	ME	CHANI	CAL SYM	BOLS LIST
AC-1) TXF	EQUIPMENT SYMBOL		CONT	ROLS AND SENSORS
			 	THERMOSTAT
			(T <sub>s</sub>	TEMPERATURE SENSOR
	AIR DEVICES		(S)	SMOKE DETECTOR
	CEILING DIFFUSER SUPPLY			DUCTWORK
	CEILING DIFFUSER RETURN		======	AIR DUCT W/ 1.5" ACOUSTICAL LINING
				FLEXIBLE DUCT
	JUCT ACCESSORIES			FLEXIBLE CONNECTION
BD				RECTANGULAR DUCT (WIDTH X DEPTH)
	BACKDRAFT DAMPER			SUPPLY AIR RECTANGULAR DUCT CROSS SECTION
	VOLUME DAMPER W/ ACCESS D	OOR		RETURN AIR RECTANGULAR DUCT CROSS SECTION
	FIRE DAMPER W/ ACCESS DOOF	२		
MECHANI			]	
AL	ACOUSTIC LINING			
CDS	CEILING DIFFUSER SUPPLY			
CDR	CEILING DIFFUSER RETURN			
CFM	CUBIC FEET OF AIR PER MINUTE			
COP	COEFFICIENT OF PERFORMANCE			
EER	ENERGY EFFICIENCY RATIO			
EN	ENERGY ANALYSIS			
FC	FLEXIBLE CONNECTION			
TEF	TOILET EXHAUST FAN			
VD	VOLUME DAMPER			
FD	FIRE DAMPER			
MD				
OA				
RIU	KOOF TOP UNIT			

	MECHANICAL DRAWING LIST
M0.1	MECHANICAL GENERAL NOTES, SYMBOLS LIST & ABBREVIATIONS
M0.2	MECHANICAL SPECIFICATIONS (1 OF 2)
M0.3	MECHANICAL SPECIFICATIONS (2 OF 2)
M1.1	MECHANICAL FLOOR & ROOF PLANS
M5.1	MECHANICAL DETAILS (1 OF 2)
M5.2	MECHANICAL DETAILS (2 OF 2)
M6.1	MECHANICAL SCHEDULES

# CODE COMPLIANCE

ALL WORK AND MATERIAL SHALL BE PERFORMED AND INSTALLED IN COMPLIANCE WITH THE FOLLOWING CODES AS ADOPTED AND AMENDED BY THE INSPECTING AUTHORITY. NOTHING IN THESE DRAWINGS IS TO BE CONSTRUCTED TO PERMIT WORK NOT CONFORMING TO THESE CODES OR OTHERS APPLICABLE TO THESE PROJECT:

- a. 2018 NORTH CAROLINA BUILDING CODE (BASE CODE-IBC 2015)
- b. 2018 NORTH CAROLINA MECHANICAL CODE (BASE CODE-IMC 2015)
- c. 2018 NORTH CAROLINA PLUMBING CODE (BASE CODE-IPC 2015)
- d. 2018 NORTH CAROLINA ENERGY CONSERVATION CODE (BASE CODE-IECC 2015)
- e. 2018 NORTH CAROLINA FUEL GAS CODE (BASE CODE-IFGC 2015)



# NORTH CAROLINA BUILDING DEPARTMENT NOTES

ALL WORK SHALL COMPLY WITH APPLICABLE SECTIONS OF 2018 NORTH CAROLINA BUILDING CODE; BASE CODE IBC 2015, AND ALL RULES AND REGULATIONS OF THE DEPARTMENT OF BUILDINGS TO DATE.

- 1. ALL HEATING AND COOLING LOADS CALCULATED PER ASHRAE/ACCA 183.
- 2. VENTILATION FOR ALL AREA SHALL COMPLY WITH 2018 NORTH CAROLINA MECHANICAL CODE, CHAPTER 4.
- 3. AS PER C408.2.5 OF 2018 NORTH CAROLINA ENERGY CONSERVATION CODE, CONSTRUCTION DOCUMENT SHALL REQUIRE THAT, WITHIN 90 DAYS AFTER THE DATE OF SYSTEM ACCEPTANCE, RECORD DRAWINGS OF THE ACTUAL INSTALLATION BE PROVIDED TO THE BUILDING OWNER OR THE DESIGNATED REPRESENTATIVE OF THE BUILDING OWNER.
- 4. AS PER C408.3.2 OF 2018 NORTH CAROLINA ENERGY CONSERVATION CODE, CONSTRUCTION DOCUMENT SHALL REQUIRE THAT AN OPERATING MANUAL AND A MAINTAINED MANUAL BE PROVIDED TO THE BUILDING OWNER WITHIN 90 DAYS AFTER THE DATE OF SYSTEM ACCEPTANCE THE CONTRACTOR SHALL ENGAGE THE SERVICES OF A PROFESSIONAL ENGINEER TO PROVIDE THE REQUIRED SPECIAL INSPECTIONS AND TESTS.
- 5. TESTS WILL BE CONDUCTED UNDER DIRECTION OF A LICENSED PROFESSIONAL ENGINEER, ARCHITECT OR OTHER PERSON HAVING NOT LESS THAN FIVE (5) YEARS EXPERIENCE SUPERVISING THE INSTALLATION OF SUCH MECHANICAL SYSTEMS. THE TESTS WILL SHOW COMPLIANCE WITH 2018 NORTH CAROLINA BUILDING CODE, REQUIREMENTS AS OUTLINES IN SECTION.
- 6. THE LICENSED PROFESSIONAL ENGINEER, ARCHITECT OR OTHER PERSON HAVING NOT LESS THAN FIVE (5) YEARS EXPERIENCE SUPERVISING THE INSTALLATION OF SUCH MECHANICAL SYSTEMS AND CONDUCTING SUCH TESTS WILL FILE DOCUMENTATION AND REPORTS OF TESTS THAT THE SYSTEM COMPLIES WITH THE CONSTRUCTION DOCUMENTS AND APPLICABLE LAWS.
- TESTS OF MECHANICAL SYSTEMS SHALL BE PERFORMED IN ACCORDANCE WITH THE FOLLOWING SECTIONS OF 2018 NORTH CAROLINA MECHANICAL CODE CHAPTER 4 AND CHAPTER 5:
   A. MECHANICAL VENTILATION - SECTION 403.
- 8. THE FOLLOWING WORK ITEMS, COMPONENTS, MATERIALS, CAPACITIES, ETC. SHALL COMPLY WITH THE REFERENCED CODE OR STANDARD:
  - A. STANDARDS OF HEATING SECTION 309 OF 2018 NORTH CAROLINA MECHANICAL CODE.B. DUCT CONSTRUCTION AND INSTALLATION-SECTION 603 OF 2018 NORTH CAROLINA
  - MECHANICAL CODE.
  - C. AIR INTAKES, EXHAUSTS AND RELIEF-SECTION 401 OF 2018 NORTH CAROLINA MECHANICAL CODE.
- D. AIR FILTERS -SECTION 605 OF 2018 NORTH CAROLINA MECHANICAL CODE.
   E. MANUAL AND AUTOMATIC FIRE AND SMOKE CONTROLS FOR AIR DISTRIBUTION SYSTEMS -SECTION 513 OF 2018 NORTH CAROLINA MECHANICAL CODE.
- 9. MINIMUM TEMPERATURE TO BE MAINTAINED IN OCCUPIED SPACES DURING HEATING SEASON: 68 DEG. FAHRENHEIT.
- 10. REFER TO ARCHITECTURAL DRAWINGS FOR REQUIRED FIRE-RATED WALL AND SMOKE WALL CONSTRUCTION AND LOCATION.
- 11. THESE PLANS ARE APPROVED ONLY FOR THE WORK INDICATED ON THE APPLICATION SPECIFICATION SHEET. ALL OTHER MATTERS SHOWN ARE NOT TO BE RELIED UPON OR TO BE CONSIDERED AS EITHER BEING APPROVED OR IN ACCORDANCE WITH APPLICABLE CODES.

# GENERAL NOTES

- 1. CONTRACTOR SHALL SURVEY THE AREA OF THIS WORK BEFORE SUBMITTING A BID AND SHALL BE RESPONSIBLE FOR NOTIFYING THE ARCHITECT OF ANY CONDITIONS WHICH WOULD PREVENT THE INSTALLATION OF THE WORK AS SHOWN ON DRAWINGS.
- 2. ALL APPLICABLE CODES, LAWS AND REGULATIONS GOVERNING OR RELATING TO ANY PORTION OF THIS WORK ARE HEREBY INCORPORATED INTO AND MADE A PART OF THESE SPECIFICATIONS, AND THEIR PROVISIONS SHALL BE CARRIED OUT BY THE CONTRACTOR WHO SHALL INFORM THE OWNER, PRIOR TO SUBMITTING A PROPOSAL, OF ANY WORK OR MATERIALS WHICH VIOLATE ANY OF THE ABOVE LAWS AND REGULATIONS. ANY WORK DONE BY THE CONTRACTOR CAUSING SUCH VIOLATION SHALL BE CORRECTED BY THE CONTRACTOR.
- 3. BEFORE PROCEEDING WITH ANY WORK IN OCCUPIED OR USED AREAS, THE CONTRACTOR SHALL APPLY TO OWNER FOR PERMISSION TO ENTER SUCH AREAS. THE CONTRACTOR IS OBLIGED TO PERFORM HIS WORK ONLY AT THE TIMES DESIGNATED BY OWNER. THERE WILL BE NO ADDITIONAL COMPENSATION FOR THE WORK PERFORMED AFTER HOURS OR ON OFF-DAYS WITHOUT PRIOR WRITTEN APPROVAL.
- 4. THE WORK IN THE BUILDING SHALL BE DONE WHEN AND AS DIRECTED, AND IN A MANNER SATISFACTORY TO THE OWNER. THE WORK SHALL BE PERFORMED SO AS TO CAUSE THE LEAST POSSIBLE INCONVENIENCE AND DISTURBANCE TO THE PRESENT OCCUPANTS.
- 5. THE CONTRACTOR'S PROPOSAL FOR ALL WORK SHALL BE PREDICATED ON THE PERFORMANCE OF THE WORK DURING REGULAR WORKING HOURS. WHEN SO DIRECTED, HOWEVER, THE CONTRACTOR SHALL INSTALL WORK IN OVERTIME AND THE ADDITIONAL COST TO BE CHARGED THEREFORE SHALL BE ONLY THE "PREMIUM" PORTION OF THE WAGES PAID.
- 6. CONTRACTOR SHALL ASCERTAIN THE APPROPRIATE METHOD FOR BRINGING THE UNITS INTO AND THROUGH THE BUILDING TO POSITION UNIT IN LOCATION SHOWN ON THE PLANS. WHERE NECESSARY, EQUIPMENT SHALL BE SHIPPED FROM MANUFACTURER IN SECTIONS OF SIZE SUITABLE FOR MOVING THROUGH RESTRICTIVE SPACES. COORDINATE WITH BUILDING OWNER APPROPRIATE TIMES OF DAY SUCH EQUIPMENT MAY BE MOVED THROUGH ALL AREAS.
- 7. DISCONNECT, REMOVE AND/OR RELOCATE EXISTING MATERIAL, EQUIPMENT AND OTHER WORK AS NOTED OR REQUIRED FOR PROPER INSTALLATION OF NEW SYSTEM.
- CONNECT NEW WORK TO EXISTING WORK IN NEAT AND APPROVED MANNER. RESTORE EXISTING WORK DISTURBED WHILE INSTALLING NEW WORK TO ACCEPTABLE CONDITION AS DETERMINED BY ARCHITECT.
- 9. PLAN INSTALLATION OF NEW WORK AND CONNECTIONS TO EXISTING WORK TO INSURE MINIMUM INTERFERENCE WITH REGULAR OPERATION OF EXISTING FACILITIES. ALL SYSTEM SHUTDOWNS AFFECTING OTHER AREAS SHALL BE COORDINATED

WITH BUILDING OWNER. INSTALL ISOLATION VALVES AT POIN CONNECTION TO THE EXISTING PIPING. PROVIDE TEMPORARY DUCT AND/OR CONNECTIONS TO MINIMIZE SHUTDOWN TIME.

- 10. SUPPORT ALL DUCTWORK AND PIPING FROM BUILDING STRUCT AND/OR FRAMING IN AN APPROVED MANNER. WHERE OVER CONSTRUCTION DOES NOT PERMIT FASTENING OR SUPPORTS EQUIPMENT, FURNISH ADDITIONAL FRAMING. INSERTS SHALL BE SLOTTED TYPE AND FACTORY PAINTED. SINGLE ROD SHALL BE SIMIL GRINNELL FIG. 281. MULTI-ROD SHALL BE SIMILAR TO FEE & MASON S 9000 WITH END CAPS AND CLOSURE STRIPS. MAXIMUM LC INCLUDING PIPES, DUCTWORK CONTENTS AND COVERING SHALL EXCEED 75% OF RATED INSERT CAPABILITY. WHEN SUPPORTING BUILDING USE BEAM CLAMPS IN APPROVED MANNER.
- 11. PROVIDE ALL NECESSARY FLASHING AND COUNTER FLASHIN MAINTAIN THE WATERPROOFING INTEGRITY OF THIS BUILDIN REQUIRED BY THE INSTALLATION OR REMOVAL OF PIPES, E LOUVERS, CONDUIT, AND EQUIPMENT. PROVIDE EQUIPMENT CURB DUNNAGE STEEL AS REQUIRED.
- 12. SEAL OPENINGS AROUND DUCTS AND PIPING THROUGH PARTI WALLS AND FLOORS (NOT IN SHAFTS) WITH MINERAL WOOL OR ON NONCOMBUSTIBLE MATERIAL (FIBERGLASS INSULATION IS ACCEPTABLE).
- 13. WHERE PENETRATIONS THROUGH FIRE RATED WALLS ARE I PROOFED THIS CONTRACTOR SHALL BE RESPONSIBLE TO SEAL MAINTAIN THE RATED INTEGRITY.
- 14. INSTALL WORK SO AS TO BE READILY ACCESSIBLE FOR OPER MAINTENANCE AND REPAIR. MINOR DEVIATIONS FROM DRAWINGS M MADE TO ACCOMPLISH THIS, BUT CHANGES WHICH INVOLVE EXTRA SHALL NOT BE MADE WITHOUT APPROVAL.
- 15. ACCESS DOORS ARE REQUIRED FOR ALL BUILDING SERVICE VALVES RUN THROUGH THE SPACE, AND ACCESS DOOR SHALL HAVE THE E RATED CAPACITY (1HR, 2HR, ETC.) AS WALL. COORDINATE ALL LOCA OF ACCESS DOORS WITH THE ARCHITECT.
- 16. REMOVABLE ACCESS TILE AND/OR ACCESS DOOR ARE REQUIRED IN CEILINGS, SHAFTS AND WALLS FOR ALL VOLUME AND FIRE DAM AUTOMATIC DAMPERS AND ALL OTHER MECHANICAL EQUIPMENT DEVICES. HVAC CONTRACTOR TO FURNISH ACCESS LOC REQUIREMENTS TO GENERAL CONTRACTOR. ACCESS IDENTIFICATION: PROVIDE BUTTONS, TABS, AND MARKERS TO IDE LOCATION OF CONCEALED VALVES, DAMPERS AND EQUIPMENT.
- 17. THE CONTRACTOR SHALL KEEP ALL EQUIPMENT AND MATERIALS, AN PARTS OF THE BUILDING, EXTERIOR SPACES AND ADJACENT STE SIDEWALKS AND PAVEMENTS, FREE FROM MATERIAL AND E RESULTING FROM THE EXECUTION OF THIS WORK. EXCESS MATE WILL NOT BE PERMITTED TO ACCUMULATE EITHER ON THE INTERIO THE EXTERIOR.
- 18. UNLESS OTHERWISE SPECIFICALLY SPECIFIED, INCLUDE ALL CUTTING PATCHING OF EXISTING FLOORS, WALLS, PARTITIONS AND C MATERIALS IN THE EXISTING BUILDING. THE CONTRACTOR S RESTORE THESE AREAS TO ORIGINAL CONDITION.
- 19. MATERIALS AND WORKMANSHIP, UNLESS OTHERWISE NOTED, SHALI ACCORDANCE WITH BUILDING STANDARDS.
- 20. ALL EQUIPMENT SHALL BE PROVIDED WITH ONE YEAR WARRANTY F AND LABOR AND FIVE YEARS ON COMPRESSORS. WARRANTY P BEGINS UPON PROJECT ACCEPTANCE
- 21. ALL MATERIAL AND EQUIPMENT TO BE NEW UNLESS OTHERWISE AND SHALL BE IN ACCORDANCE WITH BUILDING STANDARDS.
- 22. THE CONTRACTOR SHALL BE RESPONSIBLE FOR HIS WORK WIT COMPLETION AND FINAL ACCEPTANCE AND SHALL REPLACE ANY C SAME WHICH MAY BE DAMAGED, LOST, OR STOLEN WITHOUT ADDIT COST TO THE OWNER.
- 23. THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE FAILURE O DUCTWORK SYSTEM OR EQUIPMENT TO FUNCTION PROPERLY COMPLETION OF HIS WORK UPON SAID SYSTEM OR EQUIPMENT.
- 24. SUBMIT SHOP DRAWING OF ALL WORK WHICH MUST BE APPROVED E ARCHITECT AND ENGINEER BEFORE WORK COMMENCES.
- 25. ALL MATERIAL AND EQUIPMENT TO BE NEW UNLESS OTHERWISE AND SHALL BE IN ACCORDANCE WITH BUILDING STANDARDS.
- 26. SUBMISSION OF A PROPOSAL SHALL BE CONSTRUED AS EVIDENCE T CAREFUL EXAMINATION OF THE PORTIONS OF THE EXISTING BUIL EQUIPMENT, ETC., WHICH AFFECT THIS WORK, AND THE ACCESS TO SPACES, HAS BEEN MADE AND THAT THE CONTRACTOR IS FAMILIAR EXISTING CONDITIONS AND DIFFICULTIES THAT WILL AFFECT EXECUTION OF THE WORK. LATER CLAIMS SHALL NOT BE MADE LABOR, EQUIPMENT OR MATERIALS REQUIRED BECAUSE OF DIFFICU ENCOUNTERED WHICH COULD HAVE BEEN FORESEEN DURING SUC EXAMINATION. THE ON-SITE INSPECTION SHALL VERIFY EXI DUCTWORK, PIPING (SIZES, CLEARANCES, ETC) AND CONDITIONS.
- 27. INSURANCE: IN ACCORDANCE WITH BUILDING REQUIREMENTS CONTRACTOR SHALL INCLUDE A HOLD HARMLESS CLAUSE FOR C AND ENGINEER.
- 28. THE FINAL ACCEPTANCE WILL BE MADE AFTER THE CONTRACTOR ADJUSTED HIS EQUIPMENT, BALANCED THE VARIOUS SYS DEMONSTRATED THAT IT FULFILLS THE REQUIREMENTS OF THE DRAV AND SPECIFICATIONS AND HAS FURNISHED ALL THE REQ CERTIFICATES OF INSPECTION AND APPROVAL.
- 29. SPECIFICATIONS ARE OF SIMPLIFIED FORM AND INCLUDE INCOM SENTENCES. WORDS OR PHRASES SUCH AS "THE CONTRACTOR S "SHALL BE," "FURNISH," "PROVIDE," "A," "THE," AND "ALL" HAVE OMITTED FOR BREVITY.
- 30. WHERE A CONFLICT EXISTS BETWEEN THE DRAWINGS, SPECIFICATIONS OR ANY OTHER CONSTRUCTION DOCUMENT, THE WITH THE MOST STRINGENT REQUIREMENT(S) SHALL APPLY.

DEFINITIONS:

- 1) "PROVIDE": TO SUPPLY, INSTALL AND CONNECT UP COMPLETE AND I FOR SAFE AND REGULAR OPERATION THE PARTICULAR WORK REFI TO UNLESS SPECIFICALLY OTHERWISE NOTED.
- 2) "INSTALL": TO ERECT, MOUNT AND CONNECT COMPLETE WITH RE ACCESSORIES.
   2) "EURNISH" OR "SUPPLY": TO PURCHASE PROCURE ACOURT AND DE
- 3) "FURNISH" OR "SUPPLY": TO PURCHASE, PROCURE, ACQUIRE AND DE COMPLETE WITH RELATED ACCESSORIES.

SCOPE OF WORK  1. THE WORK UNDER CONTRACT INCLUDES ALL LABOR, MATERIALS AND APPLIANCES IN THE WORK UNDER CONTRACT INCLUDES ALL LABOR, MATERIALS AND APPLIANCES IN THE WORK UNDER CONTRACT INCLUDES ALL ABOR, MATERIALS AND APPLIANCES IN THE CONTRACTOR SHALL PORT ALL SYSTEMS AS DESCRIPTED IN THE OPENATION PORT THE SYSTEMS AS DESCRIPTED IN THE OPENATION OF THE OPENATION OF THE SYSTEMS AS DESCRIPTED IN THE OPENATION OF THE OPENATION OF THE SYSTEMS AS DESCRIPTED IN THE OPENATION OF THE OPENATION OF THE SYSTEMS AS DESCRIPTED IN THE OPENATION OF THE OPENATION OF THE SYSTEMS AS DESCRIPTED IN THE OPENATION OF THE	DHEKSO
<ul> <li>1. THE WORK INDER CONTRACT INCLUDES ALL LABOR, MATERNIA AND ASTING, COMPLETE AND READY FOR SAFE OPERATION OF THE SYSTEMS AS DESCRIBED IN THE SPECIFICATIONS, FLOOR PHAND, DESCRI DESTAL DRAWINGS, NOTES, RFIS, ETC, FOR THIS PROVECT. WORK SHALL BE INSTALLED IN A NEAT, WORKMANLKE MANNER.</li> <li>2. THE CONTRACTOR SHALL GIVE NECESSARY NOTICE. FILE DRAWINGS AND SPECIFICATIONS WITH HE DEPARTMENT HAVING JURISDICTION AND TESTS OF ALL PARTS OF THE WORK WITH SUBJECTION AND TESTS OF ALL PARTS OF THE WORK WITH SUBJECTION AND TESTS OF ALL PARTS OF THE WORK WITH ALL PROVECT SHALL STATUS OF ALL PARTS OF THE WORK WITH ALL PROVECTION AND TESTS OF ALL PARTS OF THE WORK WITH ALL PARTS OF THE WORK WITH ALL PERSIDENT OF ALL PARTS OF THE WORK WITH ALL PERSIDENT OF ALL PARTS OF THE WORK WITH ALL PERSIDENT OF ALL PARTS OF THE WORK WITH ALL PERSIDENT FOR ALL PARTS OF THE WORK WITH ALL PERSIDENT OF ALL PARTS OF THE WORK WITH ALL PERSIDENT FOR ALL PARTS OF THE WORK WITH ALL PERSIDENT FOR ALL PARTS OF THE WORK WITH ALL PERSIDENT FOR ALL PERSIDENT FOR ALL PARTS OF THE WORK WITH ALL PERSIDENT FOR ALL PERSID</li></ul>	
<ul> <li>1. HE CONTRACTOR SHALL GIVE INCESSARY NOTICE. FLEE DRAWINGS AND SPECIFICATIONS WITH THE DEPARTMENT HAVING JURISICTION ADD TEREMITIS OR LICENSES NECESSARY TO CARRY OUT THIS WORK AND PAY ALL FEES THEREFICIES INCERSANCE THE CONTRACTOR SHALL ANAL CONTINCE TON ADD TESTS OF AN OR ALL PARTS OF THE WORK IS O REQUIRED BY AUTHORITIES AND PAY ALL FEES THE CONTRACTOR SHALL PAY ALL CONTINUES FOR AND UPWRITE THE OWNER EFFORE FINAL BULING, ALL CERTIFICATES INCERSARY WHERE THE VAPRAL TO HIS WORK.</li> <li>3. THE OWNER SHALL FURNISH A WRITTEN GUARANTEE TO REPLACE OR REPAR FROMTHLY AND ASSUME RESPONSIBILITY FOR ALL EXPENSES INCURRED FROM MY AND ASSUME RESPONSIBILITY FOR ALL EXPENSES INCURRED FROM MY OWNERANDER THE AND CONTRACTOR SHALL BE ONE AS DIRECTED BY THE OWNER. THIS GUARANTEE TO REPLACE WRITING ONE FROM MY OWNERANDER THE AND CONTRACTOR WILL ASSUME RESPONSIBILITY FOR ALL EXPENSES INCURRED IN REALISE. SHALL BE DONE AS DIRECTED BY THE OWNER. THIS GUARANTEE SHALL HAR DONE RATION WORK OF THE WORK WHICH WERE DONE AS DIRECTED BY THE OWNER. THIS GUARANTEE SHALL HAR DONE RATION WORK OF OTHER TRADES ARE PECTOS DEVELOP WITHIN ONE FLACEMENTS IN EQUIPMENT SUPPLIED BY THE CONTRACTOR.</li> <li>THEREMONSTATIC CONTROL SPATSO DONE OF THE WORK WHICH WERE DATE IS EARLIER. THIS WORK SHALL BE DONE AS DIRECTED BY THE OWNER. THIS GUARANTEE WITHIN THE ZONE. WHERE HUMIDITICATION OR THE OWNER THAN DAR HUMIDITY CONTROL SPATSO.</li> <li>THEREMONSTATIC CONTROL SPATSO DONE OF MORE THAN ONE HUMIDITY CONTROL SPATSO.</li> <li>THEREMONSTATIC CONTROL SPATSO DONE OF MORE THAN ONE OF MORE THAN ONE OF MORE THAN ONE OF MORE THAN ONE THEREMOSTATIC CONTROL SPATSO.</li> <li>THEREMONSTATIC CONTROLS SPATSO DONE OF MORE THAN ONE OF MORE THAN OS ONTH SERVICE ONE ON THE SPATSON ONE OR MORE THAN SO ONTH SERVICE DATA AND CONTROL SPATSON.</li> <li>THEREMONSTATIC CONTROLS SPATSON THE ASSET ON THE TAKE THAN ONE THAN DONE OF MORE THE SALL ALSO DONE OF MORE THAN SO CONTROLS SPATSON.</li> <li>THEREMONSTATIC CONTROLS SPATSON THE ADD TO CO</li></ul>	
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<ul> <li>THE CONTRACTOR SHALL FURNISH A WRITTEN GUARANTEE TO REPLACE OR THEORN PROMPTLY AND ASSUME RESPONSIBILITY FOR ALL EXPENSES INCURRED PROMPTLY AND ASSUME RESPONSIBILITY FOR PAYMENT AND/OR FROM DATE OR ACTUAL USE OF EQUIPMENT OR OCCUPANCY OF SPACES, BY OWNER, INCLUED UNDER THE VARIOUS PARTS OF THE WORK, WHICH-VERE DATE IS EARLIER. THIS WORK SHALL BE DONE AS DIRECTED BY THE OWNER. THIS GUARANTEE SHALL ASSUME RESPONSIBILITY FOR ALL EXPENSES INCURRED IN REPARING AND REPLACEMENTS IN EQUIPMENT SUPPLIED BY THE OWNER. THIS GUARANTEE SHALL ASSUME RESPONSIBILITY FOR ALL EXPENSES INCURRED IN REPARING AND REPLACEMENTS IN EQUIPMENT SUPPLIED BY THE CONTRACTOR.</li> <li>THERMOSTATIC CONTROLS: C0032.4.1 GENERAL: THE SUPPLY OF HEATING AND COOLING ENERGY TO EACH ZONE SHALL BE CONTROLLED BY INDIVIDUAL THERMOSTATIC CONTROLS CAPABLE OF RESPONSIBIL TO TEMPERATURE. WITHIN THE ZONE. WHERE HUMDIFICATION OR DEFLUMIORICATION OR BOTH IS PROVIDED, NOT FEWER THAN ONE HUMDITY CONTROL DEVICE SHALL BE PROVIDED FOR EACH HUMIDITY CONTROL SYSTEM.</li> <li>EXCEPTION: MODEPUNDENT PERIMETER SYSTEMS THAT ARE DESIGNED TO OFSET ONLY BILLIDING ENVELOPE HEAT LOSSES (GAINS OR BOTH SERVING ONE OR MORE PERIMETER ZONES ALSO SERVED BY AN INTERIOR SYSTEM PROVIDED THAT BOTH OF THE FOLLOWING CONDITIONS ARE MET: 1. THE PERIMETER SYSTEM INCLUDES NOT FEWER THAN ONE THERMOSTATIC CONTROL ZONE FOR EACH BUILDING EXPOSURE HAVING EXTERIOR WALLS FACING ONLY ONE ORIENTATION (WITHIN ±45 DEGREES) (18 RAD) FOR MORE THAN SO CONTROL ZONE FOR EACH BUILDING EXPOSURE THAN ONE THERMOSTATIC CONTROL ZONE FOR EACH BUILDING EXPOSURE THAN ONE THERMOSTATIC CONTROL ZONE FOR EACH BUILDING EXPOSURE THAN ONE THERMOSTATIC CONTROL SONE REPUTATION HEATING AND COOLING SUPPLY IS CONTROLLED BY THERMOSTATS LOCATED UNTHIN THE ZONES SERVED BY THE SYSTEM.</li>     1. CAG32.4.1.1 HEAT PUMP SUPPLEMENTARY HEAT THERE AND FOR THEM THAS AND CONTROL SONE REPUTATIONS REPUTING AND COOLING SUPPLY IS CONTROLLED BY THERMOSTATS LOCATED WITHIN THE ZONES SERVED BY THE S</ul>	
<ul> <li>Included UNDER THE VARIOUS PARTS OF THE WORK, WHICHEVER DATE IS EARLIER. THIS WORK SHALL BE DOWLE AS DIRECTED BY THE WORK. THIS IQUARANTEE SHALL ALSO PROVIDE THAT WHERE DEFECTS OCCUR. THE ICONTRACTOR WILL ASSUME RESPONSIBILITY FOR ALL EXPENSES INCURRED IN REPARING AND REPLACING WORK OF OTHER TRADES AFFECTED BY DEFECTS, REPARING AND REPLACING WORK OF OTHER TRADES AFFECTED BY DEFECTS, REPARING AND REPLACING WORK OF OTHER TRADES AFFECTED BY DEFECTS, REPARING AND REPLACING WORK OF OTHER TRADES AFFECTED BY DEFECTS, REPARING AND REPLACING WORK OF OTHER TRADES AFFECTED BY DEFECTS, REPARING AND REPLACING WORK OF OTHER TRADES AFFECTED BY DEFECTS, REPARING AND REPLACING WORK OF OTHER TRADES AFFECTED BY DEFECTS, REPARING AND REPLACING WORK OF OTHER TRADES AFFECTED BY DEFECTS, REPARING AND REPLACING WORK OF OTHER THAN ONE HUMIDITY CONTROL DEVICE SHALL BE PROVIDED FOR EACH HUMIDITY CONTROL SYSTEM.</li> <li>EXCEPTION: INDEPENDENT PERIMETER SYSTEMS THAT ARE DESIGNED TO OFFSET ONLY BUILDING ENVELOPE HEAT LOSSES, GAINS OR BOTH SERVING ONE OR MORE PERIMETER ZONES ALSO SERVED BY AN INTERIOR SYSTEM PROVIDED THAT BOTH OF THE FOLLOWING CONDITIONS ARE MET:</li> <li>THE PERIMETER SYSTEM INCLUDES NOT FEWER THAN ONE THERMOSTATIC ONTROL ZONE FOR EACH BUILDING EXPOSURE HAVING EXTERIOR WALLS FACING ONLY ONE ORIENTATION WITHIN 1 ± 6 DEGREES) (0.8 RAD) FOR MORE THAN SO CONTROLUCINE GIVEN THIN THE ZONES SERVED BY THE SYSTEM.</li> <li>C40324.1.1 HEAT PUMP SUPPLEMENTARY ELECTRIC RESISTANCE HEAT SHALL HAVE CONTROLS THAT, EXCEPT DURING DEFROST, PREVENT SUPPLEMENTARY HEAT OPERATION WHERE THE HEAT PUMP CAN PROVIDE THE HEATING LOAD.</li> <li>C4032.4.1.2 DEADBAND</li> <li>WHERE USED TO CONTROL BOTH HEATING AND COOLING, ZONE THERMOSTATIC CONTROLS SHALL BE CONFIGURED TO PROVIDE THE HEATING LOAD.</li> <li>C4032.4.1.2 DEADBAND</li> <li>WHERE HE HEAT PLAN FARS THAN SECURING PRECISION IN INDOOR TEMPERATURE CONTROL AS APPROVED BY THE ZONE IS SHUT OFF OR REDUCED TO A MINIMUM.</li> <li>EXCEPTIONS:</li> <li>MERE</li></ul>	
<ul> <li>THERMOSTATIC CONTROLS:</li> <li>C403.2.4.1 GENERAL:</li> <li>THE SUPPLY OF HEATING AND COOLING ENERGY TO EACH ZONE SHALL BE CONTROLED BY INDIVIDUAL THERMOSTATIC CONTROLS CAPABLE OF RESPONDING TO TEMPERATURE WITHIN THE ZONE WHERE HUMIDFICATION OR DEHUMIDFICATION OR BOTH IS PROVIDED FOR EACH HUMIDITY CONTROL SYSTEM.</li> <li>EXCEPTION:</li> <li>INDEPENDENT PERIMETER SYSTEMS THAT ARE DESIGNED TO OFFSET ONLY BUILDING ENVELOPE HEAT LOSSES, GAINS OR BOTH SERVING ONE OF MORE PERIMETER ZONES ALSO SERVED BY AN INTERIOR SYSTEM PROVIDED THAT BOTH OF THE FOLLOWING CONDITIONS ARE MET:</li> <li>1. THE PERIMETER SYSTEM INCLUDES NOT FEWER THAN ONE THERMOSTATIC CONTROL SOLUTIONS ARE MET:</li> <li>1. THE PERIMETER SYSTEM INCLUDES NOT FEWER THAN ONE THERMOSTATIC CONTROL SPET ON UNDER THAT SOLUTION (WITHIN ± 45 DEGREES) (0.8 RAD) FOR MORE THAN 50 CONTROLUDES FET (15.440 MM).</li> <li>2. THE PERIMETER SYSTEM HEATING AND COOLING SUPPLY IS CONTROLLED BY THERMOSTATS LOCATED WITHIN THE ZONES SERVED BY THE SYSTEM.</li> <li>a. C403.24.1.1 HEAT PUMP SUPPLEMENTARY HEAT</li> <li>HEAT PUMPS HAVING SUPPLEMENTARY HEAT HEAT PUMPS HAVING SUPPLEMENTARY HEAT OPERATION WHERE THE HEAT PUMP CAN PROVIDE THE HEATING LOAD.</li> <li>b. C403.24.1.2 DEADBAND</li> <li>WHERE USED TO CONTROL BOTH HEATING AND COOLING, ZONE THERMOSTATIC CONTROL SHALL BE CONFIGURED TO PROVIDE THE HEATING LOAD.</li> <li>b. C403.24.1.2 DEADBAND</li> <li>WHERE USED TO CONTROL BOTH HEATING AND COOLING, ZONE THERMOSTATIC CONTROL SHALL BE CONFIGURED TO PROVIDE A TEMPERATURE RANGE OR DEADBAND OF NOT LESS THAN 5°F (28°C) WITHIN WHICH THE SUPPLEMENTARY HEAT OPERATION WHERE THE HEAT PUMP CAN PROVIDE A TEMPERATURE RANGE OR DEADBAND OF NOT LESS THAN 5°F (28°C) WITHIN WHICH THE SUPPLY OF HEATING AND COOLING MODES.</li> <li>1. THERMOSTATS REQUIRING MANUAL CHANGEOVER BETWEEN HEATING AND COOLING MODES.</li> <li>2. OCCUPANCIES OR APPLICATIONS REQUIRING PRECISION IN INDOOR TEMPERATURE CONTROL SA PROVOED BY THE CODE OFFICIAL.</li> <li>c. C403.24.1.3 SETPONIT OVERLAP RESTRICTION</li> <li>W</li></ul>	
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EACH ZONE SHALL BE PROVIDED WITH THERMOSTATIC SETBACK CONTROLS THAT	
CONTROL SYSTEM.	
1. ZONES THAT WILL BE OPERATED CONTINUOUSLY.	
2. ZONES WITH A FULL HVAC LOAD DEMAND NOT EXCEEDING 6,800 BTU/H (2 KW) AND HAVING A MANUAL SHUTOFF SWITCH LOCATED WITH READY ACCESS.	
e. C403.2.4.2.1 THERMOSTATIC SETBACK THERMOSTATIC SETBACK CONTROLS SHALL BE CONFIGURED TO SET BACK OR TEMPORARILY OPERATE THE SYSTEM TO MAINTAIN ZONE TEMPERATURES DOWN TO 55°F (13°C) OR UP TO 85°F (29°C).	
f. C403.2.4.2.2 AUTOMATIC SETBACK AND SHUTDOWN	
AUTOMATIC TIME CLOCK OR PROGRAMMABLE CONTROLS SHALL BE CAPABLE OF STARTING AND STOPPING THE SYSTEM FOR SEVEN DIFFERENT DAILY SCHEDULES PER WEEK AND RETAINING THEIR PROGRAMMING AND TIME SETTING DURING A LOSS OF POWER FOR NOT FEWER THAN 10 HOURS. ADDITIONALLY, THE CONTROLS SHALL HAVE A MANUAL OVERRIDE THAT ALLOWS TEMPORARY OPERATION OF THE SYSTEM FOR UP TO 2 HOURS; A MANUALLY OPERATED TIMER CONFIGURED TO OPERATE THE SYSTEM FOR UP TO 2 HOURS; OR AN OCCUPANCY SENSOR.	PERMIT SET
g. C403.2.4.2.3 AUTOMATIC START	<b> Q                     </b>
AUTOMATIC START CONTROLS SHALL BE PROVIDED FOR EACH HVAC SYSTEM. THE CONTROLS SHALL BE CONFIGURED TO AUTOMATICALLY ADJUST THE DAILY START TIME OF THE HVAC SYSTEM IN ORDER TO BRING EACH SPACE TO THE DESIRED OCCUPIED TEMPERATURE IMMEDIATELY PRIOR TO SCHEDULED OCCUPANCY.	05/16
	AWN BY

ABBREVIATIONS

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MECHANICAL GENERAL NOTES, SYMBOL LIST &

-SHEET NAME -----

# GENERAL HVAC NOTES

GENERAL:

- PROVIDE ALL MATERIAL AND EQUIPMENT AND PERFORM ALL LABOR REQUIRED TO INSTALL COMPLETE AND OPERABLE MECHANICAL SYSTEMS AS INDICATED ON THE DRAWINGS, AS SPECIFIED AND AS REQUIRED BY CODE.
- 2. CONTRACT DOCUMENT DRAWINGS FOR MECHANICAL WORK (HVAC, PLUMBING, AND FIRE PROTECTION) ARE DIAGRAMMATIC AND ARE INTENDED TO CONVEY SCOPE AND GENERAL ARRANGEMENT ONLY.
- THE LOCATIONS OF ALL ITEMS SHOWN ON THE DRAWINGS OR CALLED FOR IN THE SPECIFICATIONS THAT ARE NOT FIXED BY DIMENSIONS ARE APPROXIMATE ONLY. THE EXACT LOCATIONS NECESSARY TO SECURE THE BEST CONDITIONS AND RESULTS MUST BE DETERMINED BY THE PROJECT SITE CONDITIONS AND SHALL HAVE THE APPROVAL OF THE ENGINEER BEFORE BEING INSTALLED. DO NOT SCALE DRAWINGS.
- 4. WHEN MECHANICAL WORK (HVAC, PLUMBING, SHEET METAL, FIRE PROTECTION, ETC.) IS SUBCONTRACTED, IT SHALL BE THE MECHANICAL CONTRACTOR'S RESPONSIBILITY TO COORDINATE SUBCONTRACTORS AND THE ASSOCIATED CONTRACTS. WHEN DISCREPANCIES ARISE PERTAINING TO WHICH CONTRACTOR PROVIDES A PARTICULAR ITEM OF THE MECHANICAL CONTRACT OR WHICH CONTRACTOR PROVIDES FINAL CONNECTIONS FOR A PARTICULAR ITEM OF THE MECHANICAL CONTRACT, IT SHALL BE BROUGHT TO THE ATTENTION OF THE MECHANICAL CONTRACTOR, WHOSE DECISION SHALL BE FINAL.
- COORDINATE CONSTRUCTION OF ALL MECHANICAL WORK WITH ARCHITECTURAL, STRUCTURAL, CIVIL, ELECTRICAL WORK, ETC., SHOWN ON OTHER CONTRACT DOCUMENT DRAWINGS.
- INSTALL ALL MECHANICAL EQUIPMENT AND APPURTENANCES IN ACCORDANCE WITH MANUFACTURER'S RECOMMENDATIONS, CONTRACT DOCUMENTS, AND APPLICABLE CODES AND REGULATIONS.
- WHERE TWO OR MORE ITEMS OF THE SAME TYPE OF EQUIPMENT ARE REQUIRED, THE PRODUCT OF ONE MANUFACTURER SHALL BE USED.
- 8. COORDINATE ALL EQUIPMENT CONNECTIONS WITH MANUFACTURERS' CERTIFIED DRAWINGS. COORDINATE AND PROVIDE ALL DUCT AND PIPING TRANSITIONS REQUIRED FOR FINAL EQUIPMENT CONNECTIONS TO FURNISHED EQUIPMENT. FIELD VERIFY AND COORDINATE ALL DUCT AND PIPING DIMENSIONS BEFORE FABRICATION.
- 9. ALL CONTROL WIRE AND CONDUIT SHALL COMPLY WITH THE NATIONAL ELECTRIC CODE AND ELECTRICAL DIVISION OF THE SPECIFICATION.
- 10. PROVIDE VIBRATION ISOLATION FOR ALL MECHANICAL EQUIPMENT TO PREVENT TRANSMISSION OF VIBRATION TO BUILDING STRUCTURE.
- 11. LOCATE ALL TEMPERATURE, AND FLOW MEASURING DEVICES IN ACCESSIBLE LOCATIONS WITH THE STRAIGHT SECTION OF PIPE OR DUCT UP- AND DOWNSTREAM AS RECOMMENDED BY THE MANUFACTURER FOR GOOD ACCURACY.
- 12. WHERE BEAMS ARE INDICATED TO BE PENETRATED WITH DUCTWORK OR PIPING, COORDINATE DUCTWORK AND PIPING LAYOUT WITH BEAM OPENING SIZE AND OPENING LOCATIONS. COORDINATION SHALL BE DONE PRIOR TO THE FABRICATION OF DUCTWORK, CUTTING OF PIPING, OR FABRICATION OF BEAMS.
- 13. ALL MISCELLANEOUS STEEL REQUIRED TO ENSURE PROPER INSTALLATION AND AS SHOWN IN THE DETAILS FOR DUCTWORK, AND EQUIPMENT (UNLESS OTHERWISE NOTED) SHALL BE FURNISHED AND INSTALLED BY THE MECHANICAL CONTRACTOR.
- 14. PROVIDE ACCESS PANELS FOR INSTALLATION IN WALLS AND CEILINGS, WHERE REQUIRED, TO SERVICE DAMPERS, VALVES, SMOKE DETECTORS, AND OTHER CONCEALED MECHANICAL EQUIPMENT. ACCESS PANELS SHALL BE TURNED OVER TO THE GENERAL CONTRACTOR FOR INSTALLATION. ACCESS PANELS SHALL HAVE THE EQUAL RATED CAPACITY (1HR, 2HR, ETC.) AS WALL.
- 15. MECHANICAL EQUIPMENT, DUCTWORK, AND PIPING SHALL NOT BE SUPPORTED FROM A METAL DECK.
- 16. ALL EQUIPMENT, PIPING, DUCTWORK, ETC., SHALL BE SUPPORTED AS DETAILED, SPECIFIED AND REQUIRED TO PROVIDE A VIBRATION-FREE INSTALLATION.
- 17. ALL DUCTWORK, PIPING, AND EQUIPMENT SUPPORTED FROM STRUCTURAL STEEL SHALL BE COORDINATED WITH THE GENERAL CONTRACTOR. ALL ATTACHMENTS TO STEEL BAR JOISTS, TRUSSES, OR JOIST GIRDERS SHALL BE AT PANEL POINTS. PROVIDE BEAM CLAMPS MEETING MSS STANDARDS. WELDING TO STRUCTURAL MEMBERS SHALL NOT BE PERMITTED. THE USE OF C-CLAMPS SHALL NOT BE PERMITTED.
- 18. LOCATIONS AND SIZES OF ALL FLOOR, WALL, AND ROOF OPENINGS SHALL BE COORDINATED WITH ALL OTHER TRADES INVOLVED.
- 19. ALL OPENINGS IN FIRE WALLS DUE TO DUCTWORK, PIPING, CONDUIT, ETC., SHALL BE FIRE STOPPED WITH A PRODUCT SIMILAR TO 3M OR APPROVED EQUAL.
- 20. ALL CONDENSATE DRAIN LINES FROM EACH ROOF TOP UNIT SHALL BE PIPED FULL SIZE OF THE UNIT DRAIN OUTLET, WITH "P" TRAP, AND PIPED TO THE NEAREST DRAIN. SEE THE DETAILS SHOWN IN THE DRAWINGS OR THE CONTRACT SPECIFICATIONS FOR THE DEPTH OF THE AIR CONDITIONING CONDENSATE TRAP.
- 21. REFER TO TYPICAL DETAILS FOR DUCTWORK, PIPING, AND EQUIPMENT INSTALLATION.
- 22. ALL TESTS SHALL BE COMPLETED BEFORE ANY MECHANICAL EQUIPMENT OR PIPING INSULATION IS APPLIED.
- 23. TESTING, ADJUSTING, AND BALANCING AGENCY SHALL BE A MEMBER OF THE ASSOCIATED AIR BALANCE COUNCIL (AABC) OR THE NATIONAL ENVIRONMENTAL BALANCING BUREAU (NEBB). TESTING, ADJUSTING, AND BALANCING SHALL BE PERFORMED IN ACCORDANCE WITH THE AABC STANDARDS.

## **HVAC DUCTWORK - SHEET METAL**

- CERTAIN ITEMS SUCH AS RISES AND DROPS IN DUCTWORK, ACCESS DOORS, VOLUME DAMPERS, ETC., ARE INDICATED ON THE CONTRACT DOCUMENT DRAWINGS FOR CLARITY FOR A SPECIFIC LOCATION REQUIREMENT AND SHALL NOT BE INTERPRETED AS THE EXTENT OF THE REQUIREMENTS FOR THESE ITEMS.
- 2. CONTRACTOR TO CHECK AND CORRECT ANY AND ALL DEFICIENCIES IN EXISTING DUCTS. ALL NEW DUCTWORK WILL COMPLY WITH THE

LATEST SMACNA GUIDELINES AND CONFORM WITH REQUIREMENTS OF THE LATEST HANDBOOKS PUBLISHED BY ASHRAE

- 3. PROVIDE VOLUME DAMPER AT EACH TAP TO MAIN DUCT AND WHERE NECESSARY TO PROPERLY BALANCE SYSTEM.
- 4. SUPPLY AND RETURN DUCTWORK 20' FROM ALL HVAC UNITS SHALL BE LINED WITH 1.5" ACOUSTICAL LINING.
- 5. RE-INSULATE ALL DUCTWORK AND PIPING IN WHICH INSULATION HAS BEEN REMOVED OR DAMAGED WITH INSULATION EQUAL TO THE EXISTING INSULATION.
- 6. CONTRACTOR SHALL SUPPLY AND INSTALL ALL NECESSARY SUPPLY DIFFUSERS AND RETURN AIR REGISTERS WHERE INDICATED ON THE DRAWING. COORDINATE LOCATION OF DIFFUSERS AND REGISTERS WITH REFLECTED CEILING PLAN.
- IN CORRIDORS WHERE CEILING SPEAKERS AND AIR DIFFUSERS ARE INDICATED BETWEEN THE SAME LIGHT FIXTURES, INSTALL BOTH DEVICES AT THE QUARTER POINTS BETWEEN THE FIXTURES.
- 8. UNLESS OTHERWISE SHOWN, LOCATE ALL ROOM THERMOSTATS 4'-0" (CENTER LINE) ABOVE THE FINISHED FLOOR. NOTIFY THE ENGINEER OF ANY ROOMS WHERE THE PRECEDING LOCATION CANNOT BE MAINTAINED OR WHERE THERE IS A QUESTION ON LOCATION.
- 9. ALL DUCTWORK SHALL CLEAR DOORS AND WINDOWS.
- 10. ALL DUCTWORK DIMENSIONS, AS SHOWN ON THE DRAWINGS, ARE INTERNAL CLEAR DIMENSIONS AND DUCT SIZE SHALL BE INCREASED TO COMPENSATE FOR DUCT LINING THICKNESS.
- 11. PROVIDE ALL 90-DEGREE SQUARE ELBOWS WITH DOUBLE RADIUS TURNING VANES UNLESS OTHERWISE INDICATED. ELBOWS IN DISHWASHER, KITCHEN, AND LAUNDRY EXHAUSTS SHALL BE OF UN-VANED SMOOTH RADIUS CONSTRUCTION WITH A RADIUS EQUAL TO 1-1/2 TIMES THE WIDTH OF THE DUCT. PROVIDE ACCESS DOORS UPSTREAM OF ALL ELBOWS WITH TURNING VANES.
- 12. COORDINATE DIFFUSER, REGISTER, AND GRILL LOCATIONS WITH ARCHITECTURAL REFLECTED CEILING PLANS, LIGHTING, AND OTHER CEILING ITEMS AND MAKE MINOR DUCT MODIFICATIONS TO SUIT.
- 13. ALL AIR HANDLING UNITS SHALL OPERATE WITHOUT MOISTURE CARRYOVER.
- 14. LOCATE ALL MECHANICAL EQUIPMENT FOR UNOBSTRUCTED ACCESS TO UNIT ACCESS PANELS, CONTROLS, AND VALVING.
- 15. PROVIDE FLEXIBLE CONNECTIONS IN ALL DUCTWORK SYSTEMS (SUPPLY, RETURN, AND EXHAUST) CONNECTED TO AIR HANDLING UNITS, FANS, AND OTHER EQUIPMENT THAT REQUIRE VIBRATION ISOLATION. FLEXIBLE CONNECTIONS SHALL BE PROVIDED AT THE POINT OF CONNECTION TO THE EQUIPMENT UNLESS OTHERWISE INDICATED.
- 16. UNLESS OTHERWISE NOTED, ALL DUCTWORK IS OVERHEAD, TIGHT TO THE UNDERSIDE OF THE STRUCTURE, WITH SPACE FOR INSULATION IF NEEDED.
- 17. RUNS OF FLEXIBLE DUCT SHALL NOT EXCEED 5 FT.
- 18. ALL DUCTWORK SHALL BE COORDINATED WITH ALL TRADES INVOLVED. OFFSETS IN DUCTS, INCLUDING DIVIDED DUCTS AND TRANSITIONS AROUND OBSTRUCTIONS, SHALL BE PROVIDED AT NO ADDITIONAL COST TO THE OWNER.
- 19. PROVIDE ACCESS DOORS IN DUCTWORK TO PROVIDE ACCESS FOR ALL SMOKE DETECTORS, FIRE DAMPERS, SMOKE DAMPERS, VOLUME DAMPERS, COILS, AND OTHER ITEMS LOCATED IN THE DUCTWORK THAT REQUIRE SERVICE AND/OR INSPECTION.
- 20. PROVIDE ACCESS DOORS IN DUCTWORK FOR THE OPERATION, ADJUSTMENT, AND MAINTENANCE OF ALL FANS, VALVES, AND MECHANICAL EQUIPMENT.
- 21. ALL DUCTS SHALL BE GROUNDED ACROSS FLEXIBLE CONNECTIONS WITH FLEXIBLE COPPER GROUNDING STRAPS. GROUNDING STRAPS SHALL BE BOLTED OR SOLDERED TO BOTH THE EQUIPMENT AND THE DUCT.
- 22. SMOKE DETECTORS SHALL BE FURNISHED AND WIRED BY THE ELECTRICAL CONTRACTOR. THE MECHANICAL CONTRACTOR SHALL BE RESPONSIBLE FOR MOUNTING THE SMOKE DETECTOR IN DUCTWORK AS SHOWN ON THE DRAWINGS AND IN ACCORDANCE WITH THE MANUFACTURER'S PRINTED INSTRUCTIONS.
- 23. SEE SPECIFICATIONS FOR DUCTWORK GAUGES, BRACING, HANGERS, AND OTHER REQUIREMENTS.



# SPECIFICATIONS

# SECTION 0001 - NOTICE TO BIDDERS

1.1 BIDDERS REPRESENTATIONS

- A. THE BIDDER BY MAKING A BID REPRESENTS THAT:
- THE BIDDER HAS READ AND UNDERSTANDS THE BIDDING DOCUMENTS, TO THE EXTENT THAT SUCH DOCUMENTATION RELATES TO THE WORK FOR WHICH THE BID IS SUBMITTED, AND FOR OTHER PORTIONS OF THE PROJECT, IF ANY, BEING BID CONCURRENTLY OR PRESENTLY UNDER CONSTRUCTION.
- B. THE BID IS MADE IN COMPLIANCE WITH THE BIDDING DOCUMENTS.
- C. THE SPECIFICATIONS AND DRAWINGS ARE INTENDED TO SERVE JOINTLY AS A BASIS FOR THE BIDDER TO SUBMIT A CONTRACT PRICE FOR THE MATERIAL AND LABOR.
- D. SHOULD CONFLICTS OR DISCREPANCIES OCCUR WITHIN THE BIDDING DOCUMENTS, THE ITEM OR ITEMS IN DISPUTE THAT REPRESENT THE GREATER COST SHALL PREVAIL IN THE FINAL BID.
- E. THE BID IS BASED UPON THE MATERIALS, EQUIPMENT AND SYSTEMS REQUIRED BY THE BIDDING DOCUMENTS WITHOUT EXCEPTION.
- 1.2 EXISTING CONDITIONS AND COORDINATION
- A. THE BIDDER HAS VISITED THE SITE, BECOME FAMILIAR WITH LOCAL CONDITIONS UNDER WHICH THE WORK IS TO BE PERFORMED AND HAS CORRELATED THE BIDDER'S PERSONAL OBSERVATIONS WITH THE REQUIREMENTS OF THE PROPOSED BIDDING DOCUMENTS.
- B. THE BIDDER SHALL PROPOSE COORDINATION OF WORK SUCH THAT CONFLICTS WITH OTHER TRADES AND SPACE ALLOCATIONS ARE AVOIDED.
- 1.3 RESPONSIBILITIES
- A. THE BIDDER UNDERSTANDS THAT ANY CONTRACTOR SHALL BE FULLY RESPONSIBLE FOR THE TIMELY COMPLETION AND ACCEPTANCE OF THEIR WORK AND THAT ANY ITEMS DAMAGED, LOST OR STOLEN DURING TIME OF CONSTRUCTION SHALL BE REPAIRED OR REPLACED WITHOUT ANY ADDITIONAL COST TO THE OWNER.
- B. THE BIDDER UNDERSTANDS THAT ANY PROPOSED WORK IN OCCUPIED TENANT SPACES SHALL BE PERFORMED DURING TIMES OF NON-TENANT OCCUPANCY OR AS SCHEDULED OR DIRECTED BY THE BUILDING MANAGER.
- C. THE BIDDER UNDERSTANDS THAT ANY PROPOSED SHUT-DOWN OF EXISTING SYSTEMS DURING CONSTRUCTION SHALL BE PRE-ARRANGED WITH THE BUILDING MANAGER AND THAT SUCH SHUT-DOWNS ARE TO BE KEPT TO A MINIMUM.

END OF SECTION 0001

### SECTION 0101 - QUALITY OF WORK

1.1 WORKMANSHIP

- A. ALL WORK SHALL BE FREE FROM DEFECTS IN MATERIALS AND WORKMANSHIP FOR A PERIOD OF ONE YEAR FROM DATE OF FINAL ACCEPTANCE.
- B. ALL DEFECTS WHICH DEVELOP OR ARE DISCOVERED WITHIN THIS PERIOD SHALL BE REPAIRED BY THE CONTRACTOR TO THE SATISFACTION OF THE ARCHITECT OR BUILDING MANAGER AT NO ADDITIONAL COST TO THE OWNER.
- C. UPON COMPLETION OF THE WORK THE CONTRACTOR SHALL REMOVE FROM THE SITE, ALL TOOLS, DEMOLISHED APPLIANCES AND ANY SURPLUS MATERIAL.
- 1.2 CODE COMPLIANCE
- A. ALL WORK SHALL MEET ALL STATE AND LOCAL CODES HAVING JURISDICTION.
- END OF SECTION 0101
- SECTION 0102 REQUIRED DOCUMENTS
- 1.1 SHOP DRAWINGS
- A. A SET OF PRINTS FOR ANY MECHANICAL WORK INCLUDING BUT NOT LIMITED TO, DUCTWORK AND PIPING LAYOUT SHALL BE SUBMITTED FOR APPROVAL TO THE ENGINEER PRIOR TO CONSTRUCTION OR PURCHASE OF MATERIALS.
- 1.2 SUBMITTALS
- A. EQUIPMENT SUBMITTALS OF ALL PROPOSED MECHANICAL AND NCILLARY EQUIPMENT INCLUDING ALL ACCESSORIES SHALL BE SUBMITTED TO THE ENGINEER FOR REVIEW. ALL PERTINENT MODELS, SIZES, ACCESSORIES AND CHOICES SHALL BE CLEARLY CHECKED, PRINTED OR OTHERWISE INDICATED ON THE SUBMITTALS.
- RECORD DRAWINGS
- UPON COMPLETION OF THE WORK, A RECORD DRAWING SHALL BE UBMITTED TO THE OWNER DEPICTING ALL SUBSEQUENT CHANGES, ADDITIONS AND OR CORRECTIONS TO THE CONTRACT DRAWINGS AND OR CONTRACT SCOPE MADE DURING CONSTRUCTION. THIS DRAWING SHALL REPRESENT A COMPLETE RECORD OF THE WORK INSTALLED.
- 1.4 EQUIPMENT OPERATING INSTRUCTIONS
- A. ON COMPLETION AND ACCEPTANCE OF WORK, THIS CONTRACTOR SHALL FURNISH WRITTEN INSTRUCTIONS, EQUIPMENT MANUALS AND DEMONSTRATE TO THE OWNER THE PROPER OPERATION AND MAINTENANCE OF ALL EQUIPMENT AND APPARATUS FURNISHED UNDER THIS CONTRACT.
- B. THESE INSTRUCTIONS SHALL BE TYPED ON 8-1/2 IN. X 11 IN. PAPER AND BOUND IN THREE-RING BINDERS WITH CLEAR ACETATE COVERS. THE CONTRACTOR SHALL GIVE THREE COPIES OF THE INSTRUCTIONS TO THE OWNER AND ONE ELECTRONIC COPY TO THE ENGINEER.
- C. THE INSTRUCTION BOOKLET SHALL BE ORGANIZED IN SECTIONS, WITH ONE SECTION PER SYSTEM. THE COVER OF THE INSTRUCTION BOOKLET SHALL BEAR THE NAME, ADDRESS AND PHONE NUMBER OF THE PROJECT, ARCHITECT, ENGINEER, MECHANICAL CONTRACTOR AND SUBCONTRACTORS.

END OF SECTION 0102

SECTION 078413-PENETRATION FIRE-STOPPING

- 1.1 QUALITY ASSURANCE A. INSTALLER QUALIFICATIONS: AN FM GLOBAL-APPROVED FIRE-STOP CONTRACTOR OR A UL-QUALIFIED FIRE-STOP CONTRACTOR.
- B. FIRE-TEST-RESPONSE CHARACTERISTICS: UL, INTERTEK ETL SEMKO OR FM GLOBAL
- 1.2 PENETRATION FIRESTOPPING A. PENETRATIONS IN FIRE-RESISTANCE-RATED WALLS: F-RATINGS PER ASTM E 814 OR UL 1479.
- B. PENETRATIONS IN HORIZONTAL ASSEMBLIES: F- AND T-RATINGS
- PER ASTM E 814 OR UL 1479: C. PENETRATIONS IN SMOKE BARRIERS: L-RATINGS PER UL 1479.
- D. W-RATINGS: PER UL 1479.
- 1.3 INSTALLATION A. IDENTIFICATION: PREPRINTED METAL OR PLASTIC LABELS.
- 1.4 FIELD QUALITY CONTROL A. INSPECTION OF INSTALLED FIRE-STOPPING: BY OWNER-ENGAGED
- AGENCY ACCORDING TO ASTM E 2174. 1.5 THROUGH-PENETRATION FIRESTOP SYSTEM SCHEDULE
- WHERE UL-CLASSIFIED SYSTEMS ARE INDICATED, THEY REFER TO SYSTEM NUMBERS IN UL'S "FIRE RESISTANCE DIRECTORY" UNDER PRODUCT CATEGORY XHEZ.
- FOR THE FOLLOWING SYSTEMS:

METALLIC AND NON-METALLIC PIPES, CONDUIT, OR TUBING, ELECTRICAL CABLES, CABLE TRAYS WITH ELECTRIC CABLES, MISCELLANEOUS ELECTRICAL PENETRANTS, INSULATED PIPES, GROUPINGS OF PENETRANTS, USE ON OR MORE THE FOLLOWING MATERIALS:

- a. LATEX SEALANT
- b. SILICONE SEALANT c. INTUMESCENT PUTTY
- d. MORTAR
- h. SILICONE FOAM
- i. PILLOWS/BAGS
- j. INTUMESCENT WRAP STRIPS k. INTUMESCENT COMPOSITE SHEET
- 1.6 MANUFACTURERS
  - 1. HILTI CONSTRUCTION CHEMICAL, INC
  - 2. TREMCO IN
  - 3. 3M FIRE PROTECTION PRODUCTS
- END OF SECTION 078413
- SECTION 230529 HANGERS AND SUPPORTS FOR HVAC PIPING AND EQUIPMENT
- 1.1 PERFORMANCE REQUIREMENTS
- A. DELEGATED DESIGN: DESIGN TRAPEZE PIPE HANGERS AND EQUIPMENT SUPPORTS, INCLUDING COMPREHENSIVE ENGINEERING ANALYSIS BY A QUALIFIED PROFESSIONAL ENGINEER, USING PERFORMANCE REQUIREMENTS AND DESIGN CRITERIA INDICATED.
- B. STRUCTURAL PERFORMANCE: HANGERS AND SUPPORTS FOR HVAC PIPING AND EQUIPMENT SHALL WITHSTAND THE EFFECTS OF GRAVITY LOADS AND STRESSES WITHIN LIMITS AND UNDER CONDITIONS INDICATED ACCORDING TO ASCE/SEI 7.
- 1. DESIGN SUPPORTS FOR MULTIPLE PIPES CAPABLE OF SUPPORTING COMBINED WEIGHT OF SUPPORTED SYSTEMS. SYSTEM CONTENTS, AND TEST WATER.
- DESIGN EQUIPMENT SUPPORTS CAPABLE OF SUPPORTING COMBINED OPERATING WEIGHT OF SUPPORTED EQUIPMENT AND CONNECTED SYSTEMS AND 3.DESIGN SEISMIC-RESTRAINT HANGERS AND SUPPORTS FOR PIPING AND EQUIPMENT AND OBTAIN APPROVAL FROM AUTHORITIES HAVING JURISDICTION.
- 1.2 SUBMITTALS
- A. SHOP DRAWINGS: SIGNED AND SEALED BY A PROFESSIONAL ENGINEER
- 1.3 QUALITY ASSURANCE
- A. AWS D1.1/D1.1M, "STRUCTURAL WELDING CODE STEEL."
- 1.4 COMPONENTS
- A. METAL PIPE HANGERS AND SUPPORTS: CARBON OR STAINLESS STEEL
- B. TRAPEZE PIPE HANGERS: CARBON OR STAINLESS STEEL
- C. FIBERGLASS PIPE HANGERS: -CLEVIS, CENTURY COMPOSITES, COOPER B-LINE
- D. METAL FRAMING SYSTEMS: MFMA MANUFACTURER
- E. FIBERGLASS STRUT SYSTEMS: COOPER B-LINE
- F. THERMAL-HANGER SHIELD INSERTS:
- G. FASTENER SYSTEMS: POWDER-ACTUATED FASTENERS OR MECHANICAL-EXPANSION ANCHORS
- H. PIPE STANDS: COMPACT, LOW TYPE, SINGLE PIPE, HIGH TYPE, SINGLE PIPE, HIGH TYPE, MULTIPLE PIPES, CURB-MOUNTED TYPE
- I. EQUIPMENT SUPPORTS.
- END OF SECTION 230529

SECTION 230548 - VIBRATION CONTROLS FOR HVAC PIPING AND EQUIPMENT

- PART 1 GENERAL 1.1 COMPONENTS
- A. VIBRATION ISOLATORS:

1.2 FIELD QUALITY CONTROL A. TESTING: BY EITHER: OWNER-ENGAGED AGENCY, CONTRACTOR-ENGAGED AGENCY, OR CONTRACTOR. 1.1 VIBRATION ISOLATORS & SEISMIC-RESTRAINT DEVICES A. AVAILABLE MANUFACTURERS: SUBJECT TO COMPLIANCE WITH REQUIREMENTS, MANUFACTURERS OFFERING PRODUCTS THAT MAY BE INCORPORATED INTO THE WORK INCLUDE, BUT ARE NOT LIMITED TO, THE FOLLOWING:

1. ACE MOUNTINGS CO., INC. 2. AMBER/BOOTH COMPANY, INC. 3. CALIFORNIA DYNAMICS CORPORATION 4. HILTI, INC. 5. ISOLATION TECHNOLOGY, INC. 6. KINETICS NOISE CONTROL 7. LOOS & CO.; CABLEWARE DIVISION. 8. MASON INDUSTRIES. 9. TOLCO INCORPORATED; A BRAND OF NIBCO INC.

FACTORY-FABRICATED, WELDED, 1. STEEL BASE: STRUCTURAL-STEEL BASES AND RAILS. 2. INERTIA BASE: FACTORY-FABRICATED, WELDED, STRUCTURAL-STEEL BASES AND RAILS READY FOR FIELD-APPLIED, CAST-IN-PLACE CONCRETE

- PART-2 PRODUCTS

1. ISOLATOR PADS: NEOPRENE, RUBBER, HERMETICALLY AND/OR SEALED COMPRESSED FIBERGLASS 2. MOUNTS: DOUBLE-DEFLECTION TYPE.

3. RESTRAINED MOUNTS: ALL DIRECTIONAL MOUNTINGS WITH SEISMIC RESTRAINT: CAST-DUCTILE-IRON HOUSING.

4. SPRING ISOLATORS: FREESTANDING, LATERALLY STABLE, OPEN-SPRING TYPE.

5. RESTRAINED SPRING ISOLATORS: FREESTANDING, STEEL, OPEN-SPRING TYPE WITH SEISMIC RESTRAINT.

6. HOUSED SPRING MOUNTS: DUCTILE-IRON OR STEEL HOUSING, WITH INTEGRAL, VERTICALLY ADJUSTABLE SEISMIC SNUBBERS. 7. ELASTOMERIC HANGERS: DOUBLE-DEFLECTION TYPE.

8. SPRING HANGERS: COMBINATION COIL-SPRING AND ELASTOMERIC-INSERT HANGERS WITH SPRING AND INSERT IN COMPRESSION.

9. SPRING HANGERS WITH VERTICAL-LIMIT STOP: COMBINATION COIL-SPRING AND ELASTOMERIC-INSERT HANGERS WITH SPRING AND INSERT IN COMPRESSION AND WITH VERTICAL-LIMIT STOP. 10.PIPE RISER RESILIENT SUPPORT: ALL-DIRECTIONAL, ACOUSTICAL PIPE ANCHOR.

# B. AIR-MOUNTING SYSTEMS:

**RESILIENT PIPE GUIDES** 

AIR MOUNTS: FREESTANDING, SINGLE OR MULTIPLE, COMPRESSED-AIR BELLOWS.

RESTRAINED AIR MOUNTS: HOUSED COMPRESSED-AIR BELLOWS.

C. RESTRAINED VIBRATION ISOLATION ROOF-CURB RAILS: FACTORY-ASSEMBLED, FULLY ENCLOSED, INSULATED, AIR- AND WATERTIGHT CURB RAIL; WITH SPRING ISOLATORS MOUNTED ON ELASTOMERIC ISOLATION PADS, AND SNUBBER BUSHINGS.

D. VIBRATION ISOLATION EQUIPMENT BASES:

B. MANUFACTURERS: SUBJECT TO COMPLIANCE WITH REQUIREMENTS, PROVIDE PRODUCTS BY ONE OF THE FOLLOWING:

10. UNISTRUT; TYCO INTERNATIONAL, LTD.

END OF SECTION 230548



-SHEET NAME

MECHANICAL SPECIFICATIONS (1 OF 2)



# SECTION 230593 - TESTING, ADJUSTING, AND BALANCING FOR HVAC

- 1.1 SUMMARY
- A. TESTING, ADJUSTING, AND BALANCING FOR THE FOLLOWING:
  - 1. AIR SYSTEMS: CONSTANT VOLUME.
- MOTORS.
- 1.2 QUALITY ASSURANCE A. THE CONTRACTOR SHALL PROCURE THE SERVICES OF A TESTING, ADJUSTING AND BALANCING (TAB) SPECIALIST WHO SPECIALIZES IN HEATING, VENTILATION AND AIR CONDITIONING SYSTEMS, THE TAB AGENT SHALL HAVE THE FOLLOWING QUALIFICATIONS: AABC, NEBB OR TABB CERTIFIED.
- 1.3 EXECUTION
- A. THE TAB SPECIALIST SHALL PERFORM FLOW MEASUREMENTS OF ALL EXISTING AIR AND HYDRONIC SYSTEMS THAT ARE TO REMAIN OR TO BE INCORPORATED INTO NEW WORK PRIOR TO THE STARTING OF WORK IN THE PROJECT SCOPE. A REPORT OF THESE MEASUREMENTS, INDICATING ANY AND ALL DEFICIENCIES SHALL BE SUBMITTED FOR OWNER REVIEW.
- B. THE TAB SPECIALIST SHALL PERFORM FLOW MEASUREMENTS OF ALL NEW AIR AND HYDRONIC SYSTEMS AS LISTED ABOVE IN THE PROJECT SCOPE. A REPORT OF THESE MEASUREMENTS, INDICATING ANY AND ALL DEFICIENCIES SHALL BE SUBMITTED FOR OWNER REVIEW.
- C. THE REPORT SHALL INDICATE A SCHEMATIC DIAGRAM INDICATING LOCATIONS OF ALL EQUIPMENT TESTED AND MEASUREMENT LOCATIONS.
- D. PRIOR TO FINAL INSPECTION OF THE WORK, THE TAB SPECIALIST SHALL BALANCE ALL SYSTEMS AS INDICATED ABOVE TO THE REQUIREMENTS OF THE DESIGN.
- E. THE CONTRACTOR SHALL HAVE FURNISH AND INSTALL ALL ADDITIONAL BALANCING EQUIPMENT, PRESSURE TAPS, GAUGES AND OTHER EQUIPMENT AS REQUIRED FOR A PROPERLY BALANCED SYSTEM AT NO ADDITIONAL COST TO THE OWNER. SUCH ADDITIONAL EQUIPMENT SHALL ADHERE IN STRICT ACCORDANCE WITH THE RESPECTIVE EQUIPMENT MANUFACTURER'S RECOMMENDATIONS.
- F. THE CONTRACTOR SHALL HAVE THE TESTING AND BALANCING SPECIALIST COORDINATE ALL WORK OF THIS S3ECTION WITH THE BUILDING MANAGER. BALANCING WORK SHALL NOT CONFLICT WITH OTHER WORK SO AS TO MAINTAIN COMPLETION WITHIN THE SPECIFIED TIME.
- G. ALL INSTRUMENTS USED FOR TAB SHALL BE MAINTAINED IN GOOD WORKING CONDITION AND ACCURATELY CALIBRATED.
- H. TOLERANCES: PLUS OR MINUS 5 PERCENT OF DESIGN VALUES.
- INSPECTIONS: RANDOM CHECKS BY OWNER OR ARCHITECT TO VERIFY FINAL TESTING, ADJUSTING, AND BALANCING REPORT.
- J. ADDITIONAL TESTS: RANDOM TESTS WITHIN 90 DAYS OF COMPLETING TAB TO VERIFY BALANCE CONDITIONS AND SEASONAL TESTS.

END OF SECTION 230593

# SECTION 230713 - DUCT INSULATION

1.1 QUALITY ASSURANCE

SURFACE-BURNING CHARACTERISTICS: ALL INSULATION SHALL HAVE COMPOSITE (INSULATION JACKET OR FACING AND ADHESIVE USED TO ADHERE THE FACING OR JACKET TO THE INSULATION) A FLAME-SPREAD INDEX OF 25, AND SMOKE-DEVELOPED INDEX OF 50 FOR INSULATION INSTALLED INDOOR, 75, AND SMOKE-DEVELOPED INDEX OF 150 FOR INSULATION INSTALLED OUTDOORS; ACCORDING TO ASTME 84.

- 1.2 FIELD QUALITY CONTROL A. FIELD INSPECTIONS: BY OWNER-ENGAGED AGENCY.
- 1.3 INDOOR DUCT AND PLENUM INSULATION SCHEDULE;
- A. CONCEALED, RECTANGULAR, ROUND AND FLAT-OVAL, SUPPLY-RETURN, OUTDOOR-AND EXHAUST-AIR DUCT AND AIR PLENUM INSULATION:
- B. FLEXIBLE ELASTOMERIC, MINERAL-FIBER BLANKET,

MINERAL-FIBER BOARD OR POLYOLEFIN WITH MINIMUM INSTALLED THERMAL RESISTANCE AS FOLLOWS:

	SUPPLY	RETURN
UNCONDITIONED SPACES WITHIN BUILDING:	R-6	R-6
WITHIN BUILDING ENVELOPE ASSEMBLY:	R-8	R-8
OUTSIDE OF BUILDING:	R-8	R-8

1.4 ITEMS NOT INSULATED:

- 1. FIBROUS-GLASS DUCTS.
- 2. METAL DUCTS WITH DUCT LINER OR SUFFICIENT THICKNESS TO COMPLY WITH ENERGY CODE ANDASHRAE/IESNA 90.1.
- 3. FACTORY-INSULATED FLEXIBLE DUCTS.
- 4. FACTORY-INSULATED PLENUMS AND CASINGS.
- 5. FLEXIBLE CONNECTORS.
- 6. VIBRATION-CONTROL DEVICES.
- FACTORY-INSULATED ACCESS PANELS AND DOORS.
- 8. DUCTS THAT HAVE INTERNAL ACOUSTICAL LINING.

# 1.5 PRODUCTS

- A. THE FOLLOWING INSULATION MANUFACTURERS WILL BE ACCEPTABLE:
  - 1. JOHNS-MANVILLE
  - 2. OWENS-CORNING
- **1.6 ACOUSTICAL TREATMENT** 
  - 1. WHERE SHOWN ON THE DRAWINGS. LOW PRESSURE DUCTWORK SHALL BE LINED WITH 1.5" THICK R-6 AS MANUFACTURED BY DUCTMATE, 1-1/2 POUND MINIMUM

DENSITY, NEOPRENE COATED, FLEXIBLE FIBERGLASS DUCT LINER. LINING SHALL COMPLY WITH NFPA 90A AND SHALL HAVE A FLAME SPREAD CLASSIFICATION OF NOT MORE THAN 25 AND A SMOKE DEVELOPED RATING NOT MORE THAN 50. DUCT SIZES WHERE LINING IS INDICATED ON PLANS ARE MINIMUM INSIDE CLEAR DIMENSIONS REQUIRED,

END OF SECTION 230713

# SECTION 233113 - METAL DUCTS

- 1.1 CONSTRUCTION
- A. EACH DUCT SYSTEM SHALL BE CONSTRUCTED FOR THE SPECIFIC SMACNA DUCT PRESSURE CLASSIFICATIONS SHOWN ON THE CONTRACT DRAWINGS. WHERE NO PRESSURE CLASSES ARE SPECIFIED BY THE DESIGNER, THE SMACNA 1 INCH WG PRESSURE, SEAL CLASS "A".
- B. ALL DUCTWORK SHALL BE CONSTRUCTED TO SMACNA 1" WG DESIGN AND NOT LESS THAN THE FOLLOWING STANDARDS:
- 1. CONSTRUCT SO THAT ALL INTERIOR SURFACES ARE SMOOTH. USE SLIP AND DRIVE OR FLANGED AND BOLTED CONSTRUCTION WHEN FABRICATING RECTANGULAR DUCTWORK. USE SPIRAL LOCK SEAM CONSTRUCTION WHEN FABRICATING ROUND SPIRAL DUCTWORK. SHEET METAL SCREWS MAY BE USED ON DUCT HANGERS, TRANSVERSE JOINTS AND OTHER SMACNA APPROVED LOCATIONS IF THE SCREW DOES NOT EXTEND MORE THAN 1/2 INCH INTO THE DUCT.
- 2. SHEET STEEL SHALL COMPLY WITH ASTMA653 STANDARD SPECIFICATION FOR STEEL SHEET METAL, ZINC COATED (GALVANIZED) OR ZINC IRON ALLOY-COATED (GALVANINEALED) BY HOT DIP PROCESS, AND A924 STANDARD SPECIFICATION FOR GENERAL REQUIREMENT FOR SHEET METALLIC-COATED BY HOT DIP PROCESS. ALL ANGLE IRON USED FOR SUPPORT SHALL BE GALVANIZED. CONNECTIONS TO WALLS OR FLOOR SHALL BE AIR TIGHT WITH ANGLE IRON AND CAULKING. SEAL ALL DUCT SEAMS, TRANSVERSE AND LONGITUDINAL, AIR TIGHT. PROVIDE TURNING VANES ALL 90° ELBOWS.
- 3. USE ELBOWS AND TEES WITH A CENTER LINE RADIUS TO WIDTH OR DIAMETER RATIO OF 1.5 WHEREVER SPACE PERMITS. WHEN A SHORTER RADIUS MUST BE USED DUE TO LIMITED SPACE, INSTALL SINGLE WALL SHEET METAL SPLITTER VANES IN ACCORDANCE WITH SMACNA PUBLICATIONS, TYPE RE 3. WHERE SPACE WILL NOT ALLOW AND THE C VALUE OF THE RADIUS ELBOW, AS GIVEN IN SMACNA PUBLICATIONS, EXCEEDS 0.31, USE RECTANGULAR ELBOWS WITH TURNING VANES AS SPECIFIED IN SECTION 23 33 00. SQUARE THROAT-RADIUS HEEL ELBOWS WILL NOT BE ACCEPTABLE. STRAIGHT TAPS OR BULLHEAD TEES ARE NOT ACCEPTABLE.
- 4. WHERE RECTANGULAR ELBOWS ARE USED, PROVIDE TURNING VANES IN ACCORDANCE WITH SECTION 23 33 00.
- 5. PROVIDE EXPANDED TAKE-OFFS OR 45 DEGREE ENTRY FITTINGS FOR BRANCH DUCT CONNECTIONS WITH BRANCH DUCTWORK AIRFLOW VELOCITIES GREATER THAN 700 FPM. SQUARE EDGE 90-DEGREE TAKE-OFF FITTINGS OR TRAIGHT TAPS WILL NOT BE ACCEPTED.
- 6. BUTTON PUNCH SNAP-LOCK CONSTRUCTION WILL NOT BE ACCEPTED ON ALUMINUM DUCTWORK.
- 7. ROUND DUCTS MAY BE SUBSTITUTED FOR RECTANGULAR DUCTS IF SIZED IN ACCORDANCE WITH ASHRAE TABLE OF EQUIVALENT RECTANGULAR AND ROUND DUCTS. NO VARIATION OF DUCT CONFIGURATION OR SIZES PERMITTED EXCEPT BY WRITTEN PERMISSION OF THE ENGINEER.
- C. WHERE LATEST EDITION OF SMACNA DOES NOT CLEARLY STATE GAUGES AND/OR STIFFENERS TO BE USED OR, WHERE SMACNA STANDARDS REQUIRE INTERPRETATION, THE FOLLOWING MINIMUM METAL GAUGES AND BRACING SHALL BE USED:

MAX. SIDE INCHES TRANSVERSE JOINTS AND

UP TO 12 S SLIP, DRIVE SLIP, ONE INCH 22 POCKET LOCK ON 8 FOOT

CENTERS

22 13 TO 24 1"X1"X1/8" ANGLES ON 4

20 25 TO 35 1"X1"X1/8" ANGLES ON 2

- D. PROVIDE TAPPING IN DUCTS FOR THERMOMETERS WHERE SPECIFIED. IN ADDITION, PROVIDE AN AIRTIGHT PLUGGED TAPPING LOCATED AS FOLLOWS:
- 1. UPSTREAM OF EACH REHEAT COIL AND VAV BOX.
- 2. DOWNSTREAM OF EACH REHEAT COIL AND VAV BOX.
- E. FLAT OVAL OR ROUND DUCTWORK MAY BE PROVIDED IN LIEU RECTANGULAR DUCTWORK WITH THE REINFORCEMENT FOR FLAT SIDES SAME AS SPECIFIED FOR THE RECTANGULAR DUCTWORK, AND AS PER SMACNA FLAT OVAL DUCT CONSTRUCTION STANDARDS SHOWN IN FIG. 3-6 AND AS SHOWN IN FIG. 3-1 AND 3-2 FOR ROUND DUCTWORK.
- F. ALL DUCTWORK SHALL BE SEALED TO CLASS "A" AND LEAK TESTED TO MEAT SMACNA CLASS 6 FOR RECTANGULAR AND CLASS 3 FOR ROUND DUCTS.
- 1.2 MATERIALS
- A. SINGLE-WALL RECTANGULAR DUCTS AND FITTINGS.
- B. SINGLE-WALL ROUND AND FLAT-OVAL DUCTS AND FITTINGS.
- C. SHEET METAL MATERIALS
- 1. GALVANIZED SHEET STEEL.
- 2. STAINLESS-STEEL SHEETS
- 3. ALUMINUM SHEETS.
- 4. FACTORY-APPLIED ANTI-MICROBIAL COATING.

FOOT CENTERS

FOOT CENTERS

# <u>USG</u> BRACING

# D. DUCT LINER:

- 3. FIBROUS GLASS, TYPE I, FLEXIBLE.
- a. WITH ANTI-MICROBIAL EROSION-RESISTANT COATING.
- 4. FLEXIBLE ELASTOMERIC.
- 5. NATURAL FIBER.

# E. SEALANT MATERIALS:

- 1. TWO-PART TAPE SEALING SYSTEM.
- 2. WATER-BASED JOINT AND SEAM SEALANT.
- 3. SOLVENT-BASED JOINT AND SEAM SEALANT.
- 4. FLANGED JOINT SEALANT.
- 5. FLANGE GASKETS.
- 6. ROUND DUCT JOINT O-RING SEALS.

# 1.3 DUCT CLEANING

A. CLEAN EXISTING DUCT SYSTEM(S) BEFORE TESTING, ADJUSTING, AND BALANCING.

- B. CLEAN THE FOLLOWING ITEMS:
- 1. AIR OUTLETS AND INLETS.
- 2. SUPPLY, RETURN, AND EXHAUST FANS
- 3. AIR-HANDLING UNITS.
- 4. COILS AND RELATED COMPONENTS.
- 5. RETURN-AIR DUCTS, DAMPERS, ACTUATORS, AND TURNING VANES.
- 6. SUPPLY-AIR DUCTS, DAMPERS, ACTUATORS, AND TURNING VANES.
- 7. DEDICATED EXHAUST AND VENTILATION COMPONENTS AND MAKEUP AIR SYSTEMS.
- 1.4 DUCT SCHEDULE
- A. ALL DUCTS SHALL BE GALVANIZED STEEL EXCEPT AS FOLLOWS:
  - 8. MOIST ENVIRONMENT DUCT MATERIAL: ALUMINUM.

END OF SECTION 233113

# SECTION 233713 - DIFFUSERS, REGISTERS, AND GRILLES

- 1.1 PRODUCTS
- A. DIFFUSERS, REGISTERS AND GRILLES SHALL BE FURNISHED AND INSTALLED FOR CAPACITIES AND IN LOCATIONS INDICATED ON DRAWINGS. ALL REGISTERS AND DIFFUSERS SHALL BE PRIME COATED STEEL OR EXTRUDED ALUMINUM FINISHED UNLESS OTHERWISE NOTED IN BAKED WHITE ENAMEL.
- B. MANUFACTURERS: TITUS
  - 1. SUBJECT TO COMPLIANCE WITH REQUIREMENTS, PROVIDE PRODUCT BY ONE OF THE FOLLOWING:
- a. CARNES.
- b. HART & COOLEY INC.
- c. KRUEGER.
- C. ALL DIFFUSERS SHALL HAVE CONTROLLING/EQUALIZING GRID AND
- OPPOSED BLADE DAMPER UNLESS OTHERWISE NOTED. D. ALL DUCTED RETURN REGISTERS SHALL HAVE AN OPPOSED
- BLADE DAMPER UNLESS OTHERWISE NOTED.

END OF SECTION 233713









M1.1

1/4" = 1'-0"



(6) ROUTE 6"Ø EXHAUST DUCT UP THROUGH ROOF WITH TALL CONE FLASHING, WEATHER SKIRT, AND GOOSE NECK. MAINTAIN A MINIMUM OF 10'-O" FROM ALL OUTSIDE AIR INTAKES AND

(3) ROUTE 8"Ø EXHAUST DUCT UP THROUGH ROOF WITH TALL CONE FLASHING, WEATHER SKIRT, AND GOOSE NECK. MAINTAIN A MINIMUM OF 10'-O" FROM ALL OUTSIDE AIR INTAKES AND

(5) RELOCATE AND REUSE EXISTING SMOKE DETECTOR, IF IT IS NOT PRESENT THEN, PROVIDE

(4) INTERLOCK EXHAUST FAN EF-1 (N), TEF-1 (N) & TEF-2 (N) WITH RTU-1(E). COORDINATE WITH

NEW ONE. SMOKE DETECTOR SHALL BE FURNISHED/INSTALLED BY MECHANICAL CONTRACTOR AND WIRED BY ELECTRICAL CONTRACTOR TO SHUT DOWN CORRESPONDING RTU UNDER ALARM CONDITIONS. ALL WIRING SHALL BE IN CONDUIT PER N E C SMOKE

(1) EXTEND FULL SIZE SUPPLY & RETURN DUCTWORK FROM EXISTING ROOFTOP UNIT TO SPACE. EXTEND AS SHOWN. ACOUSTICALLY LINE. THE FIRST 10'-0" OF BOTH SUPPLY AND RETURN

FOR EXPOSED DUCTWORK, PROVIDE INTERNAL INSULATION. FOR CONCEALED DUCTWORK

H. ALL SOURCE OF MECHANICAL INTAKE SHALL MAINTAIN 10 LINEAR FEET SEPARATION BETWEEN ANY SOURCE OF EXHAUST. CONTRACTOR IS RESPONSIBLE TO ADJUST DUCT

G. ALL EXPOSED DUCTWORK SHALL BE AS SHOWN, DOUBLE WALL, INSULATED METAL, PRIMED FOR PAINTING. ALL CONCEALED DUCTWORK SHALL BE INSULATED METAL RECTANGULAR UNLESS OTHERWISE ALLOWED IN WRITING BY THE ENGINEER OF RECORD. COORDINATE

D. DUCT SIZES SHOWN ON PLANS ARE CLEAR INSIDE AIR STREAM DIMENSIONS. E. CONTRACTOR SHALL COORDINATE ALL ELECTRICAL REQUIREMENTS FOR ALL HVAC BASED ON ACTUAL EQUIPMENT SELECTED PRIOR TO INSTALLATION. F. CONTRACTOR SHALL COORDINATE EQUIPMENT WEIGHTS AND SUPPORTS BASED ON ACTUAL

OTHER ACCESSORIES IN ORDER TO COMPLETE THE INSTALLATION. C. EQUIPMENT SIZES, DIMENSIONS AND REQUIRED CONNECTIONS SHALL BE VERIFIED WITH THE ACTUAL EQUIPMENT SELECTED VENDOR DRAWINGS BEFORE FABRICATION OF DUCTWORK.

A. CONTRACTOR SHALL BALANCE EACH AIR DIFFUSER WITH THE CFM SHOWN ON PLANS. B. DUCTWORK SHOWN ON PLAN ARE SCHEMATIC ONLY. CONTRACTOR SHALL COORDINATE WITH OTHER TRADES FOR DUCTWORK ROUTING. OFFEST AND RUN DUCTWORK INSIDE THE STRUCTURE IF REQUIRED. PROVIDE ANY EXTRA DUCTWORK, FITTINGS, INSULATIONS AND

TERMINATES.

(8) Ø6" EXHAUST DUCT UP THROUGH ROOF WITH TALL CONE FLASHING, WEATHER SKIRT, AND GOOSE NECK. MAINTAIN A MINIMUM OF 10'-0" FROM ALL OUTSIDE AIR INTAKES.

EXISTING CONDENSATE DRAIN FROM RTU-1(E) TO REMAIN AS IT IS. CONTRACTOR TO FLUSH THE EXISTING DRAIN LINES. REPLACE AS/IF REQUIRED.

INTAKE SOURCE FROM ADJACENT TENANTS. ALSO MAINTAIN 10 FEET DISTANCE BETWEEN ANY OUTSIDE AIR INTAKE SOURCE AND ANY EXHAUST AIR SOURCE FROM ADJACENT TENANTS. CONTRACTOR TO FIELD VERIFY.

INFORM TO ARCHITECT IF ANY ACCESSORIES NOT WORKING OR NOT IN GOOD CONDITION. MAINTAIN 10 FEET DISTANCE BETWEEN ANY EXHAUST AIR SOURCE AND ANY OUTSIDE AIR

(5) EXISTING RTU-1(E) TO REMAIN AS IS AND TO BE REUSED WITH ALL ITS EXISTING ACCESSORIES. CONTRACTOR TO FIELD VERIFY LOCATION OF THE EQUIPMENT ON SITE &

Ø8" TOILET EXHAUST DUCT UP THROUGH ROOF WITH TALL CONE FLASHING, WEATHER SKIRT, AND GOOSE NECK. MAINTAIN A MINIMUM OF 10'-0" FROM ALL OUTSIDE AIR INTAKES.

CONTRACTOR TO FIELD VERIFY THAT THE LOCATION OF ANY INTAKE SOURCE FROM ADJACENT TENANTS SHOULD BE AT LEAST 10' AWAY FROM THE EXHAUST DUCT

CONTRACTOR TO FIELD VERIFY THAT THE LOCATION OF ANY EXHAUST SOURCE FROM ADJACENT TENANTS SHOULD BE AT LEAST 10' AWAY FROM RTU-1(E).

(1) COORDINATE FINAL LOCATION OF EQUIPMENT WITH STRUCTURAL DRAWINGS/ENGINEER

F. COORDINATE WITH ALL TRADES FOR MATERIALS IN RATED AND PLENUM SPACES. G. ALL SOURCE OF MECHANICAL INTAKE SHALL MAINTAIN 10 LINEAR FEET SEPARATION BETWEEN ANY SOURCE OF EXHAUST. CONTRACTOR IS RESPONSIBLE TO ADJUST DUCT

D. CONTRACTOR SHALL COORDINATE ALL ELECTRICAL REQUIREMENTS FOR ALL HVAC BASED ON ACTUAL EQUIPMENT SELECTED PRIOR TO INSTALLATION. E. CONTRACTOR SHALL COORDINATE EQUIPMENT WEIGHTS AND SUPPORTS BASED ON ACTUAL

A. COORDINATE LOCATIONS AND SIZES OF ROOF OPENINGS WITH OWNER AND STRUCTURAL B. ALL ITEMS TO BE RE-USED OR RELOCATED SHALL BE CLEANED, REPAIRED, AND RESTORED TO LIKE NEW CONDITION PRIOR TO RE-USE. C. EQUIPMENT SIZES, DIMENSIONS AND REQUIRED CONNECTIONS SHALL BE VERIFIED WITH THE ACTUAL EQUIPMENT SELECTED VENDOR DRAWINGS BEFORE FABRICATION OF DUCTWORK,









![](_page_5_Figure_1.jpeg)

	EXISTING ROOF TOP UNIT SCHEDULE																						
						SUPPLY FAN		LY FAN COOLING CAPACITY GAS HEATING CAPACITY		COOLING CAPACITY			GAS HEATING CAPACITY		ELECTRICAL DATA								
UNITID	MANUFACTURER	MODEL			SUPPLY AIR	OUTSIDE AIR	MAX. ESP	TOTAL	SENSIBLE A	MBIENT TEMP.	ENTERING TEMP.	INDUT MRH				рц			THERMAL EFFICIENCY (%)	EER		REMARK	
					JLIVED		CFM	CFM	(IN. OF W.G.)	MBH	MBH	DB (°F)	DB / WB (°F)			VOLIS							
RTU-1 (E)	CARRIER (V.I.F)	48TCED08A2A5A0A0A0 (V.I.F)	SEE PLAN	7.5 (V.I.F)	3000 (V.I.F)	250	1.0 (VIF)	S.A.E	S.A.E	S.A.E	S.A.E	180 (V.I.F)	148 (V.I.F)	4-13 (V.I.F)	208-230(VIF)	) 3(VIF)	50(VIF) 46(V	F) 50(VIF)	82% (V.I.F)	11(VIF)	S.A.E	1-5	
NOTES:			•	•														·		•			
1	S.A.E - SAME AS EX	ISTING , V.I.F - VERIFY IN FIELD																					
2	2 EXISTING RTU WITH ALL ACCESSORIES TO REMAIN SAME AND TO BE REUSED.																						
3	CONTRACTOR TO CONFIRM IF EXISTING RTU IS WORKING AT ITS 100% RATED CAPACITY.																						
4	CONTRACTOR TO I	FIELD VARIFY EXACT LOCATION AND CO	VFIGURATIO	ON OF RTU	ON SITE.																		

5 CONTRACTOR TO REBALANCE OUTSIDE AIR & RETURN AIR DAMPERS ON EXISTING RTU TO MATCH VALUES MENTIONED IN ABOVE TABLE..

	EXHAUST FAN SCHEDULE												
ELOW BATE EXTERNAL SPEED ELECTRIC DATA MAXIMUM													
TAG	QUANTITY		STATIC PRESSURE	SFEED	V/DU/U7				LOUDNESS	BASIS OF	DESIGN		
		CFM	IN W.G.	RPM	V/FN/NZ			FLA (AIVIF3)	DBA	MANUFACTURER	MODEL		
TEF-1(N)	TEF-1(N)         1         70         0.5         838         115/1/60         0.4         15         0.29         40         GREENHECK         SP-A50-90-VG         12												
TEF-2 (N)	1	70	0.5	838	115/1/60	0.4	15	0.29	40	GREENHECK	SP-A50-90-VG	12	
EF-1(N)	EF-1 (N) 1 70 0.5 838 115/1/60 0.4 15 0.29 40 GREENHECK SP-A50-90-VG 12												
1) PROVIDI	1) PROVIDE THERMAL OVERLOAD PROTECTION, BACKDRAFT DAMPER, AMCA SEAL & UL CERTIFIED.												
2) PROVIDI	2) PROVIDE ALL NECESSARY ACCESSORIES AS PER MANUFACTURER'S RECOMMENDATIONS.												

3) INTERLOCK TEF-1 (N), TEF-2 (N) & EF-1 (N) WITH RTU-1 (E). COORDINATE WITH ELECTRICAL CONTRACTOR.

	VENTILATION CALCULATION											
					CFM AS PER IM				EXHAUST	CFM		
ROOM NAME	AREA	NUMBER OF PEOPLE/1000sq.ft AS PER IMC 2015	NUMBER OF PEOPLE IMC 2015	FINAL PEOPLE NO.	CFM/PERSON	CFM/SQ.FT	REQUIRED OA (CFM)	PROVIDED OA (CFM)	CFM/SQFT/FIXTURE	CALCULATED CFM	PROVIDED EXHAUST CFM	
SALES/CUSTOMER/RETAIL AREA	709	15	11	11	7.5	0.12	170		0	0		
BACK AREA	341	0	0	0	0	0.12	45	250	0	0	] 210	
RESTROOM-1	52	0	0	0	0	0	0		70	70	210	
RESTROOM-2	51	0	0	0	0	0	0		70	70		
TOTAL	1153	-	-	11	-	-	215	250	-	140	210	

	AIR BALANCE									
UNIT	UNIT AREA SERVED SUPPLY AIR CFM OUTSIDE AIR CFM RETURN AIR CFM EXHAUST AIR CF									
RTU-1 (E)	SEE PLAN	250 CFM	2750 CFM	-						
EF-1(N)	BACK HOUSE	-	-	70 CFM						
TEF-1(N)	70 CFM									
TEF-2 (N)	TEF-2 (N) RESTROOM-2 70 CFM									
	TOTAL: 3000 CFM 250 CFM 2750 CFM 210 CFM									
BUILDING PRESSURE:										
1) CONTRACTOR TO REBALANCE OUTSIDE AIR & RETURN AIR DAMPERS ON RTUS TO MATCH VALUES										
MENTIONE	MENTIONED IN ABOVE TABLE.									

	AIR TERMINAL DEVICES SCHEDULE											
					BASIS OF DE	SIGN						
TAG	SIZE (IN.)	DESCRIPTION	CONSTRUCTION	NECK SIZE (IN.)	MANUFACTURER	MODEL	- NOTES					
S-1	24X24	SQUARE CONE DIFFUSER	ALUMINUM	10	TITUS	TMS	1,2,3,4,5					
S-2	24X24	SQUARE CONE DIFFUSER	ALUMINUM	8	TITUS	TMS	1,2,3,4,5					
S-3	S-3 12X12 SQUARE CONE DIFFUSER ALUMINUM 6 TITUS TMS 1,2,3,4,5											
R-1 24X24 EGGCRATE GRILLE ALUMINUM 16 TITUS 50F 1,2,3,4,5												
1) PROVID	E FRAME FO	R MOUNTING AIR DEVICE IN LAY-IN GRII	D CEILING UNLESS R	EFLECTED CEILING	PLAN INDICATES HA	RD CEILING.	IN AREAS					
WITH HAR	D CEILINGS,	PROVIDE FRAMES FOR SURFACE MOUN	TING.									
2) UNLESS	OTHERWISE	NOTED, BRANCH DUCTS SERVING AIR D	EVICES SHALL BE SA	ME SIZE AS NECK	OF AIR DEVICE.							
3) COORDI	NATE FINAL	COLOR/FINISH WITH ARCHITECT/OWNE	ER.									
4) AIR DEV	ICE SHALL BI	E OF GALVANIZED FINISH WHEN INSTAL	LED ON EXPOSED DI	JCTWORK.								
5) MAXIMI	JM NOISE CF	RITERION RATING < 30 DBA.										
FOR ROUN	D NECK DIF	USERS: NECK SIZES SHALL BE:-										
15" DIA: 901-1100 CFM												
14" DIA: 601-900 CFM												
12" DIA: 401-600 CFM												
10" DIA: 201-400 CFM												
8" DIA: 101	-200 CFM											
6" DIA: 0-1	00 CFM											

![](_page_6_Picture_7.jpeg)

<sup>5</sup> REMARK
1, 2, 3
1, 2, 3
1, 2, 3

![](_page_6_Picture_9.jpeg)

![](_page_6_Figure_10.jpeg)

				-1			
	LIGHTING		POWER AND TELECOMMUNICATION		ELECTRICAL A	BBREVIAT	IONS
	LED LIGHTING FIXTURE AND OUTLET BOX. HALF SHADED FIXTURE OR	$\bigcirc$	JUNCTION BOX WITH BLANK COVER PLATE, FLUSH IN FLOOR.	A	AMPERES	EA	EACH
	EM INDICATES FIXTURES WITH INTEGRAL BATTERY PACK FOR EMERGENCY SERVICE, U.O.N.		JUNCTION BOX WITH BLANK COVER PLATE, WALL MOUNTE, +18" AFF OR AS NOTED.	A/C, AC	AIR CONDITIONING UNIT	EC	ELECTRICAL CONTRACTOR
	LUMINAIRE TYPE : INDICATE BY LIPPERCASE LETTER SEE LIGHTING EXTURE SCHEDULE.		JUNCTION BOX WITH BLANK COVER PLATE, CEILING MOUNTED	AF	AMPERE FRAME/AMP FUSE	EF	EXHAUST FAN
	- CIRCUIT NUMBER : INDICATED BY NUMBER	0	SIMPLEX RECEPTACLE. +18" AFF OR AS NOTED.	AFF	ABOVE FINISHED FLOOR	EM	EMERGENCY
A 0 2	- SWITCHING INDICATED BY LOWER CASE LETTERS.	T <sub>A</sub>	SUFFIXE DENOTES FOLLOWING:	AS	AMP SWITCH	EMT	ELECTRICAL METALLIC TUBING
⊂a <sup>∽</sup>	- DENOTES LUMINAIRE ON EMERGENCY CIRCUIT.		B - NEMA 6 - 15R $C - NEMA 14 - 30R$	AIC	AMPS INTERRUPTING CAPACITY	EQUIP	
	- DENOTES FIXTURES DESIGNATED AS NIGHTLIGHT, WIRED TO 24 HOURS		D- NEMA 14-50R				EXISTING TO BE RELOCATED
	UNSWITCHED CIRCUIT.	<u> Ф</u>	DUPLEX CONVENIENCE RECEPTACLE, 20A, 120V +18" AFF OR AS NOTED.			EIR	ELECTRIFIED WORKSTATION
& <u>&amp;</u> <u>&amp;</u> <u></u>	CEILING/WALL MOUNTED SELF POWERED EXIT LIGHT FIXTURE WITH DIRECTIONALARROWS AS INDICATED. SHADED AREA DENOTES FACE(S).	<b>P</b>	GFI DUPLEX RECEPTACLE, 20A, 120V +18" AFF OR AS NOTED.	AWG	AMERICAN WIRE GAUGE	FWH	FURNITURE
	ISOLITE ELITE SERIES LED EXIT SIGN	₽ <sup>CL</sup>	CEILING / FLOOR MOUNTED RECEPTACLE AS INDICATED ON PLAN	C	CONDUIT	FA	FIRE ALARM
	EMERGENCY BATTERY UNIT WITH ATTACHED EMERGENCY FIXTURES AND OUTLET BOX.		HALF SWITCHED RECEPTACLE, CONTROLLED FROM WALL SWITCH. HALF	C/B,CB	CIRCUIT BREAKER	FBO	FURNISHED BY OTHERS, INSTALL
	SWITCHES AND CONTROLS	¥	SWITCHED, HALF CONSTANT HOT.	СКТ	CIRCUIT	FDR	FEEDER
\$	20A SPST TOGGLE SWITCH U.O.N. "a" DENOTES LIGHTING FIXTURE CONTROLLED.	•	DOUBLE DUPLEX OR QUAD RECEPTACLE - 20A-1P, 125V, NEMA 5-20R.	CLG	CEILING	FIBO	FURNISHED & INSTALLED BY OTHERS, WIRED BY EC
+3 +3			TELEPHONE/DATA OUTLET, 4"SQUARE OUTLET BOX WITH SINGLE GANG COLLAR	СОММ	COMMUNICATION	FIXT	FIXTURE
₽a +1	20A 3-WAY TOGGLE SWITCH U.N.O. & DENOTES LIGHTING FIXTURE CONTROLLED	V	TERMINATE WITH 90° ELBOW, BUSHING AND DRAG WIRE.	СТ	CURRENT TRANSFORMER	FL	FLOOR
\$ª 	2UA 4-WAY TOGGLE SWITCH U.N.O. "a" DENOTES LIGHTING FIXTURE CONTROLLED	_	TELEPHONE OUTLET, WALL-MOUNTED +48" AFF UNO TEL / DATA OUTLET TO BE	CU	COPPER	FLUOR	FLUORESCENT
\$ <sup>0,03</sup>	SWITCH WITH OCCUPANCY SENSOR AND DIMMER		PROVIDED WITH 1" CONDUIT U.O.N. TO H.C. AND TERMINATED WITH 90 DEGREE REE ELBOW AND BUSHING. TEL / DATA OUTLET PLATE SHALL BE PROVIDED WITH	•C	DEGREE CELSIUS	G	GROUND
	WALL MOUNTED PHOTOCELL MOUNTED IN NEMA 3R ENCLOSURE.		1 1/4"DIAMETER GROMMETED OPENING.	•F	DEGREE FAHRENHEIT	GFI	GROUND FAULT INTERRUPTER
os	CEILING OCCUPANCY SENSOR, NUMBER INDICATES TYPE; SEE OCCUPANCY SENSOR SCHEDULE		DATA OUTLET – (1) PORT UNO, +18" AFF, UNO TEL / DATA OUTLET TO BE PROVIDED WITH 1" CONDUIT U.O.N. TO H.C. AND TERMINATED WITH 90 DEGREE	DIA	DIAMETER	GP	GENERAL PURPOSE
-0s	WALL OCCUPANCY SENSOR, NUMBER INDICATES TYPE; SEE OCCUPANCY	7	ELBOW AND BUSHING. TEL / DATA OUTLET PLATE SHALL BE PROVIDED WITH 1 1/4" DIAMETER GROMMETED OPENING.	DISC	DISCONNECT	НС	HUNG CEILING
PC	DIMMER SWITCH		USB OUTLET WITH RECEPTACLE	DN	DOWN	HP	HORSEPOWER
	CEILING VACANCY SENSOR, NUMBER INDICATES TYPE; SEE OCCUPANCY			DP	DISTRIBUTION PANEL	HWH	HOW WATER HEATER
	SENSOR SCHEDULE.		SPECIAL RECEPTACLE – 240V, AMPS AS NOTED.	DWH	DOMESTIC WATER HEATER	HZ	HERTZ
US	CEILING MOUNTED DAYLIGHT SENSOR.		CABLE TV OUTLET, WALL-MOUNTED AT 18" AFF UNO.	DWG	DRAWING		
	WIRING SYSTEMS		MOTORS AND CONTROLS	KCMII	ONE THOUSAND CIRCULAR MILS	PVC	
3	POWER OR LIGHTING CIRCUITRY HOMERUN WITH PANELBOARD DESIGNATION, NUMBER WHERE USED INDICATES CIRCUIT NUMBER. IT SHALL CONSISTS OF	M	AC INDOOR UNIT MOTOR AS NOTED WITH LIQUID TIGHT FLEXIBLE CONNECTION	KV	KILOVOLT	PWR	POWER
UP-	1#12 Ø, 1#12 N. & 1#12 G. IN 3/4"C, UNLESS OTHERWISE NOTED.		WITH JUNCTION BOX AND MOTOR SWITCH.	KVA	KILOVOLT-AMPERES	R	REMOVE
3 5	POWER OR LIGHTING CIRCUITRY HOMERUN WITH PANELBOARD DESIGNATION, NUMBER WHERE USED INDICATES CIRCUIT NUMBER. IT SHALL CONSISTS OF	WP	SWITCH WITH WEATHER PROOF.	KW	KILOWATTS	RE	RELOCATED EXISTING
09–	2#12 Ø, 2#12 N. & 2#12 G. IN 3/4"C, UNLESS OTHERWISE NOTED.		NON FUSED DISCONNECT SWITCH AMPERAGE, AND NUMBER OF POLES	LP	LIGHTING PANEL	REC	RECEPTACLE
357 UP-	NUMBER WHERE USED INDICATES CIRCUIT NUMBER. IT SHALL CONSISTS OF		30A/240V NON FUSED DISCONNECT SWITCH	LTG	LIGHTING	RGS	RIGID GALVANIZED STEEL
	CONDUIT TURNING UP SEE FLOOR PLANS FOR CONDITIONS		60A/240V NON EUSED DISCONNECT SWITCH	MAX	МАХІМИМ	RR	REMOVE & RELOCATE
•	CONDUIT TUIRNING DOWN SEE FLOOR PLANS FOR CONDITION		1004/240V NON EUSED DISCONNECT SWITCH	МС	MOTOR CONTROLLER	SECT	SECTION
•			2004 (240V NON FUSED DISCONNECT SWITCH	MCB	MAIN CIRCUIT BREAKER	SPDT	SINGLE POLE DOUBLE THROW
	CONDUIT AND WIRE TO BUILDING GROUND.		200A/240V NON FOSED DISCONNECT SWITCH	MER	MECHANICAL EQUIPMENT ROOM	SPST	SINGLE POLE SINGLE THROW
			HVAC/CONTRACTOR, INSTALLED AND WIRED BY ELECTRICAL CONTRACTOR.	MIN	MINIMUM	SPEC	SPECIFICATION
	CABLE TRAY, WIDTH AND MOUNTING AS NOTED.	<u>400</u>	FUSED DISCONNECT SWITCH AND FUSE AMPERAGE AS INDICATED. TOP	MLO	MAIN LUGS ONLY	SW	SWITCH
	UNDERGROUND		NUMBER DENOTS SWITCH SIZE AND BOTTOM NUMBER DENOTES FUSE.	MTD		SWBD	SWITCHBOARD
	EXISTING		MOTORIZED DAMPER	MIS	MANUAL IKANSELK SWIICH		SIMMEIKILAL
			FIRE SMOKE DAMPER			TEMP	
	NEW			NI		TXF	TOILET EXHAUST FAN
<u>(s)</u>	CEILING MOUNTED SMOKE DETECTOR.		DUPLEX PUMP. NUMBER INDICATES HP RATING OF PUMP.	NTS	NOT TO SCALE	TYP	TYPICAL
\$700	COMBINATION OF SMOKE AND CO DETECTOR.	S <sub>T</sub> 🥔	THERMAL OVERLOAD SWITCH AT MOTOR. PROVIDE THERMAL ELEMENTS AS	OC	ON CENTER	UON	UNLESS OTHERWISE NOTED
	ELECTRICAL DRAWING LIST	Su	MANUAL MOTOR SWITCH	Р	POLES	V	VOLT/VOLTAGE
E0.1	ELECTRICAL SYMBOLS AND GENERAL NOTES	1.5 kW	ELECTRICAL HEATER, NUMBER DENOTES HEATER RATING	РВ	PULLBOX	VA	VOLT AMPERE
E0.2	ELECTRICAL SPECIFICATIONS SHEET 1 OF 2		CODES & STANDARDS	W	WATT	WP	WEATHER PROOF
E0.3	ELECTRICAL SPECIFICATIONS SHEET 2 OF 2			W	WIRE	XFMR	TRANSFORMER
E1.0	ELECTRICAL LIGHTING PLAN	2020 NA	ECC (BASE IECC 2015)	E	EXISTING	IG	ISOLATED GROUND
E2.0	ELECTRICAL POWER PLAN			USB	USB JACK	TR	TAMPER RESISTANT
E2.1	LOW VOLTAGE PLAN	_		HD	HAND DRYER		
E3.0	ELECTRICAL RISER & SIGNLE LINE DIAGRAM & PANEL SCHEDULE	_					
E4.0	ELECTRICAL DETAILS	_					
£5.0	LECTRICAL COMCHECK						

# ELECTRICAL SYMBOLS LIST

		GENERAL NOTES ( apply to all "e" drawings)							
	1.	CONTRACTOR SHALL VISIT THE SITE AND BECOME FAMILIAR WITH ALL EXISTING CONDITIONS THAT MAY AFFECT THE WORK. NO ADDITIONAL COMPENSATION							
	2.	CONTRACTOR SHALL OBTAIN AND PAY FOR ALL PERMITS, TEST REPORTS, AND CERTIFICATIONS FOR TEMPORARY AND FINAL CERTIFICATE OF OCCUPANCY.							
	3.	FIRE STOP ALL PENETRATIONS OF FIRE RATED CONSTRUCTION IN A CODE APPROVED MANNER IN ORDER TO MAINTAIN FIRE RATING. ALL PENETRATIONS							
	4	SECURE ALL SUPPORTS TO BUILDING STRUCTURE UTILIZING TOGGLE BOLTS (HOLLOW MASONRY), EXPANSION SHIELDS OR INSERTS (CONCRETE AND BRICK), MACHINE SCREWS (METAL), BEAM CLAMPS (FRAMEWORK), WOOD SCREWS (WOOD) OR PAN THRU STRAPS (METAL DECK). NAILS, RAWL PLUGS AND WOOD PLUGS ARE NOT PERMITTED. WHERE REQUIRED BY STRUCTURE, PROVIDE THRU BOLTS AND FISH PLATES. SUPPORT HORIZONTAL RUNS OF METALLIC RACEWAYS NOT MORE THAN 10 FT APART. SUPPORT RACEWAY RISERS AT EACH FLOOR LEVEL. RUN EXPOSED RACEWAYS PARALLEL WITH OR AT RIGHT ANGLES TO WALLS.							
	5.	LEAVE WIRES WITH SUFFICIENT SLACK TO PERMIT MAKING FINAL CONNECTIONS. RACEWAYS OVER 10 FT LONG IN WHICH WIRING IS NOT INSTALLED: FURNISH FISH WIRE.							
D	6.	VERIFY LOCATIONS OF OUTLETS AND SWITCHES IN FINISHED ROOMS WITH ARCHITECTURAL DRAWINGS OF INTERIOR DETAILS AND FINISH. IN CENTERING OUTLETS AND LOCATING BOXES AND OUTLETS, ALLOW FOR OVERHEAD PIPES, DUCTS AND MECHANICAL EQUIPMENT, EQUIPMENT, VARIATIONS IN FIREPROOFING AND PLASTERING, WINDOW AND DOOR TRIM, PANELING, HUNG CEILINGS AND THE LIKE. CORRECT ANY INACCURACY RESULTING FROM FAILURE TO DO SO WITHOUT EXPENSE TO OWNER.							
	7.	CONTRACTOR SHALL PROVIDE A WARRANTY ON ALL MATERIALS, EQUIPMENT, AND WORKMANSHIP FOR A PERIOD OF ONE YEAR FROM THE DATE OF FINAL ACCEPTANCE.							
	8.	ALL UNUSED MATERIALS AND DEBRIS SHALL BE LEGALLY REMOVED AND DISPOSED OF AWAY FROM THE PREMISES ON A DAILY BASIS.							
	9.	CONTRACTOR SHALL PATCH, PAINT, AND RESTORE EXISTING SURFACES DAMAGED DURING THE COURSE OF THIS CONSTRUCTION TO PRE-EXISTING CONDITIONS OR BETTER.							
	10.	MINIMUM SIZE OF CONDUIT SHALL BE $\frac{3}{4}$ ", and type shall be electrical metallic tubing (emt), unless otherwise noted. Provide nylon drag line and conduit cap for all empty conduits.			C				
	11.	CONNECT CONDUIT TO MOTOR CONDUIT TERMINAL BOXES WITH FLEXIBLE CONDUIT (MINIMUM 18 IN. LENGTH AND 50% SLACK). DO NOT TERMINATE IN OR FASTEN RACEWAYS TO MOTOR FOUNDATION.		ſ	Š				
	12.	PULL AND JUNCTION BOXES WHERE INDICATED ON THE DRAWINGS, SHALL BE CONSIDERED SHOWN AT THEIR APPROXIMATE LOCATION. THE CONTRACTOR SHALL LOCATE THEM AS FIELD CONDITIONS DICTATE. ADDITIONAL PULL AND JUNCTION BOXES NOT SHOWN ON DRAWINGS SHALL BE PROVDED WHERE REQUIRED BY APPLICABLE CODE PROVISIONS OR WHERE CALLED FOR BY FIELD CONDITIONS. PULL AND JUNCTION BOXES SHALL BE SURFACE TYPE IN UNFINISHED AREAS AND INSTALLED CANCEALED IN FINISHED AREAS, AND ALL COVERS TO PULL & JUNCTION BOXES SHALL BE READILY ACCESSIBLE.		•	THEK				
	13.	SUPPORT PANEL, JUNCTION AND PULLBOXES INDEPENDENTLY TO BUILDING STRUCTURE WITH NO WEIGHT BEARING ON RACEWAYS.			C				
	14.	FOR EXACT LOCATION AND MOUNTING HEIGHT OF LIGHTING FIXTURES AND SWITCH/RECEPTACLE OUTLETS, REFER TO ARCHITECTURAL REFLECTED CEILING AND POWER PLANS.							
	15.	ALL ELECTRICAL ACCESSORIES AND EQUIPMENT INSTALLED OUTSIDE OR EXPOSED TO WEATHER SHALL HAVE NEMA 3R ENCLOSURES AND SHALL BE TIGHTLY GASKETED FOR A COMPLETE RAINTIGHT INSTALLATION. ALL BUILDING EXTERIOR MOUNTED RECEPTACLES SHALL BE GFCI RATED AND MOUNTED IN WEATHERPROOF ENCLOSURE.			5	) K			
	16.	ALL ACCESS PANEL LOCATIONS SHALL BE REVIEWED BY ARCHITECT PRIOR TO INSTALLATION.			5				
	. 17.	ELECTRICAL CONTRACTOR SHALL COORDINATE THE LOCATION AND INSTALLATION OF NEW WORK WITH THE GENERAL CONTRACTOR AND OTHER ASSOCIATED TRADES IN A TIMELY MANNER. THE CONTRACTOR IS RESPONSIBLE FOR FIELD VERIFYING ALL DIMENSIONS AND CONDITIONS PRIOR TO CONSTRUCTION. REFER TO ALL GENERAL, MECHANICAL, AND ELECTRICAL, DRAWINGS AND SPECIFICATIONS FOR THIS PROJECT.							
	18.	ALL CONDUITS AND EQUIPMENT TO BE CONCEAL ED IN FINISHED SPACES UNLESS OTHERWISE NOTED. CONDUITS SHALL BE ENCASED IN THE CONCRETE FLOOR SLAB.							
	19.	ALL EQUIPMENT AND MATERIALS INSTALLED IN PLENUM CEILINGS SHALL BE APPROVED FOR THAT APPLICATION.	PTION						
	20.	OUTLET BOXES AND JUNCTION BOXES ON OPPOSITE SIDES OF FIRE-RATED WALLS SHALL BE SEPARATED BY A HORIZONTAL DISTANCE OF NOT LESS THAN 24 INCHES, UNLESS FIRE-RATED BOXES OR PUTTY PADS ARE UTILIZED.	DESCRI	1					
	21.	COORDINATE ALL FLOOR PENETRATIONS WITH THE STRUCTURAL AND ARCHITECTURAL DRAWINGS. CONFIRM PENETRATION LOCATIONS WITRH THE ENGINEER AND OWNER BEFORE INSTALLATION.		ATAITO	AENTS				
	22.	COORDINATE THE MOUNTING HEIGHT AND LOCATION OF RACEWAYS, COMMUNICATIONS OUTLETS, AND RECEPTACLES WITH THE ARCHITECTURAL CASEWORK DRAWINGS AND DETAILS. COORDINATE LOCATIONS OF LIGHT		PERMIT SET	ZEVIEW COM				
	23.	DRAWINGS AND DETAILS. REFER TO ARCHITECTURAL PLANS FOR FINAL LOACTIONS OF ALL LUMINARIES	DATE	5/16/24 F	8/12/24 F				
	24.	AND SWITCHES, AND FOR ALL FINISHED CEILING HEIGHTS. REFER TO ARCHITECTURAL PLANS FOR FINAL LOCATIONS OF ALL ELECTRICAL	NO.	0 0	5 8 				
	25.	LIGHTING FIXTURES PROVIDED WITH EMERGENCY BATTERY PACKS AND INDICATED WITH SWITCH CONTROL SHALL BE WIRED WITH BATTERY CHARGING/SENSING CIRCUIT WIRED AHEAD OF SWITCH CONTROL	DF CF	AWN BY HECKED	у вү H. PRO	JECT N	0.:	<u> </u>	
	26.	NUMBER(S) SHOWN AT RECEPTACLES, JUNCTION BOXES AND EQUIPMENT INDICATES CIRCUIT NUMBERS IN PANELBOARD. PROVIDE WIRE AND CONDUIT TO INTERCONNECT EQUIPMENT AND DEVICES WITH SAME CIRCUIT NUMBERS AND RUN TO PANELBOARD.	_	<sup>MOS24</sup> - SHEI E	i001.0 ET NAN LECTI	ne — RICAL	SYM	BOL	 S &
	27.	ALL ELECTRICAL WORK SHALL BE IN ACCORDANCE WITH THE 2020 NATIONAL ELECTRICAL CODE. ALL ELECTRICAL MATERIALS, DEVICES, APPLIANCES, AND EQUIPMENT SHALL BE LABEL LISTED BY A NORTH CAROLINA (NC) APPROVED THIRD PARTY TESTING AGENCY.	-	-SHEI NUN	Ge et - 18er			лЕS 	
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# ELECTRICAL SPECIFICATIONS

# GENERAL:

- A. THE "GENERAL CONDITIONS OF THE CONTRACT FOR CONSTRUCTION," AIA DOCUMENT A201, LATEST EDITION, AND THESE SPECIFICATIONS AS APPLICABLE ARE PART OF THIS CONTRACT.
- B. DRAWING ARE DIAGRAMMATIC AND INDICATE GENERAL ARRANGEMENT OF SYSTEMS AND WORK. CONDUIT ROUTING IS SHOWN DIAGRAMMATICALLY AND DOES NOT SHOW ALL OFFSETS, DROPS AND RISES OF RUNS. THE CONTRACTOR SHALL ALLOW IN HIS PRICE FOR ROUTING OF CONDUIT TO AVOID OBSTRUCTIONS. COORDINATION WITH EXISTING SERVICES, INCLUDING THOSE OF OTHER TRADES, IS REQUIRED, MAINTAIN HEADROOM AND SPACE CONDITIONS.
- C. BIDDERS, BEFORE SUBMITTING PROPOSALS, SHALL VISIT AND CAREFULLY EXAMINE THE AREA AFFECTED BY THIS WORK TO FAMILIARIZE THEMSELVES WITH THE EXISTING CONDITIONS AND THE DIFFICULTIES THAT WILL ATTEND THE EXECUTION OF THIS WORK. SUBMISSION OF A PROPOSAL WILL BE CONSTRUED AS EVIDENCE THAT SUCH AN EXAMINATION HAS BEEN MADE, AND LATER CLAIMS WILL NOT BE RECOGNIZED FOR EXTRA LABOR, EQUIPMENT, OR MATERIALS, REQUIRED BECAUSE OF DIFFICULTIES ENCOUNTERED WHICH COULD HAVE BEEN FORESEEN HAD SUCH AN EXAMINATION BEEN MADE.
- D. DISCONNECT, REMOVE AND/OR RELOCATE EXISTING MATERIAL EQUIPMENT AND OTHER WORK AS NOTED OR REQUIRED FOR PROPER INSTALLATION OF NEW WORK.
- E. THE CONTRACTOR SHALL KEEP ALL EQUIPMENT AND MATERIALS, AND ALL PARTS OF THE BUILDING EXTERIOR SPACES AND ADJACENT STREETS, SIDEWALKS AND PAVEMENTS, FREE FROM MATERIAL AND DEBRIS RESULTING FROM THE EXECUTION OF THIS WORK. EXCESS MATERIALS WILL NOT BE PERMITTED TO ACCUMULATE EITHER ON THE INTERIOR OR THE EXTERIOR.
- F. SEAL OPENINGS THROUGH PARTITIONS, WALLS AND FLOORS WITH MINERAL WOOL OR OTHER NONCOMBUSTIBLE MATERIAL, UNLESS OTHERWISE NOTED.
- G. PROVIDE ALL NECESSARY FLASHING AND COUNTER FLASHING TO MAINTAIN THE WATERPROOFING INTEGRITY OF THE BUILDING AS REQUIRED BY THE INSTALLATION OR REMOVAL OF CONDUIT AND EQUIPMENT, PROVIDE EQUIPMENT CURBS AS REQUIRED.
- H. ALL EXISTING MATERIAL, EQUIPMENT AND CONSTRUCTION DEBRIS TO BE REMOVED UNDER THIS CONTRACT SHALL BECOME THE PROPERTY OF THE CONTRACTOR WITH THE EXCEPTION OF SPECIFIC EQUIPMENT ND APPARATUS REQUESTED BY THE BUILDING REPRESENTATIVE, ARCHITECT OR AS NOTED TO BE RELOCATED ON THE DRAWINGS. REMOVED EQUIPMENT SHALL BE PROPERLY DISPOSED OF BY THIS CONTRACTOR.
- I. THE CONTRACTOR'S PROPOSAL FOR ALL WORK SHALL BE PREDICATED ON THE PERFORMANCE OF THE WORK DURING REGULAR WORKING HOURS. WHEN SO DIRECTED, HOWEVER, THE CONTRACTOR SHALL INSTALL WORK DURING OVERTIME HOURS AND THE ADDITIONAL COST TO BE CHARGED THEREFORE SHALL BE ONLY THE "PREMIUM" PORTION OF THE WAGES PAID.
- J. UNLESS OTHERWISE SPECIFICALLY NOTED OR SPECIFIED, INCLUDE ALL CUTTING AND PATCHING OF EXISTING FLOORS, WALLS, PARTITIONS AND OTHER MATERIALS IN THE EXISTING BUILDING. THE CONTRACTOR SHALL RESTORE THESE AREAS TO ORIGINAL CONDITION.
- K. ALL MATERIAL AND EQUIPMENT SHALL BE NEW UNLESS OTHERWISE NOTED AND SHALL BE IN ACCORDANCE WITH BUILDING STANDARDS.
- L. INSURANCE: PROVIDE IN ACCORDANCE WITH OWNER/BUILDING REQUIREMENTS AND SHALL INCLUDE A HOLD HARMLESS CLAUSE FOR OWNER AND ENGINEER.
- M. THE FINAL ACCEPTANCE SHALL BE MADE AFTER THE CONTRACTOR HAS ADJUSTED HIS EQUIPMENT, TESTED THE VARIOUS SYSTEMS, DEMONSTRATED THAT IT FULFILLS THE REQUIREMENTS OF THE DRAWINGS AND SPECIFICATIONS AND HAS FURNISHED ALL THE REQUIRED CERTIFICATED OF INSPECTION AND APPROVAL.
- GENERAL PROVISIONS FOR ELECTRICAL WORK:
- DEFINITIONS:
- 1) "PROVIDE": TO FURNISH, INSTALL AND CONNECT UP COMPLETE AND READY FOR SAFE AND REGULAR OPERATION THE PARTICULAR WORK REFERRED TO UNLESS SPECIFICALLY OTHERWISE NOTED.
- 2) "INSTALL": TO ERECT, MOUNT AND CONNECT COMPLETE WITH RELATED ACCESSORIES.
- 3) "FURNISH" OR "SUPPLY": TO PURCHASE, PROCURE, ACQUIRE. AND DELIVER COMPLETE WITH RELATED ACCESSORIES.
- 4) "WORK": LABOR, MATERIALS, EQUIPMENT, APPARATUS, CONTROLS, ACCESSORIES AND OTHER ITEMS REQUIRED FOR PROPER AND COMPLETE INSTALLATION.
- 5) "WIRING": RACEWAY. FITTINGS, WIRE, BOXES, AND RELATED ITEMS.
- 6) "CONCEALED": EMBEDDED IN MASONRY OR OTHER CONSTRUCTION, INSTALLED IN FURRED SPACES, WITHIN DOUBLE PARTITIONS OR HUNG CEILINGS, IN TRENCHES, IN CRAWL SPACES, OR IN ENCLOSURES.
- 7) "EXPOSED": NOT INSTALLED UNDERGROUND OR "CONCEALED" AS DEFINED ABOVE.
- 8) "SIMILAR" OR "EQUAL": EQUAL IN MATERIALS, WEIGHT, SIZE, DESIGN AND EFFICIENCY OF SPECIFIED PRODUCT.
- B. TEMPORARY LIGHT AND POWER: PROVIDE TEMPORARY LIGHT AND POWER SYSTEMS AT EARLIEST POSSIBLE DATE WITHIN THE CONSTRUCTION AREAS FOR THE REQUIREMENTS OF ALL TRADES AS HEREIN DESCRIBED. EXTEND SYSTEMS TO NEW CONSTRUCTION AS SOON AS PHYSICALLY POSSIBLE. MAINTAIN SYSTEM DURING WORKING OWNER. PROVIDE ALL REQUIRED MAINTENANCE, INCLUDING LAMPS AND SOCKETS.
- C. QUALITY ASSURANCE
  - 1) QUALITY OF MATERIALS: ALL EQUIPMENT SHALL BE NEW SPECIFICATION GRADE, FREE FROM DEFECTS AND LISTED BY APPROVED TESTING AGENCY AND BEARING THEIR LABEL MATERIALS AND EQUIPMENT OF SIMILAR APPLICATION SHALL BE OF SAME

MANUFACTURER, EXCEPT AS NOTED.

- 2) GUARANTEE: ALL MATERIALS AND WORKMANSHIP S GUARANTEED AS DEFINED IN PARAGRAPH 2.C. 3) CURRENT CHARACTERISTICS:
- a. SERVICE: 120/208 VOLT, 3 PHASE, 4 WIRE,
- GROUNDED NEUTRAL.
- b. DISTRIBUTION: 120/208 VOLT, 3 PHASE, 4 WIRE, 60 HERTZ WITH GROUNDED NEUTRAL
- 4) HEIGHTS OF OUTLETS:
- a. FROM FINISHED FLOOR TO CENTERLINE OF OUTLETS FOR:
- RECEPTACLES AND TELEPHONES: 1 FT-6 IN.
- WALL SWITCHES: 4 FT-0 IN.
- WALL FIXTURES: 7 FT-0 IN.
- MOTOR CONTROLLERS: 5 FT-0 IN.
- CLOCKS: 7 FT 6 IN
- b. EXCEPTIONS: AT JUNCTION OF DIFFERENT WALL FINISH MATERIALS, ON MOLDING OR BREAK IN WALL SURFACE, IN VIOLATION OF CODE, OR AS NOTED OR DIRECTED.
- D. PRODUCT DELIVERY, STORAGE AND HANDLING
  - 1) MOVING OF EQUIPMENT: WHERE NECESSARY, SHIP IN CARTED SECTIONS OF SIZE TO PERMIT PASSING THROUGH AVAILABLE SPACES.
  - 2) ACCESSIBILITY: FOR OPERATION, MAINTENANCE AND REPAIR, MINOR DEVIATIONS SHALL BE PERMITTED, CHANGES OF MAGNITUDE OR INVOLVING EXTRA COST ARE NOT PERMISSIBLE WITHOUT REVIEW. GROUP CONCEALED ELECTRICAL EQUIPMENT REQUIRING ACCESS WITH EQUIPMENT FREELY ACCESSIBLE THROUGH ACCESS DOORS. MATERIALS
- 1) NAMEPLATES: PROVIDE BLACK LAMICOID SHEET WITH 3/4 IN. WHITE LETTERING, FASTENED WITH EPOXY CEMENT FOR EACH DISCONNECT SWITCH, CIRCUIT BREAKER, PANEL, CABINET, TRANSFORMER, ENCLOSURE, MOTOR CONTROLLER AND THE LIKE. NAMEPLATES SHALL DESCRIBE THE NAME AND NUMBER OF EACH COMPONENT.
- 2) CABLE TAGS: TAG EACH CONDUCTOR PASSING THROUGH SPLICE OR PULLBOX WITH A WHITE LINEN TAG, INDICATING POINT OF ORIGIN AND TERMINATION OF THE CIRCUIT.
- 3) INSERTS AND SUPPORTS:
- a. INSERTS: STEEL, SLOTTED TYPE, FACTORY PAINTED.
- SINGLE ROD: SIMILAR TO GRINNELL FIG. 281.
- MULTI-ROD: SIMILAR TO FEE AND MASON SERIES 9000 WITH END CAPS AND CLOSURE STRIPS.
- CLIP FORM NAILS FLUSH WITH INSERTS.
- MAXIMUM LOADING 75 PERCENT OF RATING.
- b. SUPPORTS FROM BUILDING CONSTRUCTION: INSERTS, BEAM CLAMPS, STEEL FISHPLATES (IN CONCRETE FILL ONLY), CANTILEVER BRACKETS OR OTHER MEANS. SUBMIT FOR REVIEW.
- c. GROUPED LINES AND SERVICES: TRAPEZE HANGERS OF BOLTED ANGLES OR CHANNELS.
- d. WHERE BUILDING CONSTRUCTION IS INADEQUATE: PROVIDE ADDITIONAL FRAMING. SUBMIT FOR REVIEW.
- PAINT SHALL BE THE BEST GRADE FOR ITS PURPOSE. DELIVER IN ORIGINAL SEALED CONTAINERS AND APPLY IN ACCORDANCE WITH MANUFACTURER'S INSTRUCTIONS. COLORS SHALL BE AS SELECTED BY ARCHITECT OR ENGINEER. UTILIZE GALVANIZED IRON PRIMER ON PANEL AND PULL BOXES, AFTER FABRICATION. UTILIZE HOT DIPPED GALVANIZED OR DIPPED IN ZINC BASED PRIMER FOR: OUTLET BOXES, JUNCTION BOXES, CONDUIT HANGERS, RODS, INSERTS AND SUPPORTS. ZINC BASED PRIMER WITH FINISH TO MATCH SURROUNDINGS SHALL BE USED FOR MARRED SURFACES OF STEEL EQUIPMENT AND RACEWAYS. A FIELD-APPLIED ZINC BASED PRIME COAT SHALL BE UTILIZED FOR STEEL OR IRONWORK.
- BRUSH AND CLEAN WORK PRIOR TO CONCEALING, PAINTING AND ACCEPTANCE. PAINTED EXPOSED WORK SOILED OR DAMAGED; CLEAN AND REPAIR TO MATCH ADJOINING WORK BEFORE FINAL ACCEPTANCE. REMOVE DEBRIS FROM INSIDE AND OUTSIDE OF MATERIAL AND EQUIPMENT.
- H. FINAL LOCATIONS AND MOUNTING ORIENTATIONS OF ALL SWITCHES, RECEPTACLES AND LIGHT FIXTURES SHALL BE VERIFIED WITH ARCHITECT.
- ALL ACCESS DOOR LOCATIONS SHALL BE REVIEWED BY ARCHITECT PRIOR TO INSTALLATION.
- SCOPE OF WORK:

3.

- SCOPE OF WORK SHALL CONSIST OF PROVIDING LABOR, MATERIALS, EQUIPMENT, SERVICES AND FEES NECESSARY FOR COMPLETE AND SAFE INSTALLATION IN CONFORMING WITH NATIONAL AND LOCAL CODES AND AUTHORITIES HAVING JURISDICTION, AS INDICATED ON DRAWINGS AND HEREIN SPECIFIED.
- ALL DRAWINGS, PLANS, DETAILS, SPECIFICATIONS AND SPECIFICATION DDENDA ARE MADE PART OF THIS CONTRACT AND SHALL APPLY TO ALL WORK UNDER THE CONTRACT UNLESS OTHERWISE AMENDED, MODIFIED, SUPPLIED OR SPECIFIED HEREIN.
- THE CONTRACTOR SHALL FURNISH A WRITTEN GUARANTEE TO REPLACE OR REPAIR PROMPTLY AND ASSUME RESPONSIBILITY FOR ALL EXPENSES INCURRED FOR ANY WORKMANSHIP AND EQUIPMENT 6 IN WHICH DEFECTS DEVELOP WITHIN ONE YEAR FROM THE DATE OF FINAL CERTIFICATE FOR PAYMENT AND/OR FROM DATE OR ACTUAL USE OF EQUIPMENT OR OCCUPANCY OF SPACES BY OWNER INCLUDED UNDER THE VARIOUS PARTS OF THE WORK, WHICHEVER, DATE IS EARLIER, THIS WORK SHALL BE DONE AS DIRECTED BY THE OWNER. THIS GUARANTEE SHALL ALSO PROVIDED THAT WHERE

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DEFECTS OCCUR, THE CONTRACTOR WILL ASSUME RESPONSIBILITY OF OTHER TRADES AFFECTED BY DEFECTS, REPAIRS OR REPLACEMENTS IN EQUIPMENT SUPPLIED BY THE CONTRACTOR

D. THE CONTRACTOR SHALL GIVE NECESSARY NOTICE, FILE DRAWINGS AND SPECIFICATIONS WITH ALL DEPARTMENTS HAVING JURISDICTION, WORK AND PAY ALL FEES THEREFORE. THE CONTRACTOR SHALL ARRANGE FOR INSPECTION AND TESTS OF ANY OR ALL PARTS OF THE WORK IF SO REQUIRED BY AUTHORITIES AND PAY ALL CHARGES FOR SAME. THE CONTRACTOR SHALL PAY ALL COSTS FOR, AND FURNISH TO THE OWNER BEFORE FINAL BILLING, ALL CERTIFICATES NECESSARY AS EVIDENCE THAT THE WORK INSTALLED CONFORMS WITH ALL REGULATIONS WHERE THEY APPLY TO THIS WORK.

CONTRACTOR SHALL PERFORM ALL CONTROLLED INSPECTIONS IN ACCORDANCE WITH THE FLORIDA BUILDING CODE. SECURE ALL REQUIRED PERMITS AND APPROVALS AND TRANSMIT SAME TO OWNER. CONTRACTOR SHALL BE RESPONSIBLE FOR ALL FEES.

F. AREAS WITH NO ELECTRICAL WORK SHALL REMAIN AS IS. CONTRACTOR SHALL MAINTAIN CONTINUITY OF ALL ELECTRICAL SYSTEMS TO ALL AREAS NOT COVERED BY THIS RENOVATION AND SHALL PROVIDE 48 HOUR NOTICE TO LANDLORD OF ANY PLANNED POWER INTERRUPTIONS OR SIGNAL SYSTEM OUTAGES.

SHOP DRAWINGS

- A. PRIOR TO THE INSTALLATION OF ANY WORK AND PROCUREMENT OF EQUIPMENT, CONTRACTOR SHALL PROVIDE COMPLETE SETS OF COORDINATED SHOP DRAWINGS OF ALL NEW AND EXISTING EQUIPMENT, INDICATING CAPACITY, DIMENSIONS AND SEQUENCE OF OPERATION FOR WRITTEN APPROVAL BY THE ARCHITECT AND ENGINEER.
- B. INDICATE ON EACH SHOP DRAWINGS SUBMITTED:
- 1) PROJECT NAME AND LOCATION 2) NAME OF ARCHITECT AND ENGINEER
- 3) ITEM IDENTIFICATION
- 4) APPROVAL STAMP OF PRIME CONTRACTOR
- SUBMISSIONS:
- 1) SUBMISSIONS 11 IN. X 17 IN. OR SMALLER: IF THE SUBMISSION IS A CATALOG CUT, THEN THE CONTRACTOR SHALL SUBMIT ONE ORIGINAL AND TWO COPIES. OTHERWISE, HE SHALL SUBMIT THREE COPIES. THE ARCHITECT WILL FORWARD THE ORIGINAL AND ONE COPY (TWO COPIES WHEN NO ORIGINAL IS RECEIVED) TO THE ENGINEER. ALL CATALOG CUTS SHALL BE COMPLETE.
- 2) SUBMISSIONS LARGER THAN 11 IN. X 17 IN.: SUBMIT TWO PRINTS AND ONE PAPER SEPIA TO THE ARCHITECT. THE ARCHITECT WILL FORWARD ONE PRINT AND THE PAPER SEPIA TO THE ENGINEER.
- SUBMIT SHOP DRAWINGS FOR THE FOLLOWING
- 1) SAFETY/DISCONNECT SWITCHES
- 2) FUSES
- 3) CIRCUIT BREAKERS
- 4) PANELBOARDS/LOADCENTER (INCLUDING DIMENSIONS, SCHEDULES, AND CATALOG CUTS).
- 5) RACEWAYS 6) WIRE AND CABLE
- 7) WALL SWITCHES
- INSERTION RECEPTACLES
- MOMENTARY CONTACT SWITCHES
- TIME SWITCHES
- LIGHTING FIXTURES.

ASSIST AND PROVIDE ALL NECESSARY INFORMATION, DIAGRAMS. SKETCHES, ETC. TO THE HVAC CONTRACTOR, FOR THE PREPARATION OF COORDINATED SHOP DRAWINGS INDICATING ROUTING OF FEEDERS, CONTROL CONDUITS, RECESSED FIXTURES AND ADJACENT NEARBY PIPING AND DUCTWORK WHERE APPLICABLE, CERTIFIED BY ALL TRADES THAT COORDINATION HAS BEEN ESTABLISHED. SUBMIT FOUR(4) BOOKBOUND OPERATING AND SERVICE MANUALS WHICH SHALL INCLUDE COPIES OF ALL SHOP DRAWING. PROVIDE SHOP DRAWINGS FOR PANELS. FIXTURES, WIRING DEVICES, CONDUIT, CABLE, DISCONNECT SWITCH, RELAYS, CONTRACTORS, AND OTHER SYSTEMS AS DIRECTED BY THE ENGINEER.

- AS-BUILT DRAWINGS AND EQUIPMENT OPERATIONAL INSTRUCTIONS UPON COMPLETION AND ACCEPTANCE OF WORK, CONTRACTOR SHALL FURNISH WRITTEN INSTRUCTIONS AND EQUIPMENT MANUALS AND DEMONSTRATE TO THE OWNER THE PROPER OPERATION AND
- MAINTENANCE OF ALL EQUIPMENT AND APPARATUS FURNISHED UNDER THIS CONTRACT.
- THESE INSTRUCTIONS SHALL BE TYPED ON 8-1/2 IN. X 11 IN. PAPER AND BOUND IN THREE RING BINDERS WITH CLEAR ACETATE COVERS. CONTRACTOR SHALL GIVE THREE COPIES OF THE INSTRUCTIONS TO THE OWNER AND ONE COPY TO THE ENGINEER.
- C. THE INSTRUCTION BOOKLET SHALL BEAR THE NAME, ADDRESS AND TELEPHONE NUMBER OF THE PROJECT, ARCHITECT AND ENGINEER.
- D. REPRODUCIBLE "AS-BUILT" DRAWINGS SHALL BE PROVIDED INDICATING THE AS INSTALLED CONDITIONS OF THE WORK. "AS-BUILT" DRAWINGS SHALL BE PROVIDED TO THE ARCHITECT AFTER COMPLETION OF THE INSTALLATION.
- LOW-VOLTAGE DISTRIBUTION EQUIPMENT:
- A. PROVIDE COMPLETE EQUIPMENT INCLUDING: SWITCHES, FUSES, CIRCUIT BREAKERS, PANELS AND TRANSFORMERS.
- B. ALL EQUIPMENT SHALL CONFORM TO NEMA. ANSI AND IEEE STANDARDS.

- C. DISCONNECT SWITCHES SHALL BE FUSED OR NONFUSED AS NOTED. VOLTAGE SHALL BE AS REQUIRED. SWITCHES SHALL BE HEAVY DUTY, EXCEPT AS NOTED, AND HORSEPOWER RATED FOR MOTOR LOADS. TOGGLE TYPE SWITCHES SHALL BE NONFUSED, LOAD BREAK, HAVING MAXIMUM RATINGS OF 20 AMP AT 600 VOLTS AND 30 AMP AT 240 VOLTS. TWO-POLE SWITCHES SHALL BE SIMILAR TO HART AND HEGEMAN NO. 6808F. THREE-POLE SWITCHES SHALL BE SIMILAR TO HART AND HEGEMAN NO. 7810F. KNIFE-BLADE TYPE SWITCHES SHALL BE LOAD BREAK, QUICK-MAKE- QUICK-BREAK, UL CLASS R UP TO 600 AMP. MAXIMUM RATING EXCEPT AS NOTED SHALL BE 800 AMP. ARC QUENCHERS SHALL BE PROVIDED. SWITCHES SHA BE SIMILAR TO GENERAL ELECTRIC QMR. ALL SWITCH ENCLOSURES SHALL BE DEAD FRONT, NEMA TYPE 1, EXCEPT AS NOTED. FUSES:
- A. CIRCUITS 0 TO 600 AMPERES SHALL BE PROTECTED BY FUSES SIMILAR TO CURRENT LIMITING BUSSMAN LOW-PEAK DUAL-ELEMENT TIME-DELAY LPN-RK (AMP)SP (250V) /LPS-RK (AMP)SP (600V) OR LPJ (AMP)SP (600V) (UL CLASS RK1 OR CLASS J), AND BE LISTED BY UL WITH AN INTERRUPTING RATING OF 300,000 AMPERES RMS SYMMETRICAL.

7.

B. MOTOR CIRCUITS - ALL INDIVIDUAL MOTOR CIRCUITS WITH FULL LOAD AMPERE RATINGS (FLA) OF 480 AMPERES OR LESS SHALL BE PROTECTED BY FUSES SIMILAR TO CURRENT LIMITING BUSSMANN LOW-PEAK DUAL-ELEMENT TIME-DELAY LPN-RK (AMP)SP (250V) /LPS-RK (AMP)SP (600V) OR LPJ (AMP)SP (600V) (UL CLASS RK1 OR CLASS J), AND BE LISTED BY UL WITH AN INTERRUPTING RATING OF 300,000 AMPERES RMS SYMMETRICAL.

C. ALL FUSES SHALL BE PROVIDED BY SAME MANUFACTURER. D. PROVIDE 1 SPACE MATCHING FUSE FOR EACH SET OF 3.

- E. CIRCUIT BREAKERS: MOLDED CASE BREAKERS SHALL BE THERMAL-MAGNETIC, QUICK-MAKE-QUICK-BREAK, BOLT-ON TYPE, MANUALLY DPERATED WITH INSULATED TRIP-FREE HANDLE. MULTI-POLE TYPE REAKERS SHALL CONTAIN INTERNAL TRIP BAR. TERMINALS SHALL SUITABLE FOR COPPER OR ALUMINUM CABLE. FURNISH AUXILIARY DEVICES WHERE REQUIRED FOR SHUNT-TRIPPING, OPEN A ND CLOSE MOTOR OPERATOR AND ALARM INDICATION. ENCLOSURES SHALL BE DEAD FRONT, NEMA TYPE 1, EXCEPT AS NOTED. FRAMES, IC AND INTERCHANGEABLE TRIPS SHALL BE AS FOLLOWS, UNLESS OTHERWISE NOTED:
- 120 VOLTS, 100-AMP FRAME: 10,000 AMPS, 1 POLE. 2)120/240 VOLTS, 225-AMP FRAME: 22,000 AMPS MINIMUM
- DISTRIBUTION PANELBOARDS, SWITCH AND FUSE:
- H. THREE PHASE, 3 OR 4 WIRE WITH COPPER BUS BARS. ALL THROUGH BUS SHALL BE INSULATED.
- NEMA CLASS 1 CONSTRUCTION TO ACCOMMODATE FUSIBLE INDIVIDUALLY ENCLOSED SWITCHES, FRONT REMOVABLE, SWITCH AND DOOR INTERLOCKS. COVERS TO BE PAD-LOCKABLE
- PANELBOARD SHALL BE CONSTRUCTED OF CODE-GAUGE STEEL GRAY FINISH OVER RUST INHIBITOR, FOR SURFACE MOUNTING. BOX AND PANEL FRAME SHALL BE FLANGED AND REINFORCED FOR RIGID SUPPORT OF INTERIOR AND ACCURATE ALIGNMENT OF INTERIOR WITH FRONT. TRIMS TO BE FASTENED TO BACK BOX WITH SCREWS.
- K. ALL BRANCH SWITCHES SHALL HAVE INDIVIDUAL ENGRAVED LAMICOID NAMEPLATES (BLACK WITH WHITE CORE).
- L. DISTRIBUTION PANELBOARD CONSTRUCTION MINIMUM SHORT CIRCUIT RATING 25.000 AMPERES, REMS SYMMETRICAL FOR ALL 120/208V APPLICATIONS. APPLICATIONS.
- M. DISCONNECTS

1) DISCONNECT SWITCHES SHALL CONFORM TO NEMA AND UL STANDARDS, AND SHALL BE HORSEPOWER RATED.

- 2) SWITCHING MECHANISM SHALL BE QUICK-MAKE, QUICK-BREAK, SINGLE THROW WITH EXTERNAL OPERATING HANDLE MECHANCIALLY INTERLOCKED WITH ENCLOSURE COVER TO PROVIDE ACCESS TO INTERIOR WHEN DISCONNECT IS IN OFF POSITION ONLY. PROVIDE MEANS TO LOCK OPERATING HANDLE IN THE OPEN AND CLOSED POSITION. DESIGNATE ON THE ENCLOSURE THE OPEN AND CLOSED POSITION OF THE OPERATING HANDLE.
- 3) SWITCHES SHALL BE OF THE DOUBLE STATIONARY CONTACT TYPE.
- 4) SWITCHES SHALL BE EQUIPPED WITH REJECTION TYPE FUSE HOLDERS, FUSIBLE AS SHOWN ON THE DRAWINGS; PROVIDE COMPLETE WITH FUSES AS SCHEDULED.
- G. INSTALLATION
- 1) DISTRIBUTION PANELBOARD SHALL BE MOUNTED TO STRUCTURAL STEEL CHANNEL (KINDORF) WHICH SHALL BE BOLTED TO THE WALL USING EXPANSION ANCHORS FOR LARGE PANELS.
- H. IDENTIFICATION
  - 1) PROVIDE NAMEPLATE AT EACH SWITCH IDENTIFYING THE LOAD SERVED.
  - 2) NAMEPLATES SHALL BE MOUNTED ON THE FRONT COVER SECURED WITH SELF-TAPPING SCREWS OR NUTS AND BOLTS. NAMEPLATES SHALL BE LAMINATED PHENOLIC, BLACK WITH A MINIMUM OF 1/4" HIGH WHITE LETTERING.
- DISTRIBUTION AND SUB-DISTRIBUTION PANELBOARDS SHALL BE A MINIMUM OF 30" WIDE AND 10" DEEP.
- J. POWER PANELBOARDS SHALL BE SIMILAR TO GENERAL ELECTRIC TYPE "OMR", AS MANUFACTURED BY ATLAS SWITCH COMPANY, ELECTRIC SWITCHBOARD COMPANY OR APPROVED EQUAL.
- K. PANELBOARD SHALL HAVE MAIN CIRCUIT BREAKER OR MAIN LUGS AS INDICATED ON THE DRAWINGS. QUANTITY, POLES AND TRIP RATINGS OF BRANCH CIRCUIT BREAKERS TO BE AS INDICATED ON DRAWINGS.
- PANELBOARD SHALL HAVE ENGRAVED WHITE CORE, BLACK LAMACOID NAMEPLATE SCREWED ONTO PANE TRIM WITH DESIGNATION LISTED (PANELBOARD NAME, VOLTAGE, RATING OR MAINS IN AMPS).

![](_page_8_Figure_142.jpeg)

# ELECTRICAL SPECIFICATIONS (CONT.

3) BOXES:

- a. OUTLET BOXES: EXCEPT AS OTHERWISE REQUIRED BY CONSTRUCTION, DEVICES OR WIRING, BOXES SHALL BE STAMPED STEEL, 4 IN. SQUARE OR OCTAGON FOR FIXTURES. BOXES ABOVE CEILING SHALL BE 1-1/2 IN. DEEP. BOXES IN CEILING OR SLAB SHALL BE 3 IN. DEEP. BOXES IN WALL FOR FIXTURES SHALL BE 2-3/4 IN. DEEP. BOXES IN WALL FOR RECEPTACLES AND SWITCHES SHALL BE 1-1/2 IN. DEEP. FURNISH WITH RAISED COVERS AND FIXTURE STUDS WHERE REQUIRED. WITHOUT FIXTURE OR DEVICE: FURNISH BLANK COVER. OFFSET BACK-TO-BACK OUTLETS WITH MINIMUM 6 IN. SEPARATION.
- b. JUNCTION AND PULL BOXES: GALVANIZED SHEET STEEL WITH SCREW-ON COVERS, EXCEPT AS NOTED. FURNISH WITH INSULATED SUPPORTS FOR CABLES. LOCATIONS SHALL BE AS NOTED OR REQUIRED AND ACCESSIBLE. PROVIDE BARRIERS IN NEW AND RENOVATED BOXES BETWEEN 120/208 VOLT AND 265/460 VOLT WIRING AND BETWEEN EMERGENCY AND NORMAL WIRING. FLOOR BOXES SHALL BE SUITABLE FOR CONDUIT AND DEVICES NOTED. RAISED OUTLETS SHALL BE HUBBELL #B2414 SERIES WITH ABOVE FLOOR FITTING. TELEPHONE: BUSHED HOLE. POWER: DUPLEX RECEPTACLE OR OTHER AS NOTED. INCREASE SIZE TO SUIT AS NECESSARY FLUSH OUTLETS SHALL BE HUBBELL #B2414 SERIES WITH FLUSH FLOOR FITTING FOR TELEPHONE AND FLUSH DUAL FLAP COVER WITH DUPLEX RECEPTACLE FOR POWER AS NOTED. INCREASE SIZE TO SUIT AS NECESSARY.

С.

PROVIDE RACEWAYS ONLY AS HEREIN SPECIFIED, EXCEPT AS NOTED. RACEWAYS SHALL BE RUN CONCEALED, EXCEPT AS NOTED.

PROVIDE RACEWAY SUPPORT UTILIZING CEILING TRAPEZE, STRAP HANGERS, OR WALL BRACKETS. PROVIDE U-BOLTS AT EACH FLOOR LEVEL OF RISER RACEWAYS AND CONNECTED TO ACCEPTABLE SUPPORTS. PROVIDE RISER CLAMPS AT EACH FLOOR LEVEL OF RISER RACEWAYS AND RESTING ON SLAB FOR THROUGH-THE-FLOOR SYSTEMS, UTILIZE AN ASSEMBLY SIMILAR TO HUBBELL FIRE RATED POKE-THROUGH-FLOOR BOX SYSTEM. FOR ABOVE FLOOR FITTINGS TELEPHONE SHALL BE BUSHED HOLE AND POWER SHALL BE DUPLEX RECEPTACLE OR OTHER AS NOTED. PROVIDE SEPARATION BARRIER BETWEEN POWER AND TELEPHONE COMPARTMENTS. PROVIDE JUNCTION BOX ON UNDERSIDE OF FLOOR. PACK FITTING TO RESTORE FIRE RATING OF FLOOR.

SECURE ALL RACEWAYS TO SUPPORTS WITH PIPE STRAPS OR U-BOLTS. SPACING OF SUPPORTS SHALL BE A MINIMUM OF 10 FT ON CENTER FOR METALLIC RACEWAY AND AS REQUIRED FOR NONMETALLIC RACEWAY. SPACING SHALL BE 5 FT ON CENTER FOR WIREWAYS AND PER CODE AND AS NOTED FOR OTHERS. MOUNT SUPPORTS TO STRUCTURE MASONRY WITH TOGGLE BOLTS ON HOLLOW MASONRY, EXPANSION SHIELDS OR INSERTS IN CONCRETE AND BRICK, MACHINE SCREWS ON METAL, BEAM CLAMPS ON FRAMEWORK, WOOD SCREWS ON WOOD, AND PAN THROUGH STRAPS IN METAL DECK, NAILS, RAWL PLUGS OR WOOD PLUGS SHALL NOT BE PERMITTED. WHERE REQUIRED BY STRUCTURE, FURNISH THROUGH BOLTS AND FISHPLATES.

EXPOSED RACEWAYS SHALL BE RUN PARALLEL WITH OR AT RIGHT ANGLES TO WALLS. PROVIDE CLEARANCE WITH WATER, STEAM OR OTHER PIPING (MINIMUM 3 IN. SEPARATION FROM STEAM AND HOT WATER PIPES, EXCEPT 1 IN. FROM PIPE COVER AT CROSSINGS AND 18 IN. FOR PARALLEL RUNS). FOR HUNG CEILING OUTLETS. RUN IN HUNG CEILING AND CONNEC TO CEILING SUPPORT CHANNELS. IN MASONRY AND POURED CONCRETE, RUN VERTICALLY ONLY.

MAINTAIN GROUNDING CONTINUITY OF INTERRUPTED METALLIC RACEWAYS WITH GROUND CONDUCTOR, AND IN FLEXIBLE CONDUIT FOR FEEDERS AND MOTOR TERMINAL CONNECTIONS.

EMPTY RACEWAYS OVER 10 FT LONG: PROVIDE FISH OR PULL WIRE, GALVANIZED OR NYLON ROPE.

RIGID STEEL CONDUIT SHALL BE PERMITTED FOR FEEDERS AND BRANCH CIRCUITS. PAINT MALE THREADS OF FIELD-THREADED CONDUIT WITH GRAPHITE-BASE PIPE COMPOUND AND BUTT CONDUIT ENDS. TOUCH UP MARRED SURFACES AND FIELD-CUT THREADS, CRC-COLD GALVANIZED. EMT SHALL BE PERMITTED FOR BRANCH CIRCUITS ONLY, IN DRY LOCATIONS, DRY WALLS, HUNG CEILINGS, HOLLOW BLOCK WALLS AND FURRED SPACES. EMT SHALL NOT BE PERMITTED IN RAISED FLOORS. FLEXIBLE STEEL CONDUIT SHALL BE UTILIZED FOR SHORT CONNECTIONS WHERE RIGID CONDUIT IS IMPRACTICAL. FROM OUTLET BOX TO RECESSED LIGHTING FIXTURE: PROVIDE MINIMUM 4 FT AND MAXIMUM 6 FT LENGTHS. FOR FINAL CONNECTION TO MOTOR TERMINAL BOX, TRANSFORMER AND OTHER VIBRATING EQUIPMENT: PROVIDE WITH POLYVINYL SHEATHING AND GROUND CONDUCTOR. MINIMUM LENGTH: 18 IN. WITH SLACK. CONNECT GROUND CONDUCTOR TO ENCLOSURE OR RACEWAY AT EACH END. FOR EXPANSION JOINT CROSSINGS, CROSS AT RIGHT ANGLES AND ANCHOR ENDS.

CUT CONDUIT ENDS SQUARE. REAM SMOOTH. PAINT MALE THREADS OF FIELD THREADED RACEWAYS WITH GRAPHITE BASE PIPE COMPOUND. DRAW UP TIGHT WITH RACEWAY COUPLING.

ALL COUPLINGS SHALL BE COMPRESSION TYPE. NO SET SCREW FITTINGS.

EXPANSION FITTINGS SHALL BE INSTALLED AT RIGHT ANGLES WITH CLIP JOINT CENTERED IN EXPANSION JOINT. PROVIDE A LENGTH OF RUN IN ACCORDANCE MANUFACTURER'S RECOMMENDATIONS. PRESET FITTINGS SHALL ALLOW FOR TEMPERATURE VARIATION.

RACEWAYS PASSING THROUGH FIRE-RATED CONSTRUCTION: SEAL OPENING WITH FIRE SEALANT.

D. PROVIDE CABLE SUPPORTS IN ACCORDANCE WITH NATIONAL ELECTRIC CODE ARTICLE 300.19. CABLE SUPPORTS SHALL UTILIZE A ONE-PIECE PLUG WITH POZI-GRIP WEDGING PLUG AS MANUFACTIURED BY OZ-GEDNEY. TYPE SF SHALL BE USED FOR ARMORED CABLE.

INSTALL CABLE SUPPORTS AT THE TOP OF A VERTICAL RISE AND PROVIDE INTERMEDIATE ADDITIONAL SUPPORTS AS REQUIRED TO LIMIT SUPPORTED CONDUCTOR LENGTHS TO NOT GREATER THAN THOSE SPECIFIED IN TABLE 300.19(A).

A. ERECT WALL AND SWITCH OUTLETS IN ADVANCE OF FURRING AND FIREPROOFING. OUTLET BOXES SHALL BE SET SQUARE AND TRUE WITH BUILDING FINISH. SECURE TO BUILDING STRUCTURE BY ADJUSTABLE STRAP IRON OR GROUT IN WITH MASONRY. VERIFY OUTLET LOCATIONS IN FINISHED SPACES WITH

- ARCHITECTURAL DRAWINGS OF INTERIOR DETAILS AND FINISHES. PROVIDE BARRIERS BETWEEN SWITCHES CONNECTED TO DIFFERENT PHASES FOR VOLTAGES EXCEEDING 150 VOLTS TO GROUND. PANEL, JUNCTION AND PULL BOXES SHALL BE LOCATED CLEAR D. OF OTHER TRADES. CONCEAL JUNCTION AND PULL BOXES IN FINISHED SPACES. WHERE NECESSARY, REROUTE RACEWAYS OR MAKE OTHER ARRANGEMENTS FOR CONCEALMENT. BOXES SHALL BE ACCESSIBLE. SUPPORT BOXES FROM BUILDING STRUCTURE, INDEPENDENT OF CONDUIT. PROVIDE FLOOR-TO-CEILING CHANNELS FOR MOUNTING ON DRYWALL AND LIGHTWEIGHT CONSTRUCTION. OUTLET BOXES FOR FIXTURES RECESSED IN HUNG CEILINGS SHALL BE ACCESSIBLE THROUGH OPENING CREATED BY REMOVAL OF FIXTURE. SECURE TO BLACK IRON SUPPORT. MOTOR TERMINAL BOXES: COORDINATE WITH MOTOR BRANCH CIRCUIT CONDUIT AND WIRING; ADD BOX VOLUME WHERE REQUIRED.
- FIRE SEALANTS: PROVIDE FOR RACEWAYS AND WIRE PASSING THROUGH FLOOR SLOTS, SLEEVES OR OPENINGS IN FIRE-PARTITIONS ROOMS.
- PERFORM CONTINUITY TESTS OF RESISTANCE OF FEEDER CONDUITS FROM SERVICE TO POINT OF FINAL DISTRIBUTION USING 1 CONDUCTOR RETURN. MAXIMUM RESISTANCE SHALL BE 25 OHMS.

WIRE AND CABLE:

- PROVIDE WIRE AND CABLE COMPLETE WITH ACCESSORIES. SIZE REFERENCE SHALL BE AWG EXCEPT AS NOTED.
- B. CONDUCTORS SHALL BE COPPER, ASTM STANDARD SOLID (NO. 10 AND SMALLER) OR STRANDED (NO. 8 AND LARGER). GENERAL USE CABLING SHALL BE NO. 12 MINIMUM. AT 120 VOLTS AND OVER 100 FT CIRCUIT LENGTH PROVIDE NO. 10 MINIMUM. AT 265 VOLTS AND OVER 200 FT CIRCUIT LENGTH PROVIDE NO. 10 MINIMUM.
- С. CONTROL AND ALARM CABLING, EXCEPT AS NOTED, SHALL BE NO. 14 MINIMUM. AT 120 VOLTS AND OVER 200 FT CIRCUIT LENGTH PROVIDE NO. 12 MINIMUM. OTHER VOLTAGES AND PHASES: ADJUST CABLE SIZING AS REQUIRED TO MAINTAIN VOLTAGE DROP. INCREASE RACEWAY SIZES FOR LARGER WIRE AS REQUIRED.
- INSULATION SHALL BE RUBBER AND THERMOPLASTIC MEETING D. ASTM AND IPCEA STANDARDS. TYPE THW OR THWN SHALL BE UTILIZED FOR FEEDERS AND BRANCH CIRCUITS EXCEPT AS NOTED. TYPE SFF-2 SHALL BE UTILIZED FOR BRANCH CIRCUITS LOCATED IN WIRING CHANNELS OF CONTINUOUS FLUORESCENT FIXTURES AND IN AMBIENT TEMPERATURES OVER 90 DEG C. FOR UNGROUNDED ISOLATED BRANCH CIRCUITS PROVIDE CROSS-LINKED POLYETHYLENE INSULATION (TYPE XHHW).
- ARMORED CABLE (BX) SHALL BE UTILIZED FOR BRANCH CIRCUITS IN DRY HOLLOW LOCATIONS, HUNG CEILINGS, AND BLOCK WALLS. WHEN USED IN LIEU OF WIRING IN CONDUIT, STATE IN PROPOSAL THAT PRICE IS BASED UPON THE USE OF HOSPITAL GRADE 'BX'.
- F. COLOR CODING SHALL BE AS FOLLOWS:

120/208 VOLT SYSTEM: BLACK FOR A PHASE

- RED FOR B PHASE BLUE FOR C PHASE
- 1) NEUTRAL WIRE SHALL UTILIZE WHITE OUTER COVERING THROUGHOUT. EQUIPMENT GROUND WIRE SHALL UTILIZE GREEN OUTER COVERING THROUGHOUT.
- WHERE COLOR-CODED CABLE IS NOT AVAILABLE. CERTIFY IN WRITING AND REQUEST PERMISSION TO OVERLAP CONDUCTORS WITH 6 IN. OF COLOR TAPING IN ACCESSIBLE LOCATIONS.
- G. PROVIDE FLAMEPROOF LINEN OR FIBER TAGS IN ACCESSIBLE LOCATIONS. FOR FEEDERS INDICATE FEEDER NUMBER, SIZE, PHASE AND POINTS OF ORIGIN AND TERMINATIONS. FOR CONTROL AND ALARM WIRING INDICATE TYPE (CONTROL OR ALARM), SIZE OF WIRE, AND POINTS OF ORIGIN AND TERMINATIONS.
- TERMINATIONS. SPLICES AND TAPS UNDER 600 VOLTS: COPPER CONDUCTORS NO. 10 AND SMALLER SHALL UTILIZE COMPRESSION-TYPE OF TWIST-ON SPRING-LOADED CONNECTORS AND CLEAR NYLON-INSULATED COVERING. COPPER CONDUCTORS NO. 8 AND LARGER SHALL UTILIZE MECHANICAL BOLTED PRESSURE OR HYDRAULIC COMPRESSION TYPE USING MANUFACTURER'S RECOMMENDED TOOLING. CABLE LUGS AND CONNECTORS SHALL UTILIZE COMPRESSION TYPE OF SAME METAL AS CONDUCTOR. PROVIDE TO MATCH CABLE, WITH MARKING INDICATING SIZE AND TYPE. COPPER LUG CONNECTIONS TO BUS BARS: USE ANTISEIZE COMPOUND ON TANG.
- NOT MORE THAN 3 LIGHTING OR CONVENIENCE OUTLET CIRCUITS SHALL BE INSTALLED IN ONE CONDUIT UNLESS OTHERWISE INDICATED. PULL NO THERMOPLASTIC WIRES AT TEMPERATURES LOWER THAN 32 DEG F. PROVIDE SEPARATE RACEWAYS FOR CONDUCTORS OF 120/208 AND 265/460 VOLT SYSTEMS, EXCEPT 460 VOLT MOTOR BRANCH CIRCUIT WIRING AND RELATED 120 VOLT CONTROL WIRING. THERMOPLASTIC WIRES SHALL NOT BE INSTALLED IN COMPUTER AREA RAISED FLOORS.
- J. LEAVE WIRES WITH SUFFICIENT SLACK TO PERMIT MAKING FINAL CONNECTIONS.
- PERFORM CONTINUITY AND INSULATION TESTS. MEGGER TEST 100 PERCENT OF FEEDERS, 10 PERCENT OF BRANCH CIRCUITS AND ALL MOTOR BRANCH CIRCUITS OVER 25 HP.
- PERFORM TESTS PRIOR TO CONNECTING EQUIPMENT AND IN PRESENCE OF AUTHORIZED REPRESENTATIVES. SUBMIT WRITTEN REPORT OF RESULTS. CORRECT OR REPLACE CABLE TESTING BELOW MANUFACTURER'S STANDARDS.
- WIRING DEVICES: 11.
  - WIRING DEVICES SHALL BE SPECIFICATION GRADE UNLESS OTHERWISE SPECIFIED. ALL DEVICES SHALL BE FLUSH MOUNTED, UNLESS OTHERWISE NOTED. PROVIDE COMPLETE MATERIAL AND ACCESSORIES AS NOTED.
  - LOCAL WALL SWITCHES SHALL BE ROCKER TYPE, QUIET OPERATING, Β. RATED 20 AMP, 120/208 VOLT, AC. SIMILAR TO LEVITON DECORA SERIES A5621 (SINGLE POLE), A5623 (3-WAY) AND A5624 (4-WAY).

- C. STRAIGHT BLADE RECEPTACLES SHALL BE COMMERCIAL SPECIFICATION GRADE DUPLEX CONVENIENCE 125 VOLTS, 2 POLE, 3 WIRE, U GROUND SLOT, DECORA SERIES BY LEVITON. GROUNDED, EXCEPT AS NOTED.
  - 1)SINGLE GANG, RECESSED, DUPLEX RECEPTACLE: TAMPER RESISTANT, 2-POLE, 3-WIRE GROUNDING, 15A, 125V, NEMA 5-20R; LEVITON 689 SERIES (COLOR AS SPECIFIED BY ARCHITECT).
- 2) USB CHARGER/ DUPLEX TAMPER-RESISTANT RECEPTACLE: TAMPER RESISTANT,
- E. DEVICE PLATES: SEE ARCHITECT FOR TYPE. FOR RECEPTACLES WITH OTHER THAN 120 VOLT, INSCRIBED VOLTAGE AVAILABLE.
- F. COLORS: COORDINATE COLORS WITH ARCHITECT.
- G. MOUNTING ORIENTATION OF RECEPTACLES (HORIZONTAL OR VERTICAL): COORDINATE WITH ARCHITECT.
- 12. LIGHTING FIXTURES:
  - A. FIXTURES TO BE AS SPECIFIED BY ARCHITECT AND SHALL BE COMPLETELY FACTORY ASSEMBLED, WIRED AND EQUIPPED WITH ALL NECESSARY SOCKETS, BALLASTS, SUPPORTING HARDWARE AND ACCESSORIES. REFER TO DRAWINGS FOR INDIVIDUAL FIXTURE DESCRIPTIONS.
  - FIXTURE CATALOG NUMBERS USED TO ILLUSTRATE EQUIPMENT TYPE DO NOT NECESSARILY DENOTE REQUIRED MOUNTING EQUIPMENT OR ACCESSORIES. PROVIDE ACCESSORIES TO SUIT.
  - C. BALLAST: CLASS P. HIGH POWER FACTOR, LOWEST AVAILABLE NEMA RATED NOISE LEVEL, ET1 AND CBM APPROVED. ENERGY SAVING TYPE. TRIGGER START FOR 24-INCH LAMPS AND RAPID START FOR 48-INCH. TWO LAMP BALLASTS; NO THREE LAMP BALLASTS. BALLASTS SHALL BE ADVANCE MAGNETEK, UNIVERSAL OR EQUAL
  - D. LED DRIVERS SHALL BE ELECTRONIC TYPE, LABELED AS COMPLIANT WITH RADIO FREQUENCY INTERFERENCE (RFI) REQUIREMENTS OF FCC TITLE 47, PART 15 AND COMPLY WITH NEMA SSL 1 "ELECTRONIC DRIVERS FOR LED DEVICES, ARRAYS OR SYSTEMS". LED DRIVERS SHALL HAVE A SOUND RATING OF "A", HAVE A MINIMUM EFFICIENCY OF 85% AND BE RATED FOR A THD OF LESS THAN 20% AT ALL INPUT VOLTAGES.
  - DIMMABLE LED DRIVERS SHALL BE CAPABLE OF DIMMING WITHOUT LED STROBING OR FLICKER ACROSS THEIR FULL DIMMING RANGE PROVIDE TYPE OF LED DRIVER AS PER LIGHTING FIXTURE SCHEDULE, DIMMABLE LED DRIVERS SHALL BE 0-10V WHERE NOT INDICATED.
- F. CONTINUOUS ROW, TWO LAMP STRIP FIXTURES SHALL BE STAGGERED TYPE.
- G. FLUORESCENT LIGHTING FIXTURES, INCLUDING GENERAL CONSTRUCTION, LAMPS AND BALLASTS SHALL CONFORM TO THE ENERGY EFFICIENCY REQUIREMENTS OF CONSOLIDATED EDISON CO. AND QUALITY FOR A UTILITY REBATE TO OWNER UNDER CON EDISON'S ENLIGHTENED ENERGY LIGHTING REBATE PROGRAM. CONTRACTOR SHALL COORDINATE REBATE PROGRAM WITH CON EDISON AND ARRANGE FOR CON EDISON TO PERFORM A SURVEY TO INVENTORY ALL EXISTING FIXTURES PRIOR TO DEMOLITION.
- H. EXIT SIGNS SHALL BE PRECISION DIE-CAST ALUMINUM HOUSING WITH LASER-FORMED ACRYLIC LEGEND. EXIT SIGNS SHALL COMPLY WITH UL 924 AND BE MEA APPROVED. AC POWERED WITH PREMIUM LONG-LIFE NICKEL CADMIUM BATTERY WITH STANDARD UL LISTED 3-HOUR RUN TIME. PROVIDE WITH INTEGRAL AUTOMATIC CHARGER IN A SELF CONTAINED POWER PACK. LED INDICATOR WITH PUSH TO TEST SWI
- 13. TELEPHONE CONDUIT SYSTEM:
  - PROVIDE COMPLETE SYSTEM OF: RACEWAYS AND ACCESSORIES, OUTLET BOXES, SLEEVES AND FISHWIRES.
  - EQUIPMENT SHALL CONFORM TO REQUIREMENTS OF TELEPHONE OMPANY
  - C. OUTLETS SHALL BE:
  - 1) WALL: 4 IN. SQUARE WITH BUSHED COVER PLATE.
  - D. PROVIDE FISHWIRES, IN RACEWAYS OVER 10 FT LONG.
  - CONDUIT SHALL BE 3/4 IN. MINIMUM. FURNISH EMPTY CONDUIT FROM OUTLET BOX TO BUSHED END THRU WALL 6" BELOW THE PLASTER CEILING.

FACE RACEWAYS IN ROOMS SHALL HUBBELL HBL500, HBL750 OR HBL2000 SERIES OR AS ACCEPTABLE.

- 14. GROUNDING AND BONDING:
  - A. PROVIDE GROUNDING SYSTEM IN ACCORDANCE WITH (2020 NATIONAL ELECTRICAL CODE WITH NC AMENDMENTS), AND THESE SPECIFICATIONS. THE WIRING SYSTEM SHALL BE INSTALLED AS REQUIRED TO PROVIDE A CONTINUOUSLY GROUNDED SYSTEM. WHERE FLEXIBLE CONDUIT IS USED FOR PART OF A CONDUIT RUN, EXCEPT LIGHTING BRANCH CIRCUITS, AN INSULATED GROUNDING CONDUCTOR SHALL BE PROVIDED IN THE CONDUIT AND CONNECTED TO GROUNDING BUSHINGS AT EACH END OF THE RUN.
  - B. USE EXOTHERMIC WELDING PROCESS FOR INACCESSIBLE CONNECTIONS.
  - C. EXTEND EXISTING SYSTEM GROUND TO INCLUDE ALL THE ELECTRICAL EQUIPMENT IN THE SCOPE OF WORK.
  - WHERE FLEXIBLE METALLIC CONDUIT IS USED AN INTERNAL BONDING CONDUCTOR SHALL BE INSTALLED.
  - E. IN ADDITION, FURNISH A SEPARATE INSULATED GREEN EQUIPMENT GROUND CONDUCTOR WHERE INDICATED ON DRAWINGS AND FOR THE
    - FOLLOWING BRANCH CIRCUITS: 1) CIRCUITS SERVING ANY WALL BOX DIMMER.
    - 2) CIRCUITS SERVING ANY ISOLATED GROUND RECEPTACLES. TERMINATE GROUND DIRECTLY AT AN EQUIPMENT GROUNDING CONDUCTOR TERMINAL OF THE SOURCE AT THE SOURCE , OR AS OTHER WISE NOTED ON DRAWINGS.
    - 3) CIRCUITS SERVING ANY DUPLEX OR SIMPLEX COMPUTER RECEPTACLES

4) ANY CIRCUIT SERVED VIA AN ISOLATION TRANSFORMER OR COMPUTER POWER DISTRIBUTION UNIT.

- 15. PANELBOARDS:
  - A. PANELBOARDS SHALL BE OF THE DEAD FRONT TYPE MANUFACTURED IN CODE GAUGE AND SIZE BOXES FOR MOUNTING AS INDICATED ON PLANS COMPLETE WITH TRIM, DOORS AND LOCKS. ALL LOCKS SHALL BE KEYED ALIKE.
  - CIRCUIT BREAKERS SHALL BE OF THE BOLT-ON THERMAL MAGNETIC MOLDED CASE TYPE. AND SHALL HAVE THE TRIP RATINGS AND NUMBER OF POLES SHOWN IN SCHEDULES ON THE CONTRA DRAWINGS. FOR BLANK (SPACE) COMPARTMENTS, PROVIDE FUL RATED BUS. MINIMUM GUTTER SPACES SHALL BE 5-3/4". SIDES TOP AND BOTTOM, INCREASE FOR THROUGH FEEDERS. PROVIDE 25% COPPER GROUND BUS AND 100% COPPER NEUTRAL BUS AND INCREASE NEUTRAL BUS INDICATED.
  - LOCKING TABS SHALL BE PROVIDED ON ALL CIRCUIT BREAKERS SERVING EMERGENCY LIGHTING, FIRE ALARM SYSTEM, SECURITY SYSTEMS AND OTHER EMERGENCY OR CRITICAL EQUIPMENT AND AS NOTED ON THE CONTRACT DRAWINGS. A TOTAL OF 5 LOCKING TABS SHALL BE FURNISHED TO THE OWNER.
  - BUSES SHALL BE HARD DRAWN COPPER OF 98 PERCENT D. CONDUCTIVITY AND SHALL HAVE CROSS SECTIONAL AREAS LARGE ENOUGH TO LIMIT THE TEMPERATURE RISE, WHEN CARRYING FULL LOAD, TO 35 DEGREES C. ABOVE AN AMBIENT INSIDE THE ENCLOSURE OF 55 DEGREES C. AS DEFINED IN IEEE STANDARD RULES. MAIN BUS CAPACITY SHALL BE AS SHOWN ON THE CONTRACT DRAWINGS.
  - ENCLOSURES SHALL BE SURFACE OR FLUSH AS INDICATED. TRIMS SHALL BE SECURED TO PANEL WITH MACHINE SCREWS. COVERS SHALL BE HINGED DOOR-IN-DOOR CONSTRUCTION WITH CYLINDER LOCKS AND CATCHES. LOCKS MUST BE COMPATIBLE WITH BUILDING STANDARD KEY SYSTEM AND WHEN NONE EXISTS, THEY SHALL BE SIMILAR TO A YALE NO. 911 KEY.
  - DISTRIBUTION AND SUB-DISTRIBUTION PANELBOARD SHALL BE A MINIMUM OF 30" WIDE AND 10" DEEP.
  - AND 5 3/4" DEEP.
  - FURNISH ALL PANELBOARDS WITH FEED-THRU LUGS UNLESS OTHERWISE INDICATED ON THE DRAWINGS.
  - ALL NEW PANELBOARDS SHALL BE PROVIDED WITH AN ENGRAVED WHITE CORE LAMACOID NAMEPLATE, WITH 3/4 IN. WHITE LETTERING ON A BLACK BACKGROUND, WITH DESIGNATION LISTED (PANELBOARD NAME), FASTENED WITH EPOXY CEMENT OR OVAL HEAD CHROME PLATED MACHINE SCREWS.
  - THE CIRCUIT DIRECTORY SHALL BE TYPEWRITTEN AND PROVIDED INSIDE EACH PANEL DOOR TO INDICATE EQUIPMENT AND/OR AREA SERVED. DIRECTORY HOLDER SHALL BE METAL FRAME WITH CLEAR PLASTIC, TRANSPARENT COVER. THE TYPEWRITTEN LIST INDICATING CIRCUIT NUMBERS. OUTLETS SUPPLIED AND THEIR LOCATIONS SHALL BE PROVIDED.
  - TIE-BARS SHALL NOT BE USED TO CREATE MULTI-POLE CIRCUITS. MAXIMUM 42 CIRCUITS ALLOWED.
  - L. ONLY ONE WIRE SHALL BE INSTALLED UNDER EACH CIRCUIT BREAKER LUG.
  - M. SHORT CIRCUIT RATING OF PANELBOARDS SHALL NOT BE LESS THAN AS INDICATED ON THE CONTRACT DRAWINGS OR SPECIFIED HEREIN. WHERE NOT INDICATED OR SPECIFIED THE MINIMUM SHORT CIRCUIT RATING SHALL BE EQUAL TO THE INTERRUPTING CAPACITY OF THE LOWEST RATED CIRCUIT BREAKER IN THE PANELBOARD, BUT IN NO CASE LESS THAN 10,000 AMPERES R.M.S. SYMMETRICAL FOR 208Y/120 VOLT SYSTEM. SERIES RATED PANELBOARDS SHALL BE USED TO ACHIEVE REQUIRED SHORT CIRCUIT RATINGS.
  - N. FOR ALL EXISTING PANELBOARDS, CONTRACTOR SHALL PROVIDE NEW CIRCUIT BREAKERS TO REPLACE EXISTING AS REQUIRED AS INDICATED ON DRAWINGS.

SPARE

ALL STANDARD PANELBOARDS SHALL BE A MINIMUM OF 20" WIDE

# S L

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SET PEF **DAT** 05/16/ 06/26/ ହୃତ୍କ DRAWN BY CHECKED BY ARCH. PROJECT NO.: MOS24001.0 -SHEET NAME ELECTRICAL SPECIFICATION SHEET 2 OF 2

> SHEET NUMBER

E0.3

			LIGHT FIXTURE SCHEDULE			
TAG	DESCRIPTION	MANUFACTURER	MODEL	TYPE	WATTAGE	COMMENTS
R	4X4 RECESSED DOWN LIGHT	NORA	NHIOICD-48LE3	LED	13	FIXTURE. INSTALL WITH NIO-4SNDSQ- 30X-HN/10
L1	2X2 FLAT PANEL LIGHT	LITHONIA LIGHTING	CPX 2X2 3200LM 35K M4	LED	30	
L2	2' X 4' LED PANEL	MAXLITE	MLFP24EP3535	LED	32	STANDARD WHITE LAMP 3500K
S	6" LED CAN LIGHT	LITHONIA LIGHTING	65BEMW LED 30K 90CRI M6	LED	11.9	CONTRACTOR SELECT
А	TECH LIGHTING WINDSOR PENDANT -	TBD	тво	LED	TBD	TO BE INSTALLED OVER HANDOFF AREA
EX	LED EMERGENCY EXIT SIGN	EMERGENCY LIGHTING	BOLT EZRXTEU2RWEM	LED	1	SINGLE FACE-RED-WHITE- BATTERYBACKUP
EXT	LED EMERGENCY EXIT & EMERGENCY COMBINATION LIGHT	UTOPIA LIGHTING	LEDCXTEU-SINGLE FACE-R-W-RCHL	LED	1	INSTALL AS SHOWN ON RCP ABOVE EXIT DOORS
EM	LED EMERGENCY LIGHT - WALL PACK	EMERGENCY LIGHTING	LEDR-1-SDT-HL	LED	2	LOCATED 12" BELOW CEILING OR BULKHEAD
NOTE:						
1	COORDINATE WITH THE ARCHITECT F	OR THE FINAL FINISH, COLC	R AND QTY. OF THE LIGHT FIXTURE.			
2	ALL LIGHTING CONTROLS SHALL BE PE	R AHJ AND CODE COMPLIA	NCE.			

![](_page_10_Figure_1.jpeg)

# ELECTRICAL LIGHTING PLAN (1) SCALE: 1/4" = 1'-0"

GEN	ERAL NOTES
Α.	VERIFY ALL
	FINAL PUR

B. PROVIDE ALL LENGTHS, FEEDS, ACCESSORIES, CONNECTORS, WIRING, POWER SUPPLIES, DRIVERS ETC. FOR A COMPLETE INSTALLATION. THE E.C. SHALL VERIFY THE COMPLETE BILL OF MATERIAL WITH MANUFACTURER'S REPRESENTATIVE AND ENSURE ALL EQUIPMENT ARE INCLUDED IN BID PRICE. COORDINATE INSTALLATION WITH ARCHITECTURAL DETAILS.

C. VERIFY FINAL LUMINAIRE LOCATIONS WITH OTHER CEILING MOUNTED EQUIPMENTS SUCH AS DIFFUSER WITH ARCHITECTURAL REFLECTED CEILING PLANS.

LIGHTING PLAN GENERAL NOTES:

SWITCHED LIGHTING CIRCUIT.

COMMON FACEPLATE.

APPROVED WITH OWNER/LANDLORD BEFORE INSTALLATION.

LIGHTING KEYED NOTES: (#)

- ARCHITECT/OWNER.

- ARCHITECT/OWNER.

L LUMINAIRE COLORS, TRIMS, LENGTHS, ETC. WITH THE ARCHITECT PRIOR TO PLACING CHASE ORDERS. SUBMISSION PF SHOP DRAWINGS WILL BE INTERPRETED AS HAVING BEEN COORDINATED WITH THE ARCHITECTURAL DRAWINGS .

D. VERIFY EXACT MOUNTING HEIGHT AND LOCATIONS OF ALL WALL MOUNTED LUMINAIRE WITH ARCHITECTURAL PLANS AND ELEVATIONS PRIOR TO ROUGH-IN.

E. ANY PROPOSED ALTERNATE LUMINAIRES SHALL BE APPROVED BY THE ARCHITECT PRIOR TO FINAL BID PRICING.

F. SHOULD THE CONTRACTOR PROPOSE TO FURNISH MATERIALS, EQUIPMENT AND DEVICES OTHER THAN THOSE SPECIFIED AND LISTED, THE CONTRACTOR SHALL SUBMIT A WRITTEN REQUEST FOR SUBSTITUTIONS, TO THE ENGINEERS AT LEAST TEN (10) BUSINESS DAYS PRIOR TO BID OPENING. THE REQUEST SHALL BE AN ALTERNATE TO THE ORIGINAL BID AND SHALL INCLUDE A COMPLETE SPECIFICATIONS CUTSHEET SUBMITTAL AS OUTLINED IN THE SPECIFICATIONS, COMPLETE WITH DESCRIPTIVE (MANUFACTURER, BRAND NAME, CATALOG NUMBER, ETC.) AND TECHNICAL DATA FOR ALL ITEMS. INDICATE ANY ADDITIONS OR DEDUCTIONS TO THE CONTRACT PRICE WITH THE SUBSTITUTION SUBMITTAL AND ON THE BID FORM.

VERIFY FINAL SELECTION OF LIGHT FIXTURE WITH ARCHITECT.

A. CONTRACTOR IS ADVISED THAT ADJUSTMENTS TO EMERGENCY AND EXIT LIGHT FIXTURE LOCATIONS/QUANTITIES MAY BE REQUIRED BY AHJ UPON FINAL INSPECTION.

ALL NIGHT LIGHT, EMERGENCY AND EXIT LIGHT FIXTURES SHALL BE CONNECTED AHEAD OF

C. UNLESS OTHERWISE NOTED, LIGHT SWITCHES SHALL BE GANGED TOGETHER UNDER A

D. ANY EXTERIOR MODIFICATIONS OR ADDITIONS (LIKE ELECTRICAL OUTLETS) NEEDS TO BE

1. WALL MOUNTED OCCUPANCY SENSOR. SET OFF TIME TO 15 MINUTES FOR RESTROOM, SET DIP SWITCH TO AUTOMATIC ON.

WIRE ALL EMERGENCY, EXIT LIGHT AHEAD OF SWITCHING FOR CONTINUOUS OPERATIONS. CONNECT TO ADJACENT LIGHTING CIRCUIT.

3. COORDINATE EXACT LOCATION OF MANUAL OVERRIDE SWITCH WITH

4. EXHAUST FAN IN THE ROOM SHALL BE CONNECTED LIGHTING CIRCUIT IN THE SAME ROOM AND SHALL BE INTERLOCK WITH RTU-1 (E).

5. COORDINATE EXACT LOCATION OF SWITCH BANK (SB) WITH ARCHITECT/OWNER.

6. COORDINATE EXACT LOCATION OF TIME CLOCK & LIGHTING CONTACTOR WITH

# (5 3 Smoo **S** DRAWN BY CHECKED BY ARCH. PROJECT NO.: MOS24001.0 -SHEET NAME ELECTRICAL LIGHTING PLAN -sheet NUMBER E1.0

![](_page_11_Figure_0.jpeg)

ROOF POWER PLAN

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

SEE FLOOR PLAN AND DEMO PLAN.

POWER PLAN GENERAL NOTES:

- STRONG CORROSIVE INFLUENCES. (2) IN REGIONS THAT ARE BOTH DRY AND RAINY.

A. ELECTRICIAN TO RUN SEPARATE CAT-6 PLENUM-RATED DATA LINES FROM INDIVIDUAL JACKS TO NETWORK BOARD THROUGH APPROPRIATE SIZED CONDUIT AND TERMINATE ENDS SO THEY CAN BE PLUGGED INTO PROPER LOCATION ON NETWORK BOARD.

. PROVIDE TOTAL OF (4) 1 1/2" CONDUITS IN TRENCH UNDER COUNTER - (3) FOR CURRENT EQUIPMENT W/ (1) FOR FUTURE EQUIPMENT

C. ALL DATA JACKS TO HAVE DUPLEX CONFIGURATION UNLESS NOTED OTHERWISE.

). EXPOSED AND CONCEALED EMT SHALL BE PERMITTED FOR BOTH EXPOSED AND CONCEALED WORK ACCORDING TO NEC 358.10(A) (1 TO (1) WHEN INSTALLED IN ACCORDANCE WITH 358.10(B), IN CONCRETE, IN DIRECT CONTACT WITH THE EARTH, OR IN LOCATIONS PRONE TO

(3) AS LONG AS OTHER ARTICLES IN THIS CODE PERMIT IT, IN ANY HAZARDOUS (CLASSIFIED) PLACE.

. E.C. TO VERIFY WITH AHJ FOR ANY OTHER INSTALLATION REQUIREMENTS FOR EXPOSED CONDUIT.

			ELECTRICAL EQ	UIPMENT SCHEDULE						
TAG	QTY.	DESCRIPTION	MANUFACTURER	MODEL	AMPS	VOLTAGE	PHASE	CONNECTION	OUTLETS HEIGHT	REMARK
E1	1	TURBO AIR PST-72 PREP TABLE	TURBO AIR	SK-PST-72-ASSY	5.7	115	1	NEMA 5-15P	18" AFF	DED. CIR.
E2	2	POS W/ BRINK SOFTWARE	SKFI	-					18" AFF	DED. CIR.
E4	6	BLENDING STATION ADVANCE ON-COUNTER BLENDERS	VITA-MIX	36050-3813	15	120	1	20 AMP OUTLET	42" AFF	DED. CIR.
E5	1	GLASS DOOR MERCHANDISER COOLER	TURBO AIR	TGM-22RV(B)	2.2	115	1	NEMA 5-15P	18" AFF	DED. CIR.
E7	1	TURBO AIR MUR-28L-N U. C. FREEZER	TURBO AIR	SK-MUR-28L-N6_R3-1	2.1	115	1	NEMA 5-15P	18" AFF	DED. CIR.
E7b	2	TURBO AIR MUR-28L-N U. C. REFRIGERATOR	TURBO AIR	SK-MUR-28L-N6_R3-1	2.1	115	1	NEMA 5-15P	18" AFF	DED. CIR.
E8	1	ICE CUBER MACHINE	HOSHIZAKI	KM-660MAJ	15.2	115	1	HARDWIRE	-	
E9	1	REACH-IN REFRIGERATOR ON CASTORS	TURBO AIR	TSR-72SD	5.7	115	1	NEMA 5-15P	12" AFF	DED. CIR.
E10	1	REACH-IN FREEZER ON CASTORS	TURBO AIR	TSF-72SD	5.7	115	1	NEMA 5-20P	12" AFF	DED. CIR.
E11	1	PERSONAL COMPUTER							-	DED. CIR.
E14	2	EXTERIOR SIGNAGE	TBD	TBD					-	DED. CIR.
E19	5	4 LED MENU BDS & 1 LED INSERT BOARD	COLORMARK		4	115	1	DUPLEX OUTLET	6" ABOVE CEILING	
E20	1	AUTOMATIC WATER DISPENSER	VITA-MIX	ITEM # 066032				DUPLEX OUTLET	18" AFF	
E21	1	GLOBAL 6D DIPPING FREEZER	GLOBAL	SKGBL6DF	4.5	115	1	NEMA 5-15P	18" AFF	
E22	1	TURBO AIR MST-28-N	TURBO AIR	SK-MST-28-N-ASSY	3.8	115	1	NEMA 5-15P	18" AFF	DED. CIR.
E-A	1	HEATED DIPPERWELL	-	-	-	-	-	NEMA 5-15P	18" AFF	DED. CIR.
NOTES:	;									
1. REFE	R TO TH	IE PANEL SCHEDULE FOR CIRCUIT NUMBER INFORMATION.								
2. REFE	R TO M	ANUFACTURER'S INSTALLATION MANUAL FOR POWER AN	D CONNECTION REC	UIREMENTS.						
3 CON	TRACTO	R TO COORDINATE WITH MANUFACURER INSTALLATION N		WER AND COMMUNIC	ATION C	ONNECTIO	N REOUI	REMENTS		I

KITCHEN EQUIPMENT CONNECTION SCHEDULE GENERAL NOTES

THIS SCHEDULE SHOWS ALL CIRCUITING INFORMATION FOR KITCHEN / FOOD SERVICE EQUIPMENT. REFER TO KITCHEN DESIGNER'S / FOOD SERVICE DRAWINGS FOR ADDITIONAL INFORMATION SUCH AS ROUGH-IN INFORMATION AND OTHER REQUIREMENTS.

B. NEMA X-XX DESIGNATES NEMA PLUG TYPE AND AMPERAGE, 'HPRS' DESIGNATES HORSEPOWER-RATED SWITCH, 'FD' DESIGNATES A FUSED DISCONNECT, 'NF' DESIGNATES A NON-FUSED DISCONNECT, 'L' DESIGNATES LOCKABLE CIRCUIT BREAKER.

VERIFY ALL INSTALLATION REQUIREMENTS WITH FOOD SERVICE CONSULTANT AND EQUIPMENT MANUFACTURER PRIOR TO ROUGH-IN.

VERIFY ALL MCA AND MOCP REQUIREMENTS WITH SUBMITTED AND APPROVED EQUIPMENT PRIOR TO ELECTRICAL ROUGH-IN.

E. VERIFY NEMA RECEPTACLE CONFIGURATIONS WITH EQUIPMENT VENDOR PRIOR TO ELECTRICAL ROUGH-IN.

WHERE A CONFLICT OCCURS BETWEEN FOOD SERVICE / KITCHEN DESIGNER'S DRAWINGS AND THESE DRAWINGS, THE FOOD SERVICE / KITCHEN DESIGNER'S DRAWINGS SHALL GOVERN.

G. CONTRACTOR IS RESPONSIBLE FOR FURNISHING AND INSTALLING ALL CONDUIT, WIRE, SUPPORT SYSTEM, DISCONNECTS, AND OUTLETS TO ALLOW FOR A COMPLETE CODE COMPLIANT KITCHEN INSTALLATION AS INDICATED BY ALL ELECTRICAL AND FOOD SERVICE / KITCHEN DESIGNER'S DRAWINGS AND SPECIFICATIONS UNLESS NOTED OTHERWISE.

H. ALL ELECTRICAL EQUIPMENT LOCATED ON WALLS OF PRODUCTION KITCHEN AREAS SHALL BE A MINIMUM OF 48" AFF UNLESS NOTED OTHERWISE. ALL ELECTRICAL EQUIPMENT LOCATED ABOVE COUNTERS OF KITCHEN AREAS SHALL BE 6" ABOVE COUNTER UNLESS NOTED OTHERWISE. ALL ELECTRICAL EQUIPMENT LOCATED BELOW COUNTERS AND WITHIN CASEWORK OF KITCHEN AREAS SHALL BE 6" BELOW THE TOP OF COUNTERS UNLESS NOTED OTHERWISE.

REFER TO KITCHEN DESIGNER'S / FOOD SERVICE DRAWINGS FOR ADDITIONAL ROUGH-IN INFORMATION INCLUDING EXACT ROUGH-IN LOCATION AND MOUNTING HEIGHTS OF ELECTRICAL ROUGH-INS AND DEVICES. ANY DIMENSIONS NOTED ON THE KITCHEN DESIGNER'S /

I. CONTRACTOR SHALL ENSURE THAT ALL CONDUIT ROUTED THROUGH OR NEAR CASEWORK SHALL NOT INTERFERE IN ANY WAY WITH INTENDED USE OR SERVICING OF EQUIPMENT OR COUNTERS.

K. ALL RECEPTACLES IN KITCHEN AREA SHALL BE GFCI PROTECTED. E.C. SHALL PROVIDE AND INSTALL GFCI CIRCUIT BREAKERS FOR ALL CIRCUITS FEEDING KITCHEN EQUIPMENT REQUIRING GFCI PROTECTION THAT ARE INACCESSIBLE, BEFORE OR AFTER APPLIANCE HAS BEEN INSTALLED, IF RECEPTACLE DOESNT PROVIDE GFCI PROTECTION. NEC 210.8 AND 422.5(A).

L. LOCATIONS OF DISCONNECTS FOR EACH PIECE OF EQUIPMENT MAY NOT BE SHOWN ON PLANS. IF DISCONNECT FOR EQUIPMENT IS NOT SHOWN, CONTRACTOR TO FIELD COORDINATE LOCATION IN ACCORDANCE WITH CODE.

M. CONTRACTOR SHALL LIMIT THE AMOUNT OF EXPOSED CONDUIT. ANY EXPOSED CONDUIT SHALL BE LIQUID TIGHT FLEXIBLE METAL CONDUIT OR RIGID GALVANIZED STEEL CONDUIT.

N. COORDINATE EXACT LOCATION OF ALL REMOTE CONDENSING UNITS WITH HVAC AND FOOD SERVICE DRAWINGS.

O. ALL ENERGIZED EQUIPMENT AND ALL WIRING DEVICES LOCATED UNDER A HOOD SHALL SHUNT TRIP UNPON ACTIVATION OF HOOD FIRE

P. FUSED DISCONNECTS SHALL HAVE FUSES SIZED AS LISTED ON EQUIPMENT NAMEPLATE, OTHERWISE MATCH UPSTREAM OVERCURRENT DEVICE IF NO MAXIMUM OVER CURRENT SIZE LISTED ON EQUIPMENT, UNLESS NOTED OTHERWISE.

1. E.C. TO COORDINATE THE EXACT LOCATION AND ELECTRICAL REQUIREMENT OF PLUMBING EQUIPMENT WITH PLUMBING CONTRACTOR. PROVIDE THE ELECTRICAL CONNECTION AS PER PLUMBING EQUIPMENT REQUIREMENT IN THE FIELD. INFORM ENGINEERS FOR ANY DISCREPANCY FOUND.

2. PROVIDE CEILING MOUNTED RECEPTACLES FOR SHOW WINDOW AS REQUIRED BY CODE. VERIFY EXACT LOCATION OF OUTLETS WITH

3. JUNCTION BOX WITH TOGGLE DISCONNECT PER NEC FOR CONNECTION TO BUILDING MOUNTED SIGNAGE. VERIFY EXACT LOCATION AND CONNECT TO SIGN PER MANUFACTURE'S INSTRUCTION.

4. PROVIDE DEDICATED CIRCUIT / GROUND INSULATED AND ISOLATED DATA / PHONE JACK.

5. CLEAR WORKING & DEDICATED SPACE SHALL BE PROVIDED FOR THE ELECTRICAL PANELS IN ACCORDANCE WITH THE NEC 110.26.

8. E.C. SHALL COORDINATE WITH ARCHITECT/OWNER FOR REQUIREMENTS OF THESE THREE DUPLEX RECEPTACLE IN THE KITCHEN.

9. PROVIDE DEDICATED CIRCUIT / GROUND INSULATED / ISOLATED AND DATA JACKS.

10. PROVIDE NEW FUSED DISCONNECT SWITCH 200A, 208Y/120V, 3 PHASE FOR EXISTING PANEL "A" 200A, MLO, 208Y/120V, 3 PHASE. COORDINATE EXACT LOCATION WITH ARCHITECT/OWNER IN FIELD.

# ELECTRICAL ROOF POWER PLAN KEY NOTES: $\langle \# \rangle$

1. E.C. TO VERIFY OPERABLE CONDITIONS, RATINGS AND EXACT LOCATION OF THE MECHANICAL EQUIPMENTS IN FIELD. REPLACE IF FOUND INOPERABLE. BASE BID ACCORDINGLY.

# S L S

PERMIT SET REVIEW COMMENTS REVIEW COMMENTS

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- SHEET NUMBER

-SHEET NAME

ARCH. PROJECT NO.:

ELECTRICAL POWER PLAN

E2.0

1.	ALL CABLES AND JACKS SHALL BE LAB	ELED AS OF THEIR FUNCTION (VOICE OR DATA) AND NUMBERED SEQUENTIALLY.	
2.	STATION DATA AND VOICE CABLES SHA AS LISTED IN THE MOST RECENT UL DI TWISTED PAIR CABLES. THE OUTER JA BE GENERAL CABLE 613299, CAT 5e OR	ALL BE CATEGORY 5e COMPLIANT (AS DESCRIBED IN THE ANSI/TIA/EIA 568 STANDARD AND RECTORY) 100 OHMS, FOUR PAIR, 24 GAUGE COPPER, PLENUM RATED, UNSHIELDED ACKET OF THE CABLE SHALL BE BLUE FOR "DATA" AND WHITE FOR "VOICE". CABLE SHALL E EQUAL.	
3.	ALL STATION DATA CABLES SHALL TER	MINATE INSIDE INTERNAL OR EXTERNAL JUNCTION BOXES.	
4.	MODULAR JACKS SHALL BE CATEGORY UN-KEYED, AND UTILIZE 110-STYLE TER ACCORDING TO THE T568B WIRING STA THE WIRE TO BE TERMINATED. THE JA #5G108-R*5 OR APPROVED FOUAL	<sup>7</sup> 5e COMPLIANT (AS DESCRIBED IN THE ANSI/TIA/EIA-568-B) 8 - CONDUCTOR 8 - POSITION, MINATION CONTRACTS. THE JACK SHALL BE COLOR CODED AND TERMINATED ANDARD. THE JACK SHALL BE OF THE APPROPRIATE CATEGORY COMPLIANCE TO MATCH CKS SHALL BE COLORED BLUE "DATA" AND WHITE FOR "VOICE". LEVITON PART	D1
5.	STATION OUTLET FACEPLATES SHALL I LEVTION #43080-1S1 FOR 1-PORT, LEVI	3E MANUFACTURED TO ACCEPT THE MODULAR JACK SPECIFIED. PLATES SHALL BE FON # 43080-1S2 FOR 2- PORT.	D2
6.	RUN CABLE IN CONTINUOUS LINK FROM TENSION. LEAVE AT LEAST SIX FEET S	VI OFFICE TO WORK AREA OUTLET, NO SPLICES. DO NOT EXCEED 25 LB. MAXIMUM PULL PARE CABLE AT EACH END.	
7.	<ul> <li>PROVIDE CLEARANCE OF AT LEAST:</li> <li>a. 4' FROM MOTORS OR TRANSFORMEI</li> <li>b. 1' FROM CONDUIT AND CABLES USEI</li> <li>c. 18" FROM FLUORESCENT LIGHTING.</li> <li>d. 6" ABOVE DROP CEILING.</li> </ul>	RS. D FOR ELECTRICAL POWER.	
8. 9.	PATHWAY SHOULD CROSS PERPENDIC ALL HORIZONTAL DISTRIBUTION RUNS COMBINATION. A PERMANENT LINK SO EFFICIENCY AND THROUGHPUT. THE P	ULAR TO FLUORESCENT LIGHTING AND POWER CABLES. SHALL WORK TOGETHER TO CREATE A PERMANENT LINK SOLUTION FOR WIRE AND JACK LUTION IS A PAIRING OF WIRE AND JACK TESTED TOGETHER TO PRODUCE OPTIMUM PERMANENT LINK SOLUTION WILL BE TESTED AS A COMPLETE ASSEMBLY FROM THE	
	WORKSTATION OUTLET TO THE PATCH	PANEL INTERFACE.	POS REQUIF
10.	ALL CATEGORY 5e DISTRIBUTION CABL ANSI/TIA/EIA-568-B FOR THE PERMANEN THE PRIMARY FIELD TEST PARAMETER THE PROCEDURES USED TO RECTIFY T TESTS SHALL UTILIZE A CATEGORY 5e	ES WILL BE TESTED IN ACCORDANCE WITH PROCEDURES OUTLINED IN JT LINK. WRITTEN TEST RESULTS FOR EACH CABLE SHALL INCLUDE ALL FOUR OF RESULTS. ANY CABLE THAT FAILS TESTING SHALL BE REPORTED ALONG WITH THE FAILURE (I.E. REPLACED CABLE, RE-TERMINATED JACK, ETC.). CONTRACTOR LEVEL III COMPLIANT CABLE TESTER AS DESCRIBED IN ANSI/TIA/EIA-568-B.	<u>1. INTERNET</u> COMMON INSTALLA * DSL: 15-25 B * CABLE: 45-6
11.	A WRITTEN COPY OF ALL TESTS SHALL INCLUDE A PASS/FAIL INDICATION FOR VERSION OF THE SCANNER AND A COP	BE PROVIDED TO THE OWNER AFTER COMPLETION. THE DOCUMENTATION SHALL THE SPECIFIED CABLE, THE TEST DATE, THE SERIAL NUMBER AND SOFTWARE Y OF THE CALIBRATION CERTIFICATE FOR THE SCANNER.	PREFERRED SERVIC 1. CABLE 2. DSL
			3. UVERS/FIO
			ISP MODEM/ROUTER * MODEM (NO
ELEC			INSTALLÀTIC * DSL/UVERSE
MAR	K DESCRIPTION		* DHCP DISAE * WIRELESS D
	CAT-5e CABLE TERMINATED TO RJ45 WALL JACK WITH COVER PLATE		3. BACK OFFICE CO
	JUNCTION BOX		OPERATING SYSTEM
MJ	MANUAL MOTOR STARTER TOGGLE SWITCH - CONFIRM TYPE & RATING PER EQUIP. PROVIDE ENCLOSURE W/ LOCK-OUT ACCESSORY.		RAM: HARD DRIVE CAPAC
	PHONE OUTLET		
		(1) CAT 5e JACKS (FEMALE) - BY G.C. 18" AFF (STICKY PRINTER) (6) (6) (7) (7) (7) (7) (7) (7) (7) (7) (7) (7	i) CAT 5e JACKS EMALE) - BY G.C. ' BELOW CEILING
		05 SERWIFLIN CLOS-TO PATCH PANEL	
			FEED PLATES DAT
			FEED PLATES DAT
		Image: Construction of the second	- feed plates Date 2'-0"-1"RESTROO
		PHONE (s) CAT SE JACKS (FEMALE) - BY G.C. 01 02 CUSTOMER AREA 02 RETAIL AREA	Provide the second seco
		The second secon	2'-OM- - 1'RESTROO
		Image: constrained of the second of the s	C_(I)J.3 CON FEED PLATES DAT
		VOLTAGE PLAN	C_(I)J.3 CON DAT

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

NETWORK CABLING STANDARDS

![](_page_12_Figure_4.jpeg)

### PANEL: A (EXISTING) DEMAND LOAD 53.91 208Y/120 VOLTS PHASE 3 200A MLO WIRE DEMAND CURRENT 149.80 NOTE: L: LIGHTING, H: HVAC LOAD, M: MOTOR LOAD, R: RECEPTACLES, O: OTHER/MISC. (TYPICAL) PER PHASE (KVA) | MINIMUM BRANCH CIRCUIT | LOAD (KVA) | LOAD TYPE DESCRIPTION OF LOAD CKT NO. TRIP AMPS LOAD TYPE LOAD (KVA) MINIMUM BRANCH CIRCUI A | B | C 6.72 2#12 + 1#12G, 3/4"C 1.20 5.52 50/3P RTU-1(E) EXISTING 5.52 6.06 3 Н 2#12 + 1#12G, 3/4"C 0.54 5.52 1.20 5 н 6.72 2#12 + 1#12G, 3/4"C 7 1.00 2#12 + 1#12G, 3/4"C 2#12 + 1#12G, 3/4"C 0.72 20 INTERIOR LIGHTING L 1.72 0.18 9 20 POS RECEPTACLE R 2#12 + 1#12G, 3/4"C 1.08 2#12 + 1#12G, 3/4"C 0.90 0.50 11 20 TIME CLOCK 2#12 + 1#12G, 3/4"C 1.00 2#12 + 1#12G, 3/4"C 0.50 L 13 20\*\*\* E8 - ICE CUBER MACHINE 1.82 3#12 + 1#12G, 3/4"C 2.50 2#12 + 1#12G, 3/4"C Е 0.68 15 20\*\* ACCESS POINT CEILING REC. 0.18 R 2#12 + 1#12G, 3/4"C 0.86 2#12 + 1#12G, 3/4"C 0.68 17 1.04 2#12 + 1#12G, 3/4"C 20\*\* E1 - PST-72 PREP TABLE F 0.68 2#12 + 1#12G, 3/4"C 0.36 20\*\* E2 - POS W/ BRINK SOFTWARE 19 1.20 2#12 + 1#12G, 3/4"C | 1.74 | 2#12 + 1#12G, 3/4"C 0 0.54 1.38 21 20\*\* E2 - POS W/ BRINK SOFTWARE 1.20 2#12 + 1#12G, 3/4"C 2#12 + 1#12G, 3/4"C 0.18 0 23 20\*\* E4 - BLENDING STATION 1.80 2#12 + 1#12G, 3/4"C 2.34 2#12 + 1#12G, 3/4"C 0.54 E 25 20\*\* E4 - BLENDING STATION 1.80 2#12 + 1#12G, 3/4"C 2.26 2#12 + 1#12G, 3/4"C Е 0.46 27 20\*\* E4 - BLENDING STATION 1.80 2#12 + 1#12G, 3/4"C 2.16 2#12 + 1#12G, 3/4"C 0.36 Е 29 3.60 20\*\* E4 - BLENDING STATION Е 1.80 2#12 + 1#12G, 3/4"C 2#12 + 1#12G, 3/4"C 1.80 31 20\*\* E4 - BLENDING STATION 1.80 2#12 + 1#12G, 3/4"C 3.00 2#12 + 1#12G, 3/4"C 1.20 Е 33 20\*\* E4 - BLENDING STATION Е 1.80 2#12 + 1#12G, 3/4"C 2.80 2#12 + 1#12G, 3/4"C 1.00 20\*\* E5 - MERCHANDISER COOLER 0.26 2#12 + 1#12G, 3/4"C 2#12 + 1#12G, 3/4"C 1.00 35 1.26 | Ε 37 20\*\* E7 - U.C. FREEZER 0.25 0.50 2#12 + 1#12G, 3/4"C 2#12 + 1#12G, 3/4"C E 0.75 0.25 39 20\*\* E7b - U.C. REFRIGERATOR 2#12 + 1#12G, 3/4"C 4.75 4.50 Е 2#6 + 1#10G, 3/4"C 41 20\*\* E7b - U.C. REFRIGERATOR 0.25 2#12 + 1#12G, 3/4"C 4.75 4.50 E | 18.69 | 19.09 | 20.71 | LOAD CLASSIFICATION CONNECTED LOAD (KVA) **DEMAND FACTOR** DEMAND LOAD (KVA) TOTAL LIGHTING 5.70 125% 7.13 TOTAL RECEPTACLE R 4.08 100% 4.08 TOTAL HVAC 16.56 16.56 н 100% **TOTAL MOTOR** Μ 0.00 100% 0.00 TOTAL EQUIPMENTS 17.17 65% 11.16 F TOTAL OTHER 14.98 100% 14.98 0

PANEL SCHEDULE GENERAL NOTES:

A. BREAKERS IN EXISTING PANEL SHALL BE REPLACED WITH THE BREAKER RATING AS SHOWN ON THE PANEL SCHEDULE.

B. E.C. TO VERIFY THE RATINGS AND OPERABLE CONDITIONS OF EXISTING PANELS AND BREAKERS IN FIELD. REPLACE IF FOUND INOPERABLE. BASE BID ACCORDINGLY.

PANEL SCHEDULE GENERAL NOTES:

A. ELECTRICAL CONTRACTOR SHALL VERIFY THE BREAKER AND CABLE RATING WITH EQUIPMENT SUPPLIER/OWNER AND ACCORDINGLY UPDATE THE BREAKER RATING CABLE SIZE IN FIELD.

B. GFI MARKED ON THE POWER PLAN INDICATES THAT THE CIRCUIT SHALL BE GFCI PROTECTED. E.C. SHALL PROVIDE GFCI BREAKER FOR THE GFI MARKED RECEPTACLES, IF EITHER RECEPTACLE IS NOT ACCESSIBLE OR NOT AVAILABLE.

PROVIDE HACR BREAKER FOR HAVC UNITS. COORDINATE WITH HVAC DRAWINGS.

D. PROVIDE LOCKING DEVICES ON CIRCUIT BREAKER WHERE EVER REQUIRED.

E. E.C. TO VERIFY SCOPE OF WORK WITH OWNER/ARCHITECT. PRIOR TO BID.

F. VERIFY EXACT POWER DISTRIBUTION IN FIELD.

PANEL SCHEDULE ABBREVIATIONS L=LIGHTING R=RECEPTACLE

H=HVAC M=MOTOR O=OTHER

(\*\*) NEW BREAKER IN EXISTING PANEL (\*\*\*) PROVIDE HACR BREAKER

AIC:45kA

 $\Delta$ 

M)ELECT.

METER

FAULT CURRENT CALCULATIONS LOCATION OF FAULT CURRENT X1 X2 X3 X4 40 ft FEEDER LENGTH 50 ft 3 ft FEEDER SIZE 600 QYT (PER PHASE) TYPE Three-conductor cable Three-conductor cable Three-conductor cable CONDUIT Non-magnetic Steel Steel -AL, 600V 17648A 208V AL, 600V 16979A 208V WIRE AL, 600V I total s.c. (L-L-L) 42289A 37193A V (L-L) 208V 208V KVA 750 -**VOLTAGE** secondary 208 --%7 5.47 --%Z total -10% (Max Fault) NOTE: THE ABOVE CALCULATION IS BASED ON EATON BUSSMANN SERIES FAULT CALCULATION.

# **FAULT CURRENT CALCULATION** (4) scale: NTS

![](_page_13_Figure_16.jpeg)

![](_page_13_Picture_18.jpeg)

![](_page_14_Figure_0.jpeg)

![](_page_14_Figure_1.jpeg)

Ducio et Information					
Project Information					
Energy Code: Project Title: Project Type:	SMOOTHIE KING Alteration				
Construction Site:	Owner/Agent:	Designer/C MICHAEL 382 NE 19 MIAMI, FL	ontractor: . TOBIAS 91ST STREET _ 33179	SUITE 496	74,
Allowed Interior Lightin	g Power	B	C		п
	Area Category	Floor Area (ft2)	Allowed Watts / ft2	Allow (B	ed Watts X C)
1-RESTAURANT (Retail)		1310	1.26	1	651
RESTAURANT (Retail 1310 LED: R: Other: LED: L1: Other:	<u>) sq.ft.)</u>	1 1	21 9	13 30	273 270
LED: L2: Other:		1	8	32	256
LED: S: Other: LED: A: Other:		1	4 3	12 10	48 30
		-	Total Proposed	Watts =	877
	S				
Interior Lighting PASSE					
Interior Lighting PASSE Interior Lighting Compl Compliance Statement: The p specifications, and other calcula 2015 IECC requirements in CO Checklist.	iance Statement proposed interior lighting alteration project represented in ations submitted with this permit application. The propos Mcheck Version 4.1.5.5 and to comply with any applicat	this document is cons ed interior lighting syst ole mandatory requiren	istent with the l tems have beer nents listed in th 05/03/2	building plar n designed t he Inspectic	ns, to meet th m
Interior Lighting PASSE Interior Lighting Compl Compliance Statement: The p specifications, and other calcula 2015 IECC requirements in CO Checklist. MICHAEL TOBIAS Name - Title	iance Statement iroposed interior lighting alteration project represented in ations submitted with this permit application. The propos Mcheck Version 4.1.5.5 and to comply with any application Signature	e this document is cons ed interior lighting syst ole mandatory requiren	istent with the laters have been nents listed in the later of the late	building plar n designed f he Inspectic	ns, to meet th n
Interior Lighting PASSE Interior Lighting Compl Compliance Statement: The p specifications, and other calcula 2015 IECC requirements in CO Checklist. MICHAEL TOBIAS Name - Title	iance Statement roposed interior lighting alteration project represented in ations submitted with this permit application. The propos Mcheck Version 4.1.5.5 and to comply with any application Signature	e this document is cons ed interior lighting syst ole mandatory requiren	istent with the l tems have beer nents listed in th 05/03/2 Date	building plar h designed f he Inspectic	ns, o meet th n

Section # & Req.ID	Final Inspection	Complies?	Comments/Assumptions
C303.3, C408.2.5.2 [FI17] <sup>3</sup>	Furnished O&M instructions for systems and equipment to the building owner or designated representative.	□Complies □Does Not □Not Observable □Not Applicable	Requirement will be met.
C405.4.1 [FI18] <sup>1</sup>	Interior installed lamp and fixture lighting power is consistent with what is shown on the approved lighting plans, demonstrating proposed watts are less than or equal to allowed watts.	□Complies □Does Not □Not Observable □Not Applicable	See the Interior Lighting fixture schedule for values.
C408.2.5.1 [FI16] <sup>3</sup>	Furnished as-built drawings for electric power systems within 90 days of system acceptance.	□Complies □Does Not □Not Observable □Not Applicable	Requirement will be met.
C408.3 [FI33] <sup>1</sup>	Lighting systems have been tested to ensure proper calibration, adjustment, programming, and operation.	Complies Does Not Not Observable Not Applicable	Requirement will be met.

![](_page_15_Picture_2.jpeg)

Л	CON	Acheck Softwa	are Version 4.	1.5.5		Section # & Req.ID	Rough-In Electrical Inspection	Complies?	Comments/Assumptions
ſ	۲ Ins	spection	Checklis	t		C405.2.1 [EL15] <sup>1</sup>	Lighting controls installed to uniformly reduce the lighting load by at least 50%.	□Complies □Does Not	Requirement will be met.
Requirer		gy Code: 2015 IE	CC	ck software				□Not Observable □Not Applicable	
Text in the	e "Comments/A ertifies that a c	Assumptions" column is	provided by the user i	n the COMcheck Requirements scre	en. For each requirement, being claimed. Where	C405.2.1 [EL18] <sup>1</sup>	Occupancy sensors installed in required spaces.	□Complies □Does Not	Requirement will be met.
compliance	e is itemized in	n a separate table, a re	Ference to that table is	provided.				□Not Observable □Not Applicable	
Section # & Req.ID		Plan Review	Complies?	Comments/Assu	umptions	C405.2.1, C405.2.2.3	Independent lighting controls installed per approved lighting plans and all manual controls readily accessible	□Complies □Does Not	Requirement will be met.
C103.2	Plans, specific	ations, and/or calculations	Complies	Requirement will be met.		[EL23] <sup>2</sup>	controls readily accessible and visible to occupants.	□Not Observable □Not Applicable	
	compliance ca interior lighting	n be determined for the and electrical systems ar	Mot Observable			C405.2.2.1	Automatic controls to shut off all building		Requirement will be met.
	to the standard provided shoul	d are claimed. Information Id include interior lighting				[====			
	power calculat ballasts, transf	tions, wattage of bulbs and formers and control device	l S.			C405.2.3 [EL16] <sup>2</sup>	Daylight zones provided with individual controls that control the lights independent.		Exception: Requirement does not apply.
Additional	L Commonto//	Accumptional				[]	of general area lighting.		
Additional	Comments/F	ssumptions.				C405.2.3, C405.2.3.1,	Primary sidelighted areas are equipped wit required lighting controls.	h Complies	Exception: Requirement does not apply.
						C405.2.3.2 [EL20] <sup>1</sup>			
						C405.2.3, C405.2.3.1,	Enclosed spaces with daylight area under skylights and rooftop monitors are equipped	□Complies d □Does Not	Exception: Requirement does not apply.
						C405.2.3.3 [EL21] <sup>1</sup>	with required lighting controls.	□Not Observable □Not Applicable	
						C405.2.4 [EL4] <sup>1</sup>	Separate lighting control devices for specific uses installed per approved lighting	□Complies □ □Does Not	Requirement will be met.
							plans.	□Not Observable □Not Applicable	
						C405.2.4 [EL8] <sup>1</sup>	Additional interior lighting power allowed fo special functions per the approved lighting	r Complies	Requirement will be met.
							plans and is automatically controlled and separated from general lighting.	□Not Observable □Not Applicable	
						C405.3 [EL6] <sup>1</sup>	Exit signs do not exceed 5 watts per face.	Complies	Requirement will be met.
						-		□Not Observable □Not Applicable	
						Additional	Comments/Assumptions:		
Proiect Title	SMOOTH	1 High Impact (Tier 1)	2 Medium Impac	t (Tier 2) 3 Low Impact (Tier 3	3)	Proiect Title:	1   High Impact (Tier 1)	2 Medium Impa	act (Tier 2) 3 Low Impact (Tier 3)
					Report date: 05/03/24		,,,		
		,,,			Report date: 05/03/24 Page 2 of 5	,			Page
					Report date: 05/03/24 Page 2 of 5				Page
					Report date: 05/03/24 Page 2 of 5				Page
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roject Title:		KING - MINT HILL, NC			Report date: 05/03/24 Page 2 of 5				Page
Dject Title:		KING - MINT HILL, NC			Report date: 05/03/24 Page 2 of 5				Page

![](_page_15_Figure_4.jpeg)

# PLUMBING SYMBOLS LIST

— GSAN —	GREASE SANITARY SEWER (UNDERFLOOR)
— SAN —	SANITARY SEWER (UNDERFLOOR)
EX.SAN	EXISTING SANITARY SEWER (UNDERFLOOR)
	VENT PIPING
	COLD WATER PIPING
	HOT WATER PIPING
	HOT WATER RETURN PIPING
·	FILTER PIPING
	EXISTING COLD WATER PIPING
	P-TRAP
———————————————————————————————————————	PIPE UP
ə	PIPE DROP
	CLEANOUT
II	PLUGGED OUTLET/CLEANOUT
$\bullet$	POINT OF CONNECTION

## PLUMBING ABBREVIATIONS

_	
со	CLEANOUT
CW	COLD WATER
нพ	HOT WATER
HWR	HOT WATER RETURN
SAN	SANITARY
V	VENT
W	WASTE
LAV	LAVATORY
WC	WATER CLOSET
TYP.	TYPICAL
DN	DOWN
AFF	ABOVE FINISH FLOOR
FD	FLOOR DRAIN
SQ. FT.	SQUARE FEET
BFP	BACK FLOW PREVENTER
WH	WATER HEATER
ET-1	EXPANSION TANK
RCP-1	HOT WATER CIRCULATION PUMP

# PLUMBING DRAWING LIST

- P0.1 PLUMBING SYMBOLS & SPECIFICATIONS
- P2.0 PLUMBING FLOOR PLANS
- P2.1 PLUMBING DIMENSIONAL PLAN
- P3.0 PLUMBING DETAILS (1 OF 2)
- P3.1 PLUMBING DETAILS (2 OF 2)
- **P4.0 PLUMBING RISERS & SCHEDULES**

P5.0 PLUMBING COMCHECK

# BUILDING DEPARTMENT PLUMBING NOTES

ALL PLUMBING SYSTEMS (SANITARY, WASTE, VENT, WATER) AND ASSOCIATED EQUIPMENT SHALL BE INSTALLED. OPERATED AND MAINTAINED IN ACCORDANCE WITH THE REQUIREMENTS OF 2018 NORTH CAROLINA STATE PLUMBING CODE (2015IBC).

INSTALLATION OF UNDERGROUND PIPING SHALL BE IN ACCORDANCE WITH THE **REQUIREMENTS OF SECTION PC 702.2** 

PROTECTION OF PIPING AND PLUMBING SYSTEM COMPONENTS AS PER SECTION PC 305. TRENCHING, EXCAVATION AND BACKFILL AS PER SECTION PC 306.

**RODENT PROOFING AS PER PC 304** 

MATERIALS USED IN PLUMBING SYSTEMS SHALL BE IN ACCORDANCE WITH THE REQUIREMENTS OF SECTION PC 303, PC 605, PC 702, PC 902, PC 1102.

EQUIPMENT CONNECTIONS AND JOINING OF PIPING SHALL BE IN ACCORDANCE WITH THE 1.03 SUBSTITUTIONS REQUIREMENTS OF CHAPTERS 4, 5, 6, 7 AND 9.

DEEP SEAL TRAPS FOR FLOOR DRAINS SHALL BE PROVIDED AS PER PC 1002, AND CLEAN-OUTS SHALL BE INSTALLED IN ACCORDANCE WITH THE REQUIREMENTS OF SECTION PC 708

DRAINAGE PIPE CLEANOUTS AS PER SECTION PC 708.

- VERTICAL AND HORIZONTAL PIPING SHALL BE SUPPORTED IN ACCORDANCE WITH THE **REQUIREMENTS OF SECTION PC 308**
- WATER SUPPLY SYSTEMS SHALL BE INSTALLED AND MAINTAINED IN ACCORDANCE WITH THE REQUIREMENTS OF CHAPTER 6 SECTION PC 601-603, 604, 606, 607, 608, 610
- THE SANITARY DRAINAGE SYSTEM SHALL BE SIZED AND INSTALLED IN ACCORDANCE WITH THE REQUIREMENTS OF CHAPTER 7 SECTION PC 701, 704, 705, 706, 707, 708, 711.
- VENT PIPING FOR THE SANITARY DRAINAGE SYSTEM SHALL BE INSTALLED IN ACCORDANCE WITH THE REQUIREMENTS OF CHAPTER 9 SECTIONS PC 901 THROUGH PC 912 THROUGH PC 917
- INSPECTION AND TESTING OF PLUMBING SYSTEMS SHALL BE IN ACCORDANCE WITH SECTION NCAC

## PLUMBING SPECIFICATIONS:

1. BASIC PLUMBING REQUIREMENTS, MATERIALS AND METHODS

1.01 SCOPE

- A. PROVIDE ALL MATERIAL, TOOLS, SUPERVISION AND LABOR INCLUDING ALL MISCELLANEOUS AND INCIDENTAL ITEMS REQUIRED FOR COMPLETE AND OPERABLE PLUMBING INSTALLATIONS AS SHOWN OR DESCRIBED ON THE DRAWINGS AND IN THESE SPECIFICATIONS.
- B. THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE PROTECTION OF ALL EXISTING AND NEW CONDITIONS AND MATERIALS WITHIN THE CONSTRUCTION AREA. ANY DAMAGE CAUSED BY THE CONTRACTOR SHALL BE REPAIRED TO THE OWNER'S SATISFACTION.
- C. OBTAIN ALL PERMITS, PAY ALL PERMIT FEES AND SCHEDULE ALL REQUIRED INSPECTIONS. COPIES OF ALL PERMITS AND INSPECTION CERTIFICATES SHALL BE FORWARDED TO THE OWNER FOR RECORD.
- D. THE GENERAL CONDITIONS OF THE CONTRACT AND ALL DIVISION 1 REQUIREMENTS APPLY TO THE WORK OF THIS SECTION.
- E. THE CONTRACTOR SHALL VISIT THE SITE PRIOR TO SUBMITTING BID TO DETERMINE CONDITIONS AND THE EXTENT OF THE WORK. BY COMMENCING WORK, THE CONTRACTOR ACKNOWLEDGES HIS CONFIRMATION OF ALL CONDITIONS AS ACCEPTABLE WITH REFERENCE TO HIS CONTRACT, SCOPE OF WORK AND BID PRICE SUCH THAT NO ADDITIONAL COMPENSATION SHALL BE FORTHCOMING FOR UNFORESEEN EXISTING CONDITIONS.
- F. IN ALL AREAS SUBJECT TO FREEZING CONDITIONS, THE CONTRACTOR SHALL PROVIDE FREEZE PROTECTION FOR ALL DOMESTIC WATER PIPING INSTALLED UNDER HIS CONTRACT.
- G. ALL ELECTRICAL REQUIREMENTS SHALL BE COORDINATED WITH THE CONTRACTOR FOR ELECTRICAL WORK. THIS CONTRACTOR IS RESPONSIBLE FOR ALL LOW VOLTAGE WIRING FOR EQUIPMENT INSTALLED UNDER HIS CONTRACT. THE CONTRACTOR FOR
- ELECTRICAL WORK IS RESPONSIBLE FOR LINE VOLTAGE POWER WIRING ONLY. H. COLOR AND FINISH SELECTIONS FOR ALL MATERIALS, INCLUDING PAINTING OF PIPING, SHALL BE AS DIRECTED AND/OR APPROVED BY THE ARCHITECT.
- MINOR DETAILS NOT SHOWN OR SPECIFIED, BUT NECESSARY FOR THE PROPER AND ACCEPTABLE CONSTRUCTION, INSTALLATION OR OPERATION OF ANY PART OF THE WORK AS DETERMINED BY THE ENGINEER SHALL BE INCLUDED AS IF SPECIFIED OR INDICATED ON THE DRAWINGS.
- J. THIS CONTRACTOR SHALL BE RESPONSIBLE FOR COORDINATING ALL REQUIREMENTS FOR THE INSTALLATION, CONNECTION, EXTENSION OR MODIFICATION TO ALL UTILITY SERVICES WITH RESPECTIVE PROVIDERS INCLUDING PAYMENT OF ALL ASSOCIATED FEES.
- K. THE CONTRACTOR IS RESPONSIBLE FOR ALL PAINTING ASSOCIATED WITH CUTTING AND PATCHING. ALL PAINTING IN AREAS WITH COMPLETE FINISH RENOVATIONS SHALL BE PROVIDED BY THE GENERAL CONTRACTOR.

1.02 SUBMITTALS

- A. SUBMITTAL REQUIREMENTS SHALL BE COORDINATED WITH THE ARCHITECT AND AUTHORITIES HAVING JURISDICTION. UNLESS OTHERWISE DIRECTED, CONTRACTOR SHALL PROVIDE SUBMITTALS AS LISTED BELOW.
- PIPE AND FITTINGS
- 2. VALVES HANGERS AND SUPPORTS
- PLUMBING PIPING LAYOUT
- TESTS PLUMBING FIXTURES
- WATER HEATERS & ACCESSORIES
- MIXING VALVES
- 9. ALL SCHEDULED PLUMBING EQUIPMENT
- B. SUBMITTALS FROM SUPPLIERS OR MANUFACTURERS WHICH DO NOT BEAR THE STAMP OF THE SUBMITTING CONTRACTOR INDICATING THAT THE CONTRACTOR HAS REVIEWED THE SUBMITTAL FOR CONFORMANCE WITH THE PROJECT REQUIREMENTS WILL BE RETURNED REJECTED.
- C. THE ENGINEER'S REVIEW OF SUBMITTALS IS A COURTESY WHICH DOES NOT RELIEVE THE CONTRACTOR FROM CONFORMING WITH THE CONSTRUCTION DOCUMENTS, REGARDLESS OF THE ACTION INDICATED BY THE SHOP DRAWINGS STAMP.
- D. REVIEW OF SHOP DRAWINGS BY THE ENGINEER SHALL BE LIMITED TO THE INITIAL REVIEW, AND A SECOND REVIEW OF ANY REQUIRED RESUBMITTED DATA. IF THE ENGINEER IS REQUIRED TO REVIEW SHOP DRAWINGS FOR A THIRD (OR MORE) SUBMISSION OF THE SAME ITEM, THE CONTRACTOR SHALL BE LIABLE FOR COMPENSATING THE ENGINEER FOR THESE SUBSEQUENT REVIEWS AS PER THE ENGINEER'S CURRENT HOURLY RATE SCHEDULE.
- E. SUBMIT PROOF OF APPROVAL AND/OR CONFIRMATION OF SATISFACTORY TEST RESULTS TO THE OWNER AND THE ARCHITECT.
- F. SUBMIT TO THE OWNER'S MAINTENANCE PERSONNEL OPERATION AND MAINTENANCE DATA FOR ALL SYSTEM COMPONENTS, SERVICING REQUIREMENTS, INSPECTION DATA, REPLACEMENT PART NUMBERS AND AVAILABILITY AND CONTACT INFORMATION FOR SERVICE/SUPPLY COMPANY.
- G. FOR ALL BELOW GRADE PIPING WHERE ACTUAL INSTALLATION DEVIATES FROM CONSTRUCTION DRAWINGS, THE CONTRACTOR SHALL PROVIDE AS-BUILT DRAWINGS INDICATING BELOW GRADE PIPE LOCATIONS DIMENSIONED TO NEAREST COLUMN LINES.
- H. RECORD AS-BUILT DRAWINGS SHALL BE SUPPLIED TO THE OWNER/TENANT AFTER COMPLETION OF THE WORK SHOWING ANY ALTERATIONS, ADDITIONS AND/OR DELETIONS TO THE SYSTEM(S) INSTALLED.

- A. ALL EQUIPMENT SHALL BE PRODUCTS OF THE SPECIFIED MANUFACTURER OR MANUFACTURERS. ALL BIDS SHALL BE BASED ON THE SPECIFIED MANUFACTURER OR MANUFACTURER'S EQUIPMENT. FOR SUBSTITUTIONS OF OTHER MANUFACTURER'S EQUIPMENT TO BE CONSIDERED, THE SUBSTITUTION MUST BE INDICATED PRIOR TO BIDDING WITH THE REASON FOR THE PROPOSED SUBSTITUTION IDENTIFIED, AND THE PROPOSED CREDIT TO THE OWNER INDICATED. THE ENGINEER SHALL DETERMINE THE ACCEPTABILITY OF ANY PROPOSED SUBSTITUTIONS.
- B. THE CONTRACTOR ASSUMES ALL RESPONSIBILITY FOR COORDINATING THE WORK OF OTHER TRADES WHICH MAY BE AFFECTED BY SUBSTITUTIONS, INCLUDING ALL RELATED COSTS.

1.05 DEFINITIONS

- ACCESSORIES.
- C. PROVIDE: TO FURNISH AND INSTALL.

D. PLUMBING CONTRACTOR, THE CONTRACTOR, THIS CONTRACTOR: THE CONTRACTOR FOR PLUMBING WORK WHICH IS SPECIFIED HEREIN AND SHOWN ON THESE DRAWINGS.

### 1.06 DRAWINGS

A. THE DRAWINGS ARE DIAGRAMMATIC AND ARE INTENDED TO ILLUSTRATE THE GENERAL ARRANGEMENT AND ROUTING OF PIPING AND GENERAL LOCATIONS OF EQUIPMENT. PRECISE LOCATIONS OF EQUIPMENT, RISERS AND STACKS, AND ROUTING AND ELEVATION OF ALL PIPING SYSTEMS SHALL BE COORDINATED IN THE FIELD WITH THE ARCHITECT, ARCHITECTURAL DRAWINGS, THE WORK OF OTHER TRADES, EXISTING AND NEW BUILDING CONDITIONS AND/OR THE PREFERENCES OF THE OWNER/TENANT AS CONSTRUCTION PROCEEDS. ALL PIPING SHALL BE INSTALLED CONCEALED IN FINISHED SPACES, UNLESS NOTED OTHERWISE.

SPECIFIED.

- REQUIREMENTS.

# A. SANITARY AND VENT PIPING:

- COUPLING. DRAIN.
- CAROLINA STATE.

# B. DOMESTIC WATER PIPING:

ABOVE GRA PIPING IS A B137.5.
FITTINGS IN
JOINTS SHA

141-200 105-140

WATER DISTRIBUTION SYSTEM AS PER INTERNATIONAL ENERGY CONSERVATION CODE 2015 C404.7. HAVING ONE OR MORE RECIRCULATION PUMPS THAT PUMP WATER FROM A HEATED-WATER SUPPLY PIPE BACK TO THE HEATED-WATER SOURCE THROUGH A COLD-WATER SUPPLY PIPE SHALL BE A DEMAND RECIRCULATION WATER SYSTEM. PUMPS SHALL HAVE CONTROLS THAT COMPLY

A. FURNISH: TO PURCHASE, PROCURE, ACQUIRE AND DELIVER, COMPLETE WITH RELATED

B. INSTALL: TO ERECT, MOUNT AND CONNECT, COMPLETE WITH RELATED ACCESSORIES.

B. PROVIDE ALL NECESSARY INCIDENTAL MATERIALS AND ACCESSORIES REQUIRED TO MAKE THE WORK COMPLETE IN ALL RESPECTS, EVEN IF NOT PARTICULARLY SHOWN OR

. REFER TO PLUMBING EQUIPMENT/FIXTURE SCHEDULE ON THE DRAWINGS FOR ALL FIXTURE AND EQUIPMENT SPECIFICATIONS.

D. REFER TO FIXTURE CONNECTION SIZE SCHEDULE FOR ALL FIXTURE ROUGHING SIZE

E. VERIFY ALL INDICATED CONDITIONS BEFORE STARTING WORK AND REPORT ANY DISCREPANCIES. THE DRAWINGS REFLECT CONDITIONS WHICH CAN BE REASONABLY INTERPRETED FROM THE EXISTING VISIBLE CONDITIONS OR FROM DRAWINGS AND INFORMATION FURNISHED BY THE OWNER.

F. LOCATE ALL FIXTURES AND EQUIPMENT AS PER THE FINAL ARCHITECTURAL DRAWINGS.

ABOVE ABOVE GRADE PIPING SHALL BE HUBLESS CAST IRON PIPE WITH STAINLESS STEEL COUPLINGS AND ELASTOMERIC GASKETS WITH A MINIMUM 4 BANDS PER

2. SLOPE OF DRAINAGE SYSTEM SHALL BE 1/8" PER FOOT OF RUN FOR PIPE OVER 3" (I.D.) AND 1/4" PER FOOT OF RUN FOR PIPE 3" AND SMALLER (I.D.). VENT PIPING SHALL BE PITCHED TO

3. ALL CAST IRON SOIL PIPE AND FITTINGS SHALL BE MARKED WITH THE COLLECTIVE TRADEMARK OF THE CAST IRON SOIL PIPE INSTITUTE (CISPI) AND BE LISTED BY NSF NORTH

ADE WATER PIPING SHALL BE TYPE 'L' HARD-DRAWN COPPER TUBE. PEX AN ACCEPTABLE SUBSTITUTE AS PER ASTM F876 AWWA C904 AND CSA

DOMESTIC WATER PIPING SHALL BE WROUGHT COPPER OR CAST BRASS. IALL BE MADE WITH LEAD-FREE SOLDER.

THE ENTIRE DOMESTIC WATER DISTRIBUTION SYSTEM SHALL BE INSULATED INCLUDING ALL VALVES, FITTINGS, ETC.

5. COMPLY WITH NSF 61 FOR MATERIALS FOR WATER-SERVICE PIPING AND SPECIALTIES FOR DOMESTIC WATER.

6. ALL DOMESTIC WATER PIPING ABOVE GRADE SHALL BE INSULATED WITH FIRE-RETARDANT, FACTORY-APPLIED JACKET. PROVIDE COLD WATER PIPING WITH FACTORY-APPLIED VAPOR BARRIER. INSULATION REQUIREMENT SHOULD COMPLY WITH INTERNATIONAL ENERGY CONSERVATION CODE 2015, SECTION C403.2.10 REFER BELOW TABLE.

	MINIMUM PIPI	E INSULATION THIC	KNES	S				
FLUID OPERATING	INSULATION C	ONDUCTIVITY	NO	MINAL P Size (	IPE OR TI (INCHES)	UBE		
IEMPERATURE RANGE AND USAGE (°F)	CONDUCTIVITY BTU · IN./ (H · FT2 · °F)	MEAN RATING TEMPERATURE, °F	<1	1 to < 1½	1½ to < 4	4 to < 8	>8 -	
141-200	0.25-0.29	125	1.5	1.5	2	2	2	
105-140	0.21-0.28	100	1.0	1.0	1.5	1.5	1.5	
40-60	0.21-0.27	75	0.5	0.5	1.0	1.0	1.0	

WITH BOTH OF THE FOLLOWING: a. THE CONTROL SHALL START THE PUMP UPON RECEIVING A SIGNAL FROM THE ACTION OF A USER OF A FIXTURE OR APPLIANCE, SENSING THE PRESENCE OF A USER OF A FIXTURE OR SENSING THE FLOW OF HOT OR TEMPERED WATER TO A FIXTURE FITTING OR APPLIANCE.

THE CONTROL SHALL LIMIT THE TEMPERATURE OF THE WATER ENTERING THE COLD-WATER PIPING TO 104°F (40°C).

AS PER INTERNATIONAL ENERGY CONSERVATION CODE 2015, C404.6.1 HEATED-WATER CIRCULATION SYSTEMS SHALL BE PROVIDED WITH A CIRCULATION PUMP. THE SYSTEM RETURN PIPE SHALL BE A DEDICATED RETURN PIPE OR A COLD WATER SUPPLY PIPE. GRAVITY AND THERMO-SYPHON CIRCULATION SYSTEMS SHALL BE PROHIBITED. CONTROLS FOR CIRCULATING HOT WATER SYSTEM PUMPS SHALL START THE PUMP BASED ON THE IDENTIFICATION OF A DEMAND FOR HOT WATER WITHIN THE OCCUPANCY. THE CONTROLS SHALL AUTOMATICALLY TURN OFF THE PUMP WHEN THE WATER IN THE CIRCULATION LOOP IS AT THE DESIRED TEMPERATURE AND WHEN THERE IS NOT A DEMAND FOR HOT WATER.

HW SYSTEM PIPING IS DESIGNED AS PER MAXIMUM ALLOWED PIPE LENGTH METHOD AS PER INTERNATIONAL ENERGY CONSERVATION CODE 2015 C404.5.1. THE HW PIPE LENGTH FROM THE NEAREST SOURCE OF HEATED WATER TO THE TERMINATION OF THE FIXTURE SUPPLY PIPE SHALL BE AS PER FOLLOWING TABLE.

NOMINAL PIPE SIZE (INCHES)	MIXIMUM PIPING LENGTH (FEET)				
	PUBLIC LAV	OTHER FIXTURES			
1⁄2"	2'	43'			
3⁄4"	0.5'	21'			
1"	0.5'	13'			
1¼"	0.5'	8'			
1½"	0.5'	6'			
2" OR LARGER	0.5'	4'			

10. SEAL ALL JOINTS BETWEEN SEGMENTS OF INSULATION. 11. PROVIDE SHIELDS BETWEEN HANGERS AND INSULATION.

C. HANGERS AND SUPPORTS

- HANGERS SHALL BE STANDARD STEEL, MALLEABLE OR WROUGHT IRON, AS MANUFACTURED BY GRINNELL OR APPROVED EQUAL, SUITABLE FOR THE TYPE OF CONSTRUCTION. PIPING SHALL NOT BE HUNG FROM OTHER PIPE.
- 2. SECTIONS OF INDIVIDUAL PIPE RUNS SHALL BE SUPPORTED BY CLEVIS HANGERS.
- 3. ALL EQUIPMENT SHALL BE PROVIDED WITH APPROVED SUPPORTS.
- 4. PROVIDE SEISMIC RESTRAINTS IN ACCORDANCE WITH ALL APPLICABLE FEDERAL, STATE AND LOCAL CODES AND STANDARDS AND THE REQUIREMENTS OF AUTHORITIES HAVING JURISDICTION.

5. SUPPORTS SHALL BE PROVIDED IN STRICT ACCORDANCE WITH THE RECOMMENDATIONS OF THE PIPING MANUFACTURER.

### D. VALVES:

- PROVIDE GATE VALVES, BUTTERFLY OR BALL VALVES FOR SHUT-OFF DUTY ON MAIN AND BRANCH SUPPLY LINES. FOR ALL PIPE RUNS 2" AND SMALLER, PROVIDE BALL FOR ALL PIPE RUNS LARGER THAN 2" AND SMALLER THAN 4", PROVIDE GATE VALVES. PIPING 4" AND LARGER, PROVIDE BUTTERFLY VALVES FOR SHUT-OFF DUTY.
- ALL FIXTURES WITH THE EXCEPTION O FLUSHOMETER-EQUIPPED WATER CLOSETS AND URINALS SHALL HAVE STOP VALVES TO CONTROL SUPPLY TO THE FIXTURE. WHERE SUPPLIES ARE EXPOSED PROVIDE CHROME-PLATED STOPS WITH CHROME-PLATED ESCUTCHEONS ON PIPING PENETRATIONS.
- 3. ALL PLUMBING FIXTURES AND EQUIPMENT TO HAVE SHUT-OFF VALVES ON SUPPLY LINES.
- 4. ALL BRANCH LINES TO HAVE SHUT-OFF VALVES.
- 5. ALL VALVES SHALL BE ACCESSIBLE. PROVIDE ACCESS DOORS WHERE REQUIRED FOR VALVE ACCESS.
- 6. PROVIDE GLOBE VALVES FOR THROTTLING/BALANCING OF THE HOT WATER CIRCULATING SYSTEM.

INSTALL PIPING TO CONSERVE BUILDING SPACE. DO NOT INTERFERE WITH USE OF BUILDING SPACE AND THE WORK OF OTHER TRADES. ALL PIPING RUN IN CEILING SHALL BE INSTALLED TIGHT TO THE STRUCTURE ABOVE.

- INSTALL PIPING TO ALLOW FOR EXPANSION AND CONTRACTION WITHOUT STRESSING PIPE, JOINTS OR CONNECTED EQUIPMENT. PROVIDE PIPE ANCHORS, GUIDES AND EXPANSION JOINTS OR LOOPS IN ALL HOT WATER AND HOT WATER CIRCULATING MAIN SUPPLY PIPING AND SEGMENTS OF SUCH PIPE THAT EXCEED 30'-0" IN LENGTH.
- IN ALL AREAS WITH FINISHED SURFACES. SYSTEM PIPING AND COMPONENTS SHALL BE CONCEALED ABOVE OR WITHIN FINISHED SURFACES.
- REDUCTIONS IN PIPE SIZES SHALL BE MADE WITH ONE-PIECE REDUCING FITTINGS. H. BUSHINGS ARE NOT ACCEPTABLE. USE FLANGED FITTINGS AT THE BASE OF RISERS.
- I. VENT PENETRATIONS THROUGH THE ROOF SHALL BE FLASHED.
- J. IF WATER PRESSURE EXCEEDS 80 PSI, A WATER PRESSURE REDUCING VALVE SHALL BE INSTALLED IN WATER PIPING AT CONNECTION TO MAIN.
- PROVIDE DIELECTRIC FITTINGS BETWEEN DISSIMILAR METALS.
- PIPE BACKFLOW PREVENTER DRAINS TO FLOOR DRAIN OR OTHER APPROVED INDIRECT L. WASTE SOURCE.
- PROVIDE ACCESS DOORS/PANELS FOR SERVICE AND ACCESS TO ALL VALVES AND M. OTHER SYSTEM COMPONENTS ENCLOSED IN WALLS AND CEILINGS. ACCESS DOORS SHALL BE FURNISHED BY THIS CONTRACTOR, INSTALLED BY THE GENERAL CONTRACTOR.
- ALL FIXTURES REQUIRING VACUUM BREAKERS SHALL BE EQUIPPED WITH INTEGRAL N. VACUUM BREAKERS.
- ANY PENETRATIONS THROUGH FIRE RATED PARTITIONS, FLOORS, OR CEILINGS SHALL O. BE STEEL SLEEVED AND SEALED WITH 3M BRAND UL RATED FIRE BARRIER CAULK OR APPROVED EQUAL
- P. WHEN THE WATER PIPING SYSTEM IS COMPLETE, THOROUGHLY FLUSH ALL DIRT, SEDIMENT, SOLDER, ETC., OUT OF THE SYSTEM, REMOVING ALL STRAINERS, VALVE STEM SEATS, ETC., REQUIRED TO ACCOMPLISH THE FLUSHING.
- AT ALL INDIRECT WASTE DRAINS, MAINTAIN AIR GAP AS REQUIRED BY CODE.
- INSTALL SLEEVES FOR ALL PIPES WHICH PASS THROUGH WALLS, FLOORS, AND CEILINGS. WHERE PIPES ARE TO BE INSULATED, THE SLEEVE SHALL BE LARGE ENOUGH R. TO ACCOMMODATE INSULATION. SLEEVES SHALL BE FLUSH WITH FINISHED SURFACES AT BOTH ENDS. ON FINISHED SURFACES IN EXPOSED AREAS PROVIDE ESCUTCHEONS COMPATIBLE WITH FINISH.

2. INSTALLATION

## 2.01 GENERAL

- T. ALL WORK WHICH REQUIRES DISRUPTION OF THE ROOFING SHALL BE DONE BY A CONTRACTOR CERTIFIED BY THE ROOFING MANUFACTURER AS REQUIRED TO MAINTAIN ANY EXISTING ROOF WARRANTIES.
- U. EXTERIOR INSTALLATIONS TO BE WEATHER PROOF IN ALL RESPECTS.
- V. EXTERIOR MATERIALS AND EQUIPMENT SHALL BE PAINTED TO PREVENT CORROSION, COLOR PER ARCHITECT.
- W. COORDINATE THE PLUMBING WORK WITH ALL OTHER AFFECTED WORK AND THE CONSTRUCTION SCHEDULE.
- X. REAM PIPE AND TUBE ENDS. REMOVE BURRS. BEVEL PLAIN AND FERROUS END PIPE.
- Y. REMOVE SCALE AND FOREIGN MATERIAL, FROM INSIDE AND OUTSIDE, BEFORE ASSEMBLY.
- Z. PREPARE PIPING CONNECTIONS TO EQUIPMENT WITH FLANGES AND UNIONS.
- AA.COORDINATION WITH THE WORK OF OTHER TRADES IS REQUIRED. PROVIDE OFFSETS IN PIPING SYSTEMS OR MINOR DEVIATIONS TO THE INDICATED PIPE ROUTING IN ORDER TO COORDINATE THE PLUMBING WORK WITH THE WORK OF ALL OTHER TRADES AND THE GENERAL BUILDING CONDITIONS.
- AB.NO DOMESTIC WATER PIPING SHALL BE INSTALLED IN UNHEATED SPACES.
- AC.PRIOR TO DISCONNECTING AND CONNECTING NEW WORK TO EXISTING SYSTEMS. THE PLUMBING CONTRACTOR SHALL NOTIFY THE PROPERTY MANAGER AND OFFER A PROPOSED SCHEDULE OF WORK. ESB WILL AUTHORIZE CONNECTIONS AND COORDINATE NECESSARY SHUT DOWNS AND DRAIN DOWNS AS REQUIRED. SHUT DOWNS AND DRAIN DOWNS MAY BE PERFORMED BY THE PLUMBING CONTRACTOR ONLY AFTER RECEIVING ESB AUTHORIZATION, AND SHOULD BE PERFORMED UNDER SUPERVISION OF ESB PERSONNEL. THREE (3) DAYS ADVANCE NOTICE TO THE PROPERTY NAGER IS REQUIRED.
- AD.THE PLUMBING CONTRACTOR IS ADVISED THAT DUE TO THE NATURE OF THE **OPERATIONS AND TENANT REQUIREMENTS, CONNECTIONS TO EXISTING SYSTEMS MAY** HAVE TO BE MADE AFTER REGULAR WORKING HOURS. THE PROPERTY MANAGER WILL ADVISE THE PLUMBING CONTRACTOR OF THE TIME CONSTRAINTS UPON RECEIPT AND APPROVAL OF THE PLUMBING CONTRACTOR'S REQUEST FOR SHUT DOWN AND CONNECTION TO EXISTING SYSTEMS.
- AE.WHEN CONNECTING TO EXISTING STACKS AND RISERS, PROVISION IS TO BE MADE FOR FUTURE CONNECTIONS BY PROVIDING CAPPED AND VALVED OUTLETS ON DOMESTIC WATER RISERS AND PLUGGED OUTLETS ON THE SANITARY AND VENT STACKS.

2.02 ABOVE GRADE

- A. INSTALL PLUMBING PIPING IN ACCORDANCE WITH RECOGNIZED INDUSTRY PRACTICES TO ENSURE THAT PIPING COMPLIES WITH REQUIREMENTS AND SERVES INTENDED PURPOSES.
- B. ROUTE PIPING IN AN ORDERLY MANNER, PLUMB AND PARALLEL TO BUILDING STRUCTURE. MAINTAIN GRADIENT. SLOPE PIPING AND ARRANGE SYSTEMS TO DRAIN. IN DOMESTIC WATER SYSTEMS, PROVIDE DRAIN VALVES AT MAIN SHUT-OFF VALVES AND ALL LOW POINTS IN PIPING.
- C. USE EXISTING CONNECTIONS AT MAINS WHERE AVAILABLE FOR NEW BRANCH PIPING. LOCATE ALL RISERS AND PIPING BEFORE CONSTRUCTION COMMENCES AND TAKE CARE NOT TO DAMAGE SAME. ANY DAMAGE OCCURRING TO THE EXISTING PIPING WILL BE THE SOLE RESPONSIBILITY OF THE CONTRACTOR.

3. TESTING

- A. AT THE COMPLETION OF THE PLUMBING WORK, COMPLETELY TEST THE ENTIRE INSTALLATION OF ALL SYSTEMS FOR PROPER OPERATION AND COMPLIANCE WITH APPLICABLE CODES AND LOCAL REQUIREMENTS, CORRECT ALL DEFICIENCIES FOUND.
- B. TESTING OF THE INSTALLED SYSTEMS SHALL BE MADE BY THE CONTRACTOR IN THE PRESENCE OF A REPRESENTATIVE OF THE OWNER.
- C. THE CONTRACTOR SHALL NOT COVER UP OR PERMANENTLY CONCEAL PIPING. DEVICES OR ANY PORTION OF NEWLY CONSTRUCTED PLUMBING SYSTEM(S) UNTIL SUCH SYSTEM. OR PORTION OF THE SYSTEM, HAS BEEN TESTED IN THE PRESENCE OF A REPRESENTATIVE OF THE OWNER AND INSPECTED BY THE LOCAL INSPECTOR AND APPROVED IN WRITING, EXCEPT PIPING PASSING THROUGH FLOORS, WALLS, PARTITIONS, OR BEAMS, FOR DISTANCES EQUAL TO THE THICKNESS OF SUCH FLOOR, WALL, PARTITION OR BEAM.
- D. THIS CONTRACTOR SHALL NOTIFY THE VARIOUS DEPARTMENTS, BUREAUS AND INDIVIDUALS AT LEAST TWO WEEKS IN ADVANCE OF THE TIME THAT THE TESTS ARE TO BE CONDUCTED.
- E. ALL DEFECTIVE PARTS SHALL BE REPLACED OR CORRECTED BY THIS CONTRACTOR AND AN EXTRA TEST OR TESTS SHALL BE MADE UNTIL THE OPERATION IS SATISFACTORY. ALL ARRANGEMENTS AND EXPENSES NECESSARY TO CONDUCT ALL TESTS REQUIRED BY THESE SPECIFICATIONS AND THE VARIOUS AGENCIES HAVING JURISDICTION OVER THE WORK INSTALLED UNDER THIS CONTRACT SHALL BE MADE BY THIS CONTRACTOR. NO EXTRA COMPENSATION WILL BE ALLOWED FOR THESE TESTS, THE COST THEREOF BEING INCLUDED IN THE LUMP SUM BID FOR THIS CONTRACT.
- F. WHERE ANY EVIDENCE OF STOPPAGE IS FOUND IN PIPING OR EQUIPMENT, THIS CONTRACTOR SHALL DISCONNECT, CLEAN, REPAIR AND RECONNECT ALL OBSTRUCTED PIPING OR EQUIPMENT AND SHALL ALSO PAY FOR ALL NECESSARY CUTTING AND REPAIRS TO ADJOINING WORK.
- G. ALL PIPING AND EQUIPMENT SHALL BE THOROUGHLY CLEANED INSIDE AND OUT. OF DIRT, CUTTINGS, OILS AND OTHER FOREIGN SUBSTANCES AND SHALL BE LEFT CLEAN.

- H. ALL REQUIRED TESTS SHALL BE WITNESSED BY LOCAL AUTHORITIES AND THE OWNER'S REPRESENTATIVE.
- J. ALL EQUIPMENT WILL BE FACTORY TESTED.
- I. CONTRACTOR SHALL IDENTIFY TO THE OWNER'S REPRESENTATIVE ANY LEAKS OR DAMAGE THAT OCCURS AS A RESULT OF SYSTEM TESTING. CONTRACTOR SHALL TAKE NECESSARY PRECAUTIONS TO LIMIT ANY POTENTIAL DAMAGE. CORRECTIVE ACTION REQUIRED AS A RESULT OF TESTING SHALL BE PERFORMED IMMEDIATELY AND AT THE CONTRACTOR'S EXPENSE.
- K. REPORT IN WRITING TO AUTHORITIES HAVING JURISDICTION, THE ARCHITECT AND THE OWNER THE RESULTS OF ALL TESTING.
- L. TESTING REQUIREMENTS
  - a. TEST ALL DOMESTIC WATER PIPING NOT LESS THAN WORKING PRESSURE b. HYDROSTATIC TEST PRESSURES SHALL REMAIN CONSTANT WITH NO
  - VARIATION FOR 120 MINUTES. c. TESTS SHALL BE WITNESSED BY THE BUILDING ENGINEER.
  - d. THE PLUMBING CONTRACTOR WILL BE HELD RESPONSIBLE FOR ALL DAMAGE DUE TO TEST FAILURES AND LEAKAGE IN THE TEST AREA AND ADJACENT TENANT OR ESB SPACES.
- M. REFILL ENTIRE POTABLE HOT AND COLD WATER SUPPLY SYSTEM WITH CHLORINE SOLUTION (HTH OLIN CHEMICAL CORP.) AT A STRENGTH TO MEET STANDARDS OF THE DEPARTMENT OF HEALTH, AND FOR A PERIOD OF RETENTION AS STIPULATED.
- N. THOROUGHLY FLUSH PIPING SYSTEM WITH FRESH WATER IMMEDIATELY PRIOR TO FINAL ACCEPTANCE.
- 4. WARRANTY
- A. EQUIPMENT, MATERIALS AND WORKMANSHIP FURNISHED UNDER THIS CONTRACT SHALL BE GUARANTEED BY THE CONTRACTOR FOR A PERIOD OF ONE YEAR FROM THE DATE OF FINAL ACCEPTANCE OF THE WORK BY THE OWNER. THE CONTRACTOR SHALL KEEP THE WORK IN GOOD REPAIR FOR ONE YEAR AFTER THE DATE OF FINAL APPROVAL. THE CONTRACTOR SHALL, AT HIS OWN EXPENSE, PROMPTLY CORRECT AND REPAIR ANY AND ALL BREAKS, FAILURES OR WEAR DUE TO FAULTY MATERIALS, WORKMANSHIP OR EQUIPMENT. ALL SETTLEMENTS OF SURFACES THAT MAY OCCUR WITHIN THAT PERIOD SHALL ALSO BE PROMPTLY REPAIRED.

![](_page_16_Figure_180.jpeg)

![](_page_17_Figure_0.jpeg)

![](_page_17_Figure_1.jpeg)

# GENERAL NOTES:

IECC- ENERGY CONSERVATION(REFER SHEET P-0)	

- 2. PROVIDE BRANCH PRV IF PRESSURE EXCEEDS 80 PSI.
- . CONTRACTOR TO FIELD VERIFY FEASIBILITY OF SLAB PENETRATION AS PER STRUCTURAL REQUIREMENT.
- PROVIDE ACCESS PANELS FOR WATER HAMMER ARRESTOR, CLEANOUTS & SHUT-OFF VALVES AS REQUIRED.
- . REFER RISER DIAGRAMS FOR ALL PIPE SIZES.
- 6. ANY ROOF PENETRATION SHALL BE PERFORMED BY LANDLORD'S ROOFERS AT LANDLORD OPTION, A BONDED ROOFER APPROVED IN ADVANCE BY LANDLORD.
- PROVIDE TRAP PRIMER/ SEAL ON FLOOR DRAIN AS PER LOCAL JURISDICTION.
- ANY UNUSED FLOOR DRAIN AND PIPING MUST BE COMPLETELY REMOVED OR CAPPED. DO NOT ABANDON IN PLACE.

![](_page_17_Figure_26.jpeg)

![](_page_18_Picture_0.jpeg)

![](_page_18_Picture_1.jpeg)

![](_page_18_Figure_2.jpeg)

![](_page_18_Figure_3.jpeg)

![](_page_19_Figure_0.jpeg)

![](_page_19_Figure_1.jpeg)

![](_page_20_Figure_0.jpeg)

![](_page_20_Figure_1.jpeg)

![](_page_21_Figure_0.jpeg)

				FOOD	SERVICE	E PLUN	1BINC	G EQU	IPMENT SCHEE	DULE		
	DESCRIPTION		MODEL	WAS	STE							
1/10/110.			MODEL	DIRECT	INDIRECT	VENT		W	HW	FW	NOTES	
P2	BLENDER SINK (STANDARD)	FF&E SUPPLIER	F835-25	-	2"	-		1/2"	1/2"	-	35 STRAINER, McGUIRE MODEL 8903 FLOOR SINK. BOWL SIZE 24"W X 16"C LEFT TO RIGHT PREP LINE SET UP	
P3	SANITARY CHEMICAL DISPENSER SYSTEM	SSDC	-	-	-	-		-	-	-	ECOLAB TO INSTALL THE SANITARY COMP. SINK IS IN PLACE.	
P4	S/S 3 COMP SINK	FF&E SUPPLIER	-	-	2"	2"		3/4"	3/4"	-	DRAINBOARD ON BOTH SIDES-PROV 16"W X 20"D X 12"H SILICON AROUND	
P5	WATER HEATER	A.O SIMITH	DEL-50		3/4"	-		1"	1"	-	-	
P6	MOP SINK	-	FLOOR MODEL	3"	-	2"	:	3/4"	3/4"	-	-	
P7	WALL HUNG LAVATORY	AMERICAN STD.	0355.012	2"	-	1 1/2"		1/2"	1/2"	-	TOP OF FRONT RIM MOUNTED AT 34	
P8	TOILET (ADA COMPLIANT)	AMERICAN STD.	FLOOR MODEL	-	4"	2"		1/2"	-	-	PROVIDE OPEN FRONT SEAT. INSTA	
P	PREP. SINK	FF&E SUPPLIER	-	-	2"	-	;	3/4"	3/4"	-	DRAINBOARD ON LEFT SIDE-PROVID	
P11	DIPPERWELL WELL SELF	FF&E SUPPLIER	F835-16	-	1 1/2"	-	1	/2"		-	PROVIDE ASSE 1022 BACKFL	
P12	S/S HAND SINK	FF&E SUPPLIER	MMS10900101 CJBF	2"	-	1½"		1/2"	1/2"	-	WITH SPLASH GUARDS AT REAR AN S.S. PAPER TOWEL HOLDER AND S.S.	
P13	WATER FILTER	WESTERN PURIFIER	SK-HFWFS07	-	-	-		1/2"	-	-	1/2" PEX TUBING TO SPIGOT. INDEP MACHINE.	
P14	WATER SPIGOT	WESTERN PURIFIER	-	-	-	-		-	-	1/2"	TUBING TO SPIGOT FROM FILTER.	
P15	GREASE TRAP	SCHIER	GB2	-	4"	2"		-	-	-	GREASE INTERCEPTOR SCHI	
<b>F</b> 8	ICE CUBER MACHINE	HOSHIZAKI	-	-	-	-		-	-	1/2"		
	ICE CUBER BIN	HOSHIZAKI	-	-	3/4"	-			-	-	ALL DRAINS TO BE ROUTED S	
E20	AUTOMATIC WATER DISPENSER	VITA-MIX	ITEM # 066032	-	-	-						
FD-1	FLOOR DRAIN	-	-	3"&4"	-	2"	-		-	-		
FS-1	FLOOR SINK	-	-	3"	-	2"	-					
							тΔ	SELECTION B				
TAG	DESCRIPTI	ON TYPE	GPM	HEAD	(ft.) HP	V	V PH HZ		MANUFACTURER MODEL			
RCP-1	HOT WATER RECI	RC. PUMP IN-LINE	2.0	9	1/12	120	1	60	BELL & GOSSETT	PL-30-B	NOTE 1,2	
OPTIONS · AQU/ · FLAN	ALL RCP UNIĪS) A-STAT & NIGHT TIMER IGED PUMP	BALANCING VAI MAINTENANCE	LVE & CHECK VAL BALL VALVES ON	VE BOTH SIDES	S OF PUMP				<b>i</b>			

	ELECTRIC WATER HEATER											
UNIT			UNIT CAPACITY			SYSTEM	ELECTRICAL DATA					
	MANUFACTURER & MODEL NUMBER	R MAXIMUM PRESSURE (PSI)	STORAGE (GAL)	RECOVERY (GPH)	DEGREE RISE (°F)	OUTLET TEMP (°F)	NUMBER OF ELEMENTS	KW PER ELEMENT	SIMULTANEOUS / NON-SIMULTANEOUS	POWER (KW)	V	
P5	DEL-50	150	50	41	90	140	2	4.5	SIMULTANEOUS	9	208	

TAG	DESCRIPTION	MAXIMUM	MINIMUM GPM	PRESSURE LOSS	SELECTION		N BASED ON	
		GPM			MANUFA	CTURER	MODEL NUMBER	REMARKS/OF HONS
MV-1	THERMOSTATIC MIXING VALVE	3.5	.25	5	LEON	NARD	270-LF	NOTE 1, A
PTIONS (ALL	<u>UNITS</u> )			•		ADDI	FIONAL OPTIONS (UN	ITS AS NOTED)
LEAD FREE NSF APPROVED					A: ASSE 1070 APPROVED, SET @ 110° F. 1/2 " INLETS/ 1/2 " C			
PROVIDE T'STAT ON TEMPERED LINE					BELOW FIXTURE			

GREASE INTERCEPTOR SIZING CALCULATION											
FIXTURE	QUANTITY	DIMENSIONS			VOLUME		PERCENTAGE	ACTUAL USAGE	FLOW RATE(GPM)		
		LENGTH(IN)	WIDTH(IN)	DEPTH(IN)	CUBIC INCHES	GALLONS	USAGE(%)	(GALLONS)	1 MIN.	2 MIN.	
3 COMP SINK	1	20	16	12	11520	49.87	0.75	37.40	37.40	18.7	
PREP SINK	1	18	18	12	3888	16.83	0.75	12.62	12.62	6.31	
MOP SINK	1	24	24	10	5760	24.93	0.75	18.70	18.70	9.35	
								TOTAL:	68.72	34.36	

GREASE INTERCEPTOR SCHEDULE									
ITEM	SERVICE	LOCATION	FLOW CAPACITY (GPM)	GREASE CAPACITY (LBS)	LIQUID CAPACITY (GALLON)	MANUFACTURER AND MODEL			
GREASE INTERCEPTOR	KITCHEN WASTE	UNDER GROUND INTERIOR	50	127	20	SCHIER MODEL GB2			
OTE- CONTRACTOR TO PROVIDE ALL REQUIRED ACCESSORIES FOR SATISFACTORY WORKING OF GREASE RAP AS PER SITE CONDITIONS.									

Energy Code:	
Project Title:	
Location:	
Climate Zone:	

SMOOTHIE KING 3a

MICHAEL TOBIAS

MICHAEL TOBIAS		0	05/03/24		
Name - Title	Signature	Da	e		
Project Title: SMOOTHIE KING - M	INTHILL, NC		Report date:	05/03/2	

Section # & Req.ID Mechanical Rough-In Inspection Complies? **Comments/Assumptions** C402.2.6 Thermally ineffective panel surfaces of Complies Exception: Requirement does not apply. R-3.5. ☐Not Observable □Not Applicable C403.2.6.2 Enclosed parking garage ventilation has Exception: Requirement does not apply. or less of design capacity. □Not Applicable C403.2.8 Kitchen exhaust systems comply with Complies Exception: Requirement does not apply. limitations, and satisfy hood rating requirements and maximum exhaust rate □Not Applicable criteria. C408.2.2.1 Air outlets and zone terminal devices have Complies Exception: Requirement does not apply. [ME53]<sup>3</sup> means for air balancing. Does Not Not Observable □Not Applicable C403.5, Refrigerated display cases, walk-in coolers Exception: Requirement does not apply. fan-powered condensers that comply with Sections C403.5.1 and refrigeration compressor systems that comply with

![](_page_22_Picture_16.jpeg)

![](_page_22_Figure_17.jpeg)