

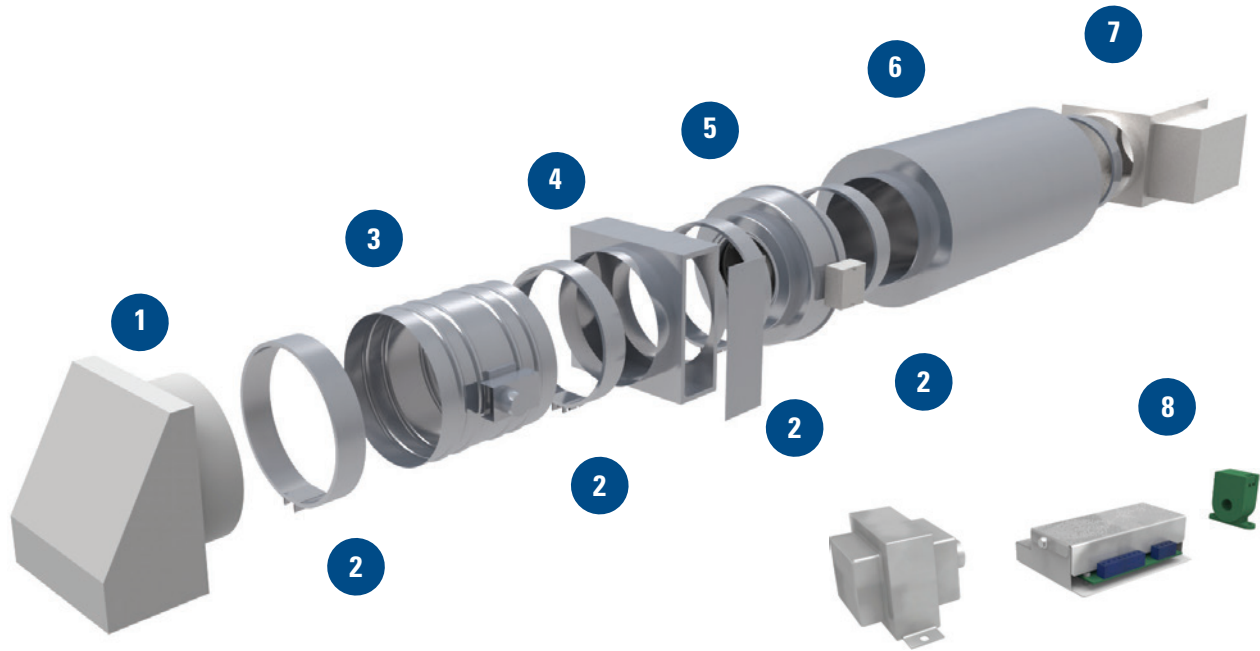
Exhaust Makeup Air System

What goes out, must come in



Exhaust Makeup Air System

What goes out, must come in - so says the building code



- | | | | | | | | |
|---|-----------------------|---|----------------------|---|-----------------------|---|----------------------------|
| 1 | Wall Intake Hood, FML | 3 | Shut-off Damper, ADC | 5 | Makeup Air Fan, FG EC | 7 | Inline Duct Heater¹, EM-WX |
| 2 | Fast Clamp, FC | 4 | Filter Cassette, FGR | 6 | Silencer¹, LD | 8 | Controller, FMAC |

¹ optional

When a fan exhausts air from a home an equal amount of air must enter the home. The air entering the home is called **makeup air**. Because today's homes are built to be "tighter" and more energy-efficient, they inherently resist the infiltration of outdoor air through the home's exterior. A home's tightness limits the amount of makeup air it will permit. In other words, even a powerful exhaust fan can only exhaust as much air as the home permits via makeup air infiltration. When an exhaust fan is operated at a speed that exceeds a home's ability to make up the air via infiltration a couple of undesirable symptoms occur.

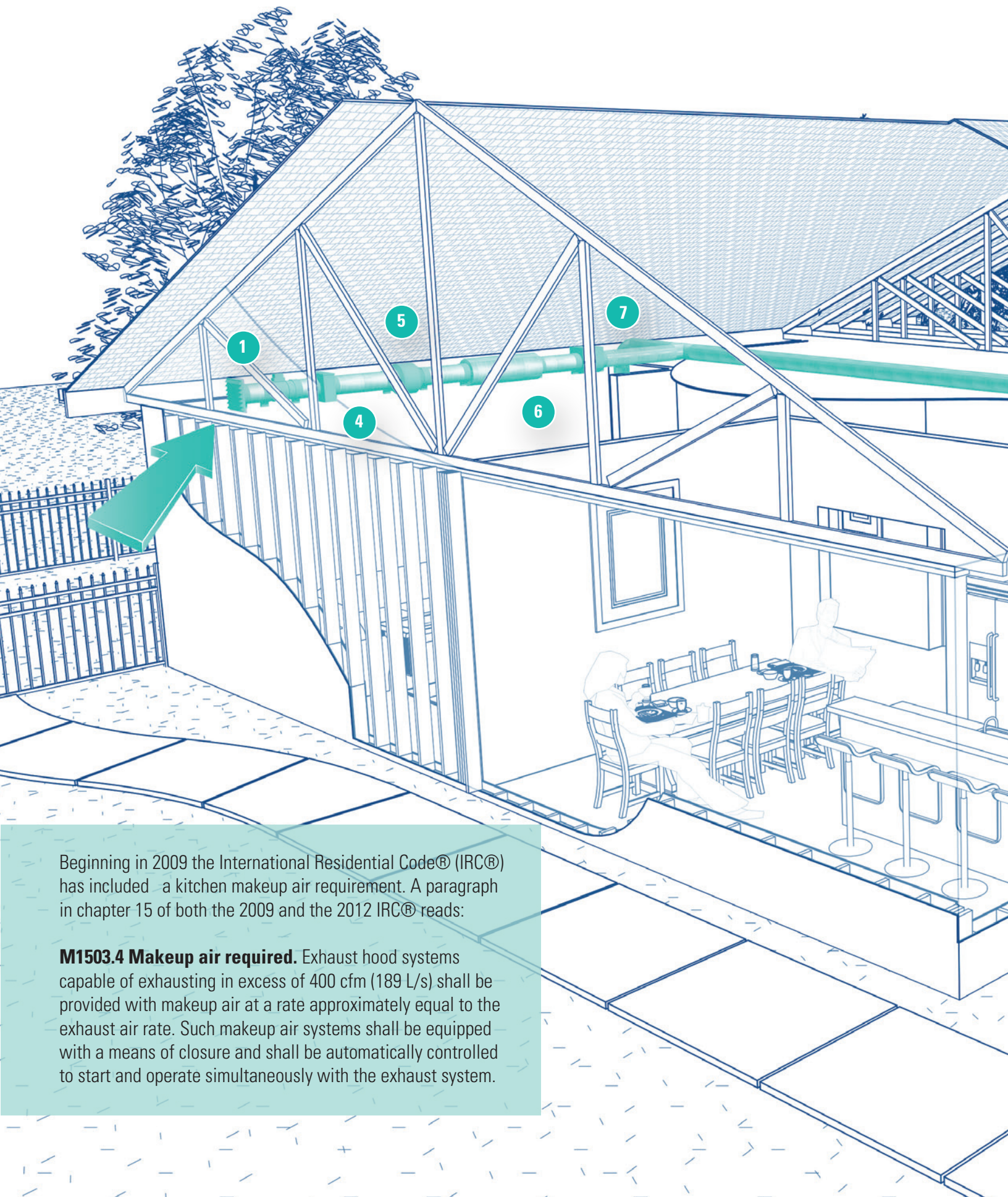
One of the most noticeable symptoms of inadequate makeup air is when a properly-sized kitchen exhaust hood doesn't remove smoke and odor in a timely manner. Cooking-generated smoke is a very visible example of this. Opening a window provides the necessary infiltration to

let the exhaust fan do its job, and the kitchen is quickly cleared of smoke via the kitchen hood. The necessity of opening a window in order to operate the kitchen exhaust hood is hardly ideal, however.

Another symptom is often not as visible, but presents a greater danger to occupants. Fuel-burning appliances (such as furnaces and water heaters) as well as fireplaces utilize vent/chimney systems to discard products of combustion out of the home. When an exhaust fan doesn't have adequate makeup air, a negative pressure is created inside the home. A small amount of negative pressure can cause "back-drafting" of vent/chimney systems, which results in the accumulation of hazardous combustion products in the home. Products of combustion include carbon monoxide, which is invisible and odorless. It's no secret that a potential back-drafting situation should be avoided without exception.

Fantech's Makeup Air System solves this problem by providing an equal amount of makeup air into the home while the exhaust fan is operating. The makeup air system's controls ensure the amount of makeup air EXACTLY matches the exhaust amount, regardless of the exhaust fan's speed. In addition to allowing the exhaust system to run at intended capacity and eliminating associated negative pressure, the makeup air system allows for the makeup air to be managed. Since the makeup air is fan-forced, it can be filtered, tempered, and routed via duct work to a desirable location for delivery into the home.

As if functionality and safety aren't reason enough, the building code requires makeup air for many applications.



Beginning in 2009 the International Residential Code® (IRC®) has included a kitchen makeup air requirement. A paragraph in chapter 15 of both the 2009 and the 2012 IRC® reads:

M1503.4 Makeup air required. Exhaust hood systems capable of exhausting in excess of 400 cfm (189 L/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.

Exhaust Makeup Air System

Simplifying Home Ventilation

Your exhaust makeup air solution should be simple, yet effective. The Fantech makeup air system, along with a kitchen exhaust solution, will be quiet, comfortable and reliable. Under ideal conditions, even while preparing the largest and most demanding meals, your kitchen remains ventilated, without pulling in air from every crack and crevice in your home.

Makeup air can be delivered into the kitchen, close to the exhaust appliance or it can be ducted into the return air duct of a forced air/heating system shown here. The supply fan can be controlled through the exhaust hoods integral variable speed controller, or an alternatively linked control system. The inline duct heater and shut-off damper are also controlled by a Fantech makeup air control, which is activated only when the exhaust fan is operating where an ON-OFF signal is sent to them.

Makeup Air Solution

- | | |
|--------------------------|------------------------------------|
| 1. Wall Intake Hood, FML | 5. Makeup Air Fan, FG EC |
| 2. Fast Clamps, FC | 6. Silencer, LD |
| 3. Shut-off Damper, ADC | 7. Duct Heater, EM-WX ¹ |
| 4. Filter Cassette, FGR | |

Kitchen Exhaust Solution

- | | |
|-----------------------|-----------------------------------|
| 5. Exhaust Fan, FG EC | 8. Roof Cap ² |
| 6. Silencer, LD | 9. Kitchen Hood, SHL ³ |

¹ optional for cold climates

² supplied by others

³ kitchen hood liners can support fans with total max amperage of 6 Amps

Installation, wiring, electrical wiring boxes and disconnect means, equipment supports, duct work, furnace, miscellaneous hardware and any other items are not described in this document and supplied by others.

Component Selection

1. Select exhaust makeup air fan air flow rate (cfm or l/s) to be equal to or exceed the maximum airflow rate of the compensation for exhaust system. The airflow rate indicated for each fan model includes anticipated static pressure losses for all makeup air system components and an allowance for up to 50 equivalent feet (15 m eq.) of 12" (300 mm) round ductwork.

2. If makeup air tempering is required, identify the Zone from map and select the heater for your Zone. The Selection table suggests heater capacity based on winter outdoor temperature.

3. Select the remaining system components under the appropriate column for the fan and heater selected in previous steps. Quantities of more than one are indicated in parentheses (). If the optional silencer is included, increase and/or decrease the fast clamp quantities as indicated in parantheses ().

Step 1	Air Flow Rate		Up to 560 cfm (264 L/s)			Air Flow Rate	Up to 650 cfm (308 L/s)			
Fan Selection	Fan Model		FG 12 EC			Fan Model	FG 12XL EC			
Step 2 Heater Selection (Optional)	Outside Average Air Temperature by Zone	Zone 1	EM-WX 12 (20 kW)			Outside Average Air Temperature by Zone	Zone 1	EM-WX 12 (20 kW)		
		Zone 2	EM-WX 10 (10 kW)				Zone 2	EM-WX 10 (10 kW)		
		Zone 3					Zone 3			
		Zone 4					Zone 4			
		Zone 5	No heat				Zone 5	No heat		
Step 3 Other Components	Wall Intake Hood	FML 12	FML 12	FML 12	Wall Intake Hood	FML 12	FML 12	FML 12		
	Shut-off Damper	ADC 12	ADC 12	ADC 12	Shut-off Damper	ADC 12	ADC 12	ADC 12		
	Filter Cassette	FGR 12	FGR 12	FGR 12	Filter Cassette	FGR 12	FGR 12	FGR 12		
	Controller	FMAC	FMAC	FMAC	Controller	FMAC	FMAC	FMAC		
	Fast Clamp	- FC 12 FC 12-315	FC 10 (2) FC 12 FC 12-315	- (2) FC 12 FC 12-315	Fast Clamp	- FC 12 FC 12-315	FC 10 FC 12 FC 12-315	- (2) FC 12 FC 12-315		
	Reducer	-	(2) CKR 10-12	-	Reducer	-	(2) CKR 10-12	-		
	Silencer (optional)	LD 12 - (+1) FC 12-315	LD 12 (-1) FC 12 (+1) FC 12-315	LD 12 (-1) FC 12 (+1) FC 12-315	Silencer (optional)	LD 12 - (+1) FC 12-315	LD 12 (-1) FC 12 (+1) FC 12-315	LD 12 (-1) FC 12 (+1) FC 12-315		

Table 1. Exhaust Makeup Air System Selection Chart

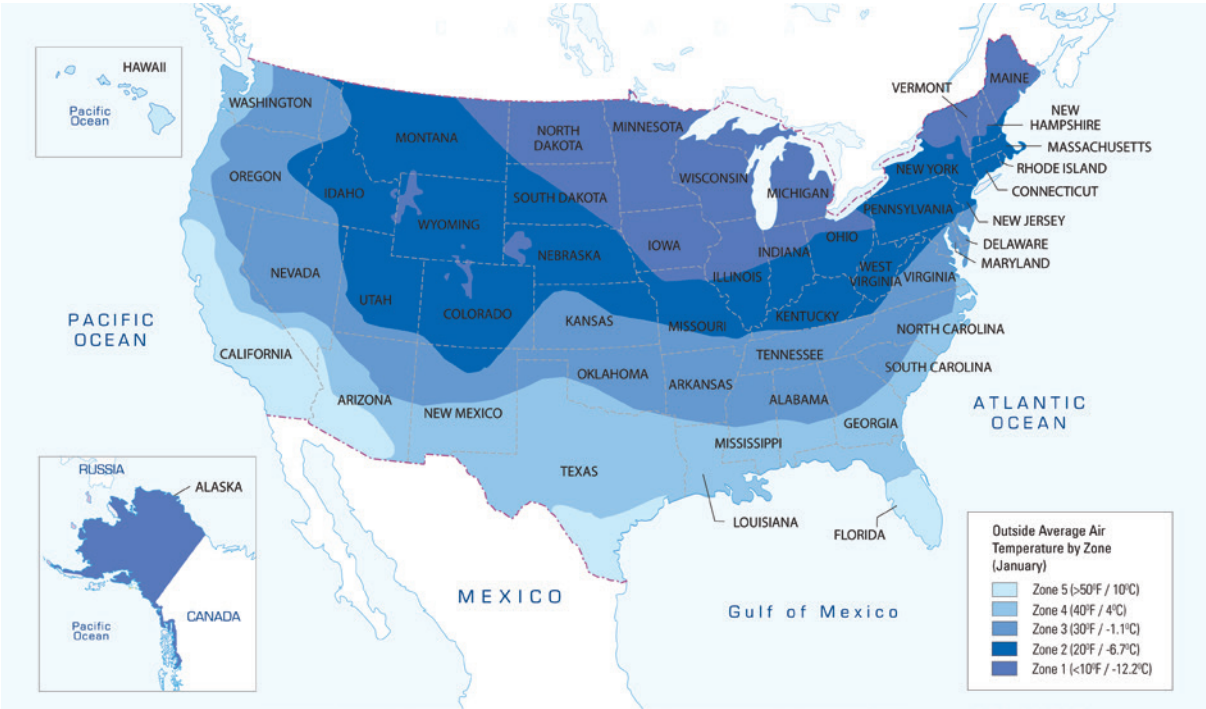


Figure 1. Outside Average Air Temperature by Zone (January)



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