VENTILATION CALCULATIONS

BASED ON TABLE 403.3 OF THE 6TH EDITION OF THE 2017 FMC

BASED ON EQUATION 4-1 FROM SECTION 403.3.1.1:
Vbz = RpPz + RaAz WHERE:
Az = ZONE FLOOR AREA
Pz = ZONE POPULATION
Rp = PEOPLE OUTDOOR AIR RATE
Ra = AREA OUTDOOR AIR RATE

AH-1

LAUNDRY:

$Vbz = \frac{400 \times 250}{1000}$ = 100 CFM OA REQUIRED

Ev = 0.8 Voz = Vbz/Ev = 100/0.8 = 125 CFM
Zp = Voz/TOT. AIRFLOW IN SPACE = 125/1100 = .11

VESTIBULE:

Vbz = 60 x 0.06 = 4 CFM OA REQUIRED

Ev = 0.8 Voz = Vbz/Ev = 4/0.8 = 5 CFM
Zp = Voz/TOT. AIRFLOW IN SPACE = 5/100 = .05

BREAK ROOM:

$Vbz = (150 \times 0.06) + \frac{150 \times 5 \times 5}{1000}$ = 13 CFM OA REQUIRED

Ev = 0.8 Voz = Vbz/Ev = 13/0.8 = 16 CFM
Zp = Voz/TOT. AIRFLOW IN SPACE = 16/300 = .06

THE HIGHEST Zp OF THE 3 ZONES IN THE SYSTEM IS .11; THEREFORE FROM TABLE 403.3.2.3.2 OF THE 2012 IMC, THE Ev FOR THE SYSTEM IS 1

Vou = D(SUM OF ALL ZONES) = 1(100 + 4 + 13) = 117

Vot = Vou/Ev = 117/1 = 117

TOTAL OUTDOOR AIR REQUIRED = 117

TOTAL OUTDOOR AIR PROVIDED = 200

AH-2

SEE ASHRAE 62.1 BI-POLAR IONIZATION CALCULATIONS THIS SHEET

TOTAL OUTDOOR AIR REQUIRED = 100

TOTAL OUTDOOR AIR PROVIDED = 250

AH-3 & 4

SEE ASHRAE 62.1 BI-POLAR IONIZATION CALCULATIONS THIS SHEET

TOTAL OUTDOOR AIR REQUIRED = 210

TOTAL OUTDOOR AIR PROVIDED = 300

AH-5

EXERCISE:

$Vbz = (700 \times 0.06) + \frac{700 \times 20 \times 10}{1000}$ = 182 CFM OA REQUIRED

Ev = 0.8 Voz = Vbz/Ev = 182/0.8 = 228 CFM
Zp = Voz/TOT. AIRFLOW IN SPACE = 228/1200 = .19

LAUNDRY:

$Vbz = \frac{75 \times 250}{1000}$ = 19 CFM OA REQUIRED

Ev = 0.8 Voz = Vbz/Ev = 19/0.8 = 24 CFM
Zp = Voz/TOT. AIRFLOW IN SPACE = 24/200 = .12

THE HIGHEST Zp OF THE 2 ZONES IN THE SYSTEM IS .19; THEREFORE FROM TABLE 403.3.2.3.2 OF THE IMC, THE Ev FOR THE SYSTEM IS 0.9

Vou = D(SUM OF ALL ZONES) = 1(182 + 19) = 201

Vot = Vou/Ev = 201/0.9 = 223

TOTAL OUTDOOR AIR REQUIRED = 223

TOTAL OUTDOOR AIR PROVIDED = 300

UPPER FLOOR CORRIDORS:

Vbz = 4000 x 0.06 = 240 CFM OA REQUIRED

Ev = 1 Voz = Vbz/Ev = 240/1 = 240 CFM

TOTAL OUTDOOR AIR REQUIRED = 240

TOTAL OUTDOOR AIR PROVIDED = 1050

TYP. GUESTROOM
Vbz = (350 x 0.06) + $\frac{350 \times 10 \times 5}{1000}$ = 39 CFM OA REQUIRED

Ev = 0.8 BASED ON SECTION 403.3.1.3 OF THE 2012 IMC:
Voz = Vbz/Ev = 39/0.8 = 48 CFM

TOTAL OUTDOOR AIR REQUIRED = 48 CFM
TOTAL OUTDOOR AIR PROVIDED = 50 CFM

BI-POLAR IONIZATION SCHEDULE - OUTSIDE AIR CALCULATIONS BASED ON ASHRAE 62.1

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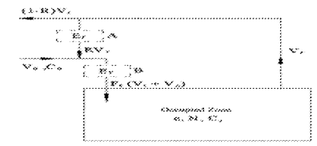
Zone Tag	Facility Type	Zone Use	Zone Floor Area (square ft) Az	Zone Max Occupancy Pz	Table 6.1 OA per Occupant Rp	Table 6.1 cfm/ft2 Ra	Pz * Rp	Az * Ra	Table 6.2 Ventilation Effectiveness Ez	Outdoor Air to Zone (CFM) with Ez correction (Vbz/Ez)
AH/HP-2	Is Motels Resorts Dormat	Cafeteria/Fast Food Dining	600.0	35.0	7.5	0.18	263	108	0.8	463

Zone Height (feet)	9
Outside Air (Vo)	100
Supply Air (Vs)	1,800
Return Air (Vr)	1700
Recirc. Flow Factor (R)	0.94
Ventilation Effectivness (Ez)	0.8
Level of Physical Activity	**Standing (desk work)**
Filter Location	B
HVAC Flow Type	Constant
Outdoor Air Flow Type	Constant



Air Changes Per Hour	20.0	VRP OA CFM per person	13.2
Outside Air Per VRP	463 CFM	IAQ OA CFM per person	2.9
Outside Air Per IAQ	100 CFM		
Outside Air Savings	363 CFM		
OA Drybulb	95.0		
OA Wetbulb	80.0		
Coil Leaving Air Drybulb	55.0		
Coil Leaving Air Wetbulb	55.0		
OA MBH Saved*	#NAME?		
OA Tons Saved*	#NAME?		

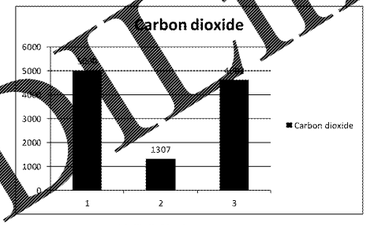
OA = Outside Air

Indoor Contaminants Generated By People	Maximum Threshold Value (PPM)**	Steady State Using the VRP* (Prescribed OA) Plasma Off	Steady State Using the IAQ Method (Reduced OA) Plasma On	Is Steady State Level Acceptable at Reduced OA Levels?
Acetaldehyde	20.0	0.0280	0.0017	Yes
Acetone	19.0	0.2302	0.0008	Yes
Ammonia	2.50	7.5127	0.0163	Yes
Benzene	0.1000	0.0102	0.0005	Yes
2- Butanone (MEK)	10.0	0.0468	0.0002	Yes
Carbon dioxide	5000	1307	4602	Yes
Chloroform	0.2000	2.6211	0.0001	Yes
Dioxane	100.0	0.0998	0.0000	Yes
Hydrogen Sulfide	20.0	0.0076	0.0000	Yes
Methane	NA	0.8238	1.6912	Yes
Methanol	200.0	0.0029	0.0000	Yes
Methylene Chloride	50.0	0.0449	0.0007	Yes
Propane	100.0	0.0189	0.0100	Yes
Tetrachloroethane	35 mg/m3	0.0007	0.0000	Yes
Tetrachloroethylene	2.5000	0.0076	0.0001	Yes
Toluene	2.0000	0.0111	0.0007	Yes
1,1,1 - Trichloroethane	0.2000	1.7012	0.0002	Yes
Xylene	0.4000	0.0000	0.0003	Yes

All values are in PPM unless otherwise noted

Is IAQ acceptable at reduced outside air levels?	**Yes**

All shaded boxes require user input or review



1 = ASHRAE C02 Limit
2 = C02 Level at Ventilation Rate OA Flow Rate
3 = C02 Level at IAQ Procedure OA Flow Rate

Date	7/31/18
Job Name	
Representative	
Engineer	
Contractor	

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BI-POLAR IONIZATION SCHEDULE - OUTSIDE AIR CALCULATIONS BASED ON ASHRAE 62.1

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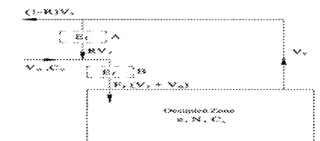
Zone Tag	Facility Type	Zone Use	Zone Floor Area (square ft) Az	Zone Max Occupancy Pz	Table 6.1 OA per Occupant Rp	Table 6.1 cfm/ft2 Ra	Pz * Rp	Az * Ra	Table 6.2 Ventilation Effectiveness Ez	Outdoor Air to Zone (CFM) with Ez correction (Vbz/Ez)
AH/HP-3 & 4	Is Motels Resorts Dormat	Cafeteria/Fast Food Dining	2,200.0	80.0	7.5	0.18	600	396	0.8	1245

Zone Height (feet)	9
Outside Air (Vo)	210
Supply Air (Vs)	1,800
Return Air (Vr)	1590
Recirc. Flow Factor (R)	0.88
Ventilation Effectivness (Ez)	0.8
Level of Physical Activity	**Standing (desk work)**
Filter Location	B
HVAC Flow Type	Constant
Outdoor Air Flow Type	Constant



Air Changes Per Hour	5.5	VRP OA CFM per person	15.6
Outside Air Per VRP	1245 CFM	IAQ OA CFM per person	2.6
Outside Air Per IAQ	210 CFM		
Outside Air Savings	1035 CFM		
OA Drybulb	95.0		
OA Wetbulb	80.0		
Coil Leaving Air Drybulb	55.0		
Coil Leaving Air Wetbulb	55.0		
OA MBH Saved*	#NAME?		
OA Tons Saved*	#NAME?		

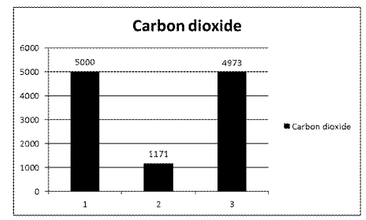
OA = Outside Air

Indoor Contaminants Generated By People	Maximum Threshold Value (PPM)**	Steady State Using the VRP* (Prescribed OA) Plasma Off	Steady State Using the IAQ Method (Reduced OA) Plasma On	Is Steady State Level Acceptable at Reduced OA Levels?
Acetaldehyde	20.0	0.0497	0.0032	Yes
Acetone	19.0	0.5246	0.0015	Yes
Ammonia	2.50	17.1897	0.0344	Yes
Benzene	0.1000	0.0201	0.0009	Yes
2- Butanone (MEK)	10.0	0.1069	0.0004	Yes
Carbon dioxide	5000	1171	4973	Yes
Chloroform	0.2000	2.6229	0.0001	Yes
Dioxane	100.0	0.1000	0.0000	Yes
Hydrogen Sulfide	20.0	0.0169	0.0001	Yes
Methane	NA	1.8828	1.6921	Yes
Methanol	200.0	0.0066	0.0000	Yes
Methylene Chloride	50.0	0.0994	0.0009	Yes
Propane	100.0	0.0177	0.0100	Yes
Tetrachloroethane	35 mg/m3	0.0015	0.0000	Yes
Tetrachloroethylene	2.5000	0.0082	0.0002	Yes
Toluene	2.0000	0.0253	0.0013	Yes
1,1,1 - Trichloroethane	0.2000	1.7272	0.0003	Yes
Xylene	0.4000	0.0000	0.0005	Yes

All values are in PPM unless otherwise noted

Is IAQ acceptable at reduced outside air levels?	**Yes**

All shaded boxes require user input or review



1 = ASHRAE C02 Limit
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3 = C02 Level at IAQ Procedure OA Flow Rate

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REVISIONS		
No.	Date	Description

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7/31/18

KEY PLAN

VTM Hotels, LLC

Home2Suites

2630 Wilde Lake Blvd.
Pensacola, FL 32526

Drawing Title
Ventilation Calculations

Phase
Construction Documents

Project No.	17-101
Prepared by	CRM
Checked by	PSH
Date	July 31, 2018

Sheet No. M004

Review

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