

SPP TECHNICAL EVALUATION FORM



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 (☒)															

SYSTEM CAPACITY CALCULATOR

Temperature	Enthalpy	Temperature	Enthalpy	Temperature	Enthalpy	Temperature	Enthalpy	Temperature	Enthalpy	Temperature	Enthalpy
Wet-Bulb (F)	Btu/LB	Wet-Bulb (F)	Btu/LB	Wet-Bulb (F)	Btu/LB	Wet-Bulb (F)	Btu/LB	Wet-Bulb (F)	Btu/LB	Wet-Bulb (F)	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)				OUTDOOR COIL (CONDENSOR)			
W.B. Enthalpy	ENTERING	LEAVING	DIFFERENCE	(Air) D.B.	ENTERING	LEAVING	DIFFERENCE
			Δh = Btu/LB				ΔT = °F
EVAPORATOR CAPACITY BTUH = 4.5 x cfm x Δh				CONDENSOR CAPACITY BTUH = 1.10 x COND. Cfm x ΔT			

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

AIRFLOW

Electric Heat Temp Rise Method

$$cfm = \frac{(\text{Volts})(\text{Amps})(3.413)}{1.08(\Delta T)}$$

Furnace

$$cfm = \frac{\text{btu output}}{1.08(\Delta T)}$$

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.

SYSTEM CAPACITY

Htg. System Capacity

$$\text{btu output} = (\text{cfm})(1.08)(\Delta T)$$

FIRING RATE OUTPUT

$$**\text{Firing Rate} = \frac{\text{Heat Content (Btu/cu.ft)} \times 3600(\text{sec/hr})}{\text{seconds per revolution (assume 1 cu.ft dial)}}$$

Sensible Capacity at Indoor db LOWER than 80°F =

$$\left(\text{MBh} \times \frac{S}{T} \right) - \frac{(80 - \text{Indoor db}) \times 835 \times \text{Indoor cfm}}{1000}$$

Sensible Capacity at Indoor db HIGHER than 80°F =

$$\left(\text{MBh} \times \frac{S}{T} \right) + \frac{(\text{Indoor db} - 80) \times 835 \times \text{Indoor cfm}}{1000}$$

* 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.

*** Supply pressure should be checked with all other gas appliances running.

† 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 from the line of sight of the heat exchanger.