

AIR DEVICE SCHEDULE			
MARK	TYPE	MANUFACTURER/MODEL	REMARKS
A	ARCHITECTURAL SQUARE PANEL SUPPLY AIR DEVICE	TITUS-TMS-AA	24"X24" OR 12"X12" FACE AREA. AIR PATTERN SHALL BE 4-WAY THROW UNLESS OTHERWISE NOTED ON DRAWINGS. REFER TO ARCHITECTURAL DRAWINGS FOR CEILING TYPE AND CONSTRUCTION DETAILS. FLEX SUPPLYING DIFFUSER TO BE SAME AS NECK SIZE.
B	PERFORATED PANEL RETURN/EXHAUST AIR DEVICE	TITUS-PAR-AA	24"X24" OR 12"X12" FACE AREA WITH 22"X22" AND 10"X10" NECK RESPECTIVELY FOR OPEN GRILLES. PROVIDE PER SCHEDULE FOR DUCTED GRILLES. REFER TO ARCHITECTURAL DRAWINGS FOR CEILING TYPE AND CONSTRUCTION DETAILS. FLEX SUPPLYING GRILLE TO BE SAME AS NECK SIZE.

AIR DEVICE CONNECTION SCHEDULE			
AIR QUANTITY (CFM)	DEVICE NECK SIZE	BRANCH DUCT SIZE	
		ROUND DUCT	ALTERNATE RECTANGULAR DUCT
0-125	6"ø	6"ø	REFER TO DRAWINGS
126-190	8"ø	8"ø	REFER TO DRAWINGS
191-290	10"ø	10"ø	REFER TO DRAWINGS
291-390	12"ø	12"ø	REFER TO DRAWINGS
391-530	14"ø	14"ø	REFER TO DRAWINGS
531-850	16"ø	16"ø	REFER TO DRAWINGS
851-1200	-	-	REFER TO DRAWINGS
1201-1500	-	-	REFER TO DRAWINGS
1500-2000	-	-	REFER TO DRAWINGS

NOTES:

- CEILING DIFFUSERS ARE 4-WAY UNLESS INDICATED OTHERWISE IN THE DRAWINGS.
- PROVIDE BLOW CLIPS TO DIRECT AIR FLOW AWAY FROM WALLS AND GLASS WHEN DEVICES ARE WITHIN 4' OF A WALL.
- ALL VISIBLE SURFACES OF THE RETURN/EXHAUST PLENUM AND DUCT CONNECTION SHALL BE PAINTED FLAT BLACK.
- AIR DEVICE FRAME AND STYLE SHALL MATCH CEILING TYPE. COORDINATE WITH ARCHITECTURAL REFLECTED CEILING PLAN.
- PROVIDE MANUFACTURER'S INSULATED BACKPAN FOR ALL SUPPLY AIR DEVICES.
- ALL AIR DEVICES SHALL BE ALUMINUM CONSTRUCTION.
- REFER TO ARCHITECT FOR FINISHES AND COLOR OF DEVICES.

DEMOLITION LEGEND	
SYMBOL	DESCRIPTION
---	EXISTING TO REMAIN
- - - - -	DEMOLITION
■	DEMO TO THIS POINT

RENOVATION LEGEND	
SYMBOL	DESCRIPTION
---	EXISTING TO REMAIN
—	NEW CONSTRUCTION
⊙	CONNECT AT THIS POINT

DEMOLITION GENERAL NOTES

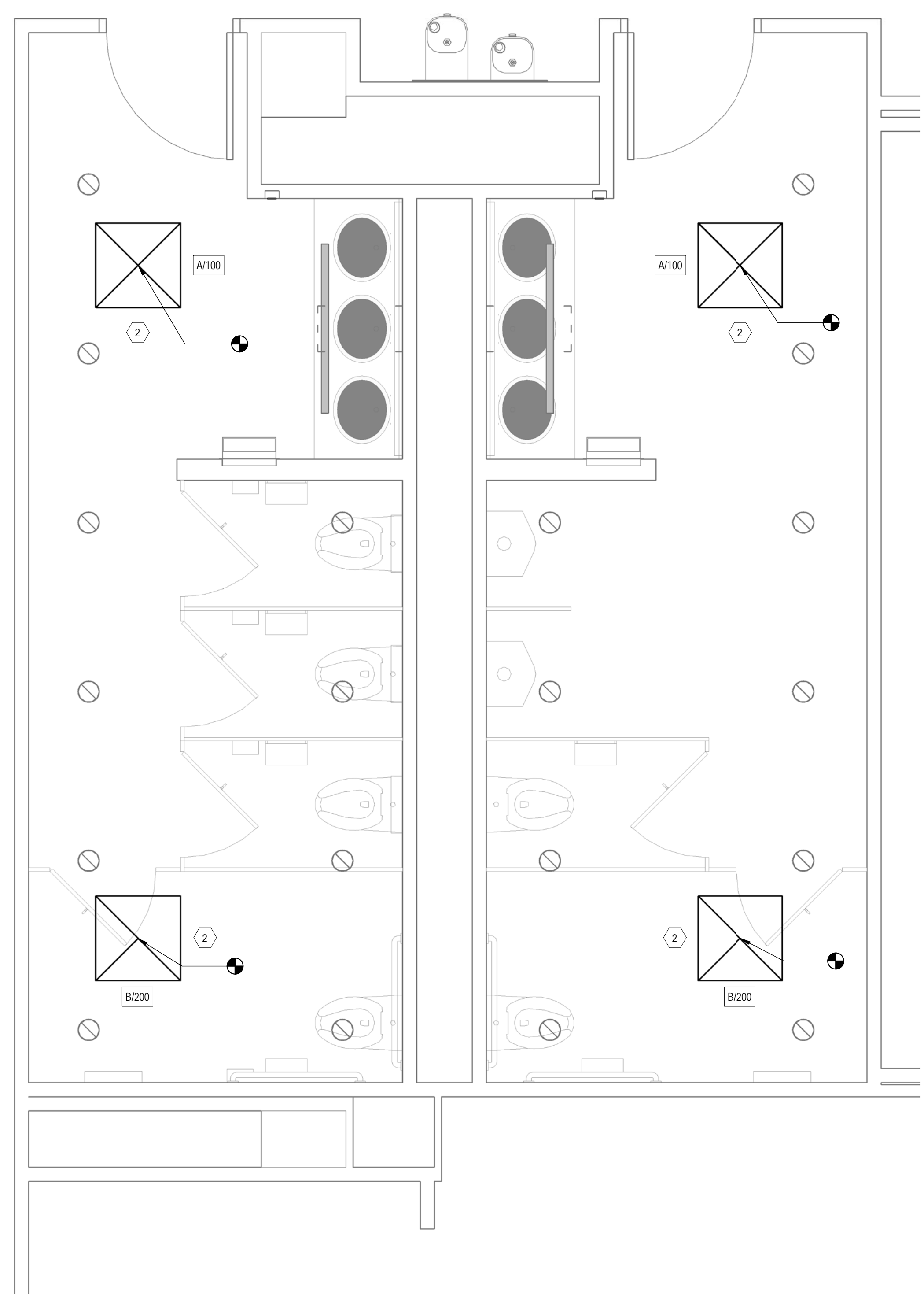
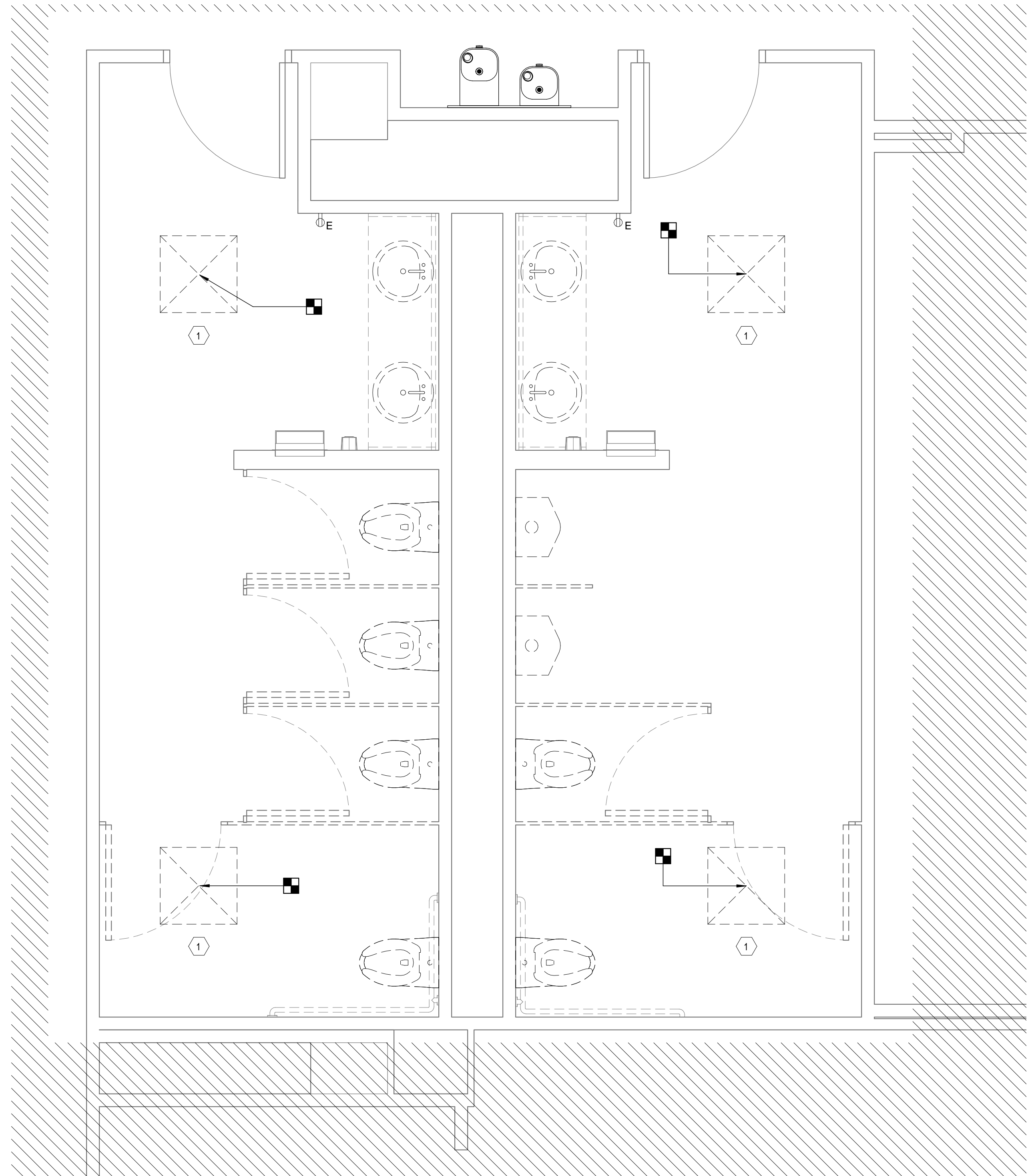
- DEMOLITION WORK SHALL BE PERFORMED TO ACCOMPLISH REPLACEMENT WORK WITH A MINIMUM AMOUNT OF SYSTEM DOWNTIME.
- SCHEDULE ALL SHUTDOWNS AND DEMOLITION WORK IN ADVANCE WITH OWNER.
- CONTRACTOR SHALL BE RESPONSIBLE TO VERIFY THE CONDITION OF EXISTING EQUIPMENT, EXACT SIZES AND LOCATION OF EXISTING DUCT, PIPING, EQUIPMENT, ETC. BEFORE DEMOLITION WORK BEGINS. REPORT ANY DISCREPANCIES BETWEEN PRIOR TO THE START OF DEMOLITION WORK.
- CONTRACTOR SHALL REMOVE EXISTING HVAC EQUIPMENT, ASSOCIATED MATERIALS, AND SUPPORTS AS INDICATED. ALL UNUSED EQUIPMENT AND MATERIALS SHALL BE REMOVED BACK TO THE SOURCE. PATCH EXISTING CONDITIONS TO REMAIN AS NECESSARY AS DIRECTED BY THE OWNER. CONTRACTOR SHALL TURN OVER TO OWNER OR REMOVE FROM SITE.
- BALANCING CONTRACTOR SHALL MEASURE AND RECORD EXISTING SYSTEMS AFFECTED BY THIS RENOVATION PRIOR TO THE DEMOLITION WORK. MEASUREMENTS SHALL INCLUDE SUPPLY AND RETURN AIR FLOWS AT EXISTING AIR HANDLING UNITS, SUPPLY, RETURN AND EXHAUST AIR FLOW AT ALL DUCT MAINS AND BRANCHES SERVING EXISTING AREAS TO REMAIN, AND THE FLOW AT PUMPS. BALANCING CONTRACTOR SHALL NOTIFY THE OWNER AND ENGINEER OF ALL DEFICIENCIES FOUND IN ANY OF THE SYSTEMS. EXISTING AIR DISTRIBUTION SYSTEMS SHALL BE REBALANCED TO MEET THE EXISTING AIR FLOW AS WELL AS THE FLOW REQUIREMENTS INDICATED IN THE CONSTRUCTION DOCUMENTS.

MECHANICAL GENERAL NOTES

- REFER TO MECHANICAL INFORMATION SHEET FOR ABBREVIATIONS AND NOTES.
- COORDINATE CEILING AIR DEVICES WITH LIGHT FIXTURES AND OTHER CEILING MOUNTED DEVICES.
- MAINTAIN MANUFACTURER'S RECOMMENDED CLEARANCES ON ALL EQUIPMENT.
- PROVIDE YOUNG REGULATORS FOR ALL VOLUME DAMPERS ABOVE INACCESSIBLE CEILINGS UNLESS OTHERWISE NOTED. COORDINATE CEILING MOUNTED ADJUSTING SORTS WITH EXISTING CEILING ELEMENTS, LINE UP FOR VISUAL PURPOSES. PROVIDE PORT LOCATIONS TO ARCHITECT FOR APPROVAL.
- PROVIDE ACCESS CEILING PANELS TO MOTORIZED DAMPERS, VALVES, AND EQUIPMENT ABOVE INACCESSIBLE CEILINGS. COORDINATE LOCATIONS WITH ARCHITECT.
- PRIOR TO ORDERING SHEET METAL FIELD VERIFY AND COORDINATE EXACT DUCT ROUTING WITH NEW AND EXISTING STRUCTURAL CONDITIONS.
- COORDINATE FINAL THERMOSTAT LOCATIONS WITH ARCHITECT.
- CONTRACTOR SHALL VERIFY CLEARANCE REQUIREMENTS AND ROUTING OF NEW SYSTEMS PRIOR TO FABRICATION AS RISES, DROPS, AND OFFSETS MAY BE NECESSARY BECAUSE OF EXISTING FIELD CONDITIONS.
- CONTRACTOR SHALL COMPLY WITH ALL LOCAL, STATE, AND FEDERAL CODES AND AUTHORITIES HAVING JURISDICTION.
- CONTRACTOR SHALL COORDINATE WITH STRUCTURAL CONDITIONS AND PROVIDE OFFSETS AND CLEARANCES AS REQUIRED.
- DUCT SIZES SHOWN ARE FOR CLEAR INSIDE DIMENSIONS. ALL DUCTWORK SHALL BE INSTALLED PER THE LATEST SMACNA STANDARDS.
- ALL SUPPLY AND RETURN AIR DEVICES SHALL BE INSULATED ON THE TOP/BACK OF THE DEVICE TO PREVENT CONDENSATION. SURFACE SHALL BE COMPLETELY COVERED AND SECURED IN PLACE WITH TAPE USED TO SEAL JOINTS. INSULATION SHOULD BE APPLIED PRIOR TO INSTALLATION.
- DRAWINGS ARE SCHEMATIC IN NATURE AND SHALL NOT BE SCALED. THE CONTRACTOR IS RESPONSIBLE FOR CREATING SHOP DRAWINGS AND FOR COORDINATING THE EXACT ROUTING OF ALL DUCTWORK AND PIPING WITH EXISTING FIELD CONDITIONS AND WITH OTHER TRADES.

KEYED NOTES

- DISCONNECT EXISTING GRILLE AND DISCARD.
- PROVIDE NEW GRILLE AS SCHEDULED. RECONNECT TO EXISTING DUCT. BALANCE TO CFMS SHOWN ON TAG.



Dewberry
DEWBERRY ARCHITECTS, INC.
5051 WESTHEIMER ROAD
SUITE 200
HOUSTON, TX 77056
713.621.8714

CFI Companies
2500 WILCREST DRIVE,
SUITE 150
HOUSTON, TX 77042
281.809.7532

Houston Methodist
 MEDICAL OFFICE BUILDINGS
 HMMOB HARGRAVE PUBLIC TOILET ROOM RENOVATION
 METHODIST WILLOWBROOK HOSPITAL
 HARGRAVE BUILDING, LEVELS 1-5
 13300 HARGRAVE HOUSTON, TX 77070

SEAL

06/05/2019

KEY PLAN

REVISIONS

NO.	DESCRIPTION	DATE

ISSUED FOR BID & PERMIT 06.05.2019

DRAWN BY _____ WG
 APPROVED BY _____ TF
 CHECKED BY _____ TF
 DATE 06/05/2019

MECHANICAL PLAN - LEVELS 1-5

PROJECT NO. 2016096

M1.01

SHEET NO.

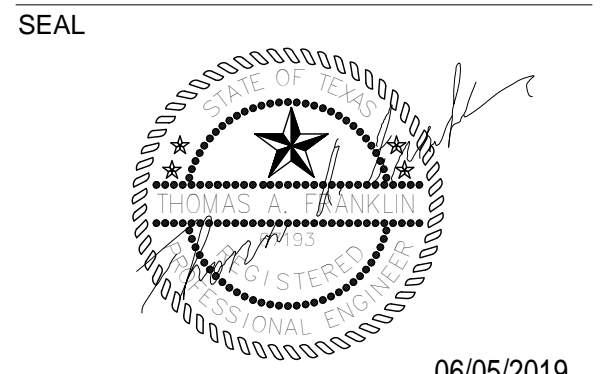


Table with 3 columns: NO., DESCRIPTION, DATE. Includes 'ISSUED FOR BID & PERMIT' entry.

DRAWN BY: WG APPROVED BY: TF CHECKED BY: TF DATE: 06/05/2019

MEP INFO SHEET

ABBREVIATIONS

Table with 4 columns: SYMBOL, DESCRIPTION, SYMBOL, DESCRIPTION. Lists various abbreviations like AMP, AC, AD, etc.

ELECTRICAL SYMBOLS LEGEND

Table with 2 columns: SYMBOL, DESCRIPTION. Lists electrical symbols like EMERGENCY BATTERY PACK, TRANSFORMER, etc.

PLUMBING SYMBOLS LEGEND

Table with 2 columns: SYMBOL, DESCRIPTION. Lists plumbing symbols like SANITARY WASTE PIPING, PLUG VALVE, etc.

MECHANICAL SYMBOLS LEGEND

Table with 4 columns: SYMBOL, DESCRIPTION, MARK #, EQUIPMENT MARK AND NUMBER. Lists mechanical symbols like SUPPLY AIR DUCT UP (PLAN), THERMOSTAT, etc.

MEP SHEET INDEX

Table with 2 columns: Sheet Number, Sheet Name. Lists sheets like MEP0.00, MEP0.01, etc.

F
E
D
C
B
A

BASIC REQUIREMENTS

A. CODES AND STANDARDS:

1. ALL WORK SHALL COMPLY WITH THE MOST RECENTLY REVISED VERSIONS OF ALL APPLICABLE LAWS, RULES, REGULATIONS AND ORDINANCES OF ALL FEDERAL, STATE AND LOCAL AUTHORITIES AND APPLICABLE UTILITIES. NONE OF THE TERMS OR PROVISIONS OF THIS SPECIFICATION SHALL BE CONSTRUED AS WAIVING ANY PART OF THE RULES, REGULATIONS OR REQUIREMENTS OF THESE AUTHORITIES.

B. DRAWINGS AND SPECIFICATIONS

1. DRAWINGS: THE DRAWINGS ARE SCHEMATIC IN NATURE AND INDICATE APPROXIMATE LOCATIONS OF THE HEATING, VENTILATING, AND AIR CONDITIONING SYSTEMS, FIRE PROTECTION SYSTEMS, PLUMBING EQUIPMENT, FIXTURES AND PIPING SYSTEMS. EXCEPT WHERE SPECIFIC LOCATIONS ARE NOTED AND DIMENSIONED ON THE DRAWINGS, ALL ITEMS ARE SHOWN APPROXIMATELY TO SCALE. THE INTENT IS TO SHOW HOW THESE ITEMS SHALL BE INTEGRATED INTO THE CONSTRUCTION. LOCATE ALL ITEMS BY ON THE JOB MEASUREMENTS AND IN ACCORDANCE WITH THE CONTRACT DOCUMENTS. COORDINATE WITH OTHER TRADES.

C. COMPLETENESS OF WORK

1. THE CONTRACT DOCUMENTS DEPICT MECHANICAL AND PLUMBING SYSTEMS WHICH ARE INTENDED TO BE COMPLETE AND FUNCTIONING SYSTEMS. ALL PRODUCTS, MATERIALS, AND LABOR NECESSARY TO RENDER A FULLY FUNCTIONAL SYSTEM TO FULFILL THE DESIGN INTENT SHOWN ON THE DOCUMENTS SHALL BE PROVIDED BY THE CONTRACTOR.
2. CATALOG NUMBERS REFERENCED THROUGHOUT THE DIVISION 15 DRAWINGS AND SPECIFICATIONS ARE INTENDED TO CONVEY A GENERAL UNDERSTANDING OF THE TYPE AND QUALITY OF THE PRODUCT REQUIRED. WHERE WRITTEN DESCRIPTIONS DIFFER FROM INFORMATION CONVEYED BY A CATALOG NUMBER, THE WRITTEN DESCRIPTION SHALL GOVERN. NO EXTRA SHALL BE ALLOWED BECAUSE A CATALOG NUMBER IS FOUND TO BE INCOMPLETE OR OBSOLETE.

D. COORDINATION

1. THIS CONTRACTOR SHALL BE RESPONSIBLE FOR THE COORDINATION OF ALL ITEMS THAT WILL AFFECT THE INSTALLATION OF THE WORK OF THIS DIVISION. THE COORDINATION SHALL INCLUDE, BUT NOT BE LIMITED TO, VOLTAGE, AMPACITY, CAPACITY, ELECTRICAL PIPING CONNECTIONS, STRUCTURAL SUPPORTS, SPACE REQUIREMENTS, LOCATING DEVICES IN ARCHITECTURAL FINISH ELEMENTS, STAGING THE CONSTRUCTION AND BUILDING REQUIREMENTS, AND SPECIAL CONDITIONS.
2. BY SUBMITTING SHOP DRAWINGS ON THE PROJECT, THIS CONTRACTOR IS INDICATING THAT ALL NECESSARY COORDINATION HAS BEEN COMPLETED AND THAT THE SYSTEMS, PRODUCTS AND EQUIPMENT SUBMITTED CAN BE INSTALLED IN THE BUILDING AND WILL OPERATE AS SPECIFIED AND INTENDED, IN FULL COORDINATION WITH ALL OTHER DISCIPLINES.

E. EQUIPMENT NOISE AND VIBRATION

1. IT IS THE INTENT TO SPECIFY AND FOR THE CONTRACTOR TO INSTALL SYSTEMS THAT ARE QUIET AND FREE OF VIBRATION. EQUIPMENT SHALL BE BALANCED AND VIBRATION ISOLATED TO MEET THE REQUIREMENTS SPECIFIED HEREIN FOR BOTH THE EQUIPMENT ITSELF AND CONDITIONS WITHIN OCCUPIED SPACES. THIS CONTRACTOR IS RESPONSIBLE FOR OBTAINING AND INSTALLING EQUIPMENT THAT IS QUIET IN OPERATION AS COMPARED TO OTHER AVAILABLE EQUIPMENT OF ITS SIZE, CAPACITY, AND TYPE.
2. EQUIPMENT NOT MEETING THESE REQUIREMENTS SHALL BE CORRECTED BY THE CONTRACTOR TO AN ACCEPTABLE LEVEL BUT WITHIN THE REQUIREMENTS OF THE SPECIFICATIONS AT NO COST TO THE OWNER, ARCHITECT OR ENGINEER.
3. AIR DISTRIBUTION EQUIPMENT SHALL BE SOUND TESTED AT THE DESIGN OPERATING CONDITIONS AND SHALL NOT EXCEED AN NC OF 35 AT RATED RPM.
4. NOISE LEVEL: UNLESS NOTED OTHERWISE HEREIN OR ON THE DRAWINGS, THE NOISE LEVEL IN ALL OCCUPIED SPACES SHALL NOT EXCEED THE "LOWEST" VALUE IN THE RANGE OF THE NOISE CRITERIA CURVES PUBLISHED IN THE CURRENT FUNDAMENTALS EDITION OF THE ASHRAE GUIDE AND DATA BOOK. THE NOISE CRITERIA CURVES SHALL BE BASED ON ANSI STANDARD S1.6-1967 OCTAVE BANDS AND A SOUND PRESSURE LEVEL IN DECIBELS REFERENCED TO 0.002 MICROPASCALS. SOUND LEVELS IN OCCUPIED SPACES MUST MEET THE DESIGN CRITERIA WITH ALL CONSTRUCTION IN PLACE.
5. VERIFICATION: SHOULD A QUESTION ARISE REGARDING THE ACCEPTABLE LEVEL OF NOISE OR VIBRATION IN A PARTICULAR SPACE OR PIECE OF EQUIPMENT, THE CONTRACTOR SHALL BE RESPONSIBLE FOR PROVIDING THE SERVICES OF AN APPROVED ACOUSTICAL CONSULTANT TO DETERMINE ACTUAL NOISE/VIBRATION CONDITIONS.

F. WARRANTIES AND GUARANTEES

1. GENERAL: CONTRACTOR SHALL GUARANTEE ALL MATERIAL AND EQUIPMENT INSTALLED BY HIM AGAINST DEFECT AND WORKMANSHIP AND MATERIAL FOR A PERIOD OF TWELVE (12) MONTHS AFTER FINAL ACCEPTANCE OF THE WORK BY THE OWNER, AND HE SHALL REPAIR OR REPLACE ANY MATERIALS OR EQUIPMENT DEVELOPING SUCH DEFECTS WITHIN THAT TIME, PROMPTLY ON THE NOTICE GIVEN HIM BY THE OWNER AND AT CONTRACTOR'S SOLE COST AND EXPENSE.
2. EQUIPMENT: ALL EQUIPMENT BEARING A MANUFACTURER'S GUARANTEE SHALL BE CONSTRUED TO HAVE AN EXTENDED GUARANTEE TO THE MANUFACTURER. ANY SUCH GUARANTEE EQUIPMENT THAT PROVES DEFECTIVE IN MATERIALS OR WORKMANSHIP WITHIN THE GUARANTEE PERIOD IS TO BE REPLACED BY THE CONTRACTOR IN ACCORDANCE WITH THE MANUFACTURER'S GUARANTEE.

G. BASE BUILDING STANDARDS

1. THE INTENT OF THIS SPECIFICATION IS TO PROVIDE A LEVEL OF QUALITY THAT MEETS OR EXCEEDS APPLICABLE CODES AND OWNERS EXPECTATIONS. IF ANY PORTION OF THESE SPECIFICATIONS ARE DIFFERENT THAT THE BUILDING STANDARDS, THIS SHOULD BE BROUGHT TO THE ENGINEER'S ATTENTION IMMEDIATELY TO DETERMINE WHICH IS THE CORRECT SPECIFICATION. ANY CHANGE WILL NOT BE CONSIDERED A CHANGE ORDER AS THE CONTRACTOR SHOULD BID ON THE MOST STRINGENT OF THE TWO.

H. SYSTEM CLEANING

1. DUCTWORK: THE DUCT SYSTEM SHALL BE KEPT CLEAN AND FREE FROM DUST AND DIRT DURING THE FABRICATION AND ERECTION PROCESS. WIPE EACH SECTION OF DUCT DOWN PRIOR TO HANGING IN PLACE. OPEN ENDS OF DUCT SYSTEMS SHALL BE SEALED WITH SHEET PLASTIC UNTIL FINAL CONNECTION TO AIR DEVICES HAS BEEN MADE. CLEAN ALL INTERIOR SURFACES OF DUCTWORK PRIOR TO STARTING THE SYSTEM FAN. REPAIR ALL TEARS IN INTERNAL DUCT LINER WITH MASTIC RATED TO THE INSULATION SYSTEM.
2. EQUIPMENT: KEEP EQUIPMENT CLEAN AND DRY DURING THE CONSTRUCTION PROCESS. PRIOR TO START UP, INSPECT AND CLEAN ALL INTERIOR EQUIPMENT SURFACES, CLEAN AND REPAIR TORN INSULATION, REMOVE ALL DIRT AND DEBRIS. PROVIDE TEMPORARY FILTER MEDIA AS REQUIRED FOR UNIT OPERATION PRIOR TO FINAL COMMISSIONING.

GENERAL MECHANICAL NOTES

1. BEFORE SUBMITTING A BID, IT WILL BE NECESSARY FOR EACH CONTRACTOR WHOSE WORK IS INVOLVED TO VISIT THE SITE AND ASCERTAIN FOR HIMSELF THE CONDITIONS TO BE MET IN INSTALLING THE WORK AND MAKE PROVISIONS FOR THE CONDITIONS IN HIS FINAL PRICE. FAILURE ON THE PART OF THE CONTRACTOR TO COMPLY WITH THIS REQUIREMENT SHALL NOT BE CONSIDERED JUSTIFICATION FOR THE OMISSION OR FAULTY INSTALLATION OF ANY WORK COVERED BY THE CONTRACT DOCUMENTS.
2. THE CONTRACTOR SHALL SECURE ALL PERMITS, LICENSES AND INSPECTIONS REQUIRED FOR HIS WORK, AND SHALL PAY ALL FEES IN CONNECTION WITH SUCH PERMITS, LICENSES AND INSPECTIONS.
3. WORK SHALL COMPLY WITH THE MOST RECENT VERSION OF ALL APPLICABLE LAWS, RULES, REGULATIONS AND ORDINANCES OF ALL FEDERAL, STATE AND LOCAL AUTHORITIES. IN THE EVENT OF CONFLICT BETWEEN THE CONTRACT DOCUMENTS AND THE LOCAL ENFORCING AUTHORITY, THE LATTER SHALL RULE. ANY MODIFICATION RESULTING THEREFROM SHALL BE MADE WITHOUT ADDITIONAL COST TO THE OWNER OR ARCHITECT/ENGINEER. THE CONTRACTOR SHALL REPORT ANY SUCH MODIFICATIONS TO THE ARCHITECT/ENGINEER AND SECURE HIS APPROVAL BEFORE PROCEEDING. SHOULD THE REQUIREMENTS OF THE CONTRACT DOCUMENTS EXCEED THE REQUIREMENTS OF THE CODES, THE CONTRACT DOCUMENTS SHALL TAKE PRECEDENCE PROVIDED THEY ARE NOT IN CONFLICT WITH THOSE CODES.
4. ALL ITEMS OF EQUIPMENT AND ALL MATERIALS FOR WHICH APPROVAL STANDARDS HAVE BEEN ESTABLISHED BY UNDERWRITERS LABORATORIES, INC. (UL), FACTORY MUTUAL (FM), CERTIFIED BALLAST MANUFACTURER (CBM), ELECTRICAL TESTING ASSOCIATION (NETA) SHALL BE SO APPROVED AND SHALL BEAR APPROVAL LABELS.
5. PENETRATIONS THROUGH FLOORS OR FIRE-RATED CONSTRUCTION SHALL BE FIRESAFED TO COMPLY WITH NFPA 803 (UL 1479), AND LOCAL CODE REQUIREMENTS.

SUBMITTALS AND SHOP DRAWINGS

1. CONTRACTOR SHALL PROVIDE THE ENGINEER WITH PRODUCT DATA AND SHOP DRAWINGS FOR ALL MATERIALS & EQUIPMENT SPECIFIED BELOW. SUBMITTALS SHALL BE PROVIDED IN AN ELECTRONIC FORMAT. SUBMITTAL DATA SHALL INCLUDE:
 1. COVER SHEET WITH NAMES AND ADDRESSES OF PROJECT, ARCHITECT MEP ENGINEER, GENERAL CONTRACTOR & SUB CONTRACTOR.
 2. DRAWING REFERENCE NUMBER, PRODUCT NAME AND/OR DESCRIPTION.
 3. INDEX OF ALL DATA IN SUBMITTAL.
 4. DIMENSIONAL DATA AND SKETCHES SHOWING THAT SUBMITTED EQUIPMENT WILL FIT INTO SPACE AVAILABLE AND WILL HAVE REQUIRED CODE AND MAINTENANCE CLEARANCES.
 5. IDENTIFICATION OF EACH ITEM MATCHING THAT INDICATED ON THE DRAWINGS.
 6. SUFFICIENT PERFORMANCE DATA, CAPACITY, SOUND DATA, DIAGRAMMATIC DATA AND DESCRIPTIVE INFORMATION TO SHOW ITS COMPLIANCE WITH THE CONTRACT DOCUMENTS. OPTIONS OR SPECIAL REQUIREMENTS SHALL BE CLEARLY INDICATED. APPLICABLE INFORMATION SHALL BE CLEARLY INDICATED AND NON APPLICABLE DATA SHALL BE CROSSED OFF.
 7. MATERIALS AND EQUIPMENT PURCHASED OR INSTALLED WITHOUT A "NO EXCEPTIONS TAKEN" SHOP DRAWING REVIEW SHALL BE AT THE RISK OF THE CONTRACTOR. THE COST OF REMOVAL AND AT THE RISK OF THE CONTRACTOR. THE COST OF REMOVAL AND REPLACEMENT OF SUCH MATERIALS WHICH IS JUDGED UN-SATISFACTORY BY THE ENGINEER FOR ANY REASON SHALL BE AT THE EXPENSE OF THE CONTRACTOR.
 8. ANY ITEMS KNOWINGLY SUBMITTED THAT DO NOT COMPLY WITH SPECIFICATIONS SHALL BE LISTED WITH EXPLANATION AS TO WHY THEY ARE BEING SUBMITTED.

B. REQUIRED SUBMITTALS/SHOP DRAWINGS.

1. GRILLES, REGISTERS AND DIFFUSERS

GENERAL MATERIALS AND METHODS

A. HANGERS AND SUPPORTS

1. GENERAL: PROVIDE PIPE HANGERS AND SUPPORT MATERIALS AS SPECIFIED HEREIN. ALL HORIZONTAL AND VERTICAL PIPING SHALL BE THOROUGHLY AND SUBSTANTIALLY SUPPORTED IN ACCORDANCE WITH ANSI B31.1 STANDARD CODE FOR PRESSURE PIPING AND MANUFACTURERS' STANDARDIZATION SOCIETY MSS SP-89 PIPE HANGERS AND SUPPORTS - SELECTION AND APPLICATION. THE DESIGN, TYPE, SPACING AND APPLICATION OF ALL HANGERS, SUPPORTS, ANCHORS AND GUIDES SHALL COMPLY WITH THE ABOVE STANDARDS. HANGER RODS SHALL BE GALVANIZED OR CADMIUM PLATED. HANGER ROD CLAMPS AND INSERTS SHALL BE AS RECOMMENDED BY THE CLAMP OR INSERT MANUFACTURER FOR THE INTENDED USE AND SHALL BE APPROVED IN WRITING BY THE STRUCTURAL ENGINEER. ALL METHODS OF ATTACHMENT TO THE STRUCTURE AND THE USE OF AFTER-SET INSERTS SHALL BE APPROVED IN WRITING BY THE STRUCTURAL ENGINEER. THE LOAD AND SPACING ON EACH HANGER AND/OR INSERT SHALL NOT EXCEED THE SAFE ALLOWABLE LOAD FOR ANY COMPONENT OF THE SUPPORT SYSTEM, INCLUDING THE CONCRETE WHICH HOLDS THE INSERTS. REINFORCEMENT AT INSERTS SHALL BE PROVIDED AS REQUIRED TO DEVELOP THE STRENGTH REQUIRED.

B. PAINTING

1. ALL MACHINERY AND EQUIPMENT NOT FINISHED AT THE FACTORY SHALL BE GIVEN A PRIME COAT AND THEN FINISH PAINTED WITH TWO COATS OF ENAMEL IN COLORS AS DIRECTED BY THE ARCHITECT/ENGINEER OR OWNER'S REPRESENTATIVE. NO NAMEPLATES ON EQUIPMENT SHALL BE PAINTED, AND SUITABLE PROTECTION SHALL BE AFFORDED SUCH PLATES TO PREVENT THEIR BEING RENDERED ILLEGIBLE DURING THE PAINTING OPERATIONS.
2. ALL UNINSULATED BLACK STEEL PIPE, HANGERS AND SUPPORTS SHALL BE GIVEN TWO COATS OF PRIMER, WHERE EXPOSED TO OUTDOOR WEATHER OR PUBLIC VIEW, THESE ITEMS SHALL BE PRIMED AND FINISHED WITH TWO COATS OF ENAMEL IN COLORS.
3. ALL INSULATED PIPING EXPOSED TO VIEW SHALL HAVE THE FINISHED INSULATION PAINTED WITH TWO COATS OF ACRYLIC IN COLORS AS INDICATED IN THE PIPING SYSTEM IDENTIFICATION TABLE. PIPING CONCEALED IN FURRINGS, CHASES, OR ABOVE SUSPENDED CEILING, NEED NOT BE PAINTED.

C. IDENTIFICATION AND LABELING

1. ROOFTOP EQUIPMENT, AIR HANDLING UNITS, PUMPS, WATER HEATERS, SUPPLY FANS, DUCT HEATERS, EXHAUST FANS, WATER CHILLING UNITS, BOILERS, COOLING TOWERS, AND ANY OTHER EQUIPMENT DESIGNATED BY THE ARCHITECT/ENGINEER SHALL BE LABELED WITH PERMANENTLY ATTACHED ENGRAVED NAMEPLATES CONSTRUCTED FROM LAMINATED PHENOLIC LAMINATE, AT LEAST 1/16 INCH THICK, 3-PLY, BLACK SURFACES AND WHITE CORE. ENGRAVING SHALL BE CONDENSED GOTHIC AT LEAST 3/8 INCH HIGH. ENGRAVING SHALL INCLUDE EQUIPMENT NAME AND NUMBER AND ELECTRICAL PANEL AND CIRCUIT WHICH SERVICES THE EQUIPMENT. CONSULT ARCHITECT/ENGINEER FOR LABEL NOMENCLATURE.
2. ALL VALVES AT MAJOR EQUIPMENT AND IN ALL EQUIPMENT ROOMS SHALL BE MARKED WITH 1-1/2" DIAMETER ALUMINUM OR ENGRAVED PLASTIC TAGS SECURELY ATTACHED TO VALVE STEMS WITH "S" HOOKS.
3. PIPING AT MAJOR EQUIPMENT AND IN ALL EQUIPMENT ROOMS SHALL BE IDENTIFIED BY COLOR CODED MARKERS AS TO TYPE OF USE, SERVICE AND DIRECTION OF FLOW AS INDICATED WITHIN THE PIPING SYSTEM IDENTIFICATION TABLE. MARKERS SHALL BE LOCATED AT EACH VALVE, ON 20 FOOT CENTERS ON STRAIGHT RUNS OF PIPE AND AT LEAST ONCE IN OR ABOVE EACH ROOM AND EACH STORY TRAVERSED BY THE PIPING. PIPING CONCEALED IN ACCESSIBLE LOCATIONS SHALL BE MARKED ON 50 FOOT CENTERS ON STRAIGHT RUNS OF PIPE AND AT ALL CHANGES IN DIRECTION. LABELS SHALL BE AS MANUFACTURED BY BRADY, BRIMAR, SETON, MARKING SERVICES, INC., OR WESTLINE.
4. ACCESS DOORS PROVIDED FOR ACCESS AND SERVICING OF FIRE AND SMOKE DAMPERS SHALL BE LABELED AS TO TYPE OF DAMPER (FIRE, SMOKE, COMBINATION FIRE AND SMOKE) SERVED.

AIR BALANCE

1. UPON COMPLETION OF THE INSTALLATION OF THE HVAC SYSTEMS, THE AIR VOLUME FOR EACH GRILLE SHALL BE SET TO DELIVER THE LISTED AIR VOLUME AND THE EXHAUST SYSTEM SHALL BE ADJUSTED TO ITS RATED EXHAUST VOLUME. AN INDEPENDENT, NEBB OR AABC CERTIFIED AIR BALANCE CONTRACTOR SHALL PERFORM THE AIR BALANCE AND SHALL SUBMIT A REPORT TO THE ENGINEER INDICATING AIR QUANTITIES AT ALL AIR HANDLING EQUIPMENT AND AIR DISTRIBUTION DEVICES. THE REPORT SHALL SHOW DESIGN QUANTITIES AND MEASURED QUANTITIES. ALL SUPPLY AND EXHAUST VOLUMES MUST BE EQUAL TO OR WITHIN +5% OF THE LISTED AIRFLOW RATE.

ACCESS DOORS

1. ACCESS DOORS SHALL BE PROVIDED FOR ACCESS TO VALVES, DAMPERS OR ANY OTHER ITEM WHICH MAY REQUIRE SERVICING OR ADJUSTING AND WHICH IS CONCEALED BEHIND AN INACCESSIBLE SURFACE SUCH AS SPLINED CEILINGS AND PLASTER WALLS OR CEILINGS. ACCESS DOORS SHALL BE AS MANUFACTURED BY MILCOR OR AN APPROVED EQUAL FOR SPECIFIC APPLICATION.

AIR DISTRIBUTION DEVICES AND DAMPERS

A. SCOPE

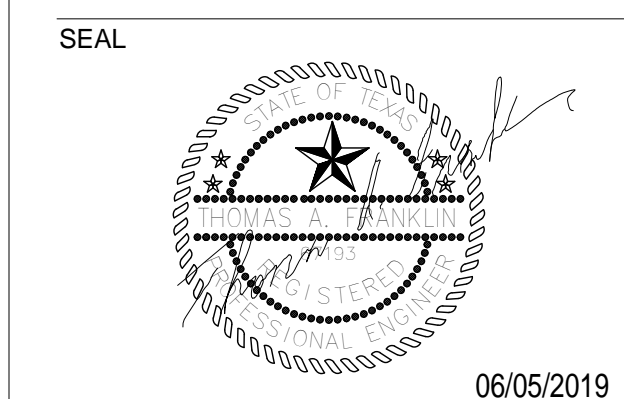
1. GENERAL: FURNISH AND INSTALL AIR DISTRIBUTION DEVICES AS SHOWN, SCHEDULED, SPECIFIED, AND REQUIRED. DEVICES SHALL BE COMPLETE WITH ALL REQUIRED MOUNTING ACCESSORIES FOR INSTALLATION IN THE ACTUAL CONSTRUCTION AT THE INSTALLATION LOCATION QUALITY ASSURANCE.

B. QUALITY ASSURANCE

1. MANUFACTURERS: IF THEY COMPLY WITH THESE SPECIFICATIONS AND REQUIREMENTS, PRODUCTS OF THE FOLLOWING MANUFACTURERS WILL BE ACCEPTABLE:
 - a. NAILOR
 - b. KRUEGER
 - c. METALARE
 - d. TITUS
 - e. PRICE
 - f. RUSKIN

C. PRODUCTS

1. GENERAL: PROVIDE AIR DISTRIBUTION DEVICES OF THE SIZE, SHAPE, AND TYPE CONSTRUCTED OF MATERIALS AND COMPONENTS AND WITH FINISHES AS SPECIFIED, SCHEDULED, AND SHOWN. GRILLES, REGISTERS, AND CEILING DIFFUSERS SHALL BE PROVIDED WITH NEOPRENE OR SOFT FELT GASKETS. IF A MANUFACTURER OTHER THAN THE ONE SCHEDULED IS USED, THE SIZES SHOWN ON THE DRAWINGS SHALL BE CHECKED FOR PERFORMANCE. NOISE LEVEL, FACE VELOCITY, THROW, PRESSURE DROP, ETC., BEFORE THE SUBMITTAL IS MADE. SELECTIONS SHALL MEET THE MANUFACTURER'S OWN PUBLISHED DATA FOR THE ABOVE PERFORMANCE CRITERIA. THE THROW SHALL BE SUCH THAT THE VELOCITY AT THE END OF THE THROW IN THE FIVE FOOT OCCUPANCY ZONE WILL BE NOT MORE THAN 6 FPM NOR LESS THAN 25 FPM. NOISE LEVELS SHALL NOT EXCEED THOSE PUBLISHED IN THE ASHRAE APPLICATIONS HANDBOOK FOR THE TYPE OF SPACE BEING SERVED (NC LEVEL) EXCEPT NONE SHALL EXCEED NC 35.
2. SURFACE COMPATIBILITY: AIR DISTRIBUTION DEVICES SHALL HAVE FRAMES FULLY COMPATIBLE WITH THE CEILING, WALL, AND FLOOR SURFACES IN WHICH THEY ARE INSTALLED AND SHALL BE PROVIDED WITH ALL REQUIRED MOUNTING ACCESSORIES FOR INSTALLATION IN THE ACTUAL CONSTRUCTION AT THE INSTALLATION LOCATION. PROVIDE CONCEALED FASTENING ON ALL SURFACES.
3. FINISHES: ALL CEILING AND WALL MOUNTED AIR DEVICES SHALL HAVE CORROSION RESISTANT TREATED SURFACES AND BE PAINTED WHITE OR OFF-WHITE WITH BAKED ENAMEL UNLESS SPECIFIED OTHERWISE AND ALL AIR DEVICES SHALL BE THE SAME COLOR. WHERE THE FACTORY FINISH ON ALL DEVICES IS NOT THE SAME AS DETERMINED BY THE ARCHITECT/ENGINEER, THE DIVISION 15 CONTRACTOR SHALL BE RESPONSIBLE FOR COORDINATING FIELD PAINTING OF ALL AIR DEVICES BY THE DIVISION 9 CONTRACTOR. THE MECHANICAL CONTRACTOR SHALL BE RESPONSIBLE FOR ALL COSTS ASSOCIATED WITH DIVISION 9 FIELD PAINTING OF WHITE OR OFF-WHITE AIR DEVICES. SPECIAL COLOR PAINTING OF AIR DEVICES SHALL BE THE RESPONSIBILITY OF THE DIVISION 9 CONTRACTOR. THE ARCHITECT/ENGINEER'S DECISION ON WHITE COLOR COMPATIBILITY IS FINAL. THE INTERIOR OF ALL PERFORATED PLATE DIFFUSERS SHALL BE PAINTED FLAT BLACK. ALL STEEL COMPONENTS SHALL BE FULLY PHOSPHATIZED PRIOR TO PAINTING AND THERE SHALL BE NO UNPAINTED STEEL PARTS.
4. CEILING DIFFUSERS: PROVIDE OPPOSED BLADE VOLUME CONTROL DAMPERS WITH SUPPLY AIR DIFFUSERS WHERE DIFFUSERS ARE INSTALLED ABOVE INACCESSIBLE CEILINGS AND WHERE SCHEDULED. WHERE APPLICABLE, PROVIDE ADAPTERS WITH DIFFUSERS TO PERMIT CONNECTION TO ROUND SUPPLY DUCT. PERFORATED PLATE SUPPLY AIR DIFFUSERS SHALL HAVE PATTERN CONTROL BLADES INSTALLED IN THE DIFFUSER NECK UNLESS NOTED. OTHERWISE, PATTERN CONTROLLERS ATTACHED TO THE PERFORATED PLATE ARE NOT ACCEPTABLE. PROVIDE CONCEALED FASTENING ON ALL CEILING DIFFUSERS. DEVICE NECK SIZE SHALL BE AS SHOWN ON THE DRAWINGS.
5. REGISTERS AND GRILLES: PROVIDE REGISTERS WHICH CONTAIN A KEY-OPERATED OPPOSED BLADE DAMPER OPERABLE FROM THE FACE SIDE WHERE REGISTERS ARE DUCTED AND INSTALLED IN INACCESSIBLE SURFACES. SUPPLY AIR REGISTERS SHALL BE OF THE DOUBLE DEFLECTION TYPE. RETURN AIR GRILLES AND REGISTERS SHALL HAVE FIXED FACE BLADES AND MATCH THE FACE OF THE SUPPLY AIR CEILING DIFFUSERS, UNLESS OTHERWISE INDICATED. PROVIDE CONCEALED FASTENING FOR ALL REGISTERS AND GRILLES.



KEY PLAN

NO.	DESCRIPTION	DATE
	ISSUED FOR BID & PERMIT	06.05.2019

DRAWN BY _____ WG
 APPROVED BY _____ TF
 CHECKED BY _____ TF
 DATE _____ 06/05/2019

TITLE

MEP SPECIFICATIONS - MECHANICAL

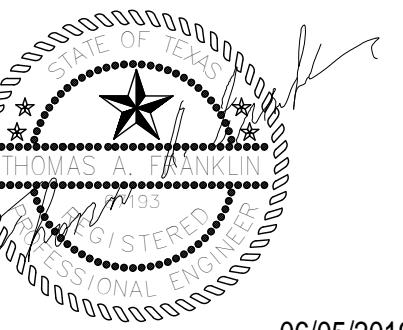
PROJECT NO. 2016096

MEP0.01

SHEET NO.

HMMOB HARGRAVE PUBLIC TOILET ROOM RENOVATION
 METHODIST WILLOWBROOK HOSPITAL
 HARGRAVE BUILDING, LEVELS 1-5
 13300 HARGRAVE HOUSTON, TX 77070

SEAL



06/05/2019

KEY PLAN

REVISIONS

NO.	DESCRIPTION	DATE
	ISSUED FOR BID & PERMIT	06.05.2019

DRAWN BY _____ WG
 APPROVED BY _____ TF
 CHECKED BY _____ TF
 DATE _____ 06/05/2019

TITLE

**MEP
 SPECIFICATIONS
 - ELECTRICAL**

PROJECT NO. 2016096

MEP0.02

SHEET NO.

GROUNDING

A. THE ELECTRICAL DISTRIBUTION SYSTEM SHALL BE GROUNDED IN ACCORDANCE WITH ARTICLE 250 OF THE NATIONAL ELECTRICAL CODE (NEC), AS SHOWN AND SPECIFIED, AND RECOGNIZED INDUSTRY PRACTICES TO ENSURE THAT PRODUCTS SERVE THE INTENDED FUNCTIONS.

WIRING DEVICES

A. DUPLEX RECEPTACLES SHALL BE LEVITON #16252J, 20AMP, 125V, 3W, DECORATOR STYLE. "SPECIFICATION GRADE", SIDE WIRED WITH MATCHING COVER PLATE UNLESS OTHERWISE INDICATED. LIGHTING WALL SWITCHES SHALL BE LEVITON #5621 OR #5623 WITH MATCHING COVER PLATES. MOTION SWITCHES SHALL BE LEVITON # 6788 WITH MATCHING COVER PLATES. THE COLOR OF PLATES AND WIRING DEVICES SHALL BE AS SELECTED BY ARCHITECT. GFI RECEPTACLES SHALL BE LEVITON #6898-HG, 20A, 125V, 3W. PROVIDE WEATHERPROOF ENCLOSURE FOR RECEPTACLES MOUNTED OUTSIDE.

LIGHTING

- A. LUMINAIRE TYPES AND LAMPING SHALL BE AS LISTED ON THE DRAWINGS. REFER TO LIGHT FIXTURE SCHEDULE FOR ADDITIONAL NOTES AND REQUIREMENTS.
- B. ELECTRICAL COMPONENTS, DEVICES, AND ACCESSORIES LISTED AND LABELED AS DEFINED IN NFPA 70, BY A QUALIFIED TESTING AGENCY, AND MARKED FOR INTENDED LOCATION AND APPLICATION.
- C. NRTL COMPLIANCE: LUMINAIRES FOR HAZARDOUS LOCATIONS SHALL BE LISTED AND LABELED FOR INDICATED CLASS AND DIVISION OF HAZARD BY AN NRTL.
- D. FM GLOBAL COMPLIANCE: LUMINAIRES FOR HAZARDOUS LOCATIONS SHALL BE LISTED AND LABELED FOR INDICATED CLASS AND DIVISION OF HAZARD BY FM GLOBAL.
- E. UL COMPLIANCE: COMPLY WITH UL 1598. EMERGENCY EGRESS LIGHTING COMPONENTS SHALL COMPLY WITH UL 924.
- F. LAMP BASE COMPLYING WITH ANSI C81.61 OR IEC 60061-1.
- G. NOMINAL OPERATING VOLTAGE: 12 V DC, 24 V DC, 120 V AC, 240 V AC, 277 V AC, OR 480 V AC; PER DRAWINGS.
- H. RECESSED LUMINAIRES: COMPLY WITH NEMA LE 4.

FIRE ALARM FUNCTION

- A. THE ALARM OPERATING SEQUENCE FOR THIS SYSTEM IS AS FOLLOWS:
 - 1. ACTIVATION OF ANY AUTOMATIC DETECTOR (HEAT, CEILING OR DUCT SMOKE), MANUAL STATION OR SPRINKLER WATER FLOW SWITCH WILL:
 - a. ACTIVATE THE SYSTEM FIRE ALARM AUDIBLE SIGNAL AND ILLUMINATE THE ALARM LED AT THE CONTROL PANEL. THE FIRE ALARM ACKNOWLEDGE KEY WILL SILENCE THE LOCAL AUDIBLE SIGNAL.
 - b. CAUSE THE ZONE OF ALARM TO BE IDENTIFIED WITH A CUSTOM ENGLISH LANGUAGE LABEL AT THE FIRE ALARM CONTROL PANEL.
 - c. ACTIVATE THE AUDIBLE AND VISUAL ALARM SIGNALS SELECTIVELY IN THE ENTIRE FACILITY.
 - d. SHUTDOWN THE AIR HANDLING UNIT(S) SERVING THE ZONE OF ALARM.
 - e. ANY SUBSEQUENT ALARM FROM ANOTHER DEVICE LISTED ABOVE WILL REACTIVATE ANY SILENCED ALARM INDICATING APPLIANCES AND ACTIVATE THE RESPECTIVE CONTROL SEQUENCES DESCRIBED ABOVE.
 - f. UPON RESET OF THE FIRE ALARM CONTROL PANEL, AIR HANDLING UNIT(S) WILL SEQUENTIALLY START UP AT TIME INTERVALS.
 - 2. VALVE SUPERVISION
 - 1. THE OPERATING SEQUENCE FOR STANDPIPE ZONE VALVE ANNUNCIATION FOR THIS SYSTEM IS AS FOLLOWS:
 - a. ACTIVATE THE SYSTEM SUPERVISORY SERVICE AUDIBLE SIGNAL AND ILLUMINATE THE LED AT THE CONTROL PANEL.
 - b. THE SUPERVISORY SERVICE ACKNOWLEDGE KEY WILL SILENCE THE LOCAL AUDIBLE SIGNAL.
 - c. CAUSE THE ZONE OF ALARM TO BE IDENTIFIED WITH A CUSTOM ENGLISH LANGUAGE LABEL AT THE FIRE ALARM CONTROL PANEL.
 - d. DIFFERENTIATION BETWEEN VALVE TAMPER AND OPENS AND OR GROUNDS ON THE INITIATING CIRCUIT WIRING IS PROVIDED BY THE LATTER BEING REPORTED AS TROUBLES.
 - e. ACTIVATION OF A ZONE VALVE SUPERVISORY SWITCH WILL NOT PREVENT THE ALARM EVENTS LISTED ABOVE FROM OCCURRING.
 - f. RESTORING THE VALVE TO THE NORMAL POSITION WILL CAUSE THE SUPERVISORY SERVICE AUDIBLE SIGNAL TO PULSE INDICATING THE RESTORATION TO NORMAL POSITION. THE SUPERVISORY SERVICE ACKNOWLEDGE KEY WILL SILENCE THE AUDIBLE SIGNAL.
- B. DEVICE LOCATIONS
 - 1. REFER TO ELECTRICAL LIGHTING PLAN AND MECHANICAL FLOOR PLAN FOR PROPOSED DEVICE LOCATIONS. FINAL DEVICE LOCATIONS SHALL BE BY LICENSED FIRE ALARM ENGINEER.

FLEXIBLE METAL CONDUIT

- A. FLEXIBLE METAL CONDUIT SHALL BE HOT DIPPED GALVANIZED STEEL STRIP, SPIRAL WOUND AND INTERLOCKED, AND SHALL BE PROVIDED WITH INSULATED ANTI SHORT BUSHINGS AT ALL TERMINATIONS.
- B. FLEXIBLE METAL CONDUIT SHALL BE SECURED WITH GALVANIZED CONNECTORS SUITABLE FOR CONNECTION TO THE ASSOCIATED BOXES AND CONDUITS. DIE CAST CONNECTORS ARE NOT ACCEPTABLE.
- C. FLEXIBLE METAL CONDUIT AND LIQUID TIGHT FLEXIBLE METAL CONDUIT SHALL BE SECURED NO LESS THAN EVERY 54" AND WITHIN 12" OF A JUNCTION BOX. IT IS NOT ACCEPTABLE TO LAY CABLES ON CEILING, DUCTWORK, ETC.
- D. CONTINUITY OF THE EQUIPMENT GROUND ACROSS FLEXIBLE METAL CONDUIT CONNECTIONS SHALL BE MAINTAINED FOR ALL SYSTEMS THAT ARE OVER 150 VOLTS TO GROUND. THE CONTINUITY SHALL BE MAINTAINED BY INSTALLING A BARE COPPER BONDING CONDUCTOR SIZED IN ACCORDANCE WITH TABLE 250.122 OF THE LATEST EDITION OF THE NATIONAL ELECTRICAL CODE. THE BARE COPPER BONDING CONDUCTOR SHALL BE INSTALLED OUTSIDE THE FLEXIBLE CONDUIT AND SHALL BE CONNECTED ON ONE END OF THE FLEXIBLE CONDUIT BY A SUITABLE BINDING POST SIMILARLY CONNECTED ON THE OPPOSITE END WITH ANOTHER SUITABLE BINDING POST.
- E. IF IT COMPLIES WITH THESE SPECIFICATIONS, CONDUIT AND CONNECTORS MANUFACTURED BY ONE OF THE FOLLOWING WILL BE ACCEPTABLE: AFC CABLE SYSTEMS, ALLIED, ANAMET, CALCONDUIT, ELECTRI-FLEX, FSR, O-ZGEDNEY, PLASTI-BOND.

TYPE "MC" ARMORED CABLE

- 1. ARMORED CABLE USED FOR CONNECTION OF FIXTURE TAILS, SWITCH LEGS AND RECEPTACLES SHALL BE WIRE TYPE, WITH 2-#12 THIN SOLID COPPER INSULATED PHASE CONDUCTORS AND A BARE BONDING CONDUCTOR, IF ACCEPTABLE TO THE AUTHORITY HAVING JURISDICTION, TYPE "MC" CABLE MAY BE USED IN WALL PARTITIONS (AND FOR SWITCH LEGS) IN FINISHED AREAS ONLY.
- 2. WHERE PERMITTED BY THE LOCAL AUTHORITY - ARMORED CABLE MAY BE USED INDOORS WHERE CONCEALED ABOVE GRADE, FOR FIXTURE-TAILS OF INDIVIDUAL LIGHTING FIXTURES IN SUSPENDED ACCESSIBLE TYPE CEILINGS. THESE FIXTURE-TAILS SHALL IN LENGTHS NOT TO EXCEED 6 FEET FOR CONNECTION TO THEIR ASSOCIATED LIGHTING JUNCTION BOXES. THE POINT OF CONNECTION OF THE ARMORED CABLE TO THE INDIVIDUAL LIGHTING FIXTURES SHALL NOT BE MORE THAN 3" FROM THE FIXTURE BALLASTS.
- 3. WHERE PERMITTED BY THE AUTHORITY HAVING JURISDICTION - ARMORED CABLE MAY BE USED INDOORS FOR INDIVIDUAL DROPS TO OUTLETS AND SWITCHES, WHERE CONCEALED IN EXISTING WALLS AND PARTITIONS - PROVIDED THE FOLLOWING CONDITIONS ARE MET:
 - 1. THE CIRCUIT PROVIDING THE POWER FOR THE SWITCH OR OUTLET IS NOT FED FROM THE ESSENTIAL POWER SYSTEM (EXCEPT AS ALLOWED BY THE NATIONAL ELECTRICAL CODE, SECTION 617.50(C)).
 - 2. THE BRANCH CIRCUIT HOMERUN WIRING IS INSTALLED IN THE ACCESSIBLE CEILING PLENUM USING METAL CONDUIT.
 - 3. JUNCTION BOXES ARE LOCATED IN THE ACCESSIBLE CEILING PLENUM ADJACENT TO THE ASSOCIATED WALLS OR PARTITIONS IN WHICH OUTLETS OR SWITCH LEGS ARE INSTALLED.
 - 4. LENGTH OF ARMORED CABLE DROP IS NOT GREATER THAN 12'-0".
 - 5. ARMORED CABLE SHALL NOT BE USED FOR HOMERUN WIRING. HOMERUNS SHALL BE HARD PIPED WITH THE USE OF METAL CONDUIT.
- 4. ARMORED CABLE SHALL BE PROVIDED WITH INSULATED ANTI-SHORT BUSHINGS AT ALL TERMINATIONS. ARMORED CABLE CONNECTORS SHALL BE STEEL GALVANIZED OR, SUITABLE FOR CONNECTION TO ASSOCIATED BOXES. DIE CAST CONNECTORS ARE NOT ACCEPTABLE.
- 5. ARMORED CABLE SHALL BE SECURED NO LESS THAN EVERY 54" AND WITHIN 12" OF A JUNCTION BOX. IT IS NOT ACCEPTABLE TO LAY CABLES ON CEILING, DUCTWORK, ETC.
- 6. IF IT COMPLIES WITH THESE SPECIFICATIONS, ARMORED CABLE AND CONNECTORS MANUFACTURED BY ONE OF THE FOLLOWING WILL BE ACCEPTABLE: AFC CABLE SYSTEMS, ALLIED, ANAMET, CALCONDUIT, ELECTRI-FLEX, FSR, O-ZGEDNEY, PLASTI-BOND.

OUTLET BOXES

- A. REFER TO THE ARCHITECT AND VENDOR'S DRAWINGS FOR EXACT MOUNTING HEIGHT AND LOCATION OF ALL ELECTRICAL/TELEPHONE/DATA DEVICES.
- B. ALL METAL OUTLETS AND JUNCTION BOXES, EXCEPT WHERE OTHERWISE SPECIFIED, SHALL BE OF ONE PIECE CONSTRUCTION, AND SHALL BE PROTECTED AGAINST CORROSION BY AN APPROPRIATE GALVANIZING PROCESS.
- C. ALL JUNCTION BOXES SHALL BE PROVIDED WITH COVERS OF THE SAME MANUFACTURER AS THE BOXES. THE TYPE OF COVER SELECTED SHALL MEET THE CONDITIONS IMPOSED IN EVERY CASE. ALL SUCH BOXES SHALL BE LEFT IN A NEAT, CLEAN AND WORKMANLIKE MANNER.
- D. THE OUTLET BOXES SHALL BE SECURELY ATTACHED TO THE PARTITION STUDS. IT IS NOT ACCEPTABLE TO SECURE OUTLET BOXES ONLY TO DRYWALL PARTITION. SECURE ONE SIDE OF THE BOX TO WALL STUD. THE OTHER SIDE OF EACH BOX SHALL BE SUPPORTED WITH A BRACKET EQUAL TO THE INSIDE DIMENSION OF THE WALL STUD SO WHEN BOTH SIDES OF THE GYP BOARD HAVE BEEN INSTALLED, THE BOX DOES NOT MOVE. PROVIDE APPROPRIATE SUPPORTING DEVICES FOR OUTLET BOXES BY CADDY FASTENERS OR EQUAL AS FOLLOWS:
 - 1. "RB" BOX MOUNTING BRACKETS.
 - 2. SCREW GUN MOUNTING BRACKETS.
 - 3. "H" BOX MOUNTING BRACKETS.
- E. OUTLET, SWITCH AND JUNCTION BOXES FOR VARIOUS USES SHALL BE AS MANUFACTURED BY CROUSE-HINDS, FSR, HOFFMAN, HUBBELL, MONOSYSTEMS, O-ZGEDNEY, PLASTI-BOND, OR AN APPROVED EQUAL.

CONDUCTORS

- A. ALL CONDUCTORS FURNISHED AND INSTALLED SHALL COMPLY WITH THE REQUIREMENTS AND LATEST REVISIONS OF THE NATIONAL ELECTRICAL CODE (NEC), NATIONAL ELECTRICAL SAFETY CODE (NESC), STANDARDS OF THE UNDERWRITER'S LABORATORIES (UL), NATIONAL ELECTRICAL MANUFACTURER'S ASSOCIATION (NEMA), INSTITUTE OF ELECTRICAL AND ELECTRONIC ENGINEERS (IEEE).
- B. ALL FEEDER AND BRANCH CIRCUIT CONDUCTORS SHALL BE SOFT DRAWN, ANNEALED COPPER, HAVING A CONDUCTIVITY OF NOT LESS THAN 98% OF THAT OF PURE COPPER, AND MEETING BEFORE STRANDING, THE REQUIREMENTS OF ASTM B-3, "STANDARD SPECIFICATIONS FOR SOFT OR ANNEALED COPPER WIRE FOR ELECTRICAL PURPOSES", LATEST EDITION.
- C. UNLESS OTHERWISE SPECIFIED OR NOTED, ALL CONDUCTORS NO. 10 AND SMALLER SHALL BE SOLID COPPER THIN WITH AN INSULATING OUTER JACKET SUITABLE FOR CONDUCTOR TEMPERATURES OF 75° EXCEPT FOR NEC CLASS 1, 2, 3, CONDUCTORS WHICH MAYBE STRANDED IF TERMINATED AS REQUIRED HEREIN.
- D. UNLESS OTHERWISE SPECIFIED OR NOTED, ALL CONDUCTORS NO. 8 AND LARGER SHALL BE THW/THHN, 600 VOLT, STRANDED WITH A THERMOPLASTIC INSULATING COMPOUND AND AN OUTER JACKET (THW/THHN ONLY) SUITABLE FOR CONDUCTOR TEMPERATURES OF 75° C. OR 90° C., INCLUSIVE. STRANDED WIRE SHALL BE TERMINATED AS SPECIFIED HEREIN.
- E. IN THE CEILING AREAS OF EQUIPMENT ROOMS WHERE THE TEMPERATURE MAY EXCEED 102°F. UNDER OPERATING CONDITIONS, HIGHER TEMPERATURE INSULATION SHALL BE USED ON CONDUCTORS. ACCEPTABLE TYPES ARE RHH, THHN, AND XHHW.
- F. IF IT COMPLIES WITH THESE SPECIFICATIONS, THE FOLLOWING CONDUCTOR MANUFACTURERS WILL BE ACCEPTABLE: ALPHA WIRE COMPANY, AMERICAN BARE CONDUCTOR, BELDEN INC., ENCORE WIRE CORPORATION, GENERAL CABLE TECHNOLOGIES CORPORATION, SERVICE WIRE CO., SOUTHWIRE COMPANY, WESCO.
- G. IF IT COMPLIES WITH THESE SPECIFICATIONS, CABLE LUGS AND TERMINATION FITTINGS MANUFACTURED BY ONE OF THE FOLLOWING WILL BE ACCEPTABLE: BLACKBURN, BURNDY, IDEAL, ILSCO, KEARNEY, MAC, THOMAS & BETTS, SQUARE D, AMP.
- H. NO SPLICES OR TAPS SHALL BE MADE IN ANY CONDUCTOR EXCEPT IN OUTLET BOXES, JUNCTION BOXES, SPLICE BOXES, OR OTHER DEVICES AND EQUIPMENT IN EXPOSED AND ACCESSIBLE LOCATIONS APPROVED FOR THE PURPOSE BY THE LATEST EDITION OF THE NEC.
- I. ALL NO. 10 AWG AND SMALLER SOLID CONDUCTORS SHALL BE SPLICED WITH PRE-INSULATED SPRING CONNECTORS. ALL NO. 10 AWG AND SMALLER STRANDED CONDUCTORS FOR NEC CLASS 1, 2, 3 WIRING SHALL BE TERMINATED WITH AMP "PIRG" UL LISTED PREMIUM GRADE INSULATED FORK CONNECTORS, OR APPROVED EQUAL, AND SHALL BE SPLICED IN A JUNCTION BOX WITH AMP "PLASTIC-GRIP" UL LISTED STANDARD GRADE INSULATED BUTT SPLICES, OR APPROVED EQUAL.
- J. ALL NO. 8 AWG AND LARGER COPPER CONDUCTORS SHALL BE CONNECTED WITH HIGH CONDUCTIVITY, WROUGHT COPPER, COLOR KEYED COMPRESSION CONNECTORS. COMPRESSION CONNECTORS FOR ALL FEEDERS SHALL BE THOMAS & BETTS SERIES 6420, OR EQUAL, TWO-HOLE CONNECTORS.
- K. ALL NO. 8 AWG AND LARGER COPPER CONDUCTORS WHICH ARE TO BE SPLICED OR TAPPED IN WIREWAYS, GUTTERS, OR JUNCTION BOXES SHALL BE SLICED OR TAPPED USING HYDRAULICALLY APPLIED, HIGH CONDUCTIVITY COMPRESSION CONNECTOR, T & B 54700, AND 3-M ELECTRICAL TAPE OR MANUFACTURED CONNECTOR COVERS APPROVED FOR THE PURPOSE.

GENERAL ELECTRICAL NOTES:

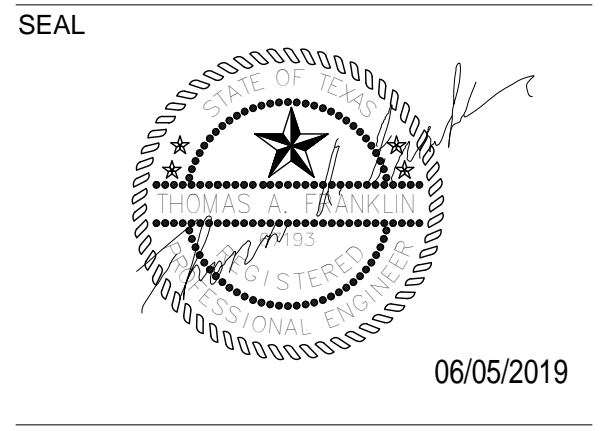
- A. BEFORE SUBMITTING A BID, IT WILL BE NECESSARY FOR EACH CONTRACTOR WHOSE WORK IS INVOLVED TO VISIT THE SITE AND ASCERTAIN FOR HIMSELF THE CONDITIONS TO BE MET IN INSTALLING THE WORK AND MAKE PROVISIONS FOR THE CONDITIONS IN HIS FINAL PRICE. FAILURE ON THE PART OF THE CONTRACTOR TO COMPLY WITH THIS REQUIREMENT SHALL NOT BE CONSIDERED JUSTIFICATION FOR THE OMISSION OR FAULTY INSTALLATION OF ANY WORK COVERED BY THE CONTRACT DOCUMENTS.
- B. THE CONTRACTOR SHALL SECURE ALL PERMITS, LICENSES AND INSPECTIONS REQUIRED FOR HIS WORK, AND SHALL PAY ALL FEES IN CONNECTION WITH SUCH PERMITS, LICENSES AND INSPECTIONS.
- C. WORK SHALL COMPLY WITH THE MOST RECENT VERSION OF ALL APPLICABLE LAWS, RULES, REGULATIONS AND ORDINANCES OF ALL FEDERAL, STATE AND LOCAL AUTHORITIES. IN THE EVENT OF CONFLICT BETWEEN THE CONTRACT DOCUMENTS AND THE LOCAL ENFORCING AUTHORITY, THE LATTER SHALL RULE. ANY MODIFICATION RESULTING THEREFROM SHALL BE MADE WITHOUT ADDITIONAL COST TO THE OWNER OR ARCHITECT/ENGINEER. THE CONTRACTOR SHALL REPORT ANY SUCH MODIFICATIONS TO THE ARCHITECT/ENGINEER AND SECURE HIS APPROVAL BEFORE PROCEEDING. SHOULD THE REQUIREMENTS OF THE CONTRACT DOCUMENTS EXCEED THE REQUIREMENTS OF THE CODES, THE CONTRACT DOCUMENTS SHALL TAKE PRECEDENCE PROVIDED THEY ARE NOT IN CONFLICT WITH THOSE CODES.
- D. ALL ITEMS OF EQUIPMENT AND ALL MATERIALS FOR WHICH APPROVAL STANDARDS HAVE BEEN ESTABLISHED BY UNDERWRITERS LABORATORIES, INC. (UL), FACTORY MUTUAL (FM), CERTIFIED BALLAST MANUFACTURER (CBM), ELECTRICAL TESTING ASSOCIATION (NEMA) SHALL BE SO APPROVED AND SHALL BEAR APPROVAL LABELS.

SUBMITTALS AND SHOP DRAWINGS

- A. CONTRACTOR SHALL PROVIDE THE ENGINEER WITH PRODUCT DATA AND SHOP DRAWINGS FOR ALL MATERIALS & EQUIPMENT SPECIFIED BELOW. SUBMITTALS SHALL BE PROVIDED IN AN ELECTRONIC FORMAT. SUBMITTAL DATA SHALL INCLUDE:
 - 1. COVER SHEET WITH NAMES AND ADDRESSES OF PROJECT, ARCHITECT MEP ENGINEER, GENERAL CONTRACTOR & SUB CONTRACTOR.
 - 2. DRAWING REFERENCE NUMBER, PRODUCT NAME AND/OR DESCRIPTION.
 - 3. INDEX OF ALL DATA IN SUBMITTAL.
 - 4. DIMENSIONAL CAPACITY SHOWING THAT SUBMITTED EQUIPMENT WILL FIT INTO SPACE AVAILABLE AND WILL HAVE REQUIRED CODE AND MAINTENANCE CLEARANCES.
 - 5. IDENTIFICATION OF EACH ITEM MATCHING THAT INDICATED ON THE DRAWINGS.
 - 6. SUFFICIENT PERFORMANCE DATA, CAPACITY, SOUND DATA, DIAGRAMMATIC DATA AND DESCRIPTIVE INFORMATION TO SHOW ITS COMPLIANCE WITH THE CONTRACT DOCUMENTS, OPTIONS OR SPECIAL REQUIREMENTS SHALL BE CLEARLY INDICATED. APPLICABLE INFORMATION SHALL BE CLEARLY INDICATED AND NON APPLICABLE DATA SHALL BE CROSSED OFF.
 - 7. MATERIALS AND EQUIPMENT PURCHASED OR INSTALLED WITHOUT A "NO EXCEPTIONS TAKEN" SHOP DRAWING REVIEW SHALL BE AT THE RISK OF THE CONTRACTOR. THE COST OF REMOVAL AND AT THE RISK OF THE CONTRACTOR. THE COST OF REMOVAL AND REPLACEMENT OF SUCH MATERIALS WHICH IS JUDGED UN-SATISFACTORY BY THE ENGINEER FOR ANY REASON SHALL BE AT THE EXPENSE OF THE CONTRACTOR.
 - 8. ANY ITEMS KNOWINGLY SUBMITTED THAT DO NOT COMPLY WITH SPECIFICATIONS SHALL BE LISTED WITH EXPLANATION AS TO WHY THEY ARE BEING SUBMITTED.
- B. REQUIRED SUBMITTALS / SHOP DRAWINGS:
 - 1. WIRING DEVICES
 - 2. CONDUIT
 - 3. LIGHTING FIXTURES

CONDUIT

- A. ALL CONDUITS SHALL BE CONCEALED IN PIPE CHASES, WALLS, FURRED SPACES, OR ABOVE THE CEILING OF THE BUILDING UNLESS OTHERWISE INDICATED. CONDUIT SHALL NOT BE EMBEDDED IN ANY STRUCTURAL SLAB OR STRUCTURAL MEMBER UNLESS APPROVED IN WRITING BY THE STRUCTURAL ENGINEER.
- B. CONDUIT MAY BE RUN EXPOSED IN MECHANICAL ROOMS, DUCT AND PIPING CHASES, BUT ONLY WHERE NECESSARY. EXPOSED CONDUIT SHALL BE RUN IN THE NEATEST, MOST INCONSPICUOUS MANNER, AND PARALLEL OR PERPENDICULAR TO THE BUILDING LINES.
- C. ALL CONDUIT AND SURFACE RACEWAYS SHALL BE ADEQUATELY AND PROPERLY SUPPORTED FROM THE BUILDING STRUCTURE BY MEANS RECOMMENDED BY THE MANUFACTURER, OR BY THE USE OF HANGER RODS OR CLAMPS.
- D. ALL CONDUITS THROUGHOUT THE BUILDING SHALL BE SUPPORTED 8 FEET ON CENTERS HORIZONTALLY AND SUPPORTED 6 FEET ON CENTERS VERTICALLY.
- E. VERTICAL CONDUITS SHALL BE SUPPORTED FROM FLOOR LINES WITH RISER CLAMPS SIZED TO FIT THE CONDUIT AND TO ADEQUATELY ALLOW FOR CONTRACTION. AT THE BASES OF CONDUIT, WHERE REQUIRED FOR PROPER SUPPORT, PROVIDE ANCHOR BASE FITTINGS OR OTHER APPROVED SUPPORTS.
- F. CONDUIT SHALL NOT BE SUPPORTED FROM DUCTWORK, PIPING, OR EQUIPMENT.
- G. THE LOAD AND SPACING ON EACH HANGER AND/OR INSERT SHALL NOT EXCEED THE SAFE ALLOWABLE LOAD FOR ANY COMPONENT OF THE SUPPORT SYSTEM, INCLUDING THE CONCRETE WHICH HOLDS THE INSERTS. REINFORCEMENT AT INSERTS SHALL BE PROVIDED AS REQUIRED TO DEVELOP THE STRENGTH REQUIRED.
- H. ALL CONDUITS NOT EMBEDDED IN CONCRETE OR MASONRY SHALL BE SECURELY AND INDEPENDENTLY SUPPORTED SO THAT NO STRAIN WILL BE TRANSMITTED TO OUTLET BOX AND PULL BOX SUPPORTS, ETC. SUPPORTS SHALL BE RIGID ENOUGH TO PREVENT DISTORTION OF CONDUITS DURING WIRE PULLING.
- I. ALL ELECTRICAL CONDUCTORS SHALL BE INSTALLED IN CONDUIT, OR SURFACE METAL RACEWAYS.
- J. RIGID STEEL CONDUIT SHALL BE USED WHERE CONDUIT IS UNDERGROUND, IN A CONCRETE SLAB WITH A VAPOR BARRIER, EXPOSED TO THE WEATHER, IN DAMP OR OTHER WET LOCATIONS, WHERE EXPOSED TO VIEW, WHERE SUBJECT TO PHYSICAL DAMAGE, OR IN SIZES GREATER THAN 4" IN DIAMETER.
- K. CONDUIT SHALL BE JOINED WITH THREADED COUPLINGS AND SHALL BE SECURED IN CABINETS, OUTLETS, ETC., WITH DOUBLE LOCKNUTS AND SHALL BE PROVIDED WITH INSULATED BUSHINGS AS MANUFACTURED BY MIDWEST, STEEL CITY, OR EFCOR. COUPLINGS, ETC., SHALL BE THREADED.
- L. RIGID STEEL CONDUIT SHALL BE HOT DIPPED GALVANIZED INSIDE AND OUT. FULL LENGTHS OF PIPE SHALL HAVE GALVANIZED OR ZINC-COATED THREADS ON BOTH ENDS.
- M. RIGID STEEL CONDUIT SHALL BE PITTSBURGH STANDARD, REPUBLIC, ALLIED, TRIANGLE, ROME, SPANG, WESTERN, WHEATLAND, WESTERN TUBE AND CONDUIT, OR YOUNGSTOWN HOT DIPPED GALVANIZED INSIDE AND OUT, NATIONAL "SHERADUCT", WALKER "DUALCOTE", OR GENERAL ELECTRIC (J&L) "WHITE" ZINC METALLIZED INSIDE AND OUT, OR APPROVED EQUAL.
- N. EMT MAY BE USED INDOORS WHERE CONCEALED OR EXPOSED ABOVE GRADE, EXCEPT WHERE RIGID STEEL CONDUIT IS REQUIRED. ELECTRICAL METALLIC TUBING SHALL BE MADE OF THIN-WALL STEEL TUBING SHALL BE MADE OF THIN-WALL STEEL TUBING UP TO 4" CONDUIT SIZE, AND SHALL BE GALVANIZED INSIDE AND OUTSIDE.
- O. EMT SHALL BE JOINED WITH STEEL SET SCREW TYPE COUPLINGS AND CONDUITS SHALL BE SECURED WITH STEEL SET SCREW TYPE CONNECTORS AT PANELS, JUNCTION BOXES, OUTLETS, ETC. EMT WHICH IS CAST IN CONCRETE SHALL BE JOINED USING CONCRETE TIGHT COMPRESSION FITTINGS. DIE CAST TYPE CONNECTORS ARE NOT ACCEPTABLE.
- P. IF IT COMPLIES WITH THESE SPECIFICATIONS, CONDUIT AND CONNECTORS MANUFACTURED BY ONE OF THE FOLLOWING WILL BE ACCEPTABLE: AFC CABLE SYSTEMS, ALLIED, ANAMET, CALCONDUIT, ELECTRI-FLEX, FSR, O-ZGEDNEY, PLASTI-BOND.
- Q. METAL CONDUIT SHALL BE OF AMPLE SIZE TO PERMIT THE EASY INSERTION OR WITHDRAWAL OF CONDUCTORS WITHOUT ABRASION. ALL JOINTS SHALL BE CUT SQUARE, REAMED SMOOTH AND DRAWN UP TIGHT. NO NON-FLEXIBLE METAL CONDUIT SHALL BE SMALLER THAN 1/2".
- R. SO FAR AS PRACTICABLE, ALL EXPOSED METAL CONDUIT SHALL RUN WITHOUT TRAPS. WHERE TRAPS OR DIPS ARE UNAVOIDABLE, A JUNCTION OR PULL BOX SHALL BE PLACED AT EACH LOW POINT.
- S. EACH ENTIRE METAL CONDUIT SYSTEM SHALL BE INSTALLED COMPLETE BEFORE ANY CONDUCTORS ARE DRAWN IN. TO GUARD AGAINST OBSTRUCTIONS AND OMISSIONS, EACH RUN OF CONDUIT SHALL BE FINISHED BEFORE PLASTERING IS INSTALLED. ALL METAL CONDUIT SHALL BE SWABBED AFTER PLASTER IS FINISHED AND DRY.
- T. AS SOON AS CONDUIT HAS BEEN PERMANENTLY INSTALLED IN PLACE, CONDUIT SHALL BE CAPPED OR PLUGGED WITH STANDARD ACCESSORIES.
- U. CONDUITS USED FOR DATA, PHONE AND PULLSTRINGS SHALL TERMINATE WITH PLASTIC GROMMET INSERTS SO THAT THE CABLE IS NOT DAMAGED BY THE OPEN END OF THE CONDUIT.
- V. ALL CONDUITS IN WALLS SHALL BE RUN VERTICALLY. HORIZONTAL RUNS IN WALLS ARE NOT ACCEPTABLE EXCEPT FOR RECEPTACLES UNDER WINDOWS.



KEY PLAN

Table with columns: NO., DESCRIPTION, DATE. Includes 'ISSUED FOR BID & PERMIT' entry dated 06.05.2019.

MEP SPECIFICATIONS - PLUMBING

PROJECT NO. 2016096

MEP0.03

SHEET NO.



2500 Wilcrest Drive, Suite 150 Houston, Texas 77042 Tel: (281) 809-7532 Fax: (281) 809-7536 Texas Reg. No.: F-12902 CFI Project No.: 119083.00 www.cficompanies.com

ACCESS DOORS

A. ACCESS DOORS SHALL BE PROVIDED FOR ACCESS TO VALVES OR ANY OTHER ITEM WHICH MAY REQUIRE SERVICING OR ADJUSTING AND WHICH IS CONCEALED BEHIND AN INACCESSIBLE SURFACE SUCH AS SPLINED CEILINGS AND PLASTER WALLS OR CEILINGS. ACCESS DOORS SHALL BE AS MANUFACTURED BY MILCOR OR AN APPROVED EQUAL FOR SPECIFIC APPLICATION.

PLUMBING FIXTURES AND TRIM

A. THE FOLLOWING MANUFACTURERS WILL BE ACCEPTABLE: 1. FIXTURES: KOHLER, AMERICAN STANDARD, ELIER, CRANE. 2. CLOSET SEATS: CHURCH, OLSONITE, BENEKE. 3. FAUCETS: CHICAGO, T&S BRASS, ZURN. 4. TRIM (TRAPS, SUPPLIES, STOPS): MCCUIRE, CAMBRIDGE BRASS, BRASSCRAFT. 5. FLUSH VALVES: SLOAN, ZURN, DELANEY. 6. CARRIERS: JAY R. SMITH, MIFAB, WADE, ZURN, JOSAM.

SYSTEM CLEANING AND PRESSURE TESTING:

- A. DOMESTIC WATER PIPING SYSTEM: 1. PROGRESSIVELY FLUSH SYSTEM BY OPENING VALVES BEGINNING AT THE POINT OF WATER ENTRY AND FINISHING AT THE LAST VALVE ON THE RUN(S). STERILIZE SYSTEM IN ACCORDANCE WITH LOCAL WATER DEPARTMENT OR AUTHORITY HAVING JURISDICTION (A.H.J.). 2. AT A MINIMUM PERFORM THE FOLLOWING: 1. INTRODUCE EPA DOMESTIC WATER SYSTEM APPROVED CHLORINE SOLUTION AT WATER SERVICE ENTRY. 2. FILL LINES SLOWLY UNTIL RESIDUAL TEST AT ENDS OF BRANCHES INDICATE A 50 PPM CONCENTRATION OF CHLORINE. 3. VALVE SYSTEM OFF AND LEAVE STANDING FOR 8 HOURS. 4. TEST RESIDUAL CHLORINE CONCENTRATION AT END OF LINES. 5. IF CONCENTRATION IS LESS THAN 5 PPM, REPEAT STERILIZING PROCESS. 6. DOCUMENT THE STERILIZATION PROCESS FOR REVIEW BY THE A.H.J. 7. DO NOT USE THE DOMESTIC WATER SYSTEM PRIOR TO APPROVAL BY THE A.H.J. B. EQUIPMENT: 1. KEEP EQUIPMENT CLEAN AND DRY DURING THE CONSTRUCTION PROCESS. 2. PRIOR TO START UP, INSPECT AND CLEAN ALL INTERIOR EQUIPMENT SURFACES, CLEAN AND REPAIR TORN INSULATION, REMOVE ALL DIRT AND DEBRIS. 3. PROVIDE TEMPORARY FILTER MEDIA AS REQUIRED FOR UNIT OPERATION PRIOR TO FINAL COMMISSIONING. C. PRESSURE TESTING: 1. DOMESTIC WATER PIPING: a. LEAVE ALL JOINTS EXPOSED FOR THE TESTING PROCEDURE. b. FLUSH SYSTEM WITH CLEAN WATER. c. ALL COLLS, VALVES, PUMPS, AND FITTINGS SHALL BE PRESSURE TESTED AT A PRESSURE OF 125 PSI PRESSURE OF THE SYSTEM. d. KEEP SYSTEM UNDER TEST PRESSURE FOR A PERIOD OF 4 HOURS. e. INSPECT SYSTEM FOR LEAKS. REPAIR LEAKS. f. REPEAT PRESSURE TEST UNTIL THERE ARE NO LEAKS.

SANITARY SOIL WASTE AND VENT PIPING - CAST IRON

A. ABOVE GRADE WASTE AND VENT SHALL BE NO-HUB STANDARD WEIGHT CAST IRON PIPE WITH NO-HUB DRAINAGE FITTINGS USING STAINLESS STEEL COUPLINGS THAT MEET ASTM C 1540. B. CAST IRON PIPE SHALL BE AS MANUFACTURED BY CHARLOTTE TYLER, OR NEWAGE CASTING. C. SLOPE ALL WASTE AND VENT PIPING IN ACCORDANCE WITH LOCAL CODES. D. PROVIDE AND INSTALL ALL CLEANOUTS INDICATED AND AS REQUIRED BY LOCAL CODES. E. THE WASTE AND VENT SYSTEM SHALL BE TESTED AS REQUIRED BY THE PLUMBING CODES HAVING JURISDICTION.

DRAINS AND CLEANOUTS

A. FURNISH AND INSTALL CLEANOUTS AS SHOWN ON THE DRAWINGS AND AS REQUIRED BY LOCAL ORDINANCE. CLEANOUTS SHALL BE MANUFACTURED BY JAY R. SMITH, JOSAM, JONESPEC, WADE, OR ZURN UNLESS NOTED OTHERWISE. B. CLEANOUTS SHALL BE THE SAME NOMINAL SIZE AS THE PIPE THEY SERVE UP TO FOUR INCHES. C. CLEANOUTS SHALL HAVE A CAST IRON BODY WITH TAPERED CAST BRASS OR BRONZE PLUG PROVIDING GAS AND WATERTIGHT SEAL. D. INTERIOR FLOOR CLEANOUTS SHALL HAVE STAINLESS STEEL OR NICKEL BRONZE SCORRIATED TOP. PROVIDE CARPET MARKER WHEN INSTALLED IN AREAS TO BE COVERED BY CARPET. E. EXTERIOR CLEANOUTS AT GRADE SHALL HAVE SCORRIATED CAST IRON TOP. F. WALL CLEANOUTS SHALL BE PROVIDED WITH STAINLESS STEEL ACCESS COVERS OF ADEQUATE SIZE TO ALLOW RODDING OF DRAINAGE SYSTEM. WALL CLEANOUTS INCORPORATING COVER SCREWS THAT EXTEND COMPLETELY THROUGH THE ACCESS PLUG ARE NOT ACCEPTABLE. G. SET TOP OF FLOOR DRAINS AND FLOOR SINKS TO MEET THE LOW POINT ELEVATION OF FINISHED FLOOR. H. FINAL MOUNTING OF INTERIOR CLEANOUT TOP OR ACCESS COVER SHALL BE SET FLUSH WITH THE FINISHED FLOOR OR WALL SURFACE. LUBRICATE THREADED CLEANOUT PLUGS WITH MIXTURE OF GRAPHITE AND UNSEED OIL. I. ENCASE EXTERIOR CLEANOUTS WITHIN 14"x14"x6" THICK REINFORCED CONCRETE PAD. SET TOP FLUSH WITH FINISHED GRADE SURFACE. J. LOCATE CLEANOUTS WITH REQUIRED CLEARANCE FOR RODDING OF DRAINAGE SYSTEM. K. ROUND WALL CLEANOUT COVERS SHALL NOT BE LARGER THAN REQUIRED FOR 4 INCH DIA. PIPE. ACCESS PANELS SHALL BE PROVIDED AS APPROVED BY ARCHITECT/ENGINEER FOR LARGER PIPE SIZES.

PIPING INSULATION

A. DOMESTIC WATER (HOT AND HOT WATER RETURN) PIPING, FITTINGS AND VALVES SHALL BE INSULATED WITH NOMINAL 1" WALL THICKNESS FIBERGLASS PIPE INSULATION WITH A K FACTOR NOT TO EXCEED 0.23 BTU/INHR-SF-DEGREE F @ 75 DEGREES F, HAVING FLAME SPREAD RATING OF 25 OR LESS AND A SMOKE DENSITY OF 50 OR LESS WHEN TESTED BY ASTM E-84 METHOD. THE INSULATION SHALL INCLUDE AN ALL PURPOSE JACKET, CONSISTING OF HIGH DENSITY WHITE KRAFT BONDED TO ALUMINUM FOIL AND REINFORCED WITH FIBERGLASS YARN. THE JACKET SHALL INCLUDE A LONGITUDINAL LAP WITH A PRESSURE SENSITIVE TAPE SEAL. B. INSULATED PIPING SHALL NOT BE EXPOSED AT HANGER AND OR COME INTO DIRECT CONTACT WITH HANGER WITHOUT INSULATION AND SHIELD AS DESCRIBED BELOW. C. PROVIDE PROTECTION SHIELDS AT ALL PIPE HANGERS, WHERE PROTECTION SHIELDS ARE USED, PROVIDE AN INSERT BETWEEN THE PIPING AND THE SHIELD 2" LONGER AND WIDER THAN THE SHIELD, HAVING THE SAME THICKNESS AND CONTOUR AS THE ADJOINING INSULATION. INSERTS SHALL BE MINIMUM 8.0# DENSITY, MINIMUM 100 PSI COMPRESSIVE STRENGTH. D. ACCEPTABLE INSERT MATERIALS ARE: 1. PITTSBURGH-CORNING 'FOAMGLAS' CELLULAR GLASS 2. SCHULLER THERMO-12 CALCIUM SILICATE 3. OWENS-CORNING KAYLO AF CALCIUM SILICATE E. CLOTH TAPE IS NOT ACCEPTABLE FOR USE IN THIS APPLICATION.

DOMESTIC WATER VALVES (COLD AND HOT WATER)

A. LINE SHUT OFF VALVES UP TO AND INCLUDING 2" SHALL BE TWO PIECE BRONZE BODY OF ASTM B884 ALLOY 844, ASTM B61 OR ASTM B62, FULL PORT BALL TYPE RATED AT 600 WOG WITH THREADED CONNECTIONS, BLOW-OUT PROOF STEM, PLASTIC COATED LOCKABLE LEVER HANDLE, TEFLON PACKING, 316 STAINLESS STEEL BALL AND STEM. ACCEPTABLE VALVES ARE NIBCO MODEL T-585-70-66-L-LF OR APPROVED EQUAL MODEL BY CRANE, MILWAUKEE OR APOLLO. B. LINE SHUT-OFF VALVES 2-1/2" AND LARGER INSTALLED WITHIN SYSTEMS HAVING DESIGN OPERATING PRESSURES BETWEEN 160 AND 250 P.S.I.G. SHALL BE THREADED LUG TYPE DUCTILE IRON BODY BUTTERFLY VALVE WITH EXTENDED NECK, LOCKABLE LEVER HANDLE, 316 STAINLESS STEEL STEM AND DISC, EPDM LINER AND SEAL, SUITABLE FOR BI-DIRECTIONAL FLOW AND DEAD END SERVICE WITH DOWNSTREAM FLANGE REMOVED. ACCEPTABLE VALVES ARE NIBCO MODEL LD-3022, OR APPROVED EQUIVALENT MODEL BY KEYSTONE, JAMESBURY, DEZURIK, MILWAUKEE, CRANE OR APOLLO. C. PROVIDE STEM EXTENSIONS OF A NON-THERMAL CONDUCTING MATERIAL FOR VALVES IN INSULATED LINES TO ALLOW UNOBSTRUCTED OPERATION. D. DOMESTIC HOT WATER RETURN CIRCUIT BALANCING VALVES 1/2" THROUGH 3" SHALL BE MACHINED BALL TYPE CALIBRATED BALANCING VALVE WITH LEAD FREE ASTM B283-095900 BRASS BODY/304 STAINLESS STEEL BALL CONSTRUCTION, GLASS AND CARBON FILLED TFE SEAT RINGS, EPDM STEM 'O' RING, THREADED NPT INLET/OUTLET CONNECTIONS, 400 PSIG MAXIMUM WORKING PRESSURE AT 250°F. VALVE SHALL HAVE DIFFERENTIAL PRESSURE READ-OUT PORTS ACROSS VALVE SEAT AREA FITTED WITH INTERNAL EPT INSERT/SICHECK VALVES. VALVE BODY SHALL HAVE 1/4" NPT TAPPED DRAIN/PURGE PORT. VALVE SHALL HAVE CALIBRATED NAMEPLATE AND MEMORY STOP FEATURE TO ALLOW VALVE TO BE CLOSED FOR SERVICE AND THEN REOPENED TO SET POINT WITHOUT DISTURBING BALANCE POSITION. VALVE SHALL CONTAIN LESS THAN 0.25% LEAD CONTENT BY WEIGHT ON WETTED SURFACES AND BE DESIGNED FOR POSITIVE SHUT-OFF. VALVES SHALL BE SAME SIZE AS THE PIPE INSTALLED. PROVIDE VALVES AS SCHEDULED ON CONTRACT DRAWINGS MANUFACTURED BY BELL & GOSSETT CIRCUIT SETTER PLUS CB SERIES, OR OWNER APPROVED EQUAL. E. SPRING LOADED CHECK VALVES, 2" AND SMALLER - SILENT CLOSING, BRONZE, CLASS 125, WITH THREADED CONNECTIONS, Buna Disc, BRONZE OR STAINLESS STEEL SPRING, MANUFACTURED BY NIBCO MODEL T-480 OR APPROVED EQUIVALENT MODEL BY MILWAUKEE OR CRANE.

PIPE HANGERS AND SUPPORTS

A. ALL PIPE SHALL BE INDEPENDENTLY SUPPORTED FROM THE BUILDING STRUCTURE IN A NEAT AND WORKMANLIKE MANNER AND WHEREVER POSSIBLE PARALLEL RUNS OF HORIZONTAL PIPING SHALL BE GROUPED TOGETHER ON TRAPEZIE TYPE HANGERS. VERTICAL RISERS SHALL BE SUPPORTED AT EACH FLOOR LINE WITH STEEL PIPE CLAMPS. SPACING OF PIPE SUPPORTS SHALL BE IN ACCORDANCE WITH NFPA 13. B. ALL PIPING SHALL BE PITCHED TO DRAIN IN ACCORDANCE WITH NFPA 13. PROVIDE VALVES WITH HOSE CONNECTIONS AT ALL SYSTEM DRAIN POINTS. C. IF IT COMPLIES WITH THESE SPECIFICATIONS, HANGERS AND SUPPORTS MANUFACTURED BY ONE OF THE FOLLOWING MANUFACTURERS WILL BE ACCEPTABLE: FEE AND MASON, GRINNELL, ELGEN OR APPROVED EQUAL.

PLUMBING PIPING HANGER SPACING

A. MAXIMUM SPACING BETWEEN PIPING HANGERS SHALL BE IN ACCORDANCE WITH THE FOLLOWING TABLE:

Table with columns: SIZE OF PIPING, DISTANCE BETWEEN SUPPORTS. Rows for COPPER (1/2", 3/4", 1", 1-1/4", 1-1/2", 2") and other pipe sizes.

- B. PROVIDE ADDITIONAL SUPPORTS TO PREVENT SAGGING OF PIPE C. SUPPORTS SHALL BE ARRANGED SO AS TO BE NEAR THE WEAKEST POINT OF THE SPAN SUCH AS JOINTS, TURNS AND AT THE BASE OF ALL VERTICAL TO HORIZONTAL OFFSETS AND AT ALL WASTE TRAPS. D. ALL PIPING SHALL BE RIGIDLY INSTALLED IN ALL CHASES OR WALLS. TEST FOR RIGIDITY SHALL BE THAT THE PIPING IS VIRTUALLY IMMOVABLE BY HAND, SHORT OF DEFORMING THE PIPING. E. IN NO CASE SHALL ANY PIPING DEPEND ON BLOCKS, BRICKS, STONE, WOOD SLEEPERS OR THE WIRES FOR ITS FINAL SUPPORT. F. SUPPORT SYSTEM SHALL BE AS MANUFACTURED BY 'HOLDRITE' OR AN APPROVED EQUAL.

BASIC REQUIREMENTS

PRODUCTS, MATERIALS, AND LABOR NECESSARY TO RENDER A FULLY FUNCTIONAL SYSTEM TO FULFILL THE DESIGN INTENT SHOWN ON THE DOCUMENTS SHALL BE PROVIDED BY THE CONTRACTOR. A. ALL WORK SHALL COMPLY WITH THE MOST RECENTLY REVISED VERSIONS OF ALL APPLICABLE LAWS, RULES, REGULATIONS AND ORDINANCES OF ALL FEDERAL, STATE AND LOCAL AUTHORITIES AND APPLICABLE UTILITIES. NONE OF THE TERMS OR PROVISIONS OF THIS SPECIFICATION SHALL BE CONSTRUED AS WAIVING ANY PART OF THE RULES, REGULATIONS OR REQUIREMENTS OF THESE AUTHORITIES.

DRAWINGS AND SPECIFICATIONS

A. DRAWINGS: THE DRAWINGS ARE SCHEMATIC IN NATURE AND INDICATE APPROXIMATE LOCATIONS OF THE HEATING, VENTILATING, AND AIR CONDITIONING SYSTEMS, FIRE PROTECTION SYSTEMS, PLUMBING EQUIPMENT, FIXTURES AND PIPING SYSTEMS, EXCEPT WHERE SPECIFIC LOCATIONS ARE NOTED AND DIMENSIONED ON THE DRAWINGS. ALL ITEMS ARE SHOWN APPROXIMATELY TO SCALE. THE INTENT IS TO SHOW HOW THESE ITEMS RELATE TO ONE ANOTHER INTO THE CONSTRUCTION. CLARIFY ALL ITEMS BY ON THE JOB MEASUREMENTS AND IN ACCORDANCE WITH THE CONTRACT DOCUMENTS. COORDINATE WITH OTHER TRADES.

COMPLETENESS OF WORK

A. THE CONTRACT DOCUMENTS DEPICT PLUMBING SYSTEMS WHICH ARE INTENDED TO BE COMPLETE AND FUNCTIONING SYSTEMS. ALL PRODUCTS, MATERIALS, AND LABOR NECESSARY TO RENDER A FULLY FUNCTIONAL SYSTEM TO FULFILL THE DESIGN INTENT SHOWN ON THE DOCUMENTS SHALL BE PROVIDED BY THE CONTRACTOR. B. CATALOG NUMBERS REFERENCED THROUGHOUT THE DIVISION 15 DRAWINGS AND SPECIFICATIONS ARE INTENDED TO CONVEY A GENERAL UNDERSTANDING OF THE TYPE AND QUALITY OF THE PRODUCT REQUIRED. WHERE WRITTEN DESCRIPTIONS DIFFER FROM INFORMATION CONVEYED BY A CATALOG NUMBER, THE WRITTEN DESCRIPTION SHALL GOVERN. NO EXTRA SHALL BE ALLOWED BECAUSE A CATALOG NUMBER IS FOUND TO BE INCOMPLETE OR OBSOLETE.

COORDINATION

A. THIS CONTRACTOR SHALL BE RESPONSIBLE FOR THE COORDINATION OF ALL ITEMS THAT WILL AFFECT THE INSTALLATION OF THE WORK OF THIS DIVISION. THE COORDINATION SHALL INCLUDE, BUT NOT BE LIMITED TO, VOLTAGE, AMPACITY, CAPACITY, ELECTRICAL/PIPING CONNECTIONS, STRUCTURAL SUPPORTS, SPACE REQUIREMENTS, LOCATING DEVICES IN ARCHITECTURAL FINISH ELEMENTS, STAGING THE CONSTRUCTION AND BUILDING REQUIREMENTS, AND SPECIAL CONDITIONS. B. BY SUBMITTING SHOP DRAWINGS ON THE PROJECT, THIS CONTRACTOR IS INDICATING THAT ALL NECESSARY COORDINATION HAS BEEN COMPLETED AND THAT THE SYSTEMS, PRODUCTS AND EQUIPMENT SUBMITTED CAN BE INSTALLED IN THE BUILDING AND WILL OPERATE AS SPECIFIED AND INTENDED, IN FULL COORDINATION WITH ALL OTHER DISCIPLINES.

EQUIPMENT NOISE AND VIBRATION

A. IT IS THE INTENT TO SPECIFY AND FOR THE CONTRACTOR TO INSTALL SYSTEMS THAT ARE QUIET AND FREE OF VIBRATION. EQUIPMENT SHALL BE BALANCED AND VIBRATION ISOLATED TO MEET THE REQUIREMENTS SPECIFIED HEREIN FOR BOTH THE EQUIPMENT ITSELF AND CONDITIONS WITHIN OCCUPIED SPACES. THIS CONTRACTOR IS RESPONSIBLE FOR OBTAINING AND INSTALLING EQUIPMENT THAT IS QUIET IN OPERATION AS COMPARED TO OTHER AVAILABLE EQUIPMENT OF ITS SIZE, CAPACITY, AND TYPE. B. EQUIPMENT NOT MEETING THESE REQUIREMENTS SHALL BE CORRECTED BY THE CONTRACTOR TO AN ACCEPTABLE LEVEL BUT WITHIN THE REQUIREMENTS OF THE SPECIFICATIONS AT NO COST TO THE OWNER, ARCHITECT OR ENGINEER. C. AIR DISTRIBUTION EQUIPMENT SHALL BE SOUND TESTED AT THE DESIGN OPERATING CONDITIONS AND SHALL NOT EXCEED AN NC OF 35 AT RATED CFM. D. NOISE LEVEL: UNLESS NOTED OTHERWISE HEREIN OR ON THE DRAWINGS, THE NOISE LEVEL IN ALL OCCUPIED SPACES SHALL NOT EXCEED THE 'LOWEST VALUE IN THE RANGE' OF THE NOISE CRITERIA CURVES PUBLISHED IN THE CURRENT FUNDAMENTALS EDITION OF THE ASHRAE GUIDE AND DATA BOOK. THE NOISE CRITERIA CURVES SHALL BE BASED ON ANSI STANDARD S1.6-1987 OCTAVE BANDS AND A SOUND PRESSURE LEVEL IN DECIBELS REFERENCED TO 0.002 MICROBARS. SOUND LEVELS IN OCCUPIED SPACES MUST MEET THE DESIGN CRITERIA WITH ALL CONSTRUCTION IN PLACE. E. VERIFICATION: SHOULD A QUESTION ARISE REGARDING THE ACCEPTABLE LEVEL OF NOISE OR VIBRATION IN A PARTICULAR SPACE OR PIECE OF EQUIPMENT, THE CONTRACTOR SHALL BE RESPONSIBLE FOR PROVIDING THE SERVICES OF AN APPROVED ACUSTICAL CONSULTANT TO DETERMINE ACTUAL NOISE/VIBRATION CONDITIONS.

WARRANTIES AND GUARANTEES

A. GENERAL: CONTRACTOR SHALL GUARANTEE ALL MATERIAL AND EQUIPMENT INSTALLED BY HIM AGAINST DEFECTS IN WORKMANSHIP AND MATERIAL FOR A PERIOD OF TWELVE (12) MONTHS AFTER FINAL ACCEPTANCE OF THE WORK BY THE OWNER, AND HE SHALL REPAIR OR REPLACE ANY MATERIALS OR EQUIPMENT DEVELOPING SUCH DEFECTS WITHIN THAT TIME, PROMPTLY ON DUE NOTICE GIVEN HIM BY THE OWNER AND AT CONTRACTOR'S SOLE COST AND EXPENSE. B. EQUIPMENT: ALL EQUIPMENT BEARING A MANUFACTURER'S GUARANTEE SHALL BE CONSTRUED TO HAVE AN EXTENDED GUARANTEE TO THE OWNER BY THE MANUFACTURER. ANY SUCH EQUIPMENT THAT PROVES DEFECTIVE IN MATERIALS OR WORKMANSHIP WITHIN THE GUARANTEE PERIOD IS TO BE REPLACED BY THE CONTRACTOR IN ACCORDANCE WITH THE MANUFACTURER'S GUARANTEE.

SUBMITTALS AND SHOP DRAWINGS

A. CONTRACTOR SHALL PROVIDE THE ENGINEER WITH PRODUCT DATA AND SHOP DRAWINGS FOR ALL MATERIALS & EQUIPMENT SPECIFIED BELOW. SUBMITTALS SHALL BE PROVIDED IN AN ELECTRONIC FORMAT. SUBMITTAL DATA SHALL INCLUDE: 1. COVER SHEET WITH NAMES AND ADDRESSES OF PROJECT, ARCHITECT MEP ENGINEER, GENERAL CONTRACTOR & SUB CONTRACTOR, DRAWING REFERENCE NUMBER, PRODUCT NAME AND/OR DESCRIPTION. 2. INDEX OF ALL DATA IN SUBMITTAL. 3. DIMENSIONAL DATA AND SKETCHES SHOWING THAT SUBMITTED EQUIPMENT WILL FIT INTO SPACE AVAILABLE AND WILL HAVE REQUIRED CODE AND MAINTENANCE CLEARANCES. 4. IDENTIFICATION OF EACH ITEM MATCHING THAT INDICATED ON THE DRAWINGS. 5. SUFFICIENT PERFORMANCE DATA, CAPACITY, SOUND DATA, DIAGRAMMATIC DATA AND DESCRIPTIVE INFORMATION TO SHOW ITS COMPLIANCE WITH THE CONTRACT DOCUMENTS. OPTIONS OR SPECIAL REQUIREMENTS SHALL BE CLEARLY INDICATED. APPLICABLE INFORMATION SHALL BE CLEARLY INDICATED AND NON APPLICABLE DATA SHALL BE CROSSED OFF. 6. MATERIALS AND EQUIPMENT FURNISHED OR INSTALLED WITHOUT A 'NO EXCEPTIONS TAKEN' SHOP DRAWING REVIEW SHALL BE AT THE RISK OF THE CONTRACTOR. THE COST OF REMOVAL AND AT THE RISK OF THE CONTRACTOR. THE COST OF REMOVAL AND REPLACEMENT OF SUCH MATERIALS WHICH IS JUDGED UN-SATISFACTORY BY THE ENGINEER FOR ANY REASON SHALL BE AT THE EXPENSE OF THE CONTRACTOR. 7. ANY ITEMS KNOWINGLY SUBMITTED THAT DO NOT COMPLY WITH SPECIFICATIONS SHALL BE LISTED WITH EXPLANATION AS TO WHY THEY ARE BEING SUBMITTED. B. REQUIRED SUBMITTALS / SHOP DRAWINGS: 1. FIXTURES 2. PIPING 3. HANGERS

DOMESTIC WATER PIPING

A. ALL BRANCH WATER PIPING INSIDE THE BUILDING SHALL BE TYPE 'L' COPPER TUBING (ASTM B-88) WITH WROUGHT COPPER FITTINGS (ANSI B16.22). CLEAN AND DEBURR THE INSIDE OF ALL FITTINGS CAREFULLY BEFORE JOINING WITH LEAD-FREE TIN-COPPER/SILVER-NICKEL SOLDER CONFORMING TO ASTM B32. WOLVERINE SILVABRITE 100 LEAD-FREE SOLDER OR HARRIS NICK LEAD-FREE SOLDER ARE ACCEPTABLE LEAD-FREE SOLDERS. USE WATER SOLUBLE FLUX RECOMMENDED BY SOLDER MANUFACTURER AND CONFORMING TO ASTM B813 AND NSF 61. WOLVERINE SILVABRITE 100 WATER SOLUBLE FLUX OR BRIDGIT WATER SOLUBLE PASTE FLUX ARE ACCEPTABLE FLUX. NO ACIDS SHALL BE USED TO CLEAN EITHER PIPE OR FITTINGS OR AS A FLUX IN SWEATING JOINTS. THE USE OF DRILLED-T CONNECTIONS IS NOT PERMITTED. B. ALL COPPER WATER PIPING SHALL BE COMPLETELY ISOLATED FROM METAL HANGERS, METAL STUDS OR ANY OTHER ELECTRICALLY CONDUCTIVE BUILDING COMPONENTS. PROVIDE DIELECTRIC UNION AT ALL CONNECTIONS BETWEEN COPPER AND GALVANIZED PIPE. C. PROGRESS MAY BE USED FOR TUBING SIZES 1/2" THRU 4" AND SHALL CONFORM TO THE MATERIALS AND SIZING REQUIREMENTS OF ASME B16.18 OR ASME B 16.22 AND HAVE 'NSF-61' STAMPED ONTO THE FITTINGS. NO MIXING OF FITTING MANUFACTURERS SHALL BE ALLOWED. SEALING ELEMENTS FOR COPPER PRESS FITTINGS SHALL BE EPDM. SEALING ELEMENTS SHALL BE FACTORY INSTALLED OR AN ALTERNATIVE SUPPLIED BY FITTING MANUFACTURER. PRESS ENDS SHALL HAVE A FEATURE DESIGN LEAKAGE PATH. COPPER PRESS FITTINGS SHALL HAVE A SPECIFIC DESIGN FEATURE TO ENSURE THAT UNPRESSED FITTINGS WILL BE IDENTIFIED AT ANY PRESSURE GREATER THAN 16 PSIG. COPPER PRESS FITTINGS SHALL BE RATED FOR 200 PSIG WORKING PRESSURES AND TEMPERATURES 250 DEGREES F. PRESS CONNECT FITTINGS SHALL HAVE THE SMART CONNECT FEATURE, GUARANTEED TO DETECT UNPRESSED FITTING DURING TESTING PROCESS. THE INSTALLER'S SHALL BE TRAINED BY VEGA AND CARRY TRAINING CREDENTIALS D. DOMESTIC WATER PIPING SHALL BE HYDROSTATICALLY TESTED AT 1.5 TIMES SYSTEM DESIGN PRESSURE.

F, E, D, C, B, A