

**PIPES AND JOINTS:** SOIL AND WASTE VENT PIPING UNDERGROUND SHALL BE STANDARD WEIGHT, "SPUN-TYPE" CAST IRON OR PVC BELL AND SPIGOT WITH COMPRESSION FITTINGS. SOIL AND WASTE VENT PIPING ABOVE GROUND SHALL BE STANDARD WEIGHT GALVANIZED STEEL PIPE OR PVC.

**THE FITTINGS FOR SOIL AND WASTE DRAIN PIPING ABOVE GROUND SHALL BE STANDARD WEIGHT CAST IRON OR PVC DRAINAGE PATTERN FITTINGS. FITTINGS FOR THE VENT PIPING ABOVE GRADE SHALL BE GALVANIZED MALLEABLE IRON. AT CONTRACTOR'S OPTION, STANDARD WEIGHT "SPUN-TYPE" CAST IRON OR PVC SOIL PIPE WITH NO HUB FITTINGS MAY BE USED FOR SOIL, WASTE DRAIN AND VENT PIPING ABOVE GROUND. STANDARD WEIGHT PVC MAY BE USED.**

**GAS PIPING ON ROOF SHALL BE SCHEDULED BLACK STEEL PIPE WITH STANDARD BLACK STEEL WELDING FITTINGS AND UNIONS. ALL GAS PIPING INSIDE BUILDING SHALL BE STANDARD WEIGHT BLACK STEEL PIPE WITH MALLEABLE IRON FITTINGS.**

**ALL HOT AND COLD WATER PIPES ABOVE GROUND SHALL BE HARD TEMPER, TYPE "L" COPPER OR PVC TUBING. FITTINGS SHALL BE WROUGHT COPPER OR PVC SWEAT TYPE. UNIONS SHALL BE BRASS, GROUND JOINT TYPE.**

**ALL HOT AND COLD WATER LINES BELOW GRADE SHALL BE TYPE "K" SOFT TEMPER COPPER OR PVC. FITTINGS SHALL BE CAST BRASS FLARED FITTINGS. SWEAT JOINTS ABOVE GRADE IN PIPING NOT EXCEEDING 100 DEGREES F AND 125 PSI SHALL BE MADE WITH 5050 SOLDER OR APPROVED EQUAL. SWEAT JOINTS BELOW GRADE SHALL BE BRAZED, WITH "SIL-FOS", OR FLARED AT THE CONTRACTOR'S OPTION.**

**DIELECTRIC FITTINGS:** DIELECTRIC FITTINGS SHALL BE FURNISHED AND INSTALLED ON PIPING SYSTEMS WHERE DISSIMILAR MATERIALS ARE IN INTIMATE CONTACT AND IMMERSED IN AN ELECTROLYTE SUCH AS WATER. THE CONTRACTOR SHALL TAKE ALL NECESSARY PRECAUTIONS TO PREVENT GALVANIC CORROSION OCCURRING IN ANY AND ALL PIPING SYSTEMS.

**EXPANSION AND CONTRACTION:** THE CONTRACTOR SHALL MAKE SUITABLE PROVISIONS FOR EXPANSION AND CONTRACTION IN ALL PIPING SYSTEMS INCLUDING ALL MAINS, BRANCHES, RUN OUTS, RISERS AND CONNECTIONS AND GRADE SO AS TO PRECLUDE LOW POINTS BEING DEVELOPED AFTER SYSTEMS ARE PLACED IN OPERATION.

**VALVES:** VALVES SHALL BE OF ONE MANUFACTURER THROUGHOUT INSTALLATION. SOLDER JOINT VALVES SHALL BE RATED 150 LBS FOR WATER SERVICE AT 200 DEGREES F. VALVES SHALL BE CRANE COMPANY, JENKINS OR APPROVED EQUAL. BRASS SOLDER JOINT VALVES FOR COPPER OR PVC TUBING.

**GATE VALVES TO BE WEDGE DISC, NON-RISING STEM, CRANE #1320. CHECK VALVES TO BE SWING CHECK, CRANE #103C.**

**GAS VALVES: 2" AND SMALLER SHALL BE IRON PLUG COCK WITH BRASS PLUG WASHER CRANE #1232, 2-1/2" AND LARGER SHALL BE LUBRICATED PLUG VALVE, SEMI-STEEL, 175 LB WOG RATING, WRENCH OPERATED, NORDSTROM #143 OR APPROVED EQUAL.**

**HANGERS AND SUPPORTS:** ALL FERROUS PIPES SHALL BE HUNG WITH MALLEABLE IRON, SPLITRING HANGERS WITH TURNBUCKLE ADJUSTMENT, FEE AND MASON FIG 215 OR APPROVED EQUAL. ALL COPPER OR PVC PIPING SHALL BE HUNG WITH MALLEABLE IRON, COPPER OR PVC PLATED, SPLIT-RING HANGERS WITH TURNBUCKLE ADJUSTMENT FOR NOMINAL TUBING SIZES AS REQUIRED. FEE AND MASON FIG 361 OR APPROVED EQUAL. PROVIDE HANGER RODS OF THE PROPER LENGTH AND SIZE FOR ALL HANGERS. STRAP HANGERS ARE NOT ACCEPTABLE.

**PIPE SLEEVES AND THIMBLES:** THROUGH FLOOR CONSTRUCTION TO HAVE MIRACLE SLEEVE CYLINDERS BOLTED TO FORM AND PLATE FOR POURING. PIPES THROUGH PARTITIONS TO HAVE STEEL PIPE SLEEVES SET FLUSH WITH FINISHED WALL SURFACE GROUTED IN DURING ERECTION OF PARTITIONS. SLEEVES THROUGH CONCRETE BEAMS SHALL BE STANDARD WEIGHT GALVANIZED STEEL PIPE AND SHALL BE LOCATED AS DIRECTED BY THE ARCHITECT. THIS CONTRACTOR SHALL BE RESPONSIBLE FOR SETTING AND PROPER LOCATION OF ALL SLEEVES REQUIRED FOR ALL PLUMBING WORK. ALL SLEEVES SHALL BE OF SUFFICIENT SIZE TO PERMIT PIPE MOVEMENT DURING EXPANSION AND CONTRACTION AND TO ACCOMMODATE PIPE INSULATION IF REQUIRED.

**PIPE COLLARS:** ADJUSTABLE NICKEL-BRASS OR CHROMIUM PLATED COLLARS WHERE PIPES PASS THROUGH PARTITIONS, WALLS, FLOORS AND CEILINGS OF FINISHED SPACES. GRANT WILSON HEAVY GAUGE ALUMINUM COVERING CUPS ON INSULATED PIPES AT JUNCTION WITH FLOORS, WALLS, PARTITIONS AND CEILINGS IN FINISHED SPACES. RISERS AND BRANCHES, SOIL AND WASTE LINES: PIPING CONCEALED IN CONSTRUCTION IN ALL FINISHED SPACES AND OFFSET TO MISS BEAMS, DUCTS OR OTHER OBSTRUCTIONS. CONNECTION BY MEANS OF SINGLE DRAINAGE Y'S. ELBOWS FROM VERTICAL TO HORIZONTAL LINES PITCHED UNIFORMLY WITH GRADE NOT LESS THAN 1/4" PER FOOT. BRANCHES FOR WATER CLOSETS TERMINATED AT FLOOR LINE WITH PROPER FLANGE TO RECEIVE FIXTURE. FLANGE SET TRUE AND LEVEL SO THAT CLOSET BASE WILL HAVE FULL BEARING ON FLOOR AS REQUIRED.

**CLEANOUTS AND TEST TEES:** CLEANOUTS SHALL BE THE SAME SIZE AS PIPES THEY ARE TO BE INSTALLED IN EXCEPT THAT CLEANOUT PLUGS LARGER THAN 4" WILL NOT BE REQUIRED. A CLEANOUT SHALL BE INSTALLED AT THE FOOT OF EACH SOIL, WASTE OR VENT STACK AND ON HORIZONTAL RUNS AT INTERVALS OF NOT MORE THAN 100 FEET. CLEANOUTS INSTALLED IN CONNECTION WITH CAST IRON OR PVC HUB AND SPIGOT PIPE SHALL CONSIST OF A LONG SWEEP 1/4 BEND OR ONE OR TWO 1/8 BENDS. WHERE THE CLEANOUTS ARE INDICATED AND ARE ACCESSIBLE IN CONNECTION WITH THREADED PIPING THEY SHALL BE CAST IRON DRAINAGE "TEE" PATTERNS, 90 BRANCH FITTINGS WITH EXTERIOR HEAVY BRASS SCREW PLUGS OF THE SAME SIZE AS THE PIPE. CLEANOUTS SHALL BE INSTALLED IN THE WALL INsofar AS PRACTICABLE UNLESS INDICATED OTHERWISE ON THE DRAWINGS. CLEANOUTS INSTALLED IN CORRIDOR FLOORS OR IN FLOOR AREAS WHERE FOOT OR OTHER TRAFFIC WILL OCCUR WILL BE FLUSH WITH FLOOR. TRAPS: EACH FIXTURE TO BE SEPARATELY TRAPPED WITH WATER SEALED TRAP INSTALLED AS CLOSE TO FIXTURES AS POSSIBLE. CHROMIUM PLATED BRASS "P" TRAP. WHERE TRAPS ARE EXPOSED TO VIEW, REMAINDER OF TRAPS TO BE INTEGRAL WITH FITTING OF CAST IRON OR PVC.

**VENT LINES:** EVERY TRAP TO BE LOOP OR BACK VENTED. EXPOSED VENT CONNECTIONS IN FINISHED ROOMS TO BE CHROMIUM PLATED BRASS. MINIMUM SIZE OF VENTURE VENTS AS REQUIRED BY SCHEDULE OF BRANCHES. CONNECTING VENTS SIZED AND RUN THROUGH ROOF AS SHOWN ON THE DRAWINGS. VENTS MUST BE CONNECTED TO STAIR VENTS ABOVE HIGH POINT FIXTURE. VENT STACKS SUPPORTED AT EACH FLOOR AND PENETRATING BUILDING THROUGH APPROVED WROUGHT IRON CLAMPS AND BRACKETS. VENT PIPES TO EXTEND A MINIMUM HEIGHT OF 1' ABOVE ROOF LINE. COORDINATE VENTS THROUGH ROOF WITH OTHER EQUIPMENT ON ROOF.

**FLASHING:** ALL VENT PIPING THROUGH ROOF SHALL BE FLASHED AT ROOF WITH 4LB PER SQUARE FOOT LEAD FLASHING 12" FROM PIPE ALONG ROOF LINE AND JOINED WITH WIPED JOINT TO PIECE OF 1/2 LB LEAD SOIL PIPE EXTENDING FROM ROOF LINE UP TO 2" ABOVE TOP OF VENT PIPE AND TURNED DOWN 1" INSIDE OF PIPE TO PERMIT EXPANSION. AT CONTRACTOR'S OPTION, UTILIZE AMERICAN FOUNDRY #1194 OR APPROVED EQUAL VENT STACK CAP FITTING.

**SANITARY SEWER MAINS:** COMPLETE DRAINAGE SYSTEM OF CAST IRON OR PVC AND STEEL PIPE ON INTERIOR OF BUILDING TO BE EXTENDED 5' OUTSIDE OF BUILDING LINE. MAINS TO BE TRUE TO LINE, UNIFORMLY GRADED NOT LESS THAN 1/8" PER FOOT, BEDDED IN DRY EARTH AND CLEAN AND UNOBSTRUCTED INSIDE. PROPER CURVED FITTINGS TO BE USED

**FOR BRANCH CONNECTIONS AND CHANGES IN LINE OR GRADE. BUILDING SANITARY SEWER LINES TO BE EXTENDED IN VITRIFIED CLAY PIPE AS SHOWN ON THE DRAWINGS. CONTRACTOR SHALL CHECK AND VERIFY ALL ELEVATIONS AND GRADES OF SEWER LINES BEFORE WORK IS STARTED. ANY DEVIATIONS FROM ELEVATIONS OR GRADES SHALL BE REPORTED IN WRITING TO ARCHITECT BEFORE WORK IS STARTED. WATER SERVICE: PROVIDE A WATER SERVICE FROM 8" MAIN FOR SPRINKLERS OUTSIDE BUILDING WHERE INDICATED ON THE DRAWINGS OR REQUIRED. WATER SERVICE ON SITE AND TO WITHIN 5' OF BUILDING SHALL BE FURNISHED AND INSTALLED BY OTHERS. FURNISH METER PIT AND VALVES AS REQUIRED BY WATER COMPANY. MAKE WATER CONNECTION TO ALL FIXTURES AND EQUIPMENT WHETHER FURNISHED BY THIS PLUMBING CONTRACTOR OR OTHERS AS REQUIRED AND AS SHOWN ON THE DRAWINGS. PROVIDE STOPS ON ALL SUPPLIES TO ALL FIXTURES AND EQUIPMENT.**

**GAS SERVICE AND CONNECTIONS:** PROVIDE GAS SERVICE AS INDICATED ON THE DRAWINGS. PLUMBING CONTRACTOR SHALL CONNECT TO GAS SERVICE 5' OUTSIDE THE BUILDING TO BE FURNISHED BY OTHERS. INSTALLATION OF PIPE AND METERS SHALL CONFORM TO THE REQUIREMENTS OF THE LOCAL GAS CO. MAKE GAS CONNECTIONS TO ALL APPLIANCES AND EQUIPMENT, WHETHER FURNISHED BY THIS PLUMBING CONTRACTOR OR OTHERS, AS REQUIRED AND AS SHOWN ON THE DRAWINGS. AIR CHAMBERS: AIR CHAMBERS ARE REQUIRED AT EACH VALVE OR FIXTURE WHERE SUPPLY PIPES TERMINATE. VOLUME OF AIR CHAMBERS SHALL BE SUFFICIENT TO PREVENT WATER HAMMER AND SHALL HAVE A LENGTH OF NOT LESS THAN 18 TIMES THE DIAMETER OF THE PIPE BRANCH.

**PLUMBING EQUIPMENT AND FIXTURE SCHEDULE:** ALL PLUMBING EQUIPMENT AND FIXTURES, WHETHER FURNISHED BY THE PLUMBING CONTRACTOR OR NOT, SHALL BE INSTALLED AND CONNECTED BY HIM COMPLETE WITH ALL NECESSARY TRIMMINGS. ANGLE STOPS, STRAIGHT STOPS, STOPS INTEGRAL WITH THE FAUCETS, OR CONCEALED TYPE OR LOCK SHIELD LOOSE-KEY PATTERN STOPS, OR CONCEALED SUPPLIES FOR ALL FIXTURES OR EQUIPMENT, SHALL BE CONNECTED TO THE ROUGH PIPING SYSTEM AT THE WALLS UNLESS OTHERWISE SPECIFIED UNDER THESE SPECIFIC ITEMS OF EQUIPMENT OR FIXTURES. ALL PLUMBING EQUIPMENT AND/OR FIXTURES MUST BE PROVIDED WITH READILY ACCESSIBLE SERVICE STOPS. THE FIXTURE NUMBERS ON THE SCHEDULE ON THE DRAWINGS, UNLESS SPECIFICALLY INDICATED TO THE CONTRARY, ARE THOSE OF AMERICAN STANDARD. EQUIVALENT FIXTURES BY KOHLER, CRANE OR ELJER WILL BE ACCEPTABLE. THE DRAINS, CLEANOUTS, ETC., NUMBERS ARE THOSE OF JOSAM UNLESS OTHERWISE INDICATED. EQUIVALENT BY ZURN, WADE OR JR SMITH WILL BE ACCEPTABLE.

**DIVISION 23 HVAC**  
**SCOPE OF WORK:** THE MECHANICAL WORK SHALL INCLUDE COMPLETE SYSTEM AS INDICATED ON THE PLANS AND AS SPECIFIED HEREIN, INCLUDING BUT NOT LIMITED TO THE FOLLOWING: FURNISH AND INSTALL HVAC UNITS, DUCTWORK, DIFFUSERS AND GRILLES PERFORM MISCELLANEOUS WORK REQUIRED TO CARRY OUT THE INTENT OF THE PLANS STANDARDS CODES AND PERMITS: EQUIPMENT, DEVICES, APPARATUS, SYSTEMS AND INSTALLATION SHALL BE IN FULL COMPLIANCE WITH APPLICABLE PLUMBING CODES AND STANDARDS OF MUNICIPAL, COUNTY, STATE GOVERNMENT AND LOCAL UTILITIES. SUB-CONTRACTOR SHALL SECURE ALL PERMITS AND PAY ALL TAXES AND FEES IMPOSED BY THE STATE OR MUNICIPAL BODIES HAVING JURISDICTION OVER THE CLASS OF WORK PERFORMED AND HEREIN DESCRIBED. THE SUB-CONTRACTOR SHALL PAY ALL METER AND SERVICE FEES WHEN SUCH SERVICE IS INDICATED ON THE PLANS. SUB-CONTRACTOR SHALL PAY FOR ALL INSPECTIONS REQUIRED BY CITY, COUNTY, STATE AND LOCAL UTILITIES. COORDINATION: BEFORE ANY WORK IS INSTALLED AND BEFORE ANY EQUIPMENT IS PURCHASED, SUB-CONTRACTOR SHALL CAREFULLY CHECK

**RECTANGULAR DUCTWORK:** PRIME SHEETS OF GALVANIZED SHEET STEEL AS MANUFACTURED BY REPUBLIC YOUNGSTON OR AMERICAN ROLLING. GAUGES: UP TO 1 26 GAUGE; 13" TO 30" - 24 GAUGE; 31" TO 54" - 22 GAUGE; 55" TO 84" - 20 GAUGE. SPACING OF REINFORCING NOT OVER 5'-0" CENTERS ON TOP AND BOTTOM OF DUCTS ONLY FOR DEPTH OF 16" AND LESS. DUCTS 24" IN DEPTH AND LESS SHALL BE HUNG WITH 1" WIDE BY 22 GAUGE GI STRAP HANGERS AT EACH JOINT AND A MAXIMUM OF 4' BETWEEN DUCTS 25" DEPTH AND LARGER SHALL BE HUNG WITH 3/16" STEEL HANGERS FROM 45 DEGREE ANGLE TO THE CONSTRUCTION ABOVE. FIXED TURNING VANES SHALL BE INSTALLED IN BENDS OR TURNS IN SUPPLY DUCTWORK AND WHENEVER SHOWN ON PLANS. FIXED TURNING VANES IN DUCTS SHALL BE DESIGNED IN ACCORDANCE WITH ASHRA RECOMMENDATIONS OR AS MANUFACTURED BY TITUS OR BARBER COLEMAN. FULL AREAS MAINTAINED IN CHANGE IN SIZE OF DUCTS. TAPERING DUCTS REDUCED GRADUALLY. ALL DUCTS PRACTICALLY AIR TIGHT. ALL FITS REQUIRED TO CLEAR PIPING AND STRUCTURAL FRAMING OF THE BUILDING. ALL DUCTS 18" WITH OR DEPTH AND LARGER REQUIRED TO BE CROSS BROKE

**ISOLATION UNITS:** ALL BLOWER UNITS AND ALL VARIATION TYPE EQUIPMENT IN THIS CONTRACT SHALL BE PROPERLY ISOLATED FROM BUILDING STRUCTURE WITH THE NUMBER OF STANDARD ISOLATION UNITS AS REQUIRED BY WEIGHT AND DUTY OF THE EQUIPMENT. EACH UNIT SHALL CONSIST OF MOUNTING AND FLOOR FASTENINGS TOGETHER WITH INTERMEDIATE ISOLATION MATERIAL AND SHALL BE STANDARD CATALOG PRODUCT AS LATEST REQUIREMENTS OF THE NATIONAL ELECTRICAL CODE. GAUGE OF WIRE SHALL BE AS APPROVED BY ARCHITECT. FACTORY INSTALLED ISOLATION UNITS WILL BE ACCEPTABLE AS APPROVED BY THE ARCHITECT.

**LINE WITHIN 1' LOW POINTS:** CITY SHEET METAL SUPPLY AIR, RETURN AIR BOOT SHALL BE LINED WITH 1/4" THICK FIBER DENSITY GLASS FIBER LINER. THE LINER SHALL MEET THE STANDARDS OF 90 MINUTE FLAME SPREAD DEVELOPMENT AND SMOKE DEVELOPMENT. JOINT LINES SHALL BE CUT TO ASSURE SNUG CORNER JOINTS AND INSTALLED SO THAT THE BACK SURFACE OF THE LINER FACES THE AIR STREAM. DUCT LINER SHALL BE APPLIED TO ALL VERTICAL RUNS, TOPS OF DUCTS OF 12" IN WIDTH AND/OR SIZES OVER 16" IN HEIGHT SHALL BE ADDITIONALLY SECURED WITH GRIPNAIL OR WELDED PINS AND SPEED CLIPS ON 15" CENTERS MAXIMUM. MECHANICAL FASTENERS SHALL BE FLUSH WITH THE LINER SURFACE. CLIPS SHALL BE DRAWN FLUSH ONLY AND NOT SO AS TO COMPRESS THE LINER AND CAUSE THE LEADING EDGE TO RIP UP. ALL EXPOSED EDGES AND THE LEADING EDGE OF ALL CROSS JOINTS OF THE LINER SHALL BE COATED WITH BENJAMIN FOSTER 30-60.

**HEATING / COOLING UNITS:** SEE AE-0700 FOR HVAC SPECS

**GRILLES:** REQUIRED FOR ALL AIR SUPPLY, EXHAUST AND RETURN AIR OPENINGS AS SHOWN ON THE PLANS AND SHALL BE TITUS AS SCHEDULED OR APPROVED EQUAL BY CARNES, TUTTLE & BAILEY, ANEMOSTAT, GRILLEMMASTER, OR KRUEGER.

**ELECTRICAL WORK:** ELECTRICAL EQUIPMENT NECESSARY FOR CONTROL OF MOTORS AND EQUIPMENT UNDER THIS CONTRACT TO BE FURNISHED BY THIS CONTRACTOR. ALL ELECTRICAL WIRING AND ALL INSTALLATION OF ELECTRICAL EQUIPMENT SHALL BE BY ELECTRICAL CONTRACTOR AND AT NO EXPENSE TO THIS CONTRACTOR. THIS CONTRACTOR SHALL REFER TO THE ELECTRICAL DRAWINGS FOR THE WIRING OF ALL MOTORS AND EQUIPMENT. WHENEVER THE MOTORS FURNISHED BY THIS CONTRACTOR EXCEED THE AMPERE RATING OF THE NOMINAL HORSEPOWER LISTED ON THE ELECTRICAL DRAWINGS, THEN THIS CONTRACTOR SHALL BE RESPONSIBLE FOR THE ADDITIONAL WIRE SIZING AND CONDUIT AND SHALL REIMBURSE THE ELECTRICAL CONTRACTOR FOR THIS ADDITIONAL COST.

**PAINTING:** NO PAINTING EXCEPT TOUCH-UP OF FACTORY FINISHED EQUIPMENT. ACCESS PANELS: THE CONTRACTOR SHALL FURNISH AND LOCATE ACCESS PANELS AND/OR DOORS FOR INSTALLATION BY THE GENERAL CONTRACTOR FOR SERVICING OF CONCEALED

**MECHANICAL, PLUMBING AND ELECTRICAL EQUIPMENT THIS CONTRACTOR SHALL SUBMIT TO THE ARCHITECT FOR "REVIEW". THE SIZES AND TYPES HE PROPOSES TO FURNISH. USE 12" X 12" TYPE "A" MIL COR OR APPROVED EQUAL.**

**SUBMITTAL DATA PRIOR TO FINAL ACCEPTANCE:** SUBMIT FOUR COPIES OF PARTS LISTS, OPERATING MANUAL AND MAINTENANCE INSTRUCTIONS FOR ALL EQUIPMENT FURNISHED UNDER THIS SECTION OF THE SPECIFICATIONS TO THE OWNER. FOR OFFICE FILES AND BUILDING ENGINEER'S FILE. CONTRACTOR SHALL FURNISH AND DELIVER TO THE ARCHITECT ONE SET OF "AS-BUILT" PLANS. THESE PLANS SHALL BE BLUEPRINTS OR QUALID PRINTS KEPT ON THE JOB AND MARKED LEGIBLY WITH COLORED PENCIL AS TO ALL CHANGES IN CONSTRUCTION FROM THAT SHOWN ON THE CONTRACT DOCUMENTS. "AS-BUILT" PLANS SHALL BE DELIVERED TO THE ARCHITECT BEFORE FINAL ACCEPTANCE OF BUILDING BY OWNER. VERIFY EQUIPMENT TO BE SUPPLIED AND INSTALLED BY OWNER. STUB-UPS ONLY IN THIS CONTRACT.

**SHOP DRAWINGS:** THIS CONTRACTOR SHALL SUBMIT SHOP DRAWINGS TO THE ARCHITECT FOR "REVIEW". BEFORE CONSTRUCTION IS STARTED AND BEFORE PURCHASES ARE MADE, ELECTRONIC PDF COPIES OF SHOP DRAWINGS OF: EACH SPECIALIZED INSTALLATION OR SYSTEM INCLUDING ASSEMBLY OR COORDINATION DRAWINGS AND SHOP DRAWINGS OF EACH ITEM. DIMENSIONAL, SPACE, PERFORMANCE AND CAPACITY DATA FOR EACH ITEM. CONTROL DIAGRAMS, SEQUENCE OF OPERATION WIRING DIAGRAMS. CAPACITY AND PERFORMANCE DATA SHALL BE GIVEN IN THE SAME FORM AS CALLED FOR IN THE SPECIFICATIONS OR ON THE DRAWINGS. EACH ITEM SHALL BE CLEARLY AND INDIVIDUALLY IDENTIFIED BY THE SAME NUMBERED SYMBOLS USED IN THE SPECIFICATIONS AND ON THE DRAWINGS. EACH SHOP DRAWING SHALL INCLUDE EVIDENCE THAT IT HAS BEEN CHECKED AND APPROVED BY THE SUB-CONTRACTOR. SHOP DRAWINGS SHALL BE SUBMITTED IN GROUPS WITH EACH GROUP INCLUDING COMPLETE SHOP DRAWINGS OF RELATED SYSTEMS, DEVICES, EQUIPMENT, ETC. TOTAL NUMBER OF GROUPS SHALL NOT EXCEED FOUR FOR EACH DIVISION. NO EQUIPMENT SHALL BE INSTALLED UNTIL SHOP DRAWINGS HAVE BEEN APPROVED IN WRITING BY THE ARCHITECT. WHERE EQUIPMENT OR FIXTURES ARE FURNISHED BY OTHERS, BUT ARE NOT CALLED AND CONNECTED, OR CONNECTED, OR ROUGHED-IN BY THE PLUMBING SUB-CONTRACTOR, ALL SHOP DRAWINGS FOR SUCH FIXTURES AND EQUIPMENT SHALL BE PREPARED BY THE HVAC SUB-CONTRACTOR. FROM THE CONTRACTOR WHO FURNISHES THE FIXTURES OR EQUIPMENT. THE HVAC SUB-CONTRACTOR SHALL CHECK, APPROVE AND SUBMIT EACH SHOP DRAWINGS THE SAME AS THOUGH HE FURNISHED THE FIXTURES OR EQUIPMENT.

**DIVISION 26 ELECTRICAL**  
**SCOPE OF WORK:** THE ELECTRICAL WORK SHALL INCLUDE COMPLETE SYSTEM AS SHOWN AND OR SPECIFIED INCLUDING BUT NOT LIMITED TO THE FOLLOWING: FURNISH AND INSTALL LIGHTING SYSTEMS AS INDICATED ON THE DRAWINGS. FURNISH AND INSTALL LIGHTING FIXTURES AND LAMPS FOR SAME. FURNISH AND INSTALL POWER WIRING FROM PANELS TO ALL OUTLETS AND THROUGH PANELS. FURNISH AND INSTALL EXIST AND EMERGENCY LIGHTING SYSTEMS AS INDICATED AND REQUIRED.

**PLANS:** THESE SPECIFICATIONS ARE ACCOMPANIED BY FLOOR PLANS OF THE BUILDING SHOWING THE LOCATION OF OUTLETS. EXACT LOCATIONS SHALL BE SUBJECT TO THE "REVIEW" OF THE ARCHITECT. WHO RESERVES THE RIGHT TO MAKE REASONABLE CHANGES IN THE LOCATION INDICATED WITHOUT COST TO THE OWNER. WHILE THE GENERAL RUN OF FEEDERS, BRANCHES AND CONDUITS ARE INDICATED ON THE DRAWINGS, IT IS NOT INTENDED THAT THE EXACT ROUTING OF CIRCUITS OR LOCATIONS OF CONDUITS BE DETERMINED BY SAID DRAWINGS. DETAILED ARRANGEMENTS OF ALL WORK SHALL BE SUBJECT TO THE ARCHITECTS "REVIEW".

**CUTTING AND PATCHING:** THE ELECTRICAL CONTRACTOR SHALL BE RESPONSIBLE FOR CUTTING ALL FLOORS, WALLS, PARTITIONS, CEILINGS OR OTHER CONSTRUCTION REQUIRED FOR THE PROPER INSTALLATION OF HIS WORK. NO CUTTING SHALL BE DONE WITHOUT THE PRIOR "REVIEW" OF THE ARCHITECT AND ALL CUTTING SHALL BE PERFORMED AS DIRECTED BY THE ARCHITECT. USE OF PERFORATED IRON STRAP, CORD OR WIRE FOR SUPPORTING CONDUITS WILL NOT BE PERMITTED. CONDUIT ENDS SHALL BE CAREFULLY REAMED AFTER CUTTING AND THREADING SHALL BE CAPPED WITH METAL OR PLASTIC CAPS OR PLUGGED WITH CORKS DURING CONSTRUCTION. FLEXIBLE CONDUIT AND LIQUID TIGHT CONDUIT (SEALTITE) SHALL BE AS MANUFACTURED BY ANACONDA AMERICAN BRASS COMPANY. SHORT RUNS OF GALVANIZED GREEN SHIELD FLEXIBLE CONDUIT MAY BE USED IN DRY LOCATIONS. FLEXIBLE CONDUIT USED FOR WET LOCATIONS AND MOTOR TERMINALS SHALL BE WATER TIGHT. WIRES AND WIRING: WIRES AND CABLES SHALL BE ANACONDA WIRE AND CABLE COMPANY, GENERAL CABLE CORPORATION, CRESCENT INSULATED WIRE AND CABLE COMPANY, PHELPS-DODGE COPPER OR PVC PRODUCTS CORPORATION, SIMPLEX WIRE AND CABLE COMPANY OR AMERICAN STEEL AND WIRE COMPANY, INSULATED SOFT ANNEALED COPPER OR PVC WITH PROPERTIES (INCLUDING COLOR CODING) CONFORMING TO THE LATEST REQUIREMENTS OF THE NATIONAL ELECTRICAL CODE. GAUGE OF WIRE SHALL BE AWG GAUGE, NO 10 GAUGE AND SMALLER SHALL BE SOLID CONDUCTOR, NO 8 GAUGE AND LARGER SHALL BE STRANDED CONDUCTOR. WIRE SMALLER THAN NO 12 GAUGE SHALL NOT BE USED UNLESS SPECIFICALLY CALLED FOR. WIRES FOR GENERAL USE, SIZES #12 AND #10, SHALL BE TYPE TW, SIZES #8 THROUGH #40 SHALL BE TYPE THW AND SIZE OVER #40 SHALL BE TYPE RHH (RHW) OR CROSS LINKED POLYETHYLENE TYPE RHW. WIRE AND CABLE CONNECTORS SHALL BE SOLDER-LESS, MECHANICAL TYPE, CONNECTORS FOR CONDUCTORS #8 AWG AND SMALLER SHALL BE 3M "SCOTCH LOCK" OR IDEAL INDUSTRIES "SUPER-NUT" SPRING CONNECTORS WITH MOLDED VINYL CAPS. CONNECTORS FOR CONDUCTORS #6 AWG AND LARGER SHALL BE O-Z ELECTRICAL MFG. COMPANY OR BURNDY ENGINEERING COMPANY BOLTED MECHANICAL TYPE INSULATED WITH CLAMP ON MOLDED COVERS OR 3M "SCOTCH" ELECTRICAL TAPE.

**GROUNDING:** THE NEUTRAL CONDUCTOR FOR EACH SYSTEM SHALL BE GROUNDED IN ACCORDANCE WITH THE NATIONAL ELECTRICAL CODE. THE CONDUIT SYSTEM AND SERVICE ENTRANCE EQUIPMENT SHALL BE BONDED TO THE GROUNDED CONDUCTORS IN AN APPROVED MANNER. ALL ELECTRICAL MOTORS, CONDUIT AND OTHER ELECTRICAL ITEMS SHALL BE GROUNDED PROPERLY TO PREVENT ACCIDENTAL SHOCK TO OPERATORS OR OTHER PERSONS.

**OUTLET BOXES:** GALVANIZED STEEL OUTLET BOXES SHALL BE INSTALLED FOR OUTLETS AND THEY SHALL BE EQUAL TO THOSE MADE BY STEEL CITY PRODUCTS, APPLETON, OR RACO. SECTIONAL BOXES AND HANDY BOXES ARE NOT TO BE USED WITHOUT SPECIAL PERMISSION. PLASTER RINGS OR FINISHING RINGS SHALL BE USED WHERE REQUIRED TO MAKE OUTLET FLUSH WITH FINISH WALL SURFACE. FIXTURE STUDS SHALL BE INSTALLED IN ALL OUTLET BOXES TO RECEIVE LIGHTING FIXTURES. OUTLET BOXES SHALL BE LOCATED AS NEAR AS POSSIBLE TO LOCATIONS SHOWN ON THE DRAWINGS AND IN ACCESSIBLE LOCATIONS. SPECIAL CARE AND ATTENTION IS TO BE TAKEN IN LOCATING OUTLETS AS SHOWN ON THE INTERIOR WALL ELEVATIONS OF THE ARCHITECTURAL DRAWINGS.

**WIRING DEVICES:** DEVICES SHALL BE SLATER MEDALIST TOGGLE SWITCHES NOS 710, 712, 713, 714. DOUBLE THROW SWITCHES SHALL BE USED UNLESS OTHERWISE NOTED. TO BE SELECTED BY THE ARCHITECT. COORDINATE ALL OUTLET LOCATIONS WITH ALL OTHER DRAWINGS PRIOR TO ROUGH-IN AND NOTIFY THE ARCHITECT WHERE CONFLICTS EXIST. VERIFY MOUNTING HEIGHT OF ALL DEVICES WITH THE ARCHITECT PRIOR TO ROUGH-IN AND COMPLY AS REQUIRED. SWITCH AND RECEPTACLE PLATES: PLATES SHALL BE STA-KLEEN.

**PANEL BOARD:** PANEL BOARD(S) SHALL BE AS INDICATED.

**LIGHTING FIXTURES:** GENERAL ELECTRICAL WORK SHALL INCLUDE ALL LIGHTING FIXTURES AS SPECIFIED AND AS CALLED FOR ON THE DRAWINGS. FIXTURES SHALL BE COMPLETE INCLUDING HICKEYS, SUSPENSION NIPPLES AND ALL OTHER MATERIALS AND EQUIPMENT AS REQUIRED FOR HANGING FIXTURES IN ACCORDANCE WITH THE NATIONAL ELECTRICAL CODE. UNLESS SHOWN OR OTHERWISE SPECIFIED FIXTURES ARE SPECIFIED BY TYPE IDENTIFIED BY LETTER SHOWN ON DRAWINGS ADJACENT TO OUTLET. ALL FIXTURES SHALL BEAR UL LABEL. FINISH ON METAL PARTS, UNLESS SPECIFIED SHALL BE AS DIRECTED BY THE ARCHITECT. BALLASTS FOR FLUORESCENT FIXTURES SHALL BE HIGH-POWER FACTOR, RAPID START, PREMIUM CLASS "P", NON-D RIP, ASPHALTIC FILL TYPE WITH AUTOMATIC RESETTABLE THERMAL CONDUIT PROTECTION AND SHALL BE US, CRYVANT, ETL APPROVED. BALLASTS SHALL BE FOR VOLTAGE AS SPECIFIED IN THE FIXTURE DESCRIPTION. BALLASTS FOR FLUORESCENT FIXTURES SHALL ALSO INCLUDE ALL NECESSARY THERMAL PROTECTION AS REQUIRED INSTALLED IN FIXTURES. ALL LAMPS SHALL BE AS MANUFACTURED BY GENERAL ELECTRIC, WESTINGHOUSE, OR SYLVANIA. FLUORESCENT LAMPS SHALL BE FROSTED UNLESS OTHERWISE CALLED FOR. FLUORESCENT LAMPS SHALL BE STANDARD COOL WHITE OR WARM WHITE UNLESS CALLED FOR ON THE DRAWINGS. FIXTURES SHALL BE WIRED WITH COLOR CODED WIRE. COVERED FIXTURE WIRE, EXCEPTING THAT CIRCUIT WIRING RUN IN FLUORESCENT FIXTURE CHANNELS SHALL BE TYPE THHN OR TYPE SA NOT SMALLER THAN #12 AWG. TANDEM FLUORESCENT FIXTURES MAY BE FURNISHED WITH WIRE NOT FURNISHED WITH 5' LONG DIFFUSERS. FIXTURES AND LAMPS SHALL BE WIPED CLEAN BEFORE AND AFTER INSTALLATION. ALL LIGHTING FIXTURES SHALL BE SECURELY SUPPORTED AND ANCHORED TO PROVIDE A SAFE AND PERMANENT INSTALLATION. FIXTURE HANGERS, ANCHORS OR SUPPORTS SHALL BE TIGHTENED TO EXCEED THE EQUIVALENT OF FOUR TIMES THE WEIGHT OF THE FIXTURE OR EQUIPMENT. THE PROPER INSTALLATION OF ALL LIGHTING FIXTURES IS A PART OF THE ELECTRICAL CONTRACT. ALL LIGHTING FIXTURES ARE AS SHOWN ON THE LIGHTING FIXTURE SCHEDULE.

**SMOKE DETECTORS:** PROVIDE CEILING MOUNTED PHOTOELECTRIC SMOKE DETECTOR, SIMPLEX # 2098-9667, 120 VOLT WITH 90 DB HORN WITH ONE SET RELAY CONTACT AND CAPABILITY OF GROUPING SIX (6) DETECTORS ON ONE CIRCUIT. PROVIDE PHOTOELECTRIC SMOKE DETECTOR IN RETURN AIR DUCTS OF ALL AIR HANDLING UNITS 2000 CFM OR LARGER. SIMPLEX #2098-9648 DETECTOR WITH SAMPLING TUBE #2098-9747, 120 VOLT, POWER ADAPTOR AND 2098-9782 LED TEST SWITCH.

**CONDUITS:** CONDUITS SHALL BE GENERAL ELECTRIC, TRIANGLE OR NATIONAL ELECTRIC PRODUCTS. RIGID STEEL CONDUIT SHALL BE GALVANIZED OR SHERARDIZED OR THIN WALL TUBING SHALL BE ELECTRO-GALVANIZED IN ACCORDANCE WITH THE NATIONAL ELECTRICAL CODE STANDARDS. CONDUITS SHALL BE INSTALLED CONCEALED WHEREVER POSSIBLE.

**CONDUITS ENTERING PANEL BOXES, PULL BOXES OR OUTLET BOXES SHALL BE SECURED IN PLACE WITH LOCK NUTS AND BUSHINGS IN ACCORDANCE WITH THE NATIONAL ELECTRICAL CODE STANDARDS. BUSHINGS ARE PROHIBITED. THREADED OR THREADED-COUPINGS SHALL BE USED WHERE CONDUIT CONNECTIONS ARE NECESSARY. CONDUITS SHALL BE NATIONAL ELECTRICAL CODE SIZE UNLESS SPECIFICALLY NOTED OTHERWISE ON THE DRAWINGS. RIGID STEEL CONDUIT SHALL BE USED IN DAMP LOCATIONS AND WHERE EXPOSED TO POSSIBLE PHYSICAL DAMAGE. THIN-WALL METALLIC TUBING MAY BE USED IN EXPOSED CEILINGS, DRY WALLS AND FURRED-IN SPACE IN SIZES UP TO AND INCLUDING 2". THIN WALL CONDUIT SHALL BE INSTALLED IN ACCORDANCE WITH THE NATIONAL ELECTRICAL CODE STANDARDS. RUNNING THREADS ARE PROHIBITED. THREADED OR THREADED-COUPINGS SHALL BE USED WHERE CONDUIT CONNECTIONS ARE NECESSARY. CONDUITS SHALL BE FASTENED SECURELY TO PREVENT MOVEMENT OF ANY PART OF THE CONDUIT AND FASTENED WITH GALVANIZED STRAPS OR SPLIT OR TRAPZEE TYPE HANGERS AND SUPPORTED NOT MORE THAN 8" ON CENTER. A&J SHIELDS OR TOGGLE BOLTS SHALL BE USED WHERE REQUIRED. WOOD PLUGS SHALL NOT BE USED. CONDUITS OVER 3/4" SHALL NOT BE RUN IN SLABS LESS THAN 3" THICKNESS. CONDUIT SHALL BE MINIMUM 1/2" DIAMETER.**

**GUARANTEE:** ALL FIXTURES, EQUIPMENT, MATERIALS AND WORKMANSHIP SHALL BE GUARANTEED FREE FROM DEFECTS AND FAULTY INSTALLATION FOR A PERIOD OF ONE (1) YEAR FROM THE DATE OF FINAL ACCEPTANCE OF FINAL CERTIFICATES. THIS CONTRACTOR SHALL REPAIR OR REPLACE AT HIS EXPENSE ANY FIXTURES, EQUIPMENT, MATERIAL OR WORKMANSHIP WHICH MAY DEVELOP DEFECTS DURING THIS PERIOD. ACCEPTANCE OF THESE SPECIFICATIONS AND SIGNING OF CONTRACT SHALL BE EVIDENCE OF AGREEMENT AND ACCEPTANCE OF THE GUARANTEE. THE CONTRACTOR TO INCUR ALL CHARGES THAT MAY BE MADE TO THE OWNER BY POWER COMPANY, TELEPHONE COMPANY, ETC. AND ALL SUCH CHARGES SHALL BE INCLUDED IN THE ELECTRICAL BID FOR THIS WORK. ALL WORK NECESSARY FOR INSTALLATION OF SERVICE FROM LANDLORD SHALL BE INCLUDED. THIS CONTRACT IS TO INCLUDE ALL CONTINGENCIES WHICH MAY ARISE AND WHICH MAY BE REQUIRED BY ALTERATION AND DEMOLITION WORK. THIS IS TO INCLUDE ALL REMOVAL, RELOCATION AND REWORKING OF ELECTRICAL OUTLETS, CONDUIT WIRING AND ITEMS OF ELECTRICAL EQUIPMENT REQUIRED AND ANY NECESSARY SPLICING OR EXTENSION OF EXISTING CONDUIT AND WIRING SYSTEMS. THE ELECTRICAL CONTRACTOR SHALL VISIT THE SITE AND DETERMINE THE EXTENT OF THE WORK. MISCELLANEOUS ITEMS: THE CONTRACTOR SHALL PROVIDE ALL MISCELLANEOUS ITEMS THAT WOULD NORMALLY BE REQUIRED FOR PROPER INSTALLATION OF MECHANICAL SYSTEMS SPECIFIED BY OTHERS.

**WARRANTY:** THE CONTRACTOR SHALL PROPERLY EXECUTE IN THE OWNER'S NAME ALL MANUFACTURER'S STANDARD WARRANTY CERTIFICATES APPLYING TO EQUIPMENT INSTALLED ON THE PROJECT AND SHALL DELIVER SAID CERTIFICATES TO THE ARCHITECT AT COMPLETION OF THE JOB. ALL WARRANTY CARDS SHALL BE PROPERLY EXECUTED AND DELIVERED TO THE SUPPLIER OR MANUFACTURER'S REPRESENTATIVE FOR MANUFACTURER'S RECORDS. STANDARD WARRANTIES FOR EQUIPMENT SHALL NOT BE LESS THAN ONE YEAR. CLEANING TESTING AND PLACING IN SERVICE: IMMEDIATELY PRIOR TO FINAL INSPECTION, THE ELECTRICAL CONTRACTOR SHALL MAKE A FINAL CLEANUP OF DIRT AND REFUSE RESULTING FROM HIS WORK AND SHALL ASSIST IN KEEPING THE PREMISES CLEAN AT ALL TIMES. IMMEDIATELY PRIOR TO FINAL INSPECTION THE ELECTRICAL CONTRACTOR SHALL CLEAN ALL MATERIAL AND EQUIPMENT INSTALLED UNDER THE ELECTRICAL CONTRACT. DIRT, DUST, PLASTER, STAINS AND FOREIGN MATTER SHALL BE REMOVED FROM ALL SURFACE. DAMAGED FINISHES SHALL BE TOUCHED-UP AND RESTORED TO THEIR ORIGINAL CONDITION. MECHANISM OF ALL ELECTRICAL EQUIPMENT SHALL BE CHECKED, ADJUSTED AND TESTED FOR PROPER OPERATION. PROTECTIVE DEVICES AND PARTS SHALL BE CHECKED AND TESTED FOR SPECIFIED AND REQUIRED APPLICATION AND ADJUSTED AS REQUIRED TO PRODUCE THE INTENDED PERFORMANCE. COMPLETE WIRING SYSTEMS SHALL BE FREE FROM SHORT CIRCUITS AND AFTER COMPLETION, THIS CONTRACTOR SHALL PERFORM TESTS FOR INSTALLATION RESISTANCE IN ACCORDANCE WITH THE REQUIREMENTS OF THE NATIONAL ELECTRICAL CODE.

**DIVISION 27 COMMUNICATIONS**  
**TELEPHONE SYSTEM:** THIS WORK SHALL INCLUDE EMPTY CONDUIT, OUTLET BOXES, PULL BOXES AND STRIP BOXES FOR SYSTEMS AS SHOWN ON THE DRAWINGS AND DIAGRAMS. CONDUIT, 4" SQUARE OUTLET BOXES AND INSTALLATION SHALL BE THE SAME AS SPECIFIED FOR LIGHTING AND POWER WORK. ALL CONDUIT INSTALLED INSIDE THE BUILDING SHALL BE 3/4" UNLESS NOTED OTHERWISE ON DRAWINGS. PROVIDE 1-1/2" EMPTY CONDUIT WITH PULL WIRE FROM OUTSIDE BUILDING TO LOCATION SHOWN ON PLAN FOR TELEPHONE COMPANY USE.