GENERAL NOTES - MECHANICAL

1. THE CONTRACTOR'S ATTENTION IS DIRECTED TO THE GENERAL AND SPECIAL CONDITIONS, "GENERAL CONDITIONS - MECHANICAL" OF THE PROJECT SPECIFICATIONS AND TO ALL OTHER CONTRACT DOCUMENTS AS THEY APPLY TO THIS BRANCH OF WORK. ATTENTION IS ALSO DIRECTED TO ALL OTHER SECTIONS OF THE CONTRACT DOCUMENTS WHICH AFFECTS THE WORK AND WHICH ARE HEREBY MADE A PART OF THE WORK SPECIFIED.
2. ALL MANUFACTURERS, SUPPLIERS, FABRICATORS, CONTRACTORS, ETC. SUBMITTING PROPOSALS FOR ANY PART OF THE WORK, SERVICES, MATERIALS OR EQUIPMENT TO BE USED ON OR APPLIED TO THIS PROJECT ARE HEREBY DIRECTED TO FAMILIARIZE THEMSELVES WITH THE CONTRACT DOCUMENTS. IN CASE OF CONFLICTS, THE CONTRACTOR SHALL CONTACT THE ENGINEER FOR CLARIFICATION AND FINAL DETERMINATION PRIOR TO THE BID.
3. THE WORK SHALL CONSIST OF FURNISHING ALL LABOR, EQUIPMENT, TRANSPORTATION, SUPPLIES, MATERIALS, APPURTENANCES AND SERVICES NECESSARY FOR THE SATISFACTORY INSTALLATION OF THE COMPLETE AND OPERATING SYSTEMS INDICATED OR SPECIFIED IN THE CONTRACT DOCUMENTS.
4. ANY MATERIALS, LABOR, EQUIPMENT OR SERVICES NOT MENTIONED SPECIFICALLY HEREIN WHICH MAY BE NECESSARY TO COMPLETE ANY PART OF THE SYSTEMS IN A SUBSTANTIAL MANNER, IN COMPLIANCE WITH THE REQUIREMENTS STATED, IMPLIED OR INTENDED IN THE PLANS AND SPECIFICATIONS, SHALL BE INCLUDED IN THE BID AS PART OF THE CONTRACT.
5. THE ENGINEER DOES NOT DEFINE THE SCOPE OF INDIVIDUAL TRADES, SUBCONTRACTORS, MATERIAL SUPPLIERS AND VENDORS. ANY SHEET NUMBERING OR SPECIFICATION NUMBERING SYSTEM USED WHICH IDENTIFIES DISCIPLINES IS SOLELY FOR THE ENGINEER'S CONVENIENCE AND IS NOT INTENDED TO DEFINE A SUBCONTRACTOR'S SCOPE OF WORK. INFORMATION REGARDING INDIVIDUAL TRADES, SUBCONTRACTORS, MATERIAL SUPPLIERS AND VENDORS MAY BE DETAILED, DESCRIBED AND INDICATED AT DIFFERENT LOCATIONS THROUGHOUT THE CONTRACT DOCUMENTS. NO CONSIDERATION WILL BE GIVEN TO REQUESTS FOR CHANGE ORDERS FOR FAILURE TO OBTAIN AND REVIEW THE COMPLETE SET OF CONTRACT DOCUMENTS WHEN PREPARING BIDS, PRICES AND QUOTATIONS. UNLESS STATED OTHERWISE, THE SUBDIVISION AND ASSIGNMENT OF WORK UNDER THE VARIOUS SECTIONS SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR HOLDING THE PRIME CONTRACT.
6. IT IS THE INTENTION OF THE CONTRACT DOCUMENTS TO CALL FOR A COMPLETE AND OPERATIONAL SYSTEM, INCLUDING ALL COMPONENTS, ACCESSORIES, FINISH WORK, ETC NECESSARY FOR TROUBLE FREE OPERATION; TESTED AND READY FOR OPERATION. ANYTHING THAT MAY BE REQUIRED, IMPLIED, OR INFERRED BY THE CONTRACT DOCUMENTS SHALL BE PROVIDED AND INCLUDED AS PART OF THE BID.
7. ALL CONTRACTORS AND VENDORS PROVIDING A BID FOR THIS PROJECT SHALL REVIEW THE PLANS AND SPECIFICATIONS AND DETERMINE ANY MODIFICATIONS AND/OR ADJUSTMENTS NECESSARY RELATIVE TO THE PROPOSED EQUIPMENT AND MATERIALS WITH SPECIFIC MANUFACTURER'S INSTALLATION REQUIREMENTS. INCLUDE IN THE BID ANY NECESSARY METHODS, FEATURES, OPTIONS, ACCESSORIES, ETC. NECESSARY TO INSTALL THE PROPOSED EQUIPMENT AND MATERIALS, REGARDLESS OF WHETHER USED AS BASIS OF DESIGN OR BEING OFFERED AS A SUBSTITUTION, IN ACCORDANCE WITH THE SPECIFIC MANUFACTURER'S INSTALLATION REQUIREMENTS, WHETHER SPECIFICALLY DETAILED OR NOT, WITHIN THE PLANS AND SPECIFICATIONS.
8. THE BIDDER/PROPOSER SHALL COMPLETELY REVIEW THE CONTRACT DOCUMENTS. ANY INTERPRETATION AS TO DESIGN INTENT OR SCOPE SHALL BE PROVIDED BY THE ENGINEER. SHOULD ANY INTERPRETATION BE REQUIRED, THE BIDDER/PROPOSER SHALL REQUEST A CLARIFICATION NOT LESS THAN TEN (10) DAYS PRIOR TO THE SUBMISSION OF THE BID SO THAT THE CONDITION MAY BE CLARIFIED BY ADDENDUM. IN THE EVENT OF ANY CONFLICT, DISCREPANCY, OR INCONSISTENCY DEVELOPS; THE INTERPRETATION OF THE ENGINEER SHALL BE FINAL.
9. THE CONTRACTOR SHALL PROVIDE LAYOUT CONFIRMATION OF EQUIPMENT LOCATIONS TO VERIFY THAT ALL COMPONENTS WILL FIT IN THE PROPOSED SPACE AND HAVE ADEQUATE CLEARANCE FOR SERVICES. COORDINATE THE LOCATION OF DRAINS, CONNECTIONS, ETC. PRIOR TO COMMENCING INSTALLATION. WORK NOT SO COORDINATED SHALL BE REMOVED AND PROPERLY INSTALLED AT THE EXPENSE OF THE RESPONSIBLE CONTRACTOR(S).
10. EQUIPMENT AND MATERIALS SUBSTITUTIONS OR DEVIATIONS SHALL COMPLY WITH "GENERAL PROVISIONS - MECHANICAL PART 6." ANY VENDOR WISHING TO OBTAIN AN EQUIPMENT SUBSTITUTION SHALL REQUEST A CLARIFICATION NOT LESS THAN TEN (10) DAYS PRIOR TO THE SUBMISSION OF THE PROPOSAL SO THAT IT MAY BE CONSIDERED AND POTENTIALLY INCLUDED BY ADDENDUM. REQUESTS MADE AFTER THIS PERIOD WILL BE REJECTED.
11. CONTRACTOR SHALL BE RESPONSIBLE FOR COMPLIANCE REGARDLESS IF CONTRACTOR IS IGNORANT OF CODES, RULES, REGULATIONS, LAWS, ETC. THE CONTRACTOR SHALL ALSO BE VERSED IN ALL CODES, RULES, REGULATIONS, LAWS, ETC. PERTINENT TO THEIR PART OF THE WORK PRIOR TO SUBMISSION OF THE PROPOSAL.
12. ALL WARRANTIES SHALL BEGIN STARTING AT THE PROJECT'S SUBSTANTIAL COMPLETION DATE. ALL EQUIPMENT, MATERIAL AND LABOR WARRANTIES SHALL BE FURNISHED BY THE EQUIPMENT SUPPLIER/VENDOR.
13. WHEREVER WORK PENETRATES ROOFING, IT SHALL BE DONE IN A MANNER THAT WILL NOT DIMINISH OR VOID THE ROOFING GUARANTEE OR WARRANTY IN ANY WAY. COORDINATE ALL SUCH WORK WITH THE ROOFING INSTALLER.
14. DUCTWORK, PIPING AND EQUIPMENT SHALL BE KEPT CLEAN AT ALL TIMES. DUCTWORK STORED ON THE JOB SITE SHALL BE PLACED A MINIMUM OF 4" ABOVE THE FLOOR AND BE COMPLETELY COVERED IN PLASTIC. INSTALLED DUCTWORK SHALL BE PROTECTED WITH PLASTIC. DO NOT INSTALL THE DUCTWORK OR INSULATION (PIPE OR DUCT) IF THE BUILDING IS NOT "DRIED-IN". IF THIS IS REQUIRED, THE ENTIRE LENGTHS SHALL BE COVERED IN PLASTIC TO PROTECT. THE OWNER/ENGINEER SHALL PERIODICALLY INSPECT THAT THESE PROCEDURES ARE FOLLOWED. IF DEEMED UNACCEPTABLE, THE CONTRACTOR SHALL BE REQUIRED TO CLEAN THE DUCT SYSTEM UTILIZING A NADCA CERTIFIED CONTRACTOR.
15. THE PERMANENT SYSTEMS, WHEN INSTALLED, MAY BE USED FOR TEMPORARY SERVICES WITH THE CONSENT OF THE ENGINEER AND IN STRICT ACCORDANCE WITH "GENERAL PROVISIONS - MECHANICAL - TEMPORARY USE OF EQUIPMENT."
16. THE CONTRACTOR AND THEIR SUBCONTRACTORS SHALL INCLUDE IN THE BID TO PROVIDE EQUIPMENT AND CONTROLS STARTUP AND VERIFICATION FOR ALL MECHANICAL SYSTEMS SPECIFIED FOR THIS PROJECT AND IN STRICT ACCORDANCE WITH "GENERAL PROVISIONS - MECHANICAL - EQUIPMENT/CONTROLS STARTUP & VERIFICATION."
17. THE CONTRACTOR SHALL DETERMINE FROM THE CONTRACT DOCUMENTS, THE DATE OF COMPLETION FOR THE PROJECT AND INSURE THAT EQUIPMENT DELIVERY SCHEDULES CAN BE MET SO AS TO ALLOW THIS COMPLETION TO BE MET.
18. THROUGH COORDINATION WITH OTHER CONTRACTORS, VENDORS, AND SUPPLIERS ASSOCIATED WITH THIS PROJECT, THIS CONTRACTOR SHALL INSURE, 100% FUNCTIONAL, TESTED, INSPECTED AND APPROVED SYSTEMS. CLAIMS FOR ADDITIONAL COST OR CHANGE ORDERS WILL BE REJECTED.
19. PRIOR TO ORDERING ANY MATERIALS OR ROUGH-IN OF ANY KIND, THE MECHANICAL CONTRACTOR SHALL BE RESPONSIBLE FOR FINAL COORDINATION OF ALL ELECTRICAL REQUIREMENTS (I.E. VOLTAGE, PHASE, CIRCUIT BREAKER, WIRE SIZING, ETC.) WITH THE ELECTRICAL CONTRACTOR. THERE WILL BE NO CHANGE IN THE CONTRACT AMOUNT FOR ANY DISCREPANCIES.
20. ALL OFFSETS, TURNS, FITTINGS, TRIM, DETAIL, ETC., MAY NOT BE INDICATED, BUT SHALL BE PROVIDED AS REQUIRED. ADDITIONAL ALLOWANCES SHALL BE INCLUDED FOR SAME AT EACH PROPOSERS' DISCRETION.
21. DO NOT SCALE FROM DRAWINGS, PRINTING DISTORTS SCALE. WORK SHALL BE LAID OUT FROM CONTRACTOR GENERATED DIMENSIONED DRAWINGS.
22. THE CONTRACTOR SHALL ENSURE PROPER COORDINATION BETWEEN ALL TRADES SUCH THAT CONDUITS, PIPING, DUCTWORK, ETC, DOES NOT BLOCK ACCESS TO VALVES, EQUIPMENT, DUCT ACCESS DOORS, ETC. ITEMS THAT HAVE BEEN INSTALLED WHERE ACCESS IS COMPROMISED SHALL BE RELOCATED AT THE CONTRACTOR'S EXPENSE.
23. THESE DRAWINGS ARE ACCURATE TO THE BEST OF OUR KNOWLEDGE, HOWEVER LOCATIONS AND SIZES WERE TAKEN FROM DIFFERENT SOURCES AND ARE SUBJECT TO DEVIATION. THE CONTRACTOR SHALL ASSUME SOME DEVIATIONS AND INCLUDE OFFSETS, ADDITIONAL PIPING, ETC. AT THE TIME OF BID.
24. THIS CONTRACTOR SHALL BE RESPONSIBLE FOR ALL CUTTING AND PATCHING REQUIRED FOR THEIR WORK. ALL CUTTING AND PATCHING SHALL MATCH ADJACENT SURFACES AND PERFORMED BY SKILLED WORKERS OF THE TRADE. REFER TO SPECIFICATION SECTION "SLEEVING, CUTTING, PATCHING, REPAIRING, ETC." AND ARCHITECTURAL DRAWINGS FOR ADDITIONAL INFORMATION.
25. ALL SUPPORTS FOR EQUIPMENT, DEVICES OR FIXTURES SHALL BE UNIQUE, FROM THE BUILDING STRUCTURE. DO NOT SUPPORT WORK FROM OTHER TRADES, EQUIPMENT OR SUPPORTS WITHOUT WRITTEN PERMISSION FROM THE ENGINEER AND CONSENT OF THE OTHER TRADE, IN WRITING.
26. PRIOR TO PURCHASE OR FABRICATION OF PIPING, THE CONTRACTOR SHALL COORDINATE INSTALLATION WITH ACTUAL CONDITIONS AND INSTALL ACCORDINGLY.
27. VALVES, BALANCING DAMPERS OR ANY MECHANICAL/ELECTRICAL ITEM SHALL NOT BE LOCATED ABOVE A HARD CEILING. IF THIS IS NOT POSSIBLE, THEN AN APPROPRIATELY SIZED ACCESS DOOR SHALL BE PLACED AT NO ADDITIONAL COST UNDER THE ITEM WHETHER SHOWN OR NOT ON THE PLANS TO ALLOW ACCESS AND ADJUSTMENT.
28. THE CONTRACTOR SHALL VISIT THE SITE FOR EXACT LOCATIONS OF ALL WALL AND CEILING DEVICES. THIS SHALL INCLUDE PLUMBING FIXTURES, CEILING GRILLES AND DIFFUSERS, ETC.
29. CONTRACTOR SHALL CLEAN UP CONSTRUCTION DEBRIS AT ALL TIMES DURING CONSTRUCTION.

GENERAL NOTES - DEMOLITION

A. THE CONTRACTOR SHALL REFER TO THE ARCHITECTURAL PLANS FOR AREAS IN WHICH THE CEILING IS REMAINING. THE CONTRACTOR IS RESPONSIBLE FOR REMOVING THE EXISTING CEILING AS REQUIRED AND REINSTALLATION. TEMPORARILY SUPPORT LIGHTS, DIFFUSERS, CEILING ETC. REPLACE BROKEN CEILING TILES WITH NEW AT NO ADDITIONAL COST TO OWNER. FIELED VERIFY EXACT REQUIREMENTS.
B. ALL OUTAGES SHALL BE SCHEDULED THROUGH THE PROJECT REPRESENTATIVE FOR PROPER COORDINATION. A REQUEST FOR AN OUTAGE SHALL BE SUBMITTED IN WRITING A MINIMUM OF TWO WEEKS IN ADVANCE.
C. DURING SPRINKLER SYSTEM OUTAGES THE CONTRACTORS SHALL PROVIDE FIRE WATCH OF AREAS WITH OUTAGES.
D. ALL WALLS AND FLOOR SLABS SHALL BE REPAIRED TO MATCH EXISTING AND TO A LIKE NEW CONDITION. ALL RATED WALLS AND FLOOR SLABS SHALL BE PATCHED AND REPAIRED TO MAINTAIN RATING.
E. ALL EXISTING BUILDING FINISHES SHALL BE PROTECTED DURING THE DEMOLITION PHASE.
F. HEAVY DASHED LINES INDICATE ITEMS FOR REMOVAL (U.O.N) AND LIGHT SOLID LINES INDICATE EXISTING ITEMS TO REMAIN.
G. COORDINATE DISPOSAL OF ALL FIXTURES, DEVICES, ETC. (INDICATED FOR DEMOLITION) WITH THE OWNER.

ABBREVIATIONS

ADJ	ADJUSTABLE
AFF	ABOVE FINISHED FLOOR
AFR	ABOVE FINISHED ROOF
APD	AIR PRESSURE DROP
AVG	AVERAGE
BAS	BUILDING AUTOMATION SYSTEM
BHP	BREAK HORSEPOWER
BTU	BRITISH THERMAL UNIT
CAV	CONSTANT AIR VOLUME
CFM	CUBIC FEET PER MINUTE
CO	CARBON MONOXIDE
CO2	CARBON DIOXIDE
DB	DRY BULB
DDC	DIRECT DIGITAL CONTROLS
DN	DOWN
EAT	ENTERING AIR TEMPERATURE
EC	ELECTRICAL CONTRACTOR
ESP	EXTERNAL STATIC PRESSURE
ETR	EXISTING TO REMAIN
EWT	ENTERING WATER TEMPERATURE
FA	FREE AREA
FD	FIRE DAMPER
FLA	FULL LOAD AMPS
FPC	FIRE PROTECTION CONTRACTOR
FPM	FEET PER MINUTE
FPS	FEET PER SECOND
FSD	FIRE SMOKE DAMPER
GAL	GALLON (-S)
GC	GENERAL CONTRACTOR
GPM	GALLONS PER MINUTE
GR	GRAINS
HD	HEAD
HP	H (-ORSEPOWER, -EAT PUMP)
ID	I (-DENTIFICATION, -NSIDE DIAMETER, -NSIDE DIMENSION)
kW	KILOWATT
LAT	LEAVING AIR TEMPERATURE
LWT	LEAVING WATER TEMPERATURE
MBH	BTU PER HOUR [THOUSANDS]
MCA	MINIMUM CIRCUIT AMPS
MFG	MANUFACTURER
MOCP	MAXIMUM OVERCURRENT PROTECTION [AMPS]
NC	NOISE CRITERIA **OR** NORMALLY CLOSED

ABBREVIATIONS (CONTINUED)

NO	NORMALLY OPEN **OR** NUMBER
NTS	NOT TO SCALE
OD	OUTSIDE DI (-AMETER, -MENSION)
OFCI	OWNER FURNISHED, CONTRACTOR INSTALLED
OFOI	OWNER FURNISHED, OWNER INSTALLED
PC	PLUMBING CONTRACTOR
PD	PRESSURE DROP
PH	PHASE [ELECTRICAL]
PPM	PARTS PER MILLION
PRS	PRESSURE REDUCING STATION
PRV	PRESSURE REDUCING VALVE (STEAM, WATER, GAS)
PSF	POUNDS PER SQUARE FOOT
PSI	POUNDS PER SQUARE INCH
PSIG	PSI GAUGE
RH	RELATIVE HUMIDITY [%]
RPM	REVOLUTIONS PER MINUTE
SD	SMOKE DAMPER
SP	STATIC PRESSURE
SQ FT	SQUARE FEET **OR** FOOT
TSP	TOTAL STATIC PRESSURE
TYP	TYPICAL
UNO	UNLESS NOTED OTHERWISE
V	VOLT (-AGE, -S)
VAR	VARI (-ABLE, -IES)
VAV	VARIABLE AIR VOLUME
VEL	VELOCITY
VFD	VARIABLE FEQUENCY DRIVE
W	WATT (-AGE, -S)
WB	WET BULB
WPD	WATER PRESSURE DROP
ΔP	DIFFERENTIAL PRESSURE
ΔT	TEMPERATURE DIFFERENCE
℄	CENTERLINE

GENERAL SYMBOLS

(#)	TAGGED NOTE DESIGNATOR
(X)	REVISION TRIANGLE
ROOM NAME (RM #)	ROOM TAG
XXX-X	EQUIPMENT TAG
	POINT OF CONNECTION / CONNECT TO EXISTING
	POINT OF DEMOLITION

HVAC LEGEND

	SUPPLY AIR DIFFUSER
	RETURN AIR GRILLE
	EXHAUST AIR DIFFUSER
	TRANSFER AIR GRILLE W/ SOUND ATTENUATING BOOT
	SIDEWALL DIFFUSER/GRILLE
TAG AIRFLOW	AIR DEVICE TAG (REGISTER, GRILLE, DIFFUSER,LOUVER)
##/##	RECTANGULAR DUCT
#ø	ROUND/SPIRAL DUCT
##/##Φ	FLAT OVAL DUCT
SA	SUPPLY AIR DUCT
RA	RETURN AIR DUCT
EA	EXHAUST AIR DUCT
OA	OUTSIDE AIR DUCT
TA	TRANSFER AIR DUCT
CAE	COMBUSTION AIR EXHAUST DUCT
CAI	COMBUSTION AIR INTAKE DUCT
SA	SA AIR DUCT TURNING UP
SA	SA AIR DUCT TURNING DOWN
RA	RA AIR DUCT TURNING UP
RA	RA AIR DUCT TURNING DOWN
EA	EA AIR DUCT TURNING UP
EA	EA AIR DUCT TURNING DOWN
E(XXX)	EXISTING DUCT - (XXX) DENOTES SYSTEM
D(XXX)	DUCT TO BE DEMOLISHED - (XXX) DENOTES SYSTEM
A(XXX)	DUCT TO BE ABANDONED IN PLACE - (XXX) DENOTES SYSTEM
	MITERED ELBOW WITH TURNING VANES
	FLEXIBLE DUCT
T	THERMOSTAT
T	TEMPERATURE SENSOR
H	HUMIDITY SENSOR
C	CARBON DIOXIDE SENSOR
TC	TEMPERATURE & CARBON DIOXIDE SENSOR
VERT. HORIZ.	MANUAL BALANCING/VOLUME DAMPER
VERT. HORIZ.	MOTORIZED DAMPER

MECHANICAL PIPING LEGEND

	PIPE ELBOW TURNING UP
	PIPE ELBOW TURNING DOWN
	PIPE TEE; CONNECTION ON TOP
	PIPE TEE; CONNECTION ON BOTTOM
	PIPE CAP
CD	CONDENSATE DRAIN
RF	REFRIGERANT SUPPLY/RETURN
CWS/R	CONDENSER WATER SUPPLY/RETURN
DTS/R	DUAL TEMP. WATER SUPPLY/RETURN
GS/R	GEOTHERMAL WATER SUPPLY/RETURN
HPC	HIGH PRESSURE STEAM CONDENSATE
HPS(#)	HIGH PRESSURE STEAM; (#) DENOTES PRESSURE
HPS/R	HEAT PUMP WATER SUPPLY/RETURN
HRS/R	HEAT RECOVERY SUPPLY/RETURN PIPING
HWS/R	HEATING WATER SUPPLY/RETURN
LPC	LOW PRESSURE STEAM CONDENSATE
LPS(#)	LOW PRESSURE STEAM; (#) DENOTES PRESSURE
MPC	MEDIUM PRESSURE STEAM RETURN
MPS(#)	MEDIUM PRESSURE STEAM; (#) DENOTES PRESSURE
SVT	STEAM VENT PIPING
D(XXX)	PIPING TO BE DEMOLISHED - (XXX) DENOTES SYSTEM
E(XXX)	EXISTING PIPING - (XXX) DENOTES SYSTEM

NOTE: NOT ALL SYMBOLS AND ABBREVIATIONS MAY BE USED ON THIS PROJECT

CHAMPLIN ARCHITECTURE
720 E Pete Rose Way, Suite 140
Cincinnati, OH 45202
T 513.241.4474 F 513.241.0081
thinkchamplin.com
THINK CREATE REALIZE

THE KLEINGERS GROUP

schaefer

CMTA

BEST POINT EDUCATION & BEHAVIORAL HEALTH

Sheakley Renovation + Expansion

5050 Madison Rd
Cincinnati, OH 45227

ISSUANCES

No.	Description	Date
1	BID + PERMIT	09/07/22

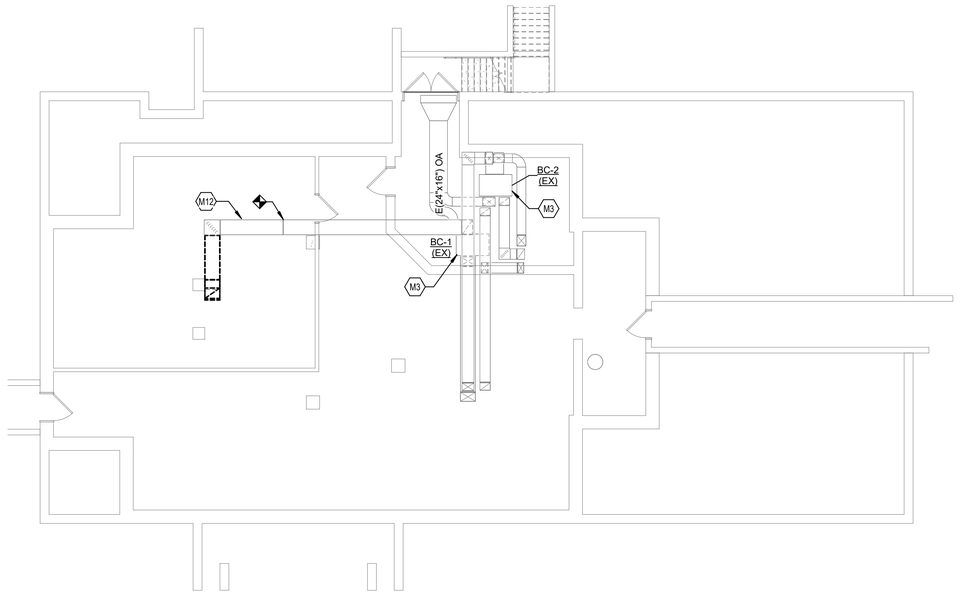
Drawn By CRH
Checked By BKR
Client Number
Project Number 6531

DRAWING TITLE
MECHANICAL LEGEND

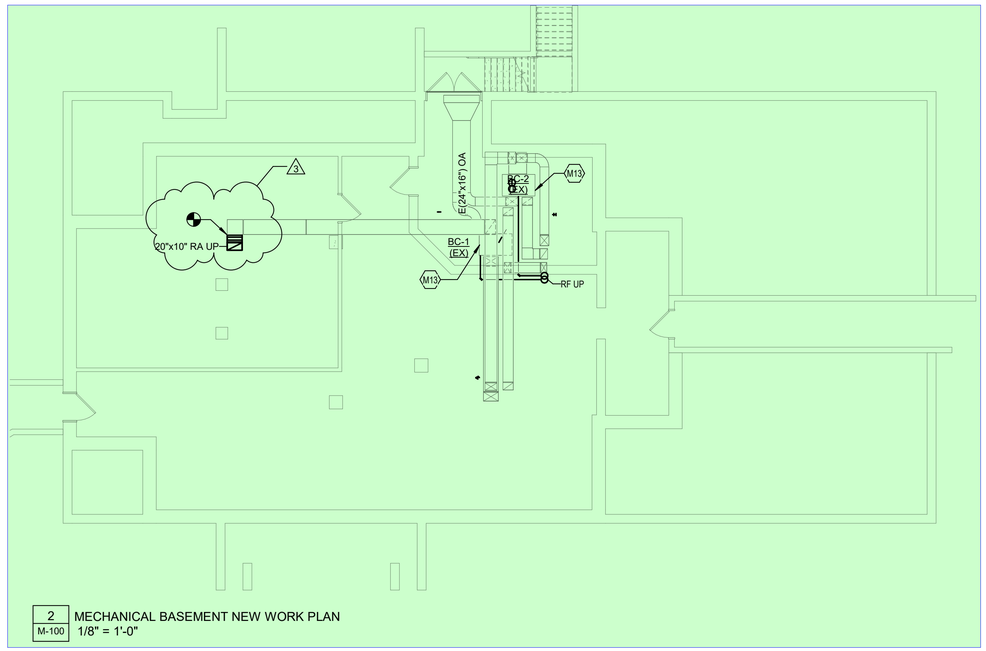
SHEET NO.
M-001

9/7/2022 1:59:05 PM

TAGGED NOTES	##
M3	EXISTING INDOOR FAN COIL UNITS TO REMAIN IN THIS LOCATION.
M12	REMOVE EXISTING DUCTWORK BACK TO POINT OF DEMOLITION IN THIS LOCATION.
M13	PROVIDE GPS-FC48-AC NEEDLEPOINT BIPOLAR IONIZATION UNIT OR EQUAL CAPABLE OF HANDLING 1600 CFM FOR INDOOR UNIT IN THIS LOCATION. UNIT TO BE INSTALLED AT FAN INLET.



1 M-100 MECHANICAL BASEMENT DEMOLITION PLAN
1/8" = 1'-0"



2 M-100 MECHANICAL BASEMENT NEW WORK PLAN
1/8" = 1'-0"

CHAMPLIN ARCHITECTURE

720 E Pete Rose Way, Suite 140
Cincinnati, OH 45202
T 513.241.4474 F 513.241.0081
thinkchamplin.com

THINK CREATE REALIZE

THE KLEINGERS GROUP

schaefer

CMTA

BEST POINT EDUCATION & BEHAVIORAL HEALTH

Sheakley Renovation + Expansion

5050 Madison Rd
Cincinnati, OH 45227

ISSUANCES

No.	Description	Date
1	BID + PERMIT	09/07/22
3	PMT. RESUBMIT/ADD. 01	11/01/22

Drawn By CRH

Checked By BKR

Client Number

Project Number 6531

STATE OF OHIO
BRIAN K. ROSE
E-56979
REGISTERED PROFESSIONAL ENGINEER

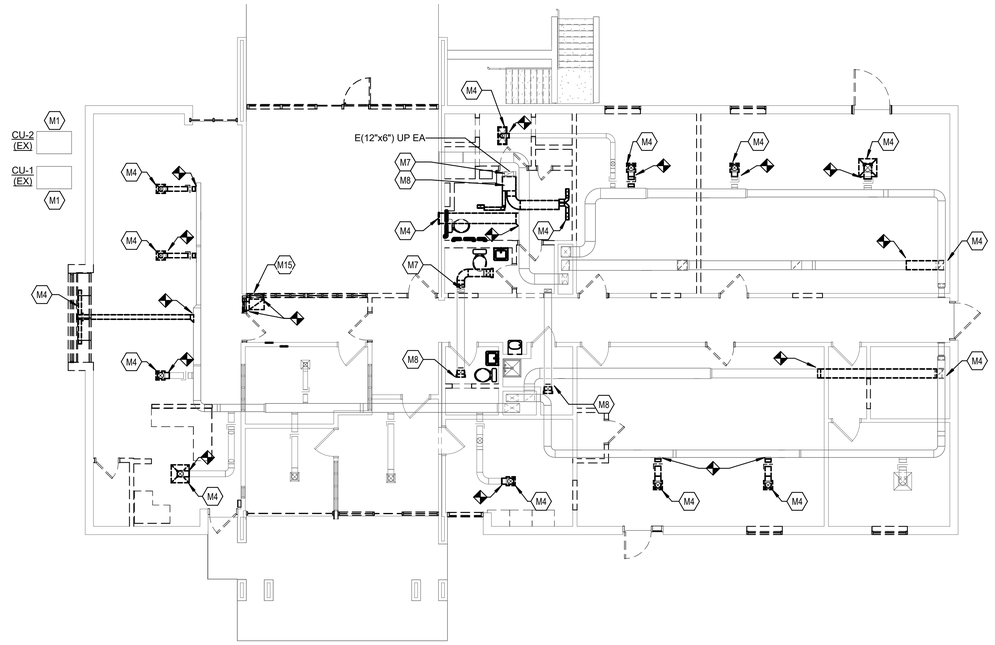
DRAWING TITLE

MECHANICAL BASEMENT PLAN

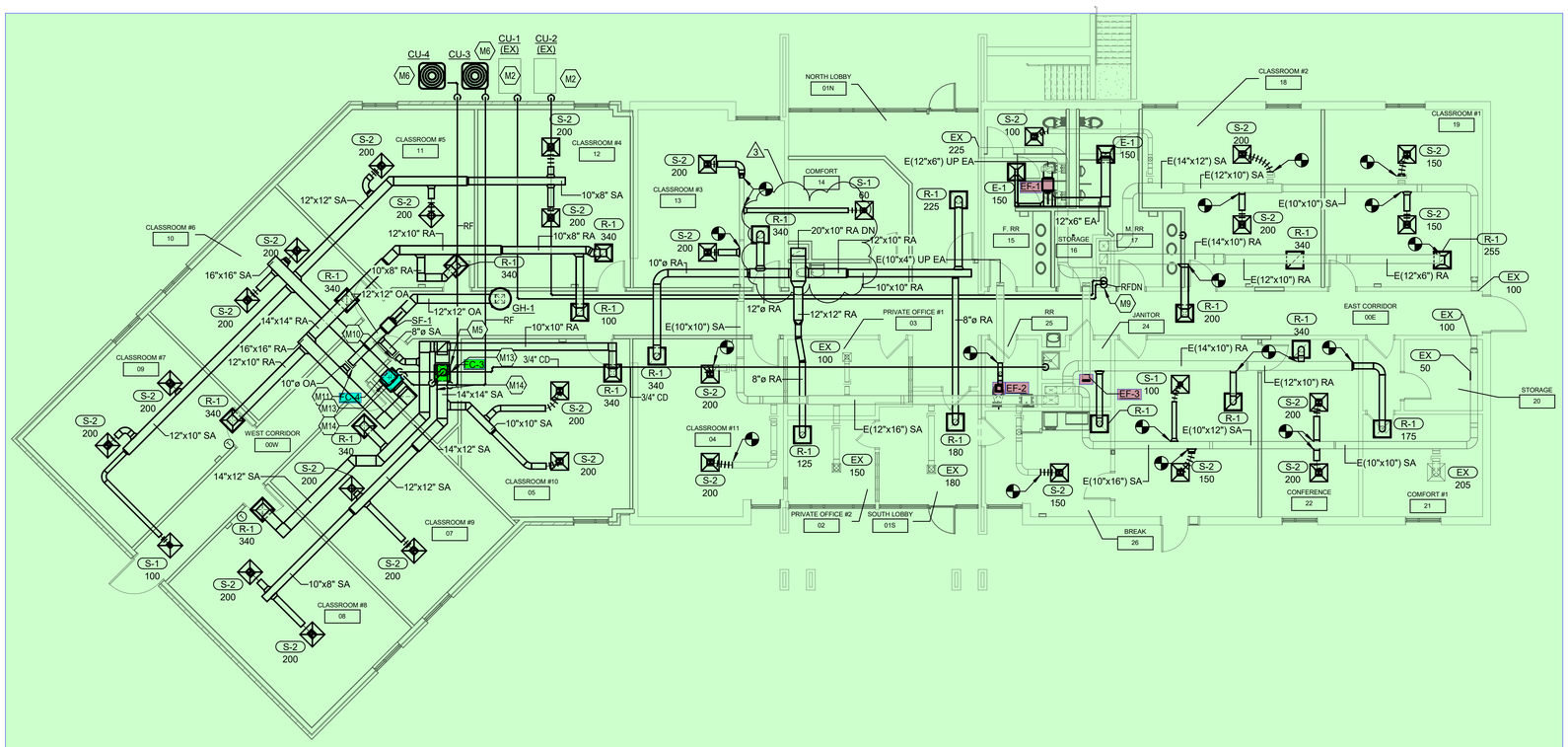
SHEET NO.

M-100

10/31/2022 9:16:32 AM



1 M-200 MECHANICAL DEMOLITION PLAN
1/8" = 1'-0"



2 M-200 MECHANICAL NEW WORK PLAN
1/8" = 1'-0"

TAGGED NOTES

M1	REMOVE AND RELOCATE EXISTING CONDENSING UNIT TO LOCATION SHOWN ON NEW WORK PLAN. CONTRACTOR TO REMOVE EXISTING REFRIGERANT LINES.
M2	RELOCATE EXISTING CONDENSING UNIT TO THIS LOCATION. CONTRACTOR TO SIZE AND ROUTE REFRIGERANT LINES TO ASSOCIATED INDOOR UNIT PER MANUFACTURER'S INSTRUCTIONS AS SHOWN.
M4	REMOVE EXISTING AIR DEVICE AND ASSOCIATED DUCTWORK BACK TO POINT OF DEMOLITION. CONTRACTOR TO PATCH, SEAL, AND INSULATE DUCTWORK.
M5	PROVIDE NEW INDOOR FAN COIL AND FURNACE IN THIS LOCATION. REFER TO SPLIT SYSTEM INDOOR UNIT SCHEDULE ON SHEET M-300 FOR FURTHER DETAILS.
M6	PROVIDE NEW OUTDOOR CONDENSING UNIT AND MOUNT ON CONCRETE PAD IN THIS LOCATION. ROUTE AND SIZE REFRIGERANT LINES AS SHOWN PER MANUFACTURER'S INSTRUCTIONS.
M7	EXISTING DUCTWORK AND ROOF DISCHARGE TO REMAIN.
M8	REMOVE EXISTING EXHAUST FAN IN THIS LOCATION. EXISTING ASSOCIATED DUCTWORK TO REMAIN FOR FUTURE USE.
M9	ROUTE REFRIGERANT LINES DOWN CHASE TO TUNNEL BELOW IN THIS LOCATION. REFER TO SHEET M-100 FOR CONTINUATION.
M10	BALANCE OUTSIDE AIR DAMPER TO 185 CFM.
M11	BALANCE OUTSIDE AIR DAMPER TO 260 CFM.
M13	PROVIDE GPS-FC48-AC NEEDLEPOINT BIPOLAR IONIZATION UNIT OR EQUAL CAPABLE OF HANDLING 1600 CFM FOR INDOOR UNIT IN THIS LOCATION. UNIT TO BE INSTALLED AT FAN INLET.
M14	PROVIDE LITTLE GIANT CONDENSATE PUMP FOR CONDENSATE PUMP REMOVAL IN THIS LOCATION. ROUTE CONDENSATE LINE TO MOP SINK AS SHOWN.
M15	REMOVE EXISTING SIDEWALL RETURN GRILLES IN THIS LOCATION. EXISTING FLOOR PENETRATION TO BE REUSED.

R,G,D RUNOUT SCHEDULE

MARK	DUCT BRANCH SIZE
E-1	8"Ø
R-1	NA
S-1	6"Ø
S-2	8"Ø

CHAMPLIN ARCHITECTURE
720 E Pete Rose Way, Suite 140
Cincinnati, OH 45202
T 513.241.4474 F 513.241.0081
thinkchamplin.com
THINK CREATE REALIZE

THE KLEINGERS GROUP

schaefer

CMTA

BEST POINT EDUCATION & BEHAVIORAL HEALTH

Sheakley Renovation + Expansion

5050 Madison Rd
Cincinnati, OH 45227

ISSUANCES

No.	Description	Date
1	BID + PERMIT	09/07/22
3	PMT. RESUBMIT/ADD. 01	11/01/22

Drawn By: CRH
Checked By: BKR
Client Number:
Project Number: 6531

STATE OF OHIO — BRIAN K. ROSE E-56929 — REGISTERED PROFESSIONAL ENGINEER

DRAWING TITLE
MECHANICAL FIRST FLOOR PLAN

SHEET NO.
M-200

10/31/2022 9:16:39 AM

REGISTERS, GRILLES, AND DIFFUSERS

MARK	MANUFACTURER	MODEL #	TYPE	GRILLE SIZE	PANEL SIZE	DUCT INLET SIZE	DUCT BRANCH SIZE	MAX CFM	P.D.	NOISE CRITERIA	THROW PATTERN	REMARKS
E-1	PRICE	530	ALUMINUM LOUVERED GRILLE	12"X12"	12"x12"	8"Ø	8"Ø	225	0.05	25	NA	1
R-1	PRICE	630	ALUMINUM LOUVERED GRILLE	24"X24"	24"x24"	NA	NA	400	0.05	25	NA	1
S-1	PRICE	ASPD	ALUMINUM SQUARE PLAQUE DIFFUSER	24"X24"	24"x24"	6"Ø	6"Ø	100	0.05	25	4-WAY	1
S-2	PRICE	ASPD	ALUMINUM SQUARE PLAQUE DIFFUSER	24"X24"	24"x24"	8"Ø	8"Ø	225	0.05	25	4-WAY	1

REMARKS:
1. WHITE IN COLOR.

SPLIT SYSTEM OUTDOOR UNIT SCHEDULE

MARK	MANUFACTURER	MODEL #	DIMENSIONS (IN.)			WEIGHT (LBS)	TOTAL COOLING (MBH)	SENSIBLE COOLING (MBH)	MINIMUM SEER	ELECTRICAL				REMARKS
			LENGTH	WIDTH	HEIGHT					MCA	MOCP	VOLTAGE	PHASE	
CU-3	CARRIER	24ACB736A003	32	32	35	255	35.0	26.0	17	20 A	35	208	1	1,2,3
CU-4	CARRIER	24ACB748A003	35	35	39	318	47.8	36.4	17	28 A	40	208	1	1,2,3

REMARKS:
1. PROVIDE R-410A REFRIGERANT UNIT WITH ALL REFRIGERATION PIPING SPECIALTIES REQUIRED BY THE MANUFACTURER'S RECOMMENDATIONS. SIZE REFRIGERANT LINES AND PROVIDE INTERMEDIATE TRAPS PER MANUFACTURER'S INSTRUCTIONS.
2. UNIT SHALL BE UL LISTED.
3. PROVIDE SINGLE POINT POWER CONNECTION: INDOOR UNIT IS FED FROM OUTDOOR UNIT.

SPLIT SYSTEM INDOOR UNIT SCHEDULE

MARK	MODEL #	MANUFACTURER	COIL DIMENSIONS (IN.)			WEIGHT (LBS)	AIRFLOW (CFM)	FURNACE						ELECTRICAL		REMARKS
			LENGTH	WIDTH	HEIGHT			LENGTH (IN.)	WIDTH (IN.)	HEIGHT (IN.)	FURNACE MODEL #	EFFICIENCY	HEATING CAPACITY (MBH)	VOLTAGE	PHASE	
FC-3	CNPVP3617ALA	CARRIER	21	18	17	49	1200	29.5	17.5	35	59TP	+96 AFUE	60	120	1	1,2
FC-4	CNPVP4821ALA	CARRIER	21	21	22	66	1600	29.5	21	35	59TP	+96 AFUE	80	120	1	1,2

REMARKS:
1. PROVIDE WITH WALL MOUNTED THERMOSTAT.
2. UNIT IS POWERED BY OUTDOOR UNIT.
3. PROVIDE UNIT WITH PROGRAMMABLE THERMOSTAT. THERMOSTAT SCHEDULE TO BE PROGRAMMED TO MATCH TIME CLOCK SCHEDULE FOR SF-1.

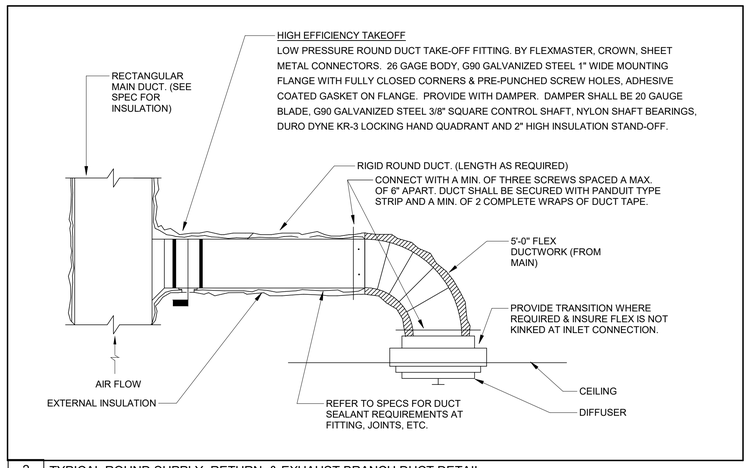
SUPPLY/EXHAUST FAN SCHEDULE

MARK	MANUFACTURER	MODEL #	SERVICE	TYPE	AIRFLOW (CFM)	E.S.P.	DRIVE	RPM	FAN HP	ELECTRICAL DATA			REMARKS
										VOLTAGE	PHASE	HZ	
EF-1	GREENHECK	SQ-80-VG	RESTROOM EXHAUST	CENTRIFUGAL INLINE FAN	300	0.25	DIRECT	1725	0.1	120	1	60	
EF-2	GREENHECK	SP-A70	RESTROOM EXHAUST	CEILING FAN	50	0.25	DIRECT	850		120	1	60	
EF-3	GREENHECK	SP-A70	RESTROOM EXHAUST	CEILING FAN	50	0.25	DIRECT	850		120	1	60	
SF-1	GREENHECK	SQ-90-VG	OUTSIDE AIR INTAKE	CENTRIFUGAL INLINE FAN	450	0.25	DIRECT	1725	0.1	120	1	60	1,2

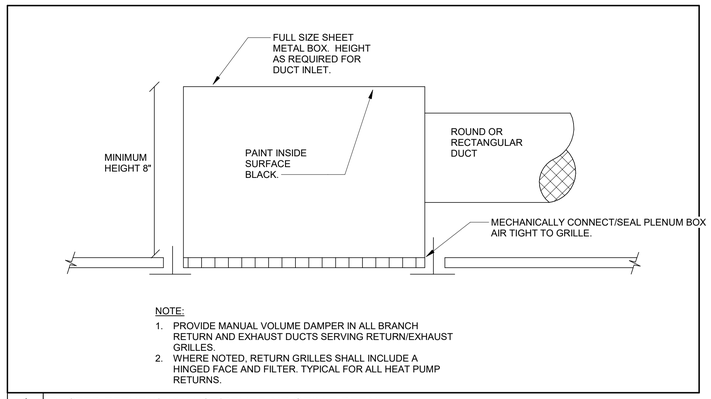
REMARKS:
1. PROVIDE FAN WITH PROGRAMMABLE TIME CLOCK.
   A. CONTRACTOR SHALL PROGRAM SCHEDULE PROVIDED BY OWNER.
   B. TIME CLOCK WILL OPERATE THE SUPPLY FAN AND OPEN THE MOTORIZED DAMPER WHEN THE SPACE IS SCHEDULED TO BE OCCUPIED.
   C. CONTRACTOR TO PROVIDE TRAINING TO OWNER ON TIME CLOCK.
2. FAN SHALL HAVE AN ECM MOTOR.

GRAVITY HOOD SCHEDULE

MARK	MANUFACTURER	MODEL	SERVICE	MAXIMUM CFM	THROAT LENGTH (IN)	THROAT WIDTH (IN)	THROAT VELOCITY (FPM)	PRESSURE DROP (IN WC)	WEIGHT (LBS.)	REMARKS
GH-1	GREENHECK	GRSI	OUTSIDE AIR INTAKE	450	12	12	500	0.25	10	



2 M-300 TYPICAL ROUND SUPPLY, RETURN, & EXHAUST BRANCH DUCT DETAIL
NOT TO SCALE



1 M-300 DUCTED RETURN/EXHAUST/RELIEF AIR GRILLE DETAIL
NOT TO SCALE

CHAMPLIN ARCHITECTURE
720 E Pete Rose Way, Suite 140
Cincinnati, OH 45202
T 513.241.4474 F 513.241.0081
thinkchamplin.com
THINK CREATE REALIZE

THE KLEINGERS GROUP

schaefer

CMTA

BEST POINT EDUCATION & BEHAVIORAL HEALTH

Sheakley Renovation + Expansion

5050 Madison Rd
Cincinnati, OH 45227

ISSUANCES

No.	Description	Date
1	BID + PERMIT	09/07/22

Drawn By CRH
Checked By BKR
Client Number
Project Number 6531

DRAWING TITLE
DETAILS AND SCHEDULES

SHEET NO.
M-300

9/7/2022 1:59:13 PM

VENTILATION CALCULATIONS

EQUIPMENT TAG	ROOM NAME	SPACE TYPE	AREA (SF)	PEOPLE	OA CFM REQ'D / PERSON	OA CFM REQ'D / SF	Ez	OA REQ'D (CFM)	BIPOLAR OA (CFM)	%OA	SA TO SPACE	ACTUAL OA (CFM)
BC-1	01 LOBBY	LOBBIES	134	0	5	0.06	0.8	10	30	15%	180	27
	02 PRIVATE OFFICE #2	OFFICE	91	1	5.0	0.06	0.8	13	25	15%	150	23
	03 PRIVATE OFFICE #1	OFFICE	113	1	5.0	0.06	0.8	15	15	15%	100	15
	04 CLASSROOM #11	LECTURE CLASSROOM	360	12	7.5	0.06	0.8	140	60	15%	400	60
	13 CLASSROOM #3	LECTURE CLASSROOM	368	12	7.5	0.06	0.8	140	60	15%	400	60
	14 COMFORT	BREAKROOM	56	1	5	0.06	1	10	10	15%	65	10

VENTILATION CALCULATIONS

EQUIPMENT TAG	ROOM NAME	SPACE TYPE	AREA (SF)	PEOPLE	OA CFM REQ'D / PERSON	OA CFM REQ'D / SF	Ez	OA REQ'D (CFM)	BIPOLAR OA (CFM)	%OA	SA TO SPACE	ACTUAL OA (CFM)
BC-2	18 CLASSROOM #2	LECTURE CLASSROOM	364	12	7.5	0.06	0.8	140	60	15%	400	60
	19 CLASSROOM #1	LECTURE CLASSROOM	360	12	7.5	0.06	0.8	140	45	15%	300	45
	20 STORAGE	STORAGE	72	0	0.0	0.06	0.8	5	10	15%	50	8
	21 COMFORT	BREAKROOM	158	3	5.0	0.06	0.8	31	35	15%	205	31
	22 CONFERENCE	CONFERENCE	231	10	5	0.06	0.8	80	45	15%	300	45
	23 SHARED OFFICE	OFFICE	486	8	5.0	0.06	0.8	86	60	15%	400	60

VENTILATION CALCULATIONS

EQUIPMENT TAG	ROOM NAME	SPACE TYPE	AREA (SF)	PEOPLE	OA CFM REQ'D / PERSON	OA CFM REQ'D / SF	Ez	OA REQ'D (CFM)	BIPOLAR OA (CFM)	%OA	SA TO SPACE	ACTUAL OA (CFM)
FC-3	05 CLASSROOM #10	LECTURE CLASSROOM	360	12	7.5	0.06	0.8	140	60	15%	400	60
	07 CLASSROOM #9	LECTURE CLASSROOM	354	12	7.5	0.06	0.8	139	60	15%	400	60
	08 CLASSROOM #8	LECTURE CLASSROOM	356	12	7.5	0.06	0.8	139	60	15%	400	60

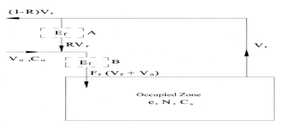
VENTILATION CALCULATIONS

EQUIPMENT TAG	ROOM NAME	SPACE TYPE	AREA (SF)	PEOPLE	OA CFM REQ'D / PERSON	OA CFM REQ'D / SF	Ez	OA REQ'D (CFM)	BIPOLAR OA (CFM)	%OA	SA TO SPACE	ACTUAL OA (CFM)
FC-4	09 CLASSROOM #7	LECTURE CLASSROOM	369	12	7.5	0.06	0.8	140	60	15%	400	60
	10 CLASSROOM #6	LECTURE CLASSROOM	369	12	7.5	0.06	0.8	140	60	15%	400	60
	11 CLASSROOM #5	LECTURE CLASSROOM	368	12	7.5	0.06	0.8	140	60	15%	400	60
	12 CLASSROOM #4	LECTURE CLASSROOM	368	12	7.5	0.06	0.8	140	60	15%	400	60
	WEST CORRIDOR	CORRIDOR	460	0	0	0	1	35	15	15%	100	15

BC-1 VENTILATION

Zone Tag	Facility Type	Zone Use	Zone Floor Area (square ft) Az	Zone Max Occupancy Pz	Table 6.1 OA per Occupant Rp	Table 6.1 cfm/ft2 Ra	Pz * Rp	Az * Ra	Table 6.2 Ventilation Effectiveness Ez	Outdoor Air to Zone (CFM) with Ez correction (Vbz/Ez)
CLASSROOM #3	Educational Facilities	Lecture Classroom	361.0	12.0	7.5	0.06	90	22	0.8	140 OA required per VRP

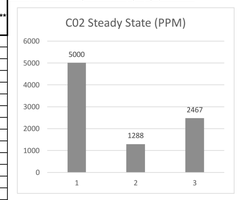
Zone Height (feet)	8.5
Desired Outside Air (Vo) IAQP (CF	60
Supply Air (Vs) (CFM)	400
Return Air (Vr)	340
Recirc. Flow Factor (R)	0.85
Ventilation Effectiveness (Ez)	0.8
Level of Physical Activity	**Sedentary**
Filter Location	B
HVAC Flow Type	Constant
Outdoor Air Flow Type	Constant



Air Changes Per Hour	7.8	VRP OA CFM per person	11.6
Outside Air Per VRP	140 CFM	IAQ OA CFM per person	5.0
Outside Air Per IAQ	60 CFM		
Outside Air Savings	80 CFM	Winter Heating Savings	
OA Summer Drybulb	95.0	OA Winter Design DB (F)	10
OA Summer Wetbulb	76.0	Supply Air DB Setpoint (F)	85
Coil Leaving Air Drybulb (F)	55.0	MBH Saved Winter	6.5
Coil Leaving Air Wetbulb (F	55.00	KW Saved Winter	1.9
OA MBH Saved Summer*	5.8		
OA Tons Saved Summer*	0.5		

*OA = Outside Air
***OSHA, NIOSH & WHO most conservative values used
http://www.cdc.gov/niosh/npg/npgsyn-a.html

Indoor Contaminants Generated By People & From Outdoors	Maximum Threshold Value Based on OSHA or NIOSH (PPM)	Steady State (lb/ft3) Using the VRP* (Prescribed OA) Plasma Off	Steady State (lb/ft3) Using the IAQ Method (Reduced OA) Plasma On	Is Steady State Level Acceptable at Reduced OA Levels?	Contaminant Generation Rate lb/person/min	Filtration Effectiveness	Cognizant Authority***
Acetaldehyde	100.0	2.6357E-09	1.1297E-09	Yes	1.2903E-08	50%	OSHA
Acetone	250.0	1.4151E-08	9.5579E-09	Yes	1.2993E-07	50%	NIOSH
Ammonia	25.00	9.6001E-07	6.5519E-07	Yes	8.9322E-06	50%	NIOSH
Benzene	1.0	1.6192E-08	1.0784E-08	Yes	1.4602E-07	50%	OSHA
2- Butanone (MEK)	200.0	9.5000E-07	6.4838E-07	Yes	8.8396E-06	50%	NIOSH
Carbon dioxide**	5000	4.7609E-05	5.1129E-05	Yes	2.4692E-05	0%	NIOSH
Chloroform	2.0	2.1674E-07	4.7541E-08	Yes	2.7342E-07	50%	NIOSH
Dioxane	100.0	1.9360E-08	2.8402E-09	Yes	0.0000E+00	50%	OSHA
Hydrogen Sulfide	10.0	1.2491E-10	1.8324E-11	Yes	0.0000E+00	50%	NIOSH
Methane	NA	6.2453E-11	6.2453E-11	Yes	0.0000E+00	0%	NA
Methanol	200.0	1.1996E-08	2.7907E-08	Yes	1.1163E-07	0%	NIOSH
Methylene Chloride	25.0	8.6319E-07	5.8881E-07	Yes	8.0262E-06	50%	OSHA
Propane	1000.0	1.2491E-09	1.2491E-09	Yes	0.0000E+00	0%	NIOSH
Tetrachloroethane	5.0	0.0000E+00	0.0000E+00	Yes	0.0000E+00	50%	OSHA
Tetrachloroethylene	100.0	9.8128E-07	6.6877E-07	Yes	9.1140E-06	50%	OSHA
Toluene	100.0	2.4512E-09	1.6728E-09	Yes	2.2806E-08	50%	NIOSH
1,1,1 - Trichloroethane	350.0	4.1249E-05	2.8116E-05	Yes	3.8318E-04	50%	NIOSH
Xylene	100.0	0.0000E+00	0.0000E+00	Yes	0.0000E+00	50%	OSHA



1 = ASHRAE IAQP & NIOSH C02 Limit is 5,000 PPM
2 = C02 Level at Ventilation Rate OA Flow Rate
3 = C02 Level at IAQ Procedure OA Flow Rate

**Carbon dioxide has been provided for reference only for gathering demand control ventilation (DCV) setpoints. The National Research Council was commissioned by the US Navy to prove C02 is not a contaminant of concern when using air purification to control the other contaminants of concern, as found on submarines.

Building materials and furnishings assumed to have no VOCs and off-gassing is complete

All yellow shaded boxes require user input or review

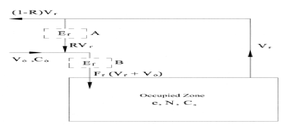
Is IAQ acceptable at reduced outside air levels? **Yes**

* IMC 2006 & later allows for ASHRAE 62 IAQP through the engineered execption found in Section 403.2

BC-1 VENTILATION

Zone Tag	Facility Type	Zone Use	Zone Floor Area (square ft) Az	Zone Max Occupancy Pz	Table 6.1 OA per Occupant Rp	Table 6.1 cfm/ft2 Ra	Pz * Rp	Az * Ra	Table 6.2 Ventilation Effectiveness Ez	Outdoor Air to Zone (CFM) with Ez correction (Vbz/Ez)
CLASSROOM #11	Educational Facilities	Lecture Classroom	360.0	12.0	7.5	0.06	90	22	0.8	140 OA required per VRP

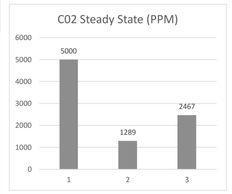
Zone Height (feet)	8.5
Desired Outside Air (Vo) IAQP (CF	60
Supply Air (Vs) (CFM)	400
Return Air (Vr)	340
Recirc. Flow Factor (R)	0.85
Ventilation Effectiveness (Ez)	0.8
Level of Physical Activity	**Sedentary**
Filter Location	B
HVAC Flow Type	Constant
Outdoor Air Flow Type	Constant



Air Changes Per Hour	7.8	VRP OA CFM per person	11.6
Outside Air Per VRP	140 CFM	IAQ OA CFM per person	5.0
Outside Air Per IAQ	60 CFM		
Outside Air Savings	80 CFM	Winter Heating Savings	
OA Summer Drybulb	95.0	OA Winter Design DB (F)	10
OA Summer Wetbulb	76.0	Supply Air DB Setpoint (F)	85
Coil Leaving Air Drybulb (F)	55.0	MBH Saved Winter	6.5
Coil Leaving Air Wetbulb (F	55.0	KW Saved Winter	1.9
OA MBH Saved Summer*	5.8		
OA Tons Saved Summer*	0.5		

*OA = Outside Air
***OSHA, NIOSH & WHO most conservative values used
http://www.cdc.gov/niosh/npg/npgsyn-a.html

Indoor Contaminants Generated By People & From Outdoors	Maximum Threshold Value Based on OSHA or NIOSH (PPM)	Steady State (lb/ft3) Using the VRP* (Prescribed OA) Plasma Off	Steady State (lb/ft3) Using the IAQ Method (Reduced OA) Plasma On	Is Steady State Level Acceptable at Reduced OA Levels?	Contaminant Generation Rate lb/person/min	Filtration Effectiveness	Cognizant Authority***
Acetaldehyde	100.0	2.6365E-09	1.1297E-09	Yes	1.2903E-08	50%	OSHA
Acetone	250.0	1.4159E-08	9.5579E-09	Yes	1.2993E-07	50%	NIOSH
Ammonia	25.00	9.6053E-07	6.5519E-07	Yes	8.9322E-06	50%	NIOSH
Benzene	1.0	1.6201E-08	1.0784E-08	Yes	1.4602E-07	50%	OSHA
2- Butanone (MEK)	200.0	9.5051E-07	6.4838E-07	Yes	8.8396E-06	50%	NIOSH
Carbon dioxide**	5000	4.7611E-05	5.1129E-05	Yes	2.4692E-05	0%	NIOSH
Chloroform	2.0	2.1676E-07	4.7541E-08	Yes	2.7342E-07	50%	NIOSH
Dioxane	100.0	1.9360E-08	2.8402E-09	Yes	0.0000E+00	50%	OSHA
Hydrogen Sulfide	10.0	1.2491E-10	1.8324E-11	Yes	0.0000E+00	50%	NIOSH
Methane	NA	6.2453E-11	6.2453E-11	Yes	0.0000E+00	0%	NA
Methanol	200.0	1.2003E-08	2.7907E-08	Yes	1.1163E-07	0%	NIOSH
Methylene Chloride	25.0	8.6366E-07	5.8881E-07	Yes	8.0262E-06	50%	OSHA
Propane	1000.0	1.2491E-09	1.2491E-09	Yes	0.0000E+00	0%	NIOSH
Tetrachloroethane	5.0	0.0000E+00	0.0000E+00	Yes	0.0000E+00	50%	OSHA
Tetrachloroethylene	100.0	9.8181E-07	6.6877E-07	Yes	9.1140E-06	50%	OSHA
Toluene	100.0	2.4525E-09	1.6728E-09	Yes	2.2806E-08	50%	NIOSH
1,1,1 - Trichloroethane	350.0	4.1271E-05	2.8116E-05	Yes	3.8318E-04	50%	NIOSH
Xylene	100.0	0.0000E+00	0.0000E+00	Yes	0.0000E+00	50%	OSHA



1 = ASHRAE IAQP & NIOSH C02 Limit is 5,000 PPM
2 = C02 Level at Ventilation Rate OA Flow Rate
3 = C02 Level at IAQ Procedure OA Flow Rate

**Carbon dioxide has been provided for reference only for gathering demand control ventilation (DCV) setpoints. The National Research Council was commissioned by the US Navy to prove C02 is not a contaminant of concern when using air purification to control the other contaminants of concern, as found on submarines.

Building materials and furnishings assumed to have no VOCs and off-gassing is complete

All yellow shaded boxes require user input or review

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

* IMC 2006 & later allows for ASHRAE 62 IAQP through the engineered execption found in Section 403.2

CHAMPLIN ARCHITECTURE

720 E Pete Rose Way, Suite 140
Cincinnati, OH 45202
T 513.241.4474 F 513.241.0081
thinkchamplin.com

THINK CREATE REALIZE

THE KLEINGERS GROUP

schaefer

CMTA

BEST POINT EDUCATION & BEHAVIORAL HEALTH

Sheakley Renovation + Expansion

5050 Madison Rd
Cincinnati, OH 45227

ISSUANCES

No.	Description	Date
1	BID + PERMIT	09/07/22

Drawn By CRH

Checked By BKR

Client Number

Project Number 6531

DRAWING TITLE

MECHANICAL VENTILATION CALCULATIONS

SHEET NO.

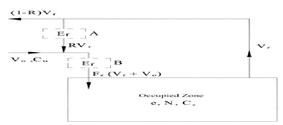
M-400

9/7/2022 1:59:14 PM

BC-2 VENTILATION

Zone Tag	Facility Type	Zone Use	Zone Floor Area (square ft) Az	Zone Max Occupancy Pz	Table 6.1 OA per Occupant Rp	Table 6.1 cfm/ft2 Ra	Pz * Rp Pz * Rp	Az * Ra Az * Ra	Table 6.2 Ventilation Effectiveness Ez	Outdoor Air to Zone (CFM) with Ez correction (Vbz/Ez)
CLASSROOM #1	Educational Facilities	Lecture Classroom	360.0	12.0	7.5	0.06	90	22	0.8	140 OA required per VRP

Zone Height (feet)	8.5
Desired Outside Air (Vo) IAQP (CF	60
Supply Air (Vs) (CFM)	400
Return Air (Vr)	340
Recirc. Flow Factor (R)	0.85
Ventilation Effectiveness (Ez)	0.8
Level of Physical Activity	**Sedentary**
Filter Location	B
HVAC Flow Type	Constant
Outdoor Air Flow Type	Constant

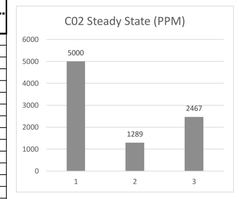


Air Changes Per Hour	7.8	VRP OA CFM per person	11.6
Outside Air Per VRP	140 CFM	IAQ OA CFM per person	5.0
Outside Air Per IAQ	60 CFM		
Outside Air Savings	80 CFM	Winter Heating Savings	
OA Summer Drybulb	95.0	OA Winter Design DB (F)	10
OA Summer Wetbulb	76.0	Supply Air DB Setpoint (F)	85
Coil Leaving Air Drybulb (F)	55.0	MBH Saved Winter	6.5
Coil Leaving Air Wetbulb (F	55.0	KW Saved Winter	1.9
OA MBH Saved Summer*	5.8		
OA Tons Saved Summer*	0.5		

*OA = Outside Air

***OSHA, NIOSH & WHO most conservative values used
http://www.cdc.gov/niosh/npg/npgsyn-a.html

Indoor Contaminants Generated By People & From Outdoors	Maximum Threshold Value Based on OSHA or NIOSH (PPM)	Steady State (lb/ft3) Using the VRP* (Prescribed OA) Plasma Off	Steady State (lb/ft3) Using the IAQ Method (Reduced OA) Plasma On	Is Steady State Level Acceptable at Reduced OA Levels?	Contaminant Generation Rate lb/person/min	Filtration Effectiveness	Cognizant Authority***
Acetaldehyde	100.0	2.6365E-09	1.1297E-09	Yes	1.2903E-08	50%	OSHA
Acetone	250.0	1.4159E-08	9.5579E-09	Yes	1.2993E-07	50%	NIOSH
Ammonia	25.00	9.6053E-07	6.5519E-07	Yes	8.9322E-06	50%	NIOSH
Benzene	1.0	1.6201E-08	1.0784E-08	Yes	1.4602E-07	50%	OSHA
2- Butanone (MEK)	200.0	9.5051E-07	6.4838E-07	Yes	8.8396E-06	50%	NIOSH
Carbon dioxide**	5000	4.7611E-05	5.1129E-05	Yes	2.4692E-05	0%	NIOSH
Chloroform	2.0	2.1676E-07	4.7541E-08	Yes	2.7342E-07	50%	NIOSH
Dioxane	100.0	1.9360E-08	2.8402E-09	Yes	0.0000E+00	50%	OSHA
Hydrogen Sulfide	10.0	1.2491E-10	1.8324E-11	Yes	0.0000E+00	50%	NIOSH
Methane	NA	6.2453E-11	6.2453E-11	Yes	0.0000E+00	0%	NA
Methanol	200.0	1.2003E-08	2.7907E-08	Yes	1.1163E-07	0%	NIOSH
Methylene Chloride	25.0	8.6366E-07	5.8881E-07	Yes	8.0262E-06	50%	OSHA
Propane	1000.0	1.2491E-09	1.2491E-09	Yes	0.0000E+00	0%	NIOSH
Tetrachloroethane	5.0	0.0000E+00	0.0000E+00	Yes	0.0000E+00	50%	OSHA
Tetrachloroethylene	100.0	9.8181E-07	6.6877E-07	Yes	9.1140E-06	50%	OSHA
Toluene	100.0	2.4525E-09	1.6728E-09	Yes	2.2806E-08	50%	NIOSH
1,1,1 - Trichloroethane	350.0	4.1271E-05	2.8116E-05	Yes	3.8318E-04	50%	NIOSH
Xylene	100.0	0.0000E+00	0.0000E+00	Yes	0.0000E+00	50%	OSHA



1 = ASHRAE IAQP & NIOSH C02 Limit is 5,000 PPM
2 = C02 Level at Ventilation Rate OA Flow Rate
3 = C02 Level at IAQ Procedure OA Flow Rate

**Carbon dioxide has been provided for reference only for gathering demand control ventilation (DCV) setpoints. The National Research Council was commissioned by the US Navy to prove C02 is not a contaminant of concern when using air purification to control the other contaminants of concern, as found on submarines.

Building materials and furnishings assumed to have no VOCs and off-gassing is complete
All yellow shaded boxes require user input or review

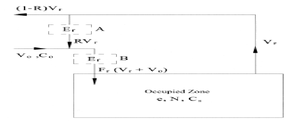
Is IAQ acceptable at reduced outside air levels? **Yes**

* IMC 2006 & later allows for ASHRAE 62 IAQP through the engineered execption found in Section 403.2

BC-2 VENTILATION

Zone Tag	Facility Type	Zone Use	Zone Floor Area (square ft) Az	Zone Max Occupancy Pz	Table 6.1 OA per Occupant Rp	Table 6.1 cfm/ft2 Ra	Pz * Rp Pz * Rp	Az * Ra Az * Ra	Table 6.2 Ventilation Effectiveness Ez	Outdoor Air to Zone (CFM) with Ez correction (Vbz/Ez)
CLASSROOM #2	Educational Facilities	Lecture Classroom	364.0	12.0	7.5	0.06	90	22	0.8	140 OA required per VRP

Zone Height (feet)	8.5
Desired Outside Air (Vo) IAQP (CF	60
Supply Air (Vs) (CFM)	400
Return Air (Vr)	340
Recirc. Flow Factor (R)	0.85
Ventilation Effectiveness (Ez)	0.8
Level of Physical Activity	**Sedentary**
Filter Location	B
HVAC Flow Type	Constant
Outdoor Air Flow Type	Constant

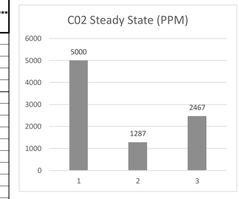


Air Changes Per Hour	7.8	VRP OA CFM per person	11.7
Outside Air Per VRP	140 CFM	IAQ OA CFM per person	5.0
Outside Air Per IAQ	60 CFM		
Outside Air Savings	80 CFM	Winter Heating Savings	
OA Summer Drybulb	95.0	OA Winter Design DB (F)	10
OA Summer Wetbulb	76.0	Supply Air DB Setpoint (F)	85
Coil Leaving Air Drybulb (F)	55.0	MBH Saved Winter	6.5
Coil Leaving Air Wetbulb (F	55.0	KW Saved Winter	1.9
OA MBH Saved Summer*	5.8		
OA Tons Saved Summer*	0.5		

*OA = Outside Air

***OSHA, NIOSH & WHO most conservative values used
http://www.cdc.gov/niosh/npg/npgsyn-a.html

Indoor Contaminants Generated By People & From Outdoors	Maximum Threshold Value Based on OSHA or NIOSH (PPM)	Steady State (lb/ft3) Using the VRP* (Prescribed OA) Plasma Off	Steady State (lb/ft3) Using the IAQ Method (Reduced OA) Plasma On	Is Steady State Level Acceptable at Reduced OA Levels?	Contaminant Generation Rate lb/person/min	Filtration Effectiveness	Cognizant Authority***
Acetaldehyde	100.0	2.6335E-09	1.1297E-09	Yes	1.2903E-08	50%	OSHA
Acetone	250.0	1.4129E-08	9.5579E-09	Yes	1.2993E-07	50%	NIOSH
Ammonia	25.00	9.5847E-07	6.5519E-07	Yes	8.9322E-06	50%	NIOSH
Benzene	1.0	1.6167E-08	1.0784E-08	Yes	1.4602E-07	50%	OSHA
2- Butanone (MEK)	200.0	9.4847E-07	6.4838E-07	Yes	8.8396E-06	50%	NIOSH
Carbon dioxide**	5000	4.7605E-05	5.1129E-05	Yes	2.4692E-05	0%	NIOSH
Chloroform	2.0	2.1670E-07	4.7541E-08	Yes	2.7342E-07	50%	NIOSH
Dioxane	100.0	1.9360E-08	2.8402E-09	Yes	0.0000E+00	50%	OSHA
Hydrogen Sulfide	10.0	1.2491E-10	1.8324E-11	Yes	0.0000E+00	50%	NIOSH
Methane	NA	6.2453E-11	6.2453E-11	Yes	0.0000E+00	0%	NA
Methanol	200.0	1.1977E-08	2.7907E-08	Yes	1.1163E-07	0%	NIOSH
Methylene Chloride	25.0	8.6180E-07	5.8881E-07	Yes	8.0262E-06	50%	OSHA
Propane	1000.0	1.2491E-09	1.2491E-09	Yes	0.0000E+00	0%	NIOSH
Tetrachloroethane	5.0	0.0000E+00	0.0000E+00	Yes	0.0000E+00	50%	OSHA
Tetrachloroethylene	100.0	9.7971E-07	6.6877E-07	Yes	9.1140E-06	50%	OSHA
Toluene	100.0	2.4473E-09	1.6728E-09	Yes	2.2806E-08	50%	NIOSH
1,1,1 - Trichloroethane	350.0	4.1182E-05	2.8116E-05	Yes	3.8318E-04	50%	NIOSH
Xylene	100.0	0.0000E+00	0.0000E+00	Yes	0.0000E+00	50%	OSHA



1 = ASHRAE IAQP & NIOSH C02 Limit is 5,000 PPM
2 = C02 Level at Ventilation Rate OA Flow Rate
3 = C02 Level at IAQ Procedure OA Flow Rate

**Carbon dioxide has been provided for reference only for gathering demand control ventilation (DCV) setpoints. The National Research Council was commissioned by the US Navy to prove C02 is not a contaminant of concern when using air purification to control the other contaminants of concern, as found on submarines.

Building materials and furnishings assumed to have no VOCs and off-gassing is complete
All yellow shaded boxes require user input or review

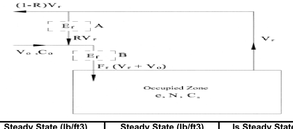
Is IAQ acceptable at reduced outside air levels? **Yes**

* IMC 2006 & later allows for ASHRAE 62 IAQP through the engineered execption found in Section 403.2

BC-2 VENTILATION

Zone Tag	Facility Type	Zone Use	Zone Floor Area (square ft) Az	Zone Max Occupancy Pz	Table 6.1 OA per Occupant Rp	Table 6.1 cfm/ft2 Ra	Pz * Rp Pz * Rp	Az * Ra Az * Ra	Table 6.2 Ventilation Effectiveness Ez	Outdoor Air to Zone (CFM) with Ez correction (Vbz/Ez)
CONFERENCE #22	Educational Facilities	Conference/meeting	231.0	10.0	5.0	0.06	50	14	0.8	80 OA required per VRP

Zone Height (feet)	8.5
Desired Outside Air (Vo) IAQP (CF	60
Supply Air (Vs) (CFM)	400
Return Air (Vr)	340
Recirc. Flow Factor (R)	0.85
Ventilation Effectiveness (Ez)	0.8
Level of Physical Activity	**Sedentary**
Filter Location	B
HVAC Flow Type	Constant
Outdoor Air Flow Type	Constant

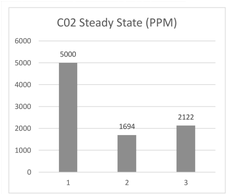


Air Changes Per Hour	12.2	VRP OA CFM per person	8.0
Outside Air Per VRP	80 CFM	IAQ OA CFM per person	6.0
Outside Air Per IAQ	60 CFM		
Outside Air Savings	20 CFM	Winter Heating Savings	
OA Summer Drybulb	95.0	OA Winter Design DB (F)	10
OA Summer Wetbulb	76.0	Supply Air DB Setpoint (F)	85
Coil Leaving Air Drybulb (F)	55.0	MBH Saved Winter	1.6
Coil Leaving Air Wetbulb (F	55.0	KW Saved Winter	0.5
OA MBH Saved Summer*	1.4		
OA Tons Saved Summer*	0.1		

*OA = Outside Air

***OSHA, NIOSH & WHO most conservative values used
http://www.cdc.gov/niosh/npg/npgsyn-a.html

Indoor Contaminants Generated By People & From Outdoors	Maximum Threshold Value Based on OSHA or NIOSH (PPM)	Steady State (lb/ft3) Using the VRP* (Prescribed OA) Plasma Off	Steady State (lb/ft3) Using the IAQ Method (Reduced OA) Plasma On	Is Steady State Level Acceptable at Reduced OA Levels?	Contaminant Generation Rate lb/person/min	Filtration Effectiveness	Cognizant Authority***
Acetaldehyde	100.0	3.2696E-09	9.7194E-10	Yes	1.2903E-08	50%	OSHA
Acetone	250.0	2.0534E-08	7.9695E-09	Yes	1.2993E-07	50%	NIOSH
Ammonia	25.00	1.3988E-06	5.4599E-07	Yes	8.9322E-06	50%	NIOSH
Benzene	1.0	2.3365E-08	8.9987E-09	Yes	1.4602E-07	50%	OSHA
2- Butanone (MEK)	200.0	1.3842E-06	5.4032E-07	Yes	8.8396E-06	50%	NIOSH
Carbon dioxide**	5000	4.8822E-05	5.0100E-05	Yes	2.4692E-05	0%	NIOSH
Chloroform	2.0	2.3017E-07	4.4198E-08	Yes	2.7342E-07	50%	NIOSH
Dioxane	100.0	1.9360E-08	2.8402E-09	Yes	0.0000E+00	50%	OSHA
Hydrogen Sulfide	10.0	1.2491E-10	1.8324E-11	Yes	0.0000E+00	50%	NIOSH
Methane	NA	6.2453E-11	6.2453E-11	Yes	0.0000E+00	0%	NA
Methanol	200.0	1.7480E-08	2.3256E-08	Yes	1.1163E-07	0%	NIOSH
Methylene Chloride	25.0	1.2575E-06	4.9069E-07	Yes	8.0262E-06	50%	OSHA
Propane	1000.0	1.2491E-09	1.2491E-09	Yes	0.0000E+00	0%	NIOSH
Tetrachloroethane	5.0	0.0000E+00	0.0000E+00	Yes	0.0000E+00	50%	OSHA
Tetrachloroethylene	100.0	1.4290E-06	5.5736E-07	Yes	9.1140E-06	50%	OSHA
Toluene	100.0	3.5715E-09	1.3940E-09	Yes	2.2806E-08	50%	NIOSH
1,1,1 - Trichloroethane	350.0	6.0072E-05	2.3432E-05	Yes	3.8318E-04	50%	NIOSH
Xylene	100.0	0.0000E+00	0.0000E+00	Yes	0.0000E+00	50%	OSHA



1 = ASHRAE IAQP & NIOSH C02 Limit is 5,000 PPM
2 = C02 Level at Ventilation Rate OA Flow Rate
3 = C02 Level at IAQ Procedure OA Flow Rate

**Carbon dioxide has been provided for reference only for gathering demand control ventilation (DCV) setpoints. The National Research Council was commissioned by the US Navy to prove C02 is not a contaminant of concern when using air purification to control the other contaminants of concern, as found on submarines.

Building materials and furnishings assumed to have no VOCs and off-gassing is complete
All yellow shaded boxes require user input or review

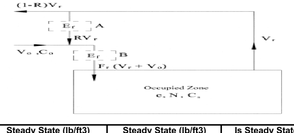
Is IAQ acceptable at reduced outside air levels? **Yes**

* IMC 2006 & later allows for ASHRAE 62 IAQP through the engineered execption found in Section 403.2

BC-2 VENTILATION

Zone Tag	Facility Type	Zone Use	Zone Floor Area (square ft) Az	Zone Max Occupancy Pz	Table 6.1 OA per Occupant Rp	Table 6.1 cfm/ft2 Ra	Pz * Rp Pz * Rp	Az * Ra Az * Ra	Table 6.2 Ventilation Effectiveness Ez	Outdoor Air to Zone (CFM) with Ez correction (Vbz/Ez)
SHARED OFFICE 23	Educational Facilities	Office space	486.0	8.0	5.0	0.06	40	29	0.8	86 OA required per VRP

Zone Height (feet)	8.5
Desired Outside Air (Vo) IAQP (CF	60
Supply Air (Vs) (CFM)	400
Return Air (Vr)	340
Recirc. Flow Factor (R)	0.85
Ventilation Effectiveness (Ez)	0.8
Level of Physical Activity	**Sedentary**
Filter Location	B
HVAC Flow Type	Constant
Outdoor Air Flow Type	Constant

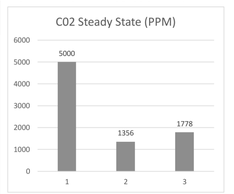


Air Changes Per Hour	5.8	VRP OA CFM per person	10.8
Outside Air Per VRP	86 CFM	IAQ OA CFM per person	7.5
Outside Air Per IAQ	60 CFM		
Outside Air Savings	26 CFM	Winter Heating Savings	
OA Summer Drybulb	95.0	OA Winter Design DB (F)	10
OA Summer Wetbulb	76.0	Supply Air DB Setpoint (F)	85
Coil Leaving Air Drybulb (F)	55.0	MBH Saved Winter	2.2
Coil Leaving Air Wetbulb (F	55.0	KW Saved Winter	0.6
OA MBH Saved Summer*	1.9		
OA Tons Saved Summer*	0.2		

*OA = Outside Air

***OSHA, NIOSH & WHO most conservative values used
http://www.cdc.gov/niosh/npg/npgsyn-a.html

Indoor Contaminants Generated By People & From Outdoors	Maximum Threshold Value Based on OSHA or NIOSH (PPM)	Steady State (lb/ft3) Using the VRP* (Prescribed OA) Plasma Off	Steady State (lb/ft3) Using the IAQ Method (Reduced OA) Plasma On	Is Steady State Level Acceptable at Reduced OA Levels?	Contaminant Generation Rate lb/person/min	Filtration Effectiveness	Cognizant Authority***
Acetaldehyde	100.0	2.7416E-09	8.1420E-10	Yes	1.2903E-08	50%	OSHA
Acetone	250.0	1.5217E-08	6.3811E-09	Yes	1.2993E-07	50%	NIOSH
Ammonia	25.00	1.0333E-06	4.3679E-07	Yes	8.9322E-06	50%	NIOSH
Benzene	1.0	1.7390E-08	7.2136E-09	Yes	1.4602E-07	50%	OSHA
2- Butanone (MEK)	200.0	1.0225E-06	4.3226E-07	Yes	8.8396E-06	50%	NIOSH
Carbon dioxide**	5000	4.7812E-05	4.9071E-05	Yes	2.4692E-05	0%	NIOSH
Chloroform	2.0	2.1899E-07	4.0856E-08	Yes	2.7342E-07	50%	NIOSH
Dioxane	100.0	1.9360E-08	2.8402E-09	Yes	0.0000E+00	50%	OSHA
Hydrogen Sulfide	10.0	1.2491E-10	1.8324E-11	Yes	0.0000E+00	50%	NIOSH
Methane	NA	6.2453E-11	6.2453E-11	Yes	0.0000E+00	0%	NA
Methanol	200.0	1.2912E-08	1.8605E-08	Yes	1.1163E-07	0%	NIOSH
Methylene Chloride	25.0	9.2905E-07	3.9257E-07	Yes	8.0262E-06	50%	OSHA
Propane	1000.0	1.2491E-09	1.2491E-09	Yes	0.0000E+00	0%	NIOSH
Tetrachloroethane	5.0	0.0000E+00	0.0000E+00	Yes	0.0000E+00	50%	OSHA
Tetrachloroethylene	100.0	1.0561E-06	4.4594E-07	Yes	9.1140E-06	50%	OSHA
Toluene	100.0	2.6383E-09	1.1152E-09	Yes	2.2806E-08	50%	NIOSH
1,1,1 - Trichloroethane	350.0	4.4393E-05	1.8747E-05	Yes	3.8318E-04	50%	NIOSH
Xylene	100.0	0.0000E+00	0.0000E+00	Yes	0.0000E+00	50%	OSHA



1 = ASHRAE IAQP & NIOSH C02 Limit is 5,000 PPM
2 = C02 Level at Ventilation Rate OA Flow Rate
3 = C02 Level at IAQ Procedure OA Flow Rate

**Carbon dioxide has been provided for reference only for gathering demand control ventilation (DCV) setpoints. The National Research Council was commissioned by the US Navy to prove C02 is not a contaminant of concern when using air purification to control the other contaminants of concern, as found on submarines.

Building materials and furnishings assumed to have no VOCs and off-gassing is complete
All yellow shaded boxes require user input or review

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

* IMC 2006 & later allows for ASHRAE 62 IAQP through the engineered execption found in Section 403.2

CHAMPLIN ARCHITECTURE

720 E Pete Rose Way, Suite 140
Cincinnati, OH 45202
T 513.241.4474 F 513.241.0081
thinkchamplin.com

THINK CREATE REALIZE

THE KLEINGERS GROUP

schaefer

CMTA

BEST POINT EDUCATION & BEHAVIORAL HEALTH

Sheakley Renovation + Expansion

5050 Madison Rd
Cincinnati, OH 45227

ISSUANCES

No.	Description	Date
1	BID + PERMIT	09/07/22

Drawn By CRH

Checked By BKR

Client Number

Project Number 6531

DRAWING TITLE

MECHANICAL VENTILATION CALCULATIONS

SHEET NO.

M-401

9/7/2022 1:59:16 PM

FC-3 VENTILATION

Zone Tag	Facility Type	Zone Use	Zone Floor Area (square ft) Az	Zone Max Occupancy Pz	Table 6.1 OA per Occupant Rp	Table 6.1 cfm/ft2 Ra	Pz * Rp Pz * Rp	Az * Ra Az * Ra	Table 6.2 Ventilation Effectiveness Ez	Outdoor Air to Zone (CFM) with Ez correction (Vbz/Ez)
CLASSROOM #8	Educational Facilities	Lecture Classroom	359.0	12.0	7.5	0.06	90	22	0.8	139 OA required per VRP

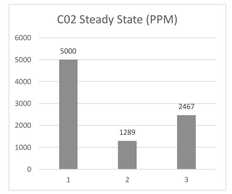
Zone Height (feet)	8.5
Desired Outside Air (Vo) IAQP (CF	60
Supply Air (Vs) (CFM)	400
Return Air (Vr)	340
Recirc. Flow Factor (R)	0.85
Ventilation Effectiveness (Ez)	0.8
Level of Physical Activity	**Sedentary**
Filter Location	B
HVAC Flow Type	Constant
Outdoor Air Flow Type	Constant

Air Changes Per Hour	7.9	VRP OA CFM per person	11.6
Outside Air Per VRP	139 CFM	IAQ OA CFM per person	5.0
Outside Air Per IAQ	60 CFM		
Outside Air Savings	79 CFM	Winter Heating Savings	
OA Summer Drybulb	95.0	OA Winter Design DB (F)	10
OA Summer Wetbulb	76.0	Supply Air DB Setpoint (F)	85
Coil Leaving Air Drybulb (F)	55.0	MBH Saved Winter	6.5
Coil Leaving Air Wetbulb (F	55.0	KW Saved Winter	1.9
OA MBH Saved Summer*	5.8		
OA Tons Saved Summer*	0.5		

*OA = Outside Air

***OSHA, NIOSH & WHO most conservative values used
http://www.cdc.gov/niosh/npg/npgsyn-a.html

Indoor Contaminants Generated By People & From Outdoors	Maximum Threshold Value Based on OSHA or NIOSH (PPM)	Steady State (lb/ft3) Using the VRP* (Prescribed OA) Plasma Off	Steady State (lb/ft3) Using the IAQ Method (Reduced OA) Plasma On	Is Steady State Level Acceptable at Reduced OA Levels?	Contaminant Generation Rate lb/person/min	Filtration Effectiveness	Cognizant Authority***
Acetaldehyde	100.0	2.6372E-09	1.1297E-09	Yes	1.2903E-08	50%	OSHA
Acetone	250.0	1.4166E-08	9.5579E-09	Yes	1.2993E-07	50%	NIOSH
Ammonia	25.00	9.6104E-07	6.5519E-07	Yes	8.9322E-06	50%	NIOSH
Benzene	1.0	1.6209E-08	1.0784E-08	Yes	1.4602E-07	50%	OSHA
2- Butanone (MEK)	200.0	9.5102E-07	6.4838E-07	Yes	8.8396E-06	50%	NIOSH
Carbon dioxide**	5000	4.7612E-05	5.1129E-05	Yes	2.4692E-05	0%	NIOSH
Chloroform	2.0	2.1677E-07	4.7541E-08	Yes	2.7342E-07	50%	NIOSH
Dioxane	100.0	1.9360E-08	2.8402E-09	Yes	0.0000E+00	50%	OSHA
Hydrogen Sulfide	10.0	1.2491E-10	1.8324E-11	Yes	0.0000E+00	50%	NIOSH
Methane	NA	6.2453E-11	6.2453E-11	Yes	0.0000E+00	0%	NA
Methanol	200.0	1.2009E-08	2.7907E-08	Yes	1.1163E-07	0%	NIOSH
Methylene Chloride	25.0	8.6412E-07	5.8881E-07	Yes	8.0262E-06	50%	OSHA
Propane	1000.0	1.2491E-09	1.2491E-09	Yes	0.0000E+00	0%	NIOSH
Tetrachloroethane	5.0	0.0000E+00	0.0000E+00	Yes	0.0000E+00	50%	OSHA
Tetrachloroethylene	100.0	9.8234E-07	6.6877E-07	Yes	9.1140E-06	50%	OSHA
Toluene	100.0	2.4538E-09	1.6728E-09	Yes	2.2806E-08	50%	NIOSH
1,1,1 - Trichloroethane	350.0	4.1293E-05	2.8116E-05	Yes	3.8318E-04	50%	NIOSH
Xylene	100.0	0.0000E+00	0.0000E+00	Yes	0.0000E+00	50%	OSHA



1 = ASHRAE IAQP & NIOSH C02 Limit is 5,000 PPM
2 = C02 Level at Ventilation Rate OA Flow Rate
3 = C02 Level at IAQ Procedure OA Flow Rate

**Carbon dioxide has been provided for reference only for gathering demand control ventilation (DCV) setpoints. The National Research Council was commissioned by the US Navy to prove C02 is not a contaminant of concern when using air purification to control the other contaminants of concern, as found on submarines.

Building materials and furnishings assumed to have no VOCs and off-gassing is complete

All yellow shaded boxes require user input or review

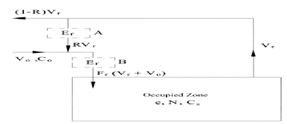
Is IAQ acceptable at reduced outside air levels? **Yes**

* IMC 2006 & later allows for ASHRAE 62 IAQP through the engineered execption found in Section 403.2

FC-3 VENTILATION

Zone Tag	Facility Type	Zone Use	Zone Floor Area (square ft) Az	Zone Max Occupancy Pz	Table 6.1 OA per Occupant Rp	Table 6.1 cfm/ft2 Ra	Pz * Rp Pz * Rp	Az * Ra Az * Ra	Table 6.2 Ventilation Effectiveness Ez	Outdoor Air to Zone (CFM) with Ez correction (Vbz/Ez)
CLASSROOM #9	Educational Facilities	Lecture Classroom	355.0	12.0	7.5	0.06	90	21	0.8	139 OA required per VRP

Zone Height (feet)	8.5
Desired Outside Air (Vo) IAQP (CF	60
Supply Air (Vs) (CFM)	400
Return Air (Vr)	340
Recirc. Flow Factor (R)	0.85
Ventilation Effectiveness (Ez)	0.8
Level of Physical Activity	**Sedentary**
Filter Location	B
HVAC Flow Type	Constant
Outdoor Air Flow Type	Constant

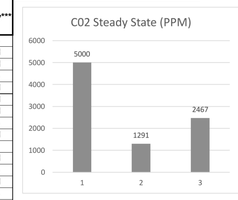


Air Changes Per Hour	8.0	VRP OA CFM per person	11.6
Outside Air Per VRP	139 CFM	IAQ OA CFM per person	5.0
Outside Air Per IAQ	60 CFM		
Outside Air Savings	79 CFM	Winter Heating Savings	
OA Summer Drybulb	95.0	OA Winter Design DB (F)	10
OA Summer Wetbulb	76.0	Supply Air DB Setpoint (F)	85
Coil Leaving Air Drybulb (F)	55.0	MBH Saved Winter	6.4
Coil Leaving Air Wetbulb (F	55.0	KW Saved Winter	1.9
OA MBH Saved Summer*	5.8		
OA Tons Saved Summer*	0.5		

*OA = Outside Air

***OSHA, NIOSH & WHO most conservative values used
http://www.cdc.gov/niosh/npg/npgsyn-a.html

Indoor Contaminants Generated By People & From Outdoors	Maximum Threshold Value Based on OSHA or NIOSH (PPM)	Steady State (lb/ft3) Using the VRP* (Prescribed OA) Plasma Off	Steady State (lb/ft3) Using the IAQ Method (Reduced OA) Plasma On	Is Steady State Level Acceptable at Reduced OA Levels?	Contaminant Generation Rate lb/person/min	Filtration Effectiveness	Cognizant Authority***
Acetaldehyde	100.0	2.6402E-09	1.1297E-09	Yes	1.2903E-08	50%	OSHA
Acetone	250.0	1.4196E-08	9.5579E-09	Yes	1.2993E-07	50%	NIOSH
Ammonia	25.00	9.6312E-07	6.5519E-07	Yes	8.9322E-06	50%	NIOSH
Benzene	1.0	1.6243E-08	1.0784E-08	Yes	1.4602E-07	50%	OSHA
2- Butanone (MEK)	200.0	9.5308E-07	6.4838E-07	Yes	8.8396E-06	50%	NIOSH
Carbon dioxide**	5000	4.7618E-05	5.1129E-05	Yes	2.4692E-05	0%	NIOSH
Chloroform	2.0	2.1684E-07	4.7541E-08	Yes	2.7342E-07	50%	NIOSH
Dioxane	100.0	1.9360E-08	2.8402E-09	Yes	0.0000E+00	50%	OSHA
Hydrogen Sulfide	10.0	1.2491E-10	1.8324E-11	Yes	0.0000E+00	50%	NIOSH
Methane	NA	6.2453E-11	6.2453E-11	Yes	0.0000E+00	0%	NA
Methanol	200.0	1.2035E-08	2.7907E-08	Yes	1.1163E-07	0%	NIOSH
Methylene Chloride	25.0	8.6598E-07	5.8881E-07	Yes	8.0262E-06	50%	OSHA
Propane	1000.0	1.2491E-09	1.2491E-09	Yes	0.0000E+00	0%	NIOSH
Tetrachloroethane	5.0	0.0000E+00	0.0000E+00	Yes	0.0000E+00	50%	OSHA
Tetrachloroethylene	100.0	9.8445E-07	6.6877E-07	Yes	9.1140E-06	50%	OSHA
Toluene	100.0	2.4591E-09	1.6728E-09	Yes	2.2806E-08	50%	NIOSH
1,1,1 - Trichloroethane	350.0	4.1382E-05	2.8116E-05	Yes	3.8318E-04	50%	NIOSH
Xylene	100.0	0.0000E+00	0.0000E+00	Yes	0.0000E+00	50%	OSHA



1 = ASHRAE IAQP & NIOSH C02 Limit is 5,000 PPM
2 = C02 Level at Ventilation Rate OA Flow Rate
3 = C02 Level at IAQ Procedure OA Flow Rate

**Carbon dioxide has been provided for reference only for gathering demand control ventilation (DCV) setpoints. The National Research Council was commissioned by the US Navy to prove C02 is not a contaminant of concern when using air purification to control the other contaminants of concern, as found on submarines.

Building materials and furnishings assumed to have no VOCs and off-gassing is complete

All yellow shaded boxes require user input or review

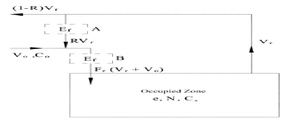
Is IAQ acceptable at reduced outside air levels? **Yes**

* IMC 2006 & later allows for ASHRAE 62 IAQP through the engineered execption found in Section 403.2

FC-3 VENTILATION

Zone Tag	Facility Type	Zone Use	Zone Floor Area (square ft) Az	Zone Max Occupancy Pz	Table 6.1 OA per Occupant Rp	Table 6.1 cfm/ft2 Ra	Pz * Rp Pz * Rp	Az * Ra Az * Ra	Table 6.2 Ventilation Effectiveness Ez	Outdoor Air to Zone (CFM) with Ez correction (Vbz/Ez)
CLASSROOM #10	Educational Facilities	Lecture Classroom	360.0	12.0	7.5	0.06	90	22	0.8	140 OA required per VRP

Zone Height (feet)	8.5
Desired Outside Air (Vo) IAQP (CF	60
Supply Air (Vs) (CFM)	400
Return Air (Vr)	340
Recirc. Flow Factor (R)	0.85
Ventilation Effectiveness (Ez)	0.8
Level of Physical Activity	**Sedentary**
Filter Location	B
HVAC Flow Type	Constant
Outdoor Air Flow Type	Constant

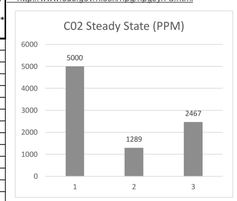


Air Changes Per Hour	7.8	VRP OA CFM per person	11.6
Outside Air Per VRP	140 CFM	IAQ OA CFM per person	5.0
Outside Air Per IAQ	60 CFM		
Outside Air Savings	80 CFM	Winter Heating Savings	
OA Summer Drybulb	95.0	OA Winter Design DB (F)	10
OA Summer Wetbulb	76.0	Supply Air DB Setpoint (F)	85
Coil Leaving Air Drybulb (F)	55.0	MBH Saved Winter	6.5
Coil Leaving Air Wetbulb (F	55.0	KW Saved Winter	1.9
OA MBH Saved Summer*	5.8		
OA Tons Saved Summer*	0.5		

*OA = Outside Air

***OSHA, NIOSH & WHO most conservative values used
http://www.cdc.gov/niosh/npg/npgsyn-a.html

Indoor Contaminants Generated By People & From Outdoors	Maximum Threshold Value Based on OSHA or NIOSH (PPM)	Steady State (lb/ft3) Using the VRP* (Prescribed OA) Plasma Off	Steady State (lb/ft3) Using the IAQ Method (Reduced OA) Plasma On	Is Steady State Level Acceptable at Reduced OA Levels?	Contaminant Generation Rate lb/person/min	Filtration Effectiveness	Cognizant Authority***
Acetaldehyde	100.0	2.6365E-09	1.1297E-09	Yes	1.2903E-08	50%	OSHA
Acetone	250.0	1.4159E-08	9.5579E-09	Yes	1.2993E-07	50%	NIOSH
Ammonia	25.00	9.6053E-07	6.5519E-07	Yes	8.9322E-06	50%	NIOSH
Benzene	1.0	1.6201E-08	1.0784E-08	Yes	1.4602E-07	50%	OSHA
2- Butanone (MEK)	200.0	9.5051E-07	6.4838E-07	Yes	8.8396E-06	50%	NIOSH
Carbon dioxide**	5000	4.7611E-05	5.1129E-05	Yes	2.4692E-05	0%	NIOSH
Chloroform	2.0	2.1676E-07	4.7541E-08	Yes	2.7342E-07	50%	NIOSH
Dioxane	100.0	1.9360E-08	2.8402E-09	Yes	0.0000E+00	50%	OSHA
Hydrogen Sulfide	10.0	1.2491E-10	1.8324E-11	Yes	0.0000E+00	50%	NIOSH
Methane	NA	6.2453E-11	6.2453E-11	Yes	0.0000E+00	0%	NA
Methanol	200.0	1.2009E-08	2.7907E-08	Yes	1.1163E-07	0%	NIOSH
Methylene Chloride	25.0	8.6366E-07	5.8881E-07	Yes	8.0262E-06	50%	OSHA
Propane	1000.0	1.2491E-09	1.2491E-09	Yes	0.0000E+00	0%	NIOSH
Tetrachloroethane	5.0	0.0000E+00	0.0000E+00	Yes	0.0000E+00	50%	OSHA
Tetrachloroethylene	100.0	9.8181E-07	6.6877E-07	Yes	9.1140E-06	50%	OSHA
Toluene	100.0	2.4525E-09	1.6728E-09	Yes	2.2806E-08	50%	NIOSH
1,1,1 - Trichloroethane	350.0	4.1271E-05	2.8116E-05	Yes	3.8318E-04	50%	NIOSH
Xylene	100.0	0.0000E+00	0.0000E+00	Yes	0.0000E+00	50%	OSHA



1 = ASHRAE IAQP & NIOSH C02 Limit is 5,000 PPM
2 = C02 Level at Ventilation Rate OA Flow Rate
3 = C02 Level at IAQ Procedure OA Flow Rate

**Carbon dioxide has been provided for reference only for gathering demand control ventilation (DCV) setpoints. The National Research Council was commissioned by the US Navy to prove C02 is not a contaminant of concern when using air purification to control the other contaminants of concern, as found on submarines.

Building materials and furnishings assumed to have no VOCs and off-gassing is complete

All yellow shaded boxes require user input or review

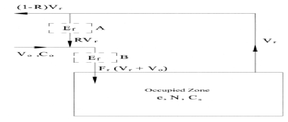
Is IAQ acceptable at reduced outside air levels? **Yes**

* IMC 2006 & later allows for ASHRAE 62 IAQP through the engineered execption found in Section 403.2

FC-4 VENTILATION

Zone Tag	Facility Type	Zone Use	Zone Floor Area (square ft) Az	Zone Max Occupancy Pz	Table 6.1 OA per Occupant Rp	Table 6.1 cfm/ft2 Ra	Pz * Rp Pz * Rp	Az * Ra Az * Ra	Table 6.2 Ventilation Effectiveness Ez	Outdoor Air to Zone (CFM) with Ez correction (Vbz/Ez)
CLASSROOM #4	Educational Facilities	Lecture Classroom	369.0	12.0	7.5	0.06	90	22	0.8	140 OA required per VRP

Zone Height (feet)	8.5
Desired Outside Air (Vo) IAQP (CF	60
Supply Air (Vs) (CFM)	400
Return Air (Vr)	340
Recirc. Flow Factor (R)	0.85
Ventilation Effectiveness (Ez)	0.8
Level of Physical Activity	**Sedentary**
Filter Location	B
HVAC Flow Type	Constant
Outdoor Air Flow Type	Constant

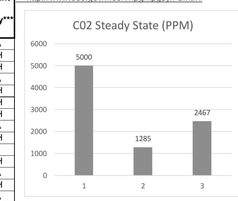


Air Changes Per Hour	7.7	VRP OA CFM per person	11.7
Outside Air Per VRP	140 CFM	IAQ OA CFM per person	5.0
Outside Air Per IAQ	60 CFM		
Outside Air Savings	80 CFM	Winter Heating Savings	
OA Summer Drybulb	95.0	OA Winter Design DB (F)	10
OA Summer Wetbulb	76.0	Supply Air DB Setpoint (F)	85
Coil Leaving Air Drybulb (F)	55.0	MBH Saved Winter	6.5
Coil Leaving Air Wetbulb (F	55.0	KW Saved Winter	1.9
OA MBH Saved Summer*	5.9		
OA Tons Saved Summer*	0.5		

*OA = Outside Air

***OSHA, NIOSH & WHO most conservative values used
http://www.cdc.gov/niosh/npg/npgsyn-a.html

Indoor Contaminants Generated By People & From Outdoors	Maximum Threshold Value Based on OSHA or NIOSH (PPM)	Steady State (lb/ft3) Using the VRP* (Prescribed OA) Plasma Off	Steady State (lb/ft3) Using the IAQ Method (Reduced OA) Plasma On	Is Steady State Level Acceptable at Reduced OA Levels?	Contaminant Generation Rate lb/person/min	Filtration Effectiveness	Cognizant Authority***
Acetaldehyde	100.0	2.6298E-09	1.1297E-09	Yes	1.2903E-08	50%	OSHA
Acetone	250.0	1.4091E-08	9.5579E-09	Yes	1.2993E-07	50%	NIOSH
Ammonia	25.00	9.5590E-07	6.5519E-07	Yes	8.9322E-06	50%	NIOSH
Benzene	1.0	1.6125E-08	1.0784E-08	Yes	1.4602E-07	50%	OSHA
2- Butanone (MEK)	200.0	9.4594E-07	6.4838E-07	Yes	8.8396E-06	50%	NIOSH
Carbon dioxide**	5000	4.7598E-05	5.1129E-05	Yes	2.4692E-05	0%	NIOSH
Chloroform	2.0	2.1662E-07	4.7541E-08	Yes	2.7342E-07	50%	NIOSH
Dioxane	100.0	1.9360E-08	2.8402E-09	Yes	0.0000E+00	50%	OSHA
Hydrogen Sulfide	10.0	1.2491E-10	1.8324E-11	Yes	0.0000E+00	50%	NIOSH
Methane	NA	6.2453E-11	6.2453E-11	Yes	0.0000E+00	0%	NA
Methanol	200.0	1.1945E-08	2.7907E-08	Yes	1.1163E-07	0%	NIOSH
Methylene Chloride	25.0	8.5950E-07	5.8881E-07	Yes	8.0262E-06	50%	OSHA
Propane	1000.0	1.2491E-09	1.2491E-09	Yes	0.0000E+00	0%	NIOSH
Tetrachloroethane	5.0	0.0000E+00	0.0000E+00	Yes	0.0000E+00	50%	OSHA
Tetrachloroethylene	100.0	9.7709E-07	6.6877E-07	Yes	9.1140E-06	50%	OSHA
Toluene	100.0	2.4407E-09	1.6728E-09	Yes	2.2806E-08	50%	NIOSH
1,1,1 - Trichloroethane	350.0	4.1072E-05	2.8116E-05	Yes	3.8318E-04	50%	NIOSH
Xylene	100.0	0.0000E+00	0.0000E+00	Yes	0.0000E+00	50%	OSHA



1 = ASHRAE IAQP & NIOSH C02 Limit is 5,000 PPM
2 = C02 Level at Ventilation Rate OA Flow Rate
3 = C02 Level at IAQ Procedure OA Flow Rate

**Carbon dioxide has been provided for reference only for gathering demand control ventilation (DCV) setpoints. The National Research Council was commissioned by the US Navy to prove C02 is not a contaminant of concern when using air purification to control the other contaminants of concern, as found on submarines.

Building materials and furnishings assumed to have no VOCs and off-gassing is complete

All yellow shaded boxes require user input or review

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

* IMC 2006 & later allows for ASHRAE 62 IAQP through the engineered execption found in Section 403.2

CHAMPLIN ARCHITECTURE

720 E Pete Rose Way, Suite 140
Cincinnati, OH 45202
T 513.241.4474 F 513.241.0081
thinkchamplin.com

THINK CREATE REALIZE

THE KLEINGERS GROUP

schaefer

CMTA

BEST POINT EDUCATION & BEHAVIORAL HEALTH

Sheakley Renovation + Expansion

5050 Madison Rd
Cincinnati, OH 45227

ISSUANCES

No.	Description	Date
1	BID + PERMIT	09/07/22

Drawn By CRH

Checked By BKR

Client Number

Project Number 6531

DRAWING TITLE

MECHANICAL VENTILATION CALCULATIONS

SHEET NO.

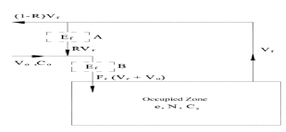
M-402

9/7/2022 1:59:17 PM

FC-4 VENTILATION

Zone Tag	Facility Type	Zone Use	Zone Floor Area (square ft) Az	Zone Max Occupancy Pz	Table 6.1 OA per Occupant Rp	Table 6.1 cfm/ft2 Ra	Pz * Rp Pz * Rp	Az * Ra Az * Ra	Table 6.2 Ventilation Effectiveness Ez	Outdoor Air to Zone (CFM) with Ez correction (Vbz/Ez)
CLASSROOM #5	Educational Facilities	Lecture Classroom	369.0	12.0	7.5	0.06	90	22	0.8	140 OA required per VRP

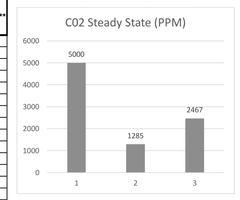
Zone Height (feet)	8.5
Desired Outside Air (Vo) IAQP (CF	60
Supply Air (Vs) (CFM)	400
Return Air (Vr)	340
Recirc. Flow Factor (R)	0.85
Ventilation Effectiveness (Ez)	0.8
Level of Physical Activity	**Sedentary**
Filter Location	B
HVAC Flow Type	Constant
Outdoor Air Flow Type	Constant



Air Changes Per Hour	7.7	VRP OA CFM per person	11.7
Outside Air Per VRP	140 CFM	IAQ OA CFM per person	5.0
Outside Air Per IAQ	60 CFM		
Outside Air Savings	80 CFM	Winter Heating Savings	
OA Summer Drybulb	95.0	OA Winter Design DB (F)	10
OA Summer Wetbulb	76.0	Supply Air DB Setpoint (F)	85
Coil Leaving Air Drybulb (F)	55.0	MBH Saved Winter	6.5
Coil Leaving Air Wetbulb (F	55.0	KW Saved Winter	1.9
OA MBH Saved Summer*	5.9		
OA Tons Saved Summer*	0.5		

*OA = Outside Air
***OSHA, NIOSH & WHO most conservative values used
http://www.cdc.gov/niosh/npg/npgsyn-a.html

Indoor Contaminants Generated By People & From Outdoors	Maximum Threshold Value Based on OSHA or NIOSH (PPM)	Steady State (lb/ft3) Using the VRP* (Prescribed OA) Plasma Off	Steady State (lb/ft3) Using the IAQ Method (Reduced OA) Plasma On	Is Steady State Level Acceptable at Reduced OA Levels?	Contaminant Generation Rate lb/person/min	Filtration Effectiveness	Cognizant Authority***
Acetaldehyde	100.0	2.6298E-09	1.1297E-09	Yes	1.2903E-08	50%	OSHA
Acetone	250.0	1.4091E-08	9.5579E-09	Yes	1.2993E-07	50%	NIOSH
Ammonia	25.00	9.5590E-07	6.5519E-07	Yes	8.9322E-06	50%	NIOSH
Benzene	1.0	1.6125E-08	1.0784E-08	Yes	1.4602E-07	50%	OSHA
2- Butanone (MEK)	200.0	9.4594E-07	6.4838E-07	Yes	8.8396E-06	50%	NIOSH
Carbon dioxide**	5000	4.7598E-05	5.1129E-05	Yes	2.4692E-05	0%	NIOSH
Chloroform	2.0	2.1662E-07	4.7541E-08	Yes	2.7342E-07	50%	NIOSH
Dioxane	100.0	1.9360E-08	2.8402E-09	Yes	0.0000E+00	50%	OSHA
Hydrogen Sulfide	10.0	1.2491E-10	1.8324E-11	Yes	0.0000E+00	50%	NIOSH
Methane	NA	6.2453E-11	6.2453E-11	Yes	0.0000E+00	0%	NA
Methanol	200.0	1.1945E-08	2.7907E-08	Yes	1.1163E-07	0%	NIOSH
Methylene Chloride	25.0	8.5950E-07	5.8881E-07	Yes	8.0262E-06	50%	OSHA
Propane	1000.0	1.2491E-09	1.2491E-09	Yes	0.0000E+00	0%	NIOSH
Tetrachloroethane	5.0	0.0000E+00	0.0000E+00	Yes	0.0000E+00	50%	OSHA
Tetrachloroethylene	100.0	9.7709E-07	6.6877E-07	Yes	9.1140E-06	50%	OSHA
Toluene	100.0	2.4407E-09	1.6728E-09	Yes	2.2806E-08	50%	NIOSH
1,1,1 - Trichloroethane	350.0	4.1072E-05	2.8116E-05	Yes	3.8318E-04	50%	NIOSH
Xylene	100.0	0.0000E+00	0.0000E+00	Yes	0.0000E+00	50%	OSHA



1 = ASHRAE IAQP & NIOSH C02 Limit is 5,000 PPM
2 = C02 Level at Ventilation Rate OA Flow Rate
3 = C02 Level at IAQ Procedure OA Flow Rate

**Carbon dioxide has been provided for reference only for gathering demand control ventilation (DCV) setpoints. The National Research Council was commissioned by the US Navy to prove C02 is not a contaminant of concern when using air purification to control the other contaminants of concern, as found on submarines.

Building materials and furnishings assumed to have no VOCs and off-gassing is complete
All yellow shaded boxes require user input or review

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

* IMC 2006 & later allows for ASHRAE 62 IAQP through the engineered execption found in Section 403.2

FC-4 VENTILATION

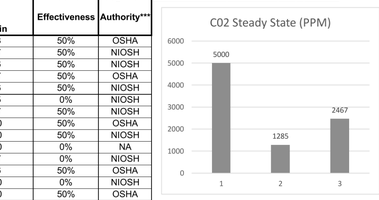
Zone Tag	Facility Type	Zone Use	Zone Floor Area (square ft) Az	Zone Max Occupancy Pz	Table 6.1 OA per Occupant Rp	Table 6.1 cfm/ft2 Ra	Pz * Rp Pz * Rp	Az * Ra Az * Ra	Table 6.2 Ventilation Effectiveness Ez	Outdoor Air to Zone (CFM) with Ez correction (Vbz/Ez)
CLASSROOM #6	Educational Facilities	Lecture Classroom	369.0	12.0	7.5	0.06	90	22	0.8	140 OA required per VRP

Zone Height (feet)	8.5
Desired Outside Air (Vo) IAQP (CF	60
Supply Air (Vs) (CFM)	400
Return Air (Vr)	340
Recirc. Flow Factor (R)	0.85
Ventilation Effectiveness (Ez)	0.8
Level of Physical Activity	**Sedentary**
Filter Location	B
HVAC Flow Type	Constant
Outdoor Air Flow Type	Constant

Air Changes Per Hour	7.7	VRP OA CFM per person	11.7
Outside Air Per VRP	140 CFM	IAQ OA CFM per person	5.0
Outside Air Per IAQ	60 CFM		
Outside Air Savings	80 CFM	Winter Heating Savings	
OA Summer Drybulb	95.0	OA Winter Design DB (F)	10
OA Summer Wetbulb	76.0	Supply Air DB Setpoint (F)	85
Coil Leaving Air Drybulb (F)	55.0	MBH Saved Winter	6.5
Coil Leaving Air Wetbulb (F	55.0	KW Saved Winter	1.9
OA MBH Saved Summer*	5.9		
OA Tons Saved Summer*	0.5		

*OA = Outside Air
***OSHA, NIOSH & WHO most conservative values used
http://www.cdc.gov/niosh/npg/npgsyn-a.html

Indoor Contaminants Generated By People & From Outdoors	Maximum Threshold Value Based on OSHA or NIOSH (PPM)	Steady State (lb/ft3) Using the VRP* (Prescribed OA) Plasma Off	Steady State (lb/ft3) Using the IAQ Method (Reduced OA) Plasma On	Is Steady State Level Acceptable at Reduced OA Levels?	Contaminant Generation Rate lb/person/min	Filtration Effectiveness	Cognizant Authority***
Acetaldehyde	100.0	2.6298E-09	1.1297E-09	Yes	1.2903E-08	50%	OSHA
Acetone	250.0	1.4091E-08	9.5579E-09	Yes	1.2993E-07	50%	NIOSH
Ammonia	25.00	9.5590E-07	6.5519E-07	Yes	8.9322E-06	50%	NIOSH
Benzene	1.0	1.6125E-08	1.0784E-08	Yes	1.4602E-07	50%	OSHA
2- Butanone (MEK)	200.0	9.4594E-07	6.4838E-07	Yes	8.8396E-06	50%	NIOSH
Carbon dioxide**	5000	4.7598E-05	5.1129E-05	Yes	2.4692E-05	0%	NIOSH
Chloroform	2.0	2.1662E-07	4.7541E-08	Yes	2.7342E-07	50%	NIOSH
Dioxane	100.0	1.9360E-08	2.8402E-09	Yes	0.0000E+00	50%	OSHA
Hydrogen Sulfide	10.0	1.2491E-10	1.8324E-11	Yes	0.0000E+00	50%	NIOSH
Methane	NA	6.2453E-11	6.2453E-11	Yes	0.0000E+00	0%	NA
Methanol	200.0	1.1945E-08	2.7907E-08	Yes	1.1163E-07	0%	NIOSH
Methylene Chloride	25.0	8.5950E-07	5.8881E-07	Yes	8.0262E-06	50%	OSHA
Propane	1000.0	1.2491E-09	1.2491E-09	Yes	0.0000E+00	0%	NIOSH
Tetrachloroethane	5.0	0.0000E+00	0.0000E+00	Yes	0.0000E+00	50%	OSHA
Tetrachloroethylene	100.0	9.7709E-07	6.6877E-07	Yes	9.1140E-06	50%	OSHA
Toluene	100.0	2.4407E-09	1.6728E-09	Yes	2.2806E-08	50%	NIOSH
1,1,1 - Trichloroethane	350.0	4.1072E-05	2.8116E-05	Yes	3.8318E-04	50%	NIOSH
Xylene	100.0	0.0000E+00	0.0000E+00	Yes	0.0000E+00	50%	OSHA



1 = ASHRAE IAQP & NIOSH C02 Limit is 5,000 PPM
2 = C02 Level at Ventilation Rate OA Flow Rate
3 = C02 Level at IAQ Procedure OA Flow Rate

**Carbon dioxide has been provided for reference only for gathering demand control ventilation (DCV) setpoints. The National Research Council was commissioned by the US Navy to prove C02 is not a contaminant of concern when using air purification to control the other contaminants of concern, as found on submarines.

Building materials and furnishings assumed to have no VOCs and off-gassing is complete
All yellow shaded boxes require user input or review

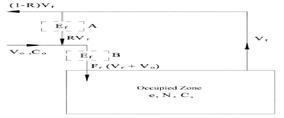
Is IAQ acceptable at reduced outside air levels? **Yes**

* IMC 2006 & later allows for ASHRAE 62 IAQP through the engineered execption found in Section 403.2

FC-4 VENTILATION

Zone Tag	Facility Type	Zone Use	Zone Floor Area (square ft) Az	Zone Max Occupancy Pz	Table 6.1 OA per Occupant Rp	Table 6.1 cfm/ft2 Ra	Pz * Rp Pz * Rp	Az * Ra Az * Ra	Table 6.2 Ventilation Effectiveness Ez	Outdoor Air to Zone (CFM) with Ez correction (Vbz/Ez)
CLASSROOM #7	Educational Facilities	Lecture Classroom	371.0	12.0	7.5	0.06	90	22	0.8	140 OA required per VRP

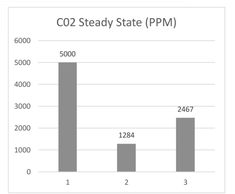
Zone Height (feet)	8.5
Desired Outside Air (Vo) IAQP (CF	60
Supply Air (Vs) (CFM)	400
Return Air (Vr)	340
Recirc. Flow Factor (R)	0.85
Ventilation Effectiveness (Ez)	0.8
Level of Physical Activity	**Sedentary**
Filter Location	B
HVAC Flow Type	Constant
Outdoor Air Flow Type	Constant



Air Changes Per Hour	7.6	VRP OA CFM per person	11.7
Outside Air Per VRP	140 CFM	IAQ OA CFM per person	5.0
Outside Air Per IAQ	60 CFM		
Outside Air Savings	80 CFM	Winter Heating Savings	
OA Summer Drybulb	95.0	OA Winter Design DB (F)	10
OA Summer Wetbulb	76.0	Supply Air DB Setpoint (F)	85
Coil Leaving Air Drybulb (F)	55.0	MBH Saved Winter	6.5
Coil Leaving Air Wetbulb (F	55.0	KW Saved Winter	1.9
OA MBH Saved Summer*	5.9		
OA Tons Saved Summer*	0.5		

*OA = Outside Air
***OSHA, NIOSH & WHO most conservative values used
http://www.cdc.gov/niosh/npg/npgsyn-a.html

Indoor Contaminants Generated By People & From Outdoors	Maximum Threshold Value Based on OSHA or NIOSH (PPM)	Steady State (lb/ft3) Using the VRP* (Prescribed OA) Plasma Off	Steady State (lb/ft3) Using the IAQ Method (Reduced OA) Plasma On	Is Steady State Level Acceptable at Reduced OA Levels?	Contaminant Generation Rate lb/person/min	Filtration Effectiveness	Cognizant Authority***
Acetaldehyde	100.0	2.6283E-09	1.1297E-09	Yes	1.2903E-08	50%	OSHA
Acetone	250.0	1.4076E-08	9.5579E-09	Yes	1.2993E-07	50%	NIOSH
Ammonia	25.00	9.5488E-07	6.5519E-07	Yes	8.9322E-06	50%	NIOSH
Benzene	1.0	1.6108E-08	1.0784E-08	Yes	1.4602E-07	50%	OSHA
2- Butanone (MEK)	200.0	9.4493E-07	6.4838E-07	Yes	8.8396E-06	50%	NIOSH
Carbon dioxide**	5000	4.7595E-05	5.1129E-05	Yes	2.4692E-05	0%	NIOSH
Chloroform	2.0	2.1659E-07	4.7541E-08	Yes	2.7342E-07	50%	NIOSH
Dioxane	100.0	1.9360E-08	2.8402E-09	Yes	0.0000E+00	50%	OSHA
Hydrogen Sulfide	10.0	1.2491E-10	1.8324E-11	Yes	0.0000E+00	50%	NIOSH
Methane	NA	6.2453E-11	6.2453E-11	Yes	0.0000E+00	0%	NA
Methanol	200.0	1.1932E-08	2.7907E-08	Yes	1.1163E-07	0%	NIOSH
Methylene Chloride	25.0	8.5858E-07	5.8881E-07	Yes	8.0262E-06	50%	OSHA
Propane	1000.0	1.2491E-09	1.2491E-09	Yes	0.0000E+00	0%	NIOSH
Tetrachloroethane	5.0	0.0000E+00	0.0000E+00	Yes	0.0000E+00	50%	OSHA
Tetrachloroethylene	100.0	9.7605E-07	6.6877E-07	Yes	9.1140E-06	50%	OSHA
Toluene	100.0	2.4381E-09	1.6728E-09	Yes	2.2806E-08	50%	NIOSH
1,1,1 - Trichloroethane	350.0	4.1029E-05	2.8116E-05	Yes	3.8318E-04	50%	NIOSH
Xylene	100.0	0.0000E+00	0.0000E+00	Yes	0.0000E+00	50%	OSHA



1 = ASHRAE IAQP & NIOSH C02 Limit is 5,000 PPM
2 = C02 Level at Ventilation Rate OA Flow Rate
3 = C02 Level at IAQ Procedure OA Flow Rate

**Carbon dioxide has been provided for reference only for gathering demand control ventilation (DCV) setpoints. The National Research Council was commissioned by the US Navy to prove C02 is not a contaminant of concern when using air purification to control the other contaminants of concern, as found on submarines.

Building materials and furnishings assumed to have no VOCs and off-gassing is complete
All yellow shaded boxes require user input or review

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

* IMC 2006 & later allows for ASHRAE 62 IAQP through the engineered execption found in Section 403.2

CHAMPLIN ARCHITECTURE

720 E Pete Rose Way, Suite 140
Cincinnati, OH 45202
T 513.241.4474 F 513.241.0081
thinkchamplin.com

THINK CREATE REALIZE

THE KLEINGERS GROUP

schaefer

CMTA

BEST POINT EDUCATION & BEHAVIORAL HEALTH

Sheakley Renovation + Expansion

5050 Madison Rd
Cincinnati, OH 45227

ISSUANCES

No.	Description	Date
1	BID + PERMIT	09/07/22

Drawn By CRH

Checked By BKR

Client Number

Project Number 6531

DRAWING TITLE

MECHANICAL VENTILATION CALCULATIONS

SHEET NO.

M-403

9/7/2022 1:59:20 PM