



INSPECTION CHECKLIST

Residential Mechanical Final

April 2005

2003 Codes

Please verify the following before calling for a mechanical final inspection. These are some of the most common inspection items. This is only a general list and does not represent the full body of the 2003 International Residential Code (R = Residential, M = Mechanical, G = Gas), 2003 Uniform Plumbing Code (UPC), the 2003 Washington State Energy Code (WSEC) or the 2003 Washington State Ventilation & Indoor Quality Code (VIAQ).

Permits and Plans

- Job address is posted in a visible location. (R321.1)
- Permit and approved plans are on site and accessible to the inspector. (R106.4.6)
- Permit information is correct (address, permit number, scope of work, etc).
- Prior required mechanical rough-in inspections are approved. (R109.1.2)

Garage

- Source of ignition on gas appliances (water heaters, furnaces, & dryers) must be a minimum of 18" above the floor unless listed as flammable vapor ignition resistant (FVIR). (M1307.3, G2408.2)
- Exposed ducts to be a minimum of 26 gauge sheet metal **with no openings into garage**. (R309.1.1)
- All ducts insulated on inside or outside of duct with minimum R-8 except fresh air from outside to return air plenum, vents, etc. (WSEC Table 5-11)
- Bollard or wheel stop required if equipment is subject to mechanical damage. (M1307.3.1)

Gas Piping

- Drip legs installed at each appliance or where condensation could collect. (G2419.2)
- Unions or flex connectors are installed between shut-off valve and appliance. (G2422.1)
- Unions or flex connectors cannot be concealed within or extend through a wall, floor, partition or appliance housing. (G2422.1.2)
- One flex connector up to 3' long is allowed on each appliance. Exception: Flex connector on range or dryer is allowed to be up to 6' long. (G2422.1.2)
- A shut-off valve is required in the same room within 6' of the appliance, upstream of union and accessible. (G2420.5)
- Support: (G2424.1)
 - $\frac{1}{2}$ " pipe supported every 6ft.
 - $\frac{3}{4}$ " – 1" support every 8ft.
 - 1 $\frac{1}{4}$ " or larger support every 10ft.
 - 1 $\frac{1}{4}$ " or larger (vertical) support at every floor level.

Appliance Vents:

- Gravity venting system of equivalent area to the vent collar on the appliance. Performance standards can reduce the vent size. (G2428.2.2)
- Single wall vents or B vents connecting to flue collars or draft hoods can be screwed or riveted for securement as recommended by the manufacturer. (M2427.10.7)
- Connect vents to common vent system within the same story. Inlets to vent system are offset. Vent system no less than the areas of the largest vent plus 50% of the area of the added vent. (M1801.11, G2427.10.3.4)

- Offsets in gravity vents installed with as many offsets as required that do not exceed 45 degrees from vertical, except no more than one of 60 degrees is allowed and horizontal runs don't exceed 75% of the vertical height of the venting system. (M1803.3.2, G2427.6.4)
- Vent connectors serving Category 1 appliances are not connected to any portion of a mechanical draft system operating under positive pressure. (G2427.10.4)
- Gas vents less than 12" in diameter in roofs with pitches less than or equal to 6/12 can terminate a minimum of 12" above the roof as long as such vents are at least 8' from a vertical wall or similar obstruction.** See Table G2427.6.5 for distances from vertical objects including roof pitch. (G2427.6.5)
- Vent clearances to combustibles per manufacturer's listing or performance standards. (M1803.3.4, M1306.2, G2427.7.7)
- Single wall vents cannot penetrate a wall, floor or ceiling without a thimble and piping limited to the space the equipment is located to the roof or exterior wall. (M1803.3.1, G2427.7.4)
- Vent terminations installed per the manufacturer's listing. (M1804.2.1)
- Venting systems terminate not less than 4' below or 4' horizontally from, and not less than 1' above a door, an operable window or a gravity air inlet into a building, nor within 10' of a forced air intake nor within 12" above grade. (M1804.2.6)
- Where vents extending into an attic pass through insulated assemblies, an insulation shield of 26 gage sleeve not less than 2 inches above the insulation, secured in place and maintain required clearances to combustibles. (G2426.4)
- Direct vent terminations. See manufacturer's installation instructions (M1804.2.5)
- Vent connector clearance to combustibles installed per Table G2427.7.7.
- Single wall connectors don't originate in an attic or concealed space or pass through an attic, inside a wall or concealed space. (G2427.7.6)
- When a vent connector of a gas appliance with a draft hood is located within or passes through a cold area, that portion of the connector is a type B or type L vent. (G2427.10.2.2) Installer will have to get the ASHRAE standards for the exception.
- B vent chimneys supported above the roof per manufacturer's requirements. (G2427.6.9)
- Type B or L vents terminate at least 5' in vertical height above the highest connected equipment draft hood or flue collar.** (G2427.6.)

Gas Water Heaters

- See the Water Heater Tip Sheet 7 for additional information.
- If a gas water heater has been installed it is a mechanical inspection but may include plumbing if piping was moved. If an electric water heater is installed, it is a plumbing inspection and will be covered on the Residential Plumbing Final Checklist.
- Temperature and pressure relief valve required on water heaters (UPC 506.2). The drain from the relief valve must be able to drain by gravity. (UPC 709)
- The pipe for the drain to be hard and full sized, no flex connectors or pex piping. No plastic pipe within 6" of draft hood. (UPC 608.5)
- The drain terminates outside the building 6" - 24" above grade and has a soldered/glued (copper/plastic) on elbow as needed to direct the flow toward the ground or terminates at an approved drain. It may not be directly connected to a sanitary sewer. (UPC 608.5 as amended by WA State)
- Water heaters located in a garage to be raised so that the source of ignition is at least 18" above the floor **unless listed as flammable vapor ignition resistant (FVIR).** (M1307.3 & UPC 508.14)
- Seismic strapping will be installed per Water Heater Tip Sheet 7. Two straps, 1 in lower 1/3 and 1 in upper 1/3 and 3/4" wide. Straps to be 22 gauge metal with each strap lag bolted onto two different studs. Lower point strapping at 4" minimum distance above the controls. (M1307.2 & UPC 508.2)
- A water heater when installed in the normal path of a vehicle requires protection.(M1307.3.1, G2408.3)
- Water heaters in attics, attic-ceiling assembly, floor-ceiling assembly, or floor/subfloor assembly where damage may result from a leaking water heater, a watertight pan of corrosion resistant material is installed with a 3/4" drain that is piped to an approved location. (UPC 508.4)
- Any water system provided with a check valve, backflow preventer or a pressure regulating device which does not have a bypass feature at its source is provided with a approved, listed, adequately sized pressure relief valve or a means to control expansion (expansion tank). (UPC 608.3) Install per specifications.

- Mechanical rooms with a floor drain or a standpipe and subject to infrequent use require trap primers or other approved automatic means of maintaining their water seals. The trap primer valve is accessible. Check to see that it is working by verifying water is in the trap. (UPC 1007)
- Combustion Air: See **GENERAL** for details.
- Fuel fired water heaters can't be installed in a room used as a storage closet. A water heater installed in a bedroom or bathroom needs to be installed in a sealed enclosure so that combustion air will not be taken from the living space. Direct-vent water heaters are not required to be installed within an enclosure. (M2005.2, G2406.2)

Furnace

- Maintain required clearances to combustible construction as specified in the listing. (M1402.2, M1306)
- Appliances in rooms require clearance for service and maintenance of 30" or as required by the National Electric Code (NEC 110.26) or the manufacturer's installation instructions, whichever is greater. (M1305.1.2)
- Clearance from grade: Equipment supported on concrete pad or approved material extending above the adjoining ground. (M1305.1.4)
- Condensate lines are required to drain by gravity to an approved drain or condensate pump. (G2427.9, UPC 709, M1411.3)
- Condensing Appliances: Vent per installer's instruction. (G2427.8)
- Seal ducts to prevent leaks, **unless located entirely within the conditioned space of the building.** (WSEC 503.10.2)

Whole house ventilation systems

Intermittent Whole House ventilation using Exhaust Fans (VIAQ 303.4.1)

- Whole house fan located $\leq 4'$ from the interior grille have a sone rating on fan 1.5 or less.
- Accessible 24 hour timer, set to operated 8 hours/day and wired to exhaust fan.
- Label affixed to controls: "Whole House Ventilation. See Operating instructions".
- Outdoor air inlets not less than 4 sq.in. in each habitable room.
- Doors undercut minimum 1/2" where separated from exhaust source.
Exception: Exhaust only ventilation systems do not require outdoor air inlets if the home has a ducted forced air heating system that communicates with all habitable rooms and the interior doors are undercut to a minimum of 1/2" above finish floor covering.

Whole House Ventilation Integrated with Forced Air System (VIAQ 303.4.2)

- Screened outdoor air inlet to return air plenum with motorized damper.
- Outdoor air inlet duct connection to the return air stream located upstream of the forced-air blower.
- Accessible 24 hour timer, set to operated 8 hours/day and wired in to furnace blower and motorized damper.
- Label affixed to control: "Whole House Ventilation. See Operating instructions".

Intermittent Whole House Ventilation Using Supply Fan (VIAQ 303.4.3)

- Uses inline supply fan.
- Outdoor air must be filtered before it is delivered to habitable rooms.
- Outdoor inlet located downstream of blower when connected to the supply side.
- Outdoor inlet minimum 4' upstream when connected to the return side.
- Accessible 24 hour timer, set to operated 8 hours/day and tied in to the inline supply fan.
- Label affixed to control: "Whole House Ventilation. See Operating instructions".

Whole House Ventilation Using a Heat Recovery Ventilation System (VIAQ 303.4.4)

- All ducts must be minimum 6" diameter.
- Balancing dampers are installed on the inlet and exhaust side.
- Supply ducts in conditioned space upstream of the heat exchanger insulated to minimum R4.
- Accessible 24 hour timer, set to operated 8 hours/day and tied in to the inline supply fan.

- Label affixed to control: "Whole House Ventilation. See Operating Instruction".

Outdoor Air Inlets

- Inlets are screened. (VIAQ 302.3.5.2, 303.4.2.4, 303.4.3.6, 303.4.4.4)
- Inlets located so as not to draw air from any of the following locations (VIAQ 302.3.5.2, 303.4.2.4, 303.4.3.6, 303.4.4.4):
 - Within 10' of an appliance vent outlet, unless such vent outlet is 3' above the outdoor air inlet.
 - Where it will pick up objectionable odors, fumes or flammable vapors.
 - A hazardous or unsanitary location.
 - A room or space having any fuel burning appliances therein.
 - Within 10' of a vent opening for a plumbing drainage system unless the vent opening is at least 3' above the air inlet.
 - Attic, crawl spaces or garages.

Range Cooktop

- Combustibles installed not less than 24" from open top broilers. See manufacturer's installation instructions. (M1504.1)
- Distance above top of cook top to unprotected combustible material not less than 30". (M1901)
- Clearance to adjacent combustibles surfaces per the manufacturer's installation instructions. (M1901)

Fireplace

- Shutoff valves for vented decorative fireplaces and decorative appliances installed in vented fireplaces can be installed in areas remote from the appliance, if labeled, serve no other equipment and they are readily accessible. (G2420.5)
- Shutoff valves located in the firebox of a fireplace are installed per the manufacturer's installation instructions. (G2420.5.1)
- Gas logs in solid fuel burning fireplace are installed per manufacturer's instructions. (G2420.5.1, G2433.1)
- Gas logs, when equipped with a pilot, have a listed safety shutoff valve. (G2420.5, G2432.1)
- When retrofitting gas log units in masonry fireplaces, dampers must be blocked open per manufacturer's installation instructions. (G2432.1 see IRC commentary)
- Solid fuel burning appliances and fireplaces have tight fitting metal or glass doors. (VIAQ 402.3)
Exception: Site-built fireplaces may use a flue draft induction fan instead of doors.

Laundry Room

- A 4" dryer exhaust duct is installed with smooth interior. Install per the manufacturer's instructions. (G2439.5)
- Approved flexible metal duct connector up to 8' long, may connect the dryer to the vent, but may not extend into wall, floor or ceiling. (G2439.5)
- Minimum 100 square inches of make up air for closets designed for the installation of clothes dryers or other approved means. (G2439.4)
- Unless permitted by the dryer manufacturer's installation instructions, dryer vents don't exceed 25' in length. The maximum length is reduced by 2 ½' for each 45-degree bend and by 5' for each 90-degree bend. (G2439.5.1)

Crawl Space and Attic

- Flex duct is supported a maximum of every 4' and is installed without kinks or tight bends. (M1601.3.2 & SMACNA Standards)
- Ducts in crawl spaces are supported at least 4" above the ground. (M1601.3.6)
- Insulate all exhaust ducts with R-4 (bathroom, range, etc.) (VIAQ 302.2.3)
- Equipment requires a light switch at crawl or attic access. (M1305.1.3.1, M1305.1.4.3)
- Electrical receptacle installed within 25' of equipment. (M1305.1.3.1, M1305.1.4.3)

- Passageway of continuous solid flooring not less than 24" wide from attic access to 30" wide work platform in front of furnace. (M1305.1.3, M1305.1.4)
- Access opening large enough to remove largest piece of equipment, but not less than 30" x 22". (M1305.1.3, M1305.1.4)
- Access opening not more than 20 feet from equipment. (M1305.1.3, M1305.1.4)

General

- Weather protect exterior gas line. (G2415.8)
- Combustion air obtained from outside of the building when the building is of unusually tight construction (homes built after 1986). (M1701.1.1, M1702.3, M1703)
 1. For vertical ducts: (2) openings, each having 1 square inch per 4000 Btu/h of total input of all appliances in the space.
 2. For horizontal ducts: (2) openings each having 1 square inch per 2000 Btu/h of total input of all appliances in the space.
 3. One opening in upper 12 inches and one opening in lower 12" of room.
 4. When the one opening method is used, locate the opening 12" from top of enclosure and provide 1 square inch per 3000 Btu/h or total input rating of all appliances in the space. (G2407.6)
 5. The minimum cross sectional area of each vent opening is 3".
 6. Minimum of 100 sq.in. of combustion air is required.
- Combustion air obtained from outside of the building, when the building is of ordinary construction (homes built prior to 1986) and the area of the room is less than 50 cubic feet per 1000 Btu/h of aggregate input rating of appliances. (M1702.1) See also Construction Tip Sheet 7, Water Heaters.
 1. The minimum cross sectional area of each vent opening is 3 inches .
 2. Minimum of 100 sq.in. per opening of combustion air is required.
 3. One opening in upper 12" and one opening in lower 12" of room. (UMC 702.1, see exception)
 4. Where vertical ducts are used each opening requires 1 square inch per 4,000 Btu/h of total input rating of all appliances in the space. (M1703.2.1)
 5. Where horizontal ducts are used each opening requires 1 square inch per 2,000 Btu/h or total input rating of all appliances in the space. (M1703.2.1)
 6. When the one opening method is used, locate the opening 12" from top of enclosure and provide 1 square inch per 3000 Btu/h or total input rating of all appliances in the space. (G2407.6.2)
- When the building is of ordinary construction and the area of a confined space is less than 50 cubic feet per 1000 Btu/h of aggregate input rating of appliances, combustion air can be taken from an adjacent space when installed as follows: (M1702.2)
 1. Minimum of 100 sq.in. of combustion air is required.
 2. One opening in upper 12" and one opening in lower 12" of room.
 3. Each opening is 1 square inch per 1000 Btu/h.
 4. The combined volume of the confined space and adjacent space is greater than 50 cubic feet per 1000 Btu/h of aggregate input rating of appliances.
- All appliances secured in place per manufacturer's listing. (M1307.2, M1401.1)
- Confirm that there is a heat source in each habitable room (R303.8)