Technical Report One

ASHRAE STANDARDS 62.1 AND 90.1 COMPLIANCE EVALUATION

10.5.2009

Defense Media Activity Building

Fort George G. Meade

Pavel Likhonin

Penn State University

Architectural Engineering

Mechanical Option

Faculty Advisor: Dr. Treado

Table of Contents

Contents

Executive Summary

The DMA Building is the new media center for the Army Corps of Engineers. It is a 3 story, 186,000 square foot facility that is composed of offices, editing suites, television studios, media centers, and data centers. Some of the spaces in the building operate 24 hours a day while others operate at normal business hours.

The purpose of this report is to determine compliance or non-compliance of the DMA Building with ASHRAE Standard 90.1-2007 as well as ASHRAE Standard 62.1.

Analysis of ASHRAE Standard 62.1 showed that the building is compliant with Section 5. Seven different zones with seven different air handlers were analyzed in Section 6 to represent different functions of the building. The majority of the building was analyzed due to different occupancies and functions of the building. When looking closer into Section 6 of ASHRAE Standard 62.1, one can see slight deviation from the requirements in the actual design. A possible reason for non compliance is the use of higher default occupancy values in the calculations and differences in assumptions made in the spaces with open floor plans.

ASHRAE Standard 90.1 was determined to be mostly compliant with a few small exceptions. The main areas of non compliance were fan horsepower and a low U-value for floors. The non-compliance for fan horsepower could be neglected because the horsepower ratings are within a couple percent of the ASHRAE requirement. The rest of the analysis showed that the DMA building exceeds most of the requirements in efficiency and insulation values. The DMA building is pursuing a LEED Silver rating; therefore efficient equipment was used for the HVAC Systems as well as implementing a well insulated building envelope.

The DMA Building uses several different types of air systems. The major system used in the DMA Building is Variable Air Volume (VAV), followed by Constant Volume (CV), and finishes with Under Floor Air Distribution (UFAD) for the data center.

Three 500 ton centrifugal water-cooled chillers are used in combination with three cooling towers for the cooling system of the building. The DMA Building will also use three 3,000 MBH gas fired condensing boilers for conditioning and service water heating.

ASHRAE Standard 62.1 Section 5 Analysis

Section 5.1 Natural Ventilation

Natural ventilation was not considered for the DMA Building because of security reasons. This is a government facility in which natural ventilation would not be feasible to implement.

Section 5.2 Ventilation Air Distribution

About half of the spaces in the DMA Building meet ventilation requirements as discussed in Section 6. The most likely reason for this is using higher default occupancy values than the ones used in the design calculations. All the spaces will meet the minimum ventilation rates required by ASHRAE Standard 62.1 Sections 6, once the VAV Boxes are calibrated to maintain minimum flows and actual occupancy is determined.

Section 5.3 Exhaust Duct Location

Exhaust ducts that convey potentially harmful contaminants are negatively pressurized relative to spaces that they pass through. The DMA Building complies with Section 5.3

Section 5.4 Ventilation System Controls

DDC controls using LonWorks language are used in the DMA Building. System controls will be set to meet the minimum VAV supply airflow requirements at all operable hours. During non-operable hours, spaces are on a setback.

Section 5.5 Airstream Surfaces

Sheet metal surfaces and metal fasteners are used in equipment and ductwork to comply with resistance to erosion and resistance to mold growth.

Section 5.6 Outdoor Air Intakes

The 6 air handling units are all located on the three levels of the DMA building; (two per floor). The 9 rooftop air handling units are also kept separated. All the requirements for minimum separation are met as specified in Table 5-1 of ASHRAE 62.1-2007.

Each Intake in the building is provided with a bird screen and a rain hood. All the screens and hoods are made of aluminum or stainless steel to conform to ASTM E 2016.

Section 5.7 Local Capture of Contaminants

There are no contaminants produced from non-combustion equipment. This section does not apply to the DMA building.

Section 5.8 Combustion Air

The combustion air from the building comes from the three condensing boilers in the building. Those exhaust gasses are vented directly outdoors. The DMA Building meets the requirements for exhausting combustion air directly outdoors.

Section 5.9 Particulate Matter Removal

Filters for the DMA Building will be 4 inches thick, deep pleated fiberglass with a MERV rating of 8. The installed filters will exceed Section 5.9 requirements.

Section 5.10 Dehumidification Systems

The DMA building doesn't have any systems designed to provide dehumidification beyond the dehumidification at the AHU's. All spaces in the building are designed to be less than 65% RH at the design condition. The building intake is greater than the maximum exhaust airflow to minimize infiltration.

Section 5.11 Drain Pans

All the water coils are required to have drain pans with a pitch no less than 1/8" per foot, pitched toward the drain end. All drain pans are double-wall constructed of 16 gauge corrosion resistant sheet steel (Type 304 Stainless Steel). Section 5.11 is met by the DMA building.

Section 5.12 Finned-Tube Coils and Heat Exchangers

Drain pans are provided under every cooling coil assembly. No specification has been stated regarding a minimum of 18 inches of access space between coils.

Section 5.13 Humidifiers and Water-Spray Systems

The DMA building does not use humidifiers or water-spray systems. This section does not apply to this building.

Section 5.14 Access for Inspection, Cleaning, and Maintenance

All the ventilation equipment is installed with sufficient working space for inspections and routine maintenance. The minimum access door opening size for an indoor AHU is 24" by 6' or the full height of the casing. All other access doors are adequately sized to allow access to the equipment.

Section 5.15 Building Envelope and Interior Surfaces

The building envelope will be provided with a continuous air barrier as well as a vapor barrier. All piping, with temperatures below the dew-point, is insulated to prevent condensation on the surfaces.

Section 5.16 Buildings with Attached Parking Garages

There is no attached Parking Garage. This section does not apply.

Section 5.17 Air Classification and Recirculation

All of the return air in the DMA building is classified as Class 1 which is air with low contaminant concentration and low sensory-irritation intensity. All of this air can be re-circulated or transferred to any space in the building. The requirements for section 5.17 are all met.

Section 5.18 Requirements for Buildings Containing ETS Areas and ETS-Free Areas

DMA is a non-smoking facility. Because it is a non-smoking facility, there are no ETS problems meeting Section 5.18.

Section 6 Ventilation Rate Calculation Procedure

The purpose of section 6 of ASHRAE Standard 62.1 is to determine the minimum outdoor air intake rates based on occupants, floor area, and distribution. Ventilation rates were calculated for the majority of the building. The DMA Building has several different types of occupancies that include media centers, television studios, editing suites, and offices.

The calculations performed include all critical spaces in the building such as television studios, offices, media centers, and data centers. A total of 7 zones were checked for compliance with minimum airflow rates in different zones. Picking critical zones of the building should represent the rest of the building and its compliance or non-compliance of Section 6 of ASHRAE Standard 62.1.

The zones checked for ventilation are shown in Figures 90.1-6.1, 90.1-6.2, and 90.1-6.3.

Ground Floor

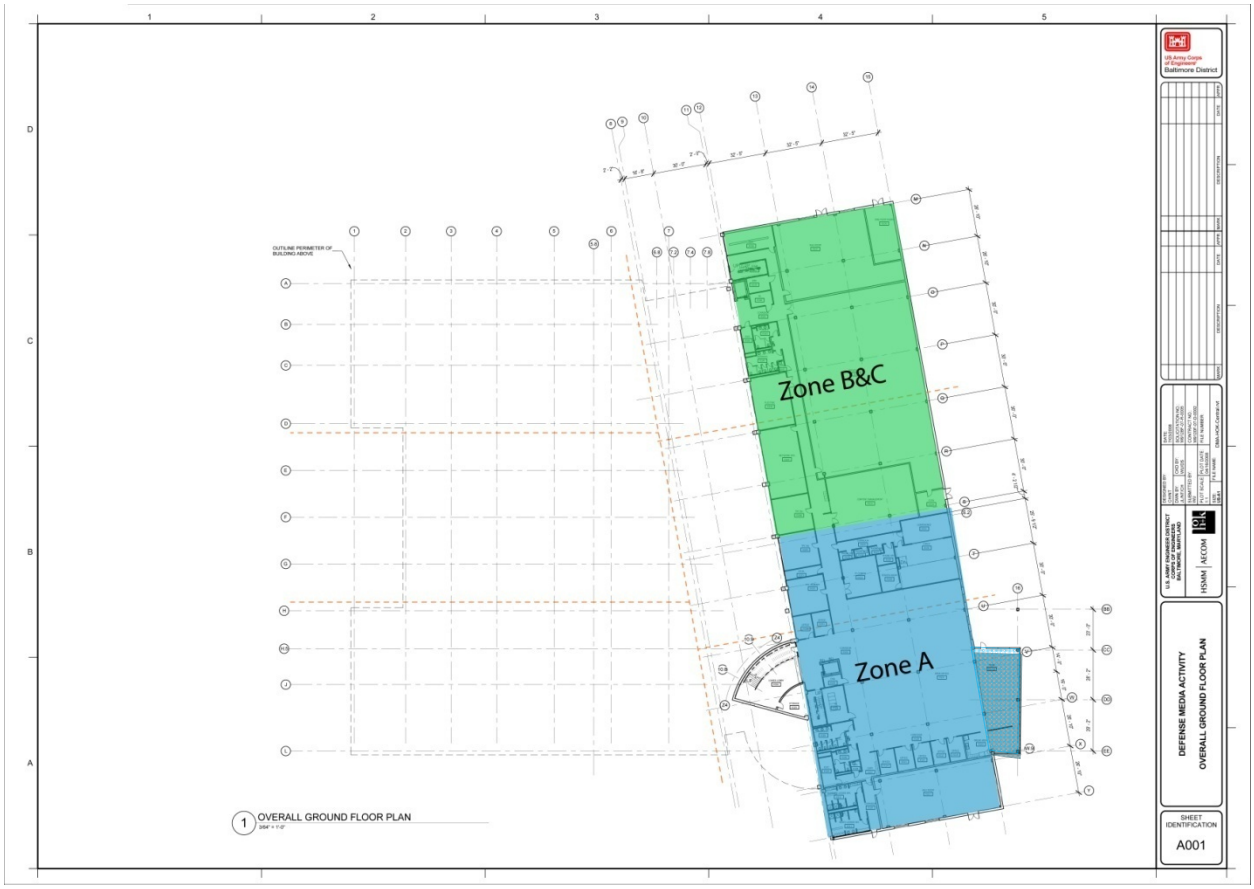

Figure 90.1-6.1

First Floor

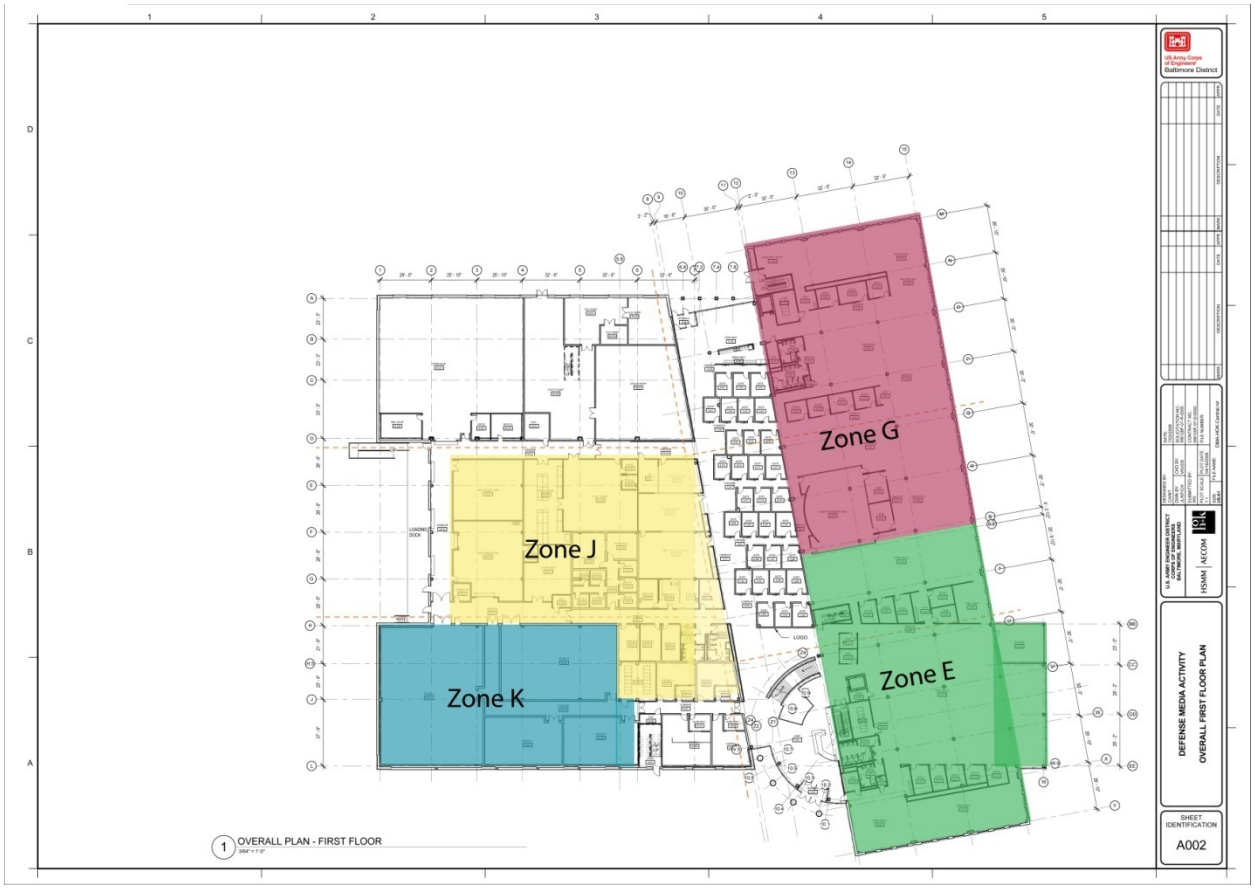

Figure 90.1-6.2

Second Floor

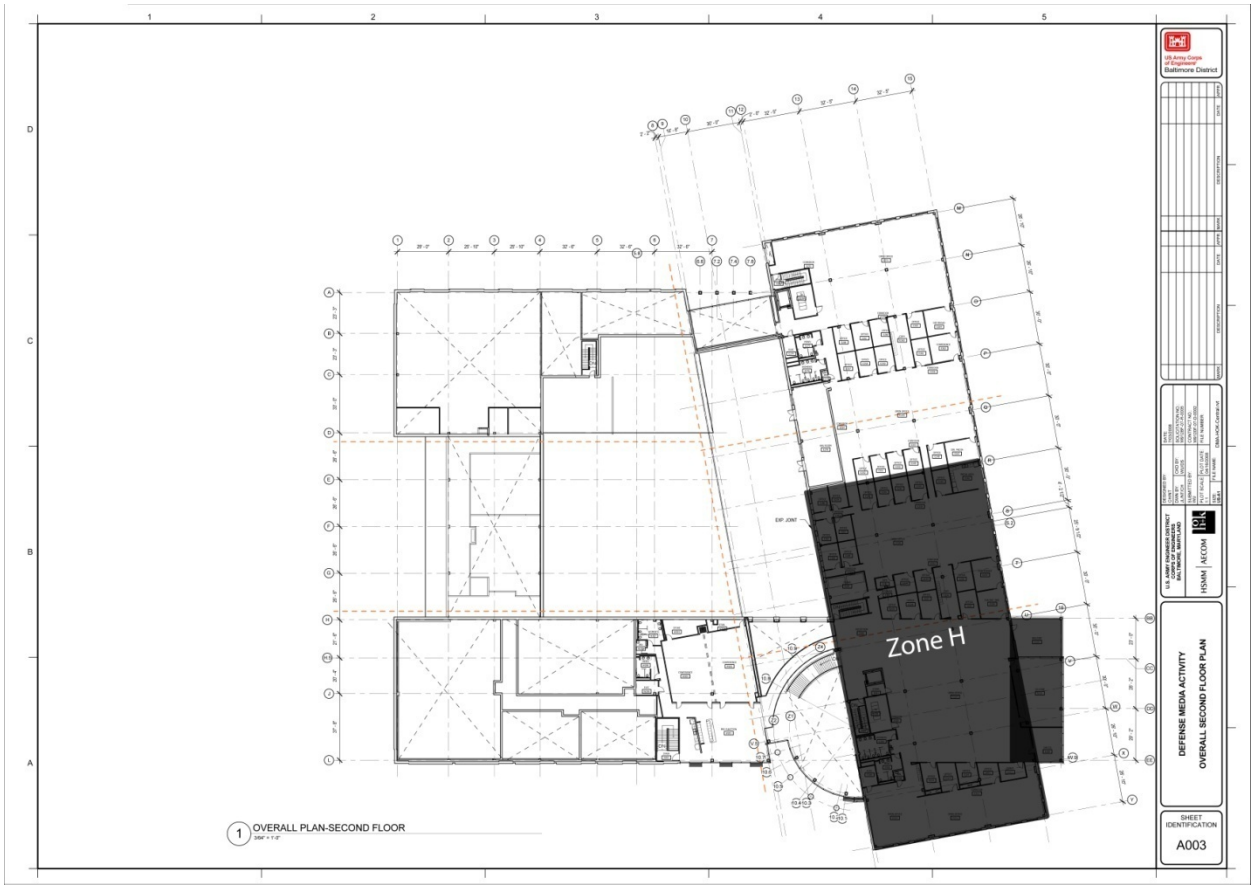

Figure 90.1-6.3

Ventilation Rate Procedure Used

$V_{bz}=R_p*P_z+R_a*A_z$ (Eq 6.1)

where,
V_{bz}=Breathing zone outdoor airflow
R_p=Outdoor airflow rate per person (CFM/person)
P_z=Zone population
R_a=Outdoor airflow rate per unit area (CFM/SF)
A_z=Zone floor area (SF)

$V_{oz}=V_{bz}/E_z$ (Eq 6.1)

where,
V_{oz}=Zone outdoor airflow
E_z=Zone air distribution effectiveness

$$Z_p=V_{oz}/V_{pz} \quad \text{(Eq 6.5)}$$

where,
V_{pz}= minimum supply airflow in VAV systems

Further calculations and procedures can be found in the Appendix attached at the end of the report. Room areas, use, occupancy, supply air, outside air, Z_p values for each space as well as max Z_p values for each system, and a comparison of nominal outside air vs. required outside air for each AHU can be found in the Appendix at the end of the report.

The following was used to complete this calculation.

- Zone population was calculated based on table 6-1 in ASHRAE Standard 62.1. Known population was used when provided from the architect.
- The supply air flow rates were taken from room load data which listed required flow rates to meet room loads

Section 6 Results

The maximum Z_p values for the DMA building come from larger spaces that had a relatively small supply of total air and from offices that had large occupancies. Using default ASHRAE Standard values for occupancy may not be completely true. The actual occupancy may be lower once the rooms are outfit by the owner.

Another interesting finding is the slight deviation of Outside Air Requirement from the actual design. A possible reason for this non-compliance is the use of higher default occupancy values in the calculations. The AHU's may need to be re-sized or adjusted for higher airflow rates if the occupancy values stay true. Table 62.1-6 shows the design airflow rates as compared to the ASHRAE calculation.

Table 62.1-6

Airflow Rates				
Unit	**Design Max CFM**	**Design Min OA**	**ASHRAE 62.1 Min OA**	**Compliance**
A	12455	2380	2924	No
B	12070	1580	1338	Yes
E	15810	1800	3159	No
G	16710	2120	3761	No
H	17660	2590	4022	No
J	12350	1460	2070	No
K	22930	1200	1198	Yes

Units B and K comply with the ASHRAE Standard 62.1 requirements for minimum outside air. The rest of the units (A, E, G, H and J) will need to be adjusted to meet the minimum outside air requirements to be compliant with Section 6. Once that is done, the DMA Building is compliant with ASHRAE Standard 62.1.

ASHRAE Standard 90.1 Evaluation

The purpose for ASHRAE Standard 90.1 is to provide minimum requirements for energy efficiency in buildings. This standard focuses on the building envelope, HVAC systems, and electrical design.

Section 5 Building Envelope

This section specifies minimum R-Values or maximum U-Values and glazing factors based on building location.

Section 5.1.4 Climate

The DMA building is located in Fort George G. Meade in Maryland. It falls into climate zone 4A as can be seen from figure 90.1-1 below

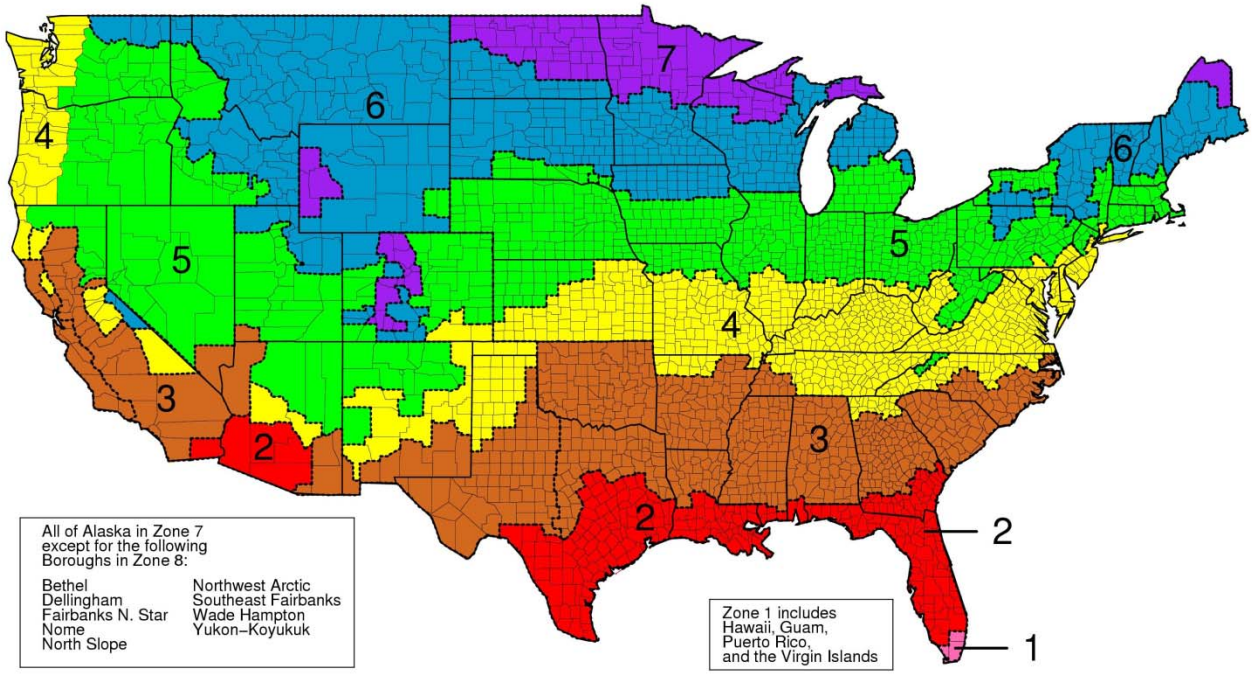

Figure 90.1-1

Section 5.2 Compliance Paths

The glazing on the DMA building is 30% which is less than 40% (maximum value by ASHRAE Standard 90.1) when compared to the gross wall area. The skylight fenestration area does not exceed 5% of the gross roof area, and therefore Section 5.2 of ASHRAE Standard 90.1 is met.

Section 5.4 Mandatory Provisions

Joints around fenestration and door frames will be sealed to decrease infiltration. Any openings at penetrations of utility services through the roofs, walls, and floors will be sealed as well. Junctions between walls, floors and roof will be sealed, caulked, or weather-stripped to minimize air leakage. The DMA building uses vestibules in accordance with Section 5.4. There is at least a 7 foot distance between the doors in the vestibule throughout the building which allows enough space for two sets of doors to be opened to comply with Section 5.4.

Section 5.5 Prescriptive Building Envelope Option

The window to gross wall ration on the DMA building is at 30%. This easily satisfies the maximum allowed ratio of 40% by Section 5.5.4. The DMA building uses two types of windows; an ordinary window and a spandrel window. Both of the window types meet and exceed the ASHRAE requirements as seen Table 90.1-5.5. No shading devices are required by Section 5.5.

Table 90.1-5.5

ASHRAE Standard 90.1 Building Envelope Compliance Summary			
Element	Proposed Building Design	90.1 Baseline Design	Compliance
	U Value	U Value	
Wall Construction	0.056	0.104	Yes
Roof Construction	0.062	0.065	Yes
Floor/Slab Construction	0.538	0.087	No
Fenestration U-factor	0.31 & 0.072	0.55	Yes
Fenestration SHGC-NORTH	0.3 & 0.3	0.4	Yes
Fenestration SHGC-NON-NORTH	0.3 & 0.4	0.4	Yes
Fenestration Visual Light Transmittance	0.52 & 0.52	0.5	Yes

Construction materials used to come up with U-Values:

- Exterior wall construction- 4" Face Brick, 1" Air Space, 2" Board insulation
- Roof construction- Ballasted and fully adhered single ply membrane, 3" insulation

The DMA building complies with the majority of the requirements. The wall and roof construction exceed 90.1 requirements. The only non compliance is the Floor/Slab construction. The floors are 5" concrete without insulation. This non-compliance can be disregarded because the floors above are conditioned to the same temperatures and therefore there is no need for insulation between the floor levels.

Section 6 Heating, Ventilating, and Air Conditioning

Section 6 provides the minimum efficiencies for HVAC equipment.

Section 6.2 Compliance Path

This section provides two different options for reaching compliance. The first is the Simplified Approach Option, and the second is the Mandatory Provisions.

Section 6.3 Simplified Approach Option for HVAC Systems

The Simplified Approach Compliance can only be used for buildings under 25,000 square feet. Since the DMA Building is almost 186,000 square feet, this approach cannot be used.

Section 6.4 Mandatory Provisions

Section 6.4 lists the minimum equipment efficiencies, verification, and labeling requirements. The DMA building uses DDC controls to stage and monitor equipment based on the loads for most efficient use as required by the Army Corps of Engineers. Every zone is provided with temperature controls for individual zone thermal comfort. The portion of the building that is not occupied 24-hours a day goes into a setback mode. Start controls are also optimized using the DDC controls to bring the temperature up to setpoint prior to scheduled occupancy. Continuous duct insulation is provided throughout the building for duct handling air below 60 degrees F.

Table 90.1-6.4.a lists duct insulation thicknesses used in the DMA building to meet Section 6.4 and Section 6.8

Table 90.1-6.4.a

Minimum Duct Insulation	
Cold Air Ducts	2"
Relief Ducts	1.5"
Rooftop Exposed Cold Ducts	3"
Outside Air Intake Ducts	1.5"
Warm Air Ducts	2"

Table 90.1-6.4.b lists piping insulation thicknesses used in the DMA building to meet Section 6.4 and Section 6.8

Table 90.1-6.4.b

Piping Insulation Thickness						
		Tube and Pipe Size				
Service	**Material**	<1	1-1.5	1.5-<4	4-<8	8 or >
Chilled Water	Cellular Glass	1.5	1.5	1.5	1.5	1.5
	Flex Elas Cell'r	1	1	1	N/A	N/A
Return and Dual Temperature	Chiller Room CG	1.5	1.5	1.5	2	2.5
Heating Hot Water S&R	Mineral Fiber	1.5	1.5	2	2	2
	Calcium Silicate	2.5	2.5	3	3	3
	Cellular Glass	2	2.5	3	3	3
Cold Domestic Water & Makeup	Mineral Fiber	1.5	1.5	1.5	1.5	1.5
	Cellular Glass	1	1	1	N/A	N/A
	Flex Elas Cell'r	1	1	1	1	1
	Polyisocianurate	1	1	1	1	1
Hot Domestic Water S&R	Mineral Fiber	1	1	1	1.5	1.5
	Cellular Glass	1.5	1.5	1.5	2	2
	Flex Elas Cell'r	1	1	1	N/A	N/A
	Polyisocianurate	1	1	1	1	1.5
Refrigerant Suction Piping	Flex Elas Cell'r	1	1	1	1	1
	Cellular Glass	1.5	1.5	1.5	1.5	1.5
A/C Condensate	Cellular Glass	1	1	1	N/A	N/A
	Flex Elas Cell'r	2	2	2	2.5	3

Section 6.5 Prescriptive Path

Both water-side and air-side economizers are used in the DMA building. Air-side economizers will be utilized for all air handlers and rooftop units to provide free cooling to the building. A water-side economizer will be utilized to provide free cooling to the server room.

Table 90.1-6.5 shows the fan motors that are used in the building and their compliance to Section 6.5. Six out of sixteen fans are not compliant with Section 6.5 of ASHRAE Standard 62.1. Motors 10HP and larger are required to have a demand of no more than 30% of design wattage at 50% of design airflow.

Table 90.1-6.5

Fan Compliance				
Unit	**CFM**	**BHP (ASHRAE)**	**BHP**	**Compliance**
AHU-EG-1	12355	18.5325	20	No
AHU-EG-2	10600	15.9	20	No
AHU-E1-1	17660	26.49	20	Yes
AHU-E1-2	15810	23.715	15	Yes
AHU-E2-1	12350	18.525	20	No
AHU-E2-2	16710	25.065	25	Yes
RTU-W1-1	3190	4.785	7.5	No
RTU-W1-2	10020	15.03	10	Yes
RTU-W1-3	12895	19.3425	15	Yes
RTU-W1-4	14000	21	15	Yes
RTU-W1-5	9200	13.8	7.5	Yes
RTU-W1-6	4700	7.05	5	Yes
RTU-W1-7	4910	7.365	7.5	No
RTU-W1-8	15890	23.835	25	No
RTU-W1-9	22930	34.395	20	Yes
HVU-V-1	4000	6	4.8	Yes

Section 6.7 Submittals

The DMA building was commissioned during the design phase, and will continue to be commissioned throughout the construction period. Commissioning was done in order to meet requirements for LEED certification.

Section 6.8 Minimum Equipment Efficiency Tables

The DMA Building will use three 500 ton centrifugal water-cooled chillers with a COP of 6.1 which exceeds the ASHRAE minimum COP of 5.50 listed in ASHRAE Standard 90.1 Table 6.8.1C.

The three 500 ton chillers are connected with their respective cooling towers. The DMA Building uses three 1,500 gpm cooling towers (3 gpm/ton). These cooling towers come with a 25HP fan motor. Using Table 6.8.1D in ASHRAE Standard 90.1, (for 95°F Entering Water Temperature and 85°F Leaving Water Temperature), the performance of the cooling towers is 60 gpm/HP. This also exceeds the ASHRAE Performance requirement of 38.2 gpm/HP.

High density APC cooling racks will be used in the DMA building for cooling the Data Center. These APC high density cooling racks are much more efficient than CRAC units listed in Table 6.8.1A in ASHRAE Standard 90.1 Section 6.8.

The DMA building will also use three 3,000 MBH gas fired condensing boilers that are rated at 98% efficiency. These boilers exceed the minimum efficiency of 80% listed in ASHRAE Standard 90.1 Table 6.8.1F.

Section 6.8 is met and exceeded for equipment efficiency ratings as seen in Table 90.1-6.8. The proposed and selected equipment should have a big impact on the total annual cost savings of about 15% over the ASHRAE 90.1 baseline.

Table 90.1-6.8

Equipment Compliance				
Unit	**Capacity**	**ASHRAE Requirement**	**Equipment Performance**	**Compliance**
Chiller A	500 Tons	5.5 COP	6.1 COP	Yes
Chiller B	500 Tons	5.5 COP	6.1 COP	Yes
Chiller C	500 Tons	5.5 COP	6.1 COP	Yes
Condensing Boiler A	3,000 MBH	80% Efficiency	98% Efficiency	Yes
Condensing Boiler B	3,000 MBH	80% Efficiency	98% Efficiency	Yes
Condensing Boiler C	3,000 MBH	80% Efficiency	98% Efficiency	Yes
Cooling Tower A	3 gpm/ton, 25HP	38.2 gpm/HP	60 gpm/ton	Yes
Cooling Tower B	3 gpm/ton, 25HP	38.2 gpm/HP	61 gpm/ton	Yes
Cooling Tower C	3 gpm/ton, 25HP	38.2 gpm/HP	62 gpm/ton	Yes

Section 7 Service Water Heating

The same gas fired condensing boilers that are used for space heating in the DMA building, are used for service water heating. These boilers are 98% efficient which meet and exceed the ASHRAE minimum requirements of 80% for a gas fired boilers being used for service water heating.

Section 8 Power

This section analyzes the power distribution in the building. Feeders should have a maximum voltage drop of 2% at design load, and branch circuits should be sized for a maximum voltage drop of 3% at design load. The DMA building was designed to have a maximum total voltage drop of 5% with a maximum voltage drop of 3% for the branch circuits. The DMA building complies with Section 8 of ASHRAE Standard 90.1

Section 9 General

This section sets the requirements for density of lighting systems for interior as well as exterior spaces of the building. Section 9 also provides requirements on power distribution. This section also provides two methods for calculating lighting power density.

The Building Area Method for determining the interior lighting power allowance was used to determine compliance of the DMA building. Table 90.1-9.2.2.1 shows the compliance of the DMA building based on Section 9 requirements.

Table 90.1-9.2.2.1

Lighting Power Density			
Area	W/SF	ASHRAE W/SF	Compliance
Ground Floor	0.71	1	Yes
First Floor	0.63	1	Yes
Second Floor	0.93	1	Yes

90.1 Conclusion

The DMA Building was designed to receive a LEED Silver rating. As a result, the energy efficiency of the building was heavily influenced. The majority of the selected equipment was much more efficient than the ASHRAE 90.1 requirements. Building envelope was carefully selected to exceed the ASHRAE requirements for building efficiency. Correct insulation for piping and duct is used to reduce losses, and lighting power density was kept to a minimum to further reduce the loads.

ASHRAE Standard 90.1 was determined to be compliant with a few small exceptions. The main areas of non compliance were; fan horsepower and a low U-value for floors. The non-compliance for fan horsepower could be neglected because the horsepower ratings are within a couple percent of the ASHRAE requirement. As a result, a few minor changes would make the DMA compliant in all of the ASHRAE 90.1 requirements

References

ASHRAE. 2007, ANSI/ASHRAE, Standard 62.1-2007, Ventilation for Acceptable Indoor Air Quality. American Society of Heating Refrigeration and Air-Conditioning Engineers, Inc., Atlanta, GA.

ASHRAE. 2007, ANSI/ASHRAE, Standard 90.1-2007, Energy Standard for Building Except Low-Rise Residential Buildings. American Society of Heating Refrigeration and Air-Conditioning Engineers, Inc., Atlanta, GA.

HSMM|AECOM. 2007. DMA Final Design Analysis. HSMM|AECOM, Washington, DC.

Appendix

The following is the calculation spreadsheet used to check for compliance of ASHRAE Standard 62.1 Section 6. This calculation includes all of the required room areas, use, occupancy, supply air, outside air, Z_p values for each space as well as max Z_p values for each system, and a comparison of nominal outside air vs. required outside air for each Air Handling Unit.

Building:	DMA
System Tag/Name:	ZONE A
Operating Condition Description:	
Units (select from pull-down list)	IP

Inputs for System	**Name**	**Units**		**System**
Floor area served by system	As	sf		16198.5
Population of area served by system (including diversity)	Ps	P	100% diversity	110
Design primary supply fan airflow rate	Vpsd	cfm		13,677
OA req'd per unit area for system (Weighted average)	Ras	cfm/sf		0.10
OA req'd per person for system area (Weighted average)	Rps	cfm/p		7.5

Inputs for Potentially Critical zones									
Zone Name				EG01	EG02	EG03	EG04-TR	EG05	EG06	EG07
			Zone title turns purple italic for critical zone(s)							
Zone Tag				1	2	3	4	5	6	7
Space type			Select from pull-down list	Corridors	Office space	Storage rooms	Telephone closets	Storage rooms	Storage rooms	Corridors
Floor Area of zone	Az	sf		860	487	54	246	246	167	193
Design population of zone	Pz	P	(default value listed; may be overridden)	0	2.435	0	0	0	0	0
Design total supply to zone (primary plus local recirculated)	Vdzd	cfm		156	176	647	106	90	60	219
Induction Terminal Unit, Dual Fan Dual Duct or Transfer Fan?			Select from pull-down list or leave blank if N/A	TF				TF	TF	
Local recirc. air % representative of ave system return air	Er			75%				75%	75%	
Inputs for Operating Condition Analyzed										
Percent of total design airflow rate at conditioned analyzed	Ds	%		100%	100%	100%	100%	100%	100%	100%
Air distribution type at conditioned analyzed			Select from pull-down list	CS	CS	CS	CS	CS	CS	CS
Zone air distribution effectiveness at conditioned analyzed	Ez			1.00	1.00	1.00	1.00	1.00	1.00	1.00
Primary air fraction of supply air at conditioned analyzed	Ep			100%				100%	100%	

Results			
Ventilation System Efficiency	Ev		**0.83**
Outdoor air intake required for system	Vot	cfm	**2924**
Outdoor air per unit floor area	Vot/As	cfm/sf	**0.18**
Outdoor air per person served by system (including diversity)	Vot/Ps	cfm/p	**26.6**
Outdoor air as a % of design primary supply air	Ypd	cfm	**21%**

Detailed Calculations													
Initial Calculations for the System as a whole													
Primary supply air flow to system at conditioned analyzed	Vps	cfm	=	VpdDs	=	13677							
UncorrectedOA requirement for system	Vou	cfm	=	Rps Ps + Ras As	=	2423							
Uncorrected OA req'd as a fraction of primary SA	Xs		=	Vou / Vps	=	0.18							
Initial Calculations for individual zones													
OA rate per unit area for zone	Raz	cfm/sf					0.06	0.06	0.12	0.00	0.12	0.12	0.06
OA rate per person	Rpz	cfm/p					0.00	5.00	0.00	0.00	0.00	0.00	0.00
Total supply air to zone (at condition being analyzed)	Vdz	cfm					156	176	647	106	90	60	219
Unused OA req'd to breathing zone	Vbz	cfm	=	Rpz Pz + Raz Az	=		51.6	41.4	6.5	0.0	29.5	20.0	11.6
Unused OA requirement for zone	Voz	cfm	=	Vbz/Ez	=		52	41	6	0	30	20	12
Fraction of zone supply not directly recirc. from zone	Fa		=	Ep + (1-Ep)Er	=		1.00	1.00	1.00	1.00	1.00	1.00	1.00
Fraction of zone supply from fully mixed primary air	Fb		=	Ep	=		1.00	1.00	1.00	1.00	1.00	1.00	1.00
Fraction of zone OA not directly recirc. from zone	Fc		=	1-(1-Ez)(1-Ep)(1-Er)	=		1.00	1.00	1.00	1.00	1.00	1.00	1.00
Unused OA fraction required in supply air to zone	Zd		=	Voz / Vdz	=		0.33	0.24	0.01	0.00	0.33	0.33	0.05
Unused OA fraction required in primary air to zone	Zp		=	Voz / Vpz	=		0.33	0.24	0.01	0.00	0.33	0.33	0.05
System Ventilation Efficiency													
Zone Ventilation Efficiency (App A Method)	Evz		=	(Fa + FbXs - FcZ) / Fa	=		0.85	0.94	1.17	1.18	0.85	0.84	1.12
System Ventilation Efficiency (App A Method)	Ev		=	min (Evz)	=	**0.83**							
Ventilation System Efficiency (Table 6.3 Method)	Ev		=	Value from Table 6.3	=	0.80							
Minimum outdoor air intake airflow													
Outdoor Air Intake Flow required to System	Vot	cfm	=	Vou / Ev	=	**2924**							
OA intake req'd as a fraction of primary SA	Y		=	Vot / Vps	=	**0.21**							
Outdoor Air Intake Flow required to System (Table 6.3 Method)	Vot	cfm	=	Vou / Ev	=	3023							
OA intake req'd as a fraction of primary SA (Table 6.3 Method)	Y		=	Vot / Vps	=	0.22							
OA Temp at which Min OA provides all cooling													
OAT below which OA Intake flow is @ minimum		Deg F	=	{(Tp-dTsf)-(1-Y)*(Tr+dTrf	=	-8							

Building:	DMA
System Tag/Name:	ZONE A
Operating Condition Description:	
Units (select from pull-down list)	IP

Inputs for System	**Name**	**Units**		**System**
Floor area served by system	As	sf		16198.5
Population of area served by system (including diversity)	Ps	P	100% diversity	110
Design primary supply fan airflow rate	Vpsd	cfm		13,677
OA req'd per unit area for system (Weighted average)	Ras	cfm/sf		0.10
OA req'd per person for system area (Weighted average)	Rps	cfm/p		7.5

Inputs for Potentially Critical zones														
Zone Name							**EG09-ELEC**	**EG10**	**EG11-LOCKER ROOM**	**EG12-LOCKER ROOM**	**EG13-MECHANICAL**	**EG14-OFFICE**	**EG15-OFFICE**
				Zone title turns purple italic for critical zone(s)									
Zone Tag							**8**	**9**	**10**	**11**	**12**	**13**	**14**
Space type		Select from pull-down list					**Storage rooms**	**Corridors**	**Storage rooms**	**Storage rooms**	**Storage rooms**	**Office space**	**Office space**
Floor Area of zone	Az	sf					130	228	238	262	2,131	158	184
Design population of zone	Pz	P		(default value listed; may be overridden)			0	0	0	0	0	0.79	0.92
Design total supply to zone (primary plus local recirculated)	Vdzd	cfm					479	129	90	100	750	154	175
Induction Terminal Unit, Dual Fan Dual Duct or Transfer Fan?		Select from pull-down list or leave blank if N/A							TF	TF	TF		
Local recirc. air % representative of ave system return air	Er								75%	75%	75%		
Inputs for Operating Condition Analyzed													
Percent of total design airflow rate at conditioned analyzed	Ds	%				100%	100%	100%	100%	100%	100%	100%	100%
Air distribution type at conditioned analyzed		Select from pull-down list					CS	CS	CS	CS	CS	CS	CS
Zone air distribution effectiveness at conditioned analyzed	Ez						1.00	1.00	1.00	1.00	1.00	1.00	1.00
Primary air fraction of supply air at conditioned analyzed	Ep								100%	100%	100%		

Results			
Ventilation System Efficiency	Ev		**0.83**
Outdoor air intake required for system	Vot	cfm	**2924**
Outdoor air per unit floor area	Vot/As	cfm/sf	**0.18**
Outdoor air per person served by system (including diversity)	Vot/Ps	cfm/p	**26.6**
Outdoor air as a % of design primary supply air	Ypd	cfm	**21%**

Detailed Calculations														
Initial Calculations for the System as a whole														
Primary supply air flow to system at conditioned analyzed	Vps	cfm	=	VpdDs	=	13677								
UncorrectedOA requirement for system	Vou	cfm	=	Rps Ps + Ras As	=	2423								
Uncorrected OA req'd as a fraction of primary SA	Xs		=	Vou / Vps	=	0.18								
Initial Calculations for individual zones														
OA rate per unit area for zone	Raz	cfm/sf					0.12	0.06	0.12	0.12	0.12	0.06	0.06	
OA rate per person	Rpz	cfm/p					0.00	0.00	0.00	0.00	0.00	5.00	5.00	
Total supply air to zone (at condition being analyzed)	Vdz	cfm					479	129	90	100	750	154	175	
Unused OA req'd to breathing zone	Vbz	cfm	=	Rpz Pz + Raz Az	=		15.6	13.7	28.6	31.4	255.7	13.4	15.6	
Unused OA requirement for zone	Voz	cfm	=	Vbz/Ez	=		16	14	29	31	256	13	16	
Fraction of zone supply not directly recirc. from zone	Fa		=	Ep + (1-Ep)Er	=		1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Fraction of zone supply from fully mixed primary air	Fb		=	Ep	=		1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Fraction of zone OA not directly recirc. from zone	Fc		=	1-(1-Ez)(1-Ep)(1-Er)	=		1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Unused OA fraction required in supply air to zone	Zd		=	Voz / Vdz	=		0.03	0.11	0.32	0.31	0.34	0.09	0.09	
Unused OA fraction required in primary air to zone	Zp		=	Voz / Vpz	=		0.03	0.11	0.32	0.31	0.34	0.09	0.09	
System Ventilation Efficiency														
Zone Ventilation Efficiency (App A Method)	Evz		=	(Fa + FbXs - FcZ) / Fa	=		1.14	1.07	0.86	0.86	0.84	1.09	1.09	
System Ventilation Efficiency (App A Method)	Ev		=	min (Evz)	=	**0.83**								
Ventilation System Efficiency (Table 6.3 Method)	Ev		=	Value from Table 6.3	=	0.80								
Minimum outdoor air intake airflow														
Outdoor Air Intake Flow required to System	Vot	cfm	=	Vou / Ev	=	**2924**								
OA intake req'd as a fraction of primary SA	Y		=	Vot / Vps	=	**0.21**								
Outdoor Air Intake Flow required to System (Table 6.3 Method)	Vot	cfm	=	Vou / Ev	=	3023								
OA intake req'd as a fraction of primary SA (Table 6.3 Method)	Y		=	Vot / Vps	=	0.22								
OA Temp at which Min OA provides all cooling														
OAT below which OA Intake flow is @ minimum		Deg F	=	{(Tp-dTsf)-(1-Y)*(Tr+dTrf	=	-8								

Building:	DMA
System Tag/Name:	ZONE A
Operating Condition Description:	
Units (select from pull-down list)	IP

Inputs for System	Name	Units		System
Floor area served by system	As	sf		16198.5
Population of area served by system (including diversity)	Ps	P	100% diversity	110
Design primary supply fan airflow rate	Vpsd	cfm		13,677
OA req'd per unit area for system (Weighted average)	Ras	cfm/sf		0.10
OA req'd per person for system area (Weighted average)	Rps	cfm/p		7.5

Potentially Critical Zones

Inputs for Potentially Critical zones				EG16-OFFICE	EG17-OFFICE	EG18-OFFICE	EG19-BREAK AREA	EG21A	EG21B	EG21C
Zone Name										
			Zone title turns purple italic for critical zone(s)							
Zone Tag				15	16	17	18	19	20	21
Space type		Select from pull-down list		Office space	Office space	Office space	Conference/meeting	Media center	Media center	Media center
Floor Area of zone	Az	sf		184	157	154	423	1,628	689	2,192
Design population of zone	Pz	P	(default value listed; may be overridden)	0.92	0.785	0.77	21.15	12	5	14
Design total supply to zone (primary plus local recirculated)	Vdzd	cfm		167	153	160	1985	1,188	668	1,224
Induction Terminal Unit, Dual Fan Dual Duct or Transfer Fan?		Select from pull-down list or leave blank if N/A								
Local recirc. air % representative of ave system return air	Er									
Inputs for Operating Condition Analyzed										
Percent of total design airflow rate at conditioned analyzed	Ds	%		100%	100%	100%	100%	100%	100%	100%
Air distribution type at conditioned analyzed		Select from pull-down list		CS	CS	CS	FSCR LV	FSCR LV	FSCR LV	FSCR LV
Zone air distribution effectiveness at conditioned analyzed	Ez			1.00	1.00	1.00	1.00	1.00	1.00	1.00
Primary air fraction of supply air at conditioned analyzed	Ep									

Results			
Ventilation System Efficiency	Ev		**0.83**
Outdoor air intake required for system	Vot	cfm	**2924**
Outdoor air per unit floor area	Vot/As	cfm/sf	**0.18**
Outdoor air per person served by system (including diversity)	Vot/Ps	cfm/p	**26.6**
Outdoor air as a % of design primary supply air	Ypd	cfm	**21%**

Detailed Calculations														
Initial Calculations for the System as a whole														
Primary supply air flow to system at conditioned analyzed	Vps	cfm	=	VpdDs	=	13677								
UncorrectedOA requirement for system	Vou	cfm	=	Rps Ps + Ras As	=	2423								
Uncorrected OA req'd as a fraction of primary SA	Xs		=	Vou / Vps	=	0.18								
Initial Calculations for individual zones														
OA rate per unit area for zone	Raz	cfm/sf					0.06	0.06	0.06	0.06	0.12	0.12	0.12	
OA rate per person	Rpz	cfm/p					5.00	5.00	5.00	5.00	10.00	10.00	10.00	
Total supply air to zone (at condition being analyzed)	Vdz	cfm					167	153	160	1985	1188	668	1224	
Unused OA req'd to breathing zone	Vbz	cfm	=	Rpz Pz + Raz Az	=		15.6	13.3	13.1	131.1	315.4	132.7	403.0	
Unused OA requirement for zone	Voz	cfm	=	Vbz/Ez	=		16	13	13	131	315	133	403	
Fraction of zone supply not directly recirc. from zone	Fa		=	Ep + (1-Ep)Er	=		1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Fraction of zone supply from fully mixed primary air	Fb		=	Ep	=		1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Fraction of zone OA not directly recirc. from zone	Fc		=	1-(1-Ez)(1-Ep)(1-Er)	=		1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Unused OA fraction required in supply air to zone	Zd		=	Voz / Vdz	=		0.09	0.09	0.08	0.07	0.27	0.20	0.33	
Unused OA fraction required in primary air to zone	Zp		=	Voz / Vpz	=		0.09	0.09	0.08	0.07	0.27	0.20	0.33	
System Ventilation Efficiency														
Zone Ventilation Efficiency (App A Method)	Evz		=	(Fa + FbXs - FcZ) / Fa	=		1.08	1.09	1.10	1.11	0.91	0.98	0.85	
System Ventilation Efficiency (App A Method)	Ev		=	min (Evz)	=	**0.83**								
Ventilation System Efficiency (Table 6.3 Method)	Ev		=	Value from Table 6.3	=	0.80								
Minimum outdoor air intake airflow														
Outdoor Air Intake Flow required to System	Vot	cfm	=	Vou / Ev	=	**2924**								
OA intake req'd as a fraction of primary SA	Y		=	Vot / Vps	=	**0.21**								
Outdoor Air Intake Flow required to System (Table 6.3 Method)	Vot	cfm	=	Vou / Ev	=	3023								
OA intake req'd as a fraction of primary SA (Table 6.3 Method)	Y		=	Vot / Vps	=	0.22								
OA Temp at which Min OA provides all cooling														
OAT below which OA Intake flow is @ minimum		Deg F	=	{(Tp-dTsf)-(1-Y)*(Tr+dTrf	=	-8								

Building:	DMA
System Tag/Name:	ZONE A
Operating Condition Description:	
Units (select from pull-down list)	IP

Inputs for System	Name	Units		System
Floor area served by system	As	sf		16198.5
Population of area served by system (including diversity)	Ps	P	100% diversity	110
Design primary supply fan airflow rate	Vpsd	cfm		13,677
OA req'd per unit area for system (Weighted average)	Ras	cfm/sf		0.10
OA req'd per person for system area (Weighted average)	Rps	cfm/p		7.5

Inputs for Potentially Critical zones									
Zone Name				*EG21D*	EG21E	EG23-IT CONFIG	EG24	EG25	EG26	EG27
			Zone title turns purple italic for critical zone(s)							
Zone Tag				22	23	24	25	26	27	28
Space type				Media center	Media center	Computer (not printing)	Corridors	Telephone/data entry	Telephone/data entry	Telephone/data entry
		Select from pull-down list								
Floor Area of zone	Az	sf		2,033	1,005	430	210	34	34	34
Design population of zone	Pz	P	(default value listed; may be overridden)	14	9	1.72	0	1	1	1
Design total supply to zone (primary plus local recirculated)	Vdzd	cfm		1,102	1,622	488	50	33	33	33
Induction Terminal Unit, Dual Fan Dual Duct or Transfer Fan?		Select from pull-down list or leave blank if N/A					TF			
Local recirc. air % representative of ave system return air	Er						75%			
Inputs for Operating Condition Analyzed										
Percent of total design airflow rate at conditioned analyzed	Ds	%		100%	100%	100%	100%	100%	100%	100%
Air distribution type at conditioned analyzed		Select from pull-down list			FSCR LV	FSCR LV	CS	CS	CS	CS	CS
Zone air distribution effectiveness at conditioned analyzed	Ez				1.00	1.00	1.00	1.00	1.00	1.00	1.00
Primary air fraction of supply air at conditioned analyzed	Ep							100%			

Results			
Ventilation System Efficiency	Ev		**0.83**
Outdoor air intake required for system	Vot	cfm	**2924**
Outdoor air per unit floor area	Vot/As	cfm/sf	**0.18**
Outdoor air per person served by system (including diversity)	Vot/Ps	cfm/p	**26.6**
Outdoor air as a % of design primary supply air	Ypd	cfm	**21%**

Detailed Calculations														
Initial Calculations for the System as a whole														
Primary supply air flow to system at conditioned analyzed	Vps	cfm	=	VpdDs	=	13677								
UncorrectedOA requirement for system	Vou	cfm	=	Rps Ps + Ras As	=	2423								
Uncorrected OA req'd as a fraction of primary SA	Xs		=	Vou / Vps	=	0.18								
Initial Calculations for individual zones														
OA rate per unit area for zone	Raz	cfm/sf					0.12	0.12	0.06	0.06	0.06	0.06	0.06	
OA rate per person	Rpz	cfm/p					10.00	10.00	5.00	0.00	5.00	5.00	5.00	
Total supply air to zone (at condition being analyzed)	Vdz	cfm					1102	1622	488	50	33	33	33	
Unused OA req'd to breathing zone	Vbz	cfm	=	Rpz Pz + Raz Az	=		384.0	210.6	34.4	12.6	7.0	7.0	7.0	
Unused OA requirement for zone	Voz	cfm	=	Vbz/Ez	=		384	211	34	13	7	7	7	
Fraction of zone supply not directly recirc. from zone	Fa		=	Ep + (1-Ep)Er	=		1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Fraction of zone supply from fully mixed primary air	Fb		=	Ep	=		1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Fraction of zone OA not directly recirc. from zone	Fc		=	1-(1-Ez)(1-Ep)(1-Er)	=		1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Unused OA fraction required in supply air to zone	Zd		=	Voz / Vdz	=		0.35	0.13	0.07	0.25	0.21	0.21	0.21	
Unused OA fraction required in primary air to zone	Zp		=	Voz / Vpz	=		0.35	0.13	0.07	0.25	0.21	0.21	0.21	
System Ventilation Efficiency														
Zone Ventilation Efficiency (App A Method)	Evz		=	(Fa + FbXs - FcZ) / Fa	=		0.83	1.05	1.11	0.93	0.96	0.96	0.96	
System Ventilation Efficiency (App A Method)	Ev		=	min (Evz)	=	**0.83**								
Ventilation System Efficiency (Table 6.3 Method)	Ev		=	Value from Table 6.3	=	0.80								
Minimum outdoor air intake airflow														
Outdoor Air Intake Flow required to System	Vot	cfm	=	Vou / Ev	=	**2924**								
OA intake req'd as a fraction of primary SA	Y		=	Vot / Vps	=	**0.21**								
Outdoor Air Intake Flow required to System (Table 6.3 Method)	Vot	cfm	=	Vou / Ev	=	3023								
OA intake req'd as a fraction of primary SA (Table 6.3 Method)	Y		=	Vot / Vps	=	0.22								
OA Temp at which Min OA provides all cooling														
OAT below which OA Intake flow is @ minimum		Deg F	=	{(Tp-dTsf)-(1-Y)*(Tr+dTrf	=	-8								

Building:	DMA
System Tag/Name:	ZONE A
Operating Condition Description:	
Units (select from pull-down list)	IP

Inputs for System	**Name**	**Units**		**System**
Floor area served by system	As	sf		16198.5
Population of area served by system (including diversity)	Ps	P	100% diversity	110
Design primary supply fan airflow rate	Vpsd	cfm		13,677
OA req'd per unit area for system (Weighted average)	Ras	cfm/sf		0.10
OA req'd per person for system area (Weighted average)	Rps	cfm/p		7.5

Inputs for Potentially Critical zones							
Zone Name				**EG28**	**EG28**	**EG30-DIMOC**	**EG31**
			Zone title turns purple italic for critical zone(s)				
Zone Tag				**29**	**30**	**31**	**32**
Space type		Select from pull-down list		**Telephone/data entry**	**Telephone/data entry**	**Computer (not printing)**	**Conference/meeting**
Floor Area of zone	Az	sf		94	158	792	365
Design population of zone	Pz	P	(default value listed; may be overridden)	1	1	3.168	18.225
Design total supply to zone (primary plus local recirculated)	Vdzd	cfm		88	60	729	563
Induction Terminal Unit, Dual Fan Dual Duct or Transfer Fan?		Select from pull-down list or leave blank if N/A					
Local recirc. air % representative of ave system return air	Er						
Inputs for Operating Condition Analyzed							
Percent of total design airflow rate at conditioned analyzed	Ds	%		100%	100%	100%	100%
Air distribution type at conditioned analyzed		Select from pull-down list		CS	CS	CS	CS
Zone air distribution effectiveness at conditioned analyzed	Ez			1.00	1.00	1.00	1.00
Primary air fraction of supply air at conditioned analyzed	Ep						

Results			
Ventilation System Efficiency	Ev		**0.83**
Outdoor air intake required for system	Vot	cfm	**2924**
Outdoor air per unit floor area	Vot/As	cfm/sf	**0.18**
Outdoor air per person served by system (including diversity)	Vot/Ps	cfm/p	**26.6**
Outdoor air as a % of design primary supply air	Ypd	cfm	**21%**

Detailed Calculations											
Initial Calculations for the System as a whole											
Primary supply air flow to system at conditioned analyzed	Vps	cfm	=	VpdDs	=	13677					
UncorrectedOA requirement for system	Vou	cfm	=	Rps Ps + Ras As	=	2423					
Uncorrected OA req'd as a fraction of primary SA	Xs		=	Vou / Vps	=	0.18					
Initial Calculations for individual zones											
OA rate per unit area for zone	Raz	cfm/sf					0.06	0.06	0.06	0.06	
OA rate per person	Rpz	cfm/p					5.00	5.00	5.00	5.00	
Total supply air to zone (at condition being analyzed)	Vdz	cfm					88	60	729	563	
Unused OA req'd to breathing zone	Vbz	cfm	=	Rpz Pz + Raz Az	=		10.6	14.5	63.4	113.0	
Unused OA requirement for zone	Voz	cfm	=	Vbz/Ez	=		11	14	63	113	
Fraction of zone supply not directly recirc. from zone	Fa		=	Ep + (1-Ep)Er	=		1.00	1.00	1.00	1.00	
Fraction of zone supply from fully mixed primary air	Fb		=	Ep	=		1.00	1.00	1.00	1.00	
Fraction of zone OA not directly recirc. from zone	Fc		=	1-(1-Ez)(1-Ep)(1-Er)	=		1.00	1.00	1.00	1.00	
Unused OA fraction required in supply air to zone	Zd		=	Voz / Vdz	=		0.12	0.24	0.09	0.20	
Unused OA fraction required in primary air to zone	Zp		=	Voz / Vpz	=		0.12	0.24	0.09	0.20	
System Ventilation Efficiency											
Zone Ventilation Efficiency (App A Method)	Evz		=	(Fa + FbXs - FcZ) / Fa	=		1.06	0.94	1.09	0.98	
System Ventilation Efficiency (App A Method)	Ev		=	min (Evz)	=	**0.83**					
Ventilation System Efficiency (Table 6.3 Method)	Ev		=	Value from Table 6.3	=	0.80					
Minimum outdoor air intake airflow											
Outdoor Air Intake Flow required to System	Vot	cfm	=	Vou / Ev	=	**2924**					
OA intake req'd as a fraction of primary SA	Y		=	Vot / Vps	=	**0.21**					
Outdoor Air Intake Flow required to System (Table 6.3 Method)	Vot	cfm	=	Vou / Ev	=	3023					
OA intake req'd as a fraction of primary SA (Table 6.3 Method)	Y		=	Vot / Vps	=	0.22					
OA Temp at which Min OA provides all cooling											
OAT below which OA Intake flow is @ minimum		Deg F	=	{(Tp-dTsf)-(1-Y)*(Tr+dTrf	=	-8					

Building:	DMA
System Tag/Name:	ZONE B&C
Operating Condition Description:	
Units (select from pull-down list)	IP

Inputs for System	**Name**	**Units**		**System**
Floor area served by system	As	sf		9531.75
Population of area served by system (including diversity)	Ps	P	100% diversity	15
Design primary supply fan airflow rate	Vpsd	cfm		12,360
OA req'd per unit area for system (Weighted average)	Ras	cfm/sf		0.08
OA req'd per person for system area (Weighted average)	Rps	cfm/p		5.0

Inputs for Potentially Critical zones			**EG32-CONTENT MGMT**	***EG34-CCER***	**EG36**	**EG37-MECHANICAL**	**EG38-ELEC**	**EG39**	**EG40**
Zone Name		*Zone title turns purple italic for critical zone(s)*							
Zone Tag			1	2	4	5	6	7	8
Space type		Select from pull-down list	Computer (not printing)	Telephone/data entry	Storage rooms	Storage rooms	Storage rooms	Storage rooms	Telephone/data entry
Floor Area of zone	Az	sf	1,698	209	473	1,587	360	147	88
Design population of zone	Pz	P (default value listed; may be overridden)	6.792	0	0	0	0	0	0
Design total supply to zone (primary plus local recirculated)	Vdzd	cfm	2455	30	200	500	2000	709	41
Induction Terminal Unit, Dual Fan Dual Duct or Transfer Fan?		Select from pull-down list or leave blank if N/A			TF				
Local recirc. air % representative of ave system return air	Er				75%				
Inputs for Operating Condition Analyzed									
Percent of total design airflow rate at conditioned analyzed	Ds	%	100%	100%	100%	100%	100%	100%	100%
Air distribution type at conditioned analyzed		Select from pull-down list	CS	CS	CS	CS	CS	CS	CS
Zone air distribution effectiveness at conditioned analyzed	Ez		1.00	1.00	1.00	1.00	1.00	1.00	1.00
Primary air fraction of supply air at conditioned analyzed	Ep				100%				

Results			
Ventilation System Efficiency	Ev		**0.65**
Outdoor air intake required for system	Vot	cfm	**1338**
Outdoor air per unit floor area	Vot/As	cfm/sf	**0.14**
Outdoor air per person served by system (including diversity)	Vot/Ps	cfm/p	**90.0**
Outdoor air as a % of design primary supply air	Ypd	cfm	**11%**

Detailed Calculations													
Initial Calculations for the System as a whole													
Primary supply air flow to system at conditioned analyzed	Vps	cfm	=	VpdDs	=	12360							
UncorrectedOA requirement for system	Vou	cfm	=	Rps Ps + Ras As	=	873							
Uncorrected OA req'd as a fraction of primary SA	Xs		=	Vou / Vps	=	0.07							
Initial Calculations for individual zones													
OA rate per unit area for zone	Raz	cfm/sf					0.06	0.06	0.12	0.12	0.12	0.12	0.06
OA rate per person	Rpz	cfm/p					5.00	5.00	0.00	0.00	0.00	0.00	5.00
Total supply air to zone (at condition being analyzed)	Vdz	cfm					2455	30	200	500	2000	709	41
Unused OA req'd to breathing zone	Vbz	cfm	=	Rpz Pz + Raz Az	=		135.8	12.5	56.8	190.4	43.2	17.6	5.3
Unused OA requirement for zone	Voz	cfm	=	Vbz/Ez	=		136	13	57	190	43	18	5
Fraction of zone supply not directly recirc. from zone	Fa		=	Ep + (1-Ep)Er	=		1.00	1.00	1.00	1.00	1.00	1.00	1.00
Fraction of zone supply from fully mixed primary air	Fb		=	Ep	=		1.00	1.00	1.00	1.00	1.00	1.00	1.00
Fraction of zone OA not directly recirc. from zone	Fc		=	1-(1-Ez)(1-Ep)(1-Er)	=		1.00	1.00	1.00	1.00	1.00	1.00	1.00
Unused OA fraction required in supply air to zone	Zd		=	Voz / Vdz	=		0.06	0.42	0.28	0.38	0.02	0.02	0.13
Unused OA fraction required in primary air to zone	Zp		=	Voz / Vpz	=		0.06	0.42	0.28	0.38	0.02	0.02	0.13
System Ventilation Efficiency													
Zone Ventilation Efficiency (App A Method)	Evz		=	(Fa + FbXs - FcZ) / Fa	=		1.02	0.65	0.79	0.69	1.05	1.05	0.94
System Ventilation Efficiency (App A Method)	Ev		=	min (Evz)	=	**0.65**							
Ventilation System Efficiency (Table 6.3 Method)	Ev		=	Value from Table 6.3	=	0.73							
Minimum outdoor air intake airflow													
Outdoor Air Intake Flow required to System	Vot	cfm	=	Vou / Ev	=	**1338**							
OA intake req'd as a fraction of primary SA	Y		=	Vot / Vps	=	**0.11**							
Outdoor Air Intake Flow required to System (Table 6.3 Method)	Vot	cfm	=	Vou / Ev	=	1193	**145.04**						
OA intake req'd as a fraction of primary SA (Table 6.3 Method)	Y		=	Vot / Vps	=	0.10	**0.11**						
OA Temp at which Min OA provides all cooling													
OAT below which OA Intake flow is @ minimum		Deg F	=	{(Tp-dTsf)-(1-Y)*(Tr+dTrf	=	-85							

Building:	DMA
System Tag/Name:	ZONE B&C
Operating Condition Description:	
Units (select from pull-down list)	IP

Inputs for System	**Name**	**Units**		**System**
Floor area served by system	As	sf		9531.75
Population of area served by system (including diversity)	Ps	P	100% diversity	15
Design primary supply fan airflow rate	Vpsd	cfm		12,360
OA req'd per unit area for system (Weighted average)	Ras	cfm/sf		0.08
OA req'd per person for system area (Weighted average)	Rps	cfm/p		5.0

				Potentially Critical Zones						
Inputs for Potentially Critical zones				**EG41**	**EG42**	**EG43**	**EG44**	**EG46-ELEC**	**EG47-NOC**	**EG48-TPC BU**
Zone Name										
			Zone title turns purple italic for critical zone(s)							
Zone Tag				9	10	11	12	13	14	15
Space type				Corridors	Storage rooms	Storage rooms	Storage rooms	Storage rooms	Computer (not printing)	Computer (not printing)
		Select from pull-down list								
Floor Area of zone	Az	sf		740	75	146	264	635	810	429
Design population of zone	Pz	P	(default value listed; may be overridden)	0	0	0	0	0	3.24	1.716
Design total supply to zone (primary plus local recirculated)	Vdzd	cfm		292	25	60	80	2000	1234	864
Induction Terminal Unit, Dual Fan Dual Duct or Transfer Fan?		Select from pull-down list or leave blank if N/A				TF	TF			
Local recirc. air % representative of ave system return air	Er					75%	75%			
Inputs for Operating Condition Analyzed										
Percent of total design airflow rate at conditioned analyzed	Ds	%	100%	100%	100%	100%	100%	100%	100%	100%
Air distribution type at conditioned analyzed		Select from pull-down list		CS	CS	CS	CS	CS	CS	CS
Zone air distribution effectiveness at conditioned analyzed	Ez			1.00	1.00	1.00	1.00	1.00	1.00	1.00
Primary air fraction of supply air at conditioned analyzed	Ep					100%	100%			

Results			
Ventilation System Efficiency	Ev		**0.65**
Outdoor air intake required for system	Vot	cfm	**1338**
Outdoor air per unit floor area	Vot/As	cfm/sf	**0.14**
Outdoor air per person served by system (including diversity)	Vot/Ps	cfm/p	**90.0**
Outdoor air as a % of design primary supply air	Ypd	cfm	**11%**

Detailed Calculations													
Initial Calculations for the System as a whole													
Primary supply air flow to system at conditioned analyzed	Vps	cfm	=	VpdDs	=	12360							
UncorrectedOA requirement for system	Vou	cfm	=	Rps Ps + Ras As	=	873							
Uncorrected OA req'd as a fraction of primary SA	Xs		=	Vou / Vps	=	0.07							
Initial Calculations for individual zones													
OA rate per unit area for zone	Raz	cfm/sf					0.06	0.12	0.12	0.12	0.12	0.06	0.06
OA rate per person	Rpz	cfm/p					0.00	0.00	0.00	0.00	0.00	5.00	5.00
Total supply air to zone (at condition being analyzed)	Vdz	cfm					292	25	60	80	2000	1234	864
Unused OA req'd to breathing zone	Vbz	cfm	=	Rpz Pz + Raz Az	=		44.4	9.0	17.5	31.7	76.2	64.8	34.3
Unused OA requirement for zone	Voz	cfm	=	Vbz/Ez	=		44	9	18	32	76	65	34
Fraction of zone supply not directly recirc. from zone	Fa		=	Ep + (1-Ep)Er	=		1.00	1.00	1.00	1.00	1.00	1.00	1.00
Fraction of zone supply from fully mixed primary air	Fb		=	Ep	=		1.00	1.00	1.00	1.00	1.00	1.00	1.00
Fraction of zone OA not directly recirc. from zone	Fc		=	1-(1-Ez)(1-Ep)(1-Er)	=		1.00	1.00	1.00	1.00	1.00	1.00	1.00
Unused OA fraction required in supply air to zone	Zd		=	Voz / Vdz	=		0.15	0.36	0.29	0.40	0.04	0.05	0.04
Unused OA fraction required in primary air to zone	Zp		=	Voz / Vpz	=		0.15	0.36	0.29	0.40	0.04	0.05	0.04
System Ventilation Efficiency													
Zone Ventilation Efficiency (App A Method)	Evz		=	(Fa + FbXs - FcZ) / Fa	=		0.92	0.71	0.78	0.67	1.03	1.02	1.03
System Ventilation Efficiency (App A Method)	Ev		=	min (Evz)	=	**0.65**							
Ventilation System Efficiency (Table 6.3 Method)	Ev		=	Value from Table 6.3	=	0.73							
Minimum outdoor air intake airflow													
Outdoor Air Intake Flow required to System	Vot	cfm	=	Vou / Ev	=	**1338**							
OA intake req'd as a fraction of primary SA	Y		=	Vot / Vps	=	**0.11**							
Outdoor Air Intake Flow required to System (Table 6.3 Method)	Vot	cfm	=	Vou / Ev	=	1193							
OA intake req'd as a fraction of primary SA (Table 6.3 Method)	Y		=	Vot / Vps	=	0.10							
OA Temp at which Min OA provides all cooling													
OAT below which OA Intake flow is @ minimum		Deg F	=	{(Tp-dTsf)-(1-Y)*(Tr+dTrf	=	-85							

Building:	DMA
System Tag/Name:	ZONE B&C
Operating Condition Description:	
Units (select from pull-down list)	IP

Inputs for System	Name	Units		System
Floor area served by system	As	sf		9531.75
Population of area served by system (including diversity)	Ps	P	100% diversity	15
Design primary supply fan airflow rate	Vpsd	cfm		12,360
OA req'd per unit area for system (Weighted average)	Ras	cfm/sf		0.08
OA req'd per person for system area (Weighted average)	Rps	cfm/p		5.0

Inputs for Potentially Critical zones								
Zone Name				EG49-TPC BU	EG50	EG53-OFFICE	EG54-OFFICE	EG81
		Zone title turns purple italic for critical zone(s)						
Zone Tag				16	17	19	20	21
Space type		Select from pull-down list		Computer (not printing)	Corridors	Office space	Office space	Storage rooms
Floor Area of zone	Az	sf		427	1,062	142	142	98
Design population of zone	Pz	P	(default value listed; may be overridden)	1.708	0	0.71	0.70875	0
Design total supply to zone (primary plus local recirculated)	Vdzd	cfm		863	365	117	94	431
Induction Terminal Unit, Dual Fan Dual Duct or Transfer Fan?		Select from pull-down list or leave blank if N/A						
Local recirc. air % representative of ave system return air	Er							
Inputs for Operating Condition Analyzed								
Percent of total design airflow rate at conditioned analyzed	Ds	%		100%	100%	100%	100%	100%
Air distribution type at conditioned analyzed		Select from pull-down list		CS	CS	CS	CS	CS
Zone air distribution effectiveness at conditioned analyzed	Ez			1.00	1.00	1.00	1.00	1.00
Primary air fraction of supply air at conditioned analyzed	Ep							

Results			
Ventilation System Efficiency	Ev		**0.65**
Outdoor air intake required for system	Vot	cfm	**1338**
Outdoor air per unit floor area	Vot/As	cfm/sf	**0.14**
Outdoor air per person served by system (including diversity)	Vot/Ps	cfm/p	**90.0**
Outdoor air as a % of design primary supply air	Ypd	cfm	**11%**

Detailed Calculations											
Initial Calculations for the System as a whole											
Primary supply air flow to system at conditioned analyzed	Vps	cfm	=	VpdDs	=	12360					
UncorrectedOA requirement for system	Vou	cfm	=	Rps Ps + Ras As	=	873					
Uncorrected OA req'd as a fraction of primary SA	Xs		=	Vou / Vps	=	0.07					
Initial Calculations for individual zones											
OA rate per unit area for zone	Raz	cfm/sf					0.06	0.06	0.06	0.06	0.12
OA rate per person	Rpz	cfm/p					5.00	0.00	5.00	5.00	0.00
Total supply air to zone (at condition being analyzed)	Vdz	cfm					863	365	117	94	431
Unused OA req'd to breathing zone	Vbz	cfm	=	Rpz Pz + Raz Az	=		34.2	63.7	12.1	12.0	11.8
Unused OA requirement for zone	Voz	cfm	=	Vbz/Ez	=		34	64	12	12	12
Fraction of zone supply not directly recirc. from zone	Fa		=	Ep + (1-Ep)Er	=		1.00	1.00	1.00	1.00	1.00
Fraction of zone supply from fully mixed primary air	Fb		=	Ep	=		1.00	1.00	1.00	1.00	1.00
Fraction of zone OA not directly recirc. from zone	Fc		=	1-(1-Ez)(1-Ep)(1-Er)	=		1.00	1.00	1.00	1.00	1.00
Unused OA fraction required in supply air to zone	Zd		=	Voz / Vdz	=		0.04	0.17	0.10	0.13	0.03
Unused OA fraction required in primary air to zone	Zp		=	Voz / Vpz	=		0.04	0.17	0.10	0.13	0.03
System Ventilation Efficiency											
Zone Ventilation Efficiency (App A Method)	Evz		=	(Fa + FbXs - FcZ) / Fa	=		1.03	0.90	0.97	0.94	1.04
System Ventilation Efficiency (App A Method)	Ev		=	min (Evz)	=	**0.65**					
Ventilation System Efficiency (Table 6.3 Method)	Ev		=	Value from Table 6.3	=	0.73					
Minimum outdoor air intake airflow											
Outdoor Air Intake Flow required to System	Vot	cfm	=	Vou / Ev	=	**1338**					
OA intake req'd as a fraction of primary SA	Y		=	Vot / Vps	=	**0.11**					
Outdoor Air Intake Flow required to System (Table 6.3 Method)	Vot	cfm	=	Vou / Ev	=	1193					
OA intake req'd as a fraction of primary SA (Table 6.3 Method)	Y		=	Vot / Vps	=	0.10					
OA Temp at which Min OA provides all cooling											
OAT below which OA Intake flow is @ minimum		Deg F	=	{(Tp-dTsf)-(1-Y)*(Tr+dTrf	=	-85					

Building:	DMA
System Tag/Name:	ZONE E
Operating Condition Description:	
Units (select from pull-down list)	IP

Inputs for System	Name	Units		System
Floor area served by system	As	sf		14584
Population of area served by system (including diversity)	Ps	P	100% diversity	146
Design primary supply fan airflow rate	Vpsd	cfm		14,711
OA req'd per unit area for system (Weighted average)	Ras	cfm/sf		0.11
OA req'd per person for system area (Weighted average)	Rps	cfm/p		8.2

Inputs for Potentially Critical zones									
Zone Name			*Zone title turns purple italic for critical zone(s)*	**E106**	**E109-OPEN OFFICE**	**E110A**	**E110B**	***E111***	**E112**	**E113**
Zone Tag				**1**	**2**	**3**	**4**	**5**	**6**	**7**
Space type			Select from pull-down list	**Storage rooms**	**Media center**	**Media center**	**Media center**	**Office space**	**Office space**	**Office space**
Floor Area of zone	Az	sf		167	1,230	765	870	178	135	135
Design population of zone	Pz	P	(default value listed; may be overridden)	0	9	8	8	8	0.675	0.675
Design total supply to zone (primary plus local recirculated)	Vdzd	cfm		80	1,282	1,004	1,340	169	142	145
Induction Terminal Unit, Dual Fan Dual Duct or Transfer Fan?			Select from pull-down list or leave blank if N/A	TF						
Local recirc. air % representative of ave system return air	Er			75%	75%	75%	75%	75%	75%	75%
Inputs for Operating Condition Analyzed										
Percent of total design airflow rate at conditioned analyzed	Ds	%	100%	100%	100%	100%	100%	100%	100%	100%
Air distribution type at conditioned analyzed			Select from pull-down list	CS	CS	CS	CS	CS	CS	CS
Zone air distribution effectiveness at conditioned analyzed	Ez			1.00	1.00	1.00	1.00	1.00	1.00	1.00
Primary air fraction of supply air at conditioned analyzed	Ep			100%						

Results			
Ventilation System Efficiency	Ev		**0.89**
Outdoor air intake required for system	Vot	cfm	**3159**
Outdoor air per unit floor area	Vot/As	cfm/sf	**0.22**
Outdoor air per person served by system (including diversity)	Vot/Ps	cfm/p	**21.7**
Outdoor air as a % of design primary supply air	Ypd	cfm	**21%**

Detailed Calculations														
Initial Calculations for the System as a whole														
Primary supply air flow to system at conditioned analyzed	Vps	cfm	=	VpdDs	=	14711								
UncorrectedOA requirement for system	Vou	cfm	=	Rps Ps + Ras As	=	2816								
Uncorrected OA req'd as a fraction of primary SA	Xs		=	Vou / Vps	=	0.19								
Initial Calculations for individual zones														
OA rate per unit area for zone	Raz	cfm/sf					0.12	0.12	0.12	0.12	0.06	0.06	0.06	
OA rate per person	Rpz	cfm/p					0.00	10.00	10.00	10.00	5.00	5.00	5.00	
Total supply air to zone (at condition being analyzed)	Vdz	cfm					80	1282	1004	1340	169	142	145	
Unused OA req'd to breathing zone	Vbz	cfm	=	Rpz Pz + Raz Az	=		20.0	237.6	171.8	184.4	50.7	11.5	11.5	
Unused OA requirement for zone	Voz	cfm	=	Vbz/Ez	=		20	238	172	184	51	11	11	
Fraction of zone supply not directly recirc. from zone	Fa		=	Ep + (1-Ep)Er	=		1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Fraction of zone supply from fully mixed primary air	Fb		=	Ep	=		1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Fraction of zone OA not directly recirc. from zone	Fc		=	1-(1-Ez)(1-Ep)(1-Er)	=		1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Unused OA fraction required in supply air to zone	Zd		=	Voz / Vdz	=		0.25	0.19	0.17	0.14	0.30	0.08	0.08	
Unused OA fraction required in primary air to zone	Zp		=	Voz / Vpz	=		0.25	0.19	0.17	0.14	0.30	0.08	0.08	
System Ventilation Efficiency														
Zone Ventilation Efficiency (App A Method)	Evz		=	(Fa + FbXs - FcZ) / Fa	=		0.94	1.01	1.02	1.05	0.89	1.11	1.11	
System Ventilation Efficiency (App A Method)	Ev		=	min (Evz)	=	**0.89**								
Ventilation System Efficiency (Table 6.3 Method)	Ev		=	Value from Table 6.3	=	0.85								
Minimum outdoor air intake airflow														
Outdoor Air Intake Flow required to System	Vot	cfm	=	Vou / Ev	=	**3159**								
OA intake req'd as a fraction of primary SA	Y		=	Vot / Vps	=	**0.21**								
Outdoor Air Intake Flow required to System (Table 6.3 Method)	Vot	cfm	=	Vou / Ev	=	3313								
OA intake req'd as a fraction of primary SA (Table 6.3 Method)	Y		=	Vot / Vps	=	0.23								
OA Temp at which Min OA provides all cooling														
OAT below which OA Intake flow is @ minimum		Deg F	=	{(Tp-dTsf)-(1-Y)*(Tr+dTrl	=	-7								

Building:	DMA
System Tag/Name:	ZONE E
Operating Condition Description:	
Units (select from pull-down list)	IP

Inputs for System	Name	Units		System
Floor area served by system	As	sf		14584
Population of area served by system (including diversity)	Ps	P	100% diversity	146
Design primary supply fan airflow rate	Vpsd	cfm		14,711
OA req'd per unit area for system (Weighted average)	Ras	cfm/sf		0.11
OA req'd per person for system area (Weighted average)	Rps	cfm/p		8.2

Inputs for Potentially Critical zones				Potentially Critical Zones						
Zone Name				E114	E115	E116	E117A	E117B	E117C	E117D
			Zone title turns purple italic for critical zone(s)							
Zone Tag				8	9	10	11	12	13	14
Space type				Office space	Office space	Office space	Media center	Media center	Media center	Media center
			Select from pull-down list							
Floor Area of zone	Az	sf		135	135	146	1,740	1,534	1,532	1,095
Design population of zone	Pz	P	(default value listed; may be overridden)	0.675	0.675	0.73	14	11	11	9
Design total supply to zone (primary plus local recirculated)	Vdzd	cfm		148	145	121	1,227	1,495	1,478	1,424
Induction Terminal Unit, Dual Fan Dual Duct or Transfer Fan?			Select from pull-down list or leave blank if N/A							
Local recirc. air % representative of ave system return air	Er			75%	75%	75%	75%	75%	75%	75%
Inputs for Operating Condition Analyzed										
Percent of total design airflow rate at conditioned analyzed	Ds	%	100%	100%	100%	100%	100%	100%	100%	100%
Air distribution type at conditioned analyzed			Select from pull-down list	CS	CS	CS	CS	CS	CS	CS
Zone air distribution effectiveness at conditioned analyzed	Ez			1.00	1.00	1.00	1.00	1.00	1.00	1.00
Primary air fraction of supply air at conditioned analyzed	Ep									

Results			
Ventilation System Efficiency	Ev		**0.89**
Outdoor air intake required for system	Vot	cfm	**3159**
Outdoor air per unit floor area	Vot/As	cfm/sf	**0.22**
Outdoor air per person served by system (including diversity)	Vot/Ps	cfm/p	**21.7**
Outdoor air as a % of design primary supply air	Ypd	cfm	**21%**

Detailed Calculations														
Initial Calculations for the System as a whole														
Primary supply air flow to system at conditioned analyzed	Vps	cfm	=	VpdDs	=	14711								
UncorrectedOA requirement for system	Vou	cfm	=	Rps Ps + Ras As	=	2816								
Uncorrected OA req'd as a fraction of primary SA	Xs		=	Vou / Vps	=	0.19								
Initial Calculations for individual zones														
OA rate per unit area for zone	Raz	cfm/sf					0.06	0.06	0.06	0.12	0.12	0.12	0.12	
OA rate per person	Rpz	cfm/p					5.00	5.00	5.00	10.00	10.00	10.00	10.00	
Total supply air to zone (at condition being analyzed)	Vdz	cfm					148	145	121	1227	1495	1478	1424	
Unused OA req'd to breathing zone	Vbz	cfm	=	Rpz Pz + Raz Az	=		11.5	11.5	12.4	348.8	294.1	293.8	221.4	
Unused OA requirement for zone	Voz	cfm	=	Vbz/Ez	=		11	11	12	349	294	294	221	
Fraction of zone supply not directly recirc. from zone	Fa		=	Ep + (1-Ep)Er	=		1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Fraction of zone supply from fully mixed primary air	Fb		=	Ep	=		1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Fraction of zone OA not directly recirc. from zone	Fc		=	1-(1-Ez)(1-Ep)(1-Er)	=		1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Unused OA fraction required in supply air to zone	Zd		=	Voz / Vdz	=		0.08	0.08	0.10	0.28	0.20	0.20	0.16	
Unused OA fraction required in primary air to zone	Zp		=	Voz / Vpz	=		0.08	0.08	0.10	0.28	0.20	0.20	0.16	
System Ventilation Efficiency														
Zone Ventilation Efficiency (App A Method)	Evz		=	(Fa + FbXs - FcZ) / Fa	=		1.11	1.11	1.09	0.91	0.99	0.99	1.04	
System Ventilation Efficiency (App A Method)	Ev		=	min (Evz)	=	**0.89**								
Ventilation System Efficiency (Table 6.3 Method)	Ev		=	Value from Table 6.3	=	0.85								
Minimum outdoor air intake airflow														
Outdoor Air Intake Flow required to System	Vot	cfm	=	Vou / Ev	=	**3159**								
OA intake req'd as a fraction of primary SA	Y		=	Vot / Vps	=	**0.21**								
Outdoor Air Intake Flow required to System (Table 6.3 Method)	Vot	cfm	=	Vou / Ev	=	3313								
OA intake req'd as a fraction of primary SA (Table 6.3 Method)	Y		=	Vot / Vps	=	0.23								
OA Temp at which Min OA provides all cooling														
OAT below which OA Intake flow is @ minimum		Deg F	=	{(Tp-dTsf)-(1-Y)*(Tr+dTrf	=	-7								

Building:	DMA
System Tag/Name:	ZONE E
Operating Condition Description:	
Units (select from pull-down list)	IP

Inputs for System	Name	Units		System
Floor area served by system	As	sf		14584
Population of area served by system (including diversity)	Ps	P	100% diversity	146
Design primary supply fan airflow rate	Vpsd	cfm		14,711
OA req'd per unit area for system (Weighted average)	Ras	cfm/sf		0.11
OA req'd per person for system area (Weighted average)	Rps	cfm/p		8.2

Inputs for Potentially Critical zones										
Zone Name		*Zone title turns purple italic for critical zone(s)*		E117E	E120	E121	E122	E123	E124	E125
Zone Tag				15	16	17	18	19	20	21
Space type		Select from pull-down list		Media center	Storage rooms	Office space	Conference/meeting	Conference/meeting	Office space	Office space
Floor Area of zone	Az	sf		1,463	174	120	124	451	170	170
Design population of zone	Pz	P	(default value listed; may be overridden)	11	0	0.6	6.2	22.55	0.85	0.85
Design total supply to zone (primary plus local recirculated)	Vdzd	cfm		1,234	224	139	144	959	134	134
Induction Terminal Unit, Dual Fan Dual Duct or Transfer Fan?		Select from pull-down list or leave blank if N/A								
Local recirc. air % representative of ave system return air	Er			75%	75%	75%	75%	75%	75%	75%
Inputs for Operating Condition Analyzed										
Percent of total design airflow rate at conditioned analyzed	Ds	%	100%	100%	100%	100%	100%	100%	100%	100%
Air distribution type at conditioned analyzed		Select from pull-down list		CS	CS	CS	CS	CS	CS	CS
Zone air distribution effectiveness at conditioned analyzed	Ez			1.00	1.00	1.00	1.00	1.00	1.00	1.00
Primary air fraction of supply air at conditioned analyzed	Ep									

Results			
Ventilation System Efficiency	Ev		**0.89**
Outdoor air intake required for system	Vot	cfm	**3159**
Outdoor air per unit floor area	Vot/As	cfm/sf	**0.22**
Outdoor air per person served by system (including diversity)	Vot/Ps	cfm/p	**21.7**
Outdoor air as a % of design primary supply air	Ypd	cfm	**21%**

Detailed Calculations													
Initial Calculations for the System as a whole													
Primary supply air flow to system at conditioned analyzed	Vps	cfm	=	VpdDs	=	14711							
UncorrectedOA requirement for system	Vou	cfm	=	Rps Ps + Ras As	=	2816							
Uncorrected OA req'd as a fraction of primary SA	Xs		=	Vou / Vps	=	0.19							
Initial Calculations for individual zones													
OA rate per unit area for zone	Raz	cfm/sf					0.12	0.12	0.06	0.06	0.06	0.06	0.06
OA rate per person	Rpz	cfm/p					10.00	0.00	5.00	5.00	5.00	5.00	5.00
Total supply air to zone (at condition being analyzed)	Vdz	cfm					1234	224	139	144	959	134	134
Unused OA req'd to breathing zone	Vbz	cfm	=	Rpz Pz + Raz Az	=		285.6	20.9	10.2	38.4	139.8	14.5	14.5
Unused OA requirement for zone	Voz	cfm	=	Vbz/Ez	=		286	21	10	38	140	14	14
Fraction of zone supply not directly recirc. from zone	Fa		=	Ep + (1-Ep)Er	=		1.00	1.00	1.00	1.00	1.00	1.00	1.00
Fraction of zone supply from fully mixed primary air	Fb		=	Ep	=		1.00	1.00	1.00	1.00	1.00	1.00	1.00
Fraction of zone OA not directly recirc. from zone	Fc		=	1-(1-Ez)(1-Ep)(1-Er)	=		1.00	1.00	1.00	1.00	1.00	1.00	1.00
Unused OA fraction required in supply air to zone	Zd		=	Voz / Vdz	=		0.23	0.09	0.07	0.27	0.15	0.11	0.11
Unused OA fraction required in primary air to zone	Zp		=	Voz / Vpz	=		0.23	0.09	0.07	0.27	0.15	0.11	0.11
System Ventilation Efficiency													
Zone Ventilation Efficiency (App A Method)	Evz		=	(Fa + FbXs - FcZ) / Fa	=		0.96	1.10	1.12	0.92	1.05	1.08	1.08
System Ventilation Efficiency (App A Method)	Ev		=	min (Evz)	=	**0.89**							
Ventilation System Efficiency (Table 6.3 Method)	Ev		=	Value from Table 6.3	=	0.85							
Minimum outdoor air intake airflow													
Outdoor Air Intake Flow required to System	Vot	cfm	=	Vou / Ev	=	**3159**							
OA intake req'd as a fraction of primary SA	Y		=	Vot / Vps	=	**0.21**							
Outdoor Air Intake Flow required to System (Table 6.3 Method)	Vot	cfm	=	Vou / Ev	=	3313							
OA intake req'd as a fraction of primary SA (Table 6.3 Method)	Y		=	Vot / Vps	=	0.23							
OA Temp at which Min OA provides all cooling													
OAT below which OA Intake flow is @ minimum		Deg F	=	{(Tp-dTsf)-(1-Y)*(Tr+dTrf	=	-7							

Building:	DMA
System Tag/Name:	ZONE E
Operating Condition Description:	
Units (select from pull-down list)	IP

Inputs for System	Name	Units		System
Floor area served by system	As	sf		14584
Population of area served by system (including diversity)	Ps	P	100% diversity	146
Design primary supply fan airflow rate	Vpsd	cfm		14,711
OA req'd per unit area for system (Weighted average)	Ras	cfm/sf		0.11
OA req'd per person for system area (Weighted average)	Rps	cfm/p		8.2

Inputs for Potentially Critical zones						
Zone Name	*Zone title turns purple italic for critical zone(s)*			E126	E127	E128	E129
Zone Tag				22	23	24	25
Space type		Select from pull-down list		Office space	Conference/meeting	Conference/meeting	Media center
Floor Area of zone	Az	sf		146	87	87	1,795
Design population of zone	Pz	P	(default value listed; may be overridden)	0.73	4.35	4.35	13
Design total supply to zone (primary plus local recirculated)	Vdzd	cfm		121	101	101	1,220
Induction Terminal Unit, Dual Fan Dual Duct or Transfer Fan?		Select from pull-down list or leave blank if N/A					
Local recirc. air % representative of ave system return air	Er			75%	75%	75%	75%
Inputs for Operating Condition Analyzed							
Percent of total design airflow rate at conditioned analyzed	Ds	%	100%	100%	100%	100%	100%
Air distribution type at conditioned analyzed		Select from pull-down list		CS	CS	CS	CS
Zone air distribution effectiveness at conditioned analyzed	Ez			1.00	1.00	1.00	1.00
Primary air fraction of supply air at conditioned analyzed	Ep						

Results			
Ventilation System Efficiency	Ev		**0.89**
Outdoor air intake required for system	Vot	cfm	**3159**
Outdoor air per unit floor area	Vot/As	cfm/sf	**0.22**
Outdoor air per person served by system (including diversity)	Vot/Ps	cfm/p	**21.7**
Outdoor air as a % of design primary supply air	Ypd	cfm	**21%**

Detailed Calculations											
Initial Calculations for the System as a whole											
Primary supply air flow to system at conditioned analyzed	Vps	cfm	=	VpdDs	=	14711				
UncorrectedOA requirement for system	Vou	cfm	=	Rps Ps + Ras As	=	2816				
Uncorrected OA req'd as a fraction of primary SA	Xs		=	Vou / Vps	=	0.19				
Initial Calculations for individual zones										
OA rate per unit area for zone	Raz	cfm/sf					0.06	0.06	0.06	0.12
OA rate per person	Rpz	cfm/p					5.00	5.00	5.00	10.00
Total supply air to zone (at condition being analyzed)	Vdz	cfm					121	101	101	1220
Unused OA req'd to breathing zone	Vbz	cfm	=	Rpz Pz + Raz Az	=		12.4	27.0	27.0	345.4
Unused OA requirement for zone	Voz	cfm	=	Vbz/Ez	=		12	27	27	345
Fraction of zone supply not directly recirc. from zone	Fa		=	Ep + (1-Ep)Er	=		1.00	1.00	1.00	1.00
Fraction of zone supply from fully mixed primary air	Fb		=	Ep	=		1.00	1.00	1.00	1.00
Fraction of zone OA not directly recirc. from zone	Fc		=	1-(1-Ez)(1-Ep)(1-Er)	=		1.00	1.00	1.00	1.00
Unused OA fraction required in supply air to zone	Zd		=	Voz / Vdz	=		0.10	0.27	0.27	0.28
Unused OA fraction required in primary air to zone	Zp		=	Voz / Vpz	=		0.10	0.27	0.27	0.28
System Ventilation Efficiency										
Zone Ventilation Efficiency (App A Method)	Evz		=	(Fa + FbXs - FcZ) / Fa	=		1.09	0.92	0.92	0.91
System Ventilation Efficiency (App A Method)	Ev		=	min (Evz)	=	**0.89**				
Ventilation System Efficiency (Table 6.3 Method)	Ev		=	Value from Table 6.3	=	0.85				
Minimum outdoor air intake airflow										
Outdoor Air Intake Flow required to System	Vot	cfm	=	Vou / Ev	=	**3159**				
OA intake req'd as a fraction of primary SA	Y		=	Vot / Vps	=	**0.21**				
Outdoor Air Intake Flow required to System (Table 6.3 Method)	Vot	cfm	=	Vou / Ev	=	3313				
OA intake req'd as a fraction of primary SA (Table 6.3 Method)	Y		=	Vot / Vps	=	0.23				
OA Temp at which Min OA provides all cooling										
OAT below which OA Intake flow is @ minimum		Deg F	=	{(Tp-dTsf)-(1-Y)*(Tr+dTrf	=	-7				

Building:	DMA
System Tag/Name:	ZONE G
Operating Condition Description:	
Units (select from pull-down list)	IP

Inputs for System	Name	Units		System
Floor area served by system	As	sf		18573.5
Population of area served by system (including diversity)	Ps	P	100% diversity	195
Design primary supply fan airflow rate	Vpsd	cfm		17,358
OA req'd per unit area for system (Weighted average)	Ras	cfm/sf		0.10
OA req'd per person for system area (Weighted average)	Rps	cfm/p		7.6

Inputs for Potentially Critical zones			*E130A*	E130B	E132	E133	E134	E135A	E135B
Zone Name	*Zone title turns purple italic for critical zone(s)*								
Zone Tag			1	2	3	4	5	6	7
Space type		Select from pull-down list	Media center	Media center	Conference/meeting	Conference/meeting	Conference/meeting	Media center	Media center
Floor Area of zone	Az	sf	1,460	1,525	209	209	1,810	1,190	1,665
Design population of zone	Pz	P (default value listed; may be overridden)	12	11	10.45	10.45	20	9	10
Design total supply to zone (primary plus local recirculated)	Vdzd	cfm	1,020	1,013	285	285	2,228	1,336	1,365
Induction Terminal Unit, Dual Fan Dual Duct or Transfer Fan?		Select from pull-down list or leave blank if N/A							
Local recirc. air % representative of ave system return air	Er								
Inputs for Operating Condition Analyzed									
Percent of total design airflow rate at conditioned analyzed	Ds	%	100%	100%	100%	100%	100%	100%	100%
Air distribution type at conditioned analyzed		Select from pull-down list	CS	CS	CS	CS	CS	CS	CS
Zone air distribution effectiveness at conditioned analyzed	Ez		1.00	1.00	1.00	1.00	1.00	1.00	1.00
Primary air fraction of supply air at conditioned analyzed	Ep								

Results			
Ventilation System Efficiency	Ev		**0.91**
Outdoor air intake required for system	Vot	cfm	**3761**
Outdoor air per unit floor area	Vot/As	cfm/sf	**0.20**
Outdoor air per person served by system (including diversity)	Vot/Ps	cfm/p	**19.3**
Outdoor air as a % of design primary supply air	Ypd	cfm	**22%**

Detailed Calculations														
Initial Calculations for the System as a whole														
Primary supply air flow to system at conditioned analyzed	Vps	cfm	=	VpdDs	=	17358								
UncorrectedOA requirement for system	Vou	cfm	=	Rps Ps + Ras As	=	3411								
Uncorrected OA req'd as a fraction of primary SA	Xs		=	Vou / Vps	=	0.20								
Initial Calculations for individual zones														
OA rate per unit area for zone	Raz	cfm/sf					0.12	0.12	0.06	0.06	0.06	0.12	0.12	
OA rate per person	Rpz	cfm/p					10.00	10.00	5.00	5.00	5.00	10.00	10.00	
Total supply air to zone (at condition being analyzed)	Vdz	cfm					1020	1013	285	285	2228	1336	1365	
Unused OA req'd to breathing zone	Vbz	cfm	=	Rpz Pz + Raz Az	=		295.2	293.0	64.8	64.8	208.6	232.8	299.8	
Unused OA requirement for zone	Voz	cfm	=	Vbz/Ez	=		295	293	65	65	209	233	300	
Fraction of zone supply not directly recirc. from zone	Fa		=	Ep + (1-Ep)Er	=		1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Fraction of zone supply from fully mixed primary air	Fb		=	Ep	=		1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Fraction of zone OA not directly recirc. from zone	Fc		=	1-(1-Ez)(1-Ep)(1-Er)	=		1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Unused OA fraction required in supply air to zone	Zd		=	Voz / Vdz	=		0.29	0.29	0.23	0.23	0.09	0.17	0.22	
Unused OA fraction required in primary air to zone	Zp		=	Voz / Vpz	=		0.29	0.29	0.23	0.23	0.09	0.17	0.22	
System Ventilation Efficiency														
Zone Ventilation Efficiency (App A Method)	Evz		=	(Fa + FbXs - FcZ) / Fa	=		0.91	0.91	0.97	0.97	1.10	1.02	0.98	
System Ventilation Efficiency (App A Method)	Ev		=	min (Evz)	=	**0.91**								
Ventilation System Efficiency (Table 6.3 Method)	Ev		=	Value from Table 6.3	=	0.86								
Minimum outdoor air intake airflow														
Outdoor Air Intake Flow required to System	Vot	cfm	=	Vou / Ev	=	**3761**								
OA intake req'd as a fraction of primary SA	Y		=	Vot / Vps	=	**0.22**								
Outdoor Air Intake Flow required to System (Table 6.3 Method)	Vot	cfm	=	Vou / Ev	=	3964								
OA intake req'd as a fraction of primary SA (Table 6.3 Method)	Y		=	Vot / Vps	=	0.23								
OA Temp at which Min OA provides all cooling														
OAT below which OA Intake flow is @ minimum		Deg F	=	{(Tp-dTsf)-(1-Y)*(Tr+dTrf	=	-6								

Building:	DMA
System Tag/Name:	ZONE G
Operating Condition Description:	
Units (select from pull-down list)	IP

Inputs for System	Name	Units		System
Floor area served by system	As	sf		18573.5
Population of area served by system (including diversity)	Ps	P	100% diversity	195
Design primary supply fan airflow rate	Vpsd	cfm		17,358
OA req'd per unit area for system (Weighted average)	Ras	cfm/sf		0.10
OA req'd per person for system area (Weighted average)	Rps	cfm/p		7.6

Inputs for Potentially Critical zones				Potentially Critical Zones						
Zone Name	*Zone title turns purple italic for critical zone(s)*			E135C	E137	E138	E139	E140	E142	E146
Zone Tag				8	9	10	11	12	13	14
Space type				Media center	Office space	Office space	Office space	Office space	Storage rooms	Storage rooms
		Select from pull-down list								
Floor Area of zone	Az	sf		1,408	136	136	153	136	264	146
Design population of zone	Pz	P	(default value listed; may be overridden)	10	0.68	0.68	0.765	0.68	0	0
Design total supply to zone (primary plus local recirculated)	Vdzd	cfm		1,360	152	119	111	103	130	80
Induction Terminal Unit, Dual Fan Dual Duct or Transfer Fan?		Select from pull-down list or leave blank if N/A							TF	TF
Local recirc. air % representative of ave system return air	Er								75%	75%
Inputs for Operating Condition Analyzed										
Percent of total design airflow rate at conditioned analyzed	Ds	%	100%	100%	100%	100%	100%	100%	100%	100%
Air distribution type at conditioned analyzed		Select from pull-down list		CS	CS	CS	CS	CS	CS	CS
Zone air distribution effectiveness at conditioned analyzed	Ez			1.00	1.00	1.00	1.00	1.00	1.00	1.00
Primary air fraction of supply air at conditioned analyzed	Ep								100%	100%

Results			
Ventilation System Efficiency	Ev		**0.91**
Outdoor air intake required for system	Vot	cfm	**3761**
Outdoor air per unit floor area	Vot/As	cfm/sf	**0.20**
Outdoor air per person served by system (including diversity)	Vot/Ps	cfm/p	**19.3**
Outdoor air as a % of design primary supply air	Ypd	cfm	**22%**

Detailed Calculations														
Initial Calculations for the System as a whole														
Primary supply air flow to system at conditioned analyzed	Vps	cfm	=	VpdDs	=	17358								
UncorrectedOA requirement for system	Vou	cfm	=	Rps Ps + Ras As	=	3411								
Uncorrected OA req'd as a fraction of primary SA	Xs		=	Vou / Vps	=	0.20								
Initial Calculations for individual zones														
OA rate per unit area for zone	Raz	cfm/sf					0.12	0.06	0.06	0.06	0.06	0.12	0.12	
OA rate per person	Rpz	cfm/p					10.00	5.00	5.00	5.00	5.00	0.00	0.00	
Total supply air to zone (at condition being analyzed)	Vdz	cfm					1360	152	119	111	103	130	80	
Unused OA req'd to breathing zone	Vbz	cfm	=	Rpz Pz + Raz Az	=		269.0	11.6	11.6	13.0	11.6	31.7	17.5	
Unused OA requirement for zone	Voz	cfm	=	Vbz/Ez	=		269	12	12	13	12	32	18	
Fraction of zone supply not directly recirc. from zone	Fa		=	Ep + (1-Ep)Er	=		1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Fraction of zone supply from fully mixed primary air	Fb		=	Ep	=		1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Fraction of zone OA not directly recirc. from zone	Fc		=	1-(1-Ez)(1-Ep)(1-Er)	=		1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Unused OA fraction required in supply air to zone	Zd		=	Voz / Vdz	=		0.20	0.08	0.10	0.12	0.11	0.24	0.22	
Unused OA fraction required in primary air to zone	Zp		=	Voz / Vpz	=		0.20	0.08	0.10	0.12	0.11	0.24	0.22	
System Ventilation Efficiency														
Zone Ventilation Efficiency (App A Method)	Evz		=	(Fa + FbXs - FcZ) / Fa	=		1.00	1.12	1.10	1.08	1.08	0.95	0.98	
System Ventilation Efficiency (App A Method)	Ev		=	min (Evz)	=	**0.91**								
Ventilation System Efficiency (Table 6.3 Method)	Ev		=	Value from Table 6.3	=	0.86								
Minimum outdoor air intake airflow														
Outdoor Air Intake Flow required to System	Vot	cfm	=	Vou / Ev	=	**3761**								
OA intake req'd as a fraction of primary SA	Y		=	Vot / Vps	=	**0.22**								
Outdoor Air Intake Flow required to System (Table 6.3 Method)	Vot	cfm	=	Vou / Ev	=	3964								
OA intake req'd as a fraction of primary SA (Table 6.3 Method)	Y		=	Vot / Vps	=	0.23								
OA Temp at which Min OA provides all cooling														
OAT below which OA Intake flow is @ minimum		Deg F	=	{(Tp-dTsf)-(1-Y)*(Tr+dTrf	=	-6								

Building:	DMA
System Tag/Name:	ZONE G
Operating Condition Description:	
Units (select from pull-down list)	IP

Inputs for System	Name	Units		System
Floor area served by system	As	sf		18573.5
Population of area served by system (including diversity)	Ps	P	100% diversity	195
Design primary supply fan airflow rate	Vpsd	cfm		17,358
OA req'd per unit area for system (Weighted average)	Ras	cfm/sf		0.10
OA req'd per person for system area (Weighted average)	Rps	cfm/p		7.6

Inputs for Potentially Critical zones									
Zone Name	*Zone title turns purple italic for critical zone(s)*			E148A	E148B	E148C	E150	E151	E152	E153
Zone Tag				15	16	17	18	19	20	21
Space type		Select from pull-down list		Media center	Media center	Media center	Conference/meeting	Office space	Office space	Office space
Floor Area of zone	Az	sf		1,803	1,214	880	403	136	186	136
Design population of zone	Pz	P	(default value listed; may be overridden)	13	11	9	20.125	0.68	0.93	0.68
Design total supply to zone (primary plus local recirculated)	Vdzd	cfm		1,216	1,075	1,224	622	118	148	118
Induction Terminal Unit, Dual Fan Dual Duct or Transfer Fan?		Select from pull-down list or leave blank if N/A								
Local recirc. air % representative of ave system return air	Er									
Inputs for Operating Condition Analyzed										
Percent of total design airflow rate at conditioned analyzed	Ds	%	100%	100%	100%	100%	100%	100%	100%	100%
Air distribution type at conditioned analyzed		Select from pull-down list		CS	CS	CS	CS	CS	CS	CS
Zone air distribution effectiveness at conditioned analyzed	Ez			1.00	1.00	1.00	1.00	1.00	1.00	1.00
Primary air fraction of supply air at conditioned analyzed	Ep									

Results			
Ventilation System Efficiency	Ev		**0.91**
Outdoor air intake required for system	Vot	cfm	**3761**
Outdoor air per unit floor area	Vot/As	cfm/sf	**0.20**
Outdoor air per person served by system (including diversity)	Vot/Ps	cfm/p	**19.3**
Outdoor air as a % of design primary supply air	Ypd	cfm	**22%**

Detailed Calculations														
Initial Calculations for the System as a whole														
Primary supply air flow to system at conditioned analyzed	Vps	cfm	=	VpdDs	=	17358								
UncorrectedOA requirement for system	Vou	cfm	=	Rps Ps + Ras As	=	3411								
Uncorrected OA req'd as a fraction of primary SA	Xs		=	Vou / Vps	=	0.20								
Initial Calculations for individual zones														
OA rate per unit area for zone	Raz	cfm/sf					0.12	0.12	0.12	0.06	0.06	0.06	0.06	
OA rate per person	Rpz	cfm/p					10.00	10.00	10.00	5.00	5.00	5.00	5.00	
Total supply air to zone (at condition being analyzed)	Vdz	cfm					1216	1075	1224	622	118	148	118	
Unused OA req'd to breathing zone	Vbz	cfm	=	Rpz Pz + Raz Az	=		346.4	255.7	195.6	124.8	11.6	15.8	11.6	
Unused OA requirement for zone	Voz	cfm	=	Vbz/Ez	=		346	256	196	125	12	16	12	
Fraction of zone supply not directly recirc. from zone	Fa		=	Ep + (1-Ep)Er	=		1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Fraction of zone supply from fully mixed primary air	Fb		=	Ep	=		1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Fraction of zone OA not directly recirc. from zone	Fc		=	1-(1-Ez)(1-Ep)(1-Er)	=		1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Unused OA fraction required in supply air to zone	Zd		=	Voz / Vdz	=		0.28	0.24	0.16	0.20	0.10	0.11	0.10	
Unused OA fraction required in primary air to zone	Zp		=	Voz / Vpz	=		0.28	0.24	0.16	0.20	0.10	0.11	0.10	
System Ventilation Efficiency														
Zone Ventilation Efficiency (App A Method)	Evz		=	(Fa + FbXs - FcZ) / Fa	=		0.91	0.96	1.04	1.00	1.10	1.09	1.10	
System Ventilation Efficiency (App A Method)	Ev		=	min (Evz)	=	**0.91**								
Ventilation System Efficiency (Table 6.3 Method)	Ev		=	Value from Table 6.3	=	0.86								
Minimum outdoor air intake airflow														
Outdoor Air Intake Flow required to System	Vot	cfm	=	Vou / Ev	=	**3761**								
OA intake req'd as a fraction of primary SA	Y		=	Vot / Vps	=	**0.22**								
Outdoor Air Intake Flow required to System (Table 6.3 Method)	Vot	cfm	=	Vou / Ev	=	3964								
OA intake req'd as a fraction of primary SA (Table 6.3 Method)	Y		=	Vot / Vps	=	0.23								
OA Temp at which Min OA provides all cooling														
OAT below which OA Intake flow is @ minimum		Deg F	=	{(Tp-dTsf)-(1-Y)*(Tr+dTrf	=	-6								

Building:	DMA
System Tag/Name:	ZONE G
Operating Condition Description:	
Units (select from pull-down list)	IP

Inputs for System	Name	Units		System
Floor area served by system	As	sf		18573.5
Population of area served by system (including diversity)	Ps	P	100% diversity	195
Design primary supply fan airflow rate	Vpsd	cfm		17,358
OA req'd per unit area for system (Weighted average)	Ras	cfm/sf		0.10
OA req'd per person for system area (Weighted average)	Rps	cfm/p		7.6

Inputs for Potentially Critical zones						
Zone Name	*Zone title turns purple italic for critical zone(s)*			E154	E155A	E155B	E156	E157
Zone Tag				22	23	24	25	26
Space type		Select from pull-down list		Corridors	Media center	Media center	Conference/meeting	Telephone/data entry
Floor Area of zone	Az	sf		750	945	945	518	211
Design population of zone	Pz	P	(default value listed; may be overridden)	0	9	9	25.9	0
Design total supply to zone (primary plus local recirculated)	Vdzd	cfm		342	987	1,015	734	172
Induction Terminal Unit, Dual Fan Dual Duct or Transfer Fan?		Select from pull-down list or leave blank if N/A						
Local recirc. air % representative of ave system return air	Er							
Inputs for Operating Condition Analyzed								
Percent of total design airflow rate at conditioned analyzed	Ds	%	100%	100%	100%	100%	100%	100%
Air distribution type at conditioned analyzed		Select from pull-down list		CS	CS	CS	CS	CS
Zone air distribution effectiveness at conditioned analyzed	Ez			1.00	1.00	1.00	1.00	1.00
Primary air fraction of supply air at conditioned analyzed	Ep							

Results			
Ventilation System Efficiency	Ev		**0.91**
Outdoor air intake required for system	Vot	cfm	**3761**
Outdoor air per unit floor area	Vot/As	cfm/sf	**0.20**
Outdoor air per person served by system (including diversity)	Vot/Ps	cfm/p	**19.3**
Outdoor air as a % of design primary supply air	Ypd	cfm	**22%**

Detailed Calculations											
Initial Calculations for the System as a whole											
Primary supply air flow to system at conditioned analyzed	Vps	cfm	=	VpdDs	=	17358					
UncorrectedOA requirement for system	Vou	cfm	=	Rps Ps + Ras As	=	3411					
Uncorrected OA req'd as a fraction of primary SA	Xs		=	Vou / Vps	=	0.20					
Initial Calculations for individual zones											
OA rate per unit area for zone	Raz	cfm/sf					0.06	0.12	0.12	0.06	0.06
OA rate per person	Rpz	cfm/p					0.00	10.00	10.00	5.00	5.00
Total supply air to zone (at condition being analyzed)	Vdz	cfm					342	987	1015	734	172
Unused OA req'd to breathing zone	Vbz	cfm	=	Rpz Pz + Raz Az	=		45.0	203.4	203.4	160.6	12.7
Unused OA requirement for zone	Voz	cfm	=	Vbz/Ez	=		45	203	203	161	13
Fraction of zone supply not directly recirc. from zone	Fa		=	Ep + (1-Ep)Er	=		1.00	1.00	1.00	1.00	1.00
Fraction of zone supply from fully mixed primary air	Fb		=	Ep	=		1.00	1.00	1.00	1.00	1.00
Fraction of zone OA not directly recirc. from zone	Fc		=	1-(1-Ez)(1-Ep)(1-Er)	=		1.00	1.00	1.00	1.00	1.00
Unused OA fraction required in supply air to zone	Zd		=	Voz / Vdz	=		0.13	0.21	0.20	0.22	0.07
Unused OA fraction required in primary air to zone	Zp		=	Voz / Vpz	=		0.13	0.21	0.20	0.22	0.07
System Ventilation Efficiency											
Zone Ventilation Efficiency (App A Method)	Evz		=	(Fa + FbXs - FcZ) / Fa	=		1.06	0.99	1.00	0.98	1.12
System Ventilation Efficiency (App A Method)	Ev		=	min (Evz)	=	**0.91**					
Ventilation System Efficiency (Table 6.3 Method)	Ev		=	Value from Table 6.3	=	0.86					
Minimum outdoor air intake airflow											
Outdoor Air Intake Flow required to System	Vot	cfm	=	Vou / Ev	=	**3761**					
OA intake req'd as a fraction of primary SA	Y		=	Vot / Vps	=	**0.22**					
Outdoor Air Intake Flow required to System (Table 6.3 Method)	Vot	cfm	=	Vou / Ev	=	3964					
OA intake req'd as a fraction of primary SA (Table 6.3 Method)	Y		=	Vot / Vps	=	0.23					
OA Temp at which Min OA provides all cooling											
OAT below which OA Intake flow is @ minimum		Deg F	=	{(Tp-dTsf)-(1-Y)*(Tr+dTrf	=	-6					

Building:	DMA
System Tag/Name:	ZONE H
Operating Condition Description:	
Units (select from pull-down list)	IP

Inputs for System	Name	Units		System
Floor area served by system	As	sf		19788
Population of area served by system (including diversity)	Ps	P	100% diversity	191
Design primary supply fan airflow rate	Vpsd	cfm		17,675
OA req'd per unit area for system (Weighted average)	Ras	cfm/sf		0.10
OA req'd per person for system area (Weighted average)	Rps	cfm/p		7.3

Inputs for Potentially Critical zones	Name	Units	E201-CORRIDOR	E204	E205-WOMENS	E208-MENS	E210	E211-OPEN OFFICE	E213-OFFICE
Zone Name									
			Zone title turns purple italic for critical zone(s)						
Zone Tag			1	2	3	4	5	6	7
Space type			Corridors	Telephone/data entry	Storage rooms	Storage rooms	Media center	Media center	Office space
		Select from pull-down list							
Floor Area of zone	Az	sf	1,151	252	246	167	1,407	1,340	172
Design population of zone	Pz	P (default value listed; may be overridden)	0	0	0	0	11	10	0.86
Design total supply to zone (primary plus local recirculated)	Vdzd	cfm	321	115	120	80	1,259	1298	130
Induction Terminal Unit, Dual Fan Dual Duct or Transfer Fan?		Select from pull-down list or leave blank if N/A			TF	TF			
Local recirc. air % representative of ave system return air	Er		75%	75%	75%	75%	75%	75%	75%
Inputs for Operating Condition Analyzed									
Percent of total design airflow rate at conditioned analyzed	Ds	%	100%	100%	100%	100%	100%	100%	100%
Air distribution type at conditioned analyzed		Select from pull-down list	CS	CS	CS	CS	CS	CS	CS
Zone air distribution effectiveness at conditioned analyzed	Ez		1.00	1.00	1.00	1.00	1.00	1.00	1.00
Primary air fraction of supply air at conditioned analyzed	Ep				100%	100%			

Results			
Ventilation System Efficiency	Ev		**0.82**
Outdoor air intake required for system	Vot	cfm	**4022**
Outdoor air per unit floor area	Vot/As	cfm/sf	**0.20**
Outdoor air per person served by system (including diversity)	Vot/Ps	cfm/p	**21.1**
Outdoor air as a % of design primary supply air	Ypd	cfm	**23%**

Detailed Calculations														
Initial Calculations for the System as a whole														
Primary supply air flow to system at conditioned analyzed	Vps	cfm	=	VpdDs	=	17675								
UncorrectedOA requirement for system	Vou	cfm	=	Rps Ps + Ras As	=	3294								
Uncorrected OA req'd as a fraction of primary SA	Xs		=	Vou / Vps	=	0.19								
Initial Calculations for individual zones														
OA rate per unit area for zone	Raz	cfm/sf					0.06	0.06	0.12	0.12	0.12	0.12	0.06	
OA rate per person	Rpz	cfm/p					0.00	5.00	0.00	0.00	10.00	10.00	5.00	
Total supply air to zone (at condition being analyzed)	Vdz	cfm					321	115	120	80	1259	1298	130	
Unused OA req'd to breathing zone	Vbz	cfm	=	Rpz Pz + Raz Az	=		69.1	15.1	29.5	20.0	278.8	260.8	14.6	
Unused OA requirement for zone	Voz	cfm	=	Vbz/Ez	=		69	15	30	20	279	261	15	
Fraction of zone supply not directly recirc. from zone	Fa		=	Ep + (1-Ep)Er	=		1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Fraction of zone supply from fully mixed primary air	Fb		=	Ep	=		1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Fraction of zone OA not directly recirc. from zone	Fc		=	1-(1-Ez)(1-Ep)(1-Er)	=		1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Unused OA fraction required in supply air to zone	Zd		=	Voz / Vdz	=		0.22	0.13	0.25	0.25	0.22	0.20	0.11	
Unused OA fraction required in primary air to zone	Zp		=	Voz / Vpz	=		0.22	0.13	0.25	0.25	0.22	0.20	0.11	
System Ventilation Efficiency														
Zone Ventilation Efficiency (App A Method)	Evz		=	(Fa + FbXs - FcZ) / Fa	=		0.97	1.05	0.94	0.94	0.96	0.99	1.07	
System Ventilation Efficiency (App A Method)	Ev		=	min (Evz)	=	**0.82**								
Ventilation System Efficiency (Table 6.3 Method)	Ev		=	Value from Table 6.3	=	0.78								
Minimum outdoor air intake airflow														
Outdoor Air Intake Flow required to System	Vot	cfm	=	Vou / Ev	=	**4022**								
OA intake req'd as a fraction of primary SA	Y		=	Vot / Vps	=	**0.23**								
Outdoor Air Intake Flow required to System (Table 6.3 Method)	Vot	cfm	=	Vou / Ev	=	4209								
OA intake req'd as a fraction of primary SA (Table 6.3 Method)	Y		=	Vot / Vps	=	0.24								
OA Temp at which Min OA provides all cooling														
OAT below which OA Intake flow is @ minimum		Deg F	=	{(Tp-dTsf)-(1-Y)*(Tr+dTrl	=	-3								

Building:	DMA
System Tag/Name:	ZONE H
Operating Condition Description:	
Units (select from pull-down list)	IP

Inputs for System	Name	Units		System
Floor area served by system	As	sf		19788
Population of area served by system (including diversity)	Ps	P	100% diversity	191
Design primary supply fan airflow rate	Vpsd	cfm		17,675
OA req'd per unit area for system (Weighted average)	Ras	cfm/sf		0.10
OA req'd per person for system area (Weighted average)	Rps	cfm/p		7.3

Inputs for Potentially Critical zones									
Zone Name		*Zone title turns purple italic for critical zone(s)*		E214-OFFICE	E215-OFFICE	E216-OFFICE	E217-OFFICE	E219A-OPEN OFFICE	E219B-OPEN OFFICE	*E219C*
Zone Tag				8	9	10	11	12	13	14
Space type		Select from pull-down list		Office space	Office space	Office space	Office space	Media center	Media center	Media center
Floor Area of zone	Az	sf		171	171	146	146	1,222	1,540	1,568
Design population of zone	Pz	P	(default value listed; may be overridden)	0.855	0.855	0.73	0.73	9	11	13
Design total supply to zone (primary plus local recirculated)	Vdzd	cfm		129	129	115	115	675	871	866
Induction Terminal Unit, Dual Fan Dual Duct or Transfer Fan?		Select from pull-down list or leave blank if N/A								
Local recirc. air % representative of ave system return air	Er			75%	75%	75%	75%	75%	75%	75%
Inputs for Operating Condition Analyzed										
Percent of total design airflow rate at conditioned analyzed	Ds	%	100%	100%	100%	100%	100%	100%	100%	100%
Air distribution type at conditioned analyzed		Select from pull-down list		CS	CS	CS	CS	CS	CS	CS
Zone air distribution effectiveness at conditioned analyzed	Ez			1.00	1.00	1.00	1.00	1.00	1.00	1.00
Primary air fraction of supply air at conditioned analyzed	Ep									

Results			
Ventilation System Efficiency	Ev		**0.82**
Outdoor air intake required for system	Vot	cfm	**4022**
Outdoor air per unit floor area	Vot/As	cfm/sf	**0.20**
Outdoor air per person served by system (including diversity)	Vot/Ps	cfm/p	**21.1**
Outdoor air as a % of design primary supply air	Ypd	cfm	**23%**

Detailed Calculations														
Initial Calculations for the System as a whole														
Primary supply air flow to system at conditioned analyzed	Vps	cfm	=	VpdDs	=	17675								
UncorrectedOA requirement for system	Vou	cfm	=	Rps Ps + Ras As	=	3294								
Uncorrected OA req'd as a fraction of primary SA	Xs		=	Vou / Vps	=	0.19								
Initial Calculations for individual zones														
OA rate per unit area for zone	Raz	cfm/sf					0.06	0.06	0.06	0.06	0.12	0.12	0.12	
OA rate per person	Rpz	cfm/p					5.00	5.00	5.00	5.00	10.00	10.00	10.00	
Total supply air to zone (at condition being analyzed)	Vdz	cfm					129	129	115	115	675	871	866	
Unused OA req'd to breathing zone	Vbz	cfm	=	Rpz Pz + Raz Az	=		14.5	14.5	12.4	12.4	236.6	294.8	318.2	
Unused OA requirement for zone	Voz	cfm	=	Vbz/Ez	=		15	15	12	12	237	295	318	
Fraction of zone supply not directly recirc. from zone	Fa		=	Ep + (1-Ep)Er	=		1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Fraction of zone supply from fully mixed primary air	Fb		=	Ep	=		1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Fraction of zone OA not directly recirc. from zone	Fc		=	1-(1-Ez)(1-Ep)(1-Er)	=		1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Unused OA fraction required in supply air to zone	Zd		=	Voz / Vdz	=		0.11	0.11	0.11	0.11	0.35	0.34	0.37	
Unused OA fraction required in primary air to zone	Zp		=	Voz / Vpz	=		0.11	0.11	0.11	0.11	0.35	0.34	0.37	
System Ventilation Efficiency														
Zone Ventilation Efficiency (App A Method)	Evz		=	(Fa + FbXs - FcZ) / Fa	=		1.07	1.07	1.08	1.08	0.84	0.85	0.82	
System Ventilation Efficiency (App A Method)	Ev		=	min (Evz)	=	**0.82**								
Ventilation System Efficiency (Table 6.3 Method)	Ev		=	Value from Table 6.3	=	0.78								
Minimum outdoor air intake airflow														
Outdoor Air Intake Flow required to System	Vot	cfm	=	Vou / Ev	=	**4022**								
OA intake req'd as a fraction of primary SA	Y		=	Vot / Vps	=	**0.23**								
Outdoor Air Intake Flow required to System (Table 6.3 Method)	Vot	cfm	=	Vou / Ev	=	4209								
OA intake req'd as a fraction of primary SA (Table 6.3 Method)	Y		=	Vot / Vps	=	0.24								
OA Temp at which Min OA provides all cooling														
OAT below which OA Intake flow is @ minimum		Deg F	=	{(Tp-dTsf)-(1-Y)*(Tr+dTrf	=	-3								

Building:	DMA
System Tag/Name:	ZONE H
Operating Condition Description:	
Units (select from pull-down list)	IP

Inputs for System	Name	Units		System
Floor area served by system	As	sf		19788
Population of area served by system (including diversity)	Ps	P	100% diversity	191
Design primary supply fan airflow rate	Vpsd	cfm		17,675
OA req'd per unit area for system (Weighted average)	Ras	cfm/sf		0.10
OA req'd per person for system area (Weighted average)	Rps	cfm/p		7.3

Inputs for Potentially Critical zones										
Zone Name		*Zone title turns purple italic for critical zone(s)*		E219D	E220-DIR CG	E221A	E221-CG CONF	E224-DIR ES	E225-OFFICE	E226
Zone Tag				15	16	17	18	19	20	21
Space type		Select from pull-down list		Media center	Office space	Conference/meeting	Conference/meeting	Office space	Office space	Corridors
Floor Area of zone	Az	sf		1,539	367	477	560	272	171	319
Design population of zone	Pz	P	(default value listed; may be overridden)	11	1.835	23.85	28	1.36	0.855	0
Design total supply to zone (primary plus local recirculated)	Vdzd	cfm		850	1101	1,196	1459	297	129	411
Induction Terminal Unit, Dual Fan Dual Duct or Transfer Fan?		Select from pull-down list or leave blank if N/A								
Local recirc. air % representative of ave system return air	Er			75%	75%	75%	75%	75%	75%	75%
Inputs for Operating Condition Analyzed										
Percent of total design airflow rate at conditioned analyzed	Ds	%	100%	100%	100%	100%	100%	100%	100%	100%
Air distribution type at conditioned analyzed		Select from pull-down list		CS	CS	CS	CS	CS	CS	CS
Zone air distribution effectiveness at conditioned analyzed	Ez			1.00	1.00	1.00	1.00	1.00	1.00	1.00
Primary air fraction of supply air at conditioned analyzed	Ep									

Results			
Ventilation System Efficiency	Ev		**0.82**
Outdoor air intake required for system	Vot	cfm	**4022**
Outdoor air per unit floor area	Vot/As	cfm/sf	**0.20**
Outdoor air per person served by system (including diversity)	Vot/Ps	cfm/p	**21.1**
Outdoor air as a % of design primary supply air	Ypd	cfm	**23%**

Detailed Calculations														
Initial Calculations for the System as a whole														
Primary supply air flow to system at conditioned analyzed	Vps	cfm	=	VpdDs	=	17675								
UncorrectedOA requirement for system	Vou	cfm	=	Rps Ps + Ras As	=	3294								
Uncorrected OA req'd as a fraction of primary SA	Xs		=	Vou / Vps	=	0.19								
Initial Calculations for individual zones														
OA rate per unit area for zone	Raz	cfm/sf					0.12	0.06	0.06	0.06	0.06	0.06	0.06	
OA rate per person	Rpz	cfm/p					10.00	5.00	5.00	5.00	5.00	5.00	0.00	
Total supply air to zone (at condition being analyzed)	Vdz	cfm					850	1101	1196	1459	297	129	411	
Unused OA req'd to breathing zone	Vbz	cfm	=	Rpz Pz + Raz Az	=		294.7	31.2	147.9	173.6	23.1	14.5	19.1	
Unused OA requirement for zone	Voz	cfm	=	Vbz/Ez	=		295	31	148	174	23	15	19	
Fraction of zone supply not directly recirc. from zone	Fa		=	Ep + (1-Ep)Er	=		1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Fraction of zone supply from fully mixed primary air	Fb		=	Ep	=		1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Fraction of zone OA not directly recirc. from zone	Fc		=	1-(1-Ez)(1-Ep)(1-Er)	=		1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Unused OA fraction required in supply air to zone	Zd		=	Voz / Vdz	=		0.35	0.03	0.12	0.12	0.08	0.11	0.05	
Unused OA fraction required in primary air to zone	Zp		=	Voz / Vpz	=		0.35	0.03	0.12	0.12	0.08	0.11	0.05	
System Ventilation Efficiency														
Zone Ventilation Efficiency (App A Method)	Evz		=	(Fa + FbXs - FcZ) / Fa	=		0.84	1.16	1.06	1.07	1.11	1.07	1.14	
System Ventilation Efficiency (App A Method)	Ev		=	min (Evz)	=	**0.82**								
Ventilation System Efficiency (Table 6.3 Method)	Ev		=	Value from Table 6.3	=	0.78								
Minimum outdoor air intake airflow														
Outdoor Air Intake Flow required to System	Vot	cfm	=	Vou / Ev	=	**4022**								
OA intake req'd as a fraction of primary SA	Y		=	Vot / Vps	=	**0.23**								
Outdoor Air Intake Flow required to System (Table 6.3 Method)	Vot	cfm	=	Vou / Ev	=	4209								
OA intake req'd as a fraction of primary SA (Table 6.3 Method)	Y		=	Vot / Vps	=	0.24								
OA Temp at which Min OA provides all cooling														
OAT below which OA Intake flow is @ minimum		Deg F	=	{(Tp-dTsf)-(1-Y)*(Tr+dTrf	=	-3								

Building:	DMA
System Tag/Name:	ZONE H
Operating Condition Description:	
Units (select from pull-down list)	IP

Inputs for System	Name	Units		System
Floor area served by system	As	sf		19788
Population of area served by system (including diversity)	Ps	P	100% diversity	191
Design primary supply fan airflow rate	Vpsd	cfm		17,675
OA req'd per unit area for system (Weighted average)	Ras	cfm/sf		0.10
OA req'd per person for system area (Weighted average)	Rps	cfm/p		7.3

Inputs for Potentially Critical zones			Potentially Critical Zones						
Zone Name		*Zone title turns purple italic for critical zone(s)*	E227-OFFICE	E228A-OFFICE	E229-OFFICE	E234-OFFICE	E235-OFFICE	E236	E237-CONF
Zone Tag			22	23	24	25	26	27	28
Space type		Select from pull-down list	Office space	Office space	Office space	Office space	Office space	Office space	Conference/meeting
Floor Area of zone	Az	sf	177	170	136	136	137	171	290
Design population of zone	Pz	P (default value listed; may be overridden)	0.885	0.85	0.68	0.68	0.685	0.855	14.5
Design total supply to zone (primary plus local recirculated)	Vdzd	cfm	132	128	110	110	110	129	444
Induction Terminal Unit, Dual Fan Dual Duct or Transfer Fan?		Select from pull-down list or leave blank if N/A							
Local recirc. air % representative of ave system return air	Er		75%	75%	75%	75%	75%	75%	75%
Inputs for Operating Condition Analyzed									
Percent of total design airflow rate at conditioned analyzed	Ds	%	100%	100%	100%	100%	100%	100%	100%
Air distribution type at conditioned analyzed		Select from pull-down list		CS	CS	CS	CS	CS	CS
Zone air distribution effectiveness at conditioned analyzed	Ez			1.00	1.00	1.00	1.00	1.00	1.00
Primary air fraction of supply air at conditioned analyzed	Ep								

Results			
Ventilation System Efficiency	Ev		**0.82**
Outdoor air intake required for system	Vot	cfm	**4022**
Outdoor air per unit floor area	Vot/As	cfm/sf	**0.20**
Outdoor air per person served by system (including diversity)	Vot/Ps	cfm/p	**21.1**
Outdoor air as a % of design primary supply air	Ypd	cfm	**23%**

Detailed Calculations														
Initial Calculations for the System as a whole														
Primary supply air flow to system at conditioned analyzed	Vps	cfm	=	VpdDs	=	17675								
UncorrectedOA requirement for system	Vou	cfm	=	Rps Ps + Ras As	=	3294								
Uncorrected OA req'd as a fraction of primary SA	Xs		=	Vou / Vps	=	0.19								
Initial Calculations for individual zones														
OA rate per unit area for zone	Raz	cfm/sf					0.06	0.06	0.06	0.06	0.06	0.06	0.06	
OA rate per person	Rpz	cfm/p					5.00	5.00	5.00	5.00	5.00	5.00	5.00	
Total supply air to zone (at condition being analyzed)	Vdz	cfm					132	128	110	110	110	129	444	
Unused OA req'd to breathing zone	Vbz	cfm	=	Rpz Pz + Raz Az	=		15.0	14.5	11.6	11.6	11.6	14.5	89.9	
Unused OA requirement for zone	Voz	cfm	=	Vbz/Ez	=		15	14	12	12	12	15	90	
Fraction of zone supply not directly recirc. from zone	Fa		=	Ep + (1-Ep)Er	=		1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Fraction of zone supply from fully mixed primary air	Fb		=	Ep	=		1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Fraction of zone OA not directly recirc. from zone	Fc		=	1-(1-Ez)(1-Ep)(1-Er)	=		1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Unused OA fraction required in supply air to zone	Zd		=	Voz / Vdz	=		0.11	0.11	0.11	0.11	0.11	0.11	0.20	
Unused OA fraction required in primary air to zone	Zp		=	Voz / Vpz	=		0.11	0.11	0.11	0.11	0.11	0.11	0.20	
System Ventilation Efficiency														
Zone Ventilation Efficiency (App A Method)	Evz		=	(Fa + FbXs - FcZ) / Fa	=		1.07	1.07	1.08	1.08	1.08	1.07	0.98	
System Ventilation Efficiency (App A Method)	Ev		=	min (Evz)	=	**0.82**								
Ventilation System Efficiency (Table 6.3 Method)	Ev		=	Value from Table 6.3	=	0.78								
Minimum outdoor air intake airflow														
Outdoor Air Intake Flow required to System	Vot	cfm	=	Vou / Ev	=	**4022**								
OA intake req'd as a fraction of primary SA	Y		=	Vot / Vps	=	**0.23**								
Outdoor Air Intake Flow required to System (Table 6.3 Method)	Vot	cfm	=	Vou / Ev	=	4209								
OA intake req'd as a fraction of primary SA (Table 6.3 Method)	Y		=	Vot / Vps	=	0.24								
OA Temp at which Min OA provides all cooling														
OAT below which OA Intake flow is @ minimum		Deg F	=	{(Tp-dTsf)-(1-Y)*(Tr+dTrf	=	-3								

Building:	DMA
System Tag/Name:	ZONE H
Operating Condition Description:	
Units (select from pull-down list)	IP

Inputs for System	Name	Units		System
Floor area served by system	As	sf		19788
Population of area served by system (including diversity)	Ps	P	100% diversity	191
Design primary supply fan airflow rate	Vpsd	cfm		17,675
OA req'd per unit area for system (Weighted average)	Ras	cfm/sf		0.10
OA req'd per person for system area (Weighted average)	Rps	cfm/p		7.3

Inputs for Potentially Critical zones										
Zone Name		*Zone title turns purple italic for critical zone(s)*		E238A	E238B-OPEN OFFICE	E240-OFFICE	E241	E242-OFFICE	E243-OFFICE	E245-OFFICE
Zone Tag				29	30	31	32	33	34	35
Space type		Select from pull-down list		Media center	Media center	Office space	Office space	Office space	Office space	Office space
Floor Area of zone	Az	sf		1,911	936	140	140	141	141	147
Design population of zone	Pz	P	(default value listed; may be overridden)	14	9	0.7	0.7	0.705	0.705	0.735
Design total supply to zone (primary plus local recirculated)	Vdzd	cfm		1,056	885	115	115	115	115	119
Induction Terminal Unit, Dual Fan Dual Duct or Transfer Fan?		Select from pull-down list or leave blank if N/A								
Local recirc. air % representative of ave system return air	Er			75%	75%	75%	75%	75%	75%	75%
Inputs for Operating Condition Analyzed										
Percent of total design airflow rate at conditioned analyzed	Ds	%	100%	100%	100%	100%	100%	100%	100%	100%
Air distribution type at conditioned analyzed		Select from pull-down list		CS	CS	CS	CS	CS	CS	CS
Zone air distribution effectiveness at conditioned analyzed	Ez			1.00	1.00	1.00	1.00	1.00	1.00	1.00
Primary air fraction of supply air at conditioned analyzed	Ep									

Results			
Ventilation System Efficiency	Ev		**0.82**
Outdoor air intake required for system	Vot	cfm	**4022**
Outdoor air per unit floor area	Vot/As	cfm/sf	**0.20**
Outdoor air per person served by system (including diversity)	Vot/Ps	cfm/p	**21.1**
Outdoor air as a % of design primary supply air	Ypd	cfm	**23%**

Detailed Calculations														
Initial Calculations for the System as a whole														
Primary supply air flow to system at conditioned analyzed	Vps	cfm	=	VpdDs	=	17675								
UncorrectedOA requirement for system	Vou	cfm	=	Rps Ps + Ras As	=	3294								
Uncorrected OA req'd as a fraction of primary SA	Xs		=	Vou / Vps	=	0.19								
Initial Calculations for individual zones														
OA rate per unit area for zone	Raz	cfm/sf					0.12	0.12	0.06	0.06	0.06	0.06	0.06	
OA rate per person	Rpz	cfm/p					10.00	10.00	5.00	5.00	5.00	5.00	5.00	
Total supply air to zone (at condition being analyzed)	Vdz	cfm					1056	885	115	115	115	115	119	
Unused OA req'd to breathing zone	Vbz	cfm	=	Rpz Pz + Raz Az	=		369.3	202.3	11.9	11.9	12.0	12.0	12.5	
Unused OA requirement for zone	Voz	cfm	=	Vbz/Ez	=		369	202	12	12	12	12	12	
Fraction of zone supply not directly recirc. from zone	Fa		=	Ep + (1-Ep)Er	=		1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Fraction of zone supply from fully mixed primary air	Fb		=	Ep	=		1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Fraction of zone OA not directly recirc. from zone	Fc		=	1-(1-Ez)(1-Ep)(1-Er)	=		1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Unused OA fraction required in supply air to zone	Zd		=	Voz / Vdz	=		0.35	0.23	0.10	0.10	0.10	0.10	0.11	
Unused OA fraction required in primary air to zone	Zp		=	Voz / Vpz	=		0.35	0.23	0.10	0.10	0.10	0.10	0.11	
System Ventilation Efficiency														
Zone Ventilation Efficiency (App A Method)	Evz		=	(Fa + FbXs - FcZ) / Fa	=		0.84	0.96	1.08	1.08	1.08	1.08	1.08	
System Ventilation Efficiency (App A Method)	Ev		=	min (Evz)	=	**0.82**								
Ventilation System Efficiency (Table 6.3 Method)	Ev		=	Value from Table 6.3	=	0.78								
Minimum outdoor air intake airflow														
Outdoor Air Intake Flow required to System	Vot	cfm	=	Vou / Ev	=	**4022**								
OA intake req'd as a fraction of primary SA	Y		=	Vot / Vps	=	**0.23**								
Outdoor Air Intake Flow required to System (Table 6.3 Method)	Vot	cfm	=	Vou / Ev	=	4209								
OA intake req'd as a fraction of primary SA (Table 6.3 Method)	Y		=	Vot / Vps	=	0.24								
OA Temp at which Min OA provides all cooling														
OAT below which OA Intake flow is @ minimum		Deg F	=	{(Tp-dTsf)-(1-Y)*(Tr+dTrf	=	-3								

Building:	DMA
System Tag/Name:	ZONE H
Operating Condition Description:	
Units (select from pull-down list)	IP

Inputs for System	Name	Units		System
Floor area served by system	As	sf		19788
Population of area served by system (including diversity)	Ps	P	100% diversity	191
Design primary supply fan airflow rate	Vpsd	cfm		17,675
OA req'd per unit area for system (Weighted average)	Ras	cfm/sf		0.10
OA req'd per person for system area (Weighted average)	Rps	cfm/p		7.3

Inputs for Potentially Critical zones									
Zone Name	*Zone title turns purple italic for critical zone(s)*			E246-BREAK ROOM	E279S	E280S	E281S	E282S	E283S	E284S
Zone Tag				36	37	38	39	40	41	42
Space type		Select from pull-down list		Conference/meeting	Office space	Office space	Corridors	Office space	Office space	Office space
Floor Area of zone	Az	sf		289	137	137	88	139	139	138
Design population of zone	Pz	P	(default value listed; may be overridden)	14.45	0.685	0.685	0	0.695	0.695	0.69
Design total supply to zone (primary plus local recirculated)	Vdzd	cfm		1,381	140	150	22	128	111	111
Induction Terminal Unit, Dual Fan Dual Duct or Transfer Fan?		Select from pull-down list or leave blank if N/A								
Local recirc. air % representative of ave system return air	Er			75%	75%	75%	75%	75%	75%	75%
Inputs for Operating Condition Analyzed										
Percent of total design airflow rate at conditioned analyzed	Ds	%	100%	100%	100%	100%	100%	100%	100%	100%
Air distribution type at conditioned analyzed		Select from pull-down list		CS	CS	CS	CS	CS	CS	CS
Zone air distribution effectiveness at conditioned analyzed	Ez			1.00	1.00	1.00	1.00	1.00	1.00	1.00
Primary air fraction of supply air at conditioned analyzed	Ep									

Results			
Ventilation System Efficiency	Ev		**0.82**
Outdoor air intake required for system	Vot	cfm	**4022**
Outdoor air per unit floor area	Vot/As	cfm/sf	**0.20**
Outdoor air per person served by system (including diversity)	Vot/Ps	cfm/p	**21.1**
Outdoor air as a % of design primary supply air	Ypd	cfm	**23%**

Detailed Calculations														
Initial Calculations for the System as a whole														
Primary supply air flow to system at conditioned analyzed	Vps	cfm	=	VpdDs	=	17675								
UncorrectedOA requirement for system	Vou	cfm	=	Rps Ps + Ras As	=	3294								
Uncorrected OA req'd as a fraction of primary SA	Xs		=	Vou / Vps	=	0.19								
Initial Calculations for individual zones														
OA rate per unit area for zone	Raz	cfm/sf					0.06	0.06	0.06	0.06	0.06	0.06	0.06	
OA rate per person	Rpz	cfm/p					5.00	5.00	5.00	0.00	5.00	5.00	5.00	
Total supply air to zone (at condition being analyzed)	Vdz	cfm					1381	140	150	22	128	111	111	
Unused OA req'd to breathing zone	Vbz	cfm	=	Rpz Pz + Raz Az	=		89.6	11.6	11.6	5.3	11.8	11.8	11.7	
Unused OA requirement for zone	Voz	cfm	=	Vbz/Ez	=		90	12	12	5	12	12	12	
Fraction of zone supply not directly recirc. from zone	Fa		=	Ep + (1-Ep)Er	=		1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Fraction of zone supply from fully mixed primary air	Fb		=	Ep	=		1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Fraction of zone OA not directly recirc. from zone	Fc		=	1-(1-Ez)(1-Ep)(1-Er)	=		1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Unused OA fraction required in supply air to zone	Zd		=	Voz / Vdz	=		0.06	0.08	0.08	0.24	0.09	0.11	0.11	
Unused OA fraction required in primary air to zone	Zp		=	Voz / Vpz	=		0.06	0.08	0.08	0.24	0.09	0.11	0.11	
System Ventilation Efficiency														
Zone Ventilation Efficiency (App A Method)	Evz		=	(Fa + FbXs - FcZ) / Fa	=		1.12	1.10	1.11	0.95	1.09	1.08	1.08	
System Ventilation Efficiency (App A Method)	Ev		=	min (Evz)	=	**0.82**								
Ventilation System Efficiency (Table 6.3 Method)	Ev		=	Value from Table 6.3	=	0.78								
Minimum outdoor air intake airflow														
Outdoor Air Intake Flow required to System	Vot	cfm	=	Vou / Ev	=	**4022**								
OA intake req'd as a fraction of primary SA	Y		=	Vot / Vps	=	**0.23**								
Outdoor Air Intake Flow required to System (Table 6.3 Method)	Vot	cfm	=	Vou / Ev	=	4209								
OA intake req'd as a fraction of primary SA (Table 6.3 Method)	Y		=	Vot / Vps	=	0.24								
OA Temp at which Min OA provides all cooling														
OAT below which OA Intake flow is @ minimum		Deg F	=	{(Tp-dTsf)-(1-Y)*(Tr+dTrf	=	-3								

Building:	DMA
System Tag/Name:	ZONE H
Operating Condition Description:	
Units (select from pull-down list)	IP

Inputs for System	Name	Units		System
Floor area served by system	As	sf		19788
Population of area served by system (including diversity)	Ps	P	100% diversity	191
Design primary supply fan airflow rate	Vpsd	cfm		17,675
OA req'd per unit area for system (Weighted average)	Ras	cfm/sf		0.10
OA req'd per person for system area (Weighted average)	Rps	cfm/p		7.3

Inputs for Potentially Critical zones					
Zone Name	*Zone title turns purple italic for critical zone(s)*			E285S	E286S	E287
Zone Tag				43	44	45
Space type		Select from pull-down list		Office space	Corridors	Office space
Floor Area of zone	Az	sf		138	88	318
Design population of zone	Pz	P	(default value listed; may be overridden)	0.69	0	1.59
Design total supply to zone (primary plus local recirculated)	Vdzd	cfm		127	22	134
Induction Terminal Unit, Dual Fan Dual Duct or Transfer Fan?		Select from pull-down list or leave blank if N/A				
Local recirc. air % representative of ave system return air	Er			75%	75%	75%
Inputs for Operating Condition Analyzed						
Percent of total design airflow rate at conditioned analyzed	Ds	%	100%	100%	100%	100%
Air distribution type at conditioned analyzed		Select from pull-down list		CS	CS	CS
Zone air distribution effectiveness at conditioned analyzed	Ez			1.00	1.00	1.00
Primary air fraction of supply air at conditioned analyzed	Ep					

Results			
Ventilation System Efficiency	Ev		**0.82**
Outdoor air intake required for system	Vot	cfm	**4022**
Outdoor air per unit floor area	Vot/As	cfm/sf	**0.20**
Outdoor air per person served by system (including diversity)	Vot/Ps	cfm/p	**21.1**
Outdoor air as a % of design primary supply air	Ypd	cfm	**23%**

Detailed Calculations									
Initial Calculations for the System as a whole									
Primary supply air flow to system at conditioned analyzed	Vps	cfm	=	VpdDs	=	17675			
UncorrectedOA requirement for system	Vou	cfm	=	Rps Ps + Ras As	=	3294			
Uncorrected OA req'd as a fraction of primary SA	Xs		=	Vou / Vps	=	0.19			
Initial Calculations for individual zones									
OA rate per unit area for zone	Raz	cfm/sf					0.06	0.06	0.06
OA rate per person	Rpz	cfm/p					5.00	0.00	5.00
Total supply air to zone (at condition being analyzed)	Vdz	cfm					127	22	134
Unused OA req'd to breathing zone	Vbz	cfm	=	Rpz Pz + Raz Az	=		11.7	5.3	27.0
Unused OA requirement for zone	Voz	cfm	=	Vbz/Ez	=		12	5	27
Fraction of zone supply not directly recirc. from zone	Fa		=	Ep + (1-Ep)Er	=		1.00	1.00	1.00
Fraction of zone supply from fully mixed primary air	Fb		=	Ep	=		1.00	1.00	1.00
Fraction of zone OA not directly recirc. from zone	Fc		=	1-(1-Ez)(1-Ep)(1-Er)	=		1.00	1.00	1.00
Unused OA fraction required in supply air to zone	Zd		=	Voz / Vdz	=		0.09	0.24	0.20
Unused OA fraction required in primary air to zone	Zp		=	Voz / Vpz	=		0.09	0.24	0.20
System Ventilation Efficiency									
Zone Ventilation Efficiency (App A Method)	Evz		=	(Fa + FbXs - FcZ) / Fa	=		1.09	0.95	0.98
System Ventilation Efficiency (App A Method)	Ev		=	min (Evz)	=	**0.82**			
Ventilation System Efficiency (Table 6.3 Method)	Ev		=	Value from Table 6.3	=	0.78			
Minimum outdoor air intake airflow									
Outdoor Air Intake Flow required to System	Vot	cfm	=	Vou / Ev	=	**4022**			
OA intake req'd as a fraction of primary SA	Y		=	Vot / Vps	=	**0.23**			
Outdoor Air Intake Flow required to System (Table 6.3 Method)	Vot	cfm	=	Vou / Ev	=	4209			
OA intake req'd as a fraction of primary SA (Table 6.3 Method)	Y		=	Vot / Vps	=	0.24			
OA Temp at which Min OA provides all cooling									
OAT below which OA Intake flow is @ minimum		Deg F	=	{(Tp-dTsf)-(1-Y)*(Tr+dTrf	=	-3			

Building:	DMA
System Tag/Name:	ZONE J
Operating Condition Description:	
Units (select from pull-down list)	IP

Inputs for System	Name	Units		System
Floor area served by system	As	sf		12208
Population of area served by system (including diversity)	Ps	P	100% diversity	79
Design primary supply fan airflow rate	Vpsd	cfm		12,095
OA req'd per unit area for system (Weighted average)	Ras	cfm/sf		0.09
OA req'd per person for system area (Weighted average)	Rps	cfm/p		7.1

Inputs for Potentially Critical zones													
Zone Name	*Zone title turns purple italic for critical zone(s)*			W105	W115	W123	W122	W121	W119	*W114*
Zone Tag				1	2	3	4	5	6	New zone ID
Space type				Computer lab	Storage rooms	Stages, studios	Stages, studios	Stages, studios	Stages, studios	Computer lab
		Select from pull-down list								
Floor Area of zone	Az	sf		252	238	99	99	1158	204	231
Design population of zone	Pz	P	(default value listed; may be overridden)	5	0	2	2	8	7	6
Design total supply to zone (primary plus local recirculated)	Vdzd	cfm		586	125	396	396	695	260	270
Induction Terminal Unit, Dual Fan Dual Duct or Transfer Fan?		Select from pull-down list or leave blank if N/A			TF					
Local recirc. air % representative of ave system return air	Er			75%	75%	75%	75%	75%	75%	75%
Inputs for Operating Condition Analyzed										
Percent of total design airflow rate at conditioned analyzed	Ds	%	100%	100%	100%	100%	100%	100%	100%	100%
Air distribution type at conditioned analyzed		Select from pull-down list		CS	CS	CS	CS	CS	CS	CS
Zone air distribution effectiveness at conditioned analyzed	Ez			1.00	1.00	1.00	1.00	1.00	1.00	1.00
Primary air fraction of supply air at conditioned analyzed	Ep				100%					

Results			
Ventilation System Efficiency	Ev		**0.81**
Outdoor air intake required for system	Vot	cfm	**2070**
Outdoor air per unit floor area	Vot/As	cfm/sf	**0.17**
Outdoor air per person served by system (including diversity)	Vot/Ps	cfm/p	**26.2**
Outdoor air as a % of design primary supply air	Ypd	cfm	**17%**

Detailed Calculations														
Initial Calculations for the System as a whole														
Primary supply air flow to system at conditioned analyzed	Vps	cfm	=	VpdDs	=	12095								
UncorrectedOA requirement for system	Vou	cfm	=	Rps Ps + Ras As	=	1686								
Uncorrected OA req'd as a fraction of primary SA	Xs		=	Vou / Vps	=	0.14								
Initial Calculations for individual zones														
OA rate per unit area for zone	Raz	cfm/sf					0.12	0.12	0.06	0.06	0.06	0.06	0.12
OA rate per person	Rpz	cfm/p					10.00	0.00	10.00	10.00	10.00	10.00	10.00
Total supply air to zone (at condition being analyzed)	Vdz	cfm					586	125	396	396	695	260	270
Unused OA req'd to breathing zone	Vbz	cfm	=	Rpz Pz + Raz Az	=		80.2	28.6	25.9	25.9	149.5	82.2	87.7
Unused OA requirement for zone	Voz	cfm	=	Vbz/Ez	=		80	29	26	26	149	82	88
Fraction of zone supply not directly recirc. from zone	Fa		=	Ep + (1-Ep)Er	=		1.00	1.00	1.00	1.00	1.00	1.00	1.00
Fraction of zone supply from fully mixed primary air	Fb		=	Ep	=		1.00	1.00	1.00	1.00	1.00	1.00	1.00
Fraction of zone OA not directly recirc. from zone	Fc		=	1-(1-Ez)(1-Ep)(1-Er)	=		1.00	1.00	1.00	1.00	1.00	1.00	1.00
Unused OA fraction required in supply air to zone	Zd		=	Voz / Vdz	=		0.14	0.23	0.07	0.07	0.22	0.32	0.32
Unused OA fraction required in primary air to zone	Zp		=	Voz / Vpz	=		0.14	0.23	0.07	0.07	0.22	0.32	0.32
System Ventilation Efficiency														
Zone Ventilation Efficiency (App A Method)	Evz		=	(Fa + FbXs - FcZ) / Fa	=		1.00	0.91	1.07	1.07	0.92	0.82	0.81
System Ventilation Efficiency (App A Method)	Ev		=	min (Evz)	=	**0.81**							
Ventilation System Efficiency (Table 6.3 Method)	Ev		=	Value from Table 6.3	=	0.83							
Minimum outdoor air intake airflow														
Outdoor Air Intake Flow required to System	Vot	cfm	=	Vou / Ev	=	**2070**							
OA intake req'd as a fraction of primary SA	Y		=	Vot / Vps	=	**0.17**							
Outdoor Air Intake Flow required to System (Table 6.3 Method)	Vot	cfm	=	Vou / Ev	=	2044	**26.52**						
OA intake req'd as a fraction of primary SA (Table 6.3 Method)	Y		=	Vot / Vps	=	0.17	**0.01**						
OA Temp at which Min OA provides all cooling														
OAT below which OA Intake flow is @ minimum		Deg F	=	{(Tp-dTsf)-(1-Y)*(Tr+dTrl	=	-27							

Building:	DMA
System Tag/Name:	ZONE J
Operating Condition Description:	
Units (select from pull-down list)	IP

Inputs for System	Name	Units		System
Floor area served by system	As	sf		12208
Population of area served by system (including diversity)	Ps	P	100% diversity	79
Design primary supply fan airflow rate	Vpsd	cfm		12,095
OA req'd per unit area for system (Weighted average)	Ras	cfm/sf		0.09
OA req'd per person for system area (Weighted average)	Rps	cfm/p		7.1

Inputs for Potentially Critical zones			W107	W116	W118	W126	W127	W128	W129
									Potentially C
Zone Name	*Zone title turns purple italic for critical zone(s)*		**New zone ID**	**New zone ID**	**New zone ID**	**New zone ID**	**New zone ID**	**New zone ID**	**New zone ID**
Zone Tag									
Space type		Select from pull-down list	**Computer (not printing)**	**Storage rooms**	**Booking/waiting**	**Stages, studios**	**Stages, studios**	**Stages, studios**	**Stages, studios**
Floor Area of zone	Az	sf	358	205	187	389	81	90	81
Design population of zone	Pz	P (default value listed; may be overridden)	4	0	3	4	1	1	1
Design total supply to zone (primary plus local recirculated)	Vdzd	cfm	629	150	133	567	50	53	50
Induction Terminal Unit, Dual Fan Dual Duct or Transfer Fan?		Select from pull-down list or leave blank if N/A		TF					
Local recirc. air % representative of ave system return air	Er		75%	75%	75%	75%	75%	75%	75%
Inputs for Operating Condition Analyzed									
Percent of total design airflow rate at conditioned analyzed	Ds	%	100%	100%	100%	100%	100%	100%	100%
Air distribution type at conditioned analyzed		Select from pull-down list		CS	CS	CS	CS	CS	CS
Zone air distribution effectiveness at conditioned analyzed	Ez			1.00	1.00	1.00	1.00	1.00	1.00
Primary air fraction of supply air at conditioned analyzed	Ep				100%				

Results			
Ventilation System Efficiency	Ev		**0.81**
Outdoor air intake required for system	Vot	cfm	**2070**
Outdoor air per unit floor area	Vot/As	cfm/sf	**0.17**
Outdoor air per person served by system (including diversity)	Vot/Ps	cfm/p	**26.2**
Outdoor air as a % of design primary supply air	Ypd	cfm	**17%**

Detailed Calculations														
Initial Calculations for the System as a whole														
Primary supply air flow to system at conditioned analyzed	Vps	cfm	=	VpdDs	=	12095								
UncorrectedOA requirement for system	Vou	cfm	=	Rps Ps + Ras As	=	1686								
Uncorrected OA req'd as a fraction of primary SA	Xs		=	Vou / Vps	=	0.14								
Initial Calculations for individual zones														
OA rate per unit area for zone	Raz	cfm/sf					0.06	0.12	0.06	0.06	0.06	0.06	0.06	
OA rate per person	Rpz	cfm/p					5.00	0.00	7.50	10.00	10.00	10.00	10.00	
Total supply air to zone (at condition being analyzed)	Vdz	cfm					629	150	133	567	50	53	50	
Unused OA req'd to breathing zone	Vbz	cfm	=	Rpz Pz + Raz Az	=		41.5	24.6	33.7	63.3	14.9	15.4	14.9	
Unused OA requirement for zone	Voz	cfm	=	Vbz/Ez	=		41	25	34	63	15	15	15	
Fraction of zone supply not directly recirc. from zone	Fa		=	Ep + (1-Ep)Er	=		1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Fraction of zone supply from fully mixed primary air	Fb		=	Ep	=		1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Fraction of zone OA not directly recirc. from zone	Fc		=	1-(1-Ez)(1-Ep)(1-Er)	=		1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Unused OA fraction required in supply air to zone	Zd		=	Voz / Vdz	=		0.07	0.16	0.25	0.11	0.30	0.29	0.30	
Unused OA fraction required in primary air to zone	Zp		=	Voz / Vpz	=		0.07	0.16	0.25	0.11	0.30	0.29	0.30	
System Ventilation Efficiency														
Zone Ventilation Efficiency (App A Method)	Evz		=	(Fa + FbXs - FcZ) / Fa	=		1.07	0.98	0.89	1.03	0.84	0.85	0.84	
System Ventilation Efficiency (App A Method)	Ev		=	min (Evz)	=	**0.81**								
Ventilation System Efficiency (Table 6.3 Method)	Ev		=	Value from Table 6.3	=	0.83								
Minimum outdoor air intake airflow														
Outdoor Air Intake Flow required to System	Vot	cfm	=	Vou / Ev	=	**2070**								
OA intake req'd as a fraction of primary SA	Y		=	Vot / Vps	=	**0.17**								
Outdoor Air Intake Flow required to System (Table 6.3 Method)	Vot	cfm	=	Vou / Ev	=	2044								
OA intake req'd as a fraction of primary SA (Table 6.3 Method)	Y		=	Vot / Vps	=	0.17								
OA Temp at which Min OA provides all cooling														
OAT below which OA Intake flow is @ minimum		Deg F	=	{(Tp-dTsf)-(1-Y)*(Tr+dTrf	=	-27								

Building:	DMA
System Tag/Name:	ZONE J
Operating Condition Description:	
Units (select from pull-down list)	IP

Inputs for System	Name	Units		System
Floor area served by system	As	sf		12208
Population of area served by system (including diversity)	Ps	P	100% diversity	79
Design primary supply fan airflow rate	Vpsd	cfm		12,095
OA req'd per unit area for system (Weighted average)	Ras	cfm/sf		0.09
OA req'd per person for system area (Weighted average)	Rps	cfm/p		7.1

Inputs for Potentially Critical zones			**ritical Zones**						
Zone Name	*Zone title turns purple italic for critical zone(s)*		**W130**	**W131**	**W132**	**W133**	**W134**	**W134A**	**W136**
Zone Tag			**New zone ID**	**New zone ID**	**New zone ID**	**New zone ID**	**New zone ID**	**New zone ID**	**New zone ID**
Space type			**Stages, studios**	**Storage rooms**	**Storage rooms**	**Computer (not printing)**	**Wood/metal shop**	**Office space**	**Office space**
		Select from pull-down list							
Floor Area of zone	Az	sf	90	78	768	100	1660	79	1390
Design population of zone	Pz	P (default value listed; may be overridden)	1	0	0	0.4	5	0.395	10
Design total supply to zone (primary plus local recirculated)	Vdzd	cfm	53	34	339	50	1222	48	1053
Induction Terminal Unit, Dual Fan Dual Duct or Transfer Fan?		Select from pull-down list or leave blank if N/A							
Local recirc. air % representative of ave system return air	Er		75%	75%	75%	75%	75%	75%	75%
Inputs for Operating Condition Analyzed									
Percent of total design airflow rate at conditioned analyzed	Ds	%	100%	100%	100%	100%	100%	100%	100%	100%
Air distribution type at conditioned analyzed		Select from pull-down list		CS	CS	CS	CS	CS	CS	CS
Zone air distribution effectiveness at conditioned analyzed	Ez			1.00	1.00	1.00	1.00	1.00	1.00	1.00
Primary air fraction of supply air at conditioned analyzed	Ep									

Results			
Ventilation System Efficiency	Ev		**0.81**
Outdoor air intake required for system	Vot	cfm	**2070**
Outdoor air per unit floor area	Vot/As	cfm/sf	**0.17**
Outdoor air per person served by system (including diversity)	Vot/Ps	cfm/p	**26.2**
Outdoor air as a % of design primary supply air	Ypd	cfm	**17%**

Detailed Calculations														
Initial Calculations for the System as a whole														
Primary supply air flow to system at conditioned analyzed	Vps	cfm	=	VpdDs	=	12095								
UncorrectedOA requirement for system	Vou	cfm	=	Rps Ps + Ras As	=	1686								
Uncorrected OA req'd as a fraction of primary SA	Xs		=	Vou / Vps	=	0.14								
Initial Calculations for individual zones														
OA rate per unit area for zone	Raz	cfm/sf					0.06	0.12	0.12	0.06	0.18	0.06	0.06	
OA rate per person	Rpz	cfm/p					10.00	0.00	0.00	5.00	10.00	5.00	5.00	
Total supply air to zone (at condition being analyzed)	Vdz	cfm					53	34	339	50	1222	48	1053	
Unused OA req'd to breathing zone	Vbz	cfm	=	Rpz Pz + Raz Az	=		15.4	9.4	92.2	8.0	348.8	6.7	133.4	
Unused OA requirement for zone	Voz	cfm	=	Vbz/Ez	=		15	9	92	8	349	7	133	
Fraction of zone supply not directly recirc. from zone	Fa		=	Ep + (1-Ep)Er	=		1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Fraction of zone supply from fully mixed primary air	Fb		=	Ep	=		1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Fraction of zone OA not directly recirc. from zone	Fc		=	1-(1-Ez)(1-Ep)(1-Er)	=		1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Unused OA fraction required in supply air to zone	Zd		=	Voz / Vdz	=		0.29	0.28	0.27	0.16	0.29	0.14	0.13	
Unused OA fraction required in primary air to zone	Zp		=	Voz / Vpz	=		0.29	0.28	0.27	0.16	0.29	0.14	0.13	
System Ventilation Efficiency														
Zone Ventilation Efficiency (App A Method)	Evz		=	(Fa + FbXs - FcZ) / Fa	=		0.85	0.86	0.87	0.98	0.85	1.00	1.01	
System Ventilation Efficiency (App A Method)	Ev		=	min (Evz)	=	**0.81**								
Ventilation System Efficiency (Table 6.3 Method)	Ev		=	Value from Table 6.3	=	0.83								
Minimum outdoor air intake airflow														
Outdoor Air Intake Flow required to System	Vot	cfm	=	Vou / Ev	=	**2070**								
OA intake req'd as a fraction of primary SA	Y		=	Vot / Vps	=	**0.17**								
Outdoor Air Intake Flow required to System (Table 6.3 Method)	Vot	cfm	=	Vou / Ev	=	2044								
OA intake req'd as a fraction of primary SA (Table 6.3 Method)	Y		=	Vot / Vps	=	0.17								
OA Temp at which Min OA provides all cooling														
OAT below which OA Intake flow is @ minimum		Deg F	=	{(Tp-dTsf)-(1-Y)*(Tr+dTrf	=	-27								

Building:	DMA
System Tag/Name:	ZONE J
Operating Condition Description:	
Units (select from pull-down list)	IP

Inputs for System	Name	Units		System
Floor area served by system	As	sf		12208
Population of area served by system (including diversity)	Ps	P	100% diversity	79
Design primary supply fan airflow rate	Vpsd	cfm		12,095
OA req'd per unit area for system (Weighted average)	Ras	cfm/sf		0.09
OA req'd per person for system area (Weighted average)	Rps	cfm/p		7.1

Inputs for Potentially Critical zones														
Zone Name	*Zone title turns purple italic for critical zone(s)*													
Zone Tag							**W137**	**W138**	**W138A**	**W138B**	**W138G**	**W139**	**W140**
							New zone ID	**New zone ID**	**New zone ID**	**New zone ID**	**New zone ID**	**New zone ID**	**New zone ID**
Space type							**Storage rooms**	**Electrical equipment rooms**	**Office space**	**Office space**	**Telephone closets**	**Storage rooms**	**Conference/meeting**
		Select from pull-down list											
Floor Area of zone	Az	sf					1125	1585	72	72	190	484	843
Design population of zone	Pz	P	(default value listed; may be overridden)				0	11	1	0.36	0	0	6
Design total supply to zone (primary plus local recirculated)	Vdzd	cfm					496	2921	43	43	42	180	1211
Induction Terminal Unit, Dual Fan Dual Duct or Transfer Fan?		Select from pull-down list or leave blank if N/A										TF	
Local recirc. air % representative of ave system return air	Er						75%	75%	75%	75%	75%	75%	75%
Inputs for Operating Condition Analyzed													
Percent of total design airflow rate at conditioned analyzed	Ds	%				100%	100%	100%	100%	100%	100%	100%	100%
Air distribution type at conditioned analyzed		Select from pull-down list					CS	CS	CS	CS	CS	CS	CS
Zone air distribution effectiveness at conditioned analyzed	Ez						1.00	1.00	1.00	1.00	1.00	1.00	1.00
Primary air fraction of supply air at conditioned analyzed	Ep											100%	

Results			
Ventilation System Efficiency	Ev		**0.81**
Outdoor air intake required for system	Vot	cfm	**2070**
Outdoor air per unit floor area	Vot/As	cfm/sf	**0.17**
Outdoor air per person served by system (including diversity)	Vot/Ps	cfm/p	**26.2**
Outdoor air as a % of design primary supply air	Ypd	cfm	**17%**

Detailed Calculations														
Initial Calculations for the System as a whole														
Primary supply air flow to system at conditioned analyzed	Vps	cfm	=	VpdDs	=	12095								
UncorrectedOA requirement for system	Vou	cfm	=	Rps Ps + Ras As	=	1686								
Uncorrected OA req'd as a fraction of primary SA	Xs		=	Vou / Vps	=	0.14								
Initial Calculations for individual zones														
OA rate per unit area for zone	Raz	cfm/sf					0.12	0.06	0.06	0.06	0.00	0.12	0.06	
OA rate per person	Rpz	cfm/p					0.00	0.00	5.00	5.00	0.00	0.00	5.00	
Total supply air to zone (at condition being analyzed)	Vdz	cfm					496	2921	43	43	42	180	1211	
Unused OA req'd to breathing zone	Vbz	cfm	=	Rpz Pz + Raz Az	=		135.0	95.1	9.3	6.1	0.0	58.1	80.6	
Unused OA requirement for zone	Voz	cfm	=	Vbz/Ez	=		135	95	9	6	0	58	81	
Fraction of zone supply not directly recirc. from zone	Fa		=	Ep + (1-Ep)Er	=		1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Fraction of zone supply from fully mixed primary air	Fb		=	Ep	=		1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Fraction of zone OA not directly recirc. from zone	Fc		=	1-(1-Ez)(1-Ep)(1-Er)	=		1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Unused OA fraction required in supply air to zone	Zd		=	Voz / Vdz	=		0.27	0.03	0.22	0.14	0.00	0.32	0.07	
Unused OA fraction required in primary air to zone	Zp		=	Voz / Vpz	=		0.27	0.03	0.22	0.14	0.00	0.32	0.07	
System Ventilation Efficiency														
Zone Ventilation Efficiency (App A Method)	Evz		=	(Fa + FbXs - FcZ) / Fa	=		0.87	1.11	0.92	1.00	1.14	0.82	1.07	
System Ventilation Efficiency (App A Method)	Ev		=	min (Evz)	=	**0.81**								
Ventilation System Efficiency (Table 6.3 Method)	Ev		=	Value from Table 6.3	=	0.83								
Minimum outdoor air intake airflow														
Outdoor Air Intake Flow required to System	Vot	cfm	=	Vou / Ev	=	**2070**								
OA intake req'd as a fraction of primary SA	Y		=	Vot / Vps	=	**0.17**								
Outdoor Air Intake Flow required to System (Table 6.3 Method)	Vot	cfm	=	Vou / Ev	=	2044								
OA intake req'd as a fraction of primary SA (Table 6.3 Method)	Y		=	Vot / Vps	=	0.17								
OA Temp at which Min OA provides all cooling														
OAT below which OA Intake flow is @ minimum		Deg F	=	{(Tp-dTsf)-(1-Y)*(Tr+dTrf	=	-27								

Building:	DMA													
System Tag/Name:	ZONE K													
Operating Condition Description:														
Units (select from pull-down list)	IP													
Inputs for System	**Name**	**Units**					**System**							
Floor area served by system	As	sf					8290							
Population of area served by system (including diversity)	Ps	P	100%	diversity			64							
Design primary supply fan airflow rate	Vpsd	cfm					26,134							
OA req'd per unit area for system (Weighted average)	Ras	cfm/sf					0.06							
OA req'd per person for system area (Weighted average)	Rps	cfm/p					10.0							
Inputs for Potentially Critical zones								**Potentially Critical Zones**						
Zone Name	*Zone title turns purple italic for critical zone(s)*							**W101**	**W102**	**W103**	**W104**	***W106***	**W104A**	
Zone Tag								**1**	**2**	**3**	**4**	**5**	**6**	
Space type		Select from pull-down list						**Stages, studios**	**Stages, studios**	**Stages, studios**	**Stages, studios**	**Stages, studios**	**Stages, studios**	
Floor Area of zone	Az	sf						4,800	1176	1176	746	252	140	
Design population of zone	Pz	P	(default value listed; may be overridden)					26	12	12	8	4	2	
Design total supply to zone (primary plus local recirculated)	Vdzd	cfm						13,362	4458	4664	2663	584	403	
Induction Terminal Unit, Dual Fan Dual Duct or Transfer Fan?		Select from pull-down list or leave blank if N/A												
Local recirc. air % representative of ave system return air	Er													
Inputs for Operating Condition Analyzed														
Percent of total design airflow rate at conditioned analyzed	Ds	%					100%	100%	100%	100%	100%	100%	100%	
Air distribution type at conditioned analyzed		Select from pull-down list						CS	CS	CS	CS	CS	CS	
Zone air distribution effectiveness at conditioned analyzed	Ez							1.00	1.00	1.00	1.00	1.00	1.00	
Primary air fraction of supply air at conditioned analyzed	Ep													
Results														
Ventilation System Efficiency	Ev						**0.95**							
Outdoor air intake required for system	Vot	cfm					**1198**							
Outdoor air per unit floor area	Vot/As	cfm/sf					**0.14**							
Outdoor air per person served by system (including diversity)	Vot/Ps	cfm/p					**18.7**							
Outdoor air as a % of design primary supply air	Ypd	cfm					**5%**							
Detailed Calculations														
Initial Calculations for the System as a whole														
Primary supply air flow to system at conditioned analyzed	Vps	cfm	=	VpdDs	=	26134								
UncorrectedOA requirement for system	Vou	cfm	=	Rps Ps + Ras As	=	1137								
Uncorrected OA req'd as a fraction of primary SA	Xs		=	Vou / Vps	=	0.04								
Initial Calculations for individual zones														
OA rate per unit area for zone	Raz	cfm/sf						0.06	0.06	0.06	0.06	0.06	0.06	
OA rate per person	Rpz	cfm/p						10.00	10.00	10.00	10.00	10.00	10.00	
Total supply air to zone (at condition being analyzed)	Vdz	cfm						13362	4458	4664	2663	584	403	
Unused OA req'd to breathing zone	Vbz	cfm	=	Rpz Pz + Raz Az	=			548.0	190.6	190.6	124.8	55.1	28.4	
Unused OA requirement for zone	Voz	cfm	=	Vbz/Ez	=			548	191	191	125	55	28	
Fraction of zone supply not directly recirc. from zone	Fa		=	Ep + (1-Ep)Er	=			1.00	1.00	1.00	1.00	1.00	1.00	
Fraction of zone supply from fully mixed primary air	Fb		=	Ep	=			1.00	1.00	1.00	1.00	1.00	1.00	
Fraction of zone OA not directly recirc. from zone	Fc		=	1-(1-Ez)(1-Ep)(1-Er)	=			1.00	1.00	1.00	1.00	1.00	1.00	
Unused OA fraction required in supply air to zone	Zd		=	Voz / Vdz	=			0.04	0.04	0.04	0.05	0.09	0.07	
Unused OA fraction required in primary air to zone	Zp		=	Voz / Vpz	=			0.04	0.04	0.04	0.05	0.09	0.07	
System Ventilation Efficiency														
Zone Ventilation Efficiency (App A Method)	Evz		=	(Fa + FbXs - FcZ) / Fa	=			1.00	1.00	1.00	1.00	0.95	0.97	
System Ventilation Efficiency (App A Method)	Ev		=	min (Evz)	=	**0.95**								
Ventilation System Efficiency (Table 6.3 Method)	Ev		=	Value from Table 6.3	=	1.06								
Minimum outdoor air intake airflow														
Outdoor Air Intake Flow required to System	Vot	cfm	=	Vou / Ev	=	**1198**								
OA intake req'd as a fraction of primary SA	Y		=	Vot / Vps	=	**0.05**								
Outdoor Air Intake Flow required to System (Table 6.3 Method)	Vot	cfm	=	Vou / Ev	=	1077		**120.88**						
OA intake req'd as a fraction of primary SA (Table 6.3 Method)	Y		=	Vot / Vps	=	0.04		**0.10**						
OA Temp at which Min OA provides all cooling														
OAT below which OA Intake flow is @ minimum		Deg F	=	{(Tp-dTsf)-(1-Y)*(Tr+dTrf	=	-299								