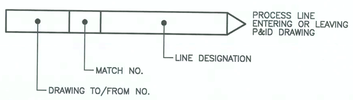
UNITED STATES COLD STORAGE, INC
NEW FACILITY
LAKE CITY, FLORIDA

ABBREVIATIONS

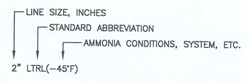
AAT	AMMONIA ABSORPTION TANK
ACC	ACCUMULATOR
AD	AMMONIA DETECTOR
ADP	AMMONIA DIFFUSION PANEL
AHU	AIR HANDLING UNIT
AP	AUTO PURGER
BD	BOOSTER DISCHARGE
BOI	BOTTOM OF INSULATION
BOP	BOTTOM OF PIPE
BW	BUTT WELD
CD	CONDENSER DRAIN
CDR	CONDENSATE DRAIN
CG	CONTROL GROUP
CHPL	CHILLED HIGH PRESSURE LIQUID
CHWR	CHILLED WATER RETURN
CHWS	CHILLED WATER SUPPLY
CP	COMPRESSOR
CO2	CARBON DIOXIDE
CPR	CONTROLLED PRESSURE RECEIVER
CV	CONTROL VALVE
CW	CITY WATER
CWP	CONDENSER WATER PUMP
CWR	CONDENSER WATER RETURN
CWS	CONDENSER WATER SUPPLY
DAHU	DEHUMIDIFYING AIR UNIT
DC	DEFROST CONDENSATE
DR	DRAIN
EC	EVAPORATIVE CONDENSER
EQ	EQUALIZING LINE
ERFOB	ECCENTRIC REDUCER FLAT ON BOTTOM
ERFOT	ECCENTRIC REDUCER FLAT ON TOP
ES	ECONOMIZER SUCTION
ESP	EXTERNAL STATIC PRESSURE
FAR	FEMALE ADAPTER RING
FLNG	FLANGE
FLTR	FILTER
FPT	FEMALE PIPE THREAD
GB	GAUGE BOARD
GLY	GLYCOL
GPM	GALLONS PER MINUTE
GR	GLYCOL RETURN
GS	GLYCOL SUPPLY
HG	HOT GAS
HGD	HOT GAS DEFROST
HLA	HIGH LEVEL ALARM
HLCO	HIGH LEVEL CUTOUT
HPG	HIGH PRESSURE GAS
HPL	HIGH PRESSURE LIQUID
HPR	HIGH PRESSURE RECEIVER
HSD	HIGH STAGE DISCHARGE
HSS	HIGH STAGE SUCTION
HTR	HIGH TEMP. RECIRCULATOR
HTRL	HIGH TEMP. RECIRC. LIQUID
HTRS	HIGH TEMP. RECIRC. SUCTION
HTS	HIGH TEMP. SUCTION
HT	HEATER
IC	INTERCOOLER
IPL	INTERMEDIATE PRESSURE LIQUID
ISD	INTERMEDIATE STAGE DISCHARGE
ISS	INTERMEDIATE STAGE SUCTION
LBS	POUNDS
LIOC	LIQUID INJECTION OIL COOLING
LLA	LOW LEVEL ALARM
LLCO	LOW LEVEL CUTOUT
LLSS	LOW LOW STAGE SUCTION
LLTRL	LOW LOW TEMP. RECIRC. LIQUID
LLTRS	LOW LOW TEMP. RECIRC. SUCTION
LPL	LOW PRESSURE LIQUID
LS	LEVEL SWITCH
LSS	LOW STAGE SUCTION
LT	LEVEL TRANSMITTER
LTR	LOW TEMP. RECIRCULATOR
LTRL	LOW TEMP. RECIRC. LIQUID
LTRS	LOW TEMP. RECIRC. SUCTION
LTS	LOW TEMP. SUCTION
LTU	LIQUID TRANSFER UNIT
MAR	MALE ADAPTER RING
MAU	MAKE-UP AIR UNIT
MSC	MISCELLANEOUS
MTR	MOTOR
NH3	AMMONIA
OD	OIL DRAIN
OL	OPERATING LEVEL
OS	OIL SEPARATOR
PERF	PERFORATED
PI	PRESSURE INDICATOR
PLF	POUNDS PER LINEAR FEET
PO	PUMPOUT
PR	PILOT RECEIVER
PRG	PURGE
PRV	PRESSURE REDUCING VALVE
PSF	POUNDS PER SQUARE FEET
PSIG	POUNDS PER SQUARE INCH GAUGE
PSV	PRESSURE SAFETY VALVE
PT	PRESSURE TRANSMITTER
RA	RETURN AIR
RAU	REFRIGERATION AIR UNIT
RCP	REFRIGERATION CONTROL PANEL
RMAU	REFRIGERATED MAKE-UP AIR UNIT
RV	RELIEF VENT
SA	SUPPLY AIR
ST	STYROFOAM INSULATION
STR	STRAINER
SV	SOLENOID VALVE
SW	SOCKET WELD
TI	TEMPERATURE INDICATOR
TIT	TEMPERATURE IND. AND TRANSMITTER
TL	TRANSFER LIQUID
TS	TEMPERATURE SENSOR
TSR	THERMOSYPHON RETURN
TSS	THERMOSYPHON SUPPLY
TSV	THERMOSYPHON VESSEL
TT	TEMPERATURE INDICATOR
UF	UNDERFLOOR SENSOR
WD	WATER DRAIN
WN	WELD NECK
WP	WATER PUMP
WR	WATER RETURN
WS	WATER SUPPLY

VALVE TAG

SHEET ARROW



LINE DESIGNATION



SYMBOLS

ANGLE VALVE (NORMALLY OPEN)	THREE WAY VALVE
ANGLE VALVE (NORMALLY CLOSED)	THREE WAY CONTROL VALVE
ANGLE EXPANSION VALVE	TIE-IN POINT
BACK PRESSURE REGULATOR	UNION
BALL VALVE	PRESSURE INDICATOR
BLEED VALVE HENRY MODEL 7773	PRESSURE RELIEF VALVE
BUTTERFLY VALVE	PRESSURE INDICATOR
CHECK VALVE	PRESSURE INDICATOR AND TRANSMITTER
CIRCUIT SETTER VALVE	PRESSURE SENSOR
CONTROL GROUP	PRESSURE TRANSMITTER
ELECTRIC MOTOR	PUMP
ERFOB	RUPTURE DISC
ERFOT	REDUCER
FLOAT SWITCH	ROTARY SCREW COMPRESSOR
FLOW ARROW	SIGHT GLASS
GAUGE W/VALVE	SOCK FILTER
GLOBE VALVE (NORMALLY OPEN)	SOLENOID
GLOBE VALVE (NORMALLY CLOSED)	SOLENOID OPERATED PRESSURE REGULATOR VALVE W/STRAINER
HAND EXPANSION VALVE	SOLENOID VALVE W\STRAINER
HEAT EXCHANGER	TEMPERATURE INDICATOR
MOTORIZED	TEMPERATURE IND. AND TRANSMITTER
PIPE STAND	TEMPERATURE TRANSMITTER
PISTON OPERATED CHECK VALVE	THERMOMETER
PRESS REGULATOR VALVE W/STRAINER	

GENERAL NOTES

1. ALL REFRIGERATION CONSTRUCTION SHALL COMPLY WITH APPLICABLE SECTIONS OF THE 2004 FLORIDA MECHANICAL CODE, 2006 AMMENDMENTS AND ANY OTHER ORDINANCES IN EFFECT AT THE PLACE OF WORK. NOTHING SHALL BE INTERPRETED TO ALLOW WORK NOT CONFORMING.
2. QUALITY ASSURANCE:
   MANUFACTURERS: THE DESIGN SHOWN ON THE DRAWINGS ARE BASED UPON PRODUCTS OF THE MANUFACTURERS SCHEDULED. ALTERNATE EQUIPMENT MANUFACTURERS WILL BE ACCEPTABLE IF EQUIPMENT MEETS THE SCHEDULED PERFORMANCE AND COMPLIES WITH THESE SPECIFICATIONS. THE INTENT OF THESE SPECIFICATION REQUIREMENTS ARE TO ASSURE THAT THE PRODUCTS ARE DELIVERED THROUGH A QUALITY SYSTEM AND FRAMEWORK THAT WILL ASSURE CONSISTENT QUALITY. IF EQUIPMENT MANUFACTURED BY MANUFACTURER OTHER THAN THAT SCHEDULED IS UTILIZED, THEN THE CONTRACTOR SHALL BE RESPONSIBLE FOR COORDINATING WITH THE GENERAL CONTRACTOR AND ALL AFFECTED SUBCONTRACTORS TO ENSURE PROPER PROVISIONS FOR INSTALLATION OF THE FURNISHED UNIT. THIS COORDINATION SHALL INCLUDE, BUT NOT BE LIMITED TO, THE FOLLOWING:
   A. STRUCTURAL SUPPORTS FOR UNITS
   B. ELECTRICAL POWER REQUIREMENTS AND WIRE/CONDUIT AND OVER CURRENT PROTECTION SIZES.
   C. PIPING SIZE AND CONNECTION HEADER LOCATIONS.
   D. THE CONTRACTOR SHALL BE RESPONSIBLE FOE ALL COST INCURRED BY THE GENERAL CONTRACTOR, SUBCONTRACTORS AND CONSULTANTS TO MODIFY THE BUILDING PROVISIONS TO ACCEPT THE ALTERNATE FURNISHED UNITS.
3. ALL PIPING SHALL BE SUITABLE FOR REFRIGERATION SERVICE PER ANSI B31.5. SEE SPECIFICATIONS FOR PIPING AND FITTINGS REQUIREMENTS.
4. ALL PRESSURE VESSELS SHALL BE ASME CODE STAMPED. SEE SPECIFICATIONS FOR DETAILS.
5. ALL WELDERS/WELDING OPERATORS SHALL BE QUALIFIED AND CERTIFIED BY THE CONTRACTOR IN ACCORDANCE WITH ASME SECTION IX REQUIREMENTS PRIOR TO PERFORMING ANY WELDING. CERTIFICATION DOCUMENTS SHALL BE MAINTAINED BY THE CONTRACTOR THROUGHOUT THE CONSTRUCTION PROJECT AND AVAILABLE TO OWNER ON REQUEST. WELDER SHALL STAMP PIPE NEXT TO EACH WELD WITH A UNIQUE MARK. CONTRACTOR SHALL PROVIDE OWNER WITH A LIST OF WELDERS AND THEIR RESPECTIVE STAMP MARKS. ALL WELDING, FABRICATION OF REFRIGERATION PIPING SYSTEM SHALL BE IN ACCORDANCE WITH ANSI B31.5.
6. INSTALL PIPING AND DUCTWORK TO PROVIDE THE MAXIMUM POSSIBLE CLEAR HEIGHT UNDERNEATH UNLESS OTHERWISE NOTED.
7. THE CONTRACTOR SHALL VERIFY ALL DIMENSIONS DURING CONSTRUCTION AND SHALL BE RESPONSIBLE FOR ALL DISCREPANCIES BETWEEN THE ACTUAL AND DRAWING DIMENSIONS.
8. THE CONTRACTOR SHALL VERIFY THE REFRIGERATION SYSTEM DESIGN AND SHALL BE RESPONSIBLE TO MAKE THE REFRIGERATION SYSTEM OPERATIONAL.
9. ON THE ROOF, HIGH AND LOW TEMPERATURE RECIRCULATED AMMONIA LINES SHALL BE SLOPED TOWARD THE ENGINE ROOM RECIRCULATORS AT 1/2" PER 40' (MINIMUM).
10. SLOPE CONDENSATE DRAIN LINES TOWARD DISCHARGE (DRAIN), 1/4" PER FOOT (MINIMUM).
11. IN THE ENGINE ROOM, SLOPE HIGH AND LOW TEMPERATURE COMPRESSOR SUCTION HEADERS AND LOW PRESSURE DISCHARGE HEADER TOWARD THE RECIRCULATORS AT 1/16" PER FOOT (MINIMUM).
12. ALL CONDUIT DROPPING DOWN FROM CEILING SHALL NOT BLOCK REQUIRED SERVICE CLEARANCES.
13. VALVES AND STRAINERS SHALL BE SIZED TO MATCH LINE SIZES UNLESS OTHERWISE NOTED.
14. CONTRACTOR TO PROVIDE DAVIT ARM FOR CONDENSER FAN AND MOTOR REMOVAL.
15. DRY NITROGEN SHALL BE USED FOR TESTING.

DRAWING LIST

REV	DWG	DESCRIPTION
A	R001	COVER SHEET
A	R002	SPECIFICATIONS
A	R003	SPECIFICATIONS
A	R004	SPECIFICATIONS, RELIEF AND AMMONIA CALCULATIONS
A	R100	UNDERFLOOR WARMING PLAN
A	R101	OVERALL FLOOR PLAN
A	R102	OVERALL ROOF PLAN
A	R301	UNDERFLOOR WARMING DETAILS
A	R401	MACHINE ROOM AND ROOF EQUIPMENT LOCATION PLANS
A	R402	MACHINE ROOM AND ROOF PIPING PLANS
A	R501	INSULATION DETAILS
A	R502	INSULATION AND REFRIGERATION DETAILS
A	R503	+11F HORIZ. RECIRCULATOR AND +30F FLASH ECONOMIZER DETAILS
A	R504	CO2/NH3 HEAT EXCHANGER/RECIRCULATOR & -25F CO2 PUMP PACKAGE "V4" DETAILS
A	R505	M&M MODEL H96EWF AND H74EWF SCREW COMPRESSOR DETAILS
A	R506	M&M MODEL HPC104S AND HPC108S RECIPROCATING COMPRESSOR DETAIL
A	R601	SCHEDULES
A	R701	MACHINE ROOM P & ID
A	R702	PLANT P & ID

CODE COMPLIANCE

CHAPTER 11 – REFRIGERATION		
2004 FLORIDA MECHANICAL CODE – CODE COMPLIANCE SUMMARY		
SECTION AND DESCRIPTION	COMPLIANCE	REFERENCE
SECTION 1101 – GENERAL	COMPLIES	REFRIGERANT ARE R-717 & R-744 (EXCEEDS 220LBS)
SECTION 1102 – SYSTEM REQUIREMENTS	COMPLIES	
SECTION 1103 – CLASSIFICATION	COMPLIES	AMMONIA IS GROUP "B2" AND CO2 IS "A1" – HIGH PROBABILITY
SECTION 1104 – REQUIREMENT FOR USE	COMPLIES	
SECTION 1105 – GENERAL REQUIREMENTS	COMPLIES	MECHANICAL VENTILATION PROVIDED
SECTION 1106 – MACHINERY ROOM	COMPLIES	VAPOR DETECTOR PROVIDED
SECTION 1107 – REFRIGERANT PIPING	COMPLIES	
SECTION 1108 – FIELD TEST	COMPLIES	TEST CERTIFICATE TO BE PROVIDED
SECTION 1109 – PERIODIC TESTING	WILL COMPLY	BY OTHERS

NOTE: SECTIONS WITHOUT REFERENCE NOTES ARE NOT SPECIFIC TO A SINGLE LOCATION IN THE FACILITY AND ARE GENERAL ITEMS.

MATERIALS

SERVICE: CO2/AMMONIA
DESIGN PRESSURE: 600 PSIG/250 PSIG
DESIGN TEMP: -25F TO +20F
TEST PRESSURE: 385 PSIG/275 PSIG

ITEM	SIZES	DESCRIPTION
PIPE	1/2" – 2"	ASTM A106, GRADE B, SEAMLESS, SCHEDULE 80, PLAIN ENDS TO MATCH FITTINGS.
	2 1/2" & LARGER	ASTM A106, GRADE B, SEAMLESS, SCHEDULE 40, BUTT WELD ENDS.
FITTINGS	2" & SMALLER	ASTM A105, CLASS 3000#, SOCKET WELD CONFORMING TO ANSI B16.11.
	2 1/2" & LARGER	ASTM A234, GRADE WPB SEAMLESS, BUTT WELD ENDS WITH SAME SCHEDULE AS THE CONNECTION PIPE.

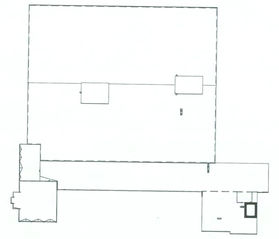
NOTE: A106 & A53B MEETING ASME B31.5 – 2001 PARAGRAPHS 523.2.2 ARE ALLOWABLE

SERVICE: CO2/AMMONIA
DESIGN PRESSURE: 600 PSIG/250 PSIG
DESIGN TEMP: +20F TO +300F
TEST PRESSURE: 640 PSIG/275 PSIG

ITEM	SIZES	DESCRIPTION
PIPE	1/2" – 2"	ASTM A106, GRADE B, SEAMLESS, SCHEDULE 80, PLAIN ENDS TO MATCH FITTINGS.
	2 1/2" & LARGER	ASTM A106, GRADE B, SEAMLESS, SCHEDULE 40, BUTT WELD ENDS.
FITTINGS	2" & SMALLER	ASTM A105, CLASS 3000#, SOCKET WELD CONFORMING TO ANSI B16.11.
	2 1/2" & LARGER	ASTM A234, GRADE WPB SEAMLESS, BUTT WELD ENDS WITH SAME SCHEDULE AS THE CONNECTION PIPE.

SERVICE: CONDENSER WATER, GLYCOL
DESIGN PRESSURE: 150 PSIG
DESIGN TEMP: 100F

ITEM	SIZES	DESCRIPTION
PIPE	1/2" – 2"	A120, SCHEDULE 40, SCREWED ENDS.
	2 1/2" & LARGER	A120, SCHEDULE 40 BUTT WELD ENDS.
FITTINGS	2" & SMALLER	150# MALLEABLE IRON, SCREWED
	2 1/2" & LARGER	150# MALLEABLE IRON, BUTT WELDED



KEY PLAN
NOT TO SCALE

NOT FOR CONSTRUCTION
DATE: 06-28-2007

stellar
OPERATING AS THE STELLAR GROUP
2300 HARTLEY ROAD, JACKSONVILLE, FL 32257 (904) 260-2900
WWW.STELLARGROUP.NET
FLORIDA ARCHITECTURAL LICENSE NO. AA-C000112
FLORIDA ENGINEERING LICENSE NO. 8630

06-29-07

UNITED STATES COLD STORAGE, INC
NEW FACILITY
LAKE CITY, FLORIDA

COVER SHEET

REV.	DATE	BY	DESCRIPTION
A	06-29-07	GLW	PERMIT ISSUE

JOB NO. 03019
DRAWN: GLW
CHECKED: RAS
SCALE: NONE

R001
DRAWING NO.

Filename: T:\Jobs\03000-03099\03019 USCS_FL\Design\Active\Refrig\03019R702.dwg Last saved By: GWHITE Date: 6/29/2007 3:36:04 PM Plotted: 7/2/2007 9:48:15 AM

Proposed Cold Storage Building for:
United States Cold Storage, Inc
Lake City, Florida

REFRIGERATION

It is proposed that the refrigeration system for this facility be a new state-of-the-art CO2 / Ammonia Cascade Refrigeration System. The following are Guidelines and Practices to be used by the Refrigeration Contractor in performing his work for the installation and start-up of the system.

TABLE OF CONTENTS

1. Scope

1.1 In this document, "Owner" shall refer to the authorized agent of United States Cold Storage (USCS), usually, but not limited to, the Project Manager. "USCS" shall refer to United States Cold Storage, Inc. "Contractor" shall refer to the authorized agent of any construction contractor or vendor supplying refrigeration equipment, piping, or refrigeration installation for USCS.

1.2 These specifications cover mandatory requirements governing all materials and construction relating to the installation of the industrial refrigeration system at United States Cold Storage, Inc. located at the following address.

United States Cold Storage, Inc.
Still Road
Lake City, Florida

1.3 These specifications, and any associated contract drawings, govern the installation of refrigeration piping, valves, vessels, compressors, condensers, evaporators, and insulation. They are intended to identify materials, equipment and installation practices.

1.4 These specifications, and any associated contract drawings, will follow all applicable Process Safety Management (29 CFR 1910.119) and safety codes in effect at time of installation. Should there be any conflicts Owner will determine which shall govern. Deviation from these specifications or project drawings must be authorized in advance by Owner.

1.5 A separate "Scope of Work" document will be supplied for each project.

1.6 Contractor shall be responsible for obtaining all permits associated with work being performed under contracts with USCS.

1.7 In no case shall Contractor begin any work in, on, or adjacent to commissioned and operating refrigeration system without prior approval of Owner, Owner's representative or the on site Chief Engineer.

1.8 Contractor shall provide all tools, equipment, and materials necessary for completion of the contract. Contractor will not be allowed to use plant tools, equipment, or other materials without prior consent of Owner. Owner's consent does not relieve Contractor of liability for damage to loaned plant tools, equipment, or materials. Contractor shall repair or replace at his own expense, any plant tools, equipment, or materials damaged or destroyed by his employees.

1.9 Nothing in this specification shall be construed as to excuse Contractor from compliance with all national, state, and local codes of governing authority, or from accepted standards of practice.

1.10 Contractor and their subs shall comply with all applicable USCS site security and control procedures.

2. Requirements for Installations in Food Processing Areas

2.1 Sanitary requirements for interior spaces are not limited to production areas, which are considered wash-down, rinse-down, or dry. Wash-down and rinse- down areas require that the hanger rods, washers, nuts, and pipe supports shall be constructed of stainless steel. The hanger rods shall be solid with threads on each end, sufficient enough to attach the rod to the supports. Dry areas inside the plant require that the hanger rods and pipe supports be constructed of galvanized steel. All pipe insulation in wash-down, located outside the building shall be constructed of galvanized steel. All pipe insulation in wash-down, rinse-down, or dry areas inside the plant shall be jacketed with white PVC covering, and all seams glued to prevent infiltration of moisture (Refer to Section 7.3 of this specification).

2.2 Areas to be considered wash-down:

2.2.1 Raw Materials, (to be specified in "Scope of Work")
2.2.1.1 Raw Material Storage (frozen and refrigerated)
2.2.1.2 Raw Materials Receiving Docks
2.2.2 Process:
2.2.2.1 Evisceration
2.2.2.2 De-boning
2.2.2.3 Pre-cook
2.2.2.4 Batter/Breading
2.2.2.5 Spiral and/or tunnel freezers
2.2.2.6 All grinding and marinating areas
2.2.2.7 Fryer and surrounding area and equipment
2.2.2.8 Oven and surrounding area and equipment
2.2.3 Packaging, Before and Including Wrapping Machines
2.2.4 Refrigerated Shipping Docks, (raw products).
2.2.5 Inedible Docks

2.3 Areas to be considered rinse-down:

2.3.1 Packaging, after Wrapping Machines
2.3.2 Outdoor Areas

2.4 Areas to be considered dry:

2.4.1 Dry Material Storage
2.4.2 Packaging Materials Storage
2.4.3 Finished Product Storage (dry and frozen)
2.4.4 Boiler, Air Compressor, and Refrigeration Engine Room
2.4.5 Maintenance and spare parts area

2.5 Pipe installations inside the production facility shall be installed to eliminate any voids, nooks, and crevices. Piping shall stand off walls, ceilings, and equipment by one-inch. If it is not feasible to provide the one-inch stand off, then allow a ¼ inch clearance and seal with white silicon rubber sealant (G.E. RTV type). Vertical pipe rows 30-inches or greater in width shall be mounted a minimum of 4-inches off the wall you provide for adequate cleaning.

2.6 Equipment must be installed at a minimum of 12" out from the wall, or curb, to allow for access and cleaning as per USDA regulations.

3. Standard, Codes, Regulations, and References

3.1 All work shall be performed in accordance with this specification, and the standards listed below in force at the time of the contract award.

3.1.1 Occupational Safety and Health Administration (OSHA).
3.1.2 USCS Process Safety Management (PSM).
3.1.3 Local codes and ordinances in force at the construction site.
3.1.4 ASME Section VIII, Division 11987 pressure vessel.
3.1.5 ASME B31.5 2004 Refrigeration Piping and Heat Transfer Components. Maintain pipe mill certification data on site and at the completion of work; install in operations manual.
3.1.6 ASHRAE 15-2004 Safety Standard for Refrigeration Systems.
3.1.7 ANSI/IIAR 2-1999 Equipment Design, and Installation of Ammonia Mechanical Refrigerating Systems.
3.1.8 IIAR Bulletin No. 107 12/97 Suggested Safety and Operating Procedures When Making Ammonia Refrigeration Plant Tests.
3.1.9 USCS Engine Room Color Coding.
3.1.10 Bulletin No.111, 1991 Guidelines for: Ammonia Machinery Room Ventilation
3.1.11 IIAR Ammonia Refrigeration Piping Handbook.
3.1.12 Bulletin #112, 1998 Guidelines for: Ammonia Machinery Room Design
NOTE: In a case where codes or standards conflict, the most recently dated code shall supersede.

4. General Requirements

4.1 Within 15 days after award of contract, Contractor must submit to Owner for approval, two copies of the material list showing type, grade and manufacture of the pipes, valves, check valves, pressure regulators, pumps, vessels, and all other major equipment.

4.2 Electrical equipment and control systems are unique to each different project, and therefore shall be covered in a separate scope of work. The electrical contractor shall ensure that all electrical equipment and materials are adequately protected from theft, damage, deterioration, and inclement weather during construction.

4.3 Owner drawings will be revised by detailed drawings or specifications. Items not specifically mentioned in the specifications or noted on the drawings, but which are required to make the installation complete, shall be brought to the Owner's attention for written authorization to proceed.

4.4 Discrepancies between plans and "AS CONSTRUCTED" conditions shall be brought to the Owner's attention. Red lines shall be made on Contractor's and Owner's drawings and signed by both.

4.5 Contractor shall verify the location and method of installation for all equipment prior to final installation. Any discrepancies shall be brought to Owner's attention

4.6 Equipment and materials shall be installed in accordance with scope of work, as well as all codes/standards, and equipment manufactures guidelines established in the contract Any materials or equipment not meeting these requirements shall be removed and reinstalled to the satisfaction of Owner, at Contractor's expense.

4.7 All refrigeration equipment and piping installations furnished by the Contractor will require a process safety review per Owner's PSM program, and testing per IIAR Bulletin 109 by Contractor prior to start-up. Contractor, at his expense, shall replace any equipment damaged by Contractor's failure to perform these steps.

4.8 All refrigeration signage, and placards, required per IIAR Bulletin 109 and Owner shall be supplied by the Contractor 15 days prior to start-up.

4.9 Any equipment upgrades, revisions, additions of new equipment or increase in capacity, or other changes to existing systems or equipment must be reviewed in accordance with Owner's "Management of Change" section of PSM program, and appropriate actions taken prior to beginning any work.

4.10 Upon completion of work, any discrepancies between the plans and the actual construction will be submitted to Owner in compliance with these specifications. Drawings reflecting conditions shall be provided to Owner by Contractor within 15 days after the completion of the project. These drawings will be supplied to Owner in both hard copy and "AutoCAD" format in addition, the Contractor will submit to Owner pipeline, valve, vessel, pump, heat exchanger, equipment, and instrumentation sheets (P&ID drawings) for each item installed.

4.11 The following documentation will be submitted to the Owner to support the "AS BUILT" drawings by the Contractor within 15 days after the completion of the project. These "AS BUILT" documents will be supplied to the Owner in both hard copy and electronic copy such as; however, not limited to "Word.doc" "PDF" and AutoCAD" formats.

4.11.1 Refrigeration piping mill papers
4.11.2 Operation and Maintenance Manuals, Shop drawings and "Cut sheets" for;

4.11.2.1 Valves, (Hand/Controls)
4.11.2.2 Compressors
4.11.2.3 Vessels
4.11.2.4 All type of heat exchangers
4.11.2.5 Pumps
4.11.2.6 Condensers
4.11.2.7 Refrigeration Computer control system
4.11.2.8 Instrumentation

4.11.3 List of model numbers with serial numbers
4.11.4 ASME vessel documentation
4.11.5 Electrical single line drawing
4.11.6 Energy balance
4.11.7 Electrical classification
4.11.8 Emergency ventilation requirements
4.11.9 Calculations for the pressure safety relief valves system.

5. Scope of Work

5.1 Work required under this specification shall include furnishing of all labor and materials for the complete installation of the refrigeration system, as described herein and shown on drawings.

5.2 The intent of the plans and specifications is not to show every thing required for proper operation of the system and service. No extra charges will be allowed for any items such as offsets, supports, valves, thermometers, etc, which are required for operation and maintenance, but which may not be shown.

5.3 The scope of work shall include, but not be limited to the furnishing and installation of the following:

5.3.1 All transportation, storage, unloading, moving, and rigging of all equipment furnished by Refrigeration Contractor or purchased by owner except where otherwise noted.
5.3.2 Compressor, pressure vessels, evaporators, condensers, heat exchangers, and control systems furnished by the Contractor.
5.3.3 All valves, gauges, thermometers, oil recovery devices, accessories and all other equipment required for the complete installation and proper operation of the refrigeration system.
5.3.4 All refrigeration controls including float valves, level controllers, automatic valves, thermally operated valves, pressure switches, temperature switches, flow switches, safety controls and all other controls required for proper operation of the system.
5.3.5 Refrigeration piping.
5.3.6 Relief piping.
5.3.7 Condenser water piping.
5.3.8 Gauge and control piping.
5.3.9 Water Drain piping.
5.3.10 All steel supports for all piping including all hangers, brackets, stands, and guards.
5.3.11 Full charges of refrigerant, glycol and oil for all equipment and as required for proper operation of the whole system under full design load conditions.
5.3.12 Shop painting and touch-up painting on equipment and piping.
5.3.13 All required vessel and pipe insulation and jacketing.
5.3.14 Automatic non-condensable gas purger(s).
5.3.15 Under-floor warming piping. Below ground and above ground.
5.3.16 Ductwork for exhaust fans, intake hoods, and penthouse air units.
5.3.17 Heat trace for water & drain lines in area that can be below 32 degrees.
5.3.18 Valve tags & pipe markers.
5.3.19 Start-up of system and warranty.
5.3.20 All applicable sales tax and permits.
5.3 .21 All control wiring.
5.3.22 All MCP panels.

5.3.23 The following items are not included under this specification:

5.3.23.1 General construction, foundation, housekeeping pads and footings.
5.3 .23 .2 All power wiring.
5.3.23.3 Structural steel for refrigeration equipment or related equipment.
5.3.23.4 Process Safety Management Data

5.4 Instruction Manuals

5.4.1 The Contractor shall furnish to the Owner six (6) copies of an instruction manual. This manual shall include all maintenance and operating instructions for the major equipment, lubrication instructions, wiring diagrams for all controls, and power wiring, etc., recommended spare parts, and replacement parts list.

5.5 Review of Materials and Submittals

5.5.1 The Contractor shall submit three (3) copies, plus the required number of copies for his use, of shop drawings to the Owner for review before installation. Each shop drawing shall be certified as being checked and approved by the contractor before being submitted to the Owner.

5.5.2 The following shop drawings shall be submitted to the Owner for review:

5.5.2.1 Air units.
5.5.2.2 Compressor.
5.5.2.3 Condensers.
5.5.2.4 Shells and pressure vessels.
5.5.2.5 Glycol pump.
5.5.2.6 Controls.
5.5.2.7 Valves
5.5.2.8 Piping and vessel insulation (materials and sample).
5.5.2.9 Under-floor tubing.

5.5.3 The contractor shall submit to the Owner three (3) copies of record drawings showing all changes made during construction.

5.6 Basics of Design

5.6.1 Each piece of equipment as listed in the specifications provides model number of various equipment manufacturers. The manufacturers listed have all been approved by the Owner.
5.6.2 In order to show design criteria and equipment layouts, one of the acceptable manufacturers had to be chosen. The basis of design is listed in the specification as the first acceptable manufacturer shown.

5.7 Equipment

5.7.1 See the attached equipment list marked Appendix A.
5.7.2 Total sell price for the equipment FOB the factory is $1,209,873.00 The price does not include any local or federal sales tax. The price on the equipment is valid for 60 days.

5.8 Refrigeration

5.8.1 Contractor to supply CO2 and ammonia charge using refrigerant grade CO2 and ammonia. Contractor to submit documentation or refrigerant purity and quantity in system.

5.9 Evacuation of CO2 System

5.9.1 During the installation and start-up of the refrigeration system the Contractor shall take every precaution necessary to ensure that the CO2 side of the refrigeration system is protected from any contaminations such as moisture and dirt entering the system.
5.9.2 To ensure a moisture free system the Contractor shall at a minimum perform the following steps:

5.9.2.1 The complete system must be pump-down at one time.
5.9.2.2 The entire system shall be evacuated to a vacuum of 300 microns. With the vacuum pumps [illegible] the vacuum shall be held for a period of at least 3 hours and the pressure shall not increase above 400 microns within this time period. If the pressure increases above the above procedure shall be repeated.

5.9.2.3 During the pump-down period all non-insulated piping and equipment shall be examined for any evidences of moisture in the system; such as however not limited to:

5.9.2.3.1 Sweating or damp surfaces
5.9.2.3.2 Ice

5.9.2.4 Hold the 300 microns of vacuum for a period of 24 hours after all evidences of moisture is gone.
5.9.2.5 Break the vacuum with CO2 vapor.

5.9.3 After evacuation of the refrigeration system the Contractor shall replace refrigerant dryers.

6. Piping Material and Sizing

This section will identify the types, grade, and size of pipe that USCS will require for refrigeration installations at its facilities. Where there is a conflict between other codes and standards, this specification will supercede.

6.1 General

6.1.1 The Contractor shall furnish and install all necessary refrigerant fittings, valves, and pipe supports as required for a complete refrigeration system.
6.1.2 It is extremely important that any foreign matter shall not enter the system and that NO STRAINS ARE IMPOSED ON THE SYSTEM MACHINERY BY PIPING CONNECTIONS. When connections are made, piping strains shall be checked by removing flange bolts at compressors, pumps, etc., which shall be loose and readily removed. ANY PIPING MIS-ALIGNMENT EVIDENCED BY BOUND BOLTS SHALL BE CORRECTED AT NO COST TO THE OWNER.
6.1.3 The Owner's representative will witness the final leveling of equipment and the proper alignment of all piping and flanges.
6.1.4 Contractor to supply owner mill reports on the piping supplied for the refrigeration system.
6.1.5 Pipe and fittings for the CO2 portion of the system will be the same as the ammonia system.

6.2 Pipe Material and Schedule

All material used in the refrigeration system shall be suitable for ammonia service, comply with ASME/ANSI B31.5 2004, and meet system pressure-temperature requirements.

6.2.1 Piping
Carbon steel pipe shall be ASTM A106. Type F pipe shall not be used or allowed on the job site (See ASME/ANSI B31.5-2001, Refrigerant Piping (a, c).

6.2.1.1 Liquid Lines (regardless of pressure)

6.2.1.1.1 2-inch and smaller shall be seamless Schedule 80.
6.2.1.1.2 2-1/2 inch thru 12-inch shall be seamless Schedule 40.

6.2.1.2 Vapor Lines (regardless of pressure)

6.2.1.2.1 2-inch and smaller shall be seamless Schedule 80.
6.2.1.2.2 2-1/2-inch and larger shall be seamless Schedule 40.

6.2.1.3 Threaded Pipe

6.2.1.3.1 Threaded pipe can only be used with Owner authorization. If threaded pipe is used, it must be Schedule 80. Screwed joints shall be avoided wherever possible. All threaded piping 1/z through 3/4" will be schedule 160 seamless.

6.2.1.4 Pipe Fittings

6.2.1.4.1 Pipe fittings shall match pipe schedule.
6.2.1.4.2 Joints in lines 2" and smaller shall be welded, using 3000 psi forged steel socket weld couplings. Jointslines 2 ½" and larger shall be butt-welded. Pipe fitting shall match schedule. Where screwed joints on gauges, screwed automatic controls, or where equipment materials do not permit seal welding, joints shall be made using X-Pando joint compound, manufactured by X-Pando Corporation, Long Island City, New York.
6.2.1.4.3 Unions will not be allowed on any refrigeration piping.
6.2.1.4.4 All piping ¾" and 3/8" shall be seamless .065" wall thickness stainless steel hydraulic tubing using compression fittings.

6.3 Pipe and Fitting Inspection

6.3.1 The Contractor is responsible for Receiving and Quality Inspection for all piping and fittings arriving at the job site.
6.3.2 All piping must be supplied coated and capped. Contractor must inspect for cleanliness and general overall condition of pipe, components, and reject any pieces which are dirty, scored, or bent

6.4 Copper Piping (Copper Piping Not Permitted On Anhydrous Ammonia Systems)

6.5 Flanges and Fittings

6.5.1 Standard refrigerant flanges shall be used for interconnection to refrigerant valves, refrigerant control valves, refrigerant check valves, and refrigerant strainers. Standard ANSI FLAT FACE FLANGES are to be used where required to match valves or equipment.
6.5.2 Forged steel flanges are to be ASTM A181, fittings other than socket weld are to be ASTM A234 and socket fittings are to be ASTM Abs.
6.5.3 For pipe fittings in piping operating between -20° F and -50° F, the Contractor shall use ASTM A350 LF2 fittings for all socket welds and ASTM A420 WPL6 for all buff weld fittings.
6.5.4 For pipe fittings in piping operating below -50° F, the Contractor shall use ASTM A350 LF3 fittings for all socket welds and ASTM A420 WPL3 for all butt weld fittings.
6.5.5 Non-ferrous flanges should be used only when flowing fluid and valve specifications require.
Flanges of this type must be supplied as companion flanges or flange kits for the specific valve. Copper bearing alloy flanges must not be used on ammonia systems.
6.5.6 Bolts for cast iron flanges shall be ASTM A307, Grade B. All bolts for steel ANSI flanges shall be ASTM A320, Grade L7. Bolt threads and nut to flange matching surfaces shall be coated with an anti-seizing compound. Fel-pro C-5A, manufactured by Felt Products, or Approved Equal.
6.5.7 All refrigerant gaskets shall be 1/8" thick Durabla. Refrigerant flanges are tongue and groove type. ANSI Flanges are to have gaskets applied as ring type gaskets-not as full face gaskets-to permit sealing the gaskets without overstressing bolts.
6.5.8 All gasketed flange joints shall be assembled so as not to overstress bolts and/or flanges and be evenly torqued to prevent cocking and flange fracture.

6.6 Valves

6.6.1 Refrigeration Shut-Off Valves

6.6.1.1 All valves except for specified ball valves and butterfly valves shall be of the globe or angle type as shown on the plans, designed for the refrigerant in the system and as specified. Valves will be socket weld or butt weld. Valves located outdoors will have seal caps. Valves indoors will have hand wheels. Approved valves are Danfoss valves.
6.6.1.2 All valves shall be of the back seating type to permit repacking under pressure, except small forged steel angle valves, ¼" to ¼" used in gauge lines.
6.6.1.3 Valves shall be installed with stems horizontal, unless otherwise shown on drawings. All valves shall have flow through the seat toward the stem, unless otherwise noted on the Drawings. Valves shall not be installed with stems vertically down.
6.6.1.4 CLOSE OPEN END OF ANY ATMOSPHERIC VALVE WITH A LUBRICATED (DOPED) STEEL PLUG FINGER-TIGHT OR WITH A LUBRICATED BLANK FLANGE LESS GASKET UNLESS NOTED OTHERWISE ON THE DRAWINGS.
6.6.1.5 All control valves will be Danfoss 120/1/60 as called for on the Drawings.
6.6.1.6 All valves are to have seal caps.

6.7 Condensate Drain Piping

6.7.1 The Contractor shall furnish and install all condensate drain piping from air units as shown on the Drawings and as required to complete the system. Drain piping shall be schedule 40 galvanized pipe with screwed joints. Fittings shall be 150 psi galvanized malleable iron.
6.7.2 All condensate drains must be pitched ¼" per foot and must be provided with plugged tees for cleanout at EVERY change of direction.
6.7.3 Provide wet traps as indicated on the Drawings.
6.7.4 All threads cut on galvanized steel pipe shall be spray painted with ZRC zinc paint.
6.7.5 Drains and traps shall be insulated and heated, either continuously or intermittently as noted on the Drawings and where ambient conditions, to both the interior and exterior, necessitate.
6.7.6 Drain line heating cable shall be Wintergard Wet Self-Limiting Heating Cable as manufactured by Raychem Corp., or Approved Equal. Cable shall be rated at 6W/foot 120 volt, with a maximum length/section of 330 feet.

6.8 Pressure Safety Relief Valve Piping

6.8.1 General

6.8.1.1 All ammonia Pressure Safety Relief Valve (PSRV) piping shall be sized and installed in accordance with ANSI/ASHRAE 15-2001 Safety Standard for Refrigeration Systems and any applicable local or federal codes and regulations.
6.8.1.2 CO2 relief piping as shown on the Drawings.

6.8.2 Pipe

6.8.2.1 1-1/4" and smaller shall be Schedule 80 black steel ASTM A53.
6.8.2.2 1-1/2" and larger shall be Schedule 40 black steel ASTM A53.

6.8.3 Joints

6.8.3.1 1-1/4" and smaller shall be screwed.
6.8.3.2 1-1/2" and larger shall be welded.

6.8.4 Fittings

6.8.4.1 1-1/2" and larger shall be black steel butt-weld fittings.

6.9 Under-floor Glycol Tubing

6.9.1 Tubing will be made of the highest quality 1" cross-linked polyethylene (Engel method, PEXa). Circuits will be overlapping on 4' centers with a maximum length of 1,000 feet. NO JOINTS WILL BE ALLOWED IN THE FLOOR PIPING. Tubing will be anchored no less than every 5 feet. The tubing will be pressure tested to 50 psi and test will be held on the tubing until the finished floor is poured. Coupling will only be allowed to repair tubing damaged during construction. Tubing installer will be on site to witness mud slab pour and make any repairs to tubing that may be damaged during the pour. Isolation and balancing valves for this system will be REHAU Everloc. Approved manufacture REHAU RATJPEX B.
6.9.2 Glycol system to be charged with premix 40% Propylene Glycol Fluid. Glycol must be FDA & USDA approved for use in food processing and food storage facilities. Premix Glycol with De-ionized water.

6.10 Equipment Supports

6.10.1 The Contractor shall furnish and install all necessary steel supports for the suction trays, heat exchangers, high pressure receiver, air units, and all other supports required for his equipment except main steel supports for the condenser which will be provided under a separate contract. Supports shall be complete so as to provide a firm, rigid support for all equipment mounted thereon.
6.10.2 The Contractor shall be responsible for accurately sizing, locating and cutting and patching all openings for refrigerant piping except where otherwise noted.
6.10.3 If the Contractor installs approved equipment by manufacturers other than specified, he shall be responsible for any extras required to modify the supporting steel.

6.11 Condenser Water Piping

6.11.1 The Refrigeration Contractor shall furnish and install all water piping as required for proper functioning and operation of the refrigeration system as shown on the drawings and as listed below.
6.11.2 All piping shall be black AS-120 Schedule 40.
6.11.3 All piping shall have screwed ends through 2".
6.11.4 All piping 2 ½" and above shall be butt welded joints between runs of pipe.
6.11.5 All fittings shall be 150 psi rated malleable iron or standard butt weld wherever used.
6.11.6 All threads cut on galvanized pipe shall be painted with ZRC Zinc paint after installation for corrosion protection as manufactured by ZRC Chemical Products, Co., Quincy Mass.

6.12 Galvanized Steel Piping

6.12.1 Galvanized steel pipe may be used for piping other than refrigeration.
6.12.2 All pipes shall be SA-120 Schedule 40 hot dip galvanized at the mill.
6.12.3 If the pipe is to be bent or coiled, it shall be SA-53 seamless.

6.13 Condenser Water and Glycol Valves

6.13.1 The Refrigeration Contractor shall furnish and install all stop valves on condenser water circulation lines and make-up lines as shown on the drawings and as required for proper operation of the system. All valves shall be as follows:

6.13.1.1 Through 1" screwed-ends ball type 600 psi WOG with:

6.13.1.1.1 Full port, chrome plated ball.
6.13.1.1.2 Cast of forged bronze bodied
6.13.1.1.3 Teflon seats
6.13.1.1.4 Blow-out-proof stems

6.13.1.2 1 ¼" through 2" screwed-end ball type, 1500 psi WOG with:

6.13.1.2.1 Full port, chrome plated ball
6.13.1.2.2 Carbon steel bodies
6.13.1.2.3 Teflon seats.
6.13.1.2.4 Blow-out proof stems

Valves per 5.11.1.1 and 5.11.1.2 shall be manufactured by Conbraco Industries, Inc., "Apollo" Ball Valve Division or approved equal.

6.13.1.3 Above 2" butterfly lug type, 150 psi rated with:

6.13.13.1 Cast iron bodies
6.13.1.3.2 Bronze discs
6.13.1.3.3 Stainless steel stems
6.13.1.3.4 EPDM seats
6.13.1.3.5 10-position latch lock handle

6.14 Gauges and Thermometers

6.14.1 Refrigeration Pressure Gauges

6.14.1.1 The Refrigeration Contractor shall furnish and install all refrigeration pressures gauges as shown on drawings and as required for proper functioning of the system.

6.14.1.2 All pressure gauges shall be designed and manufactured specifically for refrigeration service and refrigerant in the system and shall be as follows:

6.14.1.2.1 Liquid Filled
6.14.1.2.2 3" dials
6.14.1.2.3 Stainless steel bourdon tube
6.14.1.2.4 Pressure and corresponding temperature scales
6.14.1.2.5 Refrigerant clearly identified on the dial
6.14.1.2.6 Stainless steel casing

6.14.1.3 Each gauge shall have a gauge valve mounted upstream.

6.14.1.4 Pressure ranges shall be adequate for all operating and standing pressures encountered in the system and general shall be:

6.14.1.4.1 0 psig to 400 psig on low side of the system.
6.14.1.4.2 0 psig to 600 psig on high side of the system.

6.14.1.5 All gauges shall be liquid filled manufactured by Span or approved equal.

6.14.2 Non-Refrigeration Pressure Gauges

6.14.2.1 The Refrigeration Contractor shall furnish and install all non-refrigeration pressure gauges as shown on drawings and as required for proper functioning of the system.

6.14.2.2 All pressure gauges shall be designed and manufactured specifically for service intended and shall be as follows:

6.14.2.2.1 Dry type
6.14.2.2.2 4 V2" dials
6.14.2.2.3 Adjustable pointer

6.14.2.3 Each gauge shall have a gauge valve mounted upstream.
6.14.2.4 In case of pulsation, liquid filled gauges shall be used or if dry gauges are furnished, these shall be protected with pressure snubbers of appropriate design and made of appropriate material.
6.14.2.5 Pressure ranges shall be adequate for all operating and standing pressures encountered in the system.
6.14.2.6 All gauges shall be manufactured by Ashcroft or approved equal.

6.14.3 Thermometers

6.14.3.1 The Refrigeration Contractor shall furnish and install all thermometers as shown on drawings and as required for proper operation of the system.

6.14.3.2 All thermometers shall be designed and manufactured specifically for service intended with ranges suitable for all operating and standing conditions and shall be as follows:

6.14.3.2.1 Bi-metal, dry type
6.14.3.2.2 5" dia. dials
6.14.3.2.3 Stainless steel hermetically sealed case
6. 14.3.2.4 Stainless steel stem
6. 14.3.2.5 Externally adjustable pointer

6.14.3.3 All thermometers shall be provided with screwed stainless steel thermowells. On insulated piping, thermowells shall have appropriate lagging extensions. The location, size and lengths of thermowells shall have no adverse effect upon the flow of fluid whose temperature is to be measured.

6.14.3.4 All thermometers shall be accessible for ease of reading.

6.14.3.5 All thermometers shall be manufactured by Ashcroft or approved equal.

6.14.3.6 Thermo conductive paste shall be used on all thermometers.

6.15 Liquid Level Columns

6.15.4.1 The Refrigeration Contractor shall furnish and install all liquid level columns as shown on drawings as required for proper operation of the system and as follows:

6.15.4.1.1 Material: 3" diameter SA-53B black steel pipe or as shown on drawings.
6.15.4.1.2 Liquid level eyes shall be spaced maximum 12" cc. or as shown on drawings.
6.15.4.1.3 Liquid level eyes shall be 1100-R welded with reflex lens as manufactured by H.A. Phillips & Co. or approved equal. For operating temperatures below 350 F, each level eye shall have a frost shield.
6.15.4.1.4 All columns shall have a 34" drain connection located so that complete draining of column can be facilitated.
6.15.4.1.5 Each column shall be pressure tested with air at 125% of the design pressure of the vessel on which the column is to be installed.

6.16 Cleaning

6.16.5.1 To avoid loss of time, damage to equipment, and start-up difficulties, each section of pipe, fittings and valves shall be thoroughly cleaned and positively free of all foreign matter before erection. Prior to erection, each piece of pipe shall be held in an inclined position and thoroughly hammered to loosen scale and foreign matter. Each pipe shall then be swabbed immediately prior to erection. Open ends of mains shall be plugged or capped during all shutdown period. Lines shall not be left open at any place where any foreign matter might accidentally enter pipe.

6.17 Roof Protection

6.17.6.1 Roof is to be fully protected by the Contractor. Protective sheets are to be laid under each cutting and welding area. Hot welding rod stubs are to be deposited in a suitable container and must not be dropped on the roof. All precautions are to be taken against potential fire hazards. Oil of any type must not come in contact with rubber roof membranes. The roof will be covered with rubber roof membrane underneath ¾" thick plywood. The plywood will be covered with fireproof tarps.

REFRIGERATION SPECIFICATIONS (CONTINUED ON SHEET R003)

stellar
OFFICE AT THE STELLAR GROUP
2900 MATLEY ROAD, JACKSONVILLE, FL 32257 (904) 260-2900
WWW.STELLARGROUP.US
FLORIDA ARCHITECTURE LICENSE NO. AA-C000112
FLORIDA ENGINEERING LICENSE NO. 8520

UNITED STATES COLD STORAGE, INC
NEW FACILITY
LAKE CITY, FLORIDA

SPECIFICATIONS

REV.	DATE	BY	DESCRIPTION
A	10-29-07	GLW	PERMIT ISSUE

JOB NO. 03019
DRAWN: GLW
CHECKED: RAS
SCALE: NONE

NOT FOR CONSTRUCTION
DATE: 06-28-2007

R002
DRAWING NO.

Filename: T:\Jobs\03000-03099\03019 USCS_FL\Design\Active\Refrig\03019R702.dwg Last Saved By: GWHITE Date: 6/29/2007 3:36:04 PM Plotted: 7/2/2007 9:50:58 AM

REFRIGERATION SPECIFICATIONS (CONTINUED FROM SHEET R002)

7. Pipe Installation

7.1 Hangers and Supports

7.1.1 The supports shall carry the weight of the pipe, including contents and insulation. If necessary, provide sway bracing to minimize vibration
7.1.2 Hanger rod sizing and spacing shall conform to ANSI/IIAR–2–1999. The table below shows recommended spacing and the maximum loads from ANSIIIIAR–2–1999. All hanger rods shall be galvanized steel.

Table 6–1
Maximum Spacing

Nominal Pipe Size (inches)	Maximum Span (Feet)	Minimum Diameter (Inches)
Up to 1	7	3/8
1–1/4&1–1/2	9	3/8
2	10	3/8
2–1/2	10	1/2
3	12	1/2
3–1/2	13	1/2
4	14	5/8
5	16	5/8
6	17	?
8	19	7/8
10	22	7/8
12	23	7/8
14	25	1
16	27	1
18	28	1–1/4
20	30	1–1/4

Table 6–2
Maximum
Allowable Hanger Rod Loading

Rod Diameter (Inches)	3/8	1/2	5/8	3/4	1	1–1/8	1–1/4	1–1/2
Maximum Load (Pounds)	619	1130	1810	2710	4960	6230	8000	11630

7.1.3 Hangers shall be sized to accommodate insulation, and allow sufficient space to permit installation of the insulation. Whether using trapeze–type hangers or clevis hangers, metal saddles shall be provided to avoid crushing the insulation material.
7.1.4 Extra attention shall be given to pipe hangers and supports in the mechanical room, so as to ensure that no piping weight is supported by compressor flanges or other equipment components.

Table 6–3
Typical Weight Per Foot of Pipe Full of Liquid Ammonia at –20°F

Nominal Pipe Size	Empty Weight	Loaded Weight	Nominal Pipe Size	Empty Weight	Loaded Weight
Inches	lb/ft	lb/ft	Inches	lb/ft	lb/ft
½ (schedule 80)	1.088	1.16	6 (schedule 40)	18.98	27.45
? (schedule 80)	1.474	1.6	8 (schedule 40)	28.56	39.7
1 (schedule 80)	2.172	2.38	10 (schedule 40)	40.48	64.14
1–1/4 (schedule 80)	2.997	3.37	12 (standard weight)	49.56	82.72
1–1/2 (schedule 80)	3.653	4.14	14 (standard weight)	54.57	95
2 (schedule 80)	5.022	6	16 (standard weight)	62.58	116.13
2–1/2 (schedule 40)	5.794	7.2	18 (standard weight)	70.59	134.4
3 (schedule 40)	7.58	9.7.	20 (standard weight)	78.6	163.93
4 (schedule 40)	10.79	14.52	24 (standard weight)	94.62	219.09
5 (schedule 40)	14.62	20.48			

7.2 Rooftop Piping Systems

7.2.1 The same design principles apply to roof mounted piping as to any refrigeration system. The spacing between roof stands is determined by the smallest pipe to be carried. See Table 6–1 for distance between roof supports per minimum size of pipe.
7.2.2 The design of the roof stands shall be dependent upon the number and size of pipes to be carried and the weights imposed. This must include insulation and pipe contents. Refer to Table 6–3.
7.2.3 Roof stands shall be designed to provide slope for suction lines, hot gas drainage, branch line tie–ins, etc. Suction line lift from evaporators mounted below the valve stations on the roof shall be incorporated into the design.
7.2.4 Liquid and suction lines shall be sloped @ minimum of ¼" per 10' toward mechanical room for proper drainage.
7.2.5 Sufficient space between pipes shall be provided for inspection and service. Insulation thickness will be considered and galvanized saddles shall be used to support insulated lines.
7.2.6 Secure pipe(s) to roof stands using design methods that conform to the local Uniform Mechanical Code, Uniform Plumbing Code and Uniform Building Code for wind or seismic conditions (if applicable).
7.2.7 Crane bracing for roof stands shall conform to local Uniform Mechanical Code, Uniform Plumbing Code, and Uniform Building Code for wind or seismic conditions (if applicable).
7.2.8 Roof stands will be constructed of galvanized steel and all welded joints will be galvanized painted. Stands will be bolted to a synthetic wood footer and a piece of roofing material will be placed between the footer and the roof. UNISTRUT will not be allowed.

7.3 Penetrations

7.3.1 Where pipes penetrate walls or ceilings, pipes shall be installed in a pipe sleeve large enough to accommodate the pipe and its insulation. All voids in the sleeve will be filled and sealed.
7.3.2 Where electrical conduit penetrates walls or ceilings in refrigerated spaces, these conduits must absolutely be sealed internally at the nearest junction box adjacent to penetration, to prevent condensation from occurring inside the conduit creating possible short circuits and/or fire hazard.

7.4 Thermal Expansion/Contraction

7.4.1 Long pipe runs must accommodate movement due to temperature changes, both in commissioning and in service. Changes in direction, including expansion loops in the horizontal plane, can provide sufficient flexibility to control thermal–induced movement, in most cases.
7.5 Joint Alignment
7.5.1 All pipe joints will be installed, using generally accepted and proper alignment procedures so as to be free of any misalignment to avoid undue stress.

7.6 Refrigeration Control Stations

7.6.1 When more than one set of refrigeration control stations are installed next to each other, they will be spaced to allow for maintenance and ease of removal. Valve stations will be assembled to allow for isolating and removal of each component. Isolation valves must be provided for all control valve assemblies.

7.7 Welding

7.7.1 Welders shall be certified for welding pressure piping and refrigeration piping per IIAR Piping Handbook, Chapter 8, ASME Boiler and Pressure Vessel Code and ASME B31.5–2004 Refrigeration Piping and Heat Transfer Components.

7.7.2 Contractor is responsible for having all certificates available for Owner's inspection.

7.7.4 While working within any existing USCS facility and before cutting, grinding, and welding can be started, a "HOT WORK PERMIT" must be obtained from the Owner or his representative. Once the "HOT WORK PERMIT" has been reviewed; it will be signed by both Contractor and Owner.

7.7.5 Inspection of welds will be the responsibility of the Contractor and completed by a certified weld inspection company.

7.7.5.1 All welds will be 100% visually inspected per ASME 31.5 standards.
7.7.5.2 All pipeline expansion lines will have 10% of each welder's welds tested by Ultra–Sound per ASME 31.5 and correlated to the welding maps. These tests will be submitted to Owner at their completion.

7.8 Tie–Ins

7.8.1 Because tie–ins into existing ammonia systems are the cause of many ammonia releases, it is very important that proper procedures and safety precautions are followed. The Contractor is responsible for following all ammonia safety procedures and USCS PSM Program.
7.8.2 Before cutting into existing ammonia lines, the Contractor will have read and signed a copy of the Standard Operating Procedure regarding tie–ins. Owner or his representative must inspect and approve the pump down before tie–in can proceed.
7.8.3 Prior to making any tie–ins or commissioning new equipment, a "Pre–Start–Up Safety Review" must be performed by the Contractor and the Owner, as per OSHA, PSM requirements.

7.9 Testing

.7.9.1 Upon completion of the piping system, the following tests shall be accomplished and reports submitted to Owner:

7.9.1.1 Pressure and leak–test the entire piping system per ANSI/IIAR 2–1999 standard. Compressed air will not
be allowed. Only dry nitrogen will be used.
7.9.1.2 Test pressure minimum:
–58° F CO2 suction side 385#
–25° F CO2 suction side 385#
+20° F CO2 side 640#
+110 F R–717 side 275#
7.9.1.3 Clean all joints (carbon steel, welded and threaded), and remove any rust spots on the piping. Paint joints with
a rust–preventative coating.
7.9.1.4 The entire system must be evacuated and pulled down to 400 microns and signed off by the Owner.

8. Pipe Insulation, Painting and Marking (See Insulation Specifications)

9. Contractor Requirements

9.0 CONTRACTOR QUALIFICATIONS GUIDELINES

9.1 Purpose

The purpose of this section is to ensure that all contractors that work on or around the ammonia refrigeration system are properly trained and aware of the hazards associated with anhydrous ammonia. In addition, the guidelines are established to ensure that USCS considers the safety record of contractors in the bidding process.

9.2 Scope
This section applies to all contractors performing any type of work (e.g. maintenance, renovation) in the vicinity of a PSM covered process. It does not apply to contractors who provide a service (e.g. food, janitorial) that does not directly influence the safety of the process or the system. It is the Contractor's responsibility to train and inform their employees.

9.3 Definitions
Contractor: A company or individual that will provide services, labor, materials, and tools to perform specific work under contract or purchase order from the employer.
Employer: A company or individual who has obtained the services of a contractor through a contract or purchase order.

9.4 Procedures
The following steps are required as part of the Contractor selection/notification guidelines:
1. Contractor Selection
2. Contractor Awareness–Pre–Bid
3. Contractor Awareness–Post–Bid
4. Contractor Responsibilities
5. Follow–Up

9.5 Contractor Selection
USCS will administer a selection process prior to allowing contractors to bid work directly associated with or in the vicinity of the ammonia refrigeration process. It is a requirement for the contractors to have previous working experience on ammonia refrigeration systems as well as demonstrate technical and procedural knowledge of ammonia refrigeration systems and Process Safety Management USCS personnel will obtain and evaluate information regarding the contractor's historical safety performance and current safety programs. If a contractor has previously worked for USCS and the work to be bid is similar to that which was previously performed, a documented evaluation may be based upon such prior performance. Contractor evaluations, their respective safety records and programs will be kept on file.

9.6 Contractor Awareness–Pre.–Bid
USCS personnel must inform the Contractor of the potential hazards related to the refrigeration system. This notification shall occur during a pre–bid meeting and site walk–through. The Contractor shall exhibit documentation to support experience in generally accepted good engineering and work practices with ammonia refrigeration systems. This exhibit may be in the form of work references or similar documents. USCS personnel must notify contractors of potential toxic release and potential fire hazards by reviewing an ammonia MSDS with each contractor. Contractor personnel shall review the process flow diagram and/or operator manuals for the refrigeration system, as appropriate for the project. During job walk through, USCS personnel shall point out hazards associated with the ammonia refrigeration process. USCS personnel shall review site–specific safety work practices with Contractor personnel to help control the presence, entrance and exit of other contract employees in the area of the ammonia refrigeration system. The contractor shall review the USCS Emergency Response Plan for the facility. The contractor shall document and keep on file notes from pre–bid meetings.

9.7 Contractor Awareness–Post–Bid
USCS personnel shall evaluate any Contractor's response to the safety issues related to the ammonia refrigeration system. It is recommended this occur during post bid meetings. The Contractor shall review the safety record and program of subcontractors prior to beginning work at the facility. USCS personnel must verify how the Contractor will train their employees concerning safe work practices and the hazards associated with the ammonia refrigeration system. USCS personnel shall issue a confirmation letter detailing safety communications to the contractor and shall maintain notes and documents from these meetings.

9.8 Contractor Responsibilities
The PSM requires a Contractor to train its employees and ensure that any sub–contractors have been informed of the various aspects of PSM and how it relates to their work tasks. Each Contractor employee shall be aware of the potential hazards of the covered process. Using information from Section 3.0 may assist in providing such awareness. The Contractor shall document that each employee has been trained. The documentation shall identify the employee, the dates of training, and the method used to verify that the employee understood the training.

9.9 Follow–Up
USCS personnel shall routinely follow–up with the Contractor and evaluate the performance of the Contractor to ensure the Contractor is meeting PSM and other safety obligations. Evaluation of a Contractor's performance with respect to OSHA PSM shall be reviewed through an evaluation inquiry. USCS personnel shall maintain an injury and illness log related to the Contractor's employees working on or in the vicinity of the ammonia refrigeration system. All completed Contractor related forms are filed in Maintenance Manger's or Chief Engineers office.

10.0 Start–Up of Equipment and the System

10.1 Allow a minimum of forty days of start–up of the equipment and the system pull down to design working temperatures. It will be the Contractors responsibility to supply enough time to insure that the pull down is done so as not to damage the building, floor etc. It is also intended during the start–up period that system training is supplied to the Owner.

11.0 Warranty

11.1 Supply all parts and labor for a period of one year from the date of the system acceptance.

12.0 General Notes

12.1 Supply one extra drum of oil for the screw compressors. M&M 717.
12.2 Supply six (10) liter cans of oil for the CO2 compressors.
12.3 All glycol lines are to be insulated, no Armaflex? (see Attachment A.)
12.4 Power and control wiring by the Electrical Contractor.
12.5 All painting of the bare refrigeration lines to be done by the General Contractor per U.S.C.S. color code.
12.7 All wind bracing, foundations, etc. per Florida Code by the Refrigeration Contractor.
12.8 Supply four sets of drawings after acceptance of the system by U.S.C.S. plus one set of electronics on disk.
12.9 Freezer and convertible room air unit drain lines are to be traced with two (2) internal heat tapes; one (1) spare.
12.10 The Refrigeration Contractor will supply sheet metal duct for all penthouse air units.

An Ammonia and Carbon Dioxide gas detection system shall be installed and is included in the M&M Refrigeration Control System as described in Appendix A.

Carbon Dioxide Sensors shall be located as follows:

Convertible Room 1	1 sensor
Convertible Room 2	1 sensor
Freezer Room 3	4 sensors
Truck Dock	2 sensors
Rail Dock 2	
Engine Room	1 sensor
USDA Inspection Room	1 sensor

Ammonia Sensors shall be located as follows:
Engine Room 1 sensors
Ammonia vent line, Engine Room 1 sensors

APPENDIX A
Major Equipment Pre–purchased and Assigned
(1) H98E with PE motor solid state starter
(1) H74EWF with PE motor solid state starter
(1) HPC108S with PE motor and solid state starter
(1) HPC104S with PE motor and solid state starter
(2) SHH 465–1–1 CO2/ R–717 heat exchanger
(1) Hansen AP–16 purger
(1) Vertical –25° F 72" x 161" 350# CO2 pump package
(1) Horizontal +20° F 54" x 224" 580# CO2 pump package
(1) Horizontal +11° F 84" x 143" 250# R–717 pump package
(1) Vertical +30° F 42" x 145" 250# R–717 CPR
(1) Horizontal 16" x 60" 580# CO2 oil return pots
(1) Complete M&M micro processor control system
(1) Evapco ATC 136AB condenser with split coil
(1) Evapco USDA air unit
(5) Evapco truck dock air units
(4) Evapco convertible room penthouse air units
(4) Evapco freezer
(4) Evapco rail dock
(2) B&G 3E under floor glycol pumps
(5) MCP 460/3/60 Starter Panels
(1) Glycol Heat Exchanger

INSTALLATION GUIDE FOR REFRIGERATION PIPE INSULATION

1.0 SCOPE

1.1 United States Cold Storage recommends the use of rigid polyisocyanurate insulation or extruded polystyrene insulation on refrigeration piping systems, including associated vessels, tanks, and equipment. Guidelines are provided for both indoor and outdoor applications.

1.2 It is the intent of this specification to provide standardized guidelines for the installation of refrigeration system pipe and vessel insulation. Due to the variation in service conditions and use, this specification may not be pertinent for every application. A design or specifying engineer can propose alternative specifications, with owner's approval, tailored to site–specific applications or conditions. Such a design or specifying engineer may be more familiar with local conditions, codes, environments and desired service life of the insulation system allowing them to generate a more precise specification.

2.0 GENERAL REQUIREMENTS

2.1 All piping shall be free of foreign substances and free of surface moisture or frost prior to the application of insulation.

2.2 All insulation material shall be delivered to the project site in original, unbroken factory packaging labeled with product designations and thickness. The shipping package should not be air–tight. Shipment of materials from the manufacturer to the job site shall be in weather–tight transportation. Insulation materials delivered to the job–site shall be stored so as to protect the materials from moisture and weather during storage and installation. Insulation material shall be protected form sunlight to avoid exposure to UV light from the sun.

2.3 All testing of piping systems shall be completed prior to the installation of the insulation system.

2.4 Refer to insulation thickness charts in Appendix A to determine recommended insulation thickness based upon desired design criteria for ambient and service conditions.

3.0 MATERIALS OF CONSTRUCTION

3.1 CARBON STEEL PIPING

3.1.1 All carbon steel piping operating at a service temperature above 32 °F and 300°F or in cycling temperature service where the service temperature is between 32 °F and 300 °F for more than 20% of the time shall be at a minimum primer coated with a Polyamine–cured or epoxy–phenolic primer coating. Insulation contractor shall consult a coating manufacturer for the appropriate coating materials and application methods for the operating temperature range of the piping and/or equipment.

3.1.2 Prime paint all high–risk areas including, but not limited to, all pipe welds, control valve groups, areas around pump bases or control columns, evaporator coil headers, all pots, valves, unions and flanges or any termination of insulation. Piping
10 linear feet in either direction of equipment should be prime–painted. Prime–paint the entire hot gas line. Polyamine–cured or epoxy–phenolic primers are recommended. Before any type of insulation is applied, all equipment and pipe surfaces shall be dry, clean and corrosion–free.

3.2 INSULATION MATERIALS FOR PIPING, VESSELS, VALVES AND EQUIPMENT

3.2.1 For refrigeration systems using ammonia or ammonia/CO2 the insulation shall be either:

A. Rigid Polyisocyanurate Insulation as manufactured by The Dow Chemical Company (TRYMER) or an owner approved equivalent. Insulation shall have a minimum thermal conductivity of 0.19 BTU–in/hr112–°F at 75°F mean.

B. Extruded Polystyrene Insulation as manufactured by The Dow Chemical Company (STYROFOAM) or an owner approved equivalent. Insulation shall have a minimum thermal conductivity of 0.259 BTUJ–in/hr–ft2–°F at 75°F mean.

3.3 FABRICATION OF INSULATION

3.3.1 Insulation shall be fabricated in required shapes from bun stock in accordance with ASTM C–450 "Standard Practice for Prefabrication and Field Fabrication of Thermal Insulating Fitting Covers for NPS Piping, Vessel Lagging, and Dished Head Segments" and C–585 "Standard Practice for Inner and Outer Diameters of Rigid Thermal Insulation for Nominal Sizes of Pipe and Tubing (NPS System). Insulation shall be factory fabricated from bun stock.

3.3.2 Fittings, such as valves, valve stations, flanges, 90° and 45° elbows, and tees shall be two piece fly cut or routed to the preferred fabrication method. For diameters too large for fly cutting or routing, the pieces shall be fabricated in two halves with each half made up of mitered sections. Both methods shall be in accordance with ASTM C–450 and ASTM C–585. Larger outer diameter valves and flanges may be slightly oversized and cavities filled with tightly packed loose fiberglass or polyurethane spray foam (Reference Figure 1 in Appendix B). The number and size shall be kept to a minimum.

3.4 ADHESIVES, JOINT SEALERS AND MASTICS

3.4.1 Solvent based adhesives, joint sealers and mastics may be used in contact with polyisocyanurate and polystyrene insulation. Mastics must remain flexible at the lowest expected ambient temperature.
3.4.2 Joint sealers for sealing joints of insulation or PVC jacketing slip joints, shall be vapor retarder type, moisture and water resistant non hardening, and flexible with – a service temperature range from –50°F to +200°F.
3.4.3 Vapor retarder type mastic or joint sealers should be applied on insulation longitudinal joints and butt joints to prevent moisture and moisture vapor infiltration. Typical mastic or joint sealer can be CHIL–Joint CP–70, CHIL– PERM WB CP–35, AK–CRYL CP–9, VICRYL CP–10/11 from Childers Products Company or an owner approved equal.
3.4.4 Solvent or water adhesives may be used to attach the vapor retarder film to the outer surface of the insulation for factory applied vapor retarder film. Refer to vapor retarder film manufacturer specifications. Consult adhesive manufacturer's literature for instructions on handling adhesives including required operating temperatures and compatibility. Typical adhesives for use in this application include but are not limited to:

a) Childers CP88 adhesive (solvent based)
b) Foster 81–05 adhesive (solvent based)
c) Foster 85–50 adhesive (water based)
d) Childers CP56 adhesive (water based)
e) Foster 85–60 adhesive (water based)

3.5 VAPOR RETARDER

3.5.1 Vapor Retarder shall have a maximum permeance of 0.02 perm for applications at or below 32°F and a maximum permeance of 0.030 perm for applications above 32°F.
3.5.2 Vapor retarder shall be Saran 540 Vapor Retarder Film, or owner approved equivalent, for service temperatures above 32°F and Saran 540 or 560 Vapor Retarder Film, or owner approved equivalent, in services at and below 32°F or where a permeance of 0.02 perm or better is required. Refer to ASTM standards C–755 and C–1136 for information on selection and specification of vapor retarders. Refer to product literature and installation guidelines on Saran Film for recommended application instructions.
3.5.3 Elbows and fittings shall be wrapped with Saran 520 Vapor Retarder Tape, or owner approved equivalent. When operating temperature is </= 32°F or when a permeance of 0.02 perms or better is required, elbows and fittings shall be wrapped with Saran 520 Vapor Retarder Tape with a 50% overlap. When operating temperature is > 32°F, elbows and fittings shall be wrapped with a single layer of Saran 520 Tape with minimum overlap. When the nominal pipe size is 6" or less, use 1" wide Saran 520 tape. When the nominal pipe size is between 6" and 12", use 2" wide Saran 520 tape. When the nominal pipe size is
greater than 12", use 3" wide Saran 520 tape.
3.5.4 When operating temperature is </= 32°F or when a permeance of 0.02 perms or better is required, butt joints shall be wrapped with either two layers of Saran 520 Vapor Retarder or a single layer of Saran 560 tape.
3.5.5 For other laminated membrane vapor retarders, consult manufacturer's literature and installation guidelines.
3.4.6 It is preferred that vapor retarder be field–applied to the outer surface of pipe insulation. Seek owner approval prior to utilizing factory applied vapor retarder.
3.4.7 For tanks, vessels, and equipment use Saran 540 or 560 Vapor Retarder Film or owner approved equal.

3.5 PROTECTIVE JACKETING MATERIALS

3.5.1 INDOOR JACKETING APPLICATIONS

3.5.1.1 Jacketing shall be PVC material. PVC thickness shall be a minimum of 0.020 inch. Jacketing shall be tough and capable of enduring frequent wash downs 'with hot water or cleaning agents. All joints of PVC jacket shall be seal welded with manufacturers approved welding adhesive tapreven t moisture and moisture vapor infiltration into the insulation system.
3.5.1.2 Supply preformed PVC covers for all fittings, tees, elbows, valves, caps, etc. at same PVC thickness as on straight pipe sections.
3.5.1.3 PVC protective jacketing shall not be considered a vapor retarder.
3.5.1.4 Neither rivets, screws, staples nor any other fastener capable of penetrating the underlying vapor retarder shall be used to secure the PVC jacketing.
3.5.1.5 PVC jacketing color shall comply United States Cold Storage's Color Guide (reference Appendix C).

3.5.2 OUTDOOR JACKETING APPLICATIONS

3.5.2.1 Jacketing shall be aluminum cladding. Jacketing shall be aluminum alloys 3003, 1100 or 3105 meeting ASTM B–209 with H–14 temper and a minimum 2.2 mil thickness polyolefin moisture barrier on the inner surface. Aluminum cladding shall have a minimum thickness of 0.016"
3.5.2.2 Aluminum jacketing for all fittings, tees, elbows, caps, etc. shall be sectional, flctory contoured, or field–fabricated to fill closely around insulation and arranged so
as not to trap water but allow it to drain. Where this is not possible, use CHIL–BYL CP–76 joint sealant to seal the jacket.
3.5.2.3. Banding for jacketing shall be 0.02" thick by 0.5" wide stainless steel.
3.5.2.4 Aluminum protective jacketing shall not be considered a vapor retarder.
3.5.2.5 Neither rivets, screws, staples nor any other fastener capable of penetrating the underlying vapor retarder shall be used to secure the aluminum jacketing.

4.0 INSULATION APPLICATION

4.1 PIPING INSULATION – GENERAL

4.1.1 Stagger insulation half sections so that butt joints are staggered between top and bottom half sections by 6 to 18 inches on insulation layers that do not have a vapor retarder factory applied to them. On a single layer system, orient longitudinal joints between half sections in the 3 and 9 o'clock position on the pipe. (Reference Insulation Details).
4.1.2 Where insulation thickness required is greater than 2.5", employ a double layer system. Stagger all longitudinal joints between the inner and outer layers. Install the inner and outer layer longitudinal joints 90° to each other with the inner layer joints in the 12 and 6 o'clock positions and the outer layer joints in the 3 and 9 o'clock positions. All butt joints between the inner and outer layers shall be staggered between 6 and 18 inches. (Reference Insulation Details).
4.1.3 Install pre–fabricated insulation fittings on elbows, tees, and valves. Insulation shall be the same thickness at the fittings as pipe sections.
4.1.4 If a double layer is required, all fittings shall be doubled layered. Fittings may be cut to full thickness in lieu of double layered if they are fabricated with shiplap butt ends. Depth of the shiplap shall be cut to the thickness of the inner layer to allow the outer layer to overlap creating a staggered joint. (Reference Insulation Details).
4.1.5 Install half length pipe sections round on bottom of all pipe hanger saddles with a full pipe section half round on the top so as to maintain a staggered joint through the pipe hanger saddle (Reference Insulation Details). In double layer pipe systems install nested half and full pipe half round sections in bottom of saddle or use a full thickness single layer pipe section with shiplap ends cut to the depth of the inner layer thickness so the outer layer will overlap (Reference Insulation Details).
4.1.6 Single layer insulation shall be applied to piping with all joints sealed full depth with joint sealant and spread to uniform thickness so that joints appear tight and uniform. (Reference Insulation Details). In double layer insulation systems, inner layer shall not be installed with sealants. In double layer systems inner and outer layer shall remain independent of each other so as to allow movement between layers. (Reference Insulation Details).
4.1.7 Insulation shall be secured to the pipe with 3/4" wide fiber reinforced tape. Tape should be applied as per insulation Details.
4.1.8 Insulation shall be secured with fiber–reinforced tape on both inner and outer layers of a double system except as noted in section 4.1.11.
4.1.9 Insulation shall be secured with fiber reinforced tape prior to installation of the vapor retarder material when vapor retarder material is field applied.
4.1.10 Outer layer or single layer insulation and vapor retarder shall be secured with fiber reinforced tap. Use a 25% circumferential overlap on 12" centers when vapor retarder is factory applied to insulation. Fiber tape shall be applied to the exterior of the insulation/vapor retarder system. Contraction/expansion joints in double layer system shall be installed per insulation details or owner approved alternate design.
4.1.11 Contraction/expansion joints in single layer service shall be installed per insulation details or owner approved alternate design. The appropriate insulation designer or engineer must specify the spacing of contraction/expansion joints separately for each system.
4.1.12 All insulation shall be tightly butted and free of voids and gaps at all joints. Vapor retarder must be continuous. All fasteners and bands shall be neatly aligned and overall work must be high quality in appearance and workmanship.
4.1.13 Vapor stops shall be used on either side of valves frequently removed for servicing, valve stations, or odd fittings, elbows, tees, etc. where the chance of moisture infiltration is high. Install vapor stop per Insulation Details or by an owner approved alternate design.
4.1.14 Saran Vapor Retarder film to be cut to length longitudinally and wrapped around the circumference of the pipe with lap joint facing downward avoiding the placement of the joint at the top or bottom of the pipe. Lap joint to be sealed using SSL tape or an approved liquid adhesive. Butt joints shall be covered with Saran Vapor Retarder tape. Spiral wrap configuration can be used in lieu of the above installation. Spiral wrapping will require adhesive placed on one edge of the Saran film as it is wrapped over the previous layer.
4.1.15 Elbows and fittings shall be wrapped with Saran 520 or approved equivalent, or covered with a mastic type vapor retarder product. Saran tape to be wrapped in a spiral configuration. Where permeance less than 0.02 perm is required, Saran 520 tape shall be spiral wrapped with a minimum 50% overlap. If using mastic type vapor retarder at fittings and elbows, form mastic so that fitting covers can be applied true and tight. Insulation contractor may not install PVC jacket with polyurethane foam fill in lieu of vapor retarder at fittings and elbows without special approval by owner.
4.1.16 On factory applied vapor retarder film, lap joints shall be sealed with SSL tape. All vapor retarder surfaces should be cleaned and free of dust/oil/grease/etc. before application of the SSL tape to ensure good adhesion between the tape and vapor retarder. (Reference Insulation Details). Apply the Saran Tape around the butt joint with a 25% circumference overlap (Reference Insulation Details). For other types of factory applied vapor retarders, consult manufacturer's recommendation on installation.
4.1.17 Before jacketing can be applied on a portion of the piping, the vapor retarder system on that portion must be complete and continuous.
4.1.18 Pipe support legs and appendages attached directly to the pipe shall be insulated out from the pipe five times the insulation thickness and the insulation termination sealed with a vapor stop.
4.1.19 Pipe insulation through roof and wall penetrations will be strictly adhered to as per the insulation Details. It is imperative to protect the vapor retarder system of the pipe insulation. Exercise care to correctly seal and flash the penetration opening. Protect pipe line insulation and vapor retarder jacket/mastic by placing it inside a PVC or metal sleeve.

4.2 INDOOR PIPING – SPECIFIC REQUIREMENTS

4.2.1 Allow mastic to dry prior to installing PVC jacketing.
4.2.2 Insulation systems on indoor piping, valves and flanges shall be covered with PVC jacketing.
4.2.3 Seal around protrusions such as valves stems with a fill bead of silicone sealant

4.3 OUTDOOR PIPING – SPECIFIC REQUIREMENTS

4.3.1 Polyisocyanurate and polystyrene insulation shall be protected form prolonged exposure to UV light and weather upon installation.
4.3.2 Outdoors, Saran products shall be covered with a jacketing material within two weeks of installation to eliminate long–term exposure to UV light.
4.3.3 Outdoor jacketing overlap shall be a minimum of 2" at butt joints and minimum of 2" at longitudinal joints. Jacketing shall be caulked before closing and banding and positioned in an orientation to avoid water infiltration.
4.3.4 Straight sections of jacketing shall be neatly secured with bands and seals with a maximum spacing of 9" on center. End joints shall be secured with bands and seals centered directly over joint. Do not use screws, staples or other fasteners on lines containing a vapor retarder system.

4.4 TANK, VESSEL, AND EQUIPMENT INSULATION

4.4.1 All insulation materials shall be the same as those used on the pipe associated with the tank, vessel or equipment.
4.4.2 Tank and vessel head segments shall be curved or flat cut to fit in single piece or segments per ASTM C–450. Head segments shall be cut so as to eliminate voids at the head section and in a minimum number of pieces so as to eliminate through joints.
4.4.3 Prefabricated flat head sections shall be installed in the same number of layers and thicknesses as the vessel walls. Void area behind the flat head shall be filled with a spray applied polyurethane.
4.4.4 Curved segments shall be fabricated to fit the contour of the surface in equal size pieces to go around the vessel with a minimum number ofthroughjoints. Cutting in the field shall be minimized. All sections shall be tightly butted and free of voids and gaps. (Reference Figure 15).
4.4.5 Seal all outer layer and single layer butt joints with joint sealer.
4.4.6 In double layer applications, the horizontal and vertical joints of the inner and outer layer curved segments shall be staggered. (Reference Figure 15).
4.4.7 The top of the outer layer of wall insulation in a double layer system shall be held below the inner layer top a minimum of the insulation thickness. The tank head insulation layers shall be cut so as to meet the staggered joint. (Ref. Figure 15).
4.4.8 Secure the shell insulation with stainless steel bands on 12 inch centers.
4.4.9 Install Saran 540 or 560 Vapor Retarder Film or an owner approved alternate. Tightly wrap the vessel or equipment insulation circumferentially with Saran Film or an owner approved alternate. Overlap the seams by a minimum of 2 inches. Seal
the overlapped seams with Saran Tape. On vertical vessels apply the Saran Film starting at the bottom course and work upwards. Each course should overlap on top of the one below it thus providing ajoint that will naturally shed water.
4.4.10 The vapor retarder on curved head sections shall be mastic/fabric/mastic or an owner approved alternate. Flat head sections can be covered with Saran 540 or 560 films or an owner approved alternate. Lap joints shall be covered with Saran Vapor Retarder tape.
4.4.11 Vessel support legs and appendages attached directly to the shell shall be insulated out from the vessel head or wall five times the insulation thickness and the insulation termination sealed with a vapor stop.
4.4.12 All indoor tanks, vessels, and equipment shall be covered with 0.030 inch PVC jacketing. Top cover shall be one piece or joints sealed with Chil–Byl CP–76 Sealant. On outdoor equipment use aluminum jacketing per section 3.5.2. Rivets and
screws shall not be sued to attach jacketing on system using a vapor retarder.

5.0 PIPE IDENTIFICATION

5.1 All piping shall be identified as specified in section 5.9, 5.10 and 5.11. All marks of identification shall be easily visible from the floor or usual point of vision.

5.2 Piping identification systems shall conform to ANSI 13.1, OSHA Standards, and IIAR Bulletin No. 119 scheme for the identification of piping.

5.3 Ammonia piping markers shall contain the following five (5) sections:

A. Market Body
B. Physical State Section
C. Pressure Level Section
D. Abbreviation Section
E. Directional Arrow
Sections shall be in accordance with IIAR Bulletin No. 119

5.4 Identification colors shall conform to the "Base Engine Room Color Coding" Scheme.

5.5 Piping identification systems shall be identified a minimum of once in each room passed through walls, ceilings and floors, to enter room. Place legends on the lower quarter of pipe for piping above eye level.

5.6 All vessels shall be identified in accordance with IIAR Bulletin No. 119

5.7 Identification markers for pipe shall be "Wrap–Mark" as manufactured by Bunting, Inc., Pittsburgh, Pennsylvania or owner approved equivalent.

5.8 Identification markers for vessels shall be "Ammonia Identiflow" as manufactured by Bunting, Inc., Pittsburgh, Pennsylvania or owner approved equivalent.

5.9 The width of the color band shall provide a full background of lettered legend, however, the width of color band and the size legend ledgers shall not be less than that which

OUTSIDE DIAMETER OF PIPING OR COVERING	MARKER SIZE	LEGEND SIZE
Under 3" diameter	1–1/8 X as required by legend	1"
Over 3" diameter	2–1/4 X as required by legend	2"

INSTALLATION GUIDE FOR REFRIGERATION PIPE INSULATION (CONTINUED ON SHEET R004)

stellar
OPERATING AS THE STELLAR GROUP
2900 HARTLEY ROAD, JACKSONVILLE, FL 32257 (904) 260–2900
WWW.STELLAR.NET
FLORIDA ARCHITECTURAL LICENSE NO. AA 26000712
FLORIDA ENGINEERING LICENSE NO. 29870

UNITED STATES COLD STORAGE, INC
NEW FACILITY
LAKE CITY, FLORIDA

SPECIFICATIONS

REV.	DATE	BY	DESCRIPTION
A	06.29.07	GLW	PERMIT ISSUE

JOB NO. 03019
DRAWN: GLW
CHECKED: RAS
SCALE: NONE

NOT FOR CONSTRUCTION
DATE: 06–28–2007

R003
DRAWING NO.

Filename: T:\Jobs\03000–03099\03019 USCS_FL\Design\Active\Refrig\03019R702.dwg Last Saved By: GWHITE Date: 6/29/2007 3:36:04 PM Plotted: 7/2/2007 9:54:32 AM

INSTALLATION GUIDE FOR REFRIGERATION PIPE INSULATION (CONTINUED)

5.10 Piping shall be identified with the following abbreviations
High Temperature Suction (NH3) HTS
Low Temperature Suction (NH3) LTS
Low Temperature Recirculated Suction (NH3) LTRS
Very Low Temperature Recirculated Suction (CO2) VLTRS
High Pressure Liquid (NH3) HPL
Very High Pressure Liquid (CO2) VHPL
Low Temperature Recirculated Liquid (NH3) LTRL
Very Low Temperature Recirculated Liquid (CO2) VLTRL
Subcooled Liquid (NH3) SCL
Defrost Condensate (NH3) DC
Relief Vent (NH3 and CO2) RV
Hot Gas (NH3) HG
Hot Gas Defrost (NH3) HGD
Condenser Water Supply CWS
Condenser Water Return CWR
Make-Up Water MW
Glycol Supply GS
Glycol Return GR

5.11 Vessels shall be identified with vessels name and pressure rating as follows:
High Temperature Pump Recirculator (CO2) Very High
High Pressure Receiver (NH3) High
Medium Temperature Flash Economizer (NH3) Low
Low Temperature Liquid Recirculator (NH3) Low
Low Temperature Liquid Recirculator (CO2) Very Low

5.12 Provide and install one (1) vessel and pipe marker identification wall chart in the compressor room in full color graphics.
APPENDIX A
Rigid Polyisocyanurate Insulation Thickness for Refrigeration Pipe: (Reference Insulation Details).
NOTE: On all horizontal pipe runs, where there is no change in elevation, the insulation thickness should remain the same size from beginning to end.

Extruded Polystyrene Insulation Thickness for Refrigeration Pipe: (Reference Insulation Details).
NOTE: On all horizontal pipe runs, where there is no change in elevation, the insulation thickness should remain the same size from beginning to end.

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FLORIDA CERTIFICATE OF AUTHORIZATION #00001712
FLORIDA ENGINEERING LICENSE No. 0830

07-01-07

UNITED STATES COLD STORAGE, INC
NEW FACILITY
LAKE CITY, FLORIDA

SPECIFICATIONS

REV.	DATE	BY	PERMIT ISSUE DESCRIPTION
A	06-28-07	GLW	

JOB NO. 03019
DRAWN: GLW
CHECKED: RAS
SCALE: NONE

NOT FOR CONSTRUCTION
DATE: 06-28-2007

R004
DRAWING NO.

Filename: T:\Jobs\03000-03099\03019 USCS_FL\Design\Active\Refrig\03019R702.dwg Last Saved By: GWHITE Date: 6/29/2007 3:36:04 PM Plotted: 7/2/2007 9:54:23 AM

4'-0"(TYP)

PIPE ANCHOR (TYPICAL @ 5'-0" ALONG ENTIRE LENGTH OF GRID) SEE SHEET R301 FOR DETAIL

3'-11"(TYP)

684 FEET	3 GPM | A-18
700 FEET	3 GPM | A-17
716 FEET	3 GPM | A-16
732 FEET	4 GPM | A-15
748 FEET	4 GPM | A-14
764 FEET	4 GPM | A-13
780 FEET	4 GPM | A-12
797 FEET	4 GPM | A-11
812 FEET	4 GPM | A-10
830 FEET	4 GPM | A-9
846 FEET	4 GPM | A-8
862 FEET	4 GPM | A-7
878 FEET	4 GPM | A-6
894 FEET	4 GPM | A-5
910 FEET	4 GPM | A-4
926 FEET	4 GPM | A-3
943 FEET	5 GPM | A-2

600 FEET	3 GPM | B-19
616 FEET	3 GPM | B-18
632 FEET	3 GPM | B-17
648 FEET	3 GPM | B-16
664 FEET	3 GPM | B-15
680 FEET	3 GPM | B-14
699 FEET	3 GPM | B-13
722 FEET	3 GPM | B-12
745 FEET	4 GPM | B-11
769 FEET	4 GPM | B-10
792 FEET	4 GPM | B-9
815 FEET	4 GPM | B-8
839 FEET	4 GPM | B-7
862 FEET	4 GPM | B-6
885 FEET	4 GPM | B-5
909 FEET	4 GPM | B-4
932 FEET	5 GPM | B-3
955 FEET	5 GPM | B-2

593 FEET	3 GPM | C-16
607 FEET	3 GPM | C-15
626 FEET	3 GPM | C-14
645 FEET	3 GPM | C-13
671 FEET	3 GPM | C-12
694 FEET	3 GPM | C-11
717 FEET	3 GPM | C-10
740 FEET	4 GPM | C-9
763 FEET	4 GPM | C-8
786 FEET	4 GPM | C-7
809 FEET	4 GPM | C-6
832 FEET	4 GPM | C-5
855 FEET	4 GPM | C-4
878 FEET	4 GPM | C-3
901 FEET	4 GPM | C-2

250 FEET | 4 GPM | A-1

42,784 SQ. FEET

HEADER "A"

HEADER "B"

304 FEET | 4 GPM | B-1

45,786 SQ. FEET

36,649 SQ. FEET

HEADER "C"

261 FEET | 4 GPM | C-1

+40'F REFRIGERATED DOCK [110]

MEN'S LOCKER [308]

MEN'S RESTROOM [307]

WOMEN'S LOCKER [306]

WOMEN'S RESTROOM [305]

CORR. [305]

JAN. [304]

VENDING AREA [303]

BREAK ROOM [302]

VEST. [301]

SUPER. OFFICE [402]

OPEN OFFICE [401]

DRIVER'S LOUNGE [404]

GENERAL OFFICE [503]

LOBBY [501]

STAIR [502]

MEN'S RESTROOM [510]

WOMEN'S RESTROOM [511]

STAIR [514]

CORR. [513]

JAN. [512]

ELEC. [515]

OFFICE [505]

OFFICE [506]

OFFICE [507]

OFFICE [508]

OFFICE [509]

CHIEF ENGR OFFICE [204]

+45'F TO +70'F USDA INSPECTION [205]

USDA OFFICE [206]

MAINTENANCE [202]

WAREHOUSE SUPPLIES [203]

ELECTRICAL ROOM [209]

MACHINE ROOM [208]

BATTERY CHARGING [207]

FIRE PROTECTION ROOM [210]

NOTES:

1. SET CIRCUITS TO 1/2 GPM/100 FT OF LENGTH.
2. 30'-0" LENGTH HAS BEEN ADDED TO ACCOMODATE FOR FIELD CONDITIONS.
3. SEE R301 FOR HEADER DETAILS.

UNDERFLOOR WARMING PLAN

SCALE: 1" = 20'-0"

0 10' 20' 40' 60'

stellar
OPERATING AS THE STELLAR GROUP
2900 HARTLEY ROAD, JACKSONVILLE, FL. 32257 (904) 260-2600
WWW.STELLARGROUP.US
FLORIDA ARCHITECTURAL LICENSE NO. AA-C000112
FLORIDA ENGINEERING LICENSE NO. 28980

07/02/07

UNITED STATES COLD STORAGE, INC

NEW FACILITY

LAKE CITY, FLORIDA

UNDERFLOOR WARMING PLAN

REV.	DATE	BY	PERMIT ISSUE DESCRIPTION
A		GLW	

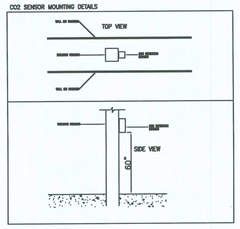
JOB NO.	03019
DRAWN:	GLW
CHECKED:	RAS
SCALE:	1"=20'

NOT FOR CONSTRUCTION
DATE: 06-28-2007

R100
DRAWING NO.

V = AIR UNIT VALVE STATION V
*CO2D = CO2 DETECTION CO2D
*RT = ROOM TEMPERATURE RT
*FTS = UNDERFLOOR TEMP SENSOR (SEE R301) FTS
*AT = AMBIENT AIR TEMPERATURE AT
*NH3D = AMMONIA DETECTION NH3D
*HYD = HUMIDITY DETECTION HYD
GM= GLYCOL MANIFOLD UNDERFLOOR
GS = GLYCOL SUPPLY UNDERFLOOR
GR = GLYCOL RETURN UNDERFLOOR
-25CL = -25° CO2 LIQUID
-25CS = -25° CO2 SUCTION
+20CL = +20° CO2 LIQUID
+20CS = +20° CO2 SUCTION

CO2 SENSOR MOUNTING DETAILS



NOTES:

1. FOR WALL PENETRATION DETAIL SEE SHEET R501, DETAIL #2.
2. CONDENSATE DRAIN LINES IN AREAS BELOW 32°F SHALL BE INSTALLED WITH HEAT TAPE (SEE "REFRIGERATION SPECIFICATION" SECTION "6.7")
3. FOR AIR HANDLING UNIT HANGER DETAIL SEE SHEET R502, DETAIL #8.
4. DIMENSIONS ARE TO THE NEAREST SUPPORT POINT ON THE AHU.

OVERALL FLOOR PLAN

SCALE: 1" = 20'-0"
0 10' 20' 40' 60'

NOT FOR CONSTRUCTION
DATE: 06-28-2007

R101
DRAWING NO.

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OPERATING AS THE STELLAR GROUP
2900 HARTLEY ROAD, JACKSONVILLE, FL 32257 (904) 260-2900
WWW.STELLAR.NET
FLORIDA ENGINEERING LICENSE NO. 28712

07/07/07

UNITED STATES COLD STORAGE, INC
NEW FACILITY
LAKE CITY, FLORIDA

REV	DATE	BY	DESCRIPTION
A	06-29-07	GLW	PERMIT ISSUE

JOB NO. 03019
DRAWN: GLW
CHECKED: RAS
SCALE: 1"=20'

Filename: T:\Jobs\03000-03099\03019 USCS_FL\Design\Active\Refrig\03019R702.dwg Last Saved By: GWHITE Date: 6/29/2007 3:36:04 PM Plotted: 7/2/2007 9:53:40 AM

V = AIR UNIT VALVE STATION [V]
*AT = AMBIENT AIR TEMPERATURE [AT]
–25CL = –25° CO2 LIQUID
–25CS = –25° CO2 SUCTION
+20CL = +20° CO2 LIQUID
+20CS = +20° CO2 SUCTION

–20°F TO +30°F CONVERTIBLE 2 [103]

SEE SHEET R502 DETAILS #14 & #15

BOI=53" BOI=68"

–25CL 3"
–25CS 5"

SEE SHEET R502 DETAILS #14 & #15

BOI=57" BOI=43"

–20°F TO –35°F CONVERSION [102]

SEE SHEET R502 DETAILS #14 & #15

BOI=40"

FUTURE –25CL 4"
–25CS 5"
+20CL 3 1/2"
+20CS 3"

BOI=185"
–25CL 4"
–25CS 5"
+20CL 3 1/2"
+20CS 3"

–25CL 5"
–25CS 10"
+20CL 4"
+20CS 4"

MEN'S LOCKER [308]
MEN'S [307]
WOMEN'S TLT./LOCKER [306]
JAN. [304]
CORR. [305]
VENDING AREA [303]
BREAK ROOM [302]
VEST. [301]
WORK STATION [403]
OPEN OFFICE [402]
SUPER. OFFICE [401]
DRIVER'S LOUNGE [404]
GENERAL OFFICE [503]
LOBBY [501]
STAIR [502]
WOMEN'S [505]
MEN'S [506]
WOMEN'S [512]
MEN'S [513]
STAIR [514]
CORR. [511]
ELEC. EQUIP. [510]
CLG. LOUVER
OFFICE [505]
OFFICE [506]
OFFICE [507]
OFFICE [508]
COFFEE AREA [509]
CONFERENCE [516]

SEE SHEET R502 DETAILS #14 & #15

BOI=38" BOI=48"

FIRE RISER [TYP.]

SEE SHEET R502 DETAILS #14 & #15

GS 3"
GR 3"
+20CL 1 1/2"
+20CS 2"

±40°F REFRIGERATED DOCK [110]

SEE SHEET R502 DETAILS #14 & #15

BOI=30" BOI=40"

FIRE RISER [TYP.]

LOW ROOF

SEE SHEET R502 DETAILS #14 & #15

HIGH ROOF

GS 3"
GR 3"
+20CL 2"
+20CS 2 1/2"

CHANGE IN ROOF ELEVATION

SEE SHEET R502 DETAILS #14 & #15

BOI=25" BOI=46"

HIGH ROOF LOW ROOF

SEE SHEET R502 DETAILS #14 & #15

BOI=18" BOI=72"

SEE SHEET R502 DETAILS #14 & #15

BOI=61" BOI=44" BOI=18"

FUTURE GS 3"
GR 3"
+20CL 2 1/2"
+20CS 3"

GS 3"
GR 3"
–25CL 5"
–25CS 10"
+20CL 4"
+20CS 5"

SEE SHEET R502 DETAILS #14 & #15

BOI=18"

GS 5"
GR 5"
–25CL 5"
–25CS 10"
+20CL 4"
+20CS 6"

COVD. ENTRY DOCK [204]
±45°F TO ±70°F USDA INSPECTION [205]
TLT. [207]
USDA OFFICE [206]
MAINTENANCE [202]
WAREHOUSE SUPPLIES [203]
BATTERY CHARGING [201]
FIRE PROTECTION ROOM [210]
ELECTRICAL ROOM [209]
MACH. ROOM [208]
+20CL 3 1/2"
+20CS 3"
BOI=18"

NOTES:

1. MAIN PIPE RUN LOCATIONS MUST BE AS DIMENSIONED. ROOF STRUCTURE IS NOT DESIGNED FOR THESE RUNS TO BE LOCATED ELSEWHERE.
2. ALL REDUCERS IN THE HORIZONTAL PLANE SHALL BE ECCENTRIC REDUCERS FLAT ON BOTTOM (ERFOB) UNLESS INDICATED OTHERWISE ON THE DRAWING.
3. FOR CONTROL GROUP PIPE SIZES AND VALVING SEE SHEETS R702.
4. STRAP CONTROL GROUP PIPING TO STANDS AT ROOF PENETRATION.
5. MAXIMUM PIPE STAND SPACING TO BE 8'–0" ON STRAIGHT RUNS AND 2'–0" FROM EACH CHANGE IN DIRECTION.
6. PIPE INSULATION REMAINS THE SAME THICKNESS INSIDE OF THE BUILDING AS IT IS AT THE POINT OF PENETRATION.
7. FOR ROOF PENETRATION DETAIL SEE SHEET R501, DETAIL #1.
8. FOR WALL PENETRATION DETAIL SEE SHEET R501, DETAIL #2.
9. FOR INSULATION DETAILS SEE SHEET R501.
10. TWO PIPE STANDS ARE REQUIRED FOR EACH CONTROL GROUP VALVE STATION.

OVERALL ROOF PLAN

SCALE: 1" = 20'–0"
0 10' 20' 40' 60'

stellar
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2900 HARTLEY ROAD, JACKSONVILLE, FL. 32257 (904) 260-2900
FLORIDA ARCHITECTURAL LICENSE NO. AA-C000172
FLORIDA ENGINEERING LICENSE NO. 3830

07/06/07

UNITED STATES COLD STORAGE, INC
NEW FACILITY
LAKE CITY, FLORIDA

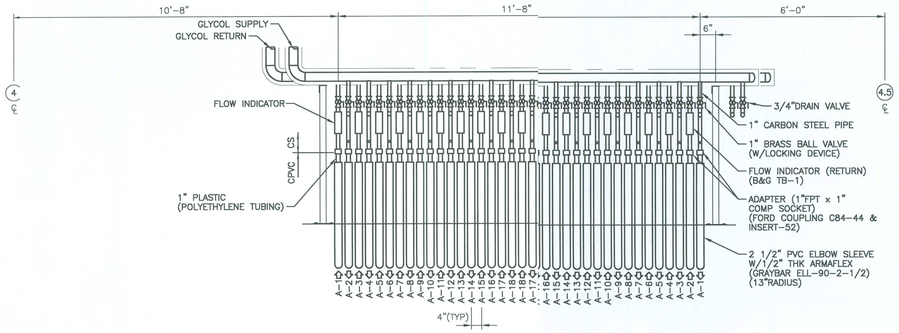
OVERALL ROOF PLAN

REV.	DATE	BY	DESCRIPTION
A	06-28-07	GLW	PERMIT ISSUE

JOB NO. 03019
DRAWN: GLW
CHECKED: RAS
SCALE: 1"=20'

R102
DRAWING NO.

NOT FOR CONSTRUCTION
DATE: 06–28–2007



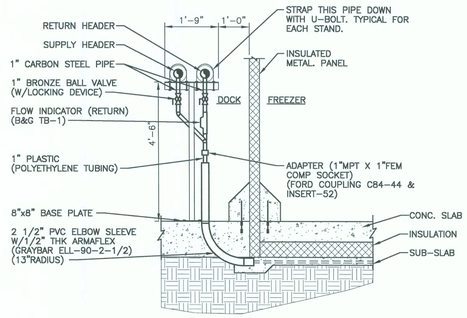
GLYCOL VALVE STATION DETAIL "A"

SCALE: 1/2" = 1'-0"

0 1' 2' 4'

NOTES:

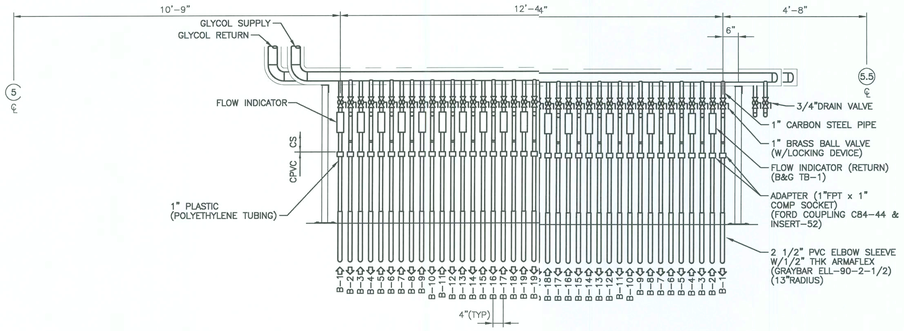
1. 30'-0" LENGTH HAS BEEN ADDED TO ACCOMODATE FOR FIELD CONDITIONS.
2. GLYCOL PIPING SHALL SHALL BE TESTED AND CHARGED PRIOR TO POURING MUD SLAB.



TYPICAL VALVE STATION SECTION

SCALE: 1/2" = 1'-0"

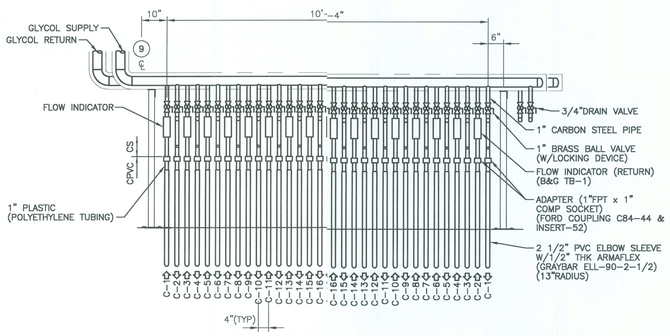
0 1' 2' 4'



GLYCOL VALVE STATION DETAIL "B"

SCALE: 1/2" = 1'-0"

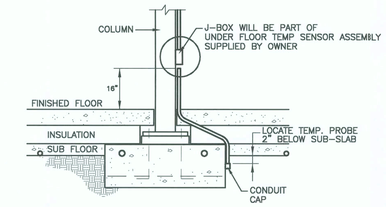
0 1' 2' 4'



GLYCOL VALVE STATION DETAIL "C"

SCALE: 1/2" = 1'-0"

0 1' 2' 4'

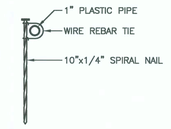


NOTES:

1. ENSURE AT LEAST 10' CLEARANCE FROM EXTERNAL HEAT SOURCES (i.e. DOORS, TRANSFORMERS)
2. COLUMN MOUNTED TEMPERATURE TRANSMITTERS MUST BE INSTALLED ON SIDE NOT FACING ISLE OR RACK SYSTEM.
3. SOLDER ALL CONNECTIONS BETWEEN EXTENSION BELDEN CABLE AND TEMP. SENSOR WIRES.
4. INSTALL ALL UNDERFLOOR TEMP. SENSORS IN 3/4" R.G.C.
5. SENSOR CABLES MAY BE COMBINED IN GROUPS AND RUN TO RCP.
6. SEE EC DRAWINGS FOR SENSOR LOCATIONS.

UNDERFLOOR TEMPERATURE TRANSMITTER WIRING AND INSTALLATION

NOT TO SCALE



PIPE ANCHOR DETAIL

NOT TO SCALE

NOT FOR CONSTRUCTION
DATE: 06-28-2007

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OPERATING AS THE STELLAR GROUP
2900 MARTLEY ROAD, JACKSONVILLE, FL 32257 (904) 230-2900
FLORIDA ARCHITECTURAL LICENSE NO. AA-0000112
FLORIDA ENGINEERING LICENSE NO. 28283

07/02/07

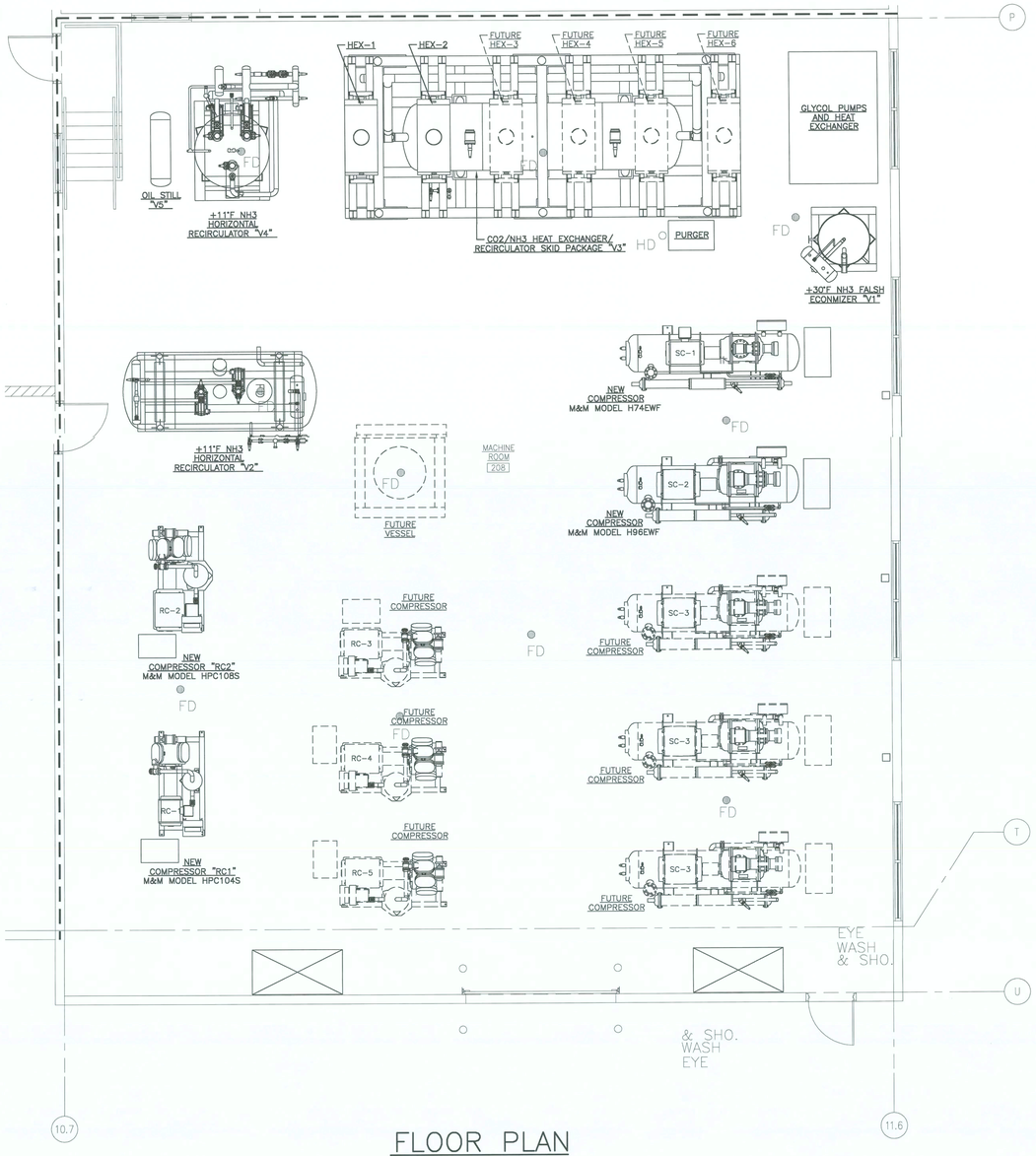
UNITED STATES COLD STORAGE, INC
NEW FACILITY
LAKE CITY, FLORIDA

UNDERFLOOR WARMING DETAILS

REV.	DATE	BY	PERMIT ISSUE DESCRIPTION
A	06-28-07	GLW	

JOB NO. 03019
DRAWN: GLWGLW
CHECKED: RAS
SCALE: 1/2"=1'-0"

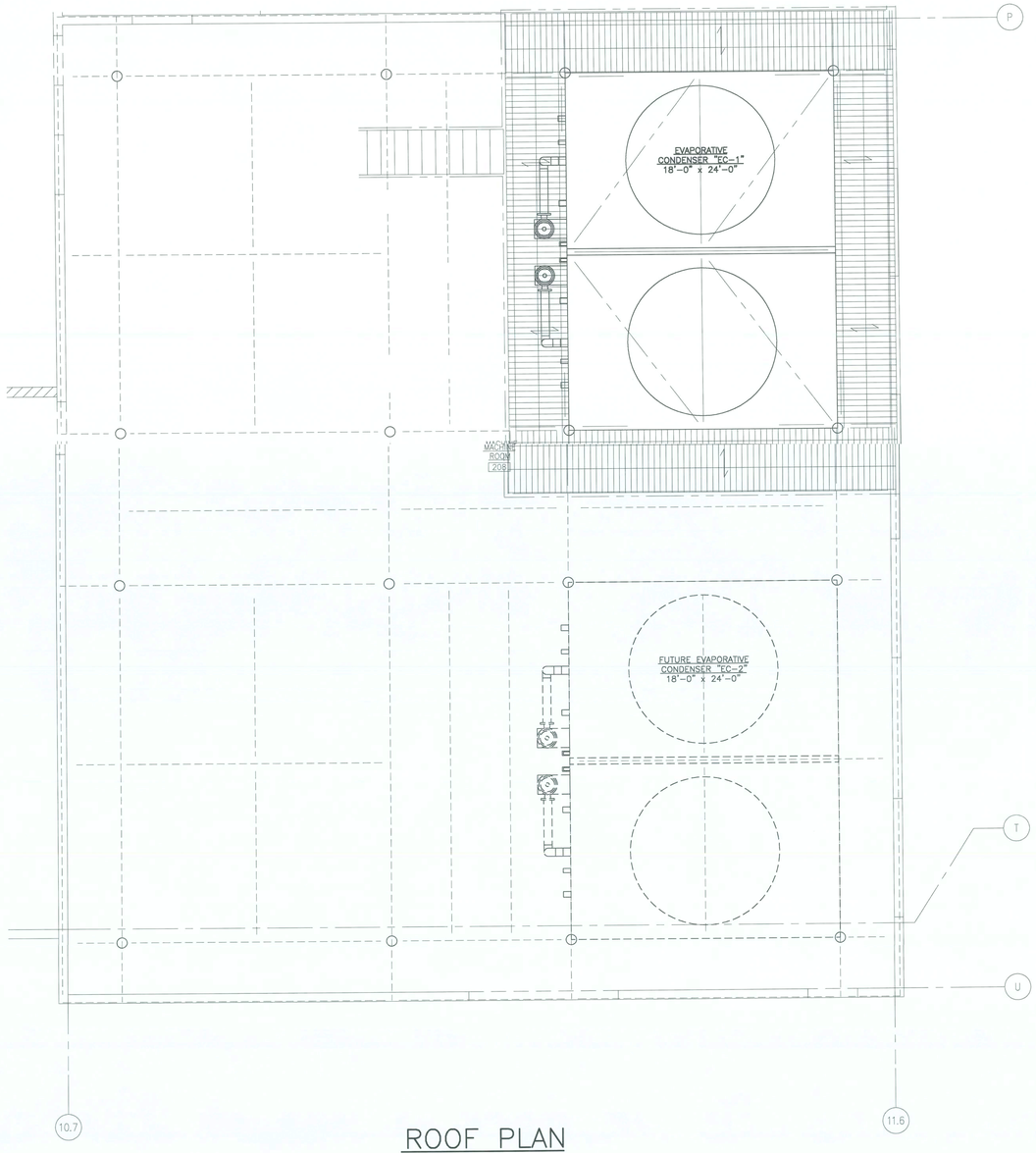
R301
DRAWING NO.



FLOOR PLAN

SCALE: 1/4" = 1'-0"

0 1' 2' 4' 8'



ROOF PLAN

SCALE: 1/4" = 1'-0"

0 1' 2' 4' 8'

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OPERATING AS THE STELLAR GROUP
2900 HARTLEY ROAD, JACKSONVILLE, FL. 32257 (904) 290-2900
FLORIDA ARCHITECTURAL LICENSE NO. AA-C000112
FLORIDA ENGINEERING LICENSE NO. 28520

07/02/07

UNITED STATES COLD STORAGE, INC
NEW FACILITY
LAKE CITY, FLORIDA

MACHINE ROOM & ROOF EQUIPMENT LOCATION PLAN

REV.	DATE	BY	PERMIT ISSUE DESCRIPTION
A	06-29-07	GLW	

JOB NO. 03019
DRAWN: GLW
CHECKED: RAS
SCALE: 1/4"=1'-0"

NOT FOR CONSTRUCTION
DATE: 06-28-2007

R401
DRAWING NO.

Filename: T:\Jobs\03000-03099\03019 USCS_FL\Design\Active\Refrig\03019R702.dwg Last Saved By: GWHITE Date: 6/29/2007 3:36:04 PM Plotted: 7/2/2007 9:32:37 AM

Rigid Polyisocyanurate Insulation Thickness for Refrigeration Pipe

PIPE SIZE	HOT GAS & CONDENSATE LINES (HPL TO AHU'S)	INTERMEDIATE (+1°F TO +50°F)	LOW (+0°F TO −50°F)	VERY LOW (−51°F TO −80°F)
1/2"	1.5	2.0	3.0	3.0
3/4"	1.5	2.0	3.0	4.0
1"	1.5	2.0	3.0	4.0
1 1/4"	1.5	2.0	3.0	4.0
1 1/2"	1.5	2.0	3.0	4.0
2"	1.5	2.0	3.0	5.0
2 1/2"	1.5	2.0	3.0	5.0
3"	1.5	2.0	3.0	5.0
4"	1.5	2.0	3.0	5.0
5"	–	2.0	3.0	5.0
6"	–	3.0	4.0	6.0
8"	–	3.0	4.0	6.0
10"	–	3.0	4.0	6.0
12"	–	3.0	4.0	6.0
14"	–	3.0	4.0	6.0
16"	–	3.0	4.0	6.0
18"	–	3.0	4.0	7.0
20"	–	3.0	4.0	7.0
24"	–	3.0	4.0	7.0
VESSEL BOTTOM	–	4.0	6.0	8.0

NOTE: ON ALL HORIZONTAL PIPE RUNS, WHERE THERE IS NO CHANGE IN ELEVATION, THE INSULATION THICKNESS SHOULD REMAIN THE SAME SIZE FROM BEGINNING TO END.

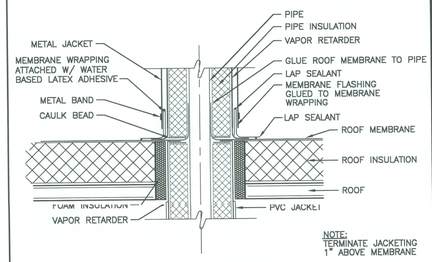
Extruded Polystyrene Insulation Thickness for Refrigeration Pipe

PIPE SIZE	TEMPERATURE (−75°F TO −51°F)	TEMPERATURE (−50°F TO −26°F)	TEMPERATURE (−25°F TO −1°F)	TEMPERATURE (+0°F TO +25°F)	TEMPERATURE (+26°F TO +50°F)	HOT GAS LINE	CONDENSATE DRAIN LINE
1/2"	3.0	2.5	2.0	1.5	1.5	1.5	1.5
3/4"	3.0	2.5	2.0	1.5	1.5	1.5	1.5
1"	3.0	2.5	2.0	1.5	1.5	1.5	1.5
1 1/4"	3.0	3.0	2.5	1.5	1.5	1.5	1.5
1 1/2"	3.0	3.0	2.5	1.5	1.5	1.5	1.5
2"	4.0	4.0	3.0	2.0	1.5	1.5	1.5
2 1/2"	4.0	4.0	3.0	2.0	1.5	1.5	1.5
3"	4.0	4.0	3.0	2.0	1.5	1.5	1.5
4"	4.0	4.0	3.0	2.0	1.5	1.5	1.5
5"	5.0	5.0	4.0	2.0	1.5	1.5	1.5
6"	5.0	5.0	4.0	2.0	2.0	1.5	1.5
8"	5.0	5.0	4.0	3.0	2.0	1.5	1.5
10"	5.0	5.0	4.0	3.0	2.0	1.5	1.5
12"	6.0	5.0	4.0	4.0	3.0	1.5	1.5
VESSEL BOTTOM	6.0	5.0	4.0	4.0	3.0	–	–

NOTE: ON ALL HORIZONTAL PIPE RUNS, WHERE THERE IS NO CHANGE IN ELEVATION, THE INSULATION THICKNESS SHOULD REMAIN THE SAME SIZE FROM BEGINNING TO END.

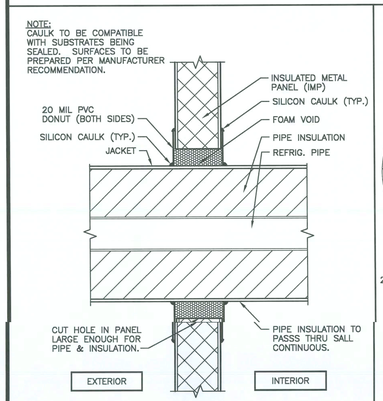
SHIELDS FOR INSULATING PIPE & TUBING

INSULATION DIAMETER, INCHES	GAUGE METAL	ARC LENGTH INCHES	SADDLE LENGTH INCHES	RADIUS INCHES
2.5	20	2.5	12	1.25
3	20	3	12	1.25
3.5	18	3.5	12	1.75
4	18	4	12	2
4.5	18	5	12	2.25
5	16	5.5	12	2.5
6	16	6.5	12	3
8	16	8.5	18	4
10	14	10.5	18	5
12	14	12.5	18	6
14	14	14.5	18	7
15	14	17	18	8
16	12	19	18	9
20	12	21	18	10



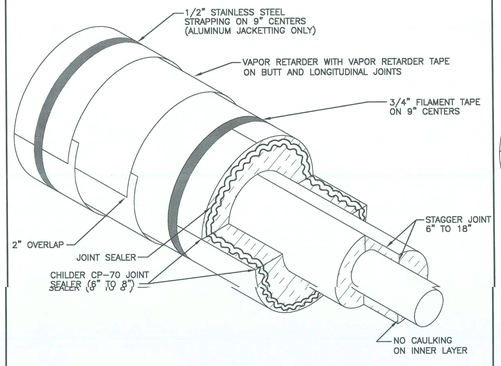
ROOF/PIPE INSULATION PENETRATION DETAIL

DETAIL (1)



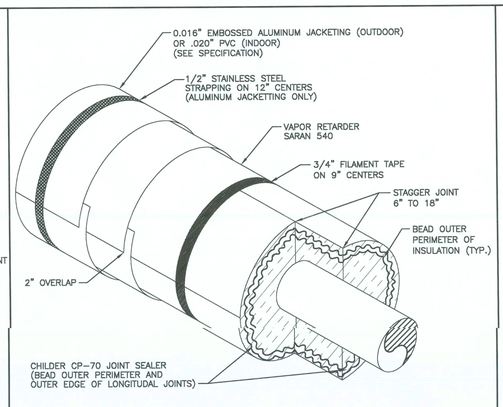
WALL PENETRATION

DETAIL (2)



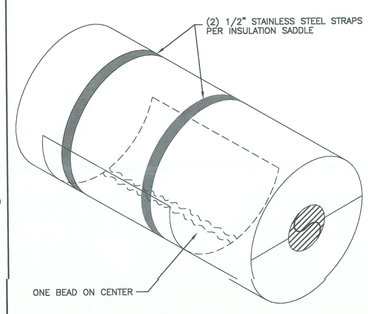
TYPICAL DOUBLE LAYER JOINT
(3" OR GREATER INSULATION THICKNESS)

DETAIL (3)



TYPICAL SINGLE LAYER JOINT SECTION
(LESS THAN 3" INSULATION THICKNESS)

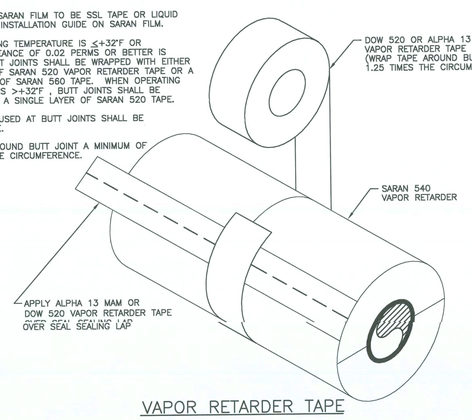
DETAIL (4)



INSULATION SADDLE DETAIL

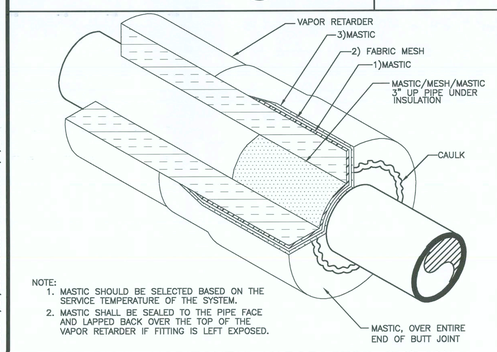
DETAIL (5)

NOTES:
1. LAP SEAL ON SARAN FILM TO BE SSL TAPE OR LIQUID ADHESIVE PER INSTALLATION GUIDE ON SARAN FILM.
2. WHEN OPERATING TEMPERATURE IS ≤+32°F OR WHEN A PERMEANCE OF 0.02 PERMS OR BETTER IS REQUIRED, BUTT JOINTS SHALL BE WRAPPED WITH EITHER TWO LAYERS OF SARAN 520 VAPOR RETARDER TAPE OR A SINGLE LAYER OF SARAN 560 TAPE. WHEN OPERATING TEMPERATURE IS >+32°F , BUTT JOINTS SHALL BE WRAPPED WITH A SINGLE LAYER OF SARAN 520 TAPE.
3. SARRAN TAPE USED AT BUTT JOINTS SHALL BE 3 INCHES WIDE.
4. WRAP TAPE AROUND BUTT JOINT A MINIMUM OF 1.25 TIMES THE CIRCUMFERENCE.



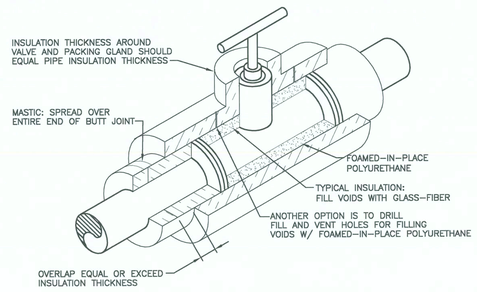
VAPOR RETARDER TAPE

DETAIL (6)



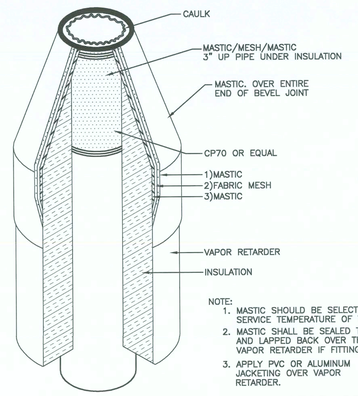
TYPICAL HORIZONTAL VAPOR STOP SECTION

DETAIL (7)



VALVE INSULATION DETAIL
(INCLUDING FILLING OF VOIDS)

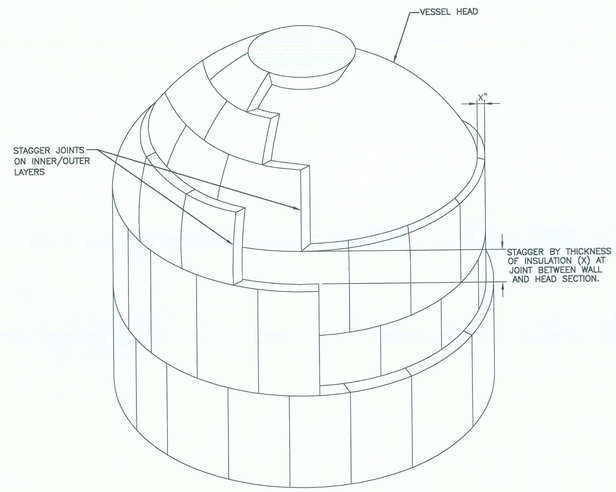
DETAIL (8)



TYPICAL VERTICAL VAPOR STOP SECTION

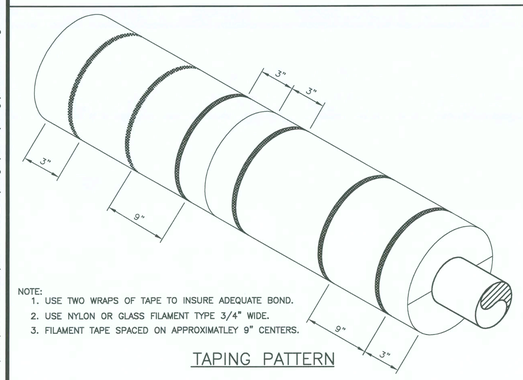
DETAIL (9)

NOTE:
1. IN MULTIPLE LAYER SYSTEMS, EACH LAYER SHALL BE INSTALLED SO THAT THE HORIZONTAL AND VERTICAL JOINTS IN THAT LAYER ARE STAGGERED FROM THE CORRESPONDING JOINTS IN THE PRECEDING LAYER BY HALF THE HEIGHT OR WIDTH OF A FULL SECTION.
2. AT JOINT BETWEEN WALL AND HEAD SECTION, THE OUTER LAYER SHALL BE STAGGERED BELOW THE INNER LAYER BY THE THICKNESS OF A SINGLE LAYER.
3. WHERE MASTIC OR SEALANTS ARE REQUIRED TO BOND THE INSULATION SECTIONS TO THE TANK HEAD CONSULT THE MANUFACTURER'S RECOMMENDATIONS ON SERVICE AND APPLICATION TEMPERATURE.



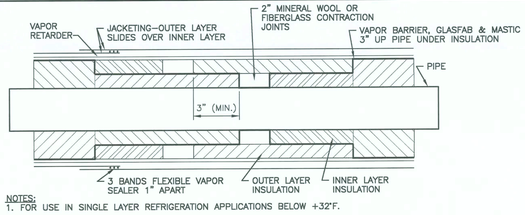
VESSEL HEAD INSULATION

DETAIL (13)



TAPING PATTERN

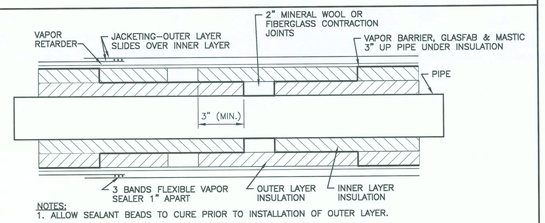
DETAIL (10)



NOTES:
1. FOR USE IN SINGLE LAYER REFRIGERATION APPLICATIONS BELOW +32°F.
2. ALLOW SEALANT BEADS TO CURE PRIOR TO INSTALLATION OF OUTER LAYER.
3. POSITION OUTER LATER PACKED GLASS FIBER BETWEEN SEALANT DAMS ON INNER LAYER AS SHOWN ABOVE.
4. AFTER GLASS FIBER IN CONTRACTION JOINT IS INSTALLED, INSULATION SECTIONS ON EITHER SIDE OF CONTRACTION JOINT SHALL BE FORCED TOGETHER AS TIGHTLY AS POSSIBLE.

TYPICAL SINGLE LAYER CONTRACTION JOINT SECTION

DETAIL (11)



NOTES:
1. ALLOW SEALANT BEADS TO CURE PRIOR TO INSTALLATION OF OUTER LAYER.
2. POSITION OUTER LATER PACKED GLASS FIBER BETWEEN SEALANT DAMS ON INNER LAYER AS SHOWN ABOVE.
3. AFTER GLASS FIBER IN CONTRACTION JOINT IS INSTALLED, INSULATION SECTIONS ON EITHER SIDE OF CONTRACTION JOINT SHALL BE FORCED TOGETHER AS TIGHTLY AS POSSIBLE.

TYPICAL DOUBLE LAYER CONTRACTION JOINT SECTION

DETAIL (12)

stellar
CREATING AT THE STELLAR GROUP
290 HARTLEY ROAD JACKSONVILLE, FL 32257 (904) 260-2900
WWW.STELLAR.NET
FLORIDA ARCHITECTURE LICENSE NO. AA-C000112
FLORIDA ENGINEERING LICENSE NO. 9030

07/02/07

UNITED STATES COLD STORAGE, INC
NEW FACILITY
LAKE CITY, FLORIDA

INSULATION DETAILS

REV.	DATE	BY	DESCRIPTION
A	06-28-07	GLW	PERMIT ISSUE

JOB NO.	03019
DRAWN:	GLW
CHECKED:	RAS
SCALE:	NONE

NOT FOR CONSTRUCTION
DATE: 06-28-2007

R501
DRAWING NO.

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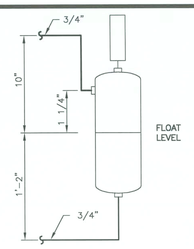
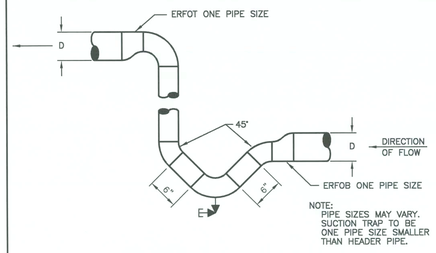


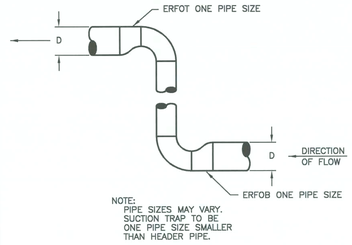
TYPICAL FLOAT PIPING

DETAIL (1)



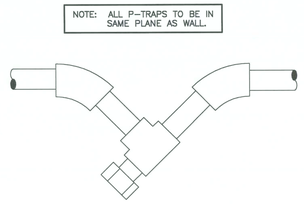
MAIN HEADER SUCTION RISER

DETAIL (2)



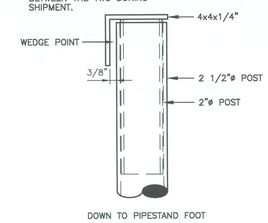
CONTROL GROUP SUCTION RISER

DETAIL (3)



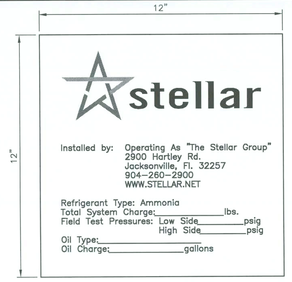
DRAIN LINE P-TRAP

DETAIL (4)



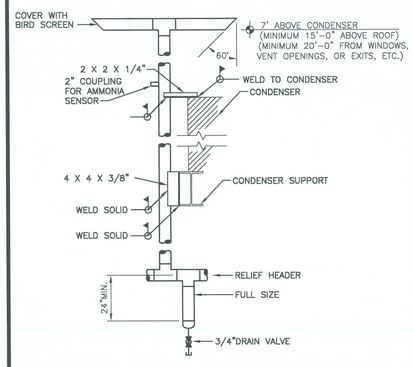
PIPE STAND PREFAB DETAIL

DETAIL (5)



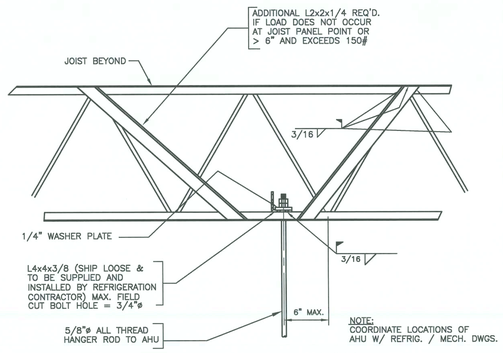
STELLAR SYSTEM NAMEPLATE

DETAIL (6)



TYPICAL RELIEF HEADER TO ATMOSPHERE

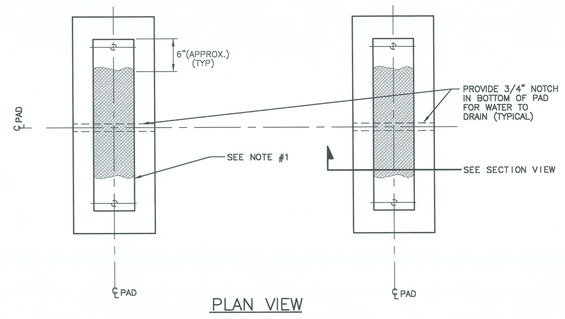
DETAIL (7)



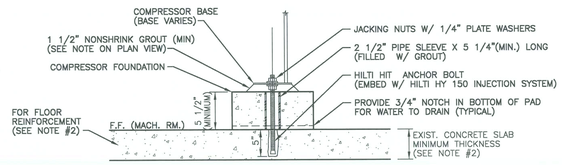
AIR HANDLING UNIT HANGERS

DETAIL (8)

IMPORTANT: PROPER GROUTING TECHNIQUES ARE REQUIRED TO ENSURE UNIFORMITY & 100% CONTACT TO THE BOTTOM OF THE COMPRESSOR BASE!



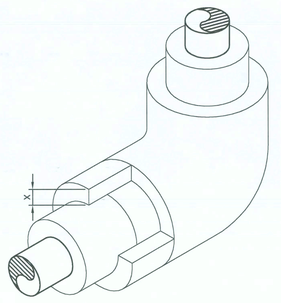
PLAN VIEW



SECTION VIEW
SCALE: NONE

NOTE:
1. WHEN GROUTING AROUND THE COMPRESSOR BASE, LEAVE ADEQUATE SPACE FOR JACKING NUT ADJUSTMENT. ONCE THE GROUT HAS SET, BACK OFF THE JACKING NUT AS FAR AS POSSIBLE TO ALLOW THE COMPRESSOR TO SET DIRECTLY ON THE GROUT. FINISH GROUTING UNDER THE REMAINDER OF THE BASE. ONCE ALL GROUTING HAS SET, SECURE THE COMPRESSOR BY TIGHTENING THE MOUNTING NUTS AND LOCKING THEM WITH A SECOND NUT.
2. SEE STRUCTURAL FLOOR DRAWINGS FOR FLOOR THICKNESS AND REINFORCEMENT.

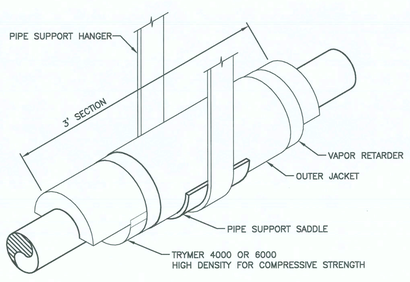
DETAIL (9)



NOTE:
1. SHIPLAP END CUT TO THICKNESS "X" TO ACCOMODATE DOUBLE LAYER PIPE INSULATION.
2. USE IN LIEU OF DOUBLE LAYERED FITTINGS.
3. WRAP ELBOW W/ SARAN 520 VAPOR RETARDER TAPE.

FULL THICKNESS SHIPLAP ELBOW FITTING

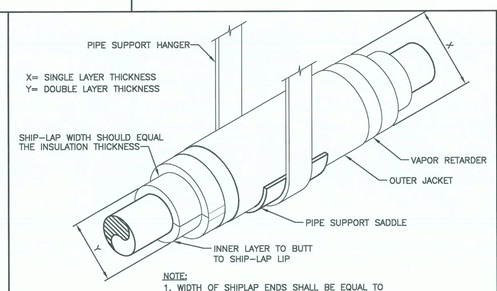
DETAIL (10)



NOTE:
VAPOR RETARDER AND JACKETING TO BE INSTALLED WITH NO JOINTS THROUGH PIPE SADDLE.

SINGLE LAYER INSULATION SYSTEM THROUGH PIPE HANGER SUPPORT

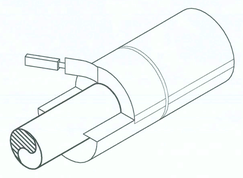
DETAIL (11)



NOTE:
1. WIDTH OF SHIPLAP ENDS SHALL BE EQUAL TO THICKNESS OF A SINGLE LAYER PIPE INSULATION.
2. BUTT INNER LAYER TO SHIPLAP END. OUTER LAYER SHALL BE STAGGERED BY WIDTH OD SHIPLAP END.
2. VAPOR RETARDER AND JACKETING TO BE INSTALLED WITH NO JOINTS THROUGH PIPE SADDLE.

FULL THICKNESS INSULATION SECTION IN DOUBLE LAYERED SYSTEM AT PIPE HANGER SUPPORT

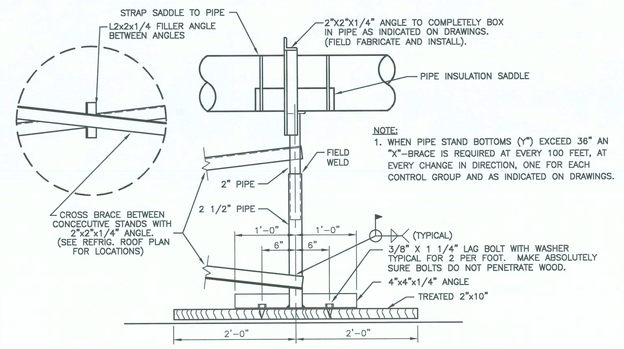
DETAIL (12)



NOTE:
USE THIN COAT OF SEALANT OVER THE WHOLE JOINT DEPTH. BUTTER EXCESS DOWN TH FACE OF JOINT AS SHOWN. USE SEALANT ON OUTER LAYER ONLY.

SEALANT APPLICATION TECHNIQUE

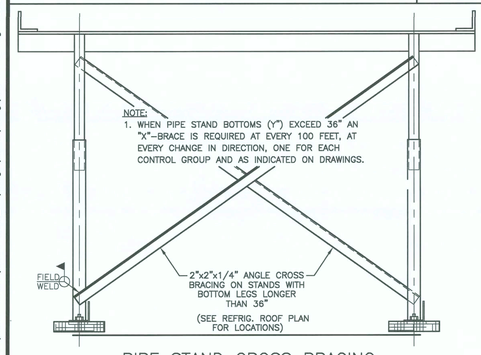
DETAIL (13)



NOTE:
1. WHEN PIPE STAND BOTTOMS (Y") EXCEED 36" AN "X"-BRACE IS REQUIRED AT EVERY 100 FEET, AT EVERY CHANGE IN DIRECTION, ONE FOR EACH CONTROL GROUP AND AS INDICATED ON DRAWINGS.

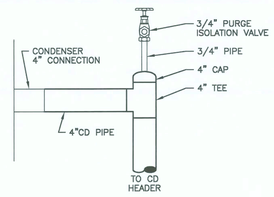
PIPE STAND CROSS BRACING SIDE VIEW

DETAIL (14)



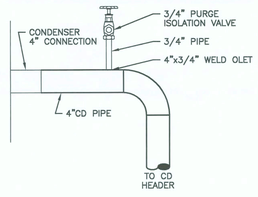
PIPE STAND CROSS BRACING

DETAIL (15)



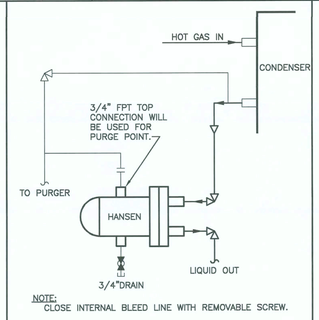
OPTIONAL CONDENSER DRAIN PURGE DETAIL

DETAIL (16)



TYPICAL CONDENSER DRAIN PURGE DETAIL

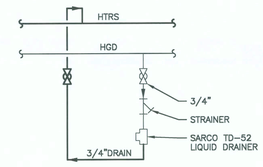
DETAIL (17)



NOTE:
CLOSE INTERNAL BLEED LINE WITH REMOVABLE SCREW.

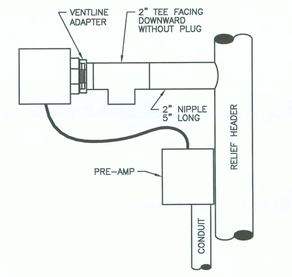
HANSEN LIQUID DRAINER CONDENSER INSTALLATION

DETAIL (18)



SARCO LIQUID DRAINER DETAIL

DETAIL (19)



RELIEF HEADER SENSOR DETAIL

DETAIL (20)

NOT FOR CONSTRUCTION
DATE: 06-28-2007

stellar
OPERATING AS THE STELLAR GROUP
2900 HARTLEY ROAD JACKSONVILLE, FL 32257 (904) 260-2900
WWW.STELLAR.NET
FLORIDA CERTIFICATE OF AUTHORIZATION NO. 4-7000112
FLORIDA ENGINEERING LICENSE NO. 53630

6/12/07

UNITED STATES COLD STORAGE, INC
NEW FACILITY
LAKE CITY, FLORIDA

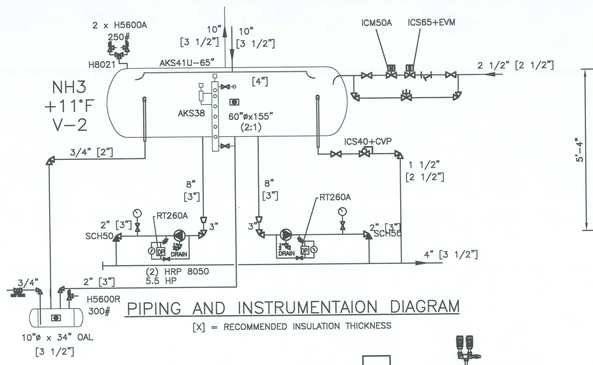
INSULATION AND REFRIGERATION DETAILS

REV.	DESCRIPTION	DATE	BY
A	PERMIT ISSUE		GLW

JOB NO.	03019
DRAWN:	GLW
CHECKED:	RAS
SCALE:	NONE

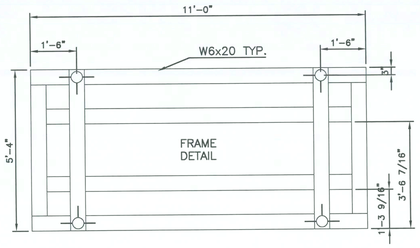
R502
DRAWING NO.

Filename: T:\Jobs\03000-03099\03019 USCS_FL\Design\Active\Refrig\03019R702.dwg Last Saved By: GWHITE Date: 6/29/2007 3:36:04 PM Plotted: 7/2/2007 9:51:59 AM

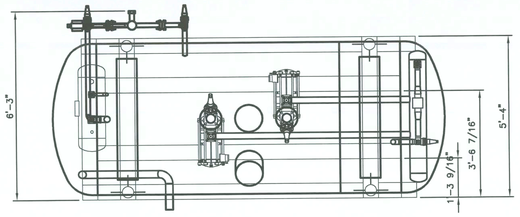


PIPING AND INSTRUMENTAION DIAGRAM

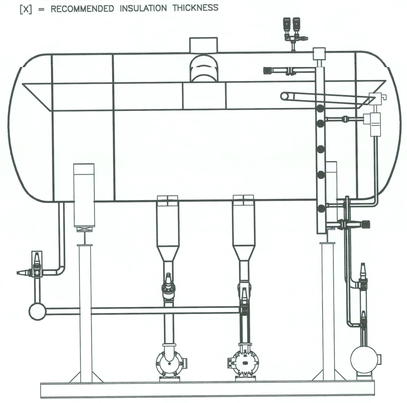
[X] = RECOMMENDED INSULATION THICKNESS



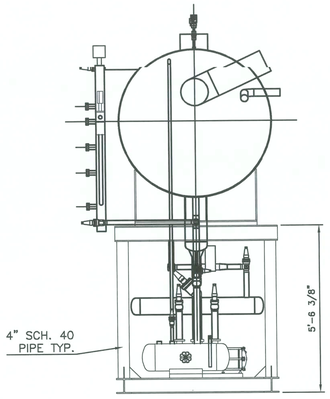
FRAME DETAIL PLAN VIEW



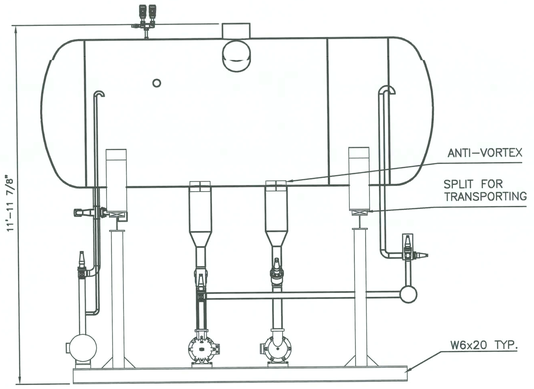
PLAN VIEW



REAR VIEW



SIDE VIEW



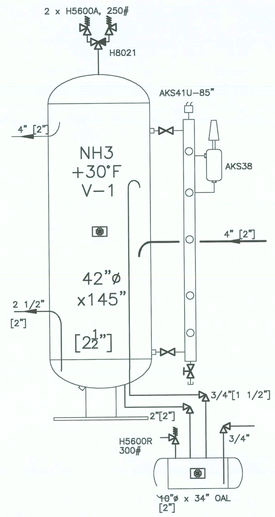
FRONT VIEW

+11°F NH3 HORIZONTAL RECIRCULATOR "V2"

60" ø x 155" OAL

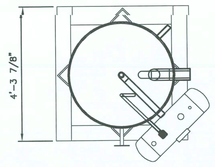
SCALE: 1/2" = 1'-0"

0 1' 2' 4'

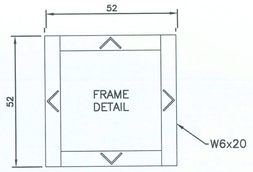


PIPING AND INSTRUMENTAION DIAGRAM

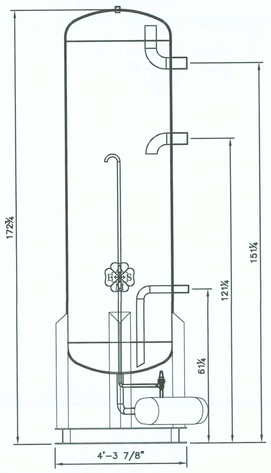
[X] = RECOMMENDED INSULATION THICKNESS



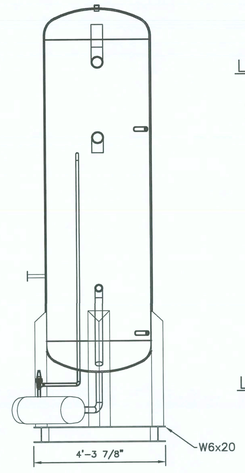
PLAN VIEW



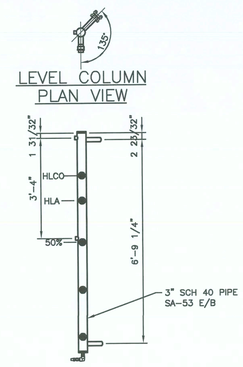
FRAME DETAIL PLAN VIEW



FRONT VIEW

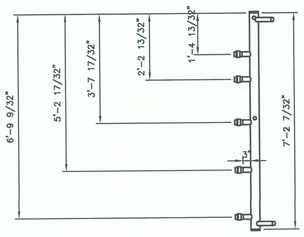


SIDE VIEW



LEVEL COLUMN
PLAN VIEW

LEVEL COLUMN
FRONT VIEW



LEVEL COLUMN
SIDE VIEW

+30°F NH3 FLASH ECONMIZER "V1"

42" ø x 145" OAL

SCALE: 1/2" = 1'-0"

0 1' 2' 4'

Filename: T:\jobs\03000-03099\03019 USCS_FL\Design\Active\Refrig\03019R702.dwg Last Saved By: GWHITE Date: 6/29/2007 3:36:04 PM Plotted: 7/2/2007 9:51:50 AM

stellar

OPERATING AS THE STELLAR GROUP
2900 HARTLEY ROAD, JACKSONVILLE, FL 32257 (904) 292-2900
FLORIDA ARCHITECTURAL LICENSE NO. AA-#0001112
FLORIDA ENGINEERING LICENSE NO. 30135

07/02/07

UNITED STATES COLD STORAGE, INC
NEW FACILITY
LAKE CITY, FLORIDA

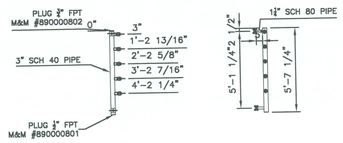
+11F HORIZ. RECIRCULATOR AND +30F FLASH ECONOMIZER DETAILS

REV.	DATE	BY	PERMIT ISSUE DESCRIPTION
A	6-28-07	GLW	

JOB NO. 03019
DRAWN: GLW
CHECKED: RAS
SCALE: 1/2"=1'-0"

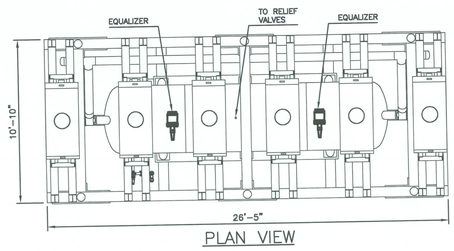
NOT FOR CONSTRUCTION
DATE: 06-28-2007

R503
DRAWING NO.

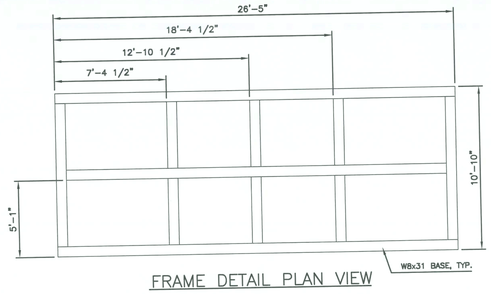


LEVEL COLUMN SIDE VIEW

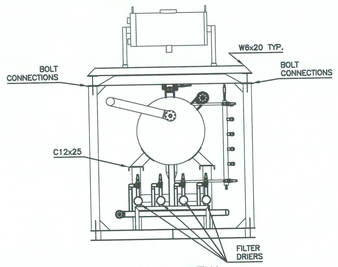
LEVEL COLUMN FRONT VIEW



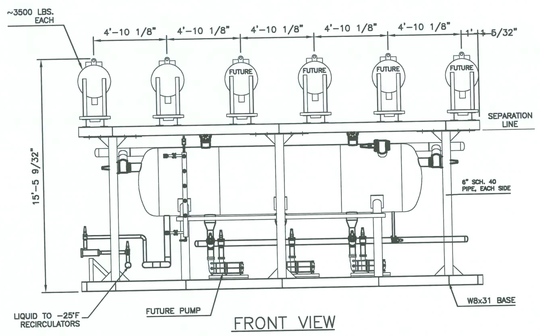
PLAN VIEW



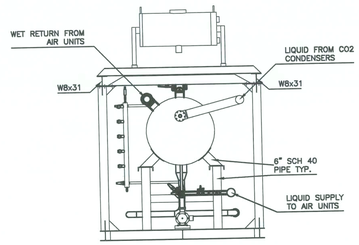
FRAME DETAIL PLAN VIEW



SIDE VIEW



FRONT VIEW



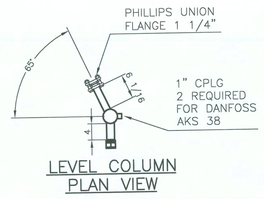
SIDE VIEW

CO2/NH3 HEAT EXCHANGER/RECIRCULATOR SKID PACKAGE

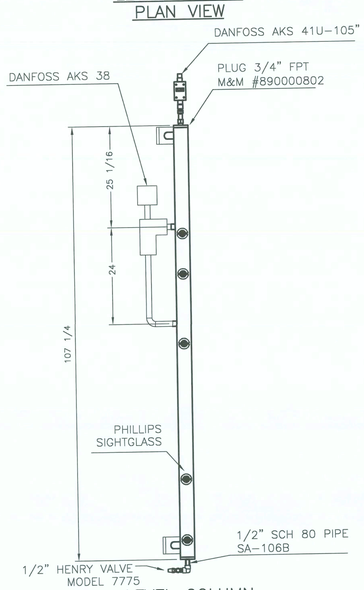
VESSEL SIZE 54" ø x 224" OAL

SCALE: 1/4" = 1'-0"

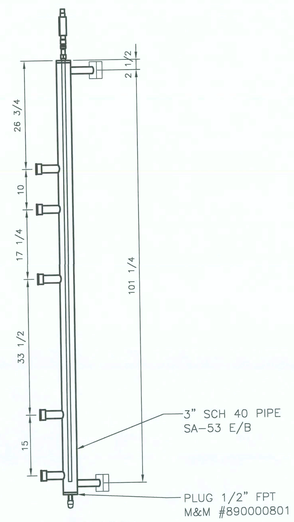
0 1' 2' 4' 8'



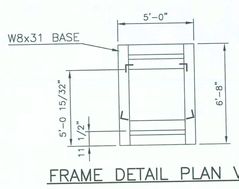
LEVEL COLUMN PLAN VIEW



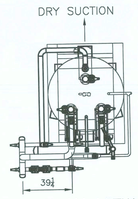
LEVEL COLUMN FRONT VIEW



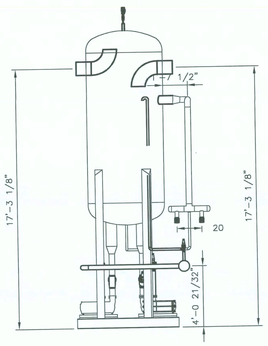
LEVEL COLUMN SIDE VIEW



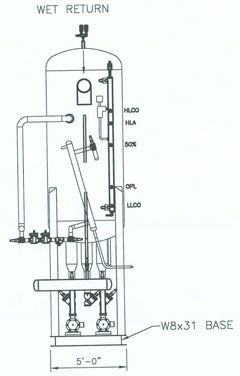
FRAME DETAIL PLAN VIEW



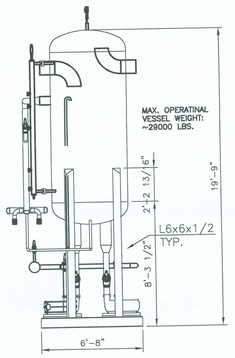
PLAN VIEW



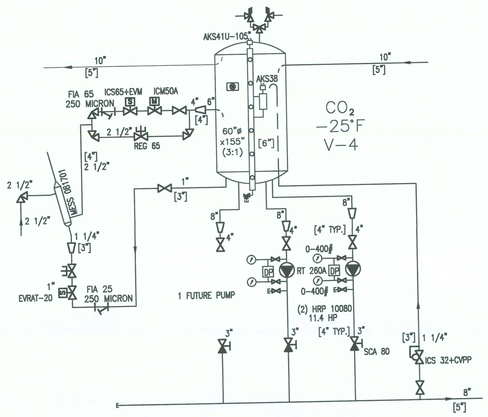
SIDE VIEW



FRONT VIEW



SIDE VIEW



PIPING AND INSTRUMENTAION DIAGRAM

[X] = RECOMMENDED INSULATION THICKNESS

-25°F CO2 PUMP PACKAGE "V4"

60" ø x 155" OAL

SCALE: 1/4" = 1'-0"

0 1' 2' 4' 8'

stellar

OPERATING AS THE STELLAR GROUP
2900 HARTLEY ROAD, JACKSONVILLE, FL 32257
WWW.STELLAR.NET
FLORIDA ARCHITECTURAL AA-C000112
FLORIDA ENGINEERING LICENSE NO. 9830
(904) 260-2900

UNITED STATES COLD STORAGE, INC
NEW FACILITY
LAKE CITY, FLORIDA

CO2/NH3 HEAT EXCHANGER/ RECIRCULATOR & -25F CO2 PUMP PACKAGE "V4" DETAILS

REV.	DATE	BY	DESCRIPTION
A	06-29-07	GLW	PERMIT ISSUE

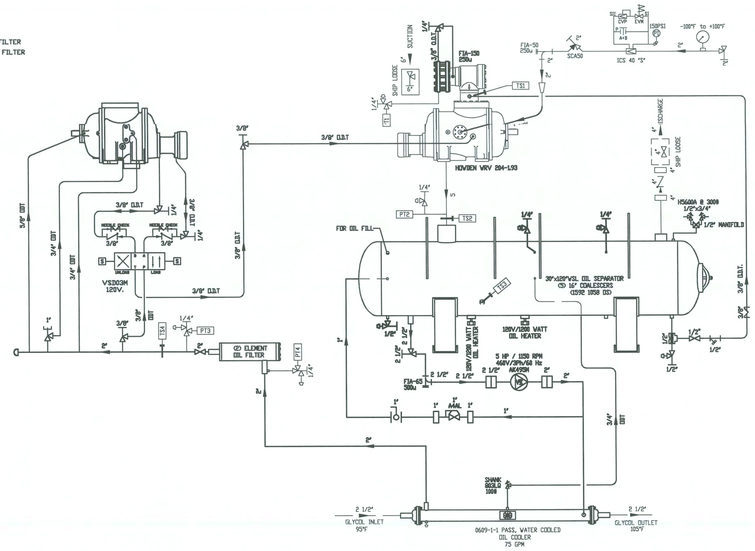
JOB NO. 03019
DRAWN: GLW
CHECKED: RAS
SCALE: 1/4"=1'-0"

NOT FOR CONSTRUCTION
DATE: 06-28-2007

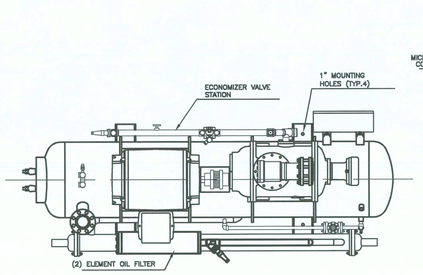
R504
DRAWING NO.

PT1	0-200 PSIA SUCTION PRESSURE
PT2	0-500 PSIG DISCHARGE PRESSURE
PT3	0-500 PSIG OIL PRESSURE AFTER OIL FILTER
PT4	0-500 PSIG OIL PRESSURE BEFORE OIL FILTER
TS1	-58°F ↑ 122°F SUCTION TEMPERATURE
TS2	32°F ↑ 302°F DISCHARGE TEMPERATURE
TS3	32°F ↑ 302°F OIL SUMP TEMPERATURE
TS4	32°F ↑ 302°F OIL TEMPERATURE

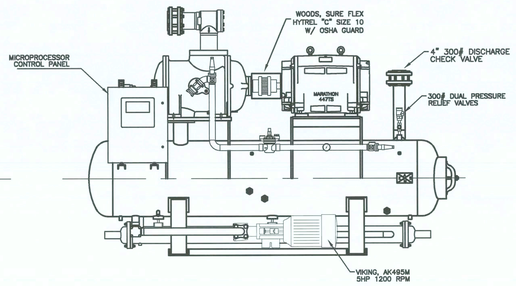
SYMBOL	DESCRIPTION
	DUAL PRESSURE RELIEF VALVE WITH DUAL MANIFOLD
	PRESSURE RELIEF VALVE
	NEEDLE VALVE
	NEEDLE CHECK VALVE
	REDUCER
	BALL VALVE
	ANGLE VALVE
	HAND EXPANSION VALVE
	GLOBE VALVE
	CHECK VALVE
	THREADED PLUG
	SOLENOID VALVE
	TRANSDUCER VALVE
	STRAINER
	SITE GLASS
	FLANGED CONNECTION
	PRESSURE REGULATOR
	COMPRESSOR CONNECTION
PT	PRESSURE TRANSDUCER
TS	TEMPERATURE TRANSDUCER
	FLOW ARROW WITH LINE SIZE
	OIL MIXING VALVE



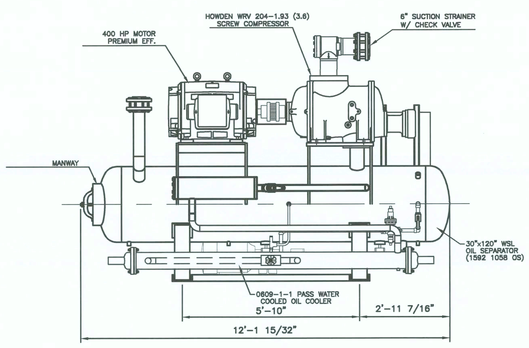
PIPING AND INSTRUMENTAION DIAGRAM



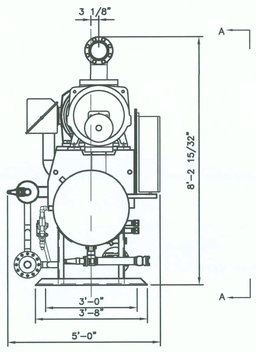
PLAN VIEW



VIEW A–A



FRONT VIEW



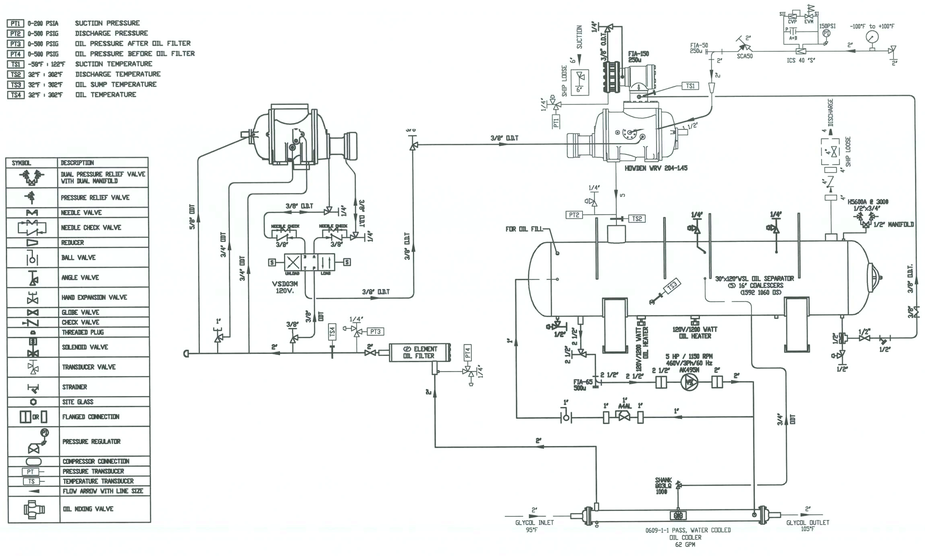
SIDE VIEW

M&M MODEL H96EWF SCREW COMPRESSOR

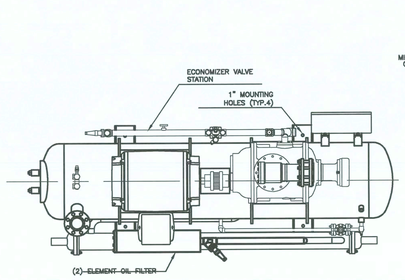
OIL SEPARATOR 30" ø x 120" OAL

SCALE: 1/2" = 1'-0"

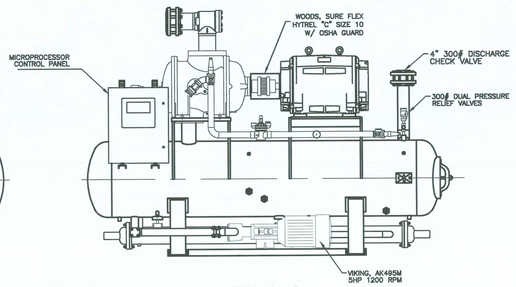
0 1' 2' 4'



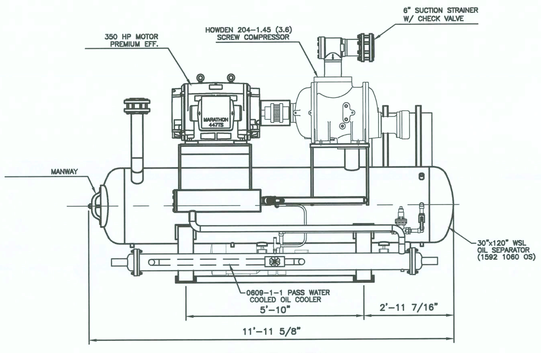
PIPING AND INSTRUMENTAION DIAGRAM



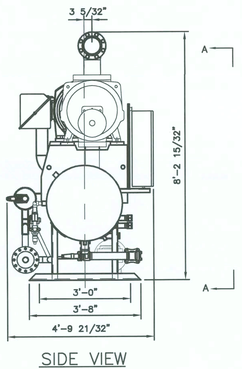
PLAN VIEW



VIEW A–A



FRONT VIEW



SIDE VIEW

M&M MODEL H74EWF SCREW COMPRESSOR

OIL SEPARATOR 30" ø x 120" OAL

SCALE: 1/2" = 1'-0"

0 1' 2' 4'

NOT FOR CONSTRUCTION
DATE: 06-28-2007

stellar
OPERATING AS THE STELLAR GROUP
2900 HARTLEY ROAD, JACKSONVILLE, FL. 32257 (904) 260-2900
FLORIDA CERTIFICATE OF AUTHORIZATION NO. AA-#0001112
FLORIDA ENGINEERING LICENSE No. 44424

07-2-17

UNITED STATES (COLD STORAGE, INC
NEW FACILITY
LAKE CITY, FLORIDA

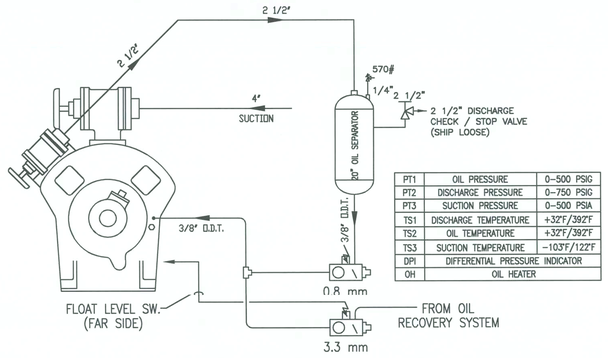
M&M MODEL H96EWF AND H74EWF SCREW COMPRESSOR DETAILS

REV.	DATE	BY	PERMIT ISSUE DESCRIPTION
A		GLW	

JOB NO. 03019
DRAWN: GLW
CHECKED: RAS
SCALE: 1/2"=1'-0"

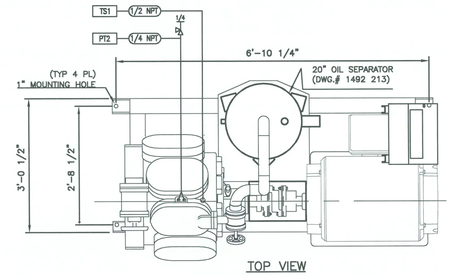
R505
DRAWING NO.

Filename: T:\Jobs\03000-03099\03019 USCS_FL\Design\Active\Refrig\03019R702.dwg Last Saved By: GWHITE Date: 6/29/2007 3:36:04 PM Plotted: 7/9/2007 9:51:21 AM

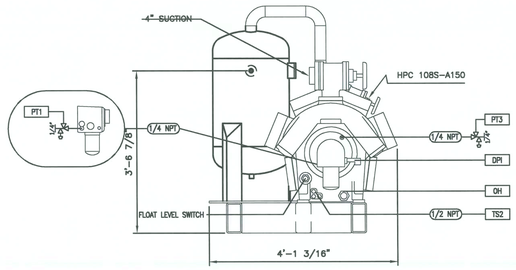


PT1	OIL PRESSURE	0-500 PSIG
PT2	DISCHARGE PRESSURE	0-750 PSIG
PT3	SUCTION PRESSURE	0-500 PSIA
TS1	DISCHARGE TEMPERATURE	+32°F/392°F
TS2	OIL TEMPERATURE	+32°F/392°F
TS3	SUCTION TEMPERATURE	-103°F/122°F
DPI	DIFFERENTIAL PRESSURE INDICATOR	
OH	OIL HEATER	

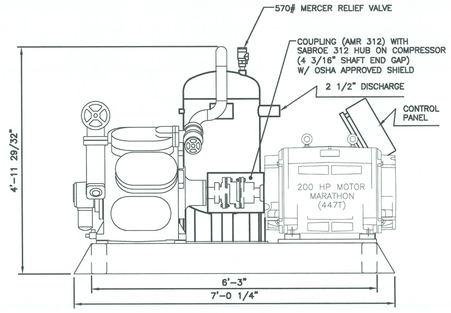
PIPING AND INSTRUMENTAION DIAGRAM



TOP VIEW



SIDE VIEW



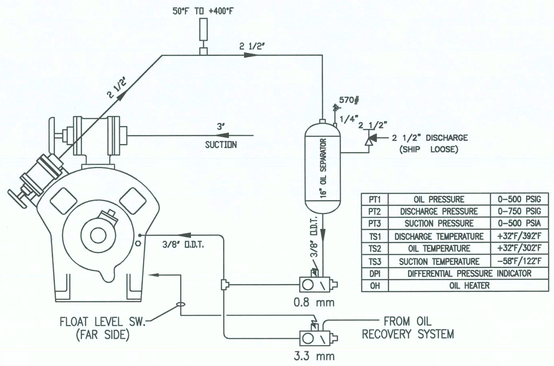
FRONT VIEW

M&M MODEL HPC108S RECIPROCATING COMPRESSOR

OIL SEPARATOR 20" DIA.

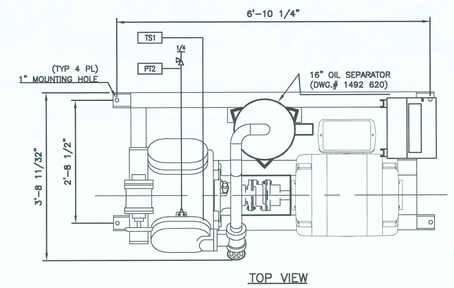
SCALE: 3/4 = 1'-0"

0 1' 2' 3'

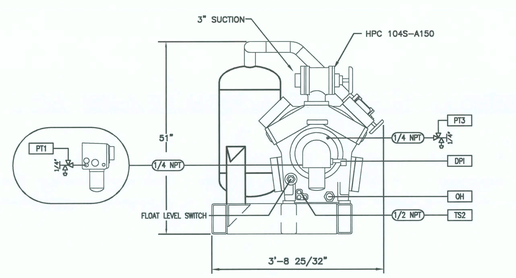


PT1	OIL PRESSURE	0-500 PSIG
PT2	DISCHARGE PRESSURE	0-750 PSIG
PT3	SUCTION PRESSURE	0-500 PSIA
TS1	DISCHARGE TEMPERATURE	+32°F/392°F
TS2	OIL TEMPERATURE	+32°F/302°F
TS3	SUCTION TEMPERATURE	-58°F/122°F
DPI	DIFFERENTIAL PRESSURE INDICATOR	
OH	OIL HEATER	

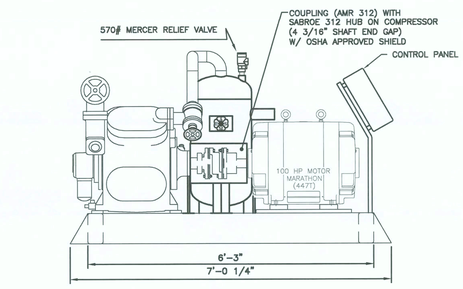
PIPING AND INSTRUMENTAION DIAGRAM



TOP VIEW



SIDE VIEW



FRONT VIEW

M&M MODEL HPC104S RECIPROCATING COMPRESSOR

OIL SEPARATOR 16" DIA.

SCALE: 3/4 = 1'-0"

0 1' 2' 3'

stellar
GROUP
OPERATING AS THE STELLAR GROUP
2900 HARTLEY ROAD, JACKSONVILLE, FL 32257 (904) 265-2900
WWW.STELLAR.NET
FLORIDA ARCHITECTURAL BUSINESS NO. AA-0001112
FLORIDA ENGINEERING LICENSE NO. 9630

07/02/07

UNITED STATES COLD STORAGE, INC
NEW FACILITY
LAKE CITY, FLORIDA

M&M MODEL HPC104S AND HPC108S RECIPROCATING COMPRESSOR DETAIL

REV.	DATE	BY	DESCRIPTION
A	06-28-07	GLW	PERMIT ISSUE

JOB NO. 03019
DRAWN: GLW
CHECKED: RAS
SCALE: 3/4"=1'-0"

NOT FOR CONSTRUCTION
DATE: 06-28-2007

R506
DRAWING NO.

EVAPORATOR SCHEDULE PHASE 1

QTY.	TAG No.	LOCATION	BASIC RATING (TD)	OPERATING DATA: CAPACITY (TR @ °TD)	TYP FEED	FINS/ INCH	COIL MAT'L	ROOM TEMP	COIL TEMP	OPERATING WEIGHT (lbs)	DEFROST ELECTRIC (KW)	NORMAL REFRIG CHARGE (Cu. Ft.)	EQUIPMENT DATA: FANS QTY	FANS TYPE	FANS DRIVE	FAN MOTORS QTY	FAN MOTORS HP	FAN MOTORS RPM	FAN MOTORS V/Ø	PAN	CASING	MANUFACTURER MODEL	REMARKS	MCP MAIN BREAKER SIZE
1	AU2051	USDA	16	5	REC.	4	STN. STEEL	+36	+20	586	7.0	0.72	1	PROP.	DIRECT	1	0.5	1160	460/3/60	STN. STEEL	STN. STEEL	SSTW1-00383-4		MCP #1 500 AMPS
6	AU1101 THRU AU1106	TRUCK DOCK	15	20	REC.	4	STN. STEEL	+35	+20	1850	29.9	2.8	3	PROP.	DIRECT	3	0.75	870	460/3/60	GALV. STEEL	GALV. STEEL	TFCSM3 3964-075N		MCP #2 400 AMPS
4	AU1011 THRU AU1014	FREEZER	10.5	63	REC.	3	STN. STEEL	-10	-20	6922	121.1	11.1	3	PROP.	DIRECT	3	10	1750	460/3/60	GALV. STEEL	GALV. STEEL	TFCS3 91103-10M	PENTHOUSE VFD RETURN HOODS	MCP #4 500 AMPS
4	AU1031 AU1032 AU1021 AU1022	CONVERT.	10	30	REC.	3	STN. STEEL	+36 -10	+20 -20	4796	86.46	7.8	2	PROP.	DIRECT	2	3.0	870	460/3/60	GALV. STEEL	GALV. STEEL	TFCS2 63103-30010	PENTHOUSE VFD RETURN HOODS	MCP #3 250 AMPS
1	AU2091	ELECT. ROOM	20	3	REC.	–	COPPER	+70	+50				1	PROP.	DIRECT	1	2.0	–	460/3/60	GALV. STEEL	GALV. STEEL	–	GLYCOL AIR CONDITION COIL	MCP #1 500 AMPS

EVAPORATIVE CONDENSER SCHEDULE PHASE 1 & 2

TAG No.	LOCATION	OPERATING DATA: REFRIG TYPE	RATED HEAT REJECTION (MBH)	ENTERING AIR WET BULB (°F)	SATURATED CONDENSING (°F AT PSIG)	EQUIPMENT DATA: FANS QTY	FANS TYPE	FANS DRIVE	FAN MOTORS QTY	FAN MOTORS HP	FAN MOTORS SERVICE FACTOR	FAN MOTORS V/Ø/HZ	WATER SUMP TYPE	INTEGRAL PUMP HP	INTEGRAL PUMP GPM	INTEGRAL PUMP V/Ø	MANUFACTURER MODEL	REMARKS	MPC MAIN BREAKER SIZE
EC-1	ENGINE ROOM ROOF	NH3	13,640	78°	95°	2	VFD	BELT	2	25	1.15	460/3/60	IN CONDENSER	(2) 7.5	2400	460/3/60	ATC 1364B	4 – 9KW HEATERS ONE SECTION HAS A SPLIT COIL FOR GLYCOL COOLING	MPC #1 500 AMPS
EC-2 (FUTURE)	ENGINE ROOM ROOF	NH3	13,640	78°	95°	2	VFD	BELT	2	25	1.15	460/3/60	IN CONDENSER	(2) 7.5	2400	460/3/60	ATC 1364B	4 – 9KW HEATERS ONE SECTION HAS A SPLIT COIL FOR GLYCOL COOLING	MPC #1 – AMPS

REFRIGERATION COMPRESSOR SCHEDULE

TAG No.	LOCATION	OPERATING DATA: REFRIG TYPE	STAGE	SATURATED SUCTION (°F AT PSIG)	SATURATED CONDENSING (°F AT PSIG)	RATED CAPACITY (TR)	RATED BHP	RPM	EQUIPMENT DATA: COMP TYPE	MOTOR DRIVE	MOTOR V/Ø/HZ	MOTOR PE HP	MOTOR RPM	MOTOR TYPE	MOTOR SERVICE FACTOR	MOTOR MFG FRAME	MANUFACTURER MODEL	REMARKS	MAIN BREAKER SIZE
RC-1	ENGINE ROOM	CO2	LOW	-25	+20 407.5	116	85	1170	PISTON	DIRECT	460/3/60	100	1200	ODP	1.15		HPC 104S	SOLID STATE STARTER	225 AMPS
RC-2	ENGINE ROOM	CO2	LOW	-25	+20 407.5	231	168	1170	PISTON	DIRECT	460/3/60	200	1200	ODP	1.15		HPC 108S	SOLID STATE STARTER	400 AMPS
SC-1	ENGINE ROOM	NH3	HIGH	+11 24.7	+95 181	255	303	3550	SCREW	DIRECT	460/3/60	350	3600	ODP	1.15		H74EWF	SOLID STATE STARTER	700 AMPS
SC-2	ENGINE ROOM	NH3	HIGH	+11 24.7	+95 181	317	365	3550	SCREW	DIRECT	460/3/60	400	3600	ODP	1.15		H96EWF	SOLID STATE STARTER	800 AMPS

AIR PURGER

MODEL	HANSEN AP16

MCP'S

LOCATION	MAIN BREAKER SIZE	DIMENSION
MCP #1	500 AMPS	78"H x 72"W x 24"D
MCP #2	400 AMPS	78"H x 38"W x 24"D
MCP #3	250 AMPS	78"H x 118"W x 24"D
MCP #4	500 AMPS	78"H x 118"W x 24"D

PUMP SCHEDULE

TAG No.	LOCATION	DESCRIPTION	MOTOR HP	MOTOR RPM	MOTOR V/Ø/HZ	MANUFACTURER MODEL	REMARKS	MPC MAIN BREAKER SIZE
P-1,2	ENGINE ROOM	11° NH3 LIQUID PUMPS	5.5	3500	460/3/60	WITT 8050	12 AMPS	MCP #1 500 AMPS
P-3,4 5 (FUTURE)	ENGINE ROOM	-25° CO2 LIQUID PUMPS	11.4	3500	460/3/60	WITT 10080	22 AMPS	MCP #1 500 AMPS
P-6,7 8 (FUTURE)	ENGINE ROOM	+20° CO2 LIQUID PUMPS	11.4	3500	460/3/60	WITT 10080	22 AMPS	MCP #1 500 AMPS
P-9,10	ENGINE ROOM	UNDER FLOOR OIL COOLER GLYCOL PUMPS	10	1750	460/3/60	B&G 3E	300 GPM @ 80 FT.	MCP #1 500 AMPS
P-11,12 (FUTURE)	ENGINE ROOM	-58° CO2 LIQUID PUMPS	–	–	460/3/60	WITT		

EXHAUST FANS

LOCATION	HP	V/Ø
ENG. ROOM	–	460/3/60
ENG. ROOM	–	460/3/60

VESSEL & HEAT EXCHANGER SCHEDULE

TAG No.	LOCATION	DESCRIPTION	DIMENSIONS	OPERATING DATA: DWP (PSI)	DWT (°F)	RELIEFS	REMARKS
HEX 1-2	ENGINE ROOM	CO2 CONDENSER	____"x____"	580			MODEL 5HH-465/1/1
V1	ENGINE ROOM	NH3/CPR +50°	VERT 42"x145"	250			
V2	ENGINE ROOM	NH3 PUMP PKG +11°	HORZ 84"x143"	250			
V3	ENGINE ROOM	CO2/HPR PUMP PKG. +20°	HORZ 54"x224"	580			
V4	ENGINE ROOM	CO2 PUMP PKG -25°	VERT 72"x161"	350			
V5	ENGINE ROOM	CO2 OIL RETURN POT	HORZ 16"x72"	580			
FUTURE V6	ENGINE ROOM	CO2 PUMP PKG -58°	VERT 42"x145"	350			
HEX 7	ENGINE ROOM	GLYCOL HEAT EXCHANGER	–	300#			ALFA LAVAL M10 WITH 46 CASSETTES

NOTE:
VESSELS V1, V2, V3, V4 ARE SIZED FOR 3 PHASES.

NOT FOR CONSTRUCTION
DATE: 06-28-2007

R601
DRAWING NO.

stellar
OPERATING AS THE STELLAR GROUP
2900 HARTLEY ROAD, JACKSONVILLE, FL. 32257 (904) 260-2800
JACKSONVILLE | MIAMI | ORLANDO
FLORIDA ARCHITECTURAL LICENSE NO. AA-0000112
FLORIDA ENGINEERING LICENSE NO. 16360

07/02/07

UNITED STATES COLD STORAGE, INC
NEW FACILITY
LAKE CITY, FLORIDA

EQUIPMENT SCHEDULES

REV.	DATE	BY	PERMIT ISSUE DESCRIPTION
A	07-02-07	GLW	

JOB NO. 03019
DRAWN: GLW
CHECKED: RAS
SCALE: NONE

Filename: T:\Jobs\03000-03099\03019 USCS_FL\Design\Active\Refrig\03019R702.dwg Last Saved By: GWHITE Date: 6/29/2007 3:36:04 PM Plotted: 7/2/2007 9:51:02 AM

MACHINE ROOM P & ID

NOT TO SCALE

NOT FOR CONSTRUCTION
DATE: 06-28-2007

= SUPPLIED BY M&M REFRIGERATION
[X] = RECOMMENDED INSULATION THICKNESS

UNITED STATES COLD STORAGE, INC
NEW FACILITY
LAKE CITY, FLORIDA

MACHINE ROOM P & ID

REV.	DATE	BY	DESCRIPTION
A	06-29-07	GLW	PERMIT ISSUE

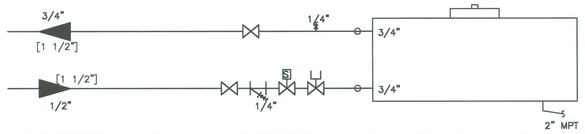
JOB NO. 03019
DRAWN: GLW
CHECKED: RAS
SCALE: NONE

R701
DRAWING NO.

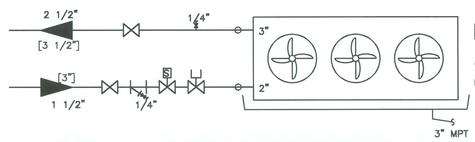
stellar
OPERATING AS THE STELLAR GROUP (FL) 260-2800
2900 HARTLEY ROAD, JACKSONVILLE, FL 32257 WWW.STELLARJAX.NET
FLORIDA CERTIFICATE OF AUTHORIZATION NO. EB-0000112
FLORIDA ENGINEERING LICENSE NO. 3630

7/6/07

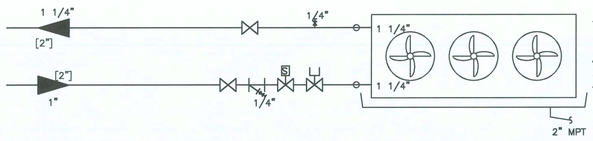
Filename: T:\Jobs\03000-03099\03019 USCS_FL\Design\Active\Refrig\03019R702.dwg Last Saved By: LWACRUCS Date: 6/29/2007 3:36:04 PM Plotted: 7/2/2007 9:50:51 AM



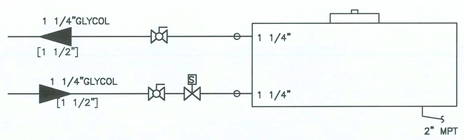
USDA
AU2051
5TR,@ 20°F



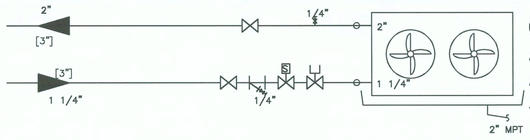
FREEZER
AU1011 – AU1014
63TR EACH, @ –25°F



TRUCK DOCK
AU1101 – AU1106
20TR EACH, @ 20°F



ELECTRICAL ROOM
AU2091
5TR,@ 40°F



CONVERTIBLE ROOM
AU1031, AU1032,
AU1021, AU1022
30TR EACH, @ –25°F

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stellar
OPERATING AS THE STELLAR GROUP
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WWW.STELLAR.NET
FLORIDA CERTIFICATE OF AUTHORIZATION #27173
FLORIDA ENGINEERING LICENSE NO. 9630

07/02/07

UNITED STATES COLD STORAGE, INC
NEW FACILITY
LAKE CITY, FLORIDA

AHU
P & ID

REV.	DATE	BY	PERMIT ISSUE DESCRIPTION
A	7/2/07	GLW	

JOB NO.	03019
DRAWN:	GLW
CHECKED:	RAS
SCALE:	NONE

NOT FOR CONSTRUCTION
DATE: 06–28–2007

R702
DRAWING NO.