OUTSIDE AIR TABULATION – OCCUPIED AREAS

AIR HANDLING UNIT	AHU-1	AHU-2	AHU-3	AHU-4	AHU-5
ROOM NAME	CLASSROOM	CLASSROOM	RESOURCE	RESOURCE	ESE FULL TIME
ROOM NUMBER	313	314	510	512	511
TOTAL AIRFLOW INTO THE SPACE (CFM)	1280	1240	680	680	1100
VENTILATION AIRFLOW (CFM)	115	115	25	25	55
RECIRCULATION AIRFLOW (CFM)	1165	1125	655	655	1045
NUMBER OF OCCUPANTS	23	23	5	5	11
VOLUME OF THE SPACE (CUBIC FT)	8712	8712	5220	5220	9612
OUTDOOR CONCENTRATION OF CO_2 (PPM)	340	340	340	340	340
INDOOR CONCENTRATION OF CO_2 AT TIME T=0 (PPM)	340	340	340	340	340
CO_2 GENERATION RATE BY ONE OCCUPANT (CUBIC FEET/HR)	0.62	0.62	0.62	0.62	0.62
LEVEL OF PHYSICAL ACTIVITY	SEDENTARY	SEDENTARY	SEDENTARY	SEDENTARY	SEDENTARY
VENTILATION EFFECTIVENESS (FRACTION)	0.8	0.8	0.8	0.8	0.8
RESPIRATORY FLOW (SINGLE OCCUPANT, CFM)	0.27	0.27	0.27	0.27	0.27
RECIRCULATION FLOW FACTOR	0.91	0.91	0.96	0.96	0.95
FILTER EFFICIENCY	30%	30%	30%	30%	30%
CONTAMINANT GENERATION RATE (LB/MIN)	1.720E-05	1.720E-05	1.720E-05	1.720E-05	1.720E-05
O/A CONTAMINANT CONCENTRATION (LBS/CUBIC FT)	7.49136E-11	7.49136E-11	7.49136E-11	7.49136E-11	7.49136E-11
ASHRAE LIMIT FOR CONTAMINANT CONCENTRATION (PPM)	2.5	2.5	2.5	2.5	2.5
DESIGN CALCULATED CONTAMINANT CONCENTRATION (PPM)	0.0098	0.0098	0.0043	0.0043	0.0057

NOTES:

(1) GENERAL DESIGN NOTE: THIS DESIGN UTILIZES THE ASHRAE STANDARD 62.1–2007 INDOOR AIR QUALITY (IAQ) PROCEDURE IN ACCORDANCE WITH THE FLORIDA MECHANICAL CODE PROVISION FOR USE OF THE LATEST ASHRAE 62 STANDARD AND APPROVED ADDENDA IN LIEU OF FLORIDA CODE O.A. TABLES. THE ASHRAE IAQ PROCEDURE (SECTION 6.1.2) IS A DESIGN PROCEDURE IN WHICH OUTDOOR AIR INTAKE RATES AND OTHER SYSTEM DESIGN PARAMETERS ARE BASED ON AN ANALYSIS OF CONTAMINANT SOURCES, CONTAMINANT CONCENTRATION TARGETS, AND PERCEIVED ACCEPTABILITY TARGETS. THE IAQ PROCEDURE ALLOWS CREDIT TO BE TAKEN FOR CONTROLS THAT REMOVE CONTAMINANTS (FOR EXAMPLE, AIR CLEANING DEVICES) OR FOR OTHER DESIGN TECHNIQUES THAT CAN BE RELIABLY DEMONSTRATED TO RESULT IN INDOOR CONTAMINANT CONCENTRATIONS EQUAL TO OR LOWER THAN THOSE ACHIEVED USING THE VENTILATION RATE PROCEDURE. THE MASS BALANCE EQUATIONS FROM APPENDIX D HAVE BEEN USED TO CALCULATE THE STEADY STATE CONDITIONS FOR VARIOUS CONTAMINANTS REQUIRED BY THE IAQ PROCEDURE. THE LEADING CONTAMINANT OF CONCERN FOR THIS BUILDING WAS DETERMINED TO BE AMMONIA. STEADY STATE CONDITIONS WERE CONSIDERED FOR 20 OTHER CONTAMINANTS INCLUDING FORMALDEHYDE, ACETONE, BENZENE, CHLOROFORM, PROPANE, TOLUENE AND XYLENE.

(2) QUANTITY OF PEOPLE IN SPACE DETERMINED EITHER BY 'EXPECTED PEAK OCCUPANCY' OR BY 'OCCUPANT DENSITY PER 1,000 S.F.'. OCCUPANT DENSITY DETERMINED FROM ASHRAE 62.1–2007 TABLE 6–1 BY OCCUPANCY TYPE. METHOD UTILIZED INDICATED BY DIRECTION OF ARROW IN MIDDLE COLUMN. PER NOTE (4) WITH ASHRAE 62.1–2007 TABLE 6–1 THE DEFAULT OCCUPANT DENSITY SHALL BE USED WHEN AN ACTUAL OCCUPANT DENSITY IS NOT KNOWN. WHEN OCCUPANT DENSITY IS USED THE RESULTING QUANTITY OF PEOPLE IS ROUNDED UP TO THE NEAREST WHOLE NUMBER.

(3) 'OUTSIDE AIR (O.A.) FLOW FRACTION' DETERMINED BY DIVIDING 'TOTAL REQUIRED O.A.' BY 'SUPPLY AIR FLOW' TO SPACE. FRACTION INDICATED BETWEEN ASTERISK (*) IS THE LARGEST FRACTION AND THEREFORE CONSIDERED TO BE THE 'CRITICAL SPACE FRACTION'.

(4) 'CORRECTED OUTSIDE AIR FRACTION' (Y) IS DETERMINED BY THE 'MULTIPLE SPACES EQUATION'. THE RESULTING FRACTION IS MULTIPLIED BY THE TOTAL SYSTEM SUPPLY AIR FLOW TO DETERMINED THE 'CORRECTED TOTAL O.A. FLOW' REQUIRED FOR EACH AIR HANDLING SYSTEM.

OUTSIDE AIR TABULATION – NON OCCUPIED SPACES

PER ANSI/ASHRAE STD. 62.1–2007 (1)

SPACE O.A. CALCULATIONS

SPACE NAME	AHU SYSTEM	OCCUPANCY TYPE	O.A. RATES: CFM PER (2) AREA	O.A. RATES: CFM PER (2) PEOPLE	OCCUP. DENSITY /1000SF	(3) OR	EXPECTED PEAK OCCUP.	SPACE G.S.F.	CALCULATED O.A. VOLUME, CFM AREA	CALCULATED O.A. VOLUME, CFM PEOPLE	TOTAL REQ'D O.A.	SUPPLY AIR FLOW	O.A.(4) FLOW FRACTION
CLOSET	AHU-1	STORAGE	0.12	–	–	–	–	64	7.7	–	8	50	* 0.16 *
VESTIBULE	AHU-1	CORRIDOR	0.06	–	–	–	–	55	3.3	–	3	50	0.06
CORRIDOR	AHU-1	CORRIDOR	0.06	–	–	–	–	272	16	–	16	170	0.09
T.R.	AHU-1	–	–	–	–	–	–	46	–	–	–	50	–
										SUM OF OUTSIDE AIR FLOW RATES:	**27**		
CLOSET	AHU-2	STORAGE	0.12	–	–	–	–	64	7.7	–	8	50	* 0.16 *
VESTIBULE	AHU-2	CORRIDOR	0.06	–	–	–	–	55	3.3	–	3	50	0.06
CORRIDOR	AHU-2	CORRIDOR	0.06	–	–	–	–	272	16	–	16	140	0.11
BOOKS	AHU-2	STORAGE	0.12	–	–	–	–	86	10	–	10	70	0.14
T.R	AHU-2	–	–	–	–	–	–	46	–	–	–	50	–
										SUM OF OUTSIDE AIR FLOW RATES:	**37**		
CLOSET	AHU-3	STORAGE	0.12	–	–	–	–	64	7.7	–	8	35	* 0.23 *
VESTIBULE	AHU-3	CORRIDOR	0.06	–	–	–	–	55	3.3	–	3	35	0.09
T.R.	AHU-3	–	–	–	–	–	–	46	–	–	–	50	–
										SUM OF OUTSIDE AIR FLOW RATES:	**11**		
CLOSET	AHU-4	STORAGE	0.12	–	–	–	–	64	7.7	–	8	35	* 0.23 *
VESTIBULE	AHU-4	CORRIDOR	0.06	–	–	–	–	55	3.3	–	3	35	0.09
T.R.	AHU-4	–	–	–	–	–	–	46	–	–	–	50	–
										SUM OF OUTSIDE AIR FLOW RATES:	**11**		
CLOSET	AHU-5	STORAGE	0.12	–	–	–	–	64	7.7	–	8	35	0.23
VESTIBULE	AHU-5	CORRIDOR	0.06	–	–	–	–	110	6.6	–	7	65	0.11
CORRIDOR	AHU-5	CORRIDOR	0.06	–	–	–	–	638	38.3	–	38	265	0.14
BOOKS	AHU-2	STORAGE	0.12	–	–	–	–	86	10	–	10	35	* 0.26 *
T.R.	AHU-5	–	–	–	–	–	–	46	–	–	–	50	–
T.R.	AHU-5	–	–	–	–	–	–	46	–	–	–	50	–
										SUM OF OUTSIDE AIR FLOW RATES:	**63**		

SYSTEM O.A. CALCULATIONS

SYSTEM NAME	SUPPLY AIR FLOW V_{st}	SUM OF O.A. RATES FOR SYSTEM V_{on}	UNCORRECTED OUTSIDE AIR FRACTION $X = V_{on}/V_{st}$	CRITICAL SPACE FRACTION $Z = V_{oc}/V_{sc}$	CORRECTED OUTSIDE AIR FRACTION (5) $Y = V_{ot}/V_{st}$	CORRECTED TOTAL O.A. FLOW V_{ot}	REFERENCE EQUATION(S)
AHU-1	1600	142	0.089	0.16	0.096	155 CFM	'MULTIPLE SPACES EQUATION' $Y = \frac{X}{(1 + X - Z)}$
AHU-2	1600	152	0.095	0.16	0.102	165 CFM	
AHU-3	800	36	0.045	0.23	0.055	45 CFM	
AHU-4	800	36	0.045	0.23	0.055	45 CFM	
AHU-5	1600	118	0.074	0.26	0.091	145 CFM	
					TOTAL BUILDING OUTSIDE AIR FLOW RATE:	**555**	

OUTSIDE AIR TABULATION NOTES:

(1) DESIGN UTLIZING ASHRAE 62.1–2007 OUTSIDE AIR CALCULATION PROCEDURE IN ACCORDANCE TO FLORIDA MECHANICAL CODE PROVISION FOR USE OF LATEST ASHRAE 62 STANDARD AND APPROVED ADDENDA IN LIEU OF FLORIDA CODE O.A. TABLES.

(2) OUTSIDE AIR RATES ARE FROM ASHRAE 62.1–2007 TABLE 6–1 'MINIMUM VENTILATION RATES IN BREATHING ZONE'. RATES ARE INDICATED BY OCCUPANCY TYPE FOR 'AREA' RATES PER SQUARE FOOT (S.F.) AND 'PEOPLE' RATES PER PERSON.

(3) QUANTITY OF PEOPLE IN SPACE DETERMINED EITHER BY 'EXPECTED PEAK OCCUPANCY' OR BY 'OCCUPANT DENSITY PER 1,000 S.F.'. OCCUPANT DENSITY DETERMINED FROM ASHRAE 62.1–2004 TABLE 6–1 BY OCCUPANCY TYPE. METHOD UTILIZED INDICATED BY DIRECTION OF ARROW IN MIDDLE COLUMN. PER NOTE (4) WITH ASHRAE 62.1–2004 TABLE 6–1 THE DEFAULT OCCUPANT DENSITY SHALL BE USED WHEN AN ACTUAL OCCUPANT DENSITY IS NOT KNOWN. WHEN OCCUPANT DENSITY IS USED THE RESULTING QUANTITY OF PEOPLE IS ROUNDED UP TO THE NEAREST WHOLE NUMBER.

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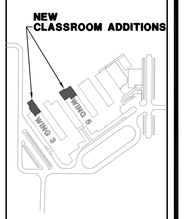

WEST NAVARRE INTERMEDIATE

No.	Revision/Issue	Date

KENNETH L. GONZALEZ
ENGINEER OF RECORD
PE 61015

DRAWN BY: KM/JS
CHECKED BY: KLG
PINDER-MARTIN ASSOCIATES, INC.
PROJECT #: 21118.03
REVIEW: 09-06-11
PERMITTING: 09-09-11
RELEASE FOR BIDDING: 09-19-11

HVAC OUTSIDE AIR TABLES

M0.2