Residential Mechanical Rough-In

This Tip Sheet reflects code requirements of the 2021 International Residential Code (IRC), 2021 Uniform Plumbing Code (UPC), 2023 National Electric Code (NEC). (References to the IRC are indicated by: R = Residential; M = Mechanical). A topic without information likely means no requirements under MUBEC.

Please verify the following before calling for mechanical rough-in inspection.

Permits and Plans

☐ Job address shall be posted in a visible location. (R319.1)

☐ Permit and approved plans are on the site. (R105.7, R106.1.1, R106.3.1)

☐ Permit information is correct (address, permit number, description of work, etc.) (R106.1.1)

Forced-Air Furnace

General

☐ Electrical receptacle is required at or near the appliance. (Within 25 feet per NEC 210.63)

☐ Means of disconnect are required within sight of appliance or the breaker is to be capable of being locked in the open position. (NEC 422.31(B))

Underfloor and Attics

☐ When equipment is installed on wood platforms the framing and sheathing is preservative treated when installed within 18 inches of soil to bottom of framing. (R317)

Garage

☐ Ducts which penetrate a wall or ceiling separating the garage from the dwelling are 26 gauge with no openings to the garage. (R302.5.2)

Condensing Furnace (High Efficiency)

☐ Evaporative Cooling Equipment connected to potable water must have a backflow assembly. (UPC 603)

Ducting

Return Air

Insulation

Combustion Air

Vents and Connectors

Appliances

Clothes Dryer

- ☐ Exhausted per manufacturer's instructions. (M1502.1)
- ☐ Clothes dryer exhaust ducts of metal with smooth interior surfaces, with joints running i n the direction of air flow. (M1502.4.2)
- ☐ Protective shield steel plates of 0.062 thickness, where nails or screws are likely to penetrate clothes dryer exhaust duct, including at framing members less than 1-1/4 inches between duct and finished face of framing member and extend not less than 2 inches above the sole plate and beyond the top plate. (M1502.5)
- ☐ Screws allowed as fasteners. No more than 1/8-inch protrusion. (M1502.4.2)
- ☐ Duct connector 4 inches minimum or appliance outlet size. (M1502.4.1)
- ☐ 2 Methods for determining dryer duct length:
  - Exhaust duct doesn't exceed 35 feet. (M1502.4.6)
    - Deduct 2-1/2 feet for each 45-degree elbow and 5 feet for each 90-degree bend.
  - Maximum length determined by the manufacturer's installation instructions when make and model of dryer are provided to the Code Official at rough-in. (M1502.4.6)
- ☐ Clothes dryer ducting run independently of other ducted systems and shall convey moisture to the outdoors (except listed and labeled condensing ductless clothes dryers). (M1502.2; G2439)
- ☐ Exterior termination is backdraft dampered with n o screens, and 3 feet minimum away from any openings into building. Clothes dryer exhaust ducts shall not connect to vent connectors, vent, or chimney. (M1502.3)
- ☐ Clothes dryer ducting concealed in construction exceeding 35 feet must be labeled with the equivalent length. Label shall be located within 6 feet of the exhaust connection. (M1502.4.7)
- ☐ Dryer exhaust duct required at time of occupancy. If dryer is not installed, exhaust duct shall be capped at the location of the future dryer (except listed and labeled condensing ductless clothes dryers) (M1502.4.8).
- ☐ Dryer transition duct shall be single length, listed and labeled to UL 2158A, and maximum length 8 feet long. Transition ducts shall not be concealed within construction. (M1502.4.3)

Range

Range Hood

- ☐ Terminates outside, it is air-tight, it is equipped with a backdraft damper, and it shall be independent of all other exhaust systems. (M1503.3)
- ☐ Hoods with an exhaust rate over 400 CFM shall be mechanically or passively provided with makeup air at a rate approximately equal to the exhaust air rate unless all fuel-burning appliances are direct-vent or uses a mechanical draft venting system with at least one damper. (M1503.6)
- ☐ Ducting is galvanized steel, stainless steel, or copper, with a smooth interior. Exception: Ducts for domestic cooking appliances equipped with downdraft exhaust system can be schedule 40 PVC and comply with all five exception requirements. (M1503.2.1-5)
- ☐ Domestic open-top broiler units shall have a metal exhaust hood, having a minimum thickness of 0.0157 inch with (M1503.2.1):
    - 1/4-inch clearance between the hood and the underside of combustible materials and cabinets.
    - A clearance of minimum 24 inches between cooking surface to combustible materials and cabinets, unless listed and labeled for broiler units with integral exhaust system.
- ☐ The hood shall be not less than the width of the broiler unit, extend over the entire unit, and when located inside the building envelope. (M1503.2.1)
- ☐ Broiler units incorporating an integral exhaust system and listed and labeled for use without an exhaust hood need not have an exhaust hood. (M1503.2.1)

Fireplace

- ☐ Factory-built fireplaces shall be listed and labeled and shall be installed in accordance with the conditions of the listing. Factory-built fireplaces shall be tested in accordance with UL 127. (R1004.1)
- ☐ Hearth extensions are to be readily distinguishable from the surrounding floor and in accordance with the fireplace listing. (R1004.2)
- ☐ Decorative shrouds used at chimney terminations are to be listed and labeled for use with specific chimney systems. (R1004.3; R1005.2)

Air Conditioning

- ☐ Condensate line minimum 3/4 inch and sloped to drain termination without sags; 1/8 unit in 12 units (1-percent slope). (UPC 814.1)

Exhaust Venting

- ☐ Source specific ventilation fans are required in kitchens, bathrooms, water closet rooms per Table M1505.4.4 (1), as amended by Washington State.
- ☐ Bathroom fans are 50 cubic feet per minute (CFM) minimum or 20 CFM continuous. Kitchen fans are 160 cfm for electric range and 250 cfm for combustion range.
- ☐ All exhaust ducts shall terminate outside the building and can not vent to attic, crawl space, soffit, or ridge vent. (M1501.1)

Whole House Ventilation Systems

Each dwelling unit shall be equipped with a ventilation system. Consult code section M1505 for the different ventilation options including whole house fan systems and exhaust type systems. Exhaust rates are listed in the tables. (M1505)

Energy Code Requirements