Residential Inspection Checklist – Mechanical

The intended use of this checklist is for preparation of an inspection. This is only a general list and is not intended to address all circumstances. Please refer to the 2018 International Residential Code and the City adopted amendments to the codes.

Please verify the following before calling for the framing inspection:

PERMITS AND PLANS
☐ Job address shall posted on in a visible location. ☐ Permit and approved plans are on site and accessible to the inspector. ☐ Duct rough in test affidavit to be on site and available to the inspector. ☐ Prior to scheduling the inspection, the contractor or person doing the work has reviewed the approved plans and can assure that the construction being inspected is consistent and complete.
MECHANICAL ROUGH
☐ Fuel burning appliances cannot be installed in sleeping rooms, bathrooms, toilet rooms, storage closets, or in a space that opens into such rooms or spaces unless they are direct vent or listed for use within living space. ☐ 80% fuel burning appliances cannot be installed in foamed attics unless it is listed and approved by manufactures installations instructions. ☐ Heat producing equipment installed shall maintain clearances to combustibles as required by the listing of the appliance, and the Manufactures installation instructions. ☐ Furnace room passageway minimum 24” inches wide. ☐ M1305 has specific requirements for installation of mechanical equipment in attics and crawl spaces, consult the IRC for general requirements and the installation instructions for the appliance. ☐ Working space 30” inches deep to height of unit or minimum 30” inches, clearance of 3” inches along sides, back and top with a total width if the space being at least 12” inches wider than the furnace. Furnaces having a firebox open to the atmosphere shall have at least a 6” inch working space along the front combustion chamber side. ☐ Electrical receptacle is required at or near the appliance. (Within 25’ feet). ☐ Means of disconnect required within sight of appliance or the breaker is to be capable of being locked in the open position. ☐ Switch controlled lighting (light protected or away from access), and receptacle outlet provided at the required passageway for servicing of equipment. ☐ Refer to the listing and manufacture installation instructions along with Section M1409 for the installation of a wall furnace. ☐ Equipment in garages which has a flame, generates a spark or uses a glowing ignition source is open to the space in which it is installed and is elevated such that the source of ignition is at least 18” inches above the floor, unless the appliance is flammable vapor resistant. ☐ Ducts in a garage which penetrate a wall or ceiling separating the garage from the dwelling shall be 26 gauge with no openings to the garage. ☐ Bollard or wheel stop required in front of or to the side of equipment if subject to impact by automobile. ☐ Condensing Furnace (High Efficiency) condensate drain required to drain by gravity to an approved place of disposal or UL 508 / condensate pump. Drain pipe minimum ¾” with 1/8” per foot slope and may drain to indirect receptor (lavatory tailpiece, tub over flow, etc.). (Per manufacture’s installation instructions, and M1411.3). ☐ Duct to ground minimum 4” inches clearance. ☐ Duct in or around concrete, encased in concrete a minimum of 2” inches thick. ☐ Round ducts have crimped joints lapped minimum 1” inch and fastened with (3) sheet metal screws or rivets equally spaced around the joint.

MECHANICAL ROUGH (CONTINUED)

☐ Joints, seams, and fittings of ducts sealed with mastic or other approved means. Review Section (M1601.4.1) for approved means.
☐ Flex duct supported per manufacture's specifications.
☐ Metal duct minimum support every 10' feet.
☐ Ducts shall not displace required insulation of walls, floors, or ceilings, and building cavities may not be used as ducts.
☐ Supply and return ducts in attics shall be insulated to an R value of not less than R-8
☐ Venting systems shall not extend into or pass through any fabricated air duct or furnace plenum.
☐ Return air opening shall comply with Section (M1602.2).
☐ The minimum cross section dimension for combustion air duct is 3".
☐ Combustion air ducts cannot be screened when terminating in an attic space.
☐ When combustion air is obtained from the attic or crawl space they must be sufficiently vented.
☐ In buildings of unusually tight construction, combustion air shall be obtained from outside the building.
☐ Indoor combustion air openings - each opening shall be 1 sq. in. per 1,000 Btu/h input of all appliances, but not less than minimum of 100 square inches.
☐ Outdoor combustion air openings - only the lower of the 2 combustion air openings can be connected to an under floor area. The openings (attic and crawl) shall communicate directly / freely with the outdoors.
☐ Where vertical ducts are used to provide combustion air from the outdoors, each opening requires 1 sq. in. of opening per 4,000 Btu/h of total input rating of all appliances in the space.
☐ Where horizontal ducts are used each opening requires 1 sq. in. of opening per 2,000 Btu/h of total input rating of all appliances in the space.
☐ When the one opening method is used the opening requires 1 sq. in. of opening per 3,000 Btu/h of total input rating of all appliances in the space and be within the top 12" of the space. The openings shall communicate directly / freely with the outdoors.
☐ Outside combustion air openings are to be screened with corrosion-resistant mesh material not smaller than ¼ inch.
☐ Combustion air may be drawn from inside the building if of ordinary tightness and the conditioned space is at least 50 cubic feet per 1,000 Btu/h input for all fuel burning appliances combined.
☐ Where two gas appliances are vented through a common vent connector it is equal to largest connector plus 50% of the smaller flue outlet and not less than the combined area of the flue outlets for which it acts as a common connector.
☐ Vent connector clearances to combustibles per manufacturer's listing or performance standards.
☐ Single wall vents cannot penetrate a wall, floor or ceiling without a listed pass through assembly, except for gas vents - exterior combustible walls only – with a "ventilated metal thimble".
☐ Vent terminations installed per the manufacturer's listing.
☐ Exhaust vent terminations for mechanical draft and direct venting shall not be 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 less than 3' above any forced air intake within 10', nor within 12" of grade.
☐ Gas vent terminations for listed caps, for roof / wall size and clearances. Gas vents < 12", and not less than 8' from vertical wall or obstruction, shall terminate above roof per table (pitch of roof). Gas vents > 12" shall terminate 2' above, and 10' away from any portion of a building.
☐ Vent terminal (except direct-vents) not mounted directly above or within 3' horizontally of a gas meter or oil tank vent.
☐ Vent terminal no closer than 3' to an interior corner formed by (2) perpendicular walls.
☐ Power exhaust terminals not located within 10' of property line and adjacent buildings, and 7' above any finished ground level public walkway.
☐ Venting systems shall not extend into or pass through any fabricated air duct or furnace plenum.

MECHANICAL ROUGH(CONTINUED)

☐ A chimney or vent connector shall not pass through any floor or wall ceiling, and shall not pass through a wall or partition unless the connector is listed and labeled for wall pass-through, and installed per the listing.

☐ 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 shall be installed to provide clearance between the vent and the combustible insulation materials, specified by the vent manufacturer.

☐ Venting supported per manufacturer's listing.

☐ Clothes dryer exhausted per manufacturer's instructions.

☐ Clothes dryer exhaust ducts of metal with smooth interior surfaces, with joints running in the direction of air flow.

☐ Clothes dryer exhaust duct requires protective shield steel plates of 0.062 thickness, where nails or screws are likely to penetrate clothes dryer exhaust duct – including at framing members < 1-1/4" between duct and finished face of framing member, and extend not less than 2" above the sole plate and beyond the top plate.

☐ Clothes dryer exhaust ducts shall have a smooth interior finish and shall be constructed of metal not less than 0.0157 inch in thickness (N0. 28 gage). The duct shall be 4 inches nominal in diameter.

☐ The maximum allowable exhaust duct length for clothes dryer shall be determined by one of the methods specified in Sections (M1502.4.5.1 through M1502.4.5.3).

☐ The maximum length of the clothes dryer exhaust duct shall be 35' feet from the connection to the transition duct from the dryer to the outlet terminal. Where fittings are used, the maximum length of the exhaust duct shall be reduced in accordance with Table (M1502.4.5.1). The maximum length of the exhaust duct does not include the transition duct.

☐ Clothes dryer ducting run independently of other ducted systems, and shall convey moisture to the outdoors (except listed and labeled condensing ductless clothes dryers).

☐ Exterior termination is backdraft dampered, with no screens, and 3' min. from away from any openings into building. Clothes dryer exhaust ducts shall not connect to: vent connectors; vent; or chimney.

☐ Clothes dryer ducting concealed in construction exceeding 35 feet, must be labeled with the equivalent length. Label shall be located within 6' of the exhaust connection.

☐ Dryer exhaust duct required at time of occupancy. If dryer not installed, exhaust duct shall be capped at the location of the future dryer (except listed and labeled condensing ductless clothes dryers).

☐ Gas dryer gas connectors maximum 6' long, measured along centerline of the connector. One connector only.

☐ Gas shutoff valve installed immediately ahead of connector, and in the same room.

☐ Range vertical clearance to combustibles is 30" minimum or per manufacturer's listing. Minimum clearance reduced to 24" (Gas cooking appliance) with one of three exceptions. (M1901.1)(G2447.5 (1,2,3).

☐ Range gas connector maximum 6' long maximum.

☐ Range shutoff valve installed immediately ahead of connector.

☐ Domestic cooking exhaust terminates outside, is air tight and is equipped with a backdraft damper, and shall be independent of all other exhaust systems.

☐ Ducting serving domestic cooking exhaust 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 5 exception requirements.

☐ Domestic open-top broiler units shall have a metal exhaust hood, having a minimum thickness of 28 gauge with ¼" clearance between hood and the underside of combustible materials or cabinets, and clearance of min. 24" between cooking surface to combustible materials or 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.

☐ 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.

☐ Masonry fireplaces shall be constructed in accordance with Section R1001 and the applicable provisions of Chapters 3 and 4 of the IRC.

MECHANICAL ROUGH (CONTINUED)

☐ Hearth extensions of approved factory built fireplaces shall be installed in accordance with the listing of the fireplace. The hearth extensions are to be readily distinguishable from the surrounding floor area. Listed and labeled hearth extensions shall comply with UL 1618.

☐ Installed per manufacturer's installation instructions when installed in a solid fuel burning fireplace. (Decorative Gas Fireplace)(G2432.1)

☐ Appliance shutoff valves shall be located in the same room, and within 6' of the appliance. Appliance shutoff valves located in fireplace firebox shall be installed per the appliance manufacturer's instructions. Shutoff valves for vented decorative appliances and room heaters shall be permitted to be installed in a remote area from the appliance where such valves are provided with: ready access; permanent identification; and serve no other appliance. Shutoff valve installed at a manifold – within 50' of appliance, but other requirements apply, as above. (G2420.5.1 through G2420.5.3.)

☐ Decorative shrouds used at chimney terminations are to be listed and labeled for use with specific chimney system. (R1004.3, R1005.2)

☐ Cooling coils installed downstream (return side) from heat exchanger. (M1411.2)

☐ Appliance access working space minimum 30" x 30". (M1305.1)

☐ Condensate disposal line to an approved place of disposal, but not to public street, alley, or create a nuisance.

☐ Condensate line minimum 3/4" and sloped to drain termination without sags – 1/8 unit in 12 units (1-percent slope). (M1411.3).

☐ Auxiliary and secondary drain systems (incl. pan) in addition to condensate disposal, where damage to any building components will occur from overflow or stoppage of condensate drain piping (4 – methods, incl. UL 508 shutoff switch).(M1411.3.1.1,2,3,4.).

☐ Refrigerants shall conform to ANSI / ASHREA 34.

☐ Refrigerant lines shall be insulated to R-4, and perm rating of max. 0.05.

☐ Refrigerant piping installed within 1 ½" of the underside of roof decks shall be protected from damage caused by nails and other fasteners.

☐ Refrigerant circuit access ports located outdoors shall be fitted with locking-type tamper-resistant caps or shall otherwise secured to prevent unauthorized access.

☐ Exhaust air from bathrooms and toilet rooms shall not be recirculated within a residence or circulated to another dwelling unit and shall be exhausted directly to the outdoors. Exhaust air from bathrooms, toilet rooms and kitchens shall not discharge into an attic, crawl space or other areas inside the building.

☐ Air exhaust and intake openings that terminate outdoors shall be protected with corrosion resistant screens, louvers or grilles having an opening size of not less than ¼" inch and a maximum opening size of ½" inch in any dimension. Openings shall be protected against local weather conditions. Outdoor air exhaust and intake openings shall meet the provisions for exterior wall opening protectives in accordance with this code (IRC).

☐ Whole house mechanical ventilation systems shall be designed in accordance with Sections (M1505.4.1 through M1505.4.4).

☐ The whole house ventilation system shall consist of one or more supply or exhaust fans, or a combination of such, and associated ducts and controls. Local exhaust or supply fans are permitted to serve as such a system. Outdoor air ducts connected to the return side of an air handler shall be considered as providing supply ventilation.

☐ The whole house mechanical ventilation system shall be provided with controls that enable manual override.

☐ The whole house mechanical ventilation system shall provide outdoor air at a continuous rate as determined in accordance with (Table M1505.4.3)(1) or Equation 15-1.

☐ Exception: The whole house mechanical ventilation system is permitted to operate intermittently where the system has controls that enable operation for not less than 25 percent of each 4 hour segment and the ventilation rate prescribed in (Table M1505.4.3)(1) is multiplied by the factor determined in accordance with (Table M1505.4.3)(2).

MECHANICAL FINAL

☐ Source of ignition on gas appliances in garages (water heaters, furnaces, & dryers) must be a minimum of 18" above the floor unless listed as flammable vapor ignition resistant (FVIR).
☐ Exposed ducts to be a minimum of 26 gauge sheet metal or other approved material with no openings into garage.
☐ All ducts in attic, garage, crawl space, or other unconditioned spaces, insulated with minimum R-8.
☐ Bollard or wheel stop in garage required if equipment is subject to mechanical damage.
☐ Unions or flex connectors cannot be concealed within or extend through a wall, floor, partition or appliance housing.
☐ Unions or flex connectors are installed between shut-off valve and appliance.
☐ One flex connector up to 6' long is allowed on each appliance.
☐ A shut-off valve is required in for each appliance, upstream of union and accessible.
☐ Piping cannot be installed in or through a ducted supply, return, supply or exhaust, or clothes chute, chimney or gas vent, ventilating duct, dumbwaiter or elevator shaft. Piping installed downstream of the point of delivery shall not extend through any townhouse unit other than the unit served by such piping
☐ Gravity venting system of equivalent area to the vent collar on the appliance. Performance standards can reduce the vent size.
☐ Single wall vents or B vents connecting to flue collars or draft hoods shall be connected by screws or secured as recommended by the manufacturer.
☐ Vents connected to common vent system within the same story require inlets to be at the highest level consistent with headroom and clearance to combustibles. Vent system area cannot be less than the area of the largest vent plus 50% of the smaller flue collar added.
☐ 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.
☐ Vent connectors serving Category 1 appliances are not connected to any portion of a mechanical draft system operating under positive pressure.
☐ 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 Figure G2427.6.3 for distances from vertical objects including roof pitch.
☐ Vent clearances to combustibles per manufacturer's listing or performance standards.
☐ 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.
☐ Vent terminations installed per the manufacturer's listing.
☐ Mechanical draft venting systems shall be installed in accordance with their listing, and: 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.
☐ 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 to be secured in place and maintain required clearances to combustibles.
☐ Direct vent terminations. See manufacturer's installation instructions.
☐ Vent connector clearance to combustibles installed per (Table G2427.10.5).
☐ Single wall connectors don't originate in an attic or concealed space or pass through an attic, inside a wall or concealed space.
☐ 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.
☐ B vent chimneys supported above the roof per manufacturer's requirements.
☐ Type B or L vents terminate at least 5' in vertical height above the highest connected equipment draft hood or flue collar.
☐ Furnace and Air Handler minimum working space clearance – sides minimum. 3"; total minimum. 12" bigger than appliance, except replacement appliances.

MECHANICAL FINAL (CONTINUED)
☐ Maintain required clearances to combustible construction as specified in the listing. ☐ Clearance from grade: Equipment supported on concrete pad or approved material extending above the adjoining ground. ☐ Condensate lines are required to drain by gravity to an approved drain or condensate pump. ☐ Secondary condensate disposal provided. ☐ Condensing Appliances: Vent per installer's instruction. ☐ Complies with whole house mechanical ventilation. ☐ Combustibles installed not less than 24" from open top broilers. See manufacturer's installation instructions. ☐ Distance above top of cook top to unprotected combustible material not less than 30". ☐ Clearance to adjacent combustibles surfaces per the manufacturer's installation instructions for cooktop. ☐ Factory built fireplaces certified, listed and labeled. ☐ Hearth extensions are to be readily distinguishable from the surrounding floor and in accordance with the fireplace listing. ☐ Installed per manufacturer's installation instructions when installed in a solid fuel burning fireplace. (Decorative Gas Fireplace)(G2432.1) ☐ Appliance shutoff valves shall be located in the same room, and within 6' of the appliance. Appliance shutoff valves located in fireplace firebox shall be installed per the appliance manufacturer's instructions. Shutoff valves for vented decorative appliances and room heaters shall be permitted to be installed in a remote area from the appliance where such valves are provided with: ready access; permanent identification; and serve no other appliance. Shutoff valve installed at a manifold – within 50' of appliance, but other req's apply, as above. ☐ Decorative shrouds used at chimney terminations are to be listed and labeled for use with specific chimney system. ☐ Gas logs in solid fuel burning fireplace are installed per manufacturer's instructions. ☐ Gas logs, when equipped with a pilot, have a listed safety shutoff valve. ☐ A 4" metal dryer exhaust duct is installed with smooth interior. Install per the manufacturer's instructions. ☐ Approved flexible listed metal duct connector up to 8' long, may connect the dryer to the vent, but may not extend into wall, floor or ceiling. ☐ Minimum 100 square inches of makeup air for closets designed for the installation of gas clothes dryers or other approved means. ☐ Flex duct is supported per manufacturer's installation instructions (a maximum of every 4') and is installed without kinks or tight bends. ☐ Ducts in crawl spaces are supported at least 4" above the ground. ☐ When equipment is installed in a crawl or attic space, a light switch and outlet is required at or near appliance. ☐ Verify that the passageway of continuous solid flooring unobstructed not less than 24" wide from attic access to 30" wide work platform in front of furnace has been installed. ☐ Access opening large enough to remove largest piece of equipment, but not less than 30" x 22". ☐ Access opening not more than 20 feet from equipment. ☐ Weather protect exterior gas line. ☐ Appliances installed in outdoor locations – listed or protected from outdoor environmental factors.