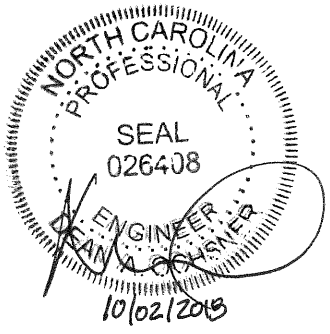
HARRIS TEETER #495
RALEIGH, NORTH CAROLINA
REFRIGERATION EQUIPMENT SPECIFICATIONS
TABLE OF CONTENTS



ochsnerEFS, p.c.
11111 Carmel Commons Blvd., Suite 325
Charlotte, North Carolina 28226
NCBELS Firm License Number: C-2438

To comply with all the particulars governing the overall Refrigeration Installation for this project and to additionally provide the opportunity for the Refrigeration Equipment Manufacturer to fully comprehend the equipment requirements, the following plans/documents as produced by Arcons Design Studios, p.c.; Bondurant Associates, Inc., Brandt Engineering, Inc.; and ochsnerEFS, p.c. shall accompany and be considered part of these specifications:

C1	Cover Sheet
A1.0	Existing Floor Plan
A1.1	Demo Floor Plan
A1.1a	Demo Reflected Ceiling Plan
A1.1f	Reference Overlay Sheet
F-1	Fixture Plan
A1.2	Floor Plan
A1.5	Reflected Ceiling Plan
A1.6	Roof Plan and Details
D1.0	Décor Plan
S1.1 thru S2.1	Structural Plans
RC1.1 thru RC5.3	Refrigeration Control Plans
RD1.1	Refrigeration Demolition Plan
RT1.1	Refrigeration Trenching Plan
EM1.1 thru EM4.1	Energy Management Termination Plans
E1.1 thru E5.2	Electrical Plans
H0.1 thru H3.2	HVAC Plans
P1.1 thru P8.1	Plumbing Plans
F1.0 and F1.1	Fire Alarm/Security Plans

ochsnerEFS, p.c.
11111 Carmel Commons Blvd., Suite 325
Charlotte, North Carolina 28226
NCBELS Firm License Number: C-2438

SECTION I BIDDING PROCEDURES

Sealed proposals for ***HARRIS TEETER #495: RALEIGH, NORTH CAROLINA*** called for in the specifications, dated ***October 2, 2018*** and shown on the fixture plan for ***HARRIS TEETER #495: RALEIGH, NORTH CAROLINA*** will be received until _____.

Bids must be sealed and plainly identified on the envelope as follows:

REFRIGERATION EQUIPMENT
HARRIS TEETER #495
RALEIGH, NORTH CAROLINA

The outside of the envelope shall also contain the Bidder's name and address.

All bids shall be addressed to:

HARRIS TEETER, INC.
c/o: Mr. Dean A. Ochsner, P.E.
ochsnerEFS, p.c.
11111 Carmel Commons Blvd., Suite 325
Charlotte, North Carolina 28226

All bid documents are the property of the owner and shall be returned with the bids.

Each Bidder shall be responsible for his own review and familiarization with the Bidding Documents as well as the existing construction inasmuch as it will affect his work. Neither the Engineer, Harris Teeter Project Manager, nor Owner will be responsible for oral instructions or interpretations given before award of Contract.

Should a Bidder find discrepancies, ambiguities or omissions in the Bidding Documents, he shall immediately notify the Engineer in writing at least seven (7) days prior to the bid opening date. Prompt clarifications will be supplied to all Bidders of record by addendum. Failure to request clarification will not relieve the Bidder of responsibility to perform the work in accordance with the intent of the Bidding Documents.

Bidders shall confer with Harris Teeter or the Engineer, prior to bidding, if there are any items shown on the plans or described herein that are not clearly understood.

No allowance will be made by Harris Teeter or the Engineer for lack of information on the part of the Contractor after the bid is submitted and the contract signed.

Submission of bid shall constitute Bidder's acknowledgment, and complete comprehension of the intent and scope of Bidding Documents.

Harris Teeter reserves the right to reject any and all bids and to waive informalities or to accept any bid, should it be deemed for the interest of Harris Teeter to do so.

ochsnerEFS, p.c.
11111 Carmel Commons Blvd., Suite 325
Charlotte, North Carolina 28226
NCBELS Firm License Number: C-2438

SECTION II GENERAL CONDITIONS

1. DEFINITION OF TERMS

1.1 The "work" shall mean the complete new parallel compressor rack engineering design, manufacturing, and delivery of all equipment and devices in accordance with these Specifications and as described in the Plans, Details, Requests for Bids, and Purchase Orders.

1.2 The "Refrigeration Equipment Manufacturer" shall mean the company awarded the bid for the manufacturing and supplying the equipment as outlined in these specifications. The Refrigeration Equipment Manufacturer shall be responsible for compliance with all applicable Federal, State, and Local codes, ordinances, and work permits. Any costs due to these codes, ordinances, or work permits shall be the manufacturer's direct responsibility and falls under the provisions of the contract.

1.3 "Subcontractor" shall mean any persons who are hired to perform work for the Refrigeration Equipment Manufacturer and are not employees of the Refrigeration Equipment Manufacturer.

1.4 The "Refrigeration Installation Contractor" shall mean the company selected by Harris Teeter, Inc. to perform the installation of all equipment and devices manufactured under these specifications for this project.

1.5 "Harris Teeter" or "Owner" shall mean Harris Teeter, Inc., P.O. Box 400, Matthews, North Carolina 28105, and whose authorized representative is the Construction Project Manager or his designated representative.

1.6 The "Engineer" shall mean ochsnerEFS, p.c.; 11111 Carmel Commons Blvd., Suite 325; Charlotte, North Carolina 28226.

2. PLANS AND SPECIFICATIONS

2.1 The Plans and Specifications are complimentary and what is called for by one shall be as binding as if called for by both. Should the plans and specifications be contradictory; or should there be any apparent errors, discrepancies, or omissions; or should there be any doubt as to the meaning of either, the Refrigeration Equipment Manufacturer shall refer the matter to Harris Teeter and the Engineer, whose decision thereon shall be binding on all parties.

2.2 Figures shall take precedence over scaled measurements and details over general plans.

2.3 All addenda, corrections, or letters issued during the time of bidding shall take precedence over the plans and specifications as written.

3. LAWS AND ORDINANCES

3.1 The Refrigeration Equipment Manufacturer shall comply with all Federal, State, and Local laws, ordinances, rules, and regulations bearing on the work within the plans and specifications that he shall perform under this contract. If the Refrigeration Equipment Manufacturer observes that the plans, specifications, or both, are at variance therewith, he shall promptly notify both Harris Teeter and the Engineer in writing. If the Refrigeration Equipment Manufacturer, without written notice to both Harris Teeter and the Engineer, furnishes any work that is not in conformance with such laws, ordinances, rules, and regulations, he shall bear all costs arising from the correction thereof. This shall not be used as a means of justifying the installation or application of parts, assemblies, or methods inferior to those specified.

ochsnerEFS, p.c.
11111 Carmel Commons Blvd., Suite 325
Charlotte, North Carolina 28226
NCBELS Firm License Number: C-2438

3.2 The Refrigeration Equipment Manufacturer shall not release or permit the release of any contaminants in an amount that would have an adverse effect on the operations or property of Harris Teeter or the general environment or would require the notification of a Federal, State, or Local governmental entity. This shall not be used as a means of justifying the installation or application of parts, assemblies, or methods inferior to those specified.

- "Release" shall include, but not be limited to, any spill, emission, leak, deposit, discharge, disposal, dispersal, migration or other movement of contaminants through or in the air, soil, surface water, ground water, or into the indoor or outdoor environment.
- "Contaminants" shall include, but not be limited to, any waste pollutant, hazardous substance, toxic substance, hazardous waste, special waste, any constituent of any such substance or waste, or any other substance regulated under Federal, State, or Local environmental or safety statute, rule, regulation, ordinance, or order.

3.3 The entire refrigeration installation including piping and equipment must comply with the 2009 International Mechanical Code with 2012 State of North Carolina Amendments for Seismic Restraints of Mechanical Systems, based on the specific store seismic zone classification, as well as ASHRAE Standard 15-2010 (Safety Code for Mechanical Refrigeration).

3.4 All refrigeration equipment must comply with the 2009 International Mechanical Code with 2012 State of North Carolina Amendments for Design Wind Speeds (Risk Category II, 100 MPH, 3 second gust).

3.5 All electrical equipment shall be U.L. and/or E.T.L. listed, where applicable.

3.6 All refrigeration equipment shall be N.S.F. and/or F.M. approved, where applicable.

4. SUBCONTRACTORS

4.1 The Refrigeration Equipment Manufacturer shall notify Harris Teeter in writing of the names of all of his subcontractors. Harris Teeter reserves the right to object to the use of any subcontractor within a reasonable period of time after receipt of this written notification.

4.2 The Refrigeration Equipment Manufacturer shall be fully responsible for the acts or omissions of his subcontractors as if they were employees of him.

5. INDEMNIFICATION

5.1 The Refrigeration Equipment Manufacturer shall protect, indemnify, hold harmless and defend Harris Teeter, its officers, directors, employees, and representatives from any and all liability damage, causes of action, suits, claims, judgments, fines, penalties, and expenses of any nature arising out of or connected with the Refrigeration Equipment Manufacturer's operation under this contract with Harris Teeter.

6. SHOP DRAWINGS, SUBMITTALS, AND EQUIPMENT MANUALS

6.1 The Refrigeration Equipment Manufacturer shall submit for written approval to the Engineer a schedule of materials that he intends to use, if such material differs in any way from that described herein. The Engineer reserves the right to refuse substitutions.

6.2 The Refrigeration Equipment Manufacturer shall submit shop drawings and brochures covering all major equipment items to the Engineer for approval prior to the manufacturing of the equipment. All shop drawings shall contain manufacturer's name, model number, and

ochsnerEFS, p.c.
11111 Carmel Commons Blvd., Suite 325
Charlotte, North Carolina 28226
NCBELS Firm License Number: C-2438

capacity data. Shop drawings for automated control system and control wiring layout shall be submitted prior to fabrication of the equipment control panels. As a minimum, the submittals shall include the following information:

- A layout plan with the size and weight for the new parallel compressor Rack A and the new parallel compressor Rack B (two sections).
- The single point electrical voltage and load for the new parallel compressor Rack A and the new parallel compressor Rack B (two sections separate) (nameplate rating).
- The single point electrical voltage and load for the new parallel compressor Rack A and the new parallel compressor Rack B controls systems.
- The compressor model numbers.
- The refrigerant and lubricant types.
- The new parallel compressor rack receiver sizing and pump down capacities.
- The new rooftop air-cooled condenser and evaporator manufacturers and model numbers.
- The single point electrical voltage and load for the new rooftop air-cooled condensers and evaporators.
- A complete list of loose mechanical components to be furnished.
- A complete list of factory installed and loose CPC and EMC components to be furnished.

This requirement must be met without exception.

It is not the intent of this list to include every particular equipment specification item for submittal review. It is the responsibility of the Refrigeration Equipment Manufacturer to abide by each and every specified item as indicated within these specifications. All equipment model and product type selections as provided within the specification set shall be adhered to by the supplier.

6.3 The Refrigeration Equipment Manufacturer shall provide a refrigeration equipment manual at the time of equipment delivery to the Refrigeration Installation Contractor. The manual shall include, but not be limited to, detailed service instructions and information with regards to the installation and operation of the new parallel compressor racks, new rooftop air-cooled condensers, and evaporators. As a minimum, the manual shall include the following information:

- Complete refrigeration legends.
- Parallel compressor rack wiring diagrams.
- Automated controls system board assignment configuration.
- Automated controls system manufacturer operational instructions.
- Rooftop air-cooled condenser installation and operation manuals.
- Evaporator installation and operation manuals.
- All Refrigeration Equipment Manufacturer's warranties.

This requirement must be met without exception.

7. GENERAL COMPONENTS:

7.1 REFRIGERANT PIPING MATERIALS:

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 line size and direction shall be accomplished with fittings or factory bent tubing/tee-drilled connections through an approved industry process warranted by the copper manufacturer.

Where the clamps are applied directly onto the copper lines, hydra-zorb cushion clamp assemblies shall be used with 1-5/8" width steel channel. ***Steel clamp parts must not touch***

ochsnerEFS, p.c.
11111 Carmel Commons Blvd., Suite 325
Charlotte, North Carolina 28226
NCBELS Firm License Number: C-2438

or rub the copper pipe.

Cadmium plated or galvanized nuts and bolts with self-locking type nut shall be used on all pipe clamps.

All piping shall be installed in such a manner as to completely prevent any type of rubbing against other pipes or any other object.

All piping shall be installed so that normal servicing of the compressors, suction filters, ball valves, schraeder valves, liquid line solenoid valves, suction CDS/EPR valves, and related equipment is not hindered.

Do not obstruct the views of the crankcase oil sight glass or run piping so it interferes with removal of the compressor, cylinder heads, end bells, access plates, fans, fan motors, coil, filters, etc.

Branch liquid lines shall exit a main liquid header manifold from the bottom of the manifold. Branch suction lines shall enter a main suction header manifold at the top of the manifold.

Branch and main liquid, latent gas, and hot gas refrigerant lines shall be sized in accordance with good industry practice to avoid excessive pressure drops.

Branch and main suction lines shall be sized to maintain adequate velocities, to properly return oil to the compressor under minimum load conditions at the lowest saturated suction pressure to be expected.

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 95/5 solder. 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 the brazing operation, dry nitrogen must be bled through the piping at very low pressure to prevent oxidation and scaling.

In order to avoid damage to the internal Silfos joints in vibration eliminators, line connections to vibration eliminators are to be made with a silver solder alloy such as Easy-Flo having a melt temperature of 900°F to 1,200°F (well below the 1,300°F melting point of Silfos).

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 female.

The Refrigeration Equipment Manufacturer shall verify that all equipment supplied has proper pressure relief protection, and that relief ports are directed downward or piped to relieve downward.

7.2 REFRIGERATION INSULATION:

Insulation shall be Armstrong Arma-flex II or Aeroflex Aerocell. All suction lines shall be insulated with 1" wall thickness insulation.

Suction header manifolds shall be entirely insulated with 1" insulation as specified. This includes insulating each suction line from the manifold back to the compressor, including the suction filters.

All insulation joints shall be sealed with rubber cement to ensure a "drip-tight" seal. Insulation shall be slipped over tubing prior to joint brazing where possible, as an alternate to splitting and then sealing the joint. Each joint should then be taped with approved insulation tape following the glue process.

Insulation shall be mitered, pre-adhered, and longitudinally slit to fit over all P-traps, tees, and elbows or bends.

ochsnerEFS, p.c.
11111 Carmel Commons Blvd., Suite 325
Charlotte, North Carolina 28226
NCBELS Firm License Number: C-2438

7.3 MECHANICAL COMPONENTS:

The mechanical connections to all pressure controlled devices, including individual compressor low pressure controllers, pressure regulated valves, etc., shall be connected with Johnson ultra cap metallic sheathed hose for non-oil flow applications and Ritchie Yellowjacket Superhose for oil flow applications that are rated for the pressures and refrigerant which it shall be used.

All valve caps shall be brass on all suction lines and subcooled liquid lines without exception. Steel valve caps shall be accepted (brass preferred and recommended) on all discharge and non-subcooled liquid lines. Plastic valve caps shall not be accepted.

Angle service valves with brass caps shall be placed at a minimum on the discharge header manifold, liquid header manifold, suction header manifold, water heat reclaim feed (where applicable), HVAC heat reclaim feed (where applicable), condenser feeds (2), and condenser return lines (2).

Schraeder valves with brass caps shall be placed on both sides of all adjustable/solenoid controlled devices in order to check the pressure drop across these devices during start-up and normal maintenance operations unless otherwise noted (see suction and liquid manifold connection details).

All ball valves shall be unitized brass assemblies manufactured by Mueller or Superior. No cap or flange style ball valves will be accepted.

All check valves without a specified pressure differential shall be unitized brass assemblies by Superior or Mueller. No take-apart style check valves will be accepted for this purpose.

All check valves with a specified pressure differential shall be spring loaded take-apart brass assemblies with brass or stainless steel bolts manufactured by Superior or Mueller.

7.4 ELECTRICAL COMPONENTS:

All electrical components shall be UL listed.

All electrical equipment shall be rated at 65K SCCR.

All electrical components and internal wiring shall be sized as per NEC2014.

All circuit breakers and contactors shall be manufactured by Square D (or approved equal), and all compressor motor contactors must be NEMA rated.

Provide two-pole toggle control switches with indicator lights for the following operations:

- Individual Compressors (green lights energized).
- Individual Refrigeration Systems (red lights energized in defrost).
- Individual auxiliary operations (red lights energized in operation).

8. REFRIGERATION EQUIPMENT MANUFACTURER REPRESENTATION

8.1 The Refrigeration Equipment Manufacturer shall provide a field service representative on site during the delivery of the new parallel compressor racks, new rooftop air-cooled condensers, and new evaporators to review the equipment and verify compliance with these specifications. Any discrepancies, defects, or physical damage of this equipment in fabrication, construction, or delivery by the Refrigeration Equipment Manufacturer or damage in installation by the Refrigeration Installation Contractor shall be addressed at this time and noted in writing to Harris Teeter and the Engineer. This shall include all labor, meals, lodging, materials, tools, and transportation for the field service representative to be on the job for the required time.

ochsnerEFS, p.c.
11111 Carmel Commons Blvd., Suite 325
Charlotte, North Carolina 28226
NCBELS Firm License Number: C-2438

8.2 The Refrigeration Equipment Manufacturer shall provide a field service representative on site for start-up service supervision of the new parallel compressor racks by the Refrigeration Installation Contractor. The Refrigeration Installation Contractor shall provide a minimum three (3) weeks notice for the Refrigeration Equipment Manufacturer for scheduling purposes. This shall include all labor, meals, lodging, materials, tools, and transportation for the field service representative to be on the job for the required time.

8.3 The Refrigeration Equipment Manufacturer shall provide a field service representative on site for one (1) day two weeks prior to grand opening, the day before grand opening, and the day of grand opening to observe the operational performance of the new parallel compressor racks, new rooftop air-cooled condensers, and evaporators within the design parameters of these specifications. Any discrepancies or deficiencies identified shall be immediately brought to the attention of the Refrigeration Installation Contractor and addressed immediately.

9. REFRIGERATION EQUIPMENT WARRANTY PERIOD

9.1 The Refrigeration Equipment Manufacturer shall warrant all equipment and workmanship for a period of one (1) year from date of start-up. All defects in material or workmanship shall be corrected at no cost to Harris Teeter during this Refrigeration Equipment Warranty Period.

9.2 The Refrigeration Equipment Manufacturer shall assign and furnish to Harris Teeter a copy of all "warranties" for equipment or manufactured components supplied for this project. It is the responsibility of the Refrigeration Installation Contractor to process all "warranty" claims that occur during the Refrigeration Equipment Warranty Period described above. All Terms and Conditions stated on the manufacturer's warranties shall apply to Harris Teeter unless in direct conflict with this specification.

9.3 The Refrigeration Equipment Manufacturer shall be responsible for all costs associated with the loss of refrigerant due to defects in material or workmanship of the equipment provided during the Refrigeration Equipment Warranty Period described above. Any refrigerant costs resulting from Refrigeration Equipment problems are to be handled directly with the Refrigeration Installation Contractor.

9.4 Harris Teeter WILL NOT pay any extra labor costs associated with the repair or replacement of any materials or parts during the Refrigeration Equipment Warranty Period described above. Any labor charges resulting from Refrigeration Equipment problems are to be handled directly with the Refrigeration Installation Contractor.

ochsnerEFS, p.c.
11111 Carmel Commons Blvd., Suite 325
Charlotte, North Carolina 28226
NCBELS Firm License Number: C-2438

SECTION III NEW PARALLEL COMPRESSOR RACKS

1. SCOPE OF WORK:

The Refrigeration Equipment Manufacturer shall be required to furnish and deliver to the site the two new (2) parallel compressor racks (identified as 'Rack A' and 'Rack B' here within) to provide the store's refrigeration capacities. These new parallel compressor racks shall be fabricated for field installation in the existing Mezzanine Motor Room.

The Refrigeration Equipment Manufacturer shall furnish all compressors, unloading valve assemblies, digital discus assemblies, manifolds, valves, piping, panels, breakers, contactors, transformers, wiring, and controls as required to provide complete and operating mechanical systems. All sizing of these components shall adhere to these specifications, the refrigerant mass flow for each individual new parallel compressor rack, and the electrical power requirements for each component.

The Refrigeration Equipment Manufacturer shall note that the new parallel compressor Rack A and new parallel compressor Rack B shall utilize R-448a refrigerant with P.O.E. oil and all of the equipment shall be manufactured to operate as such.

The Refrigeration Equipment Manufacturer shall assure that all new parallel compressor rack valve caps have been made "wrench tight" before the unit has been charged with a holding charge and shipped. Further, to enhance the overall control and assist the Refrigeration Installation Contractor in observing the condition and integrity of the brazed joints, the Refrigeration Equipment Manufacturer shall provide and install pressure gauges for the purpose of registering the holding charge comparison from charging time at the factory to the point of delivery of the racks at the site. Each rack shall be properly and conspicuously tagged as to the holding charge amount charged at the factory and the type of oil and refrigerant the equipment has been designed for. If any rack does not maintain the holding charge, the Refrigeration Equipment Manufacturer's representative shall be required to leak check the rack and repair any leaks identified. This responsibility shall fall solely upon the Refrigeration Equipment Manufacturer.

The Refrigeration Equipment Manufacturer shall ship each new parallel compressor rack free of oil and refrigerants and shall provide the necessary types and quantities of oil shipped loose for use in these racks by the Refrigeration Installation Contractor. ***All HFC refrigerants necessary for the proper operation of these racks shall be provided by the Refrigeration Installation Contractor.***

2. EQUIPMENT SELECTION/DESIGN PARAMETERS:

2.1 GENERAL REQUIREMENTS:

The new parallel compressor Rack A shall be fabricated on a minimum welded 2" tube steel frame of sufficient strength to allow unitized shipping, rigging, and installation of this rack in the existing Mezzanine Motor Room. All steel framing and welds shall be factory coated with a rust resistant coating.

The new parallel compressor Rack A shall be configured to accommodate the conventional piping configuration as indicated on the refrigeration legends in **Appendix A**. This shall include, but not be limited to the following:

- Primary oversized discharge, liquid, suction, and latent gas manifolds.
- Individual branch liquid lines with isolation ball valves and solenoid valves (electric defrost only) for individual refrigeration circuits.
- Individual branch suction lines with isolation ball valves and CDS/EPR valves with solenoid controls for individual refrigeration circuits.
- A series of ball valves to enable complete isolation for pump-down purposes.

ochsnerEFS, p.c.
11111 Carmel Commons Blvd., Suite 325
Charlotte, North Carolina 28226
NCBELS Firm License Number: C-2438

The new parallel compressor Rack A shall incorporate all of the compressor and ancillary systems as indicated within these specifications and on the refrigeration legends in **Appendix A** and shall be completely prepiped and prewired to the maximum possible extent.

The new parallel compressor Rack B shall be fabricated in two (2) sections on a minimum welded 2" tube steel frame of sufficient strength to allow unitized shipping, rigging, and installation of the two (2) rack sections in the existing Mezzanine Motor Room. All steel framing and welds shall be factory coated with a rust resistant coating.

The new parallel compressor Rack B Section 1 shall be approximately 142" long and incorporate the following components described below:

- Compressor #B1, Compressor #B2, Compressor #B3, and Compressor #B4.
- Vertical Receiver with 50%/50% split condenser liquid return.
- Primary oversized discharge, liquid, and suction (Group 1) manifolds.
- Individual branch liquid lines with isolation ball valves and solenoid valves for individual refrigeration circuits.
- Individual branch suction lines with isolation ball valves and CDS/EPR valves with solenoid controls for individual refrigeration circuits.
- Individual branch liquid and suction lines with isolation ball valves for the specified field fabricated remote header feeds.
- Electrical compartment incorporating the 208V/3Φ main power feed (Section 1), 208/1Φ control power feed (primary), and the specified automated controls system components.

The new parallel compressor Rack B Section 2 shall be approximately 114" long and incorporate the following components described below:

- Compressor #SB1, Compressor #SB2, Compressor #SB3, and Compressor #SB4.
- Oil separator with check valve and oil filter/distribution components.
- Three-way valve for HVAC heat reclaim.
- Three-way valve for 50%/50% split condenser connection.
- Primary oversized discharge, liquid, and suction (Group 2) manifolds.
- Individual branch liquid lines with isolation ball valves and solenoid valves for individual refrigeration circuits.
- Individual branch suction lines with isolation ball valves and CDS/EPR valves with solenoid controls for individual refrigeration circuits.
- Loop liquid line and suction line connections with isolation ball valves.
- Electrical compartment incorporating the 208V/3Φ main power feed (Section 2), 208/1Φ control power feed (secondary), and the specified automated controls system components.

The new parallel compressor Rack B shall incorporate all of the compressor and ancillary systems as indicated within these specifications and on the refrigeration legends in **Appendix A** and shall be completely prepiped and prewired to the maximum possible extent in the two (2) specified sections with a series of ball valves to enable complete isolation for pump down purposes. All materials necessary for the mechanical and electrical connections between the two sections shall be supplied by the Refrigeration Equipment Manufacturer and secured to Section 1.

Each new parallel compressor rack shall have two electrical connections with separate MCA and MOPD listings. The first connection shall be 208V/3Φ which shall provide operational power to the compressors. This power feed shall be connected to a phase loss monitor that shall shut down power to the compressors in the event of a loss of any of the three phases. Please note, each section of the new parallel compressor Rack B shall have a separate 208V/3Φ

ochsnerEFS, p.c.
11111 Carmel Commons Blvd., Suite 325
Charlotte, North Carolina 28226
NCBELS Firm License Number: C-2438

connection with a dedicated phase loss monitor. The second connection shall be 208V/1Φ which shall provide operational power to the automated controls system and all solenoid and contactor/component controls. These racks shall be prewired with the automated controls system controller, I/O boards, and the specified prewired sensors/transducers to the maximum possible extent.

Each new parallel compressor rack shall be as schematically depicted on the Refrigeration Controls (RC) plans by ochsnerEFS, p.c. The size and weight limitations for these parallel compressor racks shall be as follows:

SYSTEM ID	PHYSICAL DIMENSIONS	PHYSICAL WEIGHT
Rack A	184"L x 40"W x 80"H	5,500 lbs.
Rack B	256"L x 40"W x 80"H	8,250 lbs.

Due to the restrictive size of the existing Mezzanine Motor Room, the overall dimensions for the new parallel compressor racks ***MUST NOT*** exceed the sizes indicated above. In the event of a conflict, the Refrigeration Equipment Manufacturer must notify the Engineer immediately.

The Refrigeration Equipment Manufacturer shall furnish loose hard rubber isolation pads for each parallel compressor rack to dampen the transmitted vibration. These isolation pads shall be of adequate quantity and sized to accommodate the parallel compressor rack weights noted above. The Refrigeration Equipment Manufacturer shall provide the Refrigeration Installation Contractor with the spacing and location requirements to properly support these racks.

2.2 COMPRESSORS:

The two (2) new parallel compressor racks shall consist of the following semi-hermetic Copeland Intelligent Store Discus compressors in the configuration specified below:

PARALLEL COMPRESSOR RACK A

SYSTEM ID	COMPRESSORS	REFRIGERANT TYPE	ST ° F	MBH	REMARKS
A1	3DSDF46KL	R-448a	-23	38.100	Digital Discus
A2	4DHNF63KL	R-448a	-23	54.200	-
A3	4DHNF63KL	R-448a	-23	54.200	-
A4	4DHNF63KL	R-448a	-23	54.200	-
A5	4DRNF76KL	R-448a	-23	66.500	Unloader
	TOTAL			**267.200**	**TOTAL**

PARALLEL COMPRESSOR RACK B

SYSTEM ID	COMPRESSORS	REFRIGERANT TYPE	ST ° F	MBH	REMARKS
B1	3DF3R15KL	R-448a	+18	99.700	-
B2	3DSDR17ML	R-448a	+18	116.000	Digital Discus
B3	4DANR18ML	R-448a	+18	125.500	-
B4	4DCNR20ML	R-448a	+18	146.000	Unloader
	TOTAL			**487.200**	**TOTAL**
SB1	2DA3R89KL	R-448a	+24	67.800	-
SB2	3DA3R10ML	R-448a	+24	82.700	-
SB3	3DF3R15KL	R-448a	+24	115.000	-
SB4	3DSDR17ML	R-448a	+24	133.500	Digital Discus
	TOTAL			**399.000**	**TOTAL**

ochsnerEFS, p.c.
11111 Carmel Commons Blvd., Suite 325
Charlotte, North Carolina 28226
NCBELS Firm License Number: C-2438

These compressors shall each be individually mounted to the welded tube steel frame with vibratory isolation connections and shall adhere to all manufacturer's requirements.

These compressors shall each incorporate the Copeland Intelligent Store Discus 2.0 (Coresense Diagnostics) controls with the network communication interface with the corresponding parallel compressor rack automated controls system controller for compressor on/off control; capacity modulation of the specified solenoid controlled unloaders/digital discus assemblies; and protection against low oil pressure (oil failure), high discharge temperature, high discharge pressure, and low suction pressure. These controls eliminate the need for conventional oil failure, high discharge pressure, and low suction pressure safety controls for each compressor.

Each compressor control circuit shall be powered through an adjustable off time delay relay prior to the control relay within the Copeland Intelligent Store Discus 2.0 (Coresense Diagnostics) controls for offsetting compressor startup after a power outage.

Each new parallel compressor rack suction group shall incorporate a single oversized brass replaceable core suction filter with brass or stainless steel bolts manufactured by Superior. These suction filters shall be installed at the double suction header connection between the individual refrigeration system/field fabricated remote header/loop piping connection suction header and the compressor suction header as described below. The Refrigeration Equipment Manufacturer shall size these suction filters for minimal pressure drops and shall submit the designed pressure drop to the Engineer for review and approval. All suction filter bodies shall be insulated with 1" insulation, as specified, with a removable insulated cover over the suction filter core cover.

All compressors on the new parallel compressor Rack A must incorporate an auxiliary head cooling fan, designed to operate whenever the compressor is energized, which shall be separately fused from the compressor relay contacts.

All compressors on the new parallel compressor Rack A must incorporate the necessary demand cooling components for operation at the specified suction temperature.

All compressors the on new parallel compressor Rack B, the +24°F sst suction group must incorporate crank case heaters.

All new parallel compressor racks shall have their compressor heads painted as to the universally designated refrigerant color code.

All new parallel compressor racks shall be shipped dry, free of oil and refrigerants. The Refrigeration Equipment Manufacturer shall furnish the necessary P.O.E. oil (Rack A and Rack B) to be shipped separately, as specified.

2.3 OIL SEPERATION, EQUALIZATION, AND FILTRATION:

The two (2) new parallel compressor racks shall each incorporate an oversized, cleanable oil separator manufactured by Turba-shed, Westermeyer, or AC&R installed after the compressor discharge manifold with a check valve on the outlet side of the separator.

The oil distribution to compressors for each new parallel compressor rack shall be accomplished via the oil reservoir/float technique using adjustable oil level floats manufactured by Emerson Flow Controls. There shall be ***NO*** oil equalization lines installed between the compressors' adjustable oil floats.

An oil filter/drier system shall be incorporated for each new parallel compressor rack to clean and dry the oils as the oil is returned to the oil reservoir and compressor crankshaft. These components shall include a Sporlan suction filter (SF283-F), Sporlan oil filter (OF303), ball valve, and regulator (for each suction group) from the oil separator service valve connection.

ochsnerEFS, p.c.
11111 Carmel Commons Blvd., Suite 325
Charlotte, North Carolina 28226
NCBELS Firm License Number: C-2438

2.4 WATER HEAT RECLAIM:

The new parallel compressor Rack A shall be manufactured with a prewired Sporlan solenoid controlled three-way valve on the compressor discharge manifold line after all oil separators for the purpose of feeding two (2) existing water heat reclaim tanks piped in parallel. The Refrigeration Equipment Manufacturer shall incorporate this valve with a ball valve on the water heat reclaim discharge outlet, a check valve with ball valve on the water heat reclaim discharge return line, and a differential pressure check valve rated at 10 psig between these two lines to limit the discharge pressure drop across the water heat reclaim tanks.

This three-way valve shall be controlled through the automated controls system based on the tempered water outlet temperature from the water heat reclaim tanks.

2.5 HVAC HEAT RECLAIM:

The new parallel compressor Rack B shall be manufactured with a prewired Sporlan solenoid controlled three-way valve on the compressor discharge manifold line after all oil separators for the purpose of feeding a factory installed heat reclaim coil in the corresponding rooftop Seasons4 HVAC package units (provided by others). The Refrigeration Equipment Manufacturer shall incorporate this valve with a ball valve on the HVAC heat reclaim discharge outlet line, a check valve with ball valve on the HVAC heat reclaim discharge return line, and a differential pressure check valve rated at 10 psig between these two lines to limit the discharge pressure drop across the heat reclaim coil. A heat reclaim pump out line with solenoid valve shall be installed on the HVAC heat reclaim discharge return line and piped to the circuit connection section of the dual suction manifold described below.

These three-way and pumpout solenoid valves shall be controlled through the automated controls system based on a heat reclaim input from the corresponding rooftop Seasons4 package unit for the new parallel compressor Rack B, with lockout controls based on discharge pressure and receiver liquid levels. These lockouts shall be set to prevent HVAC heat reclaim operations when called for if the parallel compressor rack's discharge pressure falls 10 psig below the target discharge pressure note below or below 10% of the receiver's capacity.

The total available heat for HVAC heat reclaim for the new parallel compressor Rack B is as follows:

SYSTEM ID	AVAILABLE HEAT RECLAIM
Rack B	545.91 MBH

2.6 DISCHARGE PRESSURE CONTROL/SPLIT CONDENSERS:

The discharge pressure control for each of the two (2) new parallel compressor racks shall be through condenser fan cycling by the automated controls system based on ambient temperature differential in conjunction with 50%/50% split condenser piping and an adjustable condenser flooding valve on the condenser return line for each rack.

The two (2) new parallel compressor racks shall each be fabricated with two condenser circuits split 50%/50% from the compressor discharge manifold line after all oil separators, water heat reclaim components (if applicable), and HVAC heat reclaim components (if applicable) through a solenoid controlled three-way valve manufactured by Sporlan. The Refrigeration Equipment Manufacturer shall incorporate this valve with individual circuit ball valves on the condenser discharge outlets and individual circuit check valves and ball valves on the condenser liquid return lines. A condenser liquid pump out line with solenoid valve shall be installed on the 50% "OFF" condenser liquid return line and piped to the circuit connection

ochsnerEFS, p.c.
11111 Carmel Commons Blvd., Suite 325
Charlotte, North Carolina 28226
NCBELS Firm License Number: C-2438

section of the dual suction manifold described below.

These three-way and pump out solenoid valves shall be controlled through the automated controls system based on the ambient temperature.

The two (2) new parallel compressor racks shall each be fabricated with an adjustable inlet pressure regulator manufactured by Parker (Flo-con A8) with isolation ball valves on the combined condenser liquid return line after the split 50%/50%. This valve shall be designed to modulate the liquid return from the condensers and shall be set at 10-15 psig below the required design discharge pressure set points indicated below:

SYSTEM ID	TARGET DISCHARGE PRESSURE
Rack A	195.0 psig
Rack B	165.0 psig

Since compressor operating efficiency and energy consumption is of prime importance, it is mandatory that the condensing pressures do not exceed these values at all times when ambient conditions permit.

2.7 VERTICAL LIQUID RECEIVERS:

The two (2) new parallel compressor racks shall each incorporate a vertical receiver mounted directly to the rack's structural framing (left side facing front).

These receivers shall be sized and fabricated to the following minimum capacities to cope with the refrigerant volume, particularly during the summer months, as a result of the winter condenser flooding requirements.

SYSTEM ID	MINIMUM RECEIVER CAPACITY
Rack A	675 lbs.
Rack B	850 lbs.

These receivers shall each incorporate a minimum three (3) sight glass level indicators (25%/50%/75%) with ball floats and automated controls system level indicators that shall be installed in such a way as to provide a full and unobstructed view of these level indicators.

These receivers shall each be equipped with pressure relief valves with rupture disks manufactured by Henry or Mueller to be monitored by the automatic controls system. These relief valves shall be piped to the exterior of the Mezzanine Motor Room in the field by the Refrigeration Installation Contractor.

These receivers shall each incorporate an adjustable receiver pressure regulator manufactured by Parker (Flo-con A9) that shall be piped with isolation ball valves from the compressor discharge manifold line after all oil separators to the top of the receiver. This valve shall be designed to maintain a constant receiver vapor pressure and shall be set at 20-25 psig below the required design discharge pressure set points indicated above.

2.8 SURGE RECEIVER BYPASS AND LIQUID DRIERS:

The two (2) new parallel compressor racks shall not incorporate a surge receiver bypass system at the corresponding vertical receiver.

The two (2) new parallel compressor racks shall each incorporate a replaceable core liquid filter/drier on the receiver outlet with isolation ball valves on the inlet and outlet. The filter/driers

ochsnerEFS, p.c.
11111 Carmel Commons Blvd., Suite 325
Charlotte, North Carolina 28226
NCBELS Firm License Number: C-2438

shall be of a high moisture capacity removal style manufactured by Sporlan or Superior. Two (2) 3/8" liquid charging angle valves shall be installed at the piping inlet to the filter/drier after the isolation ball valve and a Sporlan sight glass with moisture indicator with plastic cover shall be installed at the piping outlet from the filter/drier prior to the isolation ball valve.

2.9 LIQUID HEADER MANIFOLD AND REFRIGERATION SYSTEM CONNECTIONS:

The new parallel compressor Rack A shall incorporate two horizontal liquid header manifolds from which the individual refrigeration system liquid line connections are made as per the refrigeration legends in **Appendix A** and shall be completely prepiped and prewired to the maximum possible extent. The first horizontal liquid manifold shall be piped through the latent gas defrost system liquid line pressure differential valve as described below and incorporate all individual refrigeration system liquid line connections specified with latent gas defrost. The second horizontal liquid manifold shall be connected to the liquid line outlet from the receiver after the replaceable core liquid filter/drier, prior to the aforementioned latent gas defrost system liquid line pressure differential valve, and incorporate all individual refrigeration system liquid line connections not specified with latent gas defrost.

The new parallel compressor Rack B shall incorporate a single horizontal liquid header manifold from which the individual refrigeration system, field fabricated remote header (where applicable), and loop piping (where applicable) liquid line connections are made as per the refrigeration legends in **Appendix A**, and shall be completely prepiped and prewired to the maximum possible extent.

The individual refrigeration circuit liquid line connections shall be piped to the bottom of the liquid header manifold with a J-bend liquid line sized as per the refrigerant line sizing in **Appendix B** to vertical liquid line stubs. Each liquid line for the individual refrigeration circuits shall be spaced at a minimum 6" on center and incorporate the following components in order from the liquid header manifold connection:

- An isolation ball valve.
- A Parker or Sporlan liquid line solenoid valve with bypass stem for all off-time defrost and electric defrost systems.

The field fabricated remote header liquid line connections (where applicable) shall be piped to the bottom of the liquid header manifold with a J-bend liquid line sized as per the refrigerant line sizing in **Appendix B** to vertical liquid line stubs. These liquid lines shall be spaced at a minimum 6" on center from the closest individual refrigeration circuit connection and shall incorporate an isolation ball valve.

The loop piping liquid line connections (where applicable) shall be piped to the bottom of the liquid header manifold with a J-bend liquid line as sized per the refrigeration legends in **Appendix A** to vertical loop piping liquid line connections. Each loop piping liquid line connection shall incorporate the following components in order from the liquid header manifold connection:

- An isolation ball valve.
- An angle valve with schraeder valve connection.

The Refrigeration Equipment Manufacturer shall size the liquid header manifolds to minimize the pressure loss in the manifold due to refrigerant mass flow. The horizontal liquid header manifolds shall be mounted directly to the rack structure with hydra-zorb clamp supports.

ochsnerEFS, p.c.
11111 Carmel Commons Blvd., Suite 325
Charlotte, North Carolina 28226
NCBELS Firm License Number: C-2438

2.10 SUCTION HEADER MANIFOLD AND REFRIGERATION SYSTEM CONNECTIONS:

The two (2) new parallel compressor racks shall each incorporate a horizontal double suction header manifold. The first of the double suction header manifolds shall incorporate the individual refrigeration system, field fabricated remote header (where applicable), and suction loop piping (where applicable) suction line connections as per the refrigeration legends in **Appendix A** and shall be completely prepiped and prewired to the maximum possible extent. This suction header manifold shall be connected to the second suction header manifold, from which the suction connections for the compressors are made, through the previously specified oversized brass replaceable core suction filter. These suction header manifolds shall be 4-1/8" O.D. and mounted directly to the rack structure with hydra-zorb clamp supports.

The individual refrigeration system suction line connections shall be vertically piped to the top of the appropriate suction header manifold and sized as per the refrigerant line sizing in **Appendix B**. Each suction line for the individual refrigeration circuits shall be spaced at a minimum 6" on center (centered in front of and between the liquid line stubs) and incorporate the following components in order from the suction header manifold connection:

- An isolation ball valve.
- A Sporlan CDS electronic evaporator control valve (12 VDC only) with inlet pressure tap for the specified circuits as per the refrigeration legends in **Appendix A**.
- An adjustable Parker Sport/Sport II suction EPR valve with solenoid controls for the specified circuits as per the refrigeration legends in **Appendix A**.
- A schraeder valve connection if the suction CDS/EPR valve does not incorporate one within its assembly.
- A latent gas defrost piping connection (if applicable).

The field fabricated remote header suction line connections (where applicable) shall be vertically piped to the top of the appropriate suction header manifold and sized as per the refrigerant line sizing in **Appendix B**. These suction lines shall be spaced at a minimum 6" on center (centered in front of and between the liquid line stubs) from the closest individual refrigeration circuit connection and shall incorporate the following components in order from the suction header manifold connection:

- An isolation ball valve.
- An angle valve with schraeder valve connection.

The loop piping suction line connections (where applicable) shall be vertically piped to the top of the appropriate suction header manifold and sized as per the refrigeration legends in **Appendix A**. Each loop piping suction line connection shall incorporate the following components in order from the suction header manifold connection:

- An isolation ball valve.
- An angle valve with schraeder valve connection.

Only the specified oversized brass replaceable core suction filter assembly (no suction accumulators) shall be installed between the two suction header manifolds.

The compressor suction line feeds shall be connected to the bottom of the appropriate suction header manifold and extend into the suction manifold a minimum of 2" in order to prevent direct liquid flooding into the suction side of the compressor. J-tube oil return piping or weep holes in the suction piping connection extension into the manifold shall be utilized at each compressor connection to the suction manifold header to allow refrigerant oil return.

All suction header manifolds, associated individual refrigeration system, field fabricated remote header, and loop suction line connections; and compressor suction line feeds shall be

ochsnerEFS, p.c.
11111 Carmel Commons Blvd., Suite 325
Charlotte, North Carolina 28226
NCBELS Firm License Number: C-2438

completely insulated with 1" insulation, as specified. This material must cover the entire manifold, as well as all interconnecting piping.

2.11 LATENT GAS DEFROST:

The new parallel compressor Rack A shall be manufactured with latent gas defrost for the noted refrigeration systems on the refrigeration legends in **Appendix A**, and shall be completely prepiped and prewired to the maximum possible extent. The latent gas system shall consist of the following:

- A normally open adjustable liquid line pressure differential valve with solenoid controls and ball valves installed on the liquid line outlet of the receiver after the replaceable core liquid filter/drier. This valve shall be controlled through the automated controls system based on the defrost schedules for the systems with latent gas defrost.
- A latent gas defrost manifold shall be installed from the top of the receiver to run above the compressors between the liquid and double suction header manifolds.
- A latent gas defrost connection shall be installed for each individual refrigeration system from this latent gas defrost manifold to the corresponding system suction stub through an isolation ball valve and Parker solenoid valve control.

2.12 LOOSE REFRIGERATION COMPONENTS:

The Refrigeration Equipment Manufacturer shall supply the following loose mechanical components for field installation by the Refrigeration Installation Contractor:

- A Parker or Sporlan liquid line solenoid valve with bypass stem for each off-time and electric defrost refrigeration system on the new parallel compressor racks noted above without a factory installed liquid line solenoid valve.
- A Sporlan CDS electronic evaporator control valve (12 VDC only) with inlet pressure tap as per the refrigeration legends in **Appendix A** for each specified refrigeration system on the new parallel compressor racks noted above without a factory installed suction CDS/EPR valve.

The Refrigeration Installation Contractor shall supply and install full port isolation ball valves for isolation of these components as shown on the Refrigeration Control (RC) plans by ochsnerEFS, p.c.

ochsnerEFS, p.c.
11111 Carmel Commons Blvd., Suite 325
Charlotte, North Carolina 28226
NCBELS Firm License Number: C-2438

SECTION IV NEW ROOFTOP AIR-COOLED CONDENSERS

1. SCOPE OF WORK:

The Refrigeration Equipment Manufacturer shall furnish and deliver to the site the following two (2) new rooftop air-cooled condensers (identified as 'RC-A' and 'RC-B here within) for the corresponding new parallel compressor Rack A and new parallel compressor Rack B in accordance with the following specifications.

2. EQUIPMENT SELECTION/DESIGN PARAMETERS:

TYPE ..... Vertical airflow - rooftop air-cooled.
FANS ..... Direct drive multiple fans - 850 RPM.
VOLTAGE ..... 208V/3Φ/60 (to be confirmed by reference to the electrical plans) with phase loss protection.
FIN SPACING ..... As Indicated.
CORROSION PROTECTION ..... None.
WIND SPEED RATING ..... 100 MPH, 3 second gust (to be confirmed by reference to the 2009 International Building Code with 2012 State of North Carolina Amendments Design Wind Speeds for Hurricane Restraints of Mechanical Systems.
COILS RC-A,B ..... The coil slab shall be split into two (2) independent 50% sections. Control shall enable the following steps: 50%, 100%. The condensers shall be prewired with the necessary relays and contactors to accommodate this scheme. The new parallel compressor Rack A and the new parallel compressor Rack B shall include circuiting and valves for these two (2) condenser circuits.
FAN CONTROL ..... The condenser fans shall be cycled in pairs during normal operation. During pump out of one of the two coils, the fans over the dead coil section shall be de-energized. The condensers shall be factory prewired to control the fans as specified.
CONTACTORS ..... Each condenser fan shall include a separate fan contactor. Further, the fans are to be factory wired to facilitate the shutdown of one complete fan bank, as a result of a single digital output.
CONTROL TYPE ..... The condenser control shall include separate outputs to control each fan pair and the split condenser fan.
FUSING ..... Each condenser fan shall be separately fused.
MANUFACTURERS ..... Krack or approved equivalent.

CONDENSER SELECTION PARAMETERS

UNIT DESIGNATION	COMPRESSOR SYSTEMS	KRACK CONDENSER
RC-A	Rack A	LAVC 25308K
RC-B	Rack B	LEVC 26410K

ochsnerEFS, p.c.
11111 Carmel Commons Blvd., Suite 325
Charlotte, North Carolina 28226
NCBELS Firm License Number: C-2438

SECTION V EVAPORATOR COILS

1. SCOPE OF WORK:

The Refrigeration Equipment Manufacturer shall furnish and deliver to the site the following Krack or approved equivalent new walk-in cooler, walk-in freezer, and refrigerated prep room evaporator coils for the corresponding refrigeration systems on the new parallel compressor Rack A and new parallel compressor Rack B in accordance with the specifications below. The specified existing evaporators shall be repiped in the existing locations or be relocated and repiped with the necessary expansion valve changes in accordance with the specifications below.

2. EQUIPMENT SELECTION/DESIGN PARAMETERS:

SYSTEM	QTY	KRACK MODEL #	DEFROST TYPE	FAN VOLTAGE/ DEF. VOLTAGE	ACTUAL TD	REF
A19	1	MLT4165CA (e)	ELC	230V/1Φ / 230V/3Φ	6.97	R-448a*
A20	3	KR54P185EBB (n)	LG	120V/None	5.60	R-448a
B17	1	LFA190AE (e)	OT	120V/None	11.48	R-448a*
B18	1	ADT104AK (e)	OT	120V/None	8.65	R-448a*
B19	1	LFA097AHE (e)	OT	120V/None	6.19	R-448a*
B20	2	GL56D225EAA (n)	ELC	230V/1Φ / 230V/1Φ	7.58	R-448a
B21	2	LFA230AE (e)	OT	120V/None	11.66	R-448a*
B45	3	GL56A225BB (n)	OT	120V/None	11.67	R-448a
B46	2	LFA120AHE (er)	OT	120V/None	17.29	R-448a*

(n) New evaporator
(e) Existing evaporator repiped to new system
(er) Existing evaporator relocated and repiped to new system
* **Converted from R-404a to R-448a refrigerant**

The following shall be furnished for installation in the field:

1. Sporlan thermostatic expansion valves (sweat type).
2. Liquid line strainers.
3. Fan delay thermostat - factory installed.
4. Defrost termination thermostats - factory installed (electric defrost evaporators only).
5. Electric drain pan heaters required for all latent gas and electric defrost evaporators.
6. All new evaporators shall have a white housing finish.
7. All new walk-in cooler and walk-in freezer evaporators shall utilize EC fan motors.
8. All new refrigerated prep room evaporators shall utilize PSC fan motors.

ochsnerEFS, p.c.
11111 Carmel Commons Blvd., Suite 325
Charlotte, North Carolina 28226
NCBELS Firm License Number: C-2438

SECTION VI AUTOMATED CONTROLS SYSTEM

1. SCOPE OF WORK:

The Refrigeration Equipment Manufacturer shall be required to furnish and deliver to the site the two (2) new parallel compressor racks (identified as 'Rack A' and 'Rack B' here within) and two (2) new rooftop air-cooled condensers (identified as 'RC-A' and 'RC-B' here within) with factory wired CPC E2 RX-300E/RX-400E controllers (v4.07F02) and Copeland Intelligent Store Discus 2.0 (Coresense Diagnostics) control modules (racks only), CPC Multi-flex I/O boards, CPC Multi-flex ESR-8 boards (racks only), and the specified prewired CPC sensors and transducers to the maximum possible extent for the purposes of primary suction pressure, discharge pressure, system temperature, system defrost, and ancillary function controls for this equipment.

The Refrigeration Equipment Manufacturer shall furnish all transformers, wiring, CPC E2 RX-300E/ RX-400E controllers (v4.07F02), Copeland Intelligent Store Discus 2.0 (Coresense Diagnostics) control modules, CPC Multi-flex I/O boards, CPC Multi-flex ESR-8 boards, and CPC sensors/transducers as required to provide complete and operating systems control. All sizing of these components shall adhere to these specifications and the electrical power requirements for each component.

The Refrigeration Equipment Manufacturer shall note that the new parallel compressor Rack A and new parallel compressor Rack B shall utilize R-448a refrigerant with P.O.E. oil and all the equipment shall be manufactured to operate as such.

The Refrigeration Equipment Manufacturer shall provide all loose components specified for the installation of the refrigeration controls system including the CPC Facility Status Display, Multi-flex I/O boards with enclosures, Multi-flex ESR-8 boards with enclosures, transformers, and temperature sensors.

The Refrigeration Equipment Manufacturer shall provide all loose components specified for the installation of the refrigeration controls system including the EMC refrigerant leak detection transducers.

The Refrigeration Equipment Manufacturer shall provide all loose components specified for the installation of the complete EMS system including the CPC Multi-flex I/O boards with enclosures, Multi-flex RTU boards with weatherproof enclosures, transformers, space, supply air, and return air temperature sensors; dewpoint temperature sensors, and domestic water heater outlet temperature sensor for the HVAC/Lighting control system.

The Refrigeration Equipment Manufacturer shall adhere to these specifications and the Energy Management (EM) plans by ochsnerEFS, p.c. for all details and requirements associated with the design and installation of the automated controls system.

2. EQUIPMENT SELECTION/DESIGN PARAMETERS:

2.1 CONTROLLER:

Each new parallel compressor rack shall be factory wired with a CPC E2 RX-300E/RX-400E controller (v4.07F02) with TCP/IP Ethernet Card for the control of the corresponding parallel compressor rack, CPC Multi-flex I/O boards, Multi-flex ESR-8 boards, and rooftop air-cooled condenser. All field wiring from this controller to the new parallel compressor racks, remote CPC Multi-flex I/O boards with enclosures, remote Multi-flex ESR-8 Boards with enclosures (where applicable), and new rooftop air-cooled condensers shall be installed by the Electrical Contractor and terminated by the Refrigeration Installation Contractor.

The basic control functions of each CPC E2 RX-300E/RX-400E controller (v4.07F02) shall be

ochsnerEFS, p.c.
11111 Carmel Commons Blvd., Suite 325
Charlotte, North Carolina 28226
NCBELS Firm License Number: C-2438

as follows:

- Maintain the optimum design suction pressures via the Copeland Intelligent Store Discus 2.0 (Coresense Diagnostics) control modules through modulation of the compressors and/or unloading solenoids/digital discus assemblies based on MBH capacities, through selection of the best compressor and operational cylinder combination to satisfy the current and predicted load. This shall be performed while maintaining the compressor operational integrity, and with a strategy designed to minimize power consumption.
- Maintain the pre-selected discharge pressures through modulation of the condenser fans, condenser fan split, and pump out requirements in response to ambient temperature and head pressure.
- Control and monitoring of the individual refrigeration circuits in refrigeration and defrost modes via interface with the liquid line solenoid valves (where applicable), suction CDS or EPR valves, and latent gas defrost valves (where applicable).

The programming of each CPC E2 RX-300E/RX-400E controller (v4.07F02) shall be by the Refrigeration Installation Contractor based upon parameters established by the Refrigeration Equipment Manufacturer.

2.2 INPUT/OUTPUT BOARDS:

The Refrigeration Equipment Manufacturer shall be required to factory install and prewire the necessary CPC Multi-flex input and output boards with necessary transformers in the two (2) new parallel compressor racks and two (2) new rooftop air-cooled condensers for systems control purposes by the corresponding rack CPC E2 RX-300E/RX-400E controller (v4.07F02). These boards shall consist of the necessary Copeland Intelligent Store Discus 2.0 (Coresense Diagnostics) control modules (racks only), CPC Multi-flex 168, Multi-flex 88, Multi-flex 16, 8RO, and Multi-flex ESR-8 (racks only) boards to control all functions of this equipment described here within. The selection and layout of these boards within this equipment shall be as shown on the Energy Management (EM) plans by ochsnerEFS, p.c. The Refrigeration Equipment Manufacturer shall coordinate any discrepancies with ochsnerEFS, p.c. prior to fabrication. The Refrigeration Equipment Manufacturer shall prewire all power, control, and communications wiring within this equipment to the maximum possible extent. There shall be no CPC Multi-flex input and output boards mounted on the electrical cabinet doors. A terminal strip shall be prewired within this equipment for all input and output field wiring terminations.

The two (2) new parallel compressor racks shall each be designed to have a minimum total of four (4) spare digital outputs and six (6) spare analog/digital inputs for each refrigeration system.

2.3 SENSOR/DIGITAL CONTROL INPUTS:

The Refrigeration Equipment Manufacturer shall be required to factory install and prewire the necessary CPC sensor/digital inputs in the two (2) new parallel compressor racks and two (2) new rooftop air-cooled condensers for monitoring by the corresponding rack CPC E2 RX-300E/RX-400E controller (v4.07F02). The sensors, transducers, and relays required for all sensors/digital inputs not noted as 'FIELD INSTALLED' shall be provided and factory installed by the Refrigeration Equipment Manufacturer. The following is a summary for each type of equipment of the minimum sensor/digital inputs required:

Parallel Compressor Racks:

- One (1) suction pressure transducer for each suction group.
- One (1) discharge pressure transducer.
- One (1) receiver level transducer (vertical).

ochsnerEFS, p.c.
11111 Carmel Commons Blvd., Suite 325
Charlotte, North Carolina 28226
NCBELS Firm License Number: C-2438

- One (1) refrigerant leak detection transducer and sensor bulb for the specified refrigerant.
- One (1) suction header manifold temperature sensor for each suction group.
- One (1) discharge header manifold temperature sensor.
- One (1) condenser drop leg temperature sensor.
- One (1) liquid header manifold temperature sensor.
- One (1) phase loss monitor digital input (one (1) for each section of Rack B).
- One (1) receiver rupture disk alarm digital input.
- One (1) digital input through toggle switch for each latent gas defrost system (Rack A only).
- One (1) digital input through toggle switch for each field fabricated remote header and loop piped system (Rack B only).
- One (1) water heat reclaim temperature sensor (Rack A only). FIELD INSTALLED
- One (1) HVAC heat reclaim digital input (Rack B only). FIELD INSTALLED
- One (1) ambient temperature sensor. FIELD INSTALLED
- The specified temperature sensors for the specified individual refrigeration circuits as shown on the Energy Management (EM) plans by ochsnerEFS, p.c. (specified individual refrigerated cases, walk-in coolers, walk-in freezers, and refrigerated prep rooms only). FIELD INSTALLED
- The specified refrigerant leak transducers for the specified refrigerant for the specified individual refrigeration circuits as shown on the Energy Management (EM) plans by ochsnerEFS, p.c. (specified walk-in coolers, walk-in freezers, and enclosed refrigerated prep rooms only). FIELD INSTALLED
- The specified door switch digital inputs for the specified individual refrigeration circuits as shown on the Energy Management (EM) plans by ochsnerEFS, p.c. (specified walk-in cooler and walk-in freezers only). FIELD INSTALLED
- The specified temperature sensors for heat tape sensor monitoring for the specified individual refrigeration circuits as shown on the Energy Management (EM) plans by ochsnerEFS, p.c. (specified walk-in coolers and walk-in freezers with GFCI protected heat tape only). FIELD INSTALLED

Rooftop Air-cooled Condensers:

- NONE REQUIRED.

All factory installed CPC temperature sensors shall be mechanically fastened to the appropriate copper pipe, and wrapped in a permanent insulated cover.

All factory installed transducers must be strategically located to prevent damage and inaccurate readings due to pressure surges.

2.4 CONTROL OUTPUTS:

The Refrigeration Equipment Manufacturer shall be required to factory install and prewire the necessary CPC outputs in the two (2) new parallel compressor racks and two (2) new rooftop air-cooled condensers for systems control purposes by the corresponding rack CPC E2 RX-300E /RX-400E controller (v4.07F02). The control outputs not noted as 'FIELD INSTALLED' shall be provided and factory installed by the Refrigeration Equipment Manufacturer with the noted failsafe wiring for controller failure (NC-normally closed; NO-normally open). The following is a summary for each type of equipment of the minimum control outputs required:

Parallel Compressor Racks:

- One (1) output for the water heat reclaim three-way valve controls (Rack A only). (NO)

ochsnerEFS, p.c.
11111 Carmel Commons Blvd., Suite 325
Charlotte, North Carolina 28226
NCBELS Firm License Number: C-2438

- Three (3) seriesed outputs for the HVAC heat reclaim three-way valve controls (Rack B only). (NO,NC,NC)
- One (1) output for the split condenser three-way valve controls. (NO)
- One (1) output for the liquid line pressure differential valve for latent gas defrost (Rack A only). (NO)
- One (1) output for each individual refrigeration circuit specified for refrigeration mode wired through the circuit two-pole toggle switch and to the corresponding liquid line solenoid (Off-time and electric defrost circuits only) and Parker Sport/Sport II suction EPR valve (where applicable). (NC)
- One (1) output for each individual refrigeration circuit specified for defrost mode wired through the circuit two-pole toggle switch (Rack A; latent gas defrost circuits only). (NO)
- One (1) analog output for each individual refrigeration circuit from the CPC Multi-flex ESR-8 board to the corresponding circuit Sporlan CDS electronic evaporator control valve. (12V)
- One (1) output for each individual refrigeration circuit specified for defrost mode wired through the circuit two-pole toggle switch (Rack A and Rack B; electric defrost circuits only). (NO) FIELD INSTALLED
- One (1) output for the specified individual refrigeration circuits as shown on the Energy Management (EM) plans by ochsnerEFS, p.c. for refrigerant leak detection shutdown wired through the circuit two-pole toggle switch (specified walk-in coolers, walk-in freezers, and enclosed refrigerated prep rooms only). (NC) FIELD INSTALLED
- One (1) output for the rack refrigerant leak alarm. (NO) FIELD INSTALLED

Rooftop Air-cooled Condensers:

- One (1) output for each condenser fan pair. (NC)
- One (1) output for the normally closed split condenser fan lockout contactor. (NO)

The Refrigeration Equipment Manufacturer shall wire all parallel compressor rack output wiring through the specified two-pole toggle control switches as specified in the **Section II: General Conditions** section of this specification unless otherwise noted above.

2.5 LOOSE COMPONENTS: REFRIGERATION (FIELD)

The Refrigeration Equipment Manufacturer shall be required to supply the following loose CPC/EMC components for field installation as shown on the Energy Management (EM) plans by ochsnerEFS, p.c.:

- One (1) CPC E2 Facility Status Display (CPC P/N: 850-5100).
- One (1) CPC Hand-Held Terminal (CPC P/N: 814-3110).
- Seven (7) CPC Multi-flex 168 boards and with transformers in individual enclosures (CPC P/N: 810-1168).
- Four (4) CPC Multi-flex 16 board with transformer in individual enclosure (CPC P/N: 810-3013).
- Six (6) CPC Multi-flex ESR-8 boards with transformers in individual enclosures (CPC P/N: 810-1120).
- Three (3) CPC 12VDC transducer power supplies (CPC P/N: 258-1000).
- One (1) CPC temperature sensor for water heat reclaim (CPC P/N: 501-1121).
- One (1) CPC temperature sensor for ambient temperature (CPC P/N: 501-1121).
- Thirty two (32) CPC temperature sensors for existing and relocated existing refrigerated cases (CPC P/N: 501-1121).
- One (1) CPC temperature sensor for each walk-in cooler, walk-in freezer, and refrigerated prep room (nine (9) total) (CPC P/N: 501-1121).

ochsnerEFS, p.c.
11111 Carmel Commons Blvd., Suite 325
Charlotte, North Carolina 28226
NCBELS Firm License Number: C-2438

- One (1) CPC temperature sensor for heat tape monitoring for each walk-in cooler with electric defrost and walk-in freezer (three (3) total) (CPC P/N: 501-1121).
- One (1) EMC refrigerant leak detection transducer with sensor bulb for R-448a for each walk-in cooler, walk-in freezer, and enclosed refrigerated prep room (eight (8) total) (EMC P/N: EMC/REF-LK-832).
- Two (2) CPC temperature sensors for miscellaneous use (CPC P/N: 501-1121).

All loose components shall be shipped directly to the Refrigeration Installation Contractor.

2.6 LOOSE COMPONENTS: HVAC/LIGHTING (FIELD)

The Refrigeration Equipment Manufacturer shall be required to supply the following loose CPC components for field installation as shown on the Energy Management (EM) plans by ochsnerEFS, p.c.:

- One (1) CPC Multi-flex 88 board and with transformer in individual enclosure (CPC P/N: 810-1108).
- Two (2) CPC 8RO boards with transformers in individual enclosures (CPC P/N: 810-1011).
- Three (3) CPC Multi-flex RTU boards with transformers in individual weatherproof enclosures (CPC P/N: 810-1072).
- Ten (10) CPC space temperature sensors (CPC P/N: 809-6590).
- Three (3) CPC dewpoint temperature sensors (CPC P/N: 210-2011).
- Six (6) CPC supply/return air temperature sensors (CPC P/N: 201-2112).
- One (1) CPC temperature sensor for domestic water heater control (CPC P/N: 501-1121).
- Two (2) CPC temperature sensors for miscellaneous use (CPC P/N: 501-1121).

All loose components shall be shipped directly to the Refrigeration Installation Contractor.

ochsnerEFS, p.c.
11111 Carmel Commons Blvd., Suite 325
Charlotte, North Carolina 28226
NCBELS Firm License Number: C-2438

APPENDIX A ENGINEERING LEGENDS

Please find attached the following Refrigeration Systems Legends:

New Parallel Compressor Rack A
New Parallel Compressor Rack B

ochsnerEFS, p.c.
11111 Carmel Commons Blvd., Suite 325
Charlotte, North Carolina 28226
NCBELS Firm License Number: C-2438

Store: **Harris Teeter #495 Raleigh, NC**
Date: 8/9/2018 **New Rack A** Ref: HFO-448a

								Rack 208V MCA:	284.6 Amps		Rack 208V MOPD:	300 Amps	208/3		
								Rack 208V MCA:	12.0 Amps		Rack 208V MOPD:	15 Amps	208/1		
DESIGNATION						DEFROST		ELECTRICAL						EMS	COMMENTS
SYS #	SIZE	MODEL	TYPE	EVAP LOAD MBH	EVP TMP	DEF	CDS / EPR VALVE SIZE	FAN AMP	V/PH	LIGHT AMPS	ASH AMP	DEF AMP	V/PH	PQ (t/e)	
A1	17 DOORS	RL/Innovator II	ICE CREAM	17.83	-17	LG	CDST9x 1-3/8	13.51	120/1	4.11	-	-	-	4/0	*(S) High Efficiency Fans and LED Lighting.*
A2	15 DOORS	RL/Innovator II	ICE CREAM	15.74	-17	LG	CDST9x 1-3/8	11.82	120/1	3.63	-	-	-	3/0	*(C) High Efficiency Fans and LED Lighting.*
A3	10 DOORS	RL/Innovator II	ICE CREAM	10.49	-17	LG	CDST9x 1-3/8	7.88	120/1	2.42	-	-	-	2/0	*(EE) High Efficiency Fans and LED Lighting.*
A4	10 DOORS	RL/Innovator II	ICE CREAM	10.49	-17	LG	CDST9x 1-3/8	7.88	120/1	2.42	-	-	-	2/0	*(D) High Efficiency Fans and LED Lighting.*
A5	3 DOORS	RL/Innovator II	ICE CREAM	3.15	-17	LG	CDST4x 7/8	2.44	120/1	0.73	-	-	-	1/0	*High Efficiency Fans and LED Lighting.*
A6	10 DOORS	RL/Innovator II	ICE CREAM	10.49	-17	LG	CDST9x 1-3/8	7.88	120/1	2.42	-	-	-	2/0	*(F) High Efficiency Fans and LED Lighting.*
A7	10 DOORS	RL/Innovator II	ICE CREAM	10.49	-17	LG	CDST9x 1-3/8	7.88	120/1	2.42	-	-	-	2/0	*(V) High Efficiency Fans and LED Lighting.*
A8	15 DOORS	RL/Innovator II	ICE CREAM	15.74	-17	LG	CDST9x 1-3/8	11.82	120/1	3.63	-	-	-	3/0	*(FF) High Efficiency Fans and LED Lighting.*
A9	3 DOORS	RL/Innovator II	ICE CREAM	3.15	-17	LG	CDST4x 7/8	2.44	120/1	0.73	-	-	-	1/0	*High Efficiency Fans and LED Lighting.*
A10	10 DOORS	RL/Innovator II	ICE CREAM	10.49	-17	LG	CDST9x 1-3/8	7.88	120/1	2.42	-	-	-	2/0	*(A) High Efficiency Fans and LED Lighting.*
A11	10 DOORS	RL/Innovator II	ICE CREAM	10.49	-17	LG	CDST9x 1-1/8	7.88	120/1	2.42	-	-	-	2/0	*High Efficiency Fans and LED Lighting.*
A12	15 DOORS	RL/Innovator II	ICE CREAM	15.74	-17	LG	CDST9x 1-3/8	11.82	120/1	3.63	-	-	-	3/0	*(E) High Efficiency Fans and LED Lighting.*
A13	3 DOORS	RL/Innovator II	ICE CREAM	3.15	-17	LG	CDST4x 7/8	2.44	120/1	0.73	-	-	-	1/0	*High Efficiency Fans and LED Lighting.*
A14	4DRS/7DRS	RL/Innovator II	EXPRESS LANE	11.54	-17	ELC	CDST9x 1-1/8	8.82	120/1	2.67	-	13.46	208/1	3/0	*(W) HE Fans & LED Ltg / Only 4 Drs LT case is ELC Def*
A15	4 DOORS	RL/Innovator II	MEAT / ICT	4.20	-17	LG	CDST4x 7/8	3.19	120/1	0.97	-	-	-	1/0	*High Efficiency Fans and LED Lighting.*
A16	(2) 24'	FN	D/T ISLAND	18.72	-20	ELC	Sport - 13/13	13.32	120/1	-	-	46.16	208/1	4/0	*(K) HE Fans/ ASH on Fan Circuit*
A17	7 DOORS	RL/Innovator II	SEAFOOD / ICT	7.34	-17	LG	CDST4x 7/8	5.63	120/1	1.70	-	-	-	2/0	*(F) High Efficiency Fans and LED Lighting.*
A18	5 DOORS	RL/Innovator II	BAKERY / ICT	5.25	-17	LG	CDST4x 7/8	4.13	120/1	1.21	-	-	-	1/0	*(B) High Efficiency Fans and LED Lighting.*
A19	18' x 8' x 10'	(1e) MLT4165CA	DELI/BAKE FRZR	11.50	-15	ELC	CDST9x 1-3/8	3.60	208/1	-	HT	16.00	208/3	1/0	*(J) Based on Existing Conditions = -8.0 deg Room Temp*
A20	32' x 16' x 10'	(3n) KR54P185EBB	MAIN FREEZER	31.10	-22	LG	CDST17x 2-1/8	19.20	120/1	-	HT	-	-	1/0	*(H - Liq) New Freezer / New Evaporators with EC Motors / Fan Load = Drain Pan Heaters*
A21	SPARE	-	SPARE	-	-	-	-	-	-	-	-	-	-	-	
			Total A (-23) sst =	**227.06**											

Compressor Data @ -23 F SST and 110 F SCT / 100 F Ambient / HFO-448a Refrigerant

#	Model	Unloader	Capacity-MBH	HP	RLA	Cap-SubCooled
A1	3DSDF46KL	Digital Discus	38.100	7	41.4	-
A2	4DHNF63KL	-	54.200	10	52.6	-
A3	4DHNF63KL	-	54.200	10	52.6	-
A4	4DHNF63KL	-	54.200	10	52.6	-
A5	4DRNF76KL	Unloader	66.500	12.5	64.3	-
		Rack A (-23) Total =	**267.200**	**-23**		
		A (-23) Load to Capacity % =	0.85			
		A (-23) Spare Capacity =	40.14			

General and Keyed Notes

1. Existing Single Compressor/Condensing Unit existing piping to be reused for the corresponding new circuit/loop noted in parenthesis ( ) in 'Comments'.

HT- Provide 1P/20A GFCI circuit for condensate line heat tape and door heaters for walk-in freezer.

Condenser and General Systems Information

RACK A THR = 454.915 MBH / Available Ht Reclaim = 204.71 MBH to Water Heat Reclaim
Hussmann/Krack - LAVC 25308K / 10 Fans / Selected @ 100 Deg Ambient and 10 Deg TD
Actual TD = 7.59 Degrees / 1.5 HP Motors @ 850 RPM / FLA = 69.0 Amps @ 208-230V/3ph/60hz
Estimated Operating Condenser Size/Weight = 274"L x 90.5"W x 58.5"H and 4075 Lbs
Rack A Estimated Size/Weight = 184"L x 40"W x 80"H and 5500 Lbs.

Revision Information

2	9/26/18	Updated sensor information, revised existing piping reuse designations, and modified miscellaneous notes.
3	9/27/18	Adjusted Rack B compressor capacities and condenser information; finalized EPR valve selections & connection sizes; finalized loop piping and field fabricated remote header connection sizes; and modified miscellaneous notes.
4	10/1/18	Adjusted A16 valve selection; revised B1 model number and information; adjusted Rack B required load, load to capacity, and spare capacity; and modified miscellaneous notes.

ochsnerEFS, p.c.
11111 Carmel Commons Blvd., Suite 325
Charlotte, North Carolina 28226
NCBELS Firm License Number: C-2438

Store: **Harris Teeter #495 Raleigh, NC**
Date: 8/9/2018 **New Rack B (page 1 of 2)** Ref: HFO-448a

DESIGNATION						DEFROST		ELECTRICAL						EMS	COMMENTS
SYS #	SIZE	MODEL	TYPE	EVAP LOAD MBH	EVP TMP	DEF	CDS / EPR VALVE SIZE	FAN AMP	V/PH	LIGHT AMPS	ASH AMP	DEF AMP	V/PH	PQ (t/e)	
B1	16'	M5X-GEP	MD MEAT	20.22	26	OT	CDST9x 1-3/8	2.80	120/1	9.18	-	-	-	2/0	*(X) High Efficiency Fans/ Max Lighting*
B2	24'	M5X-GEP	MD MEAT	31.44	26	OT	CDST9x 1-3/8	7.78	120/1	13.86	-	-	-	2/0	*(M) Existing Fixtures to Remain*
*1 B3	12'	CR3M	SERVICE MEAT	14.34	20	OT	CDST9x 1-1/8	5.97	120/1	1.00	-	-	-	1/0	*ASH on Fan Ckt/ Rated Higher Than Mfgr's Data per HT*
*1 B4	12'	CR3M	SERVICE SEAFOOD	14.34	20	OT	CDST9x 1-1/8	5.97	120/1	1.00	-	-	-	1/0	*ASH on Fan Ckt/ Rated Higher Than Mfgr's Data per HT*
*1 B5	6'	IM-05-I	SEAFOOD	8.88	21	OT	CDST4x 7/8	0.60	120/1	0.87	-	-	-	1/0	*High Efficiency Fans/ ASH on Fan Circuit*
*2 B6	6'	IM-05-I	CAKES	6.84	25	OT	CDST4x 7/8	0.60	120/1	0.87	-	-	-	1/0	*High Efficiency Fans/ ASH on Fan Circuit*
*2 B7	6'	WESCHO 200	SS BAKERY	9.10	20	OT	CDST4x 7/8	2.00	120/1	-	-	-	-	1/0	*Fan Load Indicates Total Fans and Lights*
*2 B8	20'	CR3D	SERV DELI	20.40	20	OT	CDST9x 1-1/8	9.95	120/1	2.22	-	-	-	2/0	*ASH on Fan Circuit*
*2 B9	8'	Q4-SS	SS DELI	8.80	20	OT	CDST4x 7/8	0.48	120/1	1.41	-	-	-	1/0	
*2 B10	18'	Q3-SP	PREP FOODS	20.88	20	OT	CDST9x 1-1/8	8.04	120/1	1.32	-	-	-	2/0	*ASH on Fan Circuit*
B11	8'+8'+6'+6'	PF	ISLAND	23.80	20	OT	CDST9x 1-3/8	4.80	120/1	6.48	-	-	-	4/0	*(U) Existing Fixtures Relocated/ ASH on Fan Circuit*
B12	12'+12'+6'+6'	PF	ISLAND	30.60	20	OT	CDST9x 1-3/8	5.40	120/1	8.24	-	-	-	4/0	*(T) Existing Fixtures Relocated/ ASH on Fan Circuit*
*2 B13	18'	IM-05	SALAD BAR	16.50	20	OT	CDST9x 1-1/8	2.76	120/1	0.66	-	-	-	3/0	
*1 B14	(2) 12'+(2) End	IM-05-C + IM-05-E	PROD ISLAND	39.44	25	OT	CDST9x 1-3/8	2.40	120/1	5.06	-	-	-	4/0	
*1 B15	16' + (2) End	PW-E + PWEE	PROD ISLAND	22.39	24	OT	CDST9x 1-3/8	1.98	120/1	-	-	-	-	4/0	*High Efficiency Fans*
*1 B16	10' + Wedge	Q3.5-SS	FLORAL	12.25	20	OT	CDST9x 1-1/8	0.84	120/1	0.85	-	-	-	2/0	
B17	18' x 22' x 10'	(1e) LFA190AE	PROD COOLER	21.70	23	OT	CDST9x 1-3/8	5.50	120/1	-	-	-	-	1/0	*(Y) Based on Existing Conditions = +34.5 deg Room Temp*
*2 B18	14' x 8' x 10'	(1e) ADT104AK	DELI/BAKE CLR #1	9.00	24	OT	CDST4x 7/8	2.00	120/1	-	-	-	-	1/0	*(V) Based on Existing Conditions = +32.7 deg Room Temp*
*2 B19	8' x 8' x 10'	(1e) LFA097AHE	DELI/BAKE CLR #2	6.00	26	OT	CDST4x 7/8	3.60	120/1	-	-	-	-	1/0	*(V) Based on Existing Conditions = +32.2 deg Room Temp*
B20	36' x 16' x 10'	(2n) GL56D225EAA	MEAT COOLER	34.10	22	ELC	CDST9x 1-1/8	2.00	230/1	-	HT	34.80	230/1	1/0	*(P) Ex. Evaporators Demo'd/ New Evaporators with EC Mtrs*
B21	44' x 17' x 10'	(2e) LFA230AE	DAIRY CLR/15Drs	52.48	21	OT	CDST9x 1-3/8	11.00	120/1	13.95	22.95	-	-	1/0	*(O) Based on Existing Conditions = +32.6 deg Room Temp / AS Htrs & Lts for Doors*
B22	SPARE	-	SPARE	-	-	-	-	-	-	-	-	-	-	-	
B23	SPARE	-	SPARE	-	-	-	-	-	-	-	-	-	-	-	
			Total B (+18) sst =	**423.50**											

*1 Denotes circuits fed from New Field Fabricated Remote Header B1

*2 Denotes circuits fed from New Field Fabricated Remote Header B2

Compressor Data @ +18 F / +24 F SST and 115 F SCT / 100 F Ambient / HFO-448a Refrigerant

#	Model	Unloader	Capacity-MBH	HP	RLA	Cap-SubCooled

See Next Legend Sheet for Compressor Information

See Next Legend Sheet for Electrical Information

General and Keyed Notes

1. *Existing Single Compressor/Condensing Unit existing piping to be reused for the corresponding new circuit/loop noted in parenthesis ( ) in 'Comments'.*
2. *All Field Fabricated Remote Header and Loop Piped circuit liquid line solenoid and suction CDST EEPR valves are to be shipped loose by the Refrigeration Equipment Manufacturer and field installed in the locations shown on plan RC5.2 by the Refrigeration Installation Contractor.*
3. *FF Remote Header Liquid Connection Sizes: 1-1/8" (FF RH B1), 1-1/8" (FF RH B2)*
4. *FF Remote Header Suction Connection Sizes: 2-5/8" (FF RH B1), 3-1/8" (FF RH B2)*

HT- Provide 1P/20A GFCI circuit for condensate line heat tape for walk-in cooler.

Condenser and General Systems Information

See Next Legend Sheet for Condenser/Heat Reclaim Information

Revision Information

2	9/26/18	Updated sensor information, revised existing piping reuse designations, and modified miscellaneous notes.
3	9/27/18	Adjusted Rack B compressor capacities and condenser information; finalized EPR valve selections & connection sizes; finalized loop piping and field fabricated remote header connection sizes; and modified miscellaneous notes.
4	10/1/18	Adjusted A16 valve selection; revised B1 model number and information; adjusted Rack B required load, load to capacity, and spare capacity; and modified miscellaneous notes.

ochsnerEFS, p.c.
11111 Carmel Commons Blvd., Suite 325
Charlotte, North Carolina 28226
NCBELS Firm License Number: C-2438

Store: **Harris Teeter #495 Raleigh, NC**

Date: 8/9/2018 **New Rack B (page 2 of 2)** Ref: HFO-448a

Rack 208V MCA:	261.4 Amps	Rack 208V MOPD:	300 Amps	208/3 (Section 1)
	195.6 Amps		250 Amps	208/3 (Section 2)
Rack 208V MCA:	12.0 Amps	Rack 208V MOPD:	15 Amps	208/1

DESIGNATION						DEFROST		ELECTRICAL						EMS	COMMENTS
SYS #	SIZE	MODEL	TYPE	EVAP LOAD MBH	EVP TMP	DEF	CDS / EPR VALVE SIZE	FAN AMP	V/PH	LIGHT AMPS	ASH AMP	DEF AMP	V/PH	PQ (t/e)	
*1 B24	20'	D5LE (w/Doors)	DAIRY	8.55	28	OT	CDST4x 7/8	3.90	120/1	2.73	-	-	-	2/0	*Existing 20' D5LE retrofitted w/ No ASH Doors*
*1 B25	24'	D5LE (w/Doors)	DAIRY	10.26	28	OT	CDST4x 7/8	4.60	120/1	3.26	-	-	-	2/0	*Existing 24' D5LE retrofitted w/ No ASH Doors*
*1 B26	32'	D5LE (w/Doors)	DAIRY	13.68	28	OT	CDST4x 7/8	6.20	120/1	4.36	-	-	-	3/0	*Ex. 20' D5LE Relo / Ex. 32' D5LE retrofitted w/ No ASH Door*
*2 B27	6'	D5LE (w/Doors)	DAIRY	2.57	28	OT	CDST4x 1/2	1.60	120/1	0.96	-	-	-	1/0	*Existing 6' D5LE relocated and retrofitted w/ No ASH Doors*
*2 B28	36'	D5LE (w/Doors)	DAIRY	15.39	28	OT	CDST4x 7/8	6.90	120/1	4.89	-	-	-	3/0	*Existing 36' D5LE relocated and retrofitted w/ No ASH Doors*
B29	36'	DD5X-ULP	DAIRY	10.62	34	OT	CDST4x 7/8	3.30	120/1	5.28	-	-	-	3/0	*HE Fans and LED Lighting/ Ecovision Doors*
B30	36'	D5LE (w/Doors)	LUNCH MEAT	16.69	26	OT	CDST9x 1-1/8	6.90	120/1	4.89	-	-	-	3/0	*Existing 36' D5LE relocated and retrofitted w/ No ASH Doors*
*3 B31	36'	DD5X-LP	BEER	10.62	34	OT	CDST4x 7/8	3.30	120/1	4.89	-	-	-	3/0	*HE Fans and LED Lighting/ Ecovision Doors*
*3 B32	24'	DD5X-LP	BEER	7.08	34	OT	CDST4x 5/8	2.20	120/1	3.26	-	-	-	2/0	*HE Fans and LED Lighting/ Ecovision Doors*
*3 B33	20'	DD5X-LP	BEER/WINE	5.90	34	OT	CDST4x 5/8	1.90	120/1	2.73	-	-	-	2/0	*HE Fans and LED Lighting/ Ecovision Doors*
*3 B34	28'	DD5X-LP	BEER/WINE	8.26	34	OT	CDST4x 7/8	2.70	120/1	3.83	-	-	-	3/0	*HE Fans and LED Lighting/ Ecovision Doors*
B35	20'	P4X-EP	PRODUCE	24.58	30	OT	CDST9x 1-3/8	3.40	120/1	1.83	-	-	-	2/0	*(Z) High Efficiency Fans / LED Lighting*
B36	16'	P4X-EP	PRODUCE	19.66	30	OT	CDST9x 1-3/8	2.80	120/1	1.46	-	-	-	2/0	*(DD) High Efficiency Fans / LED Lighting*
B37	36'	P4X-EP	PRODUCE	44.24	30	OT	CDST9x 1-3/8	6.00	120/1	3.30	-	-	-	3/0	*(BB) High Efficiency Fans / LED Lighting*
*3 B38	24'	D5X-LEP (w/Doors)	MD PRODUCE	9.29	32	OT	CDST4x 7/8	2.20	120/1	3.26	-	-	-	2/0	*Existing 24' D5X-LEP retrofitted w/ No ASH Doors*
*3 B39	20'	D5X-LEP (w/Doors)	MD PRODUCE	7.74	32	OT	CDST4x 5/8	1.90	120/1	2.73	-	-	-	2/0	*Existing 20' D5X-LEP retrofitted w/ No ASH Doors*
*3 B40	18'	DD5X-LP	NEW AGE BEV	6.39	32	OT	CDST4x 5/8	1.68	120/1	2.59	-	-	-	2/0	*HE Fans & Max Lighting/ Ecovision Doors*
*3 B41	8'	DD5NX-L	FLORAL	2.17	32	OT	CDST4x 1/2	0.80	120/1	1.10	-	-	-	1/0	*HE Fans and LED Lighting/ Ecovision Doors*
*3 B42	16'	DD6X-ULP	BEVERAGE	5.36	32	OT	CDST4x 5/8	1.60	120/1	2.40	-	-	-	2/0	*HE Fans and Max Lighting/ Ecovision Doors*
*4 B43	16'	DD5X-LP	BEVERAGE	5.68	32	OT	CDST4x 5/8	1.60	120/1	2.20	-	-	-	2/0	*HE Fans & Max Lighting/ Ecovision Doors*
*4 B44	10'	DD5X-LP	BEVERAGE	3.55	32	OT	CDST4x 5/8	1.08	120/1	1.53	-	-	-	2/0	*HE Fans & Max Lighting/ Ecovision Doors*
B45	725 SF	(3n) GL56A225BB	MEAT/SFD PREP	78.78	37	OT	Sport - 13/17	10.20	120/1	-	-	-	-	1/0	*Modifed Meat/Seafood Prep / New Evaporators with PSC Mtrs*
B46	480 SF	(2er) LFA120AHE	PRODUCE PREP	40.80	36	OT	SportII - 09/11	3.28	120/1	-	-	-	-	1/0	*(CC) Based on Existing Conditions = +53.3 deg Room Temp/ Modified Produce Prep/ Existing Produce Staging Evap and Existing Produce Prep Evap to be Relocated*
B47	SPARE	-	SPARE	-	-	-	-	-	-	-	-	-	-	-	
			Total C (+24) sst =	**357.86**											

*1 Denotes Circuits fed from Loop Piping #1 Configuration (Q)

*2 Denotes Circuits fed from Loop Piping #2 Configuration (R)

*3 Denotes Circuits fed from Loop Piping #3 Configuration (AA/BB)

*4 Denotes Circuits fed from Loop Piping #4 Configuration (New)

Compressor Data @ +18 F / +24 F SST and 115 F SCT / 100 F Ambient / HFO-448a Refrigerant

#	Model	Unloader	Capacity-MBH	HP	RLA	Cap-SubCooled
B1	3DF3R15KL	-	99.700	10	48.1	-
B2	3DSDR17ML	Digital Discus	116.000	10	59.6	-
B3	4DANR18ML	-	125.500	12	63.6	-
B4	4DCNR20ML	Unloader	146.000	13.5	72.1	-
		Rack B (+18) Total =	**487.200**	**+18**		
		B (+18) Load to Capacity % =	0.87			
		B (+18) Spare Capacity =	63.701			
SB1	2DA3R89KL	-	67.800	6	32.0	-
SB2	3DA3R10ML	-	82.700	6.5	41.0	-
SB3	3DF3R15KL	-	115.000	10	48.1	-
SB4	3DSDR17ML	Digital Discus	133.500	10	59.6	-
		Rack B (+24) Total =	**399.000**	**+24**		
		B (+24) Load to Capacity % =	0.90			
		B (+24) Spare Capacity =	41.143			

General and Keyed Notes

1. *Existing Single Compressor/Condensing Unit existing piping to be reused for the corresponding new circuit/loop noted in parenthesis ( ) in 'Comments'.*
2. *All Field Fabricated Remote Header and Loop Piped circuit liquid line solenoid and suction CDST EEPR valves are to be shipped loose by the Refrigeration Equipment Manufacturer and field installed in the locations shown on plan RC5.3 by the Refrigeration Installation Contractor.*
3. *Liquid Loop Connection Sizes: (1) 1-1/8"; (1) 7/8"; (1) 5/8"; (1) 1/2"*
4. *Suction Loop Connection Sizes: (1) 2-1/8", (2) 1-3/8", (1) 7/8"*

Condenser and General Systems Information

RACK B THR = 1213.131 MBH / Available Ht Reclaim = 545.91 MBH to RTU-2 (Sales Area)
Hussmann/Krack - LEVC 26410K / 12 Fans / Selected @ 100 Deg Ambient and 15 Deg TD
Actual TD = 12.51 Degrees / 1.5 HP Motors @ 850 RPM / FLA = 82.8 Amps @ 208-230V/3ph/60hz
Estimated Operating Condenser Size/Weight = 328"L x 90.5"W x 58.5"H and 6050 Lbs
Rack B Est. Size/Weight = 256"L x 40"W x 80"H and 8250 Lbs. (Two Section: Sec 1: 142" L / Sec 2: 114" L)

Revision Information

2	9/26/18	Updated sensor information, revised existing piping reuse designations, and modified miscellaneous notes.
3	9/27/18	Adjusted Rack B compressor capacities and condenser information; finalized EPR valve selections & connection sizes; finalized loop piping and field fabricated remote header connection sizes; and modified miscellaneous notes.
4	10/1/18	Adjusted A16 valve selection; revised B1 model number and information; adjusted Rack B required load, load to capacity, and spare capacity; and modified miscellaneous notes.

ochsnerEFS, p.c.
11111 Carmel Commons Blvd., Suite 325
Charlotte, North Carolina 28226
NCBELS Firm License Number: C-2438

APPENDIX B LINE SIZING SCHEDULE

CRT	DESCRIPTION	MBH	EVAP TEMP	REF	EQUIV LENGTH	SUCT HORIZ	SUCT VERT	LIQ
A1	17 DOORS RL/Inv II ICE CREAM	17.83	-17	R-448a	265'/23'	1-5/8"(ee)	1-3/8"	7/8"(ee)
A2	15 DOORS RL/Inv II ICE CREAM	15.74	-17	R-448a	191'/23'	1-5/8"(ee)	1-3/8"	1/2"(ee)
A3	10 DOORS RL/Inv II ICE CREAM	10.49	-17	R-448a	208'/24'	1-3/8"(ee)	1-1/8"	5/8"(ee)
A4	10 DOORS RL/Inv II ICE CREAM	10.49	-17	R-448a	235'/24'	1-3/8"(ee)	1-1/8"	1/2"(ee)
A5	3 DOORS RL/Inv II ICE CREAM	3.15	-17	R-448a	228'/24'	7/8"	5/8"	1/2"
A6	10 DOORS RL/Inv II ICE CREAM	10.49	-17	R-448a	235'/24'	1-3/8"(ee)	1-1/8"	1/2"(ee)
A7	10 DOORS RL/Inv II ICE CREAM	10.49	-17	R-448a	225'/24'	1-3/8"(ee)	1-1/8"	5/8"(ee)
A8	3 DOORS RL/Inv II ICE CREAM	15.74	-17	R-448a	190'/23'	1-5/8"(ee)	1-3/8"	5/8"(ee)
A9	3 DOORS RL/Inv II ICE CREAM	3.15	-17	R-448a	181'/23'	7/8"	5/8"	1/2"
A10	10 DOORS RL/Inv II ICE CREAM	10.49	-17	R-448a	204'/23'	1-3/8"(ee)	1-1/8"	1/2"(ee)
A11	10 DOORS RL/Inv II ICE CREAM	10.49	-17	R-448a	178'/23'	1-1/8"	1-1/8"	1/2"
A12	15 DOORS RL/Inv II ICE CREAM	15.74	-17	R-448a	177'/23'	1-5/8"(ee)	1-3/8"	1/2"(ee)
A13	3 DOORS RL/Inv II ICE CREAM	3.15	-17	R-448a	183'/30'	7/8"	5/8"	1/2"
A14	11 DRS RL/Inv II EXPRESS LANE	11.54	-17	R-448a	329'/25'	1-1/8"(ee)	1-1/8"	5/8"(ee)
A15	4 DOORS RL/Inv II MEAT / ICT	4.20	-17	R-448a	69'/22'	7/8"	5/8"	1/2"
A16	(2) 24' FN D/T ISL (OVERHEAD)	18.72	-20	R-448a	125'/24'	1-5/8"	1-1/8" & 7/8"	5/8"(ee)
A16	(2) 24' FN D/T ISL (UNDERGRD)	18.72	-20	R-448a	104'/-	1-1/8"(ee)	-	5/8"(ee)
A17	7 DOORS RL/Inv II SEAFOOD/ICT	7.34	-17	R-448a	259'/22'	1-3/8"(ee)	7/8"	1/2"(ee)
A18	5 DOORS RL/Inv II BAKERY/ICT	5.25	-17	R-448a	267'/24'	1-3/8"(ee)	5/8"	1/2"(ee)
A19	DELI/BAKERY FREEZER	11.50	-15	R-448a	338'/16'	1-3/8"(ee)	1-1/8"(ve)	1/2"(ee)
A20	MAIN FREEZER	31.10	-22	R-448a	173'/13'	2-5/8"	1-5/8"	1/2"(ee)
A21	SPARE	-	-	R-448a	-	-	-	-
B1	16' M5X-GEP MD MEAT	20.22	26	R-448a	176'/22'	1-3/8"(ee)	7/8"(ve)	5/8"(ee)
B2	24' M5X-GEP MD MEAT	31.44	26	R-448a	196'/22'	1-3/8"(ee)	1-1/8"(ve)	5/8"(ee)
*1 B3	12' CR3M SERVICE MEAT	14.34	20	R-448a	100'/18'	1-1/8"	7/8"	1/2"
*1 B4	12' CR3M SERVICE SEAFOOD	14.34	20	R-448a	86'/18'	1-1/8"	7/8"	1/2"
*1 B5	6' IM-05-I SEAFOOD	8.88	21	R-448a	91'/18'	7/8"	5/8"	1/2"
*2 B6	6' IM-05-I CAKES	6.84	25	R-448a	142'/20'	7/8"	1/2"	1/2"
*2 B7	6' WESCHO 200 SS BAKERY	9.10	20	R-448a	161'/20'	7/8"	5/8"	1/2"
*2 B8	20' CR3D SERVICE DELI	20.40	20	R-448a	130'/20'	1-1/8"	7/8"	1/2"
*2 B9	8' Q4-SS SS DELI	8.80	20	R-448a	104'/20'	7/8"	5/8"	1/2"
*2 B10	18' Q3-SP PREP FOODS	20.88	20	R-448a	164'/20'	1-1/8"	7/8"	1/2"
B11	8'+8'+6'+6' PF ISLAND	23.80	20	R-448a	281'/24'	1-3/8"(ee)	1-1/8"	5/8"(ee)
B12	12'+12'+6'+6' PF ISLAND	30.60	20	R-448a	303'/24'	1-3/8"(ee)	1-1/8"	5/8"(ee)
*2 B13	18' IM-05 SALAD BAR	16.50	20	R-448a	181'/22'	1-1/8"	7/8"	1/2"
*1 B14	(2) 12'+(2) Ends IM-05-C + IM-05-E PRODUCE ISLAND	39.44	25	R-448a	272'/20'	1-5/8"	1-1/8"	7/8"
*1 B15	16' + (2) Ends PW-E + PWEE PRODUCE ISLAND	22.39	24	R-448a	243'/20'	1-3/8"	7/8"	1/2"
*1 B16	10'+Wedge Q3.5SS FLORAL	12.25	20	R-448a	276'/20'	1-1/8"	5/8"	1/2"
B17	PRODUCE COOLER	21.70	23	R-448a	347'/14'	1-3/8"(ee)	7/8"(ve)	1/2"(ee)
*2 B18	DELI/BAKERY COOLER #1	9.00	24	R-448a	66'/11'	1-3/8"(ee)	5/8"(ve)	5/8"(ee)
*2 B19	DELI/BAKERY COOLER #2	6.00	26	R-448a	60'/11'	1-3/8"(ee)	1/2"(ve)	5/8"(ee)

ochsnerEFS, p.c.
11111 Carmel Commons Blvd., Suite 325
Charlotte, North Carolina 28226
NCBELS Firm License Number: C-2438

CRT	DESCRIPTION	MBH	EVAP TEMP	REF	EQUIV LENGTH	SUCT HORIZ	SUCT VERT	LIQ
B20	MEAT COOLER	34.10	22	R-448a	142'/13'	1-1/8"(ee)	1-1/8"	1/2"(ee)
B21	DAIRY COOLER w/ 15 Doors	52.48	21	R-448a	200'/13'	1-3/8"(ee)	1-3/8"(ve)	5/8"(ee)
B22	SPARE	-	-	R-448a	-	-	-	-
B23	SPARE	-	-	R-448a	-	-	-	-
FF HDR B1	FEEDS TO FIELD FABRICATED REMOTE HEADER B1	111.64	18	R-448a	225'/14'	2-5/8"	1-5/8" & 1-3/8"	1-1/8"
FF HDR B2	FEEDS TO FIELD FABRICATED REMOTE HEADER B2	97.52	18	R-448a	402'/12'	3-1/8"	1-5/8" & 1-3/8"	1-1/8"
*1 Denotes Systems fed from Field Fabricated Remote Header B1.								
*2 Denotes Systems fed from Field Fabricated Remote Header B2.								
*1 B24	20' D5LE (w/Doors) DAIRY	8.55	28	R-448a	61'/7'	7/8"	5/8"	1/2"
*1 B25	24' D5LE (w/Doors) DAIRY	10.26	28	R-448a	30'/7'	7/8"	5/8"	1/2"
*1 B26	32' D5LE (w/Doors) DAIRY	13.68	28	R-448a	40'/7'	7/8"	5/8"	1/2"
*2 B27	6' D5LE (w/Doors) DAIRY	2.57	28	R-448a	39'/18'	1/2"	3/8"	1/2"
*2 B28	36' D5LE (w/Doors) DAIRY	15.39	28	R-448a	82'/18'	1-1/8"	7/8"	1/2"
B29	36' DD5X-ULP DAIRY	10.62	34	R-448a	109'/22'	7/8"	5/8"	1/2"
B30	36' D5LE (w/Doors) LUNCH MEAT	16.69	26	R-448a	129'/22'	1-1/8"	7/8"	1/2"
*3 B31	36' DD5X-LP BEER	10.62	34	R-448a	77'/7'	7/8"	5/8"	1/2"
*3 B32	24' DD5X-LP BEER	7.08	34	R-448a	29'/7'	5/8"	1/2"	1/2"
*3 B33	20' DD5X-LP BEER/WINE	5.90	34	R-448a	25'/7'	5/8"	1/2"	1/2"
*3 B34	28' DD5X-LP BEER/WINE	8.26	34	R-448a	74'/19'	7/8"	5/8"	1/2"
B35	20' P4X-EP PRODUCE	24.58	30	R-448a	546'/23'	1-5/8"(ee)	7/8"(ve)	7/8"(ee)
B36	16' P4X-EP PRODUCE	19.66	30	R-448a	517'/23'	1-3/8"(ee)	7/8"(ve)	7/8"(ee)
B37	36' P4X-EP PRODUCE	44.24	30	R-448a	494'/23'	1-5/8"(ee)	1-1/8"	7/8"(ee)
*3 B38	24' D5X-LEP (w/Drs) MD PROD	9.29	32	R-448a	62'/7'	7/8"	5/8"	1/2"
*3 B39	20' D5X-LEP (w/Drs) MD PROD	7.74	32	R-448a	33'/7'	5/8"	1/2"	1/2"
*3 B40	18' D5X-LP NEW AGE BEV	6.39	32	R-448a	30'/7'	5/8"	1/2"	1/2"
*3 B41	8' DD5NX-L FLORAL	2.17	32	R-448a	39'/20'	1/2"	3/8"	1/2"
*3 B42	16' DD6X-ULP BEVERAGE	5.36	32	R-448a	57'/20'	5/8"	1/2"	1/2"
*4 B43	16' DD5X-LP BEVERAGE	5.68	32	R-448a	114'/20'	5/8"	1/2"	1/2"
*4 B44	10' DD5X-LP BEVERAGE	3.55	32	R-448a	51'/20'	5/8"	3/8"	1/2"
B45	MEAT/SEAFOOD PREP	78.78	37	R-448a	177'/13'	2-1/8"	1-5/8"	7/8"
B46	PRODUCE PREP	40.80	36	R-448a	296'/13'	1-3/8"(ee)	1-1/8"	7/8"(ee)
B47	SPARE	-	-	R-448a	-	-	-	-
*1 Denotes Systems fed from Loop Piping Configuration (Loop #1)				*3 Denotes Systems fed from Loop Piping Configuration (Loop #3)				
*2 Denotes Systems fed from Loop Piping Configuration (Loop #2)				*4 Denotes Systems fed from Loop Piping Configuration (Loop #4)				

Please see the Refrigeration Control (RC) plans by ochsnerEFS, p.c.
for all direct expansion loop piping routing and sizes to branch piping listed.

All piping listed above to be new unless noted with the following:

e – Existing Piping to Remain.

ee – Existing Piping to be extended, modified, or relocated new connections.

ve – Verify existing piping to match/replace if necessary.

Please refer to refrigeration legends for corresponding original refrigeration circuit references for existing piping to new refrigeration circuits.

ochsnerEFS, p.c.
11111 Carmel Commons Blvd., Suite 325
Charlotte, North Carolina 28226
NCBELS Firm License Number: C-2438

RACK/ COND	REF	WATER/HVAC HEAT RECLAIM		100% CONDENSER		50%/50% CONDENSER	
		TO	FROM	TO	FROM	TO	FROM
A/RC-A	R-448a	1-3/8"	1-3/8"	-	-	(2) 1-5/8"	(2) 1-3/8"
B/RC-B	R-448a	2-1/8"	2-1/8"	-	-	(2) 2-5/8"	(2) 2-1/8"

ochsnerEFS, p.c.
11111 Carmel Commons Blvd., Suite 325
Charlotte, North Carolina 28226
NCBELS Firm License Number: C-2438

APPENDIX C REFRIGERATION EQUIPMENT PROPOSAL FORM

REFRIGERATION EQUIPMENT PROPOSAL FORM
HARRIS TEETER #495:RALEIGH, NORTH CAROLINA

Bid Equipment Manufacturer's Name: _____

Bid Equipment Manufacturer's Address: _____

_____

Bid Equipment Manufacturer's Tel. No.: _____

Bid Equipment Manufacturer's Rep.: _____

In submitting this proposal, the undersigned certifies that he is familiar with the contract requirements and has included all items of labor and material necessary for a complete job in accordance with plans and specifications.

DESCRIPTION	**PRICE**
Including all labor, material and equipment required for a complete manufacturing of the following, as per these specifications..... $	
*Provide a complete breakdown in the following format on an attached sheet:	
Parallel Compressor Rack A:	
Parallel Compressor Rack B:	
Rooftop Air-cooled Condenser RC-A:	
Rooftop Air-cooled Condenser RC-B:	
Walk-in Cooler, Walk-in Freezer, and Refrigerated Prep Room Evaporator Coils:	
All loose mechanical components specified:	
All loose CPC/EMC control components specified:	
Shipping ..... $	
Refrigeration Equipment Warranty ..... $	
Applicable Sales Taxes ..... $	
TOTAL..... $	

ochsnerEFS, p.c.
11111 Carmel Commons Blvd., Suite 325
Charlotte, North Carolina 28226
NCBELS Firm License Number: C-2438