AC/HP TECHNICAL EVALUATION FORM

United Technologies
Climate | Controls | Security

Distributor: _____ Job Site Reference: _____
Dealer: _____ Date: _____
Technician's Name: _____ Installation date: _____

MODEL INFO	Model #	Serial #
Furnace or Fan coil:		
Outdoor Unit:		
Air Cleaner:		
UV Lights:		
Thermostat:		
Electronic Air Cleaner:		
Furnace:		
Humidifier:		

COMPRESSOR DATA

Comfort Alert Code:_____
Comp. Start Voltage: _____ Vac
Comp. Run Amps: Com_____ Run_____Start_____
Locked Rotor Amps: _____ amps R→C=_____Ω
Refrigerant Pressures Equal? ____yes ____no S→C=_____Ω
Run Cap: _____µF(1Φ only) R→S ≈ R→C+C→S
Hard Start Kit Used? ____yes ____no

REFRIGERANT PROPERTIES

A. Vapor Line Temp. at Service Valve: _____°F SuperHeat_____°F (A - B)
B. Vapor Pressure at Service Valve: _____psig _____°F
C. Liquid Line Temp. at Service Valve: _____°F Sub-Cooling_____°F (C - D)
D. Liquid Pressure at Service Valve: _____psig _____°F

INDOOR PROPERTIES

Air Temp Entering Indoor Coil: _____°FDB _____°FWB
Air Temp Leaving Indoor Coil: _____°FDB _____°FWB
Airflow: _____cfm
Return Static *: _____w.c. (Used with Total External Static Method)
Supply Static *: _____w.c. (Used with Total External Static Method)
Clg. Metering Device: ____txv ____piston #_____
Htg.Blower Speed Tap:_ _____ Clg. Blower Speed Tap:_____
Blower Amps: Hi Cool_____ amps Lo Cool_____amps
Heat_____amps
Filter Type: _____
Dip Switch Settings: ON or OFF (FAN COIL DIP SWITCHES)
1.ON_____2. ON_____3. ON_____4. ON_____ 5. ON_____ 6. ON_____7. ON_____8. ON_____
Defrost Time Interval: _____ min

ELECTRICAL INFO

Control Voltage:_____ Vac
Supply Voltage:_____ Vac Φ____
3 Phase (Φ) Voltages: T1→T2_____Vac
T1→T3_____Vac T2→T3_____Vac

OUTDOOR

Air Temp Entering Outdoor Coil:_____°F
Air Temp Leaving Outdoor Coil:_____°F
Outdoor Fan Amps:_____ amps

Htg.Metering Device:____txv ____piston #____
Line Set Length:____ ft
Line Set Size: Suc____in, Liq____in

AIRFLOW

Electric Heat Temp Rise CFM Method

Volts = _____ Amps = _____
Ret. Air Temp.____°F Sup. Air Temp.† ____°F
cfm = _____

Electric Heat Temp Rise Method

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

Total External Static Method *

Ret. Static + Sup. Static = Total External Static
Use the Total External Static in conjunction with the Blower Performance data in the Product Specification Sheets

NOTE: 350-400 CFM PER TON

SYSTEM CAPACITY (Cal. On page 2)

Htg. Capacity (HP): _____btuh
Clg. Capacity (AC/HP):_____btuh

Htg. System Capacity Method

btu's = (cfm)(1.08)(ΔT)
btu's = _____

ADDTL. COMMENTS:

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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.