GENERAL NOTES

REFRIGERATION GENERAL NOTES:
1. REFRIGERATION CONTRACTOR SHALL BE RESPONSIBLE FOR SUPPLYING, RECEIVING, STORING, RIGGING AND INSTALLING ALL REFRIGERATION SYSTEM COMPONENTS.
2. ALL ROOFTOP EQUIPMENT MUST BE PROPERLY SECURED TO BUILDING STEEL IN ACCORDANCE WIT ALL APPLICABLE BUILDING CODES.
3. REFRIGERATION CONTRACTOR SHALL BE RESPONSIBLE FOR FURNISHING AND INSTALLING ALL REFRIGERATION CONTROLS AND THE COMPLETE WIRING AND CONDUIT FOR CONTROLS AS REQUIRED INCLUDING TEMPERATURE AND DEFROST CONTROLS.
4. REFRIGERATION CONTRACTOR SHALL KEEP ALL HIS WORK CLEAN AND ORGANIZED. CONTRACTOR RESPONSIBLE FOR PROPERLY DISPOSING OF ALL WASTE AND PACKING MATERIALS GENERATED BY H WORK. COORDINATE DUMPSTER LOCATION WITH THE OWNERS REPRESENTATIVE.
5. ALL CONDENSATE PIPING, HEAT TRACE AND INSULATION TO BE FURNISHED AND INSTALLED BY THE PLUMBING CONTRACTOR.
6. THE EXACT MOUNTING HEIGHTS AND LOCATIONS OF ALL REFRIGERATION EQUIPMENT SHALL BE FIE VERIFIED AND COORDINATED WITH ALL OTHER MECHANICAL, ELECTRICAL, ARCHITECTURAL AND STRUCTURAL SYSTEMS.
7. PROVIDE DISCONNECT SWITCHES FOR ALL REFRIGERATION EQUIPMENT INCLUDING WEATHERPROO DISCONNECT AS REQUIRED.
8. REFRIGERATION CONTRACTOR TO PROVIDE MOTOR STARTER, CONTACTOR, SOLENOIDVALVES AND CONTROLS AS REQUIRED FOR TEMPERATURE AND DEFROST CONTROL.





DETAILS

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	XX XXX	REFRIGERATION CIRCUIT DESIGNATION	MODEL #	REFRIGERATION EVAPORATOR (HIGH PROFILE TYPE)	
		REFRIGERATION EVAPORATOR (BETWEEN THE RAIL TYPE))	SUCTION/LIQUID LINE DOWN	
	DT	DEFROST TERMINATION THERMOSTAT	———————————————————————————————————————	SUCTION/LIQUID LINE UP	
	\bigcirc	REFRIGERATION THERMOSTAT		CONDENSATE PIPING	

REFRIGERATION SYMBOLS

<u>LEGEND</u> 1 ACR COPPER REFRIGERATION LINES TYPE L

- 2 APPROVED, CLOSED CELL INSULATION. THICKNESS AS DESIGNATED FOR THE PARTICULAR APPLICATION. 3 STANDARD PIPE SUPPORT MATERIAL. 4 STANDARD PIPE CLAMP TO MATCH SUPPORT
- MATERIAL. CLAMP TO BE 1" LARGER THAN PIPE WITH 1/2" WALL INSULATION AND 2" LARGER WITH 1" WALL INSULATION. ON RISER LINES CLAMP IS NOT TO COMPRESS INSULATION, ONLY TO PREVENT UNUSUAL MOVEMENT. ALL SUPPORT OF RISER IS TO BE DONE AT BASE OF RISER OR AT TOP OF RISER.
- 5 NYLON LOCKNUT (AIRCRAFT TYPE) AND STANDARD BOLT. 6 PLATE OR SHEET METAL SADDLE (12" MINIMUM
- LENGTH) TO PREVENT COMPRESSION OF INSULATION. 7 NYLON TIE WRAP. DESIGNED TO SECURE BUT NOT TO TOTALLY PREVENT NORMAL EXPANSION AND CONTRACTION MOVEMENT.

REFRIGERATION PIPING DETAIL

PROJECT NOTES:

HE CONTRACTOR SHALL RECEIVE AND REVIEW ALL OF THE PROJECTS DRAWINGS AND SPECIFICATIONS SUCH AS ARCHITECTURAL TRUCTURAL, HVAC, ELECTRICAL, PLUMBING, FIRE ALARM, SPRINKLER, ITE, ETC. TO UNDERSTAND THE FULL SCOPE OF WORK. FAILURE TO ECEIVE AND REVIEW THOSE PLANS DURING BIDDING WILL RESULT IN HE DENIAL OF EXTRA'S.

Sheet Number	Sheet Name
R-100	REFRIGERATION COVER SHEET
R-101	REFRIGERATION SPECIFICATIONS
R-200	REFRIGERATION GROUND FLOOR
R-201	REFRIGERATION ROOF PLAN
R-300	REFRIGERATION SCHEDULES AND DETAILS
R-400	REFRIGERATION GROUND FLOOR PIPING
R-401	REFRIGERATION ROOF PIPING PLAN



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REFRIGERATION EQUIPMENT

GENERAL SCOPE OF WORK

PART 1 - GENERAL 1. THE REFRIGERATION CONTRACTOR SHALL FURNISH AND DELIVER TO THE SITE, THE AIR-COOLED CONDENSING UNITS, EVAPORATORS, AND ALL CONTROL COMPONENTS INCLUDING THE THERMOSTATS AS REQUIRED FOR THE

COMPLETE INSTALLATION FOR THIS PROJECT. THIS EQUIPMENT WILL BE AS DETAILED IN THE REFRIGERATION DRAWINGS, LEGENDS AND SPECIFICATIONS PREPARED BY THE ENGINEER. REFERENCE STANDARDS AND CODES

- 1. CODE COMPLIANCE, LAWS, ORDINANCES, RULES, AND REGULATIONS:
- A. THE CONTRACTOR'S INSTALLATION, INCLUDING WORK AND MATERIALS, SHALL COMPLY WITH ALL APPLICABLE LAWS, ORDINANCES, RULES AND REGULATIONS RELATIVE TO THIS PROJECT AND OF THE AUTHORITIES HAVING JURISDICTION
- B. IF THE CONTRACTOR PERFORMS ANY WORK NOT IN COMPLIANCE, AND DOES SO WITHOUT WRITTEN AUTHORIZATION BY THE OWNER, THE CONTRACTOR SHALL BEAR ALL COSTS RELATIVE TO CORRECTING THE INSTALLATION TO COMPLY WITH THE ORIGINAL SPECIFICATION REQUIREMENTS.
- C. IT IS THE SOLE RESPONSIBILITY OF THE CONTRACTOR TO ASSURE THE BID INCLUDES ALL THESE CODE REQUIREMENTS AND PROCEDURES.
- D. THE ENTIRE REFRIGERATION INSTALLATION INCLUDING PIPING AND EQUIPMENT MUST COMPLY WITH ALL CODE REQUIREMENTS FOR SEISMIC RESTRAINTS OF MECHANICAL SYSTEMS, BASED ON THE SPECIFIC STORE SEISMIC ZONE CLASSIFICATION.
- E. ALL ELECTRICAL EQUIPMENT SHALL UL LISTED, WHERE APPLICABLE.
- F. ALL REFRIGERATION EQUIPMENT SHALL BE F.M. APPROVED WHERE APPLICABLE
- CONDENSING UNIT REQUIREMENTS

1. THIS SECTION DEALS WITH THE SPECIFICATIONS AND DESIGN DETAILS FOR THE SUPPLY AND DELIVERY OF COMPLETE REFRIGERATION SYSTEMS AND ASSOCIATED HARDWARE, AS REQUIRED IN ORDER TO PROVIDE PROPER REFRIGERATION FOR THE WALK-INS AS DETAILED IN THE REFRIGERATION DRAWINGS.

- A. REFER TO THE ATTACHED REFRIGERATION LEGENDS FOR THE SPECIFIC SYSTEM REQUIREMENTS.
- CONDENSING UNIT REQUIREMENTS
- A. LIQUID RECEIVERS:
- 1. THE RECEIVER SHALL BE EQUIPPED WITH PRESSURE RELIEF VALVES.

B. CONFIRM ALL VOLTAGES WITH ELECTRICAL DRAWINGS

- B. LIQUID LINE SOLENOID VALVES: 1. WHERE INDICATED ON THE LEGENDS, LIQUID LINE SOLENOID VALVES MUST BE FACTORY INSTALLED. IT IS MANDATORY THAT THESE BE SELECTED AT A PRESSURE DROP NO GREATER THAN 0.5 PSIG WHENEVER POSSIBLE, HOWEVER, CARE SHALL BE TAKEN TO ENSURE SUFFICIENT PRESSURE DIFFERENTIAL TO ALLOW
- THE VALVES TO MODULATE PROPERLY. SPORLAN OR ALCO VALVES ARE REQUIRED. C. SCHRADER VALVES:
- 1. ALL SCHRADER VALVES SHALL HAVE THE PROPER LENGTH EXTENSION TO COMPENSATE FOR OVERALL CLEARANCE OF SPECIFIED INSULATION THICKNESS.
- D. SUCTION FILTERS: I. EACH INDIVIDUAL COMPRESSOR SHALL INCORPORATE AN OVERSIZED REPLACEMENT CORE SUCTION FILTER. THE FILTER HOUSING SHALL BE MANUFACTURED OF BRASS USING BRASS OR STAINLESS STEEL BOLTS. THE FILTERS SHALL BE OF A HIGH MOISTURE CAPACITY, REMOVAL STYLE SPORLAN RCW OR EQUAL. SUCTION FILTERS MUST BE OF A TYPE AND CAPACITY AS APPROVED BY THE COMPRESSOR MANUFACTURER.
- E. MECHANICAL PRESSURE INPUT: I THE MECHANICAL CONNECTIONS TO ALL PRESSURE CONTROL DEVICES, INCLUDING UNLOADING SYSTEMS.
- (WHERE APPLICABLE) SHALL BE BASED ON THE USE OF THE ECOSAFE HOSE AS MANUFACTURED BY JOHNSON CONTROLS/ PENN. F. SINGLE POINT ELECTRICAL:
- 1. EACH CONDENSING UNIT MUST INCORPORATE A SINGLE POINT ELECTRICAL CONNECTION, WHEREBY THE COMPRESSORS AND EVAPORATORS ARE FACTORY WIRED VIA CIRCUIT BREAKERS AND/OR CONTACTORS TO THIS SINGLE ELECTRICAL SOURCE WITHIN ITS ELECTRICAL PANEL.
- G. SINGLE PHASE PROTECTION AND ALARM: 1. EACH COMPRESSOR SYSTEM SHALL INCLUDE A DEDICATED SINGLE PHASE PROTECTION CIRCUIT. MONITORING OF PHASE PROTECTION SHALL BE ACCOMPLISHED VIA THE CONDENSING UNIT CONTROL
- 2. THE CONTROL PANEL FOR EACH UNIT SHALL INCLUDE THE NECESSARY BREAKERS AND CONTACTORS REQUIRED TO PROVIDE POWER AND CONTROL THE EVAPORATOR FANS AND DEFROST CIRCUITS. ALL CONTACTORS AND BREAKERS MUST BE FACTORY FURNISHED AND INSTALLED.
- H. COMPRESSOR MECHANICAL CONTROLS: 1. EACH INDIVIDUAL COMPRESSOR SHALL INCORPORATE THE FOLLOWING CONVENTIONAL CONTROLS: ADJUSTABLE PENN SERIES LOW SUCTION PRESSURE WITH MICROSET. ADJUSTABLE PENN SERIES HIGH PRESSURE, MANUAL RESET.
- OIL CONTROLS COPELAND SENTRONICS.
- I. COMPRESSOR CRANKCASE HEATERS: 1. EACH COMPRESSOR SHALL INCORPORATE A CRANKCASE HEATER.
- J. ELECTRIC DEFROST 1. WHERE ELECTRIC DEFROST IS INDICATED ON THE LEGENDS, EACH REFRIGERATION CIRCUIT UTILIZING ELECTRIC DEFROST WILL OPERATE IN THE FOLLOWING MANNER. THE DEFROST CIRCUIT BREAKER AND CONTACTOR WILL BE PROVIDED AND LOCATED IN THE CONTROL PANEL. THE REQUIRED CONTACTORS SHALL BE PROVIDED AND INSTALLED BY THE MANUFACTURER.
- 2. THE EXACT QUANTITY OF DEFROST CONTACTORS PER REFRIGERATED CIRCUIT MUST BE CONFIRMED WITH ELECTRICAL DRAWINGS.
- 3. THE CONDENSING UNIT CONTROL PANEL SHALL INCLUDE THE NECESSARY TIMECLOCK AND CONTROL COMPONENTS TO ENABLE DEFROST CONTROL, INCLUDING DEFROST TERMINATION.
- K. LIQUID DRIERS
- 1. EACH UNIT SHALL INCORPORATE A REPLACEABLE CORE LIQUID FILTER/DRIER. THE FILTER/ DRIERS SHALL BE OF A HIGH MOISTURE CAPACITY REMOVAL STYLE (SPORLAN RCW OR EQUAL) AND OF A TYPE AND CAPACITY AS APPROVED AND RECOMMENDED BY THE COMPRESSOR MANUFACTURER.

PIPING AND INSULATION

2. INSULATION:

1. REFRIGERANT PIPING

- UNLESS OTHERWISE SPECIFIED, ALL REFRIGERATION PIPING SHALL BE REFRIGERATION GRADE TYPE L OR
- TYPE K HARD DRAWN, DEGREASED SEALED COPPER TUBING. FITTINGS SHALL BE WROUGHT COPPER OR FORGED BRASS AND ONLY LONG RADIUS ELBOWS SHALL BE USED. ALL CHANGES IN THE LINE SIZE AND DIRECTION SHALL BE ACCOMPLISHED WITH FITTINGS ONLY.
- ABSOLUTELY NO "STAB-INS" OF FORMED LONG SWEEP ELBOWS ARE PERMITTED.
- SUCTION LINE FILTERS ARE TO BE INSTALLED FOR DIRECTION OF FLOW WITHOUT BYPASS RELIEF. FILTER PRESSURE DROP CAN THEN BE MEASURED BETWEEN THE FILTER GAUGE AND THE FITTING ON THE SUCTION SERVICE VALVE.
- INSULATION SHALL BE ARMACELL ARMAFLEX II OR RUBATEX R-180FS. ALL SUCTION LINES WITH 1" WALL THICKNESS INSULATION. ALL LIQUID LINES SHALL BE INSULATED WITH 1/2" WALL THICK INSULATION.
- ALL INSULATION JOINTS SHALL BE SEALED WITH RUBBER CEMENT TO ENSURE A "DRIP-TIGHT" SEAL. INSULATION SHALL BE SHIPPED ON TUBING PRIOR TO JOINT BRAZING WHERE POSSIBLE, AS AN ALTERNATE TO SPLITTING AND THEN SEALING THE JOINT. EACH JOINT SHALL THEN BE TAPED WITH APPROVED TAPE FOLLOWING THE GLUE PROCESS.
- ALL INSULATION LOCATED OUTDOORS SHALL BE COVERED IN A UV RESISTANT COVERING.
- EVAPORATOR COILS
- A. ALL EVAPORATORS SHALL BE AS MANUFACTURED BY CENTURY AND COLMAC B. REFER TO REFRIGERATION LEGENDS FOR SPECIFIC EVAPORATOR COILS.
- C. REFER TO THE REFRIGERATION LEGENDS FOR EVAPORATOR VOLTAGE REQUIREMENTS.
- A. EVAPORATOR COILS SHALL BE FURNISHED WITH THE FOLLOWING FACTORY INSTALLED OPTIONS/ACCESSORIES: 1. SPORLAN OR ALCO THERMOSTATIC EXPANSION VALVES (SWEAT TYPE). 2. LIQUID LINE CLEANABLE STRAINERS. 3. INDIVIDUAL DEFROST TERMINATION THERMOSTATS (ELECTRIC DEFROST MODELS). 4. INDIVIDUAL FAN DELAY THERMOSTATS (ELECTRIC DEFROST MODELS).
- GUARANTEE AND WARRANTY
- 1. THE REFRIGERATION CONTRACTOR SHALL WARRANT ALL EQUIPMENT AND WORKMANSHIP FOR A OF ONE (1) YEAR FROM TURNOVER. DEFECTS IN MATERIAL OR WORKMANSHIP SHALL BE CORRECTED BY MANUFACTURER AT NO COST TO THE OWNER DURING THE WARRANTY PERIOD.
- 2. THE REFRIGERATION CONTRACTOR SHALL ASSIGN AND FURNISH TO THE OWNER, A COPY OF ALL
 - -END REFRIGERATION EQUIPMENT SPECIFICATIONS-

REFRIGERATION INSTALLATION 1.1 SUMMARY OF SCOPE RESPONSIBILITIES INCLUDE

- 1. RECEIVE, STORE, RIG AND INSTALL ALL REFRIGERATION EQUIPMENT INCLUDING CONDENSING UNITS AND EVAPORATORS 2. PROVIDE ALL LABOR AND MATERIALS TO INSTALL, COMMISSION AND OPTIMIZE THE OPERATION OF THE SYSTEMS AS DETAILED IN THE PLANS AND SPECIFICATIONS. 3. WARRANTY ALL PARTS AND LABOR FOR ONE FULL YEAR FROM ACCEPTANCE BY THE OWNER. THIS INCLUDES PROVIDING REGULAR MAINTENANCE DURING THE WARRANTY PERIOD.
- 1.2 RELATED DOCUMENTS

A. THE FOLLOWING DRAWINGS AND DOCUMENTS SHALL ACCOMPANY AND BE CONSIDERED PART OF THESE SPECIFICATIONS. RELATED MATERIAL: (DRAWINGS AND/OR SPECIFICATIONS) 1. REFRIGERATION DRAWINGS (R SERIES)

- 2. REFRIGERATION LEGENDS 1.3 MECHANICAL INSTALLATION AND CONTRACTOR OBLIGATIONS
- GENERAL SCOPE OF WORK: WORK REQUIRED UNDER THIS SECTION INCLUDES ALL LABOR, MATERIALS, TOOLS, AND EQUIPMENT NECESSARY FOR INSTALLATION OF ALL REFRIGERATION SYSTEMS ON THIS PROJECT AS DETAILED ON THE DESIGN PROJECT DRAWINGS AND AS HEREIN SPECIFIED, OR AS REQUIRED BY GOOD INSTALLATION PRACTICE TO MAKE THE REFRIGERATION SYSTEMS FULLY OPERATIONAL. THE
- OPERATIONAL STATE, MAKE ALL REQUIRED ADJUSTMENTS AND CALIBRATIONS, PERFORM AND MAKE ALL INITIAL TESTS TO ENSURE COMPLIANCE WITH THESE SPECIFICATIONS AND THEIR INTENT, AND OBTAIN ALL NECESSARY APPROVALS IN WRITING FROM ALL GOVERNING BODIES HAVING JURISDICTION OVER THIS WORK TO ENSURE COMPLIANCE WITH ALL LAWS AND ORDINANCES IN EFFECT.

CONTRACTOR SHALL COMMISSION ALL OF THE REFRIGERATION EQUIPMENT TO A FULLY

- ANY OMISSIONS FROM THESE SPECIFICATIONS OR FROM THE REFRIGERATION PLANS AND SCHEDULES WITH REFERENCE TO ANY PARTS AND/OR LABOR NECESSARY FOR THE COMPLETE INSTALLATION MUST NOT BE CONSTRUED AS RELEASING THE CONTRACTOR FROM RESPONSIBILITY FOR FURNISHING SUCH PARTS AND/OR LABOR.
- 1. FOR SPECIFIC DETAILS OF THE INSTALLATION, REFER TO THE FIXTURE PLAN; REFRIGERATION LEGENDS, REFRIGERATION PLANS, PIPING PLANS, LINE SIZING PLANS, MANUFACTURER'S INSTALLATION INSTRUCTIONS, AND TO THE APPLICABLE CODES AND ORDINANCES. THE CONTRACTOR SHALL FURNISH AND INSTALL ALL NECESSARY REFRIGERANT PIPING, FITTINGS, VIBRATION ELIMINATORS, LINE VALVES, SOLENOID VALVES, THERMOSTATIC EXPANSION VALVES, DEHYDRATORS, STRAINERS, SIGHT GLASSES, MOISTURE INDICATORS, REFRIGERANT, OIL,
- FILTERS, INSULATION AND ALL FITTINGS AND ACCESSORIES NECESSARY TO PERFORM A COMPLETE INSTALLATION UNLESS OTHERWISE SPECIFIED, TOGETHER WITH ALL LABOR REQUIRED TO COMPLETE THE INSTALLATION AND PERFORM THE SERVICE COVERED BY THIS SPECIFICATION. 3. THE CONTRACTOR IS RESPONSIBLE FOR UNLOADING, ASSEMBLING, AND INSTALLING ALL COILS,
- CONDENSING UNITS AND OTHER REFRIGERATION EQUIPMENT UNLESS OTHERWISE SPECIFIED. THE CONTRACTOR SHALL ALSO ARRANGE FOR THE REMOVAL OF CRATING AND PACKING MATERIALS AND SHALL LEAVE THE UNCRATING AREA AND THE PROJECT SITE IN A CLEAN AND ORDERLY CONDITION.
- 4. THE CONTRACTOR SHALL FAMILIARIZE HIMSELF WITH THE PROJECT, AND SHALL COOPERATE WITH OTHER CONTRACTORS DOING WORK IN THE BUILDING. IF ANY CONFLICT, INTERFERENCE. OR DISCREPANCIES COME TO THE ATTENTION OF THE CONTRACTOR, HE SHALL NOTIFY THE OWNER IMMEDIATELY BEFORE PROCEEDING FURTHER WITH THE INSTALLATION. ABSOLUTE COMPLIANCE WITH THE SCHEDULE AS SUBMITTED BY THE CLIENT IS ESSENTIAL.
- INSTALLATION SCOPE OF WORK SYSTEM DESCRIPTION В. REFER TO THE REFRIGERATION PLANS FOR DETAILS OF THE INSTALLATION FOR THIS PROJECT. THE REFRIGERATION CONTRACTOR SHALL FURNISH AND INSTALL ALL OF THE REFRIGERATION SYSTEMS AS SPECIFIED IN THE DRAWINGS AND REFRIGERATION LEGENDS. THE CONTRACTOR SHALL RECEIVE, RIG, INSTALL AND COMMISSION ALL OF THE COMPRESSOR SYSTEMS AND ASSOCIATED COMPONENTS TO COMPLETION.
- THE INSTALLATION SHALL INCLUDE, BUT NOT BE LIMITED TO, THE FURNISHING AND INSTALLATION OF: SUCTION, LIQUID AND CONDENSATE PIPING INCLUDING VALVES AND FITTINGS PIPING INSULATION REFRIGERANT SYSTEM COMMISSIONING, CALIBRATION, TESTING AND CONTROL OPTIMIZATION
- EXTREME AND SPECIAL COORDINATION BETWEEN THE REFRIGERATION CONTRACTOR AND THE GENERAL CONTRACTOR IS NECESSARY FOR THE ERECTION AND INSTALLATION OF THE EVAPORATORS AND CONDENSING UNITS.
- SYSTEM REQUIREMENTS:
- 1. THE COMPRESSOR SYSTEMS WILL BE AS DETAILED ON THE REFRIGERATION DRAWINGS AND REFRIGERATION LEGENDS. 2. THE SCOPE OF WORK SHALL FURTHER INCLUDE, BUT NOT BE LIMITED TO THE FURNISHING,
- WHERE SPECIFIED, AND INSTALLATION OF THE FOLLOWING ITEMS: RIGGING AND INSTALLATION OF CONDENSING UNITS. INSTALLATION OF EVAPORATOR COILS INCLUDING CONDENSATE PIPING, HEAT TRACE AND INSULATION. REFRIGERATION VALVES, FITTINGS AND PIPING. PIPING HANGERS, UNISTRUT, FASTENERS, BOLTS, ETC.
- REFRIGERANT. COMPRESSOR OIL INSULATION OF REFRIGERANT SUCTION AND LIQUID LINES FURNISHING AND INSTALLING OF REFRIGERANT PIPING. CHARGING AND LUBRICATING OF SYSTEMS. ADJUSTMENT OF CONTROLS.
- IDENTIFICATION OF SYSTEMS. COMMISSIONING OF ALL REFRIGERATION SYSTEMS. 4. RECEIVING AND SETTING

COMMISSIONING OF THE DEFROST TERMINATION AND TEMPERATURE CONTROL SYSTEMS.

- THE REFRIGERATION CONTRACTOR SHALL RECEIVE AND BE RESPONSIBLE FOR THE RIGGING AND LOCATING THE AIR-COOLED CONDENSING UNITS AND THE EVAPORATORS. A PROFESSIONAL
- LICENSED AND INSURED RIGGING CONTRACTOR MUST BE UTILIZED FOR THIS PURPOSE. B. REMOVE TAGS, WIRES AND BLOCKING FOR SHIPPING FROM THE CONDENSING UNITS.
- 5. COMPRESSOR OIL THE REFRIGERATION CONTRACTOR SHALL BE RESPONSIBLE FOR ENSURING THAT ALL COMPRESSORS ARE OPERATING WITH THE CORRECT QUANTITY AND TYPE OF REFRIGERANT OIL THIS APPLIES PRIOR TO STARTUP, AND FOLLOWING INITIAL OPERATION TO ENSURE THAT THE OIL QUANTITIES HAVE STABILIZED. THE REFRIGERATION CONTRACTOR SHALL PROVIDE ALL OIL AS
- REQUIRED INCLUDING ANY OIL REQUIRED TO TOP OFF THE SYSTEMS AFTER THEY HAVE REACHED EQUALIZATION 7. EVAPORATOR COILS REFER TO REFRIGERATION LEGENDS FOR SPECIFIC EVAPORATOR COIL TYPES AND LOCATIONS.
- B. REFER TO THE REFRIGERATION EQUIPMENT SPECIFICATIONS FOR ACCESSORIES AND CONTROLS. C. REFRIGERATION CONTRACTOR SHALL INSTALL ALL EVAPORATOR COILS AS PER PLANS AND
- SPECIFICATIONS. COILS SHOULD BE MOUNTED IN WALK-IN BOXES AS SHOWN ON THE MANUFACTURERS SHOP
- DRAWINGS OR AS DIRECTED BY OWNER. COILS SHOULD BE MOUNTED TO PROVIDE SUFFICIENT SPACE FOR MAINTENANCE AND CLEANING
- WITHOUT HINDERING REFRIGERATION PERFORMANCE. 8. CONDENSING UNITS

PERIOD

- A. REFER TO REFRIGERATION LEGEND FOR SPECIFIC MODELS AND LOCATIONS. WARRANTIES" FOR EQUIPMENT OR MENUTAGOURFIL REVENDENTS FOR PLEDIPMENT BREEFICATIONS FOR ACCESSORIES AND CONTROL
 - METHODS. C. REFRIGERATION CONTRACTOR IS RESPONSIBLE FOR THE INSTALLATION OF ALL CONDENSING UNITS AND ASSOCIATED PIPING. CONDENSING UNITS SHALL BE FIELD INSTALLED ON THE ROOF
 - OF THE BUILDING ON A RAISED STEEL PLATFORM. REFER TO THE REFRIGERATION PLANS FOR DETAILED INSTALLATION REQUIREMENTS. 9. REFRIGERATION LEGENDS
 - SCHEDULES".

REFRIGERATION DRAINS

1. INSTALLATION MUST CONFORM TO ALL STATE AND LOCAL CODE REQUIREMENTS. COOLER AREAS - INSTALLATION OF THE EVAPORATOR COIL CONDENSATE DRAINS SHALL BE PERFORMED BY THE REFRIGERATION CONTRACTOR. ALL OF THESE CONDENSATE DRAIN LINES SHALL BE COPPER.

- A. THE REFRIGERATION CONTRACTOR SHALL INSULATE ALL THE MEAT COOLER CONDENSATE DRAINS. ELECTRIC HEATER TAPE WILL BE SUPPLIED AND INSTALLED AROUND THESE CONDENSATE LINES BY THE REFRIGERATION CONTRACTOR. THE ELECTRIC HEATER TAPE SHALL EXTEND THROUGH THE BOX WALL TO THE OUTSIDE OF THE BOX. POWER TO BE PROVIDED BY THE ELECTRICAL CONTRACTOR. WALK-IN CONDENSATE LINES SHALL EXIT THE REFRIGERATED SPACE AS SOON AS PRACTICAL. THE DRIP LINES SHALL HAVE A THREADED BRASS OR COPPER UNION CONNECTED TO THE COIL PAN. A "P" TRAP SHALL BE INSTALLED NEAR CURB DRAIN OUTSIDE OF THE REFRIGERATED AREA. WALK-IN COIL CONDENSATE DRIP LINES SHALL INCORPORATE A MINIMUM NUMBER OF FITTINGS AND EMPLOY LONG RADIUS ELBOWS. THE REFRIGERATION CONTRACTOR SHALL SEAL ALL OPENINGS CUT IN COOLER AND FREEZER PANELS. USE BUTYL RUBBER CAULK ON BOTH SIDES OF THE PANEL AT THE PENETRATION.
- AUTOMATED CONTROL SYSTEM
- 1. THE REFRIGERATION SYSTEMS WILL UTILIZE TIME CLOCKS AND THERMOSTATS TO MONITOR AND CONTROL THE COMPRESSORS AND INDIVIDUAL TEMPERATURE AND DEFROST FUNCTIONS. REFER TO THE REFRIGERATION PLANS FOR SPECIFIC FIXTURE TEMPERATURE CONTROL METHODS. THE REFRIGERATION CONTRACTOR SHALL BE RESPONSIBLE FOR, BUT NOT LIMITED TO, THE FOLLOWING:
- A. FURNISH AND INSTALL THERMOSTATS FOR THE TEMPERATURE CONTROL OF THE WALK-IN SPACES. THE THERMOSTAT IS TO BE WIRED BACK TO THE CONDENSING UNIT CONTROL PANEL.
- B. REFRIGERATION CONTRACTOR MUST CAREFULLY REVIEW THE REFRIGERATION DESIGN PLANS AND FULLY ADHERE TO THE REQUIREMENTS AS SPECIFIED AND DETAILED THEREIN.
- C. THE REFRIGERATION CONTRACTOR SHALL BE FULLY RESPONSIBLE FOR THE COMPLETE COMMISSIONING OF ALL COMPRESSOR CONTROLS.
- 1.4 GUARANTEE AND WARRANTY
- REFRIGERATION CONTRACTOR SHALL WARRANT ALL MATERIAL AND WORKMANSHIP FOR ONE (1) YEAR AFTER TURN OVER AND ACCEPTANCE FROM THE OWNER. DEFECTS IN MATERIAL OR WORKMANSHIP SHALL BE CORRECTED WITHOUT DELAY AND AT ANY COST TO THE OWNER DURING THE WARRANTY PERIOD.
- THE REFRIGERATION CONTRACTOR SHALL ASSIGN AND FURNISH TO THE OWNER A COPY OF ALL "WARRANTIES" FOR EQUIPMENT OR MANUFACTURED COMPONENTS SUPPLIED ON THE PROJECT. IT IS THE RESPONSIBILITY OF THE REFRIGERATION CONTRACTOR TO PROCESS WITHOUT DELAY ALL "WARRANTY" CLAIMS THAT OCCUR DURING THE WARRANTY PERIOD. TERMS AND CONDITIONS STATED ON MANUFACTURER'S WARRANTIES SHALL APPLY TO THE OWNER.
- A. THE REFRIGERATION CONTRACTOR SHALL PROVIDE TO OWNER TWO (2) FULL SETS OF ALL EVAPORATOR COIL SPECIFICATION SHEETS, CONDENSING UNIT DATA SHEETS, ETC. IN THREE-RING BINDERS. THIS MANUAL SHALL INCLUDE SPECIFICATIONS OF ALL REFRIGERATION EQUIPMENT INSTALLED BY THIS CONTRACTOR.
- B. DURING THE ONE (1) YEAR WARRANTY PERIOD, THE REFRIGERATION CONTRACTOR SHALL FURNISH, AT NO CHARGE TO THE OWNER, ALL LABOR AND MATERIALS NOT SPECIFICALLY COVERED BY ANY "MANUFACTURER'S WARRANTY."
- SHOULD ANY DEFECTS DEVELOP WITHIN THE WARRANTY PERIOD, THE REQUIRED REPAIRS OR REPLACEMENTS, INCLUDING LABOR AND MATERIALS, SHALL BE MADE WITHOUT CHARGE OR DELAY TO THE OWNER.
- THE CONTRACTOR SHALL GUARANTEE EACH PIECE OF EQUIPMENT SUPPLIED BY HIM TO MEET THE CAPACITY AND DUTY REQUIREMENTS HEREINAFTER SPECIFIED. THE SATISFACTORY PERFORMANCE OF THE EQUIPMENT AND SYSTEMS SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR.
- . OFFICIAL ACCEPTANCE OF THE COMPLETED CONTRACT SHALL ONLY COMMENCE WHEN THE INSTALLATION IS FINALIZED IN EVERY RESPECT AND HAS BEEN IN OPERATION UNDER LOAD CONDITIONS FOR A PERIOD OF AT LEAST ONE WEEK TO THE SATISFACTION OF THE OWNER.

1.5 MATERIALS, EQUIPMENT AND SUBSTITUTIONS

- A. DESCRIPTION: ALL MATERIALS AND EQUIPMENT SHALL BE NEW AND THE PRODUCT OF A REPUTABLE MANUFACTURER. MATERIALS AND EQUIPMENT SHALL FULLY CONFORM TO THE APPLICABLE SPECIFICATIONS AND STANDARDS, AND SHALL COMPLY WITH SIZE, MAKE TYPE AND QUALITY SPECIFIED OR AS OTHERWISE SPECIFICALLY APPROVED IN WRITING BY THE OWNER AND ENGINEER. DO NOT USE MATERIAL OR EQUIPMENT FOR ANY PURPOSE OTHER THAN THAT FOR WHICH IT IS DESIGNED. IT SHALL BE UNDERSTOOD THAT THE PLANS CANNOT INDICATE EVERY SPECIALTY OR DETAIL;
 - HOWEVER, THE CONTRACTOR SHALL FURNISH AND INSTALL ALL SUCH SPECIALTIES AND EQUIPMENT NECESSARY FOR THE COMPLETE INSTALLATION IN ACCORDANCE WITH THE NORMAL INTERPRETATION OF THE PLANS AND SPECIFICATIONS FOR A FULLY OPERATIONAL SYSTEM, GOOD PRACTICE, AND TO THE SATISFACTION OF THE OWNER AND ENGINEER.
 - WHERE MANUFACTURER'S NAMES, CATALOG NUMBERS, OR TRADE NAMES APPEAR IN THE SPECIFICATIONS, IT IS NOT THE INTENT TO RESTRICT OR ELIMINATE COMPETITION, BUT MERELY TO ESTABLISH QUALITY OF MATERIAL REQUIRED. WHERE THE WORDS "OR APPROVED EQUAL" APPEAR, THE "EQUAL" ITEM MUST CONFORM TO THE REQUIREMENTS OF THE SPECIFICATIONS AND MUST BE SUBMITTED, WITH COMPLETE INFORMATION, TO THE ENGINEER FOR WRITTEN APPROVAL PRIOR TO USE.

ALL COSTS ASSOCIATED WITH ADDITIONAL WORK THAT MAY BE REQUIRED BY OTHER TRADES AS A RESULT OF A SUBSTITUTION OF EQUIPMENT AND/OR MATERIALS, SHALL BE BORNE BY THE CONTRACTOR.

MATERIALS THAT ARE NOT SATISFACTORY TO THE OWNER SHALL BE REMOVED FROM THE PREMISES.

1.6 REFERENCE STANDARDS AND CODES

SUBSTITUTIONS

- A. CODE COMPLIANCE, LAWS, ORDINANCES, RULES, AND REGULATIONS:
 - 1. THE CONTRACTOR SHALL COMPLY WITH ALL APPLICABLE LAWS, ORDINANCES, RULES AND REGULATIONS RELATIVE TO THIS PROJECT.
 - 2. IF THE CONTRACTOR PERFORMS ANY WORK NOT IN COMPLIANCE, AND DOES SO WITHOUT WRITTEN AUTHORIZATION BY THE OWNER, THE CONTRACTOR SHALL BEAR ALL COSTS RELATIVE TO CORRECTING THE INSTALLATION TO COMPLY WITH THE ORIGINAL SPECIFICATION REQUIREMENTS.

1.7 SHOP DRAWINGS, SUBMITTALS

- FOR THE REFRIGERATION CONTRACTOR, THE MAJOR TYPES OF MATERIAL BEING INSTALLED FOR THE REFRIGERATION EQUIPMENT INSTALLATION SHALL BE DETAILED IN A SUBMITTAL FORMAL. THIS SUBMITTAL SHALL INCLUDE, BUT NOT LIMITED TO, COMPLETE AND CONCISE DATA RELATING TO THE REFRIGERANT TUBING GRADE, THE TYPE OF BRAZING MATERIALS, VALVES AND INSULATION TYPES. IN ALL CASES MANUFACTURER'S DATA SHALL BE INCLUDED.
- SUBMITTED TO THE OWNER FOR APPROVAL PRIOR TO DELIVERY AND INSTALLATION OF SAID

INSTALLATION SHOP DRAWINGS SHALL BE PREPARED BY THE REFRIGERATION CONTRACTOR AND SUBMITTED TO THE OWNER FOR APPROVAL PRIOR TO INSTALLATION COMMENCEMENT.

- A. REFRIGERANTS
- 1. THE REFRIGERANT SHALL BE DELIVERED TO THE JOB IN ORIGINAL SEALED CONTAINERS.
- 2. UNDER NO CIRCUMSTANCES SHALL THERE BY ANY MIXING OF REFRIGERANTS.
- 3. ADDITIONAL REFRIGERANT MAY BE REQUIRED FOR SYSTEMS AFTER PROPER SUPERHEAT HAS BEEN SET ON ALL EXPANSION VALVES.
- TO THE ATMOSPHERE. ABSOLUTELY NO PLANNED REFRIGERANT VENTING IS PERMITTED.

FOR COMPLETE AND DETAILED REFRIGERATION LEGENDS, REFER TO "REFRIGERATION

- B. SHOP DRAWINGS AND BROCHURES COVERING ALL MAJOR EQUIPMENT ITEMS SHALL BE EQUIPMENT.

PART 2 - PRODUCTS

- 2.1 REFRIGERANTS, PIPING AND INSULATION

- A. CONTRACTOR SHALL TAKE EXTREME CAUTION TO PREVENT THE LOSS OF ANY REFRIGERANT
- 4. CONTRACTOR SHALL OBTAIN, READ AND UNDERSTAND ALL WARNINGS AND INSTRUCTIONS LISTED ON THE REFRIGERANT CONTAINER LABEL, PACKAGING AND IN THE SAFETY AND HANDLING INSTRUCTIONS AS PROVIDED BY THE REFRIGERANT MANUFACTURER.

MANUFACTURER.

- B. REFRIGERANT PIPING
- LEAST EVERY TEN (10) FEET.
- EXPANSION VALVES.

- G. DO NOT USE:
- 45° ELBOWS PLASTIC CAPS DRILLED TEES IN FIXTURES
- STAKED STOP.

- EACH TEN FEET (10') OF RISER.
- INTO THE EVAPORATOR.
- EACH TEN (10) FEET OF RISER.
- ARE EASILY ACCESSIBLE.

FEMALE

WILL NOT BE BARRED BY ITS DESIGN.

- DOWN.
- WEIGHT AND SIZES OF EACH COIL.
- SECONDARY "U" BENDS.
- INSULATION
- THICKNESS INSULATION.
- **ARMAFLEX**

FOR SPECIFIC REFRIGERANTS USED IN EACH SITUATION, THE CONTRACTOR MUST REFER TO THE REFRIGERATION SCHEDULE TO ASCERTAIN THE ACTUAL REFRIGERANT TO BE UTILIZED. USE ONLY THE REFRIGERANT IN ANY EQUIPMENT FOR WHICH THAT EQUIPMENT WAS DESIGNED BY THE

1. THE REFRIGERATION CONTRACTOR MUST CAREFULLY REVIEW THE PIPING PLANS. THESE DOCUMENTS MAY INDICATE THE PIPING SCHEDULES, ROUTING AND OTHER REQUIREMENTS OF WHICH WILL BE NECESSARY FOR THE REFRIGERATION INSTALLATION.

2. TUBING SHALL BE INSTALLED IN A NEAT, WORKMANLIKE MANNER WITH HORIZONTAL RUNS SLOPED TOWARD THE COMPRESSOR AT A RATE OF ONE INCH (1") PER TWENTY FOOT (20'). HANGERS OR STRAPS SHALL BE INSTALLED SO AS TO ADEQUATELY PREVENT VIBRATION OR UNDUE STRAIN ON ANY PIPE OR FITTING. CLAMP LINES WITH "UNISTRUT" OR EQUIVALENT AT

A. CADMIUM PLATED OR GALVANIZED NUTS AND BOLTS WITH SELF-LOCKING TYPE NUTS SHALL BE USED ON ALL PIPE CLAMPS. LOCK TIGHT SHALL BE APPLIED TO ALL NUTS. B. ALL PIPING TO BE INSTALLED IN SUCH A MANNER AS TO COMPLETELY PREVENT ANY TYPE

OF RUBBING AGAINST ANY OTHER OBJECTS/SURFACES. C. REFRIGERATION LINES MUST BE ROUTED ADEQUATELY TO CLEAR FANS, MOTORS, AND

D. ALL PIPING SHALL BE INSTALLED SO THAT NORMAL SERVICING OF THE COMPRESSOR AND RELATED EQUIPMENT IS NOT HINDERED. DO NOT OBSTRUCT THE VIEW OF THE CRANKCASE OIL SIGHT GLASS OR RUN PIPING SO IT INTERFERES WITH REMOVAL OF COMPRESSOR, CYLINDER HEADS, END BELLS, ACCESS PLATES, FANS, FAN MOTORS, COIL, FILTERS, CONDENSERS, ETC.

E. SUCTION LINE FILTERS ARE TO BE INSTALLED FOR DIRECTION OF FLOW WITHOUT BYPASS RELIEF. FILTER PRESSURE DROP CAN THEN BE MEASURED BETWEEN THE FILTER GAUGE FITTING AND THE FITTING ON THE SUCTION SERVICE VALVE.

F. REFRIGERATION PIPING MUST NOT BE INSTALLED ABOVE ANY ELECTRICAL DISTRIBUTION PANEL(S), TRANSFORMERS OR OTHER ELECTRICAL COMPONENTS. EXTREME CARE SHALL BE APPLIED TO SATISFY THIS REQUIREMENT.

• SHORT RADIUS 90° ELBOWS

SCHRAEDER VALVES ON CONDENSER OR RECLAIM DISCHARGE LINES

H. ALL COUPLINGS AND REDUCERS SHOULD BE WELDED AROUND THE ROLLED STOP, OR

I. FURNISH AND INSTALL ADEQUATE SYSTEM SHUT-OFF VALVES TO FACILITATE MAINTENANCE, EMERGENCY SERVICE AND MODIFICATIONS WITHOUT LOSS OF REFRIGERANT.

3. UNLESS OTHERWISE SPECIFIED, ALL REFRIGERATION PIPING SHALL BE REFRIGERATION GRADE TYPE L OR TYPE K HARD DRAWN, CLEANED, DEHYDRATED AND CAPPED TO AVOID CONTAMINATION PRIOR TO INSTALLATION.

4. FITTINGS SHALL BE WROUGHT COPPER OR FORGED BRASS AND ONLY LONG RADIUS ELBOWS SHALL BE USED. ALL CHANGES IN THE LINE SIZE AND DIRECTION SHALL BE ACCOMPLISHED WITH FITTINGS ONLY. ABSOLUTELY NO "STAB-INS" OR FORMED LONG SWEEP ELBOWS ARE PERMITTED.

5. CUSHION ALL PIPES WITH CURVED SHEET METAL SECTIONS GLUED AROUND THE ARMAFLEX, ON THE INTERMEDIATE SUPPORTS WHERE PIPE IS NOT CLAMPED. WHERE THE CLAMPS ARE APPLIED DIRECTLY ONTO THE COPPER LINES, HYDRAZORB CUSHION CLAMP ASSEMBLIES SHALL BE USED WITH 1-5/8" WIDTH STEEL CHANNEL. STEEL CLAMP PARTS MUST NOT TOUCH OR RUB THE COPPER

6. WHERE VERTICAL RISERS OF MORE THAN FIVE (5) FEET OCCUR IN A SUCTION LINE, THE RISER SHALL BE TRAPPED AT THE BOTTOM (INVERTED P TRAP). INSTALL AN ADDITIONAL TRAP FOR

7. DOUBLE SUCTION LINE RISERS SHALL BE INSTALLED ON ALL CIRCUITS AS INDICATED SHOWN ON THE REFRIGERATION PIPING PLANS.

8. WHERE A BRANCH SUCTION LINE ENTERS A MAIN SUCTION LINE IT SHALL ENTER AT THE TOP. PIPING SHALL BE ARRANGED SO REFRIGERANT OR OIL CANNOT DRAIN FROM THE SUCTION LINE

9. VERTICAL DISCHARGE RISERS SHALL BE TRAPPED AT THE BOTTOM TO PREVENT OIL FROM DRAINING BACK INTO THE COMPRESSOR. INSTALL AN ADDITIONAL TRAP EQUALLY SPACED FOR

10. PIPING SHOULD BE LOCATED SO THAT THE ACCESS TO THE SYSTEM COMPONENTS IS NOT HINDERED AND THAT ALL COMPONENTS THAT COULD POSSIBLY REQUIRE FIXTURE MAINTENANCE

11. ALL JOINTS IN THE COMPRESSOR DISCHARGE SUCTION AND LIQUID LINES SHALL BE BRAZED WITH A SUITABLE HIGH TEMPERATURE SILVER SOLDER ALLOY CONTAINING NOT LESS THAN FIFTEEN PERCENT (15%) SILVER. AT ANY COPPER TO BRASS JOINT WHERE DAMAGE COULD OCCUR FROM EXCESS HEAT USE 15% SILVER, BUT MUST UTILIZE A HEAT WRAP IN BRAZING PROCESS. USE A SOLDER WITH AT LEAST THIRTY-FIVE PERCENT (35%) SILVER CONTENT ON ALL COPPER TO STEEL, BRASS TO STEEL, OR STEEL-TO-STEEL JOINTS.

DURING ALL OF THE BRAZING OPERATIONS, DRY NITROGEN MUST BE BLED THROUGH THE PIPING AT VERY LOW PRESSURE TO PREVENT OXIDATION AND SCALING.

12. IN ORDER TO AVOID DAMAGE TO THE INTERNAL SILFOS JOINTS IN VIBRATION ELIMINATORS, LINE CONNECTIONS TO VIBRATION ELIMINATORS ARE TO BE MADE WITH SILVER SOLDER ALLOY, TO 1,200 DEG. F (WELL BELOW THE 1,300 DEG. F MELTING POINT OF SILFOS).

13. TO PREVENT CONTAMINATION OF THE LINE INTERNALLY, LIMIT THE SOLDERING PASTE OR FLUX TO THE MINIMUM REQUIRED. FLUX ONLY THE MALE PORTION OF THE CONNECTION, NEVER THE

1. PROTECTION OF THE PIPING SYSTEM SHALL BE THIS CONTRACTOR'S RESPONSIBILITY. TEMPORARY PROTECTION SHALL BE PROVIDED UNTIL THE JOB IS IN SATISFACTORY CONDITION, AND PERMANENT PROTECTION SHALL BE PROVIDED BY THE BUILDING CONTRACTOR AS REQUIRED TO PROTECT THE PIPING, FITTINGS, ETC. FROM DAMAGE. THIS CONTRACTOR IS TO SUPERVISE THE CONSTRUCTION OF PERMANENT GUARDS AND TO SEE THAT FUTURE ACCESS

2. INSTALL SCHRADER TYPE VALVES AT EACH EVAPORATOR OUTLET TO FACILITATE ADJUSTMENTS OF THE SUPERHEAT SETTINGS AND TO ESTABLISH PRESSURE DROP. ADDITIONAL SCHRADER VALVES MUST BE INSTALLED IN ALL OF THE LONG BRANCH SUCTION LINES, TO FACILITATE PUMP-OUT OF EXCESS REFRIGERANT DURING PERIODS WHEN THE SYSTEM MUST BE PUMPED

3. WALK-IN COOLER EVAPORATOR COILS SHALL BE PROPERLY SUPPORTED FROM A "UNISTRUT" FRAME, ONE FOR EACH HANGER BRACKET, WHICH ITSELF MUST BE SUPPORTED FROM AN INDEPENDENT STRUCTURAL SYSTEM PROPERLY DESIGNED AND CONSTRUCTED BASED ON THE

4. THE REFRIGERATION CONTRACTOR SHALL VERIFY THAT ALL EQUIPMENT INSTALLED HAS PROPER PRESSURE RELIEF PROTECTION, AND THAT RELIEF PARTS ARE DIRECTED DOWNWARD OR PIPED TO RELIEVE DOWNWARD. ALL PRESSURE RELIEF PIPING SHALL BE PIPED TO THE OUTDOOR ENVIRONMENT AND BE INSTALLED AS PER CODES.

5. TO FACILITATE MOVEMENT OF THE PIPING AS A RESULT OF CONTRACTION AND EXPANSION DURING REFRIGERATION OPERATION, THE REFRIGERATION CONTRACTOR SHALL PROVIDE AND INSTALL EXPANSION LOOPS THROUGHOUT THE STORE'S REFRIGERATION PIPING. THESE LOOPS SHALL CONSIST OF FITTINGS OR BENT TUBING TO ACHIEVE A "U" BEND OF A REQUIRED RADIUS SUFFICIENT FOR ANTICIPATED EXPANSION. PIPE HANGERS MUST PERMIT FREE MOVEMENT OF THE REFRIGERANT LINES. ONLY LONG RADIUS ELBOWS SHOULD BE USED IN FORMING THE EXPANSION "U" AND SHALL MEASURE AT LEAST 3" INSIDE THE "U". IF NATURAL "L" OR "U" SHAPES ARE FORMED AS A RESULT OF THE PIPING LAYOUT, THESE CAN BE UTILIZED IN LIEU OF

6. REFER TO REFRIGERATION DRAWINGS FOR REFRIGERATION LINE SIZING.

1. INSULATION SHALL BE ARMACELL ARMAFLEX II, RUBATEX R-180FS. ALL SUCTION LINES SHALL BE INSULATED WITH 1" WALL THICKNESS INSULATION. ALL LIQUID LINES MUST BE INSULATED WITH 1/2"

ALL REFRIGERANT SUCTION LINES SHALL BE INSULATED THE ENTIRE LENGTH OF THE RUN WITH

2. ALL OPENINGS IN THE COOLERS FOR PIPING ACCESS SHALL BE COMPLETELY SEALED WITH "SILICONE" SEALANT OR INSTA-FOAM PRODUCTS.

3. INSULATION JOINTS SHALL BE SEALED WITH RUBBER CEMENT TO ENSURE A "DRIP-TIGHT"SEAL.

INSULATION SHALL BE SLIPPED ON THE TUBING PRIOR TO JOINT BRAZING WHERE POSSIBLE, IN PREFERENCE TO SPLITTING, AND THEN SEALING THE JOINT. EACH JOINT MUST THEN BE COVERED WITH AN INSULATED SLEEVE GLUED AROUND THE JOINT.

- 4. ALL OF THE SUCTION FITTINGS, ELBOWS AND T CONNECTIONS MUST BE PROPERLY INSULATED WITH PREFORMED INSULATION MATERIAL, DESIGNED FOR THIS PURPOSE, SECURELY FASTENED TO EACH COMPONENT. WRAPPING WITH INSULATED TAPE IS UNACCEPTABLE AS THE ONLY METHOD OF COMPONENT INSULATION.
- 5. ALL REFRIGERATION LINES WHICH RUN THROUGH PLENUM SPACES MUST BE INSULATED WITH AP ARMAFLEX ELASTOMETRIC FOAM INSULATION WITH A 25/50 FLAME-SPREAD AND SMOKE DEVELOPED RATINGS.
- 6. INSULATION SHALL BE MITERED, PRE-ADHERED AND LONGITUDINALLY SLIT TO FIT OVER P-TRAPS, TEES AND ELBOWS OR BENDS OVER 90°.
- 7. ARMAFLEX INSULATION WHICH IS LOCATED OUTDOORS, MUST INCORPORATE A WEATHER RESISTANT PROTECTIVE FINISH, SUCH AS ARMACELL ARMAFLEX FINISH.

PART 3 - EXECUTION

B. START-UP

3.1 SYSTEM TESTING AND START-UP A. TESTING EVACUATION AND CHARGING

- 1. THE REFRIGERATION CONTRACTOR MUST TAKE EXTREME CAUTION TO ENSURE THAT NO HCFC/HFC PRODUCTS ARE DISCHARGED OR OTHERWISE RELEASED INTO THE ATMOSPHERE.
- 2. AFTER COMPLETION OF ALL CONNECTIONS. THE REFRIGERATION PIPING TESTING PROCEDURE SHALL BE COMPLETED IN THE FOLLOWING MANNER. PRIOR TO COMMENCEMENT OF PRESSURE TESTING OR EVACUATION, REMOVE AND CAP ALL PRESSURE TRANSDUCERS. INTRODUCE DRY NITROGEN THROUGH A PRESSURE REGULATOR INTO PIPING BEING TESTED SO THAT THE PRESSURE EXCEEDS 150 PSI GAUGE. VALVE OFF ALL COMPRESSORS IF ANY TESTING IS DONE OVER 175 PSIG GAUGE.
- 3. PIPING MUST HOLD PRESSURE WITH NITROGEN VALVED OFF. IF PRESSURE DOES NOT HOLD GIVEN PRESSURE FOR (12) HOURS ADD THE PROPER REFRIGERANT TO THE SYSTEM AND USE A HALIDE TORCH AND / OR AN ELECTRONIC LEAK DETECTOR TO FIND THE LEAKS. REPAIR ALL SYSTEMS LEAKS.
- PRESSURIZED SYSTEMS MAY BE VENTED TO OTHER SYSTEMS UNDERGOING PRESSURE TESTING TO CONSERVE NITROGEN. MAINTAIN AT LEAST ONE POUND GAUGE PRESSURE ON ALL SYSTEMS CONTAINING REFRIGERANT MIXED WITH NITROGEN.
- 5. THE REFRIGERATION CONTRACTOR MUST UTILIZE THE FOLLOWING EQUIPMENT TO COMPLETE THE EVACUATION TEST: TWO (2) TWO-STAGE VACUUM PUMPS, (OR EQUIPMENT EQUAL TO OR SUPERIOR TO) EACH WITH A CAPACITY OF 2CFM (MINIMUM REQUIREMENT); EVACUATE SYSTEMS FROM TWO (2) INDEPENDENT LOCATIONS USING THE MANUFACTURER'S RECOMMENDED CONNECTION POINTS TO REACH ALL PORTIONS OF THE SYSTEM. USE MULTIPLE 3/8" OR 1/2" COPPER TUBING ONLY (NO GAUGE HOSES). OPEN ALL VALVES WITH MANUAL STEMS AND ADD BYPASS LOOPS AS NECESSARY. AN ELECTRONIC MICRON INSTRUMENT SUCH AS MANUFACTURED BY ROBINAIR MUST BE INSTALLED TO SENSE PIPING PRESSURE WITH THE VACUUM PUMP VALVED OFF. AN AUTHORIZED REPRESENTATIVE SHALL BE PRESENT AT THE SCHEDULED TIME OFF NOTICE ANY AND ALL EVACUATION TESTS, SO THEY MAY WITNESS THE VACUUMS OBTAINED. A MINIMUM OF FORTY-EIGHT (48) HOURS NOTICE IS REQUIRED.
- EVACUATE EACH SYSTEM TO AN ABSOLUTE PRESSURE NOT EXCEEDING 1.500 MICRONS. BREAK THE VACUUM TO 2.0 PSIG, WITH THE REFRIGERANT TO BE USED IN THE SYSTEM. REPEAT THE EVACUATION PROCESS, AGAIN BREAKING THE VACUUM WITH REFRIGERANT. INSTALL A DRIER OF THE REQUIRED SIZE IN THE LIQUID LINE, OPEN THE COMPRESSOR SUCTION AND DISCHARGE VALVES, AND EVACUATE TO AN ABSOLUTE PRESSURE NOT EXCEEDING 500 MICRONS. LEAVE THE VACUUM PUMP RUNNING FOR NOT LESS THAN TWO HOURS WITHOUT INTERRUPTION. RAISE THE SYSTEM PRESSURE TO 2.0 PSIG WITH REFRIGERANT, AND REMOVE THE VACUUM PUMP.
- 7. CONTACTORS SHALL MAINTAIN RECORDS OF TEST PRESSURES AND VACUUM READINGS ON EACH PORTION OF PIPING TESTED AND SHALL RECORD LENGTH OF TIME TEST PRESSURE AND VACUUMS THAT WERE HELD. TWO (2) COPIES OF THIS RECORD OF TESTING SHALL BE SUBMITTED TO THE ENGINEER AND THE OWNER. ANY SYSTEM PLACED IN OPERATION WITHOUT FINAL EVACUATION BEING WITNESSED BY ENGINEER OR OWNER SHALL AT OWNER'S REQUEST BE PURGED AND RE-EVACUATED. THE ADVANCE NOTICE REQUIREMENT IS INTENDED TO ARRANGE THE OWNER OR HIS REPRESENTATIVE TO BE PRESENT TO WITNESS THE VACUUM READINGS. FURTHER WHEN REQUESTED BY AUTHORITIES HAVING JURISDICTION. A DATED DECLARATION OF
- TEST SHALL BE PROVIDED FOR ALL SYSTEMS CONTAINING 55# OR MORE OF REFRIGERANT. 8. THE CONTRACTOR SHALL PROTECT ALL SYSTEM COMPONENTS FROM DAMAGE DUE TO EXCESS PRESSURE DURING THE TEST PROCEDURE.

ABSOLUTE COMPLIANCE WITH THE MANUFACTURER'S SPECIFICATIONS MUST BE FULLY ADHERED TO. REFER TO THE MANUFACTURER'S INSTALLATION INSTRUCTIONS FOR ALL APPLICABLE EQUIPMENT.

COMPRESSOR AND CONDENSING UNITS ARE NORMALLY DELIVERED TO THE JOB WITH AN INITIAL OIL CHARGE LUBRICANT. HOWEVER, THE REFRIGERATION CONTRACTOR SHALL BE RESPONSIBLE FOR THE FURNISHING AND CHARGING OF EACH SYSTEM WITH THE CORRECT OIL TYPE AND AMOUNT TO BRING THE LEVEL OF EACH RESERVOIR UP TO THE CENTER OF THE UPPER SIGHT GLASS. THIS PROCEDURE MUST BE CONTINUED UNTIL THE OIL LEVEL STABILIZES, FOLLOWING AT LEAST (21) DAYS OF OPERATION. USE ONLY OIL THAT IS APPROVED BY COMPRESSOR MANUFACTURER. ALL OIL MUST BE DELIVERED TO THE JOB IN FACTORY SEALED, UNOPENED CONTAINERS. THE CONTRACTOR MUST USE EXTREME CAUTION DURING OIL HANDLING TO PREVENT THE INGRESS OF MOISTURE LADEN AIR.

- 1. BEFORE OPERATING ANY MOTOR OR OTHER MOVING PARTS, THE PARTS ARE TO BE LUBRICATED WITH THE PROPER OIL OR GREASE AS NECESSARY.
- 2. REMOVE OR LOOSEN ALL SHIPPING RETAINERS UNDER MOTOR COMPRESSORS. MAKE SURE HOLD DOWN NUTS ON SPRING-MOUNTED COMPRESSORS ARE NOT TOUCHING THE COMPRESSOR FEET, AND ARE NOT MORE THAN 1/16" ABOVE THE MOUNTING FOOT.
- 3. CHECK HIGH AND LOW PRESSURE CONTROL CUT- IN AND CUT-OUT POINTS. ADJUST IF NECESSARY.
- 4. THE CONTRACTOR SHALL ENSURE THAT ANY AIR-COOLED OIL COOLERS ARE FULLY OPERATIONAL, PRIOR TO SYSTEM COMMISSIONING.
- 5. AFTER THE COMPRESSOR IS STARTED, CONTINUE CHARGING UNTIL SYSTEM HAS SUFFICIENT REFRIGERANT FOR PROPER OPERATION. DO NOT OVER CHARGE. DURING START-UP, NO COMPRESSOR IS TO BE LEFT OPERATING UNATTENDED AND UNWATCHED, UNTIL THE SYSTEM IS PROPERLY CHARGED WITH REFRIGERANT AND OIL.
- 6. DO NOT ADD REFRIGERATION OIL WHILE THE SYSTEM IS SHORT OF REFRIGERANT UNLESS OIL LEVEL IS DANGEROUSLY LOW. WHERE OIL HAS BEEN ADDED DURING CHARGING, CAREFULLY CHECK THE COMPRESSOR CRANKCASE SIGHT GLASS AFTER REACHING A NORMAL OPERATING CONDITION TO BE SURE THE SYSTEM DOES NOT CONTAIN AN EXCESSIVE AMOUNT OF OIL WHICH CAN CAUSE SLUGGING OR LOSS OF REFRIGERATING CAPACITY.
- 7. THE TEMPERATURE CONTROLS SHALL BE SET TO MAINTAIN THE TEMPERATURES AS INDICATED IN THE REFRIGERATION LEGENDS.

NO DEVIATION FROM THESE TEMPERATURES WILL BE ALLOWED, CONTRACTOR SHALL BE HELD RESPONSIBLE SHOULD HE ACCEPT INSTRUCTIONS, EITHER VERBALLY OR OTHERWISE FROM ANY SOURCE OTHER THAN IN WRITING FROM OWNER. SHOULD THERE BY ANY QUESTION AS TO THE CAPABILITIES OF A MANUFACTURER'S EQUIPMENT TO PRODUCE TEMPERATURES HEREIN SPECIFIED, CONTRACTOR WILL NOTIFY OWNER IN WRITING OF SAID QUESTIONS, OTHERWISE IT WILL BE CONTRACTOR'S RESPONSIBILITY TO ENSURE SAID EQUIPMENT SHALL PERFORM AS SPECIFIED. THE TEMPERATURES ARE TO BE MAINTAINED WITH FIXTURE LOADED OR UNLOADED

- 8 SET THE COMPRESSOR CONTROLS IN ACCORDANCE WITH MANUFACTURER'S APPLICATION DATA FOR INITIAL SYSTEM START-UP. OBSERVE FIXTURE TEMPERATURE PERFORMANCE. CHECK EACH EXPANSION VALVE AND ADJUST AS NEEDED TO EQUALIZE PERFORMANCE BETWEEN EVAPORATORS ON THE SAME COMPRESSOR OR TO OBTAIN REQUIRED SUPERHEAT TEMPERATURE. AFTER EXPANSION VALVE STABILIZATION HAS OCCURRED, ADDITIONAL REFRIGERANT MAY BE REQUIRED TO BRING THE SYSTEM TO FULL CAPACITY. ALL SYSTEMS MUST BE FULLY CHARGED.
- 9. IT IS THE REFRIGERATION CONTRACTOR'S RESPONSIBILITY TO CHECK ALL REFRIGERATION COMPONENTS, FLARE FITTINGS AND CONTROLS, INCLUDING ALL ELECTRICAL CONNECTIONS AT THE COMPRESSOR, TO ENSURE TIGHT AND OPERATIVE CONNECTIONS.
- 10. THE REFRIGERATION CONTRACTOR SHALL MAKE ALL NECESSARY ADJUSTMENTS TO THE CONTROLS DURING THE TIME THAT THE FIXTURES ARE BEING STOCKED.
- 11. AFTER ALL OF THE REFRIGERATING SYSTEMS HAVE BEEN OPERATIONAL FOR A PERIOD OF SEVEN (7) DAYS, THE REFRIGERATION CONTRACTOR IS REQUIRED TO INVESTIGATE AND LEAK CHECK EACH AND EVERY REFRIGERANT CIRCUIT STARTING AT THE FIXTURE EXPANSION VALVE AND WORKING BACK TO THE COMPRESSOR SYSTEM. ANY SIGN OF A REFRIGERANT LEAK, MUST IMMEDIATELY, PERMANENTLY, AND PROPERLY RECTIFIED. AT THIS TIME, THE CONTRACTOR MUST CHECK EVERY FIELD LOCATED BALL AND SOLENOID VALVE FOR INTEGRITY AND ENSURE THAT THE BALL VALVES ARE FIRMLY CAPPED AND THE CAP TEFLON GASKETS ARE SECURELY IN-PLACE.

-END REFRIGERATION INSTALLATION SPECIFICATIONS-

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REFRIGERATION GENERAL NOTES:

1. REFRIGERATION CONTRACTOR SHALL BE RESPONSIBLE FOR SUPPLYING, RECEIVING, STORING, RIGGING AND INSTALLING ALL REFRIGERATION SYSTEM COMPONENTS.

2. ALL ROOFTOP EQUIPMENT MUST BE PROPERLY SECURED TO BUILDING STEEL IN ACCORDANCE WITH ALL APPLICABLE BUILDING CODES.

4. REFRIGERATION CONTRACTOR SHALL BE RESPONSIBLE FOR FURNISHING AND INSTALLING ALL REFRIGERATION LINE AND LOW VOLTAGE CONTROLS AND THE COMPLETE WIRING AND CONDUIT FOR CONTROLS AS REQUIRED, INCLUDING FACTORY INSTALLED STEP DOWN TRANSFORMERS FOR CONTROL VOLTAGE IN THE CONDENSING UNIT CONTROL PANEL.

5. REFRIGERATION CONTRACTOR SHALL KEEP ALL HIS WORK CLEAN AND ORGANIZED. CONTRACTOR IS RESPONSIBLE FOR PROPERLY DISPOSING OF ALL WASTE AND PACKING MATERIALS GENERATED BY HIS WORK. COORDINATE DUMPSTER LOCATION WITH THE OWNERS REPRESENTATIVE.

6. ALL CONDENSATE PIPING, HEAT TRACE AND INSULATION TO BE FURNISHED AND INSTALLED BY THE REFRIGERATION CONTRACTOR.

7. THE EXACT MOUNTING HEIGHTS AND LOCATIONS OF ALL REFRIGERATION EQUIPMENT SHALL BE FIELD VERIFIED AND COORDINATED WITH ALL OTHER MECHANICAL, ELECTRICAL, ARCHITECTURAL AND STRUCTURAL SYSTEMS.

8. PROVIDE DISCONNECT SWITCHES FOR ALL REFRIGERATION EQUIPMENT INCLUDING WEATHERPROOF DISCONNECT AS REQUIRED.

9. ALL ROOFTOP REFRIGERATION EQUIPMENT SHALL BE INSTALLED SUFFICIENTLY AWAY FROM EDGE OF ROOF SO AS TO ALLOW FOR THE INSTALLATION OF PROPER FLASHING TO ENSURE A WEATHER TIGHT SEAL. IN ADDITION, ADEQUATE CLEARANCES SHALL BE PROVIDED FOR CLEANING AND MAINTENANCE REQUIREMENTS. THE FINAL LOCATION OF ALL ROOFTOP UNITS MUST ALSO COMPLY WITH ALL OSHA SAFETY REQUIREMENTS. WHEN MINIMUM REQUIRED DISTANCE CAN NOT BE MAINTAINED, IT SHALL BE THE RESPONSIBILITY OF THE GENERAL CONTRACTOR TO PROVIDE AND INSTALL CODE COMPLAINT SAFETY RAILS.

3. REFRIGERATION CONTRACTOR TO REPLACE ALL FILTERS AND DRIERS PRIOR TO TURNOVER.

	10	11	12	REFRIGERATION GENERAL NOTES:
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REFRIGERATION CONDENSING UNITS

TAG	SERVICE	MANUFACTURER	MODEL	CAPACITY (BTUH) SUCT TEM	P CONDENSING	ТЕМР НР	MAX FUSE	MCA	1
	<u>OEIIIIOE</u>	In Alter Action En							INCA	
CU-A	OPEN SLICING - SEALING AREA	CENTURY	NSB40L8A	126	-24	110 °F	40	125.0	89.0	460
CU-AA	CHICKEN PREP	CENTURY	NSB08H8A	67	+21	110 °F	8	40.0	29.0	460
CU-B	OPEN SLICING - SEALING AREA	CENTURY	NSB15H8A	112	+23	110 °F	15	70.0	46.0	460
CU-BB	CHICKEN PREP	CENTURY	NSB12H8A	90	+15	110 °F	12	60.0	39.0	460
CU-C	OPEN SLICING - SEALING AREA	CENTURY	NSB09M8A	85	+23	110 °F	9	50.0	31.0	460
CU-CC	FOOD BANK	CENTURY	BLU-B030M-8A	90	+15	110 °F	12	15.0	11.0	460
CU-D	ASSEMBLY	CENTURY	NSB20M8A	134	+23	110 °F	20	80.0	50.2	460
CU-E	ASSEMBLY	CENTURY	NSB06M8A	48	+16	110 °F	6	35.0	24.0	460
CU-F	ASSEMBLY	CENTURY	NSB15M8A	105	+19	110 °F	15	70.0	44.0	460
CU-FUT-1		CENTURY	BLU-B050M-8A	41	+21		5	30.0	18.0	460
CU-FUT-2		CENTURY	BLU-B050M-8A	41	+21		5	30.0	18.0	460
CU-FUT-3		CENTURY	BLU-B050M-8A	41	+21		5	30.0	18.0	460
CU-FUT-6		CENTURY	NSB20M8A	131	+21		20	80.0	50.2	460
CU-FUT-7		CENTURY	NSB20M8A	131	+21		20	80.0	50.2	460
CU-FUTURE 4		CENTURY	WAITING FOR SELECTION			110 °F				
CU-FUTURE 5		CENTURY	WAITING FOR SELECTION			110 °F				
CU-G	PRODUCE COOLER	CENTURY	BLU-B050M-8A	41	+21	110 °F	5	30.0	18.0	460
CU-H	OPEN SLICING - SEALING AREA	CENTURY	BLU-B060M-8A	37.5	+12	110 °F	8	30.0	18.8	460
CU-I	ASSEMBLY	CENTURY	BLU-B035M-8A	32	+20	110 °F	4	20.0	12.0	460
CU-J	PRODUCE	CENTURY	NSB15M8A	112	+20	110 °F	15	70.0	44.0	460
CU-K	ASSEMBLY	CENTURY	NSB20M8A	131	+21	110 °F	20	80.0	50.2	460
CU-L	ASSEMBLY	CENTURY	NSB20M8A	131	+21	110 °F	20	80.0	50.2	460
CU-M	ASSEMBLY	CENTURY	NSB22M8A	145	+18	110 °F	22	80.0	53.0	460
CU-N	ASSEMBLY	CENTURY	NSB22M8A	145	+18	110 °F	22	80.0	53.0	460
CU-O	ASSEMBLY	CENTURY	NSB50H8A	354	+20	110 °F	50	200.0	129.0	460
CU-P	OPEN SLICING - SEALING AREA	CENTURY	NSB12H8A	114	+25	110 °F	12	60.0	39.0	460
CU-Q	OPEN SLICING - SEALING AREA	CENTURY	NSB12H8A	114	+25	110 °F	12	60.0	39.0	460
CU-R	FOOD BANK	CENTURY	NSB10H8A	95	+25	110 °F	10	50.0	34.0	460
CU-S	CHICKEN PREP	CENTURY	NSB10H8A	95	+25	110 °F	10	50.0	34.0	460
CU-T	FOOD BANK	CENTURY	NSB15H8A	112	+23	110 °F	15	70.0	46.0	460
CU-U	FOOD BANK	CENTURY	BLU-B050M-8A	41	+21	110 °F	5	30.0	18.0	460
CU-V	BLAST CHILLER	CENTURY	NSB15H8A	249	+13	110 °F	40	150.0	102.8	460
CU-W	BLAST CHILLER	CENTURY	NSB15H8A	249	+13	110 °F	40	150.0	102.8	460
CU-X	BLAST CHILLER	CENTURY	NSB15H8A	249	+13	110 °F	40	150.0	102.8	460
CU-Y	CHICKEN PREP	CENTURY	NSB06H8A	57	+21	110 °F	6	35.0	24.5	460
CU-Z	CHICKEN PREP	CENTURY	BLU-B050M-8A	41	+21	110 °F	5	30.0	18.0	460

CONDENSING UNITS.

NOTES: 1. PROVIDE LOW AMBIENT KIT WITH HEATED AND INSULATED RECEIVER WITH TIME DELAY 2. PROVIDE REPLACEABLE CORE LIQUID LINE FILTER 3. PROVIDE REPLACEABLE CORE SUCTION FILTER

4. PROVIDE SUCTION ACCUMULATOR 5. PROVIDE FACTORY INSTALLED INPUT/OUTPUT BOARDS TO INTERFACE WITH THE DDC

CONTROL SYSTEM 6. CONDENSING UNITS TO HAVE A SINGLE POINT CONNECTION. EVAPORATOR FANS AND

DEFROST TO BE FED FROM THE CONDENSING UNIT CONTROL PANEL. PROVIDE BREAKERS AND CONTACTORS AS REQUIRED

7. REFRIGERANT IS R-448A 8. THE SYSTEM CONTROL IS THERMOSTAT ON THE WALL CONTROLLING THE LIQUID LINE SOLENOID ON THE EVAPS AND PRESSURE CONTROL TO CONTROL THE COMPRESSORS AND PUMP DOWN SEQUENCE FOR THE

A	VOLTAGE	PHASE	WEIGHT	NOTES
	460	3	3080.0 lb	1-8
	460	3	1554.0 lb	1-8
	460	3	2142.0 lb	1-8
	460	3	2046.0 lb	1-8
	460	3	1325.0 lb	1-8
	460	3	785.0 lb	1-8
	460	3	1831.0 lb	1-8
	460	3	1229.0 lb	1-8
	460	3	1786.0 lb	1-8
	460	3	822.0 lb	
	460	3	822.0 lb	
	460	3	822.0 lb	
	460	3	800.0 lb	
	460	3	800.0 lb	
				1-8
				1-8
	460	3	822.0 lb	1-8
	460	3	845.0 lb	1-8
	460	3	800.0 lb	1-8
	460	3	1786.0 lb	1-8
	460	3	1831.0 lb	1-8
	460	3	1831.0 lb	1-8
	460	3	2088.0 lb	1-8
	460	3	2088.0 lb	1-8
	460	3	3625.0 lb	1-8
	460	3	2046.0 lb	1-8
	460	3	2046.0 lb	1-8
	460	3	1889.0 lb	1-8
	460	3	1889.0 lb	1-8
	460	3	2142.0 lb	1-8
	460	3	822.0 lb	1-8
	460	3	3217.0 lb	1-8
	460	3	3217.0 lb	1-8
	460	3	3217.0 lb	1-8
	460	3	1455.0 lb	1-8
	460	3	822.0 lb	1-8

<u>TAG</u>	SERVICE	MAN
EV-A	FREEZER	CENT
EV-AA	CHICKEN PREP	CENT
EV-B	MEAT COOLER	CENT
EV-BB	CHICKEN COOLER	CENT
EV-C	PRODUCE COOLER	CENT
EV-CC	GARBAGE ROOM	CENT
EV-D	CUPLINES	CENT
EV-E	HALLWAY	CENT
EV-F	OPEN SLICING - SEALING AREA	CENT
EV-G	HALLWAY	CENT
EV-H	HALLWAY	CENT
EV-I	HALLWAY	CENT
EV-J	PRODUCE	CENT
EV-K	ASSEMBLY	CENT
EV-L	ASSEMBLY	CENT
EV-M	MARKET AREA	CENT
EV-N	MARKET AREA	CENT
EV-O	SHIPPING DOCKS	CENT
EV-P	RECEIVING DOCKS	CENT
EV-Q	RECEIVING DOCKS	CENT
EV-R	PASSAGE #1	CENT
EV-S	PASSAGE #1	CENT
EV-T	ASSEMBLY SCALING PACKAGING	CENT
EV-U	FOOD BANK	CENT
EV-V	FOOD BANK	CENT
EV-W	FOOD BANK	CENT
EV-X	FOOD BANK	CENT
EV-Y	KITCHEN PREP	CENT
EV-Z	KITCHEN COOLER	CENT

<u>CTURER</u>	MODEL	LOAD (MBH)	DEFROST TYPE	AMPS	VOLTAGE	PHASE	DEFROST	WEIGHT	NOTES
,	A 400 A 507 E	444.0		0.4	400	0	00.0		
	A438A-507-E	114.0	EL	2.1	460	3	20.8	455.0 lb	1
	BALV418A-211M-E	66.0	EL	0.7	460	3	9.6	291.0 lb	1
	A438A-413-E	106.0	EL	3.0	460	3	14.5	396.0 lb	1
	A428A-338-E	87.6	EL	1.4	460	3	14	322.0 lb	1
	BALV438A-523M-A	75.0	OT	2.0	460	3	0	646.0 lb	1
	A518A-185-A	28.0	OT	0.7	460	3	0	170.0 lb	1
	BALV518A-197M-A	139.0	OT	0.7	460	3	0	273.0 lb	1
	BALV528A-393M-E	48.0	EL	1.3	460	3	13	461.0 lb	1
	BALV418A-175M-E	100.0	EL	0.7	460	3	6.8	267.0 lb	1
	BALV418A-175M-E	41.0	EL	0.7	460	3	6.8	267.0 lb	1
	BALV428A-349M-E	40.0	EL	1.3	460	3	13	451.0 lb	1
	BALV518A-197M-E	30.0	EL	0.7	460	3	6.8	273.0 lb	1
	BALV418A-175M-A	106.0	OT	0.7	460	3	0	267.0 lb	1
	BALV418A-175M-A	123.0	OT	0.7	460	3	0	267.0 lb	1
	BALV418A-175M-A	123.0	OT	0.7	460	3	0	267.0 lb	1
	BALV418A-211M-E	136.0	EL	0.7	460	3	9.6	291.0 lb	1
	BALV418A-211M-E	136.0	EL	0.7	460	3	9.6	291.0 lb	1
	A448A-679-E	350.0	EL	2.8	460	3	26.6	589.0 lb	1
	A528A-371-A	111.0	OT	1.4	460	3	0	334.0 lb	1
	A528A-371-A	111.0	OT	1.4	460	3	0	334.0 lb	1
	A428A-338-A	95.0	OT	1.4	460	3	0	322.0 lb	1
	A428A-338-A	95.0	OT	1.4	460	3	0	322.0 lb	1
	BALV428A-349M-A	114.0	OT	1.3	460	3	0	451.0 lb	1
	BALV428A-349M-E	40.0	EL	1.3	460	3	13	451.0 lb	1
	A428A-338-A	95.0	OT	1.4	460	3	0	24520.0 lb	1
	A428A-338-A	95.0	OT	1.4	460	3	0	24520.0 lb	1
	A428A-338-A	95.0	OT	1.4	460	3	0	2452.0 lb	1
	BALV518A-197M-E	55.0	EL	0.7	460	3	6.8	273.0 lb	1
-	A428A-338-E	41.0	EL	1.4	460	3	14	322.0 lb	1

1. LIQUID LINE SOLENOID TO BE CONTROLLED BY BMS FOR WASHDOWN SEQUENCE.

REFRIGERATION PIPING NOTES:

1. TRAPS ON SUCTION RISERS MUST BE AS SHORT AS POSSIBLE. USE OF PREFABRICATED TRAPS OR SHORT RADIUS ELBOWS IS ALLOWED.

2. ALL 90 DEGREE ELBOWS EXCEPT FOR RISER TRAPS SHALL BE LONG RADIUS.

- 3. LIQUID LINES AND HOT GAS LINES SHALL BE SECURELY FASTENED TO HANGERS TO PREVENT VIBRATION AND LIQUID SHOCK. USE OF VIBRA MOUNTS OR CUSHION CLAMPS ON THIS PIPING IS REQUIRED. 4. SUCTION LINES SHALL BE INSTALLED TO PITCH A MINIMUM OF 1/8" PER FOOT IN THE DIRECTION OF FLOW.
- 5. THERMOLATORS (SUCTION LIQUID HEAT EXCHANGERS) SHALL BE INSULATED WITH A MINIMUM OF 1" ARMAFLEX.
- 6. THERMOLATORS SHALL BE INSTALLED ON THE ROOF WHERE PIPING PROJECTS THROUGH THE ROOF.
- 7. ALL LIGUID AND HOT GAS PIPING SHALL BE AS SHORT AND SYMETRICAL AS POSSIBLE TO ASSURE EQUAL PRESSURE DROP AND FLOW TO DUAL AIR UNITS.

8. ALL PIPING SHALL BE DEHYDRATED ACR TYPE L TUBING.

9. ALL AIR UNITS WITH HOT GAS DEFROST WILL HAVE HOT GAS HEATED DRAIN PANS. DO NOT UNDERSIZE THE HOT GAS LINE TO THE AIR UNITS. 10. ALL REFRIGERANT PIPING SHALL BE PURGED WITH NITROGEN WHEN SILVER SOLDERING TO PREVENT SCALE AND OXIDATION INSIDE THE COPPER

TUBING. 11. PROVIDE ONE SPARE SCHRADER VALVE IN EACH AIR UNIT SUCTION LINE FOR TESTING AND ADJUSTING SUCTION SUPERHEAT.

12. ALL EXTERIOR PIPING TO HAVE PVC UV PROTECTION.

13. CONTRACTOR TO PROVIDE ALL PIPING CURBS AND SEAL ALL PENETRATIONS AS REQUIRED.

14. REFRIGERATION LINES RUN ABOVE THE COOLER/FREEZER CEILING AND DROP INTO THE BOX AT THE EVAPORATOR CONNECTION POINT.

	REFRI	GERATION LINE	SIZING	
	EQUIV	HORIZ	VERT	
SYSTEM	RUN	SUCTION	SUCTION	LIQUID
А	100'	2-5/8"	2-5/8"	7/8"
В	104'	2-1/8"	2-1/8"	7/8"
С	132'	1-5/8"	1-5/8"	7/8"
D	155'	2-1/8"	2-1/8"	7/8"
E	41'	1-1/8"	1-1/8"	1/2"
F	75'	1-5/8"	1-5/8"	7/8"
G	109'	1-1/8"	1-1/8"	1/2"
Н	29'	1-1/8"	1-1/8"	1/2"
I	98'	1-1/8"	1-1/8"	1/2"
J	63'	1-5/8"	1-5/8"	7/8"
K	105'	2-1/8"	2-1/8"	7/8"
L	115'	2-1/8"	2-1/8"	7/8"
М	150'	2-1/8"	2-1/8"	7/8"
N	150'	2-1/8"	2-1/8"	7/8"
0	155'	3-1/8"	3-1/8"	1-3/8"
Р	178'	2-1/8"	1-5/8"	7/8"
Q	104'	15/8"	1-5/8"	7/8"
R	81'	1-5/8"	1-5/8"	7/8"
S	81'	1-5/8"	1-5/8"	7/8"
Т	121'	2-1/8"	1-5/8"	7/8"
U	46'	1-1/8"	1-1/8"	1/2"
V	92'	2-5/8"	2-5/8"	1-1/8"
W	63'	2-5/8"	2-5/8"	1-1/8"
Х	40'	2-5/8"	2-5/8"	1-1/8"
Y	104'	1-3/8"	1-3/8"	5/8"
Z	75'	1-1/8"	1-1/8"	1/2"
AA	98'	1-1/8"	1-1/8"	5/8"
BB	92'	1-5/8"	1-5/8"	7/8"
CC	52'	1-5/8"	1-5/8"	7/8"

REFRIGERATION PIPING NOTES:

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11. PROVIDE ONE SPARE SCHRADER VALVE IN EACH AIR UNIT SUCTION LINE FOR TESTING AND ADJUSTING SUCTION SUPERHEAT. 12. ALL EXTERIOR PIPING TO HAVE PVC UV PROTECTION.

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14. REFRIGERATION LINES RUN ABOVE THE COOLER/FREEZER CEILING AND DROP INTO THE BOX AT THE EVAPORATOR CONNECTION POINT.

	FOUN			
OVOTEM				
SISIEM	100	SUCTION		
A	100	2-5/8	2-5/8	7/8
В	104'	2-1/8"	2-1/8"	//8"
C	132'	1-5/8"	1-5/8"	7/8"
D	155'	2-1/8"	2-1/8"	7/8"
E	41'	1-1/8"	1-1/8"	1/2"
F	75'	1-5/8"	1-5/8"	7/8"
G	109'	1-1/8"	1-1/8"	1/2"
Н	29'	1-1/8"	1-1/8"	1/2"
I	98'	1-1/8"	1-1/8"	1/2"
J	63'	1-5/8"	1-5/8"	7/8"
K	105'	2-1/8"	2-1/8"	7/8"
L	115'	2-1/8"	2-1/8"	7/8"
М	150'	2-1/8"	2-1/8"	7/8"
N	150'	2-1/8"	2-1/8"	7/8"
0	155'	3-1/8"	3-1/8"	1-3/8"
Р	178'	2-1/8"	1-5/8"	7/8"
Q	104'	15/8"	1-5/8"	7/8"
R	81'	1-5/8"	1-5/8"	7/8"
S	81'	1-5/8"	1-5/8"	7/8"
Т	121'	2-1/8"	1-5/8"	7/8"
U	46'	1-1/8"	1-1/8"	1/2"
V	92'	2-5/8"	2-5/8"	1-1/8"
W	63'	2-5/8"	2-5/8"	1-1/8"
Х	40'	2-5/8"	2-5/8"	1-1/8"
Y	104'	1-3/8"	1-3/8"	5/8"
Z	75'	1-1/8"	1-1/8"	1/2"
AA	98'	1-1/8"	1-1/8"	5/8"
BB	92'	1-5/8"	1-5/8"	7/8"
CC	52'	1-5/8"	1-5/8"	7/8"

