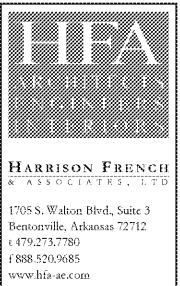


DIVISION 15  
**15A. GENERAL**  
**15A 1-1 GENERAL REQUIREMENTS**  
 REQUIREMENTS UNDER DIVISION ONE AND THE GENERAL AND SUPPLEMENTARY CONDITIONS OF THESE SPECIFICATIONS SHALL BE A PART OF THIS SECTION. CONTRACTOR SHALL BECOME THOROUGHLY ACQUAINTED WITH ITS CONTENTS AS TO REQUIREMENTS THAT AFFECT THIS DIVISION OR SECTION. THE WORK REQUIRED UNDER THIS SECTION INCLUDES MATERIAL, EQUIPMENT, APPLIANCES, TRANSPORTATION, SERVICES, AND LABOR REQUIRED TO COMPLETE THE ENTIRE SYSTEM AS REQUIRED BY THE DRAWINGS AND SPECIFICATIONS.  
 THE SPECIFICATIONS AND DRAWINGS FOR THE PROJECT ARE COMPLEMENTARY, AND PORTIONS OF THE WORK DESCRIBED IN ONE, SHALL BE PROVIDED AS IF DESCRIBED IN BOTH. IN THE EVENT OF DISCREPANCIES, NOTIFY THE ENGINEER AND/OR OWNER AND REQUEST CLARIFICATION PRIOR TO PROCEEDING WITH THE WORK INVOLVED.  
**15A 1-2 INSPECTION OF SITE**  
 PRIOR TO SUBMITTING BID, VISIT THE SITE OF THE PROPOSED WORK AND BECOME FULLY INFORMED AS TO THE CONDITIONS UNDER WHICH THE WORK IS TO BE DONE. FAILURE TO DO SO WILL NOT BE CONSIDERED SUFFICIENT JUSTIFICATION TO REQUEST OR OBTAIN EXTRA COMPENSATION OVER AND ABOVE THE CONTRACT PRICE.  
**15A 1-3 MATERIAL AND WORKMANSHIP**  
 PROVIDE NEW MATERIAL, EQUIPMENT, AND APPARATUS UNDER THIS CONTRACT UNLESS OTHERWISE STATED HEREIN. OF BEST QUALITY NORMALLY USED FOR THE PURPOSE IN GOOD COMMERCIAL PRACTICE, AND FREE FROM ANY DEFECTS. MODEL NUMBERS LISTED IN THE SPECIFICATIONS OR SHOWN ON THE DRAWINGS ARE NOT NECESSARILY INTENDED TO DESIGNATE THE REQUIRED TRIM, WRITTEN DESCRIPTIONS OF THE TRIM GOVERN MODEL NUMBERS.  
 WORK PERFORMED UNDER THIS CONTRACT SHALL PROVIDE A NEAT AND "WORKMANLIKE" APPEARANCE WHEN COMPLETED, TO THE SATISFACTION OF THE ARCHITECT AND ENGINEER. WORKMANSHIP SHALL BE THE FINEST POSSIBLE BY EXPERIENCED MECHANICS. INSTALLATIONS SHALL COMPLY WITH APPLICABLE CODES AND LAWS.  
 THE COMPLETE INSTALLATION SHALL FUNCTION AS DESIGNED AND INTENDED WITH RESPECT TO EFFICIENCY, CAPACITY, NOISE LEVEL, ETC. ABNORMAL NOISE CAUSED BY RATTLING EQUIPMENT, PIPING, DUCTS, AIR DEVICES, AND SQUEAKS IN ROTATING COMPONENTS WILL NOT BE ACCEPTABLE. IN GENERAL, MATERIALS AND EQUIPMENT SHALL BE OF COMMERCIAL SPECIFICATION GRADE IN QUALITY. LIGHT DUTY AND RESIDENTIAL TYPE EQUIPMENT WILL NOT BE ACCEPTED.  
 REMOVE FROM THE PREMISES WASTE MATERIAL PRESENT AS A RESULT OF WORK, INCLUDING CARTONS, CRATING, PAPER, STICKERS, AND/OR EXCAVATION MATERIAL NOT USED IN BACKFILLING, ETC. CLEAN EQUIPMENT INSTALLED UNDER THIS CONTRACT TO PRESENT A NEAT AND CLEAN INSTALLATION AT THE TERMINATION OF THE WORK.  
 REPAIR OR REPLACE PUBLIC AND PRIVATE PROPERTY DAMAGED AS A RESULT OF WORK PERFORMED UNDER THIS CONTRACT TO THE SATISFACTION OF AUTHORITIES AND REGULATIONS HAVING JURISDICTION.  
**15A 1-4 COORDINATION**  
 COORDINATE WORK WITH THAT OF OTHER TRADES SO THAT THE VARIOUS COMPONENTS OF THE SYSTEMS WILL BE INSTALLED AT THE PROPER TIME, WILL FIT THE AVAILABLE SPACE, AND WILL ALLOW PROPER SERVICE ACCESS TO THOSE ITEMS REQUIRING MAINTENANCE. COMPONENTS WHICH ARE INSTALLED WITHOUT REGARD TO THE ABOVE SHALL BE RELOCATED AT NO ADDITIONAL COST TO THE OWNER.  
 UNLESS OTHERWISE INDICATED, THE GENERAL CONTRACTOR WILL PROVIDE CHASES AND OPENINGS IN BUILDING CONSTRUCTION REQUIRED FOR INSTALLATION OF THE SYSTEMS SPECIFIED HEREIN. CONTRACTOR SHALL FURNISH THE GENERAL CONTRACTOR WITH INFORMATION WHERE CHASES AND OPENINGS ARE REQUIRED. KEEP INFORMED AS TO THE WORK OF OTHER TRADES ENGAGED IN THE CONSTRUCTION OF THE PROJECT, AND EXECUTE WORK IN A MANNER AS TO NOT INTERFERE WITH OR DELAY THE WORK OF OTHER TRADES.  
 FIGURED DIMENSIONS SHALL BE TAKEN IN PREFERENCE TO SCALE DIMENSIONS. CONTRACTOR SHALL TAKE HIS OWN MEASUREMENTS AT THE BUILDING, AS VARIATIONS MAY OCCUR. CONTRACTOR WILL BE HELD RESPONSIBLE FOR ERRORS THAT COULD HAVE BEEN AVOIDED BY PROPER CHECKING AND INSPECTION.  
 PROVIDE MATERIALS WITH TRIM THAT WILL PROPERLY FIT THE TYPES OF CEILING, WALL, OR FLOOR FINISHES ACTUALLY INSTALLED. MODEL NUMBERS LISTED IN THE SPECIFICATIONS OR SHOWN ON THE DRAWINGS ARE NOT INTENDED TO DESIGNATE THE REQUIRED TRIM.  
**15A 1-5 ORDINANCES AND CODES**  
 WORK PERFORMED UNDER THIS CONTRACT SHALL, AT A MINIMUM, BE IN CONFORMANCE WITH APPLICABLE NATIONAL, STATE AND LOCAL CODES HAVING JURISDICTION. EQUIPMENT FURNISHED AND ASSOCIATED INSTALLATION WORK PERFORMED UNDER THIS CONTRACT SHALL BE IN STRICT COMPLIANCE WITH CURRENT APPLICABLE CODES ADOPTED BY THE LOCAL A.U. INCLUDING ANY AMENDMENTS AND STANDARDS AS SET FORTH BY THE NATIONAL FIRE PROTECTION ASSOCIATION (NFPA), UNDERWRITERS LABORATORIES (UL), OCCUPATIONAL SAFETY AND HEALTH ADMINISTRATION (OSHA), AMERICAN SOCIETY OF MECHANICAL ENGINEERS (ASME), AMERICAN SOCIETY OF HEATING, REFRIGERATION, AND AIR CONDITIONING ENGINEERS (ASHRAE), AMERICAN NATIONAL STANDARDS INSTITUTE (ANSI), AMERICAN SOCIETY OF TESTING MATERIALS (ASTM) AND OTHER NATIONAL STANDARDS AND CODES WHERE APPLICABLE. WHERE THE CONTRACT DOCUMENTS EXCEED THE REQUIREMENTS OF THEIR REFERENCED CODES, STANDARDS, ETC., THE CONTRACT DOCUMENTS SHALL TAKE PRECEDENCE.  
 PROCURE AND PAY FOR PERMITS AND LICENSES REQUIRED FOR THE ACCOMPLISHMENT OF THE WORK HEREIN DESCRIBED. WHERE REQUIRED, OBTAIN PAY FOR AND FURNISH CERTIFICATES OF INSPECTION TO OWNER. CONTRACTOR WILL BE HELD RESPONSIBLE FOR VIOLATIONS OF THE LAW.  
**15A 1-6 PROTECTION OF EQUIPMENT AND MATERIALS**  
 STORE AND PROTECT FROM DAMAGE EQUIPMENT AND MATERIALS DELIVERED TO JOB SITE. COVER WITH WATERPROOF, TEAR-RESISTANT, HEAVY TARP OR POLYETHYLENE PLASTIC AS REQUIRED TO PROTECT FROM PLASTER, DIRT, PAINT, WATER, OR PHYSICAL DAMAGE. EQUIPMENT AND MATERIAL THAT HAS BEEN DAMAGED BY CONSTRUCTION ACTIVITIES WILL BE REJECTED, AND CONTRACTOR IS OBLIGATED TO FURNISH NEW EQUIPMENT AND MATERIAL OF A LIKE KIND.  
 KEEP PREMISES ROOM CLEAN FROM FOREIGN MATERIAL CREATED DURING WORK PERFORMED UNDER THIS CONTRACT. PIPING, EQUIPMENT, ETC. SHALL HAVE A NEAT AND CLEAN APPEARANCE AT THE TERMINATION OF THE WORK.  
 PLUG OR CAP OPEN ENDS OF DUCTWORK AND PIPING SYSTEMS WHILE STORED OR INSTALLED DURING CONSTRUCTION WHEN NOT IN USE TO PREVENT THE ENTRANCE OF DEBRIS INTO THE SYSTEMS.  
 KEEP THE MANUFACTURER PROVIDED PROTECTIVE COVERINGS ON FLOOR DRAINS, FLOOR SINKS, AND TRENCH DRAINS DURING CONSTRUCTION. REMOVE COVERINGS AT THE TERMINATION OF THE WORK AND POLISH EXPOSED SURFACES.  
**15A 1-7 OPERATION AND MAINTENANCE INSTRUCTIONS**  
 COLLECT AND COMPIL A COMPLETE BROCHURE OF FIXTURES, MATERIALS, AND EQUIPMENT FURNISHED AND INSTALLED ON THIS PROJECT. INCLUDE OPERATIONAL AND MAINTENANCE INSTRUCTIONS, MANUFACTURER'S CATALOG SHEETS, WIRING DIAGRAMS, PARTS LISTS, APPROVED SHOP DRAWINGS, AND DESCRIPTIVE LITERATURE FURNISHED BY THE MANUFACTURER. INCLUDE AN INSIDE COVER SHEET THAT LISTS THE PROJECT NAME, DATE, OWNER, ARCHITECT, ENGINEER, GENERAL CONTRACTOR, SUBCONTRACTOR, AND AN INDEX OF CONTENTS.  
 SUBMIT COPIES OF LITERATURE BOUND IN APPROVED BINDERS TO THE ARCHITECT AND OWNER AT THE TERMINATION OF THE WORK. PAPER CLIPS, STAPLES, RUBBER BANDS, AND MAILING ENVELOPES ARE NOT CONSIDERED APPROVED BINDERS. FINAL APPROVAL OF PLUMBING SYSTEMS WILL BE WITHHELD UNTIL THIS EQUIPMENT BROCHURE IS DEEMED COMPLETE BY THE ARCHITECT, ENGINEER, AND OWNER.  
**15A 1-8 WARRANTIES**  
 WARRANT EACH SYSTEM AND EACH ELEMENT THEREOF AGAINST ALL DEFECTS DUE TO FAULTY WORKMANSHIP, DESIGN OR MATERIAL FOR A PERIOD OF 12 MONTHS FROM DATE OF SUBSTANTIAL COMPLETION, UNLESS SPECIFIC ITEMS ARE NOTED TO CARRY A LONGER WARRANTY IN THE CONSTRUCTION DOCUMENTS OR MANUFACTURER'S STANDARD WARRANTY EXCEEDS 12 MONTHS. REMEDY ALL DEFECTS, OCCURRING WITHIN THE WARRANTY PERIOD(S), AS STATED IN THE GENERAL CONDITIONS AND DIVISION 1.  
 WARRANTIES SHALL INCLUDE LABOR AND MATERIAL. MAKE REPAIRS OR REPLACEMENTS WITHOUT ANY ADDITIONAL COSTS TO THE OWNER.  
 PERFORM THE REMEDIAL WORK PROMPTLY, UPON WRITTEN NOTICE FROM THE ENGINEER OR OWNER.  
 AT THE TIME OF SUBSTANTIAL COMPLETION, DELIVER TO THE OWNER ALL WARRANTIES, IN WRITING AND PROPERLY EXECUTED, INCLUDING TERM LIMITS FOR WARRANTIES EXTENDING BEYOND THE ONE YEAR PERIOD. EACH WARRANTY INSTRUMENT BEING ADDRESSED TO THE OWNER AND STATING THE COMMENCEMENT DATE AND TERM.  
**15A 1-9 CUTTING AND PATCHING**  
 PERFORM CUTTING OF WALLS, FLOORS, CEILINGS, ETC. AS REQUIRED TO INSTALL WORK UNDER THIS SECTION. DO NOT CUT OR DISTURB STRUCTURAL MEMBERS WITHOUT PRIOR APPROVAL FROM THE ARCHITECT. CUT HOLES AS SMALL AS POSSIBLE. GENERAL CONTRACTOR SHALL PATCH WALLS, FLOORS, ETC. AS REQUIRED BY WORK UNDER THIS SECTION. PATCHING SHALL MATCH THE ORIGINAL MATERIAL AND CONSTRUCTION. REPAIR AND REFINISH AREAS DISTURBED BY WORK TO THE CONDITION OF ADJOINING SURFACES IN A MANNER SATISFACTORY TO THE ARCHITECT.  
**15A 1-10 ROUGH-IN**  
 COORDINATE WITHOUT DELAY ROUGH-IN IN WITH GENERAL CONSTRUCTION. CONCEAL PIPING AND CONDUIT ROUGH-IN EXCEPT IN UNFINISHED AREAS AND WHERE OTHERWISE SHOWN.  
**15A 1-11 STRUCTURAL STEEL**  
 STRUCTURAL STEEL USED FOR PIPE SUPPORTS, EQUIPMENT SUPPORTS, ETC. SHALL BE CLEAN, AND CONFORM TO THE DESIGNATION S36.  
 SUPPORT PLUMBING AND MECHANICAL EQUIPMENT AND PIPING FROM THE BUILDING STRUCTURE. DO NOT SUPPORT PLUMBING EQUIPMENT FROM STRUCTURES, OTHER MECHANICAL OR ELECTRICAL COMPONENTS, AND OTHER NON-STRUCTURAL ELEMENTS.  
**15A 1-12 ACCESSIBLE**  
 PROVIDE ACCESS DOORS IN CEILINGS AND WALLS WHERE NECESSARY FOR ACCESS TO CONCEALED SLEEVES AND EQUIPMENT INSTALLED UNDER THIS SECTION. PROVIDE CONCEALED HINGES, SCREWDRIVER-TYPE LOCK, ANCHOR STRAPS, MANUFACTURED BY MILCOR, ZURN, TITUS, OR EQUAL. OBTAIN ARCHITECT'S APPROVAL OF TYPE, SIZE, LOCATION, AND COLOR BEFORE ORDERING.  
 REFRIGERANT PIPING SHALL BE STRAPPED TO ASSURE PIPING SUPPORT. THIS STRAPPING SHALL BE COPPER. IF NON-COPPER STRAPPING IS USED, IT SHALL BE LINED WITH AN INSULATING MATERIAL TO PREVENT BI-METALLIC ELECTROLYSIS. REFER TO MANUFACTURER'S INSTALLATION MANUAL FOR RECOMMENDED PIPE SUPPORT SPACING.  
 15C 1-13 PENETRATIONS  
 SEAL FLOOR, EXTERIOR WALL AND ROOF PENETRATIONS WATER AND WEATHER TIGHT WITH APPROPRIATE NON-SHRINK, NON-HARDENING COMMERCIAL CONSTRUCTION SEALANT. SEAL ROOF PENETRATIONS WITH 4 POUND PER SQUARE FOOT LEAD FLASHING. PROVIDE A SLEEVE, AND SEAL NON-FIRE-RATED FLOOR AND WALL PENETRATIONS WITH FIBERGLASS PACKING AND SILICONE CAULK (FOR ACOUSTICAL INSULATION).  
 COORDINATE FIRE RATING REQUIREMENTS AND LOCATIONS WITH THE ARCHITECT. SEAL PENETRATIONS OF FIRE-RATED ASSEMBLIES WITH 3M # CP-25 FIRE BARRIER CAULK (PROVIDE THICKNESS AND METHOD AS REQUIRED AND RECOMMENDED BY MANUFACTURER) TO MAINTAIN THE FIRE RESISTANCE RATING OF FIRE-RATED ASSEMBLIES.  
 SEAL EXTERIOR WALL PENETRATIONS BELOW GRADE WITH CAST IRON WALL PIPES AND MODULAR MECHANICAL SLEEVE SEALS, MANUFACTURED BY THUNDERLINK/INK SEAL, CALPICO, INC AND METRAFLEX.  
 PROVIDE SLEEVES FOR HORIZONTAL PIPE PASSING THROUGH OR UNDER FOUNDATION. SLEEVES SHALL BE CAST IRON SOIL PIPE TWO NOMINAL PIPE SIZES LARGER THAN THE PIPE SERVED.  
 PROVIDE SLEEVES FOR VERTICAL PIPE PASSING THROUGH SLAB ON GRADE. SLEEVES SHALL BE SCHEDULE 40 PVC PIPE, TWO NOMINAL PIPE SIZES LARGER THAN THE PIPE SERVED. SEAL WATER-TIGHT WITH SILICONE CAULK.  
**15B. HEATING, VENTILATION, AND AIR CONDITIONING**  
**15B 1-1 DUCTWORK**  
 ALL DUCTWORK SHALL BE CONSTRUCTED AND HUNG IN ACCORDANCE WITH ASHRAE AND SMACNA STANDARDS CORRESPONDING TO THE SYSTEM PRESSURE. DUCTWORK SHALL BE CONSTRUCTED IN ACCORDANCE WITH THE STANDARDS FOR A TWO-INCH PRESSURE RATING AND SEAL CLASS B.  
 SUPPLY AND RETURN DUCTWORK INSIDE THE BUILDING SHALL BE INSULATED WITH 1" THICK ACOUSTICALLY WRAPPED WITH 2" THICK GLASS FIBER DUCT WRAP. INSULATE SUPPLY AND RETURN DUCTWORK LOCATED OUTSIDE THE BUILDING WITH 2" LINER AND SEAL SEAMS WEATHER TIGHT. DEDICATED OUTSIDE AIR SUPPLY DUCTWORK LOCATED WITHIN THE BUILDING SHALL BE INSULATED WITH 2" DUCT WRAP.  
 FLEXIBLE DUCTWORK MAINS ARE NOT PERMITTED. PROVIDE MAXIMUM 5'-0" FLEXIBLE DUCT CONNECTIONS TO CEILING DIFFUSERS.  
 FURNISH AND INSTALL VOLUME/BALANCE DAMPERS AT ALL BRANCH DUCTS TO DIFFUSER. LOCATE DAMPERS A MINIMUM OF 4'-0" AWAY FROM DIFFUSERS.  
 INSTALL VYTRs, EXHAUST FANS, AND FLUES A MINIMUM OF 5'-0" FROM PARAPET OR OUTSIDE WALL AND 10'-0" MINIMUM FROM EQUIPMENT WITH OUTSIDE AIR INTAKE.  
**15B 1-2 ELECTRICAL WIRING**  
 LINE VOLTAGE WIRING SHALL BE FURNISHED BY ELECTRICAL CONTRACTOR. LINE VOLTAGE CONTROL AND INTERLOCK WIRING FOR MECHANICAL SYSTEMS SHALL ALSO BE FURNISHED BY ELECTRICAL CONTRACTOR. LOW VOLTAGE CONTROL WIRING SHALL BE BY THE DIVISION 15 CONTRACTOR. PROVIDE WIRING DIAGRAMS TO THE ELECTRICAL CONTRACTOR AS REQUIRED FOR PROPER EQUIPMENT HOOKUP. COORDINATE WITH THE ELECTRICAL CONTRACTOR THE ACTUAL WIRE SIZING AMPS FOR MECHANICAL EQUIPMENT (FROM THE EQUIPMENT NAMEPLATE) TO ENSURE PROPER INSTALLATION.  
 ALL TEMPERATURE SENSORS, FAN SWITCHES, AND SPEED CONTROLS SHALL BE INSTALLED 45" ABOVE THE FLOOR FOR ADA REQUIREMENTS.  
**15B 1-3 FINAL TESTING AND ADJUSTMENTS**  
 AIR BALANCE SHALL BE PERFORMED BY AN INDEPENDENT AIR BALANCE CONTRACTOR. BALANCE EACH SUPPLY, RETURN, OUTSIDE AIR DEVICE WITHIN THE REQUIREMENTS AND FURNISH A REPORT TO THE CONSTRUCTION MANAGER. THE ENTIRE HVAC SYSTEM MUST BE BALANCED, INCLUDING BALANCE AND APPROVED SIGNATURE ON THE DAY TENANT TAKES POSSESSION.  
 ADJUST THERMOSTATS TO CONTROL DEVICES TO OPERATE IN ACCORDANCE WITH BIDDING, PUMPS, FANS, ETC. FOR TYPICAL OPERATION. CERTIFY TO ARCHITECT THAT ALL SYSTEMS HAVE BEEN MADE AND THAT SYSTEMS OPERATING SATISFACTORY. CALIBRATE SET AND ADJUST AUTOMATIC TEMPERATURE CONTROLS. CHECK PROPER SEQUENCING OF INTERLOCK SYSTEMS, AND OPERATION OF SAFETY CONTROLS.  
**15C. REFRIGERATION INSTALLATION REQUIREMENTS**  
**15C 1-1 REFRIGERANT PIPING**  
 ALL SUCTION LINE PIPING SHALL BE SEALED REFRIGERANT GRADE, TYPE L HARD DRAWN. THE LIQUID LINE PIPING SHALL BE SEALED REFRIGERANT GRADE, TYPE C, HARD DRAWN ON ALL MAIN RUNS. THE SHORT SECTION OF TUBING BETWEEN THE MAIN LIQUID LINE AND EXPANSION VALVE SHALL BE SOFT DRAWN REFRIGERANT TUBING.  
 ALL HORIZONTAL TUBING RUNS SHALL BE SLOPED TOWARD THE COMPRESSOR, AND/OR "P" TRAP 1 INCH PER 20 FEET. ALL VERTICALLY RUN SUCTION LINES SHALL BE P-TRAPPED AT THE BASE OF EACH SUCTION RISER OF 4 FEET OR MORE TO ENHANCE OIL RETURN TO THE COMPRESSOR, AND SHALL BE P-TRAPPED FOR EACH 20 FEET SECTION OF RISER.  
 ONLY SILVER BASE SOLDER (15% SILVER) SHALL BE USED FOR THIS INSTALLATION.  
 REFRIGERANT PIPING SHALL BE STRAPPED TO ASSURE PIPING SUPPORT. THIS STRAPPING SHALL BE COPPER. IF NON-COPPER STRAPPING IS USED, IT SHALL BE LINED WITH AN INSULATING MATERIAL TO PREVENT BI-METALLIC ELECTROLYSIS. REFER TO MANUFACTURER'S INSTALLATION MANUAL FOR RECOMMENDED PIPE SUPPORT SPACING.  
 15C 1-2 REFRIGERANT LEAK TESTING  
 AFTER ALL REFRIGERANT TUBING IS CONNECTED, THE ENTIRE SYSTEM, INCLUDING THE CONDENSING UNIT, SHALL BE PRESSURIZED TO 150 PSIG WITH A MIXTURE OF APPROPRIATE REFRIGERANT AND DRY NITROGEN. ALL CONNECTIONS, BOTH FLARED AND SOLDERED, SHALL BE THOROUGHLY CHECKED WITH AN ELECTRONIC OR HALIDE LEAK DETECTOR. ALL LEAKING SOLDER CONNECTIONS SHALL BE DISASSEMBLED, CLEANED AND RE-SOLDERED.  
**15C 1-3 EVACUATION**  
 THE COMPLETE SYSTEM SHALL BE EVACUATED WITH A VACUUM PUMP. THE REFRIGERATION COMPRESSOR SHALL NOT BE USED TO EVACUATE THE SYSTEM.  
 THE COMPLETE SYSTEM, TO INCLUDE THE CONDENSING UNIT, SHALL BE EVACUATED A MINIMUM OF THREE TIMES. THE VACUUM SHALL BE BROKEN THE FIRST AND SECOND TIME AT 500 MICRONS USING APPROPRIATE REFRIGERANT. THE THIRD VACUUM SHALL BE BROKEN BY THE CHARGING REFRIGERANT.  
**15C 1-4 SUCTION LINE INSULATION**  
 THE MAIN SUCTION LINE TO INCLUDE THE "P" TRAP, THE VERTICAL SUCTION LINE AND ABOVE ROOF SUCTION PIPING SHALL BE INSULATED WITH 1/2" WALL ARMAFLEX OR ITS EQUIVALENT. ALL JOINTS SHALL BE PROPERLY SEALED WITH APPROVAL BY INSULATION MANUFACTURER'S ADHESIVE OR SEALANT.  
**15C 1-5 CONDENSATE DRAIN LINES**  
 CONDENSATE DRAIN LINE MATERIAL SHALL BE 1" O.D. HARD DRAWN COPPER TUBING. MECHANICAL CONTRACTOR SHALL INSTALL HEAT TRACE IN LOW TEMP SECTION.  
 THE LINES SHALL BE CAPABLE OF BEING OPENED AS CLOSE TO THE EVAPORATOR DRAIN AS POSSIBLE TO ALLOW EFFECTIVE CLEANING.  
 THE DRAIN LINE SHALL BE TRAPPED ON A VERTICAL SLOPE PRIOR TO REACHING THE RECEIVING FLOOR DRAIN OR PIT (WHICHEVER IS ALLOWABLE UNDER LOCAL CODES).  
 THE DRAIN LINE SHALL HAVE A DEFINITE SLOPE AWAY FROM THE EVAPORATOR OR DRAIN PIT (WHICHEVER IS ALLOWABLE UNDER LOCAL CODES). THE DRAINS FROM THE EVAPORATORS SHALL BE JOINED TO MAIN DRAIN LINE WHICH SHALL RUN TO A DRAIN LOCATION SHOWN ON THE MECHANICAL PLAN AND SHALL BE FIRMLY SUPPORTED WITH STRAPS AT LEAST EVERY SIX FEET ALONG THE DRAIN RUN.  
**15D. PLUMBING**  
**15D 1-1 PIPING MATERIALS**  
 MATERIALS SPECIFIED OR NOTED ON THE DRAWINGS ARE SUBJECT TO THE APPROVAL OF LOCAL CODE AUTHORITIES. VERIFY APPROVAL BEFORE INSTALLING ANY MATERIAL OR JOINING METHOD.  
 GAS PIPING: GAS PIPING SHALL BE BLACK STEEL, STANDARD WEIGHT, SCHEDULE 40 ASTM A53. PIPING 2" AND SMALLER SHALL BE WELDED OR THREADED WITH MALLEABLE IRON OR ASTM A 234, WELDED FITTINGS, PIPING 2 1/2" AND LARGER SHALL BE WELDED WITH BUTT-WELDED FITTING. FITTINGS SHALL CONFORM TO ASME B16.3, MALLEABLE IRON OR ASTM A 234, WELDED FITTINGS. EXTERIOR PIPING SHALL HAVE EPOXY PAINT.  
 DOMESTIC WATER PIPING: ABOVE AND BELOW GRADE WATER PIPING SHALL BE PEX TUBING CONFORMING TO ASTM F876 CROSS-LINKED POLYETHYLENE TUBING HOT AND COLD WATER DISTRIBUTION SYSTEMS, ASTM F876 CROSS-LINKED POLYETHYLENE TUBE, ASTM F1807 FITTING AND ASTM F2159 FITTINGS. COMPLY WITH NSF STANDARD 14 AND 61. PEX TUBING SHALL BE WATTS WATERPEX CROSS-LINKED POLYETHYLENE OR EQUAL. ALL PEX TUBING BELOW GRADE SHALL BE SLEEVED WITH PVC PIPE. FITTINGS: FITTINGS SHALL BE MECHANICAL CRIMP FITTINGS IN COMPLIANCE WITH ASTM F1897 AND F2159. PEX FITTINGS SHALL BE WATTS BRASS CRIMPING FITTINGS USING EITHER WATTS COPPER CRIMPING OR STAINLESS STEEL CINCHCLAMP OR EQUAL. INSTALLED IN ACCORDANCE WITH MANUFACTURER'S RECOMMENDATIONS.  
 AS AN OPTION, ABOVE AND BELOW GRADE WATER PIPING SHALL BE TYPE "L" AND "M" HARD DRAWN SEAMLESS COPPER TUBING CONFORMING TO ASTM B88.  
 COPPER UNIONS: CAST-COPPER-ALLOY, HEXAGONAL-STOCK BODY, WITH BALL AND SOCKET METAL-TO-METAL SEATING SURFACE AND WELDED JOINT. JOINING MATERIAL SHALL BE ASTM B813 WATER-FLUSHABLE, LEAD-FREE FLUX ALLOY SOLDER.  
 SOIL, WASTE AND VENT PIPES: ABOVE AND BELOW GRADE SOIL, WASTE AND VENT PIPING SHALL BE PVC PLASTIC, SCHEDULE 40 DWV PIPE CONFORMING TO ASTM D2665 WITH PLAIN ENDS, CELLULAR (FOAM) CORE PVC NOT ALLOWED. INSTALL PER ASTM D2665 AND ASTM D2321.  
 FITTINGS SHALL BE PVC SOCKET-TYPE DWV PIPE FITTINGS. ASTM D2665 MADE TO ASTM D3311 DRAIN, WASTE AND VENT PATTERNS.  
 INSULATION  
 DOMESTIC COLD WATER:  
 COPPER PIPE: 1" WALL ONE-PIECE FIBERGLASS COVERING HAVING A CONDUCTIVITY NOT EXCEEDING 0.27 WITH FIRE RESISTANT JACKET WITH SELF-SEALING LAP TO PROVIDE A CONTINUOUS VAPOR BARRIER BY CERTAINTIED, OWENS-CORNING OR ARMSTRONG.  
 DOMESTIC HOT WATER:  
 COPPER PIPE: 1" WALL ONE-PIECE FIBERGLASS COVERING HAVING A CONDUCTIVITY NOT EXCEEDING 0.27 WITH FIRE RESISTANT JACKET WITH SELF-SEALING LAP TO PROVIDE A CONTINUOUS VAPOR BARRIER BY CERTAINTIED, OWENS-CORNING OR ARMSTRONG.  
 PEX TUBING: 1" WALL ONE-PIECE FIBERGLASS COVERING HAVING A CONDUCTIVITY NOT EXCEEDING 0.27 WITH FIRE RESISTANT JACKET WITH SELF-SEALING LAP TO PROVIDE A CONTINUOUS VAPOR BARRIER BY CERTAINTIED, OWENS-CORNING OR ARMSTRONG.  
 FOR HOT WATER PIPING BEING SERVED BY SYSTEM WITH RECIRCULATING PUMP, PROVIDE 1" WALL ONE-PIECE FIBERGLASS COVERING HAVING A CONDUCTIVITY NOT EXCEEDING 0.27 WITH FIRE RESISTANT JACKET WITH SELF-SEALING LAP TO PROVIDE A CONTINUOUS VAPOR BARRIER BY CERTAINTIED, OWENS-CORNING OR ARMSTRONG.  
 INDIRECT AND CONDENSATE DRAIN PIPING (WITHIN BUILDING)  
 COPPER PIPE: PROVIDE 1" FLEXIBLE UNICELLULAR INSULATION BY ARMACELL.  
 PVC PIPING: NO INSULATION REQUIRED.  
 INDIRECT AND CONDENSATE DRAIN LINES:  
 PROVIDE HARD DRAWN, TYPE "M" OR "L" COPPER PIPE FOR ALL CONDENSATE DRAIN PIPING FROM COOLER AND FREEZER EVAPORATORS. PROVIDE HEAT TRACE FOR ALL CONDENSATE DRAIN PIPING LOCATED IN FREEZERS, AND ROUTE TO FLOOR DRAIN IN BUILDING.  
 PROVIDE PVC PIPE FOR ALL OTHER INDIRECT AND CONDENSATE DRAIN PIPING FROM HVAC, PLUMBING, AND BEVERAGE EQUIPMENT, AND ROUTE TO FLOOR DRAIN IN BUILDING.  
**15D 1-2 PIPING INSTALLATION**  
 GENERAL: CLEAN PIPE THOROUGHLY PRIOR TO INSTALLATION. REAM ENDS OF PIPE TO REMOVE BURR. CUT PIPE ACCURATELY TO MEASUREMENTS TAKEN ON JOB. INSTALL WITH ADEQUATE CLEARANCE FOR INSTALLATION OF COVERINGS WHEN REQUIRED. PIPE SHALL NOT BE SPRUNG OR BENT. NEVER ALIGN PIPE TO CONNECT IT SECURELY, AND SUPPORT FROM THE BUILDING STRUCTURE WITH HANGERS AS SPECIFIED BELOW. PROVIDE SOME-PLATED ESCUTCHEONS AT JUNCTIONS PASSING THROUGH CEILINGS, FLOORS OR WALLS OF FINISHED SPACES. RUN PIPES FREE THROUGH FLOOR JOISTS. ALL PIPING SHALL BE SLEEVED WITH SLEEVES. DO NOT GRIND OR FLAME CUTTING REQUIRED FOR STRUCTURAL FIRE INTEGRITY. INSTALL CONCEALED IN FINISHED SPACES WHEREVER POSSIBLE. USE A DIELECTRIC UNION WHERE FERROUS AND COPPER PIPE CONNECT. DIELECTRIC UNION SHALL HAVE A ZINC STEEL BODY, A THREADED NYLON INSERT, AND INSULATING PRESSURE GASKET. NO FERROUS UNION TO COPPER CONNECTION MADE WITHOUT INSULATING UNIONS WILL BE ALLOWED.  
 HANGER & SUPPORTS: PIPE HANGERS SHALL BE AS DESCRIBED IN THE SPECIFICATIONS BY B-LINE OR EQUAL BY ANVIL, MICHIGAN, TRUSCON, OR UNISTRUT. CONNECT HANGERS TO THE STRUCTURE WITH SIDE BEAM CONNECTORS AND ALL THREAD HANGER RODS. PROVIDE ENGINEERED SUPPORT STRUTS BETWEEN JOISTS AND OTHER STRUCTURAL MEMBERS AS REQUIRED TO PROVIDE A RIGID HANGING INSTALLATION. DO NOT HANG PIPES FROM OTHER PIPES, CONDUIT OR DUCTWORK. PROVIDE HANGER RODS AND SPACE HANGERS AT INTERVALS AS REQUIRED.  
**15D 1-3 EXTERIOR UTILITY CONNECTIONS**  
 TERMINATE DOMESTIC WATER, STORM, AND SEWER LINES AT A POINT APPROXIMATELY FIVE FEET FROM THE BUILDING WALL, OR AS SHOWN ON THE DRAWINGS. MAKE CONNECTION TO THE VARIOUS SERVICES PROVIDED BY OTHERS AND COORDINATE CONNECTION REQUIREMENTS WITH CIVIL ENGINEER. VERIFY THAT INSTALLATION WILL TIE INTO THE VARIOUS SERVICES PROVIDED BY OTHERS AT THE INDICATED INVERT ELEVATION POINT PRIOR TO INSTALLATION. IF THE INSTALLATION WILL NOT TIE INTO THE INDICATED INVERT ELEVATION POINT WHILE MAINTAINING PROPER FALL, NOTIFY ARCHITECT AND CIVIL ENGINEER SO THAT AN ALTERNATIVE MAY BE DETERMINED.  
 PROVIDE SERVICE PIPING AND ACCESSORIES REQUIRED TO COMPLETE UTILITY CONNECTIONS THAT ARE NOT FURNISHED BY THE SERVING UTILITY.  
**15D 1-4 SYSTEM TESTING AND ADJUSTING**  
 UPON COMPLETION OF EACH PHASE OF THE INSTALLATION, TEST EACH SYSTEM IN CONFORMANCE WITH LOCAL CODE REQUIREMENTS AND AS NOTED BELOW. FURNISH LABOR AND EQUIPMENT REQUIRED TO TEST PLUMBING WORK INSTALLED UNDER THIS CONTRACT, AND ASSUME COSTS INVOLVED IN MAKING THE TESTS, AND REPAIRS AND/OR REPLACING DAMAGE RESULTING THEREFROM.  
 NOTIFY THE ARCHITECT AND THE AUTHORITY HAVING JURISDICTION, THREE (3) WORKING DAYS PRIOR TO MAKING PLUMBING SYSTEM TESTS. CONCEALED WORK UNCOVERED UNTIL THE REQUIRED TESTS HAVE BEEN COMPLETED, BUT IF NECESSARY DUE TO CONSTRUCTION PROCEDURE. TESTS ON PORTIONS OF THE WORK MAY BE MADE, AND WHEN SATISFACTORY, THE WORK MAY BE CONCEALED. TEST PIPING BEFORE INSULATION IS INSTALLED, AND BEFORE BACKFILL. PIPES, JOINTS, FLANGES, VALVE STEMS, ETC. SHALL BE LEAK TIGHT. REPAIR OR REPLACE SYSTEM DEFECTS WITH NEW MATERIALS. CAULKING OF DEFECTIVE JOINTS, CRACKS OR HOLES WILL NOT BE PERMITTED. REPEAT TESTS AFTER DEFECTS HAVE BEEN ELIMINATED. MAKE TESTS IN THE PRESENCE OF THE ADMINISTRATIVE AUTHORITY AND/OR THE OWNER'S AUTHORIZED REPRESENTATIVE.  
 EACH SUBCONTRACTOR IS RESPONSIBLE FOR HAVING A THOROUGH KNOWLEDGE OF ALL DRAWINGS AND SPECIFICATIONS IN THEIR RELATED FIELD. THE FAILURE TO ACQUAINT HIMSELF WITH THIS KNOWLEDGE DOES NOT RELIEVE THE RESPONSIBILITY OF PERFORMING HIS WORK PROPER. NO ADDITIONAL COMPENSATION SHALL BE ALLOWED BECAUSE OF CONDITIONS THAT OCCUR DUE TO FAILURE TO FAMILIARIZE WORKERS WITH THIS KNOWLEDGE.  
 REMODEL  
 STORE NUMBER: 368  
 JOB KEY OR PLAN NUMBER: 35046  
 JOB NUMBER: 05-18-10283  
 CHECKED BY: JNR  
 DRAWN BY: DMR  
 DOCUMENT DATE: 8/17/20  
 MECHANICAL AND PLUMBING SPECIFICATIONS  
 SHEET M1



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REMODEL  
 STORE NUMBER: 368  
 JOB KEY OR PLAN NUMBER: 35046  
 JOB NUMBER: 05-18-10283

ISSUE BLOCK

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