

Conversion Evaluation

R-22 to R-453A (R 44B)

Storage Refrigeration System

For Advanced Refrigerant Technologies (ART) 1613 Highway 3, South League City, TX 77573

For

Del Monte Fresh Produce Piers 16 & 18 Galveston, TX

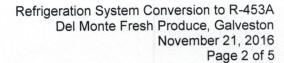
Project No. 201635

November 21, 2016

Texas Engineering Firm F-2055



Filand a. Cortetto





1.0 Introduction:

The Storage Refrigeration System at Del Monte Fresh Produce, Piers 16 & 18, in Galveston, TX was inspected and evaluated to determine its suitability for converting the system to operation on R-453A (RS 44B) from its present operation on R-22 in order to avoid the rapidly increasing cost of R-22 due to its scheduled phase out in 2020. The Del Monte System underwent a thorough upgrade during 2007- 2011 and has been operating adequately since then. The refrigeration system is used to refrigerate bananas, pineapples, and melons stored at the facility at three temperatures: bananas, 52°F, pineapples at 45°F, and melons at 38°F.

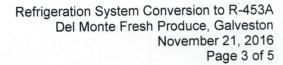
The evaluation was done to identify any performance differences (capacity gain or loss and power increase or loss) for the system, to determine any capacity deficiencies for the components and piping, and to determine the need for modification or changing system components.

The refrigeration system is an industrial, central refrigeration system consisting of 6 Frick rotary screw refrigeration compressors, 3 evaporative condensers, 2 high pressure receivers, 2 shell and tube refrigerant sub coolers, and 4 suction accumulators, installed in an engine room at the facility. The storage spaces consist of 5 storage coolers, 4 of them containing 8 evaporators (air units), 1 containing 6 air units, and 2 Docks, each containing 6 air units.

All of the evaporators operate DX with the cooler units having 2 thermostatic expansion valves (TXVs) each and the Dock units with one TXV each. All refrigerant piping to and from the evaporators is installed on the roof of the facility. Please refer to the refrigeration drawings for the facility (available at Del Monte) for complete refrigeration system details.

The design refrigeration loads are shown on 201635-PFD1 prepared for the conversion evaluation (copy in Appendix). The total refrigeration estimated design load is 689 tons at the normal operating conditions (on R-22) of 26°F (50 psig) and 95°F condensing temperature. Del Monte stated that only 3 compressors are normally needed throughout the year, therefore, the percent utilization used for this evaluation was estimated conservatively at 65% of the available capacity from the compressors. This utilization rate then determined the normal capacity available from the compressors when operating with R-453A.

Section 2.0 is an executive summary of the results of the evaluation. Section 3.0 provides a discussion of the evaluation's findings and any recommended changes that were found to be necessary. The Appendix contains the spreadsheet showing the evaluation calculations and supporting documentation including compressor rating results. The spreadsheet contains the detailed findings supporting the conversion.





2.0 Executive Summary:

The results of the evaluation show that the R-22 refrigeration system appears to be a good candidate for conversion to R-453A (RS 44B). The spreadsheet evaluation shows that compressor capacity will be reduced by about 6% and the power required increased by about 1.5%. However, because of the available excess capacity, this should be of little concern since there will be adequate excess capacity available for both unusual and unexpected larger loads might they occur, and for backup capacity for all compressors. The evaluation shows that total available capacity on R-453A will be 715.7 tons or 250.5 tons of excess capacity for 465.2 tons required for loads at 65% utilization. The available capacity will also satisfy the total estimate design loads of 689 tons, allowing 27.7 tons of excess, but that load level has not reached even near that level during the last 5 years of operation.

Operation on R-453A will require operating the compressors at 47.3 psig to maintain the average 26°F evaporating temperature due to the refrigerant glide for R-453A. This accounts for the reduced capacity. The average temperature due to glide is an estimate and some additional capacity may be available if the evaporating pressure can be adjusted a bit higher and still provide the required storage temperatures for the facility.

Additionally, R-453A requires a slightly lower mass flow rate, about 3% lower than for R-22. The total mass flow fort R-453A is 126,381 lb/hr compared to 130,122 lb/hr for R-22. This means that piping will be adequate for the conversion. The lower mass flow also means that control valves, evaporator pressure regulators and expansion valves, should have adequate capacity. However, set points on the pressure regulators will have to be checked and likely changed and superheats on the TVVs will require checking and readjustment to achieve optimum system performance.

The evaluation did not reveal the need for changing any of the other components. Evaporators, condensers, refrigerant sub coolers, and suction accumulators should be adequate, due to the lower mass flow rates and based on statements made by the refrigerant manufacturer (results of some case studies) that claim minimal performance differences as compared to R-22.

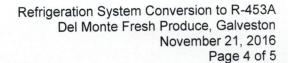
Be aware that changes in system set points will be required and some adjustments will need to be made to achieve best performance from the system.

It should be noted that although the Frick rating shows a change in oil from Frick #2 to Frick #13 for R-453A, the refrigerant manufacturer states that R-453A is compatible with most refrigeration oils. It is recommended that Frick be consulted regarding the oil, but it appears an oil change may not be necessary.

It should be understood that R-453A is a blend and is subject to composition change due to leakage. Therefore, judicious leak checking and repair will be a necessary requirement to ensure good performance from R-453A. Also, regular analysis of the blend composition, with the potential replenishment of individual component addition, if available, will minimize the concern for composition variation due to leaks.

Conversion will require recovery of the R-22 in compliance with 40CFR, Part 82, Subpart F, and any repairs or other maintenance requirements should be considered for completion during the conversion. It is also recommended that the system is evacuated to at least 1,000 microns Hg absolute pressure and checked for moisture before adding new R-453A.

Because this is an existing system with some components older than 5 years, and because there appears to be minimum experience with R-453A in large systems, there can be no quarantee of adequate performance of the system on R-453A.





3.0 Evaluation Details

The details and results of the conversion evaluation are provide on the spreadsheet 201635-Htbal-1 in the Appendix. The spreadsheet provides the details of the evaluation and any recommendations, but the following provides some explanation of the results.

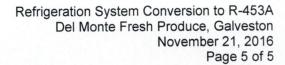
Note the flow rates for R-453A are lower than for R-22, as shown on the Frick runs in the Appendix. The rates are based on operation of the system at an estimated 65% utilization of the available compressor capacity (normally 3 compressors operating) show as 465.2 tons for R-453A. The calculations are based on 201635-PFD-1 process flow diagram, copy in the Appendix.

The compressor capacity results are included in Section II with the total heat rejection shown for the condenser. Section III shows the available condenser capacity compared to the required capacity at 65% utilization (7,454 MBH). Note that at 65%, 6,546 MBH excess condenser capacity is available over the total capacity of 14,000 MBH.

Section IV A provides a discussion of the adequacy of the evaporator pressure regulators. Note that adjustment will be necessary for all storage spaces. Section IV B discusses the thermostatic expansion valves. Superheats for all TXVs will be required.

Section V discusses the 3% lower flow rate that indicates the mass flow rates for R-453A vs. R-22. Adjustment of operating suction pressure may be necessary to achieve optimum performance.

In conclusion, it appears that conversion to R-453A should provide adequate performance for the system, with consideration of the results of this evaluation.





Appendix

201635-PFD-1 Process Flow Diagram

201635 Htbal-1 Evaluation Spreadsheet

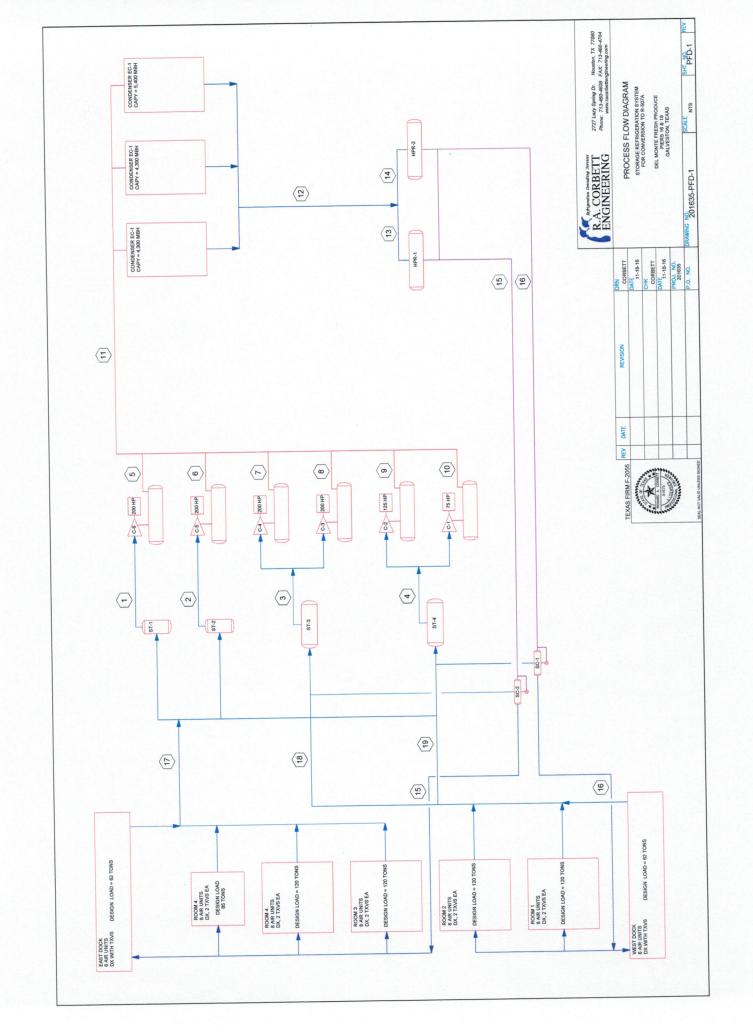
Frick Compressor Ratings

RWBII-76 R-453A (2 installed) RWBII-76 R-22 (2 installed)

RXF-68 R-453A (2 instalRXF-5led) RXF-68 R-22 (2 installed)

RXF-50 R-453A (1 installed) RXF-50 R-22 (1 installed)

RXF-30 R-453A (1 installed) RXF-30 R-22 (1 installed)





RWBII 76 (Legacy)



201635 Del Monte Run 1 Screw Package

Velocity Ref

Saver CR

0.92

2.91

Richard Corbett Date: **November 18, 2016** Gauge Ref: **14.7 psi**

Screw Package					3
PACKAGE		PERFORMANCE		CONDITIONS	
		Capacity	146.2 TR	Refrigerant	R453A
Model	RWBII 76	Shaft Power	185.7 hp	Comp Ratio	3.81
	(Legacy)	Capacity %	100.0 %	Ideal Vi	3.77
Compressor	TDSH 163L	Perf Factor	1.270 hp/TR	Actual Vi	3.77
Vi Range	2.2 - 5.0		100.0 %	Disc T	149.8 °F
Casing	Gray Cast Iron	Slide Valve Pos	100.0 %	Disc DewT	107.8 °F
Rotors	Standard	Speed		DISC DEWI	207.0
Bearings	Standard	Speed	3550 rpm		
EVAPO	DRATOR	COND	ENSER		
Capacity	146.2 TR	Heat Reject	2209 kbtu/hr		
DewT/BubbleT	31.9 °F/ 20.0 °F	DewT/BubbleT	104.8 °F/ 95.0 °F		
Pressure	62.0 psia	Pressure	211.3 psia		
Superheat	0.0 °F	Subcooling	0.0 °F		
Inlet T	90.0 °F	Ext Subcooling	5.0 °F		
Line Superheat	10.0 °F	Line Superheat	0.0 °F		
Line Pres Drop	2.0 psi	Line Pres Drop	4.0 psi		
OIL C	OOLING	OIL F	LOWS		
Туре	Frick #13	Total Flow	9.0 gpm		
Cooling Type	Water Cooled	Pump Type	None		
Heat Reject	37 kbtu/hr	Valve Dia	0.8 in		
Bearing Oil T	130.0 °F	Valve Pos	6.1 %		
Dod.ing -		System dP	10.0 psi		
F	LOW	SUCTIO	N VALVE	DISCHARGE VALVE	
	430.1 lbm/min	Type	Standard	Type	Standard
Suction	430.1 lbm/min	Pres Drop	2.1 psi	Pres Drop	3.2 psi
Discharge	430.1 10111/111111	Stop	4.0 in	Stop	3.0 in
		Check	4.0 in	Check	3.0 in
		B4/	OTOR		ESIGN
OIL SE	PARATOR				85.5 °F/ 75.0 °F
Orientation	Horizontal	Volt	460/3/60	Min Cond	
Diameter	24.0 in	Starter	Solid State	Mx Oil HR	93 kbtu/hr
Coalescers	2		Mounted		
Design Pres	300.0 psi				

AWARNINGS



RWBII 76 (Legacy)



201635 Del Monte Run 1 Screw Package Richard Corbett Date: **November 18, 2016** Gauge Ref: **14.7 psi**

PACI	PACKAGE		PERFORMANCE		CONDITIONS	
Model Compressor Vi Range Casing Rotors Bearings	RWBII 76 (Legacy) TDSH 163L 2.2 - 5.0 Gray Cast Iron Standard Standard	Capacity Shaft Power Capacity % Perf Factor Slide Valve Pos Speed Speed	156.5 TR 182.4 hp 100.0 % 1.166 hp/TR 100.0 % 100.0 % 3550 rpm	Refrigerant Comp Ratio Ideal Vi Actual Vi Disc T Disc DewT	R22 3.41 3.17 3.17 156.2 °F 98.5 °F	
EVAPO	RATOR	COND	ENSER			
Capacity DewT/BubbleT Pressure Superheat Inlet T Line Superheat Line Pres Drop	156.5 TR 26.0 °F/ 26.0 °F 64.7 psia 0.0 °F 90.0 °F 10.0 °F 2.0 psi	Heat Reject DewT/BubbleT Pressure Subcooling Ext Subcooling Line Superheat Line Pres Drop	2303 kbtu/hr 95.0 °F/ 95.0 °F 196.5 psia 0.0 °F 5.0 °F 0.0 °F 4.0 psi			
OIL CO	OOLING	OIL F	LOWS			
Type Cooling Type Heat Reject Bearing Oil T	Frick #2a Water Cooled 52 kbtu/hr 130.0 °F	Total Flow Pump Type Valve Dia Valve Pos System dP	9.4 gpm None 0.8 in 5.0 % 10.0 psi			
FL	.ow	SUCTION VALVE		DISCHARGE VALVE		
Suction Discharge	443.1 lbm/min 443.1 lbm/min	Type Pres Drop Stop Check	Standard 2.2 psi 4.0 in 4.0 in	Type Pres Drop Stop Check	Standard 3.9 psi 3.0 in 3.0 in	
OIL SEPARATOR		мс	OTOR	DESIGN		
Orientation Diameter Coalescers Design Pres Velocity Ref Saver CR	Horizontal 24.0 in 2 300.0 psi 0.67 2.62	Volt Starter	460/3/60 Solid State Mounted	Min Cond Mx Oil HR	75.0 °F/ 75.0 °F 97 kbtu/hr	

AWARNINGS



201635 Del Monte Run 1 Screw Package Richard Corbett Date: **November 18, 2016** Gauge Ref: **14.7 psi**

Screw Package					J .	
PAC	KAGE	PERFOR	RMANCE	CONDITIONS		
Model	RXF 68	Capacity	135.3 TR	Refrigerant	R453A	
Compressor	XJF 151M	Shaft Power	171.3 hp	Comp Ratio	3.77	
Vi Range	2.2 - 5.0	Capacity %	100.0 %	Ideal Vi	3.65	
Casing	Gray Cast Iron	Perf Factor	1.266 hp/TR	Actual Vi	3.50	
Rotors	Standard	Slide Valve Pos	100.0 %	Disc T	149.1 °F	
Bearings	Standard	Speed	100.0 %	Disc DewT	107.6 °F	
Bearings		Speed	3550 rpm			
EVAPO	DRATOR	COND	ENSER			
Capacity	135.3 TR	Heat Reject	2040 kbtu/hr			
DewT/BubbleT	31.9 °F/ 20.0 °F	DewT/BubbleT	104.8 °F/ 95.0 °F			
Pressure	62.0 psia	Pressure	211.3 psia			
Superheat	0.0 °F	Subcooling	0.0 °F			
Inlet T	90.0 °F	Ext Subcooling	5.0 °F			
Line Superheat	10.0 °F	Line Superheat	0.0 °F			
Line Pres Drop	2.0 psi	Line Pres Drop	4.0 psi			
OIL C	OOLING	OIL F	Lows			
Type	Frick #13	Total Flow	9.3 gpm			
Cooling Type	Water Cooled	Pump Type	None			
Heat Reject	37 kbtu/hr	Valve Dia	1.0 in			
Bearing Oil T	130.0 °F	Valve Pos	5.0 %			
bearing on t		System dP	10.0 psi			
FL	.ow	SUCTIO	N VALVE	DISCHARGE VALVE		
Suction	398.0 lbm/min	Type	Standard	Type	Standard	
Discharge	398.0 lbm/min	Pres Drop	1.7 psi	Pres Drop	2.7 psi	
Discharge		Stop	4.0 in	Stop	3.0 in	
		Check	5.0 in	Check	3.0 in	
OIL SE	PARATOR	мс	OTOR	DESIGN		
Orientation	Horizontal	Power	175 hp	Min Cond	85.5 °F/ 75.0 °F	
Diameter	24.0 in	Nominal SF	1.15	Mx Oil HR	63 kbtu/hr	
Coalescers	2	Actual SF	1.17			



460/3/60

Solid State

Mounted

193

No Warnings

Volt

FLA

Starter

300.0 psi

0.84

2.88

Design Pres

Velocity Ref

Saver CR





201635 Del Monte Run 1 Screw Package

Richard Corbett Date: November 18, 2016 Gauge Ref: 14.7 psi

PACKAGE		PERFORMANCE		CONDITIONS	
Model	RXF 68	Capacity	144.8 TR	Refrigerant	R22
Compressor	XJF 151M	Shaft Power	168.1 hp	Comp Ratio	3.38
Vi Range	2.2 - 5.0	Capacity %	100.0 %	Ideal Vi	3.07
Casing	Gray Cast Iron	Perf Factor	1.161 hp/TR	Actual Vi	3.50
Rotors	Standard	Slide Valve Pos	100.0 %	Disc T	155.6 °F
Bearings	Standard	Speed	100.0 %	Disc DewT	98.3 °F
		Speed	3550 rpm		

EVAPORATOR

CONDENSER

Capacity	144.8 TR	Heat Reject	2128 kbtu/hr
DewT/BubbleT	26.0 °F/ 26.0 °F	DewT/BubbleT	95.0 °F/ 95.0 °F
Pressure	64.7 psia	Pressure	196.5 psia
Superheat	0.0 °F	Subcooling	0.0 °F
Inlet T	90.0 °F	Ext Subcooling	5.0 °F
Line Superheat	10.0 °F	Line Superheat	0.0 °F
Line Pres Drop	2.0 psi	Line Pres Drop	4.0 psi

OIL COOLING

OIL FLOWS

Type	Frick #2a	Total Flow	9.0 gpm
Cooling Type	Water Cooled	Pump Type	None
Heat Reject	49 kbtu/hr	Valve Dia	1.0 in
Bearing Oil T	130.0 °F	Valve Pos	5.0 %
•		System dP	10.0 psi

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SUCTION VALVE

DISCHARGE VALVE

Suction	409.9 lbm/min	Type	Standard	Type	Standard
Discharge	409.9 lbm/min	Pres Drop	1.7 psi	Pres Drop	3.4 psi
3		Stop	4.0 in	Stop	3.0 in
		Check	5.0 in	Check	3.0 in

OIL SEPARATOR

MOTOR

DESIGN

OIL JE	FAILATOR	•••	OTOR		
Orientation	Horizontal	Power	175 hp	Min Cond	75.0 °F/ 75.0 °F
Diameter	20.0 in	Nominal SF	1.15	Mx Oil HR	69 kbtu/hr
Coalescers	1	Actual SF	1.20		
Design Pres	300.0 psi	Volt	460/3/60		
Velocity Ref	1.00	FLA	193		
Saver CR	2.59	Starter	Solid State		
			Mounted		

AWARNINGS



Johnson Controls

201635 Del Monte Run 1 Screw Package

Richard Corbett Date: November 18, 2016 Gauge Ref: 14.7 psi

PACKAGE		PERFORMANCE		CONDITIONS	
Model Compressor Vi Range Casing Rotors Bearings	RXF 50 XJF 120S 2.2 - 5.0 Gray Cast Iron Standard Standard	Capacity Shaft Power Capacity % Perf Factor Slide Valve Pos Speed Speed	95.6 TR 128.6 hp 100.0 % 1.345 hp/TR 100.0 % 100.0 % 3550 rpm	Refrigerant Comp Ratio Ideal Vi Actual Vi Disc T Disc DewT	R453A 3.73 3.68 3.50 151.6 °F 107.2 °F

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FV			,,	~ I	v	

CONDENSER

Capacity	95.6 TR	Heat Reject	1454 kbtu/hr
DewT/BubbleT	31.9 °F/ 20.0 °F	DewT/BubbleT	104.8 °F/ 95.0 °F
Pressure	62.0 psia	Pressure	211.3 psia
Superheat	0.0 °F	Subcooling	0.0 °F
Inlet T	90.0 °F	Ext Subcooling	5.0 °F
Line Superheat	10.0 °F	Line Superheat	0.0 °F
Line Pres Drop	2.0 psi	Line Pres Drop	4.0 psi

OIL COOLING

OIL FLOWS

Туре	Frick #13	Total Flow	7.3 gpm None
Cooling Type	Water Cooled	Pump Type	
Heat Reject	32 kbtu/hr	System dP	10.0 psi
Bearing Oil T	130.0 °F		

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SUCTION VALVE

DISCHARGE VALVE

Suction Discharge	281.3 lbm/min 281.3 lbm/min	Type Pres Drop Stop Check	Standard 1.4 psi 4.0 in 4.0 in	Type Pres Drop Stop Check	Standard 1.4 psi 3.0 in 3.0 in
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DESIGN

OIL SEPARATOR		MOTOR		
Orientation	Horizontal	Power	150 hp	
Diameter	24.0 in	Nominal SF	1.15	
Coalescers	2	Actual SF	1.34	
Design Pres	300.0 psi	Volt	460/3/60	
Velocity Ref	0.68	FLA	168	
Saver CR	2.83	Starter	Solid State	
Saver en			Mounted	

85.5 °F/ 75.0 °F Min Cond Mx Oil HR 52 kbtu/hr

WARNINGS





201635 Del Monte Run 1 Screw Package Richard Corbett Date: **November 18, 2016** Gauge Ref: **14.7 psi**

PAG	CKAGE	PERFOR	RMANCE	CON	DITIONS
Model Compressor Vi Range Casing Rotors Bearings	RXF 50 XJF 120S 2.2 - 5.0 Gray Cast Iron Standard Standard	Capacity Shaft Power Capacity % Perf Factor Slide Valve Pos Speed Speed	102.4 TR 125.7 hp 100.0 % 1.227 hp/TR 100.0 % 100.0 % 3550 rpm	Refrigerant Comp Ratio Ideal Vi Actual Vi Disc T Disc DewT	R22 3.33 3.09 3.50 158.1 °F 97.8 °F

EVAPORATOR

CONDENSER

Capacity	102.4 TR	Heat Reject	1515 kbtu/hr
DewT/BubbleT	26.0 °F/ 26.0 °F	DewT/BubbleT	95.0 °F/ 95.0 °F
Pressure	64.7 psia	Pressure	196.5 psia
Superheat	0.0 °F	Subcooling	0.0 °F
Inlet T	90.0 °F	Ext Subcooling	5.0 °F
Line Superheat	10.0 °F	Line Superheat	0.0 °F
Line Pres Drop	2.0 psi	Line Pres Drop	4.0 psi

OIL COOLING

OIL FLOWS

Type	Frick #2a	Total Flow	7.0 gpm
Cooling Type	Water Cooled	Pump Type	None
Heat Reject	42 kbtu/hr	System dP	10.0 psi
Bearing Oil T	130.0 °F		

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SUCTION VALVE DISCHARGE VALVE

Suction Discharge	289.8 lbm/min 289.8 lbm/min	Type Pres Drop	Standard 1.5 psi	Type Pres Drop	Standard 1.7 psi
	203.0 15111,11111	Stop	4.0 in	Stop	3.0 in
		Check	4.0 in	Check	3.0 in

OIL SEPARATOR

MOTOR DESIGN

Orientation	Horizontal	Power	150 hp
Diameter	24.0 in	Nominal SF	1.15
Coalescers	2	Actual SF	1.37
Design Pres	300.0 psi	Volt	460/3/60
Velocity Ref	0.54	FLA	168
Saver CR	2.54	Starter	Solid State
50.0. 5.			Mounted

Min Cond **75.0** °F/ **75.0** °F Mx Oil HR **57** kbtu/hr







201635 Del Monte Run 1 Screw Package Richard Corbett Date: **November 18, 2016** Gauge Ref: **14.7 psi**

PAG	CKAGE	PERFOR	RMANCE	CON	DITIONS
Model	RXF 30	Capacity	57.1 TR	Refrigerant	R453A
Compressor	XJF 120M	Shaft Power	77.4 hp	Comp Ratio	3.66
Vi Range	2.2 - 5.0	Capacity %	100.0 %	Ideal Vi	3.77
Casing	Gray Cast Iron	Perf Factor	1.356 hp/TR	Actual Vi	3.50
Rotors	Standard	Slide Valve Pos	100.0 %	Disc T	149.8 °F
Bearings	Standard	Speed	100.0 %	Disc DewT	106.9 °F
		Speed	3550 rpm		

EV	AΡ	OI	RA.	ГΟ	R
					-

CONDENSER

Capacity	57.1 TR	Heat Reject	863 kbtu/hr
DewT/BubbleT	31.9 °F/ 20.0 °F	DewT/BubbleT	104.8 °F/ 95.0 °F
Pressure	62.0 psia	Pressure	211.3 psia
Superheat	0.0 °F	Subcooling	0.0 °F
Inlet T	90.0 °F	Ext Subcooling	5.0 °F
Line Superheat	10.0 °F	Line Superheat	0.0 °F
Line Pres Drop	2.0 psi	Line Pres Drop	4.0 psi

OIL COOLING

OIL FLOWS

Type	Frick #13	Total Flow	6.2 gpm
Cooling Type	Water Cooled	Pump Type	None
Heat Reject	25 kbtu/hr	System dP	10.0 psi
Bearing Oil T	130.0 °F		

	1	ı

SUCTION VALVE DISCHARGE VALVE

Suction	167.8 lbm/min	Type	Standard	Type	Standard
Discharge	167.8 lbm/min	Pres Drop	0.5 psi	Pres Drop	0.5 psi
		Stop	4.0 in	Stop	3.0 in
		Check	4.0 in	Check	3.0 in

OIL SEPARATOR

MOTOR

Mounted

DESIGN

85.5 °F/ 75.0 °F 37 kbtu/hr

OIL SEI AIM OIL			MOTOR		
Orientation	Horizontal	Power	100 hp	Min Cond	
Diameter	16.0 in	Nominal SF	1.15	Mx Oil HR	
Coalescers	1	Actual SF	1.49		
Design Pres	300.0 psi	Volt	460/3/60		
Velocity Ref	0.89	FLA	112		
Saver CR	2.77	Starter	Solid State		



Johnson Controls

201635 Del Monte Run 1 Screw Package

Richard Corbett Date: November 18, 2016 Gauge Ref: 14.7 psi

> 75.0 °F/ 75.0 °F 39 kbtu/hr

PACI	KAGE	PERFOR	RMANCE	CON	DITIONS	
Model Compressor	RXF 30 XJF 120M	Capacity Shaft Power	61.1 TR 75.4 hp	Refrigerant Comp Ratio	R22 3.27	
Vi Range	2.2 - 5.0	Capacity %	100.0 %	Ideal Vi	3.18	
Casing	Gray Cast Iron	Perf Factor	1.235 hp/TR	Actual Vi	3.50	
Rotors	Standard	Slide Valve Pos	100.0 %	Disc T	155.2 °F	
Bearings	Standard	Speed	100.0 %	Disc DewT	97.4 °F	
		Speed	3550 rpm			
EVAPO	RATOR	COND	ENSER			
Capacity	61.1 TR	Heat Reject	898 kbtu/hr			
DewT/BubbleT	26.0 °F/ 26.0 °F	DewT/BubbleT	95.0 °F/ 95.0 °F			
Pressure	64.7 psia	Pressure	196.5 psia			
Superheat	0.0 °F	Subcooling	0.0 °F			
Inlet T	90.0 °F	Ext Subcooling	5.0 °F			
Line Superheat	10.0 °F	Line Superheat	0.0 °F			
Line Pres Drop	2.0 psi	Line Pres Drop	4.0 psi			
OIL CO	OOLING	OIL F	LOWS			
Type	Frick #2a	Total Flow	6.0 gpm			
Cooling Type	Water Cooled	Pump Type	None			
Heat Reject	32 kbtu/hr 130.0 °F	System dP	10.0 psi			
Bearing Oil T	130.0 F					

	FLOW	SUCT	ION VALVE	DISCH	ARGE VALVE
Suction	172.9 lbm/min	Туре	Standard	Type	Standard
Discharge	172.9 lbm/min	Pres Drop	0.5 psi	Pres Drop	0.6 psi
		Stop	4.0 in	Stop	3.0 in
		Check	4.0 in	Check	3.0 in
OII S	EDADATOD	N.	MOTOR		FSIGN

OIL SEPARATOR		MOTOR		DESIG	
Orientation	Horizontal	Power	100 hp	Min Cond	
Diameter	16.0 in	Nominal SF	1.15	Mx Oil HR	
Coalescers	1	Actual SF	1.52		
Design Pres	300.0 psi	Volt	460/3/60		
Velocity Ref	0.65	FLA	112		
Saver CR	2.47	Starter	Solid State		
			Mounted		

