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PB-125

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SUBJECT: APPLICATION GUIDELINES FOR COMMERCIAL **REFRIGERATION SYSTEMS USING ROTARY COMPRESSORS** PAGE: **REV DATE:**

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A rotary compressor is a precision piece of equipment, designed and manufactured to very close tolerances. For superior performance and long term reliability the following parameters must be maintained when applying Tecumseh rotary compressors in packaged refrigeration applications.

1.	Refrigerant:	R-404A (or as otherwise designated by Tecumseh)	
2.	Evaporator Temperature Range:	Commercial Back Pressure -13 to 59°F (-25 to 15°C) See page 4 and 5.	
3.	Condensing Temperature Range:	80 to 140 °F (26.7 to 60 °C) See page 4, 5, and 6.	
4.	Pressure Ratio:	Commercial back 8.5:1. Maximum for R-22, 14.6:1 Maximum for R-134a 10.6:1 Maximum for R-404A.	
5.	Motor Temperature:	302 °F (150 °C) Maximum (Resistance Method)	
6.	Shell Bottom:	Minimum of Saturated Condensing Temperature plus 10 °F (5.6 °C)	
7.	Discharge Gas Temperature:	260 °F (126.7 °C) Maximum (D2I) providing maximum motor temperature is not exceeded.	
8.	The rotary is a direct suction compressor with a factory installed suction screen. See Policy Bulletin No. <u>PB-120</u>		
9.	Suction Gas Temperature:	5 °F (2.8 °C) Minimum Superheat NOTE: Under transient flood back conditions, less than 5 °F (2.8 °C) superheat is permissible, providing the above shell bottom parameter is maintained. Maximum suction temperature should be limited to maintain acceptable motor and discharge temperatures (see 5 and 7 above).	
10.	Voltage Range (Run):	See Policy Bulletin No. <u>PB-113</u>	
11.	Voltage (Start)	Minimum is 90 % of lowest rated voltage when measured at the terminals at locked rotor conditions.	
12.	Abnormal Discharge Pressure:	750 PSIG (5171 kPa) Maximum	

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13.	Tubing:	The rotary compressor is an internally solid mounted compressor. Therefore it requires tubing designed with shock loops to prevent transmission of noise and vibration to the unit. Tubing should be designed to maintain acceptable stress levels.
14.	Mounting Components:	Grommet 70941, Sleeve 71000 for ¹ / ₄ inch through bolt max. Sleeve 70953 for 5/16 inch through bolt max. Bolt Torque 10 to 13 ft./lbs. See Policy Bulletin No. <u>PB-109</u>
15.	Cooling of Compressor:	A compressor-cooling fan may be required to limit motor and discharge temperatures as discussed in item 5 and 7.
16.	Cycle rate:	During normal operation, the cycle rate of the compressor should not exceed five (5) cycles per hour, with sufficient run time to insure that the proper quantity of oil will return to the compressor.
17.	Testing for new applications:	See page 3.

EP-13 "Application Guidelines for Packaged Refrigeration Systems Using Rotary Compressors"

EP-15 "Refrigerant Charge Procedure for Rotary Compressors and Condensing Units"

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Documentation Needed for New Applications

- 1. Unit description including:
 - A. Expansion device expansion valve, capillary tube, etc.
 - B. Evaporator description dimensions, tube sizes, number of circuits, diagram if possible.
 - C. Condenser description dimensions, tube sizes, number of circuits, diagram if possible.
 - D. Airflow system number of fans and motors, airflow amount if possible
 - E. Defrost system electric, off cycle, hot gas, etc.
 - F. Other special features accumulator, receiver, pump down cycle, check valves, etc.
 - G. Refrigerant charge amount
- 2. Test data from the following tests (test per industry standard or manufacturer's test):
 - A. Maximum load test
 - B. Minimum load test
 - C. Defrost test
- 3. The test data above should include at least the information listed below.
 - A. Temperatures
 - a. Suction tube before compressor accumulator
 - b. Discharge tube -2 inches from joint at compressor and insulated
 - c. Compressor bottom shell
 - d. J. tube tube between compressor accumulator and compressor housing
 - e. Condenser outlet
 - f. Compressor middle of housing
 - g. Room temperature and humidity, if applicable
 - h. For water cooled applications inlet and outlet water
 - i. Product temperatures
 - j. Liquid entering expansion device
 - B. Pressures please specify gauge or absolute
 - a. Suction
 - b. Discharge
 - c. If unable to provide pressures, please provide condenser and evaporator mid temperatures
 - C. Electrical
 - a. Volts
 - b. Amps
 - 1. Total
 - 2. Compressor
 - D. Reading intervals
 - a. When cycling 10 second intervals for at least 10 minutes after start of an on cycle
 - b. For continuous run tests 1 minute intervals
 - E. Compressor sight glass If sample compressor has a sight glass, observe oil level. Minimum oil level is above the outboard bearing on the horizontal and above the bottom of cylinder block on the vertical. Maximum oil level is not above the bottom of the oil pickup tube cap on the horizontal and not above the top of the sight glass on the vertical.

We would prefer this information be provided in a spreadsheet format in an electronic file so we can format and display it as desired. If you also wish to provide graphs, they would be welcomed.

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ROTARY COMMERCIAL BACK PRESSURE R-134a APPLICATION BOUNDARIES



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