

2009 MECHANICAL CODE REQUIREMENTS

ANTRIM COUNTY – BUILDING DEPARTMENT

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Mechanical requirements for residential buildings per the 2009 Michigan Residential Code Chapters 1, 3, 10, and 12 through 24. This lists the most common code questions, but **does not** address all of the requirements of the **MICHIGAN RESIDENTIAL CODE 2009**. It shall be the duty of every person performing work to comply with **all** the requirements of this Code.

Signed & sealed construction documents prepared by a registered design professional for a mechanical **layout** plan is required for all commercial projects and projects that meet the requirements as on the mechanical application for large residential projects (over 375,000 BTU) for plan review. See the following example pages for mechanical requirements.

1. Boiler permit and installation of boiler shall be by a licensed boiler installer as required by Public Act 290 of 1965 Section 13 or Homeowner.
2. Every dwelling unit shall be provided with heating facilities capable of maintaining a minimum 68 degrees Fahrenheit in all habitable rooms.
3. Heating and cooling equipment shall be sized in accordance with ACCA Manual J-2002. Ductwork shall be sized in accordance with ACCA Manual D-1995 (M1401.3).
4. Combustion, ventilation and make-up air shall be provided as required by Section G2407.1 (Combustion air for gas appliances), Chapter 17 (Combustion air for liquid and solid fuel), and G2439.4 & G2407.9.1 (Make-up air). See following pages for code section references.

Manufacturer's installation instruction shall be present on site for **all** mechanical inspections that are to be conducted (M1307.1).

SECTION R303

R303.3 Bathrooms. Bathrooms, water closet compartments and other similar rooms shall be provided with aggregate glazing area in windows of not less than 3 square feet (0.279 m²), one-half of which must be open-able.

- Exception: The glazed areas shall not be required where artificial light and a mechanical ventilation system are provided. The minimum ventilation rates shall be 50 cfm (23.6 L/s) for intermittent ventilation or 20 cfm (9.4 L/s) for continuous ventilation. Ventilation air from the space shall be exhausted directly to the outside.

R303.4 Opening Location. Outdoor intake and exhaust openings shall be located in accordance with Sections R303.4.1 and R303.4.2.

- R303.4.1 Intake Openings. Mechanical and gravity outdoor air intake openings shall be located a minimum of 10 feet (3048 mm) from any hazardous or noxious contaminant, such as vents, chimneys, plumbing vents, streets, alleys, parking lots and loading docks, except as otherwise specified in this code. Where a source of contaminant is located within 10 feet (3048 mm) of an intake opening, such opening shall be located a minimum of 2 feet (610 mm) below the contaminant source.
- For the purpose of this section, the exhaust from dwelling unit toilet rooms, bathrooms and kitchens shall not be considered as hazardous or noxious, but must be still be ran directly to the outside.
- R303.4.2 Exhaust Openings. Outside exhaust openings shall be located so as not to create a nuisance. Exhaust air shall not be directed onto walkways. Exhaust openings shall not terminate within 3 feet of a ventilated section of soffit.

R303.5 Outside Opening Protections. Air exhaust and intake openings that terminate outdoors shall be protected with corrosion-resistant screens, louvers or grilles having a minimum opening size of ¼ inch (6.4 mm) and a maximum opening size of ½ inch (12.7 mm), in any dimension. Openings shall be protected against local weather conditions. Outdoor air exhaust and intake openings shall meet the provisions for exterior wall openings protectives in accordance with this code.

R303.8 Required Heating. When the winter design temperature in Table R301.2 (1) is below 60° F (16° C), every dwelling unit shall be provided with heating facilities capable of maintaining a minimum room temperature of 68° F (20° C) at a point 3 feet (914 mm) above the floor and 2 feet (610 mm) from exterior walls in all habitable rooms at the design temperature. The installation of one or more portable space heaters shall not be used to achieve compliance with this section.

R302.5.2 Duct Penetration. Ducts in the garage and ducts penetrating the walls or ceilings separating the dwelling from the garage shall be constructed of a minimum No. 26 gage (0.48 mm) sheet steel or other approved material and shall have no openings into the garage.

SECTION R1004 – FACTORY-BUILT FIREPLACES

R1004.1 General. Factory-built fireplaces shall be listed and labeled and shall be installed in accordance with the conditions of the listing and this code. Factory-built fireplaces shall be tested in accordance with UL 127.

R1004.2 Hearth Extensions. Hearth extensions of approved factory-built fireplaces shall be installed in accordance with the listing of the fireplace. The hearth extensions shall be readily distinguishable from the surrounding floor area.

R1004.3 Decorative Shrouds. Decorative shrouds shall not be installed at the termination of chimneys for factory built fireplaces except where such shrouds are listed and labeled for use with the specific factory-built fireplace system and installed in accordance with the manufacturer's installation instructions.

R1004.4 Unvented Gas Log Heaters. An unvented gas log heater shall not be installed in a factory-built fireplace unless the fireplace system has been specifically tested, listed and labeled for such use in accordance with UL 127.

SECTION R1006 – EXTERIOR AIR SUPPLY

R1006.1 Exterior Air. Factory-built or masonry fireplaces covered in this chapter shall be equipped with an exterior air supply to assure proper fuel combustion unless the room is mechanically ventilated and controlled so that the indoor pressure is neutral or positive.

- R1006.1.1 Factory-built Fireplaces. Exterior combustion air ducts for factory-built fireplaces shall be listed component of the fireplace and shall be installed according to the fireplace manufacturer's instructions.

SECTION M1401 - GENERAL

M1401.1 Installation. Heating and cooling equipment and appliances shall be installed in accordance with the manufacturer's installation instructions and the requirements of this code.

M1401.2 Access. Heating and cooling equipment shall be located with respect to building construction and other equipment to permit maintenance, servicing and replacement. Clearances shall be maintained to permit cleaning of heating and cooling surfaces; replacement of filters, blowers, motors, controls and vent connections; lubrication of moving parts; and adjustments.

M1401.3 Sizing. Heating and cooling equipment shall be sized in accordance with ACCA Manual S 3-2004, as listed in chapter 43; based on building loads calculated in accordance with the provisions of ACCA Manual J-2002 listed in chapter 43 or other approved heating and cooling calculation methodologies. Ductwork shall be sized in accordance with the provisions of ACCA Manual D-1995, as listed in chapter 43.

SECTION M1602 – RETURN AIR

M1602.1 Return Air. Return air shall be taken from inside the dwelling. Dilution of return air with outdoor air shall not be prohibited.

M1602.2 Prohibited Sources. Outdoor and return air for a forced-air heating or cooling system shall not be taken from the following locations:

1. Closer than 10 feet(3048mm) to an appliance vent outlet, a vent opening from a plumbing drainage system or the discharge outlet of an exhaust fan, unless the outlet is 3 feet (914 mm) above the outside air inlet.
2. Where flammable vapors are present; or where located less than 10 feet (3048 mm) above the surface of any abutting public way or driveway; or where located at grade level by a sidewalk, street, alley or driveway.
3. A room or space, the volume of which is less than 25 percent of the entire volume served by such system. Where connected by a permanent opening having an area sized in accordance with ACCA Manual D, adjoining rooms or spaces shall be considered as a single room or

space for the purpose of determining the volume of such rooms or spaces.

- **Exception:** The minimum volume requirement shall not apply where the amount of return air taken from a room or space is less than or equal to the amount of supply air delivered to such room or space.
4. A closet, bathroom, toilet room, kitchen, garage, mechanical room, boiler room, unconditioned attic, furnace room or other dwelling unit.
 5. A room or space containing a fuel-burning appliance where such room or space serves as the sole source of return air.
 - **Exceptions:**
 1. The fuel-burning appliance is a direct-vent appliance or an appliance not requiring a vent in accordance with Section M1801.1 or Chapter 24.
 2. The room or space complies with the following requirements:
 - a) The return air shall be taken from a room or space having a volume exceeding 1 cubic foot for each 10 Btu/h (9.6 L/W) of combined input rating of all fuel-burning appliances therein.
 - b) The volume of supply air discharged back into the same space shall be approximately equal to the volume of return air taken from the space.
 - c) Return-air inlets shall not be located within 10 feet (3048 mm) of any appliance firebox or draft hood in the same room or space.
 3. Rooms or spaces containing solid-fuel burning appliances, provided that return-air inlets are located not less than 10 feet (3048 mm) from the firebox of such appliances.

G2442.2 – Minimum unobstructed total area of the outside and return air ducts or openings to a forced-air warm-air furnace shall be not less than 2 square inches per 1,000 Btu/h (4402 mm²/W) output rating capacity of the furnace and not less than specified in manufacturer's installation instructions.

- **Exception:** The total area of the supply air ducts and outside and return air ducts shall not be required to be larger than the minimum size required by the furnace manufacturer's installation instructions.

R303.5 Outdoor air inlets shall be covered with screens having not less than ¼ inch (6.4 mm) openings and not greater than ½ inch (12.7 mm) openings in any dimension.

SECTION G2406

G2406.1 (303.1) General. Appliances shall be located as required by this section, specific requirements elsewhere in this code and the conditions of the equipment and appliance listing.

G2406.2 (303.3) Prohibited locations. Appliances shall not be located in, or obtain combustion air from any of the following rooms or in a space that opens only into such rooms or spaces except where the installation complies with one of the following:

1. Sleeping rooms.
2. Bathrooms.
3. Toilet rooms.
4. Storage closets.

Exceptions:

1. Direct-vent appliances that obtain all combustion air directly from the outdoors.

2. Vented room heaters, wall furnaces, vented decorative appliances and decorative appliances for installation in vented solid fuel-burning fireplaces, provided that the room meets the required volume criteria of Section G2407.5.
3. A single wall-mounted unvented room heater equipped with an oxygen depletion safety shutoffs system and installed in a bathroom, provided that the input rating does not exceed 6,000 Btu/h (1.76k W) and the bathroom meets the required volume criteria of Section G2407.5.
4. A single wall-mounted unvented room heater equipped with an oxygen depletion safety shutoff system and installed in a bedroom, provide that the input rating does not exceed 10,000 Btu/h (2.93 kW) and the bedroom meets the required volume criteria of Section G2407.5.
5. Appliances installed in an enclosure in which all combustion air is taken from the outdoors, in accordance with Section G2407.6. Access to such enclosure shall be through a solid weather-stripped door, equipped with an approved self-closing device.

G2406.3 (303.6) Outdoor Locations. Equipment installed in outdoor locations shall be either listed for outdoor installation or provided with protection from outdoor environmental factors that influence the operability, durability and safety of the equipment.

SECTION G2407 (304) – COMBUSTION, VENTILATION AND DILUTION AIR

G2407.1 (304.1) General. Air for combustion, ventilation and dilution of flue gases for gas utilization equipment installed in buildings shall be provided by application of one of the methods prescribed in Sections G2407.5 through G2407.9. Where the requirements of Section G2407.5 are not met, outdoor air shall be introduced in accordance with one of the methods prescribed in Section G2407.6 through G2407.9. Direct-vent appliances, gas appliances of other than natural draft design and vented gas appliances other than Category I shall be provided with combustion, ventilation and dilution air in accordance with the equipment manufacturer's instructions.

- Exception: Type 1 clothes dryers that are provided with makeup air in accordance with Section G2439.4.

G2407.2 (304.2) Appliance Location. Appliances shall be located so as not to interfere with proper circulation of combustion, ventilation and dilution air.

G2407.3 (304.3) Draft hood/regulator Locations. Where used, a draft hood or a barometric draft regulators shall be installed in the same room or enclosure as the equipment served so as to prevent any difference in pressure between the hood or regulator and the combustion air supply.

G2407.11 (304.11) Combustion Air Ducts. Combustion air ducts shall comply with all of the following:

1. Ducts shall be of galvanized steel complying with Chapter 16 or of equivalent corrosion-resistant material approved for this application.
 - Exception: Within dwelling units, unobstructed stud and joist spaces shall not be prohibited from conveying combustion air, provided that not more than one required fire-block is removed.
2. Ducts shall terminate in an unobstructed space allowing free movement of combustion air to the appliances.
3. Ducts shall serve a single enclosure.
4. Ducts shall not serve both upper and lower combustion air openings where both such openings are used. The separation between ducts serving upper and lower combustion air

- openings shall be maintained to the source of combustion air.
5. Ducts shall not be screened where terminating in an attic space.
 6. Horizontal upper combustion air ducts shall not slope downward toward the source of combustion air.
 7. The remaining space surrounding a chimney liner, gas vent, special gas vent or plastic piping installed within masonry, metal or factory-built chimney shall not be used to supply combustion air.
 - **Exception:** Direct-vent gas-fired appliances designed for installation in solid fuel-burning fireplace where installed in accordance with the listing and the manufacturer's instructions.
 8. Combustion air intake openings located on the exterior of a building shall have the lowest side of such openings located not less than 12 inches (305 mm) vertically from the adjoining grade level.

G2407.12 (304.12) Protection from fumes and gases. Where corrosive or flammable process fumes or gases, other than products of combustion, are present, means for the disposal of such fumes or gases shall be provided. Such fumes or gases include carbon monoxide, hydrogen sulfide, ammonia, chlorine and halogenated hydrocarbons.

- ❖ In barbershops, beauty shops and other facilities where chemicals that generate corrosive or flammable products, such as aerosol sprays, are routinely used, non-direct-vent type appliances shall be located in an equipment room separated or partitioned off from other areas with provisions for combustion air and dilution air from the outdoors. Direct-vent appliances shall be installed in accordance with the appliance manufacturer's installation instructions.

SECTION G2408 (305) INSTALLATION

G2408.1 (305.1) General. Equipment and appliances shall be installed as required by the terms of their approval, in accordance with the conditions of listing the manufacturer's instructions, and this code.

SECTION M1502 CLOTHES DRYER EXHAUST

M1502.2 General. Dryer exhaust systems shall be independent of all other systems, and shall convey moisture to the outdoors.

- **Exception:** This section shall not apply to listed and labeled condensing (ductless) clothes dryers.

M1502.3 Duct Termination. Exhaust ducts shall terminate on the outside of the building. Exhaust duct terminations shall be in accordance with the dryer manufacturer's installation instructions. Exhaust ducts shall terminate not less than 3 feet (914 mm) in any direction from opening into buildings. Exhaust duct termination shall be equipped with a back-draft damper. Screens shall not be installed at the duct termination. Clothes dryer exhaust shall not be connected to a vent connector, vent, or chimney. Clothes dryer exhaust ducts shall not extend into or through ducts or plenums. R408.30507

M1502.4 Dryer Exhaust Duct. Dryer exhaust ducts shall conform to the requirements of Section M1502.4.1 through M1502.4.6.

M1502.4.1 Material and size. Exhaust ducts shall have a smooth interior finish and shall be constructed of metal a minimum 0.016-inch (0.4mm) thick. The exhaust duct size shall be 4 inches (102 mm) nominal in diameter.

M1502.4.2 Duct installation. Exhaust ducts shall be supported at 4 foot (1219 mm) intervals and secured in place. The insert end of the duct shall extend into the adjoining duct or fitting in the direction of airflow. Ducts shall not be joined with screws or similar fasteners that protrude into the inside of the duct.

M1502.4.3 Transition Ducts. Transition ducts shall not be concealed within construction. Flexible transition ducts used to connect the dryer to the exhaust duct system shall be limited to single lengths, not to exceed 8 feet (2438 mm) and shall be **listed** and **labeled** in accordance with UL 2158A.

M1502.4.4.1 Duct Length. The maximum allowable exhaust length shall be determined by one of the methods specified in Section m1502.4.4.1 or M1502.4.4.2.

- **M1502.4.4.1 Specified length.** The maximum length of the exhaust duct shall be 25 feet (7620 mm) from the connection to the transition duct from the fryer to the outlet terminal. Where fittings are used, the maximum length the exhaust duct shall be reduced in accordance with Table M1502.4.4.1.
- **M1502.4.4.2 Manufacturer's instruction.** The size and maximum length of the exhaust shall be determined by the dryer manufacturer's installation instructions. The code official shall be provided with a copy of the installation instructions for the make and model of the dryer at the concealment inspection. In the absence of fitting equivalent length calculations from clothes dryer manufacturer, Table M1502.4.4.1 shall be used.

M1502.4.5 Length identification. Where the exhaust duct is concealed within the building construction, the equivalent length of the exhaust duct shall be identified on a permanent label or tag. The label or tag shall be located within 6 feet (1829 mm) of the exhaust duct connection.

DUCT SYSTEMS

M1601.5 Under-floor plenums. Under-floor plenums shall be prohibited in new structures. Modification or repairs to under-floor plenums in existing structures shall conform to the requirements of this section.

- M1601.5.1 General. The space shall be cleaned of loose combustible materials and scrap, and shall be tightly enclosed. The ground surface of the space shall be covered with a moisture barrier having a minimum thickness of 4 mils (0.1 mm). Plumbing waste cleanout shall not be located within the space.
 - ❖ Exception: Plumbing waste cleanouts shall be permitted to be located in unvented crawl spaces that receive **conditioned air** in accordance with Section R408.3.

M1601.6 **Independent garage HVAC systems.** Furnaces and air-handling systems that supply air to living spaces shall not supply air to or return air from a garage.

M2103.2 Thermal barrier required. Radiant floor heating systems shall have a thermal barrier in accordance with Sections M2103.2.1 through M2103.2.4

- Exception: Insulation shall not be required in engineered systems where it can be demonstrated that the insulation will decrease the efficiency or have a negative effect on the installation.
- M2103.2.1 Slab on grade installation. Radiant piping used in slab-on-grade applications shall have insulating materials having a minimum R-value of 5 installed beneath the piping.
- M2103.2.2 Suspended floor installation. In suspended floor applications, insulation shall be installed in the joist bay cavity serving the heating space above and shall consist of materials

having a minimum R-value of 11.

- M2103.2.3 Thermal break required. A thermal break consisting of asphalt expansion joint materials or similar insulating materials shall be provided at a point where a heated slab meets a foundation wall or other conductive slab.
- M2103.2.4 Thermal barrier material marking. Insulating materials used in thermal barriers shall be installed so that the manufacturer's R-value mark is readily observable upon inspection.

FUEL GAS

G2412.5 (401.5) Identification. For other than steel *pipe*, exposed *pipng* shall be identified by a yellow label marked "**Gas**" in black letters. The marking shall be spaced at intervals not exceeding 5 feet (1524 mm). The marking shall not be required on pipe located in the same room as the appliance served.

G2415.8 (404.8) Isolation. Metallic *pipng* and metallic *tubng* that conveys *fuel gas* from an LP-gas storage container shall be provided with an *approved* dielectric fitting to electrically isolate the underground portion of the *pipe* or tube from the above ground portion that enters a building. Such dielectric fittings shall be installed aboveground outdoors.

G2418.2 (407.2) Design and installation. *Pipng* shall be supported with metal *pipe* hooks, metal *pipe* straps, metal bands, metal brackets, metal hangers or building structural components suitable for the size of *pipng*, or adequate strength and quality, and located at intervals so as to prevent or damp out excessive vibrations. *Pipng* shall be anchored to prevent undue strains on connected *appliances* and shall not be supported by other *pipng*. *Pipe* hangers and supports shall conform to the requirements of MSS SP-58 and shall be spaced in accordance with Section G2424. Supports, hangers and anchors shall be installed so as not to interfere with the free expansion and contraction of the *pipng* between anchors. All parts of the supporting *equipment* shall be designed and installed so that they will not be disengaged by movement of the supporting piping.

This lists the most common code questions, but **does not** address all of the requirements of the **MICHIGAN RESIDENTIAL CODE 2009**. It shall be the duty of every person performing work to comply with **all** the requirements of this Code.