SECTION 23 05 00
COMMON WORK RESULTS FOR HVAC

1.0 GENERAL

1.01 DESCRIPTION

A. THIS DIVISION 23 AND THE ACCOMPANYING DRAWINGS COVER THE PROVISION OF ALL LABOR, EQUIPMENT, APPLIANCES, AND MATERIALS AND PERFORMING ALL OPERATIONS IN CONNECTION WITH THE CONSTRUCTION OF THE AIR CONDITIONING, VENTILATING, HEATING, FIRE SUPPRESSION AND PLUMBING SYSTEMS AS SPECIFIED HEREIN AND AS SHOWN.

B. THE GENERAL PROVISIONS AND DIVISION 01, INCLUDING THE GENERAL, SUPPLEMENTARY AND OTHER CONDITIONS AND OTHER DIVISIONS, AS APPROPRIATE, APPLY TO WORK SPECIFIED IN THIS DIVISION.

1.02 EXISTING CONDITIONS

A. ATTENTION IS CALLED TO THE FACT THAT THE WORK IS TO BE PERFORMED WITHIN AN EXISTING, OPERATIONAL FACILITY. PRIOR TO THE SUBMISSION OF BIDS, EACH BIDDER SHALL VISIT THE PROJECT SITE, THOROUGHLY INVESTIGATE AND BE FAMILIAR WITH ALL EXISTING CONDITIONS WHICH WILL AFFECT THEIR WORK; ESPECIALLY THE WORK TO BE PERFORMED ABOVE THE EXISTING CEILINGS.

B. CONNECT NEW WORK TO EXISTING WORK IN A NEAT AND WORKMANLIKE MANNER. WHERE AN EXISTING STRUCTURE MUST BE CUT OR EXISTING UTILITIES INTERFERE, SUCH OBSTRUCTIONS SHALL BE BYPASSED, REMOVED, REPLACED OR RELOCATED, PATCHED AND REPAIRED. WORK DISTURBED OR DAMAGED SHALL BE REPLACED OR REPAIRED TO ITS PRIOR CONDITION.

C. PRIOR TO THE START OF ANY DEMOLITION OR CONSTRUCTION, SECURE THE SERVICES OF A QUALIFIED, EPA CERTIFIED ASBESTOS ABATEMENT AGENCY TO CHECK THE EXISTING INSULATION, ETC. FOR ASBESTOS. SHOULD ASBESTOS BE FOUND, DO NOT PROCEED WITH DEMOLITION OR CONSTRUCTION; NOTIFY THE ARCHITECT IN ANY CASE IN WRITING OF THE AGENCY'S FINDINGS.

1.03 INTENT OF DRAWINGS AND SPECIFICATIONS

A. THE IMPLIED AND STATED INTENT OF THE DRAWINGS AND SPECIFICATIONS IS TO ESTABLISH MINIMUM ACCEPTABLE STANDARDS FOR MATERIALS, EQUIPMENT AND WORKMANSHIP, AND TO PROVIDE OPERABLE MECHANICAL SYSTEMS COMPLETE IN EVERY RESPECT.

B. THE ENGINEERING DRAWINGS ARE DIAGRAMMATIC, INTENDED TO SHOW GENERAL ARRANGEMENT AND SIZES OF SYSTEM COMPONENTS, AND SHALL NOT BE SCALED. RATHER, THE ARCHITECTURAL AND STRUCTURAL DRAWINGS SHALL GOVERN SPACE CONSTRAINTS, DIMENSIONS AND FINISHES. ALL OFFSETS AND FITTINGS WHICH WILL BE NECESSARY TO ACCOMPLISH THE FINISHED INSTALLATION SHALL BE PROVIDED AT NO ADDITIONAL COST OR INCREASE IN THE CONTRACT.

1.04 SPACE PRIORITY

A. ENSURE OPTIMUM USE OF AVAILABLE SPACE FOR MATERIALS AND EQUIPMENT INSTALLED ABOVE CEILINGS. ALLOCATE SPACE IN THE ORDER OF PRIORITY AS LISTED BELOW EXCEPT AS OTHERWISE DETAILED. ITEMS ARE LISTED IN THE ORDER OF PRIORITY, WITH ITEMS OF EQUAL IMPORTANCE LISTED UNDER A SINGLE PRIORITY NUMBER.

1. GRAVITY FLOW PIPING SYSTEMS
2. VENT PIPING SYSTEMS
3. RECESSED LIGHTING FIXTURES
4. CONCEALED HVAC TERMINALS AND EQUIPMENT
5. AIR DUCT SYSTEMS
6. SPRINKLER PIPING SYSTEMS
7. PRESSURIZED PIPING SYSTEMS
8. ELECTRICAL CONDUIT, WIRING, CONTROL AIR TUBING

B. ORDER OF SPACE PRIORITY DOES NOT DICTATE INSTALLATION SEQUENCE. INSTALLATION SEQUENCE SHALL BE AS REQUIRED TO INSTALL ALL AFFECTED TRADES.

C. THE WORK OF THIS DIVISION 23 SHALL NOT OBSTRUCT ACCESS FOR INSTALLATION, OPERATION AND MAINTENANCE OF THE WORK OF ANY OTHER DIVISION.

D. ALL MAJOR ITEMS OF EQUIPMENT SHALL BE ARRANGED SO AS TO PROVIDE A MINIMUM OF 28" CLEAR AISLE SPACE. ADDITIONAL SPACE SHALL BE PROVIDED BETWEEN AND AROUND EQUIPMENT FOR MAINTENANCE AND PROPER OPERATION AS SHOWN IN THE EQUIPMENT MANUFACTURER'S LITERATURE.

1.05 COORDINATION

A. COORDINATE ALL WORK UNDER THIS DIVISION 23 WITH WORK UNDER ALL OTHER DIVISIONS, PROVIDING ADJUSTMENT AS NECESSARY.

B. COORDINATION OF SPACE REQUIREMENTS WITH RESPECT TO DIVISION 26 SHALL BE PERFORMED SUCH THAT:

NO EQUIPMENT, PIPING OR DUCTWORK, OTHER THAN ELECTRICAL, SHALL BE INSTALLED WITHIN 42" OF SWITCHBOARDS OR PANELBOARDS.
NO PIPING OR DUCTWORK WHICH EVER OPERATES AT A TEMPERATURE IN EXCESS OF 120°F SHALL BE INSTALLED WITHIN 3" OF ANY ELECTRICAL CONDUCTOR.

C. ALL ITEMS MOUNTED IN OR BELOW THE CEILING, AND ALL ITEMS PENETRATING THE CEILING, SHALL BE COORDINATED WITH THE ARCHITECTURAL REFLECTED CEILING PLANS. IF ANY ITEMS ARE NOT SHOWN ON THESE PLANS, OR ANY ITEMS NEED TO BE RELOCATED FOR COORDINATION PURPOSES, PREPARE A REFLECTED CEILING PLAN AND SUBMIT IT TO THE ARCHITECT FOR APPROVAL.

D. VARIABLE-FREQUENCY DRIVES SHALL BE PROVIDED UNDER DIVISION 23 AND INSTALLED BY DIVISION 26. SEE SPECIFICATION 26 29 23 VARIABLE - FREQUENCY MOTOR CONTROLLERS.

E. FUSED DISCONNECTS SHALL BE PROVIDED UNDER THIS DIVISION 23 FOR ALL EQUIPMENT CONNECTED DIRECTLY TO BUS DUCT, AND RATING SHALL MATCH BUS DUCT RATING. COORDINATE WITH DIVISION 26.

1.06 CODE COMPLIANCE

A. ALL WORKMANSHIP AND MATERIALS PROVIDED UNDER THIS DIVISION 23 SHALL COMPLY WITH ALL LAWS, ORDINANCES, CODES AND REGULATIONS OF ALL FEDERAL, STATE AND LOCAL AUTHORITIES HAVING JURISDICTION.

B. ALL FIRE SUPPRESSION, PLUMBING, HEATING, VENTILATING, AND AIR CONDITIONING MATERIALS AND WORKMANSHIP SHALL COMPLY WITH THE FOLLOWING CODES WITH HILLSBOROUGH COUNTY AMENDMENDS AND STANDARDS AS MINIMUM REQUIREMENTS:

1. 2023 FLORIDA BUILDING CODE,BUILDING, EIGHTH EDITION (IBC 2021 AMENDED)
2. 2023 FLORIDA BUILDING CODE, MECHANICAL, EIGHTH EDITION (IMC 2021 AMENDED)
3. 2023 FLORIDA BUILDING CODE, PLUMBING, EIGHTH EDITION (IPC 2021 AMENDED)
4. 2023 FLORIDA BUILDING CODE, FUEL GAS, EIGHTH EDITION (IFGC 2021 AMENDED)
5. 2023 FLORIDA BUILDING CODE, ENERGY CONSERVATION, EIGHTH EDITION (IECC 2021 AMENDED) AND ASHARE 90.1-2019 WITH AMENDMENTS
6. 2020 FLORIDA ELECTRIC CODE (NFPA 70 2020)

C. SECURE AND PAY ALL FEES ASSOCIATED WITH ALL PERMITS AND LICENSES REQUIRED FOR EXECUTION OF THE CONTRACT. ARRANGE FOR ALL INSPECTIONS REQUIRED BY CITY, COUNTY, STATE AND OTHER AUTHORITIES HAVING JURISDICTION, AND DELIVER CERTIFICATES OF APPROVAL TO THE ARCHITECT.

D. THE CODE REQUIREMENTS ARE STRICTLY A MINIMUM AND SHALL BE MET WITHOUT INCURRING ADDITIONS TO THE CONTRACT. WHERE REQUIREMENTS OF THE DRAWINGS OR SPECIFICATIONS EXCEED THE CODE REQUIREMENTS, THE WORK SHALL BE PROVIDED IN ACCORDANCE WITH THESE DRAWINGS OR SPECIFICATIONS. IN THE EVENT OF CONFLICT OR AMBIGUITY BETWEEN THE VARIOUS CODES, THE MOST STRINGENT REQUIREMENT SHALL GOVERN.

1.07 ELECTRICAL REQUIREMENTS AND INTERFACE

A. ALL ELECTRICAL EQUIPMENT AND WIRING PROVIDED UNDER THIS DIVISION 23 SHALL COMPLY WITH THE ELECTRICAL SYSTEM CHARACTERISTICS INDICATED ON THE ELECTRICAL DRAWINGS AND SPECIFIED IN DIVISION 26.

B. ELECTRIC CONTROLS, CONTACTORS, STARTERS, PILOT LIGHTS, PUSH BUTTONS, ETC., SHALL BE PROVIDED COMPLETE AS PART OF THE MOTOR, HEATER OR OTHER EQUIPMENT WHICH IT OPERATES. ALL ELECTRICAL COMPONENTS SHALL BE IN CONFORMANCE WITH THE REQUIREMENTS OF THE NATIONAL ELECTRICAL CODE AND DIVISION 26. STARTERS SHALL BE WYE-DELTA, CLOSED TRANSITION TYPE. REFERENCE DIVISION 26 AND THE ELECTRICAL ENGINEERING DRAWINGS FOR THOSE MOTOR STARTERS PROVIDED UNDER THAT DIVISION 26. ALL STARTERS NOT SHOWN SHALL BE PROVIDED UNDER THIS DIVISION 23. UNLESS SPECIFIED OTHERWISE UNDER OTHER INDIVIDUAL EQUIPMENT SECTIONS, MOTOR STARTERS SHALL CONFORM TO THE FOLLOWING MINIMUM REQUIREMENTS:

1. STARTERS FOR MOTORS 1/3 HORSEPOWER OR SMALLER SHALL BE MANUAL UNLESS REMOTE OR AUTOMATIC STARTING IS REQUIRED, IN WHICH CASE THE STARTERS SHALL BE MAGNETIC, FULL VOLTAGE, NON-REVERSING, SINGLE-SPEED, UNLESS OTHERWISE INDICATED. ALL OTHER STARTERS SHALL BE MAGNETIC.

2. EACH STARTER FOR A THREE-PHASE MOTOR SHALL BE FURNISHED WITH THREE (3) OVERLOAD RELAYS SIZED FOR THE FULL LOAD RUNNING CURRENT OF THE MOTOR ACTUALLY PROVIDED. PROVIDE AN EXTERNAL "HAND-OFF-AUTO" SELECTOR SWITCH WITH RED "RUNNING" LIGHT. PROVIDE A GREEN PILOT LIGHT TO INDICATE MOTOR "STOPPED". EACH PILOT LIGHT SHALL HAVE A LEGEND PLATE INDICATING REASON FOR SIGNAL.

3. EACH OVERLOAD RELAY SHALL HAVE A NORMALLY OPEN ALARM CONTACT WHICH WILL CLOSE ONLY WHEN ACTUATED BY AN OVERLOAD (NOT TO BE CONFUSED WITH N.O. OR N.C. AUXILIARY CONTACTS). THESE CONTACTS SHALL BE PROPERLY WIRED TO THEIR RESPECTIVE BLUE PILOT LIGHT PROVIDED ON THE STARTER FRONT COVER AND HAVING A "TRIPPED" LEGEND PLATE.

4. INDIVIDUALLY MOUNTED MOTOR STARTERS SHALL BE IN A NEMA TYPE 1 GENERAL PURPOSE ENCLOSURE IN UNFINISHED AREAS AND SHALL BE FLUSH MOUNTED IN ALL FINISHED AREAS. ALL STARTERS MOUNTED IN EXTERIOR AREAS SHALL HAVE A NEMA 3R ENCLOSURE. EACH STARTER SHALL HAVE A LAMINATED NAMEPLATE TO INDICATE EQUIPMENT UNIT NUMBER, FUNCTION AND CIRCUIT NUMBER.

5. ALL MOTOR STARTERS, PUSH BUTTONS AND PILOT LIGHTS SHALL BE OF THE SAME MANUFACTURER AS THE SWITCHBOARD AND SHALL BE GENERAL ELECTRIC, SQUARE D, SIEMENS I.T.E., OR WESTINGHOUSE.

C. MOTOR STARTERS FOR THE FOLLOWING EQUIPMENT SHALL BE PROVIDED UNDER THIS DIVISION 23 BY THE MANUFACTURER OF THE EQUIPMENT:

1. PACKAGED AIR CONDITIONING EQUIPMENT

2. OTHER EQUIPMENT HEREINAFTER SPECIFIED IN OTHER SECTIONS TO BE PROVIDED WITH INTEGRAL STARTERS

D. UNLESS OTHERWISE NOTED OR SPECIFIED IN INDIVIDUAL SECTIONS, ALL 3-PHASE MOTORS SHALL BE STANDARD NEMA CONTINUOUS DUTY "B" TYPE, WITH CLASS B INSULATION, OPEN DRIP-PROOF FRAME FOR INDOOR SERVICE, TEFC FOR OUTDOOR SERVICE AND A SERVICE FACTOR OF 1.15. ALL MOTORS 5 HP AND LARGER SHALL BE U.S. MOTORS HI-EFFICIENCY MODEL OR RELIANCE XE HI-EFFICIENCY MODEL.

E. ALL POWER WIRING AND FINAL CONNECTIONS TO EQUIPMENT SHALL BE PROVIDED UNDER DIVISION 26.

F. CONTROL COMPONENTS, ALL INTERLOCKS, (VAVS, ACTUATORS, SMOKE DAMPERS, FIRE/SMOKE DAMPERS, MOTOR-OPERATED DAMPERS, FIRE ALARM MOTORS, ETC.) AND CONTROL WIRING (277 VOLT, SINGLE PHASE AND LESS) SHALL BE PROVIDED UNDER THIS DIVISION 23 AS REQUIRED TO ACHIEVE THE SPECIFIED CONTROL SEQUENCES. ALL ELECTRICAL CONNECTIONS SHALL BE SPECIFICALLY COORDINATED WITH DIVISION 26 AND ANY NECESSARY SCOPE INCLUDED AS PART OF DIVISION 23.

1.08 SLEEVES, SEALS AND ESCUTCHEONS

A. SLEEVES SHALL BE PROVIDED THROUGH ALL PIPE AND DUCTWORK PENETRATIONS OF CONCRETE OR MASONRY WALLS, ELEVATED FLOORS AND ROOFS, EXCEPT THOSE PIPING PENETRATIONS FOR EQUIPMENT, ETC.

B. SLEEVES SHALL BE FABRICATED FROM SCHEDULE 40 STEEL PIPE THROUGH 10" AND STANDARD WALL STEEL PIPE FOR SLEEVE SIZES 12" AND LARGER. ALL SLEEVES PENETRATING EXTERIOR WALLS, UNDERGROUND WALLS, PIT OR VAULT WALLS SHALL BE PROVIDED WITH A 3" X 3/8" THICK WATERSTOP RING WELDED COMPLETELY TO THE MIDPOINT OF THE SLEEVE.

C. ALL SLEEVES PENETRATING EXTERIOR WALLS, UNDERGROUND WALLS, PIT OR VAULT WALLS AND ELEVATED FLOORS SHALL BE PACKED AND SEALED WATERTIGHT.

D. SLEEVES THROUGH ROOFS SHALL EXTEND ABOVE THE ROOF SURFACE AND BE FLASHED WATERTIGHT.

E. SLEEVES THROUGH WALLS SHALL BE CUT AND FINISHED FLUSH WITH EACH SURFACE OF THE WALL IN WHICH THEY ARE INSTALLED.

F. SLEEVES THROUGH FLOORS IN MECHANICAL ROOMS OR OTHER BACK OF HOUSE SPACES SHALL BE INSTALLED WITH THE TOP NO LESS THAN 1/2" ABOVE THE FINISHED FLOOR TO ALLOW FOR LEAK PROTECTION. SPACE BETWEEN THE TOP OF THE FIRE-STOPPING AND TOP OF THE SLEEVE SHALL BE PACKED WITH MINERAL WOOL AND CAULKED TO NOT ALLOW WATER PONDING WITHIN THE SLEEVE.

G. SLEEVES SHALL BE SIZED TO PROVIDE A MINIMUM OF 1/2" CLEARANCE BETWEEN THE INSIDE SURFACE OF THE SLEEVE AND THE OUTSIDE FINISHED SURFACE OF THE PIPE PLUS ANY INSULATION SPECIFIED.

H. FIRE-STOPS SHALL BE PROVIDED AS SPECIFIED HEREIN. ALL ANNULAR SPACES BETWEEN PIPING AND SLEEVES, WHICH DO NOT REQUIRE FIRE-STOPS, SHALL BE PACKED WITH MINERAL WOOL AND CAULKED.

I. PROVIDE ROUND, CHROME-PLATED ESCUTCHEONS ON ALL EXPOSED PIPING AND DUCTWORK PENETRATIONS PASSING THROUGH WALLS, FLOORS, PARTITIONS AND CEILINGS. ESCUTCHEONS SHALL BE PAINTED AND CAULKED IN COORDINATION WITH ARCHITECT. NOTE THAT ESCUTCHEONS SHOULD BE ONLY ATTACHED TO THE WALL AS PIPING AND DUCTWORK MAY MOVE SLIGHTLY DURING OPERATION.

1.09 FIRESTOPS

A. WHERE PIPING, CONDUIT, ETC. PASS THROUGH FIRE PARTITIONS, FIRE WALLS AND FLOORS, A FIRESTOP SHALL BE PROVIDED THAT WILL ENSURE AN EFFECTIVE BARRIER AGAINST THE SPREAD OF FIRE, SMOKE AND GASES. FIRESTOP MATERIAL SHALL BE PACKED TIGHT AND COMPLETELY FILL GAPS BETWEEN THE DUCTWORK, PIPING, CONDUIT, ETC. AND THE PERIMETER OF THEIR ROUGH OPENINGS.

B. ALL PENETRATIONS SHALL BE IN ACCORDANCE WITH UL 1479 OR ASTM E 814 LISTED SYSTEMS, AND PRODUCTS USED SHALL BE SPECIFICALLY APPLICABLE FOR THE APPROPRIATE INSTALLATION CONDITIONS. ASSEMBLIES SHALL PROVIDE A MINIMUM RATING EQUAL TO THE CONSTRUCTION PENETRATED. PRODUCTS SHALL BE BY HILTI, 3M, OR PROSET.

C. INSTALLATION SHALL BE BY A QUALIFIED INSTALLER. INSTALLER SHALL BE CERTIFIED, LICENSED, OR OTHERWISE QUALIFIED BY THE FIRESTOPPING MANUFACTURER AS HAVING THE NECESSARY TRAINING TO INSTALL THE MANUFACTURER'S SPECIFIC PRODUCT. A MANUFACTURER OR VENDOR'S WILLINGNESS TO SELL THE FIRESTOPPING PRODUCT TO THE CONTRACTOR OR INSTALLER DOES NOT IN ITSELF CONFER QUALIFICATION.

D. INSTALLER SHALL HAVE AT LEAST ONE OF THE FOLLOWING QUALIFICATIONS:
FM 4991 APPROVED CONTRACTOR
UL APPROVED CONTRACTOR
HILTI, 3M, OR PROSET ACCREDITED FIRE STOP SPECIALTY CONTRACTOR

E. INSTALLING FIRM SHALL HAVE NO LESS THAN 3 YEARS OF EXPERIENCE WITH FIRESTOP INSTALLATION.

F. A MANUFACTURER'S DIRECT REPRESENTATIVE (NOT DISTRIBUTOR OR AGENT) SHALL BE ON SITE DURING INITIAL INSTALLATION OF FIRESTOP SYSTEMS TO TRAIN APPROPRIATE CONTRACTOR PERSONNEL IN PROPER SELECTION AND INSTALLATION PROCEDURES.

G. THE FIRESTOP CONTRACTOR OR INSTALLER SHALL SUPPLY AS-BUILT DOCUMENTATION OF EACH INDIVIDUAL PENETRATION LOCATION ON THE PROJECT. DOCUMENTATION SHALL INCLUDE A SEQUENTIAL LOCATION NUMBER, DETAILED DESCRIPTION OF THE PENETRATION LOCATION, SIZE, AND TYPE, TESTED SYSTEM NUMBER, TYPE OF ASSEMBLY PENETRATED, AND RATING TO BE ACHIEVED. AS-BUILT DOCUMENTATION SHALL BE INCLUDED WITH THE CLOSE-OUT MATERIALS.

H. IDENTIFY THROUGH-PENETRATION FIRESTOP SYSTEMS WITH PRESSURE-SENSITIVE, SELF-ADHESIVE, PREPRINTED VINYL LABELS. ATTACH LABEL PERMANENTLY ON BOTH SIDES OF PENETRATED CONSTRUCTION IN A VISIBLE LOCATION. THE LABEL SHALL INCLUDE THE FOLLOWING:

1. THE WORDS "WARNING - THROUGH PENETRATION FIRESTOP SYSTEM - DO NOT DISTURB"

2. THROUGH PENETRATION FIRESTOP SYSTEM DESIGNATION AND MANUFACTURER

3. DATE OF INSTALLATION

1.10 CORE DRILLING

A. CUTTING OF HOLES THROUGH CONCRETE AND MASONRY SHALL BE BY DIAMOND CORE OR CONCRETE SAW. PNEUMATIC HAMMER, IMPACT ELECTRIC, AND HAND OR MANUAL HAMMER TYPE DRILLS WILL NOT BE ALLOWED, EXCEPT AS PERMITTED BY THE ARCHITECT WHERE REQUIRED BY LIMITED WORKING SPACE. LOCATE HOLES SUCH THAT THEY WILL NOT AFFECT STRUCTURAL SECTIONS SUCH AS RIBS OR BEAMS. HOLES SHALL BE LAID OUT WELL IN ADVANCE OF THE INSTALLATION. THESE LAYOUT LOCATIONS SHALL BE APPROVED BY THE ARCHITECT PRIOR TO DRILLING.

1.11 IDENTIFICATION OF PIPING

A. ALL ABOVEGROUND HVAC PIPING SIZED 3/4" AND LARGER WHICH IS INSTALLED IN ACCESSIBLE LOCATIONS (INCLUDING PIPING ABOVE REMOVABLE CEILINGS AND BEHIND ACCESS PANELS) SHALL BE IDENTIFIED IN STRICT CONFORMANCE WITH THE "SCHEME FOR THE IDENTIFICATION OF PIPING SYSTEMS" (ANSI A13.1-2015).

B. PIPING LABELS IN EXPOSED AREAS SHALL BE ORIENTED AND LOCATED IN COORDINATION WITH THE ARCHITECT.

C. SPECIFIC SYSTEM NAMES SHALL BE SUBJECT TO OWNER APPROVAL. SYSTEM NAMES SHALL, AT MINIMUM, UNIQUELY IDENTIFY THE SYSTEM AND PERFORMANCE CATEGORY - I.E., BASE BUILDING CONDENSER WATER SUPPLY, COOLING TOWER MAKE-UP, ETC.

D. EACH IDENTIFICATION MARKER SHALL INCLUDE THE FOLLOWING:

1. PROPER COLOR-CODED BACKGROUND
2. PROPER COLOR OF LEGEND IN RELATION TO BACKGROUND COLOR
3. PROPER LEGEND LETTER SIZE
4. PROPER MARKER LENGTH
5. DIRECTION OF FLOW ARROWS SHALL BE INCLUDED ON EACH MARKER

E. LOCATIONS FOR PIPE MARKERS SHALL BE AS FOLLOWS:

1. ADJACENT TO EACH VALVE AND FITTING
2. AT EACH BRANCH AND RISER TAKE-OFF
3. AT EACH PIPE PASSAGE THROUGH WALLS, FLOORS, OR CEILINGS
4. ON ALL STRAIGHT PIPE RUNS EVERY 25 FEET

F. IDENTIFICATION MARKERS MAY BE STENCILED OR SHALL BE SETMARK PIPE MARKERS, AS MANUFACTURED BY SETON NAME PLATE CORPORATION.

G. ALL VALVES SHALL BE IDENTIFIED WITH THE APPROPRIATE SERVICE DESIGNATION AND VALVE NUMBER WITH BRASS VALVE TAGS. EACH VALVE TAG SHALL BE 19 GAUGE BRASS WITH 1/4" BLACK-FILLED LETTERS OVER 1/2" BLACK-FILLED NUMBERS. TAGS SHALL BE FASTENED TO VALVES WITH BRASS "S" HOOKS OR BRASS JACK CHAIN. BRASS TAGS AND FASTENERS SHALL BE AS MANUFACTURED BY SETON NAME PLATE CORPORATION.

H. PROVIDE CHARTS OF ALL VALVES. VALVE CHARTS SHALL INCLUDE THE FOLLOWING ITEMS:

1. VALVE NUMBER
2. LOCATION
3. PURPOSE / MATERIAL

2.0 PRODUCTS

2.01 BID BASIS AND SUBSTITUTION PROCEDURES

A. MANUFACTURER NAMES, SERIES AND MODEL NUMBERS, AS NOTED OR SPECIFIED, ARE FOR THE PURPOSE OF DESCRIBING TYPE, CAPACITY, AND QUALITY OF EQUIPMENT, MATERIALS AND PRODUCTS TO BE USED. UNLESS "OR EQUAL" IS SPECIFICALLY STATED, BIDS SHALL BE BASED ONLY ON THE SPECIFIED "BASIS OF DESIGN" MANUFACTURER. THE LISTING OF A PARTICULAR MANUFACTURER AS AN "EQUAL" OR "ACCEPTABLE SUBSTITUTE" MANUFACTURER SHALL NOT BE MISCONSTRUED AS APPROVING NOR ALLOWING THE SUBSTITUTION OF THAT MANUFACTURER'S STANDARD PRODUCT IN PLACE OF THE BASIS OF DESIGN. NO CONSIDERATION WILL BE GIVEN TO A PRODUCT, WHICH WOULD REQUIRE DIMENSIONAL, SPATIAL OR AESTHETIC CHANGES TO THE PROJECT. "ACCEPTABLE SUBSTITUTE" AND "EQUAL" MANUFACTURERS SHALL ONLY BID THOSE PRODUCTS, WHICH EXACTLY MATCH THE SIZE AND OTHER CHARACTERISTICS OF THE SPECIFIED BASIS OF DESIGN. ANY CHANGES TO OTHER DISCIPLINES AND TRADES OF WORK REQUIRED BY AN "OR EQUAL" OR "SUBSTITUTE" PRODUCT SHALL BE DULY CONSIDERED AND PRICED ACCORDINGLY PRIOR TO BIDDING OR PRICING. THE DECISION AS TO WHETHER OR NOT A PROPOSED SUBSTITUTE OR "EQUAL" PRODUCT IS ACTUALLY EQUAL TO THAT SPECIFIED SHALL REST SOLELY WITH THE ARCHITECT.

B. REQUESTS TO PROVIDE "EQUAL" PRODUCTS IN LIEU OF THOSE SPECIFIED SHALL BE SUBMITTED TO THE ARCHITECT IN WRITING AT LEAST TEN (10) DAYS PRIOR TO FINAL PRICING AND EXECUTION OF THE CONTRACT. NO CONSIDERATION WILL BE GIVEN TO SUBSTITUTE PRODUCTS AFTER FINAL PRICING AND EXECUTION OF THE CONTRACT.

C. ANY "OR EQUAL" PRODUCT OR PROPOSED PRODUCT SUBSTITUTION WHICH WILL CAUSE A CHANGE IN THE APPEARANCE, DIMENSIONS OR DESIGN OF ANY PART OF THE BUILDING, IT STRUCTURE, ELECTRICAL SYSTEM OR ANY OTHER ENGINEERED SYSTEMS SHALL BE ACCOMPANIED BY A SCALED DRAWING AND WRITTEN DESCRIPTION OF THE REQUIRED CHANGE(S) FOR APPROVAL BY THE ARCHITECT. IF DEEMED NECESSARY BY THE ARCHITECT, OWNER, OR AHJ, DESIGN CHANGES SHALL BE SIGNED AND SEALED BY A REGISTERED PROFESSIONAL ENGINEER, CURRENTLY LICENSED IN THIS STATE. THIS SHALL BE PERFORMED UNDER THE CONTRACTOR'S SCOPE WHO SELECTS THE SUBSTITUTION.

D. ANY AND ALL CHANGES DUE TO A SUBSTITUTION OF BASIS OF DESIGN EQUIPMENT INCLUDING BUT NOT LIMITED TO ELECTRICAL CONNECTION, PHYSICAL SIZE, ACCESS, DUCT OR PIPING CONNECTIONS, CONTROLS, ETC. SHALL BE SOLELY THE RESPONSIBILITY OF SUBMITTING CONTRACTOR.

2.02 MINIMUM STANDARDS

A. EVERY PIECE OF ENERGY CONSUMING EQUIPMENT, ALL FIRE SUPPRESSION PRODUCTS AND LIFE SAFETY EQUIPMENT SHALL COMPLY WITH THE FOLLOWING STANDARDS AS APPLICABLE; ESPECIALLY IN REGARD TO PREVAILING CODES:

1. FACTORY MUTUAL LABORATORIES (FM)
2. INDUSTRIAL RISK INSURERS (IRI)
3. UNDERWRITERS LABORATORIES, INC. (UL)
4. ADC: AIR DIFFUSION COUNCIL.
5. AGA: AMERICAN GAS ASSOCIATION
6. AMCA: AIR MOVING AND CONDITIONING ASSOCIATION, INC.
7. ANSI: AMERICAN NATIONAL STANDARDS INSTITUTE
8. API: AMERICAN PETROLEUM INSTITUTE
9. AHRI: AIR CONDITIONING, HEATING, AND REFRIGERATION INSTITUTE
10. ASHRAE: AMERICAN SOCIETY OF HEATING, REFRIGERATING AND AIR CONDITIONING ENGINEERS
11. ASME: AMERICAN SOCIETY OF MECHANICAL ENGINEERS
12 ASTM: AMERICAN SOCIETY OF TESTING AND MATERIALS
13. AWWA: AMERICAN WATER WORKS ASSOCIATION
14. IBR: INSTITUTE OF BOILER AND RADIATOR MANUFACTURERS
15. MSS: MANUFACTURERS STANDARDIZATION SOCIETY
16. NBBPVI: NATIONAL BOARD OF BOILER AND PRESSURE VESSEL INSPECTORS
17. NEMA: NATIONAL ELECTRICAL MANUFACTURER'S ASSOCIATION
18. OSHA: OCCUPATIONAL SAFETY & HEALTH ADMINISTRATION
19. PDI: PLUMBING DRAINAGE INSTITUTE
20. PPI: PLASTIC PIPE INSTITUTE
21. SMACNA: SHEET METAL AND AIR CONDITIONING CONTRACTORS NATIONAL ASSOCIATION, INC.

2.03 PIPE HANGERS AND SUPPORTS

A. PIPE HANGERS, TRAPEZE HANGERS, UPPER ATTACHMENTS, RODS AND OTHER SUPPORTS SHALL BE SELECTED BASED ON PIPE SIZE AND MATERIAL CONTAINED THEREIN. PROVIDE ALL HANGERS, RODS, TURNBUCKLES, ANGLES, CHANNELS AND OTHER SUPPORTS TO SECURELY SUPPORT THE PIPING SYSTEMS FROM THE BUILDING STRUCTURE.

B. ALL MATERIALS UTILIZED FOR THE HANGING AND SUPPORT OF THE PIPING SYSTEMS SHALL BE MANUFACTURED PRODUCTS, WHICH ARE SPECIFICALLY INTENDED FOR THE PURPOSE OF HANGING PIPING SYSTEMS. THE USE OF WIRE, STEEL STRAPS, PLASTIC TIES, ETC. IS STRICTLY PROHIBITED.

C. SUPPORTS AND HANGERS SHALL BE SELECTED TO FIT AROUND THE PIPE (AND INSULATION UNLESS OTHERWISE SPECIFIED HEREIN) AND PROVIDE ADEQUATE MOVEMENT FOR EXPANSION OF THE PIPING SYSTEMS. ANCHORS SHALL BE PROVIDED TO RESTRICT AND CONTROL SUCH MOVEMENT WITHIN OFFSETS AND EXPANSION LOOPS.

D. ALL HANGERS AND SUPPORTS SHALL BE SELECTED AT A MINIMUM FACTOR OF SAFETY OF FIVE BASED ON THE ULTIMATE TENSILE STRENGTH OF THE MATERIAL.

E. INTERMEDIATE PIPE SUPPORTS SHALL BE PROVIDED BETWEEN BUILDING STRUCTURAL MEMBERS SO AS NOT TO EXCEED MAXIMUM SUPPORT SPACING SPECIFIED AND SHALL BE STRUCTURAL STEEL ANGLES (MINIMUM 2 1/2" X 2 1/2" X 1/4"). IN STEEL CONSTRUCTION, INTERMEDIATE SUPPORTS SHALL BE SECURELY CLAMPED TO STEEL BEAMS AND TO STEEL JOISTS, AND IN NO CASE SHALL SUPPORTS BE ATTACHED TO ROOF DECKS.

F. FOR SUSPENDING PIPES FROM CONCRETE BEAMS, UPPER ATTACHMENTS SHALL BE SIDE BEAM BRACKET UTILIZING BOLTS IN SLEEVES SET IN TOP PORTIONS OF THE BEAMS. WHERE SLEEVES ARE NOT USED, PROVIDE EXPANSION SHIELDS OR POWER-ACTUATED FASTENERS.

G. HANGER RODS FOR PIPE HANGERS SHALL BE AS FOLLOWS:

1. 3/8" HANGER ROD 2" NOMINAL PIPE AND SMALLER
2. 1/2" HANGER ROD 21½" AND 3" NOMINAL PIPE
3. 5/8 HANGER ROD 4" AND 5" NOMINAL PIPE
4. 3/4" HANGER ROD 6" NOMINAL PIPE
5. 7/8 HANGER ROD 8" THROUGH 16" NOMINAL PIPE

H. PIPE HANGERS SELECTED FOR SUPPORTING HORIZONTAL INSULATED PIPING SHALL BE SIZED TO FIT AROUND THE OUTSIDE OF THE PIPE INSULATION EXCEPT FOR THE FOLLOWING SERVICES, WHICH SHALL BE SIZED TO FIT AROUND THE PIPE AND UNDER THE INSULATION:

1. HOT WATER SUPPLY AND RETURN PIPING, STEAM, CONDENSATE RETURN AND RELATED PIPING SIZED 2" AND SMALLER.

I. PROVIDE PIPE SADDLES, INSERTS AND SHIELDS ON ALL INSULATED PIPING AS OUTLINED BELOW:

1. HOT WATER SUPPLY AND RETURN PIPING AND ASSOCIATED STEAM AND CONDENSATE RETURN PIPING OVER 2" SHALL BE SUPPORTED BY STEEL SADDLES WELDED TO PIPE. INSULATION SHALL BE CONTINUOUS THROUGH THE SADDLE.

2. ALL OTHER INSULATED PIPING SHALL BE SUPPORTED ON FOAMGLAS INSULATION INSERTS AND GALVANIZED SHIELDS, EXCEPT THAT NO INSERTS ARE REQUIRED ON PIPING SIZED LESS THAN 2". FOAMGLAS INSERTS SHALL EXTEND AT LEAST 2" PAST EACH END OF THE PIPE SHIELDS.

A. SHIELDS SHALL BE AS FOLLOWS:

1) PIPES 2 AND SMALLER: 18 GAUGE X 12" LONG

2) PIPES 2 1/2" AND LARGER: 16 GAUGE X 18" LONG

B. SHIELDS AND INSERTS SHALL BE 180 DEGREES AROUND THE LOWER HALF OF THE PIPE AT ALL PIPE HANGERS, EXCEPT THAT ON TRAPEZE HANGERS, PIPE RACKS AND FLOOR SUPPORTED HORIZONTAL PIPES, SHIELDS SHALL BE 360 DEGREES AROUND THE ENTIRE PIPE.

3.0 EXECUTION

3.01 SUBMITTALS

A. BEFORE PREPARING SUBMITTALS, STUDY ALL CONTRACT DRAWINGS ND SPECIFICATIONS IN DETAIL, OBTAIN MANUFACTURER'S RECOMMENDED INSTRUCTIONS, AND HAVE SUBMITTALS PREPARED BASED ON SPECIFIC EQUIPMENT AND MATERIAL PROPOSED FOR INSTALLATION. AN OFFICER OF THE CONTRACTING FIRM SHALL SIGN ALL SHOP DRAWINGS (CERTIFYING CONFORMANCE WITH PLANS AND SPECIFICATIONS) BEFORE SUBMITTING TO THE ARCHITECT OR RELEASING TO THE FIELD.

B. THE SUBMITTALS PROCESS SHALL NOT BE UTILIZED AS AN AVENUE TO SUBSTITUTE PRODUCTS AFTER THE EXECUTION OF THE CONTRACT. SHOULD ON UNSPECIFIED OR UNEQUAL PRODUCT BE SUBMITTED, IT WILL BE REJECTED. IF O SECOND ATTEMPT AT SUBSTITUTION IS MODE DURING THE RE-SUBMITTAL OF THE SOME PRODUCT, THEN NO MORE REVIEWS OF THAT PRODUCT WILL BE PERFORMED WITHOUT DIRECT COMPENSATION TO THE ENGINEER BEING PAID FOR THE ADDITIONAL SERVICES REQUIRED FOR THE THIRD REVIEW AND ANY FURTHER REVIEWS,

C. ALL SUBMITTALS SHALL BE SUBMITTED AND RETURNED ELECTRONICALLY.

D. SUBMITTALS WILL NOT BE ACCEPTED FOR REVIEW UNLESS THEY:

1. COMPLY WITH THE REQUIREMENTS OF DIVISION 1

2. INCLUDE COMPLETE INFORMATION PERTAINING TO ALL APPURTENANCES AND ACCESSORIES

3. ARE SUBMITTED AS COMPLETE PACKAGES WHICH PERTAIN TO OIL RELATED ITEMS IN DIVISION 23. SEPARATE PACKAGES SHALL BE SUBMITTED AS FOLLOWS:

a. All HVAC EQUIPMENT AND COMPONENTS
b. THE AUTOMATIC CONTROLS AND EMS

4. ARE PROPERLY MARKED WITH EQUIPMENT, SERVICE, OR FUNCTION IDENTIFICATION AS RELATED TO THE PROJECT AND ORE MARKED WITH PERTINENT SPECIFICATION PARAGRAPH NUMBER

E. SUBMIT CATALOG INFORMATION, FACTORY ASSEMBLY DRAWINGS, FIELD INSTALLATION DRAWINGS AND CERTIFICATIONS AS REQUIRED FOR COMPLETE EXPLANATION AND DESCRIPTION OF ALL ITEMS OF EQUIPMENT. THE SUBMITTALS DATA SHALL PROVIDE AMPLE, UNQUESTIONABLE COMPLIANCE WITH THE CONTRACT DOCUMENTS.

F. REVIEW OF SUBMITTALS SHALL NOT BE CONSTRUED AS AUTHORIZING ANY DEVIATIONS FROM THE PLANS AND SPECIFICATIONS UNLESS SUCH DEVIATIONS ORE CLEARLY Y IDENTIFIED AND SEPARATELY Y SUBMITTED IN THE FORM OF O LETTER THAT IS ENCASED WITH THE SUBMITTALS.

G. SUBMITTALS ORE REQUIRED ON ALL MANUF0CTURED EQUIPMENT, ESPECIALLY ENERGY CONSUMING EQUIPMENT. SUBMITTALS SHALL INCLUDE, BUT ARE NOT LIMITED TO, THE FOLLOWING ITEMS OF EQUIPMENT:

1. PIPING AND PIPING SPECIALTIES
2. DUCTWORK AND PIPING INSULATION
3. PUMPS
4. PACKAGED ROOFTOP UNITS INCLUDING PROPOSED CONTROLLER AND POINTS LIST
5. AIR DISTRIBUTION DEVICES
6. DUCTWORK ACCESSORIES (INCLUDING All DAMPERS)
7. FANS
8. UNIT, WALL, CEILING, DUCT, ETC. HEATERS
9. LOUVERS AND HOODS
10. T&B COMPANY CERTIFICATIONS AND FINAL REPORT
11. DUCTWORK AND PIPING SHOP DRAWINGS
12. FIRESTOPPING PRODUCTS AND APPLICABLE UL FORETOP DETAILS

3.02 EXCAVATION, TRENCHING AND BACKFILLING

A. PERFORM ALL EXCAVATION, TRENCHING AND BACKFILLING FOR UNDERGROUND WORK UNDER THIS DIVISION 23. DURING EXCAVATION, THE EXCAVATED MATERIAL SHALL BE PILED BACK FROM THE BANKS OF THE TRENCH TO AVOID OVERLOADING, SLIDES OR CAVE--INS. DO NOT EXCEED THE ANGIE OF REPOSE UNLESS WRITTEN APPROVAL IS OBTAINED IN ADVANCE FROM THE ARCHITECT FOR SHORING, BRACING OR OTHER ALTERNATE EXCAVATION METHODS. ALL EXCAVATED MATERIAL NOT USED FOR BACKFILLING SHALL BE REMOVED FROM THE BUILDING AND DISPOSED OF AS INDICATED OR DIRECTED BY THE ARCHITECT. TOKE MEASURES TO PREVENT SURFACE WATER FROM FLOWING INTO TRENCHES AND OTHER EXCAVATIONS AND ANY WATER ACCUMULATING THEREIN SHALL BE REMOVED BY PUMPING. ALL EXCAVATION SHALL BE MODE BY OPEN CUT. TUNNELING SHALL NOT BE ALLOWED.

B. THE BOTTOM OF ALL TRENCHES SHALL BE EVENLY GRADED TO PROVIDE FIRM SUPPORT AND ON EVEN BEARING SURFACE. PIPE SHALL BE LAID ON FIRM SOIL, LAID IN STRAIGHT LINES AND ON UNIFORM GRADES. PROVIDE BELL HOLES SO THAT THE BARREL OF THE PIPE RESTS EVENLY ON THE BOTTOM OF THE TRENCH ALONG THE ENTIRE LENGTH OF THE PIPE.

C. PIPE SHALL BE INSPECTED AND TESTED PRIOR TO BACKFILLING. TRENCH SHALL BE HAND FILLED TO A MINIMUM OF 12" ABOVE THE TOP OF PIPE WITH SUITABLE EARTH (FREE OF ROCKS, TRASH, LARGE CLODS AND ORGANIC MATERIAL) AND COMPACTED TO A MINIMUM 95G PROCTOR. AFTER THE FIRST LAYER IS COMPLETED, SUBSEQUENT LAYERS SHALL BE FILLED AND COMPACTED THE SOME AS THE FIRST LAYER. SETTLING THE BACKFILL WITH WATER SHALL NOT BE PERMITTED.

3.03 INSTALLATION REQUIREMENTS

A. ALL EQUIPMENT SHALL BE INSTALLED IN STRICT CONFORMANCE WITH THE RECOMMENDATIONS OF THE EQUIPMENT MANUFACTURER, AS INDICATED ON THE DRAWINGS AND AS SPECIFIED,

B. PROVIDE INSTALLATION MANUALS FOR EACH PIECE OF EQUIPMENT. SUBMIT IN SEPARATELY BOUND VOLUMES AFTER REVIEW OF SUBMITTALS,

C. PROVIDE SUPPLEMENTARY STEEL FRAMING AND WELDED STEEL EQUIPMENT SUPPORT STANDS AS REQUIRED FOR PROPER HANGING AND SUPPORT OF THE MECHANICAL SYSTEMS. STEEL ANGLES, CHANNELS AND TUBING UTILIZED FOR SUCH FRAMING SHALL BE SELECTED FOR A MAXIMUM DEFLECTION OF 1/360TH OF THE SPAN.

D, ALL ROOF CURBS SHALL BE A MINIMUM OF 12" HIGH AND SELECTED FOR THE VARIOUS ROOF PITCHES. CURBS INSTALLED ON ROOFS HAVING PITCHES OF NOT MORE THAN 1/4" PER FOOT MAY BE STANDARD CURBS SHIMMED LEVEL WITH STEEL CHANNELS OR Zs TO PROVIDE SUITABLE SUPPORT AND FLASHING SURFACES.

3.04 CLEANING, LUBRICATION AND ADJUSTMENT

A. THE EXTERIOR SURFACES OF ALL MECHANICAL EQUIPMENT, PIPING, DUCTWORK, CONDUIT, ETC., SHALL BE CLEANED AND FREE OF ALL DIRT, GREASE, OIL, POINT SPLATTER, AND OTHER CONSTRUCTION DEBRIS.

B. DUCTS, PLENUMS, AND AIR UNIT CASINGS SHALL BE CLEANED OF ALL DEBRIS AND EITHER VACUUMED OR BLOWN FREE OF ALL RUBBISH, DIRT, AND DUST BEFORE INSTALLING GRILLES, REGISTERS OR DIFFUSERS.

C. BEARINGS THAT REQUIRE LUBRICATION SHALL BE LUBRICATED IN STRICT ACCORDANCE WITH THE MANUFACTURER'S RECOMMENDATIONS.

D. ALL CONTROL EQUIPMENT SHALL BE ADJUSTED TO THE SETTINGS REQUIRED FOR THE PERFORMANCE SPECIFIED.

E. FANS SHALL BE ADJUSTED TO THE SPEED INDICATED BY THE MANUFACTURER TO MEET THE INSTALLED FINAL SYSTEM PRESSURE AT THE AIRFLOW INDICATED. ANY ADDITIONAL SHEAVES AND BELTS REQUIRED FOR FINAL ADJUSTMENTS SHALL BE PROVIDED WITH NO INCREASE IN THE CONTRACT AMOUNT.

F. ANY FANS OPERATED DURING CONSTRUCTION SHALL HAVE TEMPORARY FILTERS. TEMPORARY FILTERS SHALL BE CHANGED REGULARLY TO MINIMIZE CONTAMINATION OF THE EQUIPMENT AND DUCT SYSTEMS, PERMANENT FILTERS SHALL BE INSTALLED PRIOR TO FINAL INSPECTION.

G. ALL COILS SHALL BE THOROUGHLY CLEANED AND COMBED PRIOR TO FINAL INSPECTION.

H. ALL MATERIALS, EQUIPMENT, ETC. SUBJECT TO WEATHER, CORROSION, DUST, DEBRIS, WATER ETC. TO BE INSTALLED OR UTILIZED FOR THE PROJECT SHALL BE FULLY PROTECTED. THIS IS INCLUSIVE OF PIPING AND DUCT OPENINGS AND INTERNAL FAN VENTILATION INTAKES AND DISCHARGES. THIS DIVISION'S SCOPE INCLUDES PROTECTION AND REMEDIATION OF ANY AND ALL DIVISION MATERIALS, ETC. INCLUDING CLEANING, VACUUMING, DUSTING, ETC, REQUIRED FOR A CLEAN SYSTEM AND OPERATION. INSULATION AND EQUIPMENT WITH ELECTRICAL CONNECTIONS SUBJECT TO WATER SHALL BE REPLACED IN THEIR ENTIRETY. COORDINATE WITH ALL OTHER TRADES AND SCHEDULES.

3.05 PAINTING

A. ALL UNCOATED AND UN-INSULATED STEEL SURFACES EXPOSED TO SIGHT INSIDE THE BUILDING, SUCH AS PIPING, EQUIPMENT HANGERS AND SUPPORTS WHICH ORE NOT PROVIDED WITH FACTORY PRIME COAT OR GALVANIZING, SHALL BE CLEANED AND PAINTED WITH ONE COOT OF RUST INHIBITING PRIMER. IN ADDITION, OIL SURFACES IN FINISHED SPACES SHALL ALSO BE PAINTED WITH TWO COATS OF FINISH POINT IN A COLOUR SELECTED BY THE ARCHITECT.

B. ALL DUCTWORK SURFACES, PIPING, SUPPORTS, ETC. VISIBLE THROUGH GRILLES, REGISTERS AND DIFFUSERS IN FINISHED AREAS SHALL BE POINTED FLAT BLACK. ALL DUCTWORK, EQUIPMENT, PIPING, SUPPORTS, AIR DISTRIBUTION, ETC. VISIBLE IN EXPOSED FINISHED AREAS SHALL BE PAINTED A COLOUR SELECTED BY THE ARCHITECT, EXCEPT THAT NAMEPLATES SHALL NOT BE PAINTED.

C. STEEL ITEMS EXPOSED OUTSIDE THE BUILDING, SUCH AS EQUIPMENT SUPPORTS, UN-INSULATED PIPING AND HANGERS, WHICH ORE NOT FACTORY POINTED OR GALVANIZED, SHALL BE CLEANED AND PAINTED WITH ONE COAT OF RUST INHIBITING PRIMER AND TWO COATS OF ASPHALTIC BASE ALUMINUM PAINT. INSULATED STEEL PIPES OUTSIDE THE BUILDING SHALL BE CLEANED AND POINTED WITH ONE COOT OF RUST INHIBITING PRIMER BEFORE INSTALLING INSULATION.

D. FACTORY PAINTED EQUIPMENT THAT HAS BEEN SCRATCHED OR MARRED SHALL BE REPAINTED TO MATCH THE ORIGINAL FACTORY COLOR.

3.06 DUCTWORK AND PIPING LEAK TESTING

A. INSULATED, UNDERGROUND, AND CONCEALED DUCTWORK AND PIPING SHALL BE TESTED FOR LEAKS IN PLACE BEFORE BACK FILLING, CONCEALING OR COVERING. TESTS SHALL BE CONDUCTED IN THE PRESENCE OF THE ARCHITECT OR THEIR DESIGNATED REPRESENTATIVE.

TITLE:
MECHANICAL SPECIFICATIONS
(1 OF 3)

SHEET NUMBER:
M-0.1

B. ALL LOW PRESSURE DUCTWORK (DESIGN OPERATING PRESSURE OF 1.0" WC ESP OR LESS) SHALL BE TESTED BY THE OPERATION OF THE SYSTEM TO WHICH IT IS CONNECTED.

C. ALL MEDIUM AND HIGH PRESSURE DUCTWORK (OPERATING PRESSURE OF MORE THAN 1.0" WC ESP) SHALL BE TESTED AT 1.5 TIMES THE DESIGN OPERATING PRESSURE OF THE SYSTEM TO WHICH IT IS CONNECTED, OR AT THE TOTAL FAN PRESSURE AT SHUT--OFF, WHICHEVER IS GREATER, UP TO THE MAXIMUM PRESSURE CLASSIFICATION OF THE ASSOCIATED DUCTWORK SYSTEM.

D. ALL VISIBLE AND AUDIBLE AIR LEAKS FROM THE DUCTWORK SYSTEMS SHALL BE REPAIRED.

E. SEE SPECIFICATION SECTION 23 11 23 FOR TESTING REQUIREMENTS OF NATURAL GAS '*AND LIQUID PROPANE GAS PIPING. SYSTEM SHALL BE PORT OF DIVISION 22 SCOPE UNLESS OTHERWISE ARRANGED WITHIN THE CONTRACT. COORDINATE WITH DIVISION 22.

F. CHILLED WATER, CONDENSER WATER, AND HOT WATER SUPPLY AND RETURN PIPING SHALL BE HYDROSTATICALLY TESTED AT A PRESSURE OF NOT LESS THAN THE GREATER OF 1.5 TIMES THE OPERATING PRESSURE OR 100 PSIG, WHICHEVER IS GREATER, FOR A MINIMUM OF ONE HOUR. NO LOSS IN PRESSURE SHALL BE PERMITTED.

G. STEAM AND CONDENSATE RETURN PIPING SHALL BE TESTED AT A TEST PRESSURE OF 100 PSIG MINIMUM BUT NOT LESS THAN 1.25 TIMES THE SYSTEM OPERATING PRESSURE FOR A MINIMUM OF ONE HOUR. NO LOSS OF PRESSURE SHALL BE PERMITTED.

H. AII REFRIGERANT PIPING SHALL BE 100S TESTED WITH THE APPLICABLE ASHRAE STANDARD LATEST VERSION.

I. ALL LEAKS SHALL BE REPAIRED BY TIGHTENING, REMAKING JOINTS, OR REPLACING PIPE AND FITTINGS. CAULKING OF JOINTS SHALL NOT BE PERMITTED.

3.07 RECORD (AS-BUILT) DRAWINGS

A. AT THE COMPLETION OF THE PROJECT, PROVIDE A SET OF REPRODUCIBLE PRINTS TO THE ARCHITECT WHICH REFLECTS OLL CHANGES, DEVIATIONS AND REVISIONS MADE TO THE ORIGINAL DESIGN DOCUMENTS. LOCATIONS OF ALL UNDERGROUND PIPING AND UTILITIES SHALL BE CLEARLY SHOWN AND DIMENSIONED FROM PERMANENT REFERENCE POINTS SUCH AS BUILDING COLUMN LINES. RECORD DRAWINGS SHALL BE PRODUCED IN ELECTRONIC FORMAT COMPATIBLE WITH AUTOCAD. FURNISH ELECTRONIC COPIES OF ALL DRAWINGS IN DWG. FORMAT, AND TWO (2) BOND COPIES OF ALL DRAWING SHEETS. **AS--BUILTS FOR ELECTRONIC INCORPORATION BY THE DESIGN TEAM, AS APPLICABLE, SHALL BE REDLINE MARK--UPS OF THE CONSTRUCTION DOCUMENTS.

3.08 OPERATING AND MAINTENANCE MANUALS AND INSTRUCTIONS

A. COMPLETE OPERATING AND MAINTENANCE MANUALS SHALL BE PROVIDED TO THE OWNER. FOUR COPIES SHALL BE PROVIDED. EACH COPY SHALL BE BOUND IN A SEPARATE 3--RING, LOOSE--LEAF NOTEBOOK, OPERATING INSTRUCTIONS SHALL BE PROVIDED FOR EACH MECHANICAL SYSTEM, AND SHALL EACH INCLUDE A BRIEF SYSTEM DESCRIPTION, A SIMPLE SCHEMATIC AND O SEQUENCE OF OPERATION. OPERATING AND MAINTENANCE INSTRUCTIONS SHALL BE PROVIDED FOR EACH PIECE OF EQUIPMENT. A CONTROL SYSTEM WIRING DIAGRAM SHALL BE INCLUDED IN EACH OPERATING AND MAINTENANCE MANUAL.

B. PRIOR TO FINAL ACCEPTANCE OR BENEFICIAL OCCUPANCY, PROVIDE THE SERVICES OF A COMPETENT TECHNICIAN FOR NOT LESS THAN ONE (1)**TWO (2) DAYS** TO INSTRUCT THE OWNER IN THE OPERATION OF THE MECHANICAL SYSTEMS.

3.09 TESTING AND BALANCING

A. TESTING AND BALANCING OF THE HVAC SYSTEM SHALL BE PERFORMED '*IN ACCORDANCE WITH THE STANDARDS OF A ABC AND SHALL BE PERFORMED UNDER THE DIRECT SUPERVISION OF A CERTIFIED TEST AND BALANCE ENGINEER*' AS SPECIFIED IN SECTION 23 05 93. NOTE THAT THIS WORK IS TO BE PERFORMED UNDER A SEPARATE CONTRACT DIRECTLY UNDER THE GENERAL CONTRACTOR. SUBMIT FOUR (4) COPIES OF THE TEST AND BALANCE REPORT DIRECTLY TO THE ARCHITECT.

3.10 PIPING SUPPORTS

A. PIPE HANGERS OR SUPPORTS SHALL BE PROVIDED WITHIN 18" OF EACH HORIZONTAL FITTING, EQUIPMENT CONNECTION, V0LVE, ETC. AND WITHIN 18" OF THE CENTERLINE OF HORIZONTAL OR VERTICAL CHANGES IN DIRECTION SUMMING TO 90' OR MORE. SPECIFIC ATTENTION IS CALLED TO VERTICAL TURNS INTO RISERS.

B. PIPING SUPPORTS SHALL BE PROVIDED, AT A MINIMUM, IN ACCORDANCE WITH THE GREATER OF THE BELOW OR AT CODE MINIMUM. WHERE THE BELOW OR CODE DOES NOT ADDRESS SUPPORT FOR SPECIFIC PIPING, SUPPORTS SHALL BE IN ACCORDANCE WITH MANUFACTURER'S REQUIREMENTS.

PIPING MATERIAL	MAX. HORZ. SPACING	MAX. VERT. SPACING
CAST--IRON PIPE	5'	15'
COPPER PIPE	12'	10'
COPPER TUBING £ 1--1/4 " DIA.	6'	10'
COPPER TUBING ≥ 1--1/2 " DIA.	10'	10'
PVC PIPE	4'	10"

*MIDSTORY GUIDE REQUIRED FOR PIPING 2 " DIAMETER AND SMALLER

C. RISER CLOMPS SHALL BE PROVIDED AT EACH FLOOR PENETRATION. FOR PRESSURIZED PIPING SYSTEMS EXCEPT REFRIGERANT SUCTION AND LIQUID SERVICE, PROVIDE VIBRATION ISOLATION AT ALL RISER CLAMPS WITH TWO (2) POD--TYPE MOUNTINGS CONSISTING OF A

MINIMUM 3/8" THICK RIBBED OR WAFFLED ELASTOMERIC PADS BONDED BETWEEN MINIMUM 16--GAUGE GALVANIZED STEEL SEPARATOR PLATES. PODS SHALL BE SIZED FOR A DEFLECTION OF 0.12" TO 0.16". PODS SHALL BE MINIMUM 3" X 3" SQUARE.

3.11 WARRANTY

A. ALL WORK PROVIDED UNDER THIS DIVISION 23 SHALL BE SUBJECT TO A MINIMUM ONE YEAR WARRANTY. THE WARRANTY SHALL INCLUDE PROMPT REPAIR OR REPLACEMENT OF EQUIPMENT OR SYSTEM FAILURES AND SHALL INCLUDE ALL PORTS, REFRIGERANT, AND LABOR. IN ADDITION, ALL COMPRESSORS SHALL CARRY ON ADDITIONAL FOUR YEAR PARTS--ONLY WARRANTY. EXTENDED WARRANTIES SHALL BE PROVIDED ON ALL OTHER EQUIPMENT SO SPECIFIED IN OTHER SECTIONS.

3.14SH0P DRAWINGS

A. SHOP DRAWINGS PER THE SUBMITTAL REQUIREMENTS SHALL BE SUBMIT TO THE DESIGN TEAM WITH ADEQUATE TIME FOR MULTIPLE ROUNDS OF REVIEW. SHOP DRAWINGS SHALL SHOW "AS--BUILT " CONDITIONS INCLUDING ELEVATIONS, OFFSETS, TRANSITIONS, AND ACCESSORIES. SHOP DRAWINGS SHALL INDICATE ALL CODE AND MANUFACTURER'S RECOMMENDED CLEARANCES, ACCESS, AND COORDINATE THE CLEARANCE AND ACCESS REQUIREMENTS WITH ALL OTHER TRADES.

B. SHOP DRAWINGS THAT USE KEYNOTES DIRECT FROM THE DESIGN DOCUMENTS SHALL NOT BE ACCEPTABLE AS THEY DO NOT DEMONSTRATE COORDINATION WITH ALL OTHER TRADES, NECESSARY TRANSITIONS, ETC.

C. SHOP DRAWINGS SHALL BE PROVIDED AS COMPLETE PACKAGES IN PARALLEL WITH ALL TRADES TO DOCUMENT COORDINATION. FLOOR--BY--FLOOR OR OTHERWISE PIECEMEAL SHOP DRAWINGS ARE GENERALLY NOT ACCEPTABLE.

3.15 OWNER TRAINING

A. OWNER TRAINING SHALL BE PROVIDED FOR ALL SYSTEMS AND EQUIPMENT AND SHALL INCLUDE THE FOLLOWING:

1. 8--HOURS OF TRAINING FOR EACH TYPE OF EQUIPMENT
2. 24--HOURS OF TRAINING FOR HVAC CONTROLS
3. 16--HOURS FOR OVERALL SYSTEM OPERATIONAL TRAINING

B. A TRAINING SUMMARY AND SCHEDULE SHALL BE SUBMITTED TO THE ARCHITECT FOR APPROVAL WITHIN NINETY (90) DAYS OF THE DATE OF SUBSTANTIAL COMPLETION.

C. TRAINING TIMING WILL VARY AND SHALL BE ASSUMED TO INCLUDE MULTIPLE SESSIONS AS REQUIRED BY THE OWNER.

3.17 BID REQUIREMENTS

A. THE CONTRACTOR SHALL INCLUDE ALL SYSTEMS, EQUIPMENT AND ACCESSORIES SHOWN ON THE PLANS AND SPECIFICATIONS.

B. THE CONTRACTOR IS RESPONSIBLE FOR PROVIDING ALL DESIGN DOCUMENTS TO ALL SUBCONTRACTORS. ALL SYSTEMS, EQUIPMENT AND ACCESSORIES SHALL BE INCLUDED IN THE BID, WHETHER SHOWN ON THE SUBCONTRACTOR APPLICABLE PLANS OR OTHER DESIGN DOCUMENTS.

C. SHOULD ANY DISCREPANCY OCCUR IN THE DESIGN DOCUMENTS, THE CONTRACTOR SHALL PROVIDE A REQUEST FOR CLARIFICATION PRIOR TO BID OR NOTE THE DISCREPANCY IN THE BID AND PROVIDE AN APPROPRIATE COST ALLOWANCE IN THE BID.

D. THE CONTRACTOR SHALL ACKNOWLEDGE THAT THE DESIGN DOCUMENTS ARE DIAGRAMMATIC AND SHALL PROVIDE ALL SYSTEMS, EQUIPMENT AND ACCESSORIES REQUIRED FOR A COMPLETE FACILITY. ANY AREAS THAT APPEAR TO BE VOID OF SYSTEMS OR INAPPROPRIATE SYSTEMS SHALL BE NOTED IN THE BID. NO POST BID CHANGE ORDER SHALL BE CONSIDERED FOR AREAS OR DISCREPANCIES NOT NOTED IN THE BID.

E. ALL INSTALLATION COORDINATION AND MEANS AND METHODS AND LABOR AND MATERIALS REQUIRED FOR PROPER SYSTEM INSTALLATION SHALL BE INCLUDED.

F. THESE REQUIREMENTS ARE IN ADDITION TO BID PROCEDURES AND REQUIREMENTS OF THE RFP OR GENERAL SPECIFICATIONS.

END OF SECTION

SECTION 23 05 93

TESTING, ADJUSTING, AND BALANCING FOR HVAC

1.0 GENERAL

1.01 DESCRIPTION

A. ALL WORK SPECIFIED IN THIS SECTION IS GOVERNED BY THE COMMON WORK RESULTS FOR HVAC SECTION 23 05 00.

B. THIS SECTION 23 05 93 AND THE ACCOMPANYING DRAWINGS COVER THE PROVISION OF ALL LABOR, EQUIPMENT, APPLIANCES, AND MATERIALS AND PERFORMING ALL OPERATIONS IN CONNECTION WITH THE TESTING AND BALANCING (TAB) OF THE HEATING, VENTILATING AND AIR CONDITIONING (HVAC) SYSTEMS AS SPECIFIED HEREIN AND AS SHOWN. THESE SYSTEMS INCLUDE, BUT ARE NOT LIMITED TO, THE FOLLOWING:

1. SUPPLY DISTRIBUTION SYSTEMS

2. RETURN AND EXHAUST AIR SYSTEMS

3. HEATING, VENTILATING AND AIR CONDITIONING EQUIPMENT (ALL SCHEDULED EQUIPMENT AS A MINIMUM)

4. HYDRONIC SYSTEMS

1.02 INTENT

A. IT IS THE INTENT OF THIS SECTION OF THE SPECIFICATIONS TO PROVIDE A COMPLETE OPERABLE AND BALANCED HVAC SYSTEM AS SHOWN AND SPECIFIED WHICH IS REASONABLY AIRTIGHT, COMFORTABLE AND FREE OF OBJECTIONABLE NOISE AND VIBRATION.

1.03 SCOPE OF WORK

A. HVAC TEST AND BALANCE SHALL BE PERFORMED BY AN INDEPENDENT AGENCY CERTIFIED BY THE ASSOCIATED AIR BALANCE COUNCIL (AABC) OR NATIONAL ENVIRONMENTAL BALANCING BUREAU (NEBB) UNDER DIRECT CONTRACT TO THE GENERAL CONTRACTOR. ALL WORK PERFORMED BY THIS AGENCY SHALL BE PERFORMED BY QUALIFIED TECHNICIANS UNDER THE DIRECT SUPERVISION OF AN AABC OR NEBB CERTIFIED TEST AND BALANCE ENGINEER. THE AGENCY SHALL BE INDEPENDENT AND SHALL NOT BE ASSOCIATED IN ANY WAY WITH THE INSTALLING HVAC SUBCONTRACTOR.

B. HVAC TEST AND BALANCE SHALL BE PERFORMED IN ACCORDANCE WITH THE 7TH EDITION OF THE AABC NATIONAL STANDARDS, 2016 FOR TOTAL SYSTEM BALANCE OR THE NEBB PROCEDURAL STANDARDS FOR TAB OF ENVIRONMENTAL SYSTEMS, 8TH EDITION, 2015 TOGETHER WITH THE NEBB TAB MANUAL FOR TECHNICIANS, 2ND EDITION.

C. THE FINAL TEST AND BALANCE REPORT SHALL SERVE TO SUBSTANTIATE COMPLIANCE WITH THE INTENT OF THE CONTRACT DOCUMENTS, SPECIFICALLY THE HVAC SYSTEMS.

D. HVAC TEST AND BALANCE SHALL NOT BEGIN UNTIL THE SYSTEMS ARE SUBSTANTIALLY COMPLETE.

E. UPON THE COMPLETION OF THE TEST AND BALANCE WORK, THE AGENCY SHALL SUBMIT FOUR (4) COPIES OF THE COMPLETE HVAC TEST AND BALANCE REPORT DIRECTLY TO THE ARCHITECT.

F. THE AGENCY, AS A PART OF ITS CONTRACT WITH THE GENERAL CONTRACTOR, SHALL ACT AS AN AUTHORIZED INSPECTION AGENCY, RESPONSIBLE TO THE GENERAL CONTRACTOR AND THE ARCHITECT AND SHALL, DURING THE TEST AND BALANCE, LIST THOSE ITEMS WHICH REQUIRE CORRECTION OR HAVE NOT BEEN INSTALLED IN ACCORDANCE WITH THE CONTRACT DOCUMENTS.

G. THE AGENCY SHALL PLAINLY MARK THE SETTINGS OF ALL VALVES, DAMPERS AND OTHER ADJUSTABLE DEVICES. IF A BALANCING DEVICE IS PROVIDED WITH A MEMORY STOP, IT SHALL BE SET, LOCKED AND MARKED.

H. THE AGENCY SHALL RECORD ALL OF THE FINAL SET POINTS ON ALL VARIABLE SPEED DRIVES.

1.04 SUBMITTALS

A. THE NAME AND CERTIFICATION OF THE AGENCY, ALONG WITH THE NAME AND CERTIFICATION OF THE CERTIFIED TEST AND BALANCE ENGINEER, SHALL BE SUBMITTED TO THE ARCHITECT FOR REVIEW WITHIN 30 DAYS AFTER THE AWARD OF THE GENERAL CONTRACT.

B. THE SELECTED AGENCY SHALL SUBMIT TO THE OWNER:

1. PROCEDURAL MANUAL
2. REPORT FORMS
3. AABC OR NEBB PERFORMANCE GUARANTEE
4. INSTRUMENT LIST AND CALIBRATION DATES
5. SCHEDULE
6. FLOOR PLANS AS NEEDED TO UNIQUELY IDENTIFY DEVICE LOCATIONS

C. A REVIEWED COPY OF EACH OF THE ABOVE SHALL BE RETURNED TO THE AGENCY BEFORE THE HVAC TEST AND BALANCE BEGINS.

D. IF A COMPLETE SUBMITTAL IN ACCORDANCE WITH THESE REQUIREMENTS IS NOT RECEIVED WITHIN 60 DAYS FROM AWARD OF THE GENERAL CONTRACT, THEN THE ARCHITECT RESERVES THE RIGHT TO SELECT THE AGENCY.

2.0 PRODUCTS

2.01 (NOT APPLICABLE)

3.0 EXECUTION

D. HVAC TEST AND BALANCE SHALL NOT BEGIN UNTIL THE SYSTEMS ARE SUBSTANTIALLY COMPLETE.

E. UPON THE COMPLETION OF THE TEST AND BALANCE WORK, THE AGENCY SHALL SUBMIT FOUR (4) COPIES OF THE COMPLETE HVAC TEST AND BALANCE REPORT DIRECTLY TO THE ARCHITECT.

F. THE AGENCY, AS A PART OF ITS CONTRACT WITH THE GENERAL CONTRACTOR, SHALL ACT AS AN AUTHORIZED INSPECTION AGENCY, RESPONSIBLE TO THE GENERAL CONTRACTOR AND THE ARCHITECT AND SHALL, DURING THE TEST AND BALANCE, LIST THOSE ITEMS WHICH REQUIRE CORRECTION OR HAVE NOT BEEN INSTALLED IN

3.01 GENERAL CONTRACTOR'S DUTIES

A. THE GENERAL CONTRACTOR SHALL PROVIDE THE FOLLOWING, WITHIN 10 DAYS AFTER HIS RECEIPT, TO THE AGENCY:

1. CONTRACT DRAWINGS
2. CONTRACT APPLICABLE SPECIFICATION DIVISION 23 (OTHERS AS APPLICABLE)
3. ADDENDA
4. CHANGE ORDERS
5. REVIEWED SUBMITTALS

B. THE GENERAL CONTRACTOR SHALL START-UP AND MAINTAIN THE HVAC SYSTEMS AND SHALL CONTINUE THE OPERATION OF THE HVAC SYSTEMS DURING EACH DAY OF TESTING AND BALANCING. START-UP AND OPERATION SHALL INCLUDE, AS A MINIMUM, THE FOLLOWING:

1. ALL EQUIPMENT OPERABLE AND IN SAFE CONDITION.
2. TEMPERATURE CONTROL SYSTEM COMPLETE.
3. PROPER THERMAL OVERLOAD PROTECTION IN PLACE FOR ELECTRICAL EQUIPMENT.
4. DUCTWORK LEAKAGE RATES NOT EXCEEDING THOSE SPECIFIED AND ALL DUCT SYSTEMS CLEAN OF DEBRIS.
5. AIR TRANSFER SYSTEMS SHALL HAVE:
   a. CORRECT FAN ROTATION AND RPM.
   b. COIL FINS CLEANED AND COMBED.
   c. FILTERS CLEAN AND IN PLACE.
   d. ACCESS DOORS CLOSED.
   e. ALL DAMPERS IN PLACE AND OPEN.
   f. ALL GRILLES, REGISTERS, AND DIFFUSERS INSTALLED.

C. PROVIDE SUFFICIENT TIME BEFORE THE FINAL COMPLETION DATE SO THAT TESTING AND BALANCING CAN BE ACCOMPLISHED. COORDINATE THE SUBMITTED T&B SCHEDULE.

D. PROVIDE IMMEDIATE LABOR AND TOOLS TO MAKE REQUIRED CORRECTIONS AND REPAIRS WITHOUT UNDUE DELAY.

E. THE GENERAL CONTRACTOR AND HIS SUBCONTRACTORS SHALL COOPERATE FULLY WITH THE AGENCY TO PROVIDE THE FOLLOWING:

1. ACCESS TO HVAC SYSTEM COMPONENTS.
2. THE RIGHT TO ADJUST THE SYSTEMS.

F. ANY CONDITIONS WHICH PREVENT PROPER HVAC TEST AND BALANCE SHALL BE REPORTED BY THE AGENCY TO THE GENERAL CONTRACTOR AND ARCHITECT WITHIN 7 DAYS OF THEIR DISCOVERY.

G. IF IT IS DETERMINED BY THE AGENCY AND CONFIRMED BY THE ARCHITECT THAT DRIVE CHANGES OR ADDITIONAL BALANCING DAMPERS ARE REQUIRED, THE CONTRACTOR SHALL OBTAIN AND INSTALL ALL NECESSARY COMPONENTS.

H. THE AGENCY SHALL COOPERATE WITH THE ARCHITECT AND THE CONTRACTOR AND ALL HIS SUBCONTRACTORS TO PERFORM THE WORK IN SUCH A MANNER AS TO MEET THE JOB SCHEDULE.

I. THE AGENCY SHALL VERIFY THAT ALL SYSTEM COMPONENTS ARE IN PLACE AND IN PROPER WORKING ORDER PRIOR TO LEAVING THE PROJECT.

J. ALL REPORTED AND RECORDED DATA SHALL REPRESENT TRUE MEASURED CONDITIONS.

K. WHERE EQUIPMENT USES VARIABLE SPEED DRIVES, AND WHERE FEASIBLE, VFDS SHALL BE USED AS THE PRIMARY BALANCING METHOD PRIOR TO ADJUSTMENT OR BALANCING OF VALVES, DAMPERS, ETC.

END OF SECTION

SECTION 23 07 13

DUCT INSULATION

1.0 GENERAL

1.01 DESCRIPTION

A. ALL WORK SPECIFIED IN THIS SECTION IS GOVERNED BY THE COMMON WORK RESULTS FOR HVAC SECTION 23 05 00.

B. THIS SECTION 23 07 13 AND THE ACCOMPANYING DRAWINGS COVER THE PROVISIONS OF ALL LABOR, EQUIPMENT, APPLIANCES, AND MATERIALS AND PERFORMING ALL OPERATIONS IN CONNECTION WITH THE CONSTRUCTION OF THE DUCTWORK SYSTEMS AS SPECIFIED HEREIN AND AS SHOWN. THESE SYSTEMS INCLUDE, BUT ARE NOT LIMITED TO, THE FOLLOWING:

1. INSULATION FOR TYPICAL DUCTWORK
2. DUCT LINER
3. INSULATION FOR DUCTWORK OUTSIDE
4. INSULATION FOR GREASE EXHAUST DUCTWORK
5. INSULATION FOR GENERATOR EXHAUST PIPE

1.02 INTENT

A. IT IS THE INTENT OF THIS SECTION OF THE SPECIFICATIONS TO PROVIDE A COMPLETE OPERABLE DUCT SYSTEM AS SHOWN AND SPECIFIED WHICH IS REASONABLY AIRTIGHT, FREE OF NOISE, VIBRATION, AND SWEATING, AND FABRICATED SO AS TO FIT INTO THE SPACE ALLOTTED AND TO EXHIBIT A MINIMUM RESISTANCE TO AIRFLOW.

2.0 PRODUCTS

2.01 DUCT LINER

A. DUCT LINER SHALL BE ONE INCH THICK, 1 1 LB. DENSITY (3 LB. DENSITY ON MEDIUM- AND HIGH-PRESSURE SUPPLY AIR SYSTEMS EXCEPT THAT 1 1 LB. DENSITY IS ACCEPTABLE IF THE LINER IS AT LEAST R ≥ 4.2 AND NRC ≥ 0.6) FIBROUS GLASS WITH ONE FACE COATED WITH A BLOCK FIRE RETARDANT COMPOUND. THE PERMANENT COMPOSITE FIRE AND SMOKE HAZARD RATING OF THE LINER SHALL BE STENCILED ON THE LINER FACE AND SHALL BE:

MAXIMUM FLAME SPREAD 25

MAXIMUM SMOKE DEVELOPED 50

2.02 TYPICAL DUCT INSULATION

A. DUCT INSULATION SHALL BE 2" THICK, MINIMUM 3/4 LB. DENSITY FIBERGLASS WITH AN FSKL 0.00035" THICK ALUMINUM FOIL JACKET, REINFORCED WITH FIBERGLASS SCRIM. THERMAL CONDUCTIVITY SHALL BE A MAXIMUM OF K = 0.29 AT 75T MEAN TEMPERATURE, OR O MAXIMUM OF K=0.27 AT 25A COMPRESSION.

B. INSULATION ADHESIVE SHALL BE BENJAMIN FOSTER 85--20. TAPE SHALL BE ALUMINUM FOIL AND SHALL BE SMACNA LISTED AND LABELED.

C. THE COMPOSITE NFPA 90A AND 90B, ASTM E84, UL RATING OF THE INSTALLED INSULATION SHALL NOT EXCEED 25/50.

D. THE GREASE EXHAUST DUCTWORK SHALL HAVE ZERO--CLEARANCE TO COMBUSTIBLES WRAP FROM THE HOOD CONNECTION TO DISCHARGE TERMINATION. COORDINATE THE INSULATION WITH ALL REQUIRED ACCESS PANELS, DRAINS, ETC. AS REQUIRED BY NFPA 96.

2.03 MINIMUM INSULATION REQUIREMENTS AS PER ASHRAE 90.1 2019:

	SUPPLY	RETURN
UNCONDITIONED SPACES WITHIN BUILDING:	R-6	R-6
INDIRECTLY CONDITIONED SPACES:	R-1.9	R-1.9
OUTSIDE OF BUILDING:	R-8	R-8

PIPING INSULATION

A. INSULATE ALL PIPING IN ACCORDANCE WITH INSULATION SCHEDULE EXCEPT AS OTHERWISE NOTED.

PIPING INSULATION SCHEDULE

SERVICE SIZE	(OPERATING TEMP.)	PIPE SIZE	THICKNESS
REFRIGERANT PIPING	(141-200 DEG.F)	<1.5"	1.5"
CONDENSATE PIPING	(105-140 DEG.F)	<1.5"	1.0"

3.0 EXECUTION

3.1 INSTALLATION

A. DUCTWORK SHALL BE INSTALLED IN STRICT ACCORDANCE WITH SMACNA, UL, AND NFPA STANDARDS.

B. DUCT LINER SHALL BE PROVIDED THROUGHOUT ALL RETURN AIR, TRANSFER, AND PLENUMS. DUCT LINER SHALL ALSO BE PROVIDED FOR THE FOLLOWING MINIMUM DISTANCES, THROUGH THE FIRST ELBOW(S), OR AS OTHERWISE INDICATED ON THE DRAWINGS, WHICHEVER IS GREATER, DOWNSTREAM OF EACH UNIT INDICATED BELOW:

1. PACKAGED ROOFTOP UNIT — 10 FT

2. SELF-CONTAINED AIR CONDITIONING UNIT — 10 FT

3. CENTRAL AIR HANDLING UNIT — 10 FT

4. SPLIT SYSTEM AIR HANDLING UNIT — 10 FT

5. WATER-SOURCE HEAT PUMP — 10 FT

6. FAN COIL UNIT — 5 FT

7. TERMINAL UNIT — 5 FT

C. STRAIGHT RUNS ONLY SHALL BE FACTORED INTO THE ABOVE DISTANCE REQUIREMENTS. ELBOWS, ETC., WITHIN THE LENGTH SHALL BE LINED BUT SHALL NOT COUNT TOWARDS THE LENGTH REQUIREMENT.

D. DUCT LINER SHALL NOT BE INSTALLED WITHIN SIX INCHES OF A DAMPER, INCLUDING FIRE AND/OR SMOKE DAMPERS. METAL CASINGS ARE REQUIRED ON THE DOWNSTREAM SIDE OF THE EXPOSED INSULATION. WHERE LINING HAS BEEN INTERRUPTED, EXTERNAL INSULATION IS REQUIRED.

E. DUCT LINER SHALL BE CUT TO PROVIDE OVERLAPPED AND COMPRESSED LONGITUDINAL CORNER JOINTS. LINER SHALL BE INSTALLED WITH THE COATED SURFACE FACING THE AIR STREAM. DUCT LINER SHALL BE ADHERED TO THE DUCTWORK WITH A 100% COVERAGE OF THE SHEET METAL SURFACES USING A FIRE RETARDANT ADHESIVE APPLIED BY SPRAYING. COAT ALL EXPOSED LEADING EDGES AND ALL TRANSVERSE JOINTS WITH FIRE RETARDANT ADHESIVE. THE LINER SHALL BE ADDITIONALLY SECURED USING METAL PINS WELDED TO THE DUCT AND SPEED WASHERS. ALL LEADING EDGES SHALL BE SECURED WITH SHEET METAL AIRFOILS.

F. INSIDE THE VAPOR BARRIER OF THE BUILDING, ALL SUPPLY AIR DUCTWORK WHICH IS NOT LINED SHALL BE INSULATED. ALL SUPPLY AIR DUCTWORK WHICH IS ON THE TOP FLOOR, DOWNSTREAM OF A PIU SERVING AN EXTERIOR EXPOSURE OR IS WITHIN 25 FEET OF AN EXTERIOR DOOR SHALL BE INSULATED. ALL OUTSIDE AIR DUCTWORK SHALL BE INSULATED. INSULATION SHALL BE CUT SLIGHTLY LONGER THAN CIRCUMFERENCE OF DUCT TO ENSURE FULL THICKNESS AT CORNERS. ALL INSULATION SHALL BE APPLIED WITH EDGES TIGHTLY BONDED. INSULATION SHALL BE ADHERED TO DUCT WITH FIRE-RESISTANT ADHESIVE. ADHESIVE SHALL BE APPLIED SO THAT INSULATION CONFORMS TO DUCT SURFACES UNIFORMLY AND FIRMLY. IN ADDITION TO THE ADHESIVE, THE INSULATION SHALL BE ADDITIONALLY SECURED TO THE BOTTOM OF ALL DUCTS 18" OR WIDER BY MEANS OF WELDED PINS AND SPEED CLIPS. THE PROTRUDING END OF THE PINS SHALL BE CUT OFF FLUSH AFTER THE SPEED CLIPS HAVE BEEN APPLIED. THE VAPOR BARRIER FACING SHALL BE THOROUGHLY SEALED WITH TAPE WHERE THE PINS HAVE PIERCED THROUGH. ALL JOINTS SHALL BE SEALED WITH 2" WIDE SMACNA TAPE. ANY CUTS OR TEARS SHALL BE SEALED WITH SMACNA TAPE.

G. ALL OUTSIDE AIR DUCTWORK LOCATED IN CONDITIONED OR SEMI-CONDITIONED SPACES SHALL BE EXTERNALLY INSULATED SIMILAR TO SUPPLY DUCTWORK.

H. ALL CONDITIONED AIR DUCTWORK, INCLUDING PARTIALLY CONDITIONED ENERGY RECOVERY VENTILATOR OUTSIDE AIR SUPPLY TO THE BUILDING AND EXHAUST DUCTWORK, INSTALLED IN SPACES THAT ARE VENTILATED ONLY, I.E. PENTHOUSES, SHALL BE INSULATED.

END OF SECTION

SECTION 23 31 00

HVAC DUCTS, ACCESSORIES, AND CASINGS

1.0 GENERAL

1.01 DESCRIPTION

A. ALL WORK SPECIFIED IN THIS SECTION IS GOVERNED BY THE COMMON WORK RESULTS FOR HVAC SECTION 23 05 00.

B. THIS SECTION 23 31 00 AND THE ACCOMPANYING DRAWINGS COVER THE PROVISIONS OF ALL LABOR, EQUIPMENT, APPLIANCES, AND MATERIALS AND PERFORMING ALL OPERATIONS IN CONNECTION WITH THE CONSTRUCTION OF THE DUCTWORK SYSTEMS AS SPECIFIED HEREIN AND AS SHOWN. THESE SYSTEMS INCLUDE, BUT ARE NOT LIMITED TO, THE FOLLOWING:

1. SUPPLY AIR DUCTWORK
2. RETURN, TRANSFER, AND RELIEF AIR DUCTWORK
3. EXHAUST DUCTWORK
4. OUTSIDE AIR DUCTWORK
5. DUCTWORK ACCESSORIES

C. C. DUCT SIZES SHOWN ON PLANS ARE CLEAR INSIDE AIR STREAM DIMENSIONS.

1.02 INTENT

A. IT IS THE INTENT OF THIS SECTION OF THE SPECIFICATIONS TO PROVIDE A COMPLETE OPERABLE DUCT SYSTEM AS SHOWN AND SPECIFIED WHICH IS REASONABLY AIRTIGHT, FREE OF NOISE, VIBRATION, AND SWEATING, AND FABRICATED SO AS TO FIT INTO THE SPACE ALLOTTED AND TO EXHIBIT A MINIMUM RESISTANCE TO AIRFLOW.

1.03 DESIGN AND CONSTRUCTION — DUCTWORK

A. DUCTWORK SHALL BE PROVIDED IN STRICT ACCORDANCE WITH THE THIRD EDITION — 2005 — OF THE SMACNA HVAC DUCT CONSTRUCTION STANDARDS — METAL AND FLEXIBLE, NFPA NO. 90A, 90B, 91 AND 96, AND UL 181. WHERE SMACNA TABLES HAVE AN OPTION BETWEEN DIFFERENT GAUGES AND SUPPORTS, THE HEAVIER GAUGE SHALL BE USED.

B. DUCTWORK DIMENSIONS SHOWN ARE NET, CLEAR, INSIDE DIMENSIONS WITH NO ALLOWANCE SHOWN FOR DUCT LINER. ALL DUCTWORK SPECIFIED TO BE LINED SHALL BE 2" LARGER THAN SHOWN IN EACH DIMENSION TO COMPENSATE FOR THE LINER. DUCTWORK SHALL BE SQUARE, RECTANGULAR, ROUND, SPIRAL, OR FLAT OVAL AS NOTED. CONVERSION OF DUCT SHAPES AND SIZES SHOWN SHALL BE ACCOMPLISHED WITHOUT INCREASING AIR VELOCITIES OR FRICTION LOSSES AND IS SUBJECT TO PRIOR APPROVAL BY THE ARCHITECT AND ENGINEER.

C. ELBOWS SHALL BE EITHER FULL RADIUS TYPE (INSIDE RADIUS EQUAL TO DUCT WIDTH), FIVE-CORE RADIUSED FLAT-OVAL TYPE OR, IN LOW-PRESSURE SYSTEMS ONLY, MITERED WITH DOUBLE-THICKNESS TURNING VANES.

D. ABRUPT CHANGES IN DUCT SIZES AND SHAPES SHALL NOT BE PERMITTED. THE TOTAL ANGLE OF DIVERGING TRANSITIONS SHALL BE NOT MORE THAN 15 DEGREES; CONVERGING TRANSITIONS SHALL BE NOT MORE THAN 30 DEGREES UNLESS OTHERWISE NOTED OR REQUIRED DUE TO STRUCTURAL CONSTRAINTS.

E. OFFSETS, TRANSITIONS, RISES, AND DROPS ARE NOT INDIVIDUALLY DETAILED ON THE DESIGN DRAWINGS. THEY SHALL BE PROVIDED AS REQUIRED TO FIT THE DUCTWORK INTO THE ALLOCATED SPACES.

F. TRANSITION RECTANGULAR DUCTWORK ON BOTTOM AND SIDES. MAINTAIN TOP OF DUCTWORK LEVEL AND AS HIGH AS POSSIBLE.

G. "MEDIUM PRESSURE DUCTWORK" SHALL BE CONSTRUCTED FOR 3" WC STATIC PRESSURE CLASS AT 4000 FPM VELOCITY WITH CLASS A SEALS. APPLICATIONS SHALL INCLUDE:

1. ALL SUPPLY AIR DUCTWORK BETWEEN THE PACKAGED ROOFTOP UNIT AND THE TERMINAL UNITS
2. ALL DUCTWORK BETWEEN CENTRAL VENTILATION FANS (SUCH AS OUTSIDE AIR, TOILET EXHAUST, PRESSURE RELIEF, ENERGY RECOVERY UNITS, 100% OUTDOOR AIR UNITS) AND THEIR TERMINAL UNITS.
3. ALL DUCTWORK IN SYSTEMS SUBJECT TO MORE THAN 1" WC.

H. ALL OTHER DUCTWORK SHALL BE CONSTRUCTED FOR STANDARD 1" WC STATIC PRESSURE CLASS AT 2500 FPM WITH CLASS C SEALS AND IS HEREIN DEFINED AS "LOW-PRESSURE DUCTWORK".

I. PROVIDE THE FOLLOWING TYPES OF DUCTWORK MATERIAL FOR THE SERVICES INDICATED:

1. GALVANIZED SHEET METAL: SUPPLY, RETURN, EXHAUST, AND RELIEF OF CONDITIONED AND OUTSIDE AIR

2.0 PRODUCTS

2.01 GALVANIZED SHEETMETAL

A. GALVANIZED SHEET METAL SHALL BE LOCK-FORMING GRADE G90—ASTM A 525 HOT DIP GALVANIZED STEEL SHEETS. SHEET METAL SHALL BE GALVANIZED ON EACH SIDE WITH NOT LESS THAN 1.25 OUNCES OF ZINC PER SQUARE FOOT.

B. GALVANIZED SHEET METAL INSTALLED OUTSIDE THE BUILDING AND SUBJECT TO WEATHER SHALL BE SOLDERED OR WELDED. SEE SECTION 23 07 13 FOR ADDITIONAL INFORMATION ABOUT COVERING AND INSULATION.

C. GALVANIZED SHEET METAL INSTALLED OUTSIDE THE BUILDING AND NOT EXPOSED TO WEATHER, SUCH AS IN COVERED LOADING DOCKS AND PARKING DECKS, MAY MATCH THE CONSTRUCTION OF DUCTWORK INSIDE THE BUILDING.

D. GALVANIZED SHEET METAL DUCTWORK OUTSIDE THE BUILDING WITHIN 20 MILES OF THE SEACOAST SHALL HAVE CORROSION COATING APPROPRIATE TO THE INSTALLATION LOCATION.

2.02 SPIRAL DUCT

A. SPIRAL DUCT SHALL BE UTILIZED FOR ALL FLAT-OVAL AND ROUND DUCTWORK IN MEDIUM AND HIGH-PRESSURE SYSTEMS.

B. SPIRAL DUCT SHALL BE THE PRODUCT OF UNITED MCGILL CORPORATION, R.V. MONEY, EASTERN SHEET METAL, OR AN APPROVED EQUAL.

C. SPIRAL DUCT WITH INTERNAL RIBS IS NOT ACCEPTABLE.

D. SPIRAL DUCT SHALL CONFORM TO SMACNA 2005 STANDARDS. LIGHTER GAUGES, ETC., DUE TO STANDING RIBS, ARE NOT ACCEPTABLE.

2.03 DOUBLE-WALL DUCTWORK

A. SEE SECTION 23 07 13 FOR INSULATION. INSULATION SHALL BE SANDWICHED BETWEEN TWO (2) LAYERS OF SHEET METAL IN ACCORDANCE WITH SMACNA STANDARDS. ALL JOINTS SHALL BE PERMANENTLY SEALED AIRTIGHT.

2.08 DAMPERS

A. MANUAL VOLUME DAMPERS:

1. SINGLE BLADE BUTTERFLY DAMPERS ARE ACCEPTABLE UP TO 12" ROUND OR 12" X 12" SQUARE. DAMPERS LARGER THAN THESE DIMENSIONS SHALL BE MULTI-BLADE TYPE. SINGLE BLADE DAMPERS SHALL BE CONSTRUCTED OF 16 GAUGE OR HEAVIER GALVANIZED SHEET METAL.

2. NO MULTI-BLADE DAMPER BLADE SHALL EXCEED 8" IN WIDTH. ALL MULTIPLE BLADE DAMPERS SHALL BE CONSTRUCTED OF 16 GAUGE GALVANIZED STEEL OR HEAVIER. THE DAMPER FRAME SHALL BE 16 GAUGE OR HEAVIER. THE DAMPER ACTION SHALL BE OPPOSED-BLADE TYPE.

3. EACH BLADE SHALL PIVOT ON A 1/2" CADMIUM-PLATED, COLD-ROLLED STEEL AXLE WHICH PIVOTS WITHIN SELF-LUBRICATING, OILITE BRONZE BEARINGS.

4. THE TOP AND BOTTOM EDGES OF EACH RECTANGULAR DAMPER BLADE SHALL BE CRIMPED FOR STIFFNESS.

5. THE OPERATING ROD FOR ALL DAMPERS SHALL BE EXTENDED OUTSIDE THE DAMPER FRAME FOR ATTACHMENT OF AN OPERATOR. EACH OPERATOR SHALL HAVE A POSITION INDICATOR AND LOCKING QUADRANT.

6. ALL DAMPERS UTILIZED FOR THE INTRODUCTION OF OUTSIDE AIR SHALL HAVE FLEXIBLE, GASKETED EDGE AND END SEALS. THE LEAKAGE RATE SHALL BE LESS THAN 4 CFM PER SF OF FACE AREA AGAINST A 1" WC DIFFERENTIAL PRESSURE, BASED ON A NOMINAL 48" X 48" DAMPER SIZE.

7. ALL DAMPERS UTILIZED FOR EXHAUST OR RELIEF AIR SHALL HAVE FLEXIBLE, GASKETED EDGE AND END SEALS. THE LEAKAGE RATE SHALL BE LESS THAN 4 CFM PER SF OF FACE AREA AGAINST A 1" WC DIFFERENTIAL PRESSURE, BASED ON A NOMINAL 48" X 48" DAMPER SIZE.

8. DAMPERS TO BE INSTALLED IN INSULATED DUCTWORK SHALL HAVE STANDOFFS SUFFICIENT TO ALLOW FOR INSULATION AND VAPOR BARRIER INTEGRITY.

9. MANUAL VOLUME DAMPERS SHALL BE AS MANUFACTURED BY LOUVERS & DAMPERS, INC., POTTORFF, GREENHECK, NAILOR, RUSKIN, OR AN APPROVED EQUAL.

B. CONTROL DAMPERS:

1. CONTROL DAMPERS SHALL BE OF THE SAME CONSTRUCTION AS MANUAL VOLUME DAMPERS, EXCEPT THAT NO MANUAL OPERATOR AND QUADRANT ARE REQUIRED. THE OPERATING ROD SHALL BE SUITABLE FOR OPERATION BY AN AUTOMATIC PNEUMATIC OR ELECTRIC OPERATOR.

C. FIRE DAMPERS:

1. FIRE DAMPERS SHALL BE UL-LISTED AND LABELED FOR 1 1/2 OR 3 HOURS, IN ACCORDANCE WITH THE INSTALLATION LOCATION, AND SHALL BE PROVIDED WITH 160T LINKS OR LINKAGES APPROPRIATE FOR THE SERVICE. DAMPERS INSTALLED WITHIN DUCTS SHALL BE TYPE B OR TYPE C WITH THE BLADES OUT OF THE AIR STREAM. AREAS INDICATED SHALL BE NET, CLEAR, OPEN AREAS.

2. FIRE DAMPERS SHALL BE APPROPRIATE FOR THE INSTALLATION LOCATION AND APPLICATION. ALL FIRE DAMPERS IN SUPPLY, RETURN, EXHAUST, ETC. SHALL BE DYNAMIC-TYPE.

3. FIRE DAMPERS SHALL BE MANUFACTURED BY LOUVERS & DAMPERS, INC., POTTORFF, GREENHECK, NAILOR, RUSKIN, OR AN APPROVED EQUAL.

D. SMOKE DAMPERS:

1. SMOKE DAMPERS SHALL BE UL-LISTED AS CLASS 1 LOW-LEAKAGE SMOKE DAMPERS. SMOKE DAMPERS SHALL BE 24V AND WIRED UNDER THIS DIVISION.

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USA Ninja Challenge

TITLE:

MECHANICAL SPECIFICATIONS (2 OF 3)

SHEET NUMBER:

M-0.2

2. SMOKE DAMPERS SHALL BE APPROPRIATE FOR THE INSTALLATION LOCATION AND APPLICATION. ALL FIRE DAMPERS IN SUPPLY, RETURN, EXHAUST, ETC. SHALL BE DYNAMIC-TYPE.

3. SMOKE DAMPERS SHALL BE MANUFACTURED BY PREFCO, LOUVERS & DAMPERS, INC., POTTORFF, GREENHECK, NAILOR, RUSKIN, OR AN APPROVED EQUAL.

E. FIRE/SMOKE DAMPERS:

1. FIRE/SMOKE DAMPERS MAY BE COMBINED INTO A COMBINATION FIRE/SMOKE DAMPERS. ALL PROVISIONS OF THE ABOVE SHALL APPLY. FIRE/SMOKE DAMPERS SHALL BE UL-LISTED.

2.CONTRACTOR TO PROVIDE FIRE OR FIRE+SMOKE DAMPER WHEREVER DUCTS ARE CROSSING FIRE/SMOKE RATED WALLS/BARRIERS. COORDINATE WITH ARCHITECTURAL DRAWINGS FOR FIRE RATINGS OF THE WALLS.

F. BACKDRAFT DAMPERS:

1. BACKDRAFT DAMPERS SHALL BE SIZED ACCORDING TO THEIR INSTALLATION LOCATION AND NOTED PRESSURE SETTING. DAMPER PRESSURE SETTING SHALL BE ADJUSTABLE AND SHALL BE ACCESSIBLE FROM OUTSIDE DUCTWORK OR VIA ACCESS HATCH, AS APPLICABLE.

2.09 LOW-PRESSURE DUCT BRANCHES:

A. SPLITTER DAMPERS SHALL BE PROVIDED AT ALL LOW-PRESSURE DUCTWORK BRANCHES. ALL LOW-PRESSURE DUCTWORK BRANCHES SHALL BE RADIUSED OR 45-DEGREE TAKE-OFFS; STRAIGHT TOPS ARE UNACCEPTABLE. THE LENGTH OF THE DAMPER BLADE SHALL BE THE SAME AS THE WIDTH OF THE WIDEST DUCT SECTION AT THE SPLIT, BUT IN NO CASE SHALL BLADE LENGTH BE LESS THAN 12". EACH OPERATOR ROD SHALL HAVE A LOCKING SWIVEL JOINT.

2.10 FLEXIBLE DUCT:

A. FLEXIBLE DUCTWORK SHALL BE CLASS 1, UL 181 AIR DUCT AND MEET NFPA 90A AND 90B STANDARDS.

B. THE INTERNAL DUCT SURFACE SHALL BE ACOUSTICALLY RATED, BLACK CPE BONDED TO A COATED STEEL WIRE HELIX. THE EXTERNAL JACKET SHALL BE A FIBERGLASS, BI-DIRECTIONALLY REINFORCED, METALLIZED VAPOR BARRIER WITH A STANDING, TRIPLE-PLY SEAM. FIBERGLASS INSULATION SHALL BE PROVIDED BETWEEN THE DUCT SURFACE AND THE JACKET TO ACHIEVE A MAXIMUM THERMAL CONDUCTANCE OF 0.24 BTU/HR./SQ. FT./'F AT 75'F MEAN.

C. FLEXIBLE DUCTWORK SHALL BE SUITABLE FOR 10" W.G. POSITIVE PRESSURE AND 1" W.G. NEGATIVE PRESSURE IN SIZES 4" THROUGH 12" ID, AND 6" W.G. POSITIVE PRESSURE AND 0.5" W.G. NEGATIVE PRESSURE IN SIZES 14—16" ID.

D. FLEXIBLE DUCTWORK, INSULATION, AND INSULATION COVER SHALL BE SUITABLE FOR CEILING RETURN AIR PLENUM INSTALLATION AND SHALL COMPLY WITH ALL APPLICABLE CODES AND STANDARDS REGARDING SUCH CEILING PLENUM INSTALLATIONS.

E. FLEXIBLE DUCT SHALL BE THERMAFLEX M— KE OR AN APPROVED EQUAL.

F. THE MAXIMUM ALLOWABLE INSTALLED LENGTH OF FLEXIBLE DUCTWORK SHALL BE AS FOLLOWS:

1. 5'—0" ON SUPPLY AIR SYSTEMS LIMITED TO THE RUNOUTS FROM THE SHEETMETAL DUCTWORK TO EACH TERMINAL UNIT.

2. 2'—0" ON CONNECTIONS FROM ROUND NECK GRILLES TO SHEETMETAL DUCTWORK ON RETURN, EXHAUST AND TRANSFER DUCTWORK.

G. PROVIDE A SPIN—IN FITTING WITH INTEGRAL SCOOP AND VOLUME DAMPER AT ALL FLEXIBLE RUN—OUT CONNECTIONS IN LOW—PRESSURE SUPPLY AIR DUCTWORK ONLY, EXCEPT LOCATIONS WHERE SPIN—IN FITTINGS WOULD PROJECT MORE THAN 50A INTO THE PROJECTING DUCTWORK DIMENSION. ADHESIVE FITTINGS ARE ACCEPTABLE PROVIDED THEY ARE ALSO SCREWED TO THE DUCTWORK AND SEALED WITH MASTIC.

H. FLEXIBLE DUCTWORK SHALL NOT PASS THROUGH WALL, FLOORS, OR CEILINGS.

2.11 TERMINAL UNIT RUNOUTS

A. MEDIUM AND HIGH—PRESSURE RUNOUTS TO TERMINAL UNITS SHALL BE CONNECTED TO THE TRUNK DUCT WITH FACTORY—WELDED LATERALS, CONICAL TEES OR BELLMOUTH FITTINGS; ABRUPT ROUND TO RECTANGULAR TAPS ARE STRICTLY PROHIBITED AND SHALL BE REJECTED.

B. TERMINAL UNIT RUNOUTS SHALL BE THE LARGER OF THE ASSOCIATED TERMINAL UNIT INLET SIZE OR THE SIZE NOTED ON THE DRAWINGS.

<u>3.0 EXECUTION</u>

3.01 INSTALLATION

A. DUCTWORK SHALL BE INSTALLED IN STRICT ACCORDANCE WITH SMACNA, UL, AND NFPA STANDARDS.

B. ALL DUCTWORK INSTALLED OUTSIDE THE BUILDING SHALL BE SECURED TO THE STRUCTURE. COORDINATE WITH THE STRUCTURAL ENGINEER AS NEEDED. IT IS THE CONTRACTOR'S RESPONSIBILITY TO DESIGN AND COORDINATE ALL SUPPORTS. ALL SUPPORTS SHALL BE DESIGNED TO WITHSTAND ALL CODE—REQUIRED WIND AND SEISMIC LOADS.

C. FLEXIBLE DUCTS UTILIZED IN THE LOW—PRESSURE DUCTWORK SYSTEMS SHALL BE INSTALLED WITHOUT KINKS OR BENDS WHICH ARE LESS THAN A CENTERLINE RADIUS EQUAL TO OR GREATER THAN TWICE THE DIAMETER OF THE FLEXIBLE DUCT BEING INSTALLED. ALSO, IN THE RUNOUTS FROM THE MEDIUM OR HIGH—PRESSURE DUCTWORK TO THE TERMINAL UNITS, THE FLEXIBLE DUCTS SHALL BE INSTALLED WITH A VARIANCE OF NO MORE THAN 1" PER FOOT OF INSTALLED LENGTH OFF A STRAIGHT AND LEVEL LINE FROM THE CENTERLINE OF THE SHEETMETAL DUCTWORK RUNOUT OR TOP TO THE CENTERLINE OF THE TERMINAL UNIT INLET. THE SIZE OF THE FLEXIBLE DUCTWORK CONNECTED TO EACH TERMINAL UNIT SHALL BE THE EQUIVALENT SIZE OF THE LARGER OF THE FOLLOWING:

1. THE INLET SIZE OF THE TERMINAL UNIT OR VVT VALVE

2. THE RUNOUT SIZE INDICATED ON THE DRAWINGS

SHOULD THE RUNOUT SIZE INDICATED ON THE DRAWINGS DIFFER FROM THE INLET SIZE OF THE TERMINAL UNIT OR VVT VALVE, OR WHERE THE INLET TO THE TERMINAL UNIT VVT IS RECTANGULAR, THE TRANSITION SHALL BE MADE WITH SHEETMETAL AND SHALL OCCUR AT THE INLET TO THE TERMINAL UNIT VVT.

D. ALL LOW PRESSURE DUCTWORK DOWNSTREAM OF VAV UNITS SHALL BE LEFT UNCAPPED FOR BALANCING UNTIL TENANT FIT—UP AFFECTS THE UNITS.

E. ALL INTERSECTIONS (CROSSING) OF LOW—PRESSURE AND MEDIUM—PRESSURE DUCTWORK SHALL BE MADE WITH OFFSETS IN THE LOW—PRESSURE DUCTWORK ONLY. THE MEDIUM PRESSURE DUCTWORK SHALL BE RUN STRAIGHT AND LEVEL.

F. ELECTRIC DUCT HEATERS SHALL BE INSTALLED AS INDICATED AND IN CONFORMANCE WITH THE MANUFACTURER'S RECOMMENDATIONS. COORDINATE THE ACTUAL UNITS TO BE PROVIDED WITH ALL TRADES. THE HEATER SHALL BE TESTED AND ADJUSTED AFTER INSTALLATION TO PROVIDE THE CAPACITIES INDICATED.

G. DUCTWORK LABELS, INCLUDING FACTORY LABELS, TAGS, ETC. EXCEPT EQUIPMENT NAMEPLATES SHALL BE REMOVED TO THE SATISFACTION OF THE ARCHITECT IN ALL EXPOSED AREAS.

END OF SECTION

SECTION 23 34 00
HVAC FANS

DIRECT DRIVE PREMIUM CEILING MOUNTED CENTRIFUGAL EXHAUST FANS - GREENHECK MODEL SP-A

A. GENERAL DESCRIPTION:
1. BASE FAN PERFORMANCE AT STANDARD CONDITIONS (DENSITY 0.075 LB/FT3)
2. CEILING MOUNTED APPLICATIONS
3. PERFORMANCE CAPABILITIES UP TO 1,600 CUBIC FEET PER MINUTE (CFM) AND STATIC PRESSURE TO 0.75 INCHES OF WATER GAUGE
4. FANS ARE AVAILABLE IN NINETEEN SIZES (50 - 1550 UNIT SIZES)
5. MAXIMUM OPERATING TEMPERATURE IS 130 FAHRENHEIT (54.4 CELSIUS)
6. SOUND LEVELS AS LOW AS 0.7 AMCA SONESSOUND LEVELS AS LOW AS <0.3 AMCA SONES
7. UL/CUL LISTED FOR ABOVE BATHTUB EXHAUST
8. FANS ARE UL/CUL LISTED 507 - ELECTRIC FANS
9. EACH FAN SHALL BEAR A PERMANENTLY AFFIXED MANUFACTURER'S NAMEPLATE CONTAINING THE MODEL NUMBER AND INDIVIDUAL SERIAL NUMBER

B. WHEEL:
1. FORWARD CURVED CENTRIFUGAL WHEEL
2. CONSTRUCTED OF GALVANIZED STEEL OR CALCIUM CARBONATE FILLED POLYPROPYLENE
3. STATICALLY AND DYNAMICALLY BALANCED IN ACCORDANCE TO AMCA STANDARD 204-05

C. MOTORS:
1. AC INDUCTION MOTOR
a. MOTOR ENCLOSURES: TOTALLY ENCLOSED AIR OVER: (TEAO)- DESIGNED TO BE USED SOLELY IN THE AIRSTREAM, CONSTRUCTED WITH A DUST TIGHT COVER AND A AERODYNAMIC BODY WHICH REPLIES UPON THE STRONG AIRFLOW OF THE FAN TO COOL THE MOTOR, NOT SUITABLE FOR HAZARDOUS ENVIRONMENTS.
b. MOTORS SHALL BE PERMANENTLY LUBRICATED SLEEVE BEARING TYPE TO MATCH WITH THE FAN LOAD AND FURNISHED AT THE SPECIFIC VOLTAGE AND PHASE.
c. MOTOR SHALL BE MOUNTED ON VIBRATION ISOLATORS AND BE ACCESSIBLE FOR MAINTENANCE
d. THERMAL OVERLOAD PROTECTION

D. HOUSING:
1. CONSTRUCTED OF HEAVY GAUGE GALVANIZED STEEL
2. INTERIOR SHALL BE LINED WITH 0.5 INCHES OF ACOUSTICAL INSULATION
3. PROFILE AS LOW AS 10 1/2 INCHES

E. SPRING LOADED ALUMINUM BACKDRAFT DAMPER:
1. PREVENTS AIR FROM ENTERING BACK INTO THE BUILDING WHEN FAN IS OFF
2. ELIMINATES RATTLING OR UNWANTED BACKDRAFTS

F. OUTLET:
1. TYPE OF OUTLET: ROUND
2. FIELD ROTATABLE FROM HORIZONTAL TO VERTICAL DISCHARGE
3. SHALL INCLUDE AN ALUMINUM BACKDRAFT DAMPER

G. EXTERNAL ELECTRICAL ACCESSORIES:
1. ELIMINATES REMOVING THE MOTOR PACK WHICH SAVES TIME ON INSTALLATION

H. MOUNTING BRACKETS:
1. FULLY ADJUSTABLE FOR MULTIPLE INSTALLATION CONDITIONS

END OF SECTION 23 34 00

SECTION 23 37 13

DIFFUSERS, REGISTERS, AND GRILLES

1.0 GENERAL

1.01 DESCRIPTION

A. ALL WORK SPECIFIED IN THIS SECTION IS GOVERNED BY THE COMMON WORK RESULTS FOR HVAC SECTION 23 05 00. B. THIS SECTION 23 37 13 AND THE ACCOMPANYING DRAWINGS COVER THE PROVISIONS OF ALL LABOR, EQUIPMENT, APPLIANCES AND MATERIALS, AND PERFORMING ALL OPERATIONS IN CONNECTION WITH THE CONSTRUCTION AND INSTALLATION OF AIR DISTRIBUTION DEVICES AS SPECIFIED HEREIN AND AS SHOWN. THESE UNITS INCLUDE, BUT ARE NOT LIMITED TO THE FOLLOWING:

1. CEILING DIFFUSERS (CD)
2. RETURN AIR GRILLES (RG)
3. SUPPLY AIR GRILLES (SG)
4. EXHAUST AIR GRILLE (EG)

A. IT IS THE INTENT OF THIS SECTION OF THE SPECIFICATIONS TO PROVIDE COMPLETE, OPERABLE, ADJUSTED AIR DISTRIBUTION DEVICES AS SHOWN AND SPECIFIED WHICH ARE FREE OF EXCESSIVE NOISE, VIBRATION AND AIRFLOW FLUCTUATIONS.

1.03 SELECTION CRITERIA

A. ALL AIR DISTRIBUTION DEVICES SHALL BE SELECTED IN ACCORDANCE WITH THE FOLLOWING MINIMUM CRITERIA UNLESS OTHERWISE NOTED BELOW OR ON THE DRAWINGS:

1. METHOD OF MOUNTING SHALL BE COMPATIBLE WITH THE CEILING, WALL OR DUCT SURFACE WHICH IT MOUNTS ON OR IN; I.E. LAY-IN, SURFACE MOUNTING, PLASTER FRAME, DUCT COLLAR, ETC. THE ARCHITECTURAL DRAWINGS SHALL BE REFERENCED TO DETERMINE THE MOUNTING METHOD FOR EACH DEVICE. ALL FLANGES ON SURFACE MOUNTED DEVICES SHALL BE PROVIDED WITH A GASKET.

2. FINISH OF ALL CEILING MOUNTED DEVICES SHALL BE SELECTED TO MATCH THE COLOR OF THE ADJACENT CEILING. FINISH OF ALL WALL MOUNTED DEVICES SHALL BE PRIMER WHICH IS COMPATIBLE WITH THE FINISH COATING SPECIFIED FOR THE ADJACENT WALL; FINISH COAT WILL BE APPLIED UNDER DIVISION 9.

1.04 BASIS OF DESIGN

A. THE BASIS OF DESIGN IS TITUS. ANY PROPOSED SUBSTITUTIONS SHALL BE PROVEN EQUAL IN ALL RESPECTS TO THE EQUIPMENT SPECIFIED AS THE BASIS OF DESIGN. ANY MODIFICATIONS TO DUCTWORK, CONTROLS, CEILINGS, BUILDING STRUCTURE, ETC., THAT RESULT FROM ANY SUBSTITUTION SHALL BE COORDINATED WITH ALL TRADES. THIS COORDINATION SHALL OCCUR BEFORE DELIVERY OF EQUIPMENT AND ANY MODIFICATIONS SHALL BE PERFORMED WITHOUT INCURRING ADDITIONS TO THE CONTRACT.

1.05 ACCEPTABLE MANUFACTURERS

A. ACCEPTABLE MANUFACTURERS ARE PRICE, CARNES, METAL AIRE, KRUEGER, NAILOR, AND TITUS, UON, PROVIDED THAT THEIR UNITS, PERFORMANCE, APPEARANCE AND PHYSICAL CHARACTERISTICS ARE EQUAL IN ALL RESPECTS FOR THIS SPECIFIC PROJECT.

<u>2.0 PRODUCTS</u>

2.01 DESCRIPTION

A. CEILING SUPPLY DIFFUSERS (CD-1, CD-2)

1. CD CEILING DIFFUSERS (CD) SHALL BE TITUS MODEL OMNI (STEEL) OF THE SIZES AND MOUNTING TYPES SHOWN ON THE PLANS AND OUTLET SCHEDULE. THE OMNI SHALL HAVE THREE CONES, WHICH GIVE A UNIFORM FACE SIZE AND APPEARANCE WHEN DIFFERENT NECK SIZES ARE USED IN THE SAME AREA. ALL CONES SHALL BE ONE PIECE PRECISION DIE-STAMPED; THE BACK CONE SHALL ALSO INCLUDE AN INTEGRALLY DRAWN INLET (WELDED-IN INLETS AND CORNER JOINTS ARE NOT ACCEPTABLE). THE TWO INNER CONES SHALL BE CONSTRUCTED AS A SINGLE, REMOVABLE INNER CONE ASSEMBLY FOR EASY INSTALLATION AND CLEANING. THE INNER CONE ASSEMBLY MUST HAVE A HOLE WITH REMOVABLE PLUG IN THE CENTER TO ALLOW QUICK ADJUSTMENT OF AN OPTIONAL INLET DAMPER WITHOUT REMOVING THE INNER CONE ASSEMBLY. DIFFUSERS SHALL BE CONSTRUCTED OF 24-GAUGE STEEL.

THE FINISH SHALL BE #26 WHITE. THE FINISH SHALL BE AN ANODIC ACRYLIC PAINT, BAKED AT 315°F FOR 30 MINUTES. THE PENCIL HARDNESS MUST BE HB TO H.

THE PAINT MUST PASS A 100-HOUR ASTM B117 CORROSIVE ENVIRONMENTS SALT SPRAY TEST WITHOUT CREEPAGE, BLISTERING OR DETERIORATION OF FILM. THE PAINT MUST PASS A 250-HOUR ASTM D870 WATER IMMERSION TEST. THE PAINT MUST ALSO PASS THE ASTM D2794 REVERSE IMPACT CRACKING TEST WITH A 50-INCH POUND FORCE APPLIED.

OPTIONAL ROUND DAMPER SHALL BE CONSTRUCTED OF HEAVY GAUGE STEEL. DAMPER MUST BE OPERABLE FROM THE FACE OF THE DIFFUSER. OPTIONAL SECTORIZING BAFFLES SHALL BE AVAILABLE TO RESTRICT THE DISCHARGE AIR IN CERTAIN DIRECTIONS.

OPTIONAL MOLDED INSULATION BLANKET SHALL BE AVAILABLE. THE INSULATION WILL BE R-6, FOIL-BACKED AND PROVIDED AN ADDITIONAL 1-INCH GAP AROUND THE NECK TO INSTALL INSULATED FLEX DUCT.

THE MANUFACTURER SHALL PROVIDE PUBLISHED PERFORMANCE DATA FOR THE SQUARE DIFFUSER. THE DIFFUSER SHALL BE TESTED IN ACCORDANCE WITH ANSI/ASHRAE STANDARD 70-1991.

B. RETURN AIR/EXHAUST GRILLES (RG-1, RG-2)

STEEL RETURN GRILLES SHALL BE TITUS MODEL 350R (¾-INCH BLADE SPACING) OF THE SIZES AND MOUNTING TYPES SHOWN ON THE PLANS AND OUTLET SCHEDULE. THE FIXED DEFLECTION BLADES SHALL BE AVAILABLE PARALLEL TO THE LONG OR SHORT DIMENSION OF THE GRILLE. CONSTRUCTION SHALL BE OF STEEL WITH A 1¼-INCH WIDE BORDER ON ALL SIDES. SCREW HOLES SHALL BE COUNTERSUNK FOR A NEAT APPEARANCE. CORNERS SHALL BE WELDED WITH FULL PENETRATION RESISTANCE WELDS.

DEFLECTION BLADES SHALL BE CONTOURED TO A SPECIFICALLY DESIGNED AND TESTED CROSS-SECTION TO MEET PUBLISHED TEST PERFORMANCE DATA. BLADES SHALL BE FIRMLY HELD IN PLACE BY MULLIONS FROM BEHIND THE GRILLE AND FIXED TO THE GRILLE BY WELDING IN PLACE. BLADE DEFLECTION ANGLE SHALL BE AVAILABLE AT 35°.

OPTIONAL OPPOSED-BLADE VOLUME DAMPER SHALL BE CONSTRUCTED OF HEAVY GAUGE STEEL. DAMPER MUST BE OPERABLE FROM THE FACE OF THE GRILLE.

THE GRILLE FINISH SHALL BE #26 WHITE. THE FINISH SHALL BE AN ANODIC ACRYLIC PAINT, BAKED AT 315° F FOR 30 MINUTES. THE PENCIL HARDNESS MUST BE HB TO H. THE PAINT MUST PASS A 100-HOUR ASTM B117 CORROSIVE ENVIRONMENTS SALT SPRAY TEST WITHOUT CREEPAGE, BLISTERING OR DETERIORATION OF FILM.
THE PAINT MUST PASS A 250-HOUR ASTM D870 WATER IMMERSION TEST. THE PAINT MUST ALSO PASS THE ASTM D2794 REVERSE IMPACT CRACKING TEST WITH A 50-INCH POUND FORCE APPLIED.

THE MANUFACTURER SHALL PROVIDE PUBLISHED PERFORMANCE DATA FOR THE GRILLE. THE GRILLE SHALL BE TESTED IN ACCORDANCE WITH ANSI/ASHRAE STANDARD 70-1991.

3.0 EXECUTION

3.01 INSTALLATION

A. AIR DISTRIBUTION DEVICES SHALL BE INSTALLED AS INDICATED AND IN CONFORMANCE WITH THE MANUFACTURER'S RECOMMENDATIONS. THE COLOR, FRAME, AND BORDER TYPES SHALL BE COORDINATED WITH ARCHITECTURAL REQUIREMENTS AND SHALL BE SELECTED TO INSTALL IN THE FINISHED SURFACE INDICATED.

B. ALL AIR DISTRIBUTION DEVICES TO BE REUSED SHALL BE INSTALLED THE SAME WAY AS INDICATED FOR NEW DEVICES. ALL EXISTING COLOR, FRAME, AND BORDER TYPES SHALL BE MODIFIED AS REQUIRED TO MATCH NEW DEVICE REQUIREMENTS.

C. ALL AIR DISTRIBUTION DEVICES WITH BLADE ORIENTATIONS SHALL BE COORDINATED WITH ARCHITECT. SPECIFIC ATTENTION IS CALLED TO DEVICES IN EXPOSED CEILING AREAS, INCLUDING WALL—MOUNTED.

1. 3.02 ADJUSTMENT

D. GRILLES, REGISTERS, DIFFUSERS, ETC. SHALL BE TESTED AND ADJUSTED TO PROVIDE THE SCHEDULED AIR FLOW CAPACITIES.

E. ALL DEVICES SHALL HAVE ADJUSTABLE AND ACCESSIBLE VOLUME DAMPERS. WHERE DAMPERS ARE NOT OR WILL NOT BE ACCESSIBLE WITHOUT ACCESS PANELS, PROVIDE AND INSTALL REMOTE BALANCING CABLE CONTROL SYSTEM, YOUNG REGULATOR OR EQUAL. ADJUSTMENT SHALL BE FROM THE FACE OF THE AIR DISTRIBUTION DEVICE, COORDINATED WITH THE AIR DISTRIBUTION MANUFACTURER. COORDINATE THE LOCATION AND SIZE OF THE DAMPER WITH THE INSTALLATION.

C. ALL ADJUSTABLE AIR DISTRIBUTION DEVICES LOCATED WITHIN THREE FEET OF ANY WALL OR KITCHEN HOOD SHALL BE SET TO BLOW DIRECTLY AWAY FROM, OR PARALLEL TO, THE WALL OR HOOD. ALL AIR DISTRIBUTION PATTERNS NEAR KITCHEN HOODS SHALL BE COORDINATED WITH THE KITCHEN HOOD MANUFACTURER.

D. IN ALL SLOT DIFFUSER APPLICATIONS, THE INACTIVE SECTIONS OF THE SLOT SHALL BE FINISHED WITH PERFORATED STEEL, PAINTED FLAT BLACK, SELECTED TO MATCH THE LSDS. THESE SECTIONS SHALL BE OPEN TO THE PLENUM AS A RETURN AIR PATH. INACTIVE SECTIONS SHALL HAVE AN INSULATED LIGHT SHIELD.

END OF SECTION

GENERAL NOTES

1. THESE DRAWINGS ARE SCHEMATIC IN NATURE AND ARE NOT INTENDED TO SHOW ALL POSSIBLE CONDITIONS. IT IS INTENDED THAT A COMPLETE TENANT MECHANICAL SYSTEM BE PROVIDED WITH ALL NECESSARY EQUIPMENT, ACCESSORIES, OPTIONS AND CONTROLS, COMPLETELY COORDINATED WITH ALL DISCIPLINES. ALL ITEMS AND LABOR REQUIRED FOR A COMPLETE TENANT MECHANICAL SYSTEM IN ACCORDANCE WITH ALL APPLICABLE CODES, STANDARDS AND THE BASE BUILDING CONTRACT DOCUMENTS SHALL BE FURNISHED WITHOUT INCURRING ADDITIONS TO THE CONTRACT.
2. REFER TO THE ARCHITECTURAL DRAWINGS FOR EXACT PARTITION LAYOUTS, REFLECTED CEILING PLANS, DIMENSIONS, ETC.
3. EXISTING MECHANICAL EQUIPMENT AND DUCTWORK ARE SHOWN BY DASHED LINES. NEW WORK AND RELOCATED WORK ARE SHOWN BY SOLID LINES. EXISTING WORK TO BE REMOVED IS SHOWN CROSSHATCHED. WHEN ANY DUCTWORK OR AIR DISTRIBUTION DEVICE IS REMOVED, THE ASSOCIATED TRUNK DUCT SHALL BE SEALED AIRTIGHT WITH A SHEET METAL PATCH OR CAP.
4. VISIT SITE AND CAREFULLY EXAMINE EXISTING CONDITIONS PRIOR TO SUBMITTING BID. THE EXISTING CONDITIONS SHOWN ARE BASED ON DOCUMENTS PROVIDED BY OTHERS AND HAVE NOT BEEN VERIFIED BY THE ENGINEER. IF EXISTING CONDITIONS DIFFER FROM DRAWINGS IN SUCH A MANNER THAT WILL AFFECT PRICING, (LE., DUCTWORK, VAV OR PIU ARE NOT IN THE SHOWN LOCATION) CONTRACTOR WILL NOTIFY OWNER SO THAT A RESOLUTION CAN BE MADE PRIOR TO SUBMITTING BIDS. NO ALLOWANCE WILL BE MADE FOR LACK OF KNOWLEDGE OF EXISTING CONDITIONS.
5. REFER TO THE ARCHITECTURAL REFLECTED CEILING PLANS FOR EXACT LOCATIONS OF ALL CEILING MOUNTED AIR DISTRIBUTION DEVICES. IF ANY ITEMS ARE NOT SHOWN ON THE REFLECTED CEILING PLANS, PREPARE A DRAWING OF THE PROPOSED LOCATION AND PRESENT IT TO THE ARCHITECT FOR APPROVAL PRIOR TO INSTALLATION.
6. ALL ROUND AND FLEXIBLE DUCTWORK EXTENDING TO DIFFUSERS SHALL BE SIZED FULL SIZE OF DISTRIBUTION DEVICE INLET, AND TAPS TO THE EXISTING LOW-PRESSURE DUCTWORK SHALL BE MADE WITH SPIN-IN FITTINGS HAVING INTEGRAL SCOOPS AND VOLUME DAMPERS. ALL NEW RECTANGULAR DUCTWORK TAPS SHALL BE MADE WITH SPLITTERS OR EXTRACTORS. ALL DUCTWORK SHALL BE CONSTRUCTED AND INSTALLED IN ACCORDANCE WITH SMACNA DUCT STANDARDS. (NEW LOW PRESSURE SPIN-IN FITTINGS AND TAPS SHALL NOT BE MADE WITHIN 5 FT. OF OUTLET OF HEAT PUMP. NEW LOW PRESSURE SPIN-IN FITTINGS SHALL BE MADE NO CLOSER THAN 2"-6" ON CENTER.
7. FLEXIBLE DUCTS SHALL BE INSTALLED FREE OF SAGS AND KINKS; SUPPORTED AT NOT MORE THAN 48° O.C.
8. TEST AND BALANCE ALL DIFFUSERS, BOXES, FANS, ETC. TO THE AIRFLOWS AND CONDITIONS INDICATED. ALL EXISTING DIFFUSERS, BOXES, FANS, ETC. WHICH ARE NOT NOTED OTHERWISE SHALL BE BALANCED TO THEIR PRIOR DESIGN AIRFLOWS; REFERENCE THE EXISTING RECORD DRAWING AVAILABLE FROM THE OWNER. TESTING AND BALANCING OF HVAC SYSTEM SHALL BE PERFORMED IN ACCORDANCE WITH THE STANDARDS OF AABC or NEBB AND SHALL BE PERFORMED UNDER THE DIRECT SUPERVISION OF AN AABC OR NEBB CERTIFIED TEST AND BALANCE ENGINEER. SUBMIT 4 COPIES OF THE REPORT TO THE OWNER.
9. NEW PERIMETER SLOT DIFFUSERS SHALL BE PROVIDED AS REQUIRED, AND SELECTED IN ACCORDANCE WITH BASE BUILDING STANDARD.
10. PORTIONS OF DUCTWORK VISIBLE THROUGH GRILLES AND REGISTERS IN FINISHED AREA SHALL BE PAINTED FLAT BLACK.
11. ALL CONTROL WIRING AND TUBING INSTALLED ABOVE THE CEILING SHALL BE LOCATED AS HIGH ABOVE THE CEILING AS POSSIBLE AND SHALL FOLLOW THE DESIGNATED GENERAL ROUTING OF THE DUCTWORK. DO NOT HANG WIRING OR TUBING FROM DUCTWORK; RATHER, SUSPEND FROM THE STRUCTURE. ALL NEW TERMINAL UNITS SHALL BE TIED INTO THE BASE BUILDING CONTROL SYSTEM. SEE BASE BUILDING SPECIFICATIONS FOR REQUIREMENTS.

1. SPRINKLER HEADS AND ASSOCIATED BRANCH PIPING SHALL BE PROVIDED AND RELOCATED IN ACCORDANCE WITH NFPA 13 AND ALL PREVAILING LOCAL CODES AS REQUIRED TO PROTECT ALL SPACES IN THIS TENANT AREA. SPRINKLER HEADS SHALL BE SEMI-RECESSED SPRINKLER HEADS IN TENANT AREAS AND CONCEALED FULLY RECESSED TYPE IN PUBLIC CORRIDORS.
2. COORDINATE ALL WORK IN OCCUPIED AREAS WITH THE TENANT IN THAT AREA. COORDINATE ALL WORK IN UNOCCUPIED AREAS AND COMMON AREAS WITH LANDLORD.
3. ALL MATERIALS IN PLENUM SHALL BE PLENUM-RATED.
4. THERMOSTATS SHALL BE LOCATED IN EACH ZONE AS SHOWN. THE EXACT LOCATION ON THE WALL INDICATED SHALL BE AS DIRECTED BY THE ARCHITECT. NEW THERMOSTATS SHALL BE SELECTED TO MATCH EXISTING BASE BUILDING THERMOSTATS AND SHALL BE COMPATIBLE WITH EQUIPMENT SERVED.

ADJUST ALL DIFFUSERS IN CORRIDORS OR WITHIN 3 FEET OF A WALL TO PROVIDE 2- WAY OR 3-WAY BLOW AWAY FROM OR PARALLEL TO WALLS. ALL LAY-IN DIFFUSERS SHALL HAVE 4-WAY BLOW UNLESS NOTED OTHERWISE.REFERENCE BASE BUILDING SPECIFICATIONS FOR EQUIPMENT AND MATERIAL REQUIREMENTS. ALL NEW WORK SHALL CONFORM TO BASE BUILDING STANDARD AS A MINIMUM.

THERMOSTATIC CONTROL NOTES:

C403.2.4.1 THERMOSTATIC CONTROLS

THE SUPPLY OF HEATING AND COOLING ENERGY TO EACH ZONE SHALL BE CONTROLLED BY INDIVIDUAL THERMOSTATIC CONTROLS CAPABLE OF RESPONDING TO TEMPERATURE WITHIN THE ZONE. WHERE HUMIDIFICATION OR DEHUMIDIFICATION OR BOTH IS PROVIDED, NOT FEWER THAN ONE HUMIDITY CONTROL DEVICE SHALL BE PROVIDED FOR EACH HUMIDITY CONTROL SYSTEM.

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:

1. THE PERIMETER SYSTEM INCLUDES AT LEAST ONE THERMOSTATIC CONTROL ZONE FOR EACH BUILDING EXPOSURE HAVING EXTERIOR WALLS FACING ONLY ONE ORIENTATION (WITHIN ± 45 DEGREES) (0.8 RAD) FOR MORE THAN 50 CONTIGUOUS FEET (15 240 MM).
2. THE PERIMETER SYSTEM HEATING AND COOLING SUPPLY IS CONTROLLED BY THERMOSTATS LOCATED WITHIN THE ZONES SERVED BY THE SYSTEM.

C403.2.4.1.1 HEAT PUMP SUPPLEMENTARY HEAT

HEAT PUMPS HAVING SUPPLEMENTARY ELECTRIC RESISTANCE HEAT SHALL HAVE CONTROLS THAT LIMIT SUPPLEMENTAL HEAT OPERATION TO ONLY THOSE TIMES WHEN:

THE VAPOR COMPRESSION CYCLE CANNOT PROVIDE THE NECESSARY HEATING ENERGY TO SATISFY THE THERMOSTAT SETTING,

THE HEAT PUMP IS OPERATING IN DEFROST MODE,

THE VAPOR COMPRESSION CYCLE MALFUNCTIONS, OR

THE THERMOSTAT MALFUNCTIONS.

C403.2.4.1.2 DEADBAND

WHERE USED TO CONTROL BOTH HEATING AND COOLING, ZONE THERMOSTATIC CONTROLS SHALL BE CAPABLE OF PROVIDING A TEMPERATURE RANGE OR DEADBAND OF AT LEAST 5°F (2.8°C) WITHIN WHICH THE SUPPLY OF HEATING AND COOLING ENERGY TO THE ZONE IS SHUT OFF OR REDUCED TO A MINIMUM.

EXCEPTIONS:

1. THERMOSTATS REQUIRING MANUAL CHANGEOVER BETWEEN HEATING AND COOLING MODES.
2. OCCUPANCIES OR APPLICATIONS REQUIRING PRECISION IN INDOOR TEMPERATURE CONTROL AS APPROVED BY THE CODE OFFICIAL.

C403.2.4.1.3 SETPOINT OVERLAP RESTRICTION

WHERE A ZONE HAS A SEPARATE HEATING AND A SEPARATE COOLING THERMOSTATIC CONTROL LOCATED WITHIN THE ZONE, A LIMIT SWITCH, MECHANICAL STOP OR DIRECT DIGITAL CONTROL SYSTEM WITH SOFTWARE PROGRAMMING SHALL BE PROVIDED WITH THE CAPABILTY TO PREVENT THE HEATING SET POINT FROM EXCEEDING THE COOLING SET POINT AND TO MAINTAIN A DEADBAND IN ACCORDANCE WITH SECTION C403.2.4.1.2.

C403.2.4.2 OFF-HOUR CONTROLS

EACH ZONE SHALL BE PROVIDED WITH THERMOSTATIC SETBACK CONTROLS THAT ARE CONTROLLED BY EITHER AN AUTOMATIC TIME CLOCK OR PROGRAMMABLE CONTROL SYSTEM.

EXCEPTIONS:

1. ZONES THAT WILL BE OPERATED CONTINUOUSLY.

ZONES WITH A FULL HVAC LOAD DEMAND NOT EXCEEDING 6,800 BTU/H (2 KW) AND HAVING A READILY ACCESSIBLE MANUAL SHUTOFF SWITCH.

C403.2.4.2.1 THERMOSTATIC SETBACK CAPABILITIES

THERMOSTATIC SETBACK CONTROLS SHALL HAVE THE CAPABILITY 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).

C403.2.4.2.2 AUTOMATIC SETBACK AND SHUTDOWN CAPABILITIES

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 AT LEAST 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 CAPABLE OF BEING ADJUSTED TO OPERATE THE SYSTEM FOR UP TO 2 HOURS; OR AN OCCUPANCY SENSOR.

C403.2.4.2.3 AUTOMATIC AND OPTIMUM START CAPABILITIES

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.

INDIVIDUAL HEATING AND COOLING SYSTEMS WITH SETBACK CONTROLS AND DIRECT DIGITAL CONTROL SHALL HAVE OPTIMUM START CONTROLS. THE CONTROL ALGORITHM SHALL, AS A MINIMUM, BE A FUNCTION OF THE DIFFERENCE BETWEEN SPACE TEMPERATURE AND OCCUPIED SET POINT, THE OUTDOOR TEMPERATURE, AND THE AMOUNT OF TIME PRIOR TO SCHEDULED OCCUPANCY. MASS RADIANT FLOOR SLAB SYSTEMS SHALL INCORPORATE FLOOR TEMPERATURE INTO THE OPTIMUM START ALGORITHM.

<u>LUTZ, FL BUILDING DEPARTMENT NOTES</u>

ALL WORK SHALL COMPLY WITH APPLICABLE SECTIONS OF 2023 FLORIDA BUILDING CODE, 8TH EDITION (BASE CODE- IBC 2021) WITH ALL AMENDMENTS AND RULES AND REGULATIONS OF THE DEPARTMENT OF BUILDINGS TO DATE.

1. 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.
2. TESTS OF MECHANICAL SYSTEMS SHALL BE PERFORMED IN ACCORDANCE WITH THE FOLLOWING SECTIONS OF THE 2023 FLORIDA BUILDING CODE, 8TH EDITION-MECHANICAL (BASE CODE- 2021 IMC) :
   A. VENTILATION SYSTEM- 2023 FLORIDA BUILDING CODE, 8TH EDITION-MECHANICAL-SECTION 403.1.
3. THE FOLLOWING WORK ITEMS, COMPONENTS, MATERIALS, CAPACITIES, ETC. SHALL COMPLY WITH THE REFERENCED CODE OR STANDARD:
   A. DUCT CONSTRUCTION AND INSTALLATION- 2023 FLORIDA BUILDING CODE, 8TH EDITION- MECHANICAL SECTION 603
   B. STANDARDS OF HEATING - 2023 FLORIDA BUILDING CODE, 8TH EDITION-MECHANICAL SECTION 309.1
   C. AIR FILTERS - 2023 FLORIDA BUILDING CODE, 8TH EDITION- MECHANICAL SECTION 605
   D. AIR INTAKES, EXHAUSTS AND RELIEFS -2023 FLORIDA BUILDING CODE, 8TH EDITION- MECHANICAL SECTION 401.5
   E. MANUAL AND AUTOMATIC FIRE AND SMOKE CONTROLS FOR AIR DISTRIBUTION SYSTEMS - 2023 FLORIDA BUILDING CODE, 8TH EDITION-MECHANICAL SECTION 606
4. MINIMUM TEMPERATURE TO BE MAINTAINED IN OCCUPIED SPACES DURING HEATING SEASON: 68 DEG. FAHRENHEIT.
5. A STATEMENT SHALL BE FILED BY THE OWNER OR TENANT IN POSSESSION THAT THE VENTILATION SYSTEM WILL BE KEPT IN CONTINUOUS OPERATION AT ALL TIMES DURING THE NORMAL OCCUPANCY OF THE STRUCTURE AS REQUIRED BY 2023 FLORIDA BUILDING CODE, 8TH EDITION- MECHANICAL SECTION 403.
6. 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.
7. ALL HEATING AND COOLING LOADS CALCULATED PER ASHRAE/ACCA 183.
8. VENTILATION SYSTEMS SHALL BE BALANCED TO MAINTAIN THE MINIMUM VENTILATION AIRFLOW RATE AS SHOWN IN VENTILATION REQUIREMENT TABLE. THIS SYSTEM SHALL BE BALANCED BY APPROVED METHOD. CONTRACTOR TO SUBMIT THE AIR - BALANCE REPORT TO INSPECTOR OF RESPECTIVE BUILDING DEPARTMENT PRIOR TO FINAL INSPECTION.
9. SMOKE DETECTOR SHALL MEET UL2678A.

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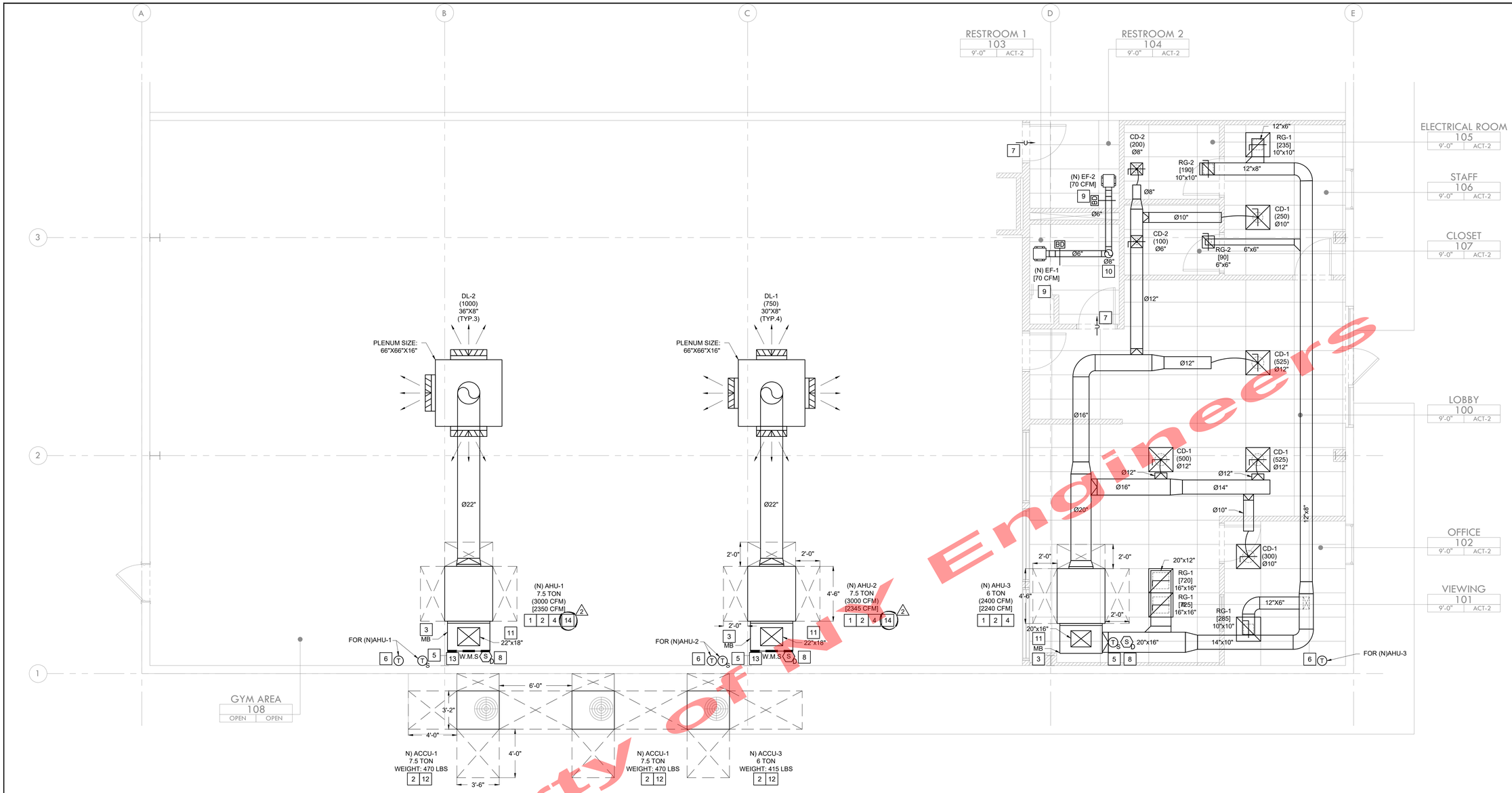
USA Ninja Challenge

TITLE:

MECHANICAL SPECIFICATIONS (3 OF 3)

SHEET NUMBER:

M-0.3



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GENERAL NOTES:

1. ALL AIR DISTRIBUTION DEVICES SHALL BE COORDINATED WITH THE ARCHITECTURAL RCP & LIGHTING LAYOUT.
2. COORDINATE ALL WORK ON OTHER FLOORS AND IN OTHER TENANT SPACES WITH OWNERS REP. SO THAT WORK DOES NOT INTERFERE WITH OTHER TENANTS.
3. COORDINATE THE EXACT LOCATION OF ALL THERMOSTATS WITH FINAL FURNITURE LAYOUT, EQUIPMENT LAYOUT, ARCH AND OWNERS REPRESENTATIVE. CONTRACTOR SHALL TIE NEW T-STATS INTO BUILDING EMS AND UPDATE IT ACCORDINGLY.
4. PROVIDE ALL MANUFACTURER AND NEC REQUIRED CLEARANCE FOR ALL EQUIPMENT.
5. ENSURE ALL NEW BUILDING VENTS ARE FITTED WITH ANIMAL SCREENS EXCEPT OTHERWISE NOTED.
6. CONTRACTOR SHALL BALANCE EACH DEVICE WITH THE CFM SHOWN ON PLAN.
7. NEW DUCTWORK SHOWN ON PLAN ARE SCHEMATIC ONLY. CONTRACTOR SHALL COORDINATE WITH OTHER TRADES FOR PIPING AND DUCTWORK ROUTING. OFFSET AND RUN PIPING, DUCTWORK INSIDE THE STRUCTURE IF REQUIRED. PROVIDE ANY EXTRA PIPING, DUCTWORK, FITTINGS, INSULATIONS AND OTHER ACCESSORIES IN ORDER TO COMPLETE THE INSTALLATION.
8. EQUIPMENT SIZES, DIMENSIONS AND REQUIRED CONNECTIONS SHALL BE VERIFIED WITH THE ACTUAL EQUIPMENT SELECTED VENDOR DRAWINGS BEFORE FABRICATION OF DUCTWORK, PIPING ETC.
9. DUCT SIZES SHOWN ON PLANS ARE CLEAR INSIDE AIR STREAM DIMENSIONS.
10. CONTRACTOR SHALL COORDINATE ALL ELECTRICAL REQUIREMENTS FOR ALL HVAC BASED ON ACTUAL EQUIPMENT SELECTED PRIOR TO INSTALLATION.
11. CONTRACTOR SHALL COORDINATE EQUIPMENT WEIGHTS AND SUPPORTS BASED ON ACTUAL EQUIPMENT SELECTED.
12. MOUNT DUCTWORK AS HIGH AS POSSIBLE.
13. TEST AND BALANCE AIR SYSTEMS. PROVIDE REPORT TO G.C AND OWNER.
14. NEW DUCTWORK IN CONCEALED AREAS MAY BE RECTANGULAR WITH EQUIVALENT CROSS SECTIONAL FLOW AREA.
15. PROVIDE FIRE OR FIRE+SMOKE DAMPER WHEREVER DUCTS ARE CROSSING FIRE/SMOKE RATED WALLS/BARRIERS/ROOF PENETRATIONS. COORDINATE WITH ARCHITECTURAL DRAWINGS FOR FIRE RATINGS OF THE WALLS.
16. PROVIDE CABLE OPERATED DAMPER IN INACCESSIBLE CEILINGS.
17. COORDINATE FINAL LOCATION OF ALL HAVC EQUIPMENT WITH STRUCTURAL ENGINEER/ OWNER/ ARCHITECT.
18. PROVIDE ACCESS DOOR FOR HVAC UNITS & FANSJAS PER MANUFACTURER RECOMMENDATIONS.
19. R-6 INSULATION (INTERNAL FOR EXPOSED DUCTS AND EXTERNAL FOR CONCEALED DUCTS) FOR SUPPLY & RETURN AIR DUCTS. PROVIDE ACOUSTIC INSULATION ON MAIN SUPPLY AND RETURN DUCTS UP TO 10 FT.FROM HVAC UNIT.

KEYED NOTES:

1. INSTALL AHUS AS PER MANUFACTURER SPECIFICATIONS. COORDINATE FINAL LOCATION OF EQUIPMENT WITH STRUCTURAL DRAWINGS. PROVIDE CLEARANCES AS RECOMMENDED BY THE MANUFACTURER. PROVIDE DRIP PAN, LEAK DETECTOR, AND CONDENSATE PUMP. PROVIDE 1" CONDENSATE DRAIN FOR ALL HVAC UNITS AND RUN ALL CONDENSATE LINES TO THE NEAREST APPROVED PLACE OF DISPOSAL BY THE LOCAL CODE. PROVIDE HORIZONTAL SLOPE IN THE DIRECTION OF DISCHARGE OF NOT LESS THAN 1/8 UNIT VERTICAL IN 12 UNITS HORIZONTAL. CONDENSATE SHALL NOT DISCHARGE INTO A STREET, ALLEY OR OTHER AREAS SO AS TO CAUSE A NUISANCE. COORDINATE FINAL LOCATION OF CONDENSATE TERMINATION WITH THE ARCHITECT. PROVIDE SERVICE CLEARANCE AS PER MANUFACTURER'S SPECIFICATION.
2. INSTALL REFRIGERANT PIPING FROM INDOOR UNITS TO OUTDOOR UNITS AS PER MANUFACTURER RECOMMENDATION. PROVIDE WHETHER PROOF COATING FOR EXPOSED PIPING. PROVIDE PIPING INSULATION AS PER LOCAL CODE. CONTRACTOR TO COORDINATE WALL PENETRATION FOR REFRIGERANT PIPING WITH BASE BUILDING STRUCTURAL ENGINEER.
3. CONTRACTOR SHALL PROVIDE A FACTORY-BUILT MIXING BOX (MICROMETL OR APPROVED EQUIVALENT) WITH AIRSIDE ECONOMIZER FOR EACH AHU, INCLUDING ALL REQUIRED SENSORS, ACTUATORS, DAMPERS, AND CONTROLS FOR FULL FUNCTIONALITY. ENSURE SYSTEM AUTOMATICALLY REGULATES OUTDOOR AIR FOR VENTILATION AND FREE COOLING, AND COMPLIES WITH ALL APPLICABLE CODES. COORDINATE WITH MANUFACTURER FOR COMPATIBILITY WITH THE AHU BEFORE PURCHASE.
4. EXTEND FULL SIZE SUPPLY & RETURN DUCTWORK FROM HVAC EQUIPMENT AS SHOWN. ACOUSTICALLY LINE THE FIRST 10-0" OF BOTH SUPPLY AND RETURN MAIN DUCTS.
5. PROVIDE REMOTE TEMP./HUMIDITY SENSOR SHOWN ON THE PLAN AND WIRE BACK TO T-STAT.
6. PROVIDE NEW 7-DAY PROGRAMMABLE THERMOSTAT WITH LOCKING COVER .COORDINATE LOCATION ON SITE WITH ARCHITECT / OWNER. SEAL WALL OPENINGS WITH CAULK. COORDINATE LOCATION ON SITE WITH GENERAL CONTRACTOR AND EQUIPMENT.
7. 1" DOOR UNDERCUT FOR AIR PASSAGE. COORDINATE WITH ARCHITECT.
8. CONTRACTOR TO PROVIDE NEW DUCT SMOKE DETECTOR IN RETURN DUCTWORK. COORDINATE WITH AHUS MANUFACTURER FOR COMPATIBLE CONTROLS AS REQUIRED. UPON DETECTION OF SMOKE, AHUS WILL SHUTDOWN AND ACTIVATE ALARM. COORDINATE INSTALLATION LOCATION WITH ACCESS REQUIREMENT
9. PROVIDE CEILING MOUNTED EXHAUST FAN, INTERLOCKED WITH SEPERATE LIGHT SWITCH. PROVIDE BACKDRAFT DAMPER. EXHAUST DUCT SHALL BE GALVANIZD STEEL. FIELD VERIFY ALL ROUTING AND REQUIREMENTS PRIOR TO BID.
10. EXHAUST TERMINATION SHALL BE DONE ON THE ROOF AND MAINTAIN 3 FEET (914 MM) FROM THE PROPERTY LINES; 3 FEET (914 MM) FROM OPERABLE OPENINGS INTO BUILDINGS; 10 FEET (3048 MM) FROM MECHANICAL AIR INTAKES.
11. PROVIDE AND INSTALL OUTSIDE AIR DUCT FROM THE MIXING BOX AND TERMINATE ON ROOF WITH GOOSE NECK AND INSECT SCREEN FOR FRESH AIR INTAKE/ ECONOMIZER MODE INTAKE. ENSURE THE DUCT TERMINATION IS 10'-0" AWAY FROM ANY EXHAUST AIR TERMINATION.
12. CONTRACTOR TO COORDINATE WITH THE LL FOR FINAL LOCATION OF THE CONDENSER UNIT. INSTALL AS PER MANUFACTURER'S RECOMMENDATIONS. ROUTE THE REFRIGERANT PIPE AS PER MANUFACTURER'S SPECIFICATIONS. CONTRACTOR TO FIELD VERIFY THE EXACT LOCATION OF REFRIGERANT PIPE CONDUITS ALLOTTED FOR THE SPACE. UNIT SHALL BE PLACED ON CONCRETE PAD / APPROVED SUPPORTS.
13. PROVIDE FULL SIZE RETURN AIR DUCT FROM MIXING BOX WITH WIRE MESH SCREEN (W.M.S).
14. CONTRACTOR SHALL INSTALL (N) AHU-1&2 WITH THE BOTTOM OF THE EQUIPMENT AT A MINIMUM OF 7'-6" AFF.

NOTE:
1. FINAL LOCATION FOR ALL EQUIPMENTS SHALL BE COORDINATED WITH INSTALLING CONTRACTOR TO ENSURE PROPER ACCESS IS PROVIDED FOR MAINTENANCE.
2. CONTRACTOR MUST FIELD VERIFY ALL AVAILABLE SPACE FOR DUCT ROUTING AND EQUIPMENT INSTALLATION PRIOR TO DUCT FABRICATION AND EQUIPMENT PROCUREMENT.
3. THE CONTRACTOR SHALL INSTALL THE DUCTS FOR (N) AHU-3 IN THE FRONT AREA, ENSURING THAT THEY ARE CONCEALED AND NOT VISIBLE FROM THE GYM SPACE.

1 | SCALE 1 / 4" = 1' - 0" | MECHANICAL FLOOR PLAN

TITLE: MECHANICAL FLOOR PLAN

SHEET NUMBER: M-1.0

MULTI POSITION INDOOR UNIT SCHEDULE

UNIT TAG	LOCATION	ODU	AREA SERVED	TYPE	CAP. (TON)	COOLING TOTAL (MBH)	SENSIBLE (MBH)	HEATING TOTAL (MBH) @47ºF	TOTAL CFM (MAX.)	OA CFM (MAX.)	MAX. ESP. (IN. WG)	ELECTRICAL DATA			DIMENTIONS (WXDXL) (IN.)	PIPE SIZE			REFRIGERENT	WEIGHT (LBS.)	PROVIDED BY LL	
												VOLT/PH/HZ	MCA	MOP	UNIT	LIQUID-LINE PIPE (INCH)	SUCTION-LINE PIPE (INCH)	DRAIN (ID) (INCH)			MODEL NO.	MANUFACTURER
(N) AHU-1	SEE PLAN	(N) ACCU-1	SEE PLAN	AIR HANDLER	7.5	101.1	75.9	85.0	3000	650	0.5	208-230/3/60	9.0	15.0	48"X26"X55"	1/2	1 1/8	1	R-454B	380	TWE090K3BAA**	TRANE
(N) AHU-2	SEE PLAN	(N) ACCU-2	SEE PLAN	AIR HANDLER	7.5	101.1	75.9	85.0	3000	655	0.5	208-230/3/60	9.0	15.0	48"X26"X55"	1/2	1 1/8	1	R-454B	380	TWE090K3BAA**	TRANE
(N) AHU-3	SEE PLAN	(N) ACCU-3	SEE PLAN	AIR HANDLER	6.0	78.9	56.0	64.3	2400	160	0.5	208-230/3/60	9.0	15.0	48"X26"X55"	1/2	1 1/8	1	R-454B	380	TWE072K3BAA**	TRANE

NOTES:
1) PROVIDE DRIP PAN , LEAK DETECTOR & CONDENSATE PUMP
2) SUPPLY AIR CFM BASED ON HIGH STATIC.
3) REFRIGERANT R-454B SHALL BE PROVIDED.
4) PROVIDE MOUNTING BRACKETS AND ALL ASSOCIATED ACCESSORIES.
5) ALL REFRIGERANT PIPING TO BE SIZED PER MANUFACTURERS RECOMMENDATIONS.
6) PROVIDE MERV 8 FILTER ON ALL RETURNS TO UNIT.
7) INDOOR UNIT ACCESS PANEL FIELD-PROVIDED.
8) PROVIDE SPRING MOUNTED VIBRATION ISOLATORS FOR UNITS.
9)INSTALL AS PER MANUFACTURERS RECOMMENDATIONS.

OUTDOOR DX SPLIT UNIT SCHEDULE

UNIT TAG	LOCATION	INDOOR UNITS SERVED	CAP.TR	COOLING MBH	SENSIBLE MBH	HEATING MBH	UNIT DIMENSIONS IN.(WxDxH)	PIPING DIMENSION		ELECTRICAL			WEIGHT (LBS)	EER	IEER	COP	PROVIDED BY LL	
								LIQUID-LINE PIPE (INCH)	SUCTION-LINE PIPE (INCH)	(V/Ph/Hz)	MCA	MOP					MODEL NO.	MANUFACTURER
(N) ACCU-1	SEE PLAN	(N) AHU-1	7.5	101.1	75.9	85.0	38"x42"x40"	1/2	1 1/8	208-230/3/60	35.0	45.0	470	11.2	14.1	3.4	TWA090K3DAA*	TRANE
(N) ACCU-2	SEE PLAN	(N) AHU-2	7.5	101.1	75.9	85.0	38"x42"x40"	1/2	1 1/8	208-230/3/60	35.0	45.0	470	11.2	14.1	3.4	TWA090K3DAA*	TRANE
(N) ACCU-3	SEE PLAN	(N) AHU-3	6.0	78.9	56.0	64.3	38"x42"x40"	1/2	1 1/8	208-230/3/60	35.0	45.0	415	11.2	14.1	3.4	TWA072K3DAA*	TRANE

NOTES:
1) UNIT SHALL HAVE TEN YEAR EXTENDED WARRANTY FOR COMPRESSORS/PARTS,
2) PROVIDE COMPRESSOR CYCLE PROTECTOR.
3) PROVIDE CONDENSING UNIT MOUNTING CONCRETE PAD.
4) CONTRACTOR SHALL PROVIDE A LONG LINE SET FOR REFRIGERANT PIPING IN THE EVENT THAT TOTAL REFRIGERANT LENGTH EXCEED THE MANUFACTURER'S STANDARD RECOMMENDED LENGTH.
5) PROVIDE COMPRESSOR THERMAL PROTECTION , COMPRESSOR OVERCURRENT DETECTION AND FAN MOTOR OVERHEATING/VOLTAGE PROTECTION.
6) REFRIGERANT R-454B SHALL BE PROVIDED.
7)INSTALL AS PER MANUFACTURERS RECOMMENDATIONS.

VENTILATION CALCULATION_2023 FBC MECHANICAL 8TH EDITION

SL.NO	ROOM NO	ROOM NAME	AREA	OCCUPANCY AS PER FBC MC 2023/1000SQ.FT.	OCCUPANY AS FBC MC 2023	FINAL OCCUPANCY	CFM/SQ.FT	CFM/PERSON	OA CFM	EFFECTIVENESS	REQUIRED OA	PROVIDED OA	PROVIDED EXHAUST CFM
1	100	LOBBY	353	10	4	4	0.06	5	41	0.8	51		0
2	101	VIEWING	312	10	4	4	0.06	5	39	0.8	48		0
3	102	OFFICE	120	5	1	1	0.06	5	12	0.8	15		0
4	103	RESTROOM 1	61	0	0	0	0	0	0	0.8	0		70
5	104	RESTROOM 2	53	0	0	0	0	0	0	0.8	0	1465	70
6	105	ELECTRICAL ROOM	48	0	0	0	0.12	0	6	0.8	7		0
7	106	STAFF	106	5	1	1	0.06	5	11	0.8	14		0
8	107	CLOSET	46	0	0	0	0.12	0	6	0.8	7		0
9	106	GYM	3240	7	23	23	0.18	20	1043	0.8	1304		0
		TOTAL	**4339**	-	-	**33**	-	-	-	-	**1447**	**1465**	**140**

FAN SCHEDULE

TAG	MANUFACTURER	MODEL	LOCATION	FAN PERFORMANCE			ELECTRICAL DATA						WEIGHT LBS	CONTROL
				CFM	ESP	FAN RPM	FLA	MCA	MOP	VOLTS	PHASE	HZ		
(N) EF-1	GREENHECK	SP-LP0511-1	RESTROOM 1	70	0.5	773	0.29	0.4	15	115	1	60	15	LIGHT SWITCH
(N) EF-2	GREENHECK	SP-LP0511-1	RESTROOM 2	70	0.5	773	0.29	0.4	15	115	1	60	15	LIGHT SWITCH

NOTES:
1. PROVIDE FACTORY MOUNTED AND INSTALLED DISCONNECT.
2. COORDINATE EXACT POWER REQUIREMENT WITH ELECTRICAL CONTRACTOR.
3. PROVIDE FAN WITH A BACKDRAFT DAMPER, AND SPEED CONTROLLER FOR BALANCING PURPOSE.
4. ALL DIRECT DRIVE FANS TO HAVE ECM MOTORS.
5. MANUFACTURE TO PROVIDE WITH DECORATIVE GRILLE.
6.INSTALL AS PER MANUFACTUARER'S RECOMMENDATIONS.

AIR TERMINAL SCHEDULE

TAG	MANUFACTURER	MODEL	TYPE	CFM RANGE	NECK SIZE	NOMINAL FACE SIZE
DL-1	TITUS	DL	DRUM SUPPLY LOUVER	600-850	30"X8"	32"X10"
DL-2				850-1200	36"X8"	38"X10"
CD-1		OMNI	SUPPLY DIFFUSER	200-300	10"Ø	24"X24"
				300-550	12"Ø	
CD-2			SUPPLY DIFFUSER	0-120	6"Ø	12"X12"
				120-200	8"Ø	
RG-1		350FL	RETURN GRILLE	200-300	10"X10"	24"X24"
				600-850	16"X16"	
RG-2				0-100	6"X6"	12"X12"
				200-300	10"X10"	

NOTES:
1) ALL DIFFUSERS : CONTRACTOR SHALL COORDINATE WITH LATEST ARCHITECTURAL REFLECTED CEILING PLANS PLANS TO ENSURE PROPER AIR DEVICE BORDER SELECTION.
2) REFER ARCHITECTURAL DRAWINGS FOR CEILING TYPE.
3) COORDINATE COLOR/FINISH WITH ARCHITECT.
4) PROVIDE VOLUME CONTROL DAMPER/OPPOSED BLADE DAMPER AS ACCESSORY FOR ALL AIR TERMINAL FOR AIR BALANCING.
5) INSTALL AS PER MANUFACTUARER'S RECOMMENDATIONS.

BUILDING AIR BALANCE

UNIT	SUPPLY AIR	OUTSIDE AIR	RETURN AIR	EXHAUST AIR
(N) AHU-1	3000	650	2350	-
(N) AHU-2	3000	655	2345	-
(N) AHU-3	2400	160	2240	-
(N) EF-1	-	-	-	70 CFM
(N) EF-2	-	-	-	70 CFM
TOTAL:	8400 CFM	1465 CFM	6935 CFM	140 CFM
BUILDING PRESSURE:			**1325 CFM**	**POSITIVE**

Property of NY Engineers

USA Ninja Challenge

TITLE:

MECHANICAL SCHEDULES

SHEET NUMBER:

M-2.0

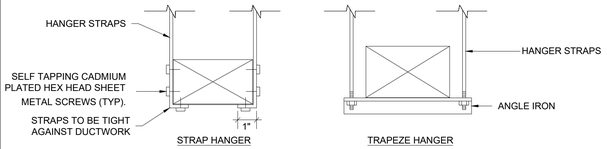
ABBREVIATIONS

A/C	ABOVE CEILING
AD	ACCESS DOOR
ADJ	ADJUSTABLE
AFF	ABOVE FINISHED FLOOR
AUTO	AUTOMATIC
AC	AIR CONDITIONING
AHU	AIR HANDLING UNIT
BAL	BALANCING
BDD	BACKDRAFT DAMPER
B/F	BELOW FLOOR
B/G	BELOW GRADE
B'FLY	BUTTERFLY
BHP	BRAKE HORSEPOWER
BCO	BASE CLEANOUT
CFM	CUBIC FEET PER MINUTE
CBCR	CURVED BLADE CEILING REGISTER
CSD	CEILING SUPPLY DIFFUSER
CU	CONDENSING UNIT
CW	COLD WATER (DOMESTIC)
CHWS	CHILLED WATER SUPPLY
CHWR	CHILLED WATER RETURN
CWS	CONDENSER WATER SUPPLY
CWR	CONDENSER WATER RETURN
CON	CONCENTRIC
CO	CLEANOUT
COND	CONDENSATE
db	DRY BULB
DN	DOWN
DR	DRAIN
do	DITTO
dB	DECIBELS
DWG	DRAWING
EA	EACH
EAT	ENTERING AIR TEMPERATURE
ECC	ECCENTRIC
EF	EXHAUST FAN
EOD	EMERGENCY OVERFLOW DRAIN
ER	EXHAUST REGISTER
ESP	EXTERNAL STATIC PRESSURE
EWT	ENTERING WATER TEMPERATURE
EXH	EXHAUST
EFF	EFFICIENCY
EG	EXHAUST AIR GRILLE
F	FAHRENHEIT
FCO	FLOOR CLEAN OUT
FCU	FAN COIL UNIT
FSD	FIRE/SMOKE DAMPER
FD	FIRE DAMPER OR FLOOR DRAIN
FL DR	FLOOR DRAIN (only)
FLR	FLOOR
FOB	FLAT ON BOTTOM
FOR	FUEL OIL RETURN
FOS	FUEL OIL SUPPLY
FOT	FLAT ON TOP
FPM	FEET PER MINUITE
FPS	FEET PER SECOND
FT	FEET
G	GATE
GA	GAUGE
GPM	GALLONS PER MINUTE
GL	GLOBE
GCO	GRADE CLEANOUT
HD	HUB DRAIN
HP	HORSEPOWER
HTG	HEATING
HW	HOT WATER (DOMESTIC)
HWR	HOT WATER RETURN
HWRR	HOT WATER REVERSE RETURN
HWS	HOT WATER SUPPLY
Hz	HERTZ

ID	INSIDE DIMENSION
IN	INCHES
KW	KILOWATTS
LAT	LEAVING AIR TEMPERATURE
LB	POUNDS
LG	LINEAR GRILLE
LRG	LINEAR RETURN GRILLE
LWR	LOOP WATER RETURN
LWS	LOOP WATER SUPPLY
MIN	MINIMUM
MAX	MAXIMUM
MD	MANUAL DAMPER
MOD	MOTOR OPERATED DAMPER
MFR	MANUFACTURER
NC	NORMALLY CLOSED
NG	NATURAL GAS
NFWH	NON-FREEZE WALL HYDRANT
NO	NORMALLY OPEN
NOM	NOMINAL
OA	OUTSIDE AIR
OD	OUTSIDE DIMENSION
OBD	OPPOSED BLADE DAMPER
PIU	POWERED INDUCTION UNIT
PSI	POUNDS PER SQUARE INCH
RA	RETURN AIR
RAD	RADIUS
RG	RETURN AIR GRILLE
RED	REDUCER
RL	REFRIGERANT LIQUID
RS	REFRIGERANT SUCTION / RETURN SLOTS
RTU	ROOFTOP UNIT
RR	RETURN REGISTER
SP	STATIC PRESSURE
SPS	STATIC PRESSURE SENSOR
SA	SUPPLY AIR
SAN	SANITARY
SD	SMOKE DAMPER / SLOT DIFFUSER
SEN	SENSIBLE
SQ	SQUARE
SR	SUPPLY REGISTER
ST	STORM
SS	SPLIT SYSTEM
SG	SUPPLY AIR GRILLE
TEMP	TEMPERATURE
TG	TRANSFER GRILLE
TYP	TYPICAL
UON	UNLESS OTHERWISE NOTED
V	VENT
VA	VALVE
VTR	VENT THRU ROOF
VAV	VARIABLE AIR VOLUME
wb	WET BULB
WC	WATER COLUMN
WHA	WATER HAMMER ARRESTOR
WT	WEIGHT
W	WASTE

LEGEND

	CEILING SUPPLY DIFFUSER
	CEILING RETURN AIR GRILLE
	CEILING EXHAUST GRILLE
	SIDE-WALL OR DUCT MOUNTED REGISTER
	SLOT DIFFUSER
	MANUAL VOLUME DAMPER
	FIRE DAMPER,,FIRE SMOKE DAMPER
	THERMOSTAT
	HUMIDSTAT
	CO2 DETECTOR
	MOTOR OPERATED DAMPER
	EXISTING WORK
	NEW WORK
	WORK TO BE REMOVED
	SMOKE DETECTOR
	PRESSURE REGULATOR VALVE 5 PSI TO 7"WATER GAUGE
	TEMPERATURE SENSOR
	BACKDRAFT DAMPER
	DUCT UP & DOWN
	POINT OF CONNECTION
	POINT OF DISCONNECTION



STRAP HANGER — TRAPEZE HANGER

NOTE:
NO POP RIVETS ALLOWED, USE SELF-TAPPING SHEETMETAL SCREWS ONLY.

HANGER SIZES*

MAX. SIDE	HANGER	HORIZONTAL SUPPORT ANGLE	MAXIMUM SPACING
30"	1"x18" GAUGE STRAP	NONE REQUIRED	10'-0"
36"	1/4" ROD	1-1/2"x1-1/2"x1/8"	8'-0"
48"	1/4" ROD	2"x2"x1/8"	8'-0"
60"	5/16" ROD	2"x2"x1/8"	8'-0"
84"	3/8" ROD	2"x2"x1/8"	8'-0"

* FOR RECTANGULAR DUCTS

1 M-3.0 DUCT HANGING DETAILS
N.T.S

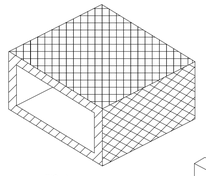


FIG. A

NOTES:
DUCTS TO BE ACOUSTICALLY LINED SHALL BE DESIGNATED BY THE SYMBOL IN FIG. "C" TO THE EXTENT OF LINING. THICKNESS SHALL BE AS SPECIFIED.
DUCTS LINED WITH ACOUSTICAL MATERIAL SHOULD BE FASTENED WITH CLIPS, ADHESIVE, OR PINS

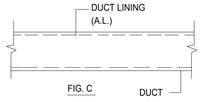


FIG. C

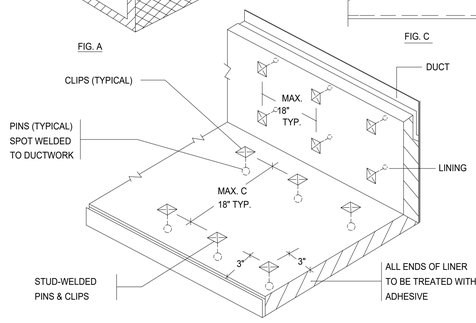
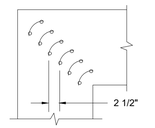
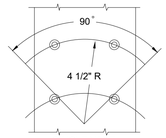


FIG. B

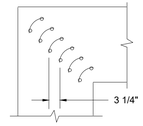
4 M-3.0 ACOUSTICAL TREATMENT DUCT LINING
N.T.S



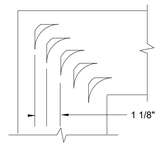
SINGLE VANE ELBOW UP TO 36" IN WIDTH



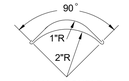
SINGLE VANE DETAIL



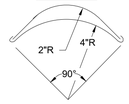
SINGLE VANE ELBOW 36" OR WIDER



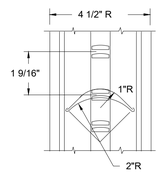
SMALL DOUBLE VANE SQUARE ELBOW UP TO 36" IN WIDTH



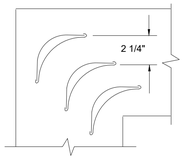
SMALL DOUBLE VANE DETAIL



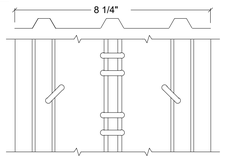
LARGE DOUBLE VANE DETAIL



SMALL DOUBLE VANE RUNNER DETAIL

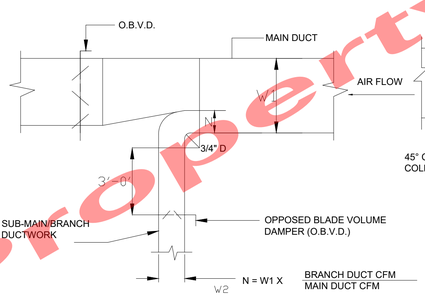


LARGE DOUBLE VANE RUNNER DETAIL

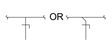


LARGE DOUBLE VANE SQUARE ELBOW 36" OR WIDER

5 M-3.0 ROUND HANGING DETAIL
N.T.S

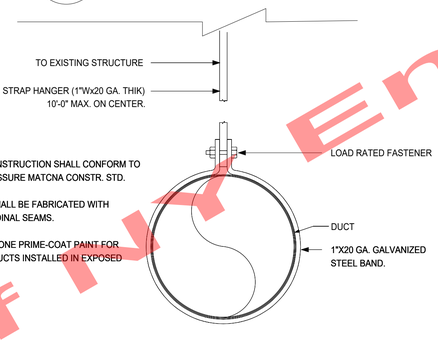


NOTE:
FURNISH THIS TYPE CONNECTION WHEN SINGLE LINE DUCTWORK IS INDICATED AS THIS



7 M-3.0 SUPPLY AIR DUCTWORK SUB-MAIN/BRANCH DUCT CONNECTION
N.T.S

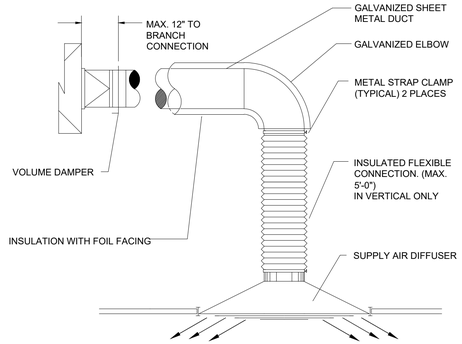
2 M-3.0 LOW VELOCITY DUCTWORK ELBOWS
N.T.S

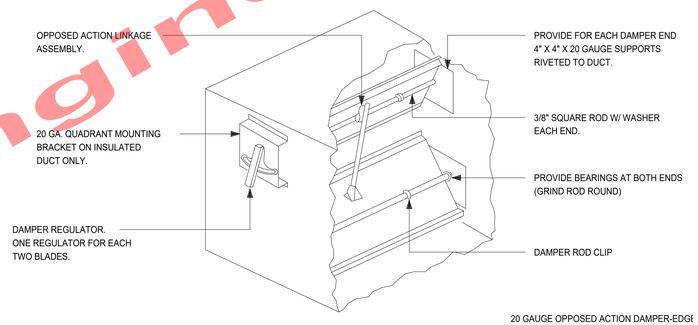


NOTES :
1. DUCT CONSTRUCTION SHALL CONFORM TO LOW PRESSURE MATCNA CONSTR. STD.
2. DUCTS SHALL BE FABRICATED WITH LONGITUDINAL SEAMS.
3. PROVIDE ONE PRIME-COAT PAINT FOR ROUND DUCTS INSTALLED IN EXPOSED AREAS.

8 M-3.0 DIFFUSER DETAILS
N.T.S

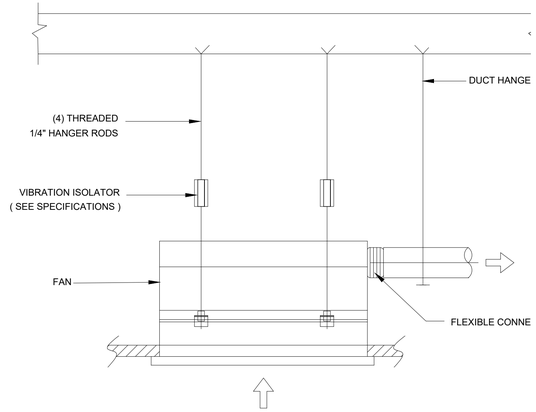
6 M-3.0 LOW PRESSURE BALANCING DAMPER
N.T.S





20 GAUGE OPPOSED ACTION DAMPER-EDGE CRIMPED AS SHOWN. (MAX. BLADE HTG. 12"

NOTE : 1. FOR DUCTS OVER 29" WIDE AND/OR OVER 12" HIGH.



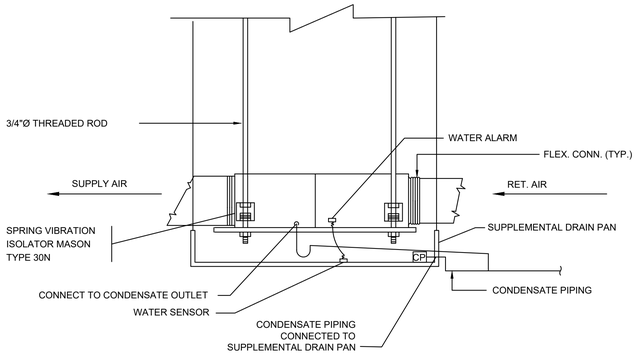
3 M-3.0 CEILING FAN HANGING SUPPORT DETAIL
N.T.S

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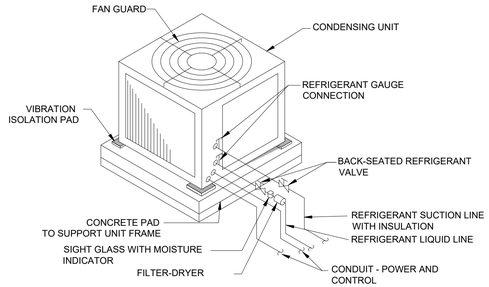
USA Ninja Challenge

TITLE:
MECHANICAL ABBREVIATION, LEGENDS & DETAILS

SHEET NUMBER:
M-3.0

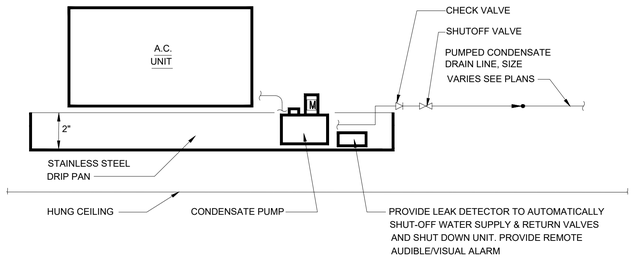


1 M-3.1 A.C. UNIT INSTALLATION DETAIL
N.T.S

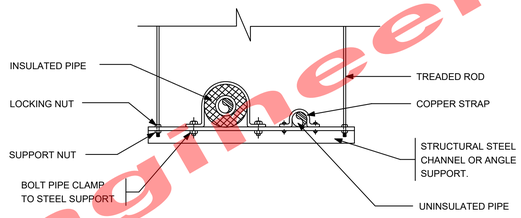


NOTE:
ALL EXTERIOR SUPPORT AND HARDWARE SHALL BE RATED FOR EXTERIOR USE.

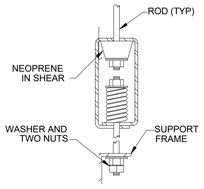
2 M-3.1 CONDENSING UNIT MOUNTING DETAIL
N.T.S



3 M-3.1 A.C. UNIT, DRIP PAN DETAIL
N.T.S

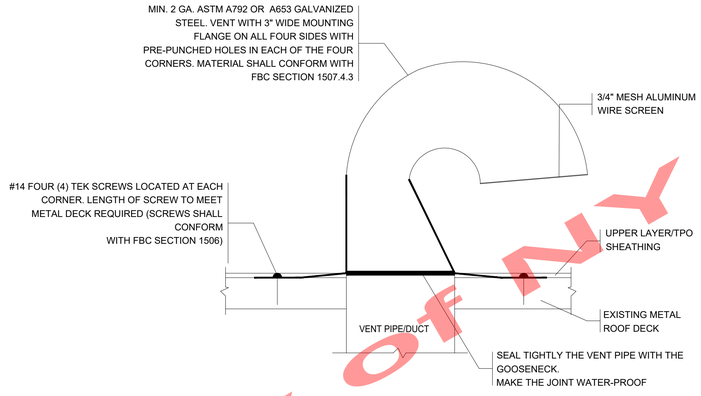


TYPICAL TRAPEZE HANGER SUPPORT



SOME OF VIBRATION ISOLATOR MANUFACTURES
- ACE MOUNTINGS CO., INC.
- AMBER/BOOTH COMPANY, INC.
- CALIFORNIA DYNAMICS CORPORATION.
- ISOLATION TECHNOLOGY, INC.
- KINETICS NOISE CONTROL.
- MASON INDUSTRIES.
- VIBRATION ELIMINATOR CO, INC.
- VIBRATION MOUNTINGS & CONTROLS, INC

4 M-3.1 VIBRATION ISOLATOR DETAIL
N.T.S

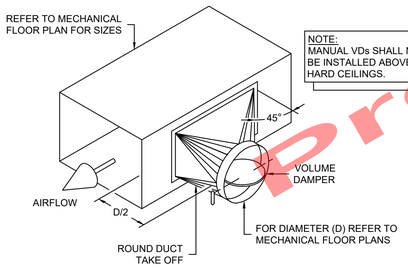


5 M-3.1 TYPIAL GOOSENECK DETAIL
N.T.S

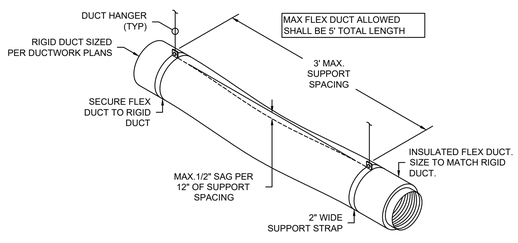
PIPE HANGER ROD AND SPACING SCHEDULE												
NOMINAL PIPE OR TUBE SIZE - INCHES	5/8	3/4	7/8	1	1 1/2	2	2 1/2	-	-	-	-	-
HANGER ROD SIZES INCHES	3/8	3/8	3/8	3/8	3/8	3/8	3/8	-	-	-	-	-
MAX. SPACING BETWEEN PIPE SUPPORTS - FEET	-	6	-	7	9	10	11	-	-	-	-	-
MAX. SPACING BETWEEN CU. TUBE SUPPORTS-FT.	6	6	6	6	8	9	10	-	-	-	-	-

NOTES : TRAPEZE HANGER SPACING SHALL BE BASED ON SPACING OF SMALLEST PIPE ON TRAPEZE. TRAPEZE SHALL BE DESIGNED WITH A FACTOR OF SAFETY OF 5 FOR CENTER OF SPAN CONCENTRATED LOAD.

6 M-3.1 REFRIDGERANT PIPE HANGING DETAILS
N.T.S



7 M-3.1 ROUND DUCT TAKE OFF DETAIL
N.T.S



8 M-3.1 FLEXIBLE DUCT INSTALLATION SUPPORT DETAIL
N.T.S

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TITLE:
MECHANICAL DETAILS

SHEET NUMBER:
M-3.1

ELECTRICAL SYMBOLS LIST

SYMBOL	DESCRIPTION
	POWER AND TELECOMMUNICATION
	CIRCUIT HOMERUN TO PANEL
	SINGLE RECEPTACLE OUTLET - WALL MOUNTED
	DUPLEX RECEPTACLE OUTLET - WALL MOUNTED
AC	ABOVE COUNTER DUPLEX RECEPTACLE OUTLET - WALL MOUNTED
	G.F.C.I. DUPLEX RECEPTACLE OUTLET - WALL MOUNTED
AC	ABOVE COUNTER G.F.C.I. DUPLEX RECEPTACLE OUTLET - WALL MOUNTED
IG	ISOLATED GROUND DUPLEX RECEPTACLE OUTLET - WALL MOUNTED
	WALL MOUNTED QUAD RECEPTACLE OUTLET
	SPECIAL PURPOSE RECEPTACLE - WALL MOUNTED (SEE EQUIPMENT SCHEDULE OR NOTES)
	125 / 250V NEMA RECEPTACLE - WALL MOUNTED (SEE EQUIPMENT SCHEDULE OR NOTES)
	DUPLEX RECEPTACLE - FLOOR MOUNTED
	DUPLEX RECEPTACLE - CEILING MOUNTED
J J+	JUNCTION BOX
	FLOOR BOX DEVICES / POKE-THRU DEVICES WITH POWER AND TELE/DATA PER PLANS (SEE DRAWINGS FOR MODEL)
	TELEPHONE / DATA COMBINATION OUTLET - WALL MOUNTED
	TELEPHONE OUTLET - WALL MOUNTED
	DATA OUTLET - WALL MOUNTED
	PANELBOARD WALL/RECESSED MOUNTED (277/480 VOLT, 120/208Y VOLT AS NOTED ON PLANS)
	TRANSFORMER (RATING AND CONFIGURATIONS AS NOTED ON PLANS)
L L	DISCONNECT SWITCH (FRAME/POLES/FUSE-IF REQUIRED)
M	MOTOR LOAD
S_M	MOTOR RATED TOGGLE SWITCH
	LIGHTING & CONTROLS
	LIGHT FIXTURE HALF SHADED FIXTURE OR"EM" INDICATES FIXTURES WITH INTEGRAL BATTERY PACK FOR EMERGENCY (REFER LIGHTING FIXTURE SCHEDULE ON LIGHTING PLAN)
	CEILING/WALL MOUNTED SELF POWERED EXIT LIGHT FIXTURE WITH DIRECTIONAL ARROWS AS INDICATED. SHADED AREA DENOTES FACE(S) (REFER LIGHTING FIXTURE SCHEDULE ON LIGHTING PLAN)
$\$_{\#}^{a,b,c,d,...}$	LIGHTING SWITCH U.O.N. "A" DENOTES LIGHTING FIXTURE CONTROLLED - WALL MOUNTED (48" AFF) UNO "a,b,c,d,..."- DENOTES NAME OF SWITCH "#' 'BLANK' - S.P.S.T. SWITCH '3' - THREE WAY SWITCH '4' - FOUR WAY SWITCH 'D' - DIMMER SWITCH 'T' - TIMER SWITCH 'OV' - OVERRIDE SWITCH 'M' - MOTOR WALL SWITCH
$\$^{OS}$	MOTION DETECTOR SWITCH W/ MANUAL OVERRIDE WALL MOUNTED.
OS	MOTION DETECTOR - CEILING MOUNTED
TC	TIME CLOCK
C	LIGHTING CONTACTORS
$\$_D^{OS}$	WALL MOUNTED MOTION DETECTOR SWITCH WITH DIMMER CAPABILITIES

NOTES:

1. NOT ALL SYMBOLS MAY APPEAR ON DRAWINGS.
2. COORDINATE EXACT LOCATION AND SPECIFIC MOUNTING HEIGHT OF OUTLETS WITH ARCHITECT.
3. MOUNTING HEIGHTS SHALL BE 18" AFF FOR THE OUTLETS, 42" AFF FOR THE LIGHTING SWITCHES OR AS INDICATED IN THE LEGEND UNLESS, OTHERWISE NOTED ON THE PLANS.

VERIFY THE FOLLOWING PRIOR TO BID/ PRICING:

- EXISTING CONDUIT AND FEEDERS SIZE BETWEEN TENANT SPACE AND LANDLORD SWITCHBOARD.
- EXISTING MAIN SERVICE DISCONNECT RATING.
- EXISTING METER.

IF THE EXISTING SERVICE DISCONNECT AND FEEDERS ARE RATED FOR LESS THAN THE RATING SHOWN ON THIS RISER. NOTIFY THE PROJECT MANAGER AND ENGINEER IMMEDIATELY PRIOR TO SUBMITTING BID/ PRICING PACKAGE SO DRAWINGS CAN BE REVISED AND UPDATED ACCORDINGLY.

- THE ELECTRICAL CONTRACTOR HAS TO ENSURE THAT THE EXISTING SERVICE CAN CARRY THE NEW ADDED LOAD AND SHALL COORDINATE WITH LANDLORD ENGINEER FOR UPGRADING THE EXISTING ELECTRICAL SERVICE IF NECESSARY.

STOP AND READ:

THE CONTRACTOR AND SUB-CONTRACTORS **SHALL NOT INITIATE ANY WORK UNTIL EXISTING FIELD CONDITIONS ARE PROPERLY VERIFIED**.

ELECTRICAL SYSTEM AND EQUIPMENT

METHOD OF COMPLIANCE

PRESCRIPTIVE ____X____ PERFORMANCE _____

LIGHTING SCHEDULE

LAMP TYPE REQUIRED IN FIXTURE	SEE LIGHTING FIXTURE SCHEDULE ON SHEET E-1.0
NUMBER OF LAMPS IN FIXTURE	SEE LIGHTING FIXTURE SCHEDULE ON SHEET E-1.0
BALLAST TYPE USED IN THE FIXTURE	SEE LIGHTING FIXTURE SCHEDULE ON SHEET E-1.0
NUMBER OF BALLASTS IN FIXTURE	SEE LIGHTING FIXTURE SCHEDULE ON SHEET E-1.0
TOTAL WATTAGE PER FIXTURE	SEE LIGHTING FIXTURE SCHEDULE ON SHEET E-1.0

TOTAL INTERIOR WATTAGE SPECIFIED VS. ALLOWED

GYMNASIUM (WITHOUT SPECTATOR SEATING 4600 SQ. FT.): GROSS AREA OF 0.76 W/SQ. FT.

PER ASHRAE 90.1 - 2019 STANDARD:

ALLOWABLE	SPECIFIED
SEE COMCHECK COMPLIANCE FORM ON SHEET E-0.1	

TOTAL EXTERIOR WATTAGE SPECIFIED VS. ALLOWED
NOT APPLICABLE (TENANT FIT-UP)

EQUIPMENT SCHEDULES WITH MOTORS (NOT USED FOR MECHANICAL SYSTEMS)

MOTOR HORSEPOWER	NONE
NUMBER OF PHASES	N/A
MINIMUM EFFICIENCY	N/A
MOTOR TYPE	N/A
# OF POLES	N/A

PROVIDE A STANDARD RISER DIAGRAM WHICH INDICATES DESIGNATED POINTS FOR CHECK METERING.

PROVIDE A STANDARD PANEL SCHEDULE DESCRIPTION WHICH IDENTIFIES DIFFERENT END USE LOADS.

STANDARD RISER DIAGRAM IS ON SHEET - E-0.4
STANDARD PANEL SCHEDULES ARE ON - E-0.4

ELECTRICAL DESIGNER STATEMENT

I HEREBY CERTIFY THAT THE DESIGN OF THIS BUILDING COMPLIES WITH THE MECHANICAL SYSTEMS, SERVICE SYSTEMS AND EQUIPMENT REQUIREMENTS OF THE ASHRAE 90.1 - 2019.

SIGNED_____ DATE 06/26/2026

NAME: MICHAEL TOBIAS
TITLE: PROJECT ENGINEER

COMcheck Software Version COMcheckWeb

Interior Lighting Compliance Certificate

Project Information

Energy Code: 90.1 (2019) Standard
Project Title: USA Ninja, Lutz, FL
Project Type: New Construction

Construction Site:

Owner/Agent:

Designer/Contractor:
Michael Tobias
NY Engineers
382 NE 191 ST Street Suite 49674
Miami 33179

Allowed Interior Lighting Power

A Area Category	B Floor Area (ft2)	C Allowed Watts / ft2	D Allowed Watts
1-Gymnasium	4600	0.76	3496
		Total Allowed Watts =	3496

Proposed Interior Lighting Power

A Fixture ID : Description / Lamp / Wattage Per Lamp / Ballast	B Lamps/ Fixture	C # of Fixture	D Fixture Watt.	E (C X D)
1-Gymnasium				
LED: A1: 24'x48" LED Panel: Other:	1	20	48	960
LED: F1: LED high Bay Light: Other:	1	8	100	800
			Total Proposed Watts =	1760

Interior Lighting PASSES: Design 50% better than code

Interior Lighting Compliance Statement

Compliance Statement: The proposed interior lighting design represented in this document is consistent with the building plans, specifications, and other calculations submitted with this permit application. The proposed interior lighting systems have been designed to meet the 90.1 (2019) Standard requirements in COMcheck Version COMcheckWeb and to comply with any applicable mandatory requirements listed in the Inspection Checklist.

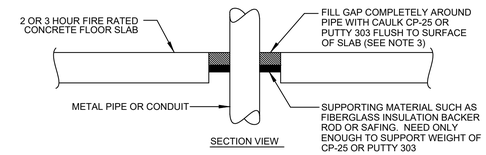
Name - Title | Signature | Date

Project Title: USA Ninja, Lutz, FL

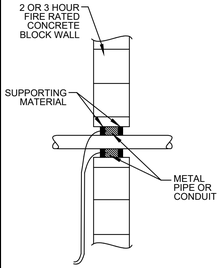
GENERAL ELECTRICAL NOTES:

1. ALL WORK THIS DIVISION SHALL COMPLY WITH ALL LOCAL BUILDING CODES, LAWS, REGULATIONS, ORDINANCES, AND THE REQUIREMENTS OF FLORIDA BUILDING CODE 8TH EDITION 2023 (FBC 2023) AND FLORIDA ELECTRICAL CODE 2020, (NATIONAL ELECTRICAL CODE 2020). ALL WORK SHALL COMPLY WITH BASE BUILDING SPECIFICATIONS. OBTAIN A COPY OF SPECIFICATIONS FROM BUILDING MANAGER IF NECESSARY.
2. PROVIDE REQUIRED WORKING SPACE, ADEQUATE ILLUMINATION, AND ACCESS TO ELECTRICAL EQUIPMENT IN ACCORDANCE WITH N.E.C. 110.26.
3. ALL EQUIPMENT, FIXTURES, MATERIALS, DEVICES, APPLIANCES, AND SYSTEMS SHALL BE U.L. LISTED OR LABELED BY AN APPROVED THIRD-PARTY TESTING AGENCY, OR CITY APPROVED.
4. EQUIPMENT AND DEVICES INSTALLED OUTDOORS OR EXPOSED TO MOISTURE SHALL BE RATED FOR WET OR DAMP LOCATIONS, AS APPROPRIATE.
5. OPERATING HANDLES OF FEEDER PROTECTIVE DEVICES, DISCONNECT SWITCHES, AND CONTROL DEVICES SHALL BE INSTALLED AT A MAXIMUM HEIGHT OF 6'-6" ABOVE FINISHED FLOOR. DEVICE MOUNTING HEIGHTS SHALL BE COORDINATED WITH THE ARCHITECT.
6. VERIFY LOCATIONS AND SEQUENCE OF OPERATION FOR TIME SWITCHES AND CONTROL DEVICES WITH OWNER. ALL DEVICES SHALL BE CLEARLY MARKED.
7. NO SUBSTITUTION OF SPECIFIED MATERIALS SHALL BE MADE WITHOUT WRITTEN APPROVAL FROM THE ENGINEER.
8. ELECTRICAL CONTRACTOR SHALL USE THE LATEST ISSUED ELECTRICAL, MECHANICAL, ARCHITECTURAL, AND STRUCTURAL DRAWINGS FOR CONSTRUCTION. COORDINATE ALL WORK WITH OTHER TRADES.
9. COORDINATE WITH MECHANICAL ENGINEER FOR CONNECTIONS TO HVAC EQUIPMENT, TOILET EXHAUST FANS, FIRE/SMOKE DAMPERS, AND THERMOSTATS. PROVIDE REQUIRED RATED CONTROL SENSORS, SWITCHES, AND LOCAL DISCONNECT SWITCHES IN SIGHT OF EQUIPMENT. SEE MECHANICAL DRAWINGS FOR EXACT LOCATIONS.
10. CONDUIT SHALL BE CONCEALED IN WALLS OR ABOVE CEILINGS UNLESS OTHERWISE NOTED. MINIMUM CONDUIT SIZE SHALL BE 1/2". STANDARD BRANCH CIRCUIT CONDUIT SHALL BE 1/2" EMT WITH (2)#12, (1)#12 GND CONDUCTORS UNLESS OTHERWISE NOTED.
11. ALL CONDUCTORS SHALL BE COPPER, TYPE "THW" OR "THHN," WITH A MINIMUM SIZE OF #12 AWG. PROVIDE SEPARATE GREEN INSULATED #12 AWG EQUIPMENT GROUNDING CONDUCTOR ROUTED WITH ALL BRANCH CIRCUIT HOMERUNS.
12. PROVIDE GROUNDING AND BONDING IN ACCORDANCE WITH N.E.C. ARTICLE 250. PROVIDE #12 AWG GROUND FOR ALL MECHANICAL EQUIPMENT UNLESS OTHERWISE NOTED.
13. DRAWINGS ARE DIAGRAMMATIC AND DO NOT SHOW EVERY FITTING OR DETAIL. ALL JUNCTION BOXES AND COMPONENTS SHALL BE ACCESSIBLE FOR SERVICE.
14. ELECTRICAL CONTRACTOR SHALL FIRESTOP ALL PENETRATIONS THROUGH FIRE-RATED WALLS, FLOORS, AND CEILINGS IN ACCORDANCE WITH N.E.C. 300.21 AND BUILDING CODE REQUIREMENTS.
15. ALL JUNCTION/DEVICE BOXES IN RATED WALLS SHALL BE INSTALLED IN ACCORDANCE WITH BUILDING CODE SECTION 706.4. OUTLET BOXES SHALL NOT BE MOUNTED BACK-TO-BACK.
16. PROVIDE NEW PANEL DIRECTORIES, CLEARLY LABELED PER N.E.C. 408.4(A). PROVIDE PLASTIC NAMEPLATES ON ALL PANELS (NEW AND EXISTING) INDICATING PANEL NAME AND SOURCE PER N.E.C. 408.4(B).
17. MULTIWIRE BRANCH CIRCUITS SHALL BE PROVIDED WITH A MEANS TO SIMULTANEOUSLY DISCONNECT ALL UNGROUNDED CONDUCTORS PER N.E.C. 210.4(B). FOR PARTITIONS, COMPLY WITH N.E.C. 605.8.
18. PROVIDE GROUND-FAULT CIRCUIT INTERRUPTER (GFCI) PROTECTION FOR RECEPTACLE OUTLETS IN ACCORDANCE WITH N.E.C. 210.8. THIS INCLUDES:
    a. BATHROOMS, GARAGES, KITCHENS, OUTDOORS, AND WITHIN 6' OF SINKS.
    b. DWELLING UNITS: ACCESSORY BUILDINGS AT OR BELOW GRADE, CRAWL SPACES, UNFINISHED BASEMENTS, BOATHOUSES, LAUNDRY AREAS, AND WITHIN 6' OF SHOWER STALLS AND BATHTUBS.
    c. NON-DWELLINGS: ROOFTOPS, SERVICE BAYS, WET LOCATIONS, LOCKER ROOMS WITH SHOWERS, AND PUBLIC TIRE INFLATION/AUTOMATIC VACUUM STATIONS.
    d. KITCHEN/LAUNDRY EQUIPMENT LOCATIONS: IF A RECEPTACLE IS BEHIND LARGE EQUIPMENT (WASHER, DRYER, DISHWASHER), THE DEVICE MAY BE NON-GFCI, BUT THE BRANCH CIRCUIT BREAKER SHALL BE GFCI TYPE.
19. PROVIDE REJECTION-TYPE FUSE HOLDERS WHERE FUSES ARE USED.
20. PROVIDE A MINIMUM OF 8 DEDICATED CIRCUITS FOR ELEVATOR EQUIPMENT INCLUDING CONTROLLER, CAB LIGHTING, MACHINE ROOM LIGHTING, PIT LIGHTING, AND REQUIRED GFCI RECEPTACLES. ALL SHALL HAVE LOCKABLE DISCONNECTS IN THE ELEVATOR MACHINE ROOM.
21. NO PIPING, DUCTS, OR EQUIPMENT FOREIGN TO ELECTRICAL EQUIPMENT SHALL BE LOCATED WITHIN THE DEDICATED SPACE ABOVE ELECTRICAL EQUIPMENT PER N.E.C. 110.26(E).
22. PROVIDE ARC-FLASH HAZARD WARNING LABELS ON ALL APPLICABLE EQUIPMENT PER N.E.C. 110.16.
23. ALL ELECTRICAL WORK SHALL BE PERFORMED IN A NEAT, WORKMANLIKE MANNER PER N.E.C. 110.12.
24. CONTRACTOR SHALL KEEP A RECORD OF ALL FIELD CHANGES. AT PROJECT COMPLETION, SUBMIT AS-BUILT DRAWINGS TO THE OWNER.
25. ALL SYSTEMS, EQUIPMENT, AND COMPONENTS SHALL BE COVERED BY A ONE-YEAR WARRANTY FROM THE DATE OF FINAL ACCEPTANCE. WARRANTY SHALL INCLUDE CORRECTION OF DEFECTS AND ALL REQUIRED CUTTING, PATCHING, AND REPAINTING.
26. ALL WORK SHALL BE PROPERLY COORDINATED WITH OTHER TRADES. WHERE GENERAL CONTRACTOR'S WORK (E.G., WALL REMOVAL OR RELOCATION) IMPACTS ELECTRICAL DEVICES OR CIRCUITS, ELECTRICAL CONTRACTOR SHALL DISCONNECT/RECONNECT ALL ACTIVE DEVICES AS REQUIRED.
27. PROVIDE VISUAL DESIGNATION FOR DEDICATED RECEPTACLES AND COORDINATE RECEPTACLE TYPE AND VOLTAGE WITH EQUIPMENT REQUIREMENTS.
28. BLANK FACEPLATES ARE NOT PERMITTED UNLESS OTHERWISE NOTED. ANY UNUSED DEVICE LOCATIONS SHALL BE REMOVED, PATCHED, AND REPAIRED TO MATCH ADJACENT FINISHES.
29. ALL WIRING TERMINATIONS ARE ASSUMED TO BE 75°C RATED UNLESS OTHERWISE NOTED. ALL WIRING UNDER 100A IS BASED ON 60°C TERMINATIONS.

FIRE STOP DETAILS:



SECTION VIEW



SECTION VIEW

NOTES:

1. FOR CONCRETE BLOCK WALLS, CENTER CAULK CP-25 OR PUTTY 303 WITHIN WALL WITH DAMMING ON BOTH SIDES.
2. RECOMMENDATIONS BASED ON PRODUCT PERFORMANCE PER ASTM E-814 (UL 1479) FIRE TEST AND UL CLASSIFICATION FIRE STOP SYSTEMS 49, 33 AND 91.
3. UP TO 40% SHRINKAGE OF CP-25 OR PUTTY 303 IS ACCEPTABLE AFTER WET DEPTH INSTALLATION.
4. WHEN ANNULAR SPACE EXCEEDS 3/4" (19mm). A 28 AWG METAL COVER PLATE MUST BE MECHANICALLY SECURED ATOP THE 3M FIRE BARRIER APPLICATION, OR TIGHTLY PACK A NON-COMBUSTIBLE DAMMING MATERIAL ATOP INSTALLED CAULK OR PUTTY.
5. OPTIONS TO MASKING TAPE TO PREVENT SAGGING:
   A. INSTALL ADDITIONAL DAMMING MATERIAL OVER PRODUCT TO HOLD WITHIN OPENING.
   B. REMOVE PRODUCT FROM CONTAINER AND ALLOW TO AIR CURE IN SMALL BATCHES FOR 12 HRS. THEN HAND FORM INTO OPENING.
6. WET INSTALLED DEPTH OF CAULK CP-25 OR PUTTY 303 DEPENDS ON TYPE AND SIZE OF PIPE:

WET DEPTH	PIPE SIZE	FIRE RATING
1/2" (13mm)	MAX. 8" (203mm)	2 HRS.
(25mm)	MAX. 6" (152mm)	3 HRS.

1" (25mm) DEPTH CAULK CP-25 OR PUTTY 303 WITHIN WALL

ABBREVIATION:

A	AMPERE	MCB	MAIN CIRCUIT BREAKER
AC	ABOVE COUNTER	MCC	MOTOR CONTROL CENTER
AFF	ABOVE FINISHED FLOOR	MCCB	MOLDED CASE CIRCUIT BREAKER
AFG	ABOVE FINISHED GRADE	MCP	MOTOR CIRCUIT PROTECTOR
AHJ	AUTHORITY HAVING JURISDICTION	MDP	MAIN DISTRIBUTION PANEL
AFC	AVAILABLE FAULT CURRENT	MFS	MAXIMUM FUSE SIZE
AIC	AMPERE INTERRUPTING CAPACITY	MLO	MAIN LUG ONLY
ATS	AUTOMATIC TRANSFER SWITCH	MOCP	MAXIMUM OVERCURRENT PROTECTION
BC	BELOW CEILING	MTD	MOUNTED
BLDG	BUILDING	MTS	MANUAL TRANSFER SWITCH
BRKR	BREAKER	N	NEW
C	CONDUIT (PROVIDE PULL STRING IN ALL EMPTY CONDUIT)	N.C.	NORMALLY CLOSED
		N.O.	NORMALLY OPEN
CL	CURRENT LIMITER	NTS	NOT TO SCALE
CKT	CIRCUIT	OCPD	OVERCURRENT PROTECTION DEVICE
CLG	CEILING.	OH	OVERHEAD
CT	CURRENT TRANSFORMER	P	POLE
CU	COPPER	PH	PHASE
CTR	CENTER	PNL	PANEL
E	EXISTING	PWR	POWER
EA	EACH	R	RELOCATED
EGC	EQUIPMENT GROUNDING CONDUCTOR	REC	RECEPTACLE
EOL	ELECTRONIC OVERLOAD	RM	ROOM
FBO	FURNISHED BY OTHERS	SW	SWITCH
FDR	FEEDER	S/W	SHOW WINDOW
FLA	FULL LOAD AMPS	SWBR	SWITCHBOARD
FPMR	FUSE PER MANUFACTURER'S RECOMMENDATION	SWGR	SWITCHGEAR
		TBB	TELECOM BACKBOARD
GEC	GROUNDING ELECTRODE CONDUCTOR	TELE	TELEPHONE
GFI	GROUND FAULT INTERRUPTER	TYP	TYPICAL
GND	GROUND	UG	UNDERGROUND
GRS	GALVANIZED RIGID STEEL	UNO	UNLESS NOTED OTHERWISE
HOA	HAND-OFF-AUTO	UPS	UNINTERRUPTIBLE POWER SUPPLY
IG	ISOLATED GROUND	V	VOLT
JB	JUNCTION BOX	VIF	VERIFY IN FIELD
KVA	KILOVOLT-AMPERE	W/	WITH
KW	KILOWATT	W	WIRE
L.S.I.G.	LONG, SHORT, INSTANTANEOUS, GROUND FAULT TRIP	WP	WEATHER PROOF
		XFMR	TRANSFORMER
LTG	LIGHTING		
MCA	MINIMUM CIRCUIT AMPS		

HOME RUNS AND BRANCH WIRING FOR 120 VOLT 16 AMP CIRCUITS SHALL BE AS FOLLOWS TO ACCOUNT FOR VOLTAGE DROP:

LENGTH	HOME RUN WIRE SIZE	CIRCUIT WIRE SIZE
1' TO 65'	12	12
66' TO 104'	10	12
105' TO 156'	8	12
157' TO 263'	6	12
264' TO 419'	4	12

Property of NY Engineers

USA Ninja Challenge

TITLE:
ELECTRICAL SYMBOL LIST, ABBREVIATIONS & GENERAL NOTES

SHEET NUMBER:
E-0.1

SUMMARY

A. GENERAL AND SUPPLEMENTARY CONDITIONS WITHIN THE SPECIFICATIONS ARE HEREBY INCORPORATED AND BECOME PART OF THESE SPECIFICATIONS AND AS SUCH SHALL BE APPLICABLE TO THE WORK OF THE ELECTRICAL CONTRACT.

B. PRIOR TO SUBMISSION OF A BID PROPOSAL, THE CONTRACTOR SHALL VISIT THE SITE AND BECOME FAMILIAR WITH ALL EXISTING CONDITIONS AND LIMITATIONS THAT IMPACT THE WORK OF THIS CONTRACT. NO ADDITIONAL COSTS TO THE OWNER SHALL BE PERMITTED FOR CHANGES TO THE WORK AS A RESULT OF THE CONTRACTORS FAILURE TO VISIT THE SITE PRIOR TO BIDDING AND IDENTIFY ITEMS THAT WERE ABLE TO BE VERIFIED DURING A SITE VISIT PRIOR TO THE SUBMISSION OF A BID PROPOSAL.

C. CONTRACTOR SHALL PROVIDE ALL LABOR, MATERIAL, EQUIPMENT, RIGGING, AND MISCELLANEOUS ITEMS AS REQUIRED FOR A COMPLETE, OPERATIONAL, FUNCTIONAL AND CODE COMPLIANT ELECTRICAL INSTALLATION AS SHOWN ON THE DRAWINGS AND AS SPECIFIED IN THESE SPECIFICATIONS.

LANDLORDS REQUIREMENTS

A. ALL WORK OF THIS CONTRACT SHALL BE COMPLETED IN STRICT ACCORDANCE WITH ALL APPLICABLE LANDLORD REQUIREMENTS INCLUDING BUT NOT NECESSARILY LIMITED TO; LANDLORD'S WORK LETTER, LANDLORD'S CONSTRUCTION CRITERIA AND/OR THE TENANT/LANDLORD AGREEMENT. THIS CONTRACTOR SHALL EXAMINE THESE DOCUMENTS PRIOR TO THE SUBMISSION OF A BID PROPOSAL.

B. ALL APPLICABLE LANDLORD REQUIREMENTS INCLUDING BUT NOT NECESSARILY LIMITED TO THE LANDLORD'S WORK LETTER, LANDLORDS CONSTRUCTION CRITERIA AND/OR THE TENANT/LANDLORD AGREEMENT DOCUMENTS SHALL BE CONSIDERED PART OF THESE SPECIFICATIONS.

EXISTING CONDITIONS

A. THE CONTRACT DOCUMENTS ARE BASED ON INFORMATION PROVIDED TO THE CONSULTANT AT THE TIME OF DESIGN. THIS CONTRACTOR SHALL VERIFY ALL EXISTING CONDITIONS PRIOR TO SUBMITTING A BID PROPOSAL.

BIDS AND SUBSTITUTIONS

A. PRIOR TO SUBMISSION OF A BID PROPOSAL, CONTRACTOR SHALL THOROUGHLY REVIEW THE BID INSTRUCTIONS AND ALL CIVIL, ARCHITECTURAL, STRUCTURAL, FOOD SERVICE AND MEPFP AND TELECOMMUNICATION CONSTRUCTION DOCUMENTS.

B. SHOULD THE CONTRACTOR WISH TO SUBMIT AN ALTERNATE PRODUCT TO THE MANUFACTURERS NAMED IN THESE SPECIFICATIONS OR ON THE DRAWINGS FOR ANY EQUIPMENT, THE CONTRACTOR SHALL SUBMIT A VOLUNTARY ALTERNATIVE A MINIMUM OF SEVEN (7) CALENDAR DAYS PRIOR TO BID, STATING THE MANUFACTURER'S NAME, MODEL NUMBER, WRITTEN, DETAILED PRODUCT DATA.

C. WORK PERFORMED OR CONSTRUCTED WITH UNAPPROVED EQUALS IS AT CONTRACTOR'S RISK AND ANY REQUIRED CORRECTION OF WORK INCORPORATING UNAPPROVED EQUALS SHALL BE AT CONTRACTOR'S SOLE COST AND EXPENSE.

D. NO SUBSTITUTIONS PERMITTED FOR LIGHTING FIXTURES.

QUALITY ASSURANCE

A. ALL MATERIALS AND EQUIPMENT SHALL BE NEW.

B. PROVIDE PERMITS, INSPECTIONS, FINAL CERTIFICATES OF INSPECTION BY THE AUTHORITY HAVING JURISDICTION, PERMIT AND INSPECTION FEES AND ALL MATERIALS, EQUIPMENT AND LABOR AS REQUIRED FOR A COMPLETE, FUNCTIONAL, FULLY OPERATIONAL AND CODE COMPLIANT ELECTRICAL SYSTEM.

C. THIS CONTRACTOR SHALL PROVIDE ALL MATERIALS, LABOR AND ACCESSORIES FOR A COMPLETE FUNCTIONAL AND CODE COMPLIANT ELECTRICAL INSTALLATION, WHETHER OR NOT SHOWN ON THE DRAWINGS OR SPECIFIED IN THESE SPECIFICATIONS.

D. EC SHALL VERIFY THE VOLTAGE AND AMPERAGE REQUIREMENTS OF ALL EQUIPMENT DELIVERED TO THE SITE PRIOR TO CONNECTION. EC SHALL NOTIFY THE OWNER OF ANY DIFFERENCES

E. REQUIREMENTS OF REGULATORY AGENCIES:

1. PERMITS: ARRANGE AND PAY FOR ALL PERMITS, INSPECTIONS AND UTILITY CONNECTIONS REQUIRED.

2. PROVIDE ALL TESTS AND INSPECTIONS REQUIRED BY THE AUTHORITY HAVING JURISDICTION.

3. PROVIDE A SIGNED CERTIFICATE OF INSPECTION AT THE COMPLETION OF THE PROJECT. INCLUDE IN OPERATION AND MAINTENANCE MANUALS.

F. CODES AND STANDARDS

1. COMPLY WITH SPECIFIED CODES AND STANDARDS. IF CONFLICT EXISTS BETWEEN CODES OR STANDARDS AND DRAWINGS, PROJECT MANUAL OR ADDENDA REQUIREMENTS, REQUEST CLARIFICATION FROM ARCHITECT /ENGINEER.

2. CONFORM TO THE INSTALLATION RULES AND REGULATIONS OF THE CODES AND STANDARDS LISTED INCLUDING ALL SUBSEQUENTLY PUBLISHED AMENDMENTS THERETO ISSUED PRIOR TO THE DATE OF THE BIDDING DOCUMENTS.

3. CONFORM TO THE REQUIREMENTS OF ALL LOCAL, STATE AND FEDERAL AGENCIES WHICH HAVE AUTHORITY OVER THIS PROJECT.

4. COMPLY WITH THE APPLICABLE EDITION OF THE FOLLOWING CODES AND STANDARDS THAT HAVE BEEN ADOPTED BY AND ARE ENFORCED BY THE AUTHORITY HAVING JURISDICTION:

a. INTERNATIONAL BUILDING CODE.
b. INTERNATIONAL ENERGY CONSERVATION CODE
c. INTERNATIONAL MECHANICAL CODE
d. NATIONAL ELECTRICAL CODE
e. INTERNATIONAL FIRE CODE
f. LIFE SAFETY CODE, NFPA 101
g. AMERICANS WITH DISABILITIES ACT ACCESSIBILITY GUIDELINES
h. ALL LOCAL CODES AND ORDINANCES ADOPTED AND ENFORCED BY THE AUTHORITY HAVING JURISDICTION.

G. REFERENCED STANDARDS:

1. ALL EQUIPMENT, APPARATUS, MATERIALS AND SYSTEMS SHALL BE RATED, TESTED, FABRICATED AND INSTALLED IN ACCORDANCE WITH THE APPLICABLE INDUSTRY STANDARDS.

2. ALL EQUIPMENT, APPARATUS, MATERIALS AND SYSTEMS SHALL BE LISTED AND LABELED BY A NATIONALLY RECOGNIZED TESTING LABORATORY (UL, ETL, ETC).

ELECTRICAL CONTRACT DOCUMENTS

A. THE ELECTRICAL DRAWINGS (DRAWINGS) AND THE SPECIFICATIONS SHALL TOGETHER FORM A SET OF CONTRACT DOCUMENTS FOR THE ELECTRICAL WORK. NEITHER THE DRAWINGS OR THE SPECIFICATIONS SHALL BE COMPLETE WITHOUT THE OTHER. ANY ITEM SHOWN ONLY ON THE DRAWINGS OR SPECIFIED ONLY IN THE SPECIFICATIONS SHALL BE CONSIDERED AS IF SHOWN AND SPECIFIED IN BOTH.

B. ELECTRICAL DRAWINGS AND SPECIFICATIONS: COMPLY WITH THE FOLLOWING REQUIREMENTS:

1. CONTRACTOR SHALL FAMILIARIZE THEMSELVES WITH ALL DRAWINGS AND SPECIFICATIONS WITHIN THE CONTRACT DOCUMENTS, INCLUDING, BUT NOT NECESSARILY LIMITED TO, GEOTECHNICAL, LANDSCAPE, CIVIL, ARCHITECTURAL, STRUCTURAL, FOOD SERVICE, MECHANICAL, PLUMBING, TELECOMMUNICATION AND FIRE PROTECTION DRAWINGS AND SPECIFICATIONS.

2. THE ELECTRICAL DRAWINGS ARE DIAGRAMMATIC IN NATURE AND ARE INTENDED TO INDICATE APPROXIMATE LOCATION ONLY OF ELECTRICAL WORK. THE ACTUAL LOCATION OF ANY ELECTRICAL WORK SHALL NOT INTERFERE WITH THE LOCATION, CLEARANCES, ETC. REQUIRED BY THE WORK OF OTHER TRADES.

3. PRIOR TO ROUGH-IN, CONTRACTOR SHALL COORDINATE ALL DEVICE LOCATIONS WITH THE ARCHITECTURAL WALL ELEVATIONS, CASEWORK/CABINETRY ELEVATIONS AND DETAILS AND THE FINAL, APPROVED SERVICE SHOP DRAWINGS.

C. DEFINITIONS: THE FOLLOWING TERMS ARE USED ON THE ELECTRICAL DRAWINGS AND IN THE SPECIFICATIONS AND SHALL BE DEFINED AS FOLLOWS:

1. CONTRACTOR - THE ELECTRICAL CONTRACTOR OR ANY OF THEIR SUB-CONTRACTORS.

2. WORK ALL MATERIAL, LABOR, TRANSPORTATION OF THE ELECTRICAL CONTRACTOR OR ANY OF THEIR SUB-CONTRACTORS.

3. FURNISH PURCHASE, SUBMIT FOR REVIEW AND APPROVAL, COORDINATE WITH THE CONTRACT DOCUMENTS AND DELIVER TO THE PROJECT SITE IN NEW, UNDAMAGED CONDITION, STORE AS DIRECTED, PROTECT FROM DAMAGE DURING STORAGE.

4. INSTALL INSTALL IN PLACE, MAKE READY FOR CONNECTION TO THE REQUIRED SERVICE.

5. CONNECT CONNECT TO THE REQUIRED SERVICE AS REQUIRED FOR PROPER OPERATION, TEST FOR PROPER OPERATION AND FUNCTIONALITY IN ACCORDANCE WITH MANUFACTURER'S REQUIREMENTS AND REQUIREMENTS SPECIFIED WITHIN THESE SPECIFICATIONS AND TURN OVER TO THE OWNER IN FULL OPERATING CONDITION.

6. PROVIDE FURNISH, INSTALL AND CONNECT AS DEFINED HEREIN FOR A COMPLETE, FUNCTIONAL AND CODE COMPLIANT INSTALLATION READY FOR INTENDED USE.

7. FINISHED SPACE SPACES HAVING WALLS PAINTED OR FINISHED WITH WALL COVERING, LAY-IN OR DRYWALL CEILINGS, AND FINISHED FLOORING MATERIALS. EXAMPLES OF FINISHED SPACES INCLUDE, BUT ARE NOT NECESSARILY LIMITED TO, ALL SPACES IN A DWELLING UNIT, OFFICES, LOBBIES, CORRIDORS, TOILET ROOMS, ETC.

8. UNFINISHED SPACES SPACES WITH UNFINISHED WALLS AND FLOORS AND TYPICALLY ARE NOT EQUIPPED WITH A CEILING. EXAMPLES INCLUDE, BUT ARE NOT NECESSARILY LIMITED TO, MECHANICAL ROOMS, ELECTRICAL ROOMS, SERVICE AREAS, ETC.

9. SHALL-ACTION THAT IS REQUIRED WITHOUT OPTION OR QUALIFICATION.

10. REMOVE DETACH ITEMS FROM EXISTING CONSTRUCTION AND LEGALLY DISPOSE OF THEM OFF SITE UNLESS INDICATED TO BE REMOVED AND SALVAGED OR REMOVED AND RE-INSTALLED.

11. REMOVE AND SALVAGE CAREFULLY DETACH FROM EXISTING CONSTRUCTION IN A MANNER TO PREVENT DAMAGE AND DELIVER TO OWNER READY FOR RE-USE.

12. REMOVE AND REINSTALL - DETACH ITEMS FROM EXISTING CONSTRUCTION, PREPARE FOR RE-USE, RE-INSTALL AND RECONNECT WHERE INDICATED SUCH THAT THE RE-INSTALLED ITEM IS FULLY OPERATIONAL.

13. EXISTING TO REMAIN EXISTING ITEMS OF CONSTRUCTION THAT ARE NOT TO BE PERMANENTLY REMOVED AND THAT ARE NOT OTHERWISE INDICATED TO BE REMOVED, REMOVED AND SALVAGED OR REMOVED AND RE-INSTALLED.

SUBMITTALS

A. REVIEW OF THE SHOP DRAWINGS IS RENDERED AS A SERVICE ONLY AND SHALL NOT BE CONSIDERED AS A GUARANTEE OF MEASUREMENTS OR OF BUILDING CONDITIONS; NOR SHALL IT BE CONSTRUED AS RELIEVING THE CONTRACTOR'S OF BASIC RESPONSIBILITIES UNDER HIS CONTRACT. ARCHITECT/ENGINEER WILL REVIEW SHOP DRAWINGS ONLY FOR CONFORMANCE WITH DESIGN CONCEPT OF THE PROJECT. REVIEW BY THE ARCHITECT/ENGINEER SHALL NOT BE CONSTRUED:

1. AS PERMITTING ANY DEPARTURE FROM THE CONTRACT REQUIREMENTS.

2. AS RELIEVING THE CONTRACTOR OF THE RESPONSIBILITY FOR ANY ERROR IN DETAILS, DIMENSIONS OR OTHERWISE THAT MAY EXIST.

3. AS APPROVED DEPARTURES FROM ADDITIONAL DETAILS OR INSTRUCTIONS PREVIOUSLY FURNISHED BY THE ARCHITECT/ENGINEER.

B. SHOP DRAWINGS:

1. THE CONTRACTOR SHALL SUBMIT SHOP DRAWINGS AND DESCRIPTIVE LITERATURE OF EQUIPMENT TO BE FURNISHED UNDER THIS CONTRACT. DRAWINGS SHALL STATE CAPACITIES, SIZES, ETC., OF ALL EQUIPMENT AND SHALL BE CERTIFIED. SEE GENERAL CONDITIONS AND SUPPLEMENTARY CONDITIONS FOR ADDITIONAL REQUIREMENTS.

2. PROVIDE SUBMITTALS FOR LIGHTING FIXTURES, TRANSFORMERS, PANELBOARDS, LIGHTING CONTROL DEVICES, CONTACTORS, WIRING DEVICES, DISCONNECT SWITCHES, POWER SYSTEM STUDY.

C. THE CONTRACTOR SHALL PERFORM NO PORTION OF THE WORK REQUIRING SUBMITTAL AND REVIEW OF SHOP DRAWINGS, PRODUCT DATA, SAMPLES OR SIMILAR SUBMITTALS UNTIL THE RESPECTIVE SUBMITTALS HAS BEEN APPROVED BY THE ENGINEER.

ELECTRICAL COORDINATION DRAWINGS

A. PREPARE ELECTRICAL COORDINATION DRAWINGS AS REQUIRED BY THE WORK AND AS DIRECTED BY THE GENERAL CONTRACTOR.

B. MEET WITH REPRESENTATIVES OF THE OTHER DISCIPLINES/TRADES TO COORDINATE THE ELECTRICAL WORK WITH THE WORK OF EACH DISCIPLINE AND TO OBTAIN INFORMATION REGARDING THEIR WORK THAT IS TO BE INDICATED ON THE COORDINATION DRAWINGS.

POWER SYSTEM STUDIES - GENERAL

A. PROVIDE COMPUTER-BASED, POWER SYSTEM STUDIES THAT INCLUDES:

1. A SHORT CIRCUIT STUDY TO DETERMINE THE MINIMUM INTERRUPTING CAPACITY OF CIRCUIT PROTECTIVE DEVICES;

2. AN ARC-FLASH STUDY TO DETERMINE THE ARC-FLASH HAZARD DISTANCE AND THE INCIDENT ENERGY TO WHICH PERSONNEL COULD BE EXPOSED DURING WORK ON OR NEAR ELECTRICAL EQUIPMENT.

B. STUDIES SHALL BE PERFORMED UTILIZING COMPUTER PROGRAMS THAT ARE DISTRIBUTED NATIONALLY AND ARE IN WIDE USE. SOFTWARE ALGORITHMS SHALL COMPLY WITH REQUIREMENTS OF STANDARDS AND GUIDES SPECIFIED IN THIS SECTION. MANUAL CALCULATIONS ARE UNACCEPTABLE.

C. SOFTWARE DEVELOPERS: SUBJECT TO COMPLIANCE WITH SPECIFIED REQUIREMENTS, PERFORM STUDIES UTILIZING SOFTWARE PRODUCTS BY ONE OF THE FOLLOWING:

1. EASY POWER
2. POWER ANALYTICS CORPORATION
3. SKM SYSTEMS ANALYSIS

D. ALL STUDIES SHALL BE BASED ON THE DEVICE CHARACTERISTICS OF ACTUAL EXISTING COMPONENTS AND THE NEW COMPONENTS BEING INSTALLED..

E. PROVIDE ALL FIELD LABOR AS REQUIRED TO OBTAIN ALL DATA NECESSARY TO CONDUCT THE STUDIES SPECIFIED HEREIN.

F. SUBMIT STUDIES FOR REVIEW BEFORE SUBMITTING THE SYSTEM OVERCURRENT PROTECTIVE DEVICE AND POWER DISTRIBUTION EQUIPMENT SUBMITTALS. SUBMIT STUDY REPORT FOR REVIEW PRIOR TO RECEIVING FINAL APPROVAL OF THE OVERCURRENT PROTECTIVE DEVICE AND DISTRIBUTION EQUIPMENT SUBMITTALS.

G. WHERE FORMAL COMPLETION OF STUDIES WILL CAUSE A DELAY IN THE ORDERING AND MANUFACTURING OF OVERCURRENT PROTECTIVE DEVICES AND POWER DISTRIBUTION EQUIPMENT, OBTAIN APPROVAL FROM ENGINEER FOR PRELIMINARY SUBMITTAL OF SUFFICIENT STUDY DATA TO ENSURE THAT THE SELECTION OF DEVICES AND ASSOCIATED CHARACTERISTICS IS SATISFACTORY AND IN COMPLIANCE WITH THE RESULTS OF THE STUDIES BEING PERFORMED.

H. POWER SYSTEM STUDY SHALL BE SIGNED AND SEALED BY THE PROFESSIONAL ENGINEER RESPONSIBLE FOR PREPARING THE STUDY.

SHORT CIRCUIT STUDY

A. PROVIDE A COMPUTER-BASED, SHORT CIRCUIT STUDY TO DETERMINE THE MINIMUM INTERRUPTING CAPACITY OF CIRCUIT PROTECTIVE DEVICES.

B. FOR NEW EQUIPMENT, USE CHARACTERISTICS SUBMITTED UNDER THE PROVISIONS OF ACTION SUBMITTALS AND INFORMATION SUBMITTALS FOR THIS PROJECT.

C. FOR EXISTING RELOCATED EQUIPMENT AND EXISTING EQUIPMENT THAT IS EXISTING TO REMAIN, OBTAIN REQUIRED ELECTRICAL DISTRIBUTION SYSTEM DATA BY FIELD INVESTIGATION AND SURVEYS, CONDUCTED BY QUALIFIED TECHNICIANS AND ENGINEERS.THE QUALIFICATIONS OF TECHNICIANS AND ENGINEERS SHALL BE QUALIFIED AS DEFINED BY NFPA 70E.

D. GATHER AND TABULATE ALL REQUIRED DATA TO SUPPORT THE SHORT-CIRCUIT STUDY. COMPLY WITH RECOMMENDATIONS IN IEEE 551 AS TO THE AMOUNT OF DETAIL THAT 15 REQUIRED TO BE ACQUIRED IN THE FIELD.

E. BEGIN SHORT-CIRCUIT CURRENT ANALYSIS AT THE SERVICE, EXTENDING DOWN TO THE SYSTEM OVERCURRENT PROTECTIVE DEVICES AS FOLLOWS:

1. TO NORMAL SYSTEM LOW-VOLTAGE LOAD BUSES WHERE FAULT CURRENT IS 10 KA OR LESS.

ARC FLASH HAZARD STUDY

A. PROVIDE A COMPUTER-BASED, ARC-FLASH HAZARD STUDY TO DETERMINE THE ARC-FLASH HAZARD DISTANCE AND THE INCIDENT ENERGY TO WHICH PERSONNEL COULD BE EXPOSED DURING WORK ON OR NEAR EXISTING AND NEW ELECTRICAL EQUIPMENT.

B. ELECTRICAL SURVEY DATA: GATHER AND TABULATE ALL REQUIRED INPUT DATA TO SUPPORT STUDY. COMPLY WITH RECOMMENDATIONS IN IEEE 1584 AND NFPA 70E AS TO THE AMOUNT OF DETAIL THAT IS REQUIRED TO BE ACQUIRED IN THE FIELD.

C. FOR NEW EQUIPMENT, USE CHARACTERISTICS SUBMITTED UNDER THE PROVISIONS OF ACTION SUBMITTALS AND INFORMATION SUBMITTALS FOR THIS PROJECT.

D. FOR EXISTING EQUIPMENT, WHETHER OR NOT RELOCATED, OBTAIN REQUIRED ELECTRICAL DISTRIBUTION SYSTEM DATA BY FIELD INVESTIGATION AND SURVEYS, CONDUCTED BY QUALIFIED TECHNICIANS AND ENGINEERS.

E. HAZARD LABELS SHALL HAVE AN ORANGE HEADER WITH THE WORDING, "WARNING, ARC-FLASH HAZARD," AND SHALL INCLUDE THE FOLLOWING INFORMATION TAKEN DIRECTLY FROM THE ARC-FLASH HAZARD ANALYSIS:

1. LOCATION DESIGNATION
2. NOMINAL VOLTAGE.
3. FLASH PROTECTION BOUNDARY.
4. HAZARD RISK CATEGORY.
5. INCIDENT ENERGY.
6. WORKING DISTANCE
7. ENGINEERING REPORT NUMBER, REVISION NUMBER, AND ISSUE DATE.

F. ARC FLASH HAZARD WARNING LABELS SHALL BE A 3.5-BY-5-INCH THERMAL TRANSFER LABEL OF HIGH-ADHESION POLYESTER FOR EACH WORK LOCATION INCLUDED IN THE ANALYSIS.

G. LABELS SHALL BE MACHINE PRINTED, WITH NO FIELD-APPLIED MARKINGS.

RECORD DOCUMENTS

A. DURING THE PROGRESS OF THE WORK, CONTRACTOR SHALL MAINTAIN A CURRENT (DAILY) AS-BUILT SET OF THE DRAWINGS AND SPECIFICATIONS, INDICATING THEREON ALL WORK INSTALLED AT VARIANCE WITH SUCH CONTRACT DOCUMENTS INCLUDING, WITHOUT LIMITATION, WORK COVERED BY ADDENDA, FIELD WORK ORDERS, CHANGE ORDERS, AND ENGINEERS

B. CONTRACTOR SHALL PROVIDE THE TENANT WITH THE FINAL AS-BUILT SET OF DRAWINGS AT THE COMPLETION OF THE WORK.

COORDINATION WITH LANDLORD AND UTILITY COMPANIES

A. PRIOR TO COMMENCEMENT OF WORK, CONTRACTOR SHALL COORDINATE THE WORK OF THIS CONTRACT WITH THE LANDLORD'S AUTHORIZED REPRESENTATIVE AND AUTHORIZED REPRESENTATIVES OF EACH SERVING UTILITY THAT WILL PROVIDE SERVICE TO THIS SITE, INCLUDING BUT NOT NECESSARILY LIMITED TO, ELECTRIC, TELEPHONE AND CABLE/SATELLITE TV SERVICE PROVIDERS.

B. CONTRACTOR SHALL MEET WITH AUTHORIZED REPRESENTATIVES OF THE LANDLORD AND EACH UTILITY TO DISCUSS LANDLORD UTILITY COMPANY SCOPE OF WORK, CONTRACTOR SCOPE OF WORK, POINT OF SERVICE PICK-UP, DETAILS REGARDING SYSTEM INTERFACE, UTILITY COMPANY STANDARDS TO BE COMPLIED WITH, ETC.

COORDINATION WITH OTHER TRADES

A. ELECTRICAL WORK SHALL BE INSTALLED SO AS TO NOT CONFLICT WITH THE WORK OF OTHER TRADES.

B. SET ALL SLEEVES AND CUT AND PATCH ALL MISCELLANEOUS HOLES NECESSARY FOR THE CONVENIENT AND PROPER INSTALLATION OF THE WORK.

C. CONFER WITH THE OTHER CONTRACTORS REGARDING THE LOCATION AND SIZE OF PIPES, EQUIPMENT, DUCTS, OPENINGS AND SPECIAL ARCHITECTURAL TREATMENTS IN ORDER THAT THERE MAY BE NO INTERFERENCES BETWEEN THE INSTALLATION OR THE PROGRESS OF THE WORK OF ANY CONTRACTOR ON THE PROJECT.

D. ALL LINE VOLTAGE WIRING AND FINAL CONNECTIONS TO COMPLETE MECHANICAL SYSTEMS SHALL BE PROVIDED BY THE ELECTRICAL CONTRACTOR.

E. PROVIDE FINAL ELECTRICAL CONNECTIONS TO EQUIPMENT FURNISHED/PROVIDED BY OTHERS, (HVAC EQUIPMENT, PLUMBING EQUIPMENT, COMMERCIAL KITCHEN EQUIPMENT, ETC.

F. COORDINATE THE NEMA CONFIGURATION OF THE RECEPTACLE TO BE PROVIDED WITH THE NEMA PLUG CONFIGURATION OF THE CORD/PLUG ASSEMBLY FURNISHED WITH THE EQUIPMENT TO BE INSTALLED. PROVIDE RECEPTACLES HAVING A NEMA CONFIGURATION THAT MATCHES THE NEMA CONFIGURATION OF THE PLUG ON THE EQUIPMENT.

G. PROVIDE FINAL COORDINATION OF AVAILABLE POWER (VOLTAGE/PHASE) WITH OTHER TRADES PRIOR TO THEIR ORDERING OF EQUIPMENT.

H. REFER TO MECHANICAL DRAWINGS FOR ADDITIONAL INFORMATION REGARDING ELECTRICAL WORK TO BE PROVIDED ASSOCIATED WITH MECHANICAL EQUIPMENT.

I. WHERE ELECTRICAL WORK (CONDUIT BOXES, RECEPTACLES, DISCONNECT SWITCHES, ETC.) ARE SECURED DIRECTLY TO THE HOUSING OF MECHANICAL EQUIPMENT, THEY SHALL BE INSTALLED ON A PORTION OF THE EQUIPMENT HOUSING NOT REQUIRED TO BE REMOVED FOR ROUTINE MAINTENANCE. PRIOR TO INSTALLATION, COORDINATE ALL ELECTRICAL WORK AT MECHANICAL EQUIPMENT WITH MECHANICAL CONTRACTOR.

TEMPORARY POWER

A. THE CONTRACTOR SHALL PROVIDE ALL REQUIRED TEMPORARY CONSTRUCTION POWER AND LIGHTING TO ALLOW ALL CONTRACTORS AND SUB-CONTRACTORS TO PERFORM THE WORK OF THEIR CONTRACTS.

B. PRIOR TO THE SUBMISSION OF A BID PROPOSAL, THE CONTRACTOR SHALL CONTACT THE GENERAL CONTRACTOR TO COORDINATE THE TYPE OF EQUIPMENT TO BE UTILIZED DURING THE WORK OF THIS CONTRACT

SEQUENCING AND SCHEDULING

A. COORDINATE ELECTRICAL EQUIPMENT INSTALLATION WITH OTHER BUILDING COMPONENTS AND THE PROJECT PHASING PLAN.

FIRE STOPPING

A. PROVIDE FIRE STOPPING FOR PENETRATIONS BY CONDUIT OR CABLES AND OTHER EQUIPMENT THROUGH FIRE-RATED VERTICAL BARRIERS (WALLS AND PARTITIONS), HORIZONTAL BARRIERS (FLOOR/CEILING ASSEMBLIES) AND VERTICAL SHAFT WALLS AND PARTITIONS.

B. FIRESTOP SYSTEM INSTALLATION SHALL COMPLY WITH THE REQUIREMENTS OF ASME E 814 OR UL 1479 TESTED ASSEMBLIES THAT PROVIDE A FIRE RATING EQUAL TO OR GREATER THAN THAT OF THE CONSTRUCTION BEING PENETRATED.

SEISMIC RESTRAINT

A. PROVIDE SEISMIC RESTRAINT FOR ELECTRICAL WORK AND SYSTEMS AND EQUIPMENT IN STRICT ACCORDANCE WITH THE APPLICABLE BUILDING CODE AND THE REQUIREMENTS OF THE AUTHORITY HAVING JURISDICTION.

B. SUBMIT ALL REQUIRED DETAILS TO THE AUTHORITY HAVING JURISDICTION FOR REVIEW AND APPROVAL.

CUTTING & PATCHING

A. PRIOR TO CORE DRILLING OR SAW CUTTING OPERATIONS, CONTRACTOR SHALL X-RAY OR GROUND PENETRATING RADAR (GPR) THE EXISTING SLAB TO DETERMINE THE LOCATION OF ANY EXISTING UTILITIES, STRUCTURAL MEMBERS. ETC. COORDINATE ALL SCANNING, CUTTING AND CORE DRILLING OPERATIONS WITH GC AND LANDLORD PRIOR TO COMMENCEMENT OF WORK.

B. CORE-DRILL OR SAW-CUT EXISTING FLOORS, WALLS, ROOF, ETC., AS REQUIRED FOR THE INSTALLATION OF THE ELECTRICAL WORK. EXISTING UTILITIES AND STRUCTURAL COMPONENTS, INCLUDING BUT NOT NECESSARILY LIMITED TO, COLUMNS, BEAMS, GIRDERS, PLATES OR JOISTS SHALL NOT BE CUT.

C. PATCH SURROUNDING AREAS FLUSH WITH ADJACENT SURFACES AND PREPARE TO RECEIVE SPECIFIED FINISHES.

D. PATCH AND REPAIR ROOF TO MATCH EXISTING ROOFING SYSTEM. ALL ROOF WORK SHALL BE PERFORMED TO MEET THE WARRANTY REQUIREMENTS OF THE EXISTING ROOFING SYSTEM.

GROUNDING

A. PROVIDE ELECTRICAL SYSTEM AND EQUIPMENT GROUNDING IN ACCORDANCE WITH APPLICABLE N.E.C. REQUIREMENTS.

B. THE METALLIC CONDUIT SYSTEM SHALL BE GROUNDED AND BONDED TO FORM AN EQUIPMENT GROUNDING CONDUCTOR.

C. PROVIDE AN INSULATED EQUIPMENT GROUND CONDUCTOR WITHIN ALL FEEDERS AND BRANCH CIRCUITS. THIS EQUIPMENT GROUND CONDUCTOR SHALL BE IN ADDITION TO THE EQUIPMENT GROUND CONDUCTOR FORMED BY THE METALLIC CONDUIT SYSTEM.

D. PROVIDE AN ISOLATED GROUND CONDUCTOR IN ADDITION TO THE EQUIPMENT GROUNDING CONDUCTOR IN SELECT BRANCH CIRCUITS AS NOTED ON THE DRAWINGS.

E. PROVIDE A #6 AWG GREEN INSULATED GROUNDING CONDUCTOR FROM THE GROUND BAR AT TELEPHONE TERMINAL BOARD TO THE ELECTRICAL SERVICE GROUND.

F. PROVIDE A COPPER GROUNDING BAR AT THE TELEPHONE TERMINAL BACKBOARD. GROUNDING BAR SHALL BE % INCH X 4 INCHES X 12 INCHES, PRE-DRILLED FOR CONDUCTOR TERMINATIONS, WITH NON-METALLIC STAND-OFF BRACKETS WITH INSULATORS. CHATSWORTH PRODUCTS 10622-012 OR APPROVED EQUAL.

EQUIPMENT IDENTIFICATION

A. PROVIDE EQUIPMENT LABELS ON PANELBOARDS, DISCONNECT SWITCHES, CONTACTORS, TRANSFORMERS, CONTROLS, ETC. EQUIPMENT LABELS SHALL BE ENGRAVED PHENOLIC RESIN NAMEPLATES ATTACHED TO ENCLOSURE WITH MECHANICAL FASTENERS. SELF-ADHESIVE NAMEPLATES ARE NOT ACCEPTABLE. LETTERING SHALL BE 1/2" HIGH, BLACK TEXT ON WHITE BACKGROUND.

B. ENGRAVED NAMEPLATES ATTACHED TO COMPONENTS SHALL IDENTIFY THE EQUIPMENT DESIGNATION, NAME OF THE "UPSTREAM POWER SOURCE (AS APPLICABLE), VOLTAGE AND PHASE.

C. THE COVERS OF ALL OUTLET AND JUNCTION BOXES INSTALLED ABOVE CEILINGS AND INSTALLED EXPOSED IN UNFINISHED SPACES SHALL BE LABELED TO IDENTIFY THE SERVING PANEL, VOLTAGE, PHASE AND CIRCUIT NUMBERS CONTAINED WITHIN THE BOX. LABEL SHALL BE LEGIBLY HANDWRITTEN WITH BLACK, FELT TIP PERMANENT MARKER.

D. THE COVER PLATES OF ALL WIRING DEVICES SHALL BE LABELED TO IDENTIFY THE SERVING PANEL AND THE CIRCUITS SERVING THE DEVICE, LABELS SHALL BE MACHINE PRINTED, BLACK TEXT ON A CLEAR, SELF ADHESIVE LABEL

CONDUIT AND FITTINGS

A. ALL INTERIOR AND EXTERIOR CONDUITS SHALL BE INSTALLED AND SUPPORTED IN ACCORDANCE WITH N.E.C. REQUIREMENTS.

B. MINIMUM CONDUIT SIZE SHALL BE N" TRADE SIZE. SWITCH LEGS SHALL BE ½" TRADE SIZE.

C. WITHIN INTERIOR FINISHED SPACES, ALL CONDUIT SHALL BE INSTALLED CONCEALED WITHIN NEW AND EXISTING WALLS AND ABOVE NEW AND EXISTING CEILINGS.

D. CONDUIT INSTALLED WITHIN THE INTERIOR OF THE BUILDING SHALL BE GALVANIZED ELECTRICAL METALLIC TUBING (EMT). CONDUIT FITTINGS FOR INDOOR EMT CONDUITS SHALL BE CAST METAL, COMPRESSION TYPE.

E. EMT SHALL BE USED FOR INTERIOR FEEDERS AND BRANCH CIRCUITS INSTALLED EXPOSED IN UNFINISHED SPACES, CONCEALED ABOVE NEW OR EXISTING CEILINGS OR CONCEALED WITHIN EXISTING AND NEW INTERIOR PARTITIONS.

F. CONDUITS INSTALLED EXPOSED ON THE EXTERIOR OF THE BUILDING SHALL BE GALVANIZED RIGID STEEL FITTINGS SHALL BE THREADED TYPE.

G. CONDUITS INSTALLED UNDER SLAB ON GRADE CONSTRUCTION SHALL BE RIGID NON-METALLIC (RNC), SCHEDULE 40 PVC. RNC COMPLYING WITH NEMA TC 2 AND UL 651 UNLESS OTHERWISE INDICATED. FITTINGS FOR RIGID NON-METALLIC CONDUIT SHALL COMPLY WITH NEMA TC 3; MATCH TO CONDUIT TYPE AND MATERIAL

H. PROVIDE CONDUIT EXPANSION FITTINGS IN ALL CONDUIT RUNS THAT EXTEND ACROSS BUILDING EXPANSION JOINTS AND WHERE MOVEMENT MAY BE ENCOUNTERED.

I. CONDUIT SHALL BE SUPPORTED FROM STRUCTURE ONLY.

J. PVC CONDUIT SHALL ONLY BE USED BELOW GRADE

K. PROVIDE FLEXIBLE METAL CONDUIT FOR CONNECTIONS TO VIBRATING EQUIPMENT WITHIN INTERIOR DRY LOCATIONS, MAXIMUM CONDUIT LENGTH SHALL BE 36 INCHES.

L. PROVIDE LIQUID-TIGHT FLEXIBLE METAL CONDUIT FOR CONNECTIONS TO VIBRATING EQUIPMENT IN WET OR OUTDOOR LOCATIONS. MAXIMUM CONDUIT LENGTH SHALL BE 36 INCHES.

M. PROVIDE FLEXIBLE METAL CONDUIT FOR FINAL CONNECTIONS TO RECESSED LIGHT FIXTURES (FIXTURE WHIPS). MAXIMUM CONDUIT LENGTH SHALL BE 72 INCHES.

N. CONDUITS THAT EXTEND UP TO THE ROOF LEVEL TO SERVE ROOF MOUNTED MECHANICAL EQUIPMENT INSTALLED ON A CURB SHALL BE ROUTED WITHIN THE EQUIPMENT CURB. COORDINATE ELECTRICAL WORK WITH MECHANICAL EQUIPMENT INSTALLER.

O. PROVIDE CONDUIT SEALING FITTINGS IN ALL CONDUITS THAT EXTEND FROM NON-CONDITIONED SPACES TO CONDITIONED SPACES PER NEC 300.7(A). PROVIDE EXPANSION JOINTS FOR CONDUIT AS REQUIRED TO COMPENSATE FOR THERMAL EXPANSION AND CONTRACTION.

P. ACCEPTABLE MANUFACTURERS FOR GALVANIZED RIGID CONDUIT, EMT, FLEXIBLE METAL-CONDUITS AND LIQUID-TIGHT FLEXIBLE METAL CONDUITS SHALL BE ALLIED, REPUBLIC,WHEATLAND, ELECTRI-FLEX AND ANACONDA.

Q. ACCEPTABLE MANUFACTURERS FOR CONDUIT FITTINGS SHALL BE THOMAS AND BETTS OR APPROVED EQUAL.

CONDUCTORS

A. ALL WIRING SHALL BE INSTALLED IN CONDUIT.

B. ALL CONDUCTORS SHALL BE SOFT DRAWN, ANNEALED COPPER, #12 AWG MINIMUM.

C. CONDUCTORS #12 AND #10 AWG SHALL BE SOLID; #8 AWG AND LARGER SHALL BE STRANDED.

D. THE USE OF ALUMINUM CONDUCTORS IS NOT ACCEPTABLE.

E. EXPOSED, INTERIOR FEEDERS: TYPE THHN-THWN, SINGLE CONDUCTORS IN CONDUIT.

F. FEEDERS INSTALLED CONCEALED IN CEILINGS, WALLS, PARTITIONS: TYPE THHN-THWN, SINGLE CONDUCTORS IN CONDUIT.

G. FEEDERS INSTALLED CONCEALED IN CONCRETE, BELOW SLABS-ON-GRADE AND UNDERGROUND: TYPE THHN-THWN, SINGLE CONDUCTORS IN PVC CONDUIT.

H. EXPOSED, INTERIOR, BRANCH CIRCUITS: TYPE THHN-THWN, SINGLE CONDUCTORS IN CONDUIT.

I. BRANCH CIRCUITS CONCEALED IN EXISTING AND NEW CEILINGS, WALLS, AND PARTITIONS: TYPE THHN-THWN, SINGLE CONDUCTORS IN CONDUIT.

J. BRANCH CIRCUITS CONCEALED BELOW SLABS-ON-GRADE, AND UNDERGROUND: TYPE THHN-THWN, SINGLE CONDUCTORS IN CONDUIT.

K. ACCEPTABLE MANUFACTURERS FOR CONDUCTORS: GENERAL CABLE COMPANY, CAROL, ANACONDA, ROME, SOUTHWIRE.

L. CLASS 1 CONTROL CIRCUITS: TYPE THHN-THWN, IN CONDUIT.

M. CLASS 2 CONTROL CIRCUITS: POWER-LIMITED PLENUM RATED CABLE, CONCEALED IN BUILDING FINISHES.

N. THE USE OF NON-METALLIC-SHEATHED CABLE (TYPE NM) AND ARMORED CABLE (TYPE AC OR BX) IS NOT ACCEPTABLE.

O. WIRE CONNECTORS SHALL BE EQUAL TO SCOTCH LOCK FOR #8 AWG AND SMALLER, THOMAS AND BETTS LOCK-TITE FOR #6 AND LARGER.

P. PROVIDE #10 AWG CONDUCTORS FOR BRANCH CIRCUITS HAVING A CONDUCTOR LENGTH LONGER THAN 75 FEET.

Q. SIZE OF CONDUCTORS AND CABLES INDICATED OR SPECIFIED ARE IN AMERICAN WIRE GAGE (AWG - BROWN AND SHARPE).

R. INSTALL ALL WIRING IN APPROVED RACEWAY AND ENCLOSURES, EXCEPT WHERE SPECIFIED OR INDICATED, FOR LOW-VOLTAGE WIRING OR, WHERE TYPE MC CABLE IS INDICATED, SPECIFIED AS ACCEPTABLE, OR BOTH.

S. SUPPORT ALL CONDUCTORS AND CABLES IN VERTICAL INSTALLATIONS, AS REQUIRED BY NFPA-70, BY INSTALLING CABLE SUPPORTS OR PLUG-TYPE CONDUIT RISER SUPPORTS, OR WIRE-MESH SAFETY GRIPS.

T. INSTALL ALL CONDUCTORS AND CABLE IN RACEWAYS CONTINUOUS WITHOUT TAPS OR SPLICES. SPLICE OR TAP ONLY IN APPROVED BOXES AND ENCLOSURES WITH APPROVED SOLDERLESS CONNECTORS, OR CRIMP CONNECTORS AND TERMINAL BLOCKS FOR CONTROL WIRING, AND KEEP TO THE MINIMUM REQUIRED. INSULATE ALL SPLICES, TAPS, AND JOINTS AS REQUIRED BY CODE.

U. ALL MATERIALS USED TO TERMINATE, SPLICE OR TAP CONDUCTORS: DESIGNED, PROPERLY SIZED, AND UL LISTED FOR THE SPECIFIC APPLICATION AND CONDUCTORS INVOLVED, AND INSTALLED IN STRICT ACCORDANCE WITH THE MANUFACTURER'S RECOMMENDATIONS, USING THE MANUFACTURER'S RECOMMENDED TOOLS.

V. WHERE WIRING IS INDICATED AS INSTALLED, BUT THE CONNECTION IS INDICATED "FUTURE" OR "BY OTHER DIVISION, TRADES, OR CONTRACTS", LEAVE A MINIMUM OF 3' FOOT "PIGTAIL" AT THE BOX, TAPE THE ENDS OF CONDUCTORS, AND COVER THE BOX.

W. VOLTAGE DROP IN BRANCH CIRCUITS SHALL NOT EXCEED 3 PERCENT.

X. WHEN NEW CONDUCTORS ARE CONNECTED TO EXISTING CONDUCTORS, THE NEW CONDUCTORS SHALL BE OF THE SAME AWG, CONDUCTOR MATERIAL, INSULATION TYPE TEMPERATURE RATING,. ETC. AS THE EXISTING CONDUCTORS TO WHICH BEING CONNECTED.

Y. ALL LINE VOLTAGE WIRING IS TO BE IN CONDUIT AND ALL LOW VOLTAGE WIRING IS TO BE IN PLENUM RATED OR IN CONDUIT.

TYPE MC CABLE

A. MC CABLE IS PERMITTED ONLY FOR FINAL CONNECTIONS (E.G., FROM OUTLET BOXES TO LIGHT FIXTURES, MOTORS, OR APPLIANCES), MAXIMUM LENGTH 6 FEET.

B. TYPE MC CABLE: 600V, UNJACKETED: ANSI E119 AND E814, UL STANDARDS 44 OR 83 (AS APPLICABLE), AND 1569, NFPA 70 ARTICLE 330; ALUMINUM OR GALVANIZED STEEL INTERLOCKED ARMOR; THHM- OR XHHW-INSULATED CONDUCTORS; COLOR CODE: ICEA METHOD 1, WITH GREEN INSULATED GROUNDING CONDUCTOR.

C. USES PERMITTED

C.1. IN LIEU OF FLEXIBLE CONDUIT AND WIRING FROM LIGHT FIXTURES IN ACCESSIBLE CEILINGS TO JUNCTION BOXES (ATTACHED TO BUILDING STRUCTURE) ABOVE THE CEILING. PROVIDE CABLE WHIPS OF SUFFICIENT LENGTHS TO ALLOW FOR RELOCATING EACH LIGHT FIXTURE WITHIN A 5' FOOT RADIUS OF ITS INSTALLED LOCATION, BUT NOT EXCEEDING 6' FEET IN UNSUPPORTED LENGTHS.

C.2. FOR VERTICAL DROPS IN STUD WALLS.

D. USES NOT PERMITTED:

D.1. HOMERUNS TO PANELSBOARDS.

D.2. WHERE EXPOSED TO VIEW.

D.3. WHERE EXPOSED TO DAMAGE.

D.4. HAZARDOUS LOCATIONS.

D.5. WET LOCATIONS.

D.6. INSTALLED HORIZONTALLY WITHIN STUD WALL.

D.7. WHEN RESTRICTED OTHERWISE ABOVE, AND WHEN SPECIFICALLY DISALLOWED BY THE LOCAL AHJ, OWNER OR BOTH.

E. PRIOR TO THE SUBMISSION OF A BID PROPOSAL, EC SHALL VERIFY THE PERMISSIBLE USE OF MC CABLE WITH THE AHJ.

CONDUCTOR COLOR CODING

A. PROVIDE COLOR CODING SYSTEM AS LISTED BELOW FOR ALL FEEDERS AND BRANCH CIRCUITS AND USED AS A BASIS FOR BALANCING LOAD ON PANELS, AND TO BE PHASE IDENTIFICATION.

B. COLOR CODING FOR CONDUCTOR #12 AWG THROUGH #6 AWG SHALL CONSIST OF COLOR CODED THERMOPLASTIC INSULATION OF THE COLORS SPECIFIED HEREIN.

C. COLOR CODING FOR CONDUCTORS #8 AWG AND LARGER SHALL BE FIELD APPLIED SELF ADHESIVE TAPE OF THE COLOR SPECIFIED HEREIN FOR THE PARTICULAR PHASE.

D. 120/208V: PHASE A--BLACK, PHASE B--RED, PHASE C--BLUE, NEUTRAL--WHITE, EQUIPMENT GROUND--GREEN, ISOLATED GROUND--GREEN WITH DISTINCTIVE WHITE OR YELLOW MARKINGS.

E. 277/480V: BROWN-A, ORANGE-B YELLOW-C, NEUTRAL WHITE OR GRAY, EQUIPMENT GROUND - GREEN.

1	SCALE N.T.S.	ELECTRICAL SPECIFICATIONS

USA Ninja Challenge

TITLE:

ELECTRICAL SPECIFICATIONS SHEET 1 OF 2

SHEET NUMBER:

E-0.2

Property of NY Engineers

BOXES AND FITTINGS

A. ALL OUTLET BOXES SHALL BE UL LISTED AND LABELED FOR USE IN THE SPACE THEY OCCUPY AND THE PURPOSE THEY SERVE.

B. SHEET METAL OUTLET AND DEVICE BOXES FOR DRY, INTERIOR APPLICATIONS: COMPLY WITH NEMA OS 1 AND UL 514A.

C. CAST-METAL OUTLET AND DEVICE BOXES FOR EXTERIOR APPLICATIONS: COMPLY WITH NEMA FB 1, FERROUS ALLOY, TYPE FS OR FD, WITH GASKETED COVER.

D. OUTLET BOXES INSTALLED WITHIN FIRE RATED ASSEMBLIES SHALL HAVE A FIRE RATING EQUAL TO OR GREATER THAN THE RATING OF THE WALL IN WHICH IT IS INSTALLED.

E. OUTLET BOXES SHALL BE 4 INCHES SQUARE BY 2 1/8 INCHES DEEP, EXCEPT FOR 2" PARTITIONS SHALL BE AT LEAST 1-1/2" DEEP.

F. OUTLET BOXES FOR VOICE AND DATA DEVICES SHALL BE 4 11/16 INCHES SQUARE BY 2 1/8 INCHES DEEP.

G. ALL PULLBOXES SHALL BE CONSTRUCTED OF GALVANIZED STEEL, OF METAL GAUGE AND PHYSICAL SIZE AS REQUIRED BY THE N.E.C. FOR THE NUMBER AND SIZE OF CONDUITS AND CONDUCTORS ASSOCIATED WITH THE PULLBOX.

H. FIXTURE OUTLET BOXES IN/OR ON CEILINGS SHALL NOT BE LESS THAN 1-1/2" DEEP OR LESS THAN 4" SQUARE. ALL OUTLET BOXES INTENDED TO SUPPORT FIXTURES SHALL BE EQUIPPED WITH 3/8" FIXTURE STUDS FASTENED THROUGH THE BOTTOM OF THE BOX WITH FOUR BOLTS.

I. PULLBOXES AND JUNCTION BOXES THAT ARE CUSTOM FABRICATED FOR THE APPLICATION SHALL BE FABRICATED BY A SHOP/FACILITY THAT IS CERTIFIED BY A NRTL FOR THE FABRICATION OF SUCH ENCLOSURES.

J. NEW OUTLET BOXES INSTALLED WITHIN NEW OR EXISTING STUD WALL CONSTRUCTION SHALL BE MOUNTED TO A STUD OR MOUNTED IN A BRACKET THAT SPANS STUD-TO-STUD, CADDY TSGB BRACKET OR APPROVED EQUAL. THE USE OF "OLD WORK" TYPE BOXES THAT. SECURE ONLY TO THE DRYWALL ARE NOT ACCEPTABLE.

K. ACCEPTABLE MANUFACTURERS FOR BOXES: APPLETON, STEEL CITY, RACO.

PANELBOARDS

A. CIRCUIT BREAKERS SHALL BE MOLDED CASE, BOLT-ON TYPE SUITABLE FOR VOLTAGE AND AMPERE RATINGS INDICATED ON DRAWINGS AND IN PANEL SCHEDULES. REFER TO THE PANEL SCHEDULES ON THE DRAWINGS FOR ADDITIONAL ACCESSORIES TO BE PROVIDED AT SELECT CIRCUIT BREAKERS.

B. CIRCUIT BREAKERS SHALL HAVE A MINIMUM AMPERE INTERRUPTING CAPACITY (AIC) OF 10,000 AMPERES FOR 120/208V SYSTEMS, 14,000 FOR 277/480V SYSTEMS.

C. WHERE THE POWER SYSTEM STUDY IDENTIFIES AVAILABLE FAULT CURRENT VALUES AT EXISTING THAT ARE HIGHER THAN THE MINIMUM AIC RATINGS SPECIFIED HEREIN, PROVIDE CIRCUIT BREAKERS IN THE PANELS THAT HAVE AIC RATINGS GREATER THAN THE AVAILABLE FAULT CURRENT AT THE PANEL AS DETERMINED BY THE POWER SYSTEM STUDY.

D. CIRCUIT BREAKERS SERVING LIGHTING CIRCUITS SHALL BE RATED FOR SWITCH DUTY.

E. CIRCUIT BREAKERS SERVING HVAC EQUIPMENT SHALL BE HACR RATED.

F. ALL LUGS SHALL BE OF THE SOLDERLESS TYPE AND RATED AT A MINIMUM OF 75°C.

G. PROVIDE NEW CIRCUIT DIRECTORIES WITHIN EXISTING PANELS TO REFLECT THE WORK OF THIS CONTRACT. DIRECTORY SHALL BE TYPEWRITTEN OR COMPUTER GENERATED. HANDWRITTEN CIRCUIT DIRECTORIES ARE NOT ACCEPTABLE.

H. UTILIZE FINAL, OWNER ASSIGNED ROOM NAMES AND NUMBERS TO IDENTIFY SPACES WITHIN THE CIRCUIT DIRECTORIES. COMPLY WITH NEC 408.4 WHEN IDENTIFYING CIRCUITS IN CIRCUIT DIRECTORIES.

I. PANEL CIRCUITS SHALL BE CONFIGURED SUCH THAT THE LOAD IS DISTRIBUTED EVENLY ACROSS ALL THREE PHASES TO WITHIN 10%.

J. EXISTING PANELBOARDS SHALL BE LABELED TO IDENTIFY THE AMOUNT OF FAULT CURRENT AVAILABLE AT THE PANEL AS DETERMINED BY THE POWER SYSTEM STUDY TO BE PERFORMED. LABEL SHALL BE MACHINE PRINTED, BLACK TEXT ON CLEAR, SELF ADHESIVE TAPE. INSTALL LABEL ADJACENT TO PANELBOARDS ENGRAVED NAMEPLATE.

K. ALL NEW AND EXISTING PANELBOARDS SHALL BE LABELED TO IDENTIFY THE ARC FLASH HAZARD CHARACTERISTICS AT THE PANEL AS DETERMINED BY THE POWER SYSTEM STUDY TO BE PERFORMED.

L. ALL "SPARE" CIRCUIT BREAKERS SHALL BE SET TO THE "OFF" POSITION.

M. PROVIDE HANDLE TIES ON ALL MULTI-WIRE BRANCH CIRCUITS IN ACCORDANCE WITH NEC 210.4(B).

N. WHEN NEW CIRCUIT BREAKERS ARE ADDED TO AN EXISTING PANEL, THE NEW CIRCUIT BREAKERS SHALL BE OF THE SAME MANUFACTURE AS THE EXISTING PANEL SHALL BE OF A "LETTER TYPE" COMPATIBLE WITH THE EXISTING PANEL SUCH THAT THE UL LISTING OF THE EXISTING PANEL IS MAINTAINED AND SHALL HAVE AN AIC RATING EQUAL TO OR GREATER THAN THE AIC RATING OF THE EXISTING OVERCURRENT PROTECTIVE DEVICES WITHIN THE EXISTING PANEL.

SWITCHES

A. TOGGLE SWITCHES SHALL BE SINGLE POLE, 3-WAY OR 4-WAY AS NOTED ON THE DRAWINGS, 20 AMPERES, 120/277 VOLT AC TYPE, SPECIFICATION GRADE WITH SCREW TERMINALS. HUBBELL 1221-X, 1223-X OR 1224-X OR APPROVED EQUIVALENT BY ONE OF THE ADDITIONAL MANUFACTURERS SPECIFIED HEREIN.

B. TOGGLE SWITCHES SHALL BE MOUNTED AT DOORS, INSTALLED ADJACENT TO THE TRIM ON THE STRIKING SIDE OF THE DOOR, REGARDLESS OF THE LOCATION INDICATED ON THE DRAWINGS. VERIFY ALL DOOR SWINGS PRIOR TO INSTALLATION OF OUTLET BOXES FOR SWITCHES.

C. DEVICE COLOR SHALL BE AS SELECTED BY THE OWNER/ARCHITECT.

D. PROVIDE A NEUTRAL CONDUCTOR TO ALL SWITCH LOCATIONS.

E. SWITCHES SHALL BE INSTALLED SURFACE MOUNTED IN UNFINISHED AREA. FLUSH MOUNTED IN FINISHED SPACES.

F. ADDITIONAL ACCEPTABLE MANUFACTURERS FOR SWITCHES: LEGRAND, LEVITON.

RECEPTACLES

A. RECEPTACLES SHALL BE 20 AMP, 125 VOLT, 2-POLE, 3-WIRE, GROUNDING TYPE, NEMA 5-20R WITH SCREW TERMINALS. HUBBELL 5362-W OR APPROVED EQUAL BY ONE OF THE ADDITIONAL MANUFACTURERS SPECIFIED HEREIN.

B. GFCI RECEPTACLES SHALL BE 20 AMP, 125 VOLT, 2-POLE, 3-WIRE, GROUNDING TYPE, NEMA 5-20R FEED THROUGH TYPE CAPABLE OF PROTECTING DOWNSTREAM RECEPTACLES ON A SINGLE CIRCUIT, SOLID STATE GROUND FAULT SENSING AND SIGNALING, 5 MILLIAMP TRIP LEVEL, NEMA 5-20R WITH SCREW TERMINALS. HUBBELL GF5362-X OR APPROVED EQUAL BY ONE OF THE ADDITIONAL MANUFACTURERS SPECIFIED HEREIN.

C. ISOLATED GROUND RECEPTACLES SHALL BE ORANGE, 20 AMP, 125 VOLT, 2-POLE, 3-WIRE, GROUNDING TYPE, NEMA 5-20R WITH SCREW TERMINALS. HUBBELL IG-5362-W OR APPROVED EQUAL BY ONE OF THE ADDITIONAL MANUFACTURERS SPECIFIED HEREIN.

D. PROVIDE SPECIAL PURPOSE RECEPTACLES HAVING NEMA CONFIGURATIONS THAT MATE AND MATCH THE NEMA PLUG CONFIGURATION PROVIDED WITH THE EQUIPMENT TO BE CONNECTED.

E. COVER PLATES FOR EXTERIOR RECEPTACLES SHALL BE RATED FOR "WEATHERPROOF WHILE IN USE".

F. DEVICE COLOR SHALL BE AS SELECTED BY THE OWNER/ARCHITECT.

G. QUAD RECEPTACLES SHALL CONSIST OF (2) DUPLE3X RECEPTACLES INSTALLED IN A SINGLE BOX UNDER A SINGLE COVER PLATE.

H. RECEPTACLES SHALL BE INSTALLED SURFACE MOUNTED IN UNFINISHED SPACES, FLUSH MOUNTED IN FINISHED SPACES.

I. ADDITIONAL ACCEPTABLE MANUFACTURERS FOR SWITCHES AND RECEPTACLES: LEGRAND, LEVITON.

GFCI PROTECTION:

A. ALL KITCHEN SINGLE PHASE RECEPTACLES RATED 150 VOLTS TO GROUND OR LESS, 50 AMPS OR LESS AND THREE PHASE RECEPTACLES RATED 150 VOLTS TO GROUND OR LESS, 100 AMPS OR LESS SHALL HAVE GROUND FAULT CIRCUIT INTERRUPTER PROTECTION FOR PERSONNEL IN ACCORDANCE WITH NEC 210.8, (B), (1) (10), OR THE EQUIVALENT REQUIREMENT WITHIN THE APPLICABLE ELECTRICAL CODE.

B. THE "GFCI" NOTATION AT A DEVICE OR CIRCUIT BREAKER INDICATES THAT GFCI PROTECTION SHALL BE PROVIDED FOR THE CIRCUIT OR CIRCUITS INDICATED. GFCI PROTECTION SHALL BE PROVIDED BY ONE OF THE FOLLOWING MEANS:

1. INTEGRAL GFCI PROTECTION WITHIN THE DEVICE (NEMA 5-20R RECEPTACLES), WHEN THE DEVICE IS ABLE TO BE INSTALLED IN A READILY ACCESSIBLE LOCATION AS DEFINED BY THE APPLICABLE ELECTRICAL CODE.
2. GFCI CIRCUIT BREAKER INSTALLED WITHIN THE PANEL FOR SERVICE TO THE CIRCUIT OR CIRCUITS.
3. GFCI CIRCUIT BREAKER INSTALLED WITHIN AN INDIVIDUAL ENCLOSURE EXTERNAL TO THE PANEL FOR SERVICE TO THE CIRCUIT.
4. DEAD-FRONT GFCI DEVICE INSTALLED IN A READILY ACCESSIBLE LOCATION AS DEFINED BY THE NEC (APPLICABLE TO 20 AMP, 120 VOLT CIRCUITS).
5. AN INDIVIDUALLY MOUNTED EXTERNAL SPECIAL PURPOSE GROUND FAULT CIRCUIT INTERRUPTER (SPGFCI) DEVICE SIMILAR TO "SHOCK BLOCK" PRODUCTS AS MANUFACTURED BY LITTLEFUSE, OR APPROVED EQUAL.
6. DEAD FRONT DEVICES SHALL BE BE LABELED TO IDENTIFY THE CIRCUIT AND THE LOAD SERVED BY THE DEVICE.

COVER PLATES FOR TOGGLE SWITCHES AND RECEPTACLES

A. COVER PLATES SHALL BE NYLON, OF CONFIGURATION TO MATCH THE WIRING DEVICE.

B. CONFIGURATION AND COLOR OF COVER PLATE SHALL MATCH THAT OF THE WIRING DEVICE THAT THE PLATE WILL BE INSTALLED ON.

C. COVER PLATE COLOR SHALL BE AS SELECTED BY THE OWNER/ARCHITECT.

D.

E. ADDITIONAL ACCEPTABLE MANUFACTURERS FOR COVER PLATES: LEGRAND, LEVITON.

MOUNTING HEIGHTS FOR ELECTRICAL DEVICES AND EQUIPMENT

A. DEVICES AND EQUIPMENT SHALL BE INSTALLED AT THE MOUNTING HEIGHTS NOTED BELOW UNLESS NOTED OTHERWISE ON THE DRAWINGS OR REQUIRED BY APPLICABLE CODES AND STANDARDS:

1. TOGGLE SWITCHES, WALL SWITCH OCCUPANCY SENSORS, VACANCY SENSORS AND DIMMERS FOR LIGHTING CONTROL-TOP OF DEVICE 48" AFF.
2. CONVENIENCE RECEPTACLES TOP OF DEVICE 18" AFF.
3. CONVENIENCE RECEPTACLES AT COUNTERTOPS-BOTTOM OF DEVICE 44" AFF OR AS NOTED ON THE DRAWINGS .
4. RECEPTACLES AT FACILITY EQUIPMENT AS INDICATED ON THE FINAL, APPROVED FOOD SERVICE SHOP DRAWINGS.
5. TELEPHONE AND DATA OUTLETS-TOP OF DEVICE 18" AFF, 44" AFF WHEN INSTALLED AT COUNTER TOPS.
6. DISCONNECT SWITCHES - TOP OF ENCLOSURE 66" AFF .

DISCONNECT SWITCHES

A. DISCONNECT SWITCHES SHALL BE HEAVY DUTY TYPE, UL LISTED AND LABELED, EQUIPPED WITH A LUG FOR TERMINATION OF THE EQUIPMENT GROUNDING CONDUCTOR.

B. DISCONNECT SWITCHES SHALL BE LOCKABLE WITH NEMA 1 ENCLOSURES FOR DRY, INDOOR APPLICATIONS; NEMA 3R ENCLOSURES FOR OUTDOOR OR WET LOCATION APPLICATIONS.

C. TOGGLE DISCONNECTS SHALL BE 20A OR 30A AS REQUIRED. SINGLE POLE, 2-POLE OR 3-POLE AS REQUIRED, SINGLE THROW, MOTOR RATED SWITCH WITHOUT OVERLOAD PROTECTION. NEMA 1, 3R OR 4X STAINLESS STEEL ENCLOSURE AS REQUIRED BY APPLICATION, PADLOCK ATTACHMENT.

D. ALL DISCONNECT SWITCHES SHALL BE EQUIPPED WITH AN ENGRAVED NAMEPLATE TO IDENTIFY THE SERVING PANEL, CIRCUIT NUMBERS AND THE LOAD SERVED BY THE SWITCH.

E. ACCEPTABLE MANUFACTURERS FOR DISCONNECT SWITCHES: SCHNEIDER, ABB, SIEMENS OR EATON.

MOTOR CONTROLLERS

A. PROVIDE ENCLOSED MOTOR CONTROLLERS AS SPECIFIED HEREIN FOR CONTROL OF MOTORS RATED FOR 600 VOLTS AND LESS.

B. FRACTIONAL HORSEPOWER MANUAL CONTROLLERS: "QUICK-MAKE, QUICK-BREAK" TOGGLE OR PUSH-BUTTON ACTION; PILOT LIGHT TO INDICATE "MOTOR RUNNING", MARKED TO SHOW WHETHER UNIT IS OFF, ON, OR TRIPPED.

1. CONFIGURATION: NON-REVERSING.
2. OVERLOAD RELAYS: INVERSE-TIME-CURRENT CHARACTERISTICS; NEMA ICS 2, CLASS 10 TRIPPING CHARACTERISTICS; HEATERS MATCHED TO NAMEPLATE FULL-LOAD CURRENT OF ACTUAL PROTECTED MOTOR; EXTERNAL RESET PUSH BUTTON.
3. FLUSH MOUNTED WITHIN FINISHED SPACES; SURFACE MOUNTED WITHIN UNFINISHED SPACES.
4. ACCEPTABLE MANUFACTURERS: SCHNEIDER, ABB, SIEMENS, EATON.

FUSES

A. PROVIDE CARTRIDGE FUSES RATED FOR 250 VAC AND 600 VAC AND LESS FOR USE AS SPECIFIED HEREIN.

B. COORDINATE FUSE RATINGS WITH UTILIZATION EQUIPMENT NAMEPLATE LIMITATIONS OF MAXIMUM FUSE SIZE AND WITH SYSTEM SHORT-CIRCUIT CURRENT LEVELS.

C. CARTRIDGE FUSE APPLICATIONS:

1. CIRCUITS, UP TO AND INCLUDING 600 AMPS: CLASS J, BUSSMANN LPJ.
2. CONTROL POWER TRANSFORMER (CPT) CIRCUITS: CLASS CC, TIME DELAY, CONTROL TRANSFORMER DUTY.
3. BASIS OF DESIGN FOR FUSES SHALL BE BUSSMANN. ADDITIONAL ACCEPTABLE MANUFACTURERS FOR SPECIFIED FUSES SHALL BE LITTLEFUSE AND MERSEN.

LIGHTING FIXTURES AND LIGHTING CONTROLS

A. USA NINJA CHALLENGE TO SUPPLY ALL LIGHT FIXTURES.

B. E.C. TO INSTALL AND CONNECT ALL LIGHT FIXTURES.

C. EC TO FURNISH, INSTALL, AND CONNECT ALL LIGHTING CONTROLS/SWITCHES/SENSORS.

ROUGH-IN SYSTEM FOR VOICE AND DATA

A. PROVIDE A ROUGH-IN SYSTEM AS SPECIFIED HEREIN FOR SERVICE TO THE OWNER'S VOICE AND DATA NETWORK.

B. PROVIDE A PLYWOOD BACKBOARD FOR TERMINATION OF TELEPHONE SERVICE AND DISTRIBUTION COMPONENTS. PLYWOOD BACKBOARD SHALL BE 2' X 3' X 3/4", FIRE RATED, PAINTED WITH TWO (2) COATS OF LIGHT GRAY ENAMEL PAINT. MASK FIRE RATED LABEL TO PREVENT THE LABEL FROM BEING PAINTED OVER.

C. OUTLET BOXES FOR TELEPHONE AND DATA DEVICES SHALL CONSIST OF 4 11/16 IN SQUARE BY 2 1/8 INCH DEEP OUTLET BOXES WITH SINGLE DEVICE COVER.

D. PROVIDE A 3" EMPTY CONDUIT WITH PULLSTRING FROM THE WALL MOUNTED PLYWOOD TELEPHONE TERMINAL BOARD IN THE TENANT SPACE TO THE LANDLORDS TELEPHONE DISTRIBUTION OR POINT OF SERVICE DELIVERY. PROVIDE A NYLON BUSHING ON EACH END OF CONDUIT FOR CABLE PROTECTION.

E. ROUGH-IN FOR WIRING DROPS TO WALL MOUNTED VOICE AND DATA DEVICES SHALL BE INSTALLED WITHIN EMT CONDUIT, 1". PROVIDE A CONDUIT STUB FROM THE DEVICE BOX TO ABOVE ACCESSIBLE CEILING. PROVIDE A PLENUM RATED NYLON BUSHING ON THE END OF THE CONDUIT STUB FOR PROTECTION OF THE WIRING.

F. PRIOR TO BEGINNING WORK, THIS CONTRACTOR SHALL FULLY COORDINATE HIS CONSTRUCTION OPERATIONS AND ALL TERMINATION LOCATIONS WITH AUTHORIZED REPRESENTATIVE OF THE TELEPHONE UTILITY COMPANY AND THE OWNER'S DATA NETWORK PROVIDER BY TIMELY NOTICE OR SCHEDULING OF SERVICE EQUIPMENT DATES, SERVICE MODIFICATION DATES AND NOTIFICATION OF REQUIRED OWNER AUTHORIZATIONS INVOLVING THE UTILITY COMPANY.

DUCT MOUNTED SMOKE DETECTORS

A. PROVIDE A 120 VOLT POWER SOURCE TO ALL DUCT MOUNTED SMOKE DETECTORS INSTALLED WITHIN NEW AND EXISTING MECHANICAL EQUIPMENT.

B. PROVIDE A DUCT MOUNTED SMOKE DETECTORS WITHIN NEW AND EXISTING MECHANICAL EQUIPMENT AS REQUIRED BY APPLICABLE CODES. FINAL ELECTRICAL CONNECTION AND ALL INTERLOCK WIRING BY THE ELECTRICAL CONTRACTOR.

C. PROVIDE ALL INTERLOCK WIRING IN CONDUIT BETWEEN ALL DUCT DETECTORS SUCH THAT UPON DETECTING SMOKE IN ANY ONE DETECTOR, ALL ROOF TOP UNITS SHALL BE SHUT DOWN.

D. PROVIDE TEST/RESET SWITCH AND PIEZO ALERT SOUNDER AND REMOTE ANNUNCIATOR ALARM LED MOUNTED AS DIRECTED BY LOCAL AHJ. EC TO PROVIDE ALL REQUIRED INTERLOCK WIRING BETWEEN DUCT DETECTOR AND REMOTE SWITCH.

E. REFER TO DETAILS ON MECHANICAL DRAWINGS FOR ADDITIONAL INFORMATION.

TESTING

A. PROVIDE ALL TESTS AS REQUIRED BY THE AUTHORITY HAVING JURISDICTION.

B. PROVIDE THE TESTS AS OUTLINED HEREINAFTER AND OTHER TESTS REQUIRED TO ESTABLISH THE ADEQUACY, QUALITY, SAFETY, COMPLETED STATUS AND SUITABLE OPERATION OF EACH SYSTEM.

C. PROMPTLY CORRECT ANY FAILURES, DEFICIENCIES AND/OR DEFECTS REVEALED BY THESE TESTS. AFTER CORRECTING FAILURES, DEFICIENCIES OF DEFECTS, CONDUCT NEW TESTING TO VERIFY THAT THE DEFICIENCY HAS BEEN RECTIFIED AND THE SYSTEM IS FUNCTIONING PROPERLY.

D. NEW AND EXISTING PANELBOARDS SHALL HAVE PHASE CURRENTS BALANCED TO WITHIN +/- 10% VARIATION BETWEEN AVERAGE PHASE CURRENT AND MEASURED INDIVIDUAL PHASE.

E. AN OPERATIONAL TEST OF THE EMERGENCY LIGHTING/EXIT SIGNAGE SYSTEM SHALL BE PERFORMED IN THE PRESENCE OF THE OWNER AND THE AUTHORITY HAVING JURISDICTION TO DEMONSTRATE PROPER OPERATION AND COMPLIANCE WITH APPLICABLE CODES AND SPECIFIED REQUIREMENTS.

OPERATION AND MAINTENANCE MANUALS

A. THIRTY (30) DAYS PRIOR TO SUBSTANTIAL COMPLETION, SUBMIT OPERATING AND MAINTENANCE MANUALS FOR EQUIPMENT TO ENGINEER FOR APPROVAL. INCLUDE ONE COPY OF EACH FINAL APPROVED SUBMITTAL FOR RECORD PURPOSES, INDICATING THE ACTUAL PRODUCT INSTALLED. INCLUDE SIGNIFICANT CHANGES IN THE PRODUCT DELIVERED TO PROJECT SITE AND CHANGES IN MANUFACTURER'S WRITTEN INSTRUCTIONS FOR INSTALLATION.

8. PROVIDE COMPREHENSIVE CONTACT LIST INCLUDING CONTRACTOR AND SUBCONTRACTOR'S NAMES, ADDRESSES, TELEPHONE AND CONTACT PERSON FOR OWNER'S USE.

TRAINING OF OWNER'S DESIGNATED PERSONNEL

A. PREPARE AND SUBMIT OPERATING INSTRUCTIONS AND PROVIDE ON-SITE TRAINING OF OWNER'S PERSONNEL IN USE AND MAINTENANCE OF OPERATING EQUIPMENT.

WARRANTY

A. THE CONTRACTOR SHALL GUARANTEE ALL MATERIALS, EQUIP JALS, EQUIPMENT AND THE INSTALLATION TO BE FREE OF DEFECTS THAT MAY DEVELOP IN ANY PART OF THEIR WORK CAUSED BY FAULTY WORKMANSHIP, MATERIAL OR EQUIPMENT FAILURES, FOR A MINIMUM OF ONE (1) YEAR FROM THE DATE OF SUBSTANTIAL COMPLETION OR FOR AS LONG AS NORMAL EQUIPMENT MANUFACTURER WARRANTIES ARE IN EFFECT FROM THE DATE OF OWNER ACCEPTANCE OF THE PROJECT, WHICHEVER IS LATER.

B. DURING THE ONE (1) YEAR WARRANTY PERIOD, THE CONTRACTOR SHALL BE RESPONSIBLE FOR ANY DAMAGE TO THE PREMISES CAUSED BY DEFECTS IN WORKMANSHIP OR DEFECTS IN THE WORK OR EQUIPMENT FURNISHED AND/OR INSTALLED UNDER THE WORK OF THE ELECTRICAL CONTRACT.

DEMOLITION

A. REMOVE ALL ELECTRICAL FIXTURES (EQUIPMENT, CONDUIT, WIRING, DEVICES, AND SYSTEMS, ETC.) THAT ARE NOT BEING REUSED.

B. OWNER SHALL HAVE FIRST RIGHT OF REFUSAL UPON REMOVAL OF ALL SALVAGED ITEMS. OTHERWISE, REMOVE ALL DEMOLISHED ITEMS FROM SITE. NO EQUIPMENT OR ACCESSORIES SHALL BE ABANDONED IN PLACE. DEMOLISHED ITEMS SHALL NOT BE RE-INSTALLED WITHOUT PRIOR WRITTEN APPROVAL FROM THE OWNER OR AS DIRECTED ON PLANS.

Engineers
Property of TVP

1	SCALE N.T.S.	ELECTRICAL SPECIFICATIONS

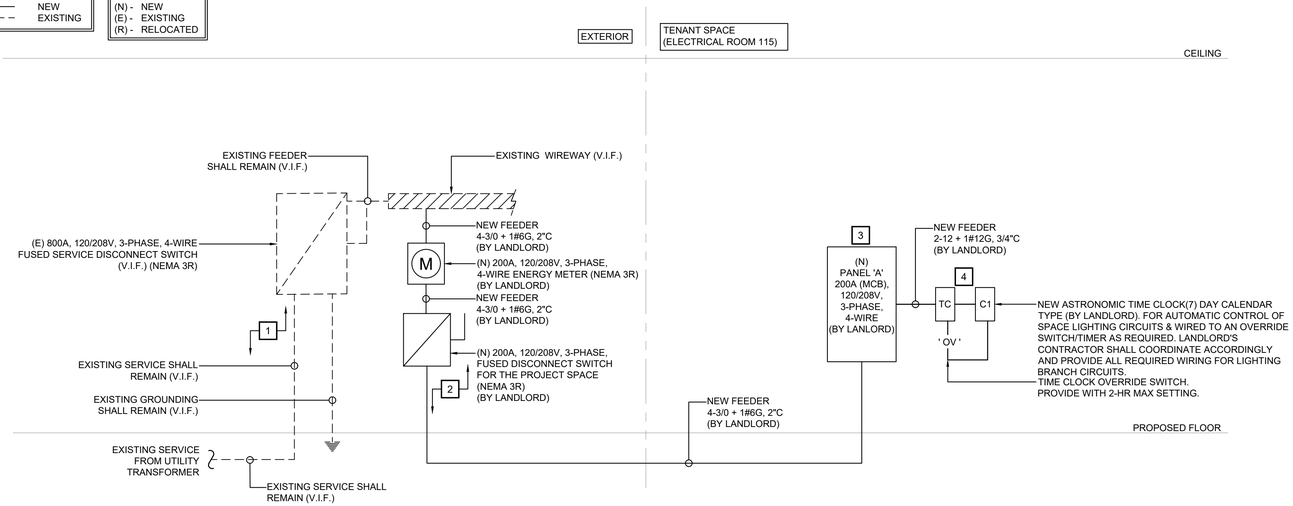
USA Ninja Challenge

TITLE:
ELECTRICAL SPECIFICATIONS SHEET 2 OF 2

SHEET NUMBER:
E-0.3

LEGEND:
——— NEW
– – – – – EXISTING

ABBREVIATIONS:
(N) - NEW
(E) - EXISTING
(R) - RELOCATED



ELECTRICAL PANEL SCHEDULE

PANELBOARD			A	VOLTAGE		120 / 208 V		PHASE		3	WIRE		4			
PANEL TYPE			MCB	MAINS		200A		BUS RATING		200A	AIC RATING		10KA (V.I.F.)			
NEMA TYPE ENCLOSURE			1	MOUNTING		SURFACE		OPTIONS		-	NOTE		NEW PANEL			
CKT. NO.	EQT TAG	CKT TAG	DESCRIPTION	POLE	WIRE SIZE	BKR. SIZE	TOTAL WATTS	PHASE	TOTAL WATTS	BKR. SIZE	WIRE SIZE	POLE	DESCRIPTION	CKT TAG	EQT TAG	CKT. NO.
1		(N)	LIGHTING- LOBBY, VIEWING AREA	1	12	20	600	A	900	20	12	1	ARENA GENERAL REC.	(N)		2
3	C1/a	(N)	LIGHTING- GYM ARENA	1	12	20	800	B	720	20	12	1	ARENA GENERAL REC.	(N)		4
5		(N)	LIGHTING- RESTROOM, OFFICE ETC.	1	12	20	500	C	180	20	12	1	DRINKING FOUNTAIN (EDF-1)	(N)		6
7		(N)	CEILING FAN	1	12	20	500	A	1,080	20	12	1	LOBBY/VIEWING AREA GEN. REC.	(N)		8
9	TC	(N)/(C)	STOREFRONT SIGNAGE	1	12	20	1,500	B	360	20	12	1	OFFICE RECEPTACLE	(N)		10
11	TC	(N)	SHOW WINDOW RECEPTACLE	1	12	20	800	C	720	20	12	1	STAFF ROOM/CLOSET GEN. RE.	(N)		12
13	TC	(N)	SHOW WINDOW RECEPTACLE	1	12	20	800	A	360	20	12	1	STAFF ROOM COUNTERTOP REC.	(N)		14
15		(N)	TV RECEPTACLE	1	12	20	600	B	360	20	12	1	RESTROOM GFI RECPETACLE	(N)		16
17		(N)	UTILITY ROOM GFI REC.	1	12	20	180	C	360	20	12	1	HVAC GFI RECEPTACLE	(N)		18
19		(N)	COUNTER RECEPTACLE	1	12	20	360	A	100	20	12	1	RCP-1	(N)		20
21		(N)	TIMECLOCK	1	12	20	200	B	1,500	20	12	2	WATER HEATER (WH-1)	(N)		22
23			SPARE	1		20		C	1,500							24
25							1,081	A	4,204							26
27		(N)	(N) AHU-1	3	12	15	1,081	B	4,204	45	8	3	(N) ACCU-1	(N)		28
29							1,081	C	4,204							30
31							1,081	A	4,204							32
33		(N)	(N) AHU-2	3	12	15	1,081	B	4,204	45	8	3	(N) ACCU-2	(N)		34
35							1,081	C	4,204							36
37							1,081	A	4,204							38
39		(N)	(N) AHU-3	3	12	15	1,081	B	4,204	45	8	3	(N) ACCU-3	(N)		40
41							1,081	C	4,204							42
43			SPARE	1		20		A		20		1	SPARE			44
45			SPARE	1		20		B		20		1	SPARE			46
47			SPARE	1		20		C		20		1	SPARE			48
49			SPACE					A					SPACE			50
51			SPACE					B					SPACE			52
53			SPACE					C					SPACE			54

ALL PHASES TO BE BALANCED TO WITHIN 7%
A= 20,555 WATTS
B= 21,895 WATTS
C= 20,095 WATTS

TOTAL CONNECTED LOAD	62,545	WATTS	174	AMPS
TOTAL DEMAND LOAD	63,795	WATTS	178	AMPS

(E) EXISTING TO REMAIN
(N) NEW CIRCUIT
GFCI GROUND FAULT CURRENT INTERRUPTER
IG CIRCUITS WITH ISOLATED GROUND
TC CIRCUITS ON TIMECLOCK
EMS ROUTING TO THE EMS PANEL
C BREAKER LOCK
a,b,c SWITCHES CONTROLLING LIGHTS

ELECTRICAL LOAD SUMMARY

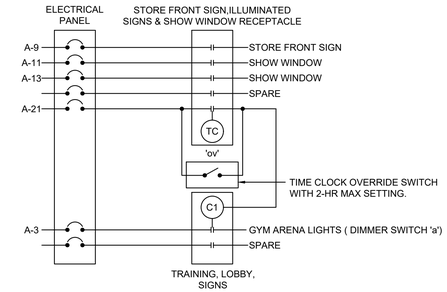
DESCRIPTION	NEC CONNECTED kW	VOLT	PHASE	NEC DEMAND FACTOR	NEC DEMAND kW
LIGHTING- 120V	1.9	120	1	1.25	2.4
RECEPTACLES	6.4	120	1	>10kW=10+[0.5*(kW-10)]	6.4
STOREFRONT SIGN	1.5	120	1	1.25	1.9
S/W OUTLETS	1.6	120	1	1.25	2.0
AHU	9.7	208	3	1.00	9.7
EQUIPMENT	0.6	120	1	1.00	0.6
ACCU	37.8	208	3	1.00	37.8
HOT WATER HEATER	3.0	208	1	1.00	3.0
TOTALS	62.5				63.8

NOTES:
* USE GREATER VALUE OF THE TWO CATEGORIES.
** 125% OF THE LARGEST MOTOR OR COMPRESSOR IN SYSTEM APPLIED ONLY ON ONE UNIT.
*** N.E.C. ARTICLE 220-12 REQUIREMENT (200 VA PER FOOT OF SHOW WINDOW) MINUS ACTUAL SHOW WINDOW LIGHTING kVA.

N.E.C. DEMAND kVA x 1,000 / SYSTEM VOLTAGE x 1.732 = MINIMUM FEEDER AMPERAGE

63.8 x 1000 = 63,795
208 x 1.732 = 360
177.1 AMPS

USE (NEW) 200AMP ELECTRICAL FEEDER FROM EXISTING BASE BUILDING'S WIREWAY (BY LANDLORD).



TIME CLOCK SCHEDULE:

CONTRACTOR TO SET TIME CLOCK SETTINGS AND VERIFY WITH OWNER:

1. DURING SET "OFF" TIME LIGHTING TO BE CONTROLLED BY A 2-HR MANUAL OVERRIDE SWITCH.

2 | SCALE N.T.S. | TIME CLOCK AND LIGHTING CONTACTOR DETAILS.

GENERAL NOTES:

1. PROPER CLEARANCE MUST BE MAINTAINED ABOUT ELECTRICAL EQUIPMENT PER N.E.C. FIELD VERIFY EXACT MOUNTING SPACE AVAILABLE IN ELECTRICAL ROOM/AREA PRIOR TO INSTALLATION OF ELECTRICAL EQUIPMENT.
2. MAKE ALL FINAL ELECTRICAL CONNECTIONS FOR A COMPLETE ELECTRICAL DISTRIBUTION SYSTEM. ALL CONNECTIONS/DISCONNECTIONS TO LANDLORDS/UTILITIES SERVICE EQUIPMENT SHALL BE AS DIRECTED BY LANDLORDS/UTILITIES SITE REPRESENTATIVE. TENANT GENERAL CONTRACTOR SHALL BE RESPONSIBLE FOR ALL TERMINATION/DETERMINATION EXPENSES.
3. SYSTEM SHALL BE GROUNDED TO THE MAIN BUILDING'S GROUNDING SYSTEM.
4. DISCONNECT SWITCHES AND PANELS SHALL BE INSTALLED ON PLYWOOD BACKBOARDS.
5. LANDLORD'S CONTRACTOR MUST VERIFY ELECTRICAL SERVICE, SUB-FEED WIRING AND PANELS PRIOR TO START OF TENANT'S ELECTRICAL WORK. LANDLORD'S GENERAL CONTRACTOR SHALL MAKE APPLICATION TO THE LOCAL UTILITY FOR CONTINUED METERED ELECTRIC SERVICE IN THE TENANT'S NAME. LANDLORD'S GENERAL CONTRACTOR SHALL CONFIRM ALL LOCAL UTILITY GUIDELINES AND REQUIREMENTS PRIOR TO BID, SHALL INCLUDE THE COSTS OF THESE REQUIREMENTS IN THE BID, AND SHALL COMPLY WITH THEM DURING CONSTRUCTION. AVAILABLE FAULT CURRENT AT SERVICE EQUIPMENT SHALL BE LEGIBLY MARKED IN THE FIELD WITH THE MAXIMUM AVAILABLE FAULT CURRENT PER NATIONAL ELECTRICAL CODE (NEC) OF ARTICLE 110.24.
6. CONTRACTOR SHALL COORDINATE SHORT CIRCUIT RATING (Isc) WITH UTILITY & AHJ, PRIOR TO COMMENCING ANY WORK, TYPICAL FOR ALL ELECTRICAL EQUIPMENT
7. CONTRACTOR SHALL VERIFY INCOMING SERVICE AMPERAGE, WIRE SIZING AND DISTRIBUTION.
8. CONTRACTOR SHALL COORDINATE WITH BASE BUILDING FOR THE EXACT LOCATION OF THE EXISTING SWITCH GEAR AND EXACT POWER DISTRIBUTION.
9. CONTRACTOR SHALL VERIFY OPERABLE CONDITION INFIELD OF ALL EXISTING TO REMAIN ELECTRICAL DEVICES/EQUIPMENTS AND REPLACE WITH NEW IF FOUND INOPERABLE.
10. DRAWING ARE DIAGRAMMATIC AND INDICATE GENERAL ARRANGEMENT OF SYSTEMS AND WORK. ALL CONDUIT ROUTING AND OFFSETS, DROPS AND RISES OF RUNS ARE NOT SHOWN ON THE PLANS AND ARE SHOWN DIAGRAMMATICALLY IN THE RISERS. 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.
11. ALL TERMINATIONS SHALL BE RATED FOR 75°C CONNECTIONS FOR COPPER CONDUCTORS. ALL METALLIC CONDUIT SHALL BE GROUNDED. SYSTEM SHALL BE BONDED TO THE MAIN BUILDING GROUNDING SYSTEM.

RISER KEYED NOTES:

1. LANDLORD'S CONTRACTOR SHALL COORDINATE WITH BASE BUILDING/LANDLORD/OWNER FOR EXACT POWER DISTRIBUTION, LOCATION PRIOR TO COMMENCING ANY WORK. INFORM ENGINEER ON RECORD FOR ANY DISCREPANCIES. BASE BID ACCORDINGLY.
2. NEW 200A, 120/208V, 3-PHASE, 4-WIRE ENERGY METER WITH FUSED DISCONNECT SWITCH (BY LANDLORD) FOR THE USA NINJA PROJECT SPACE. LANDLORD'S CONTRACTOR SHALL COORDINATE EXACT LOCATION WITH LANDLORD/OWNER IN FIELD. BASE BID ACCORDINGLY.
3. NEW 200A (MCB), 120/208V, 3-PHASE, 4-WIRE ELECTRICAL PANEL 'A' (BY LANDLORD) FOR THE USA NINJA PROJECT SPACE . LANDLORD'S CONTRACTOR SHALL COORDINATE EXACT LOCATION WITH LANDLORD/OWNER IN FIELD. BASE BID ACCORDINGLY. LANDLORD'S CONTRACTOR SHALL MAINTAIN CLEARANCE FOR ELECTRICAL PANEL PER NEC ARTICLE 110.26(A) AND (B).
4. NEW TIME CLOCK WITH LIGHTING CONTACTOR (BY LANDLORD). LANDLORD'S CONTRACTOR SHALL COORDINATE THE EXACT LOCATION AND REQUIREMENT WITH ARCHITECT/OWNER PRIOR TO ROUGH IN. BASE BID ACCORDINGLY.

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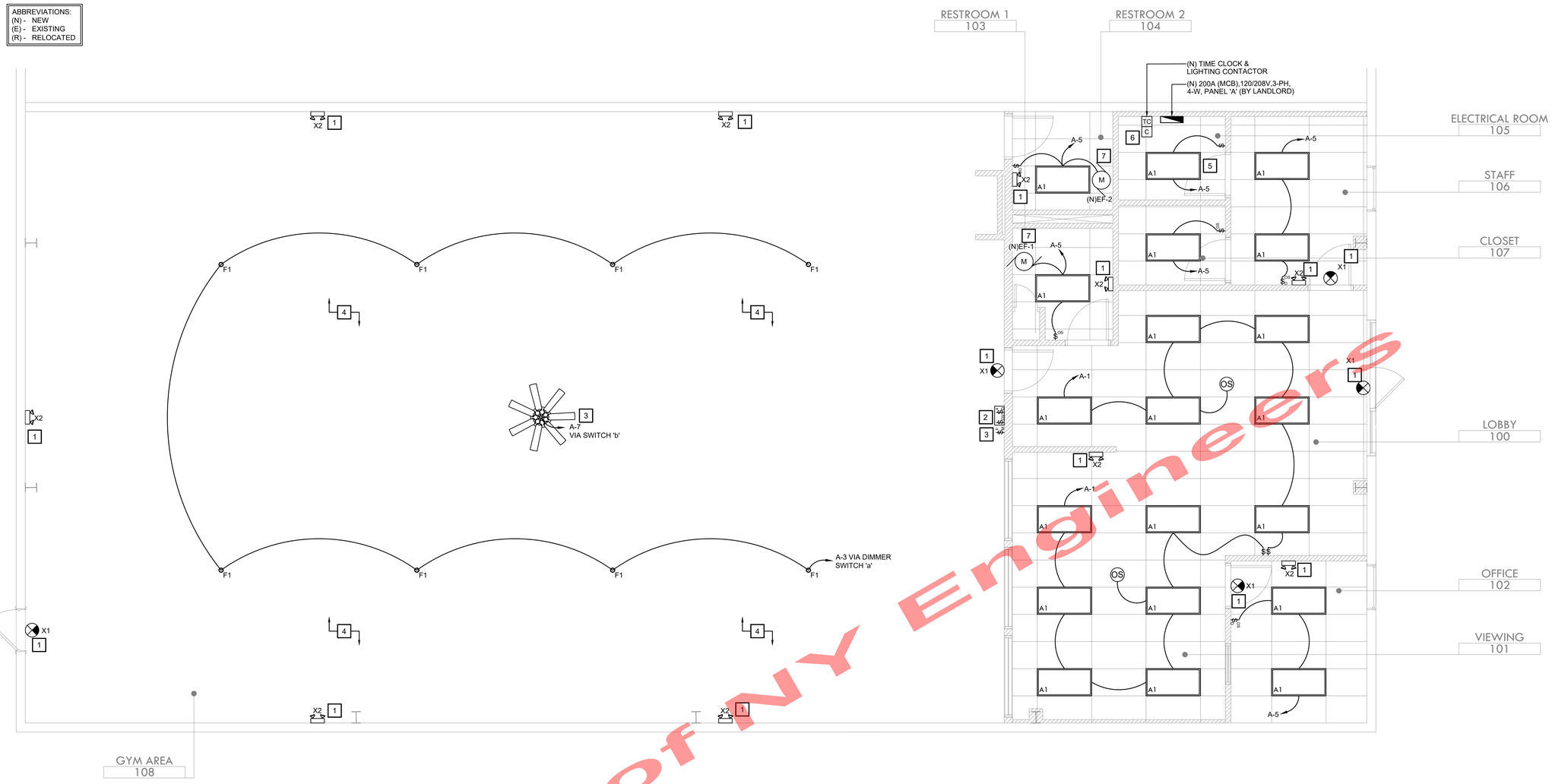
TITLE:
ELECTRICAL RISER DIAGRAM AND PANEL SCHEDULES

SHEET NUMBER:
E-0.4

1 | SCALE N.T.S. | RISER DIAGRAM AND PANEL SCHEDULES

LEGEND:
NEW
EXISTING

ABBREVIATIONS:
(N) - NEW
(E) - EXISTING
(R) - RELOCATED



GENERAL NOTES:

1. COORDINATE EXACT LOCATIONS AND MOUNTING HEIGHTS WITH ARCHITECTURAL PLANS. REFER TO ARCHITECTURAL REFLECTED CEILING PLANS, DETAILS, AND LIGHTING NOTES FOR DEVICE PLACEMENT AND OTHER RELEVANT INFORMATION.
2. 'E' DENOTES EXISTING FIXTURE/DEVICE TO REMAIN. 'R' DENOTES EXISTING FIXTURE/DEVICE TO BE RELOCATED.
3. VERIFY FUNCTIONALITY OF ALL EXISTING AND RELOCATED FIXTURES, CONTROLS, AND EXIT SIGNS. PROVIDE REPLACEMENTS WHERE EQUIPMENT IS DEFECTIVE OR WORN.
4. REFER TO ELECTRICAL SYSTEM AND EQUIPMENT SCHEDULES FOR LIGHTING POWER DENSITY INFORMATION.
5. PROVIDE AN UNSWITCHED EMERGENCY POWER CONNECTION TO ALL IDENTIFIED EGRESS FIXTURES.
6. ALL SWITCHES FOR LIGHTS, SHADES, OR OTHER DEVICES SHOWN IN THE SAME AREA SHALL BE GANGED TOGETHER AND PROVIDED WITH MULTI-GANG COVER PLATES WHERE POSSIBLE.
7. REFER TO ELECTRICAL DRAWINGS FOR PANEL AND DISTRIBUTION EQUIPMENT LOCATIONS.
8. ALL EXIT SIGNS SHALL BE TYPE "X1" UNLESS OTHERWISE NOTED.
9. WALL-MOUNTED OCCUPANCY SENSOR: WIRELESS/ WIRED SWITCH FOR MANUAL CONTROL OF LOCAL AREA OR PROGRAMMED FOR ANY ZONE ON THE SYSTEM. EACH SUBSCRIPT REPRESENTS A SEPARATE SWITCH FOR EACH ZONE. EXAMPLE SHOWN AS TWO SEPARATE SWITCHES. SUBSCRIPT "OS" SIGNIFIES A LOCAL AREA SWITCH WITH OCCUPANCY SENSING CONTROL (SMART WALL STATIONS SERIES OR NX CONNECT WIRELESS SERIES OR APPROVED EQUAL).
10. CEILING-MOUNTED OCCUPANCY SENSORS: WIRELESS/WIRED DEVICE TO BE PAIRED WITH THE DIMMING RELAY IT CONTROLS. COORDINATE AREA COVERAGE WITH MANUFACTURER.
11. LOWER-CASE LETTERS INDICATED ON FIXTURES AND SWITCHES REPRESENT CONTROL RELATIONSHIPS BETWEEN SWITCHES AND FIXTURES IN EACH ROOM/AREA.
12. ALL CONTROL CABLING PROVIDED AS PART OF ANY LIGHTING CONTROL SYSTEM SHALL BE PLENUM-RATED.
13. CIRCUIT HOMERUN DESIGNATIONS ARE SHOWN FOR DESIGN INTENT ONLY BASED ON AVAILABLE PANEL SCHEDULES. CONTRACTOR SHALL CONFIRM ALL SPARE BREAKERS AND CIRCUITS MADE AVAILABLE THROUGH DEMOLITION.
14. DIMMING SWITCHES SHALL BE WIRELESS/WIRED SWITCH FOR MANUAL CONTROL OF LOCAL AREA OR PROGRAMMED FOR ANY ZONE ON THE SYSTEM.
15. CONSULT WITH LIGHTING REPRESENTATIVE FOR COMPLETE FIXTURE SCHEDULE PACKAGE (CONTACT INFO TO BE PROVIDED BY OWNER OR ARCHITECT).
16. ARCHITECT/INTERIOR DESIGNER SHALL APPROVE ALL STYLES AND COLORS OF CONTROLS.
17. ENGRAVING SHALL BE PROVIDED ON ALL CONTROLS ACCESSIBLE ONLY TO AUTHORIZED PERSONNEL. WORDING SHALL BE DETERMINED BY THE ARCHITECT/OWNER IN COORDINATION WITH NX LIGHTING.
18. ALL LIGHTING CONTROL DEVICES SHALL BE CERTIFIED AS REQUIRED BY THE AUTHORITY HAVING JURISDICTION.
19. PROGRAMMING OF CONTROLS (IF REQUIRED) SHALL BE THE CONTRACTOR'S RESPONSIBILITY.
20. CONTRACTOR SHALL OBTAIN FIELD APPROVAL OF DEVICE LOCATIONS FROM THE ARCHITECT PRIOR TO INSTALLATION.
21. ELECTRICAL DRAWINGS ARE DIAGRAMMATIC. EXACT LOCATIONS SHALL BE DETERMINED IN THE FIELD BASED ON INTENT, MANUFACTURER RECOMMENDATIONS, AND BEST INDUSTRY PRACTICES.
22. ARENA AND FLEX AREAS SHALL BE CONTROLLED BY AUTOMATIC TIME SWITCH CAPABILITIES WITH MANUAL OVERRIDE . MANUAL OVERRIDE SHALL NOT EXCEED TWO HOURS.
23. CONTRACTOR SHALL PROVIDE AND INSTALL POWER PACKS AS REQUIRED TO COMPLETE THE LIGHTING CONTROL SYSTEM AND ENSURE PROPER OPERATION IN ACCORDANCE WITH CODE REQUIREMENTS AND MANUFACTURER'S RECOMMENDATIONS.

KEYED NOTES:

1. ALL NEW EXIT SIGNS & EMERGENCY LIGHTS TO BE CONNECTED TO LOCAL LIGHTING CIRCUIT AHEAD OF SWITCHING AND SHALL BE PROVIDED WITH A 90 MIN BATTERY BACK UP POWER PACK.
2. NEW MASTER SWITCH BANK WITH INBUILT OVERRIDE SWITCH LOCATION. DIMMER SWITCHES SHALL BE RATED FOR A TOTAL LOAD OF SWITCHED CIRCUIT AND LAMP TYPE AS REQUIRED. DIMMERS SHALL BE PROVIDED WITH AN ON/OFF SWITCH. VERIFY/CONFIRM LOCATION WITH OWNER PRIOR TO INSTALLATION AND ROUGH-IN.
3. ELECTRICAL CONTRACTOR SHALL COORDINATE WITH MANUFACTURER FOR EXACT ELECTRICAL AND CONTROL REQUIREMENTS PRIOR TO ROUGH IN. PROVIDE MOTOR RATED SWITCH AS REQUIRED. COORDINATE EXACT LOCATION FOR THE FAN SWITCHES WITH ARCHITECT/OWNER IN FIELD.
4. ELECTRICAL CONTRACTOR SHALL COORDINATE WITH THE LIGHTING VENDOR/ARCHITECT TO CONFIRM DIMMING COMPATIBILITY OF ALL SPECIFIED LIGHT FIXTURES. VERIFY LIGHT FIXTURES REQUIRING (0-10V) DIMMING AND OR ELV/MLV/TRIAC DIMMING. PROVIDE APPROPRIATE DIMMER SWITCHES AND DEDICATED CIRCUITING AS REQUIRED.
5. LIGHTING NEAR ELECTRICAL PANELS SHALL NOT BE CONTROLLED BY ANY AUTOMATIC MEANS AND SHALL BE COMPILED AS PER NEC 110.26(D).
6. NEW TIME CLOCK/LIGHTING CONTACTOR (BY LANDLORD) FOR AUTOMATIC CONTROL OF SPACE LIGHTING CIRCUITS & WIRED TO AN OVERRIDE SWITCH/TIMER AS REQUIRED. LANDLORD'S CONTRACTOR SHALL COORDINATE ACCORDINGLY AND PROVIDE ALL REQUIRED WIRING FOR LIGHTING BRANCH CIRCUITS.
7. NEW EXHAUST FAN OPERATED THROUGH LIGHT SWITCH. SEE MECHANICAL DRAWINGS FOR MORE INFORMATION AND SPECIFICATION.

LIGHT FIXTURE SCHEDULE

SYMBOL	TAG	MANUF.	DESCRIPTION	MODEL	VOLTAGE	TOTAL WATTS	PROV. BY	INSTALL BY
	F1	LED UFO HIGHBAY	LED UFO HIGH BAY LIGHT FIXTURE	PT-HB-100W-M-50	120V	100W	GC	GC
	X1	COMPASS LIGHTING	EXIT SIGN W/ 90MIN BATT PACK	CCE EXIT SERIES	-	1W	GC	GC
	X2	COMPASS LIGHTING	WALL-MOUNTED EMERGENCY LIGHTS	CSWEU2LED	-	1.9W	GC	GC
	A1	COLUMBIA LIGHTING	24"X48" LED PANEL	CBT24-LS35	120V	48W	GC	GC

NOTE:
PRIOR TO BID, CONTRACTOR SHALL COORDINATE COMPLETE LIGHTING FIXTURE PACKAGE WITH ARCHITECT/OWNER FOR FINAL COLOR TEMPERATURE (KELVIN), LENGTHS, AND FINISH COLOR.

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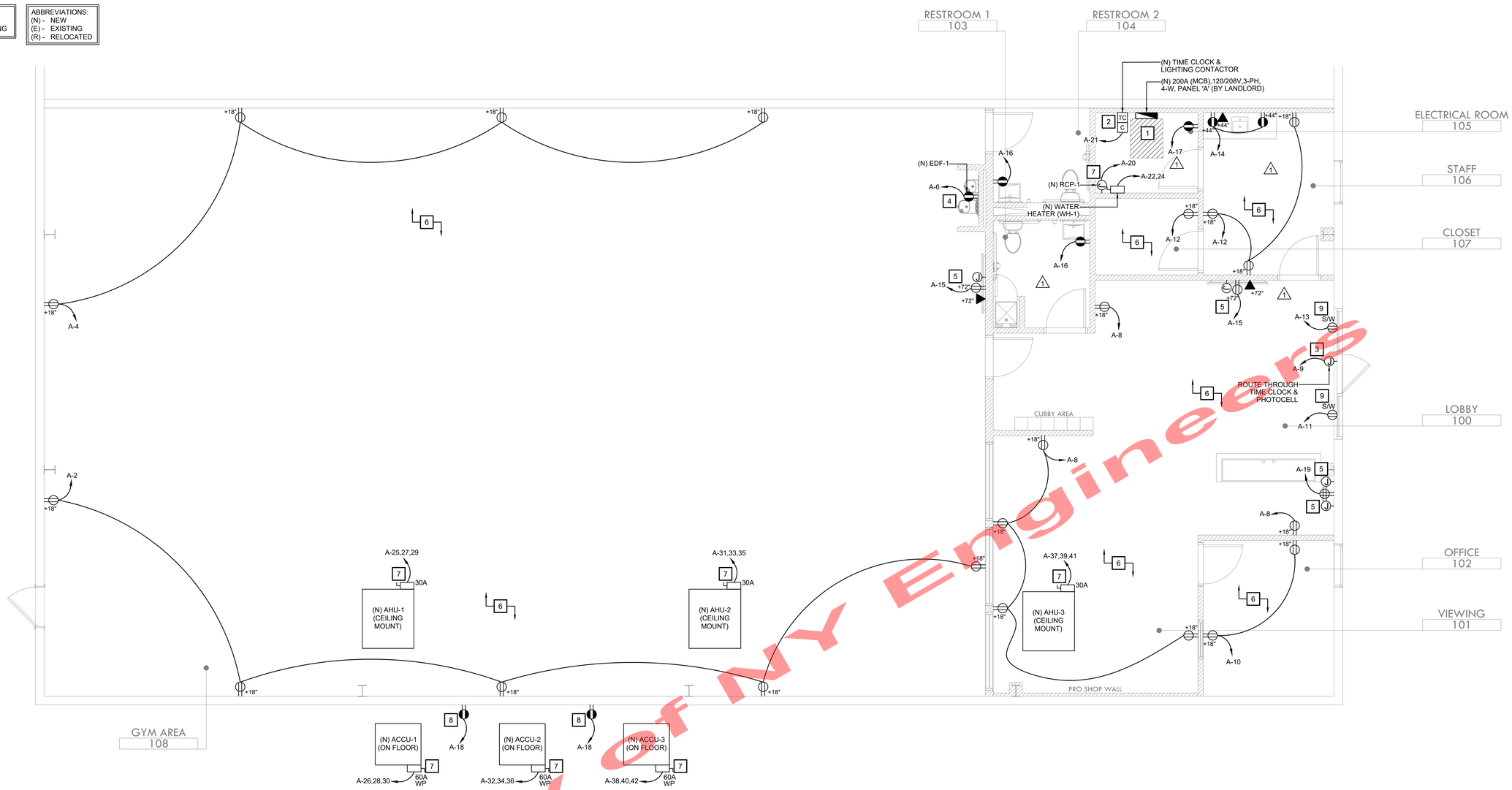
1 | SCALE 1 / 4" = 1' - 0" | LIGHTING PLAN

TITLE: LIGHTING PLAN

SHEET NUMBER: E-1.0

LEGEND:
——— NEW
– – – – – EXISTING

ABBREVIATIONS:
(N) - NEW
(E) - EXISTING
(R) - RELOCATED

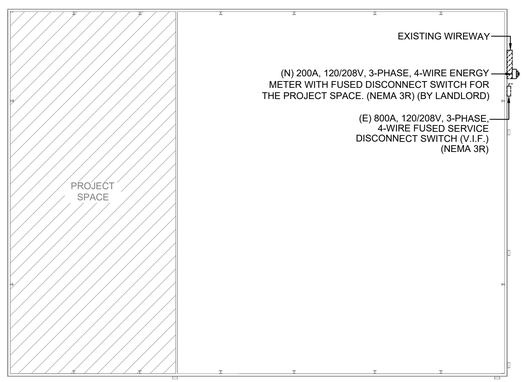


GENERAL NOTES:

1. COORDINATE WITH ARCHITECTURAL PLANS FOR EXACT LOCATIONS AND MOUNTING HEIGHTS OF ALL OUTLETS, JUNCTION BOXES, SWITCHES, FUSE DISCONNECTS, AND EQUIPMENT IN MILLWORK.
2. ELECTRICAL CONTRACTOR SHALL VERIFY ALL CONNECTION REQUIREMENTS FOR ALL EQUIPMENT SUPPLIED BY OTHERS PRIOR TO ROUGH-IN. COORDINATE NEMA PLUG CONFIGURATIONS WITH EQUIPMENT AND PROVIDE MATCHING RECEPTACLES WHERE APPLICABLE.
3. CONNECT COMPLETE POWER AND CONTROL SYSTEMS OF ALL HVAC/MECHANICAL EQUIPMENT PER MECHANICAL PLANS. COORDINATE WITH HVAC AND PLUMBING CONTRACTORS FOR EXACT LOCATIONS AND REQUIREMENTS.
4. ALL 125-VOLT RECEPTACLES INSTALLED WITHIN 6 FEET OF SINKS AND IN RESTROOMS SHALL HAVE GFCI PROTECTION PER NEC 210.8. WHERE RECEPTACLES ARE NOT READILY ACCESSIBLE (E.G., BEHIND EQUIPMENT), PROVIDE GFCI BREAKER AT THE PANELBOARD.
5. PROVIDE GROUNDING IN ACCORDANCE WITH NEC ARTICLE 250 FOR ALL SYSTEMS INCLUDING EQUIPMENT FRAMES, CONDUITS, SWITCHES, CONTROLLERS, WIREWAYS, AND NEUTRAL CONDUCTORS. PROVIDE AN INSULATED GROUND WIRE IN ALL CIRCUITS, SIZED PER NEC BUT NOT SMALLER THAN #12 AWG. PROVIDE #6 CU GROUND TO NEW METAL GAS PIPING SYSTEMS.
6. PROVIDE FINAL CONNECTIONS TO ALL HARD-WIRED EQUIPMENT USING LIQUID-TITE FLEXIBLE CONDUIT. ALL MOTORS AND EQUIPMENT SHALL HAVE DISCONNECTING MEANS. ALL EXTERIOR DISCONNECTS SHALL BE WEATHERPROOF.
7. INSTALL PULL AND JUNCTION BOXES WHERE REQUIRED BY NEC OR JOB CONDITIONS. ALL NEW WIRING SHALL BE TAGGED AT PULL BOXES, JUNCTION BOXES, EQUIPMENT BOXES, AND CABINETS WITH APPROVED TAGS.
8. ALL DATA, TELEPHONE, CABLE TV, AUDIO/VIDEO, CAMERA, SECURITY, AND LOW VOLTAGE OUTLETS SHALL BE PROVIDED WITH 1" CONDUIT AND PULL STRING, AND COORDINATED WITH LOW VOLTAGE CONTRACTORS AND VENDORS.
9. POS COMPUTERS, POS PRINTERS, AUDIO/VIDEO EQUIPMENT, MANAGER'S OFFICE COMPUTERS, NETWORK RACKS, AND TELECOM EQUIPMENT SHALL BE SERVED BY DEDICATED ORANGE RECEPTACLES. ORANGE RECEPTACLES SHALL NOT BE USED FOR GENERAL OUTLETS.
10. PROVIDE SEAL-OFFS FOR ALL CONDUITS ENTERING OR LEAVING WALK-IN BOXES. ALL SLAB AND WALL PENETRATIONS SHALL BE SEALED WITH FM APPROVED FIRE CAULK.
11. ALL CIRCUITS WITHIN ELECTRICAL ROOMS, MECHANICAL ROOMS, AND CORE AREAS SHALL BE INSTALLED IN HARD CONDUIT. ALL TENANT SLAB-UNDERGROUND RUNS SHALL BE IN HARD CONDUIT TIGHT TO DECK.
12. ALL ELECTRICAL OUTLETS SHALL BE LABELED TO REFLECT PANEL AND BREAKER NUMBERS.
13. FIELD VERIFY AND COORDINATE EQUIPMENT DISCONNECT LOCATIONS WITH OTHER TRADES PRIOR TO INSTALLATION. LOCATIONS SHALL COMPLY WITH NEC REQUIREMENTS.
14. ELECTRICAL CONTRACTOR SHALL CLEAN ALL BUILDING CORE ELECTRIC ROOMS AND PANELBOARDS OF DUST AND DEBRIS UPON COMPLETION OF WORK.
15. ELECTRICAL CONTRACTOR SHALL PROVIDE CORRECT NUMBER OF WIRES, WHETHER SHOWN OR NOT, TO FACILITATE PROPER OPERATION OF ALL EQUIPMENT AT NO ADDITIONAL COST.
16. ELECTRICAL CONTRACTOR SHALL VERIFY ALL REO'S FOR POS, TELECOM, AUDIO/VIDEO, AND LOW VOLTAGE DEVICES PRIOR TO ROUGH-IN AND COORDINATE LOCATIONS WITH LANDLORD WHERE REQUIRED.
17. PROVIDE COMPLETE ELECTRICAL PATHWAYS AND ROUGH-IN FOR WIRELESS ACCESS POINTS, SPEAKERS, CAMERAS, AND OTHER TENANT-PROVIDED LOW VOLTAGE DEVICES.
18. ALL SWITCHES AND DEVICES SHALL MATCH FINISH REQUIREMENTS (WHITE TO WHITE, GRAY TO GRAY/BLUE).
19. ALL BUILDING CORE ELECTRICAL CORES INTO CEILING SPACE BELOW PREMISES MUST BE HARD CONDUIT TO DECK WITH J-BOX OR TRANSFER BOX AT CORE.

KEYED NOTES:

1. NEW 200A (MCB), 120/208V, 3-PHASE, 4-WIRE ELECTRICAL PANEL 'A' (BY LANDLORD) FOR THE USA NINJA PROJECT SPACE . LANDLORD'S CONTRACTOR SHALL COORDINATE EXACT LOCATION WITH LANDLORD/OWNER IN FIELD. BASE BID ACCORDINGLY. LANDLORD'S CONTRACTOR SHALL MAINTAIN CLEARANCE FOR ELECTRICAL PANEL PER NEC ARTICLE 110.26(A) AND (B).
2. NEW TIME CLOCK/LIGHTING CONTACTOR FOR AUTOMATIC CONTROL OF SPACE LIGHTING CIRCUITS & WIRED TO AN OVERRIDE SWITCH/TIMER AS REQUIRED. LANDLORD'S CONTRACTOR SHALL COORDINATE ACCORDINGLY AND PROVIDE ALL REQUIRED WIRING FOR LIGHTING BRANCH CIRCUITS.
3. JUNCTION BOX FOR EXTERIOR SIGNAGE. CONTRACTOR TO COORDINATE EXACT LOCATION, HEIGHT & POWER REQUIREMENT WITH VENDOR PRIOR TO ROUGH-IN. BASE BID ACCORDINGLY. BASE BID ACCORDINGLY.
4. CONTRACTOR TO COORDINATE EXACT LOCATION, HEIGHT & POWER REQUIREMENT WITH VENDOR PRIOR TO COMMENCING ANY WORK. PROVIDE POWER AS REQUIRED PER EQUIPMENT CUTSHEET. BASE BID ACCORDINGLY.
5. PROVIDE JUNCTION BOX,DUPLEX AND DATA OUTLET FOR TV. JUNCTION BOX IS USED FOR TV CABLE AND HDMI CABLE. IT SHALL HAVE ABILITY TO RUN HDMI FROM TV TO RECEPTION DESK SIDE WALL.ELECTRICAL CONTRACTOR SHALL COORDINATE WITH THE ARCHITECT/OWNER FOR THE EXACT LOCATION, MOUNTING HEIGHT, AND CONNECTIONS PRIOR TO ROUGH-IN AND PROVIDE AS REQUIRED.
6. COORDINATE EXACT MOUNTING HEIGHT AND LOCATION OF GENERAL OUTLETS WITH ARCHITECT/OWNER IN FIELD. PRIOR TO ROUGH IN.
7. ALL MECHANICAL & PLUMBING EQUIPMENT SHALL BE PROVIDED WITH THE REQUIRED ROUGH-INS, MOCP, AND WIRE SIZES. THE ELECTRICAL CONTRACTOR SHALL COORDINATE WITH THE MANUFACTURER FOR THE EXACT TYPE OF ROUGH-INS AND WIRE SIZE AT THE COMMENCEMENT OF WORK. COORDINATE EXACT LOCATION WITH ARCHITECT/OWNER IN FIELD.
8. IF A FACTORY-MOUNTED POWERED CONVENIENCE OUTLET IS NOT PROVIDED, A 120V, 20A GFI WEATHERPROOF RECEPTACLE SHALL BE PROVIDED WITHIN 25 FT OF ALL HVAC EQUIPMENT AS SHOWN. FIELD COORDINATE EXACT LOCATION OF THE HVAC EQUIPMENT AND ADD ADDITIONAL RECEPTACLES IF REQUIRED.
9. PROVIDE SHOW WINDOW RECEPTACLE AS PER NEC 210.62 AS REQUIRED. ELECTRICAL CONTRACTOR TO COORDINATE WITH ARCHITECT/OWNER FOR EXACT HEIGHT AND LOCATION PRIOR TO ROUGH-IN. BASE BID ACCORDINGLY.



1 | SCALE: N.T.S | SITE PLAN

1 | SCALE: 1 / 4" = 1' - 0" | ELECTRICAL POWER PLAN

TITLE: ELECTRICAL POWER PLAN

SHEET NUMBER: E-2.0

Property of NY Engineers

PLUMBING SPECIFICATIONS

1. GENERAL

THE "ARCHITECTURAL GENERAL CONDITIONS" GOVERN WORK UNDER THIS SECTION.

BEFORE SUBMITTING A PROPOSAL, THIS CONTRACTOR SHALL VISIT THE SITE OF THE WORK AND SHALL CAREFULLY EXAMINE THE DRAWINGS AND SPECIFICATIONS. IT IS EXPRESSLY UNDERSTOOD THAT THIS PROPOSAL IS BASED ON THE ABOVE REQUIREMENTS AND THAT IT COVERS EVERYTHING NECESSARY TO DO AND COMPLETE THE WORK.

2. INSPECTION AND COOPERATION

NO DEVIATION FROM THE DRAWINGS AND /OR SPECIFICATIONS WILL BE ALLOWED WITHOUT PRIOR WRITTEN APPROVAL OF ARCHITECT OR ENGINEER. THIS CONTRACTOR SHALL COOPERATE WITH THE OTHER CONTRACTORS TO ALLOW FOR THE INSTALLATION OF THEIR WORK AS WELL AS HIS OWN.

THIS CONTRACTOR SHALL BE RESPONSIBLE FOR HIS WORK FITTING IN PLACE WITHOUT CONFLICT WITH THE OTHER TRADES, WHERE PROPER PLANNING COULD AVOID INTERFERENCE.

3. CODES AND PERMITS

NOTHING IN THE DRAWINGS AND/OR SPECIFICATIONS SHALL BE INTERPRETED TO CONFLICT WITH ANY CITY OR PROVINCIAL LAW, REGULATION, CODE, ORDINANCE, RULING, OR FIRE UNDERWRITER'S REQUIREMENT APPLICABLE TO THIS CLASS OF WORK.

SHOULD THE DRAWINGS AND/OR SPECIFICATIONS CONFLICT WITH SUCH LAWS OR ORDINANCES, THE CONFLICTING PORTION OF THE WORK SHALL BE INSTALLED STRICTLY IN ACCORDANCE WITH SUCH LAWS AND ORDINANCES WITHOUT EXTRA COST.

THIS CONTRACTOR SHALL SECURE AND PAY FOR ALL NECESSARY PERMITS AND INSPECTIONS REQUIRED FOR THIS INSTALLATION OF HIS WORK.

4. ACCURACY OF DATA

THE INFORMATION GIVEN HEREIN AND ON THE DRAWINGS IS AS EXACT AS COULD BE SECURED, BUT ITS EXTREME ACCURACY IS NOT GUARANTEED. THIS CONTRACTOR SHALL EXAMINE THE LOCATIONS AND VERIFY ALL MEASUREMENTS, DISTANCES, ELEVATIONS AND EXISTING PIPE SIZES BEFORE STARTING THE WORK AS ALL PIPING SYSTEMS SHOWN ON THE DRAWINGS ARE DIAGRAMMATIC ONLY.

THIS CONTRACTOR SHALL PROVIDE ALL NECESSARY OFFSETS, RAISED AND DROPS IN PIPING AND DUCTWORK AS REQUIRED BY BUILDING CONDITIONS AT NO ADDITIONAL COST.

MECHANICAL DRAWINGS SHALL NOT BE USED FOR GENERAL CONSTRUCTION DIMENSIONS OR FOR TYPE OF MATERIAL USED. FOR EXACT BUILDING LAYOUT, DIMENSIONS AND BUILDING MATERIAL USED, THIS CONTRACTOR SHALL REFER TO THE ARCHITECTURAL DRAWINGS.

5. SHOP DRAWINGS

SHOP OR INSTALLATION DRAWINGS, FOUNDATION PLANS, EQUIPMENT OR APPARATUS DRAWINGS SHALL BE FURNISHED BY THIS CONTRACTOR. THESE DRAWINGS SHALL BE CLEARLY MARKED INDICATING WHICH ITEMS ARE TO BE SUPPLIED AND SHALL STATE CAPACITIES, SIZES AND GENERAL DESCRIPTION OF ALL EQUIPMENT. ANY CHANGES FROM THE SPECIFIED ITEMS SHALL BE NOTED ON THE SUBMITTALS.

SHOP DRAWINGS OF SPECIAL APPARATUS OR EQUIPMENT WHICH IS TO BE FABRICATED INDIVIDUALLY FOR THIS PROJECT AND IS NOT DESCRIBED BY STANDARD MANUFACTURER'S DRAWINGS OR BULLETINS SHALL BE SUBMITTED FOR PROCESSING BEFORE FABRICATION.

THESE DRAWINGS SHALL BE SUBMITTED IN A TIMELY MANNER.

IT SHALL BE THIS CONTRACTORS RESPONSIBILITY TO MAINTAIN LIAISON WITH ALL PARTIES CONCERNED WITH THE MATERIAL SUBMITTED. THIS CONTRACTOR SHALL NOT PURCHASE ANY EQUIPMENT UNTIL SHOP DRAWINGS HAVE BEEN PROCESSED. THE CONTRACTOR SHALL BE RESPONSIBLE FOR ANY FEES ACCRUED FROM THE RETURN OF FIXTURES PURCHASED PRIOR TO THE REVIEW OF SHOP DRAWINGS AND THAT ARE NOT APPROVED.

THIS CONTRACTOR SHALL SUBMIT NO DRAWINGS WITHOUT NOTATION INDICATING DATE OF CONTRACTOR'S REVIEW AND SIGNATURE OF CHECK FOR CONTRACTOR TOGETHER WITH CONTRACTOR'S NAME AND PROJECT IDENTIFICATION.

ARCHITECT'S PROCESSING WILL NOT CONSTITUTE A COMPLETE CHECK BUT WILL INDICATE ONLY THAT GENERAL METHOD OF CONSTRUCTION AND DETAILING IS SATISFACTORY.

ARCHITECT'S PROCESSING WILL NOT RELIEVE THE CONTRACTOR OF RESPONSIBILITY FOR ERRORS SINCE THIS CONTRACTOR IS SOLELY RESPONSIBLE FOR DIMENSIONS AND DESIGNS OF ADEQUATE CONNECTIONS, DETAILS AND SATISFACTORY CONSTRUCTION OF ALL WORK, AS WELL AS FURNISHING MATERIALS AND WORKMANSHIP REQUIRED BY DRAWINGS AND SPECIFICATIONS WHICH MAY NOT BE INDICATED ON THE SUBMITTALS WHEN APPROVED.

CORRECTIONS OR COMMENTS MADE ON THE SHOP DRAWINGS DURING ENGINEER REVIEW DO NOT RELIEVE THE CONTRACTOR FROM COMPLIANCE WITH THE REQUIREMENTS OF THE PLANS AND SPECIFICATIONS. REVIEW OF A SPECIFIC ITEM SHALL NOT INCLUDE REVIEW OF AN ASSEMBLY OF WHICH THE ITEM IS A COMPONENT. THE CONTRACTOR IS RESPONSIBLE FOR: EQUIPMENT VOLTAGES AND DIMENSIONS TO BE CONFIRMED AND CORRELATED WITH ALL DISCIPLINES PRIOR TO PURCHASE; INFORMATION THAT PERTAINS SOLELY TO THE FABRICATION PROCESSES OR TO THE MEANS, METHODS, TECHNIQUES, SEQUENCES AND PROCEDURES OF CONSTRUCTION; COORDINATION OF THE WORK WITH THAT OF ALL OTHER TRADES AND PERFORMING ALL WORK IN A SAFE AND SATISFACTORY MANNER.

6. SUBSTITUTIONS OF EQUIPMENT OR MATERIAL

THE BRAND NAMES OF EQUIPMENT OR MATERIALS SPECIFIED HEREIN SHALL ESTABLISH QUALITY, CAPACITY, TYPE AND DIMENSIONS TO BE INCLUDED IN THE BASE BID.

APPROVAL OF SUBSTITUTED ITEMS WILL BE BASED ON ABILITY AND CAPACITY TO PERFORM FUNCTION SERVED, QUALITY AND AVAILABILITY OF PARTS AND SERVICE, QUALITY OF EQUIPMENT, DELIVERY SCHEDULE, ETC. THE ARCHITECT SHALL REVIEW ALL SUCH REQUESTS BUT RESERVES THE SOLE RIGHT OF JUDGEMENT TO APPROVE OR REJECT THE PROPOSED SUBSTITUTIONS.

ACCEPTANCE OR REJECTION OF PROPOSED SUBSTITUTIONS SHALL NOT CAUSE ADDITIONAL COST. ANY CHANGES OF PIPING, DUCTWORK, ELECTRICAL CONTROLS OR INSTALLATION REQUIRED BECAUSE OF THE SUBSTITUTION OR EQUIPMENT SHALL BE PAID FOR BY THIS CONTRACTOR PROPOSING THE SUBSTITUTION.

7. ERECTION OF APPARATUS

ALL WORK SHALL BE DONE UNDER THE PERSONAL SUPERVISION OF THIS CONTRACTOR WHO SHALL PROVIDE A COMPETENT FOREMAN TO LAY OUT ALL WORK. ALL WORK SHALL BE LAID OUT WITH DUE REGARD FOR THE SPACE REQUIREMENTS OF THE OTHER CONTRACTORS. THIS CONTRACTOR SHALL REPORT ANY CONFLICTS OR DIFFICULTIES IN REGARD TO THE INSTALLATION IMMEDIATELY.

WHERE CROWDED LOCATIONS EXIST OR WHERE THERE IS A POSSIBILITY OF CONFLICT BETWEEN TRADES, THIS CONTRACTOR SHALL MAKE COMPOSITE DRAWINGS SHOWING THE EXACT LOCATIONS OF PIPES, DUCT, CONDUIT AND EQUIPMENT. DRAWINGS SHALL BE BASED ON FIELD MEASUREMENTS AND AFTER CONSULTATION AND AGREEMENT BETWEEN THE TRADES, SHALL BE APPROVED BY ARCHITECT AND ENGINEER BEFORE INSTALLATION OF THE WORK.

EQUIPMENT OF A TYPE TO REQUIRE REPLACEMENT, SERVICING, ADJUSTING OR MAINTENANCE SHALL BE LOCATED TO ALLOW EASY ACCESS AND SPACE FOR REMOVAL OF INTERNAL ASSEMBLIES, IT REQUIRED.

8. EXCAVATION AND BACKFILL

THIS CONTRACTOR SHALL DO ALL EXCAVATION REQUIRED TO INSTALL PIPES AND EQUIPMENT SHOWN ON THE PLANS OR REQUIRED FOR PROPER OPERATION. EXCESS EXCAVATION BELOW THE REQUIRED LEVEL SHALL BE BACKFILLED WITH EARTH AND THOROUGHLY TAMPED. UTILITIES SERVICES LINES SHALL BE INSPECTED AND APPROVED BY THE PROPER INSPECTION AUTHORITY BEFORE BACKFILLING.

INSTALL PLASTIC PIPE AND FITTINGS IN STRICT ACCORDANCE WITH THE INSTALLATION RECOMMENDATIONS OF THE PIPE AND FITTINGS MANUFACTURER, APPENDIX X1 OF ASTM D2265 (STORAGE AND INSTALLATION PROCEDURES FOR PLASTIC DRAIN, WASTE, AND VENT PIPING) AND FOR BURIED PIPE ASTM D2321 (STANDARD PRACTICE FOR UNDERGROUND INSTALLATION OF THERMOPLASTIC PIPE FOR SEWERS AND OTHER GRAVITY-FLOW APPLICATIONS). SUCH INSTRUCTIONS SHALL INCLUDE BUT ARE NOT LIMITED TO CUTTING, SOLVENT CEMENTING AND PRIMING, JOINTS, CONNECTIONS, TRANSITIONS, ALIGNMENT AND GRADE, TRENCHING, BEDDING, BACKFILL AND COMPACTION, SUPPORTS AND SPACING AND ALLOWANCE FOR THERMAL EXPANSION.

CAST IRON PIPING TRENCHING SHALL BE IN ACCORDANCE TO THE CAST IRON SOIL PIPE AND FITTINGS HANDBOOK ISSUED BY THE CAST IRON SOIL PIPE INSTITUTE.

THE BOTTOM OF TRENCHES SHALL BE TAMPED HARD AN GRADED TO SECURE THE REQUIRED FALL. ROCK, WHERE ENCOUNTERED SHALL BE EXCAVATED TO A DEPTH OF SIX INCHES (6") BELOW THE BOTTOM OF THE PIPE, AND BEFORE THE PIPE IS LAID, THE SPACE BETWEEN BOTTOM PIPE AND ROCK SURFACE SHALL BE FILLED WITH GRAVEL. IF TRENCHES ARE DEEPER THAN BOTTOM OF FLOORING OR CLOSER THAN THREE FEET (3'0") TO FOOTING THEY MUST BE FILLED WITH COHESIVE SOIL AND COMPACTED TO 95% OF MAXIMUM DENSITY,STANDARD PROCTOR, ASTM D- 698. ALL OTHER EXCAVATIONS UNDER FLOOR SLABS COMPACTED TO 95% STANDARD PROCTOR.

WHEN EXCESS DIRT HAS BEEN REMOVED, THE TRENCH SHALL BE BROUGHT TO THE REQUIRED LEVEL WITH SAND AND GRAVEL FIRMLY COMPACTED.

TRENCHES AND EXCAVATION SHALL BE BACKFILLED IN 6" LAYERS OF EARTH, FREE FROM CLODS, AND STONES THOROUGHLY TAMPED TO A DEPTH OF 12" ABOVE THE PIPE. AFTER THAT DEPTH HAS BEEN REACHED, BACKFILLING SHALL BE DONE IN 12" LAYERS, THOROUGHLY TAMPED.

THIS CONTRACTOR SHALL BE RESPONSIBLE FOR ANY REPAIRS TO ANY DAMAGES OR SAGS TO THE PIPING SYSTEMS THAT OCCUR FROM THE IMPROPER EXCAVATION AND BACKFILL METHODS.

9. EQUIPMENT SUPPORTS

ANY STRUCTURAL STEEL MEMBERS REQUIRED TO ADAPT THE EQUIPMENT AND PIPING AS FURNISHED BY THIS CONTRACTOR, TO THE BUILDING STEEL OR STRUCTURE, SHALL BE INCLUDED IN THE BID OF THE CONTRACTOR FURNISHING THE EQUIPMENT OR PIPING. HANGING OF ALL EQUIPMENT AND REQUIRED SUPPORTING STEEL AND BRACING SHALL BE FURNISHED BY THE CONTRACTOR WHO SUPPLIES THE EQUIPMENT.

10. CUTTING AND PATCHING

THIS CONTRACTOR SHALL INCLUDE ALL CUTTING, PATCHING AND PAINTING OF PATCHED AREAS REQUIRED FOR AND RESULTING FROM THE INSTALLATION OF ALL OF THIS CONTRACTOR'S WORK, EXCEPT WHERE NOTED OTHERWISE.

ALL OPENINGS AROUND PIPE PENETRATIONS THROUGH SMOKE OR FIRE-RATED FLOORS, CEILINGS OR WALLS SHALL BE SEALED AIRTIGHT WITH MATERIAL HAVING A RATING EQUAL TO THE MATERIAL OF THE WALL, CEILING AND/OR FLOOR PENETRATED.

ALL PATCHING SHALL BE NEATLY FINISHED TO THE SATISFACTION OF THE ARCHITECT.

11. ACCESS PANELS

THIS CONTRACTOR SHALL LOCATE AND FURNISH FOR INSTALLATION BY THE GENERAL CONTRACTOR, ALL ACCESS PANELS AS REQUIRED FOR ACCESS TO VALVES, AND THE PROPER SERVICING OF EQUIPMENT AND LINES INSTALLED UNDER THE CONTRACT.

ALL PANELS SHALL BE MILCOR, STYLE "M" FOR MASONRY, "A" FOR ACOUSTICAL TILE AND "K" FOR PLASTER; EXCEPT FOR FIRE-RATED UL 1-1/2 HOUR AND "B" LABEL ACCESS PANELS SHALL BE FURNISHED IN FIRE-RATED WALLS AND CEILINGS AS INDICATED ON THE DRAWINGS. ACCESS DOORS SHALL BE 12" X 12" MINIMUM SIZE FOR VALVES.

12. DIELECTRIC UNIONS

FOR THE PREVENTION OF ELECTROLYTIC CORROSION AT CONNECTIONS BETWEEN PIPE OF DISSIMILAR METALS OR BETWEEN PIPE AND EQUIPMENT CONNECTIONS OF DISSIMILAR METALS, PROVIDE DIELECTRIC UNIONS OR FLANGES.

13. MOTORS, STARTERS AND DISCONNECTS

UNLESS SPECIFIED TO BE FURNISHED WITH EQUIPMENT, ALL MOTOR STARTERS AND DISCONNECT SWITCHES SHALL BE FURNISHED AND INSTALLED BY THE ELECTRICAL CONTRACTOR.

14. JOINTS AND FITTINGS

THREADS ON SCREWED PIPE SHALL BE STANDARD, CLEAN BUTT AND TAPERED. PIPE SHALL BE REAMED OF BURRS AND KEPT CLEAN OF SCALE, DIRT AND SHAVINGS. TREADS SHALL BE MADE WITH FLAKED GRAPHITE AND LUBRICATING OIL OR APPROVED PIPE COMPOUND ON THE MALE THREAD ONLY.

COPPER-TO-STEEL AND COPPER-TO-BRASS JOINTS SHALL BE MADE WITH SILVER SOLDER. ALL OTHER COPPER-TO-COPPER JOINTS ABOVE GROUND SHALL BE MADE WITH LEAD FREE SOLDER. COPPER PIPE SHALL BE CUT SQUARE, BURRS REMOVED AND CARE SHALL BE GIVEN TO KEEP THE LINES FREE OF DIRT AND MOISTURE. ALL TUBING AND FITTINGS SHALL BE THOROUGHLY CLEANED.

WELDED PIPE SHALL HAVE BUTT WELDED SINGLE "V" TYPE JOINTS FOR WHICH PIPE HAS BEEN BEVELED TO 45 DEGREES. WELD SHALL BE ONE-FOURTH GREATER THICKNESS THAN THE PIPE. CONNECTIONS TO EQUIPMENT, ACCESSORIES, ETC. SHALL BE MADE BY MEANS OF FLANGES AND/OR ADAPTERS.

UNIONS SHALL BE PROVIDED AT EACH SCREWED VALVE AND UNIONS OR FLANGES AT EACH EQUIPMENT CONNECTION.

15. EXPANSION JOINTS

FURNISH AND INSTALL FLEXONICS EXPANSION JOINTS IN PIPING SYSTEM WHERE SHOWN OR NECESSARY FOR EXPANSION AND CONTRACTION.

EXPANSION JOINTS IN PIPE 4" AND GREATER SHALL BE THE PACKLESS TYPE WITH STAINLESS STEEL BELLOWS AND HAVE WELDED OR FLANGED END. JOINTS SHALL HAVE TRAVERSE AS INDICATED ON THE PLANS. EXPANSION JOINTS SHALL BE OF THE CONTROLLED FLEXING TYPE.

EXPANSION JOINTS IN COPPER PIPE UNDER 4" IN SIZE SHALL BE OF THE COMPENSATOR TYPE CONSTRUCTED OF TWO-PLY STAINLESS STEEL BELLOWS AND CARBON STEEL SHROUDS AND END FITTINGS, INTERNAL GUIDES AND ANTI-TORQUE DEVICES.

EXPANSION JOINTS IN STEEL PIPE UNDER 4" IN SIZE SHALL BE OF THE COMPENSATOR TYPE CONSTRUCTED OF TWO-PLY STAINLESS STEEL ELBOWS AND CARBON STEEL SHROUDS AND END FITTINGS, INTERNAL GUIDES AND ANTI-TORQUE DEVICES.

PROVIDE GUIDES ON EACH SIDE OF EXPANSION JOINT, AT 4 PIPE DIAMETERS, 14 PIPE DIAMETERS, AND A THIRD GUIDE AS RECOMMENDED BY THE MANUFACTURER.

16. PIPE FLEXIBLE CONNECTIONS

FLEXIBLE PIPE CONNECTIONS SHALL BE RESISTOFLEX #R6904 OR APPROVED EQUAL FLEXIBLE CONNECTIONS MADE FROM TEFLON.

PROVIDE FOR MOVEMENT IN PIPING BY USE OF SWING JOINTS AT CONNECTION OF ALL BRANCHES TO MAINS AND RISERS. ALL BRANCHES FROM MAINS AND RISERS SHALL HAVE 1/4" CLEARANCE BETWEEN PIPE INSULATION AND SLEEVE TO PERMIT PIPE MOVEMENT.

17. VALVES

THIS CONTRACTOR SHALL FURNISH AND INSTALL ALL VALVES OF ONE MANUFACTURER, FIGURE NUMBER AND TYPE THROUGHOUT THE ENTIRE INSTALLATION OF THE WORK, UNLESS OTHERWISE SPECIFIED. THE FOLLOWING NUMBERS ARE FROM THE CRANE CATALOG. EQUAL VALVES OF REPUTABLE MANUFACTURERS, SUCH AS HAMMOND, NIBCO-SCOTT AND/OR JENKINS WILL BE CONSIDERED EQUIVALENT.

ALL VALVES SHALL BE BUILT FOR A MINIMUM OF 125 PSIG WORKING PRESSURE.

ISOLATION VALVES SHALL BE PROVIDED ON ALL INDIVIDUAL FIXTURES AND FIXTURE GROUPS.

CHECK VALVES 2-1/2" AND SMALLER SHALL BE #36 (SCREWED ENDS) OR #1342 (SOLDER-JOINT ENDS) SWING-TYPE WITH BRONZE BODY AND BRONZE TRIM.

BUTTERFLY VALVES 2" AND LARGER SHALL BE #12F, IRON BODY, CAST-IRON WAFER W/LOCK LEVER.

BALL VALVE UP TO 3" IN SIZE SHALL BE APOLLO SERIES #70 BRONZE VALVE WITH CHROME-PLATED BALL AND TEFLON SEAT.

GAS LINE COCKS UP TO 4" SHALL BE #320. 1/2 PSI FOR INDOOR APPLIANCE CONNECTIONS SHALL CONFORM TO ANSI Z21.15 AND CSA 9.1, 5 PSI FOR INDOOR SHUT OFF SHALL CONFORM TO CGA 91-002 AND ASME B16.44

HOSE END VALVES SHALL BE #438 GATE VALVES WITH HOSE END NIPPLES.

18. PIPE SLEEVES AND COLLARS

THIS CONTRACTOR SHALL LAYOUT ALL HIS WORK AND SET SLEEVES IN NEW CONSTRUCTION AS CONCRETE FORMS AND WALL ARE ERECTED SO AS TO BE ABLE TO INSTALL HIS WORK WITHOUT CUTTING OR BREAKING OF FLOORS OR WALLS. ALL SLEEVES FOR INSULATED PIPING SHALL BE LARGE ENOUGH TO ALLOW INSULATION TO PASS THROUGH SLEEVE.

ALL SLEEVES PASSING THROUGH FLOORS WHICH ARE WATERPROOFED SHALL BE COPPER TUBING SLEEVES EXTENDING 1" ABOVE FINISHED FLOOR. ALL OTHER SLEEVES SHALL BE 24 GAUGE GALVANIZED PIPES AND SLEEVES TO BE THOROUGHLY PACKED WITH WATERPROOF SEALANT AND THE REMAINING SPACE FILLED WITH MASTIC AND MUST BE WATERTIGHT.

ALL SLEEVES PASSING THROUGH INNER WALLS SHALL BE STANDARD PIPE THIMBLES EQUAL TO THE THICKNESS OF THE WALL.

SPACES BETWEEN PIPES AND SLEEVES THROUGH OUTSIDE WALLS, ABOVE GRADE, SHALL BE CAULKED WITH CAULKING COMPOUND; THOSE BELOW GRADE SHALL BE MADE WATERTIGHT.

SPACE AROUND ALL PIPING THROUGH FIRE OR SMOKE RATED PARTITIONS OR FLOORS SHALL BE SEALED AIRTIGHT WITH MATERIALS OR EQUIPMENT AS SPECIFIED UNDER FIRESTOPPING.

ALL PIPE PENETRATIONS OF SLABS ON GRADE SHALL BE WRAPPED WITH #15 BUILDING FELTS OR FOAM WRAP.

19. HANGERS

A. PIPE HANGER AND SUPPORT PRODUCTS INSTALLATION
   a. VERTICAL PIPING: MSS TYPE 8 OR 42 CLAMPS.
   b. INDIVIDUAL, STRAIGHT, HORIZONTAL PIPING RUNS: 100 FEET AND LESS: MSS TYPE 1, ADJUSTABLE, STEEL CLEVIS HANGERS. LONGER THAN 100 FEET: MSS TYPE 43, ADJUSTABLE ROLLER HANGERS. LONGER THAN 100 FEET IF INDICATED: MSS TYPE 49, SPRING CUSHION ROLLS.
   c. MULTIPLE, STRAIGHT, HORIZONTAL PIPING RUNS 100 FEET OR LONGER:MSS TYPE 44 PIPE ROLLS. SUPPORT PIPE ROLLS ON TRAPEZE.
   d. BASE OF VERTICAL PIPING: MSS TYPE 52, SPRING HANGERS.

B. SUPPORT VERTICAL PIPING AND TUBING AT BASE AND AT EACH FLOOR.
C. ROD DIAMETER MAY BE REDUCED ONE SIZE FOR DOUBLE-ROD HANGERS, TO A MINIMUM OF 3/8 INCH.
D. INSTALL HANGERS FOR ALL PIPING PER MSS SP-69, MANUFACTURERS MANUALS AND AS PER HANGER SUPPORT DETAIL ON DRAWINGS
E. INSTALL SUPPORTS FOR VERTICAL COPPER TUBING EVERY 10 FEET.
F. INSTALL SUPPORTS FOR VERTICAL STEEL PIPING EVERY 15 FEET.
G. SUPPORT PIPING AND TUBING NOT LISTED IN THIS ARTICLE ACCORDING TO MSS SP-69 AND MANUFACTURER'S WRITTEN INSTRUCTIONS.

20. DAMAGE BY LEAKS

THIS CONTRACTOR SHALL BE RESPONSIBLE FOR DAMAGES TO THE GROUNDS, WALKS, ROADS, ALL BUILDING COMPONENTS AND FINISHES, PIPING SYSTEMS, ELECTRICAL SYSTEMS AND THEIR EQUIPMENT AND CONTENT, CAUSED BY LEAKS IN THE PIPING SYSTEMS BEING INSTALLED OR HAVING BEEN INSTALLED HEREIN. ALL REPAIRS WILL BE MADE AT THIS CONTRACTOR'S EXPENSE.

21. PIPE MARKERS

FURNISH AND INSTALL BRADY #B-350 THIN FILM OR APPROVED EQUAL PIPE MARKERS. MARKERS SHALL BE 1-1/8" HIGH FOR PIPES 3" AND UNDER AND 2-1/4" HIGH FOR PIPES OVER 3". MARKERS SHALL INDICATE TYPE OF SERVICE AND DIRECTION OF FLOW.

PIPE MARKERS SHALL BE LOCATED:
- AT EQUIPMENT CONNECTIONS
- AT ACCESS DOORS
- AT BRANCH MAINS
- ON ALL ACCESSIBLE PIPE A MAXIMUM OF 75' BETWEEN MARKERS.
- AT ALL PENETRATIONS ON EITHER SIDE OF PENETRATION

22. FLOOR, WALL AND CEILING PLATES

PIPES PASSING THROUGH FLOORS AND FINISHED CEILINGS, FITTED WITH CHROME-PLATED PLATES OR ESCUTCHEONS LARGE ENOUGH TO COMPLETELY CLOSE OPENING AROUND PIPE OR PIPE COVERING AND FLOOR SUPPORT IN THE CASE OF VERTICAL PIPING, SECURELY HELD IN PLACE; CAULK WATERTIGHT AROUND PIPE IN UNFINISHED ROOMS.

23. FIRE STOPPING

THE PENETRATIONS OF FIRE AND/OR SMOKE RATED WALLS OR FLOORS SHALL BE PROTECTED BY A UL APPROVED MATERIAL TO RETAIN THE INTEGRITY OF THE TIME-RATED CONSTRUCTION BY MAINTAINING AS EFFECTIVE BARRIER AGAINST THE SPREAD OF FLAME, SMOKE AND GASES. IT SHALL BE USED IN ALL DUCT CABLE, CONDUIT AND PIPING PENETRATIONS THROUGH FLOOR SLABS AND TIME-RATED WALLS, AND/OR FLOORS. THE RATING OF THE FIRESTOPPING SHALL EQUAL THE RATING OF THE TIME-RATED ASSEMBLY.

FIRESTOPPING MATERIAL SHALL BE 3M FIRE BARRIER SEALING SYSTEM OF APPROVED EQUAL. FIRESTOPPING MATERIAL SHALL CONSTITUTE ONE OR MORE OF THE FOLLOWING PRODUCTS:
- CAULK: CP-25
- PUTTY: #303
- WRAP/STRIP: FS195
- COMPOSITE SHEET: CS195
- PENETRATING SEALING SYSTEMS: 7900 SERIES

INSTALLATION OF FIRESTOPPING SHALL BE INSTALLED IN ACCORDANCE WITH AND IN STRICT CONFORMITY WITH MANUFACTURER'S PRINTED INSTRUCTIONS AS TO SURFACE PREPARATION, INSTALLATION AND QUALITY CONTROL. AREAS OF WORK SHALL REMAIN ACCESSIBLE UNTIL INSPECTION AND APPROVAL BY THE APPLICABLE CODE AUTHORITIES.

ON INSULATED PIPES, THE FIRE-RATING CLASSIFICATION SHALL NOT REQUIRE REMOVAL OF THE INSULATION.

QUALITY ASSURANCE:
SUBMIT MANUFACTURER'S PRODUCT DATA, LETTER OF CERTIFICATION OR CERTIFIED LABORATORY TEST REPORT THAT THE MATERIAL OR COMBINATION OF MATERIALS MEET THE REQUIREMENTS SPECIFIED IN ASTM E814 AND ARE SO CLASSIFIED IN UL'S BUILDING MATERIALS DIRECTORY. MATERIALS SHALL MEET AND BE ACCEPTABLE FOR USE BY ALL MODEL BUILDING CODES. MATERIALS SHALL MEET THE REQUIREMENTS OF THE 2020 FLORIDA STATE FIRE CODE AND NFPA 70 – NATIONAL ELECTRICAL CODE (NEC) 2020, AS ADOPTED BY THE FLORIDA BUILDING CODE.

SUBMITTALS:
SUBMIT SHOP DRAWINGS, PRODUCT DATA, CERTIFICATES AND MANUFACTURER'S INSTALLATION INSTRUCTIONS. SUBMIT MANUFACTURER'S PRODUCT DATA FOR ALL MATERIALS AND PREFABRICATED DEVICES, PROVIDING DESCRIPTIONS SUFFICIENT FOR IDENTIFICATION AT THE JOB SITE. INCLUDE MANUFACTURER'S INSTRUCTIONS FOR INSTALLATION.

SUBMIT SHOP DRAWINGS SHOWING PROPOSED MATERIAL, REINFORCEMENT, ANCHORAGE, FASTENINGS, AND METHOD OF INSTALLATION. CONSTRUCTION DETAILS SHALL ACCURATELY REFLECT ACTUAL JOB CONDITIONS.

24. CLEANUP AND ADJUSTMENT

ALL PARTS WORK LEFT CLEAN: EQUIPMENT, FIXTURES, VALVES, PIPES AND FITTINGS CLEANED OF GREASE AND METAL CUTTINGS. ANY DISCOLORATION OR OTHER DAMAGE TO PORTIONS OF BUILDING, ITS FINISH OR FURNISHING DUE TO THIS CONTRACTORS FAILURE TO PROPERLY CLEAN INTERIOR OF PIPING, REPAIRED AT THIS CONTRACTOR'S EXPENSE. ALL AUTOMATIC CONTROL DEVISES ADJUSTED FOR PROPER OPERATION. ALL SURPLUS MATERIALS AND ANY RUBBISH REMOVED AS IT ACCUMULATES. ALL EQUIPMENT LEFT IN SAFE, PROPER OPERATING CONDITION.

DAMAGE TO ANY PORTIONS MUST BE REPAIRED OF THE PART REPLACED BY THIS CONTRACTOR AND ALL PARTS LEFT WITHOUT DENTS, SCRATCHES, THROUGH THE FINISH PAINT, LOOSE PLASTER, STAINS OR OTHER BLEMISHES.

25. PIPE TESTING AND START-UP

ALL PIPING TO BE TESTED IN ACCORDANCE WITH THE FOLLOWING:
- WATER - 100 PSI WATER PRESSURE

ALL TESTING MUST HOLD FOR AT LEAST 24 HOURS WITHOUT LOSS OF PRESSURE OR VACUUM. ALL CONCEALED PIPING SHALL BE TESTED IN THE PRESENCE OF THE OWNER'S REPRESENTATIVE PRIOR TO COVERING. BEFORE STARTING ANY SYSTEM, ALL EQUIPMENT SHALL BE LUBRICATED PER MANUFACTURERS REQUIREMENTS BY THIS CONTRACTOR. TEST ENTIRE BUILDING SYSTEMS UNDER FULL LOAD CONDITIONS FOR A PERIOD OF NOT LESS THAT ONE (1) WEEK DURING WHICH TIME THE OPERATING PERSONNEL SHALL BE FULLY INSTRUCTED IN THE OPERATION AND MAINTENANCE OF THE PLANT. AFTER THE PLANT IS IN FULL OPERATION, THIS CONTRACTOR IS TO FURNISH WHATEVER ADDITIONAL SERVICE IS REQUIRED TO RECALIBRATE AND RESET CONTROLS, VALVES, BALANCING COCKS, ETC. TO ENSURE PROPER OPERATION OF THIS SYSTEM.

26. TESTING AND BALANCING

THIS CONTRACTOR SHALL AT THE TIME OF INSTALLATION ENSURE THAT ALL DEVICES TO COMPLETE TESTING AND BALANCING AS DIRECTED HEREIN ARE FURNISHED AND INSTALLED DURING FABRICATION AND INSTALLATION OF WORK. THIS WORK SHALL BE PERFORMED PRIOR TO TURNOVER TO BUILDING OCCUPANT AND WITH AMPLE TIME TO MAKE ANY NECESSARY REPAIRS OR CHANGES TO ACHIEVE A PROPERLY OPERATING SYSTEM. GUARANTEE 27. THIS CONTRACTOR SHALL GUARANTEE ALL EQUIPMENT, MATERIALS, AND LABOR FURNISHED UNDER THIS CONTRACT TO BE FREE FROM DEFECTS FOR A PERIOD OF ONE (1) YEAR FROM THE DATE OF SUBSTANTIAL COMPLETION AND SHALL REPAIR OR REPLACE ANY EQUIPMENT OR MATERIAL WHICH IS DEFECTIVE OR IMPROPERLY INSTALLED. IN ADDITION, THIS CONTRACTOR SHALL ASSUME FULL RESPONSIBILITY FOR ANY DAMAGE TO THE BUILDINGS AND ITS CONTENTS OR OTHER EQUIPMENT, CAUSED BY DEFECTS OR IMPROPER INSTALLATION OF EQUIPMENT OR MATERIALS INSTALLED UNDER THIS SECTION OF THE SPECIFICATIONS.

27. DOMESTIC WATER SERVICE

THIS CONTRACTOR SHALL COORDINATE EXACT AVAILABLE DELIVERY PRESSURE AND PROVIDE ALTERNATE FEE FOR A PRESSURE BOOSTING SYSTEM IF PRESSURE IS LESS THAN 65PSI STATIC. PROVIDE PRESSURE REDUCING VALVE WITH STRAINER IN SERVICE LINE IF REQUIRED BY LOCAL CODES OR PRESSURE IS ABOVE 80 PSI.

JOINTS SHALL BE CLEANED AND DEBURRED AS RECOMMENDED BY THE MANUFACTURER AND FEDERAL, STATE, AND LOCAL CODES AND PRESS FITTINGS ARE AN ACCEPTABLE IF ALLOWED BY LOCAL AHJ. WHERE PRESS FITTING S ARE NOT ALLOWED SOLDERED AS LISTED BELOW. FLUX SHALL BE NON-CORROSIVE. VICTAULIC GROUVED COUPLINGS AREACCEPTABLE ALTERNATE IF ALLOWED BY LOCAL AHJ.

ABOVE GRADE - WHERE FITTINGS ARE SOLDERED BOTH FITTINGS AND TUBING SHALL BE CLEANED AS DESCRIBED ABOVE. UNDER NO CIRCUMSTANCES SHALL DISSIMILAR METALS COME INTO DIRECT CONTACT WITH COPPER TUBING; E.G., GALVANIZED STRAPPING, HANGERS, OR CLAMPS TO SECURE THE TUBING.

BELOW GRADE, OR FLOOR SLAB ON EARTH OR STONE FILL - HIGH TEMPERATURE, SOLDER, 1200 DEG. F OR GREATER MELTING POINT.

NOTE: WATER PIPE TO BE PROPERLY SECURED AND ALIGNED SO AS NOT TO EXERT VERTICAL OR HORIZONTAL STRESSES ON THE SEATING OF THE MATING (MALE AND FEMALE) SURFACES OF THE UNIONS.

MATERIALS - UNDERGROUND: TYPE "K" COPPER TUBE, SOFT TEMPER
MATERIALS - ABOVEGROUND: TYPE "L" COPPER TUBE, HARD DRAWN.
ALTERNATE MATERIALS - VIEGA, PROPRESS COPPER 1/2-INCH THROUGH 4-INCH WITH EPDM SEALING ELEMENT AND/OR VIEGA, PROPRESS 304 OR 316 STAINLESS 1/2-INCH THROUGH 4-INCH WITH EPDM OR FKM SEALING ELEMENT IS ACCEPTABLE IF ALLOWED BY LOCAL CODE

28. STERILIZATION OF DOMESTIC WATER SYSTEM

THE ENTIRE DOMESTIC WATER DISTRIBUTION SYSTEM SHALL BE FLUSHED CLEAR OF ANY DEBRIS AND THOROUGHLY STERILIZED WITH A SOLUTION CONTAINING NOT LESS THAN 100 PARTS PER MILLION OF AVAILABLE CHLORINE. THE SOLUTION SHALL REMAIN IN THE SYSTEM FOR TWO (2) HOURS DURING WHICH TIME ALL VALVES AND FAUCETS SHALL BE OPENED AND CLOSED SEVERAL TIMES. AFTER STERILIZATION, THE SOLUTION SHALL BE FLUSHED FROM THE SYSTEM WITH CLEAN WATER UNTIL THE RESIDUE CHLORINE CONTENT IS NOT GREATER THAN THE CHLORINE LEVEL OF THE AVAILABLE WATER SUPPLY.

STERILIZATION SHALL BE PERFORMED PRIOR TO TURNOVER TO OCCUPANT AS TO NOT ALLOW FOR THE WATER SYSTEM TO REMAIN STAGNANT FOR LONGER THAN 24 HOURS.

THIS CONTRACTOR SHALL HAVE THE WATER TESTED AND APPROVED BY THE HEALTH DEPARTMENT.

29. SANITARY SEWERS

THIS CONTRACTOR SHALL CONNECT SANITARY SEWER AS INDICATED ON THE DRAWINGS. VERIFY DIRECTION OF FLOW PRIOR TO ANY ROUGH-IN WORK.

EACH PIPE SHALL BE LAID TO THE LINE AND GRADE INDICATED ON THE PLANS AND SUCH A MANNER AS TO FORM A CLOSE CONCENTRIC JOINT WITH THE ADJOINING PIPE AND TO PRESENT OFFSETS IN FLOW LINE. ALL PIPE SHALL BE LAID WITH THE BELLS UPHILL.

THE SUB-GRADES SHALL BE KEPT FREE FROM WATER WHILE PIPES ARE BEING LAID. ALL PIPE SHALL BE LAID WITH ENDS ABUTTING AND TRUE TO LINE AND GRADE. THEY SHALL BE FITTED AND MATCHED SO THAT THEY WILL FORM A SEWER WITH A SMOOTH AND UNIFORM INVERT.

EACH JOINT SHALL BE CLEANED AS IT IS LAID AND ALL BELLS SHALL BE CLEANED BEFORE PIPES ARE JOINED.

30. WASTE, SOIL, DRAIN AND VENT PIPING

THE DRAINS, SOIL WASTE AND VENT PIPE AND FITTINGS INCLUDING EXTENSIONS TO SEWERS SHALL BE OF THE SIZES INDICATED ON THE DRAWINGS. PIPE AND FITTINGS TO BE, CYLINDRICAL AND FREE FROM CRACKS OR OTHER DEFECTS.

ALL TRENCHES TO BE DUG WITH GRADUAL FALL, THE PIPING TO BE STRAIGHT AND FREE FROM ANY SAGS.

THE ARRANGEMENT OF THE SYSTEM SHALL BE AS SHOWN ON THE DRAWINGS AND AS DIRECT AS POSSIBLE, AVOIDING ALL UNNECESSARY OFFSETS. THE STACKS SHALL BE FIRMLY SECURED IN POSITION WITH WROUGHT IRON CLAMPS AT EACH FLOOR.

ALL CHANGES IN DIRECTION OF SOIL OR WASTE PIPE SHALL BE MADE BY MEANS OF "Y" BRANCHES AND 1/8 BENDS. NINETY DEGREE SHORT TURN FITTINGS WILL NOT BE PERMITTED EXCEPT TO INDIVIDUAL FIXTURE CONNECTIONS OR WHERE THE FLOW IS FROM THE HORIZONTAL TO THE VERTICAL.

SANITARY CLEANOUTS ARE TO BE PROVIDED AT EVERY TURN GREATER THAN 45°, AT INTERVALS OF NO GREATER THAN 50', AT ANY STACK ROUTING BELOW GRADE. NOT ALL CLEANOUTS LOCATIONS MAY BE SHOWN ON THE DRAWING.

ALL TRAP SCREWS MUST BE OF FULL SIZE OF PIPE UP TO 4" AND 4" FOR ALL OVER THIS SIZE. CONNECTIONS BETWEEN OUTLETS OF FIXTURES AND SOIL OR WASTE PIPE SHALL BE MADE WITH "Y" BRANCHES TO "TY" BRANCHES WHEREVER POSSIBLE. ALL HORIZONTAL SOIL WASTE AND VENT PIPE SHALL BE GRADED TOWARD OUTLETS AND PIPE NOT BURIED SHALL BE INSTALLED ABOVE THE CEILING OR CLOSE AS POSSIBLE TO THE CONSTRUCTION ABOVE WHERE THERE IS NO CEILING.

THE STACKS SHALL BE EXTENDED THROUGH ROOF OF BUILDING TO POINTS NOT LESS THAT 12" ABOVE ROOF. EXTENSIONS THROUGH ROOF SHALL BE MADE WATER- TIGHT BY MEANS OF A LEAD FLASHING OF FOUR POINTS SHEET LEAD SPREAD OVER A DISTANCE OF NOT LESS THAN TWELVE INCHES (12") AROUND PIPE. THIMBLE TO BE SOLDERED TO BASE AND EXTENDED OVER AND TURNED DOWN INTO END OF PIPE IN AN APPROVED MANNER.

ALL CLEANOUTS IN FLOORS TO BE JOSAM #8360 OR EQUAL. ADJUSTABLE CLEANOUT WITH BODY TO MATCH THE PIPING MATERIAL, CAST BRASS SCORIATED COVER WITH LETTERS C.O. CAST IN TOP AND CONCEALED BRASS PLUG.

CLEANOUTS SHALL BE INSTALLED IN BASE OF EACH STACK. CONCEALED CLEANOUTS SHALL HAVE JOSAM #8600 OR EQUAL. CAST BRASS CHROMIUM PLATED FLAT ACCESS COVER PLATES.

ALL JOINTS OF CAST IRON PIPE SHALL BE MADE WITH MANUFACTURERS RECOMMENDED JOINING MATERIAL. AT THE CONTRACTOR'S OPTION HE MAY USE NO-HUB PIPE, FITTINGS, COUPLING AND GASKETS IN LIEU OF CAULKED JOINTS IF APPROVED BY THE LOCAL CODES AND ORDINANCES.

IF APPROVED BY THE LOCAL CODES, SCHEDULE 40 PVC PIPE WITH DWV FITTINGS MAY BE USED FOR THE UNDERGROUND WASTE SYSTEM. PVC PIPE AND FITTINGS SHALL BE INSTALLED IN STRICT ACCORDANCE WITH ALL CODES.

ABS AND PVC ARE ACCEPTABLE MATERIALS FOR UNDERGROUND SANITARY PIPING.

31. VENT FLASHING

EACH VENT FLASHING SHALL BE MADE WATER-TIGHT WITH THE ROOF BY PROPER WATER PROOF FLASHING.

32. WASTE, VENT AND WATER CONNECTIONS

THE MINIMUM SIZE OF WASTE, VENT, AND WATER CONNECTION TO THE INDIVIDUAL FIXTURES SHALL BE AS SHOWN ON DRAWINGS.

WHERE FIXTURES ARE GROUPED PIPES SHALL BE INCREASED IN PROPORTION: IN ALL CASES THE SIZE ARRANGEMENTS AND CONNECTIONS OF WATER AND VENT PIPING SHALL NOT BE LESS THAN SIZE OF OPENINGS SPECIFIED FOR FIXTURES AND APPEARING IN FIXTURE LIST. NO WATER PIPE LESS THAN 1/2" SHALL BE INSTALLED IN CONCEALED PLACES SUCH AS IN PARTITIONS OR WALLS ETC.

33. PLUMBING FIXTURES AND TRIM

PLUMBING FIXTURES SHALL BE FURNISHED AND INSTALLED IN A NEAT AND WORK MAN LIKE MANNER WITH PROPER CONNECTIONS TO SUPPLY AND DRAINAGE PIPING. ALL FIXTURES SHALL BE FREE OF FLAWS AND DEFECTS OF ANY SORT IN MATERIAL AND WORKMANSHIP AND SHALL OPERATE PERFECTLY WHEN INSTALLED IN ACCORDANCE WITH MANUFACTURER'S DIRECTION.

MATERIALS: FIXTURES SHALL BE THE STANDARD PRODUCT OF ONE OF THE MANUFACTURER'S LISTED IN THE PLUMBING FIXTURE SCHEDULE, OR ANY EQUAL UNIT APPROVED BY THE ENGINEER.

INSTALLATION: THIS CONTRACTOR SHALL BE RESPONSIBLE FOR PROTECTION OF THE PLUMBING FIXTURES AND ACCESSORIES DURING CONSTRUCTION. HE SHALL REPLACE AT HIS EXPENSE ANY MATERIAL THAT IS MARRED, SCRATCHED, DEFACED AND/OR BROKEN. FIXTURES SHALL BE COVERED WITH BUILDING PAPER AND WOODEN CRATES DURING CONSTRUCTION.

CONTRACTOR SHALL COORDINATE EXACT AND PROVIDE ROUGH-IN LOCATIONS WITH FIELD CONDITIONS AND PLANS PRIOR TO ANY WORK. CONTRACTOR SHALL CONNECT ALL FIXTURES TO THE PLUMBING SYSTEM. ALL FIXTURES TO BE INSTALLED TO DIMENSIONS WITH CHROME-PLATED SUPPLIES WITH STOPS.

ALL FIXTURES INSTALLED TO DIMENSIONS SHOWN ON THE DRAWINGS. ALL WATER CLOSETS SHALL HAVE CAULKING BETWEEN THE FLOOR AND UNDERSIDE OF THE WATER CLOSET.

PLUMBING EQUIPMENT: (REFER TO SCHEDULE ON SHEET P1.1)

34. INSULATION

ALL INSULATION SHALL HAVE COMPOSITE (INSULATION, JACKET OR FACINGS AND ADHESIVE USED TO ADHERE THE FACING OR JACKET TO THE INSULATION) FIRE AND SMOKE HAZARD RATINGS AS TESTED BY PROCEDURE ASTM E-84, NFPA 225 UL 723 NOT EXCEEDING:

FLAME SPREAD 25
SMOKE DEVELOPED 50

ALL ACCESSORIES SUCH AS ADHESIVES, MASTICS, CEMENTS, TAPES AND CLOTH FOR FITTINGS SHALL HAVE THE SAME COMPONENTS RATINGS AS LISTED ABOVE.

INSULATION SHALL BE APPLIED ON CLEAN, DRY SURFACES AND AFTER INSPECTION AND RELEASE FOR INSULATION APPLICATION. ALL INSULATION SHALL BE CONTINUOUS THROUGH WALL AND CEILING OPENINGS AND SLEEVES. INSULATION ON ALL COLD SURFACES WHERE VAPOR BARRIER JACKETS ARE USED, WILL BE APPLIED WITH A CONTINUOUS, UNBROKEN VAPOR SEAL, INCLUDING ALL FITTINGS AND VALVES. ALL INSULATION TO BE INSTALLED IN ACCORDANCE WITH MANUFACTURER'S. FITTINGS SHALL BE FINISHED WITH 1/4" COAT OF INSULATING CEMENT AND CANVAS.

INSULATION SCHEDULE:

DOMESTIC COLD WATER - 1" THICK ARMAFLEX (FLAME SPREAD 25/ SMOKE DEVELOPED 50)

DOMESTIC HOT WATER - 1" THICK ARMAFLEX (FLAME SPREAD 25/ SMOKE DEVELOPED 50)

DOMESTIC HOT WATER RETURN- 1" THICK ARMAFLEX (FLAME SPREAD 25/ SMOKE DEVELOPED 50)

EXPOSED STORM WASTE AND SANITARY WASTE - 1/2" THICK ARMAFLEX (FLAME SPREAD 25/ SMOKE DEVELOPED 50) .

1	SCALE N.T.S.	PLUMBING SPECIFICATIONS SHEET

TITLE:
PLUMBING SPECIFICATIONS SHEET

SHEET NUMBER:
P-0.1

Property of NY Engineers

PLUMBING SYMBOLS LIST

PLUMBING LEGENDS

-W-	SANITARY WASTE (BELOW GRADE)
EX.W	EXISTING SANITARY WASTE (BELOW GRADE)
-V-	VENT PIPING
CW	COLD WATER
HW	HOT WATER
HWR	HOT WATER RETURN
EX.CW	EXISTING COLD WATER
CD	CONDENSATE DRAIN
	PIPE UP OR DOWN
	PIPE UP
	UNION
	ISOLATION VALVE
	POINT OFF CONNECTION
	WALL CLEANOUT
	HUB / FLOOR DRAIN
	BACKFLOW PREVENTER
	RE-CIRCULATION PUMP

PLUMBING ABBREVIATIONS

AFF/AFG	ABOVE FINISHED FLOOR/GRADE
AHJ	AUTHORITY HAVING JURISDICTION
CC	CONTRACTORS CHOICE
CD	CONDENSATE DRAIN
CW	COLD WATER
E / EX	EXISTING
ETR	EXISTING TO REMAIN
EV	EQUIPMENT VENDOR
F	FRANCHISE
FCO	FLOOR CLEANOUT
FD	FLOOR DRAIN
GC	GENERAL CONTRACTOR
HW	HOT WATER
HWR	HOT WATER RETURN
LAV	LAVATORY
MS	MOP SINK
OC	OWNERS CHOICE
PC	PLUMBING CONTRACTOR
RCP	RE-CIRCULATION PUMP
TYP	TYPICAL
US	UTILITY SINK
V	VENT
VIF	VERIFY IN FIELD
VLL	VERIFY WITH LANDLORD
VTR	VENT THROUGH ROOF
W	WASTE
WC	WATER CLOSET
WCO	WALL CLEANOUT
WH	WATER HEATER
WHA	WATER HAMMER ARRESTOR
SK	SINK (1)

NOTES :
1. REFER TO RISER DIAGRAMS FOR PIPE SIZE.
2. REFER TO PLUMBING FIXTURE SCHEDULE.

PLUMBING DRAWING LIST

P-0.1	PLUMBING SPECIFICATIONS SHEET
P-0.2	PLUMBING SCHEDULE, SYMBOLS AND DETAILS
P-1.0	PLUMBING SANITARY AND VENT FLOOR PLAN
P-2.0	PLUMBING WATER SUPPLY FLOOR PLAN

CODE ADOPTION

2023 FBC - BUILDING, 8TH EDITION (ADOPTS WITH AMENDMENTS IBC 2021).

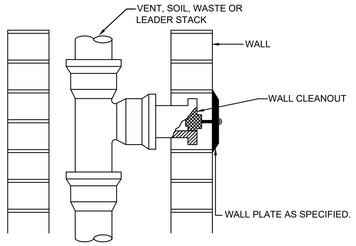
2023 FBC - PLUMBING, 8TH EDITION (ADOPTS WITH AMENDMENTS IPC 2021).

2023 FBC - MECHANICAL, 8TH EDITION (ADOPTS WITH AMENDMENTS IMC 2021).

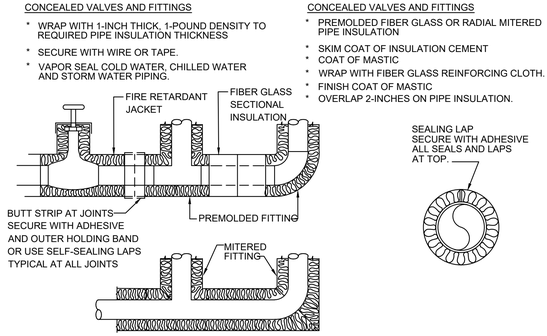
2023 FBC - FUEL GAS, 8TH EDITION (ADOPTS WITH AMENDMENTS IFGC 2021).

FLORIDA COMMERCIAL ENERGY CODE 2019 (ADOPTS WITH AMENDMENTS ASHRAE 90.1, 2019).

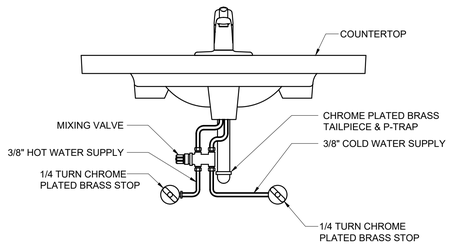
FLORIDA ELECTRICAL CODE 2020, NATIONAL ELECTRICAL CODE 2020.



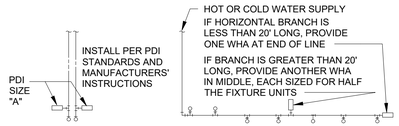
1 | SCALE N.T.S. | WALL CLEAN OUT DETAIL



2 | SCALE N.T.S. | PIPE INSULATION DETAIL



3 | SCALE N.T.S. | MIXING VALVE DETAILS



SINGLE FIXTURE

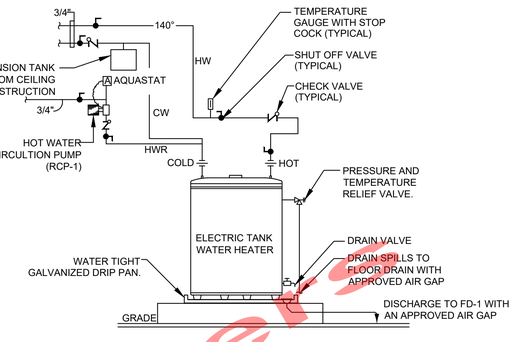
PDI SIZE	PIPE SIZE	FIXTURE UNIT LOAD
A	1/2"	1-11
B	3/4"	12-32
C	1"	33-60
D	1-1/4"	61-113
E	1-1/2"	114-154
F	2"	155-330

MULTIPLE FIXTURES

FIXTURE UNIT TABULATION		
FIXTURE	COLD	HOT
VALVE WATER CLOSET	5	--
URINAL	5	--
COUNTER SINK	1.5	1.5
LAVATORY	1.5	1.5
MOP BASIN	2.25	2.25
WATER COOLER	.25	--

PROVIDE WATER HAMMER ARRESTERS BY SIOUX CHIEF, PRECISION PLUMBING PRODUCTS, WATTS OR APPROVED EQUAL WITH PISTON AND O-RING CONSTRUCTION HAVING PDI #WH-201, ASSE #1010 AND ANSI #A112.26.1M CERTIFICATION. INSTALL IN HORIZONTAL OR VERTICAL POSITION, BUT NEVER UPSIDE DOWN. INSTALL INLINE WITH WATER FLOW DIRECTION IF POSSIBLE. SIZE UNITS PER TABLES ABOVE.

4 | SCALE N.T.S. | WATER HAMMER ARRESTOR



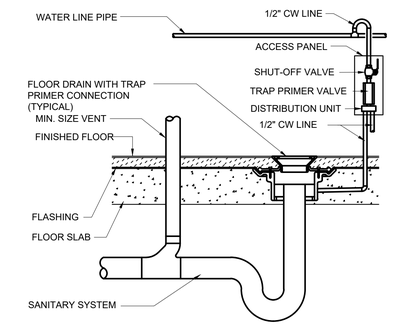
WATER HEATER: AO SMITH DEL-20
DIMENSION : 21.75" D X 22.25" H
SHIPPING WEIGHT= 73.00 LBS.
CAPACITY 20 GALLONS = APPROX. WEIGHT 166 LBS

5 | SCALE N.T.S. | FLOOR MOUNTED ELECTRIC WATER HEATER DETAILS

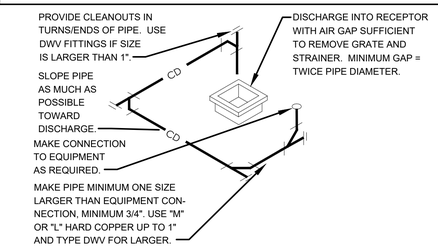
PLUMBING FIXTURE SCHEDULE

MARK	FIXTURE	SAN.	VENT	C.W.	H.W.	H.W.R.	REMARK
WC-1	FLOOR MOUNTED WATER CLOSET. AMERICAN STANDARD RIGHT WIDTH™ FLOWISE, MODEL 3641.001 TOP SPUD, ELONGATED, WHITE WATER CLOSET. FLUSHOMETER VALVE MANUAL: AMERICAN STANDARD, #6047.121.002 (TOP SPUD)	4"	2"	1"	-	-	WATER CLOSET: AMERICAN STANDARD, MODEL 3641.001, RIGHT WIDTH™ FLOWISE® ELONGATED RIGHT HEIGHT® FLUSHOMETER TOILET WITH SEAT, FLOOR-MOUNTED, ELONGATED STYLE, WATER CLOSET, FIXTURE SHALL BE 16-1/2" HIGH, WHITE COLOR. INCLUDE RIGHT WIDTH™ OPEN FRONT TOILET SEAT WITH CHECK HINGE AND ANTI-MICROBIAL AGENT. FLUSHOMETER VALVE: MANUAL, AMERICAN STANDARD #6047.121.002 (TOP SPUD), 1.28 GPF. FIXTURE SHALL BE INSTALLED TO MEET ALL ADA REQUIREMENTS. PROVIDE ALL RECOMMENDED ACCESSORIES AS REQUIRED BY THE MANUFACTURER.
LAV-1	LAVATORY: AMERICAN STANDARD DECORUM, MODEL 9024.001EC, WHITE WALL HUNG. FAUCET: KOHLER, MODEL: JULY®, K-97282-4, BRASS, SINGLE LEVER HANDLE CHROME.	2"	1-1/2"	1/2"	1/2"	1/2"	AMERICAN STANDARD DECORUM, MODEL 9024.001EC, WHITE VITREOUS CHINA, WALL HUNG LAVATORY, CONCEALED MOUNTING, REAR OVERFLOW, FAUCET LEDGE, SINGLE HOLE PUNCHING AND MOUNTING HARDWARE, FAUCET SHALL BE KOHLER JULY®, MODEL-K-97282-4, LEED®, CENTERSET LAVATORY FAUCET, SINGLE LEVER HANDLE, BRASS, 0.5 GPM FLOW RATE. DRAIN PER MANUFACTURER'S RECOMMENDATION/ARCHITECT. PROVIDE WITH POINT OF USE MIXING VALVE ACORN ST-70 SET TO 110°F, TO MEET ASSE 1070, P-TRAP, LOOSE KEY SUPPLY STOPS AND ALL OTHER TRIM FOR A COMPLETE INSTALLATION. PROVIDE ALL RECOMMENDED ACCESSORIES AS REQUIRED BY THE MANUFACTURER.
DF-1	ELKAY, LZWS-EDFP217K, SOFT SIDES® BI-LEVEL FOUNTAIN FILTERED, NON-REFRIGERATED STAINLESS DRINKING FOUNTAIN.	2"	1-1/2"	1/2"	-	-	ELKAY, LZWS-EDFP217K, WALL MOUNT, EZH2O® BOTTLE FILLING STATION WITH INTEGRAL SOFT SIDES® FOUNTAIN FILTERED NON-REFRIGERATED STAINLESS. WALL MOUNT FOUNTAIN, FINISH STAINLESS STEEL. PROVIDE ALL RECOMMENDED ACCESSORIES AS REQUIRED BY THE MANUFACTURER.
US-1	UTILITY SINK: MUSTEE,19F, COLOR-FAST WHITE.	3"	2"	1/2"	-	-	MUSTEE 9F, 34" X 20" X 24", COLOR- FAST WHITE, FLOOR MOUNT, HEAVY GAUGE STEEL LEGS WITH ADJUSTABLE LEVELERS. FAUCET- MUSTEE MODEL- 93.600 OR SIMILER, CHROME FINISH, 4" CENTER SET BRASS FAUCET, 7" SWING SPOUT WITH AERATOR, LEVEL HANDLES, REPLACEABLE SEATS AND STEMS. AREATOR OR HOSE END. PROVIDE ALL RECOMMENDED ACCESSORIES AS REQUIRED BY THE MANUFACTURER.
SK-1	SINK: KOHLER, VAULT™	K-3840-1, 15" TOP-/UNDERMOUNT BAR SINK. FAUCET: KOHLER, ELATE®, K-34906 OR EQUIVALENT. PULL-DOWN KITCHEN SINK FAUCET WITH TWO-FUNCTION SPRAYHEAD.	2"	1-1/2"	1/2"	1/2"	-	SINK: KOHLER, VAULT™ | K-3840-1,15" TOP-/UNDERMOUNT BAR SINK, STAINLESS STEEL. FAUCET: KOHLER, ELATE®, K-34906 OR EQUIVALENT PULL-DOWN KITCHEN SINK FAUCET WITH TWO-FUNCTION SPRAYHEAD, FINISH SHALL BE POLISHED CHROME. PROVIDE ALL RECOMMENDED ACCESSORIES AS REQUIRED BY THE MANUFACTURER. INSTALL LEAD-FREE, ASSE 1070–APPROVED MIXING VALVE,WATTS MODEL LFE-480 OR APPROVED EQUIVALENT.
WH-1	NEW ELECTRIC WATER HEATER, MAKE: AO SMITH MODEL: DEL-20	-	-	3/4"	3/4"	3/4"	20-GALLON FLOOR MOUNTED ELECTRIC WATER HEATER. 3 KW @ 208V 1Ø. A.O. SMITH NO. DEL-20 OR EQUAL. PROVIDE DRAIN PAN UNDER FLOOR MOUNTED WATER HEATER AS PER FLORIDA PLUMBING CODE, SECTION 504. TERMINATE DRAIN LINE IN FLOOR DRAIN WITH AN APPROVED AIR GAP. PROVIDE FULL SIZE T&P RELIEF LINE, TERMINATE 2" ABOVE THE FLOOR DRAIN. PROVIDE EXPANSION TANK (ET-1) AMTROL ST-5C-DD. INSTALL PER MANUFACTURER'S INSTRUCTIONS.
RCP-1	RECIRCULATION PUMP BELL & GOSSETT NBF-25	-	-	-	-	3/4"	RE-CIRCULATION PUMP - 2GPM @10FT HEAD (RCP-1). INSTALL PER MANUFACTURER'S INSTRUCTIONS. INLINE ON HW RETURN LINE AT WATER HEATER WITH NEMA 1 RATED MOTOR. PRVOIDE WITH AUTOMATIC TIME CONTROL KIT TC-1 AND AQUASTAT AQS-3/4.
FD-1	FLOOR DRAIN	3"	2"	-	-	-	PROVIDE ZURN MODEL EZ-1 PV3 3" FLOOR DRAIN OR SIMILER (FD-1) WITH TRAP PRIMER CONNECTION WATTS TP300.
TMV-1	THERMOSTATIC WATER MIXING VALVE MODEL LFE-480	-	-	1/2"	1/2"	-	THERMOSTATIC WATER MIXING VALVE MODEL LFE-480, INTEGRAL COMBINATION CHECK STOPS WITH STRAINERS, TEMPERATURE RANGE: 80 TO 140 DEG., FLOW CAPACITY OF A MINIMUM OF .5 GPM TO MAX .12 GPM, BRONZE BODY, INTEGRAL FILTER WASH, CHECK VALVES, ADJUSTMENT CAP WITH LOCKING FEATURE, 0.5 GPM MINIMUM FLOW.
WCO	WALL CLEANOUT	SEE PLAN	-	-	-	-	JAY R. SMITH 4402 CAULK FERRULE CLEANOUTS WITH ACCESS COVERS

NOTE: CONTRACTOR TO CROSS REFERENCE ALL LISTED PLUMBING FIXTURES WITH ARCHITECT / OWNER PROVIDED DIP (DESIGN INTENT PACKAGE) TO ENSURE ALL PLUMBING RELATED ITEMS ARE COORDINATED PROPERLY.



6 | SCALE N.T.S. | FLOOR DRAIN WITH TRAP PRIMER PIPING DETAIL



ROUTE PIPE INCONSPICUOUSLY AND UNOBTRUSIVELY. HANG PIPE AS REQUIRED.
DO NOT INSULATE INDIRECT DRAIN PIPE WHEN INSTALLED EXPOSED IN FOOD SERVICE FACILITY.
REFER TO LOCAL CODES.

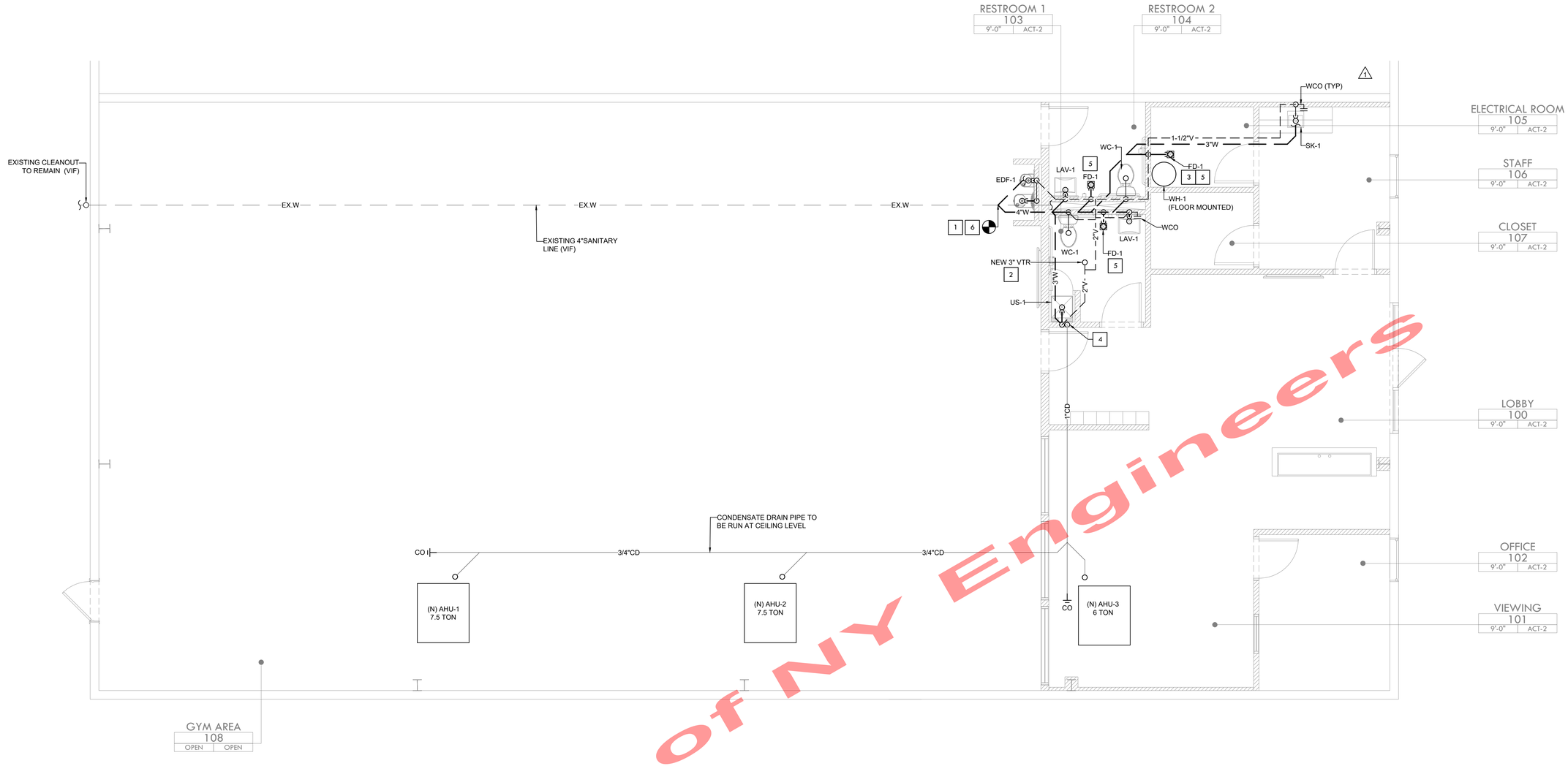
7 | SCALE N.T.S. | INDIRECT CONDENSATE DRAIN DETAILS

1 | SCALE N.T.S. | PLUMBING SCHEDULE, SYMBOLS AND DETAILS

Property of NY Engineers

TITLE: PLUMBING SCHEDULE, SYMBOLS AND DETAILS

SHEET NUMBER: P-0.2



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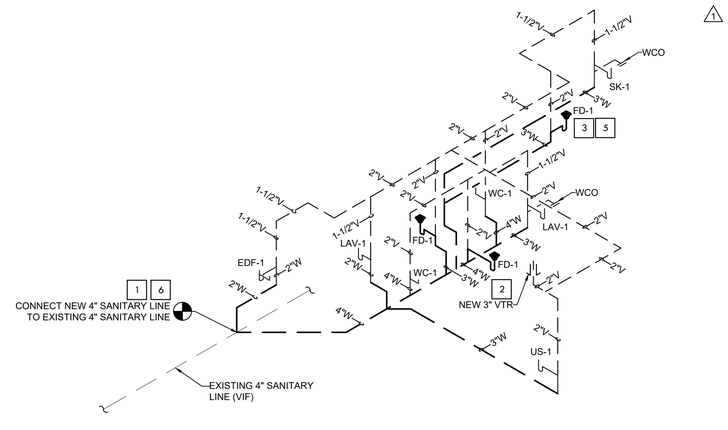
GENERAL NOTES

1. ANY CHANGES AND/ OR UPGRADES TO TENANT'S EXISTING PLUMBING SYSTEMS SHALL COMPLY WITH ALL CODES AND MALL CRITERIA. EXISTING SYSTEMS SHALL POSSESS THE CAPACITY TO HANDLE ANY AND ALL CHANGES IN LOAD.
2. PLUMBING IS NOT PERMITTED IN ANY DEMISING PARTITIONS. FURROUT THE WALL AS\ NECESSARY.
3. EXHAUST AND PLUMBING VENTS SHALL BE LOCATED A MINIMUM OF 10'-0" AWAY FROM ANY OUTSIDE AIR INTAKE, AND 5'-0" FROM ANY DEMISING WALL VERTICAL PLANE.
4. FLOOR DRAINS ARE REQUIRED TO HAVE TRAP PRIMERS OR BARRIER TYPE TRAP SEAL.
5. ANY UNUSED PLUMBING EQUIPMENT, PIPING, ETC., WITHIN OR SERVING THE PREMISES MUST BE COMPLETELY REMOVED TO POINT OF ORIGIN. DO NOT ABANDON IN PLACE.
6. ALL FLOOR PENETRATIONS MUST BE CORE BORED, SLEEVED, GROUTED, SEALED AND MADE WATERPROOF. SLEEVES MUST EXTEND A MINIMUM OF 4" AFF.
7. TENANT IS REQUIRED TO INSTALL A WATERPROOF MEMBRANE IN ALL WET AREAS OF THE SPACE. TENANT SHALL USE A 30 MIL POLYETHYLENE CLEAVAGE MEMBRANE (EQUAL TO NOBLESEAL TS) INSTALLED PER MANUFACTURERS RECOMMENDATIONS AND ANSI A108. MEMBRANE MUST BE EXTENDED UP THE WALL A MINIMUM OF 6" OR EQUAL TO THE HEIGHT OF THE FLOOR BASE.
8. NO ROOF PENETRATIONS PERMITTED WITHIN ROOF WATER PLY, REFER TO ROOF PLAN FOR LOCATIONS.
9. REFER TO RISER DIAGRAM FOR WASTE AND VENT SIZES.
10. THE SUSPENSION OF ANY ITEMS FROM BASE BUILDING STRUCTURE BY MEANS OF DRILLING, WELDING, SHOOTING ARE PROHIBITED. CONTRACTOR TO MAKE SURE ALL THE EQUIPMENTS AND PIPES TO BE SUPPORTED BY MEANS OF THE BEAM CLAMPS.
11. ALL SANITARY PIPING CONNECTING TO AND DOWNSTREAM OF TOILETS SHALL BE 4" OR LARGER.
12. NO 90° HORIZONTAL TURNS SHALL BE USED IN THE SANITARY PIPING SYSTEM. ALL HORIZONTAL TURNS SHALL BE MADE WITH 45° ELBOWS WITH PIPE IN BETWEEN THE TWO ELBOWS.
13. COORDINATE OVERALL PIPING DIAMETER (INCLUDING INSULATION) WITH WALL DEPTH.
14. NOTIFY ARCHITECT IF OVER ALL PIPE DIAMETER EXCEEDS WALL DEPTH.
15. ALL UNDERGROUND SANITARY WASTE AND VENT PIPING SHALL BE PVC, DWV SOLID WALL SCHEDULE 40 WITH SOCKET-TYPE, SOLVENT WELDED JOINTS IN SIZES UP TO 12" / 14" AND LARGER PIPING SHALL BE PVC, DWV SOLID WALL SCHEDULE 80 WITH SOCKET TYPE, SOLVENT WELDED JOINT. ALL PVC PIPING SHALL BE INSTALLED IN ACCORDANCE TO ASTM 02321. HUBLESS CAST IRON IS THE APPROVED SUBSTITUE MATERIAL FOR DRAIN. CONTRACTOR TO CO-ORDINATE WITH THE AHJ FOR THE MATERIAL AS PER THE LOCAL AHJ.
16. ALL HORIZONTAL SANITARY, WASTE, & STORM PIPING SHALL BE SLOPED AT 1/8" PER FOOT, UNLESS OTHERWISE NOTED OR REQUIRED BY CODE, IN DIRECTION OF FLOW.
17. ALL PLUMBING SHUTOFF VALVE SHALL BE COORDINATED WITH MECHANICAL EQUIPMENT AND SHALL BE EASILY ACCESSIBLE EASILY ACCESSED FOR FUTURE OPERATION.
18. ALL PROPOSED POKE-THRU AND TRENCHING LOCATIONS TO BE REVIEWED AND APPROVED BY LANDLORD'S STRUCTURAL ENGINEER BEFORE CUTTING OR DRILLING IS PERMITTED.
19. PROVIDE QUARTER-TURN ISOLATION VALVES FOR ALL PLUMBING EQUIPMENTS.

SANITARY AND VENT KEYED NOTES:

1	EXTEND & CONNECT NEW 4" SANITARY WASTE LINE TO EXISTING 4" SANITARY WASTE LINE. CONTRACTOR SHALL VERIFY IN FIELD THE EXISTING SANITARY PIPE SIZE, ROUTING, DIRECTION OF FLOW, INVERT & POINT OF CONNECTION PRIOR TO BID. REPLACE THE PIPES IF NOT GOOD CONDITION AND NOTIFY THE ENGINEER IF ANY DISCREPANCIES IN THE FIELD PRIOR TO BID.
2	EXTEND AND CONNECT NEW 2" VENT LINE TO NEW 3" VTR. CONTRACTOR TO FIELD VERIFY THE VTR TO BE INSTALLED 10 FT. AWAY FROM ANY MECHANICAL UNITS.
3	ROUTE T & P RELIEF DRAIN FROM WATER HEATER (WH-1) & BFP-1 TO FLOOR DRAIN (FD-1) WITH AN APPROVED AIR GAP.
4	ROUTE 1" CONDENSATE DRAIN LINE FROM MECHANICAL UNITS (AHU'S) INDIRECTLY INTO UTILITY SINK (US-1) WITH APPROVED AIR GAP. THE CONDENSATE LINE SHALL BE SLOPED AT 1/8 INCH PER FEET.
5	PROVIDE THE TRAP PRIMER FOR FLOOR DRAIN (FD-1).
6	CONTRACTOR TO COORDINATE WITH THE LANDLORD /BASE BUILDING ENGINEER PRIOR TO THE NEW CONNECTION TO THE EXISTING BASE BUILDING SYSTEM.

SANITARY AND VENT ISOMETRIC DIAGRAM

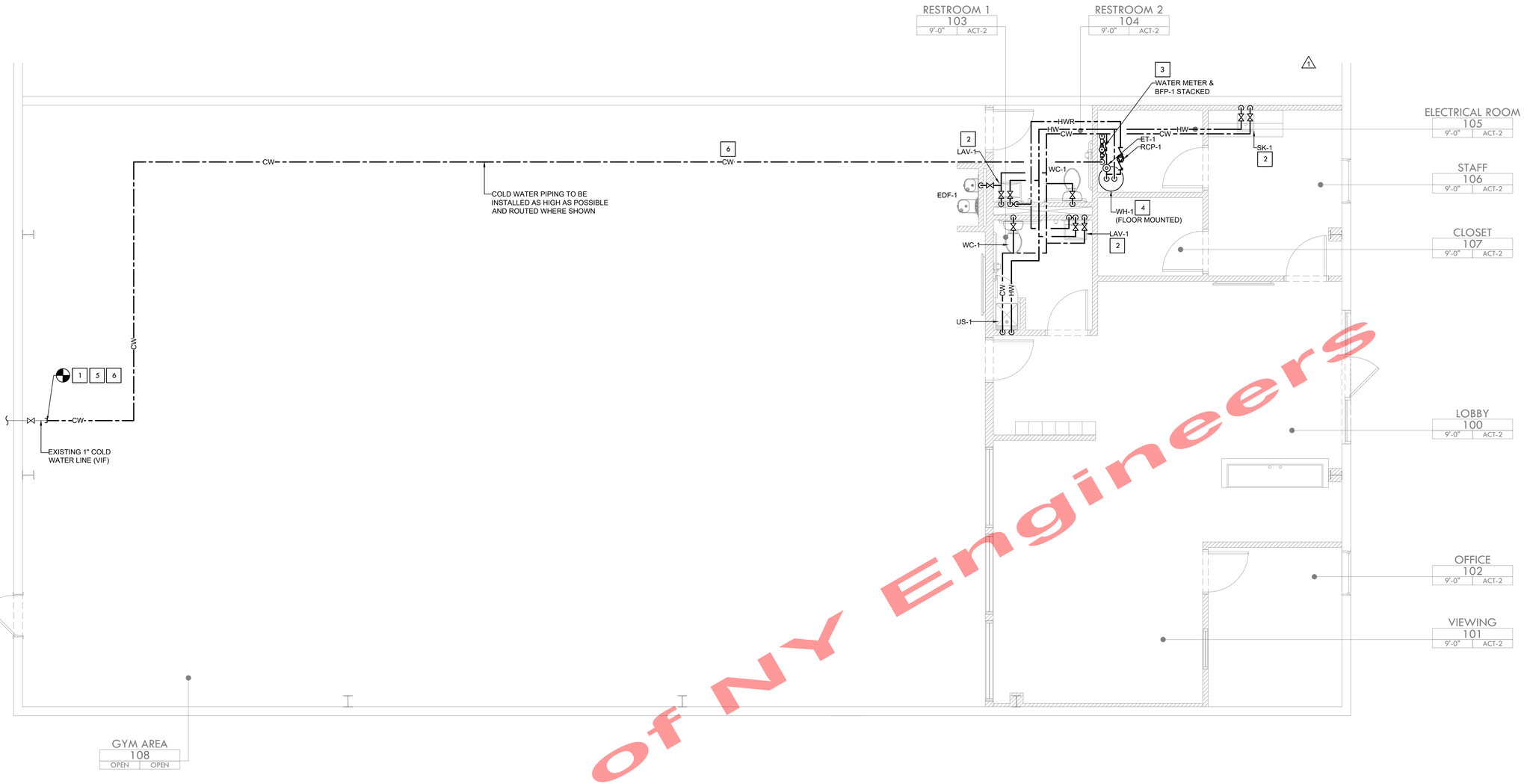


1 SCALE 1/4" = 1' - 0" PLUMBING SANITARY AND VENT FLOOR PLAN

USA Ninja Challenge

TITLE:
PLUMBING SANITARY AND VENT FLOOR PLAN

SHEET NUMBER:
P-1.0



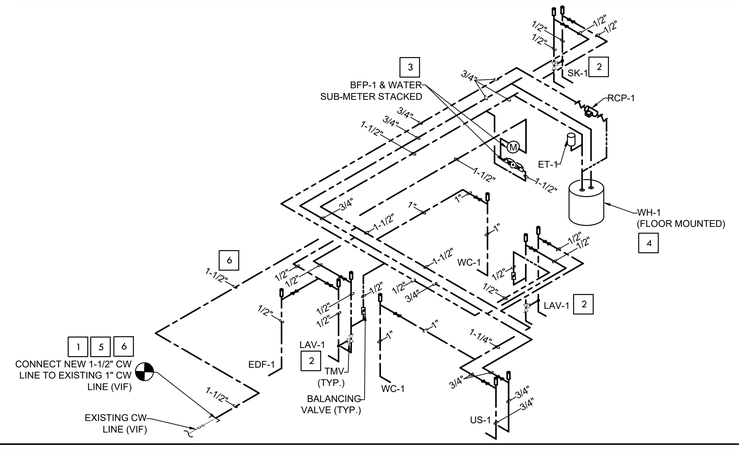
GENERAL NOTES

1. ANY CHANGES AND/ OR UPGRADES TO TENANT'S EXISTING PLUMBING SYSTEMS SHALL COMPLY WITH ALL CODES AND MALL CRITERIA. EXISTING SYSTEMS SHALL POSSESS THE CAPACITY TO HANDLE ANY AND ALL CHANGES IN LOAD.
2. ALL WATER LINES SHALL BE PEX PERMITTED (OPTIONAL PIPE MATERIAL SHALL BE COPPER TUBE TYPE-L / CPVC). THERE SHALL BE NO PIPING JOINTS OF FITTINGS INSTALLED IN WATER PIPING BELOW THE FLOOR SLAB.
3. PLUMBING IS NOT PERMITTED IN ANY DEMISING PARTITIONS. FURROUT THE WALL AS\ NECESSARY.
4. FLOOR DRAINS ARE REQUIRED TO HAVE TRAP PRIMERS BARRIER TYPE TRAP SEAL.
5. ANY UNUSED PLUMBING EQUIPMENT, PIPING, ETC., WITHIN OR SERVING THE PREMISES MUST BE COMPLETELY REMOVED TO POINT OF ORIGIN. DO NOT ABANDON IN PLACE.
6. ALL FLOOR PENETRATIONS MUST BE CORE BORED, SLEEVED, GROUTED, SEALED AND MADE WATERPROOF. SLEEVES MUST EXTEND A MINIMUM OF 4" AFF.
7. TENANT IS REQUIRED TO INSTALL A WATERPROOF MEMBRANE IN ALL WET AREAS OF THE SPACE. TENANT SHALL USE A 30 MIL POLYETHYLENE CLEAVAGE MEMBRANE (EQUAL TO NOBLESEAL TS) INSTALLED PER MANUFACTURERS RECOMMENDATIONS AND ANSI A108. MEMBRANE MUST BE EXTENDED UP THE WALL A MINIMUM OF 6" OR EQUAL TO THE HEIGHT OF THE FLOOR BASE.
8. NO ROOF PENETRATIONS PERMITTED WITHIN ROOF WATER PLY, REFER TO ROOF PLAN FOR LOCATIONS.
9. REFER TO RISER DIAGRAM FOR ALL WATER SIZES.
10. THE SUSPENSION OF ANY ITEMS FROM BASE BUILDING STRUCTURE BY MEANS OF DRILLING, WELDING, SHOOTING ARE PROHIBITED. CONTRACTOR TO MAKE SURE ALL THE EQUIPMENTS AND PIPES TO BE SUPPORTED BY MEANS OF THE BEAM CLAMPS.
11. ROUTE HW WATER LOOP DOWN IN WALL TO FIXTURE. MINIMIZE DISTANCE FROM THE LOOP TO HOT WATER DISCHARGE.
12. COORDINATE OVERALL PIPING DIAMETER (INCLUDING INSULATION) WITH WALL DEPTH.
13. NOTIFY ARCHITECT IF OVER ALL PIPE DIAMETER EXCEEDS WALL DEPTH.
14. ALL PROPOSED POKE-THRU AND TRENCHING LOCATIONS TO BE REVIEWED AND APPROVED BY LANDLORD'S STRUCTURAL ENGINEER BEFORE CUTTING OR DRILLING IS PERMITTED.
15. PROVIDE QUARTER-TURN ISOLATION VALVES FOR ALL PLUMBING EQUIPMENTS.

WATER SUPPLY KEYED NOTES:

1	EXTEND AND CONNECT NEW 1-1/2" COLD WATER LINE TO THE EXISTING 1" COLD WATER LINE. CONTRACTOR TO FIELD VERIFY EXISTING COLD WATER LINE LOCATION AND SIZE. VERIFY IF ADEQUATE PRESSURE IS AVAILABLE TO SERVE ALL PLUMBING FIXTURES; PROVIDE BOOSTER PUMP IF REQUIRED. UPGRADE EXISTING COLD WATER LINE IF REQUIRED. BASE BID ACCORDINGLY.
2	PROVIDE APPROVED ASSE 1070 THERMOSTATIC MIXING VALVE (TMV-1) SET TO 110°F AT LAVATORY & SINK.
3	CONTRACTOR TO COORDINATE WITH THE LANDLORD/AHJ REQUIREMENT OF WATER METER & BACK FLOW PREVENTER (BFP-1). PROVIDE NEW WATER METER & BFP-1 (WATTS LF009 OR EQUIVALENT) AS SHOWN ON THE PLAN IF REQUIRED. INSTALLED AS PER LOCAL AHJ REQUIREMENT. BASE BID ACCORDINGLY.
4	PROVIDE A NEW STORAGE TANK TYPE ELECTRIC WATER HEATER (WH-1) WITH THERMAL EXPANSION TANK (ET-1), RE-CIRCULATION PUMP (RCP-1), ASSOCIATED ACCESSORIES AND FITTINGS. WATER HEATER SHALL BE INSTALLED ON A PLATFORM AT FLOOR LEVEL. REFER PLUMBING SCHEDULE FOR MORE DETAILS.
5	CONTRACTOR TO COORDINATE WITH THE LANDLORD /BASE BUILDING ENGINEER PRIOR TO THE NEW CONNECTION TO THE EXISTING BASE BUILDING SYSTEM.
6	NO TAP OFF TO BE TAKEN BEFORE BFP-1.

DOMESTIC WATER ISOMETRIC DIAGRAM



Property of NY Engineers

1 SCALE 1/4" = 1' - 0" PLUMBING WATER SUPPLY FLOOR PLAN

TITLE: PLUMBING WATER SUPPLY FLOOR PLAN

SHEET NUMBER: P-2.0