

# HVAC Air / Refrigerant Diagnostic Quick Sheet



**HVAC SCHOOL**  
FOR TECHS BY TECHS  
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\* Indicates a key diagnostic indicator

Fixed Metering	Suction Pressure	Head Pressure	Super heat	Subcool	Comp. Amps	$\Delta t$
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	↓ *	↓ *	↓	Varies
High R/A Temp	↑ *	↑	↑	↓ Norm	↑	↓ Norm

## 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

TXV System	Suction Pressure	Head Pressure	Super heat	Subcool	Comp. Amps	$\Delta t$
Liquid Line Restriction*	↓	↓ Norm	↑ *	↑ Norm *	↓	↓
Overfeed / Loose Bulb Bulb uninsulated	↑	↓	↓ *	↓	↓	↓
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.

### Electric Heat

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

OR

### Furnace

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

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

$$\text{BTU Sensible Output} = \text{CFM} \times \text{TD} \times 1.08$$

1 Watt = 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°  
Refrigeration Reach In 20°

### Gas Appliance 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°

measureQuick

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