# Technical Report One

# ASHRAE STANDARDS 62.1 AND 90.1 COMPLIANCE EVALUATION

10.5.2009

# Defense Media Activity Building

Fort George G. Meade



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### **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 nonoperable 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.

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#### **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.

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#### 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**

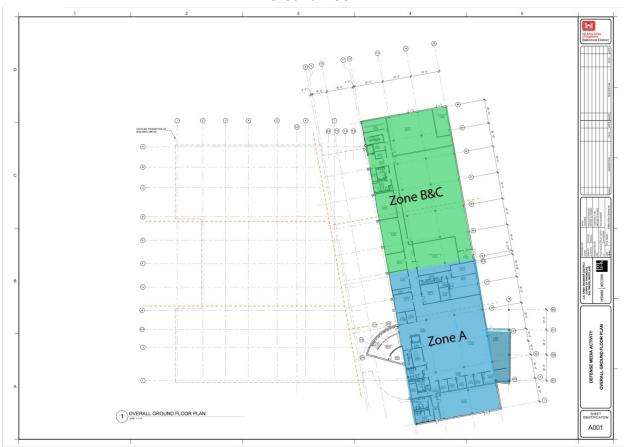


Figure 90.1-6.1

#### **First Floor**

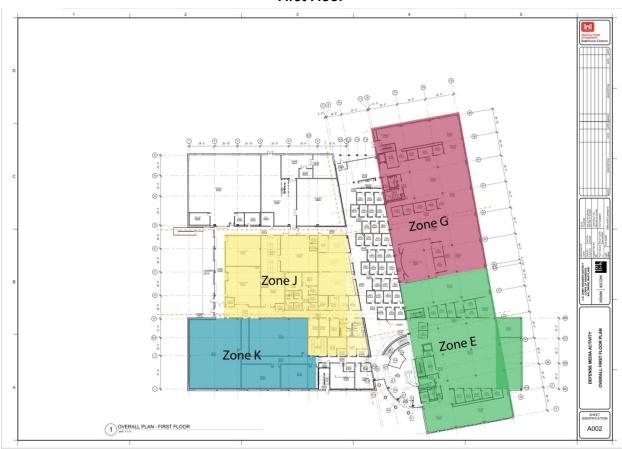


Figure 90.1-6.2

#### **Second Floor**

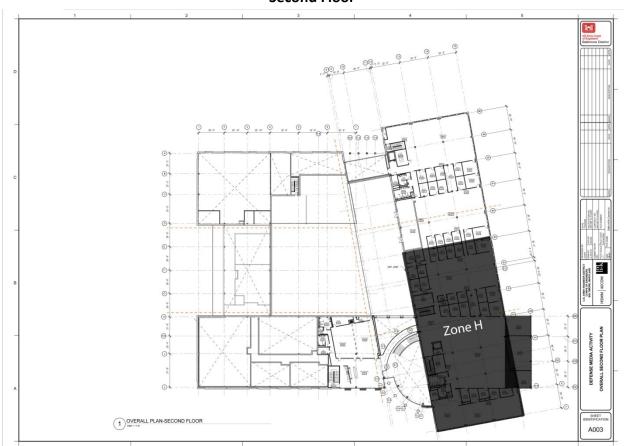


Figure 90.1-6.3

#### **Ventilation Rate Procedure Used**

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

where,

V<sub>bz</sub>=Breathing zone outdoor airflow

R<sub>p</sub>=Outdoor airflow rate per person (CFM/person)

P<sub>z</sub>=Zone population

R<sub>a</sub>=Outdoor airflow rate per unit area (CFM/SF)

A<sub>z</sub>=Zone floor area (SF)

$$V_{oz}=V_{bz}/E_{z} \tag{Eq 6.1}$$

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where,

Voz=Zone outdoor airflow

E<sub>z</sub>=Zone air distribution effectiveness

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

where,

V<sub>pz</sub>= 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									
Α	12455	2380	2924	No									
В	12070	1580	1338	Yes									
E	15810	1800	3159	No									
G	16710	2120	3761	No									
Н	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

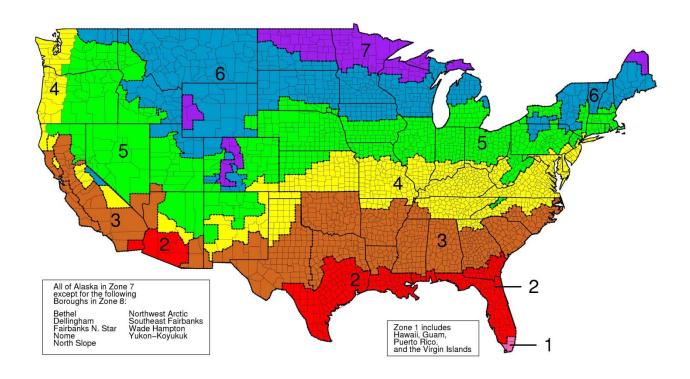


Figure 90.1-1

#### **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	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								

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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	Thick	ness			
			Tuk	e and Pip	e 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	Mineral Fiber	1.5	1.5	2	2	2
S&R	Calcium Silicate	2.5	2.5	3	3	3
	Cellular Glass	2	2.5	3	3	3
	Mineral Fiber	1.5	1.5	1.5	1.5	1.5
Cold Domestic	Cellular Glass	1	1	1	N/A	N/A
Water & Makeup	Flex Elas Cell'r	1	1	1	1	1
water & makeap	Polyisocianurate	1	1	1	1	1
	Mineral Fiber	1	1	1	1.5	1.5
Hot Domestic	Cellular Glass	1.5	1.5	1.5	2	2
Water S&R	Flex Elas Cell'r	1	1	1	N/A	N/A
Water San	Polyisocianurate	1	1	1	1	1.5
Refrigerant	Flex Elas Cell'r	1	1	1	1	1
Suction Piping	Cellular Glass	1.5	1.5	1.5	1.5	1.5
A/C Condensate	Cellular Glass	1	1	1	N/A	N/A
A/C Condensate	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)	ВНР	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	<u> </u>	
		ASHRAE	Equipment	
Unit	Capacity	Requirement	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
<b>Cooling Tower A</b>	3 gpm/ton, 25HP	38.2 gpm/HP	60 gpm/ton	Yes
<b>Cooling Tower B</b>	3 gpm/ton, 25HP	38.2 gpm/HP	61 gpm/ton	Yes
<b>Cooling Tower C</b>	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, <u>Standard 62.1-2007</u>, <u>Ventilation for Acceptable Indoor Air Quality</u>. American Society of Heating Refrigeration and Air-Conditioning Engineers, Inc., Atlanta, GA.

ASHRAE. 2007, ANSI/ASHRAE, Standard 90.1-2007, <u>Energy Standard for Building Except Low-Rise</u>
<u>Residential Buildings.</u> 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	^										
Operating Condition Description:	ZONE	٩										
Units (select from pull-down list)	IP											
Inputs for System	Name	Units		Sv	stem							
Floor area served by system	As	sf			5198.5							
Population of area served by system (including diversity)	Ps	Р	100% diversity		110							
Design primary supply fan airflow rate	Vpsd	cfm	<u> </u>	1	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					-	EG01	EG02	EG03	EG04-TR	EG05	EG06	EG07
Zone Name						LGUI	LGUZ	LGUS	LG04-TK	LGUJ	LG00	LGUI
7000 Top	Zone ti	tle turns p	urple italic for critical zone(s)		ļ		2	3	4	5	6	7
Zone Tag					-	Corridors	Office space	Storage	Telephone	Storage	Storage	Corridors
Space type			om pull-down list				•	rooms	closets	rooms	rooms	
Floor Area of zone	Az	sf	Adata di walee Batadona -	and all all	,	860	487	54	246	246	167	193
Design population of zone	Pz Vdad		(default value listed; may be over	erridden	1)	0 156	2.435	0	0 106	0	0	0
Design total supply to zone (primary plus local recirculated) Induction Terminal Unit, Dual Fan Dual Duct or Transfer Fan?	Vdzd	cfm Select fr	om pull-down list or leave blank	if NI/Δ	}	156 TF	176	647	106	90 TF	TF	219
Local recirc. air % representative of ave system return air	Er	Ociect II	om pun-down hat of leave blank	11 11/7	-	75%	75%	75%	75%	75%	75%	75%
Inputs for Operating Condition Analyzed					l l	1370	7 3 70.	1370	7 3 70	1370	7370	1070
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 fr	om 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	-t			0.83 2924							
Outdoor air intake required for system Outdoor air per unit floor area	Vot Vot/As	cfm cfm/sf			0.18							
Outdoor air per unit noor area  Outdoor air per person served by system (including diversity)	Vot/Ps				26.6							
Outdoor air per person served by system (melading diversity)  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	D	-61-6				0.00	0.00	0.40	0.00	0.40	0.40	0.00
OA rate per unit area for zone OA rate per person	Raz Rpz	cfm/sf cfm/p				0.06 0.00		0.12 0.00	0.00	0.12 0.00	0.12 0.00	0.06 0.00
Total supply air to zone (at condition being analyzed)	Vdz	cfm				156		647	106	90	60	219
Unused OA reg'd to breathing zone	Vuz	cfm	= Rpz Pz + Raz Az	_		51.6		6.5	0.0	29.5	20.0	11.6
Unused OA requirement for zone	Voz	cfm	= Vbz/Ez	=		52		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
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		0.01	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	=	0.00	0.85	0.94	1.17	1.18	0.85	0.84	1.12
System Ventilation Efficiency (App A Method) Ventilation System Efficiency (Table 6.3 Method)	Ev Ev		= min (Evz) = Value from Table 6.3	=	0.83 0.80							
			- value from Table 6.5	-	0.80							
	⊏V											
Minimum outdoor air intake airflow		cfm	= Vou / Ev	_	2924							
Minimum outdoor air intake airflow Outdoor Air Intake Flow required to System	Vot Y	cfm	= Vou / Ev = Vot / Vps	=	2924 0.21							
Minimum outdoor air intake airflow Outdoor Air Intake Flow required to System OA intake req'd as a fraction of primary SA	Vot Y	cfm	= Vou / Ev = Vot / Vps = Vou / Ev	= = =								
Minimum outdoor air intake airflow Outdoor Air Intake Flow required to System	Vot Y Vot		= Vot / Vps	= = =	0.21							
Minimum outdoor air intake airflow Outdoor Air Intake Flow required to System OA intake req'd as a fraction of primary SA Outdoor Air Intake Flow required to System (Table 6.3 Method)	Vot Y Vot		= Vot / Vps = Vou / Ev	=	<b>0.21</b> 3023							

Building:	DMA											
System Tag/Name:	ZONE	4										
Operating Condition Description:												
Units (select from pull-down list)	IP											
Inputs for System	Name	Units		S	System							
Floor area served by system	As	sf	<u></u> .		16198.5							
Population of area served by system (including diversity)	Ps	Р	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		<u> </u>	7.5							
Inputs for Potentially Critical zones					ĺ	EG09-ELEC	EG10	EG11-	EG12-	EG13-	FG14-OFFICE	EG15-OFFICE
Zone Name						LOUS LLLO	2010	LOCKER	LOCKER	MECHANICAL	2014 011102	2010 011102
	Zone tit	tle turns p	urple italic for critical zone(s)					ROOM	ROOM			
Zone Tag						8	9	10	11	12	13	14
Space type		Salact fr	om pull-down list			Storage rooms	Corridors	Storage rooms	Storage rooms	Storage rooms	Office space	Office space
Floor Area of zone	Az	sf	om pun-down nst			130	228	238	262	2,131	158	184
Design population of zone	Pz		(default value listed; may be over	erridde	en)	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 fr	om 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%	75%	75%	75%	75%
Inputs for Operating Condition Analyzed	D-	0/			40001	4000/	4000	4000	40000	4000/	40001	100%
Percent of total design airflow rate at conditioned analyzed	Ds	% Salact fr	om pull-down list		100%	100% CS	100% CS	100% CS	100% CS	100% CS	100%	100% CS
Air distribution type at conditioned analyzed  Zone air distribution effectiveness at conditioned analyzed	Ez	Selectif	om pull-down list			1.00	1.00	1.00	1.00	1.00	1.00	1.00
Primary air fraction of supply air at conditioned analyzed	Ep				Į.	1.00	1.00	100%	100%	100%	1.00	1.00
Results	p							.0070	10070	10070		
Ventilation System Efficiency	Ev				0.83							
Outdoor air intake required for system	Vot	cfm			2924							
Outdoor air per unit floor area	Vot/As				0.18							
Outdoor air per person served by system (including diversity)	Vot/Ps				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	D	-61-6				0.40	0.00	0.40	0.40	0.40	0.00	0.00
OA rate per unit area for zone	Raz Rpz	cfm/sf				0.12 0.00	0.06 0.00	0.12 0.00	0.12 0.00			
OA rate per person  Total supply air to zone (at condition being analyzed)	Vdz	cfm/p cfm				479	129	90	100			
Unused OA reg'd to breathing zone	Vuz	cfm	= Rpz Pz + Raz Az	=		15.6	13.7	28.6	31.4		13.4	
Unused OA requirement for zone	Voz	cfm	= Vbz/Ez	=		16	14	29	31	256	13	
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	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	=		0.03	0.11	0.32	0.31	0.34		
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	F		(F- : F- V- F-7) / F				4.07	0.00	6.00	6.54	4.00	
Zone Ventilation Efficiency (App A Method)	Evz Ev		= (Fa + FbXs - FcZ) / Fa	=	0.83	1.14	1.07	0.86	0.86	0.84	1.09	1.09
System Ventilation Efficiency (App A Method) Ventilation System Efficiency (Table 6.3 Method)	Ev		= min (Evz) = Value from Table 6.3	=	0.83							
Minimum outdoor air intake airflow	LV		- value from rable 0.3	_	0.00							
Outdoor Air Intake arriow  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)			= 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 ZONE A											
System Tag/Name: Operating Condition Description:	ZUNE	4										
Units (select from pull-down list)	IP											
Inputs for System	Name	<u>Units</u>		S	ystem	-						
Floor area served by system	As	sf	<b></b>	1	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) OA req'd per person for system area (Weighted average)	Ras Rps	cfm/sf cfm/p			0.10 7.5							
Inputs for Potentially Critical zones	Rps	сттур			7.5		Potentially C	ritical Zones				
Zone Name						EG16-OFFICE	EG17-OFFICE	EG18-OFFICE	EG19-BREAK AREA	EG21A	EG21B	EG21C
	Zone tit	le turns p	urple italic for critical zone(s)			15	16	17		19	20	21
Zone Tag						Office space	Office space		18 Conference/m		Media center	Media center
Space type			om pull-down list						eeting			
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 over	rridde	en)	0.92	0.785	0.77	21.15	12	5	14
Design total supply to zone (primary plus local recirculated) Induction Terminal Unit, Dual Fan Dual Duct or Transfer Fan?	Vdzd	cfm	om pull down list or loove blank	f NI/A		167	153	160	1985	1,188	668	1,224
Local recirc. air % representative of ave system return air	Er	Select II	om pull-down list or leave blank	II IN/A		750/	750/	750/.	750/.	750/.	750/	750/
Inputs for Operating Condition Analyzed						1070	1070	1070	1070	7 3 70	7570	1370
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 fr	om pull-down list			CS	CS	CS	FSCR LV	FSCR LV	FSCR LV	FSCR LV
Zone air distribution effectiveness at conditioned analyzed Primary air fraction of supply air at conditioned analyzed	Ez Ep					1.00	1.00	1.00	1.00	1.00	1.00	1.00
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)		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 Initial Calculations for individual zones	Xs		= Vou / Vps	=	0.18							
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 unit area for zone OA rate per person	Rpz	cfm/p				5.00		5.00		10.00		
Total supply air to zone (at condition being analyzed)	Vdz	cfm				167		160		1188		
Unused OA req'd to breathing zone	Vbz	cfm	= Rpz Pz + Raz Az	=		15.6		13.1	131.1	315.4		
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		
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		0.08		0.27		
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)	Ev2 Ev		= (Fa + FbAS - FcZ) / Fa = min (Evz)	_	0.83	1.08	1.09	1.10	1.11	0.91	0.98	0.85
Ventilation System Efficiency (Table 6.3 Method)	Ev		= Value from Table 6.3	_	0.80							
Minimum outdoor air intake airflow			Talas II allia did		0.00							
Outdoor Air Intake Flow required to System	Vot	cfm	= Vou / Ev	=	2924							
OA intake req'd as a fraction of primary SA	Υ		= Vot / Vps	=	0.21							
Outdoor Air Intake Flow required to System (Table 6.3 Method)		cfm	= Vou / Ev	=	3023							
OA intake req'd as a fraction of primary SA (Table 6.3 Method)	Υ		= 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							
OAT below which OA make flow is @ minimum		Deg F	- {(1p-u151)-(1-1) (11+d1ff	=	-8							

Design population of zone   Pz   Cafefult value listed; may be overridden   14   9   1.72   0   5   1	Building:	DMA											
Second	1 •		4										
Floor area served by system (including divorcity)	Units (select from pull-down list)	IP											
Population of area served by system (including diversity)   Vipid   Doding primary supply fram affine for experted by the development of the primary supply fram affine for experted by the primary supply and for experted by the	Inputs for System	Name	Units		S	ystem							
Design primary study final nations rate   A red for a utilized severage  Concept of the section of system area (vilupited average)   Pass of christ   A red for primary by the form of system area (vilupited average)   Pass of the section of system area (vilupited average)   Pass of the section of system area (vilupited average)   Pass of the section of system area (vilupited average)   Pass of the section of system area (vilupited average)   Pass of the section of t	Floor area served by system	As		<u></u> .	1	16198.5							
A red for run area for system (Weigheid average)   A red for pull-down last or original source of the pull-down list or leave blank it NA   Select from pull-down list or leave blank it NA   Sele				100% diversity									
An article for personal for systems area (Weighted average)   Rep   Cemb   T.S.													
Early   Control   Contro													
Zone Name  Zone Tag  Zone		Rps	ctm/p		<u> </u>	7.5							
Zone Name  Zone Itag  Space type  Floor Area of Zone  Design total supply to zone (primary plus local recirculated) Industrian Farmand Unit, Dual Fan Dual Dust or Transfer Fan?  Design total supply to zone (primary plus local recirculated) Industrian Farmand Unit, Dual Fan Dual Dust or Transfer Fan?  Per Cent for out a fan Dual Dust or Transfer Fan?  Per Cent for out a fan Dual Dust or Transfer Fan?  Per Cent for out a fan Dual Dust or Transfer Fan?  Per Cent for out a fan Dual Dust or Transfer Fan?  Per Cent for out a fan Dual Dust or Transfer Fan?  Per Cent for out a fan Dual Dust or Transfer Fan?  Per Cent for out a fan Dual Dust or Transfer Fan?  Per Cent for out a fan Dual Dust or Transfer Fan?  Per Cent for out a fan Dual Dust or Transfer Fan?  Per Cent for out a fan Dual Dust or Transfer Fan?  Per Cent for out a fan Dual Dust or Transfer Fan?  Per Cent for out a fan Dual Dust or Transfer Fan?  Per Cent for out a fan Dual Dust or Transfer Fan?  Per Cent for out a fan Dual Dust or Transfer Fan?  Per Cent for out a fan Dual Dust or Transfer Fan?  Per Cent for out a fan Dual Dust or Transfer Fan?  Per Cent for out a fan Dual Dust or Transfer Fan?  Per Cent for out a fan Dust or Transfer Fan?  Per Cent for out a fan Dust or Transfer Fan?  Per Cent for out a fan Dust or Transfer Fan?  Per Cent for out a fan Dust or Transfer Fan?  Per Cent for out a fan Dust or Transfer Fan?  Per Cent for out a fan Dust or Transfer Fan?  Per Cent for out a fan Dust of transfer fan Dust or Transfer Fan?  Per Cent for out a fan Dust or Transfer Fan?  Per Cent for out a fan Dust or Transfer Fan?  Per Cent for out a fan Dust or Transfer Fan?  Per Cent for out a fan Dust or Transfer Fan?  Per Cent for out a fan Dust or Transfer Fan?  Per Cent for out a fan Dust or Transfer Fan?  Per Cent for out a fan Dust or Transfer Fan?  Per Cent for out a fan Dust or Transfer Fan?  Per Cent for out a fan Dust or Transfer Fan?  Per Cent for out a fan Dust or Transfer Fan?  Per Cent for out a fan Dust or Transfer Fan?  Per Cent for out a fan Dust	inputs for Potentially Critical Zones						FG21D	FG21F	FG23-IT	FG24	FG25	FG26	FG27
Some Tags	Zone Name						20275	20212		2024	2020	2020	2027
Space type	Zone Tag	∠one tit	le turns p	urple italic for critical zone(s)			22	23	24	25	26	27	28
Floor Area of zone   Page population   Page po													
Design population of zone   Pz   Control supply to zone (primary plus local recirculated)   Design population of zone   Pz   Control supply to zone (primary plus local recirculated)   Induction Terminal Unit, Dual Fan Dual Duxt or Transfer Fan 7   Select from pull-down list or leave blank if N/A   Select from pull-down list or leave blank if N/A   Select from pull-down list or leave blank if N/A   Select from pull-down list or leave blank if N/A   Select from pull-down list or leave blank if N/A   Select from pull-down list or leave blank if N/A   Select from pull-down list or leave blank if N/A   Select from pull-down list   Select from pull-d	, ,,			om pull-down list					\		a entry	a entry	
Design total supply to zone (primary plus local rediculated)   Vizid   Induction forminal Unit, plus final part of public of trained Fair   Salect from pull-down list of leave blank if NIA   Salect from pull-down list of leave blank if NIA   1,002   1,003   1,				(default value lieted, may be seen	- املم نسم	\		1,005		210	34	34	34
Induction Terminal Unit, Dual Fan Qual Duct or Transfer Fan? Local recipies (air. We presentative of an explainment from air File Publish (Condition Analyzed Percent of total design arithments at conditioned analyzed Air distribution represents a conditioned analyzed Percent of total design arithments at conditioned analyzed Percent of the primary air fraction of supply air at conditioned analyzed Percent of the primary air fraction of supply air at conditioned analyzed Percent of the primary air fraction of supply air at conditioned analyzed Percent of the primary air fraction of supply air at conditioned analyzed Percent of the primary supply air fraction of supply air at conditioned analyzed Percent of the primary supply air fraction				(uerauit value listed; may be ove	ettiaae	eri)		1 600		0	1	1	33
Local recirc. air's, representative of ave system return air buts for Operating Condition Analyzed   Percent of total design airflow rate at conditioned analyzed   Air distribution type at conditioned analyzed   Percent of total design airflow rate at conditioned analyzed   Select from pull-down list   FSCR LV   CS   CS   CS   CS   CS   CS   CS   C		vuzu		om null-down list or leave blank	if NI/A		1,102	1,622	488		33	33	33
Inputs for Operaturia Condition Analyzed   Perent of total design affinitive at eal conditioned analyzed   Perent of total design affinitive at eal conditioned analyzed   Ez   Select from pull-down list   FSCR, IV   FSCR, IV   CS   CS   CS   CS   CS   CS   CS   C	· · · · · · · · · · · · · · · · · · ·	Er	Jeiect II	om pan down hat or leave blank	//\		75%	75%	75%		75%	75%	75%
Air distribution type at conditioned analyzed   Zone air distribution effectiveness at conditioned analyzed   Ez							1070	1070	. 0 / 0		1070	1070	1070
Zone air distribution effectiveness at conditioned analyzed   Ez	Percent of total design airflow rate at conditioned analyzed	Ds	%			100%	100%	100%	100%	100%	100%	100%	100%
Primary air fraction of supply air at conditioned analyzed	Air distribution type at conditioned analyzed		Select fr	om pull-down list									CS
Results   Ventilation System Efficiency   Ev							1.00	1.00	1.00		1.00	1.00	1.00
Ventilation System Efficiency		Ep								100%			
Outdoor air per unit floor arise of the person served by system (including diversity) VolvPs clm/g 26.6 clm/g 26.6 clm/g 26.6 clm/g 26.6 clm/g 27.6 clm/g 26.6 clm/g 27.6 clm/g		F.,				0.00							
Outdoor air per purson served by system (including diversity) Outdoor air as a % of design primary supply air  Detailed Calculations for the System as a whole Primary supply air flow to system at conditioned analyzed UncorrectedOA requirement for system UnusedOA requirement for system UnusedOA requirement for system UnusedOA requirement for system UnusedOA requirement for system UncorrectedOA requirement for system UnusedOA required in system given for system UnusedOA required for system UnusedOA re			cfm										
Outdoor air per person served by system (including diversity)   VodPs   cfm   Christophic   Christ													
Detailed Calculations   Detailed Calculations   New Year   New Y													
Initial Calculations for the System as a whole   Primary supply air flow to system at conditioned analyzed   Vps   cfm   = Nps Ps + Ras As   = 2423   VuncorrectedOA requirement for system   Vou   cfm   = Rps Ps + Ras As   = 2423   VuncorrectedOA requirement for system   Vou   cfm   = Rps Ps + Ras As   = 2423   VuncorrectedOA requirement for system   Vou   cfm   = Rps Ps + Ras As   = 2423   VuncorrectedOA requirement for system   Vou   cfm   = Rps Ps + Ras As   = 2423   VuncorrectedOA requirement for system   Vou   cfm   0.12   0.12   0.06													
Initial Calculations for the System as a whole   Primary supply air flow to system at conditioned analyzed   Vps   cfm   = Nps Ps + Ras As   = 2423   VuncorrectedOA requirement for system   Vou   cfm   = Rps Ps + Ras As   = 2423   VuncorrectedOA requirement for system   Vou   cfm   = Rps Ps + Ras As   = 2423   VuncorrectedOA requirement for system   Vou   cfm   = Rps Ps + Ras As   = 2423   VuncorrectedOA requirement for system   Vou   cfm   = Rps Ps + Ras As   = 2423   VuncorrectedOA requirement for system   Vou   cfm   0.12   0.12   0.06	Detailed Calculations												
Primary supply air flow to system at conditioned analyzed													
Uncorrected OA reg'd as a fraction of primary SA		Vps	cfm	= VpdDs	=	13677							
Initial Calculations for individual zones   Section   Calculations   Calc	UncorrectedOA requirement for system	Vou	cfm	= Rps Ps + Ras As	=	2423							
OA rate per unit area for zone OA rate per person Rpz cfm/p Rpz cfm/p 10.00 10.00 10.00 5.00 5.00 5.00 5.00 5		Xs		= Vou / Vps	=	0.18							
OA rate per person  OA rate per person  Total supply air to zone (at condition being analyzed)  Vdz cfm  Unused OA requ're the person  Voz cfm  Rpz Pz + Raz Az  Sak4.0  Unused OA requ're ment for zone  Voz cfm													
Total supply air to zone (at condition being analyzed)  Vdz cfm  Rpz Pz + Raz Az = 384.0 210.6 34.4 12.6 7.0 7.0 7.0 7.0 7.0 7.0 7.0 7.0 7.0 7.0	·												0.06
Unused OA req'd to breathing zone  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 7.0 7.0 1.0 1.0 1.0 1.0 1.0 1.0 1.0 1.0 1.0 1													5.00
Unused OA requirement for zone  Unused OA requirement for zone  Voz cfm = Vbz/Ez = 384 211 34 13 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 1.				- Poz Pz + Poz Az									33 7.0
Fraction of zone supply not directly recirc. from zone				•	=								7.0
Fraction of zone supply from fully mixed primary air			CIIII		_								1.00
Fraction of zone OA not directly recirc. from zone					=								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. 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. 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. Unused OA fraction 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. 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				•	=								1.00
System Ventilation Efficiency  Zone Ventilation Efficiency (App A Method)  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  Outdoor Air Intake Flow required to System  Vot cfm = Vou / Ev = 2924  OA intake req'd as a fraction of primary SA  OA intake req'd as a fraction of primary SA (Table 6.3 Method)  OA Temp at which Min OA provides all cooling					=								0.21
Zone Ventilation Efficiency (App A Method)		Zp		= Voz / Vpz	=		0.35	0.13	0.07	0.25	0.21	0.21	0.21
System Ventilation Efficiency (App A Method)  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  OA intake req'd as a fraction of primary SA  Outdoor Air Intake Flow required to System (Table 6.3 Method)  OA intake req'd as a fraction of primary SA  OA intake req'd as a fraction of primary SA  OA intake req'd as a fraction of primary SA (Table 6.3 Method)  OA Temp at which Min OA provides all cooling													
Ventilation System Efficiency (Table 6.3 Method)  Minimum outdoor air intake airflow  Outdoor Air Intake Flow required to System  Outdoor Air Intake Flow required to System  Outdoor Air Intake Flow required to System (Table 6.3 Method)  OA intake req'd as a fraction of primary SA  OA intake req'd as a fraction of primary SA  OA Temp at which Min OA provides all cooling					=		0.83	1.05	1.11	0.93	0.96	0.96	0.96
Minimum outdoor air intake airflow  Outdoor Air Intake Flow required to System  OA intake req'd as a fraction of primary SA  OA 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) Vot 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					=								
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		EV		= value from Table 6.3	=	0.80							
OA intake req'd as a fraction of primary SA Y = Vot / Vps = <b>0.21</b> 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		\/o <del>t</del>	cfm	- Vou / Ev	_	2024							
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			CIIII		_								
OA intake reg'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			cfm		_								
OA Temp at which Min OA provides all cooling					=								
OAT DETOW WHICH OA THIRKE HOW IS @ MINIMUM DEG P = {(1P-0151)-(1-1) (11+011) = -8	OAT below which OA Intake flow is @ minimum		Deg F	= ${(Tp-dTsf)-(1-Y)*(Tr+dTrf)}$	=	-8							

Building: System Tag/Name: Operating Condition Description: Units (select from pull-down list)  Inputs for System Floor area served by system Population of area served by system (including diversity) Design primary supply fan airflow rate OA req'd per unit area for system (Weighted average) OA req'd per person for system area (Weighted average) Inputs for Potentially Critical zones  Zone Name  Zone Tag  DMA ZONE A  Units System 16198.5 P 100% diversity 110 13,677 0,10 Ps p 100% diversity 110 13,677 0,10 T,5  EG28 EG30-I Zone title turns purple italic for critical zone(s)  Zone title turns purple italic for critical zone(s)	IMOC EG31
Operating Condition Description: Units (select from pull-down list)  Inputs for System  Floor area served by system Population of area served by system (including diversity) Design primary supply fan airflow rate OA req'd per unit area for system (Weighted average) OA req'd per person for system area (Weighted average) Rps cfm/p  Inputs for Potentially Critical zones  Zone Name  Units System 16198.5 1100% diversity 1100 1100 1100 1100 1100 1100 1100 11	MOC EG31
Units (select from pull-down list)    IP	MOC EG31
Floor area served by system Population of area served by system (including diversity) Ps P 100% diversity Design primary supply fan airflow rate Vpsd cfm OA req'd per unit area for system (Weighted average) OA req'd per person for system area (Weighted average) Rps cfm/p  Rps cfm/p  Rps cfm/p  Rps cfm/p  T.5  FG28 EG28 EG30-I  Zone title turns purple italic for critical zone(s)	MOC EG31
Floor area served by system Population of area served by system (including diversity) Ps P 100% diversity Design primary supply fan airflow rate Vpsd cfm OA req'd per unit area for system (Weighted average) OA req'd per person for system area (Weighted average) Rps cfm/p  Rps cfm/p  Rps cfm/p  Rps cfm/p  T.5  FG28 EG28 EG30-I  Zone title turns purple italic for critical zone(s)	MOC EG31
Population of area served by system (including diversity) Design primary supply fan airflow rate OA req'd per unit area for system (Weighted average) OA req'd per person for system area (Weighted average) Ras cfm/sf OA req'd per person for system area (Weighted average) Inputs for Potentially Critical zones  Zone Name  Zone title turns purple italic for critical zone(s)	MOC EG31
OA req'd per unit area for system (Weighted average) OA req'd per person for system area (Weighted average) Inputs for Potentially Critical zones  Zone Name  Ras cfm/sf Rps cfm/p  T.5  EG28 EG28 EG30-I  Zone title turns purple italic for critical zone(s)	MOC EG31
OA req'd per person for system area (Weighted average) Inputs for Potentially Critical zones  Zone Name  Rps cfm/p  7.5  EG28 EG28 EG30-I  Zone title turns purple italic for critical zone(s)	MOC EG31
Inputs for Potentially Critical zones  Zone Name  Zone title turns purple italic for critical zone(s)  EG28 EG28 EG30-I	MOC EG31
Zone Name  Zone title turns purple italic for critical zone(s)  EG28 EG30-T	MOC EG31
Zone Name  Zone title turns purple italic for critical zone(s)	IWOC EGS1
	32
Telephone/dat Telephone/dat Com	
Space type Select from pull-down list a entry a entry not pr	
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 75% 75%	75% 75%
Inputs for Operating Condition Analyzed	4000/
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	100% 100% 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	1.00
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 reg'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	4.00
Zone Ventilation Efficiency (App A Method)  Evz = (Fa + FbXs - FcZ) / Fa = 1.06 0.94  System Ventilation Efficiency (App A Method)  Ev = min (Evz) = <b>0.83</b>	1.09 0.98
System Ventilation Efficiency (App A Method)  Ev = min (Evz) = <b>0.83</b> 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 regid as a fraction of primary SA Y = Vot /Vps = <b>0.21</b>	
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	

B are	D.1.1.1										
Building:	DMA	200									
System Tag/Name: Operating Condition Description:	ZONE	3&C									
Units (select from pull-down list)	IP										
					1						
Inputs for System	Name	<b>Units</b>		System							
Floor area served by system	As	sf	<u> </u>	9531.75							
Population of area served by system (including diversity)	Ps	Р	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	<u>)                                    </u>						
Inputs for Potentially Critical zones					EG32-	EG34-CCER	EG36	EG37-	EG38-ELEC	EG39	EG40
Zone Name					CONTENT	EG34-CCER	EG36	MECHANICAL	EG36-ELEC	EG39	EG40
Zone Name	Zone tit	tle turns n	urple italic for critical zone(s)		MGMT			WECHANICAL			
Zone Tag	20110 111	io tarrio p	inpromano for emilion zerre(o)		1	2	4	5	6	7	8
					Computer	Telephone/dat	Storage	Storage	Storage	Storage	Telephone/dat
Space type		Select fr	om pull-down list		(not printing)	a entry	rooms	rooms	rooms	rooms	a entry
Floor Area of zone	Az	sf			1,698	209	473	1,587	360	147	88
Design population of zone	Pz	Р	(default value listed; may be ove	rridden)	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 fr	om pull-down list or leave blank i	f 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%
Percent of total design airflow rate at conditioned analyzed Air distribution type at conditioned analyzed	DS		om pull-down list	100%	CS	CS	CS	CS	CS	CS	CS
Zone air distribution effectiveness at conditioned analyzed	Ez	Ocioci II	om pun-down nat		1.00	1.00	1.00	1.00	1.00	1.00	
Primary air fraction of supply air at conditioned analyzed	Ep				1.00	1.00	100%	1.00	1.00	1.00	1.00
Results					1				l		
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%	•						
Detelled Oplantations											
<u>Detailed Calculations</u> Initial Calculations for the System as a whole											
Primary supply air flow to system at conditioned analyzed	Vps	cfm	= VpdDs	= 12360	1						
UncorrectedOA requirement for system	Vou	cfm	= Rps Ps + Ras As	= 873							
Uncorrected OA reg'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		200	500	2000	709	
Unused OA req'd to breathing zone	Vbz	cfm	= Rpz Pz + Raz Az	=	135.8		56.8	190.4	43.2	17.6	
Unused OA requirement for zone	Voz	cfm	= Vbz/Ez	=	136		57	190	43	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	
Fraction of zone supply from fully mixed primary air	Fb Fc		= Ep	=	1.00 1.00		1.00 1.00	1.00 1.00	1.00 1.00	1.00 1.00	
Fraction of zone OA not directly recirc. from zone Unused OA fraction required in supply air to zone	FC Zd		= 1-(1-Ez)(1-Ep)(1-Er) = Voz / Vdz	=	0.06		0.28	0.38	0.02	0.02	
Unused OA fraction required in supply air to zone  Unused OA fraction required in primary air to zone	Zu Zp		= V0Z / V0Z = V0Z / VpZ	=	0.06		0.28	0.38	0.02	0.02	
System Ventilation Efficiency	<b>-</b> P		- VOZ / VPZ		0.00	0.42	0.20	0.30	0.02	0.02	0.13
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		2.00	20	3.00		7.00	2.3.
Ventilation System Efficiency (Table 6.3 Method)	Ev		` '	= 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	Υ		= 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)	Υ		= Vot / Vps	= 0.10	0.11						
OA Temp at which Min OA provides all cooling		D	(/T   T-0 /4 \\ ) (**   T /								
OAT below which OA Intake flow is @ minimum		Deg F	$= {(Tp-dTsf)-(1-Y)*(Tr+dTrf)}$	= -85							

Building:	DMA											
System Tag/Name:	ZONE I	B&C										
Operating Condition Description:	IP											
Units (select from pull-down list)	IP											
Inputs for System	Name	<u>Units</u>		S	ystem							
Floor area served by system	As	sf		9	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) OA req'd per person for system area (Weighted average)	Ras Rps	cfm/sf cfm/p			0.08 5.0							
Inputs for Potentially Critical zones	Kps	cili/p			5.0		Poten	tially Critical Z	nnes			
inputs for 1 steritury of theur 20165					Ī	EG41	EG42	EG43	EG44	EG46-ELEC	EG47-NOC	EG48-TPC BU
Zone Name												
	Zone tit	tle turns p	urple italic for critical zone(s)									
Zone Tag						9 Corridors	10 Storage	11 Storage	12 Storage	13 Storage	14 Computer	15 Computer
Space type		Select fr	om pull-down list			Corridors	rooms	rooms	rooms	rooms	(not printing)	(not printing)
Floor Area of zone	Az	sf			į	740	75	146	264	635	810	429
Design population of zone	Pz		(default value listed; may be ov	erridde	en)	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 fr	om pull-down list or leave blank	if N/A	ļ	7.50/	750/	TF	TF	750/	750/	750/
Local recirc. air % representative of ave system return air Inputs for Operating Condition Analyzed	Er					75%	75%	75%	75%	75%	75%	75%
Percent of total design airflow rate at conditioned analyzed	Ds	%			100%	100%	100%	100%	100%	100%	100%	100%
Air distribution type at conditioned analyzed	D3	, -	om pull-down list		10070	CS	CS	CS	CS	CS	CS	CS
Zone air distribution effectiveness at conditioned analyzed	Ez		p		ŀ	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				0.14 90.0							
Outdoor air per person served by system (including diversity) Outdoor air as a % of design primary supply air	Vot/Ps Ypd	cfm/p			11%							
<u> </u>												
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 reg'd as a fraction of primary SA	Xs	OIIII	= Vou / Vps	_	0.07							
Initial Calculations for individual zones	710		- 104, 150		0.07							
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		1234	
Unused OA req'd to breathing zone	Vbz	cfm	= Rpz Pz + Raz Az	=		44.4	9.0	17.5	31.7		64.8	
Unused OA requirement for zone	Voz	cfm	= Vbz/Ez	=		44	9	18	32		65	
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 Fc		= Ep = 1 (1 Ez)(1 Ep)(1 Er)	=		1.00 1.00	1.00 1.00	1.00 1.00	1.00 1.00		1.00 1.00	
Fraction of zone OA not directly recirc. from zone Unused OA fraction required in supply air to zone	FC Zd		= 1-(1-Ez)(1-Ep)(1-Er) = Voz / Vdz	=		0.15	0.36	0.29	0.40		0.05	
Unused OA fraction required in supply all to zone	Zp		= V02 / V02 = V0z / Vpz	=		0.15	0.36	0.29	0.40		0.05	
System Ventilation Efficiency	_p		. 327 792			3.10	2.00	0.20	3.40	3.04	3.00	3.04
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)		cfm	= Vou / Ev	=	1193							
OA intake req'd as a fraction of primary SA (Table 6.3 Method)  OA Temp at which Min OA provides all cooling	Y		= Vot / Vps	=	0.10							
OAT below which OA Intake flow is @ minimum		Deg F	= {(Tp-dTsf)-(1-Y)*(Tr+dTrf	_	-85							
OAT DEIOW WHICH OA IIIIAKE HOW IS W HIIIIIIIIIIIIII		peg i.	- ((1p-u13))-(1-1) (11+u111	_	-00							

Building:	DMA										
System Tag/Name:	ZONE I	3&C									
Operating Condition Description:	LOITE	340									
Units (select from pull-down list)	IP										
Inputs for System	Name	Units			S	ystem	1				
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							EG49-TPC BU	EG50	ECE2 OFFICE	EG54-OFFICE	EG81
Zone Name							EG49-1FC BU	EG30	EG33-OFFICE	EG34-OFFICE	EGOI
Zone Tag	∠one tit	le turns pi	ırple	e italic for critical zone(s)			16	17	19	20	21
							Computer	Corridors	Office space	Office space	Storage
Space type			om p	oull-down list			(not printing)		·	-	rooms
Floor Area of zone	Az	sf					427	1,062	142	142	98
Design population of zone	Pz		(def	ault value listed; may be ov	erridde	en)	1.708	0	0.71	0.70875	0
Design total supply to zone (primary plus local recirculated)	Vdzd	cfm		uull alauma liak ee leeve hil. I	:£ N1/A		863	365	117	94	431
Induction Terminal Unit, Dual Fan Dual Duct or Transfer Fan?	F-	Select in	om p	oull-down list or leave blank	IT IN/A		750/	750/	750/	750/	750/
Local recirc. air % representative of ave system return air Inputs for Operating Condition Analyzed	Er						75%	/5%	/5%	75%	75%
Percent of total design airflow rate at conditioned analyzed	Ds	%				100%	100%	100%	100%	100%	100%
Air distribution type at conditioned analyzed	D3		om r	oull-down list	_	10070	CS	CS	CS	CS	CS
Zone air distribution effectiveness at conditioned analyzed	Ez	OCIOOL III	O111 F	oun down not			1.00	1.00	1.00	1.00	1.00
Primary air fraction of supply air at conditioned analyzed	Ep						1.00		1.00	1100	1100
Results							l.			L.	
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%					
<u>Detailed Calculations</u>											
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		0.12
OA rate per person	Rpz	cfm/p					5.00	0.00	5.00		0.00
Total supply air to zone (at condition being analyzed)	Vdz Vbz	cfm cfm		D== D= + D== A=			863 34.2	365 63.7	117 12.1		431
Unused OA requirement for zone				Rpz Pz + Raz Az	=						11.8
Unused OA requirement for zone Fraction of zone supply not directly recirc. from zone	Voz Fa	cfm	=	Vbz/Ez En + (1-En)Er	=		34 1.00	64 1.00	12 1.00		12 1.00
Fraction of zone supply from fully mixed primary air	га Fb			Ep + (1-Ep)Er Ep	=		1.00	1.00	1.00		1.00
Fraction of zone Supply from fully mixed primary all 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	=		0.04	0.17	0.10		0.03
Unused OA fraction required in supply air to zone	Zp			Voz / Vpz	_		0.04	0.17	0.10		0.03
System Ventilation Efficiency							0.04	3.17	3.10	3.10	2.00
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	Υ		=	Vot / Vps	=	0.11					
Outdoor Air Intake Flow required to System (Table 6.3 Method)		cfm		Vou / Ev	=	1193					
OA intake req'd as a fraction of primary SA (Table 6.3 Method)	Υ		=	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				1							
System Tag/Name:	ZONE	F										
Operating Condition Description:	ZONL											
Units (select from pull-down list)	IP											
Inputs for System	Name	Units		S	System							
Floor area served by system	As	sf			14584							
Population of area served by system (including diversity)	Ps	Р	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					-	E106	E400 OPEN	E110A	E110B	E111	E112	E113
Zone Name	Zone ti	tle turns	purple italic for critical zone(s)				E109-OPEN OFFICE					
Zone Tag						1 Storogo	2 Media center	3 Media center	4 Media center	5 Office space	6 Office space	7 Office space
Space type		Select	from pull-down list			Storage rooms	wedia center	wedia center	wedia 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	Р	(default value listed; may be ov	erridde	en)	0	9	8	8	8	0.675	0.675
Design total supply to zone (primary plus local recirculated)	Vdzd	cfm			L	80	1,282	1,004	1,340	169	142	145
Induction Terminal Unit, Dual Fan Dual Duct or Transfer Fan?  Local recirc. air % representative of ave system return air	Er	Select	from pull-down list or leave blank	if N/A	٠	TF 75%	750/	750/	750/	750/	750/	750/
Inputs for Operating Condition Analyzed	EI				<u> </u>	75%	75%	73%	/5%	/5%	75%	73%
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				L	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 Control of the Control of th	_				0.00							
Ventilation System Efficiency Outdoor air intake required for system	Ev Vot	cfm			0.89 3159							
Outdoor air intake required for system  Outdoor air per unit floor area	Vot/As				0.22							
Outdoor air per unit noor area  Outdoor air per person served by system (including diversity)	Vot/Ps				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	_					0.40	0.40	0.40	0.40	0.00		2.22
OA rate per unit area for zone	Raz	cfm/sf				0.12		0.12	0.12			
OA rate per person	Rpz Vdz	cfm/p cfm				0.00		10.00 1004	10.00 1340	5.00 169		
Total supply air to zone (at condition being analyzed) Unused OA reg'd to breathing zone	Vuz Vbz	cfm	= Rpz Pz + Raz Az	=		20.0		171.8	184.4	50.7		11.5
Unused OA requirement for zone	Voz	cfm	= Kpz Fz + Kaz Az = Vbz/Ez	=		20.0		171.0	184	50.7		
Fraction of zone supply not directly recirc. from zone	Fa	OIIII	= 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		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	=		0.25		0.17	0.14	0.30		
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			V /5									
Outdoor Air Intake Flow required to System	Vot	cfm	= Vou / Ev	=	3159							
OA intake req'd as a fraction of primary SA	Y	ofer	= Vot / Vps	=	0.21							
Outdoor Air Intake Flow required to System (Table 6.3 Method) OA intake reg'd as a fraction of primary SA (Table 6.3 Method)		cfm	= Vou / Ev	=	3313 0.23							
OA Temp at which Min OA provides all cooling	1		= Vot / Vps	_	0.23							
OAT below which OA Intake flow is @ minimum		Deg F	= ${(Tp-dTsf)-(1-Y)*(Tr+dTrf)}$	=	-7							
SALI DOLON WHICH CALLINGAGE HOW IS SETTIMINATION		2091	(1.5 0.0.) (1.1) (1.14111									

Building:	DMA												
System Tag/Name:	ZONE	E											
Operating Condition Description: Units (select from pull-down list)	IP												
Cinto (Solost Hom pair down not)													
Inputs for System	Name				S	ystem							
Floor area served by system	As	sf		4000/ diversity		14584							
Population of area served by system (including diversity)	Ps	P		100% diversity	_	146 14,711							
Design primary supply fan airflow rate OA reg'd per unit area for system (Weighted average)	Vpsd Ras	cfm cfm/sf			-	0.11							
OA reg'd per drift area for system (Weighted average)  OA reg'd per person for system area (Weighted average)	Rps	cfm/p				8.2							
Inputs for Potentially Critical zones	Про	omrp				0.2						entially Critical	Zones
Zone Name	Zone ti	tle turns p	urple	italic for critical zone(s)			E114	E115	E116	E117A	E117B	E117C	E117D
Zone Tag							8	9	10	11	12	13	14
Space type		Select fr	rom p	oull-down list			Office space	Office space	Office space	Media center	Media center	Media center	Media center
Floor Area of zone	Az	sf	·				135	135	146	1,740	1,534	1,532	1,095
Design population of zone	Pz	Р	(defa	ault value listed; may be ove	erridde	en)	0.675	0.675	0.73	14		11	
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 fr	rom p	oull-down list or leave blank	if N/A								
Local recirc. air % representative of ave system return air Inputs for Operating Condition Analyzed	Er						75%	75%	75%	75%	75%	75%	75%
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 fr	rom p	oull-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	1.00
Primary air fraction of supply air at conditioned analyzed  Results	Ep												
Ventilation System Efficiency	Ev					0.89							
Outdoor air intake required for system	Vot	cfm				3159							
Outdoor air per unit floor area	Vot/As					0.22							
Outdoor air per person served by system (including diversity)	Vot/Ps					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	Raz	cfm/sf					0.06	0.06	0.06	0.12	9.12	9.12	2 0.12
OA rate per unit area for zone OA rate per person	Rpz	cfm/p					5.00		5.00				
Total supply air to zone (at condition being analyzed)	Vdz	cfm					148		121				
Unused OA reg'd to breathing zone	Vbz	cfm	=	Rpz Pz + Raz Az	=		11.5		12.4				
Unused OA requirement for zone	Voz	cfm		Vbz/Ez	=		11		12				
Fraction of zone supply not directly recirc. from zone	Fa			Ep + (1-Ep)Er	=		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)  Minimum outdoor air intake airflow	Ev		=	Value from Table 6.3	=	0.85							
Outdoor Air Intake Flow required to System	Vot	cfm	=	Vou / Ev	=	3159							
OA intake reg'd as a fraction of primary SA	Y			Vot / Vps	=	0.21							
		cfm		Vou / Ev	_	3313							
Outdoor Air Intake Flow required to System (Table 6.3 Method)	Vot	CITI	=	VUU / EV									
Outdoor Air Intake Flow required to System (Table 6.3 Method) OA intake req'd as a fraction of primary SA (Table 6.3 Method)		Cim		Vot / Vps	=	0.23							
		Deg F	=		=								

Building: System Tag/Name:	DMA ZONE	F										
Operating Condition Description:		_										
Units (select from pull-down list)	IP											
Inputs for System	Name	<u>Units</u>			stem							
Floor area served by system	As	sf			14584							
Population of area served by system (including diversity)	Ps	Р	100% diversity		146							
Design primary supply fan airflow rate	Vpsd	cfm		1	4,711							
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) Inputs for Potentially Critical zones	Rps	cfm/p			8.2							
Zone Name	Zone ti	itle turns n	urple italic for critical zone(s)			E117E	E120	E121	E122	E123	E124	E125
Zone Tag	20110 11	ασ ταπο ρ	inpro hallo for ornibar 20110(b)		-	15	16	17	18	19	20	21
Space type		Select fr	om pull-down list			Media center	Storage rooms	Office space	Conference/m eeting	Conference/m eeting	Office space	Office space
Floor Area of zone	Az	sf	·			1,463	174	120	124	451	170	170
Design population of zone	Pz	Р	(default value listed; may be ov	erridden	)	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 fr	om 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 fr	om 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	-6			0.89 3159							
Outdoor air intake required for system Outdoor air per unit floor area	Vot	cfm cfm/sf			0.22							
Outdoor air per unit noor area  Outdoor air per person served by system (including diversity)	Vot/As Vot/Ps				21.7							
Outdoor air per person served by system (including diversity)  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 reg'd as a fraction of primary SA	Xs	OIIII	= 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 reg'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		- 4			1.00	1.00	1.00	1.00	1.00	1.00	1.00
	га		= Ep + (1-Ep)Er	=								1.00
Fraction of Zone supply from fully mixed primary air	Fb		= Ep + (1-Ep)Er = Ep	=		1.00	1.00	1.00	1.00	1.00	1.00	
Fraction of zone supply from fully mixed primary air Fraction of zone OA not directly recirc. from zone			= Ep	= = =		1.00 1.00	1.00 1.00	1.00 1.00	1.00 1.00	1.00 1.00	1.00 1.00	1.00
Fraction of zone Supply from fully filized primary air Fraction of zone OA not directly recirc. from zone Unused OA fraction required in supply air to zone	Fb			_								
Fraction of zone OA not directly recirc. from zone	Fb Fc		= Ep = 1-(1-Ez)(1-Ep)(1-Er)	=		1.00	1.00	1.00	1.00	1.00	1.00	0.11
Fraction of zone OA not directly recirc. from zone Unused OA fraction required in supply air to zone Unused OA fraction required in primary air to zone System Ventilation Efficiency	Fb Fc Zd Zp		= Ep = 1-(1-Ez)(1-Ep)(1-Er) = Voz / Vdz	=		1.00 0.23 0.23	1.00 0.09	1.00 0.07	1.00 0.27 0.27	1.00 0.15 0.15	1.00 0.11	0.11 0.11
Fraction of zone OA not directly recirc. from zone Unused OA fraction required in supply air to zone Unused OA fraction required in primary air to zone	Fb Fc Zd		= Ep = 1-(1-Ez)(1-Ep)(1-Er) = Voz / Vdz	=		1.00 0.23	1.00 0.09	1.00 0.07	1.00 0.27	1.00 0.15 0.15	1.00 0.11	0.11 0.11
Fraction of zone OA not directly recirc. from zone Unused OA fraction required in supply air to zone Unused OA fraction required in primary air to zone System Ventilation Efficiency Zone Ventilation Efficiency (App A Method) System Ventilation Efficiency (App A Method)	Fb Fc Zd Zp		= Ep = 1-(1-Ez)(1-Ep)(1-Er) = Voz / Vdz = Voz / Vpz	=	0.89	1.00 0.23 0.23	1.00 0.09 0.09	1.00 0.07 0.07	1.00 0.27 0.27	1.00 0.15 0.15	1.00 0.11 0.11	0.11 0.11
Fraction of zone OA not directly recirc. from zone Unused OA fraction required in supply air to zone Unused OA fraction required in primary air to zone System Ventilation Efficiency Zone Ventilation Efficiency (App A Method) System Ventilation Efficiency (App A Method) Ventilation System Efficiency (Table 6.3 Method)	Fb Fc Zd Zp Evz		= Ep = 1-(1-Ez)(1-Ep)(1-Er) = Voz / Vdz = Voz / Vpz = (Fa + FbXs - FcZ) / Fa	= =	<b>0.89</b> 0.85	1.00 0.23 0.23	1.00 0.09 0.09	1.00 0.07 0.07	1.00 0.27 0.27	1.00 0.15 0.15	1.00 0.11 0.11	0.11 0.11
Fraction of zone OA not directly recirc. from zone Unused OA fraction required in supply air to zone Unused OA fraction required in primary air to zone System Ventilation Efficiency Zone Ventilation Efficiency (App A Method) System Ventilation Efficiency (App A Method) Ventilation System Efficiency (Table 6.3 Method) Minimum outdoor air intake airflow	Fb Fc Zd Zp Evz Ev Ev		= Ep = 1-(1-Ez)(1-Ep)(1-Er) = Voz / Vdz = Voz / Vpz = (Fa + FbXs - FcZ) / Fa = min (Evz) = Value from Table 6.3	= =	0.85	1.00 0.23 0.23	1.00 0.09 0.09	1.00 0.07 0.07	1.00 0.27 0.27	1.00 0.15 0.15	1.00 0.11 0.11	0.11 0.11
Fraction of zone OA not directly recirc. from zone Unused OA fraction required in supply air to zone Unused OA fraction required in primary air to zone System Ventilation Efficiency Zone Ventilation Efficiency (App A Method) System Ventilation Efficiency (App A Method) Ventilation System Efficiency (Table 6.3 Method) Minimum outdoor air intake airflow Outdoor Air Intake Flow required to System	Fb Fc Zd Zp Evz Ev Ev	cfm	= Ep = 1-(1-Ez)(1-Ep)(1-Er) = Voz / Vdz = Voz / Vpz = (Fa + FbXs - FcZ) / Fa = min (Evz) = Value from Table 6.3 = Vou / Ev	= =	0.85 3159	1.00 0.23 0.23	1.00 0.09 0.09	1.00 0.07 0.07	1.00 0.27 0.27	1.00 0.15 0.15	1.00 0.11 0.11	0.11 0.11
Fraction of zone OA not directly recirc. from zone Unused OA fraction required in supply air to zone Unused OA fraction required in primary air to zone System Ventilation Efficiency Zone Ventilation Efficiency (App A Method) System Ventilation Efficiency (App A Method) Ventilation System Efficiency (Table 6.3 Method) Minimum outdoor air intake airflow Outdoor Air Intake Flow required to System OA intake req'd as a fraction of primary SA	Fb Fc Zd Zp Evz Ev Ev Vot Y		= Ep = 1-(1-Ez)(1-Ep)(1-Er) = Voz / Vdz = Voz / Vpz = (Fa + FbXs - FcZ) / Fa = min (Evz) = Value from Table 6.3 = Vou / Ev = Vot / Vps	= =	0.85 3159 0.21	1.00 0.23 0.23	1.00 0.09 0.09	1.00 0.07 0.07	1.00 0.27 0.27	1.00 0.15 0.15	1.00 0.11 0.11	0.11 0.11
Fraction of zone OA not directly recirc. from zone Unused OA fraction required in supply air to zone Unused OA fraction required in primary air to zone System Ventilation Efficiency Zone Ventilation Efficiency (App A Method) System Ventilation Efficiency (App A Method) Ventilation System Efficiency (Table 6.3 Method) Minimum outdoor air intake airflow Outdoor Air Intake Flow required to System OA intake req'd as a fraction of primary SA Outdoor Air Intake Flow required to System (Table 6.3 Method)	Fb Fc Zd Zp Evz Ev Ev Vot Y	cfm cfm	= Ep = 1-(1-Ez)(1-Ep)(1-Er) = Voz / Vdz = Voz / Vpz = (Fa + FbXs - FcZ) / Fa = min (Evz) = Value from Table 6.3 = Vou / Ev = Vot / Vps = Vou / Ev	= =	0.85 3159 0.21 3313	1.00 0.23 0.23	1.00 0.09 0.09	1.00 0.07 0.07	1.00 0.27 0.27	1.00 0.15 0.15	1.00 0.11 0.11	0.11 0.11
Fraction of zone OA not directly recirc. from zone Unused OA fraction required in supply air to zone Unused OA fraction required in primary air to zone System Ventilation Efficiency Zone Ventilation Efficiency (App A Method) System Ventilation Efficiency (App A Method) Ventilation System Efficiency (Table 6.3 Method) Minimum outdoor air intake airflow Outdoor Air Intake Flow required to System OA intake req'd as a fraction of primary SA Outdoor Air Intake Flow required to System (Table 6.3 Method) OA intake req'd as a fraction of primary SA (Table 6.3 Method)	Fb Fc Zd Zp Evz Ev Ev Vot Y		= Ep = 1-(1-Ez)(1-Ep)(1-Er) = Voz / Vdz = Voz / Vpz = (Fa + FbXs - FcZ) / Fa = min (Evz) = Value from Table 6.3 = Vou / Ev = Vot / Vps	= =	0.85 3159 0.21	1.00 0.23 0.23	1.00 0.09 0.09	1.00 0.07 0.07	1.00 0.27 0.27	1.00 0.15 0.15	1.00 0.11 0.11	0.11 0.11
Fraction of zone OA not directly recirc. from zone Unused OA fraction required in supply air to zone Unused OA fraction required in primary air to zone System Ventilation Efficiency Zone Ventilation Efficiency (App A Method) System Ventilation Efficiency (App A Method) Ventilation System Efficiency (Table 6.3 Method) Minimum outdoor air intake airflow Outdoor Air Intake Flow required to System OA intake req'd as a fraction of primary SA Outdoor Air Intake Flow required to System (Table 6.3 Method)	Fb Fc Zd Zp Evz Ev Ev Vot Y	cfm	= Ep = 1-(1-Ez)(1-Ep)(1-Er) = Voz / Vdz = Voz / Vpz = (Fa + FbXs - FcZ) / Fa = min (Evz) = Value from Table 6.3 = Vou / Ev = Vot / Vps = Vou / Ev	= = = = = = = = = = = = = = = = = = = =	0.85 3159 0.21 3313	1.00 0.23 0.23	1.00 0.09 0.09	1.00 0.07 0.07	1.00 0.27 0.27	1.00 0.15 0.15	1.00 0.11 0.11	0.11 0.11

System TapaName: Operating Continue Description: Operating C	Building:	DMA									-
Special Condition Description:			E								
Parties for System   Fibor area served by system (including diversity)   Parties   Fibror area area (Verlighted average)   Rea   Girls   Fibror area											
Floor area served by system (including diversity)	Units (select from pull-down list)	IP									
Floor area served by system (including diversity)	Inputs for System	Name	Units			Sv	stem				
Population of area served by system (including diversity)						-					
Design primary supply fan airflow rate   Vision   Visio					100% diversity						
OA red'd per person for system area (Weighted average)   Rps   Cmrp   E126   E127   E128   E129			cfm				14,711				
	OA req'd per unit area for system (Weighted average)	Ras	cfm/sf				0.11				
Zone Name	OA req'd per person for system area (Weighted average)	Rps	cfm/p				8.2				
Zone Name   Zone Name   Zone title turns purple faste for critical zone(s)   22 23 24 25	Inputs for Potentially Critical zones						ı	E100	E40=	F100	
Space type   Space	Zone Name	Zone ti	tle turns į	ourpl	e italic for critical zone(s)			E126		E128	E129
Space type	Zone Tag										
Select tron puls-down list	Space type							Office space			Media center
Design population of zone   Pz   P   (default value listed; may be overridden)   0.75   4.35   4.35   1.3	1 21	<b>A</b> -		rom	pull-down list			4.40			4.705
Design total supply to zone (primary plus local recirculated)   Votar family found from pull-town (ist or leave blank if N/A   Votar family found from pull-town (ist or leave blank if N/A   Votar family found from pull-town (ist or leave blank if N/A   Votar family found from pull-town (ist or leave blank if N/A   Votar family found from pull-town (ist or leave blank if N/A   Votar family found from pull-town (ist or leave blank if N/A   Votar family found from pull-town (ist or leave blank if N/A   Votar family for potential				( al a s	facilit calcia liata di mancha acci						
Induction Terminal Unit, Dual Fan Dual Duct or Transfer Fan?   Local recrice, air % representative of ave system return air   Er				(de	iauit value iisted; may be ov	emaaer	')				
Local rectic, aif's frepresentative of ave system return air   Inputs for Operating Condition Analyzed   Percent of total design airflow rate at conditioned analyzed   Exprising part of total design airflow rate at conditioned analyzed   Exprising part factor of supply air at conditioned analyzed   Exprising part factor of supply air at conditioned analyzed   Exprising part factor of supply air at conditioned analyzed   Exprising part factor of supply air at conditioned analyzed   Exprising part factor of supply air at conditioned analyzed   Exprising part factor of supply air at conditioned analyzed   Exprising part factor of supply air at conditioned analyzed   Exprising part factor of supply air at conditioned part factor of supply air flow to system   Vot chross part factor of part factor of supply air flow to system (including diversity)   Vot Chross part factor of air per unit flora area   Vot/As christ   Vot/Ps christ part factor of part facto		vuZu		rom	null-down list or leave blank	if N/Δ		121	101	101	1,220
	· ·	Er	Select I	IUIII	pun-uowii list oi leave bidlik	11 IN//A		75%	75%	75%	75%
Air distribution type at conditioned analyzed   Ez   Select from pull-down list   CS   CS   CS   CS   CS   CS   CS   C	Inputs for Operating Condition Analyzed										
Zone air distribution effectiveness at conditioned analyzed Primary air fraction of supply air at conditioned analyzed Primary air fraction of supply air at conditioned analyzed Vot Crim Suddoor air intake required for system Vot Crim Suddoor air intake required for system Vot Crim Suddoor air per unit floor area Outdoor air per purson served by system (including diversity) Vot Property Crim Suddoor air per unit floor area Suddoor air per unit floor area Suddoor air per person served by system (including diversity) Vot Property Crim Suddoor air per person served by system at conditioned analyzed Vps Crim Suddoor	Percent of total design airflow rate at conditioned analyzed	Ds	%				100%	100%	100%	100%	100%
Primary air fraction of supply air at conditioned analyzed   Ep	Air distribution type at conditioned analyzed		Select f	rom	pull-down list			CS	CS	CS	CS
Vertilation System Efficiency	Zone air distribution effectiveness at conditioned analyzed	Ez						1.00	1.00	1.00	1.00
Ventilation System Efficiency		Ep									
Outdoor air per unit floor area Outdoor air per person served by system (including diversity) Outdoor air per person served by system (including diversity) Outdoor air per person served by system (including diversity) Outdoor air per person served by system (including diversity) Outdoor air as a % of design primary supply air  Detailed Calculations    Primary supply air flow to system as a whole   Primary supply air flow to system at conditioned analyzed   Vps   cfm   = VpdDs   = 14711											
Outdoor air per unit floor rare Outdoor air per person served by system (including diversity) Outdoor air as a % of design primary supply air  Detailed Calculations Initial Calculations for the System as a whole Primary supply air flow to system at conditioned analyzed Uncorrected OA requirement for system Vou Cfm = Rps Ps + Ras As = 2816 Uncorrected OA requirement for system OA rate per unit area for zone A publications OA rate per unit area for zone Voz Cfm  Rpz Cfm/p  Spz Cfm/p  Spz Cfm/p  OA rate per unit area for zone OA rate per unit area for zone Voz Cfm  Rpz Cfm/p  Spz Cfm/p  Spz Cfm/p  OA rate per unit area for zone Voz Cfm  Rpz Cfm/p  Spz Cfm/p											
Outdoor air per person served by system (including diversity) Outdoor air as a % of design primary supply air  Detailed Calculations Initial Calculations Initial Calculations for the System as a whole  Primary supply air flow to system at conditioned analyzed Uncorrected OA requirement for system Vou  off  Reps  off  off  off  off  off  off  off  o	· · · ·										
Detailed Calculations Initial Calculations for the System as a whole Primary supply air flow to system at conditioned analyzed Vps cfm = VpdDs = 14711 Uncorrected OA requirement for system Vou cfm = Rps Ps + Ras As = 2816 Uncorrected OA requirement for system Vou cfm = Rps Ps + Ras As = 2816 Uncorrected OA requirement for system Vou cfm = Rps Ps + Ras As = 2816 Uncorrected OA requirement for system Vou cfm = Rps Ps + Ras As = 2816 Uncorrected OA requirement for system Vou cfm = Rps Ps + Ras As = 2816 Uncorrected OA requirement for system Vou cfm = Rps Ps + Ras As = 2816 Uncorrected OA requirement for system Vou cfm = Rps Ps + Ras As = 2816 Uncorrected OA requirement for system Vou cfm = Rps Ps + Ras As = 2816 Uncorrected OA requirement for system Vou cfm = Rps Ps + Ras As = 2816 Uncorrected OA requirement for system Vou cfm = Rps Ps + Ras As = 2816 Uncorrected OA requirement for system Vou cfm = Rps Ps + Ras As = 2816 Uncorrected OA requirement for system Vou cfm = Rps Ps + Ras As = 2816 Uncorrected OA requirement for system Vou cfm = Rps Ps + Ras As = 2816 Unused OA requirement for system Vou cfm = Rps Ps + Ras As = 2816 Unused OA requirement for system Vou cfm = Rps Ps + Ras As = 2816 Unused OA requirement for system Vou cfm = Rps Ps + Ras As = 2816 Unused OA fraction required in supply air to zone Fa = Ep + (1-Ep)Er = 124 Unused OA fraction required in supply air to zone Fc = 1-(1-Ep)Er = 1.00 Unused OA fraction required in supply air to zone Zd = Vou Vou = 1.00 Unused OA fraction required in supply air to zone Zd = Vou Vou = 1.00 Unused OA fraction required in supply air to zone Zd = Vou Vou = 1.00 Unused OA fraction required in supply air to zone Zd = Vou Vou = 1.00 Unused OA fraction required for primary air to zone Zp = Vou Vou = 1.00 Unused OA fraction required for primary air to zone Zd = Vou Vou = 1.00 Unused OA fraction required for primary Sa Vou = 1.00 Unused OA fraction required for primary Sa Vou = 1.00 Unused OA fraction required for supply air to zone Zd = Vou Vou = 1.00 Unused OA fraction requ	· ·										
Detailed Calculations   Initial Calculations for the System at conditioned analyzed   Vps   cfm   = VpdDs   = 14711											
Primary supply air flow to system at conditioned analyzed   Vpd	Outdoor all as a % or design primary supply all	rpu	CIIII				21/0				
Primary supply air flow to system at conditioned analyzed   Vps   cfm   = VpdDs   = 14711   Uncorrected OA 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											
Uncorrected OA requirement for system											
Uncorrected OA req'd as a fraction of primary SA					•						
Natial Calculations for individual zones			ctm								
OA rate per unit area for zone		XS		=	vou / vps	=	0.19				
OA rate per person Total supply air to zone (at condition being analyzed) Vdz cfm  Total supply air to zone (at condition being analyzed) Vdz cfm  Unused OA requ'd to breathing zone Vbz cfm  Rpz Pz + Raz Az  121 101 101 101 101 1220 1220 123 345.4 Unused OA requirement for zone Voz cfm  Vbz/Ez  Fraction of zone supply not directly recirc. from zone Fa  Ep + (1-Ep)Er  Ep = 1.00 Fraction of zone supply from fully mixed primary air Fb  Ep = Ep  In.00  Fraction of zone supply from fully mixed primary air Fb  Ep = 1.00  Unused OA fraction required in supply air to zone Fc  Unused OA fraction required in supply air to zone Unused OA fraction required in primary air to zone Unused OA fraction required in primary air to zone  Zd  Voz / Vdz  Vdz  Vdz  Unused OA fraction required in primary air to zone Unused OA fraction required in primary air to zone  Zp  Voz / Vpz  Evz  Voz / Vpz  System Ventilation Efficiency  Zone Ventilation Efficiency (App A Method) Ev  System Ventilation Efficiency (App A Method) Ev  Vox		Paz	cfm/cf					0.06	0.06	0.06	0.12
Total supply air to zone (at condition being analyzed)											
Unused OA req'd to breathing zone											
Unused OA requirement for zone				=	Rnz Pz + Raz Az	=					
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 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 = 0.10 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) 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 (Table 6.3 Method) Vot cfm = Vou / Ev = 3159 OA intake req'd as a fraction of primary SA OA intake req'd as a fraction of primary SA (Table 6.3 Method) OA Temp at which Min OA provides all cooling						=					
Fraction of zone supply from fully mixed primary air Fb						=					
Fraction of zone OA not directly recirc. from zone Unused OA fraction required in supply air to zone Zd = Voz / Vdz = 0.10 Unused OA fraction required in primary air to zone Zp = Voz / Vpz = 0.10 Unused OA fraction required in primary air to zone Zp = Voz / Vpz = 0.10 Unused OA fraction required in primary air to zone Zp = Voz / Vpz = 0.10 Unused OA fraction required in primary air to zone Zp = Voz / Vpz = 0.10 Unused OA fraction required in primary air to zone Zp = Voz / Vpz = 0.10 Unused OA fraction required in primary air to zone Zp = Voz / Vpz = 0.10 Unused OA fraction required in primary air to zone Zp = Voz / Vpz = 0.10 Unused OA fraction required in primary air to zone Zp = Voz / Vpz = 0.10 Unused OA fraction required in primary air to zone Zp = Voz / Vpz = 0.28  Vertilation Efficiency (App A Method) Ev = min (Evz) = 0.89 Vertilation 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 OA intake req'd as a fraction of primary SA (Table 6.3 Method) Vot cfm = Vou / Ev = 3313 OA intake req'd as a fraction of primary SA (Table 6.3 Method) Vot Vps = 0.23  OA Temp at which Min OA provides all cooling					1 ( 1/	=					
Unused OA fraction required in supply air to zone Unused OA fraction required in primary air to zone Zp = Voz / Vdz = 0.10 0.27 0.27 0.28  System Ventilation Efficiency Zone Ventilation Efficiency (App A Method) System Ventilation Efficiency (App A Method) Ev = (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 Outdoor Air Intake Flow required to System (Table 6.3 Method) OA intake req'd as a fraction of primary SA (Table 6.3 Method) OA Temp at which Min OA provides all cooling		Fc		=	•	=					
System Ventilation Efficiency  Zone Ventilation Efficiency (App A Method)  System Ventilation Efficiency (App A Method)  System Ventilation Efficiency (App A Method)  Ventilation Efficiency (Table 6.3 Method)  Ventilation System Efficiency (Table 6.3 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  OA intake req'd as a fraction of primary SA  OA intake Flow required to System (Table 6.3 Method)  OA intake req'd as a fraction of primary SA (Table 6.3 Method)  OA intake req'd as a fraction of primary SA (Table 6.3 Method)  OA Temp at which Min OA provides all cooling		Zd		=		=		0.10	0.27	0.27	
Zone Ventilation Efficiency (App A Method)  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  OA intake req'd as a fraction of primary SA  OA intake Flow required to System (Table 6.3 Method)  Vot cfm = Vou / Ev = 3159  OA intake Flow required to System (Table 6.3 Method)  OA intake req'd as a fraction of primary SA (Table 6.3 Method)  OA intake req'd as a fraction of primary SA (Table 6.3 Method)  OA Temp at which Min OA provides all cooling		Zp		=	Voz / Vpz	=		0.10	0.27	0.27	0.28
System Ventilation Efficiency (App A Method)  Ventilation System Efficiency (Table 6.3 Method)  Ev = win (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	System Ventilation Efficiency										
Ventilation System Efficiency (Table 6.3 Method)  Minimum outdoor air intake airflow  Outdoor Air Intake Flow required to System  OA intake req'd as a fraction of primary SA  OA intake req'd as a fraction of primary SA  OA Temp at which Min OA provides all cooling				=	,			1.09	0.92	0.92	0.91
Minimum outdoor air intake airflow  Outdoor Air Intake Flow required to System  OA intake req'd as a fraction of primary SA  OA intake Flow required to System (Table 6.3 Method)  OA intake Flow required to System (Table 6.3 Method)  OA intake req'd as a fraction of primary SA (Table 6.3 Method)  OA on intake req'd as a fraction of primary SA (Table 6.3 Method)  OA Temp at which Min OA provides all cooling											
Outdoor Air Intake Flow required to System  OA intake req'd as a fraction of primary SA  OA intake Flow required to System (Table 6.3 Method)  Ot cfm  Vot  Vot  Cfm  Vot Vps  = Vot / Vps  = Vot / Vps  = 3313  OA intake Flow required to System (Table 6.3 Method)  Vot  Cfm  Vot  Vot  Vot  Vot  Vot  Vot  Small Cooling  OA Temp at which Min OA provides all cooling		Ev		=	value from Table 6.3	=	0.85				
OA intake req'd as a fraction of primary SA Y = Vot / Vps = <b>0.21</b> 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		Vet	-6		Ven / Fu		2452				
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			cim								
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			cfm								
OA Temp at which Min OA provides all cooling			CIIII								
					VOLT VPO		0.23				
	OAT below which OA Intake flow is @ minimum		Deg F	=	{(Tp-dTsf)-(1-Y)*(Tr+dTrf	=	-7				

Building:	DMA				I						
•	ZONE										
System Tag/Name: Operating Condition Description:	ZUNE	G									
Units (select from pull-down list)	IP										
onits (select from pun-down list)					ļ						
Inputs for System	Name	Units		System	1						
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	arreletty	17,358							
OA reg'd per unit area for system (Weighted average)	Ras	cfm/sf		0.10							
OA req'd per unit area for system (Weighted average)  OA req'd per person for system area (Weighted average)	Rps	cfm/p		7.6							
Inputs for Potentially Critical zones	търз	CITIVE		7.0							
Zone Name	Zone ti	tle turns r	ourple italic for critical zone(s)		E130A	E130B	E132	E133	E134	E135A	E135B
Zone Tag	20/10 11	uo turrio p	surpre hand for Gridour 20110(0)		1	2	3	4	5	6	7
· ·					Media center	Media center	Conference/m				Media center
Space type		Select f	rom pull-down list		media ocinei	Micaia conto	eeting	eeting	eeting	media ocinei	media deriter
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 ove	rridden)	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?			rom pull-down list or leave blank i	f N/A	.,020	.,010	200	200	2,220	.,000	1,000
Local recirc. air % representative of ave system return air	Er		, and a second station		75%	75%	75%	75%	75%	75%	75%
Inputs for Operating Condition Analyzed					, , , , ,		. 0 70	.070		. 070	. 0 70
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 f	rom 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				1.00	1.00			1100	1.00	1100
Results						1					
Ventilation System Efficiency	Ev			0.91							
Outdoor air intake required for system	Vot	cfm		3761							
Outdoor air per unit floor area	Vot/As			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%							
3 (,, ,											
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 reg'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
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
Unused OA fraction required in supply air to zone	Zd		= Voz / Vdz	_	0.29			0.23	0.09	0.17	0.22
Unused OA fraction required in primary air to zone	Zp		= Voz / Vpz	_	0.29			0.23	0.09		0.22
System Ventilation Efficiency	-17		- VOZ / VPZ		0.20	0.20	0.20	0.20	0.00	0.17	0.22
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	0.91	0.91	0.97	0.97	1.10	1.02	0.30
Ventilation System Efficiency (Table 6.3 Method)	Ev		= Value from Table 6.3	= 0.86							
Minimum outdoor air intake airflow			- value from Table 0.5								
Outdoor Air Intake Flow required to System	Vot	cfm	= Vou / Ev	= 3761							
OA intake reg'd as a fraction of primary SA	Y	CIIII	= Vot / Vps	= 0.22							
Outdoor Air Intake Flow required to System (Table 6.3 Method		cfm	= Voi / Vps = Vou / Ev	= 0.22							
OA intake reg'd as a fraction of primary SA (Table 6.3 Method)		CIIII	= Vou / EV = Vot / Vps	= 3964							
OA Intake req d as a fraction of primary SA (Table 6.3 Method)  OA Temp at which Min OA provides all cooling			= vot / vps	- 0.23							
		Deg F	- ((Tp_dTef)_(1_V)*(Tr+dTef	= -6							
OAT below which OA Intake flow is @ minimum		Deg F	$= {(Tp-dTsf)-(1-Y)*(Tr+dTrf)}$	6							

Building:		DMA										
System Ta	n/Name	ZONE	G.									
	Condition Description:	ZONE										
	ct 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	Р	100% diversity	19	5						
	Design primary supply fan airflow rate	Vpsd	cfm		17,35	8						
	DA req'd per unit area for system (Weighted average)	Ras	cfm/sf		0.1							
	DA req'd per person for system area (Weighted average)	Rps	cfm/p		7	6						
	Potentially Critical zones											ritical Zones
	Zone Name	Zone ti	tle turns p	urple italic for critical zone(s)		E135C	E137	E138	E139	E140	E142	E146
1	Zone Tag					8	9	10	11	12	13	14
;	Space type		Select f	rom pull-down list		Media center	Office space	Office space	Office space	Office space	Storage rooms	Storage rooms
	Floor Area of zone	Az	sf			1,408	136	136	153	136	264	146
	Design population of zone	Pz	Р	(default value listed; may be over	rridden)	10		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
	nduction Terminal Unit, Dual Fan Dual Duct or Transfer Fan?	_	Select f	rom pull-down list or leave blank	if N/A						TF	TF
	ocal recirc. air % representative of ave system return air	Er				75%	75%	75%	75%	75%	75%	75%
	Operating Condition Analyzed	De	0/		400	/ 1000	10001	40001	40001	40001	40001	40001
	Percent of total design airflow rate at conditioned analyzed	Ds	% Soloot f	rom pull-down list	100	6 100% CS	100% CS	100% CS	100% CS	100% CS	100% CS	100% CS
	Air distribution type at conditioned analyzed	Ez	Select	om pull-down list		1.00		1.00	1.00		1.00	1.00
	Zone air distribution effectiveness at conditioned analyzed Primary air fraction of supply air at conditioned analyzed	E2 Ep				1.00	1.00	1.00	1.00	1.00	100%	100%
Results	Timary all fraction of supply all at conditioned analyzed	∟р				1					10076	10076
	/entilation System Efficiency	Ev			0.9							
	Outdoor air intake required for system	Vot	cfm		376							
	Outdoor air per unit floor area	Vot/As	cfm/sf		0.2	)						
	Outdoor air per person served by system (including diversity)	Vot/Ps	cfm/p		19.	1						
	Outdoor air as a % of design primary supply air	Ypd	cfm		22	6						
D 4 11 10	1.10											
Detailed Calc	ulations for the System as a whole											
	Primary supply air flow to system at conditioned analyzed	Vps	cfm	= VpdDs	= 1735	8						
	JncorrectedOA requirement for system	Vou	cfm	= Rps Ps + Ras As	= 341							
1	Incorrected OA reg'd as a fraction of primary SA	Xs		= Vou / Vps	= 0.2	0						
<b>Initial Calc</b>	ulations for individual zones											
	DA rate per unit area for zone	Raz	cfm/sf			0.12	0.06		0.06			
	DA 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			111			80
	Jnused OA req'd to breathing zone	Vbz	cfm	= Rpz Pz + Raz Az	=	269.0			13.0			17.5
	Unused OA requirement for zone	Voz	cfm	= Vbz/Ez	=	269						
	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
	Jnused OA fraction required in supply air to zone	Zd		= Voz / Vdz	=	0.20			0.12		0.24	0.22
	Jnused 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
	ntilation 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)	Evz		= (Fa + FDXS - FCZ) / Fa = min (Evz)	= 0.9		1.12	1.10	1.08	1.08	0.95	0.98
	/entilation System Efficiency (App A Method)	Ev		= Value from Table 6.3	= 0.9							
	utdoor air intake airflow	LV		- value from rable 0.3	_ 0.0							
	Outdoor Air Intake airnow Outdoor Air Intake Flow required to System	Vot	cfm	= Vou / Ev	= 376	1						
	DA intake req'd as a fraction of primary SA	Y	Siiii	= Vot / Vps	= 0.2							
	Outdoor Air Intake Flow required to System (Table 6.3 Method)		cfm	= Vou / Ev	= 396							
	DA intake reg'd as a fraction of primary SA (Table 6.3 Method)		J	= Vot / Vps	= 0.2							
	t which Min OA provides all cooling											
	DAT below which OA Intake flow is @ minimum		Deg F	= $\{(Tp-dTsf)-(1-Y)*(Tr+dTrf)$	= .	6						

D. T. P.	D										
Building:	DMA										
System Tag/Name:	ZONE	G									
Operating Condition Description: Units (select from pull-down list)	IP										
Units (select from pull-down list)	IP				l.						
Inputs for System	Name	Units		System	1						
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 reg'd per unit area for system (Weighted average)	Ras	cfm/sf		0.10							
OA reg'd per person for system area (Weighted average)	Rps	cfm/p		7.6							
Inputs for Potentially Critical zones		ор		- 110	<u>.</u>						
Zone Name	Zone ti	tle turns i	ourple italic for critical zone(s)		E148A	E148B	E148C	E150	E151	E152	E153
Zone Tag	20110 1		surpre name for entitled 20110(0)		15	16	17	18	19	20	21
ů .					Media center	Media center	Media center	Conference/m		Office space	Office space
Space type		Select f	rom pull-down list		ouiu ooiiioi	mouna conto	mouna conto.	eeting	Cinico opuco	Cinico opuco	ooo opuoo
Floor Area of zone	Az	sf			1,803	1,214	880	403	136	186	136
Design population of zone	Pz	Р	(default value listed; may be over	rridden)	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 f	rom 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 f	rom pull-down list		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										
<u>Results</u>											
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%	i						
Detelled Oplantations											
<u>Detailed Calculations</u> 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	· · · · · · · · · · · · · · · · · · ·	= 3411							
Uncorrected OA regid as a fraction of primary SA	Xs	Citi	•	= 0.20							
Initial Calculations for individual zones	7.5		= vou / vps	_ 0.20							
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 unit area for 2016  OA rate per person	Rpz	cfm/p			10.00						5.00
Total supply air to zone (at condition being analyzed)	Vdz	cfm			1216		1224	622			118
Unused OA reg'd to breathing zone	Vuz	cfm	= Rpz Pz + Raz Az	=	346.4		195.6				11.6
Unused OA requirement for zone	Voz	cfm		_ _	346		196				12
Fraction of zone supply not directly recirc. from zone	Fa	CIIII		=	1.00		1.00				1.00
	га Fb				1.00		1.00				1.00
Fraction of zone supply from fully mixed primary air Fraction of zone OA not directly recirc. from zone	Fc		<del></del>	=	1.00		1.00				1.00
Unused OA fraction required in supply air to zone	Zd		_	=	0.28		0.16				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
	Evz		` <u> </u>	= = 0.91	0.91	0.96	1.04	1.00	1.10	1.09	1.10
System Ventilation Efficiency (App A Method) Ventilation System Efficiency (Table 6.3 Method)	Ev			= 0.91							
Minimum outdoor air intake airflow	EV		= Value from Table 6.3	= 0.86							
	Vot	cfm	= Vou / Ev	= 3761							
Outdoor Air Intake Flow required to System	Yot	CIIII		= 3/61 = 0.22							
OA intake req'd as a fraction of primary SA		ofm									
Outdoor Air Intake Flow required to System (Table 6.3 Method)		cfm	- 100/ =1	= 3964 = 0.23							
OA intake req'd as a fraction of primary SA (Table 6.3 Method)			= Vot / Vps	= 0.23							
OA Temp at which Min OA provides all cooling		Dog F	- (/Tp dTof) /1 V)*/T-:								
OAT below which OA Intake flow is @ minimum		Deg F	$= \{(Tp-dTsf)-(1-Y)*(Tr+dTrf$	= -6							

Duit-line.	DMA										
Building: System Tag/Name:	DMA ZONE (										
Operating Condition Description:	ZONE	,									
Units (select from pull-down list)	IP										
	-										
Inputs for System	Name	<u>Units</u>			S	ystem					
Floor area served by system	As	sf			1	8573.5					
Population of area served by system (including diversity)	Ps	Р		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 tit	le turns p	urple	italic for critical zone(s)			E154	E155A	E155B	E156	E157
Zone Tag							22	23	24	25	26
Space type							Corridors	Media center	Media center		Telephone/dat
			om p	ull-down list			750	0.45	0.15	eeting	a entry
Floor Area of zone	Az	sf				,	750	945	945	518	211
Design population of zone	Pz	P	(deta	ault value listed; may be ove	erriaae	n)	0	9	9	25.9	0
Design total supply to zone (primary plus local recirculated)	Vdzd	cfm		ull davin list and area blank	:c b1/6	ŀ	342	987	1,015	734	172
Induction Terminal Unit, Dual Fan Dual Duct or Transfer Fan?	E.	Select fr	om p	ull-down list or leave blank	II IN/A	ļ	750/	750/	750/	750/	750/
Local recirc. air % representative of ave system return air Inputs for Operating Condition Analyzed	Er						75%	75%	75%	75%	75%
Percent of total design airflow rate at conditioned analyzed	Ds	%				100%	100%	100%	100%	100%	100%
Air distribution type at conditioned analyzed	DS		om r	ull-down list		100 /6	CS	CS	CS	CS	CS
Zone air distribution effectiveness at conditioned analyzed	Ez	Ocioci II	OIII P	dii-down iist			1.00	1.00	1.00	1.00	1.00
Primary air fraction of supply air at conditioned analyzed	Ep					•	1.00	1.00	1.00	1.00	1.00
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	1/	-6		V1D-		47050					
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 Initial Calculations for individual zones	Xs		=	Vou / Vps	=	0.20					
OA rate per unit area for zone	Raz	cfm/sf					0.06	0.12	0.12	0.06	0.06
OA rate per unit area for zone  OA rate per person	Rpz	cfm/p					0.00	10.00	10.00		5.00
Total supply air to zone (at condition being analyzed)	Vdz	cfm					342	987	10.00	734	172
Unused OA reg'd to breathing zone	Vuz	cfm	_	Rpz Pz + Raz Az	=		45.0	203.4	203.4	160.6	12.7
Unused OA requirement for zone	Voz	cfm		Vbz/Ez	_		45.0	203.4	203.4		13
Fraction of zone supply not directly recirc. from zone	Fa	OIIII		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 + (1-29)21	_		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		
Unused OA fraction required in supply air to zone	Zp			Voz / Vpz	_		0.13	0.21	0.20	0.22	
System Ventilation Efficiency	-						30	3.2.	3.20	3.22	5.01
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	Υ		=	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)	Υ		=	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											
Operating Condition Description:	ZONL											
Units (select from pull-down list)	IP											
Inputs for System	Name	Units		S	ystem							
Floor area served by system	As	sf			19788							
Population of area served by system (including diversity)	Ps	Р	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 ti	tle turns į	ourple italic for critical zone(s)			E201- CORRIDOR	E204	E205- WOMENS	E208-MENS	E210	E211-OPEN OFFICE	E213-OFFICE
Zone Tag						1	2	3	4	5	6	7
Space type						Corridors	Telephone/dat	Storage	Storage	Media center	Media center	Office space
• • • • • • • • • • • • • • • • • • • •			rom pull-down list				a entry	rooms	rooms			
Floor Area of zone	Az	sf P			,	1,151	252	246	167	1,407	1,340	172
Design population of zone	Pz	cfm	(default value listed; may be ov	erridde	n)	<u>0</u> 321	115	120	<u>0</u> 80	11	10	
Design total supply to zone (primary plus local recirculated) Induction Terminal Unit, Dual Fan Dual Duct or Transfer Fan?	Vdzd		rom pull-down list or leave blank	if NI/A	ŀ	321	115	TF	TF	1,259	1298	130
Local recirc. air % representative of ave system return air	Er	Select	forn pull-down list of leave blank	II IN/A		75%	75%	75%	75%	75%	75%	75%
Inputs for Operating Condition Analyzed					-		1070	1070	1070			1070
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	rom 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	1.00	1.00
Primary air fraction of supply air at conditioned analyzed	Ep							100%	100%			
Results	_											
Ventilation System Efficiency	Ev				0.82 4022							
Outdoor air intake required for system	Vot	cfm cfm/sf			0.20							
Outdoor air per unit floor area	Vot/As Vot/Ps				21.1							
Outdoor air per person served by system (including diversity) Outdoor air as a % of design primary supply air	Ypd	cfm			23%							
· · · · · · · · · · · · · · · · · · ·												
<u>Detailed Calculations</u> 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 reg'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		0.00	0.00	10.00		
Total supply air to zone (at condition being analyzed)	Vdz	cfm				321		120	80			
Unused OA req'd to breathing zone	Vbz	cfm	= Rpz Pz + Raz Az	=		69.1	15.1	29.5	20.0	278.8		
Unused OA requirement for zone	Voz	cfm	= Vbz/Ez	=		69		30	20			
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 Zp		= Voz / Vdz	=		0.22 0.22		0.25 0.25	0.25 0.25	0.22 0.22		
Unused OA fraction required in primary air to zone System Ventilation Efficiency	Zβ		= Voz / Vpz	=		0.22	0.13	0.25	0.25	0.22	0.20	0.11
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	0.07	1.00	0.34	0.04	0.90	0.99	1.07
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	Υ		= Vot / Vps	=	0.23							
Outdoor Air Intake Flow required to System (Table 6.3 Method)		cfm	= Vou / Ev	=	4209							
OA intake req'd as a fraction of primary SA (Table 6.3 Method)	Υ		= 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	н									
Operating Condition Description:	ZONE										
Units (select from pull-down list)	IP										
Inputs for System	Name	Units		Systen	П						
Floor area served by system	As	sf		1978							
Population of area served by system (including diversity)	Ps	P	100% diversity	19							
Design primary supply fan airflow rate	Vpsd	cfm		17,67	5						
OA req'd per unit area for system (Weighted average)	Ras	cfm/sf		0.1	0						
OA req'd per person for system area (Weighted average)	Rps	cfm/p		7	.3						
Inputs for Potentially Critical zones									I ======		
Zone Name	Zone ti	tle turns p	urple italic for critical zone(s)		E214-OFFICE	E215-OFFICE	E216-OFFICE	E217-OFFICE	OFFICE	E219B-OPEN OFFICE	E219C
Zone Tag					8	9	10	11	12	13	14
Space type		Select f	rom 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	Р	(default value listed; may be ov	erridden)	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 f	rom 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 f	rom pull-down list		CS		CS	CS	CS		CS
Zone air distribution effectiveness at conditioned analyzed	Ez Ep				1.00	1.00	1.00	1.00	1.00	1.00	1.00
Primary air fraction of supply air at conditioned analyzed  Results	Eb										
Ventilation System Efficiency	Ev			0.8	,						
Outdoor air intake required for system	Vot	cfm		402							
Outdoor air per unit floor area	Vot/As			0.2							
Outdoor air per person served by system (including diversity)	Vot/Ps			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	= 1767							
UncorrectedOA requirement for system	Vou	cfm	= Rps Ps + Ras As	= 329							
Uncorrected OA req'd as a fraction of primary SA	Xs		= Vou / Vps	= 0.1	9						
Initial Calculations for individual zones											
OA rate per unit area for zone	Raz	cfm/sf			0.06			0.06			
OA rate per person	Rpz	cfm/p			5.00			5.00			
Total supply air to zone (at condition being analyzed) Unused OA reg'd to breathing zone	Vdz Vbz	cfm cfm	= Rpz Pz + Raz Az		129 14.5			115 12.4			866 318.2
Unused OA requirement for zone	Voz	cfm	= Kpz Fz + Kaz Az = Vbz/Ez	=	14.5			12.4			
Fraction of zone supply not directly recirc. from zone	Fa	CIIII	= Ep + (1-Ep)Er	_	1.00			1.00			
Fraction of zone supply from fully mixed primary air	Fb		= Ep	=	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			
Unused OA fraction required in supply air to zone	Zd		= Voz / Vdz	=	0.11		0.11	0.11			
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)	= 0.8							
Ventilation System Efficiency (Table 6.3 Method)	Ev		= Value from Table 6.3	= 0.7	3						
Minimum outdoor air intake airflow					_						
Outdoor Air Intake Flow required to System	Vot	cfm	= Vou / Ev	= 402	—						
OA intake req'd as a fraction of primary SA	Y	ofm	= Vot / Vps	= 0.2							
Outdoor Air Intake Flow required to System (Table 6.3 Method) OA intake reg'd as a fraction of primary SA (Table 6.3 Method)		cfm	= Vou / Ev = Vot / Vps	= 420 = 0.2							
OA Temp at which Min OA provides all cooling			= VOL / VPS	= 0.2	*						
OAT below which OA Intake flow is @ minimum		Deg F	= {(Tp-dTsf)-(1-Y)*(Tr+dTrf	_	-3						
OAT DEIOW WHICH OA HEARE HOW IS @ HIIIIIIIUIII		Deg i	- \(\(\p\-\ar\si\)^-(\(\p\-\ar\si\)\(\p\-\ar\si\)		0						

Building:	DMA										
System Tag/Name:	ZONE I	Н									
Operating Condition Description:											
Units (select from pull-down list)	IP										
Inputs for System	Name	Units		System							
Floor area served by system	As	sf	<u> </u>	1978	8						
Population of area served by system (including diversity)	Ps	Р	100% diversity	19							
Design primary supply fan airflow rate	Vpsd	cfm		17,67							
OA req'd per unit area for system (Weighted average)	Ras	cfm/sf		0.1							
OA req'd per person for system area (Weighted average)	Rps	cfm/p		7.	3						
Inputs for Potentially Critical zones					E219D	E220-DIR CG	E221A	E221-CG	F224-DIR FS	E225-OFFICE	E226
Zone Name	Zone tit	tle turns p	urple italic for critical zone(s)					CONF			
Zone Tag					15 Media center	16 Office space	17 Conference/m	18 Conference/m	19 Office space	20 Office space	21 Corridors
Space type			om pull-down list				eeting	eeting	-	•	
Floor Area of zone	Az	sf			1,539	367	477	560	272	171	319
Design population of zone	Pz Vdzd		(default value listed; may be over	erridden)	850	1.835 1101	23.85 1,196	28 1459	1.36 297	0.855 129	<u>0</u> 411
Design total supply to zone (primary plus local recirculated) Induction Terminal Unit, Dual Fan Dual Duct or Transfer Fan?	vaza	cfm Soloct fr	om pull-down list or leave blank	if NI/A	830	1101	1,190	1459	297	129	411
Local recirc. air % representative of ave system return air	Er	Selectii	on pun-down list of leave blank	II IN/71	75%	75%	75%	75%	75%	75%	75%
Inputs for Operating Condition Analyzed							,			.070	
Percent of total design airflow rate at conditioned analyzed	Ds	%		1009		100%	100%	100%	100%	100%	100%
Air distribution type at conditioned analyzed	_	Select fr	om 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  Results	Ep										
Ventilation System Efficiency	Ev			0.82	2						
Outdoor air intake required for system	Vot	cfm		4022	2						
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	= 1767							
UncorrectedOA requirement for system	Vou	cfm	= Rps Ps + Ras As	= 329							
Uncorrected OA req'd as a fraction of primary SA	Xs		= Vou / Vps	= 0.1	9						
Initial Calculations for individual zones  OA rate per unit area for zone	Raz	cfm/sf			0.12	9.06	0.06	0.06	0.06	0.06	0.06
OA rate per unit area for zone OA rate per person	Rpz	cfm/p			10.00		5.00	5.00			0.00
Total supply air to zone (at condition being analyzed)	Vdz	cfm			850		1196	1459			411
Unused OA reg'd to breathing zone	Vbz	cfm	= Rpz Pz + Raz Az	=	294.7			173.6		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
Unused OA fraction required in supply air to zone	Zd		= Voz / Vdz	=	0.35						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)	Ev2 Ev		= (Fa + FbAs - FcZ) / Fa = min (Evz)	= 0.82		1.10	1.06	1.07	1.11	1.07	1.14
Ventilation System Efficiency (Table 6.3 Method)	Ev		= Value from Table 6.3	= 0.78							
Minimum outdoor air intake airflow				0.71							
Outdoor Air Intake Flow required to System	Vot	cfm	= Vou / Ev	= 402	2						
OA intake req'd as a fraction of primary SA	Υ		= Vot / Vps	= 0.2							
Outdoor Air Intake Flow required to System (Table 6.3 Method)		cfm	= Vou / Ev	= 420							
OA intake req'd as a fraction of primary SA (Table 6.3 Method)	Υ		= Vot / Vps	= 0.2	4						
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						
OAT DEIOW WHICH OA INTAKE HOW IS @ MITHIMUM		Deg F	- 1(1p-a1si)-(1-1) (11+a111		J						

Building:	DMA										
System Tag/Name:	ZONE I	4									
Operating Condition Description:	ZONE										
Jnits (select from pull-down list)	IP										
					_						
nputs for System	<u>Name</u>	<u>Units</u>		Systen							
Floor area served by system	As	sf	1000/18: 3:	1978							
Population of area served by system (including diversity)	Ps	P	100% diversity	19							
Design primary supply fan airflow rate	Vpsd	cfm		17,67							
OA req'd per unit area for system (Weighted average)	Ras	cfm/sf		0.							
OA req'd per person for system area (Weighted average)	Rps	cfm/p		7	.3		_				
puts for Potentially Critical zones						tially Critical Z					
Zone Name					E227-OFFICE	E228A-	E229-OFFICE	E234-OFFICE	E235-OFFICE	E236	E237-CONF
7 T	Zone tit	ile turns p	purple italic for critical zone(s)			OFFICE	0.4	05		07	
Zone Tag					22	23	24	25	26	27	28
Space type					Office space	Office space	Office space	Office space	Office space	Office space	Conference/m
•			rom pull-down list								eeting
Floor Area of zone	Az	sf			177	170	136	136	137	171	290
Design population of zone	Pz	P	(default value listed; may be of	overridaen)	0.885	0.85	0.68	0.68	0.685	0.855	14.5 444
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?	F-	Select f	rom pull-down list or leave blar	IIK IT IN/A	750/	750/	750/	750/	750/	750/	750/
Local recirc. air % representative of ave system return air	Er				75%	/5%	/5%	75%	/5%	/5%	75%
puts for Operating Condition Analyzed	_	0.4		100		1000/	1000/	1000/	1000/	1000/	4000/
Percent of total design airflow rate at conditioned analyzed	Ds	%	and and decoration	100		100%	100%	100%	100%	100%	100%
Air distribution type at conditioned analyzed	_	Select f	rom 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										
esults	_				•						
Ventilation System Efficiency	Ev			0.8							
Outdoor air intake required for system	Vot	cfm		402							
Outdoor air per unit floor area				0.2							
Outdoor air per person served by system (including diversity)		cfm/p		21.							
Outdoor air as a % of design primary supply air	Ypd										
	•	cfm		23	%						
etailed Calculations		Cilli		23	<b>%</b>						
		Cilli									
	Vps	cfm	= VpdDs	= 176							
itial Calculations for the System as a whole	•		= VpdDs = Rps Ps + Ras As		75						
tial Calculations for the System as a whole Primary supply air flow to system at conditioned analyzed UncorrectedOA requirement for system Uncorrected OA req'd as a fraction of primary SA	Vps	cfm		= 176	75 94						
tial Calculations for the System as a whole Primary supply air flow to system at conditioned analyzed UncorrectedOA requirement for system Uncorrected OA req'd as a fraction of primary SA	Vps Vou	cfm	= Rps Ps + Ras As	= 1767 = 329	75 94						
tial Calculations for the System as a whole Primary supply air flow to system at conditioned analyzed UncorrectedOA requirement for system Uncorrected OA req'd as a fraction of primary SA tial Calculations for individual zones OA rate per unit area for zone	Vps Vou Xs	cfm cfm	= Rps Ps + Ras As	= 1767 = 329	75 04 19	0.06			0.06		
tial Calculations for the System as a whole Primary supply air flow to system at conditioned analyzed UncorrectedOA requirement for system Uncorrected OA req'd as a fraction of primary SA tial Calculations for individual zones	Vps Vou Xs	cfm cfm	= Rps Ps + Ras As	= 1767 = 329	75 94 9	0.06 5.00			0.06 5.00		
tial Calculations for the System as a whole  Primary supply air flow to system at conditioned analyzed UncorrectedOA requirement for system Uncorrected OA req'd as a fraction of primary SA tial Calculations for individual zones OA rate per unit area for zone	Vps Vou Xs	cfm cfm	= Rps Ps + Ras As	= 1767 = 329	75 04 19		5.00	5.00		5.00	5.00
tial Calculations for the System as a whole  Primary supply air flow to system at conditioned analyzed UncorrectedOA requirement for system Uncorrected OA req'd as a fraction of primary SA tial Calculations for individual zones OA rate per unit area for zone OA rate per person	Vps Vou Xs Raz Rpz	cfm cfm	= Rps Ps + Ras As	= 1767 = 329	75 94 19 0.06 5.00	5.00	5.00 110	5.00 110	5.00	5.00 129	5.00 444
tial Calculations for the System as a whole  Primary supply air flow to system at conditioned analyzed UncorrectedOA requirement for system Uncorrected OA req'd as a fraction of primary SA tial Calculations for individual zones  OA rate per unit area for zone OA rate per person Total supply air to zone (at condition being analyzed)	Vps Vou Xs Raz Rpz Vdz	cfm cfm/sf cfm/p cfm	= Rps Ps + Ras As = Vou / Vps	= 176: = 32: = 0.	75 144 19 0.06 5.00 132	5.00 128	5.00 110 11.6	5.00 110 11.6	5.00 110	5.00 129 14.5	5.00 444 89.9
tial Calculations for the System as a whole  Primary supply air flow to system at conditioned analyzed UncorrectedOA requirement for system Uncorrected OA req'd as a fraction of primary SA tial Calculations for individual zones  OA rate per unit area for zone OA rate per person Total supply air to zone (at condition being analyzed) Unused OA req'd to breathing zone	Vps Vou Xs Raz Rpz Vdz Vbz	cfm cfm/sf cfm/p cfm cfm	= Rps Ps + Ras As = Vou / Vps = Rpz Pz + Raz Az	= 176: = 32: = 0.	75 94 9 0.06 5.00 132 15.0	5.00 128 14.5	5.00 110 11.6 12	5.00 110 11.6 12	5.00 110 11.6	5.00 129 14.5 15	5.00 444 89.9 90
Primary supply air flow to system at conditioned analyzed UncorrectedOA requirement for system Uncorrected OA req'd as a fraction of primary SA itial Calculations for individual zones  OA rate per unit area for zone OA rate per person Total supply air to zone (at condition being analyzed) Unused OA req'd to breathing zone Unused OA requirement for zone	Vps Vou Xs Raz Rpz Vdz Vbz Voz	cfm cfm/sf cfm/p cfm cfm	= Rps Ps + Ras As = Vou / Vps = Rpz Pz + Raz Az = Vbz/Ez	= 1763 = 329 = 0.	75 94 99 0.06 5.00 132 15.0	5.00 128 14.5 14	5.00 110 11.6 12 1.00	5.00 110 11.6 12 1.00	5.00 110 11.6 12	5.00 129 14.5 15 1.00	5.00 444 89.9 90 1.00
ritial Calculations for the System as a whole  Primary supply air flow to system at conditioned analyzed UncorrectedOA requirement for system Uncorrected OA req'd as a fraction of primary SA  Itial Calculations for individual zones  OA rate per unit area for zone OA rate per person Total supply air to zone (at condition being analyzed) Unused OA req'd to breathing zone Unused OA requirement for zone Fraction of zone supply not directly recirc. from zone Fraction of zone supply from fully mixed primary air	Vps Vou Xs Raz Rpz Vdz Vbz Voz Fa Fb	cfm cfm/sf cfm/p cfm cfm	= Rps Ps + Ras As = Vou / Vps = Rpz Pz + Raz Az = Vbz/Ez = Ep + (1-Ep)Er = Ep	= 176: = 32! = 0.*	75 94 99 0.06 5.00 132 15.00 15 1.00	5.00 128 14.5 14 1.00	5.00 110 11.6 12 1.00 1.00	5.00 110 11.6 12 1.00 1.00	5.00 110 11.6 12 1.00	5.00 129 14.5 15 1.00	5.00 444 89.9 90 1.00
itial Calculations for the System as a whole  Primary supply air flow to system at conditioned analyzed UncorrectedOA requirement for system Uncorrected OA req'd as a fraction of primary SA itial Calculations for individual zones  OA rate per unit area for zone OA rate per person Total supply air to zone (at condition being analyzed) Unused OA req'd to breathing zone Unused OA requirement for zone Fraction of zone supply not directly recirc. from zone Fraction of zone supply from fully mixed primary air Fraction of zone OA not directly recirc. from zone	Vps Vou Xs Raz Rpz Vdz Vbz Voz Fa Fb Fc	cfm cfm/sf cfm/p cfm cfm	= Rps Ps + Ras As = Vou / Vps = Rpz Pz + Raz Az = Vbz/Ez = Ep + (1-Ep)Er = Ep = 1-(1-Ez)(1-Ep)(1-Er)	= 176: = 32: = 0.	0.06 5.00 132 15.0 15 1.00 1.00	5.00 128 14.5 14 1.00 1.00	5.00 110 11.6 12 1.00 1.00	5.00 110 11.6 12 1.00 1.00	5.00 110 11.6 12 1.00 1.00	5.00 129 14.5 15 1.00 1.00	5.00 444 89.9 90 1.00 1.00
tial Calculations for the System as a whole  Primary supply air flow to system at conditioned analyzed UncorrectedOA requirement for system Uncorrected OA req'd as a fraction of primary SA tial Calculations for individual zones  OA rate per unit area for zone OA rate per person Total supply air to zone (at condition being analyzed) Unused OA req'd to breathing zone Unused OA requirement for zone Fraction of zone supply not directly recirc. from zone Fraction of zone System fully mixed primary air Fraction of zone OA not directly recirc. from zone Unused OA fraction required in supply air to zone	Vps Vou Xs Raz Rpz Vdz Vbz Voz Fa Fb Fc Zd	cfm cfm/sf cfm/p cfm cfm	= Rps Ps + Ras As = Vou / Vps = Rpz Pz + Raz Az = Vbz/Ez = Ep + (1-Ep)Er = Ep = 1-(1-Ez)(1-Ep)(1-Er) Voz / Vdz	= 176: = 32! = 0.	0.06 5.00 132 15.0 15 1.00	5.00 128 14.5 14 1.00 1.00	5.00 110 11.6 12 1.00 1.00	5.00 110 11.6 12 1.00 1.00	5.00 110 11.6 12 1.00 1.00	5.00 129 14.5 15 1.00 1.00	5.00 444 89.9 90 1.00
tial Calculations for the System as a whole  Primary supply air flow to system at conditioned analyzed UncorrectedOA requirement for system Uncorrected OA req'd as a fraction of primary SA tial Calculations for individual zones  OA rate per unit area for zone OA rate per person Total supply air to zone (at condition being analyzed) Unused OA req'd to breathing zone Unused OA requirement for zone Fraction of zone supply not directly recirc. from zone Fraction of zone supply from fully mixed primary air Fraction of zone OA not directly recirc. from zone Unused OA fraction required in supply air to zone Unused OA fraction required in primary air to zone	Vps Vou Xs Raz Rpz Vdz Vbz Voz Fa Fb Fc	cfm cfm/sf cfm/p cfm cfm	= Rps Ps + Ras As = Vou / Vps = Rpz Pz + Raz Az = Vbz/Ez = Ep + (1-Ep)Er = Ep = 1-(1-Ez)(1-Ep)(1-Er) = Voz / Vdz	= 1761 = 329 = 0.	0.06 5.00 132 15.0 15 1.00 1.00	5.00 128 14.5 14 1.00 1.00 1.00 0.11	5.00 110 11.6 12 1.00 1.00 1.00 0.11	5.00 110 11.6 12 1.00 1.00 0.11	5.00 110 11.6 12 1.00 1.00 1.00 0.11	5.00 129 14.5 15 1.00 1.00 1.00 0.11	5.00 444 89.9 90 1.00 1.00 0.20
tial Calculations for the System as a whole  Primary supply air flow to system at conditioned analyzed UncorrectedOA requirement for system Uncorrected OA req'd as a fraction of primary SA tial Calculations for individual zones  OA rate per unit area for zone OA rate per person Total supply air to zone (at condition being analyzed) Unused OA req'd to breathing zone Unused OA requirement for zone Fraction of zone supply not directly recirc. from zone Fraction of zone supply from fully mixed primary air Fraction of zone OA not directly recirc. from zone Unused OA fraction required in supply air to zone Unused OA fraction required in primary air to zone	Vps Vou Xs Raz Rpz Vdz Vbz Voz Fa Fb Fc Zd	cfm cfm/sf cfm/p cfm cfm	= Rps Ps + Ras As = Vou / Vps = Rpz Pz + Raz Az = Vbz/Ez = Ep + (1-Ep)Er = Ep = 1-(1-Ez)(1-Ep)(1-Er) Voz / Vdz	= 1761 = 329 = 0.	0.06 5.00 132 15.0 15 1.00 1.00	5.00 128 14.5 14 1.00 1.00 1.00 0.11	5.00 110 11.6 12 1.00 1.00 0.11	5.00 110 11.6 12 1.00 1.00 0.11 0.11	5.00 110 11.6 12 1.00 1.00 1.00 0.11	5.00 129 14.5 15 1.00 1.00 0.11	5.00 444 89.9 90 1.00 1.00 0.20
tial Calculations for the System as a whole  Primary supply air flow to system at conditioned analyzed UncorrectedOA requirement for system Uncorrected OA req'd as a fraction of primary SA tial Calculations for individual zones  OA rate per unit area for zone OA rate per person Total supply air to zone (at condition being analyzed) Unused OA req'd to breathing zone Unused OA requirement for zone Fraction of zone supply not directly recirc. from zone Fraction of zone supply from fully mixed primary air Fraction of zone OA not directly recirc. from zone Unused OA fraction required in supply air to zone Unused OA fraction required in primary air to zone Unused OA fraction required in primary air to zone Unused OA fraction required in primary air to zone Ventilation Efficiency Zone Ventilation Efficiency (App A Method)	Vps Vou Xs Raz Rpz Vdz Vbz Voz Fa Fb Fc Zd Zp	cfm cfm/sf cfm/p cfm cfm	= Rps Ps + Ras As = Vou / Vps = Rpz Pz + Raz Az = Vbz/Ez = Ep + (1-Ep)Er = Ep = 1-(1-Ez)(1-Ep)(1-Er) = Voz / Vdz = Voz / Vpz = (Fa + FbXs - FcZ) / Fa	= 176: = 32! = 0.	0.06 5.00 132 15.0 15 1.00 1.00 0.11 0.11	5.00 128 14.5 14 1.00 1.00 0.11 0.11	5.00 110 11.6 12 1.00 1.00 0.11	5.00 110 11.6 12 1.00 1.00 0.11 0.11	5.00 110 11.6 12 1.00 1.00 0.11	5.00 129 14.5 15 1.00 1.00 0.11	5.00 444 89.9 90 1.00 1.00 0.20
tial Calculations for the System as a whole  Primary supply air flow to system at conditioned analyzed UncorrectedOA requirement for system Uncorrected OA requirement for system Uncorrected OA req'd as a fraction of primary SA tial Calculations for individual zones  OA rate per unit area for zone OA rate per person Total supply air to zone (at condition being analyzed) Unused OA req'd to breathing zone Unused OA req'd to breathing zone Fraction of zone supply not directly recirc. from zone Fraction of zone supply from fully mixed primary air Fraction of zone OA not directly recirc. from zone Unused OA fraction required in supply air to zone Unused OA fraction required in primary air to zone Unused OA fraction required in primary air to zone System Ventilation Efficiency (App A Method) System Ventilation Efficiency (App A Method)	Vps Vou Xs Raz Rpz Vdz Vbz Voz Fa Fb Fc Zd	cfm cfm/sf cfm/p cfm cfm	= Rps Ps + Ras As = Vou / Vps = Rpz Pz + Raz Az = Vbz/Ez = Ep + (1-Ep)Er = Ep = 1-(1-Ez)(1-Ep)(1-Er) = Voz / Vdz = Voz / Vpz = (Fa + FbXs - FcZ) / Fa	= 176: = 32: = 0.	0.06 5.00 132 15.0 15 1.00 1.00 0.11 0.11	5.00 128 14.5 14 1.00 1.00 0.11 0.11	5.00 110 11.6 12 1.00 1.00 0.11	5.00 110 11.6 12 1.00 1.00 0.11 0.11	5.00 110 11.6 12 1.00 1.00 0.11	5.00 129 14.5 15 1.00 1.00 0.11	5.00 444 89.9 90 1.00 1.00 0.20
itial Calculations for the System as a whole  Primary supply air flow to system at conditioned analyzed UncorrectedOA requirement for system Uncorrected OA req'd as a fraction of primary SA itial Calculations for individual zones  OA rate per unit area for zone OA rate per person Total supply air to zone (at condition being analyzed) Unused OA req'd to breathing zone Unused OA requirement for zone Fraction of zone supply not directly recirc. from zone Fraction of zone supply from fully mixed primary air Fraction of zone OA not directly recirc. from zone Unused OA fraction required in supply air to zone Unused OA fraction required in primary air to zone Unused OA fraction required in primary air to zone Ventilation Efficiency Zone Ventilation Efficiency (App A Method) System Ventilation Efficiency (Table 6.3 Method)	Vps Vou Xs Raz Rpz Vdz Vbz Voz Fa Fb Czd Zp	cfm cfm/sf cfm/p cfm cfm	= Rps Ps + Ras As = Vou / Vps = Rpz Pz + Raz Az = Vbz/Ez = Ep + (1-Ep)Er = Ep = 1-(1-Ez)(1-Ep)(1-Er) = Voz / Vdz = Voz / Vpz = (Fa + FbXs - FcZ) / Fa = min (Evz)	= 176: = 32! = 0.*	0.06 5.00 132 15.0 15 1.00 1.00 0.11 0.11	5.00 128 14.5 14 1.00 1.00 0.11 0.11	5.00 110 11.6 12 1.00 1.00 0.11	5.00 110 11.6 12 1.00 1.00 0.11 0.11	5.00 110 11.6 12 1.00 1.00 0.11	5.00 129 14.5 15 1.00 1.00 0.11	5.00 444 89.9 90 1.00 1.00 0.20
rial Calculations for the System as a whole  Primary supply air flow to system at conditioned analyzed UncorrectedOA requirement for system Uncorrected OA req'd as a fraction of primary SA tital Calculations for individual zones  OA rate per unit area for zone OA rate per person Total supply air to zone (at condition being analyzed) Unused OA req'd to breathing zone Unused OA requirement for zone Fraction of zone supply not directly recirc. from zone Fraction of zone supply from fully mixed primary air Fraction of zone OA not directly recirc. from zone Unused OA fraction required in supply air to zone Unused OA fraction required in primary air to zone Unused OA fraction required in primary air to zone Vertilation Efficiency Zone Ventilation Efficiency (App A Method) System Ventilation Efficiency (Table 6.3 Method) Ventilation System Efficiency (Table 6.3 Method) Inimum outdoor air intake airflow	Vps Vou Xs Raz Rpz Vdz Vbz Voz Fa Fb Fc Zd Zp Evz Ev	cfm cfm/sf cfm/p cfm cfm	= Rps Ps + Ras As = Vou / Vps = Rpz Pz + Raz Az = Vbz/Ez = Ep + (1-Ep)Er = Ep = 1-(1-Ez)(1-Ep)(1-Er) = Voz / Vdz = Voz / Vpz = (Fa + FbXs - FcZ) / Fa = min (Evz) = Value from Table 6.3	= 176: = 32: = 0.	0.06 5.00 132 15.0 1.00 1.00 1.00 0.11 0.11	5.00 128 14.5 14 1.00 1.00 0.11 0.11	5.00 110 11.6 12 1.00 1.00 0.11	5.00 110 11.6 12 1.00 1.00 0.11 0.11	5.00 110 11.6 12 1.00 1.00 0.11	5.00 129 14.5 15 1.00 1.00 0.11	5.00 444 89.9 90 1.00 1.00 0.20
itial Calculations for the System as a whole  Primary supply air flow to system at conditioned analyzed UncorrectedOA requirement for system Uncorrected OA reqi'd as a fraction of primary SA  itial Calculations for individual zones  OA rate per unit area for zone OA rate per person Total supply air to zone (at condition being analyzed) Unused OA reqi'd to breathing zone Unused OA requirement for zone Fraction of zone supply not directly recirc. from zone Fraction of zone supply from fully mixed primary air Fraction of zone OA not directly recirc. from zone Unused OA fraction required in supply air to zone Unused OA fraction required in primary air to zone Unused OA fraction required in primary air to zone Ventilation Efficiency Zone Ventilation Efficiency (App A Method) System Ventilation Efficiency (Table 6.3 Method) inimum outdoor air intake airflow Outdoor Air Intake Flow required to System	Vps Vou Xs Raz Rpz Vdz Vbz Voz Fa Fb Czd Zp Evz Evz Ev	cfm cfm/sf cfm/p cfm cfm cfm	= Rps Ps + Ras As = Vou / Vps = Rpz Pz + Raz Az = Vbz/Ez = Ep + (1-Ep)Er = Ep = 1-(1-Ez)(1-Ep)(1-Er) = Voz / Vdz = Voz / Vpz = (Fa + FbXs - FcZ) / Fa = min (Evz) = Value from Table 6.3 = Vou / Ev	= 176: = 32: = 0.: = = = = = = = = = = = = = = 0.8 = 0.7	0.06 5.00 132 15.0 15 1.00 1.00 0.11 0.11	5.00 128 14.5 14 1.00 1.00 0.11 0.11	5.00 110 11.6 12 1.00 1.00 0.11	5.00 110 11.6 12 1.00 1.00 0.11 0.11	5.00 110 11.6 12 1.00 1.00 0.11	5.00 129 14.5 15 1.00 1.00 0.11	5.00 444 89.9 90 1.00 1.00 0.20
Uncorrected OA requirement for system Uncorrected OA reqid as a fraction of primary SA  itital Calculations for individual zones OA rate per unit area for zone OA rate per person Total supply air to zone (at condition being analyzed) Unused OA reqid to breathing zone Unused OA requirement for zone Fraction of zone supply not directly recirc. from zone Fraction of zone supply from fully mixed primary air Fraction of zone OA not directly recirc. from zone Unused OA fraction required in supply air to zone Unused OA fraction required in supply air to zone Unused OA fraction required in primary air to zone ystem Ventilation Efficiency Zone Ventilation Efficiency (App A Method) System Ventilation Efficiency (Table 6.3 Method) Ventilation System Efficiency (Table 6.3 Method) linimum outdoor air Intake airflow Outdoor Air Intake Ilow required to System OA intake req'd as a fraction of primary SA	Vps Vou Xs Raz Rpz Vdz Vbz Voz Fa Fb C Zd Zp Evz Ev Ev	cfm cfm/sf cfm/p cfm cfm cfm	= Rps Ps + Ras As = Vou / Vps = Rpz Pz + Raz Az = Vbz/Ez = Ep + (1-Ep)Er = Ep = 1-(1-Ez)(1-Ep)(1-Er) = Voz / Vdz = Voz / Vpz = (Fa + FbXs - FcZ) / Fa = min (Evz) = Value from Table 6.3 = Vou / Ev = Vot / Vps	= 176i = 32! = 0.* = = = = = = = = = = = = = = = = = = 0.8 = 0.7 = 40: = 0.3	0.06 5.00 132 15.0 15.0 1.00 1.00 1.00 1.11 0.11	5.00 128 14.5 14 1.00 1.00 0.11 0.11	5.00 110 11.6 12 1.00 1.00 0.11	5.00 110 11.6 12 1.00 1.00 0.11 0.11	5.00 110 11.6 12 1.00 1.00 0.11	5.00 129 14.5 15 1.00 1.00 0.11	5.00 444 89.9 90 1.00 1.00 0.20
Itial Calculations for the System as a whole  Primary supply air flow to system at conditioned analyzed UncorrectedOA requirement for system Uncorrected OA req'd as a fraction of primary SA  Itial Calculations for individual zones  OA rate per unit area for zone OA rate per person Total supply air to zone (at condition being analyzed) Unused OA req'd to breathing zone Unused OA reqid to breathing zone Unused OA requirement for zone Fraction of zone supply not directly recirc. from zone Fraction of zone supply from fully mixed primary air Fraction of zone OA not directly recirc. from zone Unused OA fraction required in supply air to zone Unused OA fraction required in supply air to zone Unused OA fraction required in primary air to zone ystem Ventilation Efficiency Zone Ventilation Efficiency (App A Method) System Ventilation Efficiency (App A Method) Ventilation System Efficiency (Table 6.3 Method) inimum outdoor air intake airflow OA intake req'd as a fraction of primary SA Outdoor Air Intake Flow required to System (Table 6.3 Method)	Vps Vou Xs Raz Rpz Vdz Vbz Voz Fa Fb Fc Zd Zp Evz Ev Ev Vot Yot	cfm cfm/sf cfm/p cfm cfm cfm	= Rps Ps + Ras As = Vou / Vps = Rpz Pz + Raz Az = Vbz/Ez = Ep + (1-Ep)Er = Ep = 1-(1-Ez)(1-Ep)(1-Er) = Voz / Vdz = Voz / Vpz = (Fa + FbXs - FcZ) / Fa = min (Evz) = Value from Table 6.3 = Vou / Ev = Vot / Vps = Vou / Ev	= 176; = 32! = 0.* = = = = = = = = = = = = = = 0.8 = 0.7 = 40: = 42!	0.06 5.00 132 15.00 1.00 1.00 0.11 0.11 1.07 2 8	5.00 128 14.5 14 1.00 1.00 0.11 0.11	5.00 110 11.6 12 1.00 1.00 0.11	5.00 110 11.6 12 1.00 1.00 0.11 0.11	5.00 110 11.6 12 1.00 1.00 0.11	5.00 129 14.5 15 1.00 1.00 0.11	5.00 444 89.9 90 1.00 1.00 0.20
Itial Calculations for the System as a whole  Primary supply air flow to system at conditioned analyzed UncorrectedOA requirement for system Uncorrected OA req'd as a fraction of primary SA  Itial Calculations for individual zones  OA rate per unit area for zone OA rate per person Total supply air to zone (at condition being analyzed) Unused OA req'd to breathing zone Unused OA requirement for zone Fraction of zone supply not directly recirc. from zone Fraction of zone supply from fully mixed primary air Fraction of zone oA not directly recirc. from zone Unused OA fraction required in supply air to zone Unused OA fraction required in primary air to zone Unused OA fraction required in primary air to zone ystem Ventilation Efficiency Zone Ventilation Efficiency (App A Method) System Ventilation Efficiency (Table 6.3 Method) inimum outdoor air intake airflow Outdoor Air Intake Ilow required to System OA intake req'd as a fraction of primary SA	Vps Vou Xs Raz Rpz Vdz Vbz Voz Fa Fb Fc Zd Zp Evz Ev Ev Vot Yot	cfm cfm/sf cfm/p cfm cfm cfm	= Rps Ps + Ras As = Vou / Vps = Rpz Pz + Raz Az = Vbz/Ez = Ep + (1-Ep)Er = Ep = 1-(1-Ez)(1-Ep)(1-Er) = Voz / Vdz = Voz / Vpz = (Fa + FbXs - FcZ) / Fa = min (Evz) = Value from Table 6.3 = Vou / Ev = Vot / Vps	= 176i = 32! = 0.* = = = = = = = = = = = = = = = = = = 0.8 = 0.7 = 40: = 0.3	0.06 5.00 132 15.00 1.00 1.00 0.11 0.11 1.07 2 8	5.00 128 14.5 14 1.00 1.00 0.11 0.11	5.00 110 11.6 12 1.00 1.00 0.11	5.00 110 11.6 12 1.00 1.00 0.11 0.11	5.00 110 11.6 12 1.00 1.00 0.11	5.00 129 14.5 15 1.00 1.00 0.11	5.00 444 89.9 90 1.00 1.00 0.20

Building:	DMA										
System Tag/Name:	ZONE I	Н									
Operating Condition Description:	IP										
Units (select from pull-down list)	IP										
Inputs for System	Name	<u>Units</u>		Syste	m						
Floor area served by system	As	sf		197	88						
Population of area served by system (including diversity)	Ps	Р	100% diversity		91						
Design primary supply fan airflow rate	Vpsd	cfm		17,6							
OA req'd per unit area for system (Weighted average)	Ras	cfm/sf			10						
OA req'd per person for system area (Weighted average)	Rps	cfm/p			7.3						
Inputs for Potentially Critical zones					E238A	F238B-OPEN	E240-OFFICE	E241	F242-OFFICE	E243-OFFICE	F245-OFFICE
Zone Name	Zone tit	tle turns p	urple italic for critical zone(s)			OFFICE					
Zone Tag					29 Media center	30 Media center	31 Office space	32 Office space	33 Office space	34 Office space	35 Office space
Space type			om pull-down list					-	•	-	•
Floor Area of zone	Az	sf			1,91		140	140	141	141	147
Design population of zone	Pz		(default value listed; may be ove	erridden)	1		0.7	0.7	0.705	0.705	0.735
Design total supply to zone (primary plus local recirculated)	Vdzd	cfm	and well alone that an large black	: 6 N I / A	1,05	6 885	115	115	115	115	119
Induction Terminal Unit, Dual Fan Dual Duct or Transfer Fan?  Local recirc. air % representative of ave system return air	Er	Select II	om pull-down list or leave blank	IT IN/A	750	750/	750/.	750/.	750/	750/	75%
Inputs for Operating Condition Analyzed	LI				73,	70 70	1370	7 3 /0	1370	1370	1370
Percent of total design airflow rate at conditioned analyzed	Ds	%		10	0% 1009	% 100%	100%	100%	100%	100%	100%
Air distribution type at conditioned analyzed		Select fr	om pull-down list		C		CS	CS	CS	CS	CS
Zone air distribution effectiveness at conditioned analyzed	Ez				1.0	0 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			0.8	82						
Outdoor air intake required for system	Vot	cfm		40:							
Outdoor air per unit floor area	Vot/As	cfm/sf		0.:							
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		2	3%						
Detailed Calculations											
Initial Calculations for the System as a whole											
Primary supply air flow to system at conditioned analyzed	Vps	cfm	= VpdDs	= 176	75						
UncorrectedOA requirement for system	Vou	cfm	= Rps Ps + Ras As		94						
Uncorrected OA req'd as a fraction of primary SA	Xs		= Vou / Vps	= 0	19						
Initial Calculations for individual zones	_							0.00	0.00		0.00
OA rate per unit area for zone	Raz	cfm/sf			0.1						
OA rate per person Total supply air to zone (at condition being analyzed)	Rpz Vdz	cfm/p cfm			10.0 105						
Unused OA reg'd to breathing zone	Vuz	cfm	= Rpz Pz + Raz Az	_	369.						
Unused OA requirement for zone	Voz	cfm	= Vbz/Ez	_	36						
Fraction of zone supply not directly recirc. from zone	Fa	*****	= Ep + (1-Ep)Er	=	1.0						
Fraction of zone supply from fully mixed primary air	Fb		= Ep	=	1.0						
Fraction of zone OA not directly recirc. from zone	Fc		= 1-(1-Ez)(1-Ep)(1-Er)	=	1.0	0 1.00	1.00	1.00	1.00	1.00	1.00
Unused OA fraction required in supply air to zone	Zd		= Voz / Vdz	=	0.3	5 0.23	0.10	0.10	0.10	0.10	0.11
Unused OA fraction required in primary air to zone	Zp		= Voz / Vpz	=	0.3	5 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	=	0.8	4 0.96	1.08	1.08	1.08	1.08	1.08
System Ventilation Efficiency (App A Method)	Ev Ev		= min (Evz)	= 0.8							
Ventilation System Efficiency (Table 6.3 Method)  Minimum outdoor air intake airflow	cv		= Value from Table 6.3	= 0.7	0						
Outdoor Air Intake Airnow  Outdoor Air Intake Flow required to System	Vot	cfm	= Vou / Ev	= 40	22						
OA intake reg'd as a fraction of primary SA	Y	J	= Vot / Vps		23						
Outdoor Air Intake Flow required to System (Table 6.3 Method)		cfm	= Vou / Ev		09						
OA intake req'd as a fraction of primary SA (Table 6.3 Method)			= Vot / Vps		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 I	Н									
Operating Condition Description:											
Units (select from pull-down list)	IP										
Inputs for System	Name	Units		Syster	n						
Floor area served by system	As	sf	<u></u>	197							
Population of area served by system (including diversity)	Ps	Р	100% diversity	1							
Design primary supply fan airflow rate	Vpsd	cfm		17,6							
OA req'd per unit area for system (Weighted average)	Ras	cfm/sf		0.							
OA req'd per person for system area (Weighted average)	Rps	cfm/p			7.3						
Inputs for Potentially Critical zones					E246-BREAK	E279S	E280S	E281S	E282S	E283S	E284S
Zone Name	Zone tit	tle turns p	urple italic for critical zone(s)		ROOM						
Zone Tag					36 Conference/m	37 Office space	38 Office space	39 Corridors	40 Office space	41 Office space	42 Office space
Space type			om pull-down list		eeting	,	•		-	•	
Floor Area of zone	Az	sf			289	137	137	88	139	139	138
Design population of zone	Pz Vdzd		(default value listed; may be over	erridden)	14.45 1,381	0.685	0.685 150	22	0.695 128	0.695 111	0.69
Design total supply to zone (primary plus local recirculated) Induction Terminal Unit, Dual Fan Dual Duct or Transfer Fan?	vaza	cfm	om null down list or loove blank	if NI/A	1,361	140	150		128	111	
Local recirc. air % representative of ave system return air	Er	Selectii	om pull-down list or leave blank	II IN/A	75%	75%	75%	75%	75%	75%	75%
Inputs for Operating Condition Analyzed					1370	7 3 70	7 3 70	1070	7570	7570	7570
Percent of total design airflow rate at conditioned analyzed	Ds	%		100		100%	100%	100%	100%	100%	100%
Air distribution type at conditioned analyzed		Select fr	om 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	1.00
Primary air fraction of supply air at conditioned analyzed  Results	Ep										
Ventilation System Efficiency	Ev			0.0	2						
Outdoor air intake required for system	Vot	cfm		402	2						
Outdoor air per unit floor area	Vot/As	cfm/sf		0.2	0						
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	<b>3%</b>						
Detailed Calculations											
Initial Calculations for the System as a whole											
Primary supply air flow to system at conditioned analyzed	Vps	cfm	= VpdDs	= 176	75						
UncorrectedOA requirement for system	Vou	cfm	= Rps Ps + Ras As	= 32							
Uncorrected OA req'd as a fraction of primary SA	Xs		= Vou / Vps	= 0.	19						
Initial Calculations for individual zones	_				0.00		0.00				0.00
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		5.00	0.00			5.00 111
Total supply air to zone (at condition being analyzed) Unused OA req'd to breathing zone	Vdz Vbz	cfm cfm	= Rpz Pz + Raz Az	_	1381 89.6			5.3			1117
Unused OA requirement for zone	Voz	cfm	= Kpz Pz + Kaz Az = Vbz/Ez	=	90			5.3 5			11.7
Fraction of zone supply not directly recirc. from zone	Fa	OIIII	= Ep + (1-Ep)Er	_	1.00			1.00			1.00
Fraction of zone supply from fully mixed primary air	Fb		= Ep + (1-Lp)L1	=	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	=	0.06		0.08	0.24			0.11
Unused OA fraction required in primary air to zone	Zp		= Voz / Vpz	=	0.06			0.24			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)	= 0.8							
Ventilation System Efficiency (Table 6.3 Method)  Minimum outdoor air intake airflow	Ev		= Value from Table 6.3	= 0.7	8						
Outdoor Air Intake Airriow  Outdoor Air Intake Flow required to System	Vot	cfm	= Vou / Ev	= 40	22						
Outdoor Air Intake Flow required to System  OA intake reg'd as a fraction of primary SA	Y	CIIII	= Vou / EV = Vot / Vps	= 40							
Outdoor Air Intake Flow required to System (Table 6.3 Method)		cfm	= Voi / Vps = Vou / Ev	= 42							
OA intake reg'd as a fraction of primary SA (Table 6.3 Method)		J	= Vot / Vps	= 0.							
OA Temp at which Min OA provides all cooling				Ů.							
OAT below which OA Intake flow is @ minimum		Deg F	= ${(Tp-dTsf)-(1-Y)*(Tr+dTrf)}$	=	-3						

Duilding	DMA							
Building: System Tag/Name:	DMA ZONE I							
Operating Condition Description:	ZUNE	1						
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	Р		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) Inputs for Potentially Critical zones	Rps	cfm/p			7.3			
Zone Name	Zone tit	tle turns į	ourple	e italic for critical zone(s)		E285S	E286S	E287
Zone Tag						43	44	45
Space type		Salacti	rom r	oull-down list		Office space	Corridors	Office space
Floor Area of zone	Az	sf	ioni	Juli-down list		138	88	318
Design population of zone	Pz	P	(def	ault value listed; may be ove	erridden)	0.69	0	1.59
Design total supply to zone (primary plus local recirculated)	Vdzd	cfm	(GOI	aan raido notou, may be ovi		127	22	134
Induction Terminal Unit, Dual Fan Dual Duct or Transfer Fan?	· uzu		rom r	oull-down list or leave blank	if N/A	12.		
Local recirc. air % representative of ave system return air	Er	30.000	þ	DIAM NOT OF TOUTO DIGITAL		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 f	rom p	oull-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	Ev				0.82			
Ventilation System Efficiency	Ev Vot	cfm			4022			
Outdoor air intake required for system Outdoor air per unit floor area	Vot/As				0.20			
Outdoor air per unit noor area  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 from fully mixed primary oil	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 Unused OA fraction required in supply air to zone	Fc Zd		=	1-(1-Ez)(1-Ep)(1-Er) Voz / Vdz	=	1.00 0.09	1.00 0.24	1.00 0.20
Unused OA fraction required in supply air to zone Unused OA fraction required in primary air to zone	Za Zp		=	Voz / Vaz Voz / Vpz	=	0.09	0.24	0.20
System Ventilation Efficiency	2p			νος / νρε		0.09	0.24	0.20
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		2.00	
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	Υ		=	Vot / Vps	= 0.23			
Outdoor Air Intake Flow required to System (Table 6.3 Method)		cfm	=	Vou / Ev	= 4209			
OA intake req'd as a fraction of primary SA (Table 6.3 Method)	Υ		=	Vot / Vps	= 0.24			
OA Temp at which Min OA provides all cooling		D		(/T   T-0				
OAT below which OA Intake flow is @ minimum		Deg F	=	{(Tp-dTsf)-(1-Y)*(Tr+dTrf	= -3			

System Tray Names   Computer for the part down Its)   Fig.   Fi	Building:	DMA											
The production of an arrival type system   Page	System Tag/Name:		J										
Part   Computer   Incident   Computer   Incident   Computer   Incident   Computer   Incident   In	Operating Condition Description:												
Proportion of rotal search by system   Pack   Pac	Units (select from pull-down list)	IP											
Percent of area somethy system (including deverage)   Page   Page   Page   1000   10	Inputs for System	Name	Units		5	System							
Design primary supply that million rate   OA red of per person for system area (Weighted average)   Ras	Floor area served by system	As	sf			12208							
OA regit per unit ainen for system (Weighted average) OA regit per person for system (Weighted average) Payors for Presentable Critical zones Spice type S	Population of area served by system (including diversity)	Ps	Р	100% diversity		79							
A registry persons for persons for presents in the present of the system as a (Weighted average)   A registry persons are present as a conditioned analyzed   A registry persons are persons are persons are persons as whether a persons are persons as whether a persons are person	Design primary supply fan airflow rate	Vpsd	cfm			12,095							
Page	OA req'd per unit area for system (Weighted average)	Ras	cfm/sf			0.09							
A consistent of the control purple of the control purple down list   1		Rps	cfm/p			7.1							
Capital Content   Capital Co													
Space type  Figure from et zone Design road support plus local recirculated induction of zone Design road support plus local recirculated induction from the Composition of zone Design road support plus local recirculated induction from the Composition of zone Design road support plus local recirculated induction from the Composition of zone Design road support plus local recirculated induction of zone Design road support plus local recirculated induction of zone Design road support plus local recirculated induction of zone Design road support plus local recirculated induction of zone Design road support plus local recirculated induction of zone Design road support plus local recirculated induction of zone Design road support plus local recirculated plus local reci		Zone ti	tle turns p	urple italic for critical zone(s)									W114
Splace type   Floor Area of zone   Percent of zo	Zone Tag												
Select from pull-down list   Select from pu	Snace type						Computer lab	-					Computer lab
Poor Area of zone   Poor	Space type		Salact fr	om pull-down list				TOOMS	Studios	Studios	Studios	Studios	
Design population of zone   Pz   Design population of zone   Pz   Design potal supply to zone (primary plus local recirculated) induction Terminal Unit, Dual Fan Dual Duct or Transfer Fan'   Select from pull-down list or leave blank if N/A   Select from pull-down list or leave blank if N/A   Select from pull-down list or leave blank if N/A   Select from pull-down list or leave blank if N/A   Select from pull-down list or leave blank if N/A   Select from pull-down list or leave blank if N/A   Select from pull-down list or leave blank if N/A   Select from pull-down list   Select from pull-	Floor Area of zone	Δ7		om pan-down nat			252	238	90	90	1158	204	231
Design total supply to zone (primary plus local recirculated) Induction Trainfall Unit, Dutal Family but Seed recirculated induction Trainfall Unit, Dutal Family Seed of trom pull-down list or leave blank if NA				(default value listed: may be over	erridd	len)	5	230		2	8	7	6
Induction Terminal Unit, Dual Fan Dual Duct or Transfer Fan?   Coat recor, at % propensitive of any system return air remarks for Operating Condition Analyzed Percent of total design and tota				(ac.adit value listed, may be ove	Jinuu	,	586	125	-	396	695	260	270
Local recirc, air % perpenditative of ave system return air Er     75%				om pull-down list or leave blank	if N/A		555		000	555	555	200	2.0
Percent of total design affine analyzed   Percent of total design affine wate at conditioned analyzed   Percent of total design affine wate at conditioned analyzed   Percent of total design affine water at conditioned analyzed   Percent of total design affine water analyzed   Percent of the water analyzed   Percent		Er	00.000	om pan down not or loave blaint	,,,	•	75%		75%	75%	75%	75%	75%
Percent of total design airflow rate at conditioned analyzed Air distribution type at conditioned analyzed E   Select from pull-down list   Select from pull-do													
Zone air distribution effectiveness at conditioned analyzed E2   1.00		Ds	%			100%	100%	100%	100%	100%	100%	100%	100%
Primary air fraction of supply air at conditioned analyzed   Ep	Air distribution type at conditioned analyzed		Select fr	om pull-down list			CS	CS	CS	CS	CS	CS	CS
Venilation System Efficiency	Zone air distribution effectiveness at conditioned analyzed	Ez					1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ventilation System Efficiency	Primary air fraction of supply air at conditioned analyzed	Ep						100%					
Outdoor air prave full foor area of the present served by system (including diversity) VoVPs of more o	Results												
Outdoor air per person served by system (including diversity) VoVPs cm													
Outdoor air per person served by system (including diversity)													
Detailed Calculations   Detailed Calculations   Detailed Calculations   Detailed Calculations   The System as a whole													
Detailed Calculations initial Calculations for the System as a whole  Primary supply air flow to system at conditioned analyzed Vps cfm = Rps Ps + Ras As = 1686 Uncorrected OA requirement for system Vou cfm = Rps Ps + Ras As = 1686 Uncorrected OA requirement for system Vou cfm = Rps Ps + Ras As = 1686 Uncorrected OA requirement for system Vou vps = 0.14  Initial Calculations for Individual zones  OA rate per person  OA rate per person  Total supply air to zone (at condition being analyzed) Vdz cfm = Rpz Pz + Rax Az = 10.00 0.00 10.00													
Initial Calculations for the System as a whole	Outdoor air as a % of design primary supply air	Ypd	cfm			17%							
Primary supply air flow to system at conditioned analyzed   Vps   cfm   = VpdDs   = 12095	Detailed Calculations												
Uncorrected OA requirement for system													
Uncorrected OA req'd as a fraction of primary SA Xs = Vou / Vps = 0.14   Initial Calculations for individual zones   National Calculations for individual zone   National Calculations   National C		•			=								
Initial Calculations for Individual zones			cfm		=								
OA rate per unit area for zone		Xs		= Vou / Vps	=	0.14							
OA rate per person  OA oa rate per person  OA company  10.00  0.00  10.		_											
Total supply air to zone (at condition being analyzed)  Vdz	·												
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 OA not directly recirc. from zone  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 0.07 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 0.07 0.22 0.32 0.32  System Ventilation Efficiency  Zone 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  OA intake req'd as a fraction of primary SA  V = 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  OA intake req'd as a fraction of primary SA (Table 6.3 Method)  Vot cfm = Vou / Ev = 2044  OA intake req'd as a fraction of primary SA (Table 6.3 Method)  Vot Cfm = Vou / Ev = 2044  OA intake req'd as a fraction of primary SA (Table 6.3 Method)  Vot Cfm = Vou / Ev = 2044  OA intake req'd as a fraction of primary SA (Table 6.3 Method)  Vot Cfm = Vou / Ev = 2044  OA intake req'd as a fraction of primary SA (Table 6.3 Method)  Vot Cfm = Vou / Ev = 2044  OA intake req'd as a fraction of primary SA (Table 6.3 Method)  Vot Cfm = Vou / Ev = 2044  OA intake req'd as a fraction of primary SA (Table 6.3 Method)  Vot Cfm = Vou / Ev = 2044  OA intake req'd as a fraction of primary SA (Table 6.3 Method)  Find Table 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)  Vot Cfm = Vou / Vps = 0.17  OA intake req'd as a fraction of primary SA (Table 6.3 Method)  Vot Cfm = Vot													
Unused OA requirement for zone  Unused OA requirement for zone supply not directly recirc. from zone  Fa  EP + (1-Ep)Er  ED  EP + (1-Ep)Er  ED  EP + (1-Ep)Er  ED  ED  ED  ED  ED  ED  ED  ED  ED													
Fraction of zone supply not directly recirc. from zone													
Fraction of zone supply from fully mixed primary air  Fb			ctm										
Fraction of zone OA not directly recirc. from zone Fc = 1-(1-Ez)(1-Ep)(1-Ep) = 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.					=								
Unused OA fraction required in supply air to zone				•	=								
Unused OA fraction required in primary air to zone					=								
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  Outdoor Air Intake Flow required to System  Vot cfm = Vou / Ev = 2070  OA intake req'd as a fraction of primary SA  OA intake req'd as a fraction of primary SA (Table 6.3 Method)  OA intake req'd as a fraction of primary SA (Table 6.3 Method)  OA temp at which Min OA provides all cooling													
Zone Ventilation Efficiency (App A Method) 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 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) OA intake req'd as a fraction of primary SA (Table 6.3 Method) Vot cfm = Vou / Ev = 2044 OA intake req'd as a fraction of primary SA (Table 6.3 Method) OA Temp at which Min OA provides all cooling		Zp		= Voz / Vpz	=		0.14	0.23	0.07	0.07	0.22	0.32	0.32
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  OA intake req'd as a fraction of primary SA  OA intake req'd as a fraction of primary SA  OA intake req'd as a fraction of primary SA  OA intake req'd as a fraction of primary SA  OA intake req'd as a fraction of primary SA  OA Temp at which Min OA provides all cooling		F		(Fo : FbVo Fo7) (F-			4.00	0.01	4.07	4.07	0.00	0.00	0.04
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				,	=	0.04	1.00	0.91	1.07	1.07	0.92	0.82	0.81
Minimum outdoor air Intake airflow  Outdoor Air Intake Flow required to System  OA intake req'd as a fraction of primary SA  Outdoor Air Intake Flow required to System (Table 6.3 Method)  OA intake req'd as a fraction of primary SA (Table 6.3 Method)  OA intake req'd as a fraction of primary SA (Table 6.3 Method)  OA Temp at which Min OA provides all cooling					=								
Outdoor Air Intake Flow required to System  OA intake req'd as a fraction of primary SA  OUtdoor Air Intake Flow required to System (Table 6.3 Method)  OA intake req'd as a fraction of primary SA (Table 6.3 Method)  OA intake req'd as a fraction of primary SA (Table 6.3 Method)  OA Temp at which Min OA provides all cooling		EV		- value from rable 6.3	_	0.63							
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		Vot	cfm	= Vou / Ev	_	2070							
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			CIIII										
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			cfm		_		26 F2						
OA Temp at which Min OA provides all cooling			CITT										
					_	0.17	0.01						
	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		Syste	em							
Floor area served by system	As	sf			208							
Population of area served by system (including diversity)	Ps	Р	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				· ·								Potentially C
Zone Name	Zone ti	tle turns p	urple italic for critical zone(s)		W107		W116	W118	W126	W127	W128	W129
Zone Tag					New zone		lew zone ID	New zone ID	New zone ID	New zone ID	New zone ID	New zone ID
Change type					Comput		Storage	Booking/waiti	Stages,	Stages,	Stages,	Stages,
Space type		Salact fr	om pull-down list		(not print	ing)	rooms	ng	studios	studios	studios	studios
Floor Area of zone	Az	sf	om pun-down nat			358	205	187	389	81	90	81
Design population of zone	Pz		(default value listed; may be over	rridden)		4	0	3	4	1	1	1
Design total supply to zone (primary plus local recirculated)	Vdzd	cfm	(doladit value listed, may be ove	illadoli)		629	150	133	567	50	53	50
Induction Terminal Unit, Dual Fan Dual Duct or Transfer Fan?	VULU		om pull-down list or leave blank	if N/A		020	TF	100	001		00	
Local recirc. air % representative of ave system return air	Er	20.00011				75%	75%	75%	75%	75%	75%	75%
Inputs for Operating Condition Analyzed												
Percent of total design airflow rate at conditioned analyzed	Ds	%		10	10%	00%	100%	100%	100%	100%	100%	100%
Air distribution type at conditioned analyzed		Select fr	om 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				81							
Outdoor air intake required for system	Vot	cfm			70							
Outdoor air per unit floor area	Vot/As	cfm/sf			17							
Outdoor air per person served by system (including diversity)	Vot/Ps	cfm/p			6.2							
Outdoor air as a % of design primary supply air	Ypd	cfm			7%							
Detailed Calculations												
Initial Calculations for the System as a whole												
Primary supply air flow to system at conditioned analyzed	Vps	cfm	= VpdDs	= 12	095							
UncorrectedOA requirement for system	Vou	cfm	= Rps Ps + Ras As		686							
Uncorrected OA req'd as a fraction of primary SA	Xs		= Vou / Vps	= (	).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
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
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	F		(F- : F- ) - F-7) : F			4.07	0.00	6.00	4 00	0.01	0.05	6.04
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)		.81							
Ventilation System Efficiency (Table 6.3 Method)	Ev		= Value from Table 6.3	= 0	83							
Minimum outdoor air intake airflow	\/ot	ofm	- Vou / Ev		070							
Outdoor Air Intake Flow required to System	Vot	cfm	= Vou / Ev		070							
OA intake req'd as a fraction of primary SA	Y	ofm	= Vot / Vps		) <b>.17</b> 044							
Outdoor Air Intake Flow required to System (Table 6.3 Method)		cfm	= Vou / Ev									
OA intake req'd as a fraction of primary SA (Table 6.3 Method) OA Temp at which Min OA provides all cooling	Y		= Vot / Vps	= (	).17							
OAT below which OA Intake flow is @ minimum		Deg F	= {(Tp-dTsf)-(1-Y)*(Tr+dTrf	_	-27							
OAT DEIOW WHICH OA III.dke HOW IS @ HIIIIIIIIUIII		Degi	- ((1) (11+a11)	_	_1							

Building:	DMA										
System Tag/Name: Operating Condition Description:	ZONE	J									
Units (select from pull-down list)	IP										
Time (coloct from pair do thi not)											
Inputs for System	Name	<u>Units</u>		System							
Floor area served by system	As	sf		12208							
Population of area served by system (including diversity)	Ps	Р	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 ti	tle turns p	urple 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
					Stages,	Storage	Storage	Computer	Wood/metal	Office space	Office space
Space type					studios	rooms	rooms	(not printing)	shop		
			om pull-down list								
Floor Area of zone	Az	sf			90	78	768	100	1660	79	1390
Design population of zone	Pz	Р	(default value listed; may be over	erridden)	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 fr	om 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 fr	om 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 unit floor area  Outdoor air per person served by system (including diversity)	Vot/As Vot/Ps	cfm/sf cfm/p		0.17 26.2							
Outdoor air per person served by system (including diversity) Outdoor air as a % of design primary supply air	Vot/Ps	cfm/p		26.2							
Outdoor air per person served by system (including diversity) Outdoor air as a % of design primary supply air  Detailed Calculations	Vot/Ps	cfm/p		26.2							
Outdoor air per person served by system (including diversity) Outdoor air as a % of design primary supply air  Detailed Calculations Initial Calculations for the System as a whole	Vot/Ps Ypd	cfm/p cfm	- VodDs	26.2 17%							
Outdoor air per person served by system (including diversity) Outdoor air as a % of design primary supply air  Detailed Calculations Initial Calculations for the System as a whole Primary supply air flow to system at conditioned analyzed	Vot/Ps Ypd Vps	cfm/p cfm	= VpdDs	26.2 17% = 12095							
Outdoor air per person served by system (including diversity) Outdoor air as a % of design primary supply air  Detailed Calculations Initial Calculations for the System as a whole Primary supply air flow to system at conditioned analyzed UncorrectedOA requirement for system	Vot/Ps Ypd Vps Vou	cfm/p cfm	= Rps Ps + Ras As	26.2 17% = 12095 = 1686							
Outdoor air per person served by system (including diversity) Outdoor air as a % of design primary supply air  Detailed Calculations Initial Calculations for the System as a whole Primary supply air flow to system at conditioned analyzed UncorrectedOA requirement for system Uncorrected OA req'd as a fraction of primary SA	Vot/Ps Ypd Vps	cfm/p cfm	•	26.2 17% = 12095							
Outdoor air per person served by system (including diversity) Outdoor air as a % of design primary supply air  Detailed Calculations Initial Calculations for the System as a whole Primary supply air flow to system at conditioned analyzed UncorrectedOA requirement for system Uncorrected OA requirement for system Uncorrected OA requirement for system Initial Calculations for individual zones	Vot/Ps Ypd Vps Vou Xs	cfm/p cfm	= Rps Ps + Ras As	26.2 17% = 12095 = 1686		0.12	0.12	0.00	0.10	0.06	0.00
Outdoor air per person served by system (including diversity) Outdoor air as a % of design primary supply air  Detailed Calculations Initial Calculations for the System as a whole Primary supply air flow to system at conditioned analyzed UncorrectedOA requirement for system Uncorrected OA req'd as a fraction of primary SA Initial Calculations for individual zones OA rate per unit area for zone	Vot/Ps Ypd Vps Vou Xs Raz	cfm/p cfm  cfm  cfm  cfm	= Rps Ps + Ras As	26.2 17% = 12095 = 1686	0.06	0.12	0.12		0.18	0.06	
Outdoor air per person served by system (including diversity) Outdoor air as a % of design primary supply air  Detailed Calculations Initial Calculations for the System as a whole Primary supply air flow to system at conditioned analyzed UncorrectedOA requirement for system Uncorrected OA req'd as a fraction of primary SA Initial Calculations for individual zones OA rate per unit area for zone OA rate per person	Vot/Ps Ypd  Vps Vou Xs  Raz Rpz	cfm/p cfm  cfm  cfm  cfm/sf  cfm/p	= Rps Ps + Ras As	26.2 17% = 12095 = 1686	0.06 10.00	0.00	0.00	5.00	10.00	5.00	5.00
Outdoor air per person served by system (including diversity) Outdoor air as a % of design primary supply air  Detailed Calculations Initial Calculations for the System as a whole Primary supply air flow to system at conditioned analyzed UncorrectedOA requirement for system Uncorrected OA reqid as a fraction of primary SA Initial Calculations for individual zones OA rate per unit area for zone OA rate per person Total supply air to zone (at condition being analyzed)	Vot/Ps Ypd  Vps Vou Xs  Raz Rpz Vdz	cfm/p cfm  cfm  cfm  cfm/sf  cfm/p  cfm/p	= Rps Ps + Ras As = Vou / Vps	26.2 17% = 12095 = 1686 = 0.14	0.06 10.00 53	0.00 34	0.00 339	5.00 50	10.00 1222	5.00 48	5.00 1053
Outdoor air per person served by system (including diversity) Outdoor air as a % of design primary supply air  Detailed Calculations Initial Calculations for the System as a whole Primary supply air flow to system at conditioned analyzed UncorrectedOA requirement for system Uncorrected OA reqid as a fraction of primary SA Initial Calculations for individual zones OA rate per unit area for zone OA rate per soon Total supply air to zone (at condition being analyzed) Unused OA reqid to breathing zone	Vot/Ps Ypd  Vps Vou Xs  Raz Rpz Vdz Vbz	cfm/p cfm  cfm  cfm/sf  cfm/p  cfm/cfm	= Rps Ps + Ras As = Vou / Vps = Rpz Pz + Raz Az	26.2 17% = 12095 = 1686	0.06 10.00 53 15.4	0.00 34 9.4	0.00 339 92.2	5.00 50 8.0	10.00 1222 348.8	5.00 48 6.7	5.00 1053 133.4
Outdoor air per person served by system (including diversity) Outdoor air as a % of design primary supply air  Detailed Calculations Initial Calculations for the System as a whole Primary supply air flow to system at conditioned analyzed UncorrectedOA requirement for system Uncorrected OA requirement for system Uncorrected OA req'd as a fraction of primary SA Initial Calculations for individual zones OA rate per unit area for zone OA rate per person Total supply air to zone (at condition being analyzed) Unused OA req'd to breathing zone Unused OA requirement for zone	Vot/Ps Ypd  Vps Vou Xs  Raz Rpz Vdz Vbz Voz	cfm/p cfm  cfm  cfm  cfm/sf  cfm/p  cfm/p	= Rps Ps + Ras As = Vou / Vps = Rpz Pz + Raz Az = Vbz/Ez	26.2 17% = 12095 = 1686 = 0.14	0.06 10.00 53 15.4	0.00 34 9.4 9	0.00 339 92.2 92	5.00 50 8.0 8	10.00 1222 348.8 349	5.00 48 6.7 7	5.00 1053 133.4 133
Outdoor air per person served by system (including diversity) Outdoor air as a % of design primary supply air  Detailed Calculations Initial Calculations for the System as a whole Primary supply air flow to system at conditioned analyzed UncorrectedOA requirement for system Uncorrected OA req'd as a fraction of primary SA Initial Calculations for individual zones OA rate per unit area for zone OA rate per person Total supply air to zone (at condition being analyzed) Unused OA req'd to breathing zone Unused OA requirement for zone Fraction of zone supply not directly recirc. from zone	Vot/Ps Ypd  Vps Vou Xs  Raz Rpz Vdz Vbz Voz Fa	cfm/p cfm  cfm  cfm/sf  cfm/p  cfm/cfm	= Rps Ps + Ras As = Vou / Vps = Rpz Pz + Raz Az = Vbz/Ez = Ep + (1-Ep)Er	26.2 17% = 12095 = 1686 = 0.14	0.06 10.00 53 15.4 15	0.00 34 9.4 9 1.00	0.00 339 92.2 92 1.00	5.00 50 8.0 8 1.00	10.00 1222 348.8 349 1.00	5.00 48 6.7 7 1.00	5.00 1053 133.4 133 1.00
Outdoor air per person served by system (including diversity) Outdoor air as a % of design primary supply air  Detailed Calculations Initial Calculations for the System as a whole Primary supply air flow to system at conditioned analyzed UncorrectedOA requirement for system Uncorrected OA req'd as a fraction of primary SA Initial Calculations for individual zones OA rate per unit area for zone OA rate per person Total supply air to zone (at condition being analyzed) Unused OA req'd to breathing zone Unused OA requirement for zone Fraction of zone supply not directly recirc. from zone Fraction of zone supply from fully mixed primary air	Vot/Ps Ypd  Vps Vou Xs  Raz Rpz Vdz Vbz Voz Fa Fb	cfm/p cfm  cfm  cfm/sf  cfm/p  cfm/cfm	= Rps Ps + Ras As = Vou / Vps = Rpz Pz + Raz Az = Vbz/Ez = Ep + (1-Ep)Er = Ep	26.2 17% = 12095 = 1686 = 0.14	0.06 10.00 53 15.4 15 1.00	0.00 34 9.4 9 1.00	0.00 339 92.2 92 1.00 1.00	5.00 50 8.0 8 1.00	10.00 1222 348.8 349 1.00	5.00 48 6.7 7 1.00	5.00 1053 133.4 133 1.00 1.00
Outdoor air per person served by system (including diversity) Outdoor air as a % of design primary supply air  Detailed Calculations Initial Calculations for the System as a whole Primary supply air flow to system at conditioned analyzed UncorrectedOA requirement for system Uncorrected OA reqid as a fraction of primary SA Initial Calculations for individual zones OA rate per unit area for zone OA rate per person Total supply air to zone (at condition being analyzed) Unused OA reqid to breathing zone Unused OA requirement for zone Fraction of zone supply not directly recirc. from zone Fraction of zone supply from fully mixed primary air Fraction of zone OA not directly recirc. from zone	Vot/Ps Ypd  Vps Vou Xs  Raz Rpz Vdz Vbz Voz Fa Fb Fc	cfm/p cfm  cfm  cfm/sf  cfm/p  cfm/cfm	= Rps Ps + Ras As = Vou / Vps = Rpz Pz + Raz Az = Vbz/Ez = Ep + (1-Ep)Er = Ep = 1-(1-Ez)(1-Ep)(1-Er)	26.2 17% = 12095 = 1686 = 0.14	0.06 10.00 53 15.4 15 1.00 1.00	0.00 34 9.4 9 1.00 1.00	0.00 339 92.2 92 1.00 1.00	5.00 50 8.0 8 1.00 1.00	10.00 1222 348.8 349 1.00 1.00	5.00 48 6.7 7 1.00 1.00	5.00 1053 133.4 133 1.00 1.00
Outdoor air per person served by system (including diversity) Outdoor air as a % of design primary supply air  Detailed Calculations Initial Calculations for the System as a whole Primary supply air flow to system at conditioned analyzed UncorrectedOA requirement for system Uncorrected OA req'd as a fraction of primary SA Initial Calculations for individual zones OA rate per unit area for zone OA rate per person Total supply air to zone (at condition being analyzed) Unused OA req'd to breathing zone Unused OA requirement for zone Fraction of zone supply not directly recirc. from zone Fraction of zone OA not directly recirc. from zone Unused OA fraction required in supply air to zone	Vot/Ps Ypd  Vps Vou Xs  Raz Rpz Vdz Vbz Voz Fa Fb Fc Zd	cfm/p cfm  cfm  cfm/sf  cfm/p  cfm/cfm	= Rps Ps + Ras As = Vou / Vps = Rpz Pz + Raz Az = Vbz/Ez = Ep + (1-Ep)Er = Ep = 1-(1-Ez)(1-Ep)(1-Er) = Voz / Vdz	26.2 17% = 12095 = 1686 = 0.14	0.06 10.00 53 15.4 15 1.00 1.00	0.00 34 9.4 9 1.00 1.00 1.00 0.28	0.00 339 92.2 92 1.00 1.00 0.27	5.00 50 8.0 8 1.00 1.00 1.00 0.16	10.00 1222 348.8 349 1.00 1.00 0.29	5.00 48 6.7 7 1.00 1.00 1.00	5.00 1053 133.4 133 1.00 1.00 1.00 1.00 0.13
Outdoor air per person served by system (including diversity) Outdoor air as a % of design primary supply air  Detailed Calculations Initial Calculations for the System as a whole Primary supply air flow to system at conditioned analyzed Uncorrected OA requirement for system Uncorrected OA requirement for system Uncorrected OA reqid as a fraction of primary SA Initial Calculations for individual zones OA rate per unit area for zone OA rate per person Total supply air to zone (at condition being analyzed) Unused OA reqid to breathing zone Unused OA requirement for zone Fraction of zone supply from fully mixed primary air Fraction of zone OA not directly recirc. from zone Unused OA fraction required in supply air to zone Unused OA fraction required in supply air to zone Unused OA fraction required in primary air to zone	Vot/Ps Ypd  Vps Vou Xs  Raz Rpz Vdz Vbz Voz Fa Fb Fc	cfm/p cfm  cfm  cfm/sf  cfm/p  cfm/cfm	= Rps Ps + Ras As = Vou / Vps = Rpz Pz + Raz Az = Vbz/Ez = Ep + (1-Ep)Er = Ep = 1-(1-Ez)(1-Ep)(1-Er)	26.2 17% = 12095 = 1686 = 0.14	0.06 10.00 53 15.4 15 1.00 1.00	0.00 34 9.4 9 1.00 1.00	0.00 339 92.2 92 1.00 1.00	5.00 50 8.0 8 1.00 1.00 1.00 0.16	10.00 1222 348.8 349 1.00 1.00	5.00 48 6.7 7 1.00 1.00	5.00 1053 133.4 133 1.00 1.00 1.00 1.00 0.13
Outdoor air per person served by system (including diversity) Outdoor air as a % of design primary supply air  Detailed Calculations Initial Calculations for the System as a whole Primary supply air flow to system at conditioned analyzed UncorrectedOA requirement for system Uncorrected OA reqid as a fraction of primary SA Initial Calculations for individual zones OA rate per unit area for zone OA rate per person Total supply air to zone (at condition being analyzed) Unused OA reqid to breathing zone Unused OA requirement for zone Fraction of zone supply not directly recirc. from zone Fraction of zone Supply from fully mixed primary air Fraction of zone OA not directly recirc. from zone Unused OA fraction required in supply air to zone Unused OA fraction required in primary air to zone System Ventilation Efficiency	Vot/Ps Ypd  Vps Vou Xs  Raz Rpz Vdz Vbz Voz Fa Fb Fc Zd Zp	cfm/p cfm  cfm  cfm/sf  cfm/p  cfm/cfm	= Rps Ps + Ras As = Vou / Vps = Rpz Pz + Raz Az = Vbz/Ez = Ep + (1-Ep)Er = Ep = 1-(1-Ez)(1-Ep)(1-Er) = Voz / Vdz = Voz / Vpz	26.2 17% = 12095 = 1686 = 0.14	0.06 10.00 53 15.4 15 1.00 1.00 0.29 0.29	0.00 34 9.4 9 1.00 1.00 0.28	0.00 339 92.2 92 1.00 1.00 0.27	5.00 50 8.0 8 1.00 1.00 0.16	10.00 1222 348.8 349 1.00 1.00 0.29	5.00 48 6.7 7 1.00 1.00 0.14	5.00 1053 133.4 133.3 1.00 1.00 1.00 0.13 0.13
Outdoor air per person served by system (including diversity) Outdoor air as a % of design primary supply air  Detailed Calculations Initial Calculations for the System as a whole Primary supply air flow to system at conditioned analyzed UncorrectedOA requirement for system Uncorrected OA reqid as a fraction of primary SA Initial Calculations for individual zones OA rate per unit area for zone OA rate per person Total supply air to zone (at condition being analyzed) Unused OA reqid to breathing zone Unused OA requirement for zone Fraction of zone supply not directly recirc. from zone Fraction of zone Supply from fully mixed primary air Fraction of zone OA not directly recirc. from zone Unused OA fraction required in supply air to zone Unused OA fraction required in primary air to zone Unused OA fraction required in primary air to zone System Ventilation Efficiency Zone Ventilation Efficiency	Vot/Ps Ypd  Vps Vou Xs  Raz Rpz Vdz Vbz Voz Fa Fb Fc Zd Zp Evz	cfm/p cfm  cfm  cfm/sf  cfm/p  cfm/cfm	= Rps Ps + Ras As = Vou / Vps = Rpz Pz + Raz Az = Vbz/Ez = Ep + (1-Ep)Er = Ep = 1-(1-Ez)(1-Ep)(1-Er) = Voz / Vdz = Voz / Vpz = (Fa + FbXs - FcZ) / Fa	26.2 17% = 12095 = 1686 = 0.14	0.06 10.00 53 15.4 15 1.00 1.00	0.00 34 9.4 9 1.00 1.00 1.00 0.28	0.00 339 92.2 92 1.00 1.00 0.27	5.00 50 8.0 8 1.00 1.00 0.16	10.00 1222 348.8 349 1.00 1.00 0.29	5.00 48 6.7 7 1.00 1.00 1.00	5.00 1053 133.4 133.3 1.00 1.00 1.00 1.00 0.13
Outdoor air per person served by system (including diversity) Outdoor air as a % of design primary supply air  Detailed Calculations Initial Calculations for the System as a whole Primary supply air flow to system at conditioned analyzed UncorrectedOA requirement for system Uncorrected OA req'd as a fraction of primary SA Initial Calculations for individual zones OA rate per unit area for zone OA rate per person Total supply air to zone (at condition being analyzed) Unused OA req'd to breathing zone Unused OA requirement for zone Fraction of zone supply not directly recirc. from zone Fraction of zone Supply from fully mixed primary air Fraction of zone OA not directly recirc. from zone Unused OA fraction required in supply air to zone Unused OA fraction required in primary air to zone System Ventilation Efficiency Zone Ventilation Efficiency (App A Method) System Ventilation Efficiency (App A Method)	Vot/Ps Ypd  Vps Vou Xs  Raz Rpz Vdz Vbz Voz Fa Fb Fc Zd Zp  Evz Ev	cfm/p cfm  cfm  cfm/sf  cfm/p  cfm/cfm	= Rps Ps + Ras As = Vou / Vps = Rpz Pz + Raz Az = Vbz/Ez = Ep + (1-Ep)Er = Ep = 1-(1-Ez)(1-Ep)(1-Er) = Voz / Vdz = Voz / Vpz = (Fa + FbXs - FcZ) / Fa = min (Evz)	26.2 17% = 12095 = 1686 = 0.14 = = = = = = = = = = = = = = = = = = =	0.06 10.00 53 15.4 15 1.00 1.00 0.29 0.29	0.00 34 9.4 9 1.00 1.00 0.28	0.00 339 92.2 92 1.00 1.00 0.27	5.00 50 8.0 8 1.00 1.00 0.16	10.00 1222 348.8 349 1.00 1.00 0.29	5.00 48 6.7 7 1.00 1.00 0.14	5.00 1053 133.4 133.3 1.00 1.00 1.00 1.00 0.13
Outdoor air per person served by system (including diversity) Outdoor air as a % of design primary supply air  Detailed Calculations Initial Calculations for the System as a whole Primary supply air flow to system at conditioned analyzed UncorrectedOA requirement for system Uncorrected OA reqid as a fraction of primary SA Initial Calculations for individual zones OA rate per unit area for zone OA rate per son Total supply air to zone (at condition being analyzed) Unused OA requirement for zone Fraction of zone supply not directly recirc. from zone Fraction of zone supply from fully mixed primary air Fraction of zone Supply from fully mixed primary air Fraction of zone oA not directly recirc. from zone Unused OA fraction required in supply air to zone Unused OA fraction required in primary air to zone System Ventilation Efficiency Zone Ventilation Efficiency (App A Method) System Ventilation Efficiency (Table 6.3 Method) Ventilation System Efficiency (Table 6.3 Method)	Vot/Ps Ypd  Vps Vou Xs  Raz Rpz Vdz Vbz Voz Fa Fb Fc Zd Zp Evz	cfm/p cfm  cfm  cfm/sf  cfm/p  cfm/cfm	= Rps Ps + Ras As = Vou / Vps = Rpz Pz + Raz Az = Vbz/Ez = Ep + (1-Ep)Er = Ep = 1-(1-Ez)(1-Ep)(1-Er) = Voz / Vdz = Voz / Vpz = (Fa + FbXs - FcZ) / Fa	26.2 17% = 12095 = 1686 = 0.14	0.06 10.00 53 15.4 15 1.00 1.00 0.29 0.29	0.00 34 9.4 9 1.00 1.00 0.28	0.00 339 92.2 92 1.00 1.00 0.27	5.00 50 8.0 8 1.00 1.00 0.16	10.00 1222 348.8 349 1.00 1.00 0.29	5.00 48 6.7 7 1.00 1.00 0.14	5.00 1053 133.4 133.3 1.00 1.00 1.00 0.13 0.13
Outdoor air per person served by system (including diversity) Outdoor air as a % of design primary supply air  Detailed Calculations Initial Calculations for the System as a whole Primary supply air flow to system at conditioned analyzed UncorrectedOA requirement for system Uncorrected OA reqid as a fraction of primary SA Initial Calculations for individual zones OA rate per unit area for zone OA rate per unit area for zone OA rate per son Total supply air to zone (at condition being analyzed) Unused OA reqid to breathing zone Unused OA requirement for zone Fraction of zone supply not directly recirc. from zone Fraction of zone supply from fully mixed primary air Fraction of zone OA not directly recirc. from zone Unused OA fraction required in supply air to zone Unused OA fraction required in primary air to zone Unused OA fraction required in primary air to zone System Ventilation Efficiency Zone Ventilation Efficiency (App A Method) Ventilation System Efficiency (Table 6.3 Method) Minimum outdoor air intake airflow	Vot/Ps Ypd  Vps Vou Xs  Raz Rpz Vdz Vbz Voz Fa Fb Fc Zd Zp Evz Ev	cfm/p cfm cfm cfm cfm/sf cfm/p cfm cfm	= Rps Ps + Ras As = Vou / Vps = Rpz Pz + Raz Az = Vbz/Ez = Ep + (1-Ep)Er = Ep = 1-(1-Ez)(1-Ep)(1-Er) = Voz / Vdz = Voz / Vpz = (Fa + FbXs - FcZ) / Fa = min (Evz) = Value from Table 6.3	= 12095 = 1686 = 0.14	0.06 10.00 53 15.4 1.5 1.00 1.00 0.29 0.29	0.00 34 9.4 9 1.00 1.00 0.28	0.00 339 92.2 92 1.00 1.00 0.27	5.00 50 8.0 8 1.00 1.00 0.16	10.00 1222 348.8 349 1.00 1.00 0.29	5.00 48 6.7 7 1.00 1.00 0.14	5.00 1053 133.4 133.3 1.00 1.00 1.00 1.00 0.13
Outdoor air per person served by system (including diversity) Outdoor air as a % of design primary supply air  Detailed Calculations Initial Calculations for the System as a whole Primary supply air flow to system at conditioned analyzed UncorrectedOA requirement for system UncorrectedOA requirement for system UncorrectedOA requirement for primary SA Initial Calculations for individual zones OA rate per unit area for zone OA rate per person Total supply air to zone (at condition being analyzed) Unused OA requirement for zone Fraction of zone supply not directly recirc. from zone Fraction of zone supply from fully mixed primary air Fraction of zone OA not directly recirc. from zone Unused OA fraction required in supply air to zone Unused OA fraction required in primary air to zone Unused OA fraction fraction required in primary air to zone Unused OA fraction fifciency (App A Method) System Ventilation Efficiency (App A Method) Ventilation System Efficiency (Table 6.3 Method) Minimum outdoor air intake airflow Outdoor Air Intake Flow required to System	Vot/Ps Ypd  Vps Vou Xs  Raz Rpz Vdz Vbz Voz Fa Fb Fc Zd Zp  Evz Ev Ev Vot	cfm/p cfm  cfm  cfm/sf  cfm/p  cfm/cfm	= Rps Ps + Ras As = Vou / Vps = Rpz Pz + Raz Az = Vbz/Ez = Ep + (1-Ep)Er = Ep = 1-(1-Ez)(1-Ep)(1-Er) = Voz / Vdz = Voz / Vpz = (Fa + FbXs - FcZ) / Fa = min (Evz) = Value from Table 6.3 = Vou / Ev	= 12095 = 1686 = 0.14	0.06 10.00 53 15.4 15 1.00 1.00 0.29 0.29	0.00 34 9.4 9 1.00 1.00 0.28	0.00 339 92.2 92 1.00 1.00 0.27	5.00 50 8.0 8 1.00 1.00 0.16	10.00 1222 348.8 349 1.00 1.00 0.29	5.00 48 6.7 7 1.00 1.00 0.14	5.00 1053 133.4 133.3 1.00 1.00 1.00 0.13 0.13
Outdoor air per person served by system (including diversity) Outdoor air as a % of design primary supply air  Detailed Calculations Initial Calculations for the System as a whole Primary supply air flow to system at conditioned analyzed UncorrectedOA requirement for system Uncorrected OA req'd as a fraction of primary SA Initial Calculations for individual zones OA rate per unit area for zone OA rate per person Total supply air to zone (at condition being analyzed) Unused OA req'd to breathing zone Unused OA requirement for zone Fraction of zone supply from fully mixed primary air Fraction of zone supply from fully mixed primary air Fraction of zone OA not directly recirc. from zone Unused OA fraction required in supply air to zone Unused OA fraction required in primary air to zone Unused OA fraction frequired in primary air to zone System Ventilation Efficiency Zone Ventilation Efficiency (App A Method) System Ventilation System Efficiency (Table 6.3 Method) Minimum outdoor air Intake airflow Outdoor Air Intake Flow required to System OA intake req'd as a fraction of primary SA	Vot/Ps Ypd  Vps Vou Xs  Raz Rpz Vdz Vbz Voz Fa Fb Czd Zp  Evz Ev Ev Vot Y	cfm/p cfm  cfm  cfm  cfm/sf  cfm/p  cfm  cfm  cfm	= Rps Ps + Ras As = Vou / Vps = Rpz Pz + Raz Az = Vbz/Ez = Ep + (1-Ep)Er = Ep = 1-(1-Ez)(1-Ep)(1-Er) = Voz / Vdz = Voz / Vpz = (Fa + FbXs - FcZ) / Fa = min (Evz) = Value from Table 6.3 = Vou / Ev = Vot / Vps	= 12095 = 1686 = 0.14 = = = = = = = = = = = = = = = = = = =	0.06 10.00 53 15.4 15 1.00 1.00 1.00 0.29 0.29	0.00 34 9.4 9 1.00 1.00 0.28	0.00 339 92.2 92 1.00 1.00 0.27	5.00 50 8.0 8 1.00 1.00 0.16	10.00 1222 348.8 349 1.00 1.00 0.29	5.00 48 6.7 7 1.00 1.00 0.14	5.00 1053 133.4 133.3 1.00 1.00 1.00 1.00 0.13
Outdoor air per person served by system (including diversity) Outdoor air as a % of design primary supply air  Detailed Calculations Initial Calculations for the System as a whole Primary supply air flow to system at conditioned analyzed UncorrectedOA requirement for system Uncorrected OA reqid as a fraction of primary SA Initial Calculations for individual zones OA rate per unit area for zone Unused OA reqid to breathing zone Unused OA requirement for zone Fraction of zone supply not directly recirc. from zone Fraction of zone supply from fully mixed primary air Fraction of zone Supply from fully mixed primary air Fraction of zone OA not directly recirc. from zone Unused OA fraction required in supply air to zone Unused OA fraction required in supply air to zone Unused OA fraction Efficiency Zone Ventilation Efficiency (App A Method) System Ventilation Efficiency (App A Method) Ventilation System Efficiency (Table 6.3 Method) Minimum outdoor air intake airflow Outdoor Air Intake Flow required to System OA intake reqid as a fraction of primary SA Outdoor Air Intake Flow required to System (Table 6.3 Method)	Vot/Ps Ypd  Vps Vou Xs  Raz Rpz Vdz Vbz Voz Fa Fb Fc Zd Zp Evz Ev Vot Y Vot	cfm/p cfm cfm cfm cfm/sf cfm/p cfm cfm	= Rps Ps + Ras As = Vou / Vps = Rpz Pz + Raz Az = Vbz/Ez = Ep + (1-Ep)Er = Ep = 1-(1-Ez)(1-Ep)(1-Er) = Voz / Vdz = Voz / Vpz = (Fa + FbXs - FcZ) / Fa = min (Evz) = Value from Table 6.3 = Vou / Ev = Vot / Vps = Vou / Ev	= 12095 = 1686 = 0.14 = = = = = = = = = = = = = = = = = = =	0.06 10.00 53 15.4 15 1.00 1.00 1.00 0.29 0.29	0.00 34 9.4 9 1.00 1.00 0.28	0.00 339 92.2 92 1.00 1.00 0.27	5.00 50 8.0 8 1.00 1.00 0.16	10.00 1222 348.8 349 1.00 1.00 0.29	5.00 48 6.7 7 1.00 1.00 0.14	5.00 1053 133.4 133.3 1.00 1.00 1.00 1.00 0.13
Outdoor air per person served by system (including diversity) Outdoor air as a % of design primary supply air  Detailed Calculations Initial Calculations for the System as a whole Primary supply air flow to system at conditioned analyzed UncorrectedOA requirement for system UncorrectedOA requirement for system Uncorrected OA reqid as a fraction of primary SA Initial Calculations for individual zones OA rate per unit area for zone OA rate per person Total supply air to zone (at condition being analyzed) Unused OA reqid to breathing zone Unused OA requirement for zone Fraction of zone supply not directly recirc. from zone Fraction of zone supply from fully mixed primary air Fraction of zone OA not directly recirc. from zone Unused OA fraction required in supply air to zone Unused OA fraction required in primary air to zone Unused OA fraction frequired in primary air to zone System Ventilation Efficiency Zone Ventilation Efficiency (App A Method) System Ventilation Efficiency (Table 6.3 Method) Minimum outdoor air intake airflow Outdoor Air Intake Flow required to System OA intake req'd as a fraction of primary SA Outdoor Air Intake Flow required to System (Table 6.3 Method) OA intake req'd as a fraction of primary SA (Table 6.3 Method) OA intake req'd as a fraction of primary SA (Table 6.3 Method)	Vot/Ps Ypd  Vps Vou Xs  Raz Rpz Vdz Vbz Voz Fa Fb Fc Zd Zp Evz Ev Vot Y Vot	cfm/p cfm  cfm  cfm  cfm/sf  cfm/p  cfm  cfm  cfm	= Rps Ps + Ras As = Vou / Vps = Rpz Pz + Raz Az = Vbz/Ez = Ep + (1-Ep)Er = Ep = 1-(1-Ez)(1-Ep)(1-Er) = Voz / Vdz = Voz / Vpz = (Fa + FbXs - FcZ) / Fa = min (Evz) = Value from Table 6.3 = Vou / Ev = Vot / Vps	= 12095 = 1686 = 0.14 = = = = = = = = = = = = = = = = = = =	0.06 10.00 53 15.4 15 1.00 1.00 1.00 0.29 0.29	0.00 34 9.4 9 1.00 1.00 0.28	0.00 339 92.2 92 1.00 1.00 0.27	5.00 50 8.0 8 1.00 1.00 0.16	10.00 1222 348.8 349 1.00 1.00 0.29	5.00 48 6.7 7 1.00 1.00 0.14	5.00 1053 133.4 133 10 1.00 1.00 1.00 1.00 0.13
Outdoor air per person served by system (including diversity) Outdoor air as a % of design primary supply air  Detailed Calculations Initial Calculations for the System as a whole Primary supply air flow to system at conditioned analyzed UncorrectedOA requirement for system UncorrectedOA requirement for system Uncorrected OA reqid as a fraction of primary SA Initial Calculations for individual zones OA rate per unit area for zone OA rate per person Total supply air to zone (at condition being analyzed) Unused OA reqid to breathing zone Unused OA reqid to breathing zone Fraction of zone supply not directly recirc. from zone Fraction of zone supply from fully mixed primary air Fraction of zone OA not directly recirc. from zone Unused OA fraction required in supply air to zone Unused OA fraction required in primary air to zone System Ventilation Efficiency Zone Ventilation Efficiency (App A Method) System Ventilation System Efficiency (Table 6.3 Method) Minimum outdoor air intake airflow Outdoor Air Intake Flow required to System (Table 6.3 Method) Outdoor Air Intake Flow required to System (Table 6.3 Method)	Vot/Ps Ypd  Vps Vou Xs  Raz Rpz Vdz Vbz Voz Fa Fb Fc Zd Zp Evz Ev Vot Y Vot	cfm/p cfm  cfm cfm  cfm/sf cfm/p cfm cfm cfm cfm	= Rps Ps + Ras As = Vou / Vps = Rpz Pz + Raz Az = Vbz/Ez = Ep + (1-Ep)Er = Ep = 1-(1-Ez)(1-Ep)(1-Er) = Voz / Vdz = Voz / Vpz = (Fa + FbXs - FcZ) / Fa = min (Evz) = Value from Table 6.3 = Vou / Ev = Vot / Vps = Vou / Ev	= 12095 = 1686 = 0.14 = = = = = = = = = = = = = = = = = = =	0.06 10.00 53 15.4 15 1.00 1.00 0.29 0.29	0.00 34 9.4 9 1.00 1.00 0.28	0.00 339 92.2 92 1.00 1.00 0.27	5.00 50 8.0 8 1.00 1.00 0.16	10.00 1222 348.8 349 1.00 1.00 0.29	5.00 48 6.7 7 1.00 1.00 0.14	5.00 1053 133.4 133 10 1.00 1.00 1.00 1.00 0.13

D. W.C.	D111										
Building:	DMA										
System Tag/Name:	ZONE	J									
Operating Condition Description: Units (select from pull-down list)	IP										
onits (select from pun-down list)											
Inputs for System	Name	Units		System	7						
Floor area served by system	As	sf		1220	3						
Population of area served by system (including diversity)	Ps	Р	100% diversity	7	9						
Design primary supply fan airflow rate	Vpsd	cfm		12,09	5						
OA reg'd per unit area for system (Weighted average)	Ras	cfm/sf		0.0							
OA reg'd per person for system area (Weighted average)	Rps	cfm/p		7.							
Inputs for Potentially Critical zones											
Zone Name	Zone ti	tle turns	purple italic for critical zone(s)		W137	W138	W138A	W138B	W138G	W139	W140
Zone Tag			(-)		New zone ID	New zone ID	New zone ID	New zone ID	New zone ID	New zone ID	New zone ID
20.10 1 4 9					Storage	Electrical	Office space	Office space	Telephone	Storage	Conference/m
Space type					rooms	equipment	Cilico opuco	Cinico opuco	closets	rooms	eeting
Opado type		Select	from pull-down list		1001113	rooms			Ciosets	1001113	cetting
Floor Area of zone	Az	sf	non pui down not		1125	1585	72	72	190	484	843
Design population of zone	Pz	P	(default value listed; may be over	erridden)	1123	1303	12	0.36	190	104	6
Design total supply to zone (primary plus local recirculated)	Vdzd	cfm	(asidan value listed, may be ove		496	2921	43		42	180	1211
Induction Terminal Unit, Dual Fan Dual Duct or Transfer Fan?	₹ UZU		from pull-down list or leave blank	if N/Δ	490	2921	40	43	42	TF	1211
Local recirc. air % representative of ave system return air	Er	Select	nom pan-down list of leave blattk	11 11/7	75%	75%	75%	75%	750/	75%	75%
Inputs for Operating Condition Analyzed					1376	1370	1370	1370	7576	1376	1570
Percent of total design airflow rate at conditioned analyzed	Ds	%		1009	6 100%	100%	100%	100%	100%	100%	100%
Air distribution type at conditioned analyzed	20		from pull-down list	.00	CS	CS	CS	CS	CS	CS	CS
Zone air distribution effectiveness at conditioned analyzed	Ez	Ocioot	non pui down not		1.00	1.00	1.00	1.00	1.00	1.00	1.00
Primary air fraction of supply air at conditioned analyzed	Ep				1.00	1.00	1.00	1.00	1.00	100%	1.00
Results	ЕР									10070	l .
Ventilation System Efficiency	Ev			0.81							
Outdoor air intake required for system	Vot	cfm		2070							
Outdoor air make required for system  Outdoor air per unit floor area	Vot/As			0.17							
Outdoor air per unit noor area  Outdoor air per person served by system (including diversity)	Vot/Ps			26.2							
Outdoor air per person served by system (including diversity)  Outdoor air as a % of design primary supply air	Ypd	cfm		179							
Outdoor all as a % or design primary supply all	rpu	CIIII			0						
Detailed Calculations											
Initial Calculations for the System as a whole											
Primary supply air flow to system at conditioned analyzed	Vps	cfm	= VpdDs	= 1209	5						
UncorrectedOA requirement for system	Vou	cfm	= Rps Ps + Ras As	= 168	6						
Uncorrected OA reg'd as a fraction of primary SA	Xs		= Vou / Vps	= 0.1							
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	
Total supply air to zone (at condition being analyzed)	Vdz	cfm			496		43				
Unused OA reg'd to breathing zone	Vbz	cfm	= Rpz Pz + Raz Az	=	135.0		9.3		0.0		80.6
Unused OA requirement for zone	Voz	cfm	= Vbz/Ez	=	135		9				
Fraction of zone supply not directly recirc. from zone	Fa	J	= Ep + (1-Ep)Er	_	1.00		1.00				1.00
Fraction of zone supply from fully mixed primary air	Fb		= Ep + (1-Lp)L1	_	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				
Unused OA fraction required in supply air to zone	Zd		= Voz / Vdz	_	0.27	0.03	0.22		0.00		
Unused OA fraction required in supply all to zone	Zp		= Voz / Vpz	_	0.27	0.03	0.22				
System Ventilation Efficiency	<b>-</b> Ρ		= VOZ / VPZ	_	0.27	0.03	0.22	0.14	0.00	0.32	0.07
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		1.11	0.92	1.00	1.14	0.02	1.07
Ventilation System Efficiency (Table 6.3 Method)	Ev		= Value from Table 6.3	= 0.83							
Minimum outdoor air intake airflow	LV		- Value Holli Table 0.3	_ 0.00							
	Vot	cfm	= Vou / Ev	= 207	1						
Outdoor Air Intake Flow required to System	Y	CIIII	= Vou / EV = Vot / Vps	= 207	·						
OA intake req'd as a fraction of primary SA		ofm	= Vot / Vps = Vou / Ev	= 0.1							
Outdoor Air Intake Flow required to System (Table 6.3 Method)		cfm		= 204							
OA Tamp of which Min OA provides all seeling	1		= Vot / Vps	= 0.1							
OAT helevy which OA letele flow is @ minimum		Dog F	- (/To dTof) (1 V)*/T-: dT-f	= -2	7						
OAT below which OA Intake flow is @ minimum		Deg F	$= \{(Tp-dTsf)-(1-Y)^*(Tr+dTrf$	= -2							

Building:	DMA											
suilding: System Tag/Name:	ZONE	<i>y</i>										
ystem rag/Name: Operating Condition Description:	ZUNE	Λ										
Inits (select from pull-down list)	IP											
onits (select from pull-down list)	IP											
nputs for System	Name	Units			5	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 reg'd per unit area for system (Weighted average)	Ras	cfm/sf				0.06						
OA reg'd per person for system area (Weighted average)	Rps	cfm/p				10.0						
puts for Potentially Critical zones	Про	omitp			<u> </u>	10.0			Potentially Cr	itical Zones		
Zone Name	Zone ti	tla turne n	urnle	e italic for critical zone(s)		-	W101	W102	W103	W104	W106	W104A
Zone Tag	20110 11	iic turris p	uipic	nancior chicarzone(3)		-	1	2	3	4	5	6
Zone rag						-	Stages,	Stages,	Stages,	Stages,	Stages,	Stages,
Space type		Select fr	om r	oull-down list			studios	studios	studios	studios	studios	studios
Floor Area of zone	Az	sf	۲	an administ			4.800	1176	1176	746	252	140
Design population of zone	Pz	P	(def	ault value listed; may be ove	erridd	en)	26	12	12	2	1	2
Design total supply to zone (primary plus local recirculated)	Vdzd	cfm	(GOI	aan value heleu, may be ove	,,,,uu	S.1)	13.362	4458	4664	2663	584	403
Induction Terminal Unit, Dual Fan Dual Duct or Transfer Fan?	v uzu		nm r	oull-down list or leave blank i	if NI/A	, F	10,002	4430	4004	2003	304	403
Local recirc, air % representative of ave system return air	Er	JOIEUL II	OIII þ	an administ of leave bidlik i	11 1 N/M	,	750/	750/	750/	750/	750/	750/
puts for Operating Condition Analyzed							7 3 76	7 3 76	7370	7370	7376	73%
Percent of total design airflow rate at conditioned analyzed	Ds	%				100%	100%	100%	100%	100%	100%	100%
	DS	, -	om r	oull-down list		10076	CS	CS	CS	CS	CS	CS
Air distribution type at conditioned analyzed	Ez	Selectii	OIII þ	Juli-down list		-	1.00	1.00	1.00	1.00	1.00	1.00
Zone air distribution effectiveness at conditioned analyzed	Ez Ep					<u> </u>	1.00	1.00	1.00	1.00	1.00	1.00
Primary air fraction of supply air at conditioned analyzed	ЕР											
esults	Ev					0.95						
Ventilation System Efficiency						1198						
Outdoor air intake required for system	Vot	cfm										
Outdoor air per unit floor area	Vot/As					0.14						
Outdoor air per person served by system (including diversity)	Vot/Ps	•				18.7						
Outdoor air as a % of design primary supply air	Ypd	cfm				5%						
etailed Calculations												
itial 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 reg'd as a fraction of primary SA	Xs	0		Vou / Vps	_	0.04						
itial Calculations for individual zones	7.0			V00 / Vp3		0.04						
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 drift area for 2011e	Rpz	cfm/p					10.00	10.00	10.00	10.00	10.00	10.00
	Vdz	cfm					13362	4458	4664	2663	584	403
Total supply air to zone (at condition being analyzed)				Poz Pz + Poz ^=								
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
stem 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						
nimum outdoor air intake airflow												
Outdoor Air Intake Flow required to System	Vot	cfm	=	Vou / Ev	=	1198						
OA intake reg'd as a fraction of primary SA	Y			Vot / Vps	=	0.05						
Outdoor Air Intake Flow required to System (Table 6.3 Method)		cfm		Vou / Ev	_	1077	120.88					
OA intake reg'd as a fraction of primary SA (Table 6.3 Method)		Jiiii		Vot / Vps		0.04	0.10					
A Temp at which Min OA provides all cooling				VOL7 VP3		0.04	0.10					
		Doc F		(/To dTof) (4 \\/\*/T++ dT-f		-299						
OAT below which OA Intake flow is @ minimum		Deg F	=	{(Tp-dTsf)-(1-Y)*(Tr+dTrf	=	-299						