

BGC
BROOKSHIRE
GROCERY COMPANY

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facility services

REFRIGERATION SPECIFICATIONS

A Remodel Building & Gas Station

For

BROOKSHIRE'S #006

212 East Coke Street

F.M. Hwy. 315 at F.M. Hwy. 312

Winnsboro, Texas

Project #4000600-0

April, 2020

Division of Brookshire Grocery Co.

430 E. Front Street, Tyler, Texas 75702

903/579-0500

Set No.

SECTION 00200 -INSTRUCTIONS TO REFRIGERATION BIDDERS

1.1 DEFINITION OF THE PROJECT

- A. Brookshire Grocery Company is requesting firm Lump Sum proposals for furnishing of labor, material, equipment, and all other items required to perform a remodel of an existing store.
- B. Project Manager and contact for this project is:
Brookshire Grocery Company
430 E. Front Street, Tyler, TX 75702
Tel: 903.579.0500, Fax: 903.593.2213
- C. The Contract Documents consist of Drawings and Specifications of the Project prepared by Energy Squared, LLC.
- D. Sealed bids by the Bidders for furnishing labor, material and/or equipment for specific portions of the Project (Work) may be submitted to the Owner.

**BID DUE DATE WILL BE DETERMINED AT THE PREBID MEETING
NO FAXED BIDS WILL BE ACCEPTED!!**

NOTE: Owner, Bidder, Architect/Engineer (A/E), and Project Manager (PM) are referred to in masculine gender only for ease of preparation of documents.

1.2 BIDDERS REPRESENTATIONS

- A. It is further understood and mutually agreed that by submitting a Proposal, the Bidder acknowledges the Work and has satisfied himself as to the nature and requirements of the Contract Document Work.
- B. Drawings and specifications are complementary, and that which is called for by one shall be as binding as if called for by both.
- C. In case of difference between drawings of the same scale, or between large scale drawings, or between the drawings and the specifications, or on the drawings or in the specifications, the conflicts must be reported before the award of a Contract. Addenda and RFI's which may be issued, will take precedence over drawings and specifications in case of conflict.
- D. It is further mutually agreed that the Bidder, by submitting a Proposal, acknowledges that he has satisfied himself as to the feasibility and correctness of the Contract Documents and that he accepts all the terms, conditions and stipulations contained herein, and that he will work in cooperation with other Contractors performing Work on the job-site. The Bidder represents that he has visited the site and has familiarized himself with the local conditions under which the Work is to be performed. Contractor is responsible to field verify all necessary measurements.
- E. No verbal agreement or conversation with any office, agent, or employee of the Owner, the A/E or the PM, either before or after the execution of a Contract shall affect any of the terms, conditions, or other obligations set forth in any of the Contract Documents.

- F. The Scope of Work in the Project Manual takes precedent over references in the Plans and Technical Specifications to work by a particular Contractor. Where conflicts exist between these documents the Scope of Work should be followed.

1.3 QUESTIONS, CLARIFICATIONS, & INTERPRETATIONS

- A. No oral explanation in regards to the meaning of the Contract Documents will be made and no oral instructions will be given before the award of a Contract. Discrepancies, omissions, questions, needs for clarification or interpretation, or doubts as the true meaning of the Contract Documents, should be communicated at once using the RFI form located on the project website, and shall thereafter notify the A/E and the PM. The A/E and PM, with time permitting, will issue a written instruction in response to the posted RFI to all Bidders of record and its receipt by the Bidder must be listed on the Form of Proposal. RFIs will be accepted until three days prior to bid date in order to answer and distribute Bid Clarifications.

1.4 STANDARDS, SUBSTITUTIONS, & APPROVED EQUALS

- A. All bids must be based on the brands specified or approved by Addendum.
- B. To receive proper consideration, bids must be based on drawings and specifications without exception. Bidder may offer proposed substitutions and corresponding add or deduct on the Form of Proposal, but base bid must be based on Bid Documents without exception. Shop Drawings for proposed substitutions to manufacturer's equipment must be provided within ten (10) calendar days after bid date by all contractors. Failure to do so may result in disqualification of bid.
- C. A statement setting forth any changes in other materials, equipment, or work that the substitution incorporates should be included. The burden of proof of the merit of the proposed substitute is the responsibility of the proposer. The A/E will recommend approval or disapproval to the Owner of each proposed substitution.
- D. The materials, products, and equipment described in the Contract Documents establish a standard of required function, dimension, appearance and quality to be met by any proposed substitutions.

1.5 ADDENDA/CLARIFICATIONS

- A. All addenda issued before bids are received shall be included in the bid, and upon execution of a contract, shall be a part thereof. Bidders shall list addenda received in the appropriate space provided on the Form of Proposal. Failure of any bidder to receive such addenda shall not relieve the Bidder from any obligation under his bid as submitted. All addenda and RFI's issued shall become a part of the Contract Documents.

1.6 PREPARATION OF PROPOSALS

- A. Proposals must be submitted on the prescribed forms. Each Bid Package Proposal No. must be included where allowed for on form.

- B. Each Proposal shall be submitted on the designated form or copies thereof, and shall be signed in ink. Erasures or other changes in a Proposal must be explained or noted over the signature of the Bidder. The Owner may reject proposals containing any conditions, omissions, unexplained erasures or alterations, or items not called for in the Form of Proposal, or irregularities of any kind.
- C. Unit Price Proposals are required if set forth in the Form of Proposal, Scope of Work, or Contract Documents.
- D. Each copy of the Proposal shall include the legal name of Bidder and a statement whether Bidder is a sole proprietor, a partnership, a corporation, or any other legal entity, and each copy shall be signed by the person or persons legally authorized to bind the Bidder to a contract.
- E. Bids must be sealed and plainly identified on the envelope as follows:
Refrigeration Equipment and Installation Specifications

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

All bids shall be addressed to:

Brookshire Grocery Company

430 E. Front Street, Tyler, TX 75702

Tel: 903.579.0500, Fax: 903.593.2213

- F. All bid documents are the property of the Owner and shall be returned with the bids.
- G. The Contractor shall include in his Lump Sum Price all of the labor necessary for the on schedule completion of the project based on straight time.

Overtime that is initiated by the Contractor will not be reimbursable and shall be included in the Lump Sum price.

When the Brookshire Grocery Company Representative authorizes additional overtime work, the Contractor must obtain a written authorization for such work prior to commencement. Should the work involved be part of the original contract, additional payment will be made only for the incremental cost increase between regular and overtime rates.

1.7 MODIFICATION OR WITHDRAWAL OF BID

- A. A bid may not be modified, withdrawn or canceled by the Bidder during the stipulated time period following the time and date designated for the receipt of bids, and Bidder so agrees in submitting his bid.
- B. Prior to the time and date designated for receipt of bids, any bids submitted early may be modified or withdrawn only by notice to the party receiving bids at the place and prior to the time designated for receipt of bids. Such notice shall be in writing over the signature of the Bidder.
- C. Withdrawn bids may be resubmitted up to the time designated for the receipt of bids provided that they are then fully in conformance with these Instructions to Bidders.

1.8 CONSIDERATION OF PROPOSALS

- A. The Owner shall have the right to reject any or all bids and in particular to reject a bid not accompanied by data required by the Bidding Contract Documents or a Proposal in any way incomplete or irregular.
- B. The Owner shall have the right to waive any informality or irregularity in any proposal received.

1.9 ALTERNATES

- A. The Owner shall have the right to accept or reject alternates in any order or combination and to determine the best Proposal on the basis of the sum of the Base Bid and the Alternates accepted.

1.10 QUALIFICATION OF BIDDERS

All Bidders are by Invitation and Pre-Qualification Only!!

- A. The Owner reserves the right to request a financial statement together with a statement of past experience, personnel, machinery, and equipment available to perform the proposed Work from any Bidder considered for award of a contract. Failure or refusal to furnish such a statement or statements or to provide such information constitutes a basis for disqualifying the Bidder.

1.11 SUBCONTRACTORS

- A. Each bidder is specifically advised that any person, firm, or other party, to whom the bidder proposes to award a Subcontract, must be acceptable to Owner.

1.12 POST-BID INFORMATION

- A. Each Bidder, submitting a Proposal, agrees to meet with the Owner and/or PM, if so requested, prior to an award. The purpose of such a meeting is to review:
 - 1. Items to be included in the contract, quantities, manpower, scheduling, and shop drawing submittals.
 - 2. General Conditions and Contract Documents
 - 3. Safety, temporary facilities, and site conditions
 - 4. Possible material/method alternatives
 - 5. Possible overlap or work items
 - 6. Project administration and Quality Control
 - 7. Alternates to be accepted and contract amount, unit prices, terms, retainage, payment, and accounting procedures and forms
 - 8. Bidders questions and recommendations
 - 9. Schedule of Values

1.13 CONTRACT AWARD

- A. Prior to contract award, the successful Contractor Bidder shall:

1. Procure, at his own expense, all necessary permits and licenses incident to the work and as required by local ordinance. All equipment shall be installed in strict compliance with all local building codes and ordinances.
 2. The Contractor shall not commence work under this contract until he has obtained all the insurance required hereunder, and has filed certificates to that effect with the Owner.
 3. The Contractor shall indemnify and hold harmless the Owner for any and all claims, suits, losses, damages, or expenses on account of bodily injury, sickness, disease, death, and property damage as a result of the Contractor's operations, acts, omissions, neglect or misconduct in connection with this project.
 4. Procure and maintain at his own expense, until completion of Contractors obligations, final acceptance of Work and 1 year Warranty Period: A.) Workers (Workmen's) Compensation, including occupational disease and employers liability insurance with the broad form all states endorsement; employers liability coverage shall be as noted in the Contract and General Conditions.
 5. Liability Insurance providing coverage not less than that of a standard comprehensive general liability policy including premises operations with explosion, collapse and underground coverage, elevators, independent contractor products, and completed operations, contractual liability coverage on a blanket basis designating all written contracts, broad form property damage including completed operations and contractual liability, personal injury liability coverage for claims rising out of the Work for personal injury, occurrence of bodily injury, including death and property damage; comprehensive automobile liability insurance including owned, non-owned, or hired vehicles. The minimum requirements are identified in the Contract and General Conditions.
- B. Before commencing the Work the Contractor shall furnish full and complete Certificates showing that Workers (Workmen's) Compensation coverage and such insurance is in force and further providing that such insurance shall not be canceled, modified or not renewed without at least sixty (60) days prior written notice of PM. The Contractor agrees to maintain the products and completed operations liability insurance, herein above described, in effect for duration of Guarantee Warranty period.
1. List the names of all proposed subcontractors and material, equipment suppliers, and list all materials to be used.
 2. List all delivery dates of all major materials and equipment and any other materials and equipment critical to the progress of construction.
 3. Provide an itemized breakdown with separate materials and labor (Schedule of Values) which comprise the Contract Price. The breakdown will be used as a basis for partial payments to the Contractor. It is essential that the breakdown be as representative of the true total cost of each item as is possible to ascertain. The PM shall have the right to require the Contractor to submit to the PM copies of Subcontract Agreements or other documentation regarding breakdown costs necessary to confirm the accuracy of the Schedule of Values.

1.14 TAXES

A. The Bidder shall include all applicable taxes in the Proposal as required.

1.15 ONGOING OPERATIONS

After area Turnover, work will not be allowed to have a detrimental effect on the ongoing operations of the store. At all times, Courtesy and respect will be shown to Brookshire Grocery Company guests, managers, and associates at all times.

END OF SECTION 00200

SECTION 01020 - GENERAL REQUIREMENTS, REFRIGERATION

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY OF WORK

- A. The Project consists of remodel construction for the facility. Project includes Refrigeration & Refrigeration Energy Management.
 - 1. Owner: Brookshire Grocery Company, 430 E. Front St., Tyler, Texas 75702
- B. Contract Documents.
- C. Contractor's use of premises: The Contractor shall confine all operations at the site to areas permitted by law, ordinances, permits and the Contract Documents and shall not unreasonably encumber the site with any materials or equipment. Coordinate with scheduling requirements.
 - 1. During the construction period the Contractor shall have use of the premises for construction operations, including use of the site. The Contractor's use of the premises is limited by the Owner's right to perform work or to retain other Contractors on portions of the Project. The Contractor's use of the premises is limited by the Owner's right to occupy completed portions of the Project.
 - a. Owner may occupy the site and portions of the building during the construction period. Cooperate with the Owner during construction operations to minimize conflicts and facilitate Owner usage. Such partial occupancy shall not constitute acceptance of the work. Perform the Work so as not to interfere with the Owner's operations.
 - b. Owner reserves the right to install equipment, and other items within portions of the building. Contractor shall not be responsible for equipment and other items so installed beyond negligence or intentional wrongdoing by Contractor and his employees.
 - 2. Assume full responsibility for protection and safekeeping of materials and products stored on and off the premises.
 - 3. Do not load structures with weight that will endanger or damage them.
 - 4. Members of Contractors staff will only be permitted to smoke in those areas where Brookshire Grocery Company Employees are allowed to smoke.
 - 5. The Contractor must maintain safe conditions in all his work areas in order to protect the Owner from liability as a result of personal injury.
- D. The Contractor at all times shall keep the premises free from accumulation of waste materials or rubbish caused by his operations. At the completion of each day, he shall remove all his waste materials and rubbish from and about the project as well as all his tools, construction equipment, machinery and surplus materials, and shall clean all glass surfaces and leave the work " broom

clean' or it's equivalent. If the Contractor fails to clean up, the Owner may do so and the cost thereof shall be charged to the Contractor.

- E. Owner-Furnished Products (Pre-Purchased): Owner-furnished items include, but are not limited to, those specified as such in Section 15652, Remodel Refrigeration Installation.

1.3 SCHEDULE OF VALUES

- A. Coordination: Coordinate preparation of the Schedule of Values with preparation of the Construction Manager's Project Construction Schedule.
- B. Format and Content: Use the Project Construction Schedule as a guide to establish the format for the Schedule of Values.
 - 1. Identification: Include the following Project identification on the Schedule of Values:
 - a. Project name and location.
 - b. Name of the Construction Manager.
 - c. Project number.
 - d. Contractor's name and address.
 - e. Date of submittal.
 - 2. Arrange the Schedule of Values in tabular form with separate columns to indicate the following for each item listed:
 - a. Related Specification Section or Division.
 - b. Description of Work.
 - c. Name of subcontractor.
 - d. Name of manufacturer or fabricator.
 - e. Name of supplier.
 - f. Change Orders (numbers) that affect value.
 - g. Dollar value.
 - h. Sales tax.
 - 3. Schedule Updating: Update and resubmit the Schedule of Values prior to the next Applications for Payment when Change Orders result in a change in the Contract Sum.
 - 4. A Schedule of Values (Application and Certificate for Payment, AIA Documents G702, G703) allocated to the various portions of the work, prepared in such form and supported by such data to substantiate its accuracy is to be submitted to the Owner prior to the first application for payment. This schedule, unless objected to by the Owner, is to be used as a basis for the Contractor's application for payment.

1.4 SITE INVESTIGATION

- A. Prior to bidding, all bidders shall make a field inspection of job site and carefully appraise all field conditions.

Bidders shall confer with the Owner's representative and/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 the Owner or Engineer for lack of information on the part of the Contractor after the bid is submitted and the contract signed.

1. Existing utilities and equipment: The existence and location of underground utilities and construction indicated as existing are not guaranteed. Before beginning site work, verify the existence and location of underground utilities and other construction.
2. No oral explanation in regards to the meaning of the Contract Documents will be made and no oral instructions will be given before the award of a Contract. Discrepancies, omissions, questions, needs for clarification or interpretation, or doubts as the true meaning of the Contract Documents, should be communicated at once using the RFI form located on the project website, and shall thereafter notify the A/E and the PM. The A/E and PM, with time permitting, will issue a written instruction in response to the posted RFI to all Bidders of record and its receipt by the Bidder must be listed on the Form of Proposal. RFIs will be accepted until three days prior to bid date in order to answer and distribute Bid Clarifications.

The Refrigeration Contractor will be required to attend walk-thrus with the Brookshire Grocery Company representative at intervals of construction as requested.

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

- B. Reference data made available to Contractor are given for Contractor's information only, and neither Owner, nor the Project Manager, nor the Engineer and Architect assume any responsibility for conclusions Contractor may draw there from.
- C. Failure by Contractor to acquaint himself with all available information concerning these conditions will not relieve him from responsibility for estimating cost or difficulty of successfully performing work.

1.5 REFERENCE STANDARDS

- A. Applicability of Standards: Except where the Contract Documents include more stringent requirements, applicable industry standards have the same force and effect as if bound or copied into Contract Documents. Such standards are part of the Contract Documents by reference.
 1. The Contractor and each subcontractor shall be familiar with industry standards applicable to the Work.
 2. Where copies of standards are needed for performance of a required construction activity, the Contractor shall obtain copies directly from the publication source and make them available to the Project Manager upon request.
 3. The entire Refrigeration system, including work and materials, shall be in strict accordance with applicable codes, regulations and/or authorities having jurisdiction.
 4. It is the sole responsibility of the Refrigeration Contractor to assure compliance with all codes, regulations, ordinances, and requirements of Inspection authorities, and figure bid and work on these requirements.
- B. Where the specific date or issue of the standard is not included with the reference to the standard in the Specification Sections or elsewhere in the Contract Documents, the edition and

amendments adopted, published, and available to the public on the date of this Project Manual shall apply.

- C. Where two or more standards are specified to establish quality, the product and workmanship shall conform to or surpass the requirements of both. In case of conflict between referenced standards, the more stringent shall apply.
 - 1. Refer uncertainties, conflicting requirements, and standards that are different but equal to the Construction Manager for a decision prior to proceeding with the Work.

1.6 PROJECT CONSTRUCTION SCHEDULES

- A. Project Manager will prepare an overall Project Construction Schedule.
- B. Schedule Updating: Project Manager will revise schedules as needed.
 - 1. Contractor shall provide updated look-ahead schedules as requested by the Project Manager.
- C. It is imperative the work covered by this specification shall be completed as soon as possible. The Contractor shall see that cooperation among his men and all other trades be maintained. Since some phases of construction work, as described hereinafter, are covered by separate contracts, cooperation with these other contractors is essential.

It is the Contractor's responsibility to fully abide by the project schedule as developed for each specific phase of the installation and to attend all scheduled job meetings.

The Refrigeration Contractor shall keep approximately the same schedule of working hours as the other Contractors and shall stay on the job continuously from beginning to end except as agreed with the Owner.

1.7 OWNER-FURNISHED PRODUCTS (PRE-PURCHASED)

- A. Receive, accept, inspect, protect, and install Owner-furnished items as indicated and specified and in accordance with manufacturer's recommendations.
 - 1. The Contractor shall be responsible for inspecting for completeness and damage immediately upon receipt. Upon receipt of each shipment, the Contractor shall:
 - a. Verify freight documents: count all cartons and verify the quantity on the freight bill, making notations of overages, shortages, or damaged cartons and obtaining the driver's signature on the freight bill;
 - b. Locate the packing slip and verify actual quantities, making notations of any discrepancies;
 - 1) Immediately report all freight damages/damaged goods as follows:
 - a) Call the Owner's Central Purchasing department at:
Brookshire Grocery Company – 903-579-0500
 - b) If requested mail a legible photocopy of all documents pertaining to the shipment to:
Brookshire Grocery Company
430 E. Front St., Tyler, TX 75702.

- c) Retain a legible photocopy of all documents pertaining to the shipment and forward a legible photocopy to the Contractor.
 - c. Obtain a copy of the Owner's purchase order pertaining to the items received, and compare the owner copy with the packing documents verifying quantities, model numbers, and all pertinent specifications and making notations of any discrepancies on the owner copy.
 - 1) Immediately report all purchase order discrepancies, shortages, overages and back order as:
 - a) Call the Owner's Central Purchasing department at:
Brookshire Grocery Company – 903-579-0500
 - b) Mail a legible photocopy of the mark-up owner copy along with all original attachments pertaining to the shipment to:
Brookshire Grocery Company
430 E. Front St., Tyler, TX 75702.
 - 2) Sign and date the copy of the Owner's purchase order on the line provided;
 - 3) Attach the packing list, freight bill, and any other informational papers to the back of the Purchase Order, and;
 - 4) Forward the completed copy of the Owner's purchase order and attachments to Brookshire Grocery Company.
- 2. The copy of the Owner's purchase order identifies the department or area and states the breakdown of quantities for each location. Shipments must be split by location and items must be stored with other items for that location in the storage area selected by the Construction Manager for this purpose. The Contractor shall submit to the Project Manager accurate receiving logs and locations of all received items.
- 3. The Contractor is responsible for protecting Owner-furnished items from damage, including damage from exposure to the elements. The Contractor shall repair or replace items damaged as a result of his operations.
- 4. Owner-Furnished Contractor-Installed (OFCI): The Contractor shall install Owner Furnished Items in strict compliance with manufacturers' recommendations, Construction Documents, and as required by applicable codes, laws, rules and regulations.
 - a. The Contractor is responsible for providing appropriate installation equipment, miscellaneous fasteners, adhesives, blocking, and mechanical and electrical connections required for complete assembly and installation of Owner-furnished items.
 - b. The Contractor is responsible for providing start-up and testing of Owner-furnished items in accordance with the manufacturer's instructions.
- 5. Owner-furnished items include, but are not limited to, those specified in Section 15652, Remodel Refrigeration Installation.

1.8 OWNER-NEGOTIATED PRODUCTS

- A. Owner-Negotiated Products: Brookshire Grocery Company has negotiated with certain suppliers for purchase of the products as indicated. Contractor shall use those suppliers, WITHOUT SUBSTITUTION, for all products identified as Owner-Negotiated.
 - 1. Refer to the technical sections of the specifications for additional product requirements.

1.9 SPECIFICATION FORMATS AND CONVENTIONS

SUMMARY

- A. Specifications Format: The Specifications are organized into Divisions and Sections using the 16-division format and CSI/CSC's "Master Format" numbering system.
1. Section Identification: The Specifications use section numbers and titles to help cross referencing in the Contract Documents. Sections in the specifications are in numeric sequence; however, the sequence is incomplete. Consult the table of contents at the beginning of the specifications to determine numbers and names of sections in the Contract Documents.
- B. Specification Content: The Specifications use certain conventions for the style of language and the intended meaning of certain terms, words, and phrases when used in particular situations. These conventions are as follows:
1. Abbreviated Language: Language used in the Specifications and other Contract Documents is abbreviated. Words and meanings shall be interpreted as appropriate. Words implied, but not stated, shall be inferred as the sense requires. Singular words shall be interpreted as plural, and plural words shall be interpreted as singular where applicable as the context of the Contract Documents indicates.
 2. Imperative mood and streamlined language are generally used in the Specifications. Requirements expressed in the imperative mood are to be performed by Contractor. Occasionally, the indicative or subjunctive mood may be used in the Section Text for clarity to describe responsibilities that must be fulfilled indirectly by Contractor or by others when so noted.
 - a. The words "shall", "shall be" or "shall comply with", depending on the context, are implied where a colon (:) is used within a sentence or phrase.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION (NOT USED)

END OF SECTION 01020

SECTION 15652-REFRIGERATION INSTALLATION

PART 1 - GENERAL

1.1 SUMMARY

- A. Section includes:
1. Requirements for compliance with all the particulars governing the overall Refrigeration Installation for this project.
 2. Information relating to the refrigeration systems and equipment, to enable the Contractor to comprehend the overall design and installation requirements.
 3. Documents to ascertain the scope of the installation obligations and for coordination purposes.

1.2 RELATED DOCUMENTS

The following drawings and documents shall accompany and be considered part of these specifications.

- A. Related Material: (Drawings and/or Specifications)
1. Table of Contents
 2. Section 00200 Instruction to Refrigeration Bidders
 3. Section 01020 General Requirements, Refrigeration
 4. Refrigeration Drawings: All "R" Drawings
 5. HVAC Drawings: All "M" Drawings
 6. Electrical Drawings: All "E" Drawings
 7. Plumbing Drawings: All "P" Drawings
 8. Energy Management Drawings: All "EM" Drawings
 9. Division 1 of Specifications
 10. Division 2 of Specifications
 11. Division 3 of Specifications
 12. Division 7 of Specifications
 13. Division 15 of Specifications
 14. Division 16 of Specifications

1.3 DEFINITIONS

- A. Owner: Shall be defined as Brookshire Grocery Company purchaser of equipment or Brookshire Grocery Company authorized representative.
- B. Refrigeration Contractor and Contractor: Shall mean the Refrigeration Installation Company.
- C. Installation Drawings: Shall mean all drawings showing graphical representation of project. Example including, but not limited to: Floor plans, Legends, Schedules, Details,
- D. Contract Documents: Shall mean all installation drawings, specifications and other provided documents required for this specific project.
- E. Walk-in box Contractor: Shall mean the Walk-in Box manufacturer.
- F. Manufacturer: Shall be defined as the company or companies who are supplying various fixtures, equipment, etc. for this project.

- G. Provide: Where this word appears, Contractor shall furnish and install and connect complete item unless otherwise indicated.
- H. Refrigeration Designer: Shall mean the originator of the Refrigeration plans.
- I. Materials: Include items such as piping and fittings, structural steel, pipe hangers, pipe insulation, welding rods, etc., which are purchased from a materials supplier and installed by the workmen during construction.
- J. Equipment: Items such as pressure vessels, air handling units, compressors, condensers, electric motors, valves, etc., which are purchased from an equipment manufacturer and installed by the workman during construction.
- K. Workmanship: Quality of performance of the workman during the construction phase of the project. The Refrigeration Contractor is responsible for furnishing installation technicians that have experience and a thorough working knowledge of refrigeration system installation.
- L. Warranty Period: The Warranty Period shall be one calendar year following written acceptance by the Owner.

1.4 MECHANICAL INSTALLATION AND CONTRACTOR OBLIGATIONS

- A. General Scope of work:
Work required under this Section includes all labor, materials, tools, and equipment necessary for installation of all mechanical / energy management systems on this project as detailed on the design project drawings and as herein specified, or as required by good installation practice to make the refrigeration systems fully operational. The Contractor shall commission all of the refrigeration equipment to a fully operational state, make all required adjustments and calibrations, perform and make all initial tests to ensure compliance with these specifications and their intent, and obtain all necessary approvals in writing from all governing bodies having jurisdiction over this work to ensure compliance with all laws and ordinances in effect.

Any person performing installation, maintenance, service, repair or disposal must be certified by the EPA to handle any refrigerants that are required on the project.

Any omissions from these specifications or from the refrigeration plans and schedules with reference to any parts and/or labor necessary for the complete installation must not be construed as releasing the Contractor from responsibility for furnishing such parts and/or labor.

1. For specific details of the installation, refer to the fixture plan; refrigeration schedule, refrigeration plans/specifications, piping plans (overhead and underground), line sizing plans, energy management plans/specifications, manufacturer's installation instructions, and to the applicable codes and ordinances.
2. The Contractor shall furnish and install all necessary refrigerant piping, fittings, vibration eliminators, line valves, solenoid valves, thermostatic expansion valves, dehydrators, strainers, sight glasses, moisture indicators, refrigerant, oil, filters, insulation and all fittings and accessories necessary to perform a complete installation

unless otherwise specified, together with all labor required to complete the installation and perform the service covered by this specification.

The Contractor is responsible for unloading, assembling, and installing all new coils, condensing units, condensers and other refrigeration equipment unless otherwise specified. The Contractor shall also arrange for the removal of crating and packing materials and shall leave the uncrating area and the compressor room in a clean and orderly condition.

3. The Contractor shall familiarize himself with the project, and shall cooperate with other Contractors doing work in the building. If any conflict, interference, or discrepancies come to the attention of the Contractor, he shall notify the Owner immediately before proceeding further with the installation. Absolute compliance with the schedule as submitted by the client is essential.

B. Installation Scope of Work – System Description

Refrigerant Conversion:

The Refrigeration Contractor shall furnish all new USA Manufactured R448A refrigerant as required by the contract documents, to replace the existing refrigerant in the existing refrigeration systems.

In all instances, the installation shall include, but not be limited to, the furnishing and installation of:

- Removal and proper disposal of all existing refrigerant and oil. Contractor must comply with most current EPA published requirements for disposal of used refrigerant and refrigeration oil posted to Parasense Refrigerant Tracking Program no later than one (1) week prior to Grand Opening.
- New refrigerant
- New system seals (e.g. compressor seals, valve seals)
- New polyol ester (POE) oil
- New thermal expansion valve replacements (as necessary)
- System commissioning, calibration, testing and control optimization

CPC Control System Upgrade:

The Refrigeration Contractor shall install all new CPC equipment, whether provided by Brookshire's Grocery Company or Refrigeration Contractor and specified in the installation drawings. This shall include, but not be limited to:

- Installation of new RX controllers for refrigeration control (as required)
- Installation of new BX controllers for HVAC / lighting control (as required)
- Installation of new input/output boards to accommodate additional control requirements
- Installation of new control boards to interface new CDS valve with the control system
- Installation of new temperature sensors, klixons, etc. for case control and monitoring
- Furnish and install new transformers for control power requirements
- Furnish and install new relays as required for interfacing equipment with the control system

- The Electrical Contractor shall furnish and install all new wiring for sensors, defrost termination, control valves, compressor control, condenser control. The Refrigeration Contractor must coordinate closely with the Electrical Contractor to ensure the control system is terminated properly. The Refrigeration Contractor is responsible to make all final connections.

The Refrigeration Contractor is fully responsible to remove all demolished control equipment in a safe, workmanlike manner. Dispose of all removed control equipment, unless directed otherwise by Brookshire's, in a manner which complies with local jurisdictional requirements.

CDS Valve Conversion:

The Refrigeration Contractor shall provide and install new Sporlan / Parker CDS valves on each refrigeration circuit at all racks.

Provide wiring and transformers as required to interface new CDS valves with the existing / modified CPC control system. Refrigeration Contractor will supply and install the required control boards.

RLDS (Refrigeration Leak Detection System):

Brookshire's Grocery Company shall furnish all new CPC RLDS panels, through the OEM, as specified by Brookshire's Grocery Company. The Refrigeration Contractor shall install all specified RLDS panels as shown in the installation drawings. This shall include, but not be limited to:

- Installation of new panels at locations shown in 'EM' drawings
- Provide and install all new tubing and end filters for new leak detection system.
 - One end filter per walk-in box
 - One end filter per refrigeration system unless noted otherwise on EMS plan.
- Provide communication wiring from the new RLDS panel to the CPC control system network. Refrigeration Contractor to make all final connections.

System Requirements and Procedures

1. Evaporator Coils

- Refer to refrigeration legends for specific evaporator coil types and locations.
- Refrigeration Contractor shall install all new evaporator coils as per plans and specifications.
- Coils should be mounted in walk-in boxes as shown on the Manufacturers shop drawings or as directed by Owner. Coil Manufacturer minimum clearances should be observed.
- Coils should be mounted to provide sufficient space for maintenance and cleaning without hindering refrigeration performance.

2. Condensers

- Refer to refrigeration legend for specific condensers, models and locations.

- b. Refrigeration Contractor is responsible for the installation of all new condensers, and associated piping (as required to be revised).
- c. Each discharge line shall be reverse trapped at the inlet of the condenser with a purge valve at the highest point for purging.
- d. The condenser drain lines shall traverse vertically immediately leaving the condenser and have a minimum drop of (3) three feet before proceeding horizontally.
- e. Refrigeration Contractor shall install the condensers on Brookshire Grocery Company racks if not factory installed.

3. Refrigeration Legends

For complete and detailed refrigeration legends, refer to “Refrigeration Schedules”.

C. Refrigeration Drains

1. Installation must conform to all State and Local Code Requirements.

Cases – Installation of one (1) drain line per coil or case of the condensate piping from the case drains to the nearest provided drains shall be performed by the Refrigeration Contractor. Plastic drip lines are acceptable, unless not approved by local codes. Copper is an acceptable substitute.

Coolers and Preparation Areas – Installation of the evaporator coil condensate drains shall be performed by the Refrigeration Contractor. All of these condensate drain lines shall be copper.

- a. The Refrigeration Contractor shall insulate all cooler, freezer and prep area condensate drains. Electric Heater Tape will be supplied and installed around all condensate lines in areas that have a design temperature less than or equal to 32 degrees Fahrenheit by the Refrigeration Contractor. Wiring slack shall not extend below condensate drain line. Power to be provided by the Electrical Contractor. Walk-in condensate lines shall exit the refrigerated space as soon as practical. The drip lines shall have a threaded brass or copper union connected to the coil pan. A “P” trap shall be installed near the hub drain outside of the refrigerated area. Walk-in coil condensate drip lines shall incorporate a minimum number of fittings and employ long radius elbows. The Refrigeration Contractor shall seal all openings cut in cooler and freezer panels with foam. Use butyl rubber caulk on both sides of the panel at the penetration.

D. Automated Control System

1. The refrigeration systems will utilize controllers to monitor and control the compressors, condensers and individual case temperature and defrost functions. Refer to the refrigeration plans for specific fixture temperature control methods. The Refrigeration Contractor shall be responsible for, but not limited to, the following:
 - a. Installation of all equipment (furnished by Brookshire’s Grocery Company), termination of control wiring (type as specified and appropriately labeled and

grounded) and labor necessary for the programming and start-up of the entire refrigeration and HVAC control system. Provide all necessary coordination and assistance to the Electrical Contractor during the installation and startup of the control system. For this purpose, the Contractor shall solicit and include in the price, the services of the Controller Manufacturer Field Engineer.

- All control-wiring types shall be as indicated on EMS documents and Manufacturer's Installation Manuals. No substitutions are permitted.
 - All EMS cable is to be permanently numbered at both ends with standard numbered wire markers.
 - EMS cables are to be run in non-metallic conduit or panduit cable tray. Sensor wiring is to be installed in single dedicated conduits.
 - Analog sensor wiring within conduit containing line voltage or other control wiring is forbidden. Further, the sensor wiring shall not be installed anywhere the signal can be disturbed by other sources.
 - All communication wiring shall be run from board to board without splices and installed in a logical daisy chain fashion.
 - Cables for input sensors shall be run with no breaks or splices from the respective I/O board to the sensor wires.
 - Use stripped conductors and crimp caps with dielectric grease or Dolphin gel connectors, stripping not required with Dolphin connectors. Wire nuts or butt splices are not permitted.
 - The Refrigeration Contractor shall coordinate with the Electrical Contractor as to the overall energy management system conduit requirements, quantities and locations. Energy management system conduit and wiring is to be provided by the Electrical Contractor.
- b. Provide all qualified labor materials to check-out start-up and program the entire Energy Management System.
- c. Temperature probes shall be factory installed by Case Manufacturer on all new standard refrigerated cases. Exception is on existing to remain and refurbished cases and other specialty fixtures where the Refrigeration Contractor shall supply and install all probes and sensors for these line-ups. Temperature sensors for each walk-in box shall be supplied by the Refrigeration Contractor. If a probe is shipped loose, it will be the responsibility of the Refrigeration Contractor to install the probe. Refrigeration Contractor shall furnish and install any additional sensors as required.

Sensor installation requirements:

- Sensor locations shall be per design document requirements and installed in such a manner and location to preclude damage from normal facility operations such as the movement of product inventory.
- All cables must be of sufficient length as to avoid the need for splicing, and be installed in a neat and workmanship manner.
- Each cable is to be labeled at the respective I/O board. For further details of labeling, refer to EMS Equipment Identification Section.
- Refrigeration Contractor to provide all necessary cables for each input to I/O board and point designated on schedules.

- d. Refrigeration Contractor must carefully review the refrigeration design plans and fully adhere to the requirements as specified and detailed therein.
- e. The Refrigeration Contractor shall be fully responsible for the complete commission of all compressor and condenser controls.
- f. Control of the discharge pressures shall be via condenser fan throttling.
- g. All new air-cooled condensers shall include factory installed fan contactors for control in response to ambient temperature and head pressure. The fan cycling controller will be part of the electronic control system to be supplied and installed by the Refrigeration Equipment Manufacturer. Outdoor ambient sensor shall be installed by Refrigeration Contractor at the condenser.
- h. The Brookshire’s system operator and Refrigeration Contractor shall be responsible for the final programming of all compressor rack set points, condenser fan settings, inverter control, alarm settings, etc. for full and satisfactory operation of the entire refrigeration system.
- i. The Refrigeration Contractor shall be responsible for initial programming of systems with, but not limited to, circuit information and factory set points for control, defrost and alarming. Any programming changes, which may be required after initial programming, shall be the responsibility of the Refrigeration Contractor. All installation labor is the responsibility of the Refrigeration Contractor.
- j. Further, the Refrigeration Contractor shall, upon entry completion of all the aforementioned operational settings, download the programmed settings to a computer disk. This disk shall be provided to the Owner and used as a backup when any restoration may be required.
- k. The operating saturated suction pressures and control parameters are indicated on the respective refrigeration legend. Example is shown below:

#	RACK 1	RACK 2	RACK 3
1	33.90	40.22	39.12
2	273.51	273.51	273.51
3	122.85	122.85	122.85
4	N/A	N/A	N/A
5	N/A	N/A	N/A
6	N/A	N/A	N/A
7	R-448A	R-448A	R-448A

#	DESCRIPTION
1	DESIGN SUCTION SETPOINT – (PSIG)
2	DESIGN SUMMER DISCHARGE PRESSURE – (PSIG)
3	DESIGN WINTER DISCHARGE PRESSURE (NO RECLAIM) – (PSIG)
4	DESIGN WINTER DISCHARGE PRESSURE (RECLAIM ON) – (PSIG)
5	SPLIT CONDENSERS AT (DEG. F)
6	OVERRIDE SPLIT AT – (PSIG)
7	REFRIGERANT TYPE

2. Refrigerant Leak Detection

a. "RLDS" II Leak Detector shall be furnished and installed by the Refrigeration Contractor.

The Refrigeration Contractor is to install the refrigerant leak detection equipment.

- 1.) The detector must incorporate multiple refrigerant gas detection filters, and provide an air sampling for the purpose of generating an outgoing leak alarm signal to the central alarm receiving computer.
- 2.) The monitor shall be as supplied by CPC or Bacharach.
- 3.) End filters manufactured by Bacharach, no substitutions, shall be utilized and located as follows:
 - One end filter located on each Compressor System (shipped loose for field installation by others)
 - One end filter located on each Remote Header only if applicable (shipped loose for field installation by others)
 - One end filter located in each walk-in box (shipped loose for field installation by others); sensors for R-448A detection.
 - One end filter located outdoors (to zero system)
- 4.) Tubing shall be provided by the Refrigeration Contractor.
 - Individual sampling tubes shall be run from the detector system to each area being monitored per design documents.
 - A purge tube is to be installed to provide clean air for resetting infrared zero baselines. Purge line not to exceed 100 feet in length. Purge line is to terminate outdoors and be installed in a location as to prevent exposure to rain, snow, ice, exhaust, fumes or other airborne contaminants.
 - Tubing is to be free of residual moisture or other contaminants.
 - To insure proper airflow, tubing bends shall not be less than 5" radius.
 - Sampling intake line shall be less than 500 feet in length.
 - Line terminations shall be positioned to reduce the possibility of mists, aerosols, oil, water, dust or other contaminants being drawn in to the detector.
 - A termination filter is to be installed at the end of each sampling tube line.
 - Line end filters are to be installed 12" to 18" above the floor.
 - An exhaust line is required to vent gas samples away from the detector. The exhaust tubing shall not exceed 100 feet in length. The exhaust line shall terminate in an exterior location completely isolated from the purge line termination point and free from any water or moisture entering the exhaust tubing.
- 5.) Voltage of detector shall be 120 Volt.
- 6.) Audible alarms and strobes to be furnished and installed by the Refrigeration Contractor.

3. Energy Management Relay Power
 - a. The Refrigeration Contractor is to provide all necessary transformer, equipment and wiring requirements from within the rack and remote header control panel for all control points associated with the relay boards installed in the rack control panel and remote header panel. The power for these respective relay points shall also include all output power requirements for equipment that is to be installed and controlled outside and beyond the equipment of the rack, yet wired to the output board installed at the rack control panel. Relay control voltage is 120 volt. All necessary transformers are to be factory installed and wired within the control panel for these relays.
 - 1.) Where relay board points are not powered from the compressor rack, the Refrigeration Contractor shall provide all power requirements, transformers and wiring for relay control points.
 - 2.) The Refrigeration Contractor shall provide all necessary relays, contactors, ice cube relays, etc. for the control interface between the EMS equipment and the equipment being controlled.

1.5 GUARANTEE AND WARRANTY

- A. Refrigeration Contractor shall warrant all material and workmanship for the Warranty Period. Defects in material or workmanship shall be corrected without delay and at no cost to the Owner during the warranty period.
- B. The Refrigeration Contractor shall assign and furnish to the Owner a copy of all “warranties” for equipment or manufactured components supplied on the project. It is the responsibility of the Refrigeration Contractor to process without delay all “warranty” claims that occur during the warranty period. Terms and Conditions stated on manufacturer’s warranties shall apply to the Owner.
- C. The Refrigeration Contractor shall provide to Owner two (2) full sets of all refrigerated case fixture instruction manuals, evaporator coil specification sheets, condenser data, etc. in three-ring binders. This manual shall include specifications of all refrigeration equipment installed by this Contractor.
- D. During the one (1) year warranty period, the Refrigeration Contractor shall furnish, at no charge to the Owner, all labor and materials not specifically covered by any “manufacturer’s warranty.”
- E. Should any defects develop within the warranty period, the required repairs or replacements, including labor and materials, shall be made without charge or delay to the Owner.
- F. The Contractor shall guarantee each piece of equipment supplied by him to meet the capacity and duty requirements hereinafter specified. The satisfactory performance of the equipment and systems shall be the responsibility of the Contractor.
- G. Official acceptance of the completed contract shall only commence when the installation is finalized in every respect and has been in operation under load conditions for a period of at least one week to the satisfaction of the Owner.

1.6 MATERIALS, EQUIPMENT AND SUBSTITUTIONS

A. Description:

All materials and equipment shall be new and the product of a reputable manufacturer. Materials and equipment shall fully conform to the applicable specifications and standards, and shall comply with size, make type and quality specified or as otherwise specifically approved in writing by the Owner and Engineer. Do not use material or equipment for any purpose other than that for which it is designed.

It shall be understood that the plans cannot indicate every specialty or detail; however, the Contractor shall furnish and install all such specialties and equipment necessary for the complete installation in accordance with the normal interpretation of the plans and specifications for a fully operational system, good practice, and to the satisfaction of the Owner and Engineer.

B. Substitutions:

Where manufacturer's names, catalog numbers, or trade names appear in the specifications, it is not the intent to restrict or eliminate competition, but merely to establish quality of material required. Where the words "or approved equal" appear, the "equal" item must conform to the requirements of the specifications and must be submitted, with complete information, to the Engineer for written approval prior to use.

All costs associated with additional work that may be required by other trades as a result of a substitution of equipment and/or materials, shall be borne by the Contractor.

Materials that are not satisfactory to the Owner shall be removed from the premises.

1.7 REFERENCE STANDARDS AND CODES

A. Code Compliance, Laws, Ordinances, Rules, and Regulations:

1. The Contractor shall comply with all applicable laws, ordinances, rules and regulations relative to this project.
2. If the Contractor performs any work not in compliance, and does so without written authorization by the Owner, the Contractor shall bear all costs relative to correcting the installation to comply with the original specification requirements.
3. The entire refrigeration installation including piping and equipment must comply with the most currently up to date International Building Code and most currently up to date International Mechanical Code for Seismic Restraints of Mechanical Systems, based on the specific store seismic zone classification, or the current versions adapted by the local jurisdiction.
4. All refrigeration equipment and installation thereof shall comply with ASHRAE Standard 15-2013.

1.8 TEMPERATURE/PRESSURE RECORDINGS

- A. Following final control calibration, and after the system has established operational equilibrium, the Contractor is required to obtain an accurate twenty-four (24) hour temperature recording chart of each system indicating the case number and location of probe.
- B. In addition, a twenty-four (24) hour pressure recording of both the discharge and suction pressure shall be obtained for each system. The recordings shall be submitted to the Engineer within five (5) days after the store opening for approval.

1.9 REFRIGERATION IDENTIFICATION

The identification procedure as outlined below is to be used in the absence of alternate plans from the Owner or Engineer.

- A. Use single letters beginning with “A” for lowest suction temperature and progressing in order to highest suction temperature (utilize same designation as detailed in the legend).
- B. Compressors in parallel are identified by number from left to right from the front of the unit.
- C. Satellites are prefixed with “S” before the corresponding unit letter (e.g. SA1).
- D. Condensers and reclaim heater circuits
 - 1. Use same letters as for the units attached.
- E. Refrigeration systems
 - 1. Assign numbers on the suction manifold from left to right for each system when viewing the rack from the front. Begin with “1” on each rack.
 - 2. The Refrigeration Contractor shall install Brother P-Touch (or equivalent) labeling tape displaying the operating system set points for each compressor unit. The labels shall include the refrigerant name, the suction and discharge pressures and their respective temperatures. The labels shall be placed on the outside of the compressor system control panel, next to the system identification labeling.
 - 3. The Refrigeration Contractor shall install Brother P-Touch (or equivalent) labeling tape displaying each circuit number and the name of the specified connected refrigeration device and its defrost requirements. The labels shall be placed on the outside of the compressor system control panel, next to the system identification labeling.
- F. Cases
 - 1. Case numbers shall be assigned in addition to the unit and system numbers, to identify the location of each case in the line-up. Add a hyphenated alphabetical letter assigned from left to right when viewed from the front of the case line-up:

Example: Line up of Six (6) Cases on Two Systems.

2. No case number shall be assigned where there is only one case evaporator on a system. Complete identification can be made in that instance using only the unit and system numbers.

G. Markings

1. Each case shall be marked with 1-1/4" diameter plastic tag featuring 1/4" high characters bearing the unit, system, and case numbers, attached by screws or rivets to the top left corner of the lower front case panel using existing screws where possible.
2. Coolers and freezers shall be similarly marked with a tag on each door.
3. Prep rooms shall be marked with a label on the door and label fan coil plenum on non-removal panels.
4. Condensers shall be tagged on the metal housing near the inlet fitting for each unit.
5. Units, and systems, shall be marked on the rooftop by metal tags.
6. Letters "I" and "O" shall not be used to identify units in order to avoid confusion with number "1" and "0".
7. All characters shall be stamped on one liner on the metal tags wherever possible.
8. All cases which incorporate any type of control or thermostat shall be identified.
9. Defrost schedules to be displayed at respective controllers.

H. Energy Management System (EMS) equipment

The EMS identification procedure as outlined below is to be used in the absence of alternate plans from the Owner or Engineer.

1. All wiring and cable runs shall be permanently tagged at each cable end with the corresponding system identification as indicated on the design schedules, legends and plans. All EMS junction boxes shall be clearly identified as to the EMS cables and wiring system identified within.
2. Equipment labeling shall display the proper equipment identification tag, affixed to the exterior cabinet of each controller, EMS enclosure and on each control board. The proper EMS equipment tag name shall display the name and identification as indicated on the design plans.

1.10 AS BUILT DOCUMENTATION

- A. The Refrigeration Contractor shall provide two (2) sets of “as-built” documents prior to final completion of the installation. The Refrigeration Contractor shall mount one (1) set on the wall of the machine room and one (1) copy provided to Owner.
- B. Upon completion of refrigeration piping installation, the Refrigeration Contractor shall provide to the Owner “as-built” refrigeration piping diagrams detailing all tubing sizes, piping paths and valve locations. The Refrigeration Contractor shall provide two (2) “as-built” sets, one (1) copy to be mounted in the prefabricated Weather-Pac and one (1) set provided to the Owner.
- C. Permanent Fixture Plan

The Refrigeration Contractor will be required to develop, supply and install a permanent store fixture plan indicating all refrigeration circuits, location of all ball valves and solenoid valves, and their interface with the compressor systems. This plan shall be framed in clear glass and permanently located in the electrical room.

- D. Asset Tags

Brookshire Grocery Company job superintendent shall tag all assets. Refrigeration Contractor to mark all asset numbers on As-Built plans.

1.11 SHOP DRAWINGS, SUBMITTALS

- A. For the Refrigeration Contractor, the major types of material being installed for the refrigeration equipment installation shall be detailed in a submittal formal. This submittal shall include, but not limited to, complete and concise data relating to the refrigerant tubing grade, the type of brazing materials, valves and insulation types. In all cases manufacturer’s data shall be included. For specifics relating to submittals, refer to section 01300; Submittal Procedures.
- B. Shop drawings and brochures covering all major equipment items shall be submitted to the Owner for approval prior to delivery and installation of said equipment. All shop drawings shall contain required data per Section 01300; Submittal Procedures.
- C. Installation shop drawings shall be prepared by the Refrigeration Contractor and submitted to the Owner for approval prior to installation commencement as indicated in Section 01300; Submittal Procedures.

PART 2 - PRODUCTS

2.1 REFRIGERANTS, PIPING AND INSULATION

- A. Refrigerants
 - 1. The refrigerant shall be delivered to the job in original sealed containers.
 - 2. Under no circumstances shall there be any mixing of refrigerants.

3. Any refrigerant used for initial charging or otherwise introduced into the refrigeration systems shall be UL listed on the container and/or packaging.
4. The entrained charge should be a stable 20% of receiver(s) capacity. The amount to obtain this percentage shall be recorded and noted on the rack and conveyed to the owner in writing.
5. Additional refrigerant may be required for systems after proper superheat has been set on all expansion valves. Since compressor systems may be operated with flooded condensers during winter, sufficient refrigerant must be charged into each system for this purpose. If necessary, the Contractor shall return during cooler ambient conditions, in order to provide the optimum refrigerant charge.
 - a. Contractor shall take extreme caution to prevent the loss of any refrigerant to the atmosphere. Absolutely, no planned refrigerant venting is permitted.
6. Contractor shall obtain, read and understand all warnings and instructions listed on the refrigerant container label, packaging and in the safety and handling instructions as provided by the refrigerant manufacturer.

For specific refrigerants used in each situation, the Contractor must refer to the refrigeration schedule to ascertain the actual refrigerant to be utilized. Use only the refrigerant in any equipment for which that equipment was designed by the Manufacturer.

7. The Refrigeration Contractor shall provide all information to the Brookshire's system operator in charge of the premises for the purpose of maintaining a written record of refrigerant quantities brought onto and removed from the premises. This record is to be made available to the Fire Department.

B. Refrigerant Piping

1. The Refrigeration Contractor must carefully review the piping and trenching plans. These documents may indicate the piping schedules, routing and other requirements of which will be necessary for the refrigeration installation.
2. Tubing shall be installed in a neat, workmanlike manner with horizontal runs sloped toward the compressor at a rate of one inch (1") per twenty foot (20'). Hangers or straps shall be installed so as to adequately prevent vibration or undue strain on any pipe or fitting. Clamp lines with "Unistrut" or equivalent at least every six (6) feet in compressor room. Outside the compressor room support lines a minimum of every ten (10) feet. Piping supports shall not compress the insulation or reduce the wall thickness.

It shall be noted by reference to refrigeration plans that some of the refrigerant piping may run overhead in individual circuit systems.

Piping installed underground shall be located in separate conduits for each circuit, except where noted otherwise. All underground circuits are to be installed prior to the installation of the concrete slab (Contractor to coordinate with the General Contractor to ensure protection from the elements, damage and any possibility of moisture ingress). The balance of all refrigeration piping must be hard copper. Each circuit must be pressure tested, and left under pressure prior to the slab installation. It

is this Contractor's responsibility to coordinate the installation schedule with the General Contractor, and to ensure security of the refrigeration piping systems.

- a. Cadmium plated or galvanized nuts and bolts with self-locking type nuts shall be used on all pipe clamps. Lock Tight shall be applied to all nuts of non-self-locking style.
 - b. All piping to be installed in such a manner as to completely prevent any type of rubbing against any other objects/surfaces.
 - c. Case lines must be routed adequately to clear fans, motors, and expansion valves. Do not run tubing from one system through a case connected to another system. Protect lines with tape or insulation where running through case openings.
 - d. All piping shall be installed so that normal servicing of the compressor and related equipment is not hindered. Do not obstruct the view of the crankcase oil sight glass or run piping so it interferes with removal of compressor, cylinder heads, end bells, access plates, fans, fan motors, coil, filters, condensers, etc.
 - e. Suction line filters are to be installed for direction of flow without bypass relief. Filter pressure drop can then be measured between the filter gauge fitting and the fitting on the suction service valve.
 - f. Refrigeration piping must not be installed above any electrical distribution panel(s), transformers or other electrical components. Extreme care shall be applied to satisfy this requirement.
 - g. Do Not Use:
 - a. Short radius 90° elbows
 - b. 45° elbows
 - c. Plastic caps
 - d. Drilled tees in fixtures
 - e. Capillary tubes
 - h. All couplings and reducers should be welded around the rolled stop, or staked stop.
 - i. Furnish and install adequate system shut-off valves to facilitate maintenance, emergency service and modifications without loss of refrigerant.
 - j. Ball isolation valves shall be provided by the Refrigeration Contractor upstream of each refrigeration system and downstream of each refrigeration system for isolation and servicing purposes.
 - k. Pulled tees are acceptable. Pulled fittings must be at least 2 trade sizes smaller than the line.
3. Unless otherwise specified, all refrigeration piping shall be refrigeration grade ACR Type L or Type K hard drawn, cleaned, dehydrated and capped to avoid contamination prior to installation. Type L soft copper tubing may be used for underfloor runs providing the pipe is straight and kept free from kinks and bends. Minimize inaccessible refrigerant pipe joints wherever possible.

4. Fittings shall be wrought copper or forged brass and only long radius elbows shall be used. All changes in the line size and direction shall be accomplished with fittings only. Absolutely no “stab-ins” or formed long sweep elbows are permitted.
5. Cushion all pipes with curved sheet metal sections glued around the Armaflex, on the intermediate supports where pipe is not clamped. Where the clamps are applied directly onto the copper lines, Hydrazorb cushion clamp assemblies shall be used with 1-5/8” width steel channel. Steel clamp parts must not touch or rub the copper pipe.
6. Where vertical risers of more than five (5) feet occur in a suction line, the riser shall be trapped at the bottom (inverted P trap). Install an additional trap for each ten feet (10') of riser.
7. Double suction line risers shall be installed on all circuits as indicated shown on the refrigeration piping plans.
8. Where a branch suction line enters a main suction line it shall enter at the top. Piping shall be arranged so refrigerant or oil cannot drain from the suction line into the evaporator.
9. Vertical discharge risers shall be trapped at the bottom to prevent oil from draining back into the compressor. Install an additional trap equally spaced for each ten (10) feet of riser.
10. The Refrigeration Contractor is required to furnish and install full flow port brass ball valves throughout, as indicated on the piping plans, and any additional valves which may be necessary (and which may not be indicated on the plans), to isolate both liquid and suction circuits. Suction ball valves must only be installed in horizontal pipe runs, and should never be located in a vertical suction riser. Valves shall incorporate a dual seal Teflon ball. Each valve must be selected to introduce a maximum of 0.25 psig pressure drop. Design working pressure of 500 psig. (Approved manufacturers: Superior, Mueller).
11. Refrigeration piping is to be located so that the access to the system components is not hindered and all components that could possibly require fixture maintenance are easily accessible. Further, the Refrigeration Contractor shall review and strategically locate all control valves and isolation valves prior to the installation of any refrigerant piping. The planning of the refrigeration pipe location shall include accessible locations and adequate space for installation and adjustment of valves. The coordination of the refrigerant piping installation shall be in agreement with the overall construction schedule and shall have all piping path and accessories locations confirmed by the Refrigeration Contractor prior to closing of any wall, floor or ceiling where refrigerant piping may be passing through or installed in.
12. All joints in the compressor discharge suction and liquid lines shall be brazed with a suitable high temperature silver solder alloy containing not less than fifteen percent (15%) silver. At any copper to brass joint where damage could occur from excess heat use 15% silver, but must utilize a heat wrap in brazing process. Use solder with at least forty-five percent (45%) silver content on all copper to steel, brass to steel or steel-to-steel joints.

During all of the brazing operations, dry nitrogen must be bled through the piping at very low pressure to prevent oxidation and scaling.

13. In order to avoid damage to the internal Silfos joints in vibration eliminators, line connections to vibration eliminators are to be made with silver solder alloy, to 1,200 DEG. F (well below the 1,300 DEG. F melting point of Silfos).
14. 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.
15. Protection of the piping system shall be this Contractor's responsibility. Temporary protection shall be provided until the job is in satisfactory condition, and permanent protection shall be provided by the building contractor as required to protect the piping, fittings, etc. from damage. This Contractor is to supervise the construction of permanent guards and to see that future access will not be barred by its design.
16. Install Schrader type valves at each evaporator outlet to facilitate adjustments of the superheat settings and to establish pressure drop. Additional Schrader valves must be installed in all of the long branch suction lines, to facilitate pump-out of excess refrigerant during periods when the system must be pumped down.
17. Walk-in cooler evaporator coils shall be properly supported from a "Unistrut" frame, one for each hanger bracket, which itself must be supported from an independent structural system properly designed and constructed based on the weight and sizes of each coil.
18. The Refrigeration Contractor shall verify that all equipment installed has proper pressure relief protection, and that relief parts are directed downward or piped to relieve downward. All pressure relief piping shall be piped to the outdoor environment and be installed as per codes.
19. To facilitate movement of the piping as a result of contraction and expansion during refrigeration operation, the Refrigeration Contractor shall provide and install expansion loops throughout the store's refrigeration piping. These loops shall consist of fittings or bent tubing to achieve a "U" bend of a required radius sufficient for anticipated expansion. For underfloor circuits, these loops shall be placed at intervals so as to coordinate with refrigeration pits, and should not be anchored in the pits. Pipe hangers must permit free movement of the refrigerant lines. Only long radius elbows should be used in forming the expansion "U" and shall measure at least 3" inside the "U". If natural "L" or "U" shapes are formed as a result of the piping layout, these can be utilized in lieu of secondary "U" bends.
20. The Contractor shall support all stop valves independently of the refrigeration tubing of piping of 3/4" or less outside diameter.

C. Insulation

1. Exterior insulation shall be K-Flex Clad AL by K-FLEX USA. All suction and liquid lines shall be insulated with 1" wall thickness insulation.

All interior refrigerant suction and liquid lines shall be insulated the entire length of the run with 1" wall thickness elastomeric tube insulation. Where piping is ran underground the insulation thickness can be reduced by one size. However, all

piping installed in the machine room and above the store sales area must be insulated with the maximum thickness material.

2. All openings in the refrigerated fixtures and coolers for piping access shall be completely sealed with “Silicone” sealant or Insta-Foam products.
3. Insulation joints shall be sealed with rubber cement to ensure a “drip-tight” seal.

Insulation shall be slipped on the tubing prior to joint brazing where possible, in preference to splitting, and then sealing the joint. Each joint must then be covered with an insulated sleeve glued around the joint.

4. All of the suction ball valves, fittings, elbows and T connections must be properly insulated with preformed insulation material, designed for this purpose, securely fastened to each component. Wrapping with insulated tape is unacceptable as the only method of component insulation.
5. All refrigeration lines which run through plenum spaces must be insulated with K-Flex elastomeric foam insulation with a 25/50 flame-spread and smoke developed ratings.
6. Insulation shall be mitered, pre-adhered (except for reclaim piping, whereby pre-adhered insulation is not permitted) and longitudinally slit to fit over p-traps, tees and elbows or bends over 90°.
7. All liquid lines shall be insulated; including liquid lines from the liquid manifolds to the evaporator coils with 1” insulation.
8. All openings for refrigerant lines into the compressor room shall be closed-off on the outside with plywood having holes drilled for the lines and sealed from the inside using Insta-Foam Products “Froth-Pak” (non-combustible) or equal.
9. Elastomeric insulation which is located outdoors, must incorporate a weather resistant protective finish, such as Nomaco K-Flex Clad AL.
10. Refer to the architectural specifications for fire stopping materials required for sealing of penetrations.

2.2 INSTALLATION OF ACCESSORIES

- A. If liquid line driers are not otherwise specified, they shall be of the filter-drier type, and of the size recommended by the Manufacturer. Drier cartridges shall not be installed until the second evacuation has been completed.
- B. A replaceable core suction line filter shall be installed in each compressor suction line. A pressure fitting must be provided ahead of the filter, preferably in the shell, to facilitate checking the pressure drop. If the pressure drop across the filter is in excess of 1.0 psig after the initial twenty-four (24) hours of operation, the suction line filter cartridge shall be replaced.
- C. All controls, components, and valves shall be located in serviceable locations and positions. The locations of all solenoid valves, ball valves and control valves located outside the machine room or prefabricated house shall be noted on a fixture plan, and provided to the

Owner at the completion of the project. The plan shall be laminated, framed and installed within the prefabricated Weather-Pac.

- D. After the delivery of the refrigerated case fixtures, the Refrigeration Contractor shall provide and utilize plastic covers for each refrigerated case fixture. To shield the case fixtures from dust, etc. these covers shall remain on the cases during general project construction. As the overall project proceeds, the Refrigeration Contractor shall remove the plastic covers and clean the cases before placing the cases in operation.
- E. All walk-in storage areas each require door switch (installed by Refrigeration Contractor) which will turn off the evaporator fans, close the liquid line solenoid valves and/or CDS valve whenever the latch type door is opened. This solenoid valve must be supplied and installed by the Refrigeration Contractor.
- F. Thermostatic expansion valves shall be sweat type and installed as indicated on "Refrigeration Schedule".
- G. Solenoid valves shall be of a sweat type. The solenoid installation requirements are as indicated on the "Refrigeration Schedule".
- H. Electronic Evaporator Pressure Regulator (EEPR) valves shall be sweat type and installed as indicated on "Refrigeration Schedule".
- I. Where field installed controls valves are required, (i.e. EPR, CDS, liquid solenoids, suction solenoids, etc.) the Refrigeration Contractor shall provide and install valves / valve conversion kits. Voltage of solenoid or EPR valves shall be 120 volt. Voltage of CDS valves shall be 12 volt.

PART 3 - EXECUTION

3.1 SYSTEM TESTING AND START-UP

- A. Testing Evacuation and Charging:
 - 1. The Refrigeration Contractor must take extreme caution to ensure that no HFO/HCFC/HFC/CFC products are discharged or otherwise released into the atmosphere.
 - 2. After completion of all connections, the refrigeration piping testing procedure shall be completed in the following manner. Prior to commencement of pressure testing or evacuation, remove and cap all pressure transducers. Introduce dry nitrogen through a pressure regulator into piping being tested so that the pressure is 150 psi gauge. Valve off all compressors if any testing is done over 175 psig gauge.
 - 3. Piping must hold pressure with nitrogen valved off. If pressure does not hold given pressure for (12) hours add the proper refrigerant to the system and use an electronic leak detector to find the leaks. Repair all systems leaks.
 - 4. Pressurized systems may be vented to other systems undergoing pressure testing to conserve nitrogen. Maintain at least one pound gauge pressure on all systems containing refrigerant mixed with nitrogen.

5. The Refrigeration Contractor must utilize the following equipment to complete the evacuation test: Two (2) two-stage vacuum pumps, (or equipment equal to or superior to) each with a capacity of 6 CFM (minimum requirement); Evacuate systems from two (2) independent locations using the manufacturer's recommended connection points to reach all portions of the system. Use multiple 3/8" or 1/2" copper tubing only (no gauge hoses). Open all valves with manual stems and add bypass loops as necessary. An electronic micron instrument such as manufactured by Robinair must be installed to sense piping pressure with the vacuum pump valved off. An authorized Brookshire's Representative shall be present at the scheduled time off notice any and all evacuation tests, so they may witness the vacuums obtained. A minimum of forty-eight (48) hours notice is required.
6. Evacuate each system and associated connected piping to 1,500 microns. Break the vacuum to 2.0 psig, with nitrogen. Repeat the initial evacuation process, again, breaking the vacuum with nitrogen and evacuate to 1,000 microns. Install a drier of the required size in the liquid line, open the compressor suction and discharge valves, and evacuate to 500 microns. After the final evacuation, a decay test shall begin with all pumps off. The micron level shall not rise above 600 in a six hour period. An EPA certified, owner assigned representative will verify.
7. Contractors shall maintain records of test pressures and vacuum readings on each portion of piping tested and shall record length of time test pressure and vacuums that were held (attachments at end of section 3, 3.5). Two (2) signed copies of this record of testing shall be submitted to Energy Squared, LLC and the Owner. Any system placed in operation without final evacuation being witnessed by Engineer or Owner shall at Owner's request be purged and re-evacuated. The advance notice requirement is intended to arrange the Owner or his Representative to be present to witness the vacuum readings. Further, when requested by authorities having jurisdiction, a dated declaration of test shall be provided for all systems containing 50# or more of refrigerant.
8. The Contractor shall protect all system components (float balls, TXV's, transducers, etc.) from damage due to excess pressure during the test procedure.

B. Start-up

Final testing and start-up of the existing parallel compressor systems shall be carried out in conjunction with a Brookshire's Grocery Company representative. This individual is to be contacted by the Refrigeration Contractor to be present during installation and to supervise the system commissioning.

Absolute compliance with the manufacturer's specifications must be fully adhered to. Refer to the Manufacturer's Installation Instructions for all applicable equipment.

Condensing units are normally delivered to the job with an initial oil charge lubricant. However, the Refrigeration Contractor shall be responsible for the furnishing and charging of each system with the correct oil type and amount to bring the level of each reservoir up to the center of the upper sight glass. This procedure must be continued until the oil level stabilizes, following at least (21) days of operation. Use only oil that is approved by Compressor Manufacturer. All oil must be delivered to the job in factory sealed, unopened containers. The Contractor must use extreme caution during oil handling to prevent the ingress of moisture laden air.

1. Before operating any motor or other moving parts, the parts are to be lubricated with the proper oil or grease as necessary.
2. Remove or loosen all shipping retainers under motor compressors. Make sure hold down nuts on spring-mounted compressors are not touching the compressor feet, and are not more than 1/16" above the mounting foot.
3. Check high and low pressure control cut- in and cut-out points. Adjust if necessary.
4. The Contractor shall ensure that any air-cooled oil coolers are fully operational, prior to system commissioning.
5. After the compressor is started, continue charging until system has sufficient refrigerant for proper operation. Do not over charge. During start-up, no compressor is to be left operating unattended and unwatched, until the system is properly charged with refrigerant and oil.
6. Do not add refrigeration oil while the system is short of refrigerant unless oil level is dangerously low. Where oil has been added during charging, carefully check the compressor crankcase sight glass after reaching a normal operating condition to be sure the system does not contain an excessive amount of oil which can cause slugging or loss of refrigerating capacity.
7. The temperature controls and controller equipment shall be set to maintain the following temperatures. These conditions must be read in the primary discharge air stream, except for all walk-in boxes which are read in return air stream. Full compliance with manufacturer's installation, setup recommendations and operating temperatures must be adhered to.

No deviation from these temperatures will be allowed, Contractor shall be held responsible should he accept instructions, either verbally or otherwise from any source other than in writing from Owner. Should there be any question as to the capabilities of a Manufacturer's equipment to produce temperatures herein specified, Contractor will notify Owner in writing of said questions, otherwise it will be Contractor's responsibility to ensure said equipment shall perform as specified below. The temperatures are to be maintained with fixture loaded or unloaded. Temperatures listed below are product zone temperatures. See specific legend for case/cooler/freezer target temperatures.

TARGET TEMPERATURES

FIXTURE (AS APPLICABLE)	TEMPERATURE RANGE DEF. F
DAIRY CASES	+32
SERVICE DELI CASES	+20
SINGLE DECK RED MEAT CASES	+24
SINGLE DECK APPY	+20
MULTI-DECK RED MEAT CASES	+24
PRODUCE CASES	+34
REACH-IN DOOR ICE CREAM CASES	-12
DAIRY COOLER	+34
MEAT COOLER	+28
PRODUCE COOLER	+36
DELI COOLER	+34

MEAT PREPARATION	+50
PRODUCE PREPARATION	+50
WALK-IN FROZEN FOOD	-10
WALK-IN BAKERY FREEZER	-10
WALK-IN ICE CREAM	-12

8. The Contractor is to use 1° F graduation thermometers to set the temperature as specified above. Thermometers furnished with cases are not satisfactory for this purpose.
9. Set the compressor controls in accordance with manufacturer's application data for initial system start-up. Observe case temperature performance. Check each expansion valve and adjust as needed to obtain required superheat temperature. After expansion valve stabilization has occurred, additional refrigerant may be required to bring the system to full capacity. All systems must be fully charged.
10. It is the Refrigeration Contractor's responsibility to check all refrigeration components, flare fittings, cases and controls, including all electrical connections at the compressor, to ensure tight and operative connections.
11. The Refrigeration Contractor shall make all necessary adjustments to the controls during the time that the fixtures are being stocked. The Contractor's mechanic shall remain at the store at least eight (8) hours during the first day the store is open for business, beginning one (1) hour before opening time.
12. After all of the refrigerating systems have been operational for a period of seven (7) days, the Refrigeration Contractor is required to investigate and leak check each and every refrigerant circuit starting at the fixture expansion valve and working back to the compressor rack or condensing unit. Any sign of a refrigerant leak, must immediately, permanently, and properly rectified. At this time, the Contractor must check every field located ball and solenoid valve for integrity and ensure that the ball valves are firmly capped and the cap Teflon gaskets are securely in-place.
13. Self-Contained Equipment Start-Up

This Contractor shall check all self-contained refrigeration equipment for proper operation and correct temperature settings. Fixtures are to be set in place by the Contractor and the electrical connection by others.

Contractor to review Check Fixture Plan Layout and any other Addenda for the locations of all self-contained equipment. Follow manufacturer's specifications for start-up and checking. Confirm refrigerant level, compressor operation, and set all operating controls.
14. The Refrigeration Contractor is to provide a written record of the required testing to be maintained on the premises for the following:
 - a. Isolation solenoid valve operation for refrigerant leak detection interface.
 - b. Horn / strobe operation with refrigerant leak detection alarm interface.
 - c. Machine room emergency ventilation activation.
 - d. Refrigerant leak detection alarm.

3.2 REFRIGERATION INSTALLATION
PROPOSAL FORM

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	<u>PRICE</u>
INSTALLATION:	
Including all labor and material required for a complete installation, as per the enclosed specifications and project design documents.....	\$ _____
Hourly labor rate	\$ _____
Hourly premium for overtime authorized to be Reimbursed by Owner	\$ _____
Mark-up on extra materials supplied outside On contract.....	\$ _____
First Year Service	\$ _____
Second Year Service	\$ _____
Third Year Service	\$ _____

Submitted by: _____ Date: _____
(Contracting Firm)

To: Brookshire Grocery Company
430 E. Front Street, Tyler, TX 75702
Tel: 903.579.0500, Fax: 903.593.2213

Having examined and studied the Project Manual dated: _____, the instructions to Bidders, and the other required contract documents for: Brookshire's #093 – Comanche, TX and having inspected the site and noted all conditions governing construction of the Projects:

Bid Package: _____ Description:

We hereby propose to furnish all labor, materials and equipment and perform work described above and within the design documents for the submitted sum(s), which include all applicable taxes.

Acknowledge receipt of all Addenda & Clarifications below.

OFFICERS SIGNATURE:

TITLE: _____ DATE: _____

Names and Titles of Officers Authorized to Sign Contracts:

3.5 REFRIGERATION FORMS

Upon completion of the refrigeration installation and the refrigeration energy management systems installation, the Refrigeration Contractor shall provide to Owner the authorized forms as detailed in this section.

All the noted information must be completed as pertaining to this particular project.

All time required for acquisition and provision of this data shall be included as part of the Refrigeration Contractor's Contract Fee.

Refrigeration Equipment Setup Verification

Store Name: _____

Address/City/State: _____

Refrigeration System #: _____

This system has been successfully evacuated per Specifications.

The initial evacuation was to _____ microns.

The second evacuation was to _____ microns.

The final evacuation was to _____ microns.

The micron level rose to _____ microns after 6 hours of pump isolation.

This system contains R- _____ refrigerant.

The total and final refrigerant charge of this system is _____ pounds.

The following are the refrigerant charge amounts installed during start-up of this unit:

Date: _____ pounds

Date: _____ pounds

Date: _____ pounds

Date: _____ pounds

Date: _____ pounds

This system contains (choose one) POE / AB / Mineral oil.

The total amount oil in this system is _____ gallons. Oil Viscosity: _____.

The system final operating high side(including condenser and heat reclaim piping) field pressure reading was _____ PSI @ ambient temp: _____°F.

The system final operating low side field pressure reading was _____ PSI.

All rack circuit suction and liquid piping and valves, as well as the high side piping and valves have been leaked checked and verified the entire equipment is refrigerant leak free.[_____:initial here]

Refrigeration System #: _____

This system has been successfully evacuated per Specifications.

The initial evacuation was to _____ microns.

The second evacuation was to _____ microns.

The final evacuation was to _____ microns.

This system contains R- _____ refrigerant.

The total and final refrigerant charge of this system is _____ pounds.

Refrigeration System #: _____ (CONTINUED)

The following are the refrigerant charge amounts installed during start-up of this unit:

Date: _____ pounds
Date: _____ pounds
Date: _____ pounds
Date: _____ pounds
Date: _____ pounds

This system contains (choose one) POE / AB / Mineral oil.

The total amount oil in this system is _____ gallons. Oil Viscosity: _____.

The system final operating high side(including condenser and heat reclaim piping) field pressure reading was _____ PSI @ ambient temp: _____°F.

The system final operating low side field pressure reading was _____ PSI.

All rack circuit suction and liquid piping and valves, as well as the high side piping and valves have been leaked checked and verified the entire equipment is refrigerant leak free.[_____:initial here]

Refrigeration System #: _____

This system has been successfully evacuated per Specifications.

The initial evacuation was to _____ microns.

The second evacuation was to _____ microns.

The final evacuation was to _____ microns.

This system contains R- _____ refrigerant.

The total and final refrigerant charge of this system is _____ pounds.

The following are the refrigerant charge amounts installed during start-up of this unit:

Date: _____ pounds
Date: _____ pounds
Date: _____ pounds
Date: _____ pounds
Date: _____ pounds

This system contains (choose one) POE / AB / Mineral oil.

The total amount oil in this system is _____ gallons. Oil Viscosity: _____.

The system final operating high side(including condenser and heat reclaim piping) field pressure reading was _____ PSI @ ambient temp: _____°F.

The system final operating low side field pressure reading was _____ PSI.

All rack circuit suction and liquid piping and valves, as well as the high side piping and valves have been leaked checked and verified the entire equipment is refrigerant leak free.[_____:initial here]

Refrigeration System #: _____

This system has been successfully evacuated per Specifications.

The initial evacuation was to _____ microns.

The second evacuation was to _____ microns.

The final evacuation was to _____ microns.

This system contains R- _____ refrigerant.

The total and final refrigerant charge of this system is _____ pounds.

The following are the refrigerant charge amounts installed during start-up of this unit:

Date: _____ pounds

Date: _____ pounds

Date: _____ pounds

Date: _____ pounds

Date: _____ pounds

This system contains (choose one) POE / AB / Mineral oil.

The total amount oil in this system is _____ gallons. Oil Viscosity: _____.

The system final operating high side(including condenser and heat reclaim piping) field pressure reading was _____ PSI @ ambient temp: _____°F.

The system final operating low side field pressure reading was _____ PSI.

All rack circuit suction and liquid piping and valves, as well as the high side piping and valves have been leaked checked and verified the entire equipment is refrigerant leak free.[_____:initial here]

Person providing reporting and verifications(print name): _____.

I certify that all test and procedures were performed and the noted pressure readings are accurate:

Signed: _____.

State License or Registration Number: _____.

Installing Company Name: _____ Phone Number: _____

Street Address: _____.

City / State: _____, _____.

NOTE: THIS FORM MUST BE COMPLETED IN FULL AND PROVIDED WITH AND ATTACHED TO THE COMPLETED REFRIGERATION PIPING TEST/EVACUATION VERIFICATION FORM AND THE REFRIGERATION START UP CHECKLIST. THESE COMPLETED FORMS ARE TO BE PROVIDED TO THE ENGINEER AND THE OWNER.

Refrigeration Start-up Checklist

Store Name: _____

Address/City/State: _____

Refrig. Circuit #.	Case / Coil Discharge Air Temp. (F)	Circ. Temp. Set-point	Super- Heat Degrees (F)	Defrost Termin. Checked	Defrost Time (min.) & Frequency

Person providing reporting and verifications (print name): _____.

I certify that all test and procedures were performed and the noted pressure readings are accurate:

Signed: _____.

State License or Registration Number: _____.

Installing Company Name: _____ Phone Number: _____

Street Address: _____.

City / State: _____, _____.

NOTE: THIS FORM MUST BE COMPLETED IN FULL FOR EACH SYSTEM AND BE ATTACHED TO THE COMPLETED REFRIGERATION EQUIPMENT SET-UP VERIFICATION FORM AND REFRIGERATION PIPING TEST/EVACUATION VERIFICATION FORM. ALL FORMS ARE TO BE PROVIDED TO ENGINEER AND OWNER.

EMS Equipment Setup Verification

Store Name: _____

Address/City/State: _____

Refrigeration Controller:

Compressor **RACK #** : _____ Condenser # : _____

Controller ID # : _____ Controller model: _____

All control boards, controllers and enclosures properly labeled: Y N
exceptions: _____

All sensors (factory and field installed) tested and verified: Y N
exceptions: _____

Receiver liquid level probe calibrated: Y N
exceptions: _____

Pressure transducers operation verified: Y N
exceptions: _____

All control boards set points, setup and programming complete: Y N
exceptions: _____

All controllers, bds. and accessory equipment installed per Controller Manufacturer's
specifications: Y N
exceptions: _____

All remote communications verified: Y N
exceptions: _____

All alarms properly reporting to auto dialer, remote alarm panel and properly performing
emergency shutdown?: Y N
exceptions: _____

All watchdog circuitry operation simulated, tested and verified: Y N
exceptions: _____

All refrigerated case temperature sensors ice tested: Y N
exceptions: _____

Person providing reporting and verifications(print name): _____.

I certify that all test and procedures for the EMS equipment installation were performed and that all EMS
equipment is operating, controlling and monitoring as specified:

Signed: _____.

Installing Company Name: _____ Phone Number: _____

Street Address: _____.

City / State: _____, _____.

NOTE: THIS FORM MUST BE COMPLETED IN FULL AND PROVIDED TO THE ENGINEER AND THE OWNER.

Refrigerant Leak Detection(Infrared):

Controller ID # : _____ Controller model: _____

All control boards, controllers and enclosures properly labeled: Y N
exceptions: _____

All filters tested and verified: Y N
exceptions: _____

All sensing, purge and exhaust tubing installed: Y N
exceptions: _____

All control boards set points, setup and programming complete: Y N
exceptions: _____

All controllers, bds. and accessory equipment installed per Controller Manufacturer's specifications: Y N
exceptions: _____

All remote communications verified, including fire alarm connection Y N
exceptions: _____

All leak detection alarms properly reporting to auto dial, remote alarm panel and properly performing emergency shut down?: Y N
exceptions: _____

Person providing reporting and verifications(print name): _____.

I certify that all test and procedures for the EMS equipment installation were performed and that all EMS equipment is operating, controlling and monitoring as specified:

Signed: _____.

Installing Company Name: _____ Phone Number: _____

Street Address: _____.

City / State: _____, _____.

NOTE: THIS FORM MUST BE COMPLETED IN FULL AND PROVIDED TO THE ENGINEER AND THE OWNER .

END OF SECTION 15652