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KYSOR // WARREN

The Leading Edge of Technology

INSTALLATION & OPERATION MANUAL

MODEL: **D61 D6L1 D6H1**

DAIRY - DELI

HIS REFRIGERATOR CONFORMS TO THE COMMERCIAL
EFRIGERATOR MANUFACTURERS ASSOCIATION HEALTH AND
ANITATION STANDARD.

KYSOR // WARREN

/ISION OF KYSOR INDUSTRIAL CORPORATION

)0 INDUSTRIAL BLVD., CONYERS, GEORGIA 30207 / 404•483•5600
)1 TRANSPORT BLVD., COLUMBUS, GEORGIA 31907

INSTALLATION AND OPERATING INSTRUCTIONS

FOR

D61, D6L1, D6H1 MODELS

SELF-SERVICE DAIRY CASES

APPLICATION:

The Kysor//Warren multi-shelf self-service dairy cases are designed to merchandise packaged dairy products. These cases should be installed and operated according to the instructions contained in the manual to insure proper performance. They are designed for display of products in an air-conditioned store where temperature and humidity are maintained at a maximum of 75 degree F dry bulb temperature, 55% relative humidity.

MODEL	DESCRIPTION
D6L1	Front Load Dairy - Front Height Usually (4) adjustable shelves - 19.5", 20", 22"
*D61	Front Load Dairy - Front Height Usually (4) adjustable shelves - 23.75", 20", 22"
*D6H1	Front Load Dairy - Front Height Usually (4) adjustable shelves - 28.25", 20", 22"

*These models may be used for deli (processed meats) with proper BTU capacity and Kysor//Warren special hook-a-pak systems are used or 18" and 20" shelves are used above a hook-a-pak system supplied by others.

GENERAL

These display refrigerators may be installed individually or in a continuous line-up consisting of several 8' and 12' sections by using a joint trim kit. A plexi-glass divider kit must be used between cases operating on different refrigeration systems.

SHIPPING DAMAGE

All equipment should be examined for shipping damage before and during unloading. If there is any damage, the carrier should be notified immediately and an inspection requested. The delivery receipt must be noted that the equipment was received damaged. If damage is of a concealed nature you must contact the carrier immediately or no later than three (3) days following delivery. A claim must be filed with the carrier by the consignee for all damages.

NOTE: ALL CLAIMS FOR SHORTAGES MUST BE MADE WITHIN 10 DAYS AFTER RECEIPT OF SHIPMENT.

LOCATION

This refrigerator must be located on a firmly based floor and leveled within plus or minus 1/16". Use shims provided to level your refrigerator.

JOINING

Two or more fixtures of like models can be joined together to form a continuous line-up. Instructions for joining fixtures are included in the joint kit. Before lining up refrigerator, inspect refrigeration lines, electrical connections and controls to insure refrigerators are in proper line-up and are in the proper sequence.

NOTE: THESE REFRIGERATORS ARE LINED UP AT THE FACTORY AND ARE NUMBERED. INSURE THEY ARE LINED UP IN THE FIELD IN THE SAME SEQUENCE NUMBER.

WASTE OUTLET

These cases are equipped with a 1-1/2" M-NPT waste outlet connection which terminates in the center of the refrigerator below the insulated bottom. The water seal is shipped loose for field installation.

INSTALLING DRIP PIPE

Improperly installed drip pipes can seriously effect the operation of this equipment and result in increased maintenance costs. Listed below are some general rules for drip pipe installation.

1. Never use a double water seal.

2. Never use a pipe smaller than the size pipe or water seal supplied with the equipment.

3. Always provide as much fall as possible in drip pipe. (1" fall for each 4' of drip pipe.)

4. Avoid long runs in drip pipe which make it impossible to provide maximum fall in pipe.

5. Provide a drip space between pipe and floor drain or sewer connection.

6. Do not allow drip pipe to come in contact with uninsulated suction lines, which will cause the condensation from your refrigerator to freeze.

CLEANING

To insure minimum maintenance cost, cabinet should be thoroughly emptied and washed out every three months. The exterior should be washed weekly. A mild soap and water solution is recommended for painted surfaces of the cabinet. Do not use cleaners containing abrasive materials which will scratch or dull finish. The waste outlet should be flushed with a bucket of water following each cleaning.

NOTE: Never introduce water into the fixture faster than the waste outlet can carry it away.

When cleaning lighted shelves, wipe down with a wet sponge or cloth so that water does not enter the light rails. DO NOT USE A HOSE OR SUBMERGE SHELVES IN WATER. BE SURE REFRIGERATION IS TURNED OFF AND ALL ELECTRICAL IS OFF BEFORE WASHING YOUR REFRIGERATOR.

LOADING

Merchandise should not be placed in the fixture until all controls have been adjusted and the refrigerator is at proper temperature.

At no time should the fixture be stocked beyond the load line or over the front edge of adjustable shelves. In doing so, you will seriously affect the performance which will result in higher product temperatures and increase operating costs.

ELECTRICAL

All field installed wiring must comply with the NATIONAL ELECTRICAL CODES and LOCAL CODES.

ELECTRICAL RACEWAY

An electrical raceway is provided with each refrigerator for running your fan, anti-sweat heaters, and defrost circuits from case to case without using conduit. This applies, of course, when the front bumper is properly secured into position. This is an approved method by the Underwriters' Laboratories; however, wiring must be run in accordance with local and national electrical codes.

ELECTRICAL CONNECTIONS

All field connections are made in the electrical raceway.

Make sure that proper voltage is supplied to your refrigerator. Check refrigerator nameplate for the required voltage for fans, anti-sweat heaters, lights and defrost heaters. ALL REFRIGERATORS MUST BE GROUNDED.

Fan motors must operate continuously and panel must be marked sufficiently to prevent the fan motors and anti-sweat heaters from being turned off accidentally. When refrigerators are multiplexed, add the total of these amperage values to determine wire size and circuit protection. Anti-condensate controllers can be used to control the anti-condensate heater.

On electric defrost models, the defrost heater amperages of all cases on defrost circuit should be added together, and if their rating exceeds the defrost time clock or condensing unit breaker capacity, a defrost relay and circuit breaker must be employed and furnished by others. Make sure that proper wire size and branch circuit protection are employed for safe operation.

Chart #1 shows the electrical ratings for your refrigerator. This is the same information that appears on your refrigeration nameplate.

CASE LIGHTING

Cases are standard with one row of rapid start lamps (F40T12CWX). Ballasts are located behind the canopy. If lighted shelves are supplied, ballasts for each shelf will be located behind the lower bumper assembly in the electrical raceway. See wiring diagram for layout.

REFRIGERATION FAN MOTORS

The fan motors employed are permanently oiled for the life of the motor and requires no periodic maintenance. They are wired according to the enclosed wiring diagram and must run continuously.

ANTI-SWEAT HEATERS

At present these cases do not have any anti sweat heaters.

EXPANSION VALVE

The expansion valve furnished with your refrigerator has been sized for maximum coil efficiency. To adjust superheat, place a thermocouple under the expansion valve bulb. Read the suction line pressure as near coil as possible. (If at the condensing unit, estimate suction line loss at 2PSIG.) Convert coil suction pressure to temperature. The difference between coil temperature and the thermocouple temperature is superheat. (Use average superheat when expansion valve is hunting.) Do not set superheat until cases have pulled down to operating temperature and never open or close valve over 1/4 turn between adjustments and allow 10 minutes or more between adjustments. Superheat should be set to 6-8-degree F.

REFRIGERATION LINES

The refrigeration lines are located under the deck pans on the 8' and 12' cases. A refrigeration outlet is provided in the front right hand end of the cases. Make sure all refrigeration lines lie as close to the refrigerator bottom so as not to obstruct the air pattern or block the deck pans. See the section on "Recommended Piping Practices" for additional details on piping practices.

These 8' and 12' refrigerators have polyurethane foamed-in-place insulation. In opening a ferrule hole, simply heat a piece of copper tubing of the same size as the tubing to be employed and force it through the ferrule hole.

NOTE: SEAL AROUND LINES AFTER CONNECTIONS ARE MADE. KEEP DIRECT FLAME FROM BOTTOM OF REFRIGERATOR, AS HEAT WILL DISINTEGRATE THE BOTTOM AND INSULATION. USE A HEAT SHIELD WHEN WELDING NEAR THE BOTTOM OF THE CASES.

REFRIGERANT

R-502 expansion valves are standard. If another refrigerant is used, the order must specify the expansion valve to be supplied.

HEAT EXCHANGER

Heat exchangers are standard in these refrigerators. They aid to increase operating efficiency and reduce frosting and flood-back to compressor.

OPERATION

On single condensing unit systems a thermostat should be used to control temperatures. The thermostat bulb should be mounted in the discharge air. On parallel units, temperature control can be provided by EPR valve, thermostat and liquid line solenoid or solid state low pressure controls on compressor unit. Chart #2 shows approximate settings for merchandisers. Since many variables are present in each installation, such as store temperature, length of tubing runs, temperature desired in refrigerator, etc., Chart #2 is only a guide for the installer.

DEHYDRATION OF REFRIGERATION SYSTEMS

Please read carefully before placing system into operation. After laying refrigerant lines, they should be blown out before making final connection at fixture or condensing unit. Use dry nitrogen to prevent any foreign matter being left in the lines. Keep pressure below 250 pounds. To prevent scaling due to brazing, dry nitrogen should be allowed to flow through lines while brazing operations are taking place.

After the refrigeration system has been pressure-tested and proven leak-free, it is recommended that the system be dehydrated with a vacuum pump to 1000 microns for the first two evacuations and 500 microns on the third. The triple evacuation method requires evacuating the system three successive times and breaking each vacuum with dry refrigerant. Allow the pressure to rise above atmospheric pressure.

CAUTION: DURING INSTALLATION AND SERVICE OF THIS EQUIPMENT, PRECAUTIONS SHOULD BE TAKEN TO PREVENT LOSS OF REFRIGERANT TO THE ATMOSPHERE.

CONTROL DESCRIPTION

OFF-TIME DEFROST

Off-time defrost is standard on these models. The fans run continuously and defrost termination is by pressure or time (fail safe). See Chart #2 for defrost settings.

ELECTRIC DEFROST MODELS

For optional electric defrost, electric heaters are utilized to melt the frost and ice on the coil. The heaters are located in the air stream in front of the coil. The defrost cycle is time initiated and should be temperature terminated. Case fans operate continuously in defrost and refrigeration. As a safety precaution, a safety cut-off Klixon is wired in series with the defrost heater to turn the heater off at temperatures above 70-degree F.

HOT GAS DEFROST MODELS

On hot gas defrost models, (optional for parallel compressors operation only) hot gas is routed through the suction line and evaporator coil. It exits the coil through a by-pass around the expansion valve and heat exchanger to return to the liquid line where the condensed liquid is used to feed the other cases on the same parallel unit. The case fans continue to operate during defrost to warm up the drain pan and air ducts. The defrost cycle is time initiated and should be temperature terminated.

THERMOSTAT LOCATION

For convenience, the thermostat (if utilized) is located at the left end of the case in the canopy light rail. Adjustment access is between the light tubes. If the case is equipped with a defrost terminator, it will be located in the same area. Should the thermostat have to be replaced, remove the canopy lights for access.

CHART #1

MODEL	EVAPORATOR FANS (AMPS)	ANTI-COND HEATER (AMPS)	LIGHTS (AMPS)	
D61, D6L1, D6H1 - 8'	1.12	---	.8	(2)
D61, D6L1, D6H1 - 12'	1.68	---	1.27	(2)

NOTES:

1. For each lighted shelf, add .64 amps per shelf (all ballasts are remote)

2. Values shown are for one canopy light - standard

3. Add to above if front nose light is utilized
   8' -- .8 amps
   12' --1.27 amps

CHART #2

RECOMMENDED CONTROL SETTINGS

MODEL	REFRIGERANT & APPLICANT	THERMOSTAT LP CONTROL CUT-OUT	THERMOSTAT LP CONTROL CUT-IN	EPR VALVE	(DISC. AIR TEMP) CUT-OUT	(DISC. AIR TEMP) CUT-IN
D61,D6L1,D6H1	R-22 - Dairy	38 PSIG	50 PSIG	41#	28	32
D61,D6L1,D6H1	R-502 - Dairy	46 PSIG	60 PSIG	50#	28	32
D61,D6H1	R-22 - Deli	32 PSIG	50 PSIG	35#	24	28
D61,D6H1	R-502 - Deli	40 PSIG	60 PSIG	43#	24	28

MODEL	*DEFROST PERIODS FREQUENCY	PRESSURE TERMINATION R-22	PRESSURE TERMINATION R-502	FAIL SAFE SETTING TIME OFF
D61,D6L1,D6H1	4	80#	90#	40 min.

MODEL	*DEFROST PERIODS FREQUENCY	TEMPERATURE TERMINATION (1)	FAIL SAFE SETTING HOT GAS	FAIL SAFE SETTING ELECTRIC
D61,D6L1,D6H1	4	60-degF	20 min.	30 min.

(1) Temperature measured in discharge air

*Defrost frequency is at design conditions. Higher temperature or humidity may require more frequent defrost setting.

PARTS LIST

D61, D6L1, D6H1 - 8'

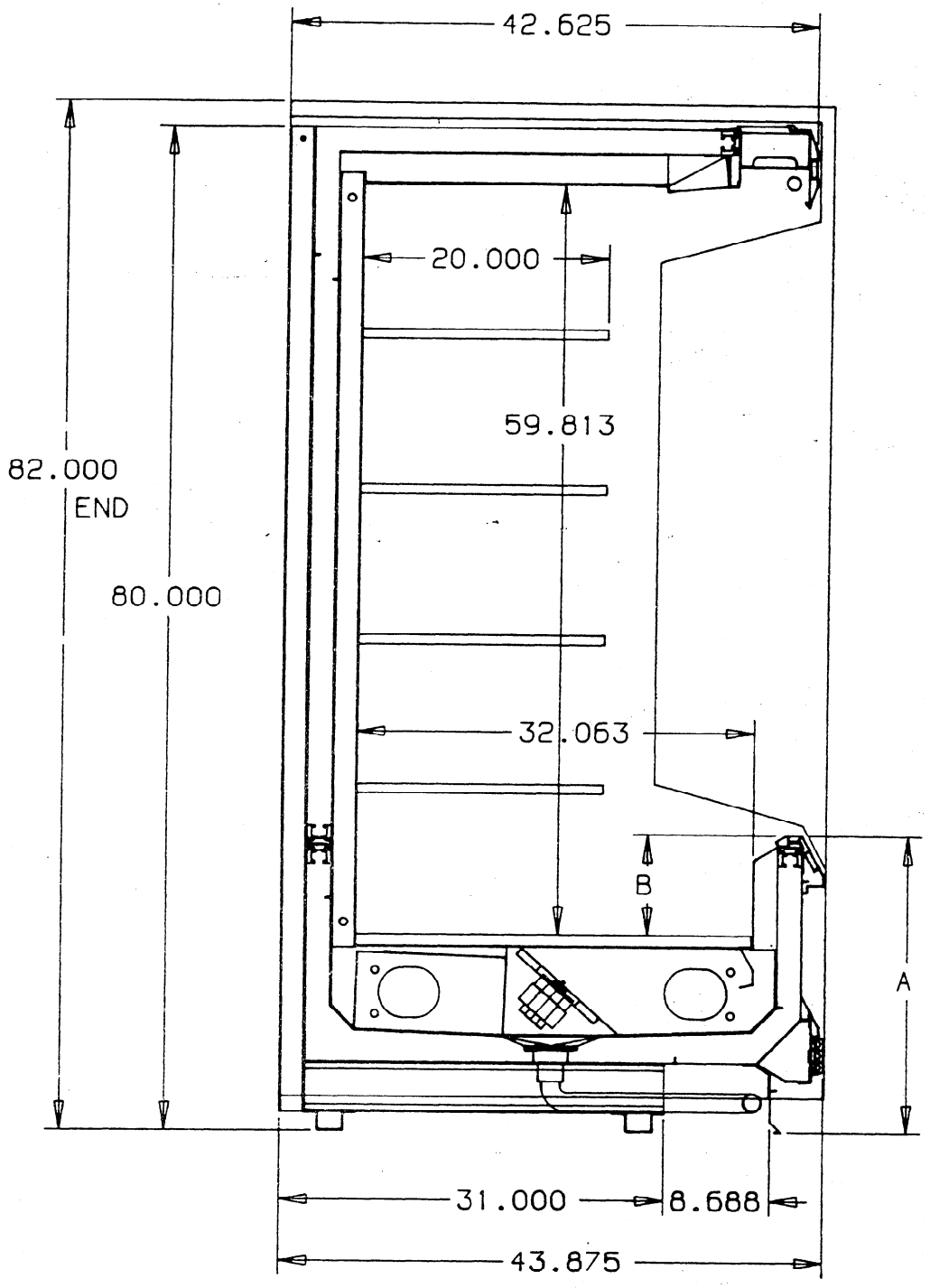
DESCRIPTION	PART NO.	D61	D6L1	D6H1
Expansion Valve (BFRE-A-C)	3A11-051	1	1	1
Evap Fan Motor (9W 115 Volt)	9A10-041	2	2	2
Evap Fan Blade (8" - 30 deg)	9B10-043	2	2	2
	9B10-027			
Lamp (Canopy) Double Row (CWX)	10A10-058	2	2	2
Lamp (Canopy) Single Row (CWX)	10A10-058	1	1	1
Lampholder w/Red Wire Sin. Row	10B11-049	1	1	1
Lampholder w/Blue Wire Sin. Row	10B11-050	1	1	1
Lampholder w/Yellow Wire Sin. Row	10B11-051	1	1	1
Lampholder W/Red Wire Dbl. Row	10B11-049	2	2	2
Lampholder W/Blue Wire Dbl. Row	10B11-050	2	2	2
Lampholder W/Yellow Wire Dbl. Row	10B11-051	2	2	2
Ballast (Canopy) Double Row	10D10-038	1	1	1
Ballast (Canopy) Single Row	10D10-038	1	1	1
Lamp (Shelf)/1 Lighted Shelf	10A10-055	1	1	1
Lampholder (Shelf)/1 Ltd Shelf	10B11-017	1	1	1
Lampholder (Shelf)/1 Ltd Shelf	10B11-018	1	1	1
Ballast (Shelf)/1 Lighted Shelf	10D10-012	1	1	1
Fan Wiring Harness	10M10-100	1	1	
Fan Wiring Harness	10M10-081			
Wire Rack	28G19-251	4	4	4
Canopy Panel Painted	51C12-072	1	1	1
Canopy Panel Danish	53E14-136	1	1	1
Canopy Panel Heritage	53E14-134	1	1	1
Canopy Panel Clarion Hickory	53E14-138	1	1	1
Kickplate SS Bright	55A32-389	1	1	1
Deck Pan	54N18-237	4	4	4
Shield-Clear ABS Plastic	13A11-029	2	2	2
Shield-Honeycomb	13A15-027	2	2	2

PARTS LIST

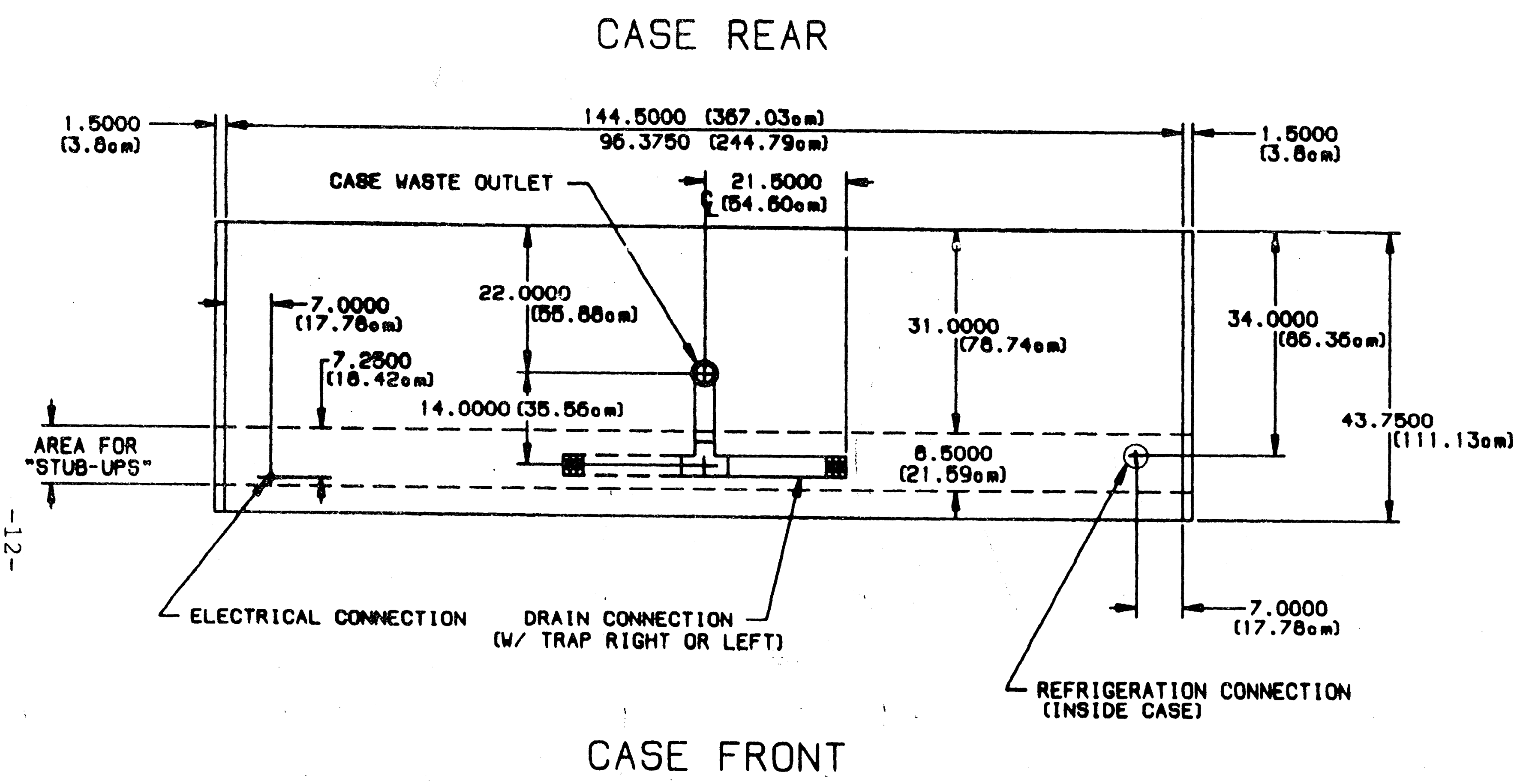
D61, D6L1, D6H1 - 12'

DESCRIPTION	PART NO.	D61	D6L1	D6H1
Expansion Valve (BFRE-C-C)	3A12-035	1	1	1
Evap Fan Motor (9W 115 Volt)	9A10-041	3	3	3
Evap Fan Blade (8" - 30 deg)	9B10-043 9B10-027	3	3	3
Lamp (Canopy) Double Row (CWX)	10A10-057	4	4	4
Lamp (Canopy) Single Row (CWX)	10A10-057	2	2	2
Lampholder w/Red Wire Sin. Row	10B11-049	2	2	2
Lampholder w/Blue Wire Sin. Row	10B11-050	2	2	2
Lampholder w/Yellow Wire Sin. Row	10B11-051	1	1	1
Lampholder W/Red Wire Dbl. Row	10B11-049	4	4	4
Lampholder W/Blue Wire Dbl. Row	10B11-050	4	4	4
Lampholder W/Yellow Wire Dbl. Row	10B11-051	2	2	2
Ballast (Canopy) Double Row	10D10-037	2	2	2
Ballast (Canopy) Double Row	10D10-038	2	2	2
Ballast (Canopy) Single Row	10D10-037	1	1	1
Ballast (Canopy) Single Row	10D10-038	1	1	1
Lamp (Shelf)/1 Lighted Shelf	10A10-055	1	1	1
Lampholder (Shelf)/1 Ltd Shelf	10B11-017	1	1	1
Lampholder (Shelf)/1 Ltd Shelf	10B11-018	1	1	1
Ballast (Shelf)/1 Lighted Shelf	10D10-012	1	1	1
Fan Wiring Harness	10M10-101	1	1	1
Canopy Panel Painted	51C14-068	1	1	1
Canopy Panel Danish	53E14-137	1	1	1
Canopy Panel Clarion Hickory	53E14-135	1	1	1
Canopy Panel Heritage	53E14-139	1	1	1
Kickplate SS Bright	55A32-390	1	1	1
Deck Pan	54N18-237	6	6	6
Shield Clear ABS Plastic	13A11-029	3	3	3
Honeycomb	13A15-027	3	3	3

	D6L	D6	D6H
A	19.500	23.750	28.250
B	3.813	8.063	12.563



D61



LETTER	REVISED	DATE	BY

DATE 10/21/88
SCALE None
DRAWN B. Toombs
APPD GB

TITLE PLAN VIEW- D6(L)(H) 1 8&12

KYSOR WARREN/SHERER DIVISION OF KYSOR INDUSTRIAL CORPORATION

DRAWING NUMBER PA-30048A

SHELF LIGHT RECEPTACLES

8 & 12 FT.

1	2	3	4	5	6	7	8	9	10

12 FT. ONLY

11	12	13	14	15

SHELF LIGHT BALLAST (LOCATED IN LOWER WIREWAY)

NOTE:

THE SHELF LIGHT RECEPTACLES ARE WIRED TO THE BALLASTS AS NUMBERED ABOVE.

LETTER	REVISED	DATE	BY

DATE 3-15-89

SCALE

DRAWN JBell

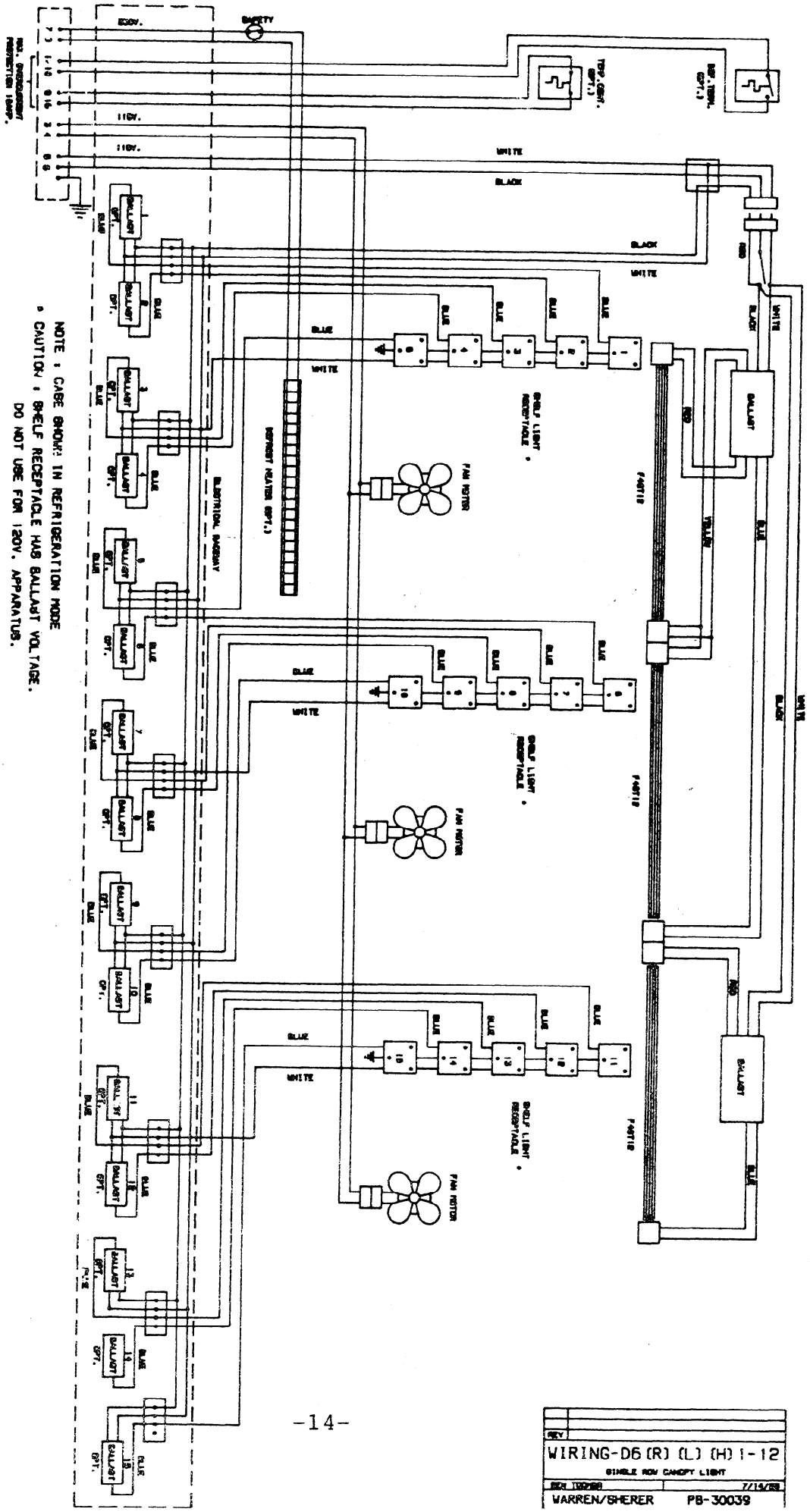
APPD JRB

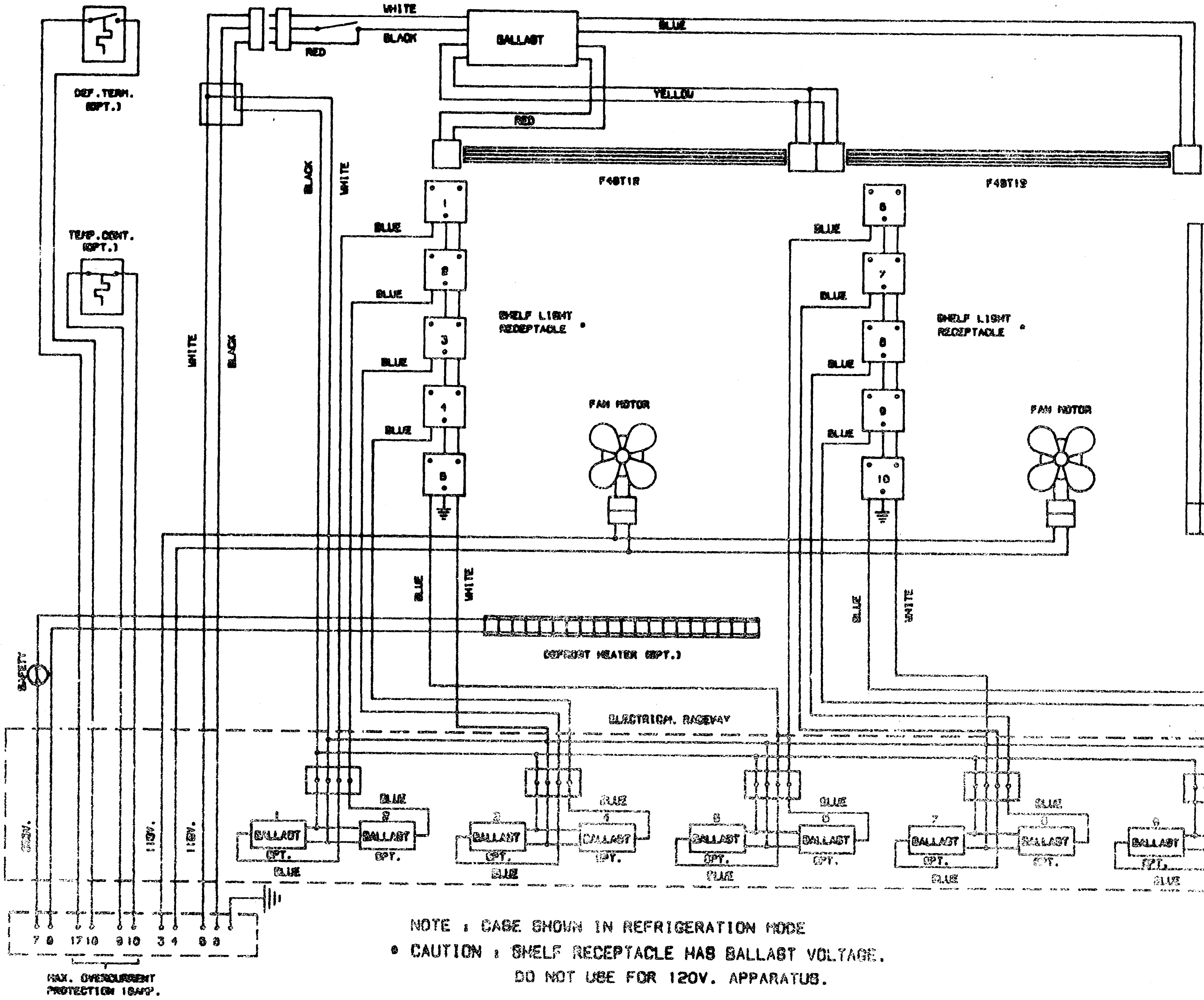
TITLE

LIGHTED SHELF RECEPTACLE & BALLAST LAYOUT - D6(L)(H)1

KYSOR | WARREN / SHERER
DIVISION OF KYSOR INDUSTRIAL CORPORATION

DRAWING NUMBER
PA-30094


NOTE : CASE SHOWN IN REFRIGERATION MODE
CAUTION : SHELF RECEPTACLE HAS BALLAST VOLTAGE.
DO NOT USE FOR 120V. APPARATUS.
WIRING-D6(R)(L)(H)1-12
SINGLE ROW CANOPY LIGHT
WARREN/SHERER
PB-30039



NOTE : CASE SHOWN IN REFRIGERATION MODE

• CAUTION : SHELF RECEPTACLE HAS BALLAST VOLTAGE.
DO NOT USE FOR 120V. APPARATUS.

REV	WIRING-D6 (R) (L) (H) 1-8
	SINGLE ROW CANOPY LIGHT
	BEN TOOMBS 7/14/88
	WARREN/SHERER PB-30018

RECOMMENDED PIPING PRACTICES FOR KYSOR/WARREN CASES

1. Proper size refrigeration lines are essential to good refrigeration performance. Suction lines are more critical than liquid or discharge lines. Oversized suction lines may prevent proper oil return to the compressor. Undersized lines can rob refrigeration capacity and increase operating cost. Consult the technical manual or legend sheet for proper line sizes.

2. Refrigeration lines in cases in line-ups can be reduced. However, the lines should be no smaller than the main trunk lines in at least 1/3 of the cases and no smaller than one size above the case lines to the last case. Reductions should not exceed one line size per case. It is preferred to bring the main trunk lines in at the center of line-up. Liquid lines on systems on <u>hot gas</u> defrost must be increased one line size above the main trunk line for the entire line-up. Individual feed lines should be at the bottom of the liquid header.

3. Do not run refrigeration lines from one system through cases on another system.

4. Use dry nitrogen in lines during the brazing to prevent scaling and oxidation.

5. Insulate suction lines from the cases to the compressor with 3/4" wall thickness Armaflex or equal on low temperature cases to provide maximum of 65 Degree superheated gas back to the compressor and prevent condensation in exposed areas. Insulate suction lines on medium temperature cases with 1/2" thick insulation in exposed areas to prevent condensate droppage.

6. Suction and liquid lines should never be taped or soldered together. Adequate heat exchanger is provided in the case.

7. Refrigeration lines should never be placed in the ground unless they are protected against moisture and electrolysis attack.

8. Always slope suction lines <u>down</u> toward the compressor, 1/2" each 10'. Do not leave dips in the line that would trap oil.

9. Provide "P" traps at the bottom of suction line risers, 4' or longer. Use a double "P" trap for each 20' of risers. "P" traps should be the same size as the horizontal line. Consult the technical manual or legend sheet for proper size risers.

10. Use long radius ells and avoid 45 Degree ells.

RECOMMENDED PIPING PRACTICES FOR KYSOR/WARREN CASES (continued)

11. Provide expansion loops in suction lines on systems on hot gas defrost. See Engineering Bulletin #85-204-3 for detail.

12. Strap and support tubing to prevent excessive line vibration and noise.

13. Brazing of copper to copper should be with a minimum of 10% silver. Copper to brass or copper to steel should be with 45% silver.

14. Avoid the use of "bull head" tees in suction lines. An example is where suction gas enters both ends of the tee and exits the center. This can cause a substantial increase in pressure drop in the suction lines.

15. When connecting more than one suction line to a main trunk line, connect each branch line with an inverted trap.