surfaces including enclosures or walls facing hot tubs, whirlpools, saunas, steam rooms, bathtubs and showers where the bottom-exposed edge of the glazing is less than 60 inches measured vertically above any standing or walking surface and less than 60-inches measured horizontally in a straight line from the water's edge of a bathtub, hot spa, or whirlpool, or swimming pool. Glazing in walls and fences adjacent to indoor and outdoor swimming pools, hot tubs and spas where the bottom edge of the glazing is less than 60 inches above a walking surface and within 60 inches, measured horizontally and in a straight line, of the water's edge. This shall apply to single glazing and all panes in multiple glazing.

R308.4.6. Glazing adjacent to stairways, landings and ramps less than 36 inches above the plane of the walking surface.

*Exceptions:*

1. *When a rail is installed on the accessible side(s) of the glazing 34 to 38 inches above the walking surface. The rail shall be capable of withstanding a horizontal load of 50 pounds per linear foot without contacting the glass and be a minimum of 1 1/2 inches in cross sectional height.*
2. *Glazing 36-inches or more measured horizontally from the walking surface.*

R308.4.7. Glazing adjacent to the stair landing at the bottom of a stairway where the glazing is less than 36-inches above the landing and within 60 inches horizontally of the bottom tread.

*Exceptions:*

1. *The side of the stairway has a guardrail or handrail, including balusters or in-fill panels, complying with Sections R311.7.6 and R312 and the plane of the glass is more than 18 inches from the guard.*

## 5. **WINDOW OPENINGS:**

IRC R312.2.1 **FALL PROTECTION:** In dwelling units, where the top of the sill of an operable window opening is located less than 24 inches above the finished floor and greater than 72 inches above the finish grade or other surface below on the exterior of the building, operable window shall comply with one of the following:

1. Operable windows whose openings will not allow a 4-inch diameter (102 mm) sphere to pass through the opening when the opening is in its largest opened position.
2. Operable windows that are provided with window fall prevention devices that comply with ASTM F-2090.
3. Operable windows that are provided with window opening control devices that comply with Section R312.2.2.

IRC R303 **NATURAL LIGHT & VENTILATION:** All habitable rooms shall be provided aggregate-glazing area

of not less than 8% of the area of such rooms. Natural ventilation shall be through windows, doors, louvers or other approved openings to the outdoor air. The minimum open able area to the outdoors shall be 4% of the floor area being ventilated.

*Exception:*

1. *The glazed area need not be open able where the opening is not required by R310 (egress) and an approved mechanical ventilation system is provided capable of producing .35 ACH in the room or a Whole house mechanical ventilation system is installed capable of supplying outdoor ventilation air of 15 CFM per occupant computed on the basis of two occupants for the 1st bedroom and one occupant for each additional bedroom.*

2. *The glazed areas need not be provided in rooms where artificial light is provided and capable of producing an average illumination of 6 foot-candles over the area of the room at a height of 30 inches above the floor level. (WAC51-50)*

6. **EXHAUST FANS:** IRC R303.4, Section M1501, M1507. Exhaust fans are required in each kitchen, bathroom, water closet room, laundry facility, indoor swimming pool, spa and other rooms where excess water vapor or cooking odor is produced. The air removed by every mechanical exhaust system shall be discharged outdoors at a point where it will not cause a nuisance and not less than the distances specified in IMC Section 501.3.1. The air shall be discharged to a location from which it cannot again be readily drawn in by a ventilating system. Dryer exhaust ducts shall **not** be exhausted into an attic or crawl space. **The termination point shall be located at least 3-feet from property lines, 3-feet in any direction from openings into the buildings and 10-feet from mechanical air intakes. See energy section of this checklist for more specific requirements.**

7. **CLOTHES DRYERS:** IRC Section M1502, G2439, & IMC Section 504. Exhaust ducts, not less than 4-inch diameter, shall be constructed of .016-inch-thick (28-gage) rigid metal ducts, having smooth interior surfaces with joints running in the direction of air flow. Exhaust ducts may be connected with **short** pop-rivets or 1/8 inch screws. Either can only extend 1/8 inch max into the duct. **Ducts must be supported at intervals not to exceed 12-ft and secured in place.** Transition ducts shall not be concealed within construction. Flexible transition ducts used to connect the dryer to the to the exhaust system shall be limited to single lengths, not to exceed 8-feet and shall be listed and labeled in accordance to UL 2158A. Exhaust ducts shall terminate outside the building not less than 3-feet in any direction from openings into buildings. Screens shall not be installed at the duct termination. Ducts shall be equipped with a back draft damper. The maximum length of a clothes dryer exhaust duct shall be in accordance with manufacturer specifications or shall not exceed 35 feet from the dryer location to the wall or roof termination. When fittings are used the maximum length of the duct shall be reduced in accordance to Table M1502.4.4.1. The maximum length of the exhaust duct

does not include the transition duct.

8. **RANGE HOOD:** IRC Section M1501, M1503, M1504, M1505, M1901& M1306. All kitchens shall be provided with exhaust hoods capable of exhausting 100 CFM at .25 inches water gauge. Exhaust hoods shall be installed in accordance with manufacturer installation instructions and discharge to the outdoors. Single wall ducts serving range hoods shall be constructed of galvanized steel, stainless steel or copper. Such ducts shall have a smooth inner wall and air tight and equipped with a back draft damper. Exhaust systems capable of exhausting in excess of 400 CFM shall be provided with make-up air at a rate approximately equal to the exhaust air rate. Such makeup air system shall be equipped with not less than one damper; each damper shall be a gravity damper or an electrically operated that automatically opens when the exhaust system operates. Dampers shall be accessible for inspection, service, repair and replacement without removing permanent construction or any other ducts not connected to the damper being inspected, serviced, repaired or replaced. Clearance of at least **30-inches** shall be maintained between the cooking surface and the combustible material or cabinet. Reduced clearances are permitted in accordance with the listing and labeling of the range hoods or appliances. Clearances to combustibles shall include such considerations as door swing, drawer pull, overhead projections or shelving and window swing, coverings and drapes.

9. **WATER CLOSET:** IRC Section R307, UPC Section 408, 402. Water closet shall be located in a clear space not less than 30" in width. The clear space in front shall not be less than 21-inches. Water closet seats shall be of smooth, non-absorbent material. The maximum water use allowed in gallons per flush (gpf) shall not exceed 1.6 gpf.

10. **SHOWER and BATHTUB AREAS:** IRC Section R307, and UPC Sections 411, 414, 415, and 418. Bathtub and shower floors and walls above bathtubs with installed showerheads and in shower compartments shall be finished with non-absorbent surfaces that extend to a height of not less than 6-feet above the floor. The clear space in front of the shower opening shall not be less than 24-inches. All showers shall have a minimum finished interior floor area of 900 square inches and shall be capable of encompassing a 30-inch circle. The minimum area and dimensions shall be maintained to a point 70" above the shower drain outlet. Shower receptors shall have curbs not less than 2-inches and not more than 9- inches deep. The finished floor shall slope uniformly toward the drain not less than 1/4-inch vertical per foot horizontal (2% slope) nor more than 1/2" per foot, and floor drains shall be flanged to provide watertight joint in the floor. On-site built-up shower receptors shall be lined in accordance to UPC Section 408.7 **Shower receptors shall be tested for water tightness by filling with water to the level of the rough threshold.** A removable panel shall be provided to access and remove whirlpool pumps. Whirlpool pump access located in the crawl space shall be located no more than 20-feet from an access door. Showers and tub-shower

combinations shall be provided with individual control valves that provide scald and thermal shock protection and shall conform to ASSE 1016. Hot water supplied to bathtubs, whirlpool bathtubs and showers shall be limited to a maximum temperature of 120°F. The water heater thermostat shall not be considered a suitable control for meeting this provision.

11. **CHIMNEYS & FIREPLACES:** IRC Chapter 10, R903.2.2, R905. After January 1, 1997 no new or used factory-built fireplace, and new masonry or concrete fireplace shall be installed in Washington State unless certified and labeled in accordance with the procedures and criteria specified ASTM E2558, Standard Test Method for Determining Particulate Matter Emissions from Fires in Los Mass Wood Burning Fireplaces. Contact the Olympic Region Clean Air Agency ([www.ORCAA.org](http://www.ORCAA.org)) to obtain a list of approved fireplaces and stoves.

**FACTORY BUILT CHIMNEYS & FIREPLACES:** shall be labeled and installed in accordance with the conditions of the listing. Factory built chimneys installed in dwelling units with solid-fuel-burning appliances shall comply with the HT requirements of UL 103 and shall be marked "Type HT and Residential Type and Building Heating Appliance Chimney."

**MASONRY FIREPLACES/CHIMNEYS:** IRC Chapter 10 Masonry and concrete chimneys shall be designed and reviewed in accordance with Chapter 10 of IRC. R1001 Masonry and concrete chimneys shall be anchored **at each floor, ceiling or roofline more than 6 feet above grade except where constructed completely within exterior walls.** Chimneys shall be provided with crickets where the dimension parallel to the ridgeline is greater than 30 inches and does not intersect the ridgeline. The intersection of the cricket and the chimney shall be flashed and counter flashed in the same manner as normal roof-chimney intersections. Crickets shall be constructed in compliance with Figure R1003.20 and Table R1003.20. Chimney flashing shall be applied according to the asphalt shingle manufacturer printed instructions.

12. **TIGHT-FITTING DOORS (FIREPLACE):** R1006.2. Solid fuel burning appliances and fireplaces shall be provided with tight-fitting metal or ceramic glass doors and an outside source for combustion air shall be ducted to the firebox. (See WAC 50-51/R1006.2)

13. **FIREPLACE HEARTH EXTENSION:** IRC Sections R1004.2, R1001.9, R1001.10 and R1004.2, M1414.2. Hearth extensions of approved factory-built fireplaces shall be installed in accordance with the listing of the fireplace. The hearth extension shall be readily distinguishable from the surrounding floor area. Masonry fireplace hearths and hearth extensions shall be constructed of concrete or masonry, supported by noncombustible materials. Fireplace hearths shall be at least 4" thick and hearth extensions shall be at least 2" thick. The fireplace extension shall extend at least 16" in front of, and at least 8" beyond each side of the fireplace opening. Where the fireplace opening is 6 square feet or

larger, the hearth extension shall extend at least 20" in front of, and at least 12" beyond each side of the fireplace opening. Hearth extensions for fireplace stoves shall be installed in accordance to the listing of the fireplace stove.

14. **CLEARANCE TO COMBUSTIBLES & FIREPLACE FIREBLOCKING:** IRC Sections R302.13, R1001.11, 1003.18, 1003.19, and M1306.2.1. Combustible insulation shall be separated a minimum of 3" from heat producing appliances. *Exception: Insulation shall be separated in accordance with conditions stipulated in manufacturer's listing.* When masonry chimneys are built within a structure, minimum 2" air space clearance to combustible material is required. When the chimney is placed on the exterior of the structure, a 1" clearance is allowed. The air space shall not be filled, except to provide noncombustible fireblocking. All wood beams, joists, studs and other combustible material shall have a clearance of not less than 2" from the front faces and sides of masonry fireplaces and not less than 4" from the back faces of masonry fireplaces. The air space shall not be filled, except to provide fireblocking in accordance to Section R602.8 (see item #64). All spaces between chimneys and floors and ceilings through which chimneys pass shall be fireblocked with noncombustible material securely fastened in place. The fireblocking of spaces between chimneys and wood beams, joists, or headers shall be self-supporting or be placed on strips of metal or metal lath laid across the spaces between combustible material and the chimney. The air space shall not be filled, except to provide fire blocking in accordance with sections R1003.19. Woodwork or other combustible materials shall not be placed within 6" of a fireplace opening. Combustible material placed within 12" of the fireplace opening (such as mantles or decorative fireplace surrounds) shall not project more than 1/8" for each 1" clearance from the opening.

15. **COMBUSTION AIR/EXTERIOR AIR SUPPLY:** IRC R1001.7.1 (WAC), AND R1006. (WAC), M1701 and G2407. Masonry fireplaces shall be equipped with a ferrous metal damper located at least 8 inches above the top of the fireplace opening. Dampers shall be installed in the fireplace or the chimney venting the fireplace, and shall be operable from the room containing the fireplace. Fireplaces shall be provided with each of the following: (1) Tightly fitting flue dampers, operated by a readily accessible manual or approved automatic control; exception: Fireplaces with gas logs shall be installed in accordance with the IMC section 901, except that the standards for Liquefied Petroleum Gas Code and NFPA 54 (National Fuel Gas Code). (2) An outside source for combustion air ducted into the firebox. The duct shall be at least 6 square inches, and shall be provided with an operable outside air duct damper. (3) Site built fireplaces shall have tight fitting glass or metal doors, or a flue draft induction fan or as approved for minimizing back drafting. Factory built fireplaces shall use doors listed for the installed appliance. Direct vent appliances or equipment that does not draw combustion air from inside

of the building shall be provided with combustion ventilation and dilution air in accordance to the manufacturer's specifications. Fuel gas dryers shall be provided with make-up air as directed by manufacturer specifications. Solid-fuel-burning appliances shall be provided with combustion air in accordance with the manufacturers' installation instructions. Oil-fired appliances shall be provided with combustion air in accordance to NFPA 31. Where required, outdoor combustion air shall be provided in accordance to IRC G2407.6. The minimum dimension of air openings shall be not less than 3 inches. *Two-permanent-openings method:* Two permanent openings, one commencing within 12 inches of the top and one commencing within 12 in. of the bottom of the enclosure, shall be provided. The openings shall communicate directly, or by ducts, with the outdoors or spaces that freely communicate with the outdoors and have an opening of 1 sq- inch per 4,000 Btu/h of total input rating of all *appliances* in the enclosure. Where communicating with the outdoors through horizontal ducts, each opening shall have a minimum free area of not less than 1 square inch per 2,000 Btu/h of total input rating of all *appliances* in the enclosure. *One-permanent-opening method:* One permanent opening, commencing within 12 inches of the top of the enclosure, shall be provided. The *appliance* shall have *clearances* of at least 1 inch from the sides and back and 6 inches from the front of the *appliance*. The opening shall directly communicate with the outdoors or through a vertical or horizontal duct to the outdoors, or spaces that freely communicate with the outdoors and shall have a minimum free area of 1 square inch per 3,000 Btu/h of the total input rating of all *appliances* located in the enclosure and not less than the sum of the areas of all *vent connectors* in the space. Outside combustion air openings shall be corrosion resistant screen or equivalent protection having not less than ¼-inch openings and not greater than ½" openings. Unless otherwise specified by the manufacturer or determined by actual measurement, the free area shall be considered 75% of the gross area for metal louvers and 25% of the gross area for wood louvers. Volume dampers (manual dampers) shall not be installed in combustion air openings. Openings shall be covered with corrosion-resistant screen, not less than ¼-inch openings and not greater than ½-inch openings. Outdoor air openings for fuel-burning appliances are permitted to connect spaces such as ventilated crawl spaces or ventilated attic spaces, provided those spaces can provide unobstructed openings to the outdoors. The exterior air intake shall not be located within the garage or basement of the dwelling nor shall the air intake be located at an elevation higher than the firebox. Mechanical and gravity outside air intake openings shall be located a minimum of 10' from any hazardous or noxious contaminant, such as vents, chimneys, plumbing vents, streets, alleys, parking lots and loading docks. Where a source of contaminant is located within 10' of an intake opening, such opening shall be located a min. of 2' below the contaminant source. Exhaust from dwelling units, toilet rooms, bathrooms and kitchens shall not be

considered as hazardous or noxious.

16. **APPLIANCE INSTALLATION:** IRC Chapter M-12, Chapter M-13, M2005, G2406. Appliances shall be listed and labeled for the application in which they are installed and used. A permanent factory-applied nameplate shall be affixed to appliances with information listed in accordance to M1303. The standards for liquefied petroleum gas installations shall be in accordance with NFPA 58 (Liquefied Petroleum Gas Code) and the International Fuel Gas Code. **The manufacturer's operating and installation instructions shall remain attached to the appliance.** Fuel-fired appliances shall not be located in sleeping rooms, bathrooms, toilet rooms, or storage closets. *Exception: 1) direct vent appliances that obtain all combustion air from the outdoors.* Where combustion air is obtained from a dedicated enclosure in which combustion air is taken directly from the outdoor in accordance to G2407, *access to such enclosure shall be through a WSEC approved solid door, weather-stripped and equipped with an approved self-closing device.* Appliances shall be accessible for inspection, service, repair, and replacement without removing permanent construction, other appliances, or other piping or ducts not connected to the appliance. Appliances shall not be installed in a location where subject to mechanical damage unless protected by approved barriers. Appliances designed to be in fixed positions shall be anchored or strapped to resist horizontal displacement caused by earthquake motion in an approved manner. Strapping shall be at points within the upper 1/3 and lower 1/3 of the appliances vertical dimensions. At the lower point the strapping shall maintain a minimum distance of 4-inches above the controls. Fuel-fired furnaces and boilers installed in closets and alcoves shall be listed for such installation. Equipment installed in outdoor locations shall be either listed for outdoor installation or provided with protection from outdoor environment factors that influence operability, durability and safety of the equipment. Appliances installed in a compartment, alcove, basement or similar space shall be accessed by an opening or 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 there is a level service space of not less than 30-inches deep and the height of the appliance, but not less than 30-inches, at the front or service side of the appliance with the door open. Attics containing appliances requiring access shall have an opening and a clear unobstructed passageway large enough to allow removal of the largest appliance, but not less than 30-inches high and 22-inches wide and not more than 20-feet long when measure from the opening to the appliance. The passageway shall have continuous solid flooring not less than 24-inches wide. A level service space at least 30-inches x 30-inches along all sides. Appliances located in under floor spaces shall have an unobstructed passageway large enough to remove the largest appliance, but not less than 30-inches high and 22-inches wide, nor more than 20-feet long, measured from the opening to the appliance. A level service space at least

30-inches x 30-inches along all sides. If the service space exceeds 12-inches below the adjoining grade, the walls on the passageway shall be lined with concrete or masonry extending 4-inches above the adjoining grade. Appliance supported from the ground shall be level and firmly supported on a concrete slab. Appliances suspended from the floor shall have a clearance of not less than 3-inches from the ground in stalled in accordance to manufacturer specifications. Luminaries, controlled by a switch at the passageway opening shall be installed near under floor and attic appliances and a receptacle outlet shall be installed at or near the appliance location.

17. **APPLIANCES LOCATED IN GARAGE:** IRC Section M1307, IBC 1607.8.3. Appliances located in a garage, carport or other location where subject to vehicle damage shall be protected with approved barriers. Vehicle barrier systems for passenger cars shall be designed to resist a single load of 6,000 lbs. Applied horizontally in any direction to the barrier system and shall have anchorage or attachment capable of transmitting this load to the structure. For design of the system, the load shall be assumed to act at a minimum height of 1'6" above the floor or ramp surface on an area not to exceed 1 sq. ft. Equipment and appliances having an ignition source shall be elevated such that the source of ignition is not less than 18" above the floor surface on which the equipment or appliance stands unless the appliance is listed as flammable vapor ignition resistant. Rooms or spaces that are not part of the living space of a dwelling unit and that communicate with the private garage through openings shall be considered to be part of the garage and appliances located in the space shall be elevated as specified above.
18. **WATER HEATERS:** UPC Chapter 5 & 608, IRC Section M1307.2, M2005 & IECC/WSEC R403.4. When water heaters or hot water storage tanks are installed in locations where leakage of the tanks or connections will cause damage, the tank or water heater shall be installed in a watertight pan of corrosion resistant material. The pan shall be at least 1.5" deep and with a 3/4" diameter drain to the exterior of the building not less than 6" and not more than 24" above the adjacent ground surface. Temperature and pressure relief valves shall be drained to the outside of the building. Drains may not be trapped. Pressure relieve drains must terminate not more than 2' nor less than 6" above the ground or the flood level of the area receiving the discharge and pointing downward. Water heaters shall be anchored or strapped to resist horizontal displacement due to earthquake motion. *Twenty-two (22) gage x 3/4" straps* shall be used and be placed at points within the upper one-third (1/3) and lower one-third (1/3) of its vertical dimensions. At the lower point, a minimum distance of 4" shall be maintained above the controls. Lag screws not less than 1/4" in diameter must be used to anchor the restraints to the wall and each lag screw must have at least 1-1/2" thread penetration into a stud wall. A flat washer must be installed between each lag screw and the strap for reinforcement. When the water supply system is provided with a pressure regulating device or check valve a properly sized expansion tank shall be installed per

manufacturer specifications. Check with your water purveyor. Water heaters used to supply both potable hot water and hot water for space heating shall be installed in accordance with manufacturer's installation instructions. In accordance with WSEC R403.2 Hot water boilers that supply heat to the building through one or two pipe heating systems shall have an outdoor temperature setback control that shall have on outdoor temperature setback control that lowers the boiler water temperature based on the outdoor temperature. Service water heater shall be equipped with automatic temperature controls and shall be set to 120oF. WSEC Section 403.5.5 requires that all electric water heaters shall be placed on an incompressible, insulated surface with a minimum thermal resistance of R-10, when located in an unheated space or on a concrete floor.

19. **LPG (PROPANE) APPLIANCES & TANKS:** IFGC 303, NFPA 58, IRC M1301, IRC Chapter G24, & IMC Section 303.7 and IFGC303.7. Appliances shall be installed in accordance with the manufacturer listing. Fuel-gas appliances shall not be located in sleeping rooms, bathrooms, toilet rooms, storage closets or in a space that opens only into such rooms unless allowed in accordance with IRC G2406.2 & IMC 303.3. Appliances installed in pits or excavations shall not come in direct contact with the surrounding soil. The sides of the pit shall be held back a minimum of 12" from the appliance. Where the depth exceeds 12" below the adjoining grade, the walls of the pit or excavation shall be lined with concrete or masonry. Such concrete or masonry shall extend not less than 4 inches above adjoining grade and shall have sufficient lateral load-bearing capacity to resist collapse. The appliance shall be protected from flooding in an approved manner. Containers used for storage of LPG shall be installed in accordance with the Fire Code, see details attached.
20. **MANUFACTURER'S SPECS:** IRC Section M1302, M1303.1, M1307, and IMC 304.1. All appliances shall be listed and bear a permanent factory applied nameplate(s) affixed to the appliances with manufacturer's name or trademark, model number, serial number, and seal or mark of testing agency. The installer shall leave the manufacturer's installation and operating instructions attached to the appliance.
21. **VACUUM BREAKERS:** UPC Sections 603.5.7 Potable water outlets with hose attachments, other than water heater drains, boiler drains and clothes washer connections shall be protected by a listed non-removable hose bibb backflow preventer, a non-removable hose bibb vacuum breaker, or an atmospheric vacuum breaker installed at least 6" above the highest point of usage located on the discharge side of the last valve.
22. **TRAP PRIMERS, DISHWASHER AIRGAP:** UPC Section 1007 & 807.3, 909.1. Floor drains or similar traps connected to the drainage system and subject to infrequent use shall be protected with a trap seal primer and shall be accessible for maintenance. All **dishwashers** connected to a drainage system or food waste disposer shall be equipped with an **approved air gap fitting** on the discharge side of

the dishwashing machine. Listed air gaps shall be installed with the flood-level marking at or above the flood-level of the sink or drain board, whichever is higher. For island sink venting see detail attached.

*exempted from permits by R105.2 or Mason County ordinance are not required to provide wall protection based on location on the lot. Projections beyond the wall line shall not extend over the lot line. Exception: Foundation vents installed in compliance with this code are permitted.*

**23. GARAGE/DWELLING DOOR/OPENINGS:**

IRC Section R302.5.1 Openings between the garage and residence shall be equipped with **self-closing**, solid wood doors not less than 1-3/8 inches (35mm) in thickness, solid or honeycomb core steel doors not less than 1-3/8" thick, or 20-minute fire-rated doors. Openings from a private garage directly into a room used for sleeping purposes shall not be permitted.

**27. FLOOR AREA:** IRC Section R304, R306. Every dwelling unit shall have at least one habitable room with not less than 70 square feet of gross floor area. Other habitable rooms except kitchens shall have an area of not less than 70 square feet. Habitable rooms shall not be less than 7-feet in any dimension. *Exception: Kitchens.* Every dwelling unit shall be provided with a water closet, lavatory, bathtub or shower, kitchen area with a separate sink, be connected to an approved sewage disposal system, and shall be connected to an approved water supply with hot and cold water.

**24. GARAGE/DWELLING SEPARATION:** IRC Section

R302.5 R302.6. The garage shall be separated from the residence and its attic area by not less than 1/2" gypsum board applied to the garage side. Garages beneath habitable rooms shall be separated from all habitable rooms above by not less than 5/8" Type X gypsum board or equivalent. Where the separation is a floor-ceiling assembly, the structure supporting the separation shall also be protected by not less than 1/2" gypsum board or equivalent. Garages located less than 3-feet from a dwelling unit on the same lot shall be protected with not less than 1/2-inch gypsum board applied to the interior side of the exterior walls that are within this area. Ducts in the garage and ducts penetrating the walls or ceilings separating the dwelling from the garage shall be constructed of a minimum 26-gage sheet metal or other approved material and shall have no openings into the garage. Penetrations shall be protected by filling the opening around the penetrating item with approved material to resist the free passage of flame and products of combustion. Openings shall meet the same protection as required in R302.5.

**28. MINIMUM CEILING HEIGHTS:** IRC R305.

Habitable space, hallways, corridors, laundry rooms and basements shall have a ceiling height of not less than 7-feet, measured from the finished floor to the lowest projection from the ceiling. Bathrooms, toilet rooms and laundry rooms shall have a ceiling height of not less than 6 feet 8 inches. *Exceptions: 1) For rooms with sloped ceilings, at least 50% of the required floor area of the room must have a ceiling height of at least 7-feet and no portion of the required floor area may have a ceiling height of less than 5-feet. 2) The ceiling height above bathroom and toilet room fixtures shall be such that the fixture is capable of being used for its intended purpose. A shower head equipped with a showerhead shall have a ceiling height of not less than 6 feet 8 inches above the area of not less than 30-inches x 30-inches at the showerhead. 3) Beams, girders, ducts or other obstructions in basements containing habitable space shall be permitted to project to within 6 feet 4 inches of the finished floor.*

**25. SEPARATION BETWEEN DWELLING UNITS:**

IRC Section R302.3. Walls and floors assemblies separating dwelling units in 2-family dwellings shall not be less than 1-hr fire-resistive rating.

R305.1.1 Basements. Portions of basements that do not contain habitable space, hallways shall have a ceiling height of not less than 6 feet 8 inches of the finished floor. *Exception: At beams, girders, ducts or other obstructions, the ceiling height shall be not less than 6 feet 4 inches from of the finished floor.*

**26. FIRE-RESISTANCE OF EXTERIOR WALLS:** IRC

R302.1, Tables R302.1(1) Exterior walls with a fire separation distance less than 5-feet shall have not less than a 1-hour fire-resistive rating with exposure from both sides. Openings are not permitted at less than 3-ft and limited when located between 3-ft to 5-ft. Projections shall not extend to a point closer than 2-feet from the line used to determine the fire separation distance. **When a structure is equipped with an automatic fire-sprinkler system installed in accordance with P2904 fire-resistive ratings may be reduced in accordance with Table R302.1(2).** *Exception: Detached garages accessory to a dwelling located within 2-ft of a lot line may have roof eave projections not exceeding 4". Projections extending into the fire separation distance shall have not less than one-hour fire-resistive construction on the underside. These provisions shall not apply to walls perpendicular to the line used to determine the fire separation distance. Exception: Tool and storage shed, playhouses and similar structures*

**29. ATTIC ACCESS:** IRC R807.1. Buildings with combustible ceiling or roof construction shall have an attic access opening to attic areas that exceed 30 sq. ft. and have a vertical height of 30". Minimum access openings shall not be less than 22" x 30". The attic access shall be located in a hallway or other readily accessible location with 30" minimum unobstructed headroom in the attic space above the access opening. The vertical height shall be measured from the top of the ceiling framing members to the underside of the roof framing members.

**30. EXTERIOR DOORS/EXITS:** IRC R311. At least one egress door shall be provided to each dwelling. The egress door shall be side-hinged and with a min. clear width of 32-inches in width and not less than 78-inches in height,



measured from the top of the threshold to the bottom of the stop. The exit door shall provide direct access from the habitable portions of the dwelling to the exterior without requiring travel through a garage. Egress from habitable levels including habitable attics and basements not provided with an egress door shall be by a ramp or a stairway in accordance to applicable IRC sections 311.8 or 311.7. Egress doors shall be readily open able from the side from which egress is to be made without the use of a key or special knowledge or effort. The required egress door shall provide a continuous and unobstructed path of egress travel from all portions of the dwelling without travel through a garage. The egress door shall open directly into a public way or to a yard or court that opens to a public way.

31. **LANDINGS AT DOORS AND STAIRWAYS & CONSTRUCTION:**

IRC R311. The floor or landing at the required egress door shall not be more than 1-1/2" lower than the top of the threshold. *Exception: The landing on the exterior side shall not be more than 7-3/4" below the top of the threshold provided the door does not swing over the landing or floor.* There shall be a floor or landing on each side of all other exterior doors. Floor elevations for the doors shall be provided with landings no more than 7-3/4" below the top of the threshold. *Exception: A landing is not required where a stairway of two or fewer risers is located on the exterior side of the door, provided the door does not swing over the stairway.* Storm and screen doors are allowed to swing over all exterior stairs and landings. When exterior landings or floors serving the required egress door are not at grade, they shall be provided with access to grade by means of a ramp or stairway. The width of each landing shall not be less than the door served and shall have a dimension of 36-inches measured in the direction of travel. The landing shall be permitted to have a slope not to exceed 1/4 unit vertical in 12 units horizontal (1:48). A flight of stair shall **not** have a vertical rise greater than 12 feet between floor levels or landings. Landings shall be the same width of the stairway served and at least 36 inches measured in the direction of travel. Exterior landings, decks, balconies, stairs, and similar facilities shall be positively anchored to the primary structure to resist both vertical and lateral forces or shall be designed to be self-supporting. Attachments shall not be accomplished by use of toenails or nails subject to withdrawal. See also item #69 for deck attachment info.

32. **GUARDS:** IRC Section R312. Table R301.5 Guards shall be provided for open sided walking surfaces including, stairs, ramps, landings, porches, balconies, or raised floor surfaces located more than 30" above grade or a floor below. Grade shall be measured 36-inches horizontally from the edge of the open side. Guards shall be not less than 36" in height, measured from the adjacent walking surface or the line connecting the leading edges of a tread. *Exception:*

1) *Open sides of stairs with a total rise of more than 30" above the floor or grade below shall have guards not less than 34" in ht. 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" and not more than 38" above the leading edge of treads.* Required guards shall be designed such that a sphere 4" in diameter cannot pass through. *Exceptions: 1) The triangular openings at the open side of a stair, formed by the riser, tread and bottom rail of a guard are permitted to be of such size that sphere 6-inches cannot pass through. 2) Guards on the open sides of stairs shall not have openings which allow passage of a sphere 4- 3/8" in diameter.* Handrail assemblies and guards shall be able to resist a single concentrated load of 200 lbs., applied in any direction at any point along the top, and have attachment devices and supporting structure to transfer this loading to appropriate structural elements of the building. Intermediate rails (all those except the handrail), balusters and panel fillers shall be designed to withstand a horizontally applied normal load of 50 lbs. on an area equal to 1 sq. ft., including openings and space between rails.

33. **HANDRAILS:** IRC Section R311.7.8, R311.8.3

Handrail shall be provided on not less than one side of each continuous run of treads or flight with four or more risers. Such handrails shall be placed not less than 34" and not more than 38" above the nosing of the treads. Handrails for stairways shall be continuous for the full length of the flight, from a point directly above the top riser to a point directly above the lowest riser. Handrail ends shall be returned or terminate in newel posts or safety terminals. Handrails adjacent to the wall shall have a space not less than 1 1/2" between the wall and the handrail. TYPE I: Circular handrails shall have an outside diameter of at least 1 1/4" and not greater than 2". If the handrail is not circular, it shall have a perimeter dimension of at least 4" and not greater than 6 1/4" with a maximum cross-section dimension of 2 1/4". TYPE II: Handrails with a perimeter greater than 6 1/4" shall have a graspable finger recess area on both sides of the profile. The finger recess shall begin a distance of 3/4" measured vertically from the tallest portion of the profile and achieve a depth of at least 5/16" within 7/8" below the widest portion of the profile. This required depth shall continue for at least 3/8" to a level that is not less than 1 3/4" below the tallest portion of the profile. The minimum width of the handrail above the recess shall be 1 1/4" to a maximum of 2 3/4". Edges shall have a minimum radius of .01". See item #34, stairway width, for additional information. Also refer to deck detail information attached to this checklist.

34. **STAIR WIDTH:** IRC Section R311.7.1 Stairways shall not be less than 36" in clear width at all points above the handrail height and below the required headroom height. Handrails shall not project more than 4 1/2" 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 1/2" where the handrail is installed on one side and 27" where handrails are installed on both sides. Width of spiral stairways shall be in accordance with Section R311.7.9.1. See item #39.



35. **STAIR TREADS & RISERS and RAMP SLOPE:**

IRC Section R311.7.5 & R311.8.1 the maximum riser height shall be 7 ¾". The greatest riser height within any flight of stairs shall not exceed the smallest by more than 3/8". The minimum tread depth shall be 10". The tread depth within any flight of stairs shall not exceed the smallest by more than 3/8". A nosing not less than ¾" but not more than 1 ¼" shall be provided on stairways with solid risers. Open risers are permitted, provided that the openings located more than 30 inches, as measured vertically, to the floor or grade below, does not permit the passage of a 4" diameter sphere. Ramps shall have a maximum slope of 1 unit vertical in 12 units horizontal. *Exception: Nosing is not required where the tread depth is at least 11". The opening between adjacent treads is not limited on stairs with a total rise of 30" or less*

36. **STAIR HEADROOM CLEARANCE:** IRC R311.7.2

All parts of the stairway shall not be less than 6'8" measured vertically from the sloped plane adjoining the tread nosing or from the floor surface of the landing or platform. *See exception for spiral stairways.*

37. **UNDER STAIR PROTECTION:** IRC Section R302.7

enclosed accessible space under stairs shall have walls, under stair surface and any soffits protected on the enclosed side with ½" gypsum board.

38. **ILLUMINATION:** IRC Section R303.7. All interior and exterior stairways shall be provided with a means to illuminate the stairs, including landings and treads. Interior stairways shall be provided with an artificial light source located in the immediate vicinity of each landing of the stairway. Where lighting outlets are installed in the interior stairways, there shall be a wall switch at each floor level to control the lighting outlet where the stairway has 6 or more risers. Exterior stairways shall be provided with a light source located at the top of the landing of the stairway. Exterior stairways providing access to a basement from the outside grade level shall be provided with an artificial light source located in the immediate vicinity of the bottom landing of the stairway. **Stairway illumination shall receive primary power from the building wiring.** The illumination of exterior stairways shall be controlled from inside the dwelling. *Exception: Lights that are continuously illuminated or automaticity controlled.*

39. **SPECIAL STAIRWAYS:** IRC Section R311.4,

R311.7.10, R311.7.5.2.1, Spiral stairways and bulkhead enclosure stairways shall comply with all requirements of stairways. Spiral stairways are permitted, provided the minimum width at and below the handrail shall be 26 inches and the walkline radius is not greater than 24 ½ inches Each tread having a 6-3/4 inch at the walkline. All treads shall be identical and the rise shall be no more than 9 ½". Headroom shall be not less than 6 feet 6 inches. Stairways serving bulkhead enclosures see IRC Section R311.7.10.2.

*Note: Washington State Amendment to IRC R311.4: Stairs and*

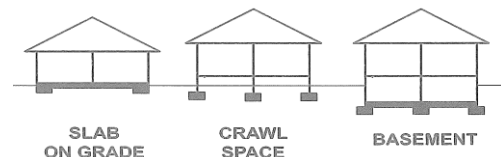
*ladders are permitted within an individual dwelling unit used for access to areas of 200 sq. ft. or less, and not containing the primary bathroom or kitchen. See R311.7.11 & R311.7.12*

40. **FOUNDATION FOOTING SIZE:** IRC Section R403.

Assume load-bearing value of soil 1500 PSF unless proven otherwise. Snow load is designated by area, when snow load is between designated loads, use the higher snow load.

**Table R403.1(3) -Min. Width & Thickness for Concrete**

Snow Load	Light Frame	
	Story/type of structure	Footing Size
30 psf	1 story—slab-on-grade	12 × 6
	1 story—with crawl space	13 × 6
	1 story—plus basement	19 × 6
	2 story—slab-on-grade	12 × 6
	2 story—with crawl space	17 × 6
	2 story—plus basement	23 × 6
	3 story—slab-on-grade	15 × 6
	3 story—with crawl space	20 × 6
	3 story—plus basement	26 × 8
50 psf	1 story—slab-on-grade	12 × 6
	1 story—with crawl space	16 × 6
	1 story—plus basement	21 × 6
	2 story—slab-on-grade	14 × 6
	2 story—with crawl space	19 × 6
	2 story—plus basement	25 × 7
	3 story—slab-on-grade	17 × 6
	3 story—with crawl space	22 × 6
	3 story—plus basement	28 × 9
70 psf	1 story—slab-on-grade	12 × 6
	1 story—with crawl space	18 × 6
	1 story—plus basement	24 × 7
	2 story—slab-on-grade	16 × 6
	2 story—with crawl space	21 × 6
	2 story—plus basement	27 × 9
	3 story—slab-on-grade	19 × 6
	3 story—with crawl space	25 × 7
	3 story—plus basement	30 × 10



R403.1.1 Minimum width, (W), and thickness (T), for concrete footings shall be in accordance with Tables R403.1(1) through R403.1.3 and figure R403.1(1) or R403.1.3, as applicable. (See Attached). Footing projections (P), shall not be less than 2" and shall not exceed the thickness of the footing. All exterior walls shall be supported on continuous footings placed on undisturbed natural soils or engineered fill. In accordance with R403.1.3.6 in detached one- and two-family dwellings that are three stories, or less in height and construct with stud bearing walls, isolated plain concrete footing supporting column or pedestals are permitted. **R402.1.2 All required interior braced wall panels shall be supported on footings at intervals not exceeding 50-ft.**

41. **FOOTING REINFORCEMENT:** IRC Section

R403.1.3, R403.1.3.3, R403.13.5. Concrete footings shall have bottom reinforcement located a minimum of 3-inches clear from the bottom of the footing. Where a

construction joint is created between a concrete footing and stem wall, a min. #4, grade 60, vertical bar shall be provided at not more than 4-feet on center. The vertical bar shall extend to 3-inches clear of the bottom of the footing, have a standard hook and extend a minimum of 14-inches into the stem wall. The standard hook shall have a 3-inch return and shall engage the center-footing bar. The vertical bar shall be tied in place at inspection. As a minimum standard, **refer to the attached handouts: Foundation Reinforcement Requirements.**

42. **FOUNDATION WALL SIZE:** IRC R403.1.3.1, R404, Tables R404.1.1(1) through R404.1.1(4), & Section 404.1.4 *See attached handouts.* Concrete foundation walls located in Seismic Design Categories D2, as established in Table R302.1(1), shall comply with the R404.1.4.2 and Table 404.1.2(1): 1) Minimum reinforcement shall consist of one #4 horizontal bar located in the upper 12" of the wall. Two bars if wall greater than 8' in height; one #4 bar within 12 inches of the top of the wall story and one #4 bar near third points in wall story. 2) Wall height shall not exceed 8'. 3) Height of unbalanced backfill shall not exceed 4'0", and 4) A minimum thickness of 7 1/2" is required for concrete foundation walls except that a minimum thickness of 6" shall be permitted for concrete foundation walls with a maximum height of 4'6" provided the minimum specified compressive strength of concrete, FC, is 3000 psi. Masonry foundation Walls located in Seismic Design Categories D2, as established in Table R301.2(1), shall comply with the R404.1.1(1); 1) Wall height shall not exceed 8 feet. 2) Unbalanced backfill height shall not exceed 4 feet. 3) Minimum nominal thickness for plain masonry foundation walls shall be 8 inches. 4) Masonry stem walls shall have a minimum vertical reinforcement of one No. 4 bar located a maximum of 4 feet on center in grouted cells. Vertical reinforcement shall be tied to the horizontal reinforcement in the footings. Foundation walls located in Seismic Design Categories D2, as established in Table R301.2(1), supporting more than 4' of unbalanced backfill or exceeding 8' in height shall be constructed in accordance with IRC Section R404.

43. **STEPPED FOUNDATIONS IN SEISMIC DESIGN D2:** IRC Section 602.11.2. Where the height of a required braced wall line that extends from the foundation to floor above varies more than 4', the braced wall panel shall be constructed in accordance to figure R602.11.2 and as follows: *See attached details.* 1) Where the lowest floor framing rests directly on a sill bolted to a foundation not less than 8' in length along a line of bracing, the line shall be considered as braced. The double plate of the cripple stud wall beyond the segment of footing that extends to the lowest framed floor shall be spliced by extending the upper top plate a minimum of 4' along the foundation. Anchor bolts shall be located a maximum of 1' and 3' from the step foundation. 2) Where cripple walls occur between the top of the foundation and the lowest floor framing, the bracing requirements for a story shall apply, see R602.10.9 and R602.10.9.1. 3) Where only the bottom of the foundation is stepped and the lowest floor

framing rests directly on a sill bolted to the foundations, the requirements of R403.1.6 and R602.11.1 shall apply.

44. **FOOTING DEPTH:** IRC Section R403.1.4, R403.1.3.4 All exterior footings shall be placed at least 12" below undisturbed ground. Interior footings supporting bearing or bracing walls and cast monolithically with a slab on grade shall extend to a depth of less than 12" below the top of slab. Interior footings bearing supporting braced wall panel bearing wall panels (D2 seismic category) and cast monolithically with a slab at grade, shall extend to a depth of not less than 12 inches below the top of the slab.

45. **FOUNDATION ANCHORAGE:** IRC Section 403.1.6, R602.11. Braced wall panels shall be supported directly on continuous foundations. The wood sole plates at all exterior walls on monolithic slabs, wood sill plates of brace wall panels at building interiors on monolithic slabs and all wood sill plates shall be anchored to the foundation with 1/2" diameter anchor bolts spaced a maximum of 6' o.c. or approved anchors or anchor straps spaced as required to provide equivalent anchorage to 1/2 in diameter anchor bolts. Bolts shall extend a minimum of 7" into concrete or grouted cells of concrete masonry units. The bolts shall be located in the middle third of the width of the plate. A nut and washer shall be tightened on each anchor bolt. The maximum anchor bolt spacing shall be 4-ft for buildings over two stories in height. There shall be 2 bolts per plate section with one bolt located not more than 12" or less than 7 bolt diameters (3 1/2" typical) from each end of the plate section. Where interior braced wall lines are required (seismic zones D1 & D2) to be supported by continuous foundations in Section 403.1.2, 1/2" anchor bolts shall be spaced not more than 6' o.c. and located within 12" from the ends of each plate section. Interior bearing wall sole plates on monolithic slab foundations shall be positively anchored with approved fasteners. A nut and washer shall be tightened on each bolt to the mudsill plate using 1/4" x 3" x 3" plate washers except where approved anchor straps are used. At all braced wall lines sills and sole plates shall be protected against decay. The hole in the plate washer is permitted to be diagonally slotted with a width of up to 3/16" larger than the bolt diameter and a slot length not to exceed 1-3/4", provided a standard cut washer is placed between the plate washer and the nut.

46. **DAMP-PROOF FOUNDATION WALLS:** IRC Section R406. Except where required to be waterproofed by section R406.2, foundation walls that retain earth and enclose interior or usable spaces located below grade shall be damp proofed from the top of the footing to the finished grade. R406.2: 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 usable spaces located below grade shall be waterproofed with a membrane extending from the a) top of the footing to the finished grade b) 6 inches below the top of the basement floor, to the finish grade. The membrane shall consist of 2-ply hot mopped felts, 55-pound roll roofing, 6-mil polyvinyl chloride, 6-mil polyethylene, 40-mil polymer-

modified asphalt, 60-mil flexible polymer cement, one-eighth inch cement based, fiber reinforced waterproof coating or 60-mil solvent-free liquid-applied synthetic rubber. The joints in the membrane shall be lapped and sealed with an adhesive compatible with the waterproofing membrane. See exceptions for additional information.

47. **FOUNDATION DRAINAGE:** IRC Section R401.3, R405. Surface drainage shall be diverted to an approved point of collection so as to not create a hazard. Lots shall be graded so as to drain surface water away from foundation walls. The grade away from foundation walls shall fall a minimum of 6" within the first 10'. *Exception: Where lot lines, walls, slopes or other physical barriers prohibit 6" of fall within 10' drains or swales shall be provided to ensure drainage away from the structure. Impervious surfaces within 10-ft of the building foundation shall be sloped a min. 2% away from the building.* Drains shall be provided around all concrete or masonry foundations that retain earth and enclose habitable spaces located below grade. Drainage tiles, gravel, or crushed stone drains, perforated pipe or other approved systems or materials shall be installed at or below the area to be protected and shall discharge by gravity or mechanical means into an approved drainage system. Gravel or crushed stone drains shall extend at least 1-foot beyond the outside edge of the footing and at least 6 inches above the top of the footing and be covered with an approved filter membrane material. The top of open joints of drain tiles shall be protected with strips of building paper, and the drainage tiles or perforated pipe shall be placed on a minimum 2 inches of washed gravel or crushed rock at least one sieve larger than the tile joint opening or perforation and covered with not less than 6 inches of the same material.

48. **FOOTING/PIERS ON OR ADJACENT TO SLOPES:** IRC Section 403.1.7. The placement of buildings and structures on or adjacent to slopes steeper than 1 unit vertical in 3 units horizontal (33.3-percent slope) shall conform to Sections R403.1.7.1 through R403.1.7.4. Buildings below slopes shall be set a sufficient distance from the slope to provide protection from slope drainage, erosion and shallow failures. Where the existing slope is steeper than one unit vertical in one unit horizontal (100% slope), the toe of the slope shall be assumed to be at the intersection of the horizontal plane drawn from the top of the foundation and a plane drawn tangent to the slope at an angle 45 degrees to the horizontal. Where a retaining wall is constructed at the toe of the slope, the height of the slope shall be measured from the top of the wall to the top of the slope. Footings on or adjacent to slopes shall be founded in material with an embedment and setback from the slope surface to provide vertical and lateral support for the footing without detrimental settlement. Except as provided for in Section R403.1.7.4 and Figure R403.1.7.1, the following setback is deemed adequate to meet the criteria. Where the slope is steeper than one unit vertical in one unit horizontal (100% slope), the required setback shall be measured from an imaginary

plane 45 degrees to the horizontal, projected upward from the toe of the slope. Footings adjacent to slopes shall be founded in firm material with an embedment and setback sufficient to provide vertical and lateral support for the footing without detrimental settlement. Alternate setbacks and clearances are permitted, subject to the approval of the building official. The building official is permitted to require an investigation and recommendation of a qualified engineer to demonstrate that the intent of the code has been satisfied. Such an investigation (geotechnical evaluation) shall include consideration of material, height of slope, slope gradient, load intensity and erosion characteristics of slope material. *Exception: Mason County Development Regulations may specify additional requirements.*

49. **BRACED WALL PANEL SUPPORT/CRIPPLE WALL BRACING: IRC Definition, Sections R602.9, R602.10.9.1, R602.10.11.** One story buildings in seismic design category D2 shall be supported on continuous foundations at intervals not to exceed 50- ft. **In two-story buildings ALL interior braced wall panels shall be supported by continuous foundation.** Foundation cripple walls shall be framed of studs not smaller than the studding above. When exceeding 4 feet in height, such walls shall be framed of stud having the size required for an additional story. Cripple walls supporting bearing walls or exterior walls or interior braced wall panels as required in Section R403.12 and R602.10.9.1 with a stud height less than 14 inches shall be continuously sheathed on one side with wood structural panels fastened to both the top and bottom plates in accordance with Table R602.3(1) or the cripple walls shall be constructed of solid blocking. All cripple walls footings or foundation. *Exception: Footing supporting cripple walls used to support interior braced wall panels as required in Section R403.1.2 and R602.10.0.1 shall be continuous for the required length of the cripple wall and constructed beyond the cripple wall for minimum distance of 4 inches and maximum distance of the footing thickness. The footing extension is not required at intersections with other footings.* Cripple walls defined as the framed wall extending from the top of the foundation to the underside of the floor framing of the story above. **Cripple walls below brace walls shall be constructed with wood structural panels with the length and method specified in Table R602.10.3(3) and R602.10.3(4).** Adhesive attachment of wall sheathing shall not be permitted in Seismic Design Categories D2.

50. **CHIMNEY FOUNDATION & SEISMIC REINFORCING:** IRC Sections 1001, R1001.2, When an approved design is not provided, footings for masonry and concrete fireplaces and their chimneys shall be constructed of concrete or solid masonry not less than 12" thick, and extend 6-inches beyond the face of the fireplace or foundation wall on all sides. Footings shall be founded on natural, undisturbed earth or engineered fill below the frost depth, at least 12" below finished grade. Masonry or concrete chimneys shall be anchored at each floor, ceiling, or roof line more than 6-ft. above grade, except where

completely within the exterior walls. Unless designed otherwise masonry and concrete chimneys shall be reinforced and anchored in accordance to Chapter 1001.

51. **UNDER-FLOOR VENTILATION:** WAC amendment to IRC Section R408.1 and R408.2. The under-floor space between the bottom of the floor joists and the earth under any building (except space occupied by a basement or cellar) shall be provided with ventilation openings through foundation walls or exterior walls having a net area of not less than 1 square foot for each 300 square feet of under-floor space area. In addition, a ground cover of 6 mil polyethylene or approved equal shall be laid over the ground within crawl spaces. The ground cover shall be overlapped six inches minimum at the joints and shall extend to the foundation wall. *Exception: The ground cover may be omitted in crawl spaces if the crawl space has a concrete slab floor with minimum thickness of two inches.* One ventilating opening shall be within 3-feet of each corner of the building, except one side of the building shall be permitted to have no ventilation openings. Ventilation openings shall be covered for their height and width with any of the following materials provided that the least dimension of the covering shall not exceed ¼":
- 1) perforated sheet metal plates not less than .070" thick,
  - 2) Expanded sheet metal plates not less than .047" thick,
  - 3) Cast iron grills or grating,
  - 4) Extruded load-bearing brick vents,
  - 5) Hardware cloth of .035" wire or heavier,
  - 6) Corrosion-resistant wire mesh, with the least dimension being 1/8". See exceptions for additional options.

52. **WOOD IN CONTACT WITH CONCRETE & MASONRY:** IRC Section R317.1 #2. All wood framing members that rest on concrete or masonry exterior foundation walls and are less than 8" from the exposed ground require the use of naturally durable wood or wood that is preservative treated accordance with AWP A U1 for the species, product, preservative, and end use. Preservatives shall be listed in Section 4 of AWP A U1.

53. **COLUMNS AND POSTS:** IRC Section R317.1.2, R317.1.4 & R407.3. Posts, poles and columns supporting permanent structures that are embedded in concrete in direct contact with the ground, or embedded in concrete exposed to the weather shall be approved pressure preservative treated or wood suitable for ground contact. Wood columns shall be approved wood of natural decay resistance or approved pressure preservative treated wood. *Exceptions:* 1) Posts or columns which are exposed to the weather or located in basements or cellars, supported by concrete piers or metal pedestals projecting 1" above the floor or finished grade and 6" above exposed earth, and are separated by an approved impervious moisture barrier. 2) Posts or columns in enclosed crawl spaces or unexcavated areas located within the periphery of the building, supported by a concrete pier or metal pedestal at a height greater than 8" from the exposed earth and the earth is covered by an impervious moisture barrier. 3) Deck posts supported by concrete piers or metal pedestals projecting not less than 1 inch above a concrete floor or 6 inches above exposed earth (See Section R317.1.3) Columns shall be restrained to prevent lateral

displacement at the bottom end. Wood columns shall not be less in nominal size than 4" x 4" or approved equivalent.

54. **GIRDERS ENTERING MASONRY OR CONCRETE WALLS:** IRC Section R317.1 #4. The ends of wood girders entering exterior concrete or masonry walls shall be provided with a 1/2" airspace on tops, sides and ends unless an approved species and grade of lumber specified in Sections R317.1 & R317.2 and listed in #56 of this checklist is used.
55. **POST-BEAM CONNECTIONS/EASTENING:** IRC Section R502.9, R301.1, R602.3(1). Where post and beam or girder construction is used to support floor framing, positive connections shall be provided to ensure against uplift and lateral displacement. The construction of buildings and structures shall result in a system that provides a complete load path that meets all requirements for the transfer of all loads from their point of origin through their load resisting elements to the foundation.
56. **MINIMUM STANDARDS & PROTECTION AGAINST DECAY:** IRC Sections R317.1, R317.2, & R317.3, R502.1, R602.1, R802.1. In areas subject to decay and where required, the use of a naturally durable wood and grade of lumber shall be required, including wood pressure treated in accordance with AWP A U1, listed in Section 4, or naturally durable wood such as decay resistant redwood, black locust, black walnut or cedar. Pressure-preservative-treated wood shall bear the quality mark of an approved agency in accordance to R317.2. Field cut ends, notches and drilled holes of preservative-treated wood shall be treated in the field in accordance to AWP A M4. All wood embedded in concrete exposed to weather that supports permanent structures intended for human occupancy shall be approved pressure-preservative-treated wood suitable for ground contact use, except untreated wood may be used entirely below groundwater level or continuously submerged in fresh water. Approved naturally durable or pressure-preservative-treated wood shall be used for those portions of wood members that form the structural supports of buildings, balconies, porches or similar permanent building appurtenances when they are exposed to weather without adequate protection from a roof, eave, overhang or other covering that would prevent moisture or water accumulation on the surface or at joints between members. Load bearing dimension lumber used for joists, beams, girders, studs, plates, headers, rafters, trusses, and ceiling joists, including, end-jointed lumber, pre-fabricated I-joists, structural glue-laminated timber, structural log members, wood structural panels, fiberboard sheathing (when used structurally), hardboard siding (when used structurally), particleboard, preservative treated wood, fire-retardant-treated wood, hardwood plywood, shall be identified by a grade mark of a lumber grading or inspection agency that has been approved by an accreditation body that complies with DOC PS 20. In lieu of a grade mark, a certification of inspection issued by a

lumber grading or inspection agency meeting the requirements of this section shall be accepted.

**FASTENERS:** Fasteners for pressure preservative and fasteners for pressure-preservative and fire-retardant-treated wood shall be of hot-dipped zinc-coated galvanized steel, stainless steel, silicon bronze or copper. The coating weights for zinc-coated fasteners shall be in accordance with manufacturer recommendations or in accordance to ASTM A 653 type G185. See also manufacturer specifications or distributor specific installation instructions or recommendations. *Exception:* ½" diameter or larger steel bolts (where required by location). 2) Fasteners other than nails and timber rivets shall be permitted to be mechanically deposited zinc-coated steel with coating weights in accordance with ASTM B 695, Class 55, minimum. Sill plate need not be pressure treated if sill plate installed over an approved moisture barrier such as 30 lb. Felt or equivalent and the sill plate is 8" or more above grade.

57. **FLOOR FRAMING:** IRC Chapter 5, Section R502.6, R502.7, The ends of each joist, beam or girder shall have not less than 1- ½" bearing on wood or metal and not less than 3" on masonry or concrete except where supported on a 1" x 4" ribbon strip and nailed to the adjacent stud or by the use of approved joist hangers. Joist framing from opposite sides of a beam or partition shall lap a minimum of 3" and shall be nailed together with three 10d-face nails. A wood splice with strength equal to or greater than that provided by the nailed lap is permitted. Joists framing into the side of a wood girder shall be supported by approved framing anchors or on ledger strips not less than 2-inches x 2-inches. Joists shall be supported laterally at the ends and at each intermediate support by full depth solid blocking not less than 2" nominal thickness; or by attachment to a full-depth header, band or rim joist, or to an adjoining stud; or shall be otherwise provided with lateral support to prevent rotation. *Exception:* 1) *Trusses, structural composite lumber, structural glued-laminated member and I-Joist shall be supported laterally as required by the manufactures recommendations.* 2) *In a D2 seismic design category lateral restraint shall be provided at each intermediate support.* Joists exceeding a nominal 2" x 12" shall be supported laterally by solid blocking, diagonal bridging (wood or metal), or a continuous 1" x 3" strip nailed across the bottom of joists perpendicular to joists at intervals not exceeding 8'0". See Figure R502.2 for floor framing information and Tables 502.3.1(1), R502.3.1(2), R502.3.3(1) and R502.3.3(2) for allowable spans. Structural floor members shall not be cut, bored or notched in excess of that Section R502.8. **Notches:** in solid lumber joists, rafters and beams shall not exceed 1/6 of the depth of the member, shall not be longer than 1/3 of the depth of the member and shall not be located in the middle 1/3 of the span. Notches at the ends of the member shall not exceed 1/4 the depth of the member. The tension side of members 4 inches or greater in nominal thickness shall not be notched except at the ends of the members. The diameter of holes bored or cut into members shall not exceed 1/3 the depth

of the member. Holes shall not be closer than 2 inches to the top or bottom of the member, or to any other hole located in the member. Where the member is also notched, the hole shall not be closer than 2 inches to the notch.

**Engineered wood products:** Cuts, notches and holes bored in trusses, structural composite lumber, structural glue-laminated members or I-joists are prohibited except where permitted by the manufacturer's recommendations or where the effects of such alterations are specifically considered in the design of the member by a *registered design professional*. Floor framing shall be **Fastened** in accordance with Table R602.3(1). Posts and beams used to support floor framing shall be provided with positive connections to ensure against uplift and lateral displacement. **Floor assemblies, where the space below is used for storage or fuel-fired appliances shall be protected from fire in accordance with R302.13.** *Exception: dimensional or structural composite wood floor assemblies with a cross-sectional area equal to or greater than 2x10 or other floor assemblies demonstrating equivalent fire performance.*

58. **JOISTS UNDER BEARING PARTITIONS:** IRC Section R502.4. Joists under parallel bearing partitions shall be of adequate size to support the load. Double joists, sized to adequately support the load, that are separated to permit the installation of piping or vents shall be full depth solid blocked with lumber not less than 2" in nominal thickness spaced not more than 4' O.C. Bearing partitions perpendicular to joists shall not be offset from supporting girders, walls or partitions more than the joist depth unless joists are of sufficient size to carry the additional load.

59. **UNDER-FLOOR CLEARANCE / REMOVAL OF DEBRIS:** IRC Section R317.1 #1, R408.5. When floor joists or the bottom of a wood structural floor are located within 18" or wood girders are located within 12" to the exposed ground in crawl spaces or unexcavated area located within the periphery of the building foundation, all components of the floor assembly shall be wood approved in areas subject to decay as identified in #56 of this checklist. Included are the posts, beams or girders, joists and sub-floor. The under-floor grade shall be cleaned of all vegetation and organic material. All wood forms used for placing concrete and construction materials shall be removed before the building is occupied or used for any purpose.

60. **UNDER-FLOOR ACCESS:** IRC Section R408.4, M1305.1.4. Access shall be provided to all under-floor spaces. Access openings through the floor shall be a minimum of 18" x 24". Openings through a perimeter wall shall be at least 16" x 24". When any portion of the through wall access is below grade, an areaway not less than 16" x 24" shall be provided. The bottom of the areaway shall be below the threshold of the access opening. Through wall access openings shall not be located under a door to the residence. Where appliances are located under floors a rough-framed access shall be provided with an opening or door and an unobstructed

passageway not less than 22 inches wide **and** large enough to allow the removal of the largest appliance in the space. Access shall be unobstructed by pipes, ducts or similar construction.

61. **WALL FRAMING:** IRC Section R602 including R602.3.1, R602.3.2, R602.3.3, R 602.3.4, R602.6 & R602.9. The size, height, and spacing of all other wood-framing studs shall be in accordance with Table R602.3(5). *Exception: 1) Utility grade studs shall not be spaced more than 16" on center, support more than a roof and ceiling, and shall not exceed 8-feet in height for exterior and load bearing walls or 10' for interior non-bearing walls. 2) Where snow loads are less than or equal to 25 pounds per square foot, and the ultimate wind speed is less than or equal to 130 mph, 2x6 studs supporting a roof load with not more than 6 feet of tributary length shall have a maximum height of 18 feet where spaced at 16 inches on center, or 20 feet where spaced at 12 inches on center. Stud shall be a minimum No. 2 grade lumber. In accordance with Table R602.3.1.* Studs shall be placed with their wide dimension perpendicular to the wall. Wood stud walls shall be capped with a double top plate installed to provide overlapping at corners and intersections with bearing partitions. End joints in top plates shall be offset at least 24". Joints in plates need not occur over studs. Plates shall be a nominal 2" in depth and have a width at least equal to the width of studs. Where joists, trusses, or rafters are spaced more than 16" o.c. and the bearing studs are spaced 24" o.c. such members shall bear within 5" of the studs beneath. Studs shall have full bearing on a 2-inch nominal or larger plate or sill having a width at least equal to the width of the studs.

**Drilling & notching – studs (R602.6): Notching:** Any stud in an exterior wall or bearing partition may be cut or notched to a depth not exceeding 25% of the stud width. Studs in non-bearing partitions maybe notched to a depth not to exceed 40% of a single stud width. **Drilling:** Any stud may be bored or drilled, provided that the diameter of the resulting hole is not more than 60% of the stud width, the edge of the hole is no closer than 5/8" to the edge of the stud, and the hole is not located in the same section as a cut or notch. Studs located in exterior walls or bearing partitions drilled over 40% and up to 60% shall be doubled with no more than 2-successive doubled studs bored (See Figure R602.6.(1) and R602.6(2). *Exception: Use of approved stud shoes is permitted when they are installed in accordance with the manufacturer's recommendations and R602.6 for additional details.*

**Drilling and notching of top plate:** When piping or ductwork is placed in or partly in an exterior wall or interior load bearing wall, necessitating cutting, drilling or notching of the top plate by more than 50% of its width, a galvanized metal tie of not less than .054-inch thick and 1½ inches wide shall be fastened across the plate at each side of the opening with not less than 8-10d nails at each side having a min. length of 1½" each side or equivalent. The metal tie must extend a min. of 6" past the opening. (See figure R602.6.1). **Foundation cripple walls** (WAC R602.9) shall be framed of studs not less in size than the

studding above. When exceeding 4'0" in height, such walls shall be framed of studs having the size required for an additional story. Cripple walls supporting bearing walls or exterior walls or interior braced wall panels as required in Section R403.1.2 and R602.10.9.1 with a stud height less than 14" shall be continuously sheathed on at least one side with a wood structural panel that is fastened to both the top and bottom plates in accordance with Table R602.3(1) or the cripple walls shall be constructed of solid blocking. All cripple walls shall be supported on continuous foundations. *Exception: Footings supporting cripple walls used to support interior braced wall panels as required in Sections R403.1.2 and R602.10.9.1 shall be continuous for the required length of the cripple wall and constructed beyond the cripple wall for a min. distance of 4" and a maximum distance of the footing thickness. The footings extension is not required at intersections with other footings.*

62. **WALL BRACING:** IRC 602.10. **Mason County is located in Seismic Design Category (SDC) D2.** All braced walls and cripple wall bracing in Seismic Design Category D2 shall be constructed in accordance with IRC Tables R602.10.1.3(1) & (3) and Sections R602.10 and R602.11.

- Standard braced wall panels require nailing patterns of 6" o.c. along all panel edges and 12" in the field. All sheathing joints must be over studs (vertically) or solid block of min. 1 ½ inches thickness, at joints (horizontally).
- R602.102.2.1 Braced wall panels shall be located at each end of a braced wall line. In accordance with the exception listed in R602.10.2.2.1; *states no brace wall shall begin more than 10' 0" from each end of a braced wall line and be no more than 20-ft apart. If the braced wall panel is not located at the corner, a 24" panel shall be required at the corner return panel, in addition to the required BWP within 10', as an option an 1800# hold down device shall be fastened to the brace wall panel closest to the corner and to the foundation or framing below as shown in Figure R602.10.7.*
- Spacing of interior braced wall lines shall not exceed 25' apart. An increase up to 35' apart for a single room within the structure is not to exceed 900 sq. ft., is permitted provided the braced wall length is adjusted in accordance with IRC Table R602.10.3(4). (Ref Table R602.10.1.3)
- Braced wall lines may have offsets, out of plane of up to 4'0".
- In one-story buildings, braced wall panels shall be supported on continuous foundations at intervals not exceeding 50'. In two-story buildings all interior braced wall panels shall be supported on continuous foundations.
- Brace wall panels shall be fastened to required foundations in accordance with R602.10.8.1 & R602.10.8.2. See Figure R602.10.8(1) , Figure



R602.10.8(2), R602.10.8.2(1), R602.8.2.(2) & Figure R602.10.8(3). See Attached

- Cripple walls supporting bearing walls or exterior walls or interior braced wall panels as required in IRC R403.1.2 shall be braced length and method of bracing used for the wall above in accordance with Tables R602.10.3(1) & (3) and applicable adjustment factors in Table R602.10.3(2) or R602.10.3(4). Cripple wall does not exceed 4' in height shall be designated as the first story wall for purposes of designating the wall bracing requirements (R602.11.3).

- Where "stepped foundations" occur, See IRC **R602.11.2** for additional requirements such as plate strapping, cripple wall height limitations, etc.
- Adhesive attachment is not permitted.
- 1<sup>st</sup> floor braced panels supported by double joists, continuous blocking or floor beams.

See attached "Braced Wall Panel" and "Alternate Braced Wall Panel" details for typical construction requirements.

#### 63. **OPENINGS IN EXTERIOR & INTERIOR WALLS**

**(HEADERS):** IRC Section R602.7, R502.5 & R502.6. Headers shall be provided over each opening in exterior-bearing walls. Headers shall be of two pieces of nominal 2-inch framing lumber set on edge as permitted in tables R602.7(1) and R602.7(2) and nailed together in accordance with Table R602.3(1) or of solid lumber of equivalent size. Exterior headers not listed in the tables shall be designed to support the loads specified in Table R301.5. Each end of all headers shall have at least 1-1/2" of bearing for the full width. A single flat 2"x4" member shall be permitted as a header in interior or exterior nonbearing walls for openings up to 8-ft in width if the vertical distance to the parallel nailing surface above is not more than 24- inches. Headers shall be supported on each end with one or more jack studs or with approved framing anchors in accordance with Table R602.7(1). A full height stud adjacent to each end of the header shall be end nailed to each end of the header with four 16d nails.

#### 64. **FIREBLOCKING & DRAFTSTOPPING:** IRC

R302.11, R302.12, R1001.12, R1003.19.

**FIREBLOCKING** shall be installed to cut off all concealed vertical and horizontal draft openings and shall form an effective fire barrier between stories and between a top story and the roof space. Fireblocking shall be provided in wood-frame construction in the following locations: 1) In concealed spaces of stud walls and partitions, including furred spaces and parallel rows of studs or staggered studs as follows: a) Vertically at the ceiling and floor levels. b) Horizontally at intervals not exceeding 10 feet. 2) At all interconnections between concealed vertical and horizontal spaces such as occur at soffits, drop ceilings and cove ceilings. 3) In concealed spaces at stair stringers at the top and bottom of the run. Enclosed spaces under stairs shall comply with Section R302.7. 4) At openings around vents, pipes and ducts, cables and wires at ceiling and floor level, with an

approved material to resist the free passage of flame and products of combustion. 5) For the fireblocking of chimneys and fireplaces, see Section R1003.19. 6) Fireblocking of cornices of a two-family dwelling is required at the line of dwelling unit separation. 7) Batts or blankets of mineral wool or glass fiber or other approved materials installed in such a manner as to be securely retained in place. 8) Cellulose insulation installed as tested in accordance with ASTM E 119 or UL 263, for the specific application. Fire blocking materials shall consist of material listed in Section R302.11.1. Loose-fill insulation material shall not be used as a fireblock unless specifically tested in the form and manner intended. The integrity of all fireblocks shall be maintained. **DRAFTSTOPPING** R302.12: Where there is usable space both above and below a concealed space of a floor/ceiling assembly, draftstops shall be installed so that the area of the concealed space does not exceed 1,000 square feet. Draftstops shall divide the concealed space into approximately equal areas. Draftstopping materials shall consist of the following materials: 1/2" gypsum board, 3/8" wood structural panels, or other approved materials adequately supported. Draftstopping shall be installed parallel to the floor framing members unless otherwise approved. The integrity of draftstops shall be maintained. **CHIMNEY FIREBLOCKING:** All spaces between chimneys and floors and ceilings through which chimneys pass shall be fireblocked with noncombustible material securely fastened in place. The fireblocking of spaces between chimneys and wood joists, beams, or headers shall be self-supporting or be placed on strips of metal or metal lath laid across the spaces between combustible material and the chimney.

65. **EXTERIOR COVERING & ATTACHMENTS:** IRC Section R701.2, 703.1, R703.4, R703.5, R703.6, R703.7, R703.8, R703.9, R703.10, R703.11. Exterior walls shall provide the building with a weather-resistant exterior wall envelope. *Exception: Log walls designed and constructed in accordance with the provisions of ICC 400.* The exterior wall envelope shall include flashing as described in Section R703.8. The exterior wall envelope shall be designed and constructed in a manner that prevents accumulation of water within the wall assembly by providing a water resistant barrier behind the exterior veneer, as specified R703.2, and means draining water that enters the assembly to the exterior. The requirement for a means of drainage shall not be construed to mean an air space cavity under the exterior cladding for an exterior wall clad with panel or lapped siding made of plywood, engineered wood, hardboard, or fiber cement. A water-resistive barrier as required by Section R703.2 will be required on exterior walls. Protection against condensation in the exterior wall assembly shall be provided in accordance with section R702.7 of this code and the Washington State Energy Code (WSEC) as described in item #95. Exterior wall coverings shall be securely fastened with aluminum, galvanized, stainless steel or rust-preventative coated nails or staples in accordance with Table R703.3(1) or with other approved corrosion-resistance fasteners in



accordance with the wall coverings manufacturer's installation instructions. In accordance with Table R703.3(1) wood siding may not be less than 3/8" thick; to ensure proper fastening for type used see Table R703.3(1). Approved corrosion-resistant fasteners shall be provided in the exterior wall envelope in such a manner as to prevent entry of water into the wall cavity or penetration of water to the building structural framing components. Minimum fastener length and penetration shall have the greater of the minimum length specified in Table R703.3(1) or as required to provide a minimum penetration into framing as follows: 1. Fasteners for horizontal aluminum siding, steel siding, particleboard panel siding, wood structural panel siding in accordance with ANSI/APA-PRP 210, fiber-cement panel siding installed over foam plastic sheathing shall penetrate not less than 1 1/2 inches into framing or shall be in accordance with the manufacturer's installation instructions. 2) Fasteners for hardboard panel and lap siding shall penetrate not less than 1 1/2 inches into framing. 3) Fasteners for vinyl siding and insulated vinyl siding installed over wood structural panel sheathing shall penetrate not less than 1 1/4 inches into sheathing and framing combined. Vinyl siding and insulated vinyl siding shall be permitted to be installed with fasteners penetrating into or through wood or wood structural sheathing of minimum thickness as specified by the manufacturer's instruction or test report, with or penetration into the framing See Section R703.3.3 for more detail. For information related to masonry and anchored stone wall coverings. See #67

66. **WEATHER RESISTANT SHEATHING PAPER and FLASHING:** IRC Section R703.2 and R703.8. One layer of #15 asphalt felt, free from holes and breaks, complying with ASTM D 226 for Type I felt or other approved water-resistant material shall be applied over studs or sheathing of all exterior walls. Such felt or material shall be applied horizontally, with the upper layer lapped over the lower layer not less than 2". Where joints occur felt shall be lapped not less than 6-inches. The felt or other approved material shall be continuous to the top of walls and terminated at penetrations and building appendages in a manner to meet the requirements of the exterior envelope as described in item #65, *Exception: The water-resistive barrier is not required for detached accessory buildings.* Section R703.3 The nominal thickness and attachment of exterior wall covering shall be in accordance with Table R703.3(1), the wall covering material requirements of this section and the wall covering manufacturer's installation instructions. Table R703.3(1) are based on a maximum stud spacing of 16 inches on center. *Exception: Log walls designed and constructed in accordance with the provisions of ICC 400. R703.* **FLASHING:** Approved corrosion resistant flashing shall be applied shingle-fashion in such a manner to prevent entry of water into the building cavity or penetration of water to the building structural framing components. Self-adhered membranes used as flashing shall comply with AAMA 711. The flashing shall extend to the surface of the exterior wall finish. Approved corrosion resistant flashing shall be installed at all of the following locations:

1) Exterior window and door openings. Flashing at exterior window and door openings shall extent to the surface of the exterior wall finish or to the water resistive barrier complying with Section 703.2 for subsequent drainage. Mechanically attached flexible flashings shall comply with AAMA 712. 2) At the intersection of chimneys or other masonry construction with frame or stucco walls, with projecting lips on both sides under stucco copings. 3) Under and at the ends of masonry, wood or metal copings and sills. 4) Continuously above all projecting wood trim. 5) Where exterior porches, decks or stairs attach to a wall or floor assembly of wood construction. 6) At wall and roof intersections. 7) At built-in gutters.

67. **STONE AND MASONRY VENEER. GENERAL:** IRC Section R703.7. All stone and masonry veneer shall be installed in accordance with IRC Chapter 7, Table R703.3(1) and Figure R703.8. Such veneers installed over backing of wood or cold-formed steel shall be limited to the first story above grade and shall not exceed 5" in thickness. *Exception:* For detached one- or two- family dwellings in a Seismic Design Category D-2, exterior stone or masonry veneer, as specified in Table R703.8(2) with a backing of wood framing shall be permitted to the height specified in Table R703.8(2) above a non-combustible foundation. Wall bracing and hold downs at exterior and interior braced wall lines shall be in accordance with section R602.10 and R602.11. In accordance with Footnote a of Table R703.8(2), cripple walls shall not be permitted due to D2 seismic design category. Required interior braced wall lines shall be supported on continuous foundations. Anchored veneer shall be supported on footings, foundations or other noncombustible support. Wall ties shall be corrosion resistant.

68. **SIDING/EARTH SEPARATION:** IRC Section R317.1- #5. Wood siding, sheathing and wall framing on the exterior of the building used within 6" of ground or less than 2 inches measured vertically from concrete steps, porch slabs, patio slabs and similar horizontal surfaces exposed to the weather; shall be natural durable wood or wood that is preservative treated in accordance that specified in item #56 of this checklist. Wood or other products shall conform to the most restrictive of either manufacturer specifications or code requirements.

69. **DECKS & EXTERIOR STAIRS:** IRC R507. All wood in contact with the ground, embedded in concrete in direct contact with the ground or embedded in concrete exposed to the weather that supports permanent structures intended for human occupancy shall be naturally durable wood as specified in item #56 or approved pressure-preservative-treated wood suitable for ground contact use. In addition naturally durable wood or pressure preservative treated wood shall be used in those portions of wood members that form the structural supports of buildings, balconies, porches or similar permanent building appurtenances when those members are exposed to the weather without adequate protection from a roof, eave, overhang or other covering that would prevent moisture or

water accumulation on the surface or at joints between members. Such members may include: 1) Horizontal members such as girders, joists and decking. 2) Vertical members such as posts, poles and columns. 3) Both horizontal and vertical members. Field applied treatment is not an approved method. Treatment must be applied by manufacturer, see item #56 of this checklist. Where supported by attachment to an exterior wall, decks shall be positively anchored to the primary structure and designed for both vertical and lateral loads as applicable. Such attachment shall not be accomplished by the use of toenails or nails subject to withdrawal. Where positive connection to the primary building structure cannot be verified during inspection, decks shall be self-supporting. Decks connected to the structure shall be provided with an approved deck ledger connected with hot-dipped galvanized or stainless steel lag screws, bolts, and washers in accordance with the detail attached, "Deck Ledger Attachment Details and Specifications." Girders supporting deck joists shall not be supported on deck ledgers or band joists. Deck lateral load connections shall be provided in accordance with R507.2.3. Decks more than 30-inches above grade, shall be provided with hold-down tension devices, or be self-supporting. Hold-down devices shall be installed in accordance with manufacturer specifications, in not less than two (2) locations per deck, within 24 inches of the end of the deck with not less than 1,500 lb design stress capacity. **As an option, where a deck is being added to an existing structure, 750# capacity hold down devices may be installed at 4 locations, evenly distributed, within 2-ft of each end of the ledger and shall fully engage the deck joist. See IRC Figure R507.2.3(2), "Deck attachment for lateral loads."**

70. **WOOD TRUSSES:** IRC Section R502.11, R602.10.6.2, R802.10. Wood trusses shall be designed in accordance with approved engineering practice. Engineering data and installation specifications, including the type of roofing to be used, shall be available on site **at framing inspection**. Roof trusses shall be supported laterally at points of bearing by solid blocking to prevent rotation and lateral displacement.

71. **RAFTERS:** IRC Sections R802.3, R802.8. Rafters shall be framed to ridge board or to each other with a gusset plate as a tie. Ridge board shall be framed not more than 1½ inch offset from each other to ridge board or directly opposite from each other with a gusset plate as a tie. Ridge board shall be not less than 1-inch nominal thickness and not less in depth than the cut end of the rafter. At all valleys or hips there shall be a valley or hip rafter not less than 2" nominal thickness and not less in depth than the cut end of the rafter. Hip and valley rafters shall be supported at the ridge by a brace to a bearing partition or be designed to carry and distribute the specific load at that point. Where the roof pitch is less than three units in 12 unit horizontal (25-percent slope), structural members that support rafters and ceiling joists, such as ridge beams, hips and valleys, shall be designed as beams. Ceiling joists and

rafters shall be nailed to each other in accordance with Tables R802.5.1(9), and the rafter shall be nailed to the top wall plate in accordance with Table R602.3(1). Ceiling joists shall be continuous or securely joined in accordance with Table R802.5.1(9) where they meet over interior partitions and nailed to adjacent rafters to provide a continuous tie across the building when such joists are parallel to the rafters. Where ceiling joists are not connected to the rafters at the top wall plate, joists connected higher in the attic shall be installed as rafter ties, or rafter ties shall be installed to provide a continuous tie. Where ceiling joists are not parallel to the rafters, rafter ties shall be installed. Rafter ties shall be min. 2"x4", installed in accordance with connection requirements in Table R802.5.1(9), or connections of equivalent capacities shall be provided, the ridge formed by these rafters shall be supported by a wall or girder designed in accordance with engineering practice. Collar ties or ridge straps to resist wind uplift shall be connected in the upper third of the attic space in accordance with Table R602.3.1. Collar ties shall be minimum of 1"x4" spaced not more than 4-ft o.c. Rafters and ceiling joists having a depth-to-thickness ratio exceeding 5 to 1 based on nominal dimensions shall be provided with lateral support at points of bearing to prevent rotation.

72. **RAFTER OPENINGS:** IRC Section R802.9. Openings in roof and ceiling framing shall be framed with header and trimmer joists. When the header joist does not exceed 4', the header joist may be a single member the same size as the ceiling joist or rafter. Single trimmer joists may be used to carry a single header joist that is located within 3' of the trimmer joist bearing. When the header joist span exceeds 4', the trimmer joists and the header joist shall be doubled and sufficient cross section to support the ceiling joists or rafter framing into the header. Approved hangers shall be used for the header joist to trimmer joist connections when the header joist span exceeds 6-ft. Tail joists over 12-ft long shall be supported at the header by framing anchors or on ledger strips not less than 2"x2."

73. **CEILING JOISTS LATERAL SUPPORT BRIDGING:** IRC Section R802.8, R802.8.1. Rafters and ceiling joists having a depth-to-thickness ratio exceeding 5 to 1 based upon nominal dimensions shall be provided with lateral support at points of bearing to prevent rotation. Rafters and ceiling joists having a depth-to-thickness ratio exceeding 6 to 1 based upon nominal dimensions shall be supported laterally by solid blocking, diagonal bridging (wood or metal) or continuous 1" x 3" wood strip nailed across the rafter or ceiling joists at intervals not exceeding 8'.

74. **ROOF DRAINAGE:** UPC 1101.11.1. Roof areas of a building shall be drained by roof drains or gutters. Gutters and downspouts are to be installed on structures to conform to the provisions of Mason County Code, Title 14 chapter 14.48 (Stormwater Management), and IRC R401.3. If a stormwater plan is not required, or an alternative method is proposed, measures must be put in

place to protect the structure from excessive splash, divert the water away from the foundation per IRC R401.3, R405 & R405.1, and protect the parcel (and adjacent parcels) from erosion. IRC Section R903.4. Unless roofs are sloped to drain over roof edges, roof drains shall be installed at each low point of the roof. Where required for roof drainage, scuppers shall be placed level with the roof surface in a wall or parapet. Overflow drains shall discharge to an approved location and shall not be connected to roof drain lines.

75. **ROOF MATERIALS:** IRC Section R904 & R905.

Roof covering materials shall be delivered in packages bearing the manufacturer's identifying marks and approved testing agency labels when required. Roof coverings shall be applied and installed in accordance with Section R905 and the manufacturer's installation instructions. In accordance with Table R905.2.4.1 Asphalt shingles classified using ASTM D 3161 with shingle classification of A,D, or F are acceptable for use in Mason County and other areas where wind zones less than 110 mph .

76. **ATTIC VENTILATION:** IRC Section R806. Enclosed attics and 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 and snow.

Ventilating openings shall have a least dimension of 1/16 inch minimum and ¼ inch maximum opening. Openings in roof framing members shall conform to the requirements of Section R802.7. Required ventilation openings shall open directly to the outside air. Ventilation openings must be provided with corrosion- resistant wire cloth screening, hardware cloth or similar material. The total net free ventilating area shall not be less than 1 to150 of the area of the space ventilated. Exception: The minimum net free ventilation area shall be 1 to 300 of the vented space provided one or more of the following conditions are met: 1. In Climate Zones 6,7 and 8, a Class I or Class II vapor retarder is installed on the warm-in-winter side of the ceiling. 2. Not less than 40% and not more than 50% of the required ventilating area is provided by ventilators located in the upper portion of the attic or rafter space. Upper ventilators shall be located not more than 3 feet below ridge or highest point of the space, measured vertically, with the balance of the required ventilation provided by eave or cornice vents by eave or cornice vents. Where the location of wall or roof framing members conflicts with the installation upper ventilators, installation more than 3 feet below the ridge or highest point of the space, shall be permitted. Where eave or cornice vents are installed, insulation shall not block the free flow of air. A minimum of a 1" space shall be provided between the insulation and the roof sheathing at the location of the vent. Unvented attic assemblies may be permitted provided all the conditions of Section R806.5 are met **AND** such installation allows warranty to be maintained by the roofing manufacturer.

77. **CHIMNEY HEIGHT/CHIMNEY CRICKETS:**

IRC, R1003.9, R1003.20 R1005, R905.2.8.3. Masonry chimneys shall extend at least 2-ft higher than any portion of a building within 10-ft, but shall not be less than 3-ft. above the highest point where the chimney passes through the roof. Masonry chimneys shall be provided with crickets when the dimension parallel to the ridgeline is greater than 30" and does not intersect the ridgeline. The cricket and chimney shall be flashed and counter flashed and shall be constructed in compliance with Figure R1003.20 and Table R1003.20. Factory-built chimneys shall be listed and labeled and shall be installed and terminated in accordance with the manufacturer's installation instructions. A cricket or saddle shall be installed on the ridge side of any chimney or penetration of roof more than 30-inches wide as measured perpendicular to the slope. Cricket or saddle coverings shall be sheet metal or of the same material as the roof covering.

## GENERAL

78. **PREMISE IDENTIFICATION:** IRC Section R319, IFC Section 505, and Mason County Code Title 14.28. (see also checklist item 108). Approved numbers or addresses shall be a minimum of 4" high with a stroke of ½" and shall be provided for all new buildings in such a position as to be plainly visible and legible from the street or road fronting the property and shall be a minimum of 4" high with a minimum width of ½". Approved numbers or addresses shall be placed on all buildings, at the beginning of long driveways when the address is not clearly visible from the access road, or in any other areas deemed necessary by the local fire district or Fire Marshal. They shall be placed in such a position as to be plainly visible and legible from the street or road fronting the property. Said numbers shall contrast with their background. See address posting and private road signage requirement information attached.

79. **APPROVED PLANS:** IRC Sections R106.3.1, R106.4. When the building official issues a permit, the construction documents shall be approved in writing or by stamp. One set of the construction documents so reviewed shall be retained by the building official. The other set shall be returned to the applicant, shall be kept at the site of work and shall be open to inspection by the building official or the duly authorized representative. The work shall be installed in accordance with the approved construction documents, and any changes made during construction that are not in compliance with the approved construction documents shall be resubmitted for approval as an amended set of construction documents.

80. **HEATING:** IRC Section R303.9 & Washington State Amendment to R303.9. Every dwelling unit shall be provided with heating facilities capable of maintaining a minimum room temperature of 68° F at a point 3' above the floor and 2' from exterior walls in all habitable rooms at the design temperature. The installation of portable heaters shall **not** be used to achieve compliance with this section.

Primary heating sources in all new and substantially remodeled buildings shall not be dependent upon wood stoves. No used solid fuel-burning device shall be installed in new or existing buildings unless such device is U.S. EPA certified or a pellet stove either certified or exempt from certification by the U.S. EPA. *Exception: Antique wood cook stoves and heaters manufactured prior to 1940.*

81. **SKYLIGHTS:** IRC Section R308.6.2. The following types of glazing may be used: 1) Laminated glass with a minimum .015" polyvinyl butyl interlayer for glass panes 16 sq. ft. or less in area located such that the highest point of the glass is not more than 12' above a walking surface or other accessible area; for higher or larger sizes, the minimum interlayer thickness shall be .030". 2) Fully

tempered glass. 3) Heat-strengthened glass. 4) Wired glass. 5) Approved rigid plastics. Installed skylights shall comply with Washington State Energy Code requirements.

82. **INTERIOR FINISHES:** IRC Sections R302.9, R316 and R702.5 Wood veneer paneling and hardboard paneling shall be placed on wood or cold-formed steel framing spaced not more than 16-inches o.c. Wood veneer and hardboard paneling less than ¼" nominal thickness shall have not less than 3/8-inch gypsum board backer. Wood veneer paneling not less than ¼" nominal thickness shall conform to ANSI/HPVA HP-1. Hardboard paneling shall conform to ANSI/AHA A135.5. All structural panel components within the conditioned space such as plywood, particle board, wafer board and oriented strand board shall be identified as "EXPOSURE 1," "EXTERIOR" or "HUD-APPROVED." When using **foam plastic insulation** the interior of the building shall be separated by a thermal barrier of at least ½" gypsum wallboard. The ½" gypsum wallboard is not required when the foam plastic in a roof assembly or under a roof covering is installed in accordance with the manufacturer's installation instructions and is separated from the interior of the building by tongue-and-groove wood planks not less than 15/32 inch (11.9 mm) thick bonded with exterior glue and identified as Exposure 1, with edges supported by blocking or tongue-and-groove joints. The smoke-developed index for roof applications shall be maintained.

83. **GYPSUM WALLBOARD & GYPSUM WALLBOARD FASTENING:** IRC Section R702.3, and Table R702.3.5. All wood framing supporting gypsum board shall not be less than 2-inches nominal thickness in the least dimension except that furring strips, not less than 1"x 2" may be used over solid backing or framing spaced not more than 24-inches o.c. When gypsum is used as a base or backer for adhesive application of ceramic tile or other required nonabsorbent material shall conform with ASTM 1396, C 1178 or C1278. Use of water resistant gypsum backing board shall be permitted to be used on ceilings. Water resistant gypsum wallboard shall not be installed over a class I or II vapor retarder, in a shower or tub compartment. Cut or exposed edges, including those at wall intersections, shall be sealed as recommended by the manufacturer. *Limitations: Water-resistant gypsum backing board shall not be used where there will be direct exposure to water, or in areas subject to continuous high humidity.* Screws for attaching gypsum board to wood framing shall be type W or Type S in accordance with ASTM C 1002 and shall penetrate the wood not less than 5/8".

- 3/8" min. Thickness of gypsum board or gypsum panel product.
- Fastening (**nails**): 7" o.c. max. on ceiling & 8" o.c. max on walls when framing is 16" o.c.

- Fastening (**screws**): 12" o.c. max ceiling & 16" o.c. max on walls when framing is 16" o.c.
  - Size of Nail: 13 gage, 1 ¼ inch long, 19/64 inch head; 0.098 inch diameter, 1 ¼ long, annular-ringed; or 4d cooler nail, .080 inch diameter, 1 3/8 inch long, 7/32 head.
  - See Table R702.3.5 for more information
84. **STORY/STORY ABOVE GRADE:** IRC Section R202. Any story having its finished floor surface entirely above grade plane or in which the finished surface of the floor next above is either of the following; 1) Is more than 6' above grade plane. 2) Is more than 12' above the finished ground level at any point?
85. **HEIGHT OF BUILDING/GRADE PLANE:** IRC Section R202. The vertical distance from top to top of two successive tiers of beams or finished floor surfaces; and, for the topmost story, from the top of the floor finished to the top of the ceiling joists or, where there is not a ceiling, to the top of the roof rafters. The grade plane: A reference plane representing the average of the finished ground level adjoining the building at all exterior walls. Where the finished ground level slopes away from the exterior walls, the reference plane shall be established by the lowest points within the area between the building and the lot line or, where the lot line is more than 6' from the building between the structure and a point 6' from the building.

86. **RETAINING WALLS:** IRC Section R105.2, R404.4. Retaining walls that are not laterally supported at the top and that retain in excess of 24-inches of unbalanced backfill shall be designed to ensure stability against overturning, sliding, excessive foundation pressure and water uplift. Retaining walls shall be designed for a safety factor of 1.5 against lateral sliding and overturning. Retaining walls that are not over 4' in height measured from the bottom of the footing to the top of the wall **not supporting a surcharge, is exempt from permits.** *Retaining Wall Surcharge; loading on a retaining wall is a vertical load imposed on the retained soil that may impose a lateral force against the retaining wall in addition to the lateral earth pressure of the retained soil.*

## ENERGY CODE/VENTILATION (IECC/WSEC & IRC CHAPTER 15 MASON COUNTY CLIMATE ZONE: 4C (MARINE))

87. **FOUNDATION INSULATION:** IECC/WSEC R303, R402.2.8, R402.2.9, R402.2.9.1 & Table R402.1.1. Slab-on-grade insulation, installed inside the foundation wall, shall extend downward from the top of the slab for a minimum distance of 24" or downward and then horizontally beneath the slab for a minimum combined distance of 24". Insulation installed outside the foundation shall extend downward to a minimum of 24" or to the frostline. Above grade insulation shall be protected. For monolithic slabs, the insulation shall extend downward from the top of the slab to the bottom of the footing. Unless approved for other than prescriptive approach the typical R-Value for slab insulation shall be R-10. Insulation used for this application shall be rated & labeled for such use. The entire area of a **radiant slab** shall be thermally isolated from the soil with min. R-10 insulation approved by the listing for its intended use.
88. **UNDER-FLOOR INSULATION:** IECC/WSEC R303, R402.2.7. Table R402.1.1 & Table R402.4.1.1. Floor insulation shall be installed in a permanent contact with the surface being insulated and shall include areas over unconditioned spaces, such as vented crawl spaces, unheated basements and garages. The nominal R-value shall not be less than that approved for floors over unconditioned spaces on the approved building plan. Unless approved for other than prescriptive approach the

typical R-Value for floors shall be R-30. **Insulation shall be installed in substantial contact with the sub-floor and supported not less than 24" o.c.** Foundation vents shall be placed so that the top of the vent is below the lower surface of the floor insulation.

89. **WALL INSULATION:** IECC/WSEC R303, R402.2.8 & Table R402.1.1, Table R402.4.1.1. Above grade exterior walls shall be insulated to not less than the nominal R-value specified on the approved building plans. Unless approved for other than prescriptive approach the typical R-Value for wall insulation shall be R-21. All exterior wall insulation shall fill the entire framed cavity. Faced batts shall be face-stapled to avoid compression (*not inset-stapled*).

90. **ATTIC INSULATION:** IRC R806, IECC/WSEC R303.1, R402.2.1, R402.2.1.1 & Table R402.4.1.1.. Ceilings below vented attics shall be insulated to not less than the nominal R-value specified on the approved building plans. Unless approved for other than prescriptive approach the typical R-Value for attic insulation shall be R-49 installed in a standard manner or R-38 where the full R-Value extends over the wall top plate at the eaves. The thickness of roof/ceiling insulation that is blown in shall be identified by inches of thickness, density and R-Value markers shall be installed at least one for every 300 sq. ft. through the attic/ceiling. The markers shall be affixed to

the trusses or joists and marked with the minimum initial installed thickness and the minimum settle thickness with number at least 1" in height. Each marker shall face the attic access. Loose-fill insulation may be used in attic spaces where the slope of the ceiling is not more than 3' in 12 and there is at least 30" of clear distance from the top of the bottom cord. Eave vents shall be provided with baffles to deflect incoming air above the surface of the insulation. The baffles shall be rigid material, resistant to wind driven moisture. The vertical joints shall be staggered when two or more layers of rigid board insulation are used. The minimum ventilation requirements in IRC Section R806.3, R806.4 & R806.5; shall be maintained. *See item #76.* Baffles shall be installed so that 1" is maintained between the roof sheathing and the baffle. The baffles shall be installed from the top of the outside wall, extending inward, to a point 6" vertically above the height of non-compressed insulation, and 12" vertically above loose fill insulation.

91. **VAULTED CEILING INSULATION:** R402.2 Tables R402.1.1 and R402.4.1.1. Vaulted ceiling insulation shall be installed where an enclosed joist or rafter space is formed by ceilings applied directly to the underside of roof joists or rafters. This requirement applies where both the distance between the top of the ceiling and the underside of the roof sheathing is less than 12-inches and there is a minimum 1-inch vented air space above the insulation. Where a single rafter or joist-vaulted ceiling is 13-inches or more the space shall be insulated as a ceiling, typically R-38, described in item #90 of this checklist. Vaulted ceilings shall be insulated to not less than the nominal R-value specified on the approved building plans. Unless approved for other than prescriptive approach the typical R-Value for non-trussed, vaulted ceiling insulation shall be R-38. Faced batts shall be face-stapled (*not inset-stapled*).

92. **ACCESS HATCHES AND DOORS:** R402.2.4. Access doors from conditioned to unconditioned spaces (attics and crawl spaces) shall be weather-stripped and insulated to a level equivalent to the insulation on the surrounding surfaces. A wood framed or equivalent baffle or retainer must be provided when loose fill insulation is installed the purpose of which is to prevent insulation from spilling into the living space when the attic access opened and/or to provide a permanent means of maintaining the installed R-value of loose-fill insulation. Exception: Vertical doors that provide access from conditioned to unconditioned spaces shall be permitted to meet the fenestration requirements of Table R402.1.1

93. **DUCT INSULATION/DUCT LEAKAGE:** IECC/WSEC R401.3, R403.2., R403.2.3. IRC chapter M16, & IMC Chapter 6. Ducts shall be insulated to R-8, sealed in accordance with R403.2.2, and leak tested. Ducts or building cavities used for air distribution that are located entirely within the conditioned space do not require sealing.

**Duct Tightness Testing:** The duct system shall be leak

tested in accordance with WSU RS-33, using the maximum duct leakage rates specified. Duct tightness shall be verified in accordance to IECC/WSEC R403.3.3 using the post-construction test or rough-in test methods. Duct leakage tests are not required when ducts and air handlers located entirely within the building thermal envelope. Leak test shall be required when ducts are located in the crawl space. **Duct leakage test results shall be posted on the permanent certificate posted in accordance with R401.3.** See also item #98

94. **PIPE INSULATION:** R403.4.2. All hot and cold water pipes installed outside the conditioned space shall be insulated to a minimum of R-4.

95. **VAPOR RETARDER/MOISTURE CONTROL:** IRC R702.7 Class I, II, or III, vapor retarders shall be installed on the interior side of the framed walls. Sheet polyethylene, imperforated aluminum foil, kraft-faced fiberglass batts, latex or enamel paints installed in accordance with manufacturer specifications are deemed to meet class I, II, or III. Kraft-faced batts shall be face stapled over studs.

96. **GROUND COVER IN CRAWL SPACE:** IRC R406.3.2, IECC/WSEC Table R402.4.1.1. A 6-mil thick polyethylene film ground cover shall be laid over the ground within crawl spaces. **The ground cover shall be lapped 6" minimum at the joints and sealed with adhesive** and shall extend to the foundation wall and be bonded to form a seal. The ground cover may be omitted in crawl spaces if the crawl space has a concrete slab with a minimum thickness of 2 inches.

97. **WINDOWS & EXTERIOR DOORS:** R402.3., R402.1.1. U-Factors for glazing and doors (fenestration) shall be not more than the U-factor specified on the approved building plans. Unless approved for other than prescriptive approach the maximum typical U-factor for fenestration shall be dependant upon the compliance method. **Typically the max. U-factor for prescriptively approved structures is U-.30.** Any change in windows or doors must be approved by the Building Department before installation. **NFRC compliance stickers shall remain on the windows until the insulation inspection has been approved by the Building Department.** Doors with a glazed area more than 50%, such as half-lite and full-light doors, shall be considered windows for the purposes of energy code requirements.

98. **AIR LEAKAGE INCLUDING RECESSED LIGHTING FIXTURES:** IECC/WSEC R401.3, R402.4. The building or dwelling shall be tested and verified as having an air leakage rate not exceeding 5 air changes per hour. Testing shall be conducted with a blower door in accordance with IECC/WSEC R402.4.1.2. A written report of the results of the test shall be signed by the party conducting the test and **provided to the building inspector during the final inspection.** Provisions to limit air leakage shall be provided to those locations separating

outdoor ambient conditions from interior spaces that are heated or mechanically cold. *Seals & Weather-stripping:*

a) Exterior joints around windows and door frames, openings between walls and foundation, between walls and roof and wall panels; openings at penetrations of utility services through walls, floors, and roofs; and at all other openings in the building envelope, and between dwelling units shall be sealed, caulked, a gasket or weather-stripping to limit air leakage. Other exterior joints and seams and seams shall be similarly treated or taped, or covered with moisture vapor permeable house wrap. b) All exterior doors or doors serving as access to an enclosed unheated area shall be weather-stripped to limit air leakage around the perimeter when in a closed position. c) Site built windows are exempt from testing but shall be made tight fitting. Fixed lites shall have glass retained by stops with sealant or caulking all around. **RECESSED LIGHTING FIXTURES** shall be type IC rated, and certified under ASTM283 to having air leakage rate no more than 2.0 cfm when tested at 75 Pascal's or 1.57-lbs/sq. ft. pressure difference and have a label attached, showing with this test method. Recessed lighting fixtures shall be sealed with a gasket or caulk between the housing and the interior wall or ceiling cover.

99. **EXHAUST FANS;** R303.5, M1507.4:

Source specific exhaust ventilation is required in each kitchen, bathroom, water closet, laundry room, indoor swimming pool, spa, and other rooms where excess water vapor or cooking odor is produced as follows:

**MINIMUM SOURCE SPECIFIC VENTILATION CAPACITY REQUIREMENTS - TABLE M1507.4**

AREA TO BE EXHAUSTED	EXHAUST RATES
Kitchens or where cooking appliances are located	100 cfm intermittent or 25 cfm continuous
Bathrooms-toilet rooms Laundry rooms Indoor swimming pools & spas	Mechanical exhaust capacity of 50 cfm intermittent or 20 cfm continuous.

**NOTE:** All exhaust fans providing local exhaust shall have a minimum fan flow rating not less than 50 cfm at .25 water gauge for bathrooms, laundries, or similar rooms and 100 cfm at .25 water gauge for kitchens. Ventilation ducts shall terminate outside the building. Ventilation ducts located in unconditioned spaces shall be insulated a minimum of R-4.

100. **WHOLE HOUSE VENTILATION SYSTEM**

**Continuous or Intermittent** : IRC R303.4, M1507.3. Each dwelling unit or guest room shall be equipped with a whole house ventilation system that shall be capable of providing the volume of outdoor air designed in accordance with IRC M1507.3.1 through M1507.3.7. Compliance may also be demonstrated through the International Mechanical Code or ASHRAE Standard 62.2. Whole house ventilation systems shall be have a flow rating of .25 inches water gauge as specified in Table M1507.3.3(1). A Sone rating of 1.0 or less measured at 0.1 inches water gauge. The whole house fan shall be

controlled by a 24-hour clock timer with the capability of continuous operation, manual and automatic control. At the time of final inspection, the automatic control timer shall be set to operate the whole house fan according to the schedule used to calculate the whole-house fan sizing (Table M1507.3.3(1) & (2). The clock timer shall be readily accessible and be capable of operating the whole house ventilation fan without energizing other energy consuming appliances. A label shall be affixed to the controls that reads; "Whole House Ventilation (see operating instructions)."

101. **VENTILATION DUCTS;** IRC M1507.3, R303.5, All Ventilation ducts shall terminate outside the building and be equipped with a back draft damper. All exhaust ducts in unconditioned spaces shall be insulated to a minimum of R-4. All supply ducts located in the conditioned space shall be insulated to R-4. Fan ducts shall be equipped with back draft dampers. Terminal elements shall have at least the equivalent net free area of the ductwork. Terminal elements for exhaust fan duct systems shall be screened or otherwise protected from entry by leaves or other material.

Exhaust Ducts shall be sized in accordance to IMC, Table 403.8.4.2 and shall not be less than 4-inch diameter.

Fan tested CFM @ .25 WG	Min. Flex Diameter	Max. Length in Feet	Min. Smooth Diameter	Max. Length Feet	Max. Elbows <sup>1</sup>
50	4-inch	25	4-inch	70	3
50	5-inch	90	5-inch	100	3
50	6-inch	No Limit	6-inch	No Limit	3
80	4-inch <sup>2</sup>	NA	4-inch	20	3
80	5-inch	15	5-inch	100	3
80	6-inch	90	6-inch	No Limit	3
100	5-inch <sup>2</sup>	NA	5-inch	50	3
100	6-inch	45	6-inch	No Limit	3
125	6-inch	15	6-inch	No Limit	3
125	7-inch	70	7-inch	No Limit	3

1. For each dwelling elbow subtract 10 feet from length Flex ducts of this diameter are not permitted with fans of this size.
2. Flex ducts of this diameter are not permitted with fans of this size.

102. **MECHANICAL VENTILATION SYSTEM;** IRC

M1507. Each dwelling unit and guest room shall be provided with a whole house mechanical ventilation systems designed in accordance with M1507.3.1 through M1507.3.7 or in accordance with specifications allowed in the IMC.

*Controls and Operation (M1507.3.2):*

1. Location of controls. Controls for all ventilation systems shall be readily accessible by the occupant.
2. Instructions. Operating instructions for whole-house ventilation systems shall be provided to the occupant by the installer of the system.
3. Local exhaust systems. Local exhaust systems shall be controlled by manual switches, dehumidistats, timers, or other approved means.



4. Continuous whole-house ventilation systems. Continuous whole-house ventilation systems shall operate continuously and shall be equipped with fan override control. Controls shall be capable of operating the ventilation system without energizing other energy-consuming appliances. A label shall be affixed to the controls that reads; "Whole House Ventilation (see operating instructions)."

5. Intermittent whole-house ventilation systems. Intermittent whole-house ventilation systems shall comply with the following:

- 5.1. They shall be capable of operating intermittently and continuously.
- 5.2. They shall have controls capable of operating the exhaust fans, forced-air system fans, or supply fans without energizing other energy-consuming appliances.
- 5.3. The ventilation rate shall be adjusted according to the exception in Section 403.8.5.1.
- 5.4. The system shall be designed so that it can operate automatically based on the type of control timer installed.
- 5.5. The intermittent mechanical ventilation system shall operate at least one hour out of every four.
- 5.6. The system shall have a manual control and automatic control, such as a 24-hour clock timer.
- 5.7. At the time of final inspection, the automatic control shall be set to operate the whole-house fan according to the schedule used to calculate the whole-house fan sizing.
- 5.8. A label shall be affixed to the control that reads "Whole House Ventilation (see operating instructions)."

Operating Instructions and a whole-house ventilation operation description shall be provided by installers. The whole-house ventilation system shall provide outdoor air to each habitable space at a continuous rate not less than that specified in Table M1507.3.3(1). The system may operate intermittently when the system has controls that enable operation for not less than 25% of each 4-hour segment and the ventilation rate prescribed in Table M1507.3.3(1) is multiplied by the factor determined in accordance with Table M1507.3.3(2).

Outdoor air shall be distributed to each habitable room by means such as individual inlets, separate duct systems, or integrated with a forced air system. Where outdoor air supplies are separated from exhaust points by doors, provisions shall be made to ensure air flow by installation of distribution ducts, undercutting doors, installation of grilles, transoms or other similar means. Doors shall be undercut to a minimum 1/2" above of the surface of the finish floor.

Table M1507.3.3(2)						
<i>Continuous Whole-house ventilation rate factors</i>						
Run-time % in each	25%	33%	50%	66%	75%	100%
Factor	4	3	2	1.5	1.3	1.0

Dwelling Unit floor area (sf)	Table 403.8.1 International Mechanical Code Number of bedrooms		
	0-1	2-3	4-5
	Airflow in CFM		
<500	30	40	45
500-1000	45	55	60
1001-1500	60	70	75
1501-2000	75	85	90
2001-2500	90	100	105
2501-3000	105	115	120
3001-3500	120	130	135
>3500	135	145	150

Intermittent mechanical fan shall operate not less than one hour every 4-hours. Where the system has controls that enable operation for not less than 25% every four hours the ventilation rate shall be multiplied by the factor in Table M1507.3.3(2)

**See Table 403.8.1 for additional bedrooms**

**103. WHOLE-HOUSE VENTILATION SYSTEM USING EXHAUST FANS:** IRC M1507.3.4. Exhaust fans providing whole-house ventilation shall have a flow rating at 0.25 water gauge as specified in accordance with Table 1507.3.3(1). The whole-house fan shall have a rating of 1.0 or less measured at 0.1" w.g.

Individual outdoor air inlets shall be provided in each habitable room where outdoor air supplies are separated from exhaust points by doors, provisions shall be made to ensure air flow by installation of distribution ducts, undercutting doors, installation of grilles, transoms or similar means. Doors shall be undercut to a minimum of 1/2 inch above the surface of the finish floor. Individual room outdoor air inlets shall: a) controllable and secure opening. b) sleeved or otherwise designed so as not to compromise the thermal properties of the wall or window in which they are placed. c) Any inlet or combination of inlets which provide 10 cfm at 10 pascals are deemed equivalent to 4 square inches net free area. Doors and operable lights in windows are not deemed to meet the outdoor air supply intake requirements. Outdoor air inlets shall be screened or otherwise protected from entry by leaves or other material. Outdoor air inlets shall be located so as not to take air from the following areas: a) closer than 10' from an appliance vent outlet, unless such vent outlet is 3' above the outdoor air inlet. b) Where it will pick-up objectionable odors, fumes or other flammable vapors. c) A hazardous or unsanitary location. d) A room or space having and fuel-burning appliances therein. e) closer than 10' from any vent opening of a plumbing drainage system unless the vent is located at least 3' above the air inlet. f) Attic, crawl spaces, or garages. g) Asphalt roofs unless it is shown that no other location is permissible. In such case the inlet opening shall be located a min. of 2 feet from the nearest surface of the asphalt roofing, measured from the intake opening.

104. **INTERMITTENT WHOLE HOUSE VENTILATION INTEGRATED WITH A FORCED-AIR SYSTEM. (Make-up air through the furnace):** IRC M1507.3.5. Integrated ventilation systems shall provide outdoor air at the rate calculated using Table M1507.3.3. The ventilation system shall distribute outdoor air to each habitable room through the forced-air system ducts. The outside air inlet duct shall terminate outside of the building and be connected to the return air plenum of the forced air system at a point within 4-ft upstream of the air handler. The outdoor inlet shall be connected upstream of the forced air system blower and shall not be connected directly into the furnace cabinet. The system shall be provided with a motorized damper connected to the automatic ventilation control as specified in M1507.3.2. The required flow rate shall be verified by field-testing with a flow hood or a flow measuring station. A copy of the testing report shall be provided to the inspector during inspection. The system shall be controlled by a 24-hour clock timer with the capability of continuous operation, manual and automatic. This control will control the forced air system blower and the automatic damper. The 24-hour timer shall be readily accessible and capable of operating the whole house ventilation system without energizing other energy-consuming appliances. At the time of inspection the automatic control timer shall be set to operate at least 8-hours a day. A label shall be affixed to the control that reads, "Whole House Ventilation (see operating instructions)".

105. **Intermittent Whole House Ventilation Using a Supply Fan.** IRC M1507.3.6. Supply fan ventilation systems shall distribute outdoor air to each habitable room through the forced-air system ducts or through dedicated ducts to each habitable room. Supply fans shall have the capacity to provide outdoor air specified in Table M1507.3.3(1) at .40" w.g. per HVI 916. The outdoor air must be filtered before it is delivered to habitable rooms. Ducts shall be installed in accordance to M1507.3.6.2, dampers in accordance to M1507.3.6.3.

106. **Whole House Ventilation using Heat Recovery Ventilation:** M1507.3.7. Heat Recovery ventilation systems shall be sized and installed in accordance to manufacturer's instructions and in accordance to M1507.3.3(1). Minimum flow rating shall not be less than that specified in Table M1507.3.3(1).

107. **LIGHTING:** IECC/WSEC R404 & Chapter 2. **A minimum of 75% of permanently installed lamps in lighting fixtures shall be high-efficacy lamps. Fuel gas lighting systems shall not have continuously burning pilot lights.** High efficiency lamps are defined in Chapter 2. Compact fluorescent lamps, T-8 or smaller diameter linear fluorescent lamps or lamps with an efficacy 1) 60 lumens per watt for lamps over 40 watts; 2) 50 lumens per watt for lamps over 15 watts to 40 watts; 3) 40 lumens per watt for lamps 15 watts or less.

108. **FIRE ACCESS:** Mason County Title 14, Chapter 14.17 *Standards for Fire Apparatus Access Roads*. All roads, driveways, or other means of access serving structures, facilities, buildings or portions of buildings hereafter constructed, altered, moved into, or within, the jurisdiction and developed under permit from Mason County shall meet the requirements of the fire apparatus access road standards. (see detail pages contained within this checklist).





