

Case Study

Air Conditioning System Refrigerant Retrofit
R-22 to Summit Plus R-407c with Super Change

Location



C. Leon King High School
6815 N 56th St, Tampa, FL 33610

Performed by:

Richard Roland, Engineer

Project Objective:

To determine the relative performance comparing the data collected from the air conditioning system operating with the two different types of refrigerant.

Collect pre retrofit operating data for analysis and evaluation while the system is running with refrigerant R-22. Collect post retro fit operational data for evaluation and comparison after replacing the refrigerant in the system with Summit Plus R-407c with Super Change.

Measure and calculate the capacity comparison between the two refrigerants and demonstrate the ease of usage as a direct replacement refrigerant.

Test Subject: York Split System – Model #H1CE150A46C

Location: C. Leon King High School
6815 N 56th St, Tampa, FL 33610

Project Date: October 24th / 27th 2016

Project Outline:

- Measure and document the “base line” performance of the air conditioning system while operating under the existing charge of refrigerant R-22
- Remove the refrigerant R-22 following all proper procedures
- Charge the air conditioning system with Summit Plus R-407c with Super Change.
- Measure and document the post retrofit “base line” performance of the air conditioning system while operating with Summit Plus R-407c with Super Change.
- Document the conclusion as to the effectiveness of the air conditioning system changes with the different refrigerants.

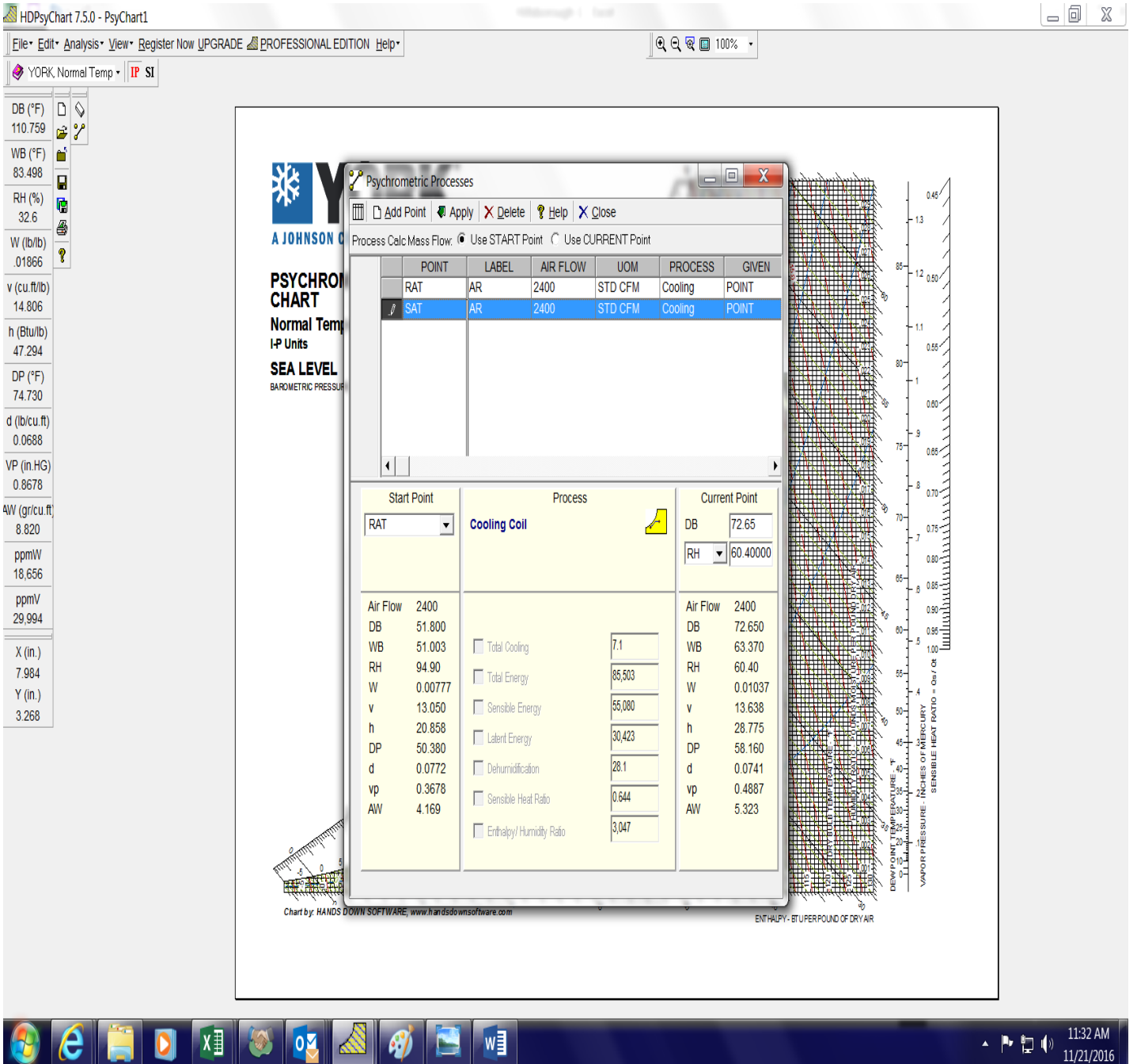
Field Data Collection

Pre-Retrofit Date: _____ October 24th 2016_____

Post-Retrofit Date: _____ October 27th 2016_____

Hillsborough County Schools R-22 to R-407c with SuperChange retro-fit										
York split system H1CE150A46C			King High School Tampa							
R-22 operation 10/24/16			Ambient temp 70F							
Condensing coil condition 6-7			Capacity control solenoid was disconnected							
Compressor model number			ZR72KCTFD 430							
Time	10/24/2016	10:00 AM	70F		Time	3:00 PM	75F			
Suction pressure	72 psi	73			Suction pressure	73	69	65	71.6	
Discharge pressure	166psi	170			Discharge pressure	208	201	220	200	
Super Heat	16.8	15-2.3			Super Heat	6.8	1.8	5.9	8.7	
Sub cooling	17.4	17.3			Sub cooling	15	13.2	13.8	12.5	
	Amperage	L1	L2	L3		Amperage	L1	L2	L3	
		7.9	8.8	7.5	460 volts		8.5	9.3	7.9	460 volts
Operation was off and on, off 8 minutes and on for only 2 minutes.										
Retro-fit to R-407c with SuperChange 10/27/2016										
Recovered 32lbs of R-22										
Initial charge of Summit Plus R-407c with Super Change was 16 lbs, final charge was 20 lbs										
Time			75F	3:00 PM		82F				
Charge of SP407SC	16 lbs	16.5 lbs	17 lbs	17.5 lbs	18 lbs	18.5	19.0	19.5	20	
Suction pressure	75.2	76	77	77.4	78.5	76	76.5	76.1	75.5	
Discharge pressure	217	218	218.7	220	222.7	220.8	224	226	227	
Super Heat	27	9.7	25	24.3	22.8	23	23.4	23	22.7	
Sub cooling	9.6	9.7	10.3	10.1	10.3	9.3	9.8	9.2	9.4	
							Amperage	L1	L2	L3
Operation was steady and the cycle was continuous.										
								8.6	9.6	8.2 460 volts
Capacity calculation										
Return air temp			74.7	74.25	73.7	73.7	72.9	72.9	72.65	F
return air RH			62.5	62.1	62	61.8	60.7	60.7	60.4	%
Supply air temp			56	55	54.4	54	52.9	52.64	51.8	F
Supply air RH			90.5	91.9	92.9	93.2	94.3	94.5	94.9	%
Temp drop			18.7	19.25	19.3	19.7				
Calculated capacity	Assuming 2400 cfm air flow				6.9 tons	7.0 tons			7.1 tons	cooling

Capacity Data





System Analysis Tools

Yellow Jacket System Analyzer

HOBO System Analyzer

Conclusion:

No oil change or modifications were done to this system.

Based on the testing results, we have concluded that the air conditioning system ran with similar performance pressures, temperatures, and amperages.

The data also supports that the system capacity remained virtually the same while running on refrigerant Summit Plus R-407c with Super Change as compared to refrigerant R-22.

Certified by:

 Rick Roland

Richard Roland, Engineer
Roland Engineering Services, LLC