HVAC Air / Refrigerant Diagnostic Quick Sheet

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Fixed Metering	Suction Pressure	Head Pressure	Super heat	Subcool	Comp. Amps	Δt
Low Charge	↓	↓	↑	↓	↓	↓
Over Charge	↑	↑	↓	↑	↑	Norm
Low Indoor Airflow/Low R/A Temp	↓	Norm	↓	Norm	Norm	↑
Dirty Condenser	↑	↑	Norm	Norm	↑	↓
Liquid Line Restriction*	↓	Norm	↑	Norm	↓	↓
Oversized Piston	Norm	Norm	↓	↓	↓	↓
High R/A Temp	↑	↑	↑	Norm	↑	↓

TXV System	Suction Pressure	Head Pressure	Super heat	Subcool	Comp. Amps	Δt
Liquid Line Restriction*	↓	Norm	↑	Norm	↓	↓
Overfeed / Loose Bulb Bulb Insulated	↑	↓	↓	↓	↓	↓
Low Charge Slightly	Norm	↓	Norm	↓	↓	Norm
Over Charge Slightly	Norm	↑	Norm	↑	↑	Norm
Low Indoor Airflow/Low R/A Temp	↓	Norm	↓	Norm	Norm	↑

*Restriction effect on head pressure varies with the exact location of the restriction, system refrigerant capacity, presence of a receiver and whether the charge is correct. Restrictions may show high head with short runtime, or on systems with very small condensers or on systems that have been overcharged in addition to the restriction. In general, restrictions are in the liquid Line and will result in low head after sufficient run time.

WB	Enthalpy
40	15.23
41	15.70
42	16.17
43	16.66
44	17.15
45	17.65
46	18.16
47	18.68
48	19.21
49	19.75
50	20.30
51	20.86
52	21.44
53	22.02
54	22.62
56	23.84
57	24.48
58	25.12
59	25.86
60	26.46
61	27.15
62	27.85
63	28.57
64	29.31
65	30.06
66	30.83
67	31.62
68	32.42
69	33.25
70	34.09
71	34.95
72	35.83
73	36.74
74	38.61
76	39.57
77	40.57
78	41.58
79	42.62

Electric Heat

$$CFM = \frac{Volts \times Amps \times 3.413}{\Delta T \times 1.08}$$

OR

Furnace

$$\frac{Cu.\ Ft. \times BTU/cu.ft. \times Measured\ eff}{\Delta T \times 1.08}$$

400 CFM per ton of cooling (Nominal)
12,000 BTU per ton of cooling

BTU Sensible Output = CFM x TD x 1.08

1Watt = 3.413 BTUs
1 Kilowatt = 3,413 BTUs
746 Watts = 1 Horsepower

Clocking a Gas Meter

$$\text{Input Cu. Ft.} = \frac{3600 \times \text{Smallest dial size}}{\text{\# of seconds for one revolution}}$$

Testing Capacitors Under Load

$$\frac{2652 \times (\text{Amps of the start winding})}{E \quad (\text{Volts across the capacitor})}$$

Total Heat = (H1-H2) x 4.5 x CFM
H1 = Return air wet bulb (converted to enthalpy

H2 = Supply air wet bulb (converted to enthalpy)

Estimated Evaporator TD

AC at 400 CFM/Ton =35°
Refrigeration Walk In 10°
Refrgeration Reach In 20°

Gas Appiance Outlet Pressure

Natural Gas 3.5" wc / LP =11°WC

CTOA

Estimated Condensing Temp Over Ambient

6-9 SEER = 30°
10-12 SEER = 25°
13-15 SEER = 20°
16+ SEER = 15°