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AC/HP TECHNICAL EVALUATION FORM

United Technologies
Climate | Controls | Security

REFERENCE CHARTS

PRESSURE -TEMPERATURE CHART

Temp	R-22	R-410A
°F		
	Pressure	Pressure
-50	**6.2**	3.5
-45	**2.7**	8.5
-40	**0.5**	11.6
-35	**2.6**	14.9
-30	**4.9**	18.5
-25	**7.4**	22.5
-20	**10.1**	26.9
-15	**13.2**	31.7
-10	**16.5**	36.8
-5	**20**	42.5
0	**23.9**	48.6
5	**28.2**	55.2
10	**32.8**	62.3
15	**37.7**	70
20	**43**	78.3
25	**48.7**	87.3
30	**54.9**	96.8
35	**61.5**	107
40	**68.5**	118
45	**76**	129.7
50	**84**	142.2
55	**92.5**	155.5
60	**101.6**	169.6
65	**111.2**	184.6
70	**121.4**	200.6
75	**132.2**	217.4
80	**143.6**	235.3
85	**155.7**	254.1
90	**168.4**	274.1
95	**181.8**	295.1
100	**195.9**	317.2
105	**210.7**	340.5
110	**226.3**	365
115	**242.7**	390.7
120	**259.9**	417.7
125	**277.9**	445.9
130	**296.8**	475.6
135	**316.5**	506.5
140	**337.2**	539
145	**358.8**	572.8
150	**381.5**	608.1

QUICK SYSTEM ANALYSIS (√)

SYSTEM PROBLEM	OPERATING TRENDS (LOW-NORMAL-HIGH)														
	SUCTION PRESSURE			DISCHARGE PRESSURE			SUPERHEAT			SUBCOOLING			AMPERES		
	L	N	H	L	N	H	L	N	H	L	N	H	L	N	H
Overcharge			●			●	●					●			●
Condenser (Air) Restricted			●			●	●			●					●
Non-Condensibles in System			●			●	●			●					●
High Evaporator Load			●			●		●			●				●
Loose TXV Feeder Bulb															
- Oversized TXV															
- Leaking TXV Seat			●			●	●			●					●
- Wrong Equalizer Connection															
- Uninsulated Feeder Bulb															
Undercharge	●			●					●	●			●		
Liquid Line Restriction	●			●					●			●	●		
Low Outdoor Ambient	●			●					●			●	●		
Suction Line Restriction	●			●					●			●	●		
Evaporator Air (Cooler Liquid) Restricted	●			●			●					●	●		
Undersized TXV															
- Leaking Feeder Bulb	●			●					●			●	●		
- No External Equalizer															
Inefficient Compressor			●	●					●			●	●		
ACTUAL SYSTEM OPERATION (▤)															

INDOOR DRY BULB ADJUSTMENT

Use equations below in conjunction with unit's "Tech Label" information for total and sensible capacities @ indoor dry bulbs other than 80°F entering coil.

Sensible Capacity at Indoor db LOWER than 80°F = $(MBh \times S/T) - \left(\frac{(80\text{-Indoor db}) \times 835 \times \text{Indoor cfm}}{1000}\right)$

Sensible Capacity at Indoor db HIGHER than 80°F = $(MBh \times S/T) + \left(\frac{(\text{Indoor db}-80) \times 835 \times \text{Indoor cfm}}{1000}\right)$

SYSTEM CAPACITY CALCULATOR

Temperature Wet-Bulb (F)	Enthalpy Btu/LB	Temperature Wet-Bulb (F)	Enthalpy Btu/LB	Temperature Wet-Bulb (F)	Enthalpy Btu/LB	Temperature Wet-Bulb (F)	Enthalpy Btu/LB	Temperature Wet-Bulb (F)	Enthalpy Btu/LB	Temperature Wet-Bulb (F)	Enthalpy Btu/LB
40	15.23	**48**	19.21	**56**	23.84	**64**	29.31	**72**	35.83	**80**	43.69
41	15.7	**49**	19.75	**57**	24.48	**65**	30.06	**73**	36.74	**81**	44.78
42	16.17	**50**	20.3	**58**	25.12	**66**	30.83	**74**	37.66	**82**	45.9
43	16.66	**51**	20.86	**59**	25.78	**67**	31.62	**75**	38.61	**83**	47.04
44	17.15	**52**	21.44	**60**	26.46	**68**	32.42	**76**	39.57	**84**	48.22
45	17.65	**53**	22.02	**61**	27.15	**69**	33.25	**77**	40.57	**85**	49.43
46	18.16	**54**	22.62	**62**	27.85	**70**	34.09	**78**	41.58		
47	18.68	**55**	23.22	**63**	28.57	**71**	34.95	**79**	42.62		

INDOOR COIL (EVAPORATOR)

	ENTERING	LEAVING	DIFFERENCE
W.B.			
Enthalpy			Δh = Btu/LB

EVAPORATOR CAPACITY
BTUH = 4.5 x cfm x Δh

OUTDOOR COIL (CONDENSOR)

	ENTERING	LEAVING	DIFFERENCE
(Air) D.B.			ΔT = °F

CONDENSOR CAPACITY
BTUH = 1.10 x COND. Cfm x ΔT

Due to varying field condidtions, a tolerance of 10% must be expected when comparing test data to actual performance.

* Used in the "Total External Static" method in conjunction with the "Blower Performance Data" in Product Specification sheets or the unit's "Tech Label" to calculate airflow.
† Temperature rise is equal to the supply air temp. minus the return air temp. at steady state operation. The supply air temp. should be measured away form the line of sight of the heat exchanger.