Marginal Markings

Solid vertical lines indicate technical changes from 2012 IBC.

Dashed vertical lines indicate technical changes in Seattle amendments.

Solid deletion arrow indicates IBC text has been deleted.

Hollow arrow indicates Seattle amendments have been deleted.

Text Markings

Underlining indicates Seattle amendments. **ADULT FAMILY HOME.**

Italics indicate a defined term. A *dwelling* licensed.

Strikethrough indicates Seattle deletions. ((~~ADULT FAMILY HOME~~))

A bracketed and underlined W indicates Washington state amendments. **[W]**

CHAPTER 15
EXHAUST SYSTEMS

Note: this chapter includes only those sections of the 2015 International Residential Code for which amendments are proposed.

SECTION M1505
OVERHEAD EXHAUST HOODS

[W]M1505.1 General. Domestic open-top broiler units shall have a metal exhaust hood, having a minimum thickness of 0.0157-inch (0.3950 mm) (No. 28 gage) with ¼ inch (6.4 mm) clearance between the hood and the underside of combustible material or cabinets. A clearance of not less than 24 inches (610 mm) shall be maintained between the cooking surface and the combustible material or cabinet. 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, shall discharge to the outdoors and be equipped with a backdraft damper or other means to control infiltration/exfiltration when not in operation. Broiler units incorporating an integral exhaust system, and *listed* and *labeled* for use without an exhaust hood, or broiler units permanently installed outside the building envelope and having the cooking surface at least 5'0" below a 1-hour fire resistance rated ceiling, need not have an exhaust hood.

SECTION M1507
MECHANICAL VENTILATION

[W]M1507.1 General. ((~~Where~~ ~~I~~))Local exhaust ((~~or~~)) and whole-house mechanical ventilation systems and ((~~is provided, the~~))equipment shall be designed in accordance with this section.

[W] M1507.2 Recirculation of air. Exhaust air from bathrooms and toilet rooms shall not be recirculated within a residence or to another *dwelling unit* and shall be exhausted directly to the outdoors. Exhaust air from bathrooms and toilet rooms shall not discharge into an *attic*, crawl space or other areas ((~~inside~~)) of the building.

M1507.3 Whole-house mechanical ventilation system. Whole-house mechanical ventilation systems shall be designed in accordance with Sections M1507.3.1 through ((~~M1507.3.3~~)) M1507.3.7.3.

[W]M1507.3.1 System design. ((~~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.~~)) Each *dwelling unit* or *guestroom* shall be equipped with a ventilation system complying with Section M1507.3.4, M1507.3.5, M1507.3.6, or M1507.3.7. Compliance is also permitted to be demonstrated through compliance with the *International Mechanical Code* or ASHRAE Standard 62.2.

[W]M1507.3.2 ((~~System controls.~~)) Control and operation. ((~~The whole-house mechanical ventilation system shall be provided with controls that enable manual override.~~))

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 be equipped with an override control. A "fan on" switch shall be permitted as an override control. Controls shall be capable of operating the ventilation system without energizing other energy-consuming appliances. A clearly visible 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 M1507.3.3.

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)."

[W]M1507.3.2.1 Operating instructions. Installers shall provide the manufacturer's installation, operating instructions, and a whole-house ventilation system operation description.

[W]M1507.3.3 Mechanical ventilation rate. The whole-house mechanical ventilation system shall provide outdoor air to each dwelling unit at a continuous rate of not less than that determined in accordance with Table M1507.3.3(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 M1507.3.3(1) is multiplied by the factor determined in accordance with Table M1507.3.3(2).

Table M1507.3.3(1)

Continuous Whole-House Mechanical Ventilation System Airflow Rate Requirements

	NUMBER OF BEDROOMS				
Dwelling Unit Floor Area (square feet)	**0 - 1**	**2 - 3**	**4 - 5**	**6 - 7**	**> 7**
	Airflow in CFM				
≤ 1,500	30	45	60	75	90
1,501 - 3,000	45	60	75	90	105
3,001 - 4,500	60	75	90	105	120
4,501 - 6,000	75	90	105	120	135
6,001 - 7,500	90	105	120	135	150
> 7,500	105	120	135	150	165

For SI: 1 square foot = 0.0929 m^2, 1 cubic foot per minute = 0.0004719 m^3/s.

TABLE M1507.3.3(2)
INTERMITTENT WHOLE-HOUSE MECHANICAL VENTILATION RATE FACTORS[a, b]

RUN-TIME PERCENTAGE IN EACH 4-HOUR SEGMENT	25%	33%	50%	66%	75%	100%
Factor[a]	4	3	2	1.5	1.3	1.0

a. For ventilation system run time values between those given, the factors are permitted to be determined by interpolation.
b. Extrapolation beyond the table is prohibited.

[W]M1507.3.4 Whole-house ventilation using exhaust fans. This section establishes minimum prescriptive requirements for whole-house ventilation systems using exhaust fans. A system which meets all the requirements of this section shall be deemed to satisfy the requirements for a whole-house ventilation system.

[W]M1507.3.4.1 Whole-house ventilation fans. Exhaust fans providing whole-house ventilation shall have a flow rating at 0.25 inches water gauge as specified in Table M1507.3.3 (1). Manufacturers' fan flow ratings shall be determined according to HVI 916 or AMCA 210.

[W]M1507.3.4.2 Fan noise. Whole-house fans located 4 feet or less from the interior grille shall have a sone rating of 1.0 or less measured at 0.1 inches water gauge. Manufacturer's noise ratings shall be determined as per HVI 915 (March 2009). Remotely mounted fans shall be acoustically isolated from the structural elements of the building and from attached duct work using insulated flexible duct or other approved material.

[W]M1507.3.4.3 Fan controls. The whole-house ventilation fan shall meet the requirements of Sections M1507.3.2 and M1507.3.2.1

[W]M1507.3.4.4 Ventilation openings. Each habitable space shall be provided with outdoor air inlets or operable windows with an openable area not less than 4 square inches of net free area of opening for each 10 cfm of outdoor air required by Table M1507.7.3.3 (1). 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 ½ inch above the surface of the finish floor covering.

Individual room outdoor air inlets shall:

1. Have controllable and secure openings;
2. Be sleeved or otherwise designed so as not to compromise the thermal properties of the wall or window in which they are placed;
3. Any inlet or combination of inlets which provide 10 cfm at 10 Pascals are deemed equivalent to 4 square inches net free area.

Ventilation openings shall be screened or otherwise protected from entry by leaves or other material. Openings shall be controllable, securable and shall be designed to not compromise the thermal properties of the building envelope. Ventilation openings shall be located so as not to take air from the following areas:

1. Closer than 10 feet from an appliance vent outlet, unless such vent outlet is 3 feet above the outdoor air inlet.
2. Where it will pick up objectionable odors, fumes or flammable vapors.
3. A hazardous or unsanitary location.
4. A room or space having any fuel-burning appliances therein.
5. Closer than 10 feet from a vent opening of a plumbing drainage system unless the vent opening is at least 3 feet above the air inlet.
6. Attics, crawl spaces, or garages.
7. Asphalt roofs unless it is shown that no other location is permissible. In such cases the inlet opening shall be located a minimum of 2 feet from the nearest surface of the asphalt roofing, measured from the intake opening.

[W]M1507.3.5 Whole-house ventilation integrated with a forced-air system. This section establishes minimum prescriptive requirements for whole-house ventilation systems integrated with forced-air ventilation

systems. A system which meets all the requirements of this section shall be deemed to satisfy the requirements for a whole-house ventilation system.

[W]M1507.3.5.1 Integrated whole-house ventilation systems. Integrated whole-house ventilation systems shall provide outdoor air at the rate calculated using Section M1507.3.3. Integrated forced-air ventilation systems shall distribute outdoor air to each habitable space through the forced-air system ducts. Integrated forced-air ventilation systems shall have an outdoor air inlet duct connecting a terminal element on the outside of the building to the return air plenum of the forced-air system, at a point within 4 feet upstream of the air handler. The outdoor air inlet duct connection to the return air stream shall be located upstream of the forced-air system blower and shall not be connected directly into a furnace cabinet to prevent thermal shock to the heat exchanger. The system shall be equipped with a motorized damper connected to the automatic ventilation control as specified in Section M1507.3.2. The required flow rate shall be verified by field testing with a flow hood or a flow measuring station.

[W]M1507.3.5.2 Ventilation duct insulation. All supply ducts in the conditioned space shall be insulated to a minimum of R-4.

[W] M1507.3.5.3 Outdoor air inlets. 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:

1. Closer than 10 feet from an appliance vent outlet, unless such vent outlet is 3 feet above the outdoor air inlet.
2. Where it will pick up objectionable odors, fumes or flammable vapors.
3. A hazardous or unsanitary location.
4. A room or space having any fuel-burning appliances therein.
5. Closer than 10 feet from a vent opening of a plumbing drainage system unless the vent opening is at least 3 feet above the air inlet.
6. Attics, crawl spaces, or garages.

[W]M1507.3.6 Whole-house ventilation using a supply fan. This section establishes minimum prescriptive requirements for whole-house systems using an inline supply fan. A system which meets all the requirements of this section shall be deemed to satisfy the requirements for a whole-house ventilation system.

[W[M1507.3.6.1 Outdoor air. Supply fan ventilation systems shall distribute outdoor air to each habitable space through the forced-air system ducts or through dedicated ducts to each habitable space. Supply fans shall have the capacity to provide the amount of outdoor air specified in Table M1507.3.3 (1) at 0.40 inches water gauge as per HVI 916. The outdoor air shall be filtered before it is delivered to habitable spaces. The filter may be located at the intake device, in line with the fan, or, in the case of a connection to the return plenum of the air handler, using the furnace filter. An outdoor air inlet shall be connected to either the supply or return air stream.

[W]M1507.3.6.2 Ducts. An outdoor air inlet duct connection to the supply air stream shall be located downstream of the forced-air system blower. An outdoor air inlet duct connection to the return air stream shall be located at least 4 feet upstream of the forced-air system blower and its filter. Neither type of duct shall be connected directly into a furnace cabinet to prevent thermal shock to the heat exchanger. The outdoor air inlet duct shall be prescriptively sized in accordance with Table M1507.3.6.2. The terminal element on the outside of the building shall be sized 2 inches in diameter larger than the outdoor air inlet duct.

Table M1507.3.6.2

Prescriptive Supply Fan Duct Sizing

Supply Fan Tested cfm at 0.40" wg		
Specified Volume from Table M1507.3.3(1)	**Minimum Smooth Duct Diameter**	**Minimum Flexible Duct Diameter**
50 - 90 cfm	4 inch	5 inch
90 - 150 cfm	5 inch	6 inch
150 - 250 cfm	6 inch	7 inch
250 - 400 cfm	7 inch	8 inch

[W]M1507.3.6.3 Dampers. The system shall be equipped with a backdraft damper and one of the following:

1. A calibrated manual volume damper installed and set to meet the measured flow rates specified in Table M1507.3.3(1) by field testing with a pressure gauge and/or following manufacturer's installation instructions; or
2. A manual volume damper installed and set to meet the measured flow rates specified in Table M1507.3.3(1) by field testing with a flow hood or a flow measuring station; or
3. An automatic flow-regulating device sized to the specified flow rates in Table M1507.3.3(1) which provides constant flow over a pressure range of 0.20 to 0.60 inches water gauge.

[W]M1507.3.6.4 Ventilation duct insulation. All supply ducts in the conditioned space shall be insulated to a minimum of R-4.

[W]M1507.3.6.5 Outdoor air inlets. 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:

1. Closer than 10 feet from an appliance vent outlet, unless such vent outlet is 3 feet above the outdoor air inlet.
2. Where it will pick up objectionable odors, fumes or flammable vapors.
3. A hazardous or unsanitary location.
4. A room or space having any fuel-burning appliances therein.
5. Closer than 10 feet from a vent opening of a plumbing drainage system unless the vent opening is at least 3 feet above the air inlet.
6. Attics, crawl spaces, or garages.

[W]M1507.3.7 Whole-house ventilation using a heat recovery ventilation system. This section establishes minimum prescriptive requirements for whole-house ventilation using a heat recovery ventilation system.

[W]M1507.3.7.1 Heat recovery ventilation systems. All duct work in heat recovery systems shall be sized and installed per the manufacturer's instructions. System minimum flow rating shall be not less than that specified in Table M1507.3.3 (1). Heat recovery ventilation systems shall have a filter on the upstream side of the heat exchanger in both the intake and exhaust airstreams with a minimum efficiency rating value (MERV) of 6.

[W]M1507.3.7.2 Ventilation duct insulation. All supply ducts in the conditioned space installed upstream of the heat exchanger shall be insulated to a minimum of R-4.

[W]M1507.3.7.3 Outdoor air inlets. 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:

1. Closer than 10 feet from an appliance vent outlet, unless such vent outlet is 3 feet above the outdoor air inlet.
2. Where it will pick up objectionable odors, fumes or flammable vapors.
3. A hazardous or unsanitary location.

4. A room or space having any fuel-burning appliances therein.

5. Closer than 10 feet from a vent opening of a plumbing drainage system unless the vent opening is at least 3 feet above the air inlet.

6. Attics, crawl spaces, or garages.

[W]M1507.4 Local exhaust ((~~rates~~)). Local exhaust shall be provided in each kitchen, bathroom, water closet, laundry room, indoor swimming pool, spa, and other rooms where water vapor or cooking odor is produced. *Local exhaust* systems shall be designed to have the capacity to exhaust the minimum air flow rate determined in accordance with Table M1507.4.

[W]M1507.4.1 Local exhaust fans. Exhaust fans providing local exhaust shall have a minimum fan flow rating not less than 50 cfm at 0.25 inches water gauge for bathrooms, laundries, or similar rooms and 100 cfm at 0.25 inches water gauge for kitchens. Manufacturers' fan flow ratings shall be determined as per HVI 916 (April 1995) or AMCA 210.

Exception: Where a range hood or down draft exhaust fan is used to satisfy the local exhaust requirements for kitchens, the range hood or down draft exhaust shall not be less than 100 cfm at 0.10 inches water gauge.

[W]M1507.4.2 Local exhaust controls. Local exhaust systems shall be controlled by manual switches, dehumidistats, timers, or other approved means. Local exhaust system controls shall be readily accessible.

[W]TABLE M1507.4

MINIMUM REQUIRED LOCAL EXHAUST RATES FOR ONE- AND TWO-FAMILY DWELLINGS

AREA TO BE EXHAUSTED	EXHAUST RATES
Kitchens	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

For SI: 1 cubic foot per minute = 0.0004719 m^3/s.