

**MECHANICAL SPECIFICATIONS**

- GENERAL PROVISIONS
  - PROVIDE ALL LABOR, MATERIALS, EQUIPMENT, NECESSARY FOR THE COMPLETE INSTALLATION OF THE PLUMBING AND MECHANICAL SYSTEMS OUTLINED.
  - OBTAIN ALL PERMITS, FEES, LICENSES, INSPECTIONS, AND CERTIFICATES OF COMPLIANCE OR APPROVAL AS REQUIRED BY THE AUTHORITIES.
  - ALL WORK SHALL BE PERFORMED IN ACCORDANCE WITH ALL APPLICABLE LAWS, CODES AND REGULATIONS OF THE GOVERNMENTAL BODIES HAVING JURISDICTION OVER THE SITE.
  - ALL TESTS REQUIRED BY AUTHORITIES SHALL BE CONSIDERED PART OF THIS WORK.
  - DURING CONSTRUCTION, ALL FIXTURES, EQUIPMENT, PIPE, DUCT, ETC. SHALL BE COVERED, FLUSHED, OR CAPPED AS REQUIRED TO KEEP CLEAN AND UNDAMAGED. ALL DAMAGED ITEMS SHALL BE RESTORED TO ORIGINAL CONDITION OR REPLACED. ALL PROTECTIVE COVERINGS SHALL BE REMOVED BEFORE FINAL ACCEPTANCE.
  - PROVIDE ALL NECESSARY CUTTING AND PATCHING OF WALLS, FLOORS, CEILINGS, AND ROOFS AS NECESSARY. PATCH AROUND ALL OPENINGS SHALL MATCH ADJACENT AREA. COORDINATE ALL ROOFING WORK WITH OWNER OR RESPONSIBLE PARTY, SO THAT THE EXISTING ROOFING WARRANTY WILL BE MAINTAINED.
- FOR SECOND FLOOR TENANTS, TENANT SHALL MAKE NO FLOOR PENETRATIONS WITHOUT LANDLORD'S WRITTEN APPROVAL. ABSOLUTELY NO FLOOR TRENCING IS ALLOWED ON THE UPPER WALL LEVEL. FLOOR PATCHES/COVER, TENANT SHALL INSTALL A FULLY WATERPROOF AND WATER-TIGHT FLOOR MEMBRANE BENEATH ALL FINISH FLOOR MATERIALS THROUGHOUT THIS ENTIRE SPACE WITH WATER-TIGHT SEALS AROUND ALL FLOOR PENETRATIONS TO INSURE NO LEAKS MAY OCCUR INTO OR ONTO THE TENANT SPACE LOCATED ON THE WALL FIRST LEVEL FLOOR LOCATED BELOW WITH WATER-TIGHT SEALS AROUND ALL FLOOR PENETRATIONS.
- CONTRACTOR SHALL GUARANTEE ALL WORK AND MATERIALS AGAINST DEFECTS FOR A PERIOD OF ONE YEAR FROM FINAL ACCEPTANCE.
- OPERATION AND MAINTENANCE MANUALS
  - DURING THE COURSE OF CONSTRUCTION, COLLECT AND COMPILE OPERATING INSTRUCTIONS, WIRING DIAGRAMS, CATALOG CUTS, LUBRICATION AND PREVENTIVE MAINTENANCE INSTRUCTIONS, PARTS LISTINGS, ETC. FOR ALL EQUIPMENT FURNISHED UNDER THIS CONTRACT.
  - ALL LITERATURE AND INSTRUCTIONS SHIPPED WITH THE EQUIPMENT SHALL BE SAVED FOR inclusion IN THE OPERATION AND MAINTENANCE MANUALS.
  - ALL LITERATURE LISTED ABOVE AND ALL PAPERS LISTING WARRANTIES, ETC. SHALL BE BOUND IN A 3-RING BINDER AND LABELED WITH THE PROJECT NAME, ADDRESS, ARCHITECT, ENGINEER, CONTRACTORS, ETC.
- MANUFACTURERS
  - MANUFACTURERS, MODEL NUMBERS, ETC. INDICATED OR SCHEDULED ON THE DRAWINGS SHALL BE INTERPRETED AS HAVING THE STANDARD OF QUALITY AND SHALL NOT BE CONSIDERED AS LIMITING COMPETITION. ARTICLES, FIXTURES, ETC. OF EQUAL QUALITY BY MANUFACTURERS SHALL BE ACCEPTABLE, SUBJECT TO STRUCTURAL AND ELECTRICAL CONSTRAINTS OF THE PROJECT DESIGN, UNLESS NOTED OTHERWISE.
- MOTORS
  - PROVIDE THERMAL OVERLOAD PROTECTION FOR EACH MOTOR PROVIDED BY THIS WORK.
- TESTING, BALANCING, AND CLEANING
  - ALL PIPING SHALL BE TESTED FOR LEAKS BEFORE BEING CONCEALED IN WALL CONSTRUCTION OR COVERED WITH INSULATION.
  - SEWER AND VENT PIPING SHALL BE HYDROSTATICALLY TESTED WITH NO LESS THAN 10 FEET OF HEAD FOR A PERIOD OF NOT LESS THAN 15 MINUTES, PER THE LOCAL PLUMBING CODE, WITH NO LEAKS.
  - PIPE PROTECTION PIPING SHALL BE TESTED IN ACCORDANCE WITH THE REQUIREMENTS OF NFPA. REFER TO ARCH.
  - DOMESTIC WATER PIPING SHALL BE HYDROSTATICALLY TESTED AT A PRESSURE OF NOT LESS THAN 1-1/2 TIMES THE OPERATING PRESSURE, BUT NOT LESS THAN 60 PSI, FOR A PERIOD OF NOT LESS THAN 2 HOURS WITH NO LEAKS.
- DUCTWORK AND PIPING SHALL BE BALANCED BY QUALIFIED BALANCING PERSONNEL WHO HAVE PREVIOUS EXPERIENCE WITH BALANCING PROCEDURES AND ARE CERTIFIED WITH TESTING AND BALANCING PROCEDURES OF THE ASSOCIATED AIR BALANCE COUNCIL (AABC) OR NATIONAL ENVIRONMENTAL BALANCING BUREAU (NEBB).
  - BALANCING SHALL INCLUDE THE BALANCING OF THE EQUIPMENT AND AIR DISTRIBUTION SYSTEMS TO PROVIDE DESIGN QUANTITIES INDICATED AND VERIFICATION OF PERFORMANCE OF ALL EQUIPMENT AND AUTOMATIC CONTROLS. IN THE EVENT THAT LANDLORD REQUIRES ADJUSTMENTS TO TENANT'S AIR DISTRIBUTION, TENANT SHALL PAY ALL COSTS RELATED THERETO.
  - WITH IN 30 DAYS OF THE COMPLETION OF THE TESTING AND BALANCING WORK, SUBMIT THE TEST AND BALANCING REPORT BEARING THE SIGNATURE OF THE TEST AND BALANCE ENGINEER. THE REPORTS SHALL BE CERTIFIED PROOF THAT THE SYSTEMS HAVE BEEN TESTED, ADJUSTED, AND BALANCED IN ACCORDANCE WITH THE REFERENCED STANDARDS, ARE AN ACCURATE REPRESENTATION OF HOW THE SYSTEMS HAVE BEEN INSTALLED AND ARE OPERATING. REPORTS SHALL BE BOUND IN A VINYL BINDER AND THE BINDER LABELED OR MAY BE AN ELECTRONIC PDF SUBMITTAL.
- BEFORE DOMESTIC WATER PIPING IS PLACED IN SERVICE, ALL DOMESTIC WATER DISTRIBUTION SYSTEMS, INCLUDING THOSE FOR COLD WATER AND HOT WATER SYSTEMS, SHALL BE FLUSHED, STERILIZED AND CHLORINATED IN ACCORDANCE WITH HEALTH DEPARTMENT REGULATIONS. THE SYSTEMS SHALL BE THOROUGHLY FLUSHED OF ALL DIRT AND FOREIGN MATTER, THEN FILLED WITH WATER TREATED WITH 50 PPM OF CHLORINE. DURING THE FILLING PROCESS, VALVES AND FAUCETS SHALL BE OPENED SEVERAL TIMES TO ASSURE TREATMENT OF THE ENTIRE SYSTEM. THE TREATED WATER SHALL BE LEFT IN THE SYSTEM FOR 24 HOURS AFTER WHICH TIME THE SYSTEM SHALL BE FLUSHED. THE RESIDUAL CHLORINE IS NOT LESS THAN 10 PPM. THE FLUSHING SHALL BE REPEATED. AFTER STERILIZATION, SAMPLES OF WATER IN THE SYSTEM SHALL BE APPROVED BY THE BOARD OF HEALTH.

**MECHANICAL SPECIFICATIONS (CONTINUED)**

- ALL PIPE HANGERS AND SUPPORTS SHALL BE STANDARD PRODUCTS OF 6 RINNELL FEE AND MASON, OR ELCON. HANGER SPACING SHALL BE IN ACCORDANCE WITH MSS-59-14.
- CHILLED WATER (SUPPLY & RETURN), (INTENT IS TO MATCH EXISTING PIPING MATERIAL)
  - BLACK STEEL PIPE, SCHEDULE 40 ASTM A-120.
  - 500 LB. MALLEABLE IRON, THREADED FITTINGS.
  - 90° ELBOW, 90° 1/2" BALL VALVE, 90° ELBOW, 90° 1/2" BRKT OR EQUAL.
- TYPE L HARD DRAWN COPPER TUBING, ASTM B-88.
  - WROUGHT BRONZE SOLDERED FITTINGS.
  - BALL VALVE, CRANE 1/2" OR EQUAL.
- SLEEVES
  - PROVIDE SET AND PROPERLY LOCATE PIPE SLEEVES AS REQUIRED FOR THIS WORK. ALL SLEEVES SHALL BE OF SUFFICIENT SIZE TO PERMIT PIPE MOVEMENT DUE TO EXPANSION AND CONTRACTION AND TO ACCOMMODATE PIPE INSULATION.
  - INTERIOR PARTITIONS: 16 GAUGE GALVANIZED STEEL, PACK BETWEEN PIPE AND SLEEVE WITH FIRE SAFING AND CAULK AT EACH END WITH FIRE RESISTANT SEALANT.
  - ROOF: PROSET OR EQUAL MANUFACTURED PVC SCHEDULE 40 PIPE SLEEVE WITH WATERPROOF SEAL. COORDINATE WITH ROOFING CONTRACTOR AND FLASH AS REQUIRED TO MAINTAIN ROOF WARRANTY.
  - PLUMBING VENTS: FLASH ROOF VENT INTO ROOFING SYSTEM AS REQUIRED BY THE ROOFING CONTRACTOR TO MAINTAIN EXISTING ROOF WARRANTY. ALL PLUMBING VENT TERMINALS SHALL TERMINATE AT A MINIMUM OF 12" ABOVE ROOF OR EQUAL, TO HEIGHT OF PARAPET, WHICHEVER IS GREATER.
  - PROVIDE CHROME PLATED EPOXYCOATINGS ON ALL PIPE ENTERING FINISHED AREAS.
- INSULATION AND DUCT LINING
  - ALL INSULATIONS AND ACCESSORIES SHALL HAVE A FIRE HAZARD CLASSIFICATION WITH A FLAME SPREAD RATING OF NOT OVER 25, A FUEL CONTRIBUTION RATING OF NOT OVER 50, AND A SMOKE DEVELOPMENT RATING OF NOT OVER 50, IN ACCORDANCE WITH NFPA.
  - PIPE INSULATION - ABOVE GRADE
    - THE PIPING INSULATION USED SHALL HAVE A THERMAL CONDUCTIVITY OF 0.21 BTU PER 1.0" THICKNESS PER 1" R-VALUE.
    - FIBERGLASS INSULATION WITH FACTORY APPLIED VAPOR BARRIER, AS JACKET, FACTORY APPLIED PRESSURE SEALING JOINTS WITH NO STAPLES, ZEPHON FIBERGLASS PVC FITTING COVERS. INSTALLATION SHALL BE IN ACCORDANCE WITH MANUFACTURER'S RECOMMENDATIONS.
    - FLEXIBLE CLOSED CELL ELASTOMERIC THERMAL INSULATION, UNSUIT OR PRESUIT WITH PRESSURE SENSITIVE ADHESIVE SYSTEM FOR CLOSURE AND VAPOR SEALING, EQUAL TO ARMSTRONGS AP ARMARULE OR ARMAVULCAN 2000.
    - FOR NON CIRCULATING SYSTEMS, THE FIRST 6 FEET OF INLET AND OUTLET PIPING BETWEEN THE TANK AND THE HEAT TRAP (INCLUDING THE HEAT TRAP) MUST BE INSULATED.
  - INSULATION SCHEDULE
    - DOMESTIC COLD WATER 1/2"
    - DOMESTIC HOT WATER 1/2"
    - CONDENSATE DRAINS INSIDE BUILDING 1/2"
    - CHILLED WATER SUPPLY AND RETURN PIPING 1/2"
  - DUCTWORK: THERMAL INSULATION
    - DUCT COVERINGS: 3/4 LB/CF, FIBERGLASS BLANKET WITH FACTORY APPLIED VAPOR BARRIER AND FACING, THICKNESS AS SCHEDULED, INSTALLATION IN ACCORDANCE WITH MANUFACTURER'S RECOMMENDATIONS.
    - DUCT COVERINGS SCHEDULE: MINIMUM R-6
      - SUPPLY AND PRIMARY AIR DUCT 2"
      - OUTDOOR AIR / MAKE-UP AIR DUCT 2"
- PLUMBING
  - PROVIDE AN APPROVED WATER HAMMER ARRESTOR FOR EACH PLUMBING FIXTURE SUPPLY AS REQUIRED BY FIXTURE MANUFACTURER.
  - ALL EXPOSED PIPE SHALL BE CHROME PLATED BRASS PIPE, NO FERROUS PIPE.
  - PROVIDE CLEANOUTS AT EACH CHANGE OF DIRECTION AND AT 100 FOOT INTERVALS IN STRAIGHT RUNS.
  - PROVIDE ACCESS PANELS FOR ALL CONCEALED VALVES AND TRAPS.
  - CLEANOUTS
    - VINYL TILE FLOOR, JR SMTH #4140, OR EQUAL.
    - QUARRY TILE FLOOR, JR SMTH #4200, OR EQUAL.
    - CARPETED FLOOR, JR SMTH #4200, OR EQUAL.
    - UNFINISHED FLOOR, JR SMTH #4200, OR EQUAL.
    - PAV. JR SMTH #4472, OR EQUAL, 24" ABOVE THE FLOOR.
  - PROVIDE DISCONNECT UNIONS WITH APPROPRIATE END CONNECTIONS TO MATCH THE PIPE SYSTEM IN WHICH INSTALLED (SOLDERED, SOLDERED, OR FLANGED). PROVIDE DIELECTRIC UNIONS ON ALL PIPING CONNECTIONS TO HOT WATER HEATERS AND EXPANSION TANKS.
  - ALL SEWER PIPING LOCATED INSIDE THE BUILDING SHALL BE INSTALLED WITH THE FOLLOWING SLOPES:
    - INSTALL 1/2" TO 2" AND SMALLER PIPE AT 1/4" PER FOOT FALL.
    - INSTALL 2" AND LARGER PIPE AT 1/8" PER FOOT FALL.
  - DUCTWORK:
    - ALL DUCTWORK, UNLESS OTHERWISE INDICATED, SHALL BE FABRICATED FROM GALVANIZED SHEET, COMPLYING WITH ASTM A 921, LOCKFORMING QUALITY, WITH 60 ZINC COATING IN ACCORDANCE WITH ASTM A 921, AND SHALL BE PHOSPHATIZED FOR EXPOSED LOCATIONS.
    - DUCTWORK: METAL GAUGES, REMOVINGS, ETC. SHALL BE CONSTRUCTED IN ACCORDANCE WITH SMACNA "HVAC DUCT CONSTRUCTION STANDARDS", LATEST EDITION FOR A 4 INCH WATER GAUGE STATIC PRESSURE.
    - ALL FITTINGS SHALL BE CONSTRUCTED IN ACCORDANCE WITH SMACNA "HVAC DUCT CONSTRUCTION STANDARDS", LATEST EDITION FOR A 4 INCH WATER GAUGE STATIC PRESSURE.
    - SEAL ALL CONCEALED DUCTWORK JOINTS WITH NON-HARDENING, NON-MIGRATING, MAGNETIC SEALANT, AS RECOMMENDED FOR SEALING SEAMS AND JOINTS IN DUCTWORK. OIL BASE CAULKS AND SEALING COMPOUNDS SHALL NOT BE ACCEPTABLE. DUCTS SHALL BE SEALED TO THE LEVEL LISTED BELOW.
      - UNCONDITIONED SPACES CLASS B CLASS A CLASS 1 CLASS 2 CLASS 3 CLASS 4 CLASS 5 CLASS 6 CLASS 7 CLASS 8 CLASS 9 CLASS 10 CLASS 11 CLASS 12 CLASS 13 CLASS 14 CLASS 15 CLASS 16 CLASS 17 CLASS 18 CLASS 19 CLASS 20 CLASS 21 CLASS 22 CLASS 23 CLASS 24 CLASS 25 CLASS 26 CLASS 27 CLASS 28 CLASS 29 CLASS 30 CLASS 31 CLASS 32 CLASS 33 CLASS 34 CLASS 35 CLASS 36 CLASS 37 CLASS 38 CLASS 39 CLASS 40 CLASS 41 CLASS 42 CLASS 43 CLASS 44 CLASS 45 CLASS 46 CLASS 47 CLASS 48 CLASS 49 CLASS 50 CLASS 51 CLASS 52 CLASS 53 CLASS 54 CLASS 55 CLASS 56 CLASS 57 CLASS 58 CLASS 59 CLASS 60 CLASS 61 CLASS 62 CLASS 63 CLASS 64 CLASS 65 CLASS 66 CLASS 67 CLASS 68 CLASS 69 CLASS 70 CLASS 71 CLASS 72 CLASS 73 CLASS 74 CLASS 75 CLASS 76 CLASS 77 CLASS 78 CLASS 79 CLASS 80 CLASS 81 CLASS 82 CLASS 83 CLASS 84 CLASS 85 CLASS 86 CLASS 87 CLASS 88 CLASS 89 CLASS 90 CLASS 91 CLASS 92 CLASS 93 CLASS 94 CLASS 95 CLASS 96 CLASS 97 CLASS 98 CLASS 99 CLASS 100 CLASS 101 CLASS 102 CLASS 103 CLASS 104 CLASS 105 CLASS 106 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