



Residential Mechanical Information

2020 MN Mechanical & 2015 Energy Code – Ventilation, Makeup, and Combustion Air Calculations
Submit at time of application of a mechanical permit for NEW construction.

This form must be posted at the jobsite at the time of the rough-in inspection.

		Permit No	
Site Address		Date	
Applicant Name		Title	
Email		Phone	

Section A – Mechanical Equipment

Water Heating			
Number of Water Heaters		<input type="checkbox"/> Sealed Combustion	<input type="checkbox"/> Power Vented
Size of Appliance – BTU'S		<input type="checkbox"/> Direct Vented	<input type="checkbox"/> Atmospherically Vented
Type of Fuel (Natural Gas, Propane, Electric)		<input type="checkbox"/> Not Applicable	

Space Heating – Furnace/ Boiler			
Number of Space Heating Units		<input type="checkbox"/> Sealed Combustion	<input type="checkbox"/> Power Vented
Size of Appliance – BTU'S		<input type="checkbox"/> Direct Vented	<input type="checkbox"/> Atmospherically Vented
Type of Fuel (Natural Gas, Propane, Electric)		<input type="checkbox"/> Not Applicable	

Gas Hearth			
Number of Heating Units		<input type="checkbox"/> Sealed Combustion	<input type="checkbox"/> Power Vented
Size of Appliance – BTU'S		<input type="checkbox"/> Direct Vented	<input type="checkbox"/> Atmospherically Vented
Type of Fuel (Natural Gas, Propane, Electric)		<input type="checkbox"/> Not Applicable	

Solid Fuel Hearth			
Number of Solid Fuel Hearths		<input type="checkbox"/> Sealed Combustion	<input type="checkbox"/> Power Vented
		<input type="checkbox"/> Direct Vented	<input type="checkbox"/> Atmospherically Vented

Section B – Ventilation Calculation

Ventilation Quantity (Determine quantity by using Table R403.5.2 or Equation R403.5.2, MN Minnesota Energy Code)			
Square feet (Conditioned area including Basement – finished or unfinished)		Total ventilation	
Number of bedrooms		Continuous ventilation	

Directions - Determine the total and continuous ventilation rate by using Table R403.5.2 or Equation R403.5.2. Insert the square footage, total required ventilation and continuous ventilation in the Mechanical Submittal form.

TABLE R403.5.2 NUMBER OF BEDROOMS						
	1	2	3	4	5	6
Conditioned space (in sq. ft.)	Total/ continuous	Total/ continuous	Total/ continuous	Total/ continuous	Total/ continuous	Total/ continuous
1000-1500	60/40	75/40	90/45	105/53	120/60	135/68
1501-2000	70/40	85/43	100/50	115/58	130/65	145/73
2001-2500	80/40	95/48	110/55	125/63	140/70	155/78
2501-3000	90/45	105/53	120/60	135/68	150/75	165/83
3001-3500	100/50	115/58	130/65	145/73	160/80	175/88
3501-4000	110/55	125/63	140/70	155/78	170/85	185/93
4001-4500	120/60	135/68	150/75	165/83	180/90	195/98
4501-5000	130/65	145/73	160/80	175/88	190/95	205/103
5001-5500	140/70	155/78	170/85	185/93	200/100	215/108
5501-6000	150/75	165/83	180/90	195/98	210/105	225/113

Total ventilation - The mechanical ventilation system shall provide sufficient outdoor air to equal the total ventilation rate average for each one-hour period according to the above table or equation. For heat recovery ventilators (HRV) and energy recovery ventilators (ERV) the average hourly ventilation capacity must be determined in consideration of any reduction of exhaust or outdoor air intake, or both, for defrost or other equipment cycling.

Continuous ventilation - A minimum of 50 percent of the total ventilation rate **but not less than 40 cfm** shall be provided on a continuous rate average for each one-hour period. The portion of the mechanical ventilation system intended to be continuously may have automatic cycling controls providing the average flow rate for each hour is met.

Section C – Balanced Ventilation

Ventilation Method (Choose either balanced or exhaust only)			
<input type="checkbox"/> Balanced, HRV (Heat Recovery Ventilator) or ERV (Energy Recovery Ventilator) – cfm of unit in low must not exceed continuous ventilation rating by more than 100%.		<input type="checkbox"/> Balanced powered intake and exhaust (capacity must not exceed continuous ventilation rating by more than 100%)	
Low cfm		High cfm	Continuous fan rating in cfm

Directions - Choose the method of ventilation: 1) balanced utilizing a HRV or ERV, or 2) balanced utilizing a powered intake and exhaust. When utilizing a single stage HRV or ERV or a powered intake and exhaust, only the low cfm will be entered in the ventilation form. The balance of total ventilation must be provided by additional ventilation fans.

NOTE: Fans that are utilized for the continuous and total ventilation requirements must be 1/3 or less and be rated for continuous duty. **Low cfm** airflow must be equal to or greater than the required **continuous ventilation** rate and less than 100% greater than the continuous rate. (For instance, if the low cfm is 40 cfm, the ventilation fan must not exceed 80 cfm.) Automatic controls may allow the use of a larger fan that is operated a percentage of each hour.

Section D – Make-Up Air

Makeup Air for Exhaust Appliances (determined from calculations from MN Minnesota Mechanical Code, Table 501.4.1)				
<input type="checkbox"/> Passive		<input type="checkbox"/> Powered		<input type="checkbox"/> Interlocked with exhaust device
Other, describe:				
Location of duct or system ventilation makeup air (Determined from make-up air opening table, Table 501.4.2.)				
cfm		Size and type (round, rectangular, flex or rigid)		

Directions - In order to determine the makeup air for ventilation, use Table 501.4.1. For most new installations, column A will be appropriate, however, if kitchen hoods exceed 300 cfm, atmospherically vented appliances or solid fuel appliances are installed, use the appropriate column. Please note, if the makeup air quantity is negative, no additional makeup air will be required for ventilation, if the value is positive refer to Table 501.4.2 and size the opening.

TABLE 501.4.1 PROCEDURE TO DETERMINE MAKEUP AIR QUANTITY FOR EXHAUST APPLIANCES IN DWELLINGS				
	ONE OR MULTIPLE POWER VENT OR DIRECT VENT APPLIANCES OR NO COMBUSTION APPLIANCES ^a	ONE OR MULTIPLE FAN- ASSISTED APPLIANCES AND POWER VENT OR DIRECT VENT APPLIANCES ^b	ONE ATMOSPHERICALLY VENTED GAS OR OIL APPLIANCE OR ONE SOLID FUEL APPLIANCE ^c	MULTIPLE APPLIANCES THAT ARE ATMOSPHERICALLY VENTED GAS OR OIL APPLIANCES OR SOLID FUEL APPLIANCES ^d
1. Use the Appropriate Column to Estimate House Infiltration				
a) pressure factor (cfm/sf)	0.15	0.09	0.6	0.03
b) conditioned floor area (sf) (including unfinished basements)	_____	_____	_____	_____
Estimated House Infiltration (cfm): [1a x 1b]	_____	_____	_____	_____
2. Exhaust Capacity				
a) clothes dryer	135	135	135	135
b) 80% of the largest exhaust rating (cfm):	_____	_____	_____	_____
(not applicable if recirculating system or if powered makeup air is electrically interlocked and matched to exhaust)				
c) 80% of the next largest exhaust rating (cfm):	Not Applicable			
(not applicable if recirculating system or if powered makeup air is electrically interlocked and matched to exhaust)				
Total Exhaust Capacity (cfm): [2a + 2b + 2c]	_____	_____	_____	_____
3. Makeup Air Requirement				
a) Total Exhaust Capacity (from above)	_____	_____	_____	_____
b) Estimated House Infiltration (from above)	_____	_____	_____	_____
Makeup Air Quantity (cfm): [3a - 3b]	_____	_____	_____	_____
(if value is negative, no makeup air is needed)				
4. For Makeup Air Opening Sizing, refer to Table 501.4.2				

- a. Use this column if there are other than fan-assisted or atmospherically vented gas or oil appliances of if there are no combustion appliances.
- b. Use this column if there is one fan-assisted appliance per venting system. Other than atmospherically vented appliances may also be included.
- c. Use this column if there is one atmospherically vented (other than fan-assisted) gas or oil appliance per venting system or on solid fuel appliance.
- d. Use this column if there are multiple atmospherically vented gas or oil appliances using a common vent or if there are atmospherically vented gas or oil appliances and solid fuel appliances.

Section E – Combustion Air

Makeup Air for Combustion (Reference Section 304 of MN Fuel Gas Code)		
<input type="checkbox"/> Not required per mechanical code (No atmospheric or power vented appliances)	<input type="checkbox"/> Passive (see IFGC Appendix E, Worksheet E-1)	<input type="checkbox"/> Other, describe:
Size and type		

Explanation - If no atmospheric or power vented appliances are installed, check the appropriate box, not required. If a power vented or atmospherically vented appliance installed, use 1346.6012 IFGC Appendix E, Worksheet E-1. Please enter size and type. Combustion air vent supplies must communicate with the appliance or appliances that require the combustion air.

Section F – General Exhaust Schedule

Ventilation Fan Schedule (include all fans and locations)				
Description	Location	CFM	Continuous	Total Ventilation

Directions - The ventilation fan schedule should describe what the fan is being used for; the location, cfm, and whether it is used for continuous or total ventilation.

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Signature _____ **Date** _____