

CHAPTER 15

EXHAUST SYSTEMS

SECTION M1501 GENERAL

M1501.1 Outdoor discharge. The air removed by every mechanical exhaust system shall be discharged to the outdoors. Air shall not be exhausted into an *attic*, soffit, ridge vent or crawl space.

Exception: Whole-house *ventilation-type attic* fans that discharge into the *attic* space of *dwelling units* having private *attics* shall be permitted.

SECTION M1502 CLOTHES DRYER EXHAUST

M1502.1 General. Clothes dryers shall be exhausted in accordance with the manufacturer's instructions.

M1502.2 Independent exhaust systems. Dryer exhaust systems shall be independent of all other systems and shall convey the 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 made with a full opening exhaust outlet or in accordance with the dryer manufacturer's installation instructions. If the manufacturer's instructions do not specify a termination location, the exhaust duct shall terminate not less than 3 feet (914 mm) in any direction from openings into buildings. Exhaust duct terminations shall be equipped with a backdraft damper. Screens shall not be installed at the duct termination.

M1502.4 Dryer exhaust ducts. Dryer exhaust ducts shall conform to the requirements of Sections 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 (0.4 mm) 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 duct. Transition ducts used to connect the dryer to the exhaust *duct system* shall be a single length. Transition ducts shall be a maximum of 8 feet (2438 mm) in length. Transition ducts shall not be concealed within construction.

M1502.4.4 Duct length. The maximum allowable exhaust duct 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 35 feet (10 668 mm) 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 M1502.4.4.1.

M1502.4.4.2 Manufacturer's instructions. The size and maximum length of the exhaust duct 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 the 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.

**TABLE M1502.4.4.1
DRYER EXHAUST DUCT FITTING EQUIVALENT LENGTH**

DRYER EXHAUST DUCT FITTING TYPE	EQUIVALENT LENGTH
4 inch radius mitered 45 degree elbow	2 feet 6 inches
4 inch radius mitered 90 degree elbow	5 feet
6 inch radius smooth 45 degree elbow	1 foot
6 inch radius smooth 90 degree elbow	1 foot 9 inches
8 inch radius smooth 45 degree elbow	1 foot
8 inch radius smooth 90 degree elbow	1 foot 7 inches
10 inch radius smooth 45 degree elbow	9 inches
10 inch radius smooth 90 degree elbow	1 foot 6 inches

For SI: 1 inch = 25.4 mm, 1 foot = 304.8 mm, 1 degree = 0.0175 rad.

M1502.4.6 Exhaust duct required. Where space for a clothes dryer is provided, an exhaust *duct system* shall be installed. Where the clothes dryer is not installed at the time of occupancy the exhaust duct shall be capped or plugged in the space in which it originates and identified and marked “future use.”

Exception: Where a *listed* condensing clothes dryer is installed prior to occupancy of the structure.

M1502.5 Protection required. Protective shield plates shall be placed where nails or screws from finish or other work are likely to penetrate the clothes dryer exhaust duct. Shield plates shall be placed on the finished face of all framing members where there is less than 1¼ inches (32 mm) between the duct and the finished face of the framing member. Protective shield plates shall be constructed of steel, shall have a minimum thickness of 0.062-inch (1.6 mm) and shall extend a minimum of 2 inches (51 mm) above sole plates and below top plates.

M1502.6 Exhaust penetrations. Ducts that exhaust clothes dryers shall not penetrate or be located within any fireblocking, draftstopping or any wall, floor/ceiling or other assembly required by this code to be fire-resistance rated, unless such duct is constructed of galvanized steel or aluminum of the thickness specified in Table M1601.1.1(2) and the fire-resistance rating is maintained in accordance with Section R302. Fire dampers, combination fire/smoke dampers and any similar devices that will obstruct the exhaust flow, shall be prohibited in clothes dryer exhaust ducts.

M1502.7 Makeup air. Installations exhausting more than 200 cfm (0.09 m³/s) shall be provided with makeup air. Where a closet is designed for the installation of a clothes dryer, an opening having an area of not less than 100 square inches (0.0645 m²) shall be provided in the closet enclosure.

SECTION M1503 RANGE HOODS

M1503.1 General. Range hoods shall discharge to the outdoors through a single-wall duct. The duct serving the hood shall have a smooth interior surface, shall be air tight and shall be equipped with a backdraft damper. Ducts serving range hoods shall not terminate in an *attic* or crawl space or areas inside the building.

M1503.2 Duct material. Single-wall ducts serving range hoods shall be constructed of galvanized steel, stainless steel or copper.

Exception: Ducts for domestic kitchen cooking *appliances* equipped with down-draft exhaust systems shall be permitted to be constructed of schedule 40 PVC pipe and fittings provided that the installation complies with all of the following:

1. The duct is installed under a concrete slab poured on grade; *and*
2. The underfloor trench in which the duct is installed is completely backfilled with sand or gravel; *and*
3. The PVC duct extends not more than 1 inch (25 mm) above the indoor concrete floor surface; *and*

4. The PVC duct extends not more than 1 inch (25 mm) above grade *outside of the building*; *and*
5. The PVC ducts are solvent cemented.

M1503.3 Clearance. Overhead exhaust hoods shall be constructed of metal, not less than 0.016 inch (0.4 mm) (No. 28 gage). A clearance of least 24 inches (610 mm) shall be maintained between the cooking surface and any combustible material above.

Exceptions:

1. Combination microwave oven/ventilating hoods installed in accordance with Section M1504.1.
2. Down-draft exhaust systems.

M1503.4 Kitchen exhaust rates. Domestic kitchen cooking *appliances* shall be equipped with a ducted range hoods or down-draft exhaust systems and shall be sized in accordance with Section M1507.3.

M1503.5 Makeup air required. Exhaust hood systems capable of exhausting in excess of 400 cubic feet per minute (0.19 m³/s) shall be provided with makeup air at a rate approximately equal to the exhaust air rate. Such makeup air systems shall be equipped with a means of closure and shall be automatically controlled to start and operate simultaneously with the exhaust system.

SECTION M1504 INSTALLATION OF MICROWAVE OVENS

M1504.1 Installation of a microwave oven over a cooking appliance. The installation of a *listed* and *labeled* cooking *appliance* or microwave oven over a *listed* and *labeled* cooking *appliance* shall conform to the terms of the upper *appliance's* *listing* and *label* and the manufacturer's installation instructions. The microwave oven shall conform to UL 923.

SECTION M1505 OVERHEAD EXHAUST HOODS

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 at least 24 inches (610 mm) shall be maintained between the cooking surface and the combustible material or cabinet. The hood shall be at least as wide as the broiler unit, extend over the entire unit, 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, need not have an exhaust hood.

SECTION M1506 EXHAUST DUCTS

M1506.1 Ducts. Where exhaust duct construction is not specified in this chapter, construction shall comply with Chapter 16.

**SECTION M1507
MECHANICAL VENTILATION**

M1507.1 General. Where Section R303.3 requires toilet rooms, bathrooms and rooms with bathing or spa facilities to be mechanically ventilated, the *ventilation equipment* shall be installed in accordance with this section.

M1507.1.1 Duct sizing. Prescriptive exhaust duct sizing shall be in accordance with Table M1507.4.

M1507.2 Recirculation of air. Exhaust air from range hoods, bathrooms, toilet rooms and rooms with bathing or spa facilities shall not be recirculated within a residence or to another *dwelling unit* and shall be exhausted directly to the outdoors. Exhaust air from range hoods, bathrooms, toilet rooms and rooms with bathing or spa facilities shall not discharge into an *attic*, crawl space or other areas inside the building.

M1507.3 Ventilation rate. *Ventilation* systems shall be designed to have the capacity to exhaust the minimum air flow rate determined in accordance with Table M1507.3. Exhaust flow ratings for source specific ventilation systems shall be in accordance with Home Ventilating Institute (HVI) or Air

Movement and Control Association (AMCA) residential ventilation standards.

M1507.3.1 Sound ratings for fans in rooms with bathing or spa facilities.

M1507.3.1.1 Continuous ventilation fans. Continuous ventilation fans shall be rated for sound at a maximum of 1.0 sone.

M1507.3.1.2 Intermittent fans. Intermittent fans shall be rated for sound at a maximum of 3 sone, unless their maximum rated airflow exceeds 400 cfm (200 L/s).

M1507.3.1.3 Remote fans. Remotely installed fans that are at least 4 feet (1220 mm) away from the inlet grill are exempt from the sone rating requirements of Sections M1507.3.1.1 and M1507.3.1.2.

M1507.4 Rooms with bathing or spa facilities. All rooms containing bathing or spa facilities shall be provided with a mechanical ventilation system controlled by a de-humidistat, timer or similar means of automatic control.

**TABLE M1507.3
EXHAUST RATES FOR RESIDENTIAL DWELLINGS**

DOMESTIC KITCHENS	
Range hoods/ downdraft exhaust.	Min. 150 cfm intermittent
BATHROOMS –TOILET ROOMS	
Rooms containing bathing and spa facilities. (Static pressure shall be rated @ 0.10 inch water gauge for intermittent fans.)	Min. 80 cfm intermittent or 20 cfm continuous
Toilet rooms without bathing or spa facilities, when not provided with natural ventilation in accordance with Section R303.3.2.	Min. 50 cfm

For SI: 1 cubic foot per minute = 0.0004719 m³/s.

**TABLE M1507.4
PERSCRIPTIVE EXHAUST DUCT SIZING**

FAN TESTED CFM @ 0.10 in. W.G.	MINIMUM METAL FLEX (diameter)	MAXIMUM LENGTH (feet)	MINIMUM SMOOTH (diameter)	MAXIMUM LENGTH (feet)	MAXIMUM ELBOWS ^a
50	4"	25	4"	70	3
	5"	90	5"	100	3
	6"	No limit	6"	No limit	3
80	4" ^b	N/A	4"	20	3
	5"	15	5"	100	3
	6"	90	6"	No limit	3
100	5" ^b	N/A	5"	50	3
	6"	45	6"	No limit	3
125	6"	15	6"	No limit	3
	7"	70	7"	No limit	3

For SI: 1 inch = 25.4 mm, 1 foot = 304.8 mm.

a. For each additional elbow subtract 10 feet from length.

b. Metal flex ducts of this diameter are not permitted with fans of this size.

