GENERAL SPECIFICATIONS FOR MECHANICAL WORK

1. GENERAL

1.1. THE FOLLOWING SECTION APPLIES TO THE MECHANICAL AND PLUMBING WORK RELATED TO THIS PROJECT.

1.2. THE INTENT OF THE SPECIFICATIONS, INCLUDING ALL APPENDICES AND DRAWINGS, SHALL BE DEEMED TO COVER THE COMPLETE INSTALLATION, READY FOR OPERATION. CONSEQUENTLY, MINOR DETAILS NOT NECESSARILY SHOWN OR SPECIFIED BUT NECESSARY FOR THE PROPER FUNCTIONING OF THE INSTALLATION, INCLUDING EQUIPMENT SERVICEABILITY, SHALL BE INCLUDED IN THE WORK.

1.3. THE CONTRACTOR SHALL FURNISH ALL LABOUR, MATERIAL AND EQUIPMENT RELATED TO THE INSTALLATION OF THE WORK OUTLINED IN THE CONTRACT DOCUMENTS.

2. DEFINITIONS

2.1. THE TERM "OWNER" USED IN THROUGHOUT THE SPECIFICATIONS REFERS TO THE BUILDING OWNER/LANDLORD.

2.2. THE TERM "TENANT" USED IN THROUGHOUT THE SPECIFICATIONS REFERS TO CHIPOTLE MEXICAN GRILL, INC.

2.3. ANY REFERENCE TO THE "DESIGN AUTHORITY" OR "CONSULTANT" SHALL MEAN PRISM ENGINEERING LTD.

2.4. THE WORD "PROVIDE" SHALL MEAN "SUPPLY AND INSTALL" UNLESS OTHERWISE INDICATED.

2.5. THE NEW INSTALLATION SHALL MEET THE CURRENT BUILDING STANDARDS IN ALL ASPECTS.

3. GOVERNING REGULATIONS

3.1. THE WORK UNDER THIS CONTRACT SHALL CONFORM, BUT NOT BE LIMITED TO, THE REQUIREMENTS OF THE FOLLOWING CODES, REGULATIONS AND STANDARDS:

- 3.1.1. BY-LAWS, STANDARDS AND CODES:
  - 3.1.1.1. LOCAL BUILDING BY-LAWS
  - 3.1.1.2. JURISDICTIONAL BUILDING BYLAWS
  - 3.1.1.3. BC BUILDING CODE (2018) PART 1 TO 11 INCLUSIVE.
  - 3.1.1.4. CURRENT NATIONAL BUILDING CODE
  - 3.1.1.5. CURRENT ASHRAE 90.1
  - 3.1.1.6. CURRENT NFPA 13
  - 3.1.1.7. NFPA 96 (2016)
  - 3.1.1.8. CANADIAN GAS CODE CAN/CGA-B149.1-M91
  - 3.1.1.9. CANADIAN ELECTRICAL CODE C22
  - 3.1.1.10. BOILER SAFETY BRANCH REGULATIONS
  - 3.1.1.11. B-52 MECHANICAL REFRIGERATION CODE
- 3.1.2. SMACNA PUBLICATIONS:
  - 3.1.2.1. CURRENT HVAC DUCT CONSTRUCTION STANDARDS
  - 3.1.2.2. GUIDELINES FOR SEISMIC RESTRAINTS OF MECHANICAL SYSTEMS AND PIPING SYSTEMS
  - 3.1.2.3. BCICA QUALITY STANDARDS FOR MECHANICAL INSULATION MANUAL

3.2. LETTERS OF ASSURANCE COMPLETED AND STAMPED BY A REGISTERED PROFESSIONAL ENGINEER, WILL BE REQUIRED TO BE SUBMITTED AT THE COMPLETION OF THE PROJECT FOR THE INSTALLATION OF SEISMIC RESTRAINT OF NEW EQUIPMENT INSTALLED. PAID AND SUPPLIED BY THE MECHANICAL CONTRACTOR.

3.3. COMPLY WITH THE OWNER'S REQUIREMENTS FOR CONSTRUCTION ACTIVITIES IN THE BUILDING.

4. PERMITS

4.1. OBTAIN ALL REQUIRED PERMITS, PAY ALL FEES THEREFORE, AND COMPLY WITH ALL PROVINCIAL, MUNICIPAL, AND OTHER LEGAL REGULATIONS, CODES AND BY-LAWS APPLICABLE TO THE WORK.

4.2. PROVIDE CERTIFICATES FOR INCLUSION IN O&M DOCUMENTATION, AS EVIDENCE THAT THE WORK CONFORMS WITH THE LAWS AND REGULATIONS OF THE AUTHORITIES HAVING JURISDICTION.

5. EXAMINATION OF SITE

5.1. VISIT THE SITE BEFORE TENDERING AND THOROUGHLY EXAMINE ALL AREAS WHERE EQUIPMENT, DUCTWORK AND PIPING WILL BE INSTALLED AND REPORT ANY CONDITION, THAT IN THEIR OPINION, PREVENTS THE PROPER INSTALLATION OF THE WORK.

5.2. NO CONSIDERATION WILL BE GRANTED FOR ANY MISUNDERSTANDING OF WORK TO BE DONE RESULTING FROM FAILURE TO VISIT THE SITE.

5.3. WHEN THE CONTRACT DOCUMENTS DO NOT CONTAIN SUFFICIENT INFORMATION FOR THE PROPER SELECTION OF EQUIPMENT FOR BIDDING, NOTIFY THE DESIGN AUTHORITY DURING THE TENDERING PERIOD. IF CLARIFICATION IS NOT OBTAINED, ALLOW FOR THE MOST EXPENSIVE ARRANGEMENT. FAILURE TO DO THIS SHALL NOT RELIEVE THE CONTRACTOR OF RESPONSIBILITY TO SUPPLY THE INTENDED EQUIPMENT.

5.4. CO-ORDINATE WORK WITH ALL TRADES AND MAKE CHANGES TO FACILITATE A SATISFACTORY INSTALLATION. MAKE NO DEVIATIONS TO THE DESIGN INTENT WITHOUT WRITTEN APPROVAL.

5.5. THE DIMENSIONS OF EXISTING WORK IS APPROXIMATE AND THE CONTRACTOR MUST TAKE ACTUAL MEASUREMENTS BEFORE ORDERING MATERIALS, EQUIPMENT, AND THE LIKE. FAILURE TO COMPLY WITH THIS REQUIREMENT WILL MAKE THE CONTRACTOR FULLY RESPONSIBLE FOR REPLACING SUCH MATERIAL OR EQUIPMENT AT NO EXTRA COST TO THE CONTRACT.

5.6. A LOCKOUT AND TAGGING SYSTEM MUST BE EMPLOYED TO PREVENT THE UNEXPECTED ENERGIZING OF EQUIPMENT, MACHINERY, OR ELECTRICAL SERVICES. THIS SYSTEM MUST BE EMPLOYED BEFORE WORKING ON ELECTRICAL SERVICES TO POWER EQUIPMENT. ALL POWER EQUIPMENT MUST BE STOPPED, DISCONNECTED, AND THEN LOCKED OUT AT THE MAIN CONTROL OR BREAKER WITH TWO OR MORE LOCKS. THE SWITCH WILL THEN BE TAGGED. WHEN WORK IS COMPLETE, EACH PERSON MUST REMOVE THEIR OWN LOCK. NO ONE WILL REMOVE ANOTHER PERSON'S LOCK.

6. LIABILITY

6.1. ASSUME RESPONSIBILITY FOR LAYING OUT WORK AND FOR DAMAGE CAUSED BY IMPROPER EXECUTION OF WORK.

6.2. PROTECT FINISHED AND UNFINISHED WORK FILLINGS AND OCCUPANT'S FURNITURE AND EQUIPMENT FROM DAMAGE.

6.3. TAKE RESPONSIBILITY FOR CONDITION OF MATERIALS AND EQUIPMENT SUPPLIED AND PROTECT UNTIL WORK IS COMPLETED AND ACCEPTED.

6.4. THE OWNER SHALL HAVE RECOURSE IN TORT FOR ANY NEGLIGENT ACTION BY THE CONTRACTOR OR HIS REPRESENTATIVES.

7. EXISTING SERVICES

7.1. ARRANGE WORK TO AVOID SHUTDOWNS OF EXISTING SERVICES. TO MAINTAIN EXISTING SERVICES IN OPERATION, TEMPORARY RELOCATIONS AND/OR BYPASSES OF DUCTWORK AND/OR PIPING MAY BE REQUIRED. SHUTDOWNS OF SYSTEMS ARE TO BE CO-ORDINATED WITH THE MANAGER OF THE FACILITY.

7.2. PROTECT ALL EXISTING SERVICES FROM CONSTRUCTION DEBRIS.

7.3. ALL EXISTING FIRE RATINGS THROUGH FLOOR SLABS OR WALLS SHALL BE RETAINED. ALL LIFE SAFETY SYSTEMS INCLUDING EXIT/EMERGENCY LIGHTING AND FIRE ALARM SYSTEMS SHALL REMAIN IN A FUNCTIONAL STATE DURING DEMOLITION AS WELL AS DURING CONSTRUCTION.

7.4. UNLESS OTHERWISE SPECIFIED, COMPLETELY REMOVE ALL EQUIPMENT, WHICH BECOMES REDUNDANT AND IS NO LONGER REQUIRED DUE TO THE WORK IN THIS CONTRACT.

7.5. WHERE NOTED ON THE DRAWINGS, THE EQUIPMENT/MATERIAL SHALL BE HANDED OVER TO THE OWNER. A RECEIPT OF THE TRANSFER MAY BE REQUIRED BY THE TENANT, INDICATING WHERE THE MATERIAL HAS BEEN STORED.

7.6. THE EXISTING FIRE PROTECTION SYSTEM MUST REMAIN FUNCTIONAL DURING DEMOLITION AS WELL AS DURING CONSTRUCTION. IF THE WORK REQUIRES THE FIRE PROTECTION SYSTEM TO BE COMPROMISED DURING CONSTRUCTION, THE CONTRACTOR SHALL PROVIDE A 24-HOUR FIRE WATCH PERSONNEL WHILE THE SYSTEM IS DOWN.

7.7. ALL EQUIPMENT OPERATED BY THE CONTRACTOR PRIOR TO FINAL ACCEPTANCE OF THE WORK, SHALL BE MAINTAINED BY THE CONTRACTOR. ALL AIR FILTERS MUST BE REPLACED PRIOR TO TURN OVER TO THE OWNER.

8. CUTTING, CORING AND PATCHING

8.1. LAYOUT ALL CUTTING, PATCHING, DIGGING, CANNING AND CORING REQUIRED TO ACCOMMODATE THE MECHANICAL SERVICES. THE PERFORMANCE OF ACTUAL CUTTING AND PATCHING IS BY THE GENERAL CONTRACTOR. BE RESPONSIBLE FOR ALL OPENINGS REQUIRED UNDER THIS CONTRACT, INCLUDING DUCT OPENINGS. ALLOW OVERSIZED OPENINGS FOR FIRE DAMPERS.

8.2. VERIFY THE LOCATIONS OF EXISTING SERVICE RUNS AND STRUCTURAL REINFORCEMENT WITHIN EXISTING CONCRETE WALLS AND FLOORS PRIOR TO CORE DRILLING AND CUTTING. PROVIDE X-RAY OR PENETRATING RADAR (GPR) FOR EACH PROPOSED OPENING THROUGH CONCRETE FLOORS AND WALLS, AS REQUIRED BY THE STRUCTURAL CONSULTANT.

8.3. CORING AND CUTTING OF STRUCTURAL BUILDING COMPONENTS SHALL ONLY TAKE PLACE UPON THE RECEIPT OF SPECIFIC WRITTEN APPROVAL OF A STRUCTURAL ENGINEER PAID BY THE MECHANICAL CONTRACTOR.

9. ACCESS DOORS AND PANELS

9.1. SUPPLY AND INSTALL ALL NECESSARY ACCESS DOORS FOR MECHANICAL EQUIPMENT, INCLUDING DAMPERS, FILTERS, CONTROL CONNECTIONS, ETC. WHERE NECESSARY, DOORS SHALL BE RATED TO SUITE FIRE ASSEMBLY RATING.

9.2. ALL ACCESS DOORS SHALL, IN ANY EVENT, BE SIZED TO SATISFY THE MINIMUM ACCESS REQUIREMENTS AS REQUIRED BY THE BUILDING CODE BUT SHALL BE INCREASED IN SIZE WHEREVER NECESSARY TO SUIT ARCHITECTURAL BLOCK OR OTHER CONSTRUCTION MODULES TO PROVIDE A COMPLETE MODULAR FINISHED APPEARANCE.

9.3. DO NOT LOCATE ACCESS DOORS IN FEATURE WALLS OR CEILINGS WITHOUT THE PRIOR APPROVAL OF THE CONSULTANT AND/OR OWNER. LOCATE IN SERVICE AREAS AND STORAGE ROOMS WHERE POSSIBLE.

9.4. PROVIDE APPROVED ACCESS PANEL FOR SERVICING AND INSPECTION OF FIRE DAMPERS.

9.5. WHERE ACCESS PANELS ARE INSTALLED IN FIRE RATED ASSEMBLIES, THE ACCESS PANEL SHALL CARRY THE APPROPRIATE FIRE RATING.

9.6. ACCESS PANELS SHALL BE 14 GAUGE BONDERIZED STEEL, WITH HINGED DOORS.

9.7. CONTRACTOR SHALL LEAVE ACCESS PANELS UNINSTALLED DURING FINAL REVIEW.

10. PENETRATIONS

10.1. SHOULD PIPES OR DUCT WORK PENETRATE FIRE RATED WALLS AND FLOORS, THE CONTRACTOR SHALL FURNISH LABOUR, MATERIAL, EQUIPMENT, AND SERVICES NECESSARY TO PROVIDE FIRE STOPPING AND SEALANT AROUND THE PENETRATION.

10.2. PENETRATIONS THROUGH NON-RATED WALL ASSEMBLIES MUST HAVE SEALANT INSTALLED AROUND THE SERVICE TO PREVENT AIR LEAKAGE. FLOOR PENETRATIONS THROUGH NON-RATED ASSEMBLIES MUST HAVE WATER RESISTANT SEALANT INSTALLED AROUND THE SERVICE.

11. FIRE STOPPING

11.1. PROVIDE LABOUR, MATERIAL, EQUIPMENT, AND SERVICES NECESSARY TO PROVIDE FIRE STOPPING AND SMOKE SEALS AROUND MECHANICAL SERVICE PIPING AND DUCT PENETRATIONS THROUGH FIRE RATED WALL AND FLOOR ASSEMBLIES.

11.2. INSTALLER SHALL HAVE PERSONNEL SPECIALIZING IN FIRE STOPPING INSTALLATIONS, WITH MINIMUM OF 3 YEARS DOCUMENTED EXPERIENCED APPROVED BY THE MANUFACTURER. THE MANUFACTURER SHALL PROVIDE INSTRUCTION, TRAINING, AND INSPECTION SERVICES OF THE INSTALLATIONS TO ENSURE THAT THE FIRE MATERIAL IS CORRECTLY INSTALLED.

11.3. EXAMINE SIZES AND CONDITIONS OF VOIDS TO BE FILLED TO ESTABLISH CORRECT THICKNESSES AND INSTALLATION OF MATERIALS. PREPARE SURFACES IN CONTACT WITH FIRE STOPPING MATERIALS AND SMOKE SEALS TO MANUFACTURER'S INSTRUCTIONS. MASK WHERE NECESSARY TO AVOID SPILLAGE AND OVER COATING ONTO ADJOINING SURFACES; REMOVE STAINS ON ADJACENT SURFACES.

11.4. LOCATION AND EXTENT OF FIRE SEPARATIONS SHALL BE COORDINATED WITH EITHER, THE ARCHITECTURAL DRAWINGS OR ON SITE.

11.5. SERVICE PENETRATION FIRESTOP COMPONENTS: CERTIFIED BY ULC IN ACCORDANCE WITH CAN4-S115 AND LISTED IN ULC GUIDE NO. 40 U19.13 AND ULC GUIDE NO. 40 U19.15 UNDER THE LABEL SERVICE OF ULC OR EQUIVALENT APPROVED TESTS BY WARNOCK HERSEY.

11.6. FIRE_RESISTANCE RATING OF INSTALLED FIRE STOPPING ASSEMBLY IN ACCORDANCE WITH BCBC.

11.7. SUBMIT SHOP DRAWINGS TO SHOW LOCATION OF PENETRANT, PROPOSED MATERIAL, REINFORCEMENT, ANCHORAGE, AND METHOD OF INSTALLATION, PRIOR TO CONSTRUCTION. CONSTRUCTION DETAILS MUST ACCURATELY REFLECT ACTUAL JOB CONDITIONS.

11.8. ACCEPTABLE FIRE STOPPING SYSTEMS: HILTI, 3M

12. WORKMANSHIP

12.1. WORKMANSHIP SHALL BE IN ACCORDANCE WITH ESTABLISHED PRACTICE AND STANDARDS ACCEPTED AND RECOGNIZED BY DESIGN AUTHORITIES AND THE TRADE. EMPLOY ONLY TRADESMEN HOLDING VALID PROVINCIAL TRADE QUALIFICATION CERTIFICATES. TRADESMEN SHALL PERFORM ONLY WORK THAT THEIR CERTIFICATE PERMITS.

12.2. ALL ROOFING WORK SHALL BE CARRIED OUT BE A REGISTERED RACBC CONTRACTOR.

12.3. THE CONTRACTOR SHALL CLEANUP THE WORK AREA AT THE END OF EACH SHIFT. UPON COMPLETION OF THE WORK, REMOVE ALL TOOLS, DEBRIS, SURPLUS AND WASTE MATERIALS.

13. REFRIGERANT DISPOSAL

13.1. REMOVAL OF ANY REFRIGERANT AC EQUIPMENT, REQUIRES REFRIGERANT TO BE PUMPED OUT BY A LICENSED REFRIGERANT MECHANIC IN ACCORDANCE WITH THE REFRIGERANT CODE OF PRACTISE. PROVIDE CERTIFIED REPORT ON REFRIGERANT DISPOSAL OR RECYCLING TO ENGINEER.

14. MATERIAL

14.1. WHERE TWO OR MORE ITEMS OF EQUIPMENT AND/OR MATERIAL, OF THE SAME TYPE, ARE REQUIRED, THEY SHALL BE THE PRODUCTS OF A SINGLE MANUFACTURER.

14.2. MATERIAL CONSIDERED TO SATISFY THE SPECIFICATION, BUT OF A MANUFACTURER OTHER THAN THOSE NAMED, MAY BE SUBMITTED TO THE DESIGN AUTHORITY FOR CONSIDERATION.

15. SHOP DRAWINGS

15.1. PRIOR TO ORDERING EQUIPMENT AND MATERIAL, SUBMIT DIGITAL SETS OF SHOP DRAWINGS FOR ALL MECHANICAL COMPONENTS TO THE CONSULTANT FOR APPROVAL. AT A MINIMUM, DRAWINGS SHOULD BE PROVIDED FOR FANS, AIR HANDLING UNITS (IE: ROOF TOP UNITS, HEAT PUMPS, FANCOILS, ETC), LOUVRES, GRILLES, DIFFUSERS, FIRE DAMPERS, AND CONTROLS).

15.2. EACH SHOP DRAWINGS SUBMITTAL SHALL BE STAMPED BY THE CONTRACTOR VERIFYING THAT THE SUBMITTED SHOP DRAWINGS HAVE BEEN REVIEWED FOR CONFORMANCE WITH THE SPECIFICATIONS AND MUST INCLUDE THE PROJECT IDENTIFICATION NUMBER, PROJECT NAME, PROJECT ADDRESS, SELECTED EQUIPMENT INCLUDING ALL ACCESSORIES AND QUANTITY OF PRODUCT.

16. RECORD DRAWINGS

16.1. MAINTAIN ONE CONTRACT DRAWING WHITE PRINT ON SITE, SOLELY FOR THE PURPOSE OF RECORDING, IN RED, ANY CHANGE AND/OR DEVIATION FROM THE CONTRACT DRAWING AS IT OCCURS. SUBMIT A COPY OF AS-INSTALLED DRAWINGS TO THE CONSULTANT UPON SUBSTANTIAL COMPLETION OF THIS CONTRACT IN PDF FORMAT OR HARD COPY.

16.2. MECHANICAL CONTRACTOR SHALL SUBMIT MECHANICAL RECORD DRAWINGS ("AS-BUILTS") MARKUPS TO PRISM ENGINEERING LTD. FOR REVIEW. THE HAND MARK UP CHANGES SHALL BE IMPLEMENTED INTO AUTOCAD BY PRISM ENGINEERING LTD TO PRODUCE RECORD DRAWINGS ON BEHALF OF CHIPOTLE MEXICAN GRILLE, INC.

17. OPERATING & MAINTENANCE MANUALS

17.1. REFER TO SECTION 01700 EXECUTION REQUIREMENTS ON DRAWING G010.

18. WARRANTY

18.1. PROVIDE A WRITTEN AND SIGNED WARRANTY IN THE NAME OF THE TENANT. THE WARRANTY IS TO INCLUDE THE NECESSARY MATERIALS AND LABOUR TO COVER REPAIR OR REPLACEMENT OF SPECIFIED WORK, AS A RESULT OF FAULTY MATERIALS OR WORKMANSHIP. THE WARRANTY IS TO COVER ONE YEAR FROM THE DATE OF THE CERTIFICATE OF SUBSTANTIAL COMPLETION.

19. SEISMIC RESTRAINTS

19.1. NEW EQUIPMENT, DUCTWORK, GRILLES AND PIPING SHALL BE SEISMICALLY RESTRAINED. REFER TO STRUCTURAL DRAWING S000 FOR SEISMIC REQUIREMENTS.

20. SITE VISITS

20.1. INTERIM FIELD REVIEWS ARE TO BE COORDINATED WITH PRISM ENGINEERING WITHIN 7 DAYS BEFORE THE PLANNED SITE VISIT. VIRTUAL SITE VISITS ARE NOT PERMITTED UNLESS PREVIOUSLY COORDINATED WITH THE CONSULTANT TEAM AND TENANT DUE TO UNFORESEEN CIRCUMSTANCES (IE: HEALTH RISK, TRAVEL RESTRICTIONS, RESOURCE SHORTAGES, ETC).

20.2. IF A VIRTUAL SITE VISIT IS AGREED TO BY THE CONSULTANT AND TENANT, THE HOST OF THE MEETING MUST PROVIDE A RECORDING OF THE VIDEO WITHIN 24 HOURS OF THE MEETING TO ENSURE PROPER RECORDS ARE MAINTAINED.

20.3. THE CONTRACTOR SHALL ADVISE THE CONSULTANT SEVEN (7) DAYS BEFORE THE PLANNED FINAL SITE REVIEW TO ARRANGE A MUTUALLY AGREEABLE TIME AND DATE TO CONDUCT THE FINAL SITE REVIEW. ALL SYSTEMS MUST BE FULLY OPERATIONAL BEFORE THE SCHEDULED SITE VISIT. IF IT IS DETERMINED AT THE TIME OF THE SITE VISIT THAT WORK IS NOT COMPLETE AND WARRANTS A SECOND SITE VISIT, ALL COSTS INCURRED WILL BE BILLED DIRECTLY TO THE MECHANICAL CONTRACTOR.

20.4. THE CONTRACTOR IS TO PROVIDE THE REQUIRED RESOURCES AND STAFF TO REVIEW THE INSTALLATION WORK AND DEMONSTRATE THE OPERATION OF EQUIPMENT.

20.5. THE CONSULTANT WILL ISSUE A DEFICIENCY LIST WITHIN FIVE (5) DAYS OF THE SITE VISIT. ALL DEFICIENCIES SHALL BE COMPLETED WITHIN TWO (2) WEEKS OF THE REPORT ISSUED DATE AND A LETTER SUBMITTED TO THE CONSULTANT ADVISING THAT THE WORK IS COMPLETE. FAILURE TO COMPLETE THE WORK WILL RESULT IN WORK BEING COMPLETED BY THE OWNER AND THE COSTS DEDUCTED FROM THE FINAL PAYMENT.

21. BALANCING AIR SYSTEMS

21.1. INDEPENDENT AIR BALANCE CONTRACTOR OR QUALIFIED MECHANICAL CONTRACTOR SHALL ACCURATELY BALANCE THE SUPPLY, RETURN, OUTSIDE AND EXHAUST AIR TO PROVIDE AIR VOLUME QUANTITIES INDICATED ON THE DRAWINGS AND/OR SPECIFICATIONS. BALANCER SHALL BE QUALIFIED FOR TAB WORK PER NEBB STANDARDS.

21.2. ADJUST DUCT AND TERMINAL BALANCE DAMPERS TO BALANCE BOTH THE HEATING AND COOLING SUPPLY AIR SYSTEM TO PROVIDE THE DESIGN AIR QUANTITIES WITHIN +/- 10% AT EACH OUTLET AND MAINTAIN THE DESIGN RELATIONSHIP BETWEEN THE SUPPLY AND RETURN AIR SYSTEMS.

21.3. ADJUST DIFFUSERS TO OBTAIN THE OPTIMUM AIR DISTRIBUTION PATTERN. SET FINAL BALANCE POSITION ON ALL BALANCE DAMPERS AND ADJUSTABLE AIR TURNING DEVICES PRIOR TO AIR FLOW TESTING AND BALANCE REPORT WRITE-UP.

21.4. SUBMIT A REPORT TO THE CONSULTANT INDICATING FINAL AIR QUANTITIES (SUPPLY, OUTDOOR AND EXHAUST AIR) OBTAINED. PROVIDE SINGLE LINE DUCT LAYOUT WITH TERMINAL DEVICES WITH DESIGN AND ACTUAL AIRFLOWS.

22. BALANCING WATER SYSTEMS

22.1. MEASURE AND ADJUST THE WATER FLOW TO NEW WATER-AIR HEAT PUMP(S) TO THE SPECIFIED GPM BY ADJUSTING THE FLOW CONTROL VALVES AFTER BALANCING INDIVIDUAL HEATING DEVICES.

23. COMMISSIONING AND DEMONSTRATION

23.1. THE CONTRACTOR IS RESPONSIBLE FOR THE PERFORMANCE AND COMMISSIONING OF ALL EQUIPMENT SUPPLIED AND REUSED IN THE SCOPE OF THE MECHANICAL WORK.

23.2. CONFIRM OPERATION OF ALL NEW EQUIPMENT AND REVIEW CONDITION OF ALL EXISTING HVAC EQUIPMENT BEING REUSED.

23.3. AT THE CONCLUSION OF THE COMMISSIONING, DEMONSTRATE THE OPERATION OF THE MECHANICAL SYSTEMS AT ALL LOADS TO THE ENGINEER AND OWNERS OPERATING STAFF.

23.4. AT THE COMPLETION OF THE COMMISSIONING AND TESTING AND BALANCING, SUBMIT A REPORT TO THE ENGINEER CERTIFYING THAT ALL OF THE WORK UNDER THE CONTRACT IS COMPLETE, CLEAN AND OPERATIONAL AND IN ACCORDANCE WITH THE DRAWINGS AND SPECIFICATIONS.

23.5. COMMISSIONING REPORT TO BE INSERTED IN THE OPERATING AND MAINTENANCE MANUAL.

END OF GENERAL SPECIFICATIONS

HVAC GENERAL NOTES

A. GENERAL NOTES APPLY TO HVAC SHEETS.

B. WORK SHALL COMPLY WITH CURRENT BUILDING CODES AND LOCAL BYLAWS AND AMENDED BY THE AUTHORITY HAVING JURISDICTION, INCLUDING APPLICABLE SECTIONS OF NFPA, BUILDING BYLAWS AND PROVINCIAL CODE. PERMITS ASSOCIATED WITH THE WORK SHALL BE PAID FOR BY THE MECHANICAL CONTRACTOR. CONTRACTOR SHALL OBTAIN ALL INSPECTIONS REQUIRED.

C. CONTRACTOR AND SUBCONTRACTORS SHALL REVIEW A COMPLETE SET OF THE CONSTRUCTION DOCUMENTS.

D. COORDINATE WORK WITH THE WORK OF OTHER TRADES, EQUIPMENT FURNISHED BY OTHERS. REQUIREMENTS OF THE OWNER, AND OF THE EXISTING CONDITIONS AT THE PROJECT SITE.

E. DRAWINGS FOR THE MECHANICAL WORK ARE DIAGRAMMATIC, SHOWING THE GENERAL LOCATION, TYPE, LAYOUT, AND EQUIPMENT REQUIRED. THE DRAWING SHALL NOT BE SCALED FOR EXACT MEASUREMENTS, REFER TO ARCHITECTURAL DRAWINGS FOR DIMENSIONS. REFER TO MANUFACTURER'S STANDARD INSTALLATION DRAWINGS FOR EQUIPMENT CONNECTIONS AND INSTALLATION REQUIREMENTS. PROVIDE DUCTWORK, CONNECTIONS, OFFSETS, ACCESSORIES, AND MATERIALS NECESSARY FOR A COMPLETE SYSTEM.

F. DUCT DIMENSIONS ON PLANS INDICATE DIMENSIONS OF INTERNAL FREE AREA.

G. PERFORATED CEILING DIFFUSERS SHALL BE 4-WAY UNLESS NOTED OTHERWISE.

H. COORDINATE ROOF WORK WITH THE OWNER'S CONSTRUCTION MANAGER PRIOR TO CONSTRUCTION.

I. UNLESS NOTED OTHERWISE, RECTANGULAR DUCT ELBOWS GREATER THAN 45° SHALL BE MITERED ELBOWS WITH DOUBLE-THICKNESS TURNING VANES AND RECTANGULAR DUCT ELBOWS 45° OR LESS SHALL HAVE RADIUS ELBOWS WITH AN INSIDE RADIUS OF AT LEAST 1/2 THE WIDTH OF THE DUCT.

J. REPLACE AIR FILTERS WITH NEW, CLEAN MERV 8 AIR FILTERS AT TURNOVER.

K. THE TERM "FURNISH" MEANS SUPPLY AND DELIVER TO THE PROJECT SITE, READY FOR UNLOADING, UNPACKING, ASSEMBLY, INSTALLATION, AND SIMILAR OPERATIONS. THE TERM "INSTALL" DESCRIBES THE OPERATIONS AT THE PROJECT SITE INCLUDING THE ACTUAL UNLOADING, UNPACKING, ASSEMBLY, ERECTING, PLACING, ANCHORING, APPLYING, WORKING TO DIMENSION, FINISHING, CURING, PROTECTING, CLEANING, AND SIMILAR OPERATIONS. THE TERM "PROVIDE" MEANS TO FURNISH AND INSTALL, COMPLETE AND READY FOR THE INTENDED USE.

L. PROVIDE LABELING CALLED FOR IN THE HVAC DRAWINGS USING ENGRAVED PHENOLIC PLATES.

M. PROVIDE P3000 12 GA. UNISTRUT WITH PG FINISH FOR DUCT SUPPORTS AND OTHER UNISTRUT IN AREAS EXPOSED TO VIEW. SLOTTED UNISTRUT AND OTHER UNISTRUT WITH HOLES IS NOT ACCEPTABLE.

HVAC MATERIAL SCHEDULE

	APPLICATION	ALLOWABLE MATERIAL
DUCT		
	CONCEALED, GENERAL EXHAUST	RECT. OR ROUND AS SHOWN
	CONCEALED, RETURN	RECT. OR ROUND AS SHOWN, LINED OR INSULATED
	CONCEALED, SUPPLY	RECT. OR ROUND AS SHOWN, LINED OR INSULATED
	CONCEALED, TYPE I HOOD EXHAUST	RECTANGULAR 16 GA. BLACK IRON W/ WRAP OR UL 1978 FACTORY-MANUFACTURED DUCT W/ WRAP (SUBMIT SHOP DRAWINGS FOR FACTORY-MANUFACTURED DUCT PRIOR TO ORDERING FOR APPROVAL)
	EXPOSED GENERAL EXHAUST	RECTANGULAR, NO EXPOSED DUCT-SEALING MASTIC
	EXPOSED RETURN	RECTANGULAR, NO EXPOSED DUCT-SEALING MASTIC
	EXPOSED SUPPLY	RECT. LINED OR ROUND AS SHOWN, NO EXPOSED DUCT-SEALING MASTIC
PIPE		
	REFRIGERANT	TYPE 'L' COPPER
	HEATING WATER (SUPPLY & RETURN)	SCH.40 BLACK STEEL, GRADE B
	CHILLED WATER (SUPPLY & RETURN)	SCH.40 BLACK STEEL, GRADE B
	CLOSED CIRCUIT HEAT PUMP	SCH.40 BLACK STEEL, GRADE B
	CONDENSING WATER (SUPPLY & RETURN)	SCH.80 BLACK STEEL, GRADE B

HVAC SYMBOLS

Symbol	Description
	DEMOLITION
	DUCTWORK
	ACOUSTICALLY INSULATED DUCT
	THERMALLY INSULATED DUCT
	SUPPLY AIR DUCT RISER – UP
	RETURN AIR DUCT RISER – UP
	SUPPLY AIR DUCT RISER – DOWN
	RETURN AIR DUCT RISER – DOWN
	SUPPLY AIR GRILLE – NEW
	RETURN/EXHAUST AIR GRILLE – NEW
	SUPPLY AIR GRILLE – EXISTING
	RETURN/EXHAUST AIR GRILLE – EXISTING
—U/C—	DOOR UNDERCUT
	DOOR GRILLE
	TURNING VANES
A H	ACCESS HATCH
A P	ACCESS PANEL
	HEAT TRACE CABLE
	EXHAUST FAN – CEILING MTD.
	EXHAUST FAN – INLINE
	FIRE DAMPER – NEW
	FIRE DAMPER – EXISTING
SD	SMOKE DAMPER – NEW
SD	SMOKE DAMPER – EXISTING
M	MOTORIZED DAMPER
	BALANCING DAMPER
BDD	BACK DRAFT DAMPER
T	PROGRAMMABLE THERMOSTAT
S	TEMPERATURE SENSOR
GM	GAS METER
WM	WATER METER
X	AIR FLOW (CFM / L/S)
#	PLAN NOTE
A 24x24 145 (TYPE, SIZE(in/mm), AIR FLOW (CFM/L/S))	DIFFUSER/GRILLE TAG
CWS	CONDENS. WATER SUPPLY
CWR	CONDENS. WATER SUPPLY
CHWS	CHILLED WATER SUPPLY
CHWR	CHILLED WATER SUPPLY
HWS	HEATING WATER SUPPLY
HWR	HEATING WATER RETURN
RL	REFRIGERANT LIQUID
RV	REFRIGERANT VAPOR
HPS	HEAT PUMP SUPPLY
HPR	HEAT PUMP RETURN

ABBREVIATIONS

(E)	EXISTING
ABV	ABOVE
AFF	ABOVE FINISHED FLOOR
ADJ	ADJACENT
AHJ	AUTHORITY HAVING JURISDICTION
APPROX	APPROXIMATELY
BLDG	BUILDING
CIE	CONNECT INTO EXISTING
CLG	CEILING
CO	CLEAN OUT
CIE	CONNECT INTO EXISTING
DCVA	DOUBLE CHECK VALVE ASSEMBLY
DCW	DOMESTIC COLD WATER
DHW	DOMESTIC HOT WATER
DHWR	DOMESTIC HOT WATER RECIRC
DN	DOWN
DWG(S)	DRAWING(S)
EXT'G	EXISTING
ELEC	ELECTRICAL
F&I	FURNISH AND INSTALL
FA	FROM ABOVE
FB	FROM BELOW
FD	FLOOR DRAIN
FT	FOOT/FEET
GC	GENERAL CONTRACTOR
HB	HOSE BIB
HD	HUB DRAIN
HVAC	HEATING, VENTILATION, AIR CONDITIONING
LL	LANDLORD
MAX	MAXIMUM
MIN	MINIMUM
NTS	NOT TO SCALE
OA	OUTSIDE AIR
RA	RETURN AIR
RE&RE	REMOVE & REINSTALL
REQD	REQUIRED
REV	REVISION
RL	RELOCATE
RPBA	REDUCED PRESSURE BACKFLOW ASSEMBLY
RWL	RAIN WATER LEADER
SA	SUPPLY AIR
SF	SQUARE FEET
TA	TO ABOVE
TB	TO BELOW
TR	TO REMAIN
TYP	TYPICAL
UNO	UNLESS NOTED OTHERWISE
VFD	VARIABLE FREQUENCY DRIVE
VSC	VARIABLE SPEED CONTROLLER
VTR	VENT TO ROOF
W/	WITH
WIC	WALK-IN COOLER

DRAWING LIST

DWG NO.	DESCRIPTION	SCALE
M-100	GENERAL SPECIFICATION	NTS
M-011	HVAC SPECIFICATION	NTS
M-100	HVAC DEMO PLAN	AS NOTED
M-101	HVAC NEW PLAN	AS NOTED
M-500	SOUTH ELEVATION	AS NOTED
M-501	BUILDING SECTIONS	AS NOTED
M-600	HVAC SCHEDULE	NTS
M-700	HVAC DETAILS	NTS
M-800	KITCHEN EXHAUST SYSTEM DETAILS 1 OF4	NTS
M-801	KITCHEN EXHAUST SYSTEM DETAILS 2 OF4	NTS
M-802	KITCHEN EXHAUST SYSTEM DETAILS 3 OF4	NTS
M-803	KITCHEN EXHAUST SYSTEM DETAILS 4 OF4	NTS
P-010	PLUMBING SPECIFICATION	NTS
P-100	PLUMBING PLAN WATER & GAS	AS NOTED
P-101	PLUMBING PLAN - WASTE & VENT	AS NOTED
P-600	PLUMBING SCHEDULE	NTS
P-700	PLUMBING DETAILS 1 OF 2	NTS
P-701	PLUMBING DETAILS 2 OF 2	NTS

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DESIGN BULLETIN: DB-01/ 2023

ISSUE RECORD

Rev	Date	Description	By
1	05/APR/23	LL COORDINATION	PE
1	18/APR/23	BP/TENDER	PE

REVISION SCHEDULE

Rev	Date	Description	By

Drawn: CYL/MHP
Checked: SKO

Project No.: 2023280

Contents: GENERAL SPECIFICATIONS

M010

SECTION 233113 METAL DUCTS

1. DUCTWORK – GALVANIZED STEEL

1.1. PROVIDE GALVANIZED SHEET METAL DUCTWORK IN ACCORDANCE WITH SMACNA STANDARDS SUITABLE FOR OPERATING PRESSURE OF 500 PA AND LESS.

1.2. BALANCE DAMPERS TO BE 0.76 MM THICK, SINGLE BLADE WITH 0.4 MM SHAFT DIAMETER AND END BEARINGS. OPERATOR TO BE LOCKABLE QUADRANT TYPE.

1.3. ALL JOINTS SHALL BE MADE UP OF AIRTIGHT USING DURO-DYNE S-2 DUCT SEALER. SEALER SHALL BE APPLIED TO ALL JOINTS AND SEAMS OF SUPPLY, RETURN AND EXHAUST DUCTWORK.

1.4. ALL DUCTS HAVING ANY SIZE OVER 12" SHALL BE REINFORCED BY CROSS BRACING.

1.5. ALL DUCTS SHALL BE SUPPORTED BY 1" WIDE (16 GA.) GALVANIZED VENT HANGERS FASTENED TO THE SIDE AND BOTTOM OF THE DUCTS BY BOLTS, RIVETS, OR METAL SCREWS. DUCT HANGERS SHALL BE SUSPENDED FROM STRUCTURAL BEARINGS SUCH AS BEAMS, TOP CHORDS, OR STRUCTURAL CONCRETE SLABS. WHERE STRUCTURAL BEARINGS DO NOT EXIST, THE CONTRACTOR SHALL PROVIDE ANGLE OR CHANNEL IRON MEMBERS FROM THE NEAREST STRUCTURAL BEARINGS TO SUPPORT HANGERS.

1.6. PROVIDE AIR EXTRACTORS AT ALL TAKE-OFFS, AND DAMPERS WHERE INDICATED ON DRAWINGS.

1.7. PROVIDE ACCESS PANELS AT EACH SIDE OF HEATING COILS IN THE TRANSITION DUCTWORK AND ON ONE SIDE OF CONTROL OR MANUAL DAMPERS AND FIRE DAMPERS.

1.8. PROVIDE TURN VANES IN ALL 90° SQUARE ELBOWS.

1.9. ALL NEW EXPOSED DUCTWORK TO BE RIGID DUCT. FINAL DUCT CONNECTIONS TO ALL DIFFUSERS TO TERMINATE IN THE FORM OF A 90° RIGID ELBOW AND STRAIGHT SECTION OF RIGID DUCT. SEE DETAIL.

1.10. WHERE INSIDE OF DUCT OR DUCT INSULATION IS VISIBLE FROM FLOOR (BEHIND GRILLE OR IN OPEN DUCT) CONTRACTOR TO PAINT INSIDE DUCT WITH MATTE BLACK PAINT. MINIMUM COVERAGE SHALL BE 1.5X THE EQUIVALENT DUCT DIAMETER.

1.11. CONTRACTOR SHALL PROVIDE ADEQUATE PROTECTION OF DUCT OPENINGS DURING CONSTRUCTION AND DEMOLITION TO PROTECT FROM CONSTRUCTION DUST & DEBRIS.

2. DUCTWORK – FLEXIBLE

2.1. FLEXIBLE DUCTWORK MAY BE INSTALLED IN CONCEALED AREAS. DUCTS SHALL BE HELICALLY WOUND SPIRAL DUCT, EQUAL TO FLEXMASTER T/L, MAXIMUM 10FT (3.048M).

2.2. FLEXIBLE DUCTS MUST BE SECURED TO SOLID DUCT WITH STAINLESS STEEL WORM GEAR TYPE CLAMP.

2.3. DUCTS SHALL CONFORM TO AND BE INSTALLED IN ACCORDANCE WITH NFPA STANDARD 90A.

2.4. RADIUS OF BENDS SHALL BE MINIMUM ONE DUCT DIAMETER CENTERLINE RADIUS.

2.5. DUCTS SHALL BE NON-METALLIC CONSTRUCTION AND INSULATED WITH 1" FIBREGLASS INSULATION WITH INTEGRAL VAPOUR BARRIER, RATED FOR 4"SP.

2.6. DUCTS SHALL BE SECURED TO THE METAL SUPPLY DUCTS AND THE INLET SLEEVES ON THE BOXES WITH DUCT SEALANT AND NON-METALLIC DRAW BANDS.

2.7. CONTRACTOR SHALL PROVIDE ADEQUATE PROTECTION OF DUCT OPENINGS DURING CONSTRUCTION AND DEMOLITION TO PROTECT FROM CONSTRUCTION DUST & DEBRIS.

3. KITCHEN EXHAUST DUCTWORK – CARBON STEEL

3.1. DUCTWORK SERVING KITCHEN HOOD EXHAUST SHALL COMPLY WITH NFPA 96 "VENTILATION CONTROL AND FIRE PROTECTION OF COMMERCIAL COOKING OPERATIONS". DUCTS SHALL BE CONSTRUCTED OF AND SUPPORTED BY WELDED CARBON STEEL NO LESS THAN 0.060 INCHES (1.52MM) IN THICKNESS (16 GAUGE).

3.2. DUCT SHALL BE INSTALLED WITH A MINIMUM 2% SLOPE ON HORIZONTAL RUNS UP TO 75FT (22.86M).

3.3. PROVIDE DRAIN AT LOW POINTS IN HORIZONTAL DUCT.

3.4. PROVIDE ACCESS PANEL OPENINGS AS REQUIRED BY NFPA 96.

3.5. EXTERIOR DUCT INSTALLATIONS SHALL BE PROTECTED WITH A PAINT OR SUITABLE WEATHER PROTECTIVE COATING (UNLESS STAINLESS STEEL DUCTWORK IS INSTALLED) AS NOTED IN THE FOLLOWING SECTION.

3.6. ENTIRE DUCT SHALL BE WRAPPED IN 2 LAYERS OF ULC LISTED 3M FIRE DUCT WRAP.

4. FLUE GAS VENT

4.1. NOT APPLICABLE.

END OF SECTION 233113

SECTION 230713 DUCT INSULATION

1. GENERAL

1.1. "CONCEALED" INSULATED MECHANICAL SERVICES IN FURRED SPACES, SHAFTS AND HUNG CEILINGS CONSIDERED TO BE CONCEALED.

1.2. "EXPOSED" WILL MEAN NOT CONCEALED.

1.3. PROVIDE INSULATION ON ALL DUCTWORK SERVING HEATING AND VENTILATION SYSTEMS INCLUDING:

1.3.1. EXTERNAL INSULATION: EXHAUST DUCTWORK WITHIN 5FT (1.5M) OF AN EXTERIOR WALL.

1.3.2. INTERNAL INSULATION: OUTDOOR AIR DUCTWORK.

1.3.3. EXTERNAL INSULATION: ALL AIR-CONDITIONED SUPPLY DUCTWORK.

1.3.4. ACOUSTIC INSULATION: ON ALL SUPPLY AND RETURN DUCT WITHIN 10FT (3.048M) OF AIR HANDLING EQUIPMENT, NOT NECESSARILY SHOWN ON THE DRAWINGS.

1.4. EXPOSED DUCTS WITHIN A ROOM, WHICH IS BEING SERVED BY THE EXPOSED DUCTS, DO NOT REQUIRE EXTERNAL INSULATION (EXCLUDING OUTDOOR AIR DUCTS). APPLY AT LEAST ONE COAT OF CORROSION RESISTANT PRIMER FOR SITE PAINTING.

1.5. INSULATION SHALL BE INSTALLED BY A QUALIFIED COMPANY PERFORMING IN THIS TYPE OF WORK, WITH A MINIMUM OF THREE (3) YEARS EXPERIENCE SPECIALIZING IN THIS TRADE.

1.6. DUCT DIMENSIONS, AS INDICATED, ARE CLEAR INSIDE DUCT LINING.

1.7. INSTALL IN ACCORDANCE WITH RECOMMENDATIONS OF SMACNA DUCT LINER STANDARDS.

1.8. EXTERNALLY INSULATE ALL CONCEALED RIGID SUPPLY AIR DUCTS AND PLENUMS.

1.9. EXHAUST DUCTWORK WITHIN 5FT (1.5M) OF AN EXTERIOR WALL SHALL BE EXTERNALLY INSULATED WITH 1 ½" (38MM) THICK FOIL FACED FLEXIBLE FIBREGLASS. APPLY USING RECOMMENDED ADHESIVE AND TAPE ALL JOINTS USING VAPOUR BARRIER TAPE.

1.10. INSULATION ON CONCEALED DUCTWORK MAY BE LEFT AS FACTORY FINISHED WITH NO FURTHER FINISH REQUIRED. ALL JOINTS TO BE SEALED WITH VAPOUR BARRIER TAPE.

1.11. FLEXIBLE DUCTWORK CONNECTIONS TO EQUIPMENT SHALL NOT BE INSULATED.

1.12. EXTREME CARE SHALL BE TAKEN IN INSULATING HIGH AND MEDIUM PRESSURE DUCTWORK INCLUDING ALL DUCTWORK BETWEEN THE FAN DISCHARGE AND ALL MIXING BOXES TO ENSURE THE DUCT IS NOT PIERCED WITH SHEET METAL SCREWS OR OTHER FASTENERS. ALL HIGH AND MEDIUM PRESSURE DUCTS IN THESE SPECIFICATIONS ARE CLASSIFIED AS HIGH VELOCITY DUCTWORK.

2. QUALITY ASSURANCE

2.1. ALL INSULATION, JACKETS, ADHESIVES, MASTICS, ETC UTILIZED IN THE FABRICATION OF THE DUCT INSULATION AND FINISH SHALL HAVE A FLAME SPREAD RATING MAXIMUM OF 25 AND THE SMOKE DEVELOPED CLASSIFICATION MAXIMUM OF 50.

2.2. INSULATION THICKNESS AND INSULATING VALUES SHALL BE IN ACCORDANCE WITH CURRENT ASHRAE 90.1.

2.3. APPLY EXTERNAL INSULATION TO DUCTWORK ONLY AFTER ALL TESTS HAVE BEEN MADE AND SYSTEMS ACCEPTED BY THE CONSTRUCTION MANAGER AS AIRTIGHT.

2.4. APPLY INSULATION AND INSULATION FINISH IN A WORKMANLIKE MANNER SO THAT THE FINISHED PRODUCT IS UNIFORM, SMOOTH IN FINISH, PLEASING TO THE EYE AND WITH LONGITUDINAL SEAMS CONCEALED FROM VIEW. APPLY DUCTWORK INSULATION MATERIALS, ACCESSORIES AND FINISHES IN ACCORDANCE WITH MANUFACTURER'S RECOMMENDATIONS.

2.5. INSULATION AND VAPOUR BARRIER SHALL BE CONTINUOUS THROUGH ALL NON-RATED SEPARATIONS.

2.6. TERMINATE INSULATION SHORT OF ALL CONTROL, SMOKE AND FIRE DAMPERS SO AS NOT TO INTERFERE WITH THEIR OPERATION (WHERE APPLICABLE).

2.7. INSULATION SHALL BE ADHERED TO THE DUCT WITH 100 MM (4") WIDE STRIPS OF ADHESIVE AROUND THE DUCT AT APPROXIMATELY 300 MM (12") CENTRES.

2.8. INSULATION SHALL BE WRAPPED AROUND THE DUCT WITH ALL EDGES BUTTED. THE JACKET SHALL OVERLAP 50 MM (2") AT ALL JOINTS AND SHALL BE STAPLED USING FLARE TYPE STAPLES AT MAXIMUM 150MM (6") CENTRES.

2.9. ALL JOINTS, SEAMS, BREAKS, PINHEADS, STAPLES, ETC., IN THE JACKET SHALL BE SEALED WITH 75 MM (3") WIDE VAPOUR BARRIER RFFRK TAPE.

2.10. DUCT SEALANT IS NOT LIMITED TO MATERIALS OF ADHESIVE OR MASTIC NATURE BUT IS INCLUSIVE OF TAPES AND COMBINATIONS OF WOVEN FABRIC STRIPS AND MASTICS.

3. INSULATION MATERIALS

3.1. FLEXIBLE GLASS FIBRE: ASTM C553 AND ASTM C1290; COMMERCIAL GRADE; 'K' VALUE OF 0.25 AT 75 DEGREES F; 1.5 LB/CU FT MINIMUM DENSITY; 0.002 INCH FOIL SCRIM KRAFT FACING FOR AIR DUCTS.

3.2. DUCTLINER (USED IN RETURN AIR PLENUM BOOTS): FLEXIBLE GLASS FIBER, ASTM C1071; TYPE II, 'K' VALUE OF 0.23 AT 75 DEGREES F; 3.0 LB/CU FT MINIMUM DENSITY; COATING AIR SIDE FOR MAXIMUM 4,000 FEET PER MINUTE AIR VELOCITY. THE AIRSTREAM SURFACE MUST BE PROTECTED WITH A DURABLE ACRYLIC SURFACE COATING SPECIFICALLY FORMULATED TO:

3.3. FIRE RATED GREASE DUCT INSULATION (HIGH TEMPERATURE FLEXIBLE BLANKET): 1-1/2-INCH THICK REFRACTORY GRADE FIBROUS FIRE BARRIER MATERIAL WITH MINIMUM SERVICE TEMPERATURE DESIGN OF 2,000 DEGREES F; ALUMINUM FOIL LAMINATED ON BOTH SIDES; WITH A MINIMUM 'K' VALUE OF 0.25 AND A MINIMUM DENSITY OF 6 LBS/CU FT; CONTAINING NO ASBESTOS. LISTED BY A NATIONALLY RECOGNIZED TESTING LABORATORY (NRTL) UL TO MEET ASTM E 2336, ASTM E119, AND WITH FLAME SPREAD/SMOKE MINIMUM RATING OF 25 / 50 WHEN TESTED AS PER ASTM E84/UL 723.

3.4. EXPOSED OUTDOOR DUCT INSULATION (EXPOSED TO THE ELEMENTS): 1 INCH THICK MATERIAL THAT HAS A SERVICE TEMPERATURE RANGE FROM -60 DEGREES F TO 180 DEGREES F. THIS OUTDOOR DUCT INSULATION MEETS ASTM C 177 OR C 518 AND SHALL HAVE MINIMUM 'K' VALUE OF 0.27 BTU-IN. / HR-FT2- DEGREES F AT MINIMUM DENSITY MEASUREMENT OF 3 LB/CU FT. THE INSULATION AND OUTSIDE SURFACE MUST BE PROTECTED WITH A WHITE THERMO PLASTIC RUBBER MEMBRANE FORMULATED TO BE RESISTANT TO UV, ACID RAIN, PHYSICAL ELEMENTS FROM OUTDOOR WEATHER. DUCT SHALL NOT BE PRESSURIZED UNTIL SEALANT HAS TIME TO CURE.

3.5. INSULATION ON EXPOSED OUTDOOR AIR DUCTWORK SHALL HAVE RD/3 PREMIUM QUALITY FINISH. APPLY TREATED CANVAS JACKET OVER INSULATION USING FABRIC ADHESIVE. FINISH CANVAS JACKET WITH ONE (1) COAT OF FABRIC COATING. INSULATION MAY BE PAINTED TO MATCH THE FINISHED CEILING.

END OF SECTION 230713

SECTION 230548 VIBRATION AND SEISMIC

1. VIBRATION ISOLATION

1.1. PROVIDE VIBRATION ISOLATION ON ALL MOTOR DRIVEN EQUIPMENT WITH MOTORS OF 0.37KW (0.5HP) AND GREATER POWER OUTLET AND ON PIPING AND DUCTWORK AS SPECIFIED. WHERE EQUIPMENT IS INTERNALLY ISOLATED BY THE MANUFACTURER, EXTERNAL ISOLATION IS NOT REQUIRED.

1.2. PROVIDE NEOPRENE GROMMETS AT THE SUPPORT POINTS.

1.3. ALL FAN CONNECTIONS TO DUCTS OR PLENUMS SHALL BE MADE WITH DOUBLE COATED NEOPRENE FLEXIBLE CONNECTIONS, DURO DYNE GRIP-LOCK NEOPRENE. CONNECTIONS SHALL BE 150 MM (6") LONG, INSTALLED AS PER THE MANUFACTURER'S INSTRUCTIONS.

1.4. BOLT ALL EQUIPMENT TO THE STRUCTURE. DO NOT BRIDGE ISOLATION ELEMENTS.

1.5. INSTALLATION OF RESTRAINT SYSTEMS AND FASTENING METHODS USED SHALL FOLLOW MANUFACTURER'S RECOMMENDATIONS.

2. SEISMIC REQUIREMENTS

2.1. ALL NEW EQUIPMENT, DUCTWORK, GRILLES AND PIPING SHALL BE PROVIDED WITH SEISMIC RESTRAINTS AS DESCRIBED IN THE GENERAL SPECIFICATIONS FOR PROJECTS LOCATED IN SEISMIC ZONES.

END OF SECTION 230548

SECTION 237400 HVAC EQUIPMENT

1. WATER SOURCE HEAT PUMP

1.1. FURNISH AND INSTALL WATER SOURCE HEAT PUMPS AS INDICATED ON THE PLANS WITH CAPACITIES AND CHARACTERISTICS AS LISTED IN THE SCHEDULE. REFER TO DRAWING M600 FOR EQUIPMENT SCHEDULE INCLUDING CAPACITIES AND APPROVED MANUFACTURERS.

1.2. HEAT PUMP SHALL BE CSA APPROVED AND CARRY AHRI OR CSA CERTIFICATION SEAL.

1.3. UNITS SHALL BE DESIGNED TO OPERATE THROUGHOUT THE RANGE OF ENTERING FLUID TEMPERATURE OF 50°F TO 100°F.

1.4. UNITS SHALL HAVE THE AIR FLOW ARRANGEMENT AS SHOWN ON THE PLANS. IF UNITS WITH THESE ARRANGEMENTS ARE NOT USED, THE CONTRACTOR SUPPLYING THE WATER SOURCE HEAT PUMPS IS RESPONSIBLE FOR ANY EXTRA COSTS INCURRED BY OTHER TRADES AND MUST SUBMIT DETAILED MECHANICAL DRAWINGS SHOWING DUCTWORK REQUIREMENTS AND CHANGES OR RELOCATION OF ANY OTHER MECHANICAL OR ELECTRICAL SYSTEM.

1.5. ALL WATER SOURCE HEAT PUMPS SHALL BE FABRICATED FROM HEAVY GAUGE CORROSION RESISTANT SHEET METAL.

1.6. HEAT PUMP SHALL BE INSTALLED SUPPORTED FROM THE STRUCTURE WITH SEISMIC SUPPORT AND CABLES AS REQUIRED BY THE SEISMIC ENGINEER.

1.7. ALL UNITS SHALL BE CONNECTED WITH FLEXIBLE HOSES. THE HOSES SHALL BE 2 FEET LONG, BRAIDED STAINLESS STEEL, FIRE RATED HOSES COMPLETE WITH ADAPTERS. NON FIRE RATED HOSES ARE NOT ACCEPTABLE.

1.8. EACH INLET WATER HEADER SHALL INCORPORATE A BUILT IN 30-MESH IN-LINE STRAINER SYSTEM TO PREVENT HEAT EXCHANGER FOULING.

END OF SECTION 237400

SECTION 233315 DAMPERS

1. VOLUME CONTROL DAMPER

1.1. FACTORY FABRICATED VOLUME CONTROL DAMPER, COMPLETE WITH REQUIRED HARDWARE AND ACCESSORIES. SINGLE BLADE AND MULTI-BLADE OPPOSED BLADE, STANDARD LEAKAGE RATING AND SUITABLE FOR HORIZONTAL OR VERTICAL APPLICATIONS.

2. MOTORIZED CONTROLS

2.1. MOTORIZED DAMPER AND ACTUATOR TO BE SUPPLIED AND INSTALLED BY MECHANICAL CONTRACTOR AND INTERLOCKED WITH FANS AS SHOWN ON THE DRAWINGS.

2.2. CONTROLS CONTRACTOR TO INTERLOCK FAN WITH DAMPER AND DAMPER WITH TIMECLOCK.

2.3. CONTROL DAMPER SHALL BE EQUIVALENT TO RUSKIN CD40 ALUMINUM AIR FOIL OPPOSED BLADE STYLE CONTROL DAMPER; MAXIMUM AIR LEAKAGE 2.5 CFM PER SQUARE FOOT. DAMPER SIZE SHALL BE EQUIVALENT FREE AREA OF DUCT DIMENSIONS.

2.4. DAMPER ACTUATOR SHALL BE EQUIVALENT TO BELIMO NFB SWING RETURN C/W END SWITCH.

2.5. SEQUENCE OF OPERATION: MOTORIZED CONTROL DAMPER SHALL BE ENABLED BY THE TIME CLOCK. ONCE PROVEN OPEN BY THE ACTUATOR END SWITCH, THE ASSOCIATED SUPPLY AND EXHAUST FAN SHALL BE ENABLED THROUGH A CONTACT RELAY.

3. FIRE DAMPERS

3.1. NOT APPLICABLE.

END OF SECTION 233315

SECTION 230505 INSTALLATION OF PIPEWORK

1. HEATING AND COOLING PIPING SYSTEM

1.1. PIPING SHALL BE STEEL TO ASTM A53 GRADE B SCHEDULE. 40. JOINTS 65 MM AND ABOVE SHALL BE WELDED, JOINTS 50 MM AND SMALLER SHALL BE SCREWED TYPE. FITTINGS PRESSURE CLASS 125 TO ASTM A536.

1.2. ISOLATING VALVES 2", (50 MM), AND SMALLER SHALL BE BRONZE OR STAINLESS-STEEL BALL VALVES WITH SCREWED ENDS. ISOLATING VALVES 2.5", (65 MM), AND LARGER SHALL BE LUG BODY BUTTERFLY OR GROOVED END BUTTERFLY TYPE, PRESSURE CLASS 125 PSI WITH EPDM SEATS, DUCTILE IRON BODY, STAINLESS SHAFTS, BRONZE DISKS RATED FOR BUBBLE TIGHT SHUTOFF. ACCEPTABLE MAKES: TOYO, CENTRELINE, KITZ, VICTAULIC.

1.3. PROVIDE DIELECTRIC COUPLINGS WHEN JOINING COPPER PIPE TO STEEL PIPE.

1.4. INSTALL THE PIPING AS SHOWN ON THE DRAWINGS. WHEN THE PIPING IS COMPLETE, TEST THE PIPING AT 200 PSI, (1300 KPA) FOR FOUR HOURS AND REPAIR ANY LEAKS FOUND.

1.5. UTILIZE EXISTING CHEMICAL POT FEEDER INSTALLED ACROSS THE MAIN CIRCULATING PUMPS FOR INTRODUCTION OF CLEANING DETERGENT AND CHEMICAL TREATMENT.

1.6. FLUSH AND CLEAN THE PIPING WITH A DETERGENT, THEN DRAIN AND FLUSH. INSTALL CHEMICAL TREATMENT IN THE PIPING SYSTEM. WHEN EXTENDING EXISTING PIPING SYSTEMS AND/OR INSTALLING NEW HEATING OR COOLING SYSTEMS, INSTALL TEMPORARY PIPING CONNECTIONS AND PUMP TO CIRCULATE CLEANING CHEMICALS THROUGH THE NEW PIPING AND EQUIPMENT BEFORE THE PIPING IS TIED INTO THE EXISTING PIPING SYSTEM.

2. PIPING ACCESSORIES

2.1. PROVIDE AUTO AIR VENT AT ALL HIGH POINTS IN THE PIPING SYSTEM. PIPE THE AIR VENTS TO DRAIN. STANDARD OF ACCEPTANCE: ARMSTRONG # 67.

2.2. PROVIDE CIRCUIT BALANCING VALVES AT EACH FAN COIL/HEAT PUMP, BOILER AND WATER CIRCUIT.

2.3. PROVIDE HOSE END DRAIN VALVES WITH SCREW CAPS AT LOW POINTS.

3. PIPING INSULATION

3.1. SUPPLY AND INSTALL THERMAL PIPING INSULATION FOR THE HOT WATER HEATING AND THERMAL PIPING INSULATION WITH VAPOUR PROOFING FOR THE CHILLED WATER-COOLING SYSTEMS AS REQUIRED IN TERMS OF THIS CONTRACT DOCUMENT.

3.2. CARRY OUT REPAIRS TO THERMAL INSULATION AT CONNECTIONS TO EXISTING PIPING SYSTEMS

3.3. ALL INSULATION SHALL BE APPLIED OVER A CLEAN, DRY SURFACE ONLY AFTER ALL PRESSURE TESTING HAS BEEN CARRIED OUT AND REVIEWED BY THE ENGINEER. ALL INSULATION SHALL BE CONTINUOUS AND COVER ALL PIPE FITTINGS, VALVES, JOINTS AND APPURTENANCES.

3.4. INSULATION THICKNESS, USING AN INSULATION K-FACTOR OF .24 AT 75°F (24°C) SHALL BE:

3.4.1. HOT WATER HEATING: ½" TO 3" PIPE, 1" THICK.

3.4.2. HOT WATER HEATING: LARGER THAN 3", 1 ½" THICK.

3.4.3. CHILLED WATER: ½" TO 3", 1 ½" THICK.

3.4.4. CHILLED WATER: LARGER THAN 3", 2" THICK.

3.5. HOT WATER HEATING PIPES AND FITTINGS SHALL BE INSULATED WITH FIBREGLASS INSULATION WITH ASJ JACKET. INSULATION JOINTS SHALL BE BUTTED TIGHTLY. ALL FITTINGS UP TO 2" (50 MM) SHALL BE INSULATED WITH MITRE-CUT PIECES OF INSULATION AND PRESSURE-SENSITIVE, COLOUR-MATCHING TAPE. ALL FITTINGS 2" (50 MM) AND LARGER, INCLUDING ELBOWS, TEES, VALVES, FLANGES AND MECHANICAL COUPLINGS, SHALL HAVE PRE-MOULDED PVC INSULATION FITTING COVERS.

3.6. CHILLED WATER PIPES SHALL BE INSULATED WITH FIBREGLASS INSULATION WITH REINFORCED FOIL VAPOUR BARRIER JACKET AND BUTT STRIPS. INSULATION JOINTS SHALL BE BUTTED TIGHTLY, AND VAPOUR BARRIER JACKET LAP SHALL BE SEALED WITH VAPOUR ADHESIVE. ADHERE THE 3" (80 MM) WIDE BUTT JOINT STRIPS OVER ALL END JOINTS WITH VAPOUR SEAL ADHESIVE TO ENSURE CONTINUOUS VAPOUR BARRIER SEAL.

3.7. INSULATE ALL FITTINGS UP TO 2" (50 MM) WITH MITRE-CUT PIECES OF INSULATION AND PRESSURE-SENSITIVE, COLOUR MATCHING TAPE.

3.8. ALL FITTINGS 2" (50 MM) AND LARGER, INCLUDING ELBOWS, TEES, VALVES, FLANGES AND MECHANICAL COUPLINGS SHALL HAVE PRE-MOULDED PVC INSULATING FITTING COVERS APPLIED STRICTLY IN ACCORDANCE WITH MANUFACTURERS RECOMMENDATIONS. HANGERS SHALL BE OUTSIDE THE INSULATION AND NON-COMPRESSIBLE INSULATION INSERTS (J-M THERMO-12 OR FOAM GLASS SHALL BE USED TO EXTEND 1" [25 MM] BEYOND THE METAL SHIELDS.)

3.9. METAL SHIELDS BETWEEN HANGERS AND PIPE INSULATION SHALL BE MADE OF GALVANIZED METAL.

3.10. PUMPS AND STRAINERS SHALL BE MADE OF BUTT PIECES OF INSULATION WIRED IN PLACE AND INSULATION CEMENT WITH CANVAS.

3.11. ALL EXPOSED INSULATED PIPING AND FITTINGS SHALL BE FINISHED WITH PVC JACKET OF 0.015 GAUGE. THE JACKET SHALL BE HOT ROLLED AND HAVE SELF-SEAL LAPS. ALL SEAMS SHALL BE FUSED PVC END CAPS FOR PIPING ABOVE 1-1/2" (40 MM) OR LESS. JOINTS FOR PIPE FITTING CONNECTIONS SHALL BE SEALED WITH SILICONE SEALANT, SO THAT THE COMPLETE INSTALLATION MAINTAINS A CONTINUOUS UNBROKEN VAPOUR SEAL.

3.12. ALL HANGER RODS PROTRUDING THROUGH INSULATION SHALL HAVE INSULATION TAPE APPLIED AROUND THE ROD OPENING IN THE INSULATION AND AT LEAST 1" (25 MM) UP THE HANGER ROD. WHERE INSULATION HAS BEEN NOTCHED FOR HANGERS, THE NOTCH SHALL BE FILLED WITH INSULATION CEMENT AND SEALED AROUND AND UP THE HANGER 1" (25 MM) WITH INSULATION TAPE.

4. REFRIGERANT PIPING

4.1. REFRIGERANT PIPING SHALL BE SUPPLIED AND INSTALLED BY AN EXPERIENCED, QUALIFIED, AND "LICENSED" REFRIGERATION CONTRACTOR.

4.2. REFRIGERANT PIPING SHALL BE REFRIGERANT GRADE COPPER ASTM B88 TYPE "L". INSTALL TO CSA STANDARDS. B-51 AND B-52 MECHANICAL REFRIGERATION CODE. CONFIRMATION TO THESE REQUIREMENTS AND THOSE OF REGULATING AUTHORITIES REQUIRES THAT THE APPLICABLE REQUIREMENTS FOR BRAZING PROCEDURES, QUALITY CONTROL AND OTHER RELATED REQUIREMENTS SHALL BE FOLLOWED.

4.3. THE SYSTEM PIPING SCHEMATIC SHALL BE SUBMITTED AND APPROVED BY THE ORIGINAL EQUIPMENT MANUFACTURER AND THE ENGINEER PRIOR TO INSTALLATION. PROVIDE NEW SOLENOID AND THERMOSTATIC VALVES FOR EACH OF THE SIX CIRCUITS OF THE EXISTING EVAPORATOR COIL

4.4. ALL SYSTEMS SHALL HAVE PROVISIONS TO HANDLE SAFELY THE REFRIGERANT CHARGE FOR SERVICING PURPOSES WITHOUT VENTING THE CHARGE TO ATMOSPHERE. THIS MAY INCLUDE PROPERLY LOCATED STOP VALVES, LIQUID TRANSFER VALVES AND REFRIGERANT STORAGE TANKS FOR THE SAFE TRANSFER, DISCHARGE AND DISPOSAL OF THE CHARGE WITHOUT VENTING THE CHARGE TO THE ATMOSPHERE.

4.5. PROVIDE STOP VALVES AT THE LOCATIONS SHOWN ON THE PIPING SCHEMATIC.

4.6. REFRIGERANT LINES CROSSING AN OPEN SPACE SHALL BE NOT LESS THAN 7.5 FT, (2.3 M) ABOVE THE FLOOR.

4.7. PRESSURE TEST PIPING TO 1.5 TIMES WORKING PRESSURE. TEST SHALL BE WITNESSED BY THE ENGINEER AND THE SYSTEM DEMONSTRATED TO HOLD A VACUUM OF 100 MICRONS FOR A PERIOD OF 24 HOURS. WRITTEN ACCEPTANCE OF THIS REFRIGERANT TEST SHALL BE OBTAINED PRIOR TO CHARGING THE SYSTEM WITH REFRIGERANT.

4.8. START-UP AND COMMISSIONING OF THE REFRIGERATION SYSTEM SHALL BE EXECUTED IN THE PRESENCE OF THE FACTORY REPRESENTATIVE.

4.9. INSULATE SUCTION AND LIQUID LINES WITH ½" THICK, (12 MM), NEOPRENE FOAM (ARMAFLEX). EXPOSED PIPING ON ROOF SHALL BE INSULATED WITH 1" THICK, (25MM) AND COVERED WITH ALUMINIUM JACKET WITH ALL JOINTS SEALED WITH SILICONE SEALANT.

5. REFRIGERANT CHARGING

5.1. AFTER THE SYSTEM IS PROPERLY INSTALLED, LEAK TESTED AND EVACUATED, CHARGE THE SYSTEM WITH R-410A REFRIGERANT AS RECOMMENDED BY THE MANUFACTURER.

5.2. RUN CONDENSER (CHILLER) FOR 3 DAYS WITH BOTH CIRCUITS IN OPERATION. AT THE END OF 3 DAYS OPERATIONS, TAKE AN OIL SAMPLE FROM BOTH CIRCUITS.

5.3. USING A REFRACTOMETER CHECK THE PERCENTAGE OF MINERAL OIL VERSUS SYNTHETIC OIL (USE WITH R-410A). IF THERE IS MORE THAN 5% MINERAL OIL, REMOVE EXISTING OIL AND CHANGE WITH NEW SYNTHETIC OIL.

5.4. REPEAT TEST WITH REFRACTOMETER AFTER 3 MORE DAYS OPERATION O UNIT WITH BOTH REFRIGERATION CIRCUIT UNTIL MINERAL OIL PERCENTAGE IS LESS THAN 5%.

6. CONDENSATE PIPING

6.1. CONDENSATE PIPING SHALL BE TYPE L COPPER OR PVC. INDOOR CONDENSATE PIPING INSTALLED IN OCCUPIED AREAS SHALL BE PRIMED AND PAINTED TO MATCH INDOOR WALL COLOUR. PROVIDE HANGERS SPACED NOT MORE THAN 1.2 METERS FOR REFRIGERANT AND CONDENSATE PIPING. WHERE COPPER IS USED, PROVIDE 12 MM THICK FLEXIBLE PIPE INSULATION WITH INTEGRAL VAPOUR BARRIER.

7. NATURAL GAS PIPING

7.1. CONTRACTOR TO OBTAIN ALL NECESSARY APPROVALS FOR THE GAS INSTALLATION. PROVIDE REPORTS AND APPROVALS TO CONSULTANT FOR REVIEW.

7.2. NATURAL GAS PIPING SHALL BE INSTALLED TO CAN/CSA B149.1, CAN/CSA B149.2 (CURRENT EDITION) AND TO FORTIS GAS STANDARDS.

7.3. ALL PIPING SHALL BE STEEL PIPE SCHEDULE 40, NPS ½" TO 2" WITH SCREWED SEAMS.

7.4. PROVIDE LOCKABLE SHUT-OFF AT CONNECTION TO GAS FIRED EQUIPMENT.

7.5. PROVIDE APPROVED FLEXIBLE CONNECTORS AT POINT OF CONNECTION TO RTU.

7.6. INSTALL PIPING ON ROOF USING C-PORT RUBBER BASES, MINIMUM 1.8 M ON CENTRE.

7.7. PROVIDE LINE SIZE, EARTHQUAKE, NATURAL GAS SHUT OFF VALVE IN MAIN LINE FEEDING NEW EQUIPMENT OR IN LINE SERVING EACH INDIVIDUAL DEVICE/APPLIANCE.

8. PIPE ESCUTCHEONS

8.1. SUPPLY AND INSTALL CHROME PLATED ESCUTCHEON PLATES ON EXPOSED PIPING PASSING THROUGH WALLS, FLOORS AND CEILINGS IN FINISHED AREAS AND OUTDOORS. WHERE THE PENETRATION IS GREATER THAN 50 MM DIAM. PROVIDE SLEEVES THROUGH WALLS, FLOORS AND CEILING IN FINISHED AREAS. SLEEVES SHALL BE CONCENTRIC WITH PIPE.

9. PIPING SYSTEMS FLUSH OUT

9.1. FLUSH HEATING AND COOLING SYSTEM, AFTER CHEMICAL CLEANING, WITH THE DOMESTIC WATER. FIRST FLUSH SHALL BE TO REMOVE DEBRIS AND BIGGER PARTICLES FROM THE SYSTEM WITHOUT OPERATION OF THE PUMPS. THE SECOND/THIRD FLUSH SHALL BE WITH SYSTEM PUMPS OPERATIONAL AT MAXIMUM SPEED. REPEAT THE PROCESS UNTIL THERE WILL BE NO MECHANICAL PARTICLES IN THE WATER. CLEAN STRAINERS AND DIRT SEPARATORS AFTER EACH STEP OF THE FLUSHING.

10. PRESSURE TESTING

10.1. PIPEWORK: TEST AS SPECIFIED IN RELEVANT SECTIONS OF HEATING, VENTILATING AND AIR CONDITIONING WORK. ALL NEW SECTION OF PIPING AND ALL INSTALLATIONS IN THE MECHANICAL ROOMS SHALL BE PRESSURE TESTED.

10.2. MAINTAIN SPECIFIED TEST PRESSURE WITHOUT LOSS FOR 4 HOURS MINIMUM UNLESS SPECIFIED FOR LONGER PERIOD OF TIME IN RELEVANT MECHANICAL SECTIONS.

10.3. CONDUCT TESTS IN PRESENCE OF CONSULTANT, TENANT OR THIRD PARTY AND PROVIDE PRESSURE TEST REPORT TO THE CONSULTANT AND TENANT FOR RECORDS.

END OF SECTION 230505

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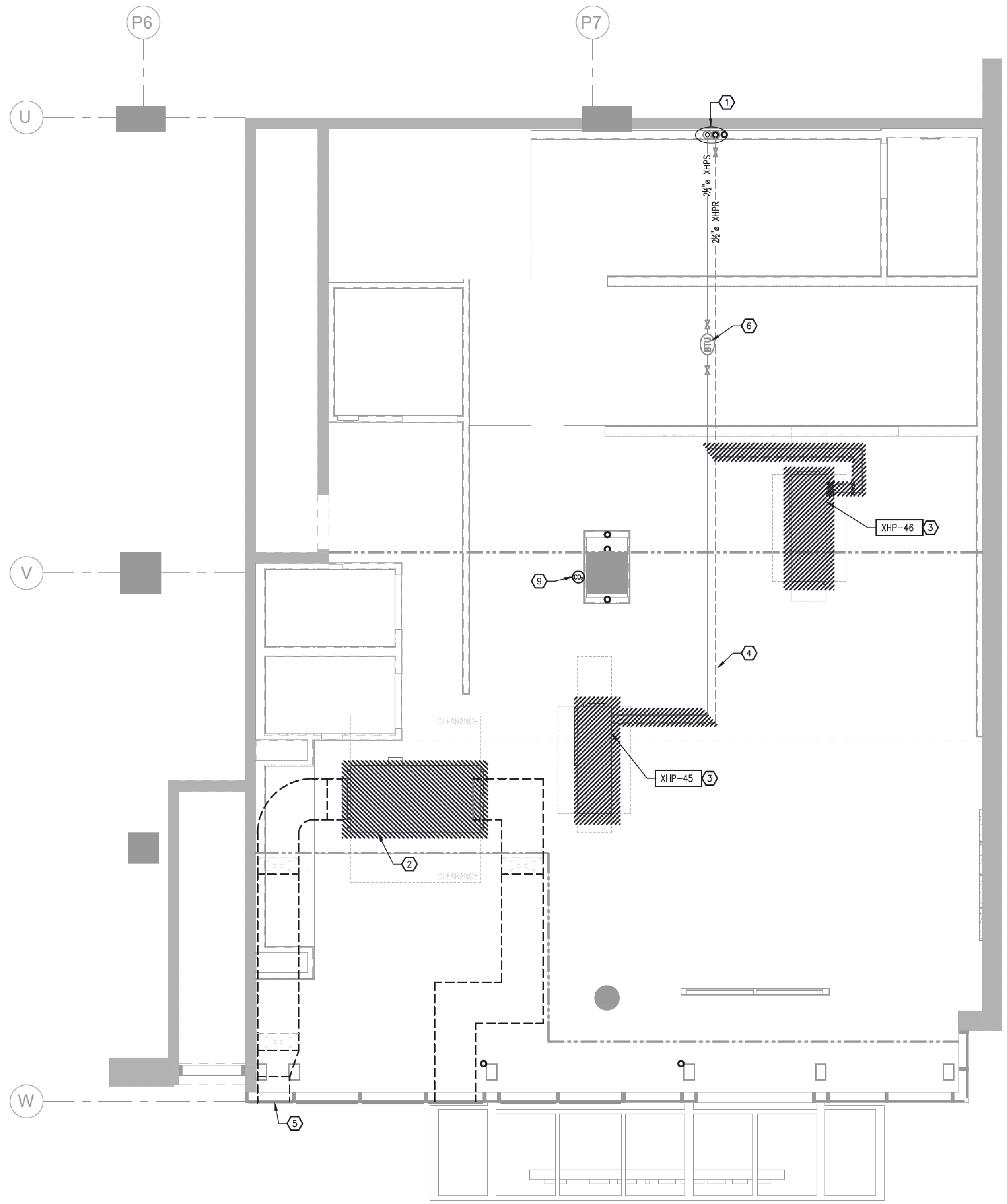
Contents:
HVAC SPECIFICATIONS

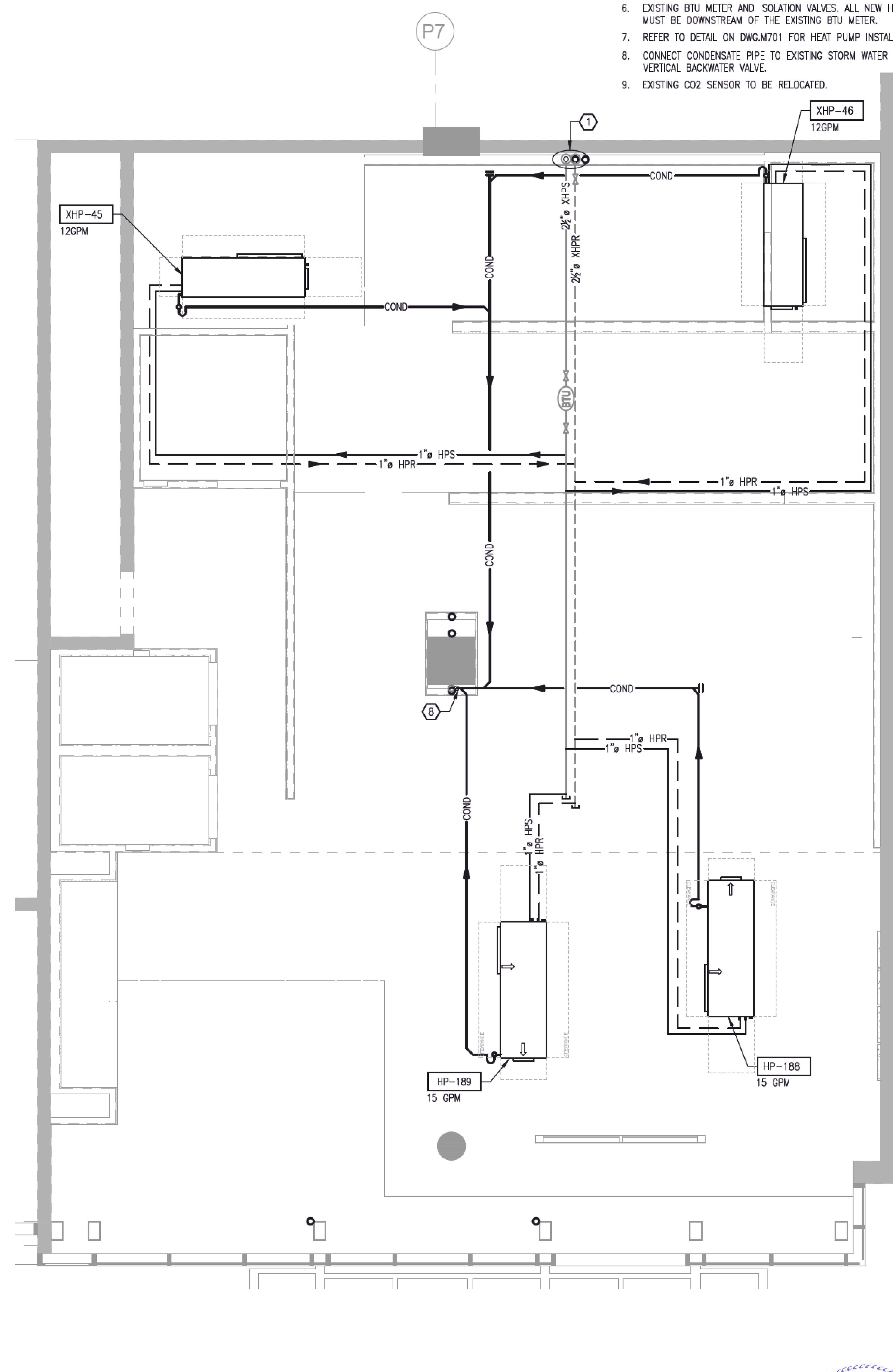
M011

HVAC PLAN NOTES

1. EXISTING 6"ø HPS/HPR PIPES F/A AND DN THROUGH SLAB.
2. REMOVE EXISTING HRV UNIT AND ALL ASSOCIATED DUCT WORK, POWER AND CONTROLS.
3. RELOCATE EXISTING HEAT PUMP, AS SHOWN ON DWG.M101. REDUNDANT HPS/R PIPING TO BE REMOVED AND CAPPED BACK TO SOURCE TO AVOID DEAD LEGS IN THE SYSTEM. ASSOCIATED CONTROLS AND POWER TO BE MODIFIED TO SUIT NEW LOCATION.
4. REMOVE EXISTING HPS/R PIPING
5. EXISTING LOUVRE TO REMAIN (TYPICAL). REFER TO DWG.M700 FOR EXTERIOR ELEVATION.
6. EXISTING BTU METER AND ISOLATION VALVES. ALL NEW HPS/R PIPING MUST BE DOWNSTREAM OF THE EXISTING BTU METER.
7. REFER TO DETAIL ON DWG.M701 FOR HEAT PUMP INSTALLATION.
8. CONNECT CONDENSATE PIPE TO EXISTING STORM WATER RISER C/W VERTICAL BACKWATER VALVE.
9. EXISTING CO2 SENSOR TO BE RELOCATED.



1 M100 HVAC DEMO PLAN
SCALE: 1/4" = 1'-0"



2 M100 NEW HYDRONIC PIPING AND EQUIPMENT LAYOUT
SCALE: 1/4" = 1'-0"

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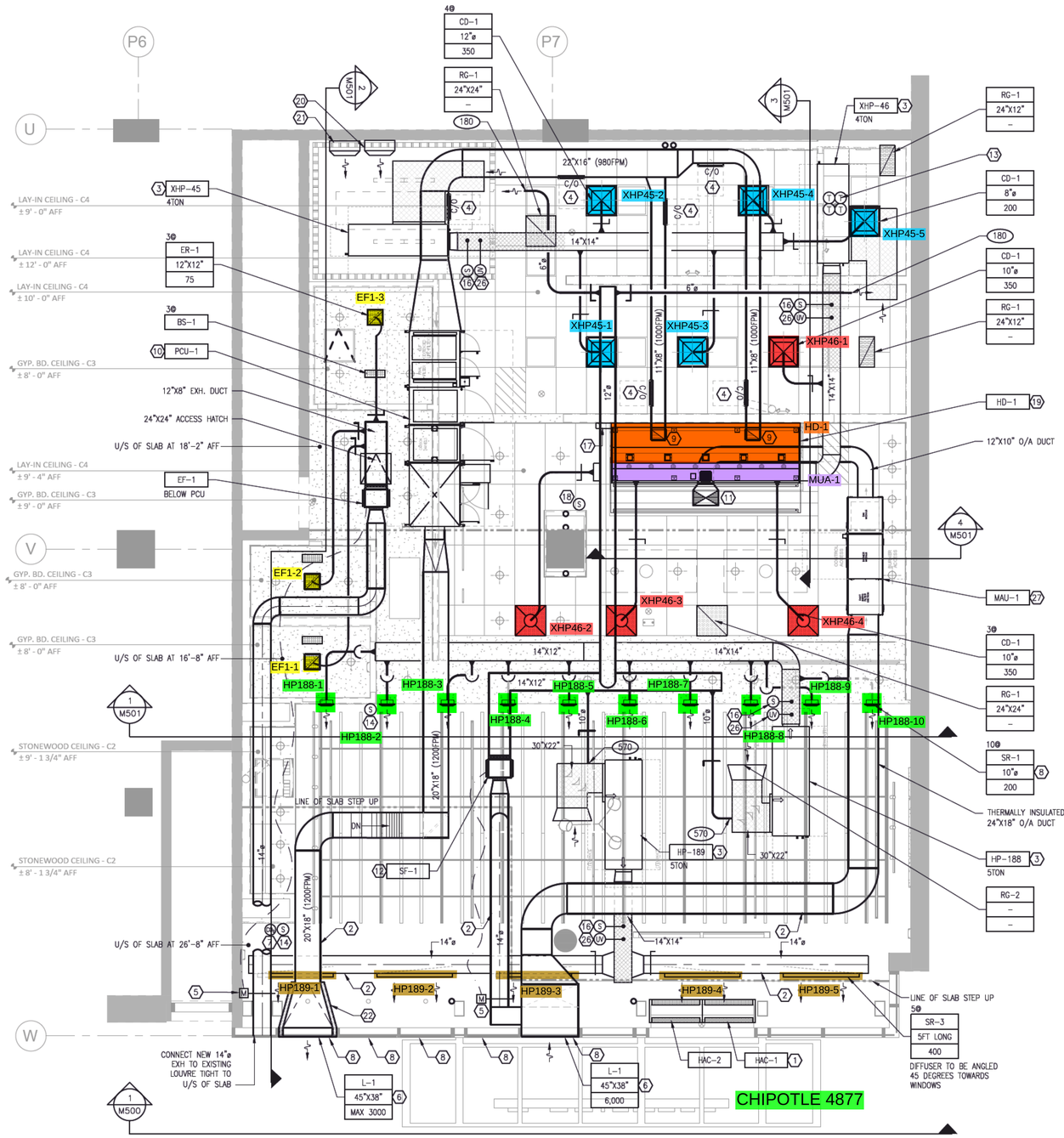
Contents:
HVAC DEMO PLAN & HYDRONIC PIPING LAYOUT

M100



1 M100 HVAC NEW PLAN
SCALE: 1/4" = 1'-0"

CLEARANCE REQUIREMENTS

1. GREASE HOOD, GREASE REMOVAL DEVICES, EXHAUST FAN AND DUCT SHALL HAVE A MINIMUM CLEARANCE OF AT LEAST:
   - 1.1. 18" (457mm) TO COMBUSTIBLE MATERIAL
   - 1.2. 3" (76mm) TO LIMITED-COMBUSTIBLE MATERIAL
   - 1.3. 0" (0mm) TO NON-COMBUSTIBLE MATERIAL
2. CLEARANCE REDUCTION SYSTEM, THROUGH COMBUSTIBLE ROOF, SHALL CONSIST OF 0.027" (0.69mm) 22GA SHEET METAL ON 1" (25mm) MINERAL WOOL BATTS OR CERAMIC FIBER BLANKET REINFORCED WITH WIRE MESH OR EQUIVALENT, SPACED 1" (25MM) ON NON-COMBUSTIBLE SPACERS.
3. ZERO CLEARANCE TO LIMITED COMBUSTIBLE MATERIALS SHALL BE PERMITTED WHERE PROTECTED BY ONE OF THE FOLLOWING:
   - 3.0.1. METAL LATH AND PLASTER
   - 3.0.2. CERAMIC TILE
   - 3.0.3. QUARRY TILE
   - 3.0.4. OTHER NON-COMBUSTIBLE MATERIALS OR ASSEMBLY OF NONCOMBUSTIBLE MATERIALS THAT ARE LISTED FOR THE PURPOSE OF REDUCING CLEARANCE
   - 3.0.5. OTHER MATERIALS AND PRODUCTS THAT ARE LISTED FOR PURPOSE OF REDUCING CLEARANCE.
4. THE EXHAUST DUCT SHALL NOT BE IN CONTACT WITH NONCOMBUSTIBLE FLOORS, INTERIOR WALLS OR OTHER NON-COMBUSTIBLE STRUCTURES (OR SUPPORTS) FOR MORE THAN 50% OF ITS SURFACE AREA FOR EACH LINEAR FOOT OF CONTACT LENGTH. WHERE DUCT CONTACT EXCEEDS THIS REQUIREMENT, THE DUCT SHALL BE PROTECTED FROM CORROSION, UNLESS THE DUCT IS LISTED FOR ZERO CLEARANCE.

COMMERCIAL KITCHEN EXHAUST NOTES

1. GREASE EXHAUST DUCTWORK SHALL BE 16-GAUGE ALL WELDED BLACK IRON OR FACTORY MANUFACTURERED IN ACCORDANCE WITH NFPA 96 STANDARDS. PROVIDE NFPA 96 COMPLIANT DUCT CLEANOUTS AT ALL CHANGES OF DIRECTION AND EVERY 12FT WITH MINIMUM 3FT CLEARANCE PROVIDED. HORIZONTAL DUCTWORK TO RUN WITH 2% SLOPE BACK TO HOOD. MAINTAIN ALL REQUIRED CLEARANCES TO COMBUSTIBLES AND PROVIDE CLEARANCE REDUCTION PANELS AS OUTLINED IN NFPA 96 OR ULC LISTED FIRE WRAP AS REQUIRED.
2. REFER TO KITCHEN EXHAUST DRAWINGS M-800 TO M-802 FOR FURTHER DETAILS REGARDING CAPTIVE AIRE EQUIPMENT INSTALLATION AND SPECIFICATIONS.
3. THE HOOD EXHAUST FAN (PCU-1) SHALL BE INTERLOCKED TO OPERATE WITH THE MAKE UP AIR (MAU-1) FAN. THIS CONTROL CIRCUIT IS ACTIVATED BY A SWITCH AND INCLUDES A FIRE PROTECTION OVERRIDE.
4. REFER TO CLEARANCE REQUIREMENTS FOR CLEARANCE REDUCTION SPECIFICATIONS AND ADDITIONAL REQUIREMENTS PER NFPA 96.

HVAC PLAN NOTES

1. AIR CURTAINS TO BE INSTALLED TIGHT TO EACH OTHER, CENTERED TO DOOR OPENING, MTD. MAXIMUM 10'-6" AFF. REFER TO AIR CURTAIN INSTALLATION DETAIL FOR MANUFACTURER REQUIREMENTS.
2. PAINT DUCTWORK VISIBLE THROUGH DINING ROOM SUPPLY REGISTERS, BLACK (TYP.)
3. REFER TO DWG.M100 FOR HPS/R PIPING TO HEAT PUMP.
4. 20"X10" CLEANOUT HATCH ON GREASE RATED DUCT. MAINTAIN MIN. 24" CLEARANCE IN FRONT OF CLEANOUT.
5. MOTORIZED DAMPER TO BE INTERLOCKED WITH FAN. ONCE DAMPER IS OPEN, FAN CAN BE ENABLED. COORDINATE WITH ELECTRICAL TO PROVIDE POWER.
6. REPLACE EXISTING WINDOW PANE WITH NEW LOUVRE. LOUVRE SIZE NOTED IS BASED ON BASE BUILDING DIMENSIONS. EXISTING WINDOW OPENING TO BE VERIFIED ON SITE PRIOR TO ORDERING LOUVRE.
7. EXISTING CO2 SENSOR TO BE RELOCATED MAX. 5FT A.F.F. EXTEND CONTROL WIRING TO NEW LOCATION. CO2 SENSOR TO BE CONNECTED TO A LIGHT PROBE LOCATED IN THE MANAGERS OFFICE TO FLASH WHEN THE CO2 LEVELS ARE AT 1401PPM. LIGHT PROBE TO BE SUPPLIED BY GC.
8. BLANK OFF EXISTING LOUVRE.
9. 11"X8" EXHAUST DUCT(S) UP FROM HOOD TO CONNECT TO PCU-1, COMPLIANT WITH NFPA-96. PROVIDE RADIUSED ELBOWS WITH AN INSIDE RADIUS OF 0.5W AT ELBOWS IN GREASE DUCT.
10. PCU-1 TO BE INTERLOCKED WITH SF-1. PCU-1 SHALL NOT BE ENABLED UNTIL PROOF THAT THAT SUPPLY PLAN IS ON.
11. 20"X12" (500X300) DUCT DN. TO CONNECTION. TRANSITION TO SUPPLY PLENUM OPENING SIZE (TYP.).
12. PROVIDE AIR FLOW SWITCH FOR SUPPLY FAN TO BE INTERLOCKED WITH PCU-1.
13. INSTALL GRIDPOINT THERMOSTATS FURNISHED BY TEMS FOR ALL FOUR HVAC UNITS, 48" (1200mm) AFF. COORDINATE WITH ELECTRICAL SWITCHING IN THIS AREA. PROVIDE WIRING AS SHOWN IN DETAIL 8/E710.
14. INSTALL GRIDPOINT ZONE SENSOR MODULE FURNISHED BY TEMS FOR HEAT PUMP, 60" (1500mm) AFF DIRECTLY TO WALL (NO JUNCTION BOX). COORDINATE LOCATION WITH EQUIPMENT. PROVIDE WIRING AS SHOWN IN DETAIL 8/E710.
15. RESERVED
16. INSTALL GRIDPOINT SUPPLY PROBE, FURNISHED BY TEMS, FOR HVAC UNIT (TYPICAL OF 4) IN THE SUPPLY DUCTWORK UPSTREAM FROM THE FIRST BRANCH CONNECTION. PROVIDE WIRING AS SHOWN IN DETAIL 8/E710.
17. PCU CORE ACTIVATION CONTROL PANEL ON WALL.
18. INSTALL REMOTE TEMPERATURE SENSOR FOR HOOD HD-1 AT THIS LOCATION 66" (1650mm) AFF. COORDINATE LOCATION WITH EQUIPMENT. PROVIDE (2) #18 G. THERMISTOR CABLE FROM TEMPERATURE SENSOR TO HOOD CONTROL PANEL.
19. INSTALL KITCHEN HOOD, HD-1. SUPPORT HOOD PER MANUFACTURER'S INSTALLATION INSTRUCTIONS AND AS DETAILED IN THE ARCHITECTURAL AND STRUCTURAL DRAWINGS. INSTALL HOOD ACCORDING TO THE REQUIREMENTS OF ITS LISTING, IN COMPLIANCE WITH NFPA 96, THE BUILDING CODE, AND AUTHORITIES HAVING JURISDICTION. HOOD SHALL HAVE AN INTEGRAL DUCT COLLAR TEMPERATURE SENSOR TO AUTOMATICALLY ENERGIZE THE EXHAUST AND MAKEUP AIR FANS IF COOKING TEMPERATURES ARE DETECTED. EXHAUST DUCT SYSTEM TO BE WELDED OR FACTORY-MANUFACTURED WATER AND AIR TIGHT. INSTALL CLEANOUTS PER CODE AND AS SHOWN. INSTALL HOOD FIRE SUPPRESSION SYSTEM PER DETAIL 4/M700. CHIPOTLE WILL PROVIDE AN INDEPENDENT TESTING AGENCY FOR TESTING THE INTEGRITY OF THE GREASE DUCT SYSTEM.
20. INSTALL REMOTE CONDENSING UNIT FOR WALK-IN COOLER ABOVE WALK-IN COOLER TO BE MOUNTED ON WALL, AS DETAILED IN THE ARCHITECTURAL AND STRUCTURAL DRAWINGS. INSTALL REFRIGERANT LINE SET, THERMOSTATIC EXPANSION VALVE, SOLENOID VALVE, TEMPERATURE CONTROL, SIGHT GLASS, FILTER DRIER, PRESSURE CONTROL AND LOW AMBIENT CONTROLS. TRAP AND SLOPE REFRIGERANT LINES PER MANUFACTURER'S RECOMMENDATIONS. INSTALLATION SHALL COMPLY WITH ASHRAE/ANSI STANDARD 15. CUT 2-1/2" HOLE IN WALK-IN COOLER ROOF FOR REFRIGERANT LINE SET AND SEAL PER THE COOLER MANUFACTURER'S INSTALLATION INSTRUCTIONS AFTER LINE SET IS INSTALLED.
21. INSTALL REMOTE CONDENSER FOR ICE MACHINE ABOVE WALK-IN COOLER TO BE MOUNTED ON WALL, AS DETAILED IN THE ARCHITECTURAL AND STRUCTURAL DRAWINGS. INSTALL REFRIGERANT LINE SET, THERMOSTATIC EXPANSION VALVE, SOLENOID VALVE, TEMPERATURE CONTROL, SIGHT GLASS, FILTER DRIER, PRESSURE CONTROL AND LOW AMBIENT CONTROLS. TRAP AND SLOPE REFRIGERANT LINES PER MANUFACTURER'S RECOMMENDATIONS. INSTALLATION SHALL COMPLY WITH ASHRAE/ANSI STANDARD 15. IF REFRIGERANT PIPING TO ICE MAKER IS EXPOSED TO PUBLIC VIEW CONCEAL WITHIN A STAINLESS STEEL SHROUD AS SHOWN IN THE ARCHITECTURAL DRAWINGS.
22. FIRE WRAP TO EXTEND TO AROUND DUCT UP TO LOUVRE TO PROVIDE A ZERO CLEARANCE REDUCTION SYSTEM THROUGH THE WALL PENETRATION. INSTALL FIRE WRAP AS PER DETAIL 3/M700.
23. INSTALL WASHROOM EXHAUST FAN EF-1 PER DETAIL 7/M700.
24. ~~PROVIDE SUPPLY DIFFUSER CONNECTION TO SUPPLY SYSTEM PER DETAIL 1/AM700 - TYPICAL.~~
25. ~~PROVIDE AUDIO/VISUAL REMOTE SMOKE DETECTOR ANNUNCIATOR WITH REMOTE KEY OPERATED MUTE A UNIT BACK TO EACH SMOKE DETECTOR. MOUNT UNIT 60" AFF - TYPICAL.~~
26. INSTALL REME HALO AIR PURIFIER FURNISHED BY TUV IN SUPPLY DUCTWORK (TYPICAL FOR ALL HVAC UNITS) PER DETAIL 6/M700. SEE ELECTRICAL DRAWINGS FOR POWER CONNECTION INFORMATION. INSTALL UV WARNING STICKERS ON FACE OF ENCLOSURE PER DETAIL AND ON ANY HVAC UNIT ACCESS DOOR(S) THROUGH WHICH THE REME HALO WOULD BE VISIBLE IF OPENED.
27. INTEGRAL MOTORIZED DAMPER.
28. ADJUST SUPPLY REGISTERS SO THAT SUPPLY AIR HITS WALL ON OPPOSITE SIDE OF ROOM AT APPROXIMATELY 7'AFF WITH NO DRAFTS FELT IN THE DINNING ROOM.

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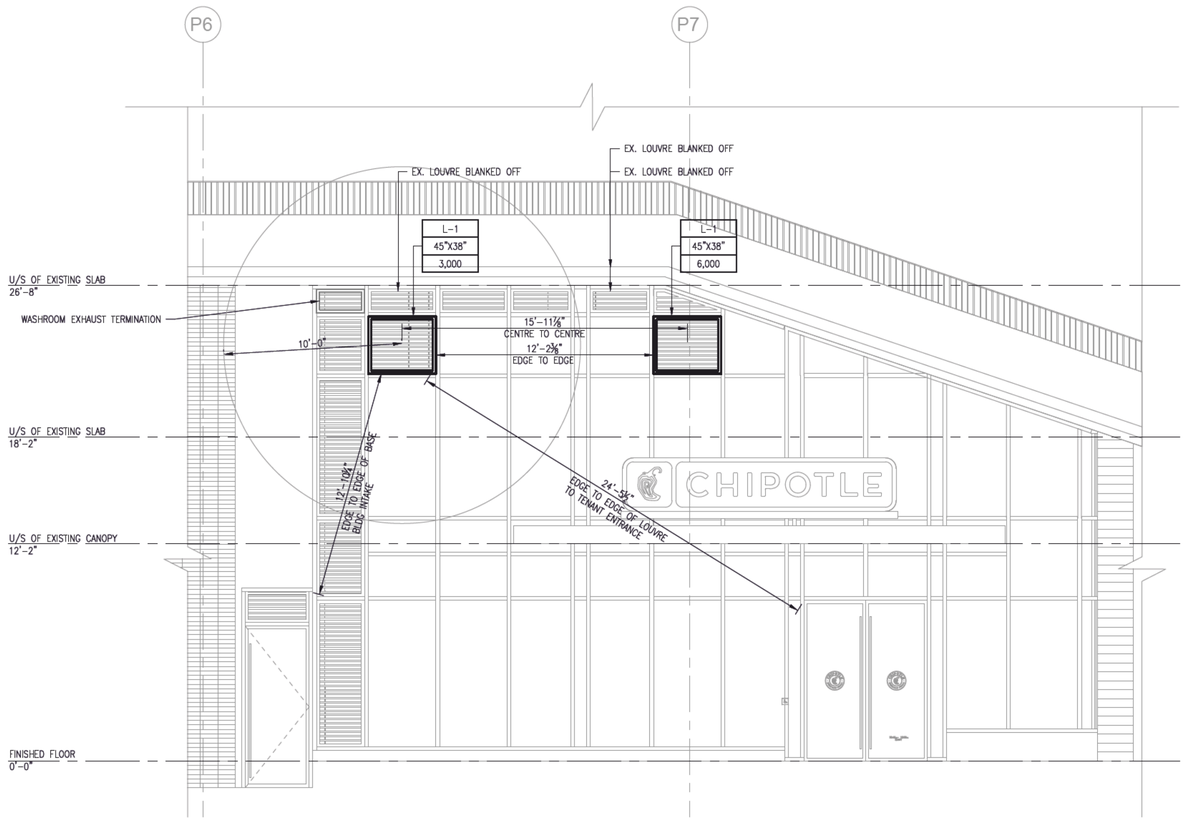
M101



1 M500 SOUTH ELEVATION
SCALE: 1/4" = 1'-0"

2023-05-02

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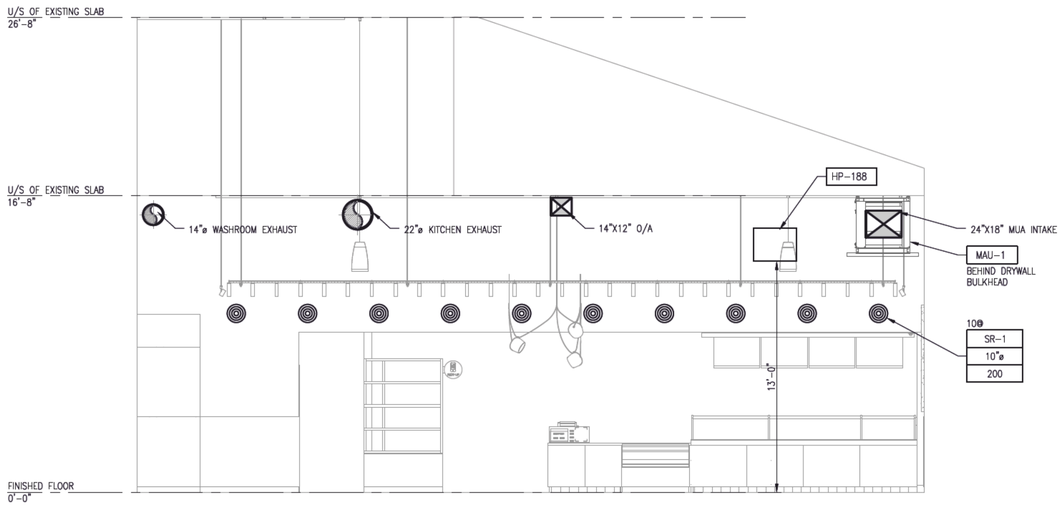
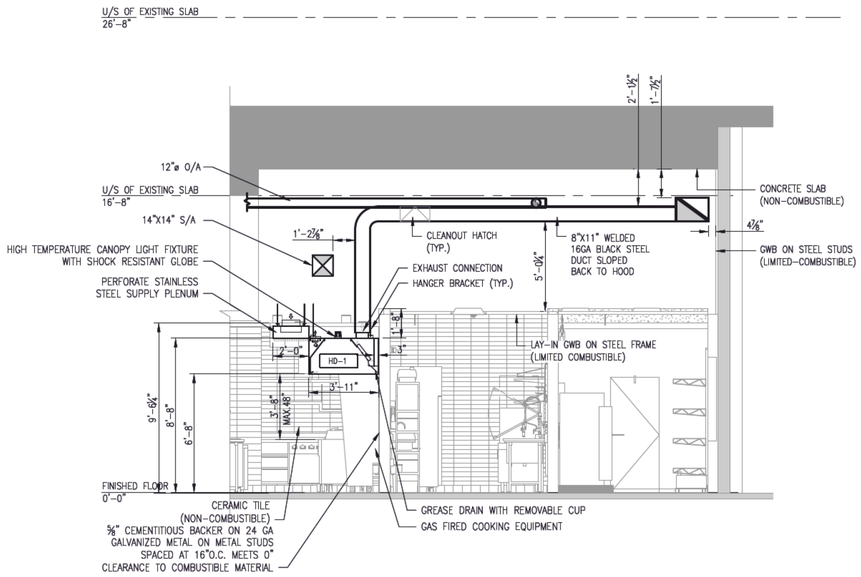
SOUTH ELEVATION

M500



1 M501 SEATING AREA SECTION
SCALE: 1/4" = 1'-0"



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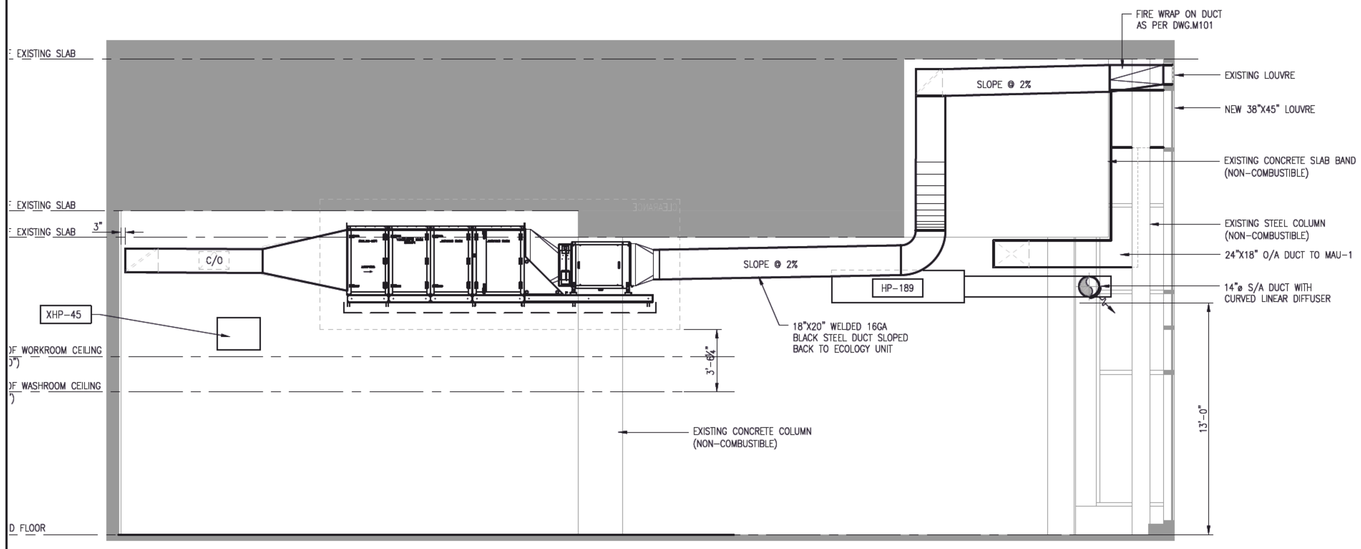
SCALE: 1/4" = 1'-0"



2 M501 BUILDING SECTION
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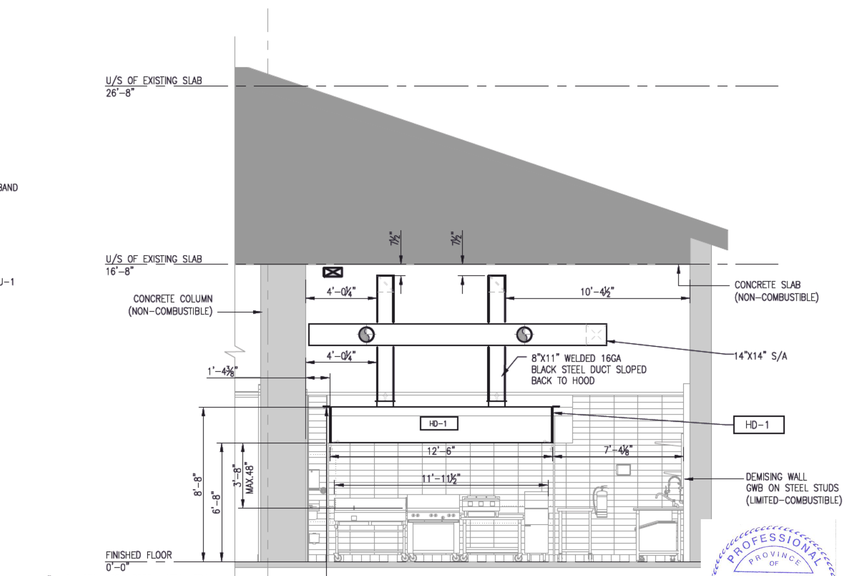

4 M501 HOOD ELEVATION
SCALE: 1/4" = 1'-0"

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BUILDING SECTIONS

M501

GRILLE AND DIFFUSER SCHEDULE

TAG	DESCRIPTION	FACE SIZE	MATERIAL	FINISH	MOUNTING	FURNISHED BY	INSTALLED BY	MANUFACTURER	MODEL NO.	SPECIFICATION
BS-1	BATHROOM AIR PURIFICATION UNIT	N/A	STAINLESS STEEL	STAINLESS STEEL	SURFACE MTD	TUV	GC	RGF ENVIRONMENTAL GROUP	BRU ASSEMBLY	REFER TO ELECTRICAL DRAWINGS FOR CONNECTION.
L-1	INTAKE LOUVRE	SEE DWGS	EXTRUDED ALUMINUM	MATCH BASE BUILDING		GC	GC	NAILOR	1606JD-FL	6" DEEP DRAINABLE LOUVRE, BLADE SPACING APPROX.5.5" O.C, FLANGED FRAME TO FIT OPENING, BIRD SCREEN.
CD-1	PERFORATED CEILING DIFFUSER	24"X24"	ALUMINUM	WHITE	LAY-IN	GC	GC	NAILOR	4320A TYPE L	PERFORATED SUPPLY, EXTRUDED ALUMINUM, LAY-IN STYLE FRAME, PROVIDE WITH INTEGRAL OBD.
SR-1	ADJUSTABLE TURBO NOZZLE	SEE DWGS	ALUMINUM	WHITE	WALL MTD.	GC	GC	AIR CONCEPTS	A NR-14	SURFACE MTD, PROVIDE WITH CONCEALED MOUNTING AND FACE ASSESSIBLE OBD.
SR-3	CURVED SPIRAL DUCT SUPPLY GRILLE	SEE DWGS	ALUMINUM	WHITE	DUCT MTD.	GC	GC	NAILOR	61L75C-60-4	3/4" SLOT CURVED SPIRAL DUCT, 60" LONG, 4 SLOT, SURFACE MTD FRAME, APPLIANCE WHITE FINISH, PROVIDE DAMPER EXTRACTOR.
ER-1	PERFORATED CEILING EXHAUST	12"X12"	ALUMINUM	WHITE	SURFACE MTD	GC	GC	NAILOR	4330R TYPE S	PERFORATED SUPPLY, EXTRUDED ALUMINUM FRAME, PROVIDE WITH INTEGRAL OBD.
RG-1	PERFORATED CEILING RETURN	SEE DWGS	ALUMINUM	WHITE	LAY-IN	GC	GC	NAILOR	4340RA	PERFORATED RETURN GRILLE WITH EXTRUDED FRAME
RG-2	PERFORATED CEILING RETURN	SEE DWGS	ALUMINUM	WHITE	DUCT MTD	GC	GC	NAILOR	5145H-S	DUCT MOUNTED, COUNTERSUNK SCREW HOLES, HORIZONTAL LONG BLADES, 45 DEG. DEFLECTION, 3/4" BLADE SPACING.

FAN SCHEDULE

TAG	DESCRIPTION	MANUFACTURER	MODEL NO.	AIR FLOW (CFM)	E.S.P (IN WC)	POWER (V/PH/HZ)	MOTOR HP	MOTOR RPM	WEIGHT (LBS)	SPECIFICATION
MUA-1	MAKE UP AIR FAN	HALTON	MUA-DG-1800	1792	1.5	208/3/60	2	1800	767	BELT DRIVE FAN, MOTORIZED DAMPER, NATURAL GAS DIRECT FIRED, MERV 8 DUST FILTER, HEATING INPUT: 148MBH, HEATING OUTPUT: 136MBH.
RF-1	WASHROOM EXHAUST FAN	COOK	90SQN-D	150	0.5	120/1/60	0.25	1703	100	INLINE DIRECT DRIVE EXHAUST FAN C/W OSHA GUARD AND MOTOR COVER, VIBRATION ISOLATORS, BACKDRAFT DAMPER, DISCONNECT AND STARTER.
SF-1	OUTDOOR AIR SUPPLY FAN	COOK	120SQN-D	1300	0.75	120/1/60	0.5	1725	125	INLINE DIRECT DRIVE SUPPLY FAN C/W OSHA GUARD AND MOTOR COVER, VIBRATION ISOLATORS, BACKDRAFT DAMPER, DISCONNECT AND STARTER. FAN CONNECTED TO AIR PROOFING SWITCH.
PCU-1	KITCHEN EXHAUST	HALTON	PST-3-EF-OCC-B	2108	5.16	600/3/60	5		1251	REFER TO KITCHEN EQUIPMENT SCHEDULES ON DRAWINGS M800-M803.

HOOD SCHEDULE

TAG	DESCRIPTION	MANUFACTURER	MODEL NO.	LENGTH	EXHAUST (CFM)	MAKE UP AIR (CFM)	SUPPLY (CFM)	DESIGN CFM/FT	WEIGHT (LBS)	SPECIFICATION
HD-1	KITCHEN EXHAUST HOOD	HALTON	KVE	150 INCHES	2108	1792	1687	168.64	927	SUPPLY AIR PLENUM TO BE PROVIDED. REFER TO KITCHEN EQUIPMENT SCHEDULES ON DRAWINGS M800-M803.

HEATED AIR CURTAIN SCHEDULE

TAG	DESCRIPTION	MANUFACTURER	MODEL NO.	AIRFLOW (CFM)	HEATING OUTPUT (MBH)	FLA (A)	LENGTH (INCHES)	POWER (V/PH/HZ)	WEIGHT (LBS)	SPECIFICATION
HAC-1	MAIN ENTRY AIR CURTAIN	FRICO	PA3210CED7-208V NA	1150	14/25	21	42	208/3/60	57	INSTALLATION HEIGHT MAXIMUM 10.5FT (3.2m). 3 STEP FAN, 2 ELECTRICAL HEATING STEPS, WALL BRACKET, WHITE.
HAC-2	MAIN ENTRY AIR CURTAIN	FRICO	PA3210CED7-208V NA	1150	14/25	21	42	208/3/60	57	INSTALLATION HEIGHT MAXIMUM 10.5FT (3.2m). 3 STEP FAN, 2 ELECTRICAL HEATING STEPS, WALL BRACKET, WHITE.

HEATPUMP SCHEDULE

TAG	DESCRIPTION	MANUFACTURER	MODEL NO.	AIR VOLUME (CFM)	COOLING CAPACITY (TON)	COOLING CAPACITY (BTUH)	HEATING OUTPUT (BTUH)	POWER (V/PH/HZ)	WEIGHT (LBS)	SPECIFICATION
XHP-45	EXISTING WATER-AIR HEAT PUMP	TRANE	EXHF048	1520	4	32,000	74,000	208/3/60	381	WATER FLOW RATE: 12GPM, FLUID P.D. 6.68FT, R410A REFRIGERANT, MOCP: 30, MCA: 20
XHP-46	EXISTING WATER-AIR HEAT PUMP	TRANE	EXHF048	1520	4	32,000	74,000	208/3/60	381	WATER FLOW RATE: 12GPM, FLUID P.D. 6.68FT, R410A REFRIGERANT, MOCP: 30, MCA: 20
HP-188	NEW HEAT PUMP	TRANE	EXHG060	1900	5	55,700	69,000	208/3/60	434	WATER FLOW RATE: 15GPM, FLUID P.D. 6.68FT, R410A REFRIGERANT, MOCP: 35, MCA: 22, 1HP
HP-189	NEW HEAT PUMP	TRANE	EXHG060	1900	5	55,700	69,000	208/3/60	434	WATER FLOW RATE: 15GPM, FLUID P.D. 6.68FT, R410A REFRIGERANT, MOCP: 35, MCA: 22, 1HP

SANITIZING EQUIPMENT SCHEDULE

TAG	DESCRIPTION	FURNISHED BY	INSTALLED BY	BASIS FOR DESIGN		REMARKS
				MANUFACTURER	MODEL	
BS-1	BATHROOM AIR PURIFICATION UNIT	TUV	GC	RGF ENVIRONMENTAL GROUP	BRU ASSEMBLE	SE ELECTRICAL SHEETS FOR CONNECTION INFORMATION
SH-1	HVAC AIR PURIFICATION UNIT	TUV	GC	RGF ENVIRONMENTAL GROUP	REME - HALO	SEE DETAIL 6/M700 FOR INSTALLATION INFORMATION
SI-1	ICE MACHINE TREATMENT SYSTEM	TUV	GC	RGF ENVIRONMENTAL GROUP	IMS-B-GA	SEE PLUMBING DRAWINGS FOR INSTALLATION INFORMATION

AIR BALANCING CALCULATION

	Supply Air	Return Air	Exhaust Air	Make-up Air	Subtotal
PCU-1 Hood Exhaust (CFM)	0	0	-2108	0	-2108
EF-2 Washroom Exhaust (CFM)	0	0	-150	0	-150
			Total Exhaust (CFM)		-2258
MAU-1 Make-up Air Unit (CFM)	0	0	0	1792	1792
Outdoor Air Supply fan (CFM)	1300	0	0	0	1300
Positive Pressurization required	122.85	0	0	0	122.85
				Total Supply (CFM)	1422.85
				Total MUA required (CFM):	1792
				Net Pressurization (CFM)	956.85
				Kitchen Exhaust Ventilation:	85%

PROFESSIONAL ENGINEER
PROVINCE OF
S. J. KOOIMAN
37324
2023-05-02

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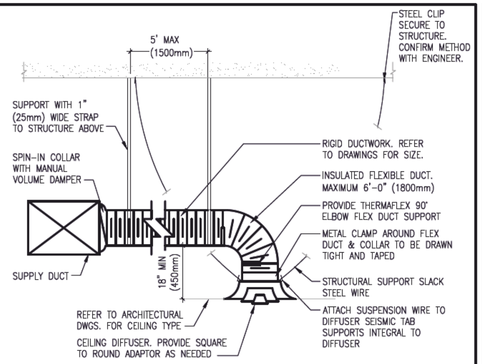
Contents:
HVAC SCHEDULES

M600

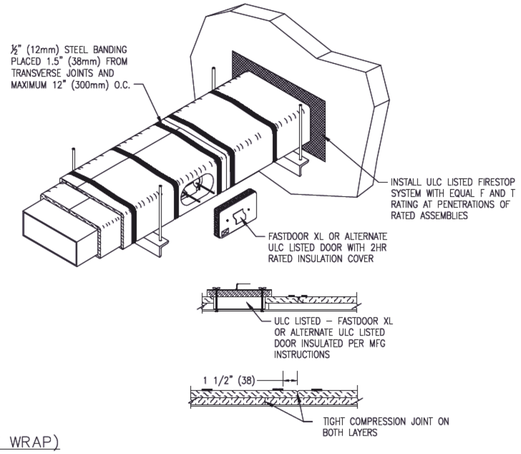


NOTE:
1. METHOD OF INSTALLATION FOR AIRTIGHT SEAL IS TYPICAL FOR ALL FLEX CONNECTIONS TO AIR DISTRIBUTION DEVICES.
2. PROVIDE SEISMIC RESTRAINT CONNECTIONS ON ALL DIFFUSERS INSTALLED IN SEISMIC ZONES.

1 M700 DIFFUSER CONNECTION DETAIL
SCALE: NTS

2 M700 RESERVED
SCALE: NTS

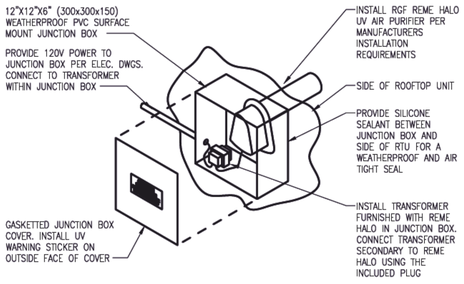
NOTE:
1. THERMAL CERAMICS FIREMASTER FASTWRAP XL IS TESTED TO ASTM E2336 AND ULC LISTED TO PROVIDE ZERO CLEARANCE TO COMBUSTIBLES AND TO PROVIDE A 1HR OR 2HR ENCLOSURE. THROUGH PENETRATIONS FIRESTOP SYSTEMS ARE TESTED IN ACCORDANCE WITH ASTM E814 (ULC 1479).
2. COMPLIANT WITH NFPA 96.
3. INSULATION APPLIED IN TWO LAYERS WITH TIGHT COMPRESSION JOINT ON BOTH LAYERS AT ALL JOINTS.
4. MINIMUM 16 GAUGE CARBON STEEL (OR 18 GAGE STAINLESS STEEL) RECTANGULAR OR ROUND GREASE EXHAUST DUCT.
5. INSTALL ULC LISTED AND LIQUID TIGHT THERMAL CERAMICS FASTDOOR XL ACCESS DOORS, OR ALTERNATE DOOR ULC LISTED PER UL1978, AT ALL CHANGES IN DIRECTION AND AT MINIMUM EVERY 20FT (6m) ON HORIZONTAL RUNS.
6. SUPPORT HANGER SYSTEMS DO NOT NEED TO BE WRAPPED PROVIDED THE HANGER RODS ARE MINIMUM ⅜" (9mm) DIAMETER AND SUPPORTS ARE MINIMUM 2"X2"X⅛" (50mmX50mmX3mm) STEEL ANGLE OR SMACNA EQUIVALENT SUPPORT SYSTEM.
7. THERMAL CERAMICS DUCT WRAP SHALL BE INSTALLED DIRECTLY ONLY THE DUCT AND APPLIED FROM THE HOOD CONNECTION TO THE CONNECTION OF THE FAN.
8. THERMAL CERAMICS DUCT ENCLOSURE SYSTEM SHALL BE INSTALLED IN STRICT ACCORDANCE WITH THE MANUFACTURERS INSTALLATION INSTRUCTIONS AND ULC LISTINGS.



3 M700 CLEARANCE REDUCTION SYSTEM (FIRE WRAP)
SCALE: NTS

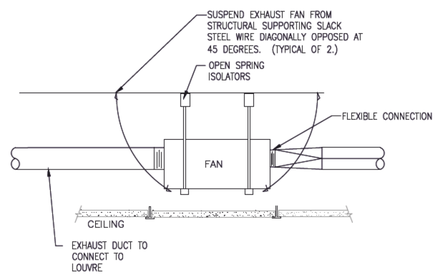
4 M700 RESERVED
SCALE: NTS

5 M700 RESERVED
SCALE: NTS

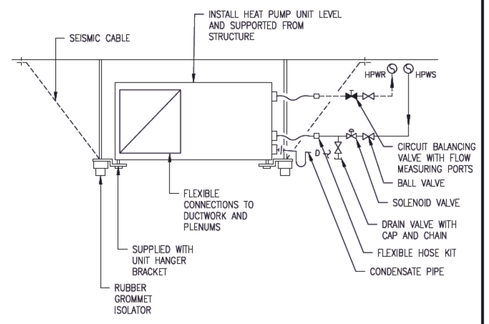


INSTALLATION LOCATION
INSTALL AIR PURIFIER WITH JUNCTION BOX ON OUTSIDE FACE OF ROOFTOP UNIT AND WITH UV LAMP TUBE EXTENDING INTO THE INTERIOR OF THE ROOFTOP UNIT. FIELD VERIFY EXACT LOCATION TO AVOID DAMAGING, TOUCHING OR INTERFERING WITH ANY RTU INTERIOR COMPONENTS. INSTALLATION LOCATION SHALL BE AS FOLLOWS:
1. TRANE: INSTALL INTO THE SUPPLY AIR STREAM THROUGH THE PANEL COVERING THE HORIZONTAL DISCHARGE SUPPLY AIR OPENING.
2. YORK: INSTALL INTO THE SUPPLY AIR PLENUM FROM THE BACK SIDE OF THE UNIT JUST ABOVE THE HEAT EXCHANGER.

6 M700 UV AIR PURIFIER INSTALLATION
SCALE: NTS



7 M700 INLINE FAN INSTALLATION
SCALE: NTS



8 M700 WATER SOURCE HEAT PUMP
SCALE: NTS

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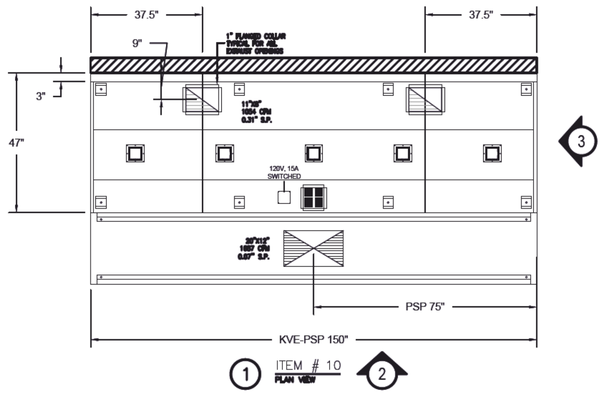
Contents:
HVAC DETAILS
(1 OF 2)

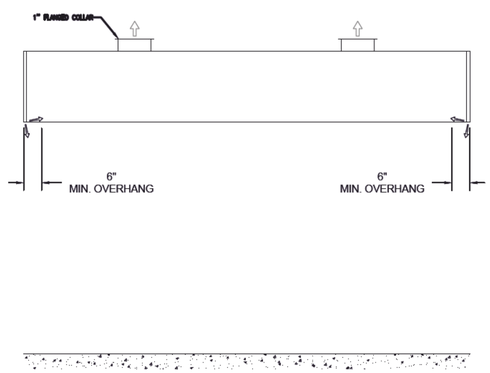
M700

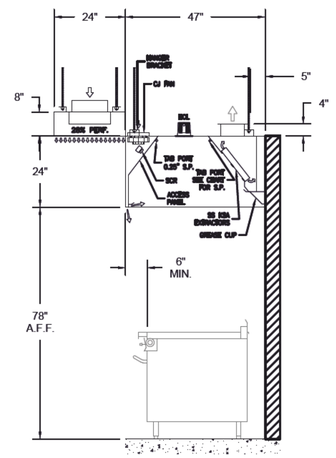
PROFESSIONAL ENGINEER
PROVINCE OF BRITISH COLUMBIA
S. J. KOOIMAN
37324
2023-05-02

HOOD INFORMATION TABLE

DIM. UNITS	HOOD NUMBER	HOOD MODEL	EXHAUST AIR FLOW REQUIREMENTS: EXHAUST AIR	T.A.B. PORT STATIC PRESSURE	TOTAL HOOD STATIC PRESSURE	EXHAUST COLLAR QTY	EXHAUST COLLAR LENGTH	EXHAUST COLLAR WIDTH	GREASE EXTRACTOR QTY	GREASE EXTRACTOR SIZE L	GREASE EXTRACTOR SIZE H	GREASE EXTRACTOR TYPE	SUPPLY AIR FLOW REQUIREMENTS: SUPPLY AIR	SUPPLY STATIC PRESSURE	SUPPLY COLLAR QTY	SUPPLY COLLAR LENGTH	SUPPLY COLLAR WIDTH	HOOD CONSTRUCTION	HOOD WEIGHT
IMPERIAL UNITS	10	KVE	2108 CFM	0.20" W.G.	0.31" W.G.	2	11"	8"	7	20"	13"	KSA	1687 CFM	0.07" W.G.	1	20"	12"	ALL 18GA. 304 S.S.	1177 lb
									0	11"	13"								
METRIC UNITS	10	KVC	995 l/s	0.050 kPa	0.077 kPa	2	279 mm	203 mm	7	508	330	KSA	796 l/s	0.017 kPa	1	508 mm	305 mm	ALL 18GA. 304 S.S.	534 kg
									0	279	330								
	TOTAL EXHAUST CFM		2108 CFM	995 l/s					TOTAL SUPPLY CFM				1687 CFM	796 l/s					







KITCHEN EXHAUST SYSTEM VENDOR DRAWINGS HAVE BEEN INCLUDED FOR REFERENCE PURPOSES ONLY. EQUIPMENT AND COMPONENTS AS DETAILED ABOVE TO BE SUPPLIED DIRECTLY BY THE OWNER FOR INSTALLATION UNDER THIS CONTRACT

GENERAL SPECIFICATIONS

1 – HOOD CONSTRUCTION AND DESIGN MEETS NFPA 96 AND UL 710 STANDARD.

2 – HOOD IS NSF AND ETL LISTED UNDER THE FOLLOWING FILE NUMBER: ETL #10314320-NSF-001

3 – ALL INSTALLATION WORK IS TO BE PERFORMED BY QUALIFIED PERSONS AND IN ACCORDANCE WITH STATE AND LOCAL BUILDING CODE REQUIREMENTS.

4 – THE INSTALLATION SHALL BE IN ACCORDANCE WITH NFPA 96, REMOVAL OF SMOKE AND GREASE LADEN VAPORS FROM COMMERCIAL COOKING EQUIPMENT.

5– ALL EXHAUST DUCTWORK AND TRANSITIONS ARE TO BE PROVIDED BY THE HVAC CONTRACTOR.

6 – CLEARANCE FROM HOOD AND DUCTS TO COMBUSTIBLE MATERIAL SHALL BE PER APPLICABLE BUILDING CODES.

7 – FOR PROPER OPERATION OF THE HOOD SYSTEM, IT IS THE RESPONSIBILITY OF THE GENERAL CONTRACTOR TO HAVE THE HOOD BALANCED AND TESTED TO ENSURE THAT THE EXHAUST AND SUPPLY REQUIREMENTS OF THE HOOD ARE MET.

INSTALLATION REQUIREMENTS

KITCHEN EQUIPMENT CONTRACTOR'S REQUIREMENTS

1– PROVIDE DRAWINGS TO APPROPRIATE TRADES REFERENCING UTILITY SERVICE AND COORDINATE FINAL CONNECTION.

2 – DELIVER, ASSEMBLE AND INSTALL HALTON SYSTEM PER DRAWING.

3 – FURNISH WIRING AND PLUMBING DIAGRAMS TO END USER.

4 – THE K.E.C MUST INFORM HALTON OF ANY CHANGES IN EQUIPMENT OR BUILDING STRUCTURE. FIELD MODIFICATIONS ARE THE RESPONSIBILITY OF THE K.E.C.

5 – IF HALTON MANUAL EXHAUST VOLUME DAMPERS ARE PROVIDED, THE K.E.C. IS RESPONSIBLE FOR THEIR INSTALLATION OR TO MAKE ARRANGEMENTS WITH OTHER TRADES FOR THEIR INSTALLATION.

6 – IF HALTON MODEL WHI BACKSHELF STYLE HOODS ARE PROVIDED, THE K.E.C. IS RESPONSIBLE FOR THE INSTALLATION OF THE CAPTURE-JET FAN.

ELECTRICAL CONTRACTOR'S REQUIREMENTS

1– PROVIDE AND CONNECT ALL REQUIRED VOLTAGES, CONNECTORS, WIRING, CONDUIT, ETC., PER NEC AND ALL APPLICABLE LOCAL CODES.

ELECTRICAL EQUIPMENT REQUIREMENTS

FLUORESCENT LIGHT FIXTURE
40 WATT MAX BULB = 0.67 AMP EACH

RECESSED INCANDESCENT LIGHT FIXTURE
150 WATT MAX BULB = 1.25 AMP EACH

GLOBE INCANDESCENT LIGHT FIXTURE
100 WATT MAX BULB = 0.83 AMP EACH

HCL LIGHT FIXTURES = 0.12 AMP EACH

CAPTURE JET FAN = 0.72 AMP EACH

ALL HOOD CIRCUITS ARE NOT TO EXCEED 15 AMP
NOTE: LIGHT BULBS/LAMPS, IF REQUIRED, ARE NOT PROVIDED BY HALTON

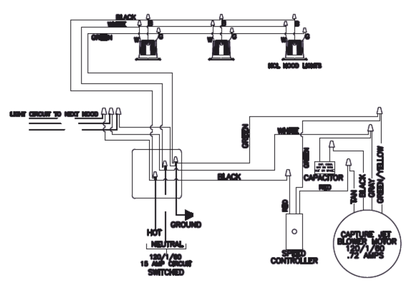
CEILING HEIGHT NOTE

IF HALTON COMPANY IS TO PROVIDE CEILING CLOSURE PANELS, THE EXACT DIMENSION OF THE FINISHED CEILING HEIGHT MUST BE PROVIDED PRIOR TO RELEASE.

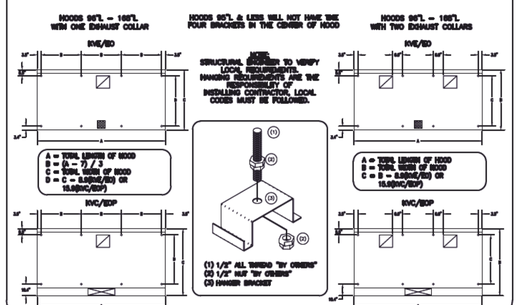
FINISHED CEILING HEIGHT A.F.F.: _____

Typical wiring of HCL Lights with Capture-Jet fan

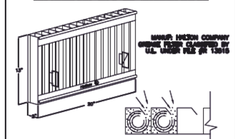
BY HALTON
BY ELECTRICIAN
REMOTE SWITCH PANEL BY OTHERS



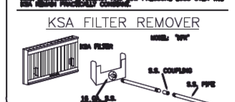
HANGER BRACKET LAYOUT



KSA GREASE EXTRACTOR



KSA FILTER REMOVER



PERFORMANCE CRITERIA

OTHER MANUFACTURERS WISHING TO OFFER AN ALTERNATE TO THE SPECIFIED MANUFACTURER MUST APPLY FOR PERMISSION TO DO SO IN WRITING FROM THE OFFICE OF THE SPECIFYING CONSULTANT. APPLICATION MUST BE RECEIVED BY THE CONSULTANT AT LEAST TEN WORKING DAYS PRIOR TO THE BID DATE. ANY ALTERNATE SYSTEM MUST MEET CONSTRUCTION AND PERFORMANCE REQUIREMENTS AND EFFICIENCIES AS OUTLINED IN THIS SPECIFICATION.

REQUESTS FOR APPROVAL MUST INCLUDE GREASE FILTRATION PERFORMANCE DATA (MICRON SIZE VS. EXTRACTION EFFICIENCY) AND MANUFACTURERS OWN EXHAUST AIR FLOW CALCULATIONS BASED ON THE CONSECTIVE HEAT LOAD OF COOKING EQUIPMENT BENEATH THE HOOD.

EFFICIENCY COMPARISON DATA TO BE PERFORMED IN ACCORDANCE WITH THE MOST CURRENT ASHRAE STANDARD F1704 AND INCLUDE RESULTS FOR THE REQUIRED CAPTURE AND CONTAINMENT EXHAUST AIR FLOW IN ACCORDANCE WITH THE "BEST METHOD TO DETERMINE THE THRESHOLD OF CAPTURE AND CONTAINMENT." DATA MUST INCLUDE THERMAL IMAGING RESULTS VALIDATING CONFORMANCE TO ASHRAE F1704 AND SUPPLY AIR TEMPERATURE REQUIREMENT OF 74°F.

MAKE UP AIR WILL BE CALCULATED SO THAT THE SAME AMOUNT OF AIR WILL BE TAKEN FROM THE ZONE AS IS REQUIRED BY THE SPECIFIED SYSTEM. AN ADDITIONAL LOAD CANNOT BE PLACED ON THE KITCHEN HVAC SYSTEM.

MANUFACTURER MUST PROVIDE A WRITTEN GUARANTEE OF PERFORMANCE, ENSURING THE SPECIFYING ENGINEER THAT THE SYSTEM WILL PERFORM TO THE ENGINEER'S SATISFACTION WHEN INSTALLED AND BALANCED ACCORDING TO DESIGN AIR FLOWS
AND RESULTS OF ASHRAE STANDARD F1704 TEST. (AS DETERMINED BY THE PORTS AND PRESSURE VS. AIR FLOW CURVE.) CONSULTANT RESERVES THE RIGHT TO REJECT ANY SYSTEM WHICH, WHEN INSTALLED, DOES NOT PROVIDE CAPTURE AND CONTAINMENT AT THE THRESHOLD FLOW RATE DETERMINED
IN ASHRAE F1704. REJECTED SYSTEM MUST BE REPLACED WITH SPECIFIED SYSTEM, WITH ALL REPLACEMENT COSTS PAID BY MANUFACTURER OF REJECTED SYSTEM.

ANY CHANGES IN THE SPECIFIED SIZING OF POWER WIRING, FAN SIZE, HOUSEKEEPING
TO THE USE OF ANY S
SPECIFIED IS THE RES
MANUFACTURER, AND I
MANUFACTURER AND C

PROFESSIONAL ENGINEER
PROVINCE OF BRITISH COLUMBIA
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Project No.

Contents:

KITCHEN EXHAUST SYSTEM DETAILS 1OF4

M800

MODEL #
PST-3-EF-OCC-B

ELECTRICAL (BY OTHERS)					
SYSTEM CONTROL (BY MANUFACTURER)				FAN CONTROL (BY MANUFACTURER)	
AMPS	VOLTS/HZ/PH	ENCLOSURE	WEIGHT (LBS)	TYPE (MOTOR STARTER/VFD)	BACNET
15	120/60/1	NEMA 1	85	VFD	YES

NOTE:
COLOR SHALL BE TIGER DRYLAC
RAL 5015 - 049/41477

POLLUSTOP SYSTEMS INSTALLATION CLEARANCES

SERVICE ACCESS SIDE: 42" CLEARANCE (REQUIRED):
ACCESS SIDE MUST BE SPECIFIED AS LEFT or RIGHT FROM THE INLET END OF THE UNIT.
ALLOWS SERVICING (i.e. REMOVAL OF 24"x24" FILTERS, UP TO 30" LONG EXPOSED CHILD AND/OR CARBON ACCESS DOORS).

OPPOSITE SIDE FROM ACCESS (PER CODE):
- OTHER SIDES TO COMBUSTIBLE/NON COMBUSTIBLE CONSTRUCTION = 18 Inches.
- WHEN FIRE SYSTEM IS PRESENT 36" TO CONSTRUCTION IS REQUIRED ON SIDE OF CARBON THAT FIRE SYSTEM IS MOUNTED ON.

NOTE: POLLUSTOP UNIT IS CLASSIFIED AS AN "ACCESSORY" TO THE SYSTEM ENCLOSURE.

TOP: 26" CLEARANCE (RECOMMENDED):
NOTE: ALLOWS PROPER REMOVAL OF PREFILTER/FINAL/HEPA PANELS, JUNCTION BOX AND SWITCHES ON TOP OF FILTER SECTION.

NOTE: THE POLLUSTOP SYSTEM MUST CONTROL THE EXHAUST FAN VFD. IT WILL NOT FUNCTION WITH ANY DEMAND CONTROL VENTILATION SYSTEM OTHER THAN HALTON'S MARVEL SYSTEM.

SHOP NOTE: BUILD PER U.L. CONSTRUCTION METHODS

NOTE: CONFIRM DATA CHART
NOTE: CONFIRM LEFT HAND ACCESS

P3 MODULE CHART		
FAN SECTION		
DATA	IMPERIAL	METRIC
Max. Exhaust Air	3000 CFM	1416 l/s
Design Exhaust Air	2108 CFM	995 l/s
Total Internal S.P.	5.16" W.G.	1.283 kpa
+Hood Static	0.31 W.G.	0.077 kpa
+Duct & other External Static	TBD W.G.	kpa
= Total External S.P.	TBD W.G.	kpa
Total External S.P. with 10% safety	TBD W.G.	kpa
Total System S.P. (supplied via field system balance)	TBD W.G.	kpa
Motor	TBD hp	kw
Power	TBD bhp	kw
Full Load AMPS	TBD	
Min Circuit AMPS (MCA)	TBD	
Motor Over Current Protection (MOCP)	TBD	
Watts (W)	TBD	
Motor RPM	TBD	
Voltage	TBD	
Phase	TBD	
Fan RPM	TBD	
Mounting	INTERIOR/ SUSPENDED	
Blower Model	ATZAF 12-12-FF-T2 DWDI	

FILTERS		
ELF FILTER	1	ELF BAG FILTER: 4 POCKET (HALF), 95%, UL 900, CLASS 1
	1	ELF BAG FILTER: 8 POCKET (FULL), 95%, UL 900, CLASS 1
FINAL FILTER	1	MERV 16 (HALF 24X12X12)
	1	MERV 16 (FULL 24X24X12)
HEPA FILTER	0	99.99% @ 0.3 MICRON (HALF 24X12X12)
	0	99.99% @ 0.3 MICRON (FULL 24X24X12)
CARBON CARTRIDGE	0	CARBON FILTER: ACTIVATED CARBON (HALF 24X12X12)
	0	CARBON FILTER: ACTIVATED CARBON (FULL 24X24X12)
CARBON PANEL	11	CARBON PANEL: ACTIVATED CARBON (HALF 12X24X1)
	11	CARBON PANEL: ACTIVATED CARBON (FULL 24X24X1)

Access to interior components of this module is from the Left Side of the unit (when looking into the First Module of the complete assembly)

3000 CFM MODULES			
	MODULE	WEIGHT LBS	WEIGHT KG
✓	ELF & FINAL FILTER	465	211
	HEPA FILTER		
	ODOR SPRAY		
	CARBON CARTRIDGE		
✓	2" CARBON PANELS	698	317
✓	2" CARBON PANELS	698	317
✓	FAN/BLOWER	895	406
	ATTENUATOR		
	TOTAL UNIT WEIGHT	2756	1251

ITEM #PCU-1

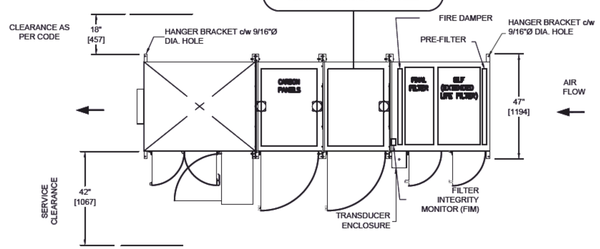
UNIT TO BE CONSTRUCTED TO UL8782 STANDARDS

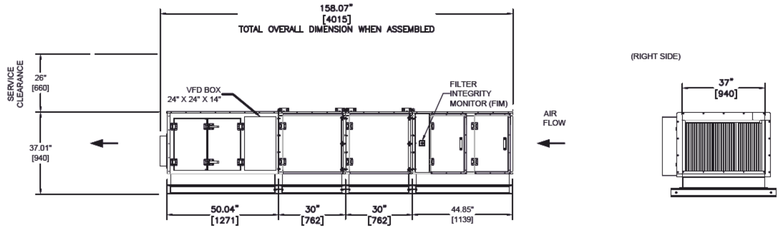
NOTE:
THE POLLUSTOP UNIT WILL SHIP IN (4) MODULES. REFERENCE THE O&M MANUAL FOR INSTALLATION INSTRUCTIONS.

SHOP NOTE:
COMES WITH CARBON TRAYS FOR ONLY (1)SECTION. 2ND CARBON SECTION TO BE EMPTY (FOR FUTURE USE)

LH FILTER ELF/FINAL SECTION/2" CARBON V-BANK ODOR SECTION/ INTERIOR FAN SECTION

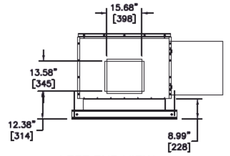
SHOP NOTE:
2ND CARBON MODULE TO INCLUDE ALUMINIUM TRACKS, NOT PANELS





FAN CARBON CARBON FILTER

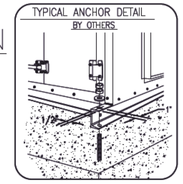
LEFT HAND ACCESS SIDE ELEVATION

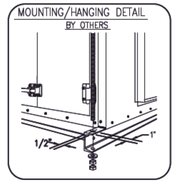


LEFT END VIEW

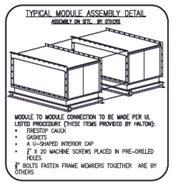
(RIGHT SIDE)

RIGHT END VIEW





INDOOR APPLICATION



GENERAL NOTES:
1) FURNISHED AS SHOWN EXCEPT CARBON PANELS (IF REQUIRED) ARE SHIPPED IN BOXES. DO NOT UNPACK UNTIL READY FOR OPERATION.
2) THIS EQUIPMENT CONFORMS TO NFPA 96 AND IS LISTED TO UL 8782, ULC S647 & ANSI/UL 867.
3) UNIVERSAL LUGS MAY BE USED FOR RIGGING OR ANCHORING TO THE FLOOR, PAD OR MEZZANINE. UNIVERSAL LUGS MAY ALSO BE USED FOR OVERHEAD SUSPENSION.
4) FAILURE TO PROVIDE SAFE AND CONVENIENT ACCESS TO THIS EQUIPMENT, AS SHOWN ON THESE DRAWINGS OR OPERATING THIS EQUIPMENT PRIOR TO COMMISSIONING BY A FACTORY AUTHORIZED TECHNICIAN, VOIDS THE MANUFACTURERS' WARRANTY.
5) A LISTED FIRE SYSTEM SHALL BE FACTORY PRE PIPED USING DETECTORS AND NOZZLES AS INSTRUCTED BY THE MANUFACTURER. FIELD CONNECTIONS, TANKS, CONTROLS, COMMISSIONING BY OTHERS ON SITE. THE AHJ MAY REQUIRE OTHER PROTECTION.
6) INSTALLATION MUST COMPLY WITH ALL REQUIREMENTS OF INTERNATIONAL, NATIONAL AND LOCAL CODES.

ELECTRICAL WIRING NOTES:
1) ELECTRICAL SHOWN WITH BROKEN LINES (- - -) TO BE FURNISHED AND FIELD INSTALLED BY THE CONTRACTOR.
2) ALL COMPONENTS SHOWN WITH SOLID LINES ARE FACTORY FURNISHED, FOR FIELD INSTALLATION BY THE CONTRACTOR.
3) POLLUSTOP CONTROL PANEL TO BE INSTALLED INDOORS AND OR IN A FREEZE PROOF AREA WHICH ALLOWS FOR OPERATOR MONITORING AND ANY REQUIRED SERVICE.

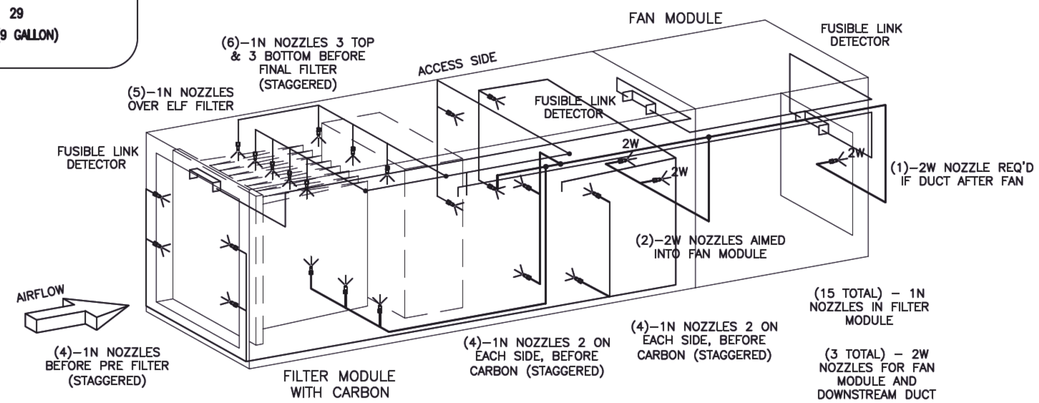
SYSTEM CONTROL
1) PANEL SHALL BE FURNISHED ASSEMBLED AND INTERNALLY PRE WIRED, CONSISTING OF PLC, RELAYS, CIRCUIT BREAKERS, FUSES, ON-OFF DISCONNECT AND E-STOP SWITCH.
2) PANEL SHALL CONTAIN HINGED, FRONT ACCESS DOOR WITH SINGLE POINT LATCHING SYSTEM.

FLOW POINT CHART

ANSUL R-102 FLOW POINT CALCULATION

NOZZLE TYPE	NOZZLE FLOW PT.	NOZZLE QUANTITY	TOTAL FLOW PT.
2W	2	3	6
1N	1	23	23
TOTAL FLOW POINTS USED			29
MAX. SYSTEM FLOW POINTS:			36 (9 GALLON)

PRE-PIPE ONLY



LH ACCESS

KITCHEN EXHAUST S
DRAWINGS HAVE BEE
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FOR INSTALLATION U

PROFESSIONAL ENGINEER
PROVINCE OF
S. J. KOOIMAN
37924
2023-05-02

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1	18/APR/23	BP/TENDER	PE

REVISION SCHEDULE

Rev	Date	Description	By

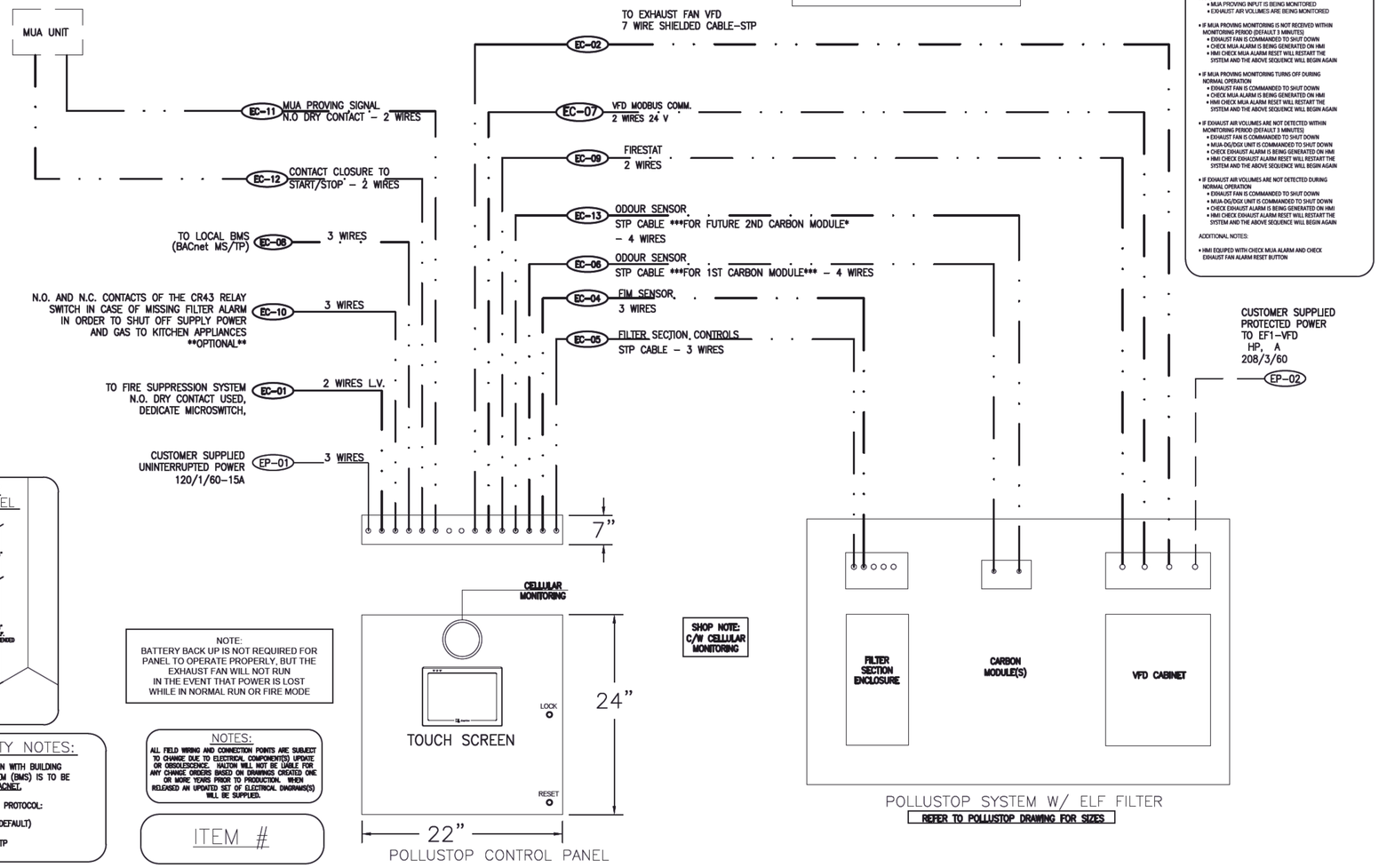
Drawn: Checked:

Project No.

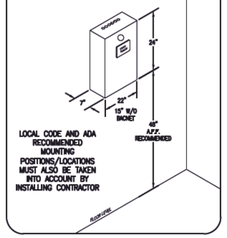
Contents:
KITCHEN EXHAUST SYSTEM DETAILS 2OF4

M801

KITCHEN EXHAUST SYSTEM VENDOR DRAWINGS HAVE BEEN INCLUDED FOR REFERENCE PURPOSES ONLY. EQUIPMENT AND COMPONENTS AS DETAILED ABOVE TO BE SUPPLIED DIRECTLY BY THE OWNER FOR INSTALLATION UNDER THIS CONTRACT



POLLUSTOP CONTROL PANEL



CONNECTIVITY NOTES:

- IF COMMUNICATION WITH BUILDING MANAGEMENT SYSTEM (BMS) IS TO BE VIA BACNET,

CONFIRM COMMUNICATION PROTOCOL:

- ☐ BACNET IP (DEFAULT)
- ☒ BACNET MS/TP

NOTE:
BATTERY BACK UP IS NOT REQUIRED FOR PANEL TO OPERATE PROPERLY, BUT THE EXHAUST FAN WILL NOT RUN IN THE EVENT THAT POWER IS LOST WHILE IN NORMAL RUN OR FIRE MODE

NOTES:
ALL FIELD WIRING AND CONNECTION POINTS ARE SUBJECT TO CHANGE DUE TO ELECTRICAL COMPONENT(S) UPDATE OR OBSOLESCENCE. HALTON WILL NOT BE LIABLE FOR ANY CHANGE ORDERS BASED ON DRAWINGS CREATED ONE OR MORE YEARS PRIOR TO PRODUCTION. WHEN RELEASED AN UPDATED SET OF ELECTRICAL DIAGRAMS(S) WILL BE SUPPLIED.

ITEM #

SEQUENCE OF OPERATIONS DOUBLE INTERLOCK FOR MUA–DG

TOUCH SCREEN ON/OFF BUTTON – "ON" POSITION (RUN MODE)

- **EXHAUST FAN ON**
- **HALTON DIRECT GAS FIRED UNIT ON**
  - MUA PROVING INPUT IS BEING MONITORED
  - EXHAUST AIR VOLUMES ARE BEING MONITORED
- IF MUA PROVING MONITORING IS NOT RECEIVED WITHIN MONITORING PERIOD (DEFAULT 3 MINUTES)
  - EXHAUST FAN IS COMMANDED TO SHUT DOWN
  - CHECK MUA ALARM IS BEING GENERATED ON HMI
  - HMI CHECK MUA ALARM RESET WILL RESTART THE SYSTEM AND THE ABOVE SEQUENCE WILL BEGIN AGAIN
- IF MUA PROVING MONITORING TURNS OFF DURING NORMAL OPERATION
  - EXHAUST FAN IS COMMANDED TO SHUT DOWN
  - CHECK MUA ALARM IS BEING GENERATED ON HMI
  - HMI CHECK MUA ALARM RESET WILL RESTART THE SYSTEM AND THE ABOVE SEQUENCE WILL BEGIN AGAIN
- IF EXHAUST AIR VOLUMES ARE NOT DETECTED WITHIN MONITORING PERIOD (DEFAULT 3 MINUTES)
  - EXHAUST FAN IS COMMANDED TO SHUT DOWN
  - MUA-DG/DGX UNIT IS COMMANDED TO SHUT DOWN
  - CHECK EXHAUST ALARM IS BEING GENERATED ON HMI
  - HMI CHECK EXHAUST ALARM RESET WILL RESTART THE SYSTEM AND THE ABOVE SEQUENCE WILL BEGIN AGAIN
- IF EXHAUST AIR VOLUMES ARE NOT DETECTED DURING NORMAL OPERATION
  - EXHAUST FAN IS COMMANDED TO SHUT DOWN
  - MUA-DG/DGX UNIT IS COMMANDED TO SHUT DOWN
  - CHECK EXHAUST ALARM IS BEING GENERATED ON HMI
  - HMI CHECK EXHAUST ALARM RESET WILL RESTART THE SYSTEM AND THE ABOVE SEQUENCE WILL BEGIN AGAIN

ADDITIONAL NOTES:

- HMI EQUIPED WITH CHECK MUA ALARM AND CHECK EXHAUST FAN ALARM RESET BUTTON

POLLUSTOP – SYSTEM SCOPE OF WORK

RESPONSIBILITY TO BE SELECTED BY GENERAL CONTRACTOR

DEFINITIONS FOR REFERENCE:

POLLUSTOP SYSTEMS = 1 EXHAUST FAN SERVING MULTIPLE KITCHEN HOODS OR ONE HOOD ONLY
VFD = VARIABLE FREQUENCY DRIVES

CONNECTION LOCATIONS WILL VARY PER SYSTEM, REFER TO HALTON MARVEL DIAGRAMS FOR SPECIFICS

1. APPLICABLE CONTRACTOR IS RESPONSIBLE FOR THE INSTALLATION OF THE POLLUSTOP CONTROL PANEL. LOCATION TO BE DETERMINED BY GC AND SHALL BE WITHIN SAME SPACE AS THE KITCHEN HOODS BEING SERVED BY PANEL.
2. APPLICABLE CONTRACTOR TO SUPPLY AND INSTALL 120V (15A) DEDICATED CIRCUIT AT POLLUSTOP CONTROL PANEL
3. APPLICABLE CONTRACTOR TO SUPPLY AND INSTALL RJ45 CAT5E CABLE CONNECTION AT POLLUSTOP CONTROL PANEL FOR SYSTEMS FOR L.P. ADDRESS IF APPLICABLE
4. APPLICABLE CONTRACTOR TO SUPPLY AND INSTALL 120V (15AMP) DEDICATED CIRCUIT AT ODOR CONTROL UNIT
5. APPLICABLE CONTRACTOR TO SUPPLY AND INSTALL 120V (15AMP) DEDICATED CIRCUIT AT VFD CABINET FOR COOLING FAN POWER FEED
6. APPLICABLE CONTRACTOR TO SUPPLY AND INSTALL THREE PHASE OR SINGLE PHASE POWER FEED FROM CIRCUIT BREAKER(S) TO VFD(S). APPLICABLE CONTRACTOR TO SUPPLY AND INSTALL THREE PHASE OR SINGLE PHASE POWER FROM VFD(S) TO EXHAUST / MUA (IF APPLICABLE) MOTORS, IF POLLUSTOP IS EXTERIOR TYPE. ALL TO BE RAN IN SEPARATE CONDUIT.
7. APPLICABLE CONTRACTOR TO SUPPLY AND RUN 2 WIRE 5 V DC WIRING FROM ANSUL FIRE SYSTEM TO POLLUSTOP CONTROL PANEL .
8. APPLICABLE CONTRACTOR TO SUPPLY AND RUN 4 WIRE STP PLENUM RATED CABLE FOR MUA SIGNAL START/STOP FROM CONTROL PANEL TO BMS OR DDC PANEL.
9. APPLICABLE CONTRACTOR TO SUPPLY AND RUN 8 WIRE STP PLENUM RATED CABLE (OR TWO CABLES 4 WIRE STP FROM POLLUSTOP CONTROL PANEL TO EXHAUST FAN VFD UNIT AND CABINET SUPPLIED BY HALTON UNLESS OTHERWISE NOTED)
10. APPLICABLE CONTRACTOR IS RESPONSIBLE FOR THE INSTALLATION OF THE VFD CABINET, ONLY IF POLLUSTOP IS EXTERIOR TYPE, LOCATION TO BE DETERMINED BY GC AND SHALL BE WITHIN 50 FEET MAX DISTANCE FROM EXHAUST FAN(S) IF VOLTAGE IS 575 V. IF VOLTAGE IS 208 V , MAX. DISTANCE SHELL BE 150 FT
11. APPLICABLE CONTRACTOR TO SUPPLY AND RUN 4 WIRE 24V AC WIRING FROM POLLUSTOP CONTROL PANEL TO VFD CABINET. TWO WIRES ARE FOR COOLING FAN OPERATION CONTROL AND TWO WIRES ARE FOR FIRESTAT CONNECTION.
12. APPLICABLE CONTRACTOR TO SUPPLY AND RUN 6 WIRE STP PLENUM RATED CABLE FROM POLLUSTOP CONTROL PANEL TO ELECTRICAL ENCLOSURE OF THE FILTER SECTION MOUNTED AT POLLUSTOP UNIT
13. APPLICABLE CONTRACTOR TO SUPPLY AND RUN 3 WIRE 24V AC WIRING FROM POLLUSTOP CONTROL PANEL IN ORDER TO SHUT OFF POWER SUPPLY AND GAS IN CASE OF MISSING FILTER AT POLLUSTOP (APPLIES FOR CANADA ONLY)
14. APPLICABLE CONTRACTOR TO SUPPLY AND RUN 4 WIRE 24V AC & DC WIRING FROM POLLUSTOP CONTROL PANEL TO POLLUSTOP ODOR CONTROL CABINET. TWO WIRES 24 VAC ARE FOR COMPRESSOR OPERATION AND TWO WIRES 24 VDC ARE FOR LOW SOLUTION LEVEL ALARM.
15. HALTON REPRESENTATIVE TO PERFORM FINAL FIELD COMMISSIONING ONCE ALL RESPONSIBILITIES ARE COMPLETED ABOVE.

ELECTRICAL CONNECTION SCHEDULE

	POWER CONNECTIONS :
EP–01	120V, 30 AMP – POLLUSTOP CONTROL PANEL POWER – 3 WIRES
EP–02	HIGH VOLTAGE POWER FROM BUILDING SOURCE TO VFD

	CONTROLS CONNECTIONS :
EC–01	2 WIRES – TO N.O. CONTACT OF FIRE SYSTEM MICROSWITCH
EC–02	7 WIRE STP CABLE 22–8 – PLENUM RATED FT6 – TO EF VFD
EC–03	N/A
EC–04	3 WIRE STP CABLE – FT6 RATED – FOR FIM SENSOR
EC–05	3 WIRE STP CABLE – FT6 RATED – TO FILTER SECTION
EC–06	4 WIRES FOR ODOR MONITOR
EC–07	VFD MODBUS COMMUNICATION
EC–08	FOR TO BMS(MS/TP) (FUTURE) – 3 WIRES
EC–09	2 WIRES – FIRESTAT SIGNAL
EC–10	3 WIRES – MISSING FILTER SIGNAL FOR END USER PURPOSES
EC–11	2 WIRES – MUA PROVING SIGNAL (DRY CONTACT)
EC–12	CONTACT CLOSURE TO START/STOP MUA
EC–13	4 WIRES FOR ODOR MONITOR (2ND CARBON)

SEQUENCE OF OPERATION:

TOUCH SCREEN ON/OFF BUTTON – "ON" POSITION (RUN MODE)

- EXHAUST FAN ON ("SET POINT" FLOW RATE)
- DRY CONTACT FOR MAKE UP AIR WILL CLOSE
- EXHAUST FAN WILL MAINTAIN CONSTANT AIRFLOW THROUGH VFD SPEED CHANGE RELATED TO STATIC PRESSURE CHANGE
- EXHAUST FAN WILL SHUT DOWN IN CASE OF MISSING FILTER(S)

FIRE MODE

- EXHAUST FAN IS ON AT 100 % IN A FIRE MODE
- MUA FAN IS OFF

NOTES:
ALL WIRING AND CABLING TO BE PROVIDED BY ELECTRICAL CONTRACTOR UNLESS STATED OTHERWISE

NOTES:
ALL POLLUSTOP FAN MOTORS MUST BE COMPATIBLE TO WORK WITH VFD'S

FIELD WIRING NOTES:

- FIELD WIRING - 120V - 12AWG MIN.-10AWG MAX. (BY G.C.'S ELECTRICIAN)
- FIELD WIRING - BUILDING SOURCE VOLTAGE - AWG VARIES (BY G.C.'S ELECTRICIAN)
- FIELD WIRING - APPLIANCE VOLTAGE - AWG VARIES (BY G.C.'S ELECTRICIAN)
- FEILD WIRING - 24V - 22 AWG MIN. - 16 AWG MAX. (BY G.C.'S CONTROLS CONTRACTOR)
- FIELD WIRING - 24V - CAT5E (BY G.C.'S CONTROLS CONTRACTOR)

TOUCH SCREEN ALARM CONDITIONS:

1. ELF BAG FILTER CLOGGED
2. ELF BAG FILTER MISSING
3. FINAL FILTER CLOGGED
4. FINAL FILTER MISSING
5. FIRE
6. CHANGE FILTERS
7. LOW ODOR CONTROL LEVEL
8. FAN FAILED

TOUCH SCREEN DISPLAY SCREEN APPLICATIONS:

1. FILTER
   - FAN SPEED
   - ELF FILTER LIFE REMAINING
   - FINAL FILTER LIFE REMAINING
2. ODOR CONTROL
   - OFF/CYCLE/CONTINUOUS
   - ON TIME SETTING
   - OFF TIME SETTING
3. CALIBRATE
4. ALARMS
5. TECH SUPPORT

(refer manual for details)

PROFESSIONAL ENGINEER PROVINCE OF S. J. KOOIMAN # 37924 ONTARIO
2023-05-02

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Contents:

KITCHEN EXHAUST SYSTEM DETAILS 3OF4

M802

MUA CHART

DATA	IMPERIAL
Model	MUA-DG-1800
Max. Supply Air	1800 CFM
Design Supply Air	1792 CFM
Internal S.P.	1.30" W.G.
External S.P.	1.50"(confirm) W.G.
Total S.P.	2.80" W.G.
Motor HP	2.00 hp
Fan BHP	1.38 bhp
Full Load AMPS	7.00
Motor RPM	1800
Voltage/Phase/HZ	208/3/60
Fan RPM	1722 @ 60 HZ
Mounting	Interior
Blower Model	ATLI 9 -7 T2
Material Type	G90 Galv. 20GA.
Paint Color	Unpainted
Weight	767 lbs

HEATING INFORMATION

Gas Type	Natural
Min. Gas Pressure	8" W.C.
Max. Gas Pressure	14" W.C.
Gas Line Size	1/2"
Discharge Temperature	70.0°F
Temperature Rise	70.2°F
Heat Input MBH	148
Heat Output MBH	136

UNIT FEATURES

Drive Package:
- ✓ Belt Drive Fan (Comefri ATLI)
- Direct Drive Plenum Fan (Comefri ANPA)

Insulation:
- ✓ 1" Duct Board
- No Insulation

Remote start/stop Controls (fan)

Isolators:
- ✓ Neoprene
- Seismic

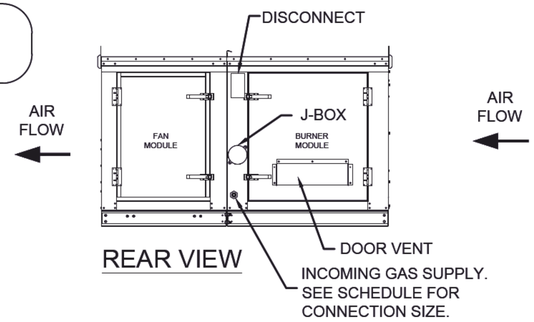
Intake Damper:
- Motorized
- ✓ Gravity

Gas Train:
- Piloted
- ✓ Direct Spark

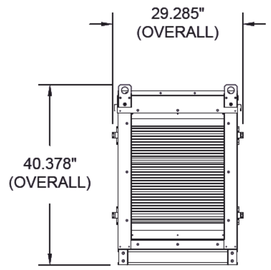
MERV 8 Filtered Intake (Dust Filter)

LCD Remote Display Unit:
- ✓ D.A.T. Control
- Space Temp Control

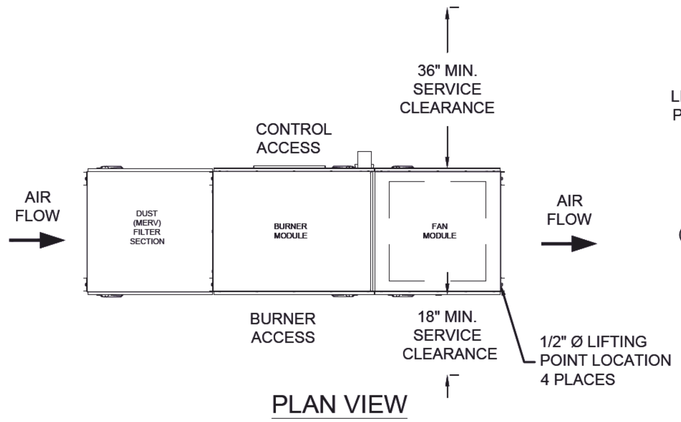
ITEM # MUA–1



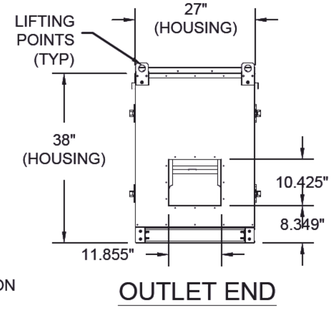
REAR VIEW



INLET VIEW



PLAN VIEW

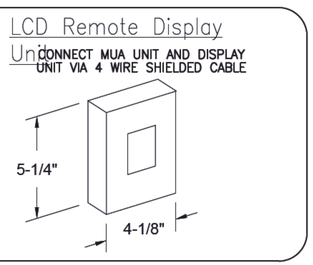


OUTLET END

NOTE:
LIFTING POINTS ARE NOT TO BE USED AS ANCHORS FOR SUSPENDED MOUNTING. THEY ARE FOR LIFTING ONLY

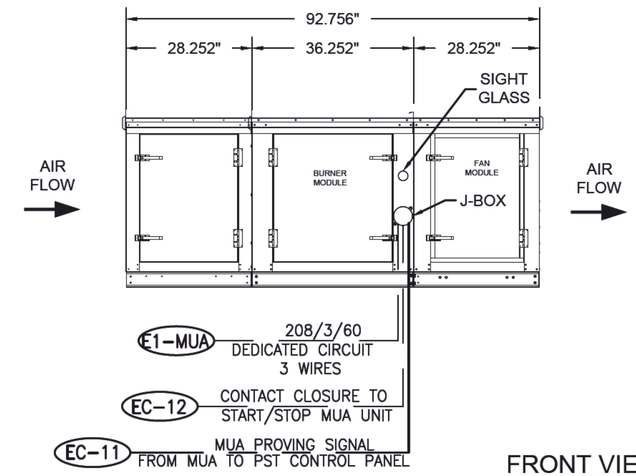
MATERIALS FOR SUSPENDING UNIT TO BE PROVIDED AND INSTALLED IN THE FIELD BY OTHERS

LCD Remote Display Unit



ELECTRICAL SCHEDULE

CONNECTION #	CONNECTION DESCRIPTION	FROM	TO
E1–MUA	208/3/60 – FAN MOTOR POWER – 3 WIRES	BUILDING SOURCE	J–BOX
EC–12	CONTACT CLOSURE TO START/STOP MUA UNIT	PST CONTROL PANEL	MUA UNIT
EC–11	MUA PROVING SIGNAL	MUA UNIT	PST CONTROL PANEL



FRONT VIEW

KITCHEN EXHAUST SYSTEM VENDOR DRAWINGS HAVE BEEN INCLUDED FOR REFERENCE PURPOSES ONLY. EQUIPMENT AND COMPONENTS AS DETAILED ABOVE TO BE SUPPLIED DIRECTLY BY THE OWNER FOR INSTALLATION UNDER THIS CONTRACT

SPECIFICATIONS

GAS INFORMATION
MIDCO 6" SS BURNER
PRESSURE REGULATOR REQUIRED - SEE RATING PLATE
RTC GAS CONTROLS
DISCHARGE TEMPERATURE DIAL MOUNTED IN UNIT
HIGH TEMP LIMIT SWITCH SET TO 140°F

ELECTRICAL INFORMATION
208V / 3PH / 60Hz SUPPLY
INTEGRAL NON-FUSED DISCONNECT SWITCH
PREMIUM EFFICIENCY MOTOR
INTEGRAL MOTOR STARTER WITH THERMAL OVERLOADS
FIRE PROTECTION INTERLOCK
REMOTE START/STOP
50% MUA TURN DOWN

EQUIPMENT SPECIFICATIONS
ENTERING AIR THERMOSTAT/LOW TEMPERATURE CUTOUT
EXTERNAL PROFILE ADJUSTMENT WITH PRESSURE GAUGE
GALVANIZED FINISH
0" CLEARANCE ON TO
UNIT SHIPS ASSEMBL
1" CLEARANCE TO CO
LISTED 18" FROM CO

PROFESSIONAL ENGINEER PROVINCE OF BRITISH COLUMBIA S. J. KOOIMAN # 37526
2023-05-02

Consultant:
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BURNABY, V3J 1N5
B.C., CANADA

DESIGN BULLETIN: DB-01/ 2023

ISSUE RECORD

Rev	Date	Description	By
1	05/APR/23	LL COORDINATION	PE
1	18/APR/23	BP/TENDER	PE

REVISION SCHEDULE

Rev	Date	Description	By

Drawn: Checked:

Project No.

Contents:

KITCHEN EXHAUST SYSTEM DETAILS 4OF4

M803