

# JR SERIES DEDICATED OUTSIDE AIR SYSTEM ENGINEERING GUIDE

Up to 100% Outside Air Design

Air Source, Heating and Cooling  
Water Source Heat Pump  
Air Source Heat Pump

3–70 Ton Cooling Capacity  
Up to 20,000 CFM



 **YORK**<sup>®</sup>

**INSTALL CONFIDENCE**

# Nomenclature

**Example Pin: JROA660H8A4AABJAH1B40FJB0H27000C0000000B1HA00ABD0AL00**

## DIGITS 1–2: PRODUCT FAMILY

JR: YORK Packaged Rooftop

## DIGIT 3: TYPE

O: Outside Air  
M: Mixed Air

## DIGIT 4: APPLICATION

A: Air-Cooled  
W: Water Source Heat Pump  
H: Air Source Heat Pump

## DIGITS 5–7: NOMINAL CAPACITY

|               |             |
|---------------|-------------|
| 036: 3 ton    | 300: 25 ton |
| 048: 4 ton    | 360: 30 ton |
| 060: 5 ton    | 420: 35 ton |
| 072: 6 ton    | 480: 40 ton |
| 084: 7 ton    | 540: 45 ton |
| 096: 8 ton    | 600: 50 ton |
| 120: 10 ton   | 660: 55 ton |
| 150: 12.5 ton | 720: 60 ton |
| 180: 15 ton   | 780: 65 ton |
| 210: 17.5 ton | 840: 70 ton |
| 240: 20 ton   |             |

## DIGITS 8–9: CABINET SIZE

A0: A Cab with 0 Cond Fans  
B0: B Cab with 0 Cond Fans  
F0: BXL Cab with 0 Cond Fans  
C0: C Cab with 0 Cond Fans  
G0: CXL Cab with 0 Cond Fans  
D0: D Cab with 0 Cond Fans  
H0: DXL Cab with 0 Cond Fans  
E0: E Cab with 0 Cond Fans  
J0: EXL Cab with 0 Cond Fans  
A1: A Cab with 1 Cond Fans  
A2: A Cab with 2 Cond Fans  
B1: A Cab with 1 Cond Fans  
B2: A Cab with 2 Cond Fans  
B3: A Cab with 3 Cond Fans  
B4: A Cab with 4 Cond Fans  
F1: BXL Cab with 1 Cond Fans  
F2: BXL Cab with 2 Cond Fans  
F3: BXL Cab with 3 Cond Fans  
F4: BXL Cab with 4 Cond Fans  
C2: C Cab with 2 Cond Fans  
C3: C Cab with 3 Cond Fans  
C4: C Cab with 4 Cond Fans  
C6: C Cab with 6 Cond Fans  
G2: CXL Cab with 2 Cond Fans  
G3: CXL Cab with 3 Cond Fans  
G4: CXL Cab with 4 Cond Fans  
G6: CXL Cab with 6 Cond Fans  
D4: D Cab with 4 Cond Fans  
D6: D Cab with 6 Cond Fans  
D8: D Cab with 6 Oversized Cond Fans  
H4: DXL Cab with 4 Cond Fans  
H6: DXL Cab with 6 Cond Fans  
H8: DXL Cab with 6 Oversized Cond Fans  
E4: E Cab with 4 Cond Fans  
E6: E Cab with 6 Cond Fans  
E8: E Cab with 6 Oversized Cond Fans  
H4: EXL Cab with 4 Cond Fans  
H6: EXL Cab with 6 Cond Fans  
H8: EXL Cab with 6 Oversized Cond Fans

## DIGIT 10: CONTROLS

A: ALC, Standard Program, DOAS  
B: ALC, Std Program, DOAS w/ Recirc NSB  
D: ALC, Std Program, w/ Economizer, Enthalpy  
E: ALC, Std Program, DOAS for Lonworks  
F: ALC, Std Program, DOAS w/ Recirc NSB for Lonworks  
H: ALC, Std Program, w/ Economizer, Enthalpy for Lonworks  
M: Compressor Lockout Thermostat  
N: ALC, Std Program, w/ Economizer, Sensible  
P: ALC, Std Program, w/ Economizer, Sensible for Lonworks

## DIGIT 11: VOLTAGE

2: 208/3/60  
3: 230/3/60  
4: 460/3/60  
5: 575/3/60

## DIGIT 12: MODEL VINTAGE

A: Mod A

## DIGIT 13: AIRFLOW CONFIGURATION

A: Vertical supply and vertical return  
B: Horizontal supply and vertical return  
C: Vertical supply and side return  
D: Horizontal supply and side return  
E: Vertical supply and no return  
F: Horizontal supply and no return

## DIGITS 14–15: SUPPLY BLOWER/SIZE TYPE

AC: 12" DD, Airfoil  
AD: 14" DD, Airfoil  
AE: 16" DD, Airfoil  
AF: 18" DD, Airfoil  
AG: 20" DD, Airfoil  
AH: 22" DD, Airfoil  
AJ: 25" DD, Airfoil  
BA: 10" DD, BI  
BB: 11" DD, BI  
BC: 12" DD, BI  
BD: 14" DD, BI  
BE: 16" DD, BI  
BF: 18" DD, BI  
BG: 20" DD, BI  
BH: 22" DD, BI  
BJ: 25" DD, BI  
CA: 280mm Single ECM (CIW.087.5FA)  
CR: 355mm Single ECM (CIB.112.6FF IE)  
CM: 450mm Single ECM (CIB.140.6IF)  
DA: 280mm Dual ECM (CIW.087.5FA)  
DK: 355mm Dual ECM (CIB.112.6FF IE)  
EA: Dual 14" DD, BI  
EB: Dual 14" DD, AF  
EC: Dual 16" DD, BI  
ED: Dual 16" DD, AF  
EE: Dual 18" DD, BI  
EF: Dual 18" DD, AF  
EG: Dual 20" DD, BI  
EH: Dual 20" DD, AF

## DIGIT 16: SUPPLY BLOWER OPTIONS

0: None  
A: Rubber Isolation (Comefri Only)  
B: Spring Isolation (Comefri Only)  
F: Rigid Mount (Comefri Only)  
C: Cometer (ECM Only)  
D: Rubber Isolation + Piezo Ring (Comefri Only)  
E: Spring Isolation + Piezo Ring (Comefri Only)  
G: Rigid Mount + Piezo Ring (Comefri Only)

## DIGIT 17: SUPPLY MOTOR SIZE

A: 1.0 HP  
B: 1.5 HP  
C: 2.0 HP  
D: 3.0 HP  
E: 5.0 HP  
F: 7.5 HP  
G: 10.0 HP  
H: 15.0 HP  
M: ECM

## DIGIT 18: SUPPLY MOTOR TYPE

1: High efficiency ODP with VFD (CV)  
2: High efficiency TEFC with VFD (CV)  
3: ECM (CV)  
4: High efficiency ODP with VFD and DPT (VAV)  
5: High efficiency TEFC with VFD and DPT (VAV)  
6: ECM and DPT ALC Only (VAV)

## DIGIT 19: COOLING COIL

0: None  
A: 4 row Copper Tube Aluminum Fin DX Coil  
B: 6 row Copper Tube Aluminum Fin DX Coil

## DIGIT 20: COMPRESSOR TYPE

0: None  
1: Single Scroll/Single Circuit  
2: Dual Scroll/Dual Circuit  
3: Single Digital Scroll/Single Circuit  
4: Single Digital Scroll and Single Scroll/Dual Circuit  
5: Dual Digital Scroll/Dual Circuit

## DIGIT 21: RESERVE FOR FUTURE USE

0: None

## DIGITS 22–23: REFRIGERATION CONTROLS OPTIONS

00: None  
AE: Hot Gas Bypass (Lead Circuit)  
AF: Hot Gas Bypass (Lag Circuit)  
AG: Hot Gas Bypass (Dual Circuit)  
AH: Hot Gas Reheat (Single Circuit)  
AJ: Hot Gas Reheat (Dual Circuit)  
AK: Hot Gas Reheat, Modulating (Single Circuit)  
AL: Hot Gas Reheat, Modulating (Dual Circuit)  
AM: Liquid Sub Cooling, Switchable, All Circuits

DA: AE + AH  
 DP: AE + AJ  
 DB: AE + AK  
 DV: AE + AL  
 DC: AE + AM  
 DM: AF + AH  
 DQ: AF + AJ  
 DT: AF + AK  
 DW: AF + AL  
 DZ: AF + AM  
 DN: AG + AH  
 DR: AG + AJ

DU: AG + AK  
 DX: AG + AL  
 EU: AG + AM  
 DD: AH + AM  
 DE: AK + AM  
 FA: AE + AH + AM  
 FB: AE + AK + AM  
 FF: AF + AH + AM  
 FJ: AF + AK + AM  
 FG: AG + AH + AM  
 FK: AG + AK + AM

**DIGIT 24: HEATING TYPE**

0: None  
 A: Electric Heat  
 B: Natural Gas Heat  
 D: LP Gas Heat  
 F: Hot Water Heat

**DIGIT 25: ELECTRIC HEATING CAPACITY**

0: None  
 A: 5 kW 240/480/575v – 3.75 kW 208v  
 B: 10 kW 240/480/575v – 7.5 kW 208v  
 C: 15 kW 240/480/575v – 11.25 kW 208v  
 D: 20 kW 240/480/575v – 15 kW 208v  
 E: 25 kW 240/480/575v – 18.75 kW 208v  
 F: 30 kW 240/480/575v – 22.5 kW 208v  
 G: 35 kW 240/480/575v – 26.25 kW 208v  
 H: 40 kW 240/480/575v – 30 kW 208v  
 K: 50 kW 240/480/575v – 37.5 kW 208v  
 M: 60 kW 240/480/575v – 45 kW 208v  
 N: 70 kW 240/480/575v – 52.5 kW 208v  
 P: 80 kW 240/480/575v – 60 kW 208v  
 R: 100 kW 240/480/575v – 75 kW 208v  
 S: 110 kW 240/480/575v – 81.4 kW 208v  
 T: 120 kW 240/480/575v – 90 kW 208v  
 U: 130 kW 240/480/575v – 97.5 kW 208v  
 V: 140 kW 240/480/575v – 105 kW 208v  
 W: 150 kW 240/480/575v – 112.5 kW 208v

**DIGITS 26–27: GAS HEATING CAPACITY**

00: None  
 A1: 75 MBH  
 B1: 100 MBH  
 C1: 150 MBH  
 D1: 200 MBH  
 E1: 250 MBH  
 F1: 300 MBH  
 G1: 350 MBH  
 H1: 400 MBH  
 J1: 500 MBH  
 K1: 600 MBH  
 A2: 100 + 100 MBH  
 G2: 150 + 150 MBH

B2: 200 + 200 MBH  
 C2: 250 + 250 MBH  
 D2: 300 + 300 MBH  
 F2: 350 + 350 MBH  
 E2: 400 + 400 MBH  
 H2: 500 + 500 MBH  
 J2: 600 + 600 MBH  
 A4: (4) 200 MBH  
 B4: (4) 250 MBH  
 C4: (4) 300 MBH  
 D4: (4) 350 MBH  
 E4: (4) 400 MBH

**DIGIT 28: HEATER CONTROL**

0: None  
 1: 1 Stage  
 2: 2 Stage  
 3: 4 Stage  
 9: 8 Stage  
 4: SCR  
 6: Modulating 5:1 NG, 3:1 LPG  
 7: Modulating 10:1 NG, 6:1 LPG  
 8: Modulating 20:1 NG, 12:1 LPG

**DIGIT 29: HEATING GAS SAFETY CONTROLS**

0: None

**DIGIT 30: ENERGY RECOVERY**

0: None  
 A: ECW 244 + 2" 30/30 Filter  
 B: ECW 324 + 2" 30/30 Filter  
 C: ECW 364 + 2" 30/30 Filter  
 D: ECW 424 + 2" 30/30 Filter  
 E: ECW 484 + 2" 30/30 Filter  
 F: ECW 486 + 2" 30/30 Filter  
 G: ECW 544 + 2" 30/30 Filter  
 H: ECW 604 + 2" 30/30 Filter  
 J: ECW 606 + 2" 30/30 Filter  
 K: ECW 664 + 2" 30/30 Filter  
 L: ECW 666 + 2" 30/30 Filter  
 M: ECW 706 + 2" 30/30 Filter  
 N: ECW 724 + 2" 30/30 Filter  
 P: ECW 726 + 2" 30/30 Filter  
 Q: ECW 784 + 2" 30/30 Filter  
 R: ECW 786 + 2" 30/30 Filter  
 S: ECW 7812 + 2" 30/30 Filter  
 T: ECW 844 + 2" 30/30 Filter  
 U: ECW 846 + 2" 30/30 Filter  
 V: ECW 8412 + 2" 30/30 Filter

**DIGIT 31: ENERGY RECOVERY OPTIONS**

0: None (No ECW)  
 A: On/Off Defrost  
 B: VFD Temp Defrost  
 C: Bypass  
 D: A + C  
 E: B + C  
 F: Standard Control  
 G: C + F

**DIGIT 32: VENTILATION**

A: Hood & Birdscreen w/o Damper  
 B: Manual OA Damper w/o Actuator  
 C: Motorized 2-Position OA Damper (Class 1 Rated) w/ 2-Position Actuator (ALC, Field DDC, EM)  
 D: Motorized Proportional OA Damper (Class 1 Rated) w/ 0–10VDC Actuator (ALC, Field DDC)  
 E: Motorized 2-Position OA & RA Dampers (Class 1 Rated) w/ 2-Position Actuators (ALC, Field DDC)  
 F: Motorized OA & RA Dampers (Class 1 Rated) w/ 0–10VDC Actuators (ALC, Field DDC)

**DIGITS 33–34: EXHAUST BLOWER SIZE**

00: None  
 AC: 12" DD, Airfoil  
 AD: 14" DD, Airfoil  
 AE: 16" DD, Airfoil  
 AF: 18" DD, Airfoil  
 AG: 20" DD, Airfoil  
 AH: 22" DD, Airfoil  
 AJ: 25" DD, Airfoil  
 BA: 10" DD, BI  
 BB: 11" DD, BI  
 BC: 12" DD, BI  
 BD: 14" DD, BI  
 BE: 16" DD, BI  
 BF: 18" DD, BI  
 BG: 20" DD, BI  
 BH: 22" DD, BI  
 BJ: 25" DD, BI  
 CA: 280mm Single ECM (CIW.087.5FA)  
 CR: 355mm Single ECM (CIB.112.6FF IE)

CM: 450mm Single ECM (CIB.140.6IF)  
 DA: 280mm Dual ECM (CIW.087.5FA)  
 DK: 355mm Dual ECM (CIB.112.6FF IE)  
 EA: Dual 14" DD, BI  
 EB: Dual 14" DD, AF  
 EC: Dual 16" DD, BI  
 ED: Dual 16" DD, AF  
 EE: Dual 18" DD, BI  
 EF: Dual 18" DD, AF  
 EG: Dual 20" DD, BI  
 EH: Dual 20" DD, AF

**DIGIT 35: EXHAUST BLOWER OPTIONS**

0: None (No Exhaust)  
 D: Gravity Relief Damper (ECM and No Exhaust Fan only)  
 E: Actuator Damper (ECM and No Exhaust Fan only)  
 H: Gravity Relief Damper + Cometer (ECM only)  
 L: Actuator Damper + Cometer (ECM only)  
 F: Gravity Relief Damper + Rubber Isolation (Comefri only)  
 J: Actuator Damper + Rubber Isolation (Comefri only)  
 M: Gravity Relief Damper + Rubber Isolation + Piezo Ring (Comefri only)  
 N: Actuator Damper + Rubber Isolation + Piezo Ring (Comefri only)  
 G: Gravity Relief Damper + Spring Isolation (Comefri only)  
 K: Actuator Damper + Spring Isolation (Comefri only)  
 P: Gravity Relief Damper + Spring Isolation + Piezo Ring (Comefri only)  
 Q: Actuator Damper + Spring Isolation + Piezo Ring (Comefri only)  
 T: Gravity Relief Damper + Rigid Mount (Comefri only)  
 U: Actuator Damper + Rigid Mount (Comefri only)  
 V: Gravity Relief Damper + Rigid Mount + Piezo Ring (Comefri only)  
 W: Actuator Damper + Rigid Mount + Piezo Ring (Comefri only)

**DIGIT 36: EXHAUST MOTOR SIZE**

0: None  
 A: 1.0 HP  
 B: 1.5 HP  
 C: 2.0 HP  
 D: 3.0 HP  
 E: 5.0 HP  
 F: 7.5 HP  
 G: 10.0 HP  
 H: 15.0 HP  
 M: ECM

**DIGIT 37: EXHAUST MOTOR TYPE**

1: High efficiency ODP with VFD (CV)  
 2: High efficiency TEFC with VFD (CV)  
 3: ECM (CV)  
 4: High efficiency ODP with VFD and DPT (VAV)  
 5: High efficiency TEFC with VFD and DPT (VAV)  
 6: ECM and DPT ALC Only (VAV)

## Nomenclature (Cont'd)

### DIGITS 38–39: CORROSION PROTECTION

00: None  
 A1: Corrosion Protection Coating - Cabinet  
 B1: Corrosion Protection Coating - Evap Coil  
 D1: Corrosion Protection Coating - Reheat Coil  
 E1: Corrosion Protection Coating - Subcooling Coil  
 F1: Corrosion Protection Coating - Condenser Coil  
 G1: Cupronickel Water Coil  
 AA: A1 + B1  
 AB: A1 + C1  
 AC: A1 + D1  
 AD: A1 + E1  
 AE: A1 + F1  
 AF: A1 + G1  
 AG: B1 + D1  
 AH: B1 + E1  
 AJ: B1 + F1  
 AK: B1 + G1  
 AL: D1 + E1  
 AM: D1 + F1  
 AN: D1 + G1  
 AP: E1 + F1  
 AQ: E1 + G1  
 BA: A1 + B1 + D1  
 BB: A1 + B1 + E1  
 BC: A1 + B1 + F1  
 BD: A1 + B1 + G1  
 BE: A1 + D1 + E1  
 BF: A1 + D1 + F1  
 BG: A1 + D1 + G1  
 BH: A1 + E1 + F1  
 BJ: A1 + E1 + G1  
 BK: B1 + D1 + E1  
 BL: B1 + D1 + F1  
 BM: B1 + D1 + G1  
 BN: B1 + E1 + F1  
 BP: B1 + E1 + G1  
 BQ: D1 + E1 + F1  
 BR: D1 + E1 + G1  
 CA: A1 + B1 + D1 + E1  
 CB: A1 + B1 + D1 + F1  
 CC: A1 + B1 + D1 + G1  
 CD: A1 + D1 + E1 + F1  
 CE: A1 + D1 + E1 + G1  
 CF: B1 + D1 + E1 + F1  
 CG: B1 + D1 + E1 + G1  
 DA: A1 + B1 + D1 + E1 + F1  
 DB: A1 + B1 + D1 + E1 + G1

**DIGITS 40–41: MAINTENANCE OPTIONS**  
 00: None  
 A1: 115V Convenience Outlet (Field Wired)  
 B1: 115V Convenience Outlet (Factory Wired)  
 C1: Magnahelic Gauge (One) by Rule  
 D1: Magnahelic Gauge (Two) by Rule  
 E1: Magnahelic Gauge (Three) by Rule  
 F1: Clogged Filter Indicator  
 G1: Condensate Overflow Switch  
 AA: A1 + C1  
 AC: A1 + E1

AD: A1 + F1  
 AE: A1 + G1  
 BA: B1 + C1  
 BB: B1 + D1  
 BC: B1 + E1  
 BD: B1 + F1  
 BE: B1 + G1  
 CA: C1 + F1  
 CB: C1 + G1  
 DB: D1 + F1  
 DA: D1 + G1  
 EB: E1 + F1  
 EA: E1 + G1  
 FA: F1 + G1  
 JA: A1 + C1 + F1  
 JB: A1 + C1 + G1  
 JC: A1 + D1 + F1  
 JF: A1 + D1 + G1  
 JJ: A1 + E1 + F1  
 JK: A1 + E1 + G1  
 JL: A1 + F1 + G1  
 KA: B1 + C1 + F1  
 KB: B1 + C1 + G1  
 KE: B1 + D1 + F1  
 KF: B1 + D1 + G1  
 KJ: B1 + E1 + F1  
 KK: B1 + E1 + G1  
 KL: B1 + F1 + G1  
 LA: C1 + F1 + G1  
 MA: D1 + F1 + G1  
 NA: E1 + F1 + G1  
 RA: A1 + C1 + F1 + G1  
 RG: A1 + D1 + F1 + G1  
 RN: A1 + E1 + F1 + G1  
 SA: B1 + C1 + F1 + G1  
 SG: B1 + D1 + F1 + G1  
 SN: B1 + E1 + F1 + G1

### DIGITS 42–43: POWER OPTIONS

00: None  
 AA: 30 Amp 240V NF Disconnect  
 AB: 30 Amp 240V, 15A Fused Disconnect  
 AC: 30 Amp 240V, 20A Fused Disconnect  
 AD: 30 Amp 240V, 25A Fused Disconnect  
 AE: 30 Amp 240V, 30A Fused Disconnect  
 BA: 60 Amp 240V NF Disconnect  
 BB: 60 Amp 240V, 35A Fused Disconnect  
 BC: 60 Amp 240V, 40A Fused Disconnect  
 BD: 60 Amp 240V, 45A Fused Disconnect  
 BE: 60 Amp 240V, 50A Fused Disconnect  
 BF: 60 Amp 240V, 60A Fused Disconnect  
 CA: 100 Amp 240V NF Disconnect  
 CB: 100 Amp 240V, 70A Fused Disconnect  
 CC: 100 Amp 240V, 80A Fused Disconnect  
 CD: 100 Amp 240V, 90A Fused Disconnect  
 CE: 100 Amp 240V, 100A Fused Disconnect  
 DA: 200 Amp 240V NF Disconnect  
 DB: 200 Amp 240V, 110A Fused Disconnect  
 DC: 200 Amp 240V, 125A Fused Disconnect  
 DD: 200 Amp 240V, 150A Fused Disconnect  
 DE: 200 Amp 240V, 175A Fused Disconnect  
 DF: 200 Amp 240V, 200A Fused Disconnect  
 EA: 400 Amp 240V NF Disconnect  
 EB: 400 Amp 240V, 225A Fused Disconnect  
 EC: 400 Amp 240V, 250A Fused Disconnect  
 ED: 400 Amp 240V, 300A Fused Disconnect  
 EE: 400 Amp 240V, 350A Fused Disconnect

EF: 400 Amp 240V, 400A Fused Disconnect  
 FA: 30 Amp 600V NF Disconnect  
 FB: 30 Amp 600V, 15A Fused Disconnect  
 FC: 30 Amp 600V, 20A Fused Disconnect  
 FD: 30 Amp 600V, 25A Fused Disconnect  
 FE: 30 Amp 600V, 30A Fused Disconnect  
 GA: 60 Amp 600V NF Disconnect  
 GB: 60 Amp 600V, 35A Fused Disconnect  
 GC: 60 Amp 600V, 40A Fused Disconnect  
 GD: 60 Amp 600V, 45A Fused Disconnect  
 GE: 60 Amp 600V, 50A Fused Disconnect  
 GF: 60 Amp 600V, 60A Fused Disconnect  
 HA: 100 Amp 600V NF Disconnect  
 HB: 100 Amp 600V, 70A Fused Disconnect  
 HC: 100 Amp 600V, 80A Fused Disconnect  
 HD: 100 Amp 600V, 90A Fused Disconnect  
 HE: 100 Amp 600V, 100A Fused Disconnect  
 JA: 200 Amp 600V NF Disconnect  
 JB: 200 Amp 600V, 110A Fused Disconnect  
 JC: 200 Amp 600V, 125A Fused Disconnect  
 JD: 200 Amp 600V, 150A Fused Disconnect  
 JE: 200 Amp 600V, 175A Fused Disconnect  
 JF: 200 Amp 600V, 200A Fused Disconnect  
 KA: 400 Amp 600V NF Disconnect  
 KB: 400 Amp 600V, 225A Fused Disconnect  
 KC: 400 Amp 600V, 250A Fused Disconnect  
 KD: 400 Amp 600V, 300A Fused Disconnect  
 KE: 400 Amp 600V, 350A Fused Disconnect  
 KF: 400 Amp 600V, 400A Fused Disconnect  
 LA: 100 Amp Rotary NF Disconnect  
 LB: 250 Amp Rotary NF Disconnect  
 LC: 400 Amp Rotary NF Disconnect

### DIGITS 44–45: CONTROL OPTIONS

00: None  
 AA: Exhaust Fan Interlock  
 AB: Energy Management Relay  
 BA: AA + AB

### DIGITS 46–47: SAFETY CONTROLS

00: None  
 AA: High Temperature Alarm (Firestat)  
 AB: Factory Installed Smoke Detector  
 AE: Carbon Dioxide Detector  
 BA: AA + AB  
 BD: AA + AE  
 BG: AB + AE  
 CC: AA + AB + AE

### DIGIT 48: PRE-FILTER

A: 2" MERV8 Pleated  
 B: 4" MERV8 Pleated  
 C: 4" MERV11 Pleated  
 D: 4" MERV14 Pleated  
 E: 4" MERV8 Pleated w/ 2" MERV8 Pleated  
 F: 4" MERV11 Pleated w/ 2" MERV8 Pleated  
 G: 4" MERV14 Pleated w/ 2" MERV8 Pleated  
 H: 2" Metal Mesh  
 J: 4" MERV8 Pleated w/ 2" Metal Mesh  
 K: 4" MERV11 Pleated w/ 2" Metal Mesh  
 L: 4" MERV14 Pleated w/ 2" Metal Mesh

### DIGIT 49: RESERVE FOR FUTURE USE

0: None

**DIGITS 50–51: ALC OPTIONS**

Note: A Zone Sensor w/ Humidity

Sensor must be selected for JRM units  
00: None

AA: Bacview (Ship With)

AB: ZS Standard Zone Sensor

AC: ZS Standard Zone Sensor w/ Humidity

AD: ZS Standard Zone Sensor w/ CO2

AE: ZS Standard Zone Sensor w/ Humidity  
and CO2

AF: ZS Plus Zone Sensor

AG: ZS Plus Zone Sensor w/ Humidity

AH: ZS Plus Zone Sensor w/ CO2

AJ: ZS Plus Zone Sensor w/ Humidity and  
CO2

AK: ZS Pro Zone Sensor

AL: ZS Pro Zone Sensor w/ Humidity

AM: ZS Pro Zone Sensor w/ CO2

AN: ZS Pro Zone Sensor w/ Humidity and  
CO2

AP: Smoke Detector

BA: AA + AB

BB: AA + AC

BC: AA + AD

BD: AA + AE

BE: AA + AF

BF: AA + AG

BG: AA + AH

BH: AA + AJ

BJ: AA + AK

BK: AA + AL

BL: AA + AM

BM: AA + AN

CA: AA + AP

CB: AB + AP

CC: AC + AP

CD: AD + AP

CE: AE + AP

CF: AF + AP

CG: AG + AP

CH: AH + AP

CJ: AJ + AP

CK: AK + AP

CL: AL + AP

CM: AM + AP

CN: AN + AP

DA: AA + AB + AP

DB: AA + AC + AP

DC: AA + AD + AP

DD: AA + AE + AP

DE: AA + AF + AP

DF: AA + AG + AP

DG: AA + AH + AP

GH: AA + AJ + AP

DJ: AA + AK + AP

DK: AA + AL + AP

DL: AA + AM + AP

DM: AA + AN + AP

BK: B Cab Roof Curb 14" w/ 4 Cond Fan  
No Exhaust

BL: B Cab Roof Curb 14" Wtr Source No Exhaust

FA: BXL Cab Roof Curb 14" Air Handler w/ Exhaust

FB: BXL Cab Roof Curb 14" w/ 1 Cond Fan  
w/ ExhaustFC: BXL Cab Roof Curb 14" w/ 2 Cond Fan  
w/ ExhaustFD: BXL Cab Roof Curb 14" w/ 3 Cond Fan  
w/ ExhaustFE: BXL Cab Roof Curb 14" w/ 4 Cond Fan  
w/ Exhaust

FF: BXL Cab Roof Curb 14" Wtr Source w/ Exhaust

FG: BXL Cab Roof Curb 14" Air Handler  
No ExhaustFH: BXL Cab Roof Curb 14" w/ 1 Cond Fan  
No ExhaustFI: BXL Cab Roof Curb 14" w/ 2 Cond Fan  
No ExhaustFJ: BXL Cab Roof Curb 14" w/ 3 Cond Fan  
No ExhaustFK: BXL Cab Roof Curb 14" w/ 4 Cond Fan  
No ExhaustFL: BXL Cab Roof Curb 14" Wtr Source  
No Exhaust

CA: C Cab Roof Curb 14" Air Handler w/ Exhaust

CB: C Cab Roof Curb 14" w/ 2 Cond Fan  
w/ ExhaustCC: C Cab Roof Curb 14" w/ 3 Cond Fan  
w/ ExhaustCD: C Cab Roof Curb 14" w/ 4 Cond Fan  
w/ ExhaustCE: C Cab Roof Curb 14" w/ 6 Cond Fan  
w/ Exhaust

CF: C Cab Roof Curb 14" Wtr Source w/ Exhaust

CG: C Cab Roof Curb 14" Air Handler No Exhaust

CH: C Cab Roof Curb 14" w/ 2 Cond Fan  
No ExhaustCI: C Cab Roof Curb 14" w/ 3 Cond Fan  
No ExhaustCJ: C Cab Roof Curb 14" w/ 4 Cond Fan  
No ExhaustCK: C Cab Roof Curb 14" w/ 6 Cond Fan  
No Exhaust

CL: C Cab Roof Curb 14" Wtr Source No Exhaust

GA: CXL Cab Roof Curb 14" Air Handler  
w/ ExhaustGB: CXL Cab Roof Curb 14" w/ 2 Cond Fan  
w/ ExhaustGC: CXL Cab Roof Curb 14" w/ 3 Cond Fan  
w/ ExhaustGD: CXL Cab Roof Curb 14" w/ 4 Cond Fan  
w/ ExhaustGE: CXL Cab Roof Curb 14" w/ 6 Cond Fan  
w/ ExhaustGF: CXL Cab Roof Curb 14" Water Source  
w/ ExhaustGG: CXL Cab Roof Curb 14" Air Handler  
No ExhaustGH: CXL Cab Roof Curb 14" w/ 2 Cond Fan  
No ExhaustGI: CXL Cab Roof Curb 14" w/ 3 Cond Fan  
No ExhaustGJ: CXL Cab Roof Curb 14" w/ 4 Cond Fan  
No ExhaustGK: CXL Cab Roof Curb 14" w/ 6 Cond Fan  
No ExhaustGL: CXL Cab Roof Curb 14" Water Source  
No Exhaust

DA: D Cab Roof Curb 14" Air Handler w/ Exhaust

DB: D Cab Roof Curb 14" w/ 4 Cond Fan  
w/ ExhaustDC: D Cab Roof Curb 14" w/ 6 Cond Fan  
w/ ExhaustDD: D Cab Roof Curb 14" w/ 6 Oversized Cond  
Fan w/ Exhaust

DE: D Cab Roof Curb 14" Wtr Source w/ Exhaust

DF: D Cab Roof Curb 14" Air Handler No Exhaust

DG: D Cab Roof Curb 14" w/ 4 Cond Fan  
No ExhaustDH: D Cab Roof Curb 14" w/ 6 Cond Fan  
No ExhaustDI: D Cab Roof Curb 14" w/ 6 Oversized Cond Fan  
No Exhaust

DJ: D Cab Roof Curb 14" Wtr Source No Exhaust

HA: DXL Cab Roof Curb 14" Air Handler w/  
ExhaustHB: DXL Cab Roof Curb 14" w/ 4 Cond Fan  
w/ ExhaustHC: DXL Cab Roof Curb 14" w/ 6 Cond Fan  
w/ ExhaustHD: DXL Cab Roof Curb 14" w/ 6 Oversized Cond  
Fan w/ ExhaustHE: DXL Cab Roof Curb 14" Water Source  
w/ ExhaustHF: DXL Cab Roof Curb 14" Air Handler No  
ExhaustHG: DXL Cab Roof Curb 14" w/ 4 Cond Fan  
No ExhaustHH: DXL Cab Roof Curb 14" w/ 6 Cond Fan  
No ExhaustHI: DXL Cab Roof Curb 14" w/ 6 Oversized Cond  
Fan No ExhaustHJ: DXL Cab Roof Curb 14" Water Source No  
Exhaust

EA: E Cab Roof Curb 14" Air Handler w/ Exhaust

EB: E Cab Roof Curb 14" w/ 4 Cond Fan  
w/ ExhaustEC: E Cab Roof Curb 14" w/ 6 Cond Fan  
w/ ExhaustED: E Cab Roof Curb 14" w/ 6 Oversized Cond  
Fan w/ Exhaust

EE: E Cab Roof Curb 14" Water Source w/ Exhaust

EF: E Cab Roof Curb 14" Air Handler No Exhaust

EG: E Cab Roof Curb 14" w/ 4 Cond Fan  
No ExhaustEH: E Cab Roof Curb 14" w/ 6 Cond Fan  
No ExhaustEI: E Cab Roof Curb 14" w/ 6 Oversized Cond Fan  
No Exhaust

EJ: E Cab Roof Curb 14" Wtr Source No Exhaust

JA: EXL Cab Roof Curb 14" Air Handler w/ Exhaust

JB: EXL Cab Roof Curb 14" w/ 4 Cond Fan  
w/ ExhaustJC: EXL Cab Roof Curb 14" w/ 6 Cond Fan  
w/ ExhaustJD: EXL Cab Roof Curb 14" w/ 6 Oversized Cond  
Fan w/ Exhaust

JE: EXL Cab Roof Curb 14" Wtr Source w/ Exhaust

JF: EXL Cab Roof Curb 14" Air Handler No  
ExhaustJG: EXL Cab Roof Curb 14" w/ 4 Cond Fan  
No ExhaustJH: EXL Cab Roof Curb 14" w/ 6 Cond Fan  
No ExhaustJI: EXL Cab Roof Curb 14" w/ 6 Oversized Cond  
Fan No ExhaustJJ: EXL Cab Roof Curb 14" Water Source  
No Exhaust**DIGITS 52–53: JR ROOF CURBS**

00: None

AA: A Cab Roof Curb 14" Air Handler w/ Exhaust

AB: A Cab Roof Curb 14" w/ 1 Cond Fan  
w/ ExhaustAC: A Cab Roof Curb 14" w/ 2 Cond Fan  
w/ Exhaust

AD: A Cab Roof Curb 14" Air Handler No Exhaust

AE: A Cab Roof Curb 14" w/ 1 Cond Fan  
No ExhaustAF: A Cab Roof Curb 14" w/ 2 Cond Fan  
No Exhaust

BA: B Cab Roof Curb 14" Air Handler w/ Exhaust

BB: B Cab Roof Curb 14" w/ 1 Cond Fan  
w/ ExhaustBC: B Cab Roof Curb 14" w/ 2 Cond Fan  
w/ ExhaustBD: B Cab Roof Curb 14" w/ 3 Cond Fan  
w/ ExhaustBE: B Cab Roof Curb 14" w/ 4 Cond Fan  
w/ Exhaust

BF: B Cab Roof Curb 14" Water Source w/ Exhaust

BG: B Cab Roof Curb 14" Air Handler No Exhaust

BH: B Cab Roof Curb 14" w/ 1 Cond Fan  
No ExhaustBI: B Cab Roof Curb 14" w/ 2 Cond Fan  
No ExhaustBJ: B Cab Roof Curb 14" w/ 3 Cond Fan  
No ExhaustBK: B Cab Roof Curb 14" w/ 4 Cond Fan  
No ExhaustBL: B Cab Roof Curb 14" w/ 6 Cond Fan  
No Exhaust

CA: C Cab Roof Curb 14" Air Handler w/ Exhaust

CB: C Cab Roof Curb 14" w/ 2 Cond Fan  
w/ ExhaustCC: C Cab Roof Curb 14" w/ 3 Cond Fan  
w/ ExhaustCD: C Cab Roof Curb 14" w/ 4 Cond Fan  
w/ ExhaustCE: C Cab Roof Curb 14" w/ 6 Cond Fan  
w/ Exhaust

CF: C Cab Roof Curb 14" Wtr Source w/ Exhaust

CG: C Cab Roof Curb 14" Air Handler No Exhaust

CH: C Cab Roof Curb 14" w/ 2 Cond Fan  
No ExhaustCI: C Cab Roof Curb 14" w/ 3 Cond Fan  
No ExhaustCJ: C Cab Roof Curb 14" w/ 4 Cond Fan  
No ExhaustCK: C Cab Roof Curb 14" w/ 6 Cond Fan  
No Exhaust

CL: C Cab Roof Curb 14" Wtr Source No Exhaust

GA: CXL Cab Roof Curb 14" Air Handler  
w/ ExhaustGB: CXL Cab Roof Curb 14" w/ 2 Cond Fan  
w/ ExhaustGC: CXL Cab Roof Curb 14" w/ 3 Cond Fan  
w/ ExhaustGD: CXL Cab Roof Curb 14" w/ 4 Cond Fan  
w/ ExhaustGE: CXL Cab Roof Curb 14" w/ 6 Cond Fan  
w/ ExhaustGF: CXL Cab Roof Curb 14" Water Source  
w/ ExhaustGG: CXL Cab Roof Curb 14" Air Handler  
No ExhaustGH: CXL Cab Roof Curb 14" w/ 2 Cond Fan  
No ExhaustGI: CXL Cab Roof Curb 14" w/ 3 Cond Fan  
No ExhaustGJ: CXL Cab Roof Curb 14" w/ 4 Cond Fan  
No ExhaustGK: CXL Cab Roof Curb 14" w/ 6 Cond Fan  
No ExhaustGL: CXL Cab Roof Curb 14" Water Source  
No Exhaust

DA: D Cab Roof Curb 14" Air Handler w/ Exhaust

DB: D Cab Roof Curb 14" w/ 4 Cond Fan  
w/ ExhaustDC: D Cab Roof Curb 14" w/ 6 Cond Fan  
w/ ExhaustDD: D Cab Roof Curb 14" w/ 6 Oversized Cond  
Fan w/ Exhaust

DE: D Cab Roof Curb 14" Wtr Source w/ Exhaust

DF: D Cab Roof Curb 14" Air Handler No Exhaust

DG: D Cab Roof Curb 14" w/ 4 Cond Fan  
No ExhaustDH: D Cab Roof Curb 14" w/ 6 Cond Fan  
No ExhaustDI: D Cab Roof Curb 14" w/ 6 Oversized Cond Fan  
No Exhaust

DJ: D Cab Roof Curb 14" Wtr Source No Exhaust

HA: DXL Cab Roof Curb 14" Air Handler w/  
ExhaustHB: DXL Cab Roof Curb 14" w/ 4 Cond Fan  
w/ ExhaustHC: DXL Cab Roof Curb 14" w/ 6 Cond Fan  
w/ ExhaustHD: DXL Cab Roof Curb 14" w/ 6 Oversized Cond  
Fan w/ ExhaustHE: DXL Cab Roof Curb 14" Water Source  
w/ ExhaustHF: DXL Cab Roof Curb 14" Air Handler No  
ExhaustHG: DXL Cab Roof Curb 14" w/ 4 Cond Fan  
No ExhaustHH: DXL Cab Roof Curb 14" w/ 6 Cond Fan  
No ExhaustHI: DXL Cab Roof Curb 14" w/ 6 Oversized Cond  
Fan No ExhaustHJ: DXL Cab Roof Curb 14" Water Source No  
Exhaust

EA: E Cab Roof Curb 14" Air Handler w/ Exhaust

EB: E Cab Roof Curb 14" w/ 4 Cond Fan  
w/ ExhaustEC: E Cab Roof Curb 14" w/ 6 Cond Fan  
w/ ExhaustED: E Cab Roof Curb 14" w/ 6 Oversized Cond  
Fan w/ Exhaust

EE: E Cab Roof Curb 14" Water Source w/ Exhaust

EF: E Cab Roof Curb 14" Air Handler No Exhaust

EG: E Cab Roof Curb 14" w/ 4 Cond Fan  
No ExhaustEH: E Cab Roof Curb 14" w/ 6 Cond Fan  
No ExhaustEI: E Cab Roof Curb 14" w/ 6 Oversized Cond Fan  
No Exhaust

EJ: E Cab Roof Curb 14" Wtr Source No Exhaust

JA: EXL Cab Roof Curb 14" Air Handler w/ Exhaust

JB: EXL Cab Roof Curb 14" w/ 4 Cond Fan  
w/ ExhaustJC: EXL Cab Roof Curb 14" w/ 6 Cond Fan  
w/ ExhaustJD: EXL Cab Roof Curb 14" w/ 6 Oversized Cond  
Fan w/ Exhaust

JE: EXL Cab Roof Curb 14" Wtr Source w/ Exhaust

JF: EXL Cab Roof Curb 14" Air Handler No  
ExhaustJG: EXL Cab Roof Curb 14" w/ 4 Cond Fan  
No ExhaustJH: EXL Cab Roof Curb 14" w/ 6 Cond Fan  
No ExhaustJI: EXL Cab Roof Curb 14" w/ 6 Oversized Cond  
Fan No ExhaustJJ: EXL Cab Roof Curb 14" Water Source  
No Exhaust

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## Introduction

### **The YORK Dedicated Outdoor Air System (DOAS) Single Package Units – designed to meet the demands of the market for today and tomorrow.**

A DOAS from YORK delivers clean, dehumidified outside air in all weather and climate conditions. New standards for efficiency and high-performance green buildings continue to evolve. With a YORK DOAS, you can meet ASHRAE requirements for fresh air and energy efficiency.

Application Characteristics:

- Up to 100% of outside air
- Continuous conditioning of the air
- Extended operation time (up to 24/7)
- Precise unit CFM delivery

Count on high efficiency and proven performance in both heating and cooling conditions. Get the quality performance you expect from YORK equipment including:

- Energy savings no matter what the season
- Robust construction for reliability and long life
- More factory-installed options for easy installation

#### **DESCRIPTION OF OPERATION**

The YORK DOAS is a factory-assembled packaged unit that can operate within a broad range of ambient conditions and introduce ventilation air into a building at neutral conditions. The unit can be configured to utilize straight cooling, gas/electric/hot water heating, or an air/water source heat pump. It consists of matched refrigeration and air moving components (system controls, compressor(s), evaporator section, condensing section and fan(s)) designed to cool, heat, and/or dehumidify 100% outside air and/or mixed air.

The unit may be provided with several different options and controls to meet various application requirements including optional hot gas reheat and liquid subcooling, energy recovery wheel, and supplemental heat (gas, electric, or hot water) with variable air volume delivery.

#### **DOAS APPLICATION OVERVIEW**

A DOAS is a special HVAC system in which its purpose is to treat outside air for ventilation of air in a space or to an ancillary cooling and heating system. A common application of the JR series is for the use of exclusively treating outside air in order to achieve a high indoor air quality. Poor indoor air quality can lead to negative impacts on the building occupants, indoor components, and overall condition of the building.

## ***Introduction (Cont'd)***

A DOAS unit should always be used in conjunction with ancillary HVAC equipment, serving the same space. The DOAS unit will provide the conditioned ventilation air but will not maintain space temperature or space relative humidity setpoints. As described above, DOAS units are used differently than traditional HVAC units. Traditional HVAC units are designed to focus on maintaining zone temperature, while DOAS units are tasked with providing zone ventilation and dehumidification of outside air. The DOAS is designed specifically to prioritize zone ventilation and dehumidification of incoming air over the zone conditioning. Under no circumstances should a DOAS unit be expected to maintain the zone's temperature and humidity setpoints.

Having a dedicated system for ventilation ensures that the exact amount of ventilation air is delivered to each zone. This helps to maintain high indoor air quality while minimizing energy consumption. Separating the conditioning of ventilation air and zone conditioning air also simplifies sizing and selection of each unit, helping to ensure proper zone comfort. This separation of loads can also help reduce overall system capacity, which saves on first costs and energy costs.



## ***Features and Benefits***

### **HEATING**

#### **Modulating or Staged Gas Heat**

- Standard stainless steel construction
- Suitable for natural or propane gas as an option
- Modulating gas heat is available 5:1, 10:1, 20:1 turndown
- Up to eight staged gas control

#### **Hot Water Heat**

- Two-row hot water coil
- Aluminum construction with air vents installed upstream of the evaporator coil
- Coil connection stubs located inside the unit cabinet

#### **Electric Heat**

Factory-installed electric heat shall have:

- Staged heat control (one, two, or four stages)
- or
- Silicon controlled rectifier (SCR) control providing infinite capacity adjustment

### **ADVANCE SINGLE PACKAGE UNIT CONTROLLER**

- Microprocessor-based single package controller
- Includes a field-installed space temperature sensor with communication port
  - Utilizes BACnet and Modbus
  - LonWorks protocol capable
- Provides an alarm indicator and an audible alarm signal
  - Displays a current alarm list and an alarm history list
- Compressor minimum run time (3 minutes) and minimum off time (5 minutes)
- Has service run test capability
- Has a service diagnostic mode

## ***Features and Benefits (Cont'd)***

### **FACTORY AIRFLOW CONFIGURATIONS**

#### **Supply and Return**

- Vertical supply and vertical return
- Horizontal supply and vertical return
- Vertical supply and side return
- Horizontal supply and side return
- Vertical supply and no return
- Horizontal supply and no return

### **DOUBLE-WALL CONSTRUCTION**

Double wall construction of 2" thick, R-13 closed cell foam insulation to reduce heat transfer losses

### **ENVIRONMENTAL PROTECTION**

Optional harsh environment protection coating on coils and cabinet that exceeds 10,000 Hour Salt Spray Test

### **FILTERS SECTION**

Unit has multiple filtration options to improve Indoor Air Quality (IAQ)

- 2" MERV8 Pleated
- 4" MERV8 Pleated
- 4" MERV11 Pleated
- 4" MERV14 Pleated
- 4" MERV8 Pleated with 2" MERV8 Pleated
- 4" MERV11 Pleated with 2" MERV8 Pleated
- 4" MERV14 Pleated with 2" MERV8 Pleated
- 2" Metal Mesh
- 4" MERV8 Pleated with 2" Metal Mesh
- 4" MERV11 Pleated with 2" Metal Mesh
- 4" MERV14 Pleated with 2" Metal Mesh

### **SCROLL COMPRESSORS**

- Digital and standard scroll compressors
  - Digital scroll compressors modulate down to 10% capacity
- Multiple options available for compressor configuration

## SUPPLY FAN SECTION

- Double Width, Double Inlet (DWDI) Backward Inclined Supply Fan
  - Moves high volume of air at a variety of static pressures.
- Airfoil Supply Fan
  - Option offers higher efficiency and lower sound in certain applications.

## VENTILATION

- Modulating Economizer outdoor air and return air dampers helps improve IAQ in your building
- Motorized OA and or R/A dampers
- Available Manual Damper

## EVAPORATOR AND CONDENSER COIL

- Minimum four row with optional six row coil available
- Evaporator and condenser coils fabricated of aluminum fins and mechanically expanded, seamless copper refrigeration tubing to help ensure long-term efficient heat transfer from tube to fin

## MODULATING HOT GAS REHEAT

- Coil shall be available on the lead circuit only or with a second coil for reheat both refrigerant circuits
- Liquid Subcooling Coil
  - Optional factory-installed liquid sub-cooling coil on all circuits
  - Operation of sub-cooling coil shall produce between 6.0 °F and 10.0 °F reheat

## ENERGY RECOVERY

The factory-installed enthalpy wheel shall be certified to meet the requirements of AHRI Standard 1060 and shall be AHRI listed.

The enthalpy wheel shall be constructed of corrugated synthetic fibrous media with a desiccant intimately bound and uniformly and permanently dispersed throughout the matrix structure of the media.

Energy wheel defrost control and air bypass shall be available including VFD option.

## OPTIONAL FACTORY FEATURES

- Mixed Outside Air Applications (down to 30% OA)
- Water Source Heat Pump operation
- Air Source Heat Pump operation

## ***Features and Benefits (Cont'd)***

- Up to 70 ton capacity
- Multiple cabinet configurations with optional condenser size
- Factory Airflow configurations (eliminates horizontal curb)
- Multiple optional supply horse power and blower sizes
- High efficiency ODP motor with VFD
- High efficiency TEFC motor with VFD
- ECM supply motor
- Standard Scroll compressor operation
- Single or Dual digital scroll options
- Hot Gas Bypass single or dual circuit
- 5kw–150kw electric heat capacity (staged, SCR control)
- 75mbh–1600mbh gas heat capacity (5:1,10:1,20:1 turndown)
- VFD Energy Recovery Temperature Defrost
- Energy Recovery air bypass for economizer operation
- Multiple exhaust fan blower sizes (Airfoil and/or Backward Incline)
- Multiple exhaust fan blower type (ODP/TEFC with VFD)
- Corrosion Protection Coating Component
- Cupronickel Water Coil
- Internal unit coating for coast regions or corrosive environments
- Convenience Outlet (field or factory wired)
- Magnehelic gauge
- Fused or Nonfused Disconnect
- 2" and 4" MERV 8,11,14 filters
- Zone Sensors with CO<sub>2</sub> and or humidity sensing
- Smoke Detector
- Roof Curb

# Application Data

## LOCATION

## RIGGING

Proper rigging and handling of the equipment is mandatory during unloading and setting it into position to retain warranty status. Rigging and lifting should only be done by a professional rigger in accordance with a written rigging and lifting plan. The most appropriate rigging and lifting method will depend on job specific factors, such as the rigging equipment available and site needs. Therefore, a professional rigger must determine the rigging and lifting method to be used, and it is beyond the scope of this guide to specify rigging and lifting details.

Spreader bars must be used by cranes to prevent damage to the unit casing. All lifting lugs must be used when lifting the unit. Fork lifts will damage the unit and are not recommended. Care must be taken to keep the unit in the upright position during rigging and to prevent damage to the watertight seams in the unit casing. Avoid unnecessary jarring or rough handling.

## UNIT PLACEMENT

The unit is typically mounted on a curb with duct work and utility connections usually going through the curb. It may also be pad-mounted. (Contact factory for specific instructions if unit is to be mounted in a different way [e.g. on mounting stand].)

Select a location where external water drainage cannot collect around the unit. Locate the unit so roof runoff water does not pour directly on the unit. Provide gutter or other shielding at roof level. Where snowfall is anticipated, mount the unit so all intakes and discharges are above the maximum snow depth for the area. Unit shall not be installed with inlet opening facing into the prevailing wind direction in order to help prevent the possibility of moisture entrainment.

When installed at ground level, the unit should be mounted on a level concrete slab, which should extend at least 2" (5.1 cm) beyond the unit on all sides. The top of the slab should be 2" (5.1 cm) above the ground level. The depth of the slab below the ground level and its structural design is governed by the type of soil and climatic conditions. The slab must not be in contact with any part of the building wall or foundation. The space between the slab and the building wall prevents the possibility of transmitting vibration to the building.

When installing a unit on the roof of a building, the structural members supporting the unit must be sufficiently strong for the weight of the unit and mounting rails. Structural members supporting the unit must be sufficiently strong for the combined weight of the installation. Transmission of sound into the building can be a problem if the structure is not strong enough.

Do not install the unit in an indoor location. Do not locate the air inlets near contaminated air or near exhaust vents. For optimal operation of the unit, adequate combustion and ventilation air must be provided in compliance with Section 5.3 (Air for Combustion and Ventilation) of the National Fuel Gas Code, ANSI Z223.1 (American National Standards Institute).

## Application Data (Cont'd)

### OPTIMIZING JR CABINET SELECTIONS

Use the following matrix for determining an optimal JR Cabinet when price is a concern.

**TABLE 1 - JR CABINET SELECTION GUIDE**

| CABINET   | CFM RANGE   | GAS HEATER<br>MAX SIZE  | REFRIGERATION<br>SIZES AVAILABLE | WHEN TO USE<br>XL  | NOTES   |
|-----------|---|---|----------------------------------|--|---|
| A Cabinet | 450–2,000<br>Horizontal SA<br>2,000 Max<br>Horizontal RA<br>2,700 Max                           | 100 MBH   | 3–8 Tons                         | N/A  | ECM fans ONLY.<br><br>If you need ODP or TEFC, use B Cabinet.   |
| B Cabinet | 1,000–5,700<br>Horizontal SA<br>5,700 Max<br>Horizontal RA<br>2,600 Max                         | 200 MBH<br><br>400 MBH (XL)   | 3–20 Tons                        | When you need<br>between<br>350–400 MBH                              | If you need<br>250–300 MBH,<br>use the C Cabinet<br>(price will be lower).  |
| C Cabinet | 3,500–7,000<br>Horizontal SA<br>7,000 Max<br>Horizontal RA<br>2,000 Max                         | 300 MBH<br><br>800 MBH (XL)   | 8–35 Tons                        | 350–800 MBH  | You may not be able to<br>run ECW above 5,000<br>CFM in Ace. If this occurs,<br>send to apps.   |
| D Cabinet | 5,000–14,000<br>Horizontal SA<br>14,000 Max<br>Horizontal RA<br>4,400 Max                       | 400 MBH<br><br>1,200 MBH (XL)   | 20–55 Tons                       | 400–1,200 MBH<br><br>Some Heat<br>Pumps                              | D Cabinet is a better price<br>than E Cabinet 99% of<br>the time.<br><br>Use Sub-cooling, and<br>always check 4-row Coil<br>performance compared to<br>6-row Coils. |
| E Cabinet | 9,000–20,000<br>Horizontal SA 16,000<br>Max (XL ONLY)<br>NO Horizontal RA<br>(E <b>and</b> EXL) | 600 MBH<br>1,600 MBH (XL)<br>(Vertical)<br>1,200 MBH (XL)<br>(Horizontal) | 40–70 Tons                       | Required for<br>some Tandem<br>Compressors<br><br>Above 1,200<br>MBH | Check 4-row Coil<br>performance to ensure<br>price savings for minimal<br>performance drop.   |

## REFRIGERATION CONTROLS GUIDELINES

Use the following table to ensure the correct JR selections are made.

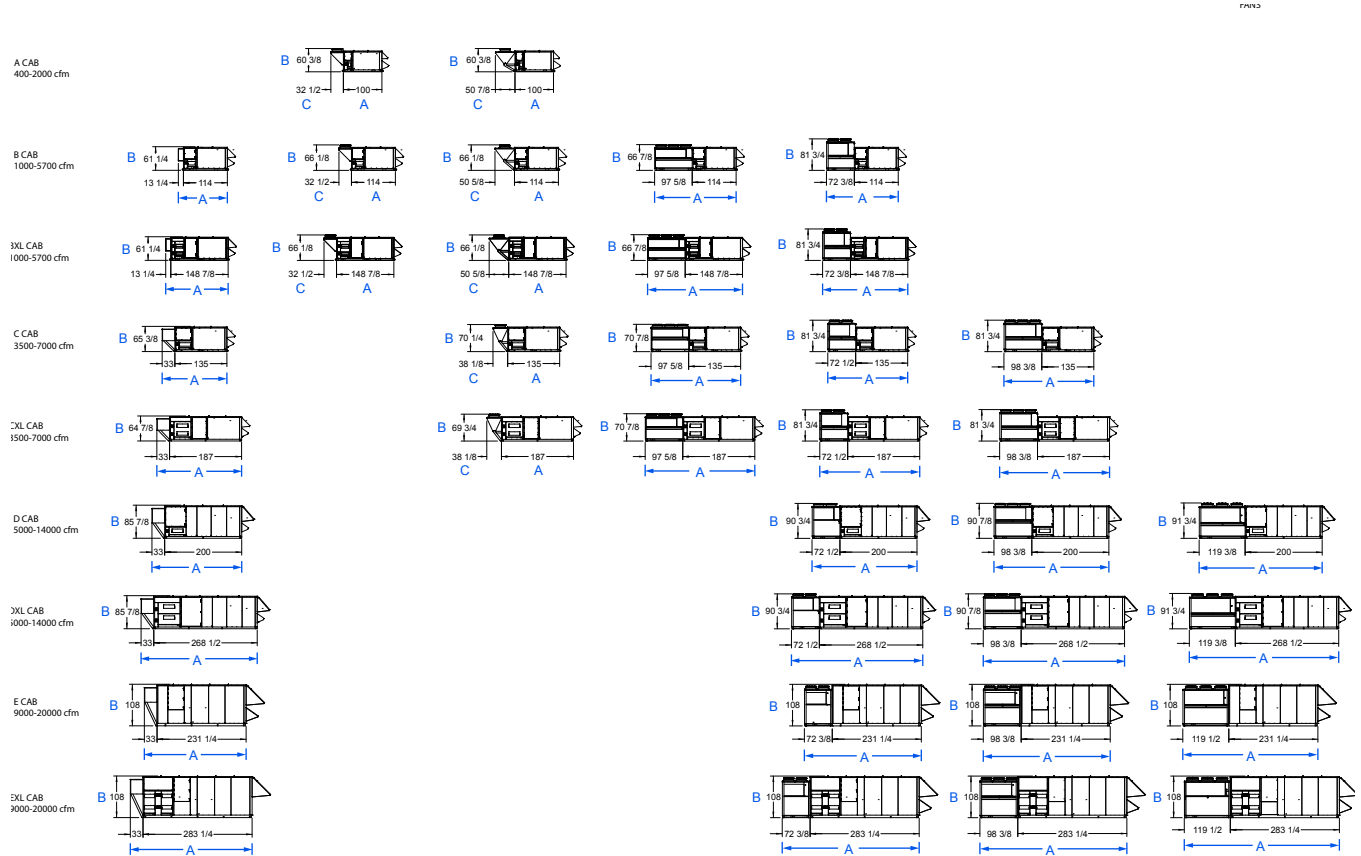
**TABLE 2 - JR SERIES REFRIGERATION CONTROLS APPLICATION BASED ON COMPRESSOR SELECTION**

| COMPRESSOR TYPE                                       | HOW TO IMPLEMENT HGRH   | HOW TO IMPLEMENT HGBP   | NOTES  | HOW TO IMPLEMENT LIQUID SUBCOOLING  |
|---|---|---|--|---|
| Standard Scroll /<br>Single Circuit                   | Single Circuit<br><br>Staged or Modulating                              | <b>REQUIRED</b> for 100%<br>OA applications<br>Select HGBP on the<br>Lead circuit | Units 96 MBH capacity<br>and <b>BELOW</b>  | <b>DO NOT</b> select with<br>Dual Circuit HGRH<br><br>Select with Single<br>Circuit HGRH <b>OR</b><br>alone<br><br><b>DO NOT</b> select<br>with Heat Pump<br>applications |
| Dual Scroll /<br>Dual Circuit                         | Select Dual Circuit <b>OR</b><br>Single Circuit<br>Staged or Modulating | Select Dual Circuit<br>HGBP <b>ONLY</b>   | Units 120 MBH<br>capacity and <b>ABOVE</b>   |   |
| Digital Scroll /<br>Single Circuit                    | Single Circuit<br><br>Staged or Modulating                              | No HGBP with Digital<br>Scrolls   | Units 96 MBH capacity<br>and <b>BELOW</b><br>Heat pump and<br>water source             |   |
| Single Digital and<br>Single Scroll<br>(Dual Circuit) | Select Dual Circuit <b>OR</b><br>Single Circuit<br>Staged or Modulating | <b>REQUIRED</b> for 100%<br>OA applications<br>Select HGBP on the<br>Lag circuit  | Digital Scroll ALWAYS<br>on lead circuit<br>Units 120 MBH<br>capacity and <b>ABOVE</b> |   |
| Dual Digital Scroll<br>(Dual Circuit)                 | Select Dual Circuit <b>OR</b><br>Single Circuit<br>Staged or Modulating | No HGBP with Digital<br>Scrolls   | Units 120 MBH<br>capacity and <b>ABOVE</b>   |   |

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# Physical Data



**FIGURE 1 - JR SERIES CABINET LINEUP**

**TABLE 3 - DIMENSIONS AND WEIGHTS FOR 1 AND 2 CONDENSER FANS**

| CABINET DESIGNATION | CFM RANGE | DIMENSIONS ARE IN INCHES |                |           |                     |          |                 |          |
|---------------------|-----------|--------------------------|----------------|-----------|---------------------|----------|-----------------|----------|
|                     |           | UNIT WIDTH               | BASE LENGTH, A | HEIGHT, B | CONDENSER LENGTH, C |          | MAX WEIGHT, LBS |          |
|                     |           |                          |                |           | ONE FAN             | TWO FANS | ONE FAN         | TWO FANS |
| Cabinet A           | 450–2000  | 64                       | 100            | 60.375    | 32.5                | 50.875   | 2370            | 2600     |
| Cabinet B           | 1000–5700 | 64                       | 114            | 66.125    | 32.5                | 50.625   | 2870            | 3300     |
| Cabinet B XL        | 1000–5700 | 64                       | 148.875        | 66.125    | 32.5                | 50.625   | 3280            | 3710     |
| Cabinet C           | 3500–7000 | 64                       | 135            | 70.25     |                     | 38.125   |                 | 4420     |
| Cabinet C XL        | 3500–7000 | 64                       | 187            | 69.75     |                     | 38.125   |                 | 5480     |

## Physical Data (Cont'd)

**TABLE 4 - DIMENSIONS AND WEIGHTS FOR UNITS WITH MORE THAN 3 CONDENSER FANS OR WATER SOURCE HEAT PUMP**

| ALL DIMENSIONS ARE IN INCHES, WEIGHTS ARE IN LBS |              |            |                |           |            |                |           |            |
|--|--------------|------------|----------------|-----------|------------|----------------|-----------|------------|
| CABINET DESIGNATION                              | CFM RANGE    | UNIT WIDTH | 3 COND FANS    |           |            | 4 COND FANS    |           |            |
|  |              |            | BASE LENGTH, A | HEIGHT, B | MAX WEIGHT | BASE LENGTH, A | HEIGHT, B | MAX WEIGHT |
| Cabinet B  | 1,000–5,700  | 64         | 211.625        | 66.875    | 3810       | 186.375        | 81.75     | 3870       |
| Cabinet B XL                                     | 1,000–5,700  | 64         | 246.5          | 66.875    | 4220       | 221.25         | 81.75     | 4280       |
| Cabinet C  | 3,500–7,000  | 64         | 232.625        | 70.875    | 4940       | 207.5          | 81.75     | 5180       |
| Cabinet C XL                                     | 3,500–7,000  | 64         | 284.625        | 70.875    | 6000       | 259.5          | 81.75     | 6240       |
| Cabinet D  | 5,000–14,000 | 87         |                |           |            | 272.5          | 90.75     | 7370       |
| Cabinet D XL                                     | 5,000–14,000 | 87         |                |           |            | 341            | 90.75     | 8820       |
| Cabinet E  | 9,000–20,000 | 100        |                |           |            | 303.625        | 108       | 13760      |
| Cabinet E XL                                     | 9,000–20,000 | 100        |                |           |            | 355.625        | 108       | 15140      |

TABLE 4 - CONTINUED

| ALL DIMENSIONS ARE IN INCHES, WEIGHTS ARE IN LBS |           |            |                      |           |            |                        |           |            |
|--|-----------|------------|----------------------|-----------|------------|------------------------|-----------|------------|
| 6 COND FANS                                      |           |            | 6 OVERSIZE COND FANS |           |            | WATER SOURCE HEAT PUMP |           |            |
| BASE LENGTH, A                                   | HEIGHT, B | MAX WEIGHT | BASE LENGTH, A       | HEIGHT, B | MAX WEIGHT | BASE LENGTH, A         | HEIGHT, B | MAX WEIGHT |
|  |           |            |                      |           |            | 127.25                 | 61.25     | 3129       |
|  |           |            |                      |           |            | 162.125                | 61.25     | 3539       |
| 233.375  | 81.75     | 5390       |                      |           |            | 168                    | 65.375    | 4320       |
| 285.375  | 81.75     | 6440       |                      |           |            | 220                    | 64.875    | 5370       |
| 298.375  | 90.875    | 7580       | 319.375              | 91.75     | 9320       | 233                    | 85.875    | 7894       |
| 366.875  | 90.875    | 9260       | 387.875              | 91.75     | 9550       | 301.5                  | 85.875    | 8134       |
| 329.625  | 108       | 14160      | 350.75               | 108       | 14630      | 264.25                 | 108       | 13444      |
| 381.625  | 108       | 15590      | 402.75               | 108       | 16060      | 316.25                 | 108       | 14628      |

# Gas Heat Capacities

TABLE 5 - GAS HEAT CAPACITIES

| UNIT CABINET SIZE*                | UNIT CAPACITY (TONS)* | INPUT (Btuh) | OUTPUT (Btuh) | XL CABINET REQUIRED | NO. OF GAS HEAT SECTIONS | NO. OF STAGES | MODULATION RANGE (%)** | MAX TEMP RISE (°F) (HORIZONTAL/VERTICAL SUPPLY)*** |
|-----------------------------------|-----------------------|--------------|---------------|---------------------|--------------------------|---------------|------------------------|--|
| A                                 | 3-8                   | 75,000       | 60,000        |                     | 1                        | 2             | 5:1                    | 80/100   |
|                                   | 3-8                   | 100,000      | 80,000        |                     | 1                        | 2             | 5:1, 10:1              | 80/100   |
| B                                 | 3-20                  | 75,000       | 60,000        |                     | 1                        | 2             | 5:1                    | 80/100   |
|                                   | 3-20                  | 100,000      | 80,000        |                     | 1                        | 2             | 5:1, 10:1              | 80/100   |
|                                   | 3-20                  | 150,000      | 120,000       |                     | 1                        | 2             | 5:1, 10:1              | 80/100   |
|                                   | 3-20                  | 200,000      | 160,000       |                     | 1                        | 2             | 5:1, 10:1              | 80/100   |
| B XL                              | 7-20                  | 200,000      | 160,000       | XL                  | 2                        | 4             | 10:1                   | 130/160  |
|                                   | 7-20                  | 300,000      | 240,000       | XL                  | 2                        | 4             | 10:1                   | 130/160  |
|                                   | 7-20                  | 400,000      | 320,000       | XL                  | 2                        | 4             | 10:1                   | 130/160  |
| C                                 | 7-35                  | 75,000       | 60,000        |                     | 1                        | 2             | 5:1                    | 80/100   |
|                                   | 7-35                  | 100,000      | 80,000        |                     | 1                        | 2             | 5:1, 10:1              | 80/100   |
|                                   | 7-35                  | 150,000      | 120,000       |                     | 1                        | 2             | 5:1, 10:1              | 80/100   |
|                                   | 7-35                  | 200,000      | 160,000       |                     | 1                        | 2             | 5:1, 10:1              | 80/100   |
|                                   | 7-35                  | 250,000      | 200,000       |                     | 1                        | 2             | 5:1, 10:1              | 80/100   |
|                                   | 7-35                  | 300,000      | 240,000       |                     | 1                        | 2             | 5:1, 10:1              | 80/100   |
| C XL                              | 7-35                  | 300,000      | 240,000       | XL                  | 2                        | 4             | 10:1                   | 130/160  |
|                                   | 7-35                  | 200,000      | 160,000       | XL                  | 2                        | 4             | 10:1                   | 130/160  |
|                                   | 7-35                  | 400,000      | 320,000       | XL                  | 2                        | 4             | 10:1                   | 130/160  |
|                                   | 7-35                  | 500,000      | 400,000       | XL                  | 2                        | 4             | 10:1                   | 130/160  |
|                                   | 7-35                  | 600,000      | 480,000       | XL                  | 2                        | 4             | 10:1                   | 130/160  |
|                                   | 7-35                  | 700,000      | 560,000       | XL                  | 2                        | 4             | 10:1                   | 130/160  |
|                                   | 7-35                  | 800,000      | 640,000       | XL                  | 2                        | 4             | 10:1                   | 130/160  |
| D                                 | 20-55                 | 100,000      | 80,000        |                     | 1                        | 2             | 5:1, 10:1              | 80/100   |
|                                   | 20-55                 | 150,000      | 120,000       |                     | 1                        | 2             | 5:1, 10:1              | 80/100   |
|                                   | 20-55                 | 200,000      | 160,000       |                     | 1                        | 2             | 5:1, 10:1              | 80/100   |
|                                   | 20-55                 | 250,000      | 200,000       |                     | 1                        | 2             | 5:1, 10:1              | 80/100   |
|                                   | 20-55                 | 300,000      | 240,000       |                     | 1                        | 2             | 5:1, 10:1              | 80/100   |
|                                   | 20-55                 | 350,000      | 280,000       |                     | 1                        | 2             | 5:1, 10:1              | 80/100   |
|                                   | 20-55                 | 400,000      | 320,000       |                     | 1                        | 2             | 5:1, 10:1              | 80/100   |
| D XL                              | 20-55                 | 400,000      | 320,000       | XL                  | 1                        | 2             | 10:1                   | 130/160  |
|                                   | 20-55                 | 500,000      | 400,000       | XL                  | 1                        | 2             | 10:1                   | 130/160  |
|                                   | 20-55                 | 600,000      | 480,000       | XL                  | 2                        | 4             | 10:1                   | 130/160  |
|                                   | 20-55                 | 700,000      | 560,000       | XL                  | 2                        | 4             | 10:1                   | 130/160  |
|                                   | 20-55                 | 800,000      | 640,000       | XL                  | 2                        | 4             | 10:1                   | 130/160  |
|                                   | 20-55                 | 1,000,000    | 800,000       | XL                  | 2                        | 4             | 10:1                   | 130/160  |
|                                   | 20-55                 | 1,200,000    | 960,000       | XL                  | 2                        | 4             | 10:1                   | 130/160  |
| E                                 | 40-70                 | 300,000      | 240,000       |                     | 2                        | 4             | 10:1                   | 80/100   |
|                                   | 40-70                 | 400,000      | 320,000       |                     | 2                        | 4             | 10:1                   | 80/100   |
|                                   | 40-70                 | 500,000      | 400,000       |                     | 2                        | 4             | 10:1                   | 80/100   |
|                                   | 40-70                 | 600,000      | 480,000       |                     | 2                        | 4             | 10:1                   | 80/100   |
| E XL<br>Horizontal<br>or Vertical | 40-70                 | 800,000      | 640,000       | XL                  | [2] or [4]               | 4 or 8        | 10:1, 20:1             | [80/100] or [130/160]                              |
|                                   | 40-70                 | 1,000,000    | 800,000       | XL                  | [2] or [4]               | 4 or 8        | 10:1, 20:1             | [80/100] or [130/160]                              |
|                                   | 40-70                 | 1,200,000    | 960,000       | XL                  | [2] or [4]               | 4 or 8        | 10:1, 20:1             | [80/100] or [130/160]                              |
| E XL<br>Vertical<br>Only          | 40-70                 | 1,400,000    | 1,120,000     | XL                  | 4                        | 8             | 20:1                   | 130/160  |
|                                   | 40-70                 | 1,600,000    | 1,280,000     | XL                  | 4                        | 8             | 20:1                   | 130/160  |

# Electric Heat Capacities

**TABLE 6 - ELECTRIC HEAT CAPACITIES**

| CABINET AND SIZE*                          | ELECTRIC<br>HEAT KW<br>(240, 480V) | ELECTRIC<br>HEAT KW<br>(208V) | STAGES | AMPS  |       |       |
|--|------------------------------------|-------------------------------|--------|-------|-------|-------|
|  |                                    |                               |        | 240V  | 480V  | 208V  |
| A Cabinet 03–08                            | 5.0                                | 3.8                           | 1      | 12.0  | 6.0   | 10.4  |
|  | 10.0                               | 7.5                           | 2, SCR | 24.1  | 12.0  | 20.8  |
|  | 15.0                               | 11.3                          | 2, SCR | 26.1  | 18.0  | 31.2  |
|  | 20.0                               | 15.0                          | 2, SCR | 48.1  | 24.1  | 41.6  |
|  | 25.0                               | 18.8                          | 2, SCR | 60.1  | 30.1  | 52.0  |
|  | 30.0                               | 22.5                          | 2, SCR | 72.2  | 36.1  | 62.5  |
| B/BXL Cabinet 03–20<br>C/CXL Cabinet 07–35 | 5.0                                | 3.8                           | 1      | 12.0  | 6.0   | 10.4  |
|  | 10.0                               | 7.5                           | 2, SCR | 24.1  | 12.0  | 20.8  |
|  | 15.0                               | 11.3                          | 2, SCR | 26.1  | 18.0  | 31.2  |
|  | 20.0                               | 15.0                          | 2, SCR | 48.1  | 24.1  | 41.6  |
|  | 25.0                               | 18.8                          | 2, SCR | 60.1  | 30.1  | 52.0  |
|  | 30.0                               | 22.5                          | 2, SCR | 72.2  | 36.1  | 62.5  |
|  | 35.0                               | 26.3                          | 2, SCR | 84.2  | 42.1  | 72.9  |
|  | 40.0                               | 30.0                          | 2, SCR | 96.2  | 48.1  | 83.3  |
|  | 50.0                               | 37.5                          | 4, SCR | 120.3 | 60.1  | 104.1 |
|  | 60.0                               | 45.0                          | 4, SCR | 144.3 | 72.2  | 124.9 |
|  | 70.0                               | 52.5                          | 4, SCR | 168.4 | 84.2  | 145.7 |
|  | 80.0                               | 60.0                          | 4, SCR | 192.5 | 96.2  | 166.5 |
| 100.0                                      | 75.0                               | 4, SCR                        | 240.6  | 120.3 | 208.2 |       |
| D/DXL Cabinet 20–35<br>E/EXL Cabinet       | 5.0                                | 3.8                           | 1      | 12.0  | 6.0   | 10.4  |
|  | 10.0                               | 7.5                           | 2, SCR | 24.1  | 12.0  | 20.8  |
|  | 15.0                               | 11.3                          | 2, SCR | 26.1  | 18.0  | 31.2  |
|  | 20.0                               | 15.0                          | 2, SCR | 48.1  | 24.1  | 41.6  |
|  | 25.0                               | 18.8                          | 2, SCR | 60.1  | 30.1  | 52.0  |
|  | 30.0                               | 22.5                          | 2, SCR | 72.2  | 36.1  | 62.5  |
|  | 35.0                               | 26.3                          | 2, SCR | 84.2  | 42.1  | 72.9  |
|  | 40.0                               | 30.0                          | 2, SCR | 96.2  | 48.1  | 83.3  |
|  | 50.0                               | 37.5                          | 4, SCR | 120.3 | 60.1  | 104.1 |
|  | 60.0                               | 45.0                          | 4, SCR | 144.3 | 72.2  | 124.9 |
|  | 70.0                               | 52.5                          | 4, SCR | 168.4 | 84.2  | 145.7 |
|  | 80.0                               | 60.0                          | 4, SCR | 192.5 | 96.2  | 166.5 |
|  | 100.0                              | 75.0                          | 4, SCR | 240.6 | 120.3 | 208.2 |
|  | 110.0                              | 82.5                          | 4, SCR | 264.6 | 132.3 | 229.0 |
|  | 120.0                              | 90.0                          | 4, SCR | 288.7 | 144.3 | 249.8 |
| 150.0                                      | 112.5                              | 4, SCR                        | 360.8  | 180.4 | 416.4 |       |

# Performance Data

TABLE 7 - JROA AIR SOURCE GENERAL PERFORMANCE

| AIRFLOW<br>(CFM)   |                                   | ENTERING AIR TEMPERATURE (°F) |                |                |                |                |                |                |                |                |    |
|--------------------|-----------------------------------|-------------------------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|----|
|                    |                                   | DRY BULB                      | 90             |                |                | 95             |                |                | 100            |                |    |
|                    |                                   | WET BULB                      | 76             | 78             | 80             | 76             | 78             | 80             | 76             | 78             | 80 |
| <b>036 (3 TON)</b> |                                   |                               |                |                |                |                |                |                |                |                |    |
| 375                | Total Capacity (Btu/h)            | 36000                         | 37400          | 38500          | 35400          | 36800          | 38000          | 34800          | 36000          | 37400          |    |
|                    | Sensible Capacity (Btu/h)         | 18400                         | 17500          | 16500          | 20200          | 19300          | 18400          | 22000          | 21200          | 20200          |    |
|                    | Electric Power (Watts)            | 2854                          | 2859           | 2863           | 3016           | 3022           | 3027           | 3193           | 3197           | 3202           |    |
|                    | Leaving Air Temp<br>(°F db/°F wb) | 45.9 /<br>45.9                | 48.3 /<br>48.3 | 50.7 /<br>50.7 | 46.5 /<br>46.5 | 48.8 /<br>48.8 | 51.2 /<br>51.2 | 47.1 /<br>47.1 | 49.4 /<br>49.4 | 51.8 /<br>51.8 |    |
| 480                | Total Capacity (Btu/h)            | 39500                         | 41000          | 42500          | 39000          | 40000          | 41500          | 38000          | 39500          | 41000          |    |
|                    | Sensible Capacity (Btu/h)         | 20600                         | 19400          | 18100          | 23000          | 21800          | 20600          | 25200          | 24200          | 23000          |    |
|                    | Electric Power (Watts)            | 2870                          | 2873           | 2877           | 3032           | 3038           | 3043           | 3207           | 3213           | 3218           |    |
|                    | Leaving Air Temp<br>(°F db/°F wb) | 51.6 /<br>51.6                | 53.9 /<br>53.9 | 56.3 /<br>56.3 | 52.0 /<br>52.0 | 54.3 /<br>54.3 | 56.7 /<br>56.7 | 52.5 /<br>52.5 | 54.9 /<br>54.9 | 57.2 /<br>57.2 |    |
| 600                | Total Capacity (Btu/h)            | 42500                         | 43500          | 45000          | 41500          | 43000          | 44500          | 40500          | 42000          | 43500          |    |
|                    | Sensible Capacity (Btu/h)         | 22800                         | 21200          | 19800          | 25800          | 24400          | 22800          | 28800          | 27400          | 26000          |    |
|                    | Electric Power (Watts)            | 2879                          | 2884           | 2890           | 3044           | 3050           | 3055           | 3220           | 3226           | 3233           |    |
|                    | Leaving Air Temp<br>(°F db/°F wb) | 56.0 /<br>55.9                | 58.3 /<br>58.2 | 60.6 /<br>60.6 | 56.3 /<br>56.3 | 58.6 /<br>58.6 | 61.0 /<br>60.9 | 56.8 /<br>56.8 | 59.0 /<br>59.0 | 61.3 /<br>61.3 |    |
| <b>048 (4 TON)</b> |                                   |                               |                |                |                |                |                |                |                |                |    |
| 500                | Total Capacity (Btu/h)            | 45500                         | 47500          | 49000          | 45000          | 46500          | 48500          | 44000          | 45500          | 47500          |    |
|                    | Sensible Capacity (Btu/h)         | 23400                         | 22200          | 21000          | 25800          | 24600          | 23400          | 28200          | 27000          | 25800          |    |
|                    | Electric Power (Watts)            | 3368                          | 3377           | 3386           | 3569           | 3563           | 3572           | 3748           | 3776           | 3771           |    |
|                    | Leaving Air Temp<br>(°F db/°F wb) | 47.9 /<br>47.9                | 50.2 /<br>50.2 | 52.6 /<br>52.6 | 48.4 /<br>48.4 | 50.8 /<br>50.7 | 53.1 /<br>53.1 | 49.1 /<br>49.0 | 51.3 /<br>51.3 | 53.7 /<br>53.6 |    |
| 640                | Total Capacity (Btu/h)            | 50000                         | 51500          | 53500          | 49000          | 50500          | 52500          | 48000          | 49500          | 51500          |    |
|                    | Sensible Capacity (Btu/h)         | 26200                         | 24600          | 23000          | 29400          | 27800          | 26200          | 32600          | 31000          | 29400          |    |
|                    | Electric Power (Watts)            | 3392                          | 3400           | 3411           | 3576           | 3588           | 3596           | 3775           | 3788           | 3797           |    |
|                    | Leaving Air Temp<br>(°F db/°F wb) | 53.2 /<br>53.2                | 55.6 /<br>55.6 | 57.9 /<br>57.9 | 53.7 /<br>53.6 | 56.0 /<br>56.0 | 58.3 /<br>58.3 | 54.1 /<br>54.1 | 56.4 /<br>56.4 | 58.7 /<br>58.7 |    |
| 800                | Total Capacity (Btu/h)            | 53000                         | 55000          | 56500          | 52000          | 54000          | 55500          | 51000          | 52500          | 54500          |    |
|                    | Sensible Capacity (Btu/h)         | 29000                         | 27200          | 25200          | 33200          | 31200          | 29200          | 37200          | 35200          | 33400          |    |
|                    | Electric Power (Watts)            | 3412                          | 3423           | 3435           | 3598           | 3607           | 3620           | 3798           | 3808           | 3820           |    |
|                    | Leaving Air Temp<br>(°F db/°F wb) | 57.4 /<br>57.3                | 59.7 /<br>59.6 | 62.0 /<br>62.0 | 57.7 /<br>57.7 | 60.0 /<br>60.0 | 62.3 /<br>62.3 | 58.1 /<br>58.1 | 60.4 /<br>60.4 | 62.7 /<br>62.7 |    |
| <b>060 (5 TON)</b> |                                   |                               |                |                |                |                |                |                |                |                |    |
| 625                | Total Capacity (Btu/h)            | 54500                         | 56500          | 58500          | 53500          | 55500          | 57500          | 52500          | 54500          | 56500          |    |
|                    | Sensible Capacity (Btu/h)         | 28200                         | 26600          | 25000          | 31200          | 29600          | 28000          | 34200          | 32800          | 31200          |    |
|                    | Electric Power (Watts)            | 4049                          | 4061           | 4075           | 4277           | 4290           | 4304           | 4528           | 4533           | 4549           |    |
|                    | Leaving Air Temp<br>(°F db/°F wb) | 49.6 /<br>49.6                | 52.0 /<br>52.0 | 54.4 /<br>54.4 | 50.0 /<br>50.0 | 52.4 /<br>52.4 | 54.8 /<br>54.8 | 50.6 /<br>50.6 | 53.0 /<br>52.9 | 55.3 /<br>55.3 |    |
| 800                | Total Capacity (Btu/h)            | 59000                         | 61000          | 63000          | 58000          | 60000          | 61500          | 56500          | 58500          | 60500          |    |
|                    | Sensible Capacity (Btu/h)         | 31400                         | 29400          | 27400          | 35400          | 33400          | 31400          | 39500          | 37400          | 35400          |    |
|                    | Electric Power (Watts)            | 4082                          | 4097           | 4112           | 4309           | 4324           | 4339           | 4553           | 4568           | 4582           |    |
|                    | Leaving Air Temp<br>(°F db/°F wb) | 54.8 /<br>54.8                | 57.2 /<br>57.1 | 59.5 /<br>59.5 | 55.2 /<br>55.2 | 57.5 /<br>57.5 | 59.9 /<br>59.9 | 55.6 /<br>55.6 | 58.0 /<br>58.0 | 60.3 /<br>60.3 |    |
| 1000               | Total Capacity (Btu/h)            | 62000                         | 64000          | 66000          | 61000          | 63000          | 65000          | 60000          | 61500          | 63500          |    |
|                    | Sensible Capacity (Btu/h)         | 34800                         | 32400          | 29800          | 40000          | 37400          | 35000          | 44500          | 42500          | 40000          |    |
|                    | Electric Power (Watts)            | 4110                          | 4126           | 4142           | 4337           | 4354           | 4371           | 4581           | 4596           | 4612           |    |
|                    | Leaving Air Temp<br>(°F db/°F wb) | 58.7 /<br>58.7                | 61.1 /<br>61.1 | 63.4 /<br>63.4 | 59.1 /<br>59.1 | 61.4 /<br>61.4 | 63.7 /<br>63.7 | 60.0 /<br>59.4 | 61.7 /<br>61.7 | 64.1 /<br>64.1 |    |

TABLE 7 - JROA AIR SOURCE GENERAL PERFORMANCE (CONT'D)

| AIRFLOW<br>(CFM)   |                                   | ENTERING AIR TEMPERATURE (°F) |                |                |                |                |                |                |                |                |    |
|--------------------|-----------------------------------|-------------------------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|----|
|                    |                                   | DRY BULB                      | 90             |                |                | 95             |                |                | 100            |                |    |
|                    |                                   | WET BULB                      | 76             | 78             | 80             | 76             | 78             | 80             | 76             | 78             | 80 |
| <b>072 (6 TON)</b> |                                   |                               |                |                |                |                |                |                |                |                |    |
| 750                | Total Capacity (Btu/h)            | 63000                         | 65000          | 67000          | 61500          | 64000          | 66000          | 60500          | 62500          | 65000          |    |
|                    | Sensible Capacity (Btu/h)         | 32600                         | 30800          | 28800          | 36200          | 34400          | 32600          | 40000          | 38000          | 36200          |    |
|                    | Electric Power (Watts)            | 4459                          | 4476           | 4493           | 4695           | 4712           | 4729           | 4947           | 4963           | 4983           |    |
|                    | Leaving Air Temp<br>(°F db/°F wb) | 51.0 /<br>51.0                | 53.3 /<br>53.3 | 55.7 /<br>55.7 | 51.5 /<br>51.4 | 53.8 /<br>53.8 | 56.2 /<br>56.2 | 52.0 /<br>52.0 | 54.3 /<br>54.3 | 56.7 /<br>56.7 |    |
| 960                | Total Capacity (Btu/h)            | 68000                         | 70000          | 72000          | 66000          | 69000          | 71000          | 65000          | 67000          | 70000          |    |
|                    | Sensible Capacity (Btu/h)         | 36400                         | 34000          | 31800          | 41500          | 39000          | 36600          | 46000          | 44000          | 41500          |    |
|                    | Electric Power (Watts)            | 4500                          | 4520           | 4542           | 4736           | 4755           | 4777           | 4988           | 5007           | 5029           |    |
|                    | Leaving Air Temp<br>(°F db/°F wb) | 55.9 /<br>55.9                | 58.2 /<br>58.2 | 60.5 /<br>60.5 | 56.3 /<br>56.3 | 58.6 /<br>58.6 | 61.0 /<br>60.9 | 56.7 /<br>56.7 | 59.0 /<br>59.0 | 61.3 /<br>61.3 |    |
| 1200               | Total Capacity (Btu/h)            | 72000                         | 74000          | 76000          | 70000          | 72000          | 75000          | 69000          | 71000          | 73000          |    |
|                    | Sensible Capacity (Btu/h)         | 40500                         | 37600          | 34600          | 47000          | 44000          | 41000          | 53000          | 50000          | 47000          |    |
|                    | Electric Power (Watts)            | 4537                          | 4559           | 4583           | 4772           | 4795           | 4818           | 5023           | 5044           | 5068           |    |
|                    | Leaving Air Temp<br>(°F db/°F wb) | 59.6 /<br>59.6                | 61.9 /<br>61.9 | 64.2 /<br>64.2 | 59.9 /<br>59.9 | 62.2 /<br>62.2 | 64.5 /<br>64.5 | 60.2 /<br>60.2 | 62.5 /<br>62.5 | 64.8 /<br>64.8 |    |
| <b>084 (7 TON)</b> |                                   |                               |                |                |                |                |                |                |                |                |    |
| 875                | Total Capacity (Btu/h)            | 79000                         | 81000          | 84000          | 77000          | 80000          | 83000          | 76000          | 79000          | 81000          |    |
|                    | Sensible Capacity (Btu/h)         | 40500                         | 38000          | 35800          | 45000          | 42500          | 40500          | 49000          | 47000          | 44500          |    |
|                    | Electric Power (Watts)            | 6485                          | 6538           | 6567           | 6764           | 6829           | 6885           | 7088           | 7137           | 7199           |    |
|                    | Leaving Air Temp<br>(°F db/°F wb) | 48.5 /<br>48.5                | 51.0 /<br>51.0 | 53.4 /<br>53.4 | 49.0 /<br>48.9 | 51.4 /<br>51.4 | 53.9 /<br>53.9 | 49.5 /<br>49.5 | 51.9 /<br>51.9 | 54.4 /<br>54.4 |    |
| 1120               | Total Capacity (Btu/h)            | 85000                         | 88000          | 91000          | 83000          | 86000          | 89000          | 82000          | 85000          | 87000          |    |
|                    | Sensible Capacity (Btu/h)         | 45000                         | 42000          | 39000          | 50500          | 48000          | 45000          | 56000          | 53500          | 50500          |    |
|                    | Electric Power (Watts)            | 6589                          | 6603           | 6652           | 6904           | 6935           | 6939           | 7197           | 7271           | 7272           |    |
|                    | Leaving Air Temp<br>(°F db/°F wb) | 53.9 /<br>53.9                | 56.5 /<br>56.3 | 58.8 /<br>58.7 | 54.4 /<br>54.4 | 56.7 /<br>56.7 | 59.3 /<br>59.1 | 54.9 /<br>54.9 | 57.2 /<br>57.2 | 59.6 /<br>59.5 |    |
| 1400               | Total Capacity (Btu/h)            | 90000                         | 93000          | 96000          | 88000          | 91000          | 94000          | 86000          | 89000          | 92000          |    |
|                    | Sensible Capacity (Btu/h)         | 49500                         | 46000          | 42500          | 56500          | 53000          | 50000          | 64000          | 60500          | 57000          |    |
|                    | Electric Power (Watts)            | 6639                          | 6694           | 6744           | 6924           | 6970           | 7030           | 7241           | 7362           | 7400           |    |
|                    | Leaving Air Temp<br>(°F db/°F wb) | 58.2 /<br>58.1                | 60.5 /<br>60.4 | 62.8 /<br>62.8 | 58.7 /<br>58.4 | 61.0 /<br>60.7 | 63.2 /<br>63.1 | 58.9 /<br>58.8 | 61.1 /<br>61.1 | 63.5 /<br>63.5 |    |
| <b>096 (8 TON)</b> |                                   |                               |                |                |                |                |                |                |                |                |    |
| 1000               | Total Capacity (Btu/h)            | 89000                         | 92000          | 95000          | 87000          | 90000          | 93000          | 86000          | 89000          | 92000          |    |
|                    | Sensible Capacity (Btu/h)         | 45500                         | 43000          | 40500          | 50500          | 48000          | 45500          | 55500          | 53000          | 50500          |    |
|                    | Electric Power (Watts)            | 7319                          | 7356           | 7412           | 7671           | 7707           | 7745           | 8062           | 8056           | 8121           |    |
|                    | Leaving Air Temp<br>(°F db/°F wb) | 49 / 49                       | 51.5 /<br>51.4 | 53.9 /<br>53.9 | 49.5 /<br>49.5 | 51.9 /<br>51.9 | 54.4 /<br>54.3 | 50.0 /<br>50.0 | 52.4 /<br>52.4 | 54.9 /<br>54.9 |    |
| 1280               | Total Capacity (Btu/h)            | 96000                         | 99000          | 102000         | 94000          | 97000          | 100000         | 92000          | 95000          | 98000          |    |
|                    | Sensible Capacity (Btu/h)         | 50500                         | 47500          | 44000          | 57000          | 54000          | 50500          | 63500          | 60500          | 57000          |    |
|                    | Electric Power (Watts)            | 7430                          | 7483           | 7536           | 7758           | 7817           | 7875           | 8124           | 8189           | 8239           |    |
|                    | Leaving Air Temp<br>(°F db/°F wb) | 54.4 /<br>54.4                | 56.8 /<br>56.8 | 59.2 /<br>59.2 | 54.9 /<br>54.8 | 57.2 /<br>57.2 | 59.6 /<br>59.6 | 55.3 /<br>55.3 | 57.6 /<br>57.6 | 60.0 /<br>60.0 |    |
| 1600               | Total Capacity (Btu/h)            | 101000                        | 104000         | 107000         | 99000          | 102000         | 105000         | 97000          | 100000         | 103000         |    |
|                    | Sensible Capacity (Btu/h)         | 56000                         | 52000          | 48000          | 64500          | 60500          | 56500          | 73000          | 69000          | 64500          |    |
|                    | Electric Power (Watts)            | 7523                          | 7579           | 7636           | 7862           | 7910           | 7969           | 8224           | 8272           | 8331           |    |
|                    | Leaving Air Temp<br>(°F db/°F wb) | 58.5 /<br>58.5                | 60.8 /<br>60.8 | 63.2 /<br>63.2 | 58.8 /<br>58.8 | 61.2 /<br>61.1 | 63.5 /<br>63.5 | 59.1 /<br>59.1 | 61.5 /<br>61.5 | 63.8 /<br>63.8 |    |

# Performance Data (Cont'd)

TABLE 7 - JROA AIR SOURCE GENERAL PERFORMANCE (CONT'D)

| AIRFLOW<br>(CFM)      |                                   | ENTERING AIR TEMPERATURE (°F) |                |                |                |                |                |                |                |                |    |
|-----------------------|-----------------------------------|-------------------------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|----|
|                       |                                   | DRY BULB                      |                |                | 95             |                |                | 100            |                |                |    |
|                       |                                   | WET BULB                      |                |                | 76             | 78             | 80             | 76             | 78             | 80             | 76 |
| <b>120 (10 TON)</b>   |                                   |                               |                |                |                |                |                |                |                |                |    |
| 1250                  | Total Capacity (Btu/h)            | 113000                        | 117000         | 121000         | 111000         | 115000         | 119000         | 109000         | 113000         | 117000         |    |
|                       | Sensible Capacity (Btu/h)         | 58000                         | 55000          | 51500          | 64000          | 61000          | 58000          | 70000          | 67000          | 64000          |    |
|                       | Electric Power (Watts)            | 8436                          | 8456           | 8478           | 8894           | 8904           | 8928           | 9396           | 9398           | 9404           |    |
|                       | Leaving Air Temp<br>(°F db/°F wb) | 48.3 /<br>48.3                | 50.7 /<br>50.7 | 53.2 /<br>53.2 | 48.9 /<br>48.9 | 51.3 /<br>51.3 | 53.7 /<br>53.7 | 49.5 /<br>49.5 | 51.8 /<br>51.8 | 54.2 /<br>54.2 |    |
| 1600                  | Total Capacity (Btu/h)            | 123000                        | 127000         | 130000         | 120000         | 125000         | 129000         | 118000         | 122000         | 126000         |    |
|                       | Sensible Capacity (Btu/h)         | 65000                         | 60500          | 56500          | 73000          | 69000          | 65000          | 81000          | 77000          | 73000          |    |
|                       | Electric Power (Watts)            | 8494                          | 8510           | 8538           | 8940           | 8964           | 8988           | 9420           | 9438           | 9470           |    |
|                       | Leaving Air Temp<br>(°F db/°F wb) | 53.6 /<br>53.6                | 56.1 /<br>56.0 | 58.5 /<br>58.4 | 54.1 /<br>54.1 | 56.4 /<br>56.4 | 58.8 /<br>58.8 | 54.5 /<br>54.5 | 56.9 /<br>56.9 | 59.2 /<br>59.2 |    |
| 2000                  | Total Capacity (Btu/h)            | 130000                        | 134000         | 138000         | 128000         | 132000         | 136000         | 125000         | 129000         | 134000         |    |
|                       | Sensible Capacity (Btu/h)         | 72000                         | 67000          | 62000          | 82000          | 77000          | 72000          | 91000          | 87000          | 82000          |    |
|                       | Electric Power (Watts)            | 8544                          | 8572           | 8602           | 8984           | 9018           | 9046           | 9460           | 9494           | 9518           |    |
|                       | Leaving Air Temp<br>(°F db/°F wb) | 57.7 /<br>57.7                | 60.0 /<br>60.0 | 62.4 /<br>62.4 | 58.1 /<br>58.1 | 60.4 /<br>60.4 | 62.7 /<br>62.7 | 59.1 /<br>58.5 | 60.8 /<br>60.8 | 63.2 /<br>63.1 |    |
| <b>150 (12.5 TON)</b> |                                   |                               |                |                |                |                |                |                |                |                |    |
| 1500                  | Total Capacity (Btu/h)            | 132000                        | 138000         | 142000         | 130000         | 134000         | 140000         | 128000         | 132000         | 136000         |    |
|                       | Sensible Capacity (Btu/h)         | 68000                         | 64500          | 60500          | 76000          | 72000          | 68000          | 83000          | 79000          | 75000          |    |
|                       | Electric Power (Watts)            | 10406                         | 10482          | 10562          | 10920          | 11002          | 11084          | 11448          | 11534          | 11636          |    |
|                       | Leaving Air Temp<br>(°F db/°F wb) | 49.0 /<br>49.0                | 51.6 /<br>51.6 | 54.0 /<br>54.0 | 49.5 /<br>49.5 | 52.0 /<br>52.0 | 54.5 /<br>54.5 | 50.1 /<br>50.1 | 52.5 /<br>52.5 | 55.0 /<br>55.0 |    |
| 1920                  | Total Capacity (Btu/h)            | 144000                        | 148000         | 152000         | 140000         | 146000         | 150000         | 138000         | 142000         | 146000         |    |
|                       | Sensible Capacity (Btu/h)         | 76000                         | 71000          | 66000          | 86000          | 81000          | 76000          | 95000          | 90000          | 86000          |    |
|                       | Electric Power (Watts)            | 10608                         | 10684          | 10770          | 11122          | 11210          | 11292          | 11658          | 11746          | 11848          |    |
|                       | Leaving Air Temp<br>(°F db/°F wb) | 54.4 /<br>54.4                | 56.9 /<br>56.9 | 59.3 /<br>59.3 | 54.8 /<br>54.8 | 57.2 /<br>57.2 | 59.7 /<br>59.7 | 55.3 /<br>55.3 | 57.7 /<br>57.7 | 60.1 /<br>60.1 |    |
| 2400                  | Total Capacity (Btu/h)            | 152000                        | 156000         | 160000         | 148000         | 152000         | 158000         | 146000         | 150000         | 154000         |    |
|                       | Sensible Capacity (Btu/h)         | 84000                         | 78000          | 72000          | 97000          | 90000          | 85000          | 107000         | 101000         | 97000          |    |
|                       | Electric Power (Watts)            | 10766                         | 10850          | 10940          | 11284          | 11364          | 11460          | 11818          | 11918          | 12000          |    |
|                       | Leaving Air Temp<br>(°F db/°F wb) | 58.5 /<br>58.5                | 60.8 /<br>60.8 | 63.2 /<br>63.2 | 58.8 /<br>58.8 | 61.2 /<br>61.2 | 63.5 /<br>63.5 | 59.9 /<br>59.1 | 62.0 /<br>61.5 | 63.9 /<br>63.9 |    |
| <b>180 (15 TON)</b>   |                                   |                               |                |                |                |                |                |                |                |                |    |
| 1875                  | Total Capacity (Btu/h)            | 156000                        | 160000         | 166000         | 154000         | 158000         | 164000         | 150000         | 156000         | 160000         |    |
|                       | Sensible Capacity (Btu/h)         | 81000                         | 76000          | 71000          | 90000          | 85000          | 81000          | 99000          | 95000          | 90000          |    |
|                       | Electric Power (Watts)            | 12440                         | 12486          | 12576          | 13068          | 13126          | 13168          | 13622          | 13806          | 13862          |    |
|                       | Leaving Air Temp<br>(°F db/°F wb) | 51.3 /<br>51.3                | 53.7 /<br>53.7 | 56.2 /<br>56.2 | 51.7 /<br>51.7 | 54.1 /<br>54.1 | 56.6 /<br>56.6 | 52.3 /<br>52.2 | 54.6 /<br>54.6 | 57.0 /<br>57.0 |    |
| 2400                  | Total Capacity (Btu/h)            | 168000                        | 172000         | 178000         | 164000         | 170000         | 174000         | 162000         | 166000         | 172000         |    |
|                       | Sensible Capacity (Btu/h)         | 90000                         | 84000          | 78000          | 102000         | 97000          | 90000          | 115000         | 108000         | 103000         |    |
|                       | Electric Power (Watts)            | 12606                         | 12680          | 12764          | 13188          | 13286          | 13352          | 13860          | 13902          | 14006          |    |
|                       | Leaving Air Temp<br>(°F db/°F wb) | 56.2 /<br>56.2                | 58.6 /<br>58.6 | 61.0 /<br>61.0 | 56.6 /<br>56.6 | 58.9 /<br>58.9 | 61.4 /<br>61.3 | 56.8 /<br>56.8 | 59.4 /<br>59.3 | 61.7 /<br>61.7 |    |
| 3000                  | Total Capacity (Btu/h)            | 176000                        | 182000         | 186000         | 174000         | 180000         | 182000         | 170000         | 176000         | 180000         |    |
|                       | Sensible Capacity (Btu/h)         | 100000                        | 93000          | 85000          | 116000         | 109000         | 101000         | 128000         | 122000         | 117000         |    |
|                       | Electric Power (Watts)            | 12738                         | 12832          | 12922          | 13350          | 13448          | 13506          | 13972          | 14062          | 14174          |    |
|                       | Leaving Air Temp<br>(°F db/°F wb) | 60.0 /<br>59.9                | 62.3 /<br>62.3 | 64.6 /<br>64.6 | 60.1 /<br>60.1 | 62.4 /<br>62.4 | 65.0 /<br>64.9 | 61.5 /<br>60.5 | 63.5 /<br>62.7 | 65.1 /<br>65.1 |    |



TABLE 7 - JROA AIR SOURCE GENERAL PERFORMANCE (CONT'D)

| AIRFLOW<br>(CFM)      |                                   | ENTERING AIR TEMPERATURE (°F) |                |                |                |                |                |                |                |                |    |
|-----------------------|-----------------------------------|-------------------------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|----|
|                       |                                   | DRY BULB                      | 90             |                |                | 95             |                |                | 100            |                |    |
|                       |                                   |                               | WET BULB       | 76             | 78             | 80             | 76             | 78             | 80             | 76             | 78 |
| <b>210 (17.5 TON)</b> |                                   |                               |                |                |                |                |                |                |                |                |    |
| 2187.5                | Total Capacity (Btu/h)            | 188000                        | 194000         | 200000         | 184000         | 190000         | 196000         | 182000         | 188000         | 194000         |    |
|                       | Sensible Capacity (Btu/h)         | 97000                         | 91000          | 86000          | 108000         | 102000         | 97000          | 119000         | 113000         | 107000         |    |
|                       | Electric Power (Watts)            | 14696                         | 14770          | 14848          | 15414          | 15492          | 15570          | 16192          | 16256          | 16336          |    |
|                       | Leaving Air Temp<br>(°F db/°F wb) | 50.1 /<br>50.1                | 52.6 /<br>52.6 | 55.1 /<br>55.1 | 50.6 /<br>50.6 | 53.0 /<br>53.0 | 55.5 /<br>55.5 | 51.1 /<br>51.1 | 53.5 /<br>53.5 | 56.0 /<br>56.0 |    |
| 2800                  | Total Capacity (Btu/h)            | 202000                        | 208000         | 214000         | 198000         | 206000         | 212000         | 194000         | 200000         | 208000         |    |
|                       | Sensible Capacity (Btu/h)         | 108000                        | 101000         | 94000          | 122000         | 115000         | 108000         | 134000         | 129000         | 122000         |    |
|                       | Electric Power (Watts)            | 14890                         | 14968          | 15040          | 15606          | 15686          | 15760          | 16350          | 16438          | 16530          |    |
|                       | Leaving Air Temp<br>(°F db/°F wb) | 55.3 /<br>55.3                | 57.7 /<br>57.7 | 60.1 /<br>60.1 | 55.7 /<br>55.7 | 58.0 /<br>58.0 | 60.5 /<br>60.5 | 56.8 /<br>56.1 | 58.4 /<br>58.4 | 60.8 /<br>60.8 |    |
| 3500                  | Total Capacity (Btu/h)            | 214000                        | 220000         | 226000         | 210000         | 216000         | 222000         | 206000         | 212000         | 218000         |    |
|                       | Sensible Capacity (Btu/h)         | 120000                        | 111000         | 102000         | 136000         | 129000         | 120000         | 152000         | 144000         | 140000         |    |
|                       | Electric Power (Watts)            | 15032                         | 15114          | 15192          | 15756          | 15824          | 15902          | 16512          | 16592          | 16686          |    |
|                       | Leaving Air Temp<br>(°F db/°F wb) | 59.2 /<br>59.2                | 61.5 /<br>61.5 | 63.9 /<br>63.9 | 60.1 /<br>59.4 | 61.9 /<br>61.8 | 64.2 /<br>64.2 | 60.8 /<br>59.7 | 63.1 /<br>62.1 | 64.4 /<br>64.4 |    |
| <b>240 (20 TON)</b>   |                                   |                               |                |                |                |                |                |                |                |                |    |
| 2500                  | Total Capacity (Btu/h)            | 214000                        | 220000         | 228000         | 210000         | 218000         | 224000         | 206000         | 214000         | 220000         |    |
|                       | Sensible Capacity (Btu/h)         | 111000                        | 104000         | 97000          | 123000         | 117000         | 110000         | 136000         | 129000         | 122000         |    |
|                       | Electric Power (Watts)            | 16942                         | 17028          | 17114          | 17830          | 17874          | 17964          | 18706          | 18772          | 18864          |    |
|                       | Leaving Air Temp<br>(°F db/°F wb) | 50.3 /<br>50.3                | 52.7 /<br>52.7 | 55.3 /<br>55.3 | 50.7 /<br>50.7 | 53.2 /<br>53.2 | 55.7 /<br>55.7 | 51.2 /<br>51.2 | 53.7 /<br>53.6 | 56.1 /<br>56.1 |    |
| 3200                  | Total Capacity (Btu/h)            | 230000                        | 238000         | 244000         | 226000         | 234000         | 240000         | 224000         | 230000         | 236000         |    |
|                       | Sensible Capacity (Btu/h)         | 123000                        | 115000         | 107000         | 140000         | 132000         | 123000         | 154000         | 146000         | 140000         |    |
|                       | Electric Power (Watts)            | 17160                         | 17252          | 17348          | 18002          | 18098          | 18194          | 18924          | 18990          | 19088          |    |
|                       | Leaving Air Temp<br>(°F db/°F wb) | 55.4 /<br>55.4                | 57.8 /<br>57.8 | 60.3 /<br>60.3 | 55.8 /<br>55.7 | 58.1 /<br>58.1 | 60.6 /<br>60.6 | 56.6 /<br>56.0 | 59.0 /<br>58.5 | 60.9 /<br>60.9 |    |
| 4000                  | Total Capacity (Btu/h)            | 242000                        | 250000         | 256000         | 238000         | 248000         | 254000         | 234000         | 240000         | 250000         |    |
|                       | Sensible Capacity (Btu/h)         | 136000                        | 127000         | 116000         | 154000         | 148000         | 138000         | 174000         | 162000         | 156000         |    |
|                       | Electric Power (Watts)            | 17334                         | 17434          | 17540          | 18180          | 18306          | 18416          | 19070          | 19158          | 19296          |    |
|                       | Leaving Air Temp<br>(°F db/°F wb) | 59.3 /<br>59.3                | 61.7 /<br>61.6 | 64.1 /<br>64.0 | 60.3 /<br>59.5 | 61.7 /<br>61.7 | 64.1 /<br>64.1 | 61.0 /<br>59.8 | 63.4 /<br>62.2 | 65.1 /<br>64.4 |    |
| <b>300 (25 TON)</b>   |                                   |                               |                |                |                |                |                |                |                |                |    |
| 3125                  | Total Capacity (Btu/h)            | 256000                        | 264000         | 272000         | 252000         | 260000         | 268000         | 248000         | 258000         | 264000         |    |
|                       | Sensible Capacity (Btu/h)         | 134000                        | 125000         | 117000         | 148000         | 142000         | 132000         | 164000         | 158000         | 148000         |    |
|                       | Electric Power (Watts)            | 19540                         | 19608          | 19674          | 20520          | 20594          | 20670          | 21562          | 21638          | 21710          |    |
|                       | Leaving Air Temp<br>(°F db/°F wb) | 51.6 /<br>51.6                | 54.1 /<br>54.1 | 56.6 /<br>56.6 | 52.1 /<br>52.1 | 54.5 /<br>54.5 | 57.0 /<br>57.0 | 52.4 /<br>52.4 | 54.8 /<br>54.7 | 57.4 /<br>57.4 |    |
| 4000                  | Total Capacity (Btu/h)            | 274000                        | 282000         | 292000         | 270000         | 278000         | 290000         | 266000         | 274000         | 282000         |    |
|                       | Sensible Capacity (Btu/h)         | 148000                        | 138000         | 128000         | 170000         | 160000         | 150000         | 186000         | 176000         | 170000         |    |
|                       | Electric Power (Watts)            | 19682                         | 19748          | 19822          | 20694          | 20746          | 20864          | 21738          | 21808          | 21904          |    |
|                       | Leaving Air Temp<br>(°F db/°F wb) | 56.6 /<br>56.5                | 59.0 /<br>58.9 | 61.4 /<br>61.4 | 56.8 /<br>56.8 | 59.3 /<br>59.3 | 61.4 /<br>61.4 | 58.0 /<br>57.1 | 60.4 /<br>59.6 | 62.0 /<br>62.0 |    |
| 5000                  | Total Capacity (Btu/h)            | 292000                        | 300000         | 310000         | 286000         | 294000         | 304000         | 282000         | 288000         | 296000         |    |
|                       | Sensible Capacity (Btu/h)         | 168000                        | 154000         | 142000         | 188000         | 180000         | 168000         | 212000         | 200000         | 188000         |    |
|                       | Electric Power (Watts)            | 19856                         | 19926          | 19998          | 20836          | 20918          | 20996          | 21898          | 21976          | 22046          |    |
|                       | Leaving Air Temp<br>(°F db/°F wb) | 60.0 /<br>60.0                | 62.3 /<br>62.3 | 64.7 /<br>64.7 | 61.2 /<br>60.3 | 62.7 /<br>62.6 | 65.0 /<br>65.0 | 61.8 /<br>60.5 | 64.0 /<br>62.9 | 66.2 /<br>65.3 |    |

## Performance Data (Cont'd)

TABLE 7 - JROA AIR SOURCE GENERAL PERFORMANCE (CONT'D)

| AIRFLOW<br>(CFM)    | DRY BULB<br>WET BULB              | ENTERING AIR TEMPERATURE (°F) |                |                |                |                |                |                |                |                |
|---------------------|-----------------------------------|-------------------------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|
|                     |                                   | 90                            |                |                | 95             |                |                | 100            |                |                |
|                     |                                   | 76                            | 78             | 80             | 76             | 78             | 80             | 76             | 78             | 80             |
| <b>360 (30 TON)</b> |                                   |                               |                |                |                |                |                |                |                |                |
| 3450                | Total Capacity (Btu/h)            | 302000                        | 312000         | 322000         | 298000         | 308000         | 318000         | 292000         | 302000         | 312000         |
|                     | Sensible Capacity (Btu/h)         | 158000                        | 148000         | 138000         | 176000         | 168000         | 158000         | 194000         | 186000         | 176000         |
|                     | Electric Power (Watts)            | 22718                         | 22668          | 22664          | 23804          | 23920          | 23842          | 24948          | 24938          | 25196          |
|                     | Leaving Air Temp<br>(°F db/°F wb) | 52.1 /<br>52.1                | 54.6 /<br>54.5 | 57.3 /<br>57.0 | 52.5 /<br>52.5 | 55.0 /<br>55.0 | 57.5 /<br>57.4 | 53.1 /<br>53.1 | 55.6 /<br>55.5 | 57.9 /<br>57.9 |
| 4800                | Total Capacity (Btu/h)            | 326000                        | 334000         | 344000         | 318000         | 328000         | 338000         | 314000         | 324000         | 334000         |
|                     | Sensible Capacity (Btu/h)         | 178000                        | 164000         | 152000         | 200000         | 190000         | 176000         | 222000         | 214000         | 202000         |
|                     | Electric Power (Watts)            | 22862                         | 22872          | 22918          | 23854          | 23952          | 24014          | 25098          | 25194          | 25276          |
|                     | Leaving Air Temp<br>(°F db/°F wb) | 56.9 /<br>56.9                | 59.3 /<br>59.3 | 61.7 /<br>61.7 | 57.3 /<br>57.3 | 59.7 /<br>59.6 | 62.1 /<br>62.0 | 58.3 /<br>57.5 | 59.8 /<br>59.8 | 62.2 /<br>62.2 |
| 6000                | Total Capacity (Btu/h)            | 342000                        | 352000         | 362000         | 336000         | 348000         | 358000         | 330000         | 338000         | 350000         |
|                     | Sensible Capacity (Btu/h)         | 196000                        | 182000         | 166000         | 224000         | 214000         | 200000         | 252000         | 238000         | 224000         |
|                     | Electric Power (Watts)            | 22880                         | 22942          | 23002          | 24044          | 24108          | 24178          | 25220          | 25202          | 25346          |
|                     | Leaving Air Temp<br>(°F db/°F wb) | 60.5 /<br>60.5                | 62.9 /<br>62.8 | 65.2 /<br>65.2 | 61.4 /<br>60.6 | 62.9 /<br>62.9 | 65.3 /<br>65.3 | 62.2 /<br>61.0 | 64.4 /<br>63.3 | 66.4 /<br>65.6 |
| <b>420 (35 TON)</b> |                                   |                               |                |                |                |                |                |                |                |                |
| 4375                | Total Capacity (Btu/h)            | 362000                        | 374000         | 384000         | 356000         | 368000         | 378000         | 354000         | 362000         | 372000         |
|                     | Sensible Capacity (Btu/h)         | 188000                        | 176000         | 164000         | 210000         | 198000         | 188000         | 234000         | 220000         | 210000         |
|                     | Electric Power (Watts)            | 30242                         | 30432          | 30600          | 31536          | 31740          | 31944          | 32998          | 33130          | 33334          |
|                     | Leaving Air Temp<br>(°F db/°F wb) | 51.4 /<br>51.4                | 53.8 /<br>53.8 | 56.5 /<br>56.4 | 51.8 /<br>51.8 | 54.2 /<br>54.2 | 56.7 /<br>56.7 | 52.0 /<br>52.0 | 54.7 /<br>54.7 | 57.2 /<br>57.2 |
| 5600                | Total Capacity (Btu/h)            | 392000                        | 405000         | 415000         | 382000         | 398000         | 410000         | 378000         | 390000         | 398000         |
|                     | Sensible Capacity (Btu/h)         | 212000                        | 198000         | 182000         | 238000         | 226000         | 212000         | 262000         | 252000         | 240000         |
|                     | Electric Power (Watts)            | 30794                         | 31014          | 31252          | 32014          | 32298          | 32532          | 33440          | 33692          | 33852          |
|                     | Leaving Air Temp<br>(°F db/°F wb) | 56.0 /<br>56.0                | 58.4 /<br>58.4 | 60.9 /<br>60.9 | 56.6 /<br>56.6 | 58.8 /<br>58.8 | 61.2 /<br>61.2 | 57.7 /<br>56.8 | 59.7 /<br>59.1 | 61.8 /<br>61.8 |
| 7000                | Total Capacity (Btu/h)            | 415000                        | 425000         | 435000         | 405000         | 415000         | 430000         | 400000         | 405000         | 425000         |
|                     | Sensible Capacity (Btu/h)         | 236000                        | 218000         | 200000         | 264000         | 254000         | 236000         | 300000         | 276000         | 268000         |
|                     | Electric Power (Watts)            | 31196                         | 31436          | 31690          | 32470          | 32720          | 32974          | 33918          | 34000          | 34448          |
|                     | Leaving Air Temp<br>(°F db/°F wb) | 59.8 /<br>59.8                | 62.2 /<br>62.2 | 64.6 /<br>64.5 | 61.0 /<br>60.1 | 62.5 /<br>62.4 | 64.8 /<br>64.8 | 61.4 /<br>60.2 | 64.4 /<br>62.9 | 65.7 /<br>64.9 |
| <b>480 (40 TON)</b> |                                   |                               |                |                |                |                |                |                |                |                |
| 5000                | Total Capacity (Btu/h)            | 415000                        | 430000         | 440000         | 410000         | 420000         | 435000         | 400000         | 415000         | 425000         |
|                     | Sensible Capacity (Btu/h)         | 216000                        | 202000         | 190000         | 240000         | 228000         | 214000         | 264000         | 252000         | 240000         |
|                     | Electric Power (Watts)            | 30944                         | 31214          | 31500          | 32226          | 32502          | 32792          | 33594          | 33870          | 34166          |
|                     | Leaving Air Temp<br>(°F db/°F wb) | 51.3 /<br>51.3                | 53.7 /<br>53.7 | 56.2 /<br>56.2 | 51.7 /<br>51.7 | 54.1 /<br>54.1 | 56.6 /<br>56.6 | 52.2 /<br>52.2 | 54.6 /<br>54.6 | 57.0 /<br>57.0 |
| 6400                | Total Capacity (Btu/h)            | 445000                        | 460000         | 475000         | 440000         | 450000         | 465000         | 430000         | 445000         | 455000         |
|                     | Sensible Capacity (Btu/h)         | 240000                        | 224000         | 208000         | 274000         | 258000         | 242000         | 306000         | 290000         | 274000         |
|                     | Electric Power (Watts)            | 31606                         | 31914          | 32242          | 32874          | 33188          | 33516          | 34212          | 34538          | 34878          |
|                     | Leaving Air Temp<br>(°F db/°F wb) | 56.2 /<br>56.2                | 58.6 /<br>58.6 | 61.0 /<br>61.0 | 56.6 /<br>56.6 | 58.9 /<br>58.9 | 61.3 /<br>61.3 | 57.0 /<br>57.0 | 59.3 /<br>59.3 | 61.6 /<br>61.6 |
| 8000                | Total Capacity (Btu/h)            | 470000                        | 485000         | 500000         | 460000         | 475000         | 490000         | 450000         | 465000         | 480000         |
|                     | Sensible Capacity (Btu/h)         | 268000                        | 248000         | 228000         | 310000         | 290000         | 270000         | 342000         | 324000         | 312000         |
|                     | Electric Power (Watts)            | 32172                         | 32508          | 32862          | 33422          | 33762          | 34120          | 34744          | 35072          | 35454          |
|                     | Leaving Air Temp<br>(°F db/°F wb) | 59.9 /<br>59.9                | 62.2 /<br>62.2 | 64.6 /<br>64.6 | 60.2 /<br>60.2 | 62.5 /<br>62.5 | 64.9 /<br>64.9 | 61.4 /<br>60.5 | 63.6 /<br>62.8 | 65.1 /<br>65.1 |

TABLE 7 - JROA AIR SOURCE GENERAL PERFORMANCE (CONT'D)

| AIRFLOW<br>(CFM)    |                                   | ENTERING AIR TEMPERATURE (°F) |                |                |                |                |                |                |                |                |    |
|---------------------|-----------------------------------|-------------------------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|----|
|                     |                                   | DRY BULB                      | 90             |                |                | 95             |                |                | 100            |                |    |
|                     |                                   |                               | WET BULB       | 76             | 78             | 80             | 76             | 78             | 80             | 76             | 78 |
| <b>540 (45 TON)</b> |                                   |                               |                |                |                |                |                |                |                |                |    |
| 5625                | Total Capacity (Btu/h)            | 510000                        | 530000         | 545000         | 505000         | 520000         | 540000         | 495000         | 510000         | 530000         |    |
|                     | Sensible Capacity (Btu/h)         | 262000                        | 248000         | 234000         | 290000         | 276000         | 262000         | 318000         | 304000         | 290000         |    |
|                     | Electric Power (Watts)            | 39406                         | 39610          | 39824          | 41424          | 41636          | 41854          | 43618          | 43832          | 44060          |    |
|                     | Leaving Air Temp<br>(°F db/°F wb) | 48.1 /<br>48.1                | 50.5 /<br>50.5 | 53.0 /<br>53.0 | 48.6 /<br>48.6 | 51.0 /<br>51.0 | 53.4 /<br>53.4 | 49.1 /<br>49.1 | 51.6 /<br>51.5 | 53.9 /<br>53.9 |    |
| 7200                | Total Capacity (Btu/h)            | 555000                        | 575000         | 590000         | 545000         | 565000         | 580000         | 535000         | 555000         | 570000         |    |
|                     | Sensible Capacity (Btu/h)         | 294000                        | 274000         | 256000         | 328000         | 310000         | 292000         | 364000         | 346000         | 328000         |    |
|                     | Electric Power (Watts)            | 39970                         | 40190          | 40426          | 41986          | 42220          | 42458          | 44178          | 44414          | 44664          |    |
|                     | Leaving Air Temp<br>(°F db/°F wb) | 53.4 /<br>53.4                | 55.9 /<br>55.9 | 58.3 /<br>58.3 | 53.9 /<br>53.9 | 56.3 /<br>56.3 | 58.7 /<br>58.7 | 54.3 /<br>54.3 | 56.7 /<br>56.7 | 59.1 /<br>59.1 |    |
| 9000                | Total Capacity (Btu/h)            | 590000                        | 610000         | 625000         | 580000         | 595000         | 615000         | 565000         | 585000         | 605000         |    |
|                     | Sensible Capacity (Btu/h)         | 324000                        | 302000         | 280000         | 370000         | 348000         | 326000         | 410000         | 388000         | 372000         |    |
|                     | Electric Power (Watts)            | 40434                         | 40666          | 40906          | 42452          | 42698          | 42956          | 44636          | 44882          | 45160          |    |
|                     | Leaving Air Temp<br>(°F db/°F wb) | 57.6 /<br>57.6                | 60.0 /<br>60.0 | 62.3 /<br>62.3 | 57.9 /<br>57.9 | 60.3 /<br>60.3 | 62.6 /<br>62.6 | 59.1 /<br>58.3 | 61.3 /<br>60.6 | 63.0 /<br>63.0 |    |
| <b>600 (50 TON)</b> |                                   |                               |                |                |                |                |                |                |                |                |    |
| 6250                | Total Capacity (Btu/h)            | 570000                        | 590000         | 610000         | 560000         | 580000         | 600000         | 550000         | 570000         | 590000         |    |
|                     | Sensible Capacity (Btu/h)         | 294000                        | 278000         | 262000         | 324000         | 308000         | 292000         | 354000         | 338000         | 322000         |    |
|                     | Electric Power (Watts)            | 42532                         | 42536          | 42778          | 44744          | 44860          | 44870          | 46970          | 47286          | 47350          |    |
|                     | Leaving Air Temp<br>(°F db/°F wb) | 47.9 /<br>47.9                | 50.3 /<br>50.2 | 52.7 /<br>52.7 | 48.4 /<br>48.4 | 50.8 /<br>50.8 | 53.2 /<br>53.2 | 48.9 /<br>48.9 | 51.4 /<br>51.4 | 53.7 /<br>53.7 |    |
| 8000                | Total Capacity (Btu/h)            | 625000                        | 645000         | 665000         | 610000         | 630000         | 650000         | 600000         | 620000         | 640000         |    |
|                     | Sensible Capacity (Btu/h)         | 328000                        | 308000         | 286000         | 368000         | 346000         | 328000         | 405000         | 388000         | 366000         |    |
|                     | Electric Power (Watts)            | 42924                         | 43172          | 43378          | 45108          | 45246          | 45512          | 47508          | 47608          | 47702          |    |
|                     | Leaving Air Temp<br>(°F db/°F wb) | 53.2 /<br>53.2                | 55.6 /<br>55.6 | 58.2 /<br>58.1 | 53.6 /<br>53.6 | 56.1 /<br>56.1 | 58.5 /<br>58.5 | 54.1 /<br>54.1 | 56.5 /<br>56.5 | 59.0 /<br>58.9 |    |
| 10000               | Total Capacity (Btu/h)            | 665000                        | 685000         | 705000         | 650000         | 670000         | 690000         | 635000         | 655000         | 675000         |    |
|                     | Sensible Capacity (Btu/h)         | 364000                        | 338000         | 312000         | 415000         | 388000         | 364000         | 455000         | 440000         | 415000         |    |
|                     | Electric Power (Watts)            | 43440                         | 43682          | 43940          | 45516          | 45730          | 46036          | 47692          | 47944          | 48252          |    |
|                     | Leaving Air Temp<br>(°F db/°F wb) | 57.4 /<br>57.4                | 59.7 /<br>59.7 | 62.1 /<br>62.1 | 57.7 /<br>57.7 | 60.1 /<br>60.1 | 62.4 /<br>62.4 | 58.9 /<br>58.2 | 60.5 /<br>60.5 | 62.8 /<br>62.8 |    |
| <b>660 (55 TON)</b> |                                   |                               |                |                |                |                |                |                |                |                |    |
| 6875                | Total Capacity (Btu/h)            | 620000                        | 640000         | 665000         | 615000         | 635000         | 655000         | 605000         | 625000         | 640000         |    |
|                     | Sensible Capacity (Btu/h)         | 320000                        | 300000         | 278000         | 352000         | 334000         | 316000         | 388000         | 370000         | 352000         |    |
|                     | Electric Power (Watts)            | 50100                         | 50662          | 50350          | 51726          | 52208          | 52850          | 54484          | 55488          | 55932          |    |
|                     | Leaving Air Temp<br>(°F db/°F wb) | 48.3 /<br>48.3                | 50.8 /<br>50.8 | 54.0 /<br>53.1 | 48.9 /<br>48.6 | 51.4 /<br>51.1 | 54.0 /<br>53.7 | 49.2 /<br>49.2 | 51.7 /<br>51.7 | 54.2 /<br>54.2 |    |
| 8800                | Total Capacity (Btu/h)            | 675000                        | 665000         | 690000         | 665000         | 680000         | 710000         | 650000         | 670000         | 690000         |    |
|                     | Sensible Capacity (Btu/h)         | 356000                        | 276000         | 300000         | 400000         | 378000         | 346000         | 435000         | 415000         | 396000         |    |
|                     | Electric Power (Watts)            | 51312                         | 48204          | 58954          | 53914          | 54860          | 53528          | 54788          | 55428          | 56578          |    |
|                     | Leaving Air Temp<br>(°F db/°F wb) | 53.6 /<br>53.6                | 62.0 /<br>57.4 | 59.6 /<br>59.6 | 54.0 /<br>54.0 | 56.5 /<br>56.5 | 59.8 /<br>58.8 | 55.3 /<br>54.5 | 57.5 /<br>57.0 | 59.7 /<br>59.3 |    |
| 11000               | Total Capacity (Btu/h)            | 707228                        | 685000         | 751484         | 690000         | 725000         | 750000         | 690000         | 710000         | 730000         |    |
|                     | Sensible Capacity (Btu/h)         | 391370                        | 348000         | 329698         | 410000         | 425000         | 396000         | 490000         | 480000         | 445000         |    |
|                     | Electric Power (Watts)            | 51740                         | 64980          | 52846          | 51810          | 55058          | 56410          | 55884          | 59154          | 57158          |    |
|                     | Leaving Air Temp<br>(°F db/°F wb) | 58.1 /<br>582                 | 61.7 /<br>61.7 | 63.3 /<br>62.8 | 61.5 /<br>58.5 | 60.4 /<br>60.4 | 62.8 /<br>62.8 | 59.8 /<br>58.5 | 60.8 /<br>60.8 | 63.7 /<br>63.2 |    |

# Performance Data (Cont'd)

TABLE 7 - JROA AIR SOURCE GENERAL PERFORMANCE (CONT'D)

| AIRFLOW<br>(CFM)    |                                   | ENTERING AIR TEMPERATURE (°F) |                |                |                |                |                |                |                |                |    |
|---------------------|-----------------------------------|-------------------------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|----|
|                     |                                   | DRY BULB                      | 90             |                |                | 95             |                |                | 100            |                |    |
|                     |                                   |                               | WET BULB       | 76             | 78             | 80             | 76             | 78             | 80             | 76             | 78 |
| <b>720 (60 TON)</b> |                                   |                               |                |                |                |                |                |                |                |                |    |
| 7500                | Total Capacity (Btu/h)            | 615000                        | 640000         | 660000         | 605000         | 625000         | 645000         | 590000         | 610000         | 635000         |    |
|                     | Sensible Capacity (Btu/h)         | 322000                        | 302000         | 284000         | 358000         | 340000         | 320000         | 394000         | 376000         | 356000         |    |
|                     | Electric Power (Watts)            | 46614                         | 46874          | 47136          | 48772          | 49038          | 49312          | 51062          | 51342          | 51612          |    |
|                     | Leaving Air Temp<br>(°F db/°F wb) | 51.5 /<br>51.5                | 53.9 /<br>53.9 | 56.3 /<br>56.3 | 52.1 /<br>52.1 | 54.4 /<br>54.4 | 56.8 /<br>56.8 | 52.7 /<br>52.6 | 55.0 /<br>55.0 | 57.4 /<br>57.4 |    |
| 9600                | Total Capacity (Btu/h)            | 665000                        | 685000         | 705000         | 650000         | 670000         | 690000         | 630000         | 655000         | 675000         |    |
|                     | Sensible Capacity (Btu/h)         | 360000                        | 336000         | 312000         | 405000         | 382000         | 358000         | 455000         | 430000         | 405000         |    |
|                     | Electric Power (Watts)            | 47220                         | 47494          | 47780          | 49350          | 49616          | 49914          | 51620          | 51934          | 52196          |    |
|                     | Leaving Air Temp<br>(°F db/°F wb) | 56.3 /<br>56.3                | 58.7 /<br>58.7 | 61.1 /<br>61.1 | 56.9 /<br>56.9 | 59.3 /<br>59.2 | 61.6 /<br>61.6 | 57.4 /<br>57.4 | 59.6 /<br>59.6 | 62.1 /<br>62.0 |    |
| 12000               | Total Capacity (Btu/h)            | 695000                        | 720000         | 740000         | 680000         | 700000         | 720000         | 665000         | 685000         | 705000         |    |
|                     | Sensible Capacity (Btu/h)         | 398000                        | 370000         | 340000         | 460000         | 430000         | 400000         | 520000         | 490000         | 460000         |    |
|                     | Electric Power (Watts)            | 47662                         | 47982          | 48276          | 49786          | 50088          | 50394          | 52100          | 52346          | 52668          |    |
|                     | Leaving Air Temp<br>(°F db/°F wb) | 60.2 /<br>60.1                | 62.4 /<br>62.4 | 64.7 /<br>64.7 | 60.6 /<br>60.5 | 62.8 /<br>62.8 | 65.2 /<br>65.1 | 60.8 /<br>60.8 | 63.2 /<br>63.2 | 65.5 /<br>65.5 |    |
| <b>780 (65 TON)</b> |                                   |                               |                |                |                |                |                |                |                |                |    |
| 8125                | Total Capacity (Btu/h)            | 675000                        | 700000         | 725000         | 665000         | 685000         | 710000         | 650000         | 670000         | 695000         |    |
|                     | Sensible Capacity (Btu/h)         | 352000                        | 332000         | 310000         | 392000         | 372000         | 350000         | 430000         | 410000         | 390000         |    |
|                     | Electric Power (Watts)            | 53328                         | 53698          | 54088          | 55744          | 56124          | 56518          | 58306          | 58708          | 59084          |    |
|                     | Leaving Air Temp<br>(°F db/°F wb) | 51.1 /<br>51.1                | 53.5 /<br>53.5 | 55.9 /<br>55.9 | 51.7 /<br>51.7 | 54.0 /<br>54.0 | 56.4 /<br>56.4 | 52.3 /<br>52.2 | 54.5 /<br>54.5 | 57.1 /<br>57.0 |    |
| 10400               | Total Capacity (Btu/h)            | 725000                        | 750000         | 770000         | 710000         | 735000         | 755000         | 695000         | 715000         | 740000         |    |
|                     | Sensible Capacity (Btu/h)         | 394000                        | 366000         | 340000         | 445000         | 420000         | 390000         | 495000         | 470000         | 445000         |    |
|                     | Electric Power (Watts)            | 54196                         | 54560          | 54994          | 56572          | 56998          | 57374          | 59110          | 59514          | 59958          |    |
|                     | Leaving Air Temp<br>(°F db/°F wb) | 56.1 /<br>56.1                | 58.6 /<br>58.5 | 60.8 /<br>60.8 | 56.6 /<br>56.6 | 58.9 /<br>58.9 | 61.4 /<br>61.3 | 57.1 /<br>57.1 | 59.5 /<br>59.4 | 61.7 /<br>61.7 |    |
| 13000               | Total Capacity (Btu/h)            | 760000                        | 785000         | 810000         | 745000         | 770000         | 790000         | 730000         | 750000         | 775000         |    |
|                     | Sensible Capacity (Btu/h)         | 435000                        | 400000         | 370000         | 505000         | 470000         | 435000         | 570000         | 535000         | 505000         |    |
|                     | Electric Power (Watts)            | 54828                         | 55242          | 55670          | 57252          | 57668          | 58050          | 59834          | 60210          | 60630          |    |
|                     | Leaving Air Temp<br>(°F db/°F wb) | 60.0 /<br>59.9                | 62.3 /<br>62.3 | 64.6 /<br>64.6 | 60.2 /<br>60.2 | 62.5 /<br>62.5 | 65.0 /<br>64.9 | 60.5 /<br>60.5 | 62.8 /<br>62.8 | 65.2 /<br>65.2 |    |
| <b>840 (70 TON)</b> |                                   |                               |                |                |                |                |                |                |                |                |    |
| 8750                | Total Capacity (Btu/h)            | 770000                        | 795000         | 820000         | 755000         | 780000         | 805000         | 740000         | 765000         | 790000         |    |
|                     | Sensible Capacity (Btu/h)         | 396000                        | 374000         | 352000         | 440000         | 415000         | 394000         | 480000         | 460000         | 435000         |    |
|                     | Electric Power (Watts)            | 62968                         | 63538          | 64138          | 65808          | 66388          | 67004          | 68854          | 69440          | 70044          |    |
|                     | Leaving Air Temp<br>(°F db/°F wb) | 49.3 /<br>49.3                | 51.7 /<br>51.7 | 54.2 /<br>54.2 | 49.9 /<br>49.9 | 52.3 /<br>52.3 | 54.7 /<br>54.7 | 50.4 /<br>50.4 | 52.8 /<br>52.8 | 55.3 /<br>55.3 |    |
| 11200               | Total Capacity (Btu/h)            | 830000                        | 855000         | 880000         | 810000         | 840000         | 865000         | 795000         | 820000         | 850000         |    |
|                     | Sensible Capacity (Btu/h)         | 440000                        | 415000         | 384000         | 495000         | 470000         | 440000         | 550000         | 525000         | 495000         |    |
|                     | Electric Power (Watts)            | 64374                         | 65014          | 65680          | 67206          | 67836          | 68526          | 70214          | 70838          | 71572          |    |
|                     | Leaving Air Temp<br>(°F db/°F wb) | 54.6 /<br>54.6                | 57.0 /<br>57.0 | 59.4 /<br>59.4 | 55.1 /<br>55.1 | 57.5 /<br>57.5 | 59.9 /<br>59.9 | 55.5 /<br>55.5 | 58.0 /<br>57.9 | 60.2 /<br>60.2 |    |
| 14000               | Total Capacity (Btu/h)            | 875000                        | 900000         | 925000         | 855000         | 880000         | 910000         | 835000         | 860000         | 890000         |    |
|                     | Sensible Capacity (Btu/h)         | 490000                        | 455000         | 420000         | 560000         | 525000         | 490000         | 630000         | 595000         | 560000         |    |
|                     | Electric Power (Watts)            | 65518                         | 66230          | 66942          | 68332          | 69002          | 69726          | 71326          | 72012          | 72702          |    |
|                     | Leaving Air Temp<br>(°F db/°F wb) | 58.7 /<br>58.7                | 61.0 /<br>61.0 | 63.3 /<br>63.3 | 59.0 /<br>59.0 | 61.4 /<br>61.4 | 63.8 /<br>63.7 | 59.4 /<br>59.4 | 61.7 /<br>61.7 | 64.1 /<br>64.1 |    |

TABLE 8 - JROH AIR SOURCE HEAT PUMP GENERAL PERFORMANCE

| AIRFLOW<br>(CFM)   |                                   | ENTERING AIR TEMPERATURE (°F) |                |                |                |                |                |                |                |                |         |       |       |
|--------------------|-----------------------------------|-------------------------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|---------|-------|-------|
|                    |                                   | COOLING                       |                |                |                |                |                |                |                |                | HEATING |       |       |
|                    |                                   | 90                            |                |                | 95             |                |                | 100            |                |                | 20      | 30    | 40    |
| DRY BULB           | 76                                | 78                            | 80             | 76             | 78             | 80             | 76             | 78             | 80             |                |         |       |       |
| WET BULB           | 76                                | 78                            | 80             | 76             | 78             | 80             | 76             | 78             | 80             |                |         |       |       |
| <b>036 (3 TON)</b> |                                   |                               |                |                |                |                |                |                |                |                |         |       |       |
| 375                | Total Capacity (Btu/h)            | 36000                         | 37400          | 38500          | 35400          | 36800          | 38000          | 34800          | 36200          | 37400          | 26000   | 29000 | 32000 |
|                    | Sensible Capacity (Btu/h)         | 18400                         | 17500          | 16600          | 20200          | 19300          | 18400          | 22000          | 21200          | 20200          |         |       |       |
|                    | Electric Power (Watts)            | 2850                          | 2853           | 2858           | 3013           | 3017           | 3022           | 3187           | 3191           | 3197           | 2455    | 2948  | 3481  |
|                    | Leaving Air Temp<br>(°F db/°F wb) | 45.9 /<br>45.9                | 48.2 /<br>48.2 | 50.6 /<br>50.6 | 46.4 /<br>46.4 | 48.8 /<br>48.8 | 51.2 /<br>51.2 | 47.1 /<br>47.1 | 49.4 /<br>49.4 | 51.7 /<br>51.7 | 83.7    | 101.3 | 118.4 |
| 480                | Total Capacity (Btu/h)            | 39500                         | 41000          | 42500          | 39000          | 40500          | 41500          | 38000          | 39500          | 41000          | 26800   | 30200 | 34000 |
|                    | Sensible Capacity (Btu/h)         | 20600                         | 19400          | 18200          | 23000          | 21800          | 20600          | 25400          | 24200          | 23000          |         |       |       |
|                    | Electric Power (Watts)            | 2864                          | 2868           | 2871           | 3027           | 3032           | 3037           | 3200           | 3207           | 3212           | 2230    | 2641  | 3131  |
|                    | Leaving Air Temp<br>(°F db/°F wb) | 51.5 /<br>51.5                | 53.8 /<br>53.8 | 56.2 /<br>56.2 | 52.0 /<br>51.9 | 54.3 /<br>54.2 | 56.6 /<br>56.6 | 52.5 /<br>52.5 | 54.8 /<br>54.8 | 57.1 /<br>57.1 | 71.4    | 87.7  | 104.8 |
| 600                | Total Capacity (Btu/h)            | 42500                         | 44000          | 45500          | 41500          | 43000          | 44500          | 40500          | 42000          | 43500          | 27600   | 31400 | 34800 |
|                    | Sensible Capacity (Btu/h)         | 22800                         | 21400          | 19900          | 25800          | 24400          | 22800          | 28800          | 27400          | 26000          |         |       |       |
|                    | Electric Power (Watts)            | 2873                          | 2879           | 2885           | 3038           | 3043           | 3050           | 3214           | 3220           | 3227           | 2080    | 2428  | 2870  |
|                    | Leaving Air Temp<br>(°F db/°F wb) | 55.9 /<br>55.8                | 58.1 /<br>58.1 | 60.5 /<br>60.5 | 56.2 /<br>56.2 | 58.6 /<br>58.5 | 60.9 /<br>60.8 | 56.7 /<br>56.7 | 58.9 /<br>58.9 | 61.2 /<br>61.2 | 62.4    | 78.1  | 93.0  |
| <b>048 (4 TON)</b> |                                   |                               |                |                |                |                |                |                |                |                |         |       |       |
| 500                | Total Capacity (Btu/h)            | 45500                         | 47000          | 49000          | 44500          | 46500          | 48000          | 44000          | 45500          | 47000          | 32200   | 36200 | 40500 |
|                    | Sensible Capacity (Btu/h)         | 23400                         | 22200          | 20800          | 25800          | 24600          | 23400          | 28200          | 27000          | 25800          |         |       |       |
|                    | Electric Power (Watts)            | 3363                          | 3368           | 3374           | 3553           | 3556           | 3562           | 3742           | 3760           | 3763           | 2886    | 3468  | 4077  |
|                    | Leaving Air Temp<br>(°F db/°F wb) | 48.1 /<br>48.1                | 50.4 /<br>50.4 | 52.7 /<br>52.7 | 48.6 /<br>48.6 | 50.9 /<br>50.9 | 53.2 /<br>53.2 | 49.2 /<br>49.1 | 51.5 /<br>51.5 | 53.8 /<br>53.8 | 79.2    | 96.6  | 114.0 |
| 640                | Total Capacity (Btu/h)            | 49500                         | 51500          | 53500          | 49000          | 50500          | 52500          | 48000          | 49500          | 51500          | 33600   | 37400 | 42000 |
|                    | Sensible Capacity (Btu/h)         | 26200                         | 24600          | 23000          | 29400          | 27800          | 26200          | 32600          | 31000          | 29400          |         |       |       |
|                    | Electric Power (Watts)            | 3379                          | 3386           | 3396           | 3566           | 3574           | 3581           | 3762           | 3770           | 3780           | 2642    | 3140  | 3688  |
|                    | Leaving Air Temp<br>(°F db/°F wb) | 53.3 /<br>53.3                | 55.7 /<br>55.6 | 58.0 /<br>58.0 | 53.8 /<br>53.7 | 56.1 /<br>56.1 | 58.4 /<br>58.4 | 54.2 /<br>54.2 | 56.5 /<br>56.5 | 58.8 /<br>58.8 | 68.2    | 83.8  | 99.9  |
| 800                | Total Capacity (Btu/h)            | 53000                         | 55000          | 56500          | 52000          | 53500          | 55500          | 51000          | 52500          | 54500          | 34400   | 38500 | 43000 |
|                    | Sensible Capacity (Btu/h)         | 29000                         | 27000          | 25200          | 33200          | 31200          | 29200          | 37200          | 35200          | 33200          |         |       |       |
|                    | Electric Power (Watts)            | 3396                          | 3407           | 3419           | 3582           | 3592           | 3604           | 3780           | 3790           | 3800           | 2474    | 2914  | 3414  |
|                    | Leaving Air Temp<br>(°F db/°F wb) | 57.4 /<br>57.4                | 59.7 /<br>59.7 | 62.0 /<br>62.0 | 57.8 /<br>57.8 | 60.1 /<br>60.0 | 62.4 /<br>62.3 | 58.2 /<br>58.2 | 60.4 /<br>60.4 | 62.8 /<br>62.7 | 59.7    | 74.5  | 89.5  |
| <b>060 (5 TON)</b> |                                   |                               |                |                |                |                |                |                |                |                |         |       |       |
| 625                | Total Capacity (Btu/h)            | 54500                         | 56500          | 58500          | 54000          | 56000          | 58000          | 52500          | 54500          | 57000          | 39000   | 44000 | 49000 |
|                    | Sensible Capacity (Btu/h)         | 28200                         | 26600          | 25200          | 31400          | 29800          | 28200          | 34400          | 33000          | 31400          |         |       |       |
|                    | Electric Power (Watts)            | 3956                          | 3959           | 3969           | 4203           | 4179           | 4193           | 4450           | 4453           | 4435           | 3421    | 4055  | 4767  |
|                    | Leaving Air Temp<br>(°F db/°F wb) | 49.4 /<br>49.4                | 51.8 /<br>51.8 | 54.2 /<br>54.2 | 50.0 /<br>50.0 | 52.3 /<br>52.2 | 54.6 /<br>54.6 | 50.5 /<br>50.5 | 52.8 /<br>52.8 | 55.1 /<br>55.1 | 77.8    | 95.0  | 112.0 |
| 800                | Total Capacity (Btu/h)            | 59500                         | 61500          | 63500          | 58000          | 60000          | 62500          | 57000          | 59000          | 61000          | 40500   | 45000 | 51000 |
|                    | Sensible Capacity (Btu/h)         | 31600                         | 29600          | 27600          | 35400          | 33600          | 31600          | 39500          | 37600          | 35600          |         |       |       |
|                    | Electric Power (Watts)            | 3972                          | 3981           | 3989           | 4195           | 4206           | 4207           | 4423           | 4437           | 4446           | 3134    | 3701  | 4294  |
|                    | Leaving Air Temp<br>(°F db/°F wb) | 54.6 /<br>54.6                | 56.9 /<br>56.9 | 59.3 /<br>59.3 | 55.1 /<br>55.0 | 57.3 /<br>57.3 | 59.8 /<br>59.7 | 55.6 /<br>55.5 | 57.8 /<br>57.8 | 60.2 /<br>60.1 | 66.8    | 81.9  | 98.7  |
| 1000               | Total Capacity (Btu/h)            | 63000                         | 65000          | 67000          | 61500          | 63500          | 66000          | 60000          | 62000          | 64000          | 41500   | 46500 | 53000 |
|                    | Sensible Capacity (Btu/h)         | 35000                         | 32600          | 30000          | 40000          | 37800          | 35200          | 44500          | 42500          | 40500          |         |       |       |
|                    | Electric Power (Watts)            | 3989                          | 4001           | 4008           | 4215           | 4225           | 4228           | 4445           | 4453           | 4475           | 2935    | 3463  | 3979  |
|                    | Leaving Air Temp<br>(°F db/°F wb) | 58.6 /<br>58.6                | 60.8 /<br>60.8 | 63.2 /<br>63.2 | 58.9 /<br>58.9 | 61.2 /<br>61.2 | 63.6 /<br>63.5 | 59.9 /<br>59.3 | 61.7 /<br>61.6 | 63.8 /<br>63.8 | 58.2    | 72.9  | 88.4  |

# Performance Data (Cont'd)

**TABLE 8 - JROH AIR SOURCE HEAT PUMP GENERAL PERFORMANCE (CONT'D)**

| AIRFLOW<br>(CFM)   |                                   | ENTERING AIR TEMPERATURE (°F) |             |             |             |             |             |             |             |             |         |       |       |
|--------------------|-----------------------------------|-------------------------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|---------|-------|-------|
|                    |                                   | COOLING                       |             |             |             |             |             |             |             |             | HEATING |       |       |
|                    |                                   | DRY BULB                      | 90          |             |             | 95          |             |             | 100         |             |         | 20    | 30    |
|                    | WET BULB                          | 76                            | 78          | 80          | 76          | 78          | 80          | 76          | 78          | 80          |         |       |       |
| <b>072 (6 TON)</b> |                                   |                               |             |             |             |             |             |             |             |             |         |       |       |
| 750                | Total Capacity (Btu/h)            | 62000                         | 64000       | 66000       | 60500       | 63000       | 65000       | 59500       | 61500       | 64000       | 43000   | 48500 | 54000 |
|                    | Sensible Capacity (Btu/h)         | 32200                         | 30400       | 28400       | 35800       | 34000       | 32200       | 39500       | 37800       | 36000       |         |       |       |
|                    | Electric Power (Watts)            | 4492                          | 4509        | 4526        | 4728        | 4746        | 4764        | 4981        | 4998        | 5016        | 3397    | 3979  | 4708  |
|                    | Leaving Air Temp<br>(°F db/°F wb) | 51.5 / 51.5                   | 53.8 / 53.8 | 56.2 / 56.2 | 52.0 / 51.9 | 54.3 / 54.3 | 56.6 / 56.6 | 52.5 / 52.5 | 54.8 / 54.8 | 57.1 / 57.1 | 72.8    | 89.3  | 106.0 |
| 960                | Total Capacity (Btu/h)            | 67000                         | 69000       | 71000       | 65000       | 68000       | 70000       | 64000       | 66000       | 68000       | 45000   | 51000 | 55500 |
|                    | Sensible Capacity (Btu/h)         | 36000                         | 33600       | 31200       | 41000       | 38500       | 36200       | 45500       | 43500       | 41000       |         |       |       |
|                    | Electric Power (Watts)            | 4532                          | 4552        | 4574        | 4769        | 4790        | 4811        | 5018        | 5041        | 5063        | 3133    | 3633  | 4251  |
|                    | Leaving Air Temp<br>(°F db/°F wb) | 56.3 / 56.3                   | 58.6 / 58.6 | 60.9 / 60.9 | 56.7 / 56.7 | 58.9 / 58.9 | 61.3 / 61.3 | 57.2 / 57.1 | 59.4 / 59.4 | 61.7 / 61.7 | 63.4    | 78.7  | 92.9  |
| 1200               | Total Capacity (Btu/h)            | 70000                         | 73000       | 75000       | 69000       | 71000       | 74000       | 67000       | 70000       | 72000       | 45500   | 51000 | 57000 |
|                    | Sensible Capacity (Btu/h)         | 40000                         | 37200       | 34200       | 46500       | 43500       | 40500       | 52500       | 49500       | 47000       |         |       |       |
|                    | Electric Power (Watts)            | 4568                          | 4590        | 4613        | 4805        | 4827        | 4851        | 5053        | 5074        | 5101        | 2949    | 3395  | 3940  |
|                    | Leaving Air Temp<br>(°F db/°F wb) | 60.0 / 59.9                   | 62.2 / 62.2 | 64.6 / 64.5 | 60.2 / 60.2 | 62.5 / 62.5 | 64.8 / 64.8 | 60.6 / 60.6 | 62.9 / 62.9 | 65.1 / 65.1 | 54.9    | 69.2  | 83.5  |
| <b>084 (7 TON)</b> |                                   |                               |             |             |             |             |             |             |             |             |         |       |       |
| 875                | Total Capacity (Btu/h)            | 76000                         | 79000       | 82000       | 75000       | 78000       | 80000       | 74000       | 76000       | 79000       | 61000   | 69000 | 76000 |
|                    | Sensible Capacity (Btu/h)         | 39500                         | 37200       | 35000       | 44000       | 41500       | 39500       | 48000       | 46000       | 44000       |         |       |       |
|                    | Electric Power (Watts)            | 6584                          | 6601        | 6608        | 6873        | 6932        | 6950        | 7181        | 7239        | 7305        | 5690    | 6669  | 7783  |
|                    | Leaving Air Temp<br>(°F db/°F wb) | 49.5 / 49.5                   | 51.9 / 51.9 | 54.4 / 54.3 | 50.0 / 50.0 | 52.4 / 52.4 | 54.8 / 54.8 | 50.6 / 50.6 | 52.9 / 52.9 | 55.4 / 55.4 | 84.2    | 102.8 | 119.8 |
| 1120               | Total Capacity (Btu/h)            | 82000                         | 85000       | 88000       | 81000       | 84000       | 87000       | 79000       | 82000       | 85000       | 62500   | 71000 | 80000 |
|                    | Sensible Capacity (Btu/h)         | 44000                         | 41000       | 38000       | 50000       | 47000       | 44000       | 55000       | 52000       | 49500       |         |       |       |
|                    | Electric Power (Watts)            | 6659                          | 6683        | 6698        | 6981        | 7001        | 7027        | 7212        | 7255        | 7368        | 5250    | 6136  | 7092  |
|                    | Leaving Air Temp<br>(°F db/°F wb) | 54.8 / 54.8                   | 57.1 / 57.1 | 59.6 / 59.5 | 55.2 / 55.2 | 57.5 / 57.5 | 59.9 / 59.9 | 55.9 / 55.6 | 58.2 / 57.9 | 60.3 / 60.3 | 71.5    | 88.3  | 105.2 |
| 1400               | Total Capacity (Btu/h)            | 87000                         | 90000       | 93000       | 85000       | 88000       | 91000       | 84000       | 86000       | 89000       | 64000   | 72000 | 82000 |
|                    | Sensible Capacity (Btu/h)         | 48500                         | 45000       | 41500       | 56000       | 53000       | 49500       | 63000       | 59500       | 56000       |         |       |       |
|                    | Electric Power (Watts)            | 6707                          | 6734        | 6786        | 7019        | 7093        | 7121        | 7293        | 7386        | 7378        | 4948    | 5771  | 6605  |
|                    | Leaving Air Temp<br>(°F db/°F wb) | 58.8 / 58.7                   | 61.2 / 61.0 | 63.5 / 63.4 | 59.1 / 59.1 | 61.4 / 61.4 | 63.7 / 63.7 | 59.6 / 59.4 | 61.7 / 61.7 | 64.3 / 64.0 | 62.0    | 77.5  | 93.6  |
| <b>096 (8 TON)</b> |                                   |                               |             |             |             |             |             |             |             |             |         |       |       |
| 1000               | Total Capacity (Btu/h)            | 88000                         | 91000       | 94000       | 86000       | 89000       | 92000       | 85000       | 88000       | 91000       | 72000   | 81000 | 92000 |
|                    | Sensible Capacity (Btu/h)         | 45000                         | 42500       | 40000       | 50000       | 47500       | 45000       | 55000       | 52500       | 50000       |         |       |       |
|                    | Electric Power (Watts)            | 7355                          | 7406        | 7456        | 7712        | 7741        | 7796        | 8054        | 8124        | 8153        | 6733    | 7897  | 9271  |
|                    | Leaving Air Temp<br>(°F db/°F wb) | 49.4 / 49.3                   | 51.8 / 51.8 | 54.2 / 54.2 | 49.8 / 49.8 | 52.3 / 52.2 | 54.7 / 54.7 | 50.4 / 50.4 | 52.8 / 52.8 | 55.3 / 55.2 | 86.5    | 104.9 | 124.0 |
| 1280               | Total Capacity (Btu/h)            | 95000                         | 98000       | 101000      | 93000       | 96000       | 99000       | 91000       | 94000       | 97000       | 74000   | 84000 | 94000 |
|                    | Sensible Capacity (Btu/h)         | 50500                         | 47000       | 44000       | 57000       | 53500       | 50500       | 63500       | 60000       | 57000       |         |       |       |
|                    | Electric Power (Watts)            | 7471                          | 7520        | 7567        | 7815        | 7859        | 7913        | 8186        | 8231        | 8280        | 6198    | 7218  | 8402  |
|                    | Leaving Air Temp<br>(°F db/°F wb) | 54.7 / 54.6                   | 57.1 / 57.0 | 59.5 / 59.4 | 55.1 / 55.1 | 57.5 / 57.4 | 59.8 / 59.8 | 55.5 / 55.5 | 57.9 / 57.9 | 60.2 / 60.2 | 73.0    | 90.4  | 107   |
| 1600               | Total Capacity (Btu/h)            | 100000                        | 103000      | 106000      | 98000       | 101000      | 104000      | 96000       | 99000       | 102000      | 75000   | 85000 | 96000 |
|                    | Sensible Capacity (Btu/h)         | 56000                         | 52000       | 47500       | 64000       | 60000       | 56000       | 72000       | 68000       | 64500       |         |       |       |
|                    | Electric Power (Watts)            | 7558                          | 7606        | 7660        | 7899        | 7949        | 7997        | 8265        | 8312        | 8368        | 5820    | 6766  | 7803  |
|                    | Leaving Air Temp<br>(°F db/°F wb) | 58.7 / 58.7                   | 61.0 / 61.0 | 63.4 / 63.3 | 59.0 / 59.0 | 61.3 / 61.3 | 63.7 / 63.7 | 59.3 / 59.3 | 61.7 / 61.7 | 64.0 / 64.0 | 63.0    | 78.6  | 94.9  |

TABLE 8 - JROH AIR SOURCE HEAT PUMP GENERAL PERFORMANCE (CONT'D)

| AIRFLOW<br>(CFM)      |                                   | ENTERING AIR TEMPERATURE (°F) |                |                |                |                |                |                |                |                |         |        |        |
|-----------------------|-----------------------------------|-------------------------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|---------|--------|--------|
|                       |                                   | COOLING                       |                |                |                |                |                |                |                |                | HEATING |        |        |
|                       |                                   | 90                            |                |                | 95             |                |                | 100            |                |                | 20      | 30     | 40     |
| DRY BULB              | 76                                | 78                            | 80             | 76             | 78             | 80             | 76             | 78             | 80             |                |         |        |        |
| WET BULB              | 76                                | 78                            | 80             | 76             | 78             | 80             | 76             | 78             | 80             |                |         |        |        |
| <b>120 (10 TON)</b>   |                                   |                               |                |                |                |                |                |                |                |                |         |        |        |
| 1250                  | Total Capacity (Btu/h)            | 124000                        | 128000         | 132000         | 121000         | 126000         | 130000         | 119000         | 123000         | 127000         | 91000   | 104000 | 116000 |
|                       | Sensible Capacity (Btu/h)         | 64500                         | 60500          | 57000          | 72000          | 68000          | 64000          | 79000          | 75000          | 71000          |         |        |        |
|                       | Electric Power (Watts)            | 8576                          | 8600           | 8632           | 9024           | 9052           | 9078           | 9506           | 9532           | 9554           | 7368    | 8786   | 10676  |
|                       | Leaving Air Temp<br>(°F db/°F wb) | 51.4 /<br>51.4                | 53.8 /<br>53.7 | 56.2 /<br>56.2 | 52.0 /<br>51.9 | 54.3 /<br>54.3 | 56.7 /<br>56.6 | 52.5 /<br>52.5 | 54.8 /<br>54.8 | 57.3 /<br>57.2 | 87.2    | 106.2  | 124.8  |
| 1600                  | Total Capacity (Btu/h)            | 124000                        | 128000         | 132000         | 121000         | 126000         | 130000         | 119000         | 123000         | 127000         | 94000   | 107000 | 120000 |
|                       | Sensible Capacity (Btu/h)         | 64500                         | 60500          | 57000          | 72000          | 68000          | 64000          | 79000          | 75000          | 71000          |         |        |        |
|                       | Electric Power (Watts)            | 8576                          | 8600           | 8632           | 9024           | 9052           | 9078           | 9506           | 9532           | 9554           | 6626    | 7728   | 9198   |
|                       | Leaving Air Temp<br>(°F db/°F wb) | 51.4 /<br>51.4                | 53.8 /<br>53.7 | 56.2 /<br>56.2 | 52.0 /<br>51.9 | 54.3 /<br>54.3 | 56.7 /<br>56.6 | 52.5 /<br>52.5 | 54.8 /<br>54.8 | 57.3 /<br>57.2 | 74.4    | 91.4   | 108.5  |
| 2000                  | Total Capacity (Btu/h)            | 124000                        | 128000         | 132000         | 121000         | 126000         | 130000         | 119000         | 123000         | 127000         | 97000   | 110000 | 123000 |
|                       | Sensible Capacity (Btu/h)         | 64500                         | 60500          | 57000          | 72000          | 68000          | 64000          | 79000          | 75000          | 71000          |         |        |        |
|                       | Electric Power (Watts)            | 8576                          | 8600           | 8632           | 9024           | 9052           | 9078           | 9506           | 9532           | 9554           | 6130    | 7050   | 8238   |
|                       | Leaving Air Temp<br>(°F db/°F wb) | 51.4 /<br>51.4                | 53.8 /<br>53.7 | 56.2 /<br>56.2 | 52.0 /<br>51.9 | 54.3 /<br>54.3 | 56.7 /<br>56.6 | 52.5 /<br>52.5 | 54.8 /<br>54.8 | 57.3 /<br>57.2 | 64.7    | 80.4   | 96.5   |
| <b>150 (12.5 TON)</b> |                                   |                               |                |                |                |                |                |                |                |                |         |        |        |
| 1500                  | Total Capacity (Btu/h)            | 138000                        | 142000         | 148000         | 136000         | 140000         | 144000         | 132000         | 138000         | 142000         | 110000  | 124000 | 140000 |
|                       | Sensible Capacity (Btu/h)         | 71000                         | 67000          | 63000          | 78000          | 74000          | 70000          | 85000          | 81000          | 78000          |         |        |        |
|                       | Electric Power (Watts)            | 10582                         | 10668          | 10756          | 11100          | 11190          | 11282          | 11646          | 11742          | 11836          | 8518    | 10238  | 12228  |
|                       | Leaving Air Temp<br>(°F db/°F wb) | 47.7 /<br>47.7                | 50.1 /<br>50.1 | 52.6 /<br>52.6 | 48.3 /<br>48.3 | 50.7 /<br>50.7 | 53.2 /<br>53.2 | 48.9 /<br>48.9 | 51.3 /<br>51.3 | 53.7 /<br>53.7 | 87.4    | 106.1  | 125.2  |
| 1920                  | Total Capacity (Btu/h)            | 150000                        | 154000         | 160000         | 146000         | 152000         | 156000         | 144000         | 148000         | 154000         | 113000  | 132000 | 146000 |
|                       | Sensible Capacity (Btu/h)         | 79000                         | 74000          | 69000          | 88000          | 83000          | 78000          | 98000          | 93000          | 88000          |         |        |        |
|                       | Electric Power (Watts)            | 10814                         | 10906          | 11002          | 11334          | 11430          | 11524          | 11884          | 11982          | 12086          | 7720    | 9116   | 10872  |
|                       | Leaving Air Temp<br>(°F db/°F wb) | 53.2 /<br>53.2                | 55.7 /<br>55.6 | 58.1 /<br>58.0 | 53.6 /<br>53.6 | 56.1 /<br>56.1 | 58.6 /<br>58.5 | 54.1 /<br>54.1 | 56.5 /<br>56.5 | 58.9 /<br>58.9 | 74.2    | 93.0   | 110.1  |
| 2400                  | Total Capacity (Btu/h)            | 160000                        | 164000         | 168000         | 156000         | 160000         | 166000         | 152000         | 158000         | 162000         | 115000  | 134000 | 148000 |
|                       | Sensible Capacity (Btu/h)         | 87000                         | 81000          | 75000          | 99000          | 93000          | 87000          | 111000         | 106000         | 100000         |         |        |        |
|                       | Electric Power (Watts)            | 11006                         | 11100          | 11200          | 11524          | 11624          | 11726          | 12074          | 12176          | 12280          | 7200    | 8376   | 9930   |
|                       | Leaving Air Temp<br>(°F db/°F wb) | 57.4 /<br>57.4                | 59.8 /<br>59.7 | 62.2 /<br>62.1 | 57.8 /<br>57.8 | 60.1 /<br>60.1 | 62.5 /<br>62.5 | 58.2 /<br>58.2 | 60.5 /<br>60.5 | 62.9 /<br>62.9 | 64.3    | 81.5   | 96.2   |
| <b>180 (15 TON)</b>   |                                   |                               |                |                |                |                |                |                |                |                |         |        |        |
| 1875                  | Total Capacity (Btu/h)            | 164000                        | 170000         | 174000         | 160000         | 166000         | 172000         | 158000         | 164000         | 168000         | 121000  | 140000 | 154000 |
|                       | Sensible Capacity (Btu/h)         | 84000                         | 80000          | 75000          | 94000          | 89000          | 84000          | 103000         | 98000          | 93000          |         |        |        |
|                       | Electric Power (Watts)            | 12604                         | 12690          | 12768          | 13194          | 13294          | 13386          | 13876          | 13922          | 14028          | 9574    | 11342  | 13506  |
|                       | Leaving Air Temp<br>(°F db/°F wb) | 49.5 /<br>49.5                | 52.0 /<br>52.0 | 54.4 /<br>54.4 | 50.1 /<br>50.1 | 52.5 /<br>52.5 | 54.9 /<br>54.9 | 50.6 /<br>50.6 | 53.1 /<br>53.0 | 55.5 /<br>55.4 | 79.6    | 98.8   | 114.8  |
| 2400                  | Total Capacity (Btu/h)            | 178000                        | 182000         | 188000         | 174000         | 180000         | 186000         | 170000         | 176000         | 182000         | 124000  | 144000 | 160000 |
|                       | Sensible Capacity (Btu/h)         | 94000                         | 88000          | 82000          | 106000         | 101000         | 94000          | 118000         | 112000         | 107000         |         |        |        |
|                       | Electric Power (Watts)            | 12810                         | 12908          | 13010          | 13420          | 13520          | 13618          | 14050          | 14158          | 14264          | 8818    | 10282  | 12094  |
|                       | Leaving Air Temp<br>(°F db/°F wb) | 54.8 /<br>54.7                | 57.2 /<br>57.1 | 59.6 /<br>59.5 | 55.2 /<br>55.1 | 57.5 /<br>57.5 | 59.9 /<br>59.9 | 55.7 /<br>55.6 | 57.9 /<br>57.9 | 60.3 /<br>60.3 | 67.5    | 85.0   | 100.8  |
| 3000                  | Total Capacity (Btu/h)            | 188000                        | 194000         | 200000         | 184000         | 190000         | 196000         | 180000         | 186000         | 192000         | 126000  | 145000 | 162000 |
|                       | Sensible Capacity (Btu/h)         | 105000                        | 98000          | 89000          | 120000         | 113000         | 105000         | 134000         | 128000         | 121000         |         |        |        |
|                       | Electric Power (Watts)            | 13006                         | 13108          | 13206          | 13602          | 13702          | 13808          | 14220          | 14324          | 14442          | 8298    | 9778   | 11156  |
|                       | Leaving Air Temp<br>(°F db/°F wb) | 58.6 /<br>58.6                | 60.9 /<br>60.9 | 63.4 /<br>63.3 | 59.0 /<br>59.0 | 61.3 /<br>61.3 | 63.6 /<br>63.6 | 59.4 /<br>59.4 | 61.7 /<br>61.7 | 64.0 /<br>64.0 | 58.8    | 74.4   | 89.7   |

# Performance Data (Cont'd)

TABLE 8 - JROH AIR SOURCE HEAT PUMP GENERAL PERFORMANCE (CONT'D)

| AIRFLOW<br>(CFM)      |                                | ENTERING AIR TEMPERATURE (°F) |             |             |             |             |             |             |             |             |         |        |        |
|-----------------------|--------------------------------|-------------------------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|---------|--------|--------|
|                       |                                | COOLING                       |             |             |             |             |             |             |             |             | HEATING |        |        |
|                       |                                | DRY BULB                      | 90          |             |             | 95          |             |             | 100         |             |         | 20     | 30     |
| WET BULB              | 76                             | 78                            | 80          | 76          | 78          | 80          | 76          | 78          | 80          |             |         |        |        |
| <b>210 (17.5 TON)</b> |                                |                               |             |             |             |             |             |             |             |             |         |        |        |
| 2187.5                | Total Capacity (Btu/h)         | 186000                        | 192000      | 198000      | 182000      | 190000      | 196000      | 180000      | 186000      | 192000      | 146000  | 160000 | 178000 |
|                       | Sensible Capacity (Btu/h)      | 96000                         | 91000       | 85000       | 107000      | 102000      | 96000       | 118000      | 112000      | 107000      |         |        |        |
|                       | Electric Power (Watts)         | 14724                         | 14794       | 14866       | 15446       | 15520       | 15594       | 16214       | 16288       | 16364       | 11774   | 13798  | 16390  |
|                       | Leaving Air Temp (°F db/°F wb) | 50.4 / 50.4                   | 52.9 / 52.9 | 55.4 / 55.4 | 50.9 / 50.9 | 53.3 / 53.3 | 55.8 / 55.8 | 51.4 / 51.4 | 53.8 / 53.8 | 56.3 / 56.3 | 81.4    | 97.6   | 114.7  |
| 2800                  | Total Capacity (Btu/h)         | 200000                        | 206000      | 214000      | 198000      | 204000      | 210000      | 192000      | 200000      | 206000      | 152000  | 166000 | 189000 |
|                       | Sensible Capacity (Btu/h)      | 108000                        | 101000      | 93000       | 122000      | 115000      | 108000      | 134000      | 129000      | 122000      |         |        |        |
|                       | Electric Power (Watts)         | 14906                         | 14976       | 15046       | 15624       | 15702       | 15776       | 16376       | 16462       | 16544       | 10800   | 12514  | 14610  |
|                       | Leaving Air Temp (°F db/°F wb) | 55.5 / 55.5                   | 57.9 / 57.9 | 60.3 / 60.3 | 55.9 / 55.9 | 58.2 / 58.2 | 60.6 / 60.6 | 57.1 / 56.3 | 58.6 / 58.6 | 61 / 61     | 69.9    | 84.5   | 101.9  |
| 3500                  | Total Capacity (Btu/h)         | 212000                        | 218000      | 224000      | 208000      | 214000      | 220000      | 204000      | 210000      | 216000      | 156000  | 170000 | 196000 |
|                       | Sensible Capacity (Btu/h)      | 119000                        | 111000      | 102000      | 136000      | 129000      | 120000      | 152000      | 144000      | 138000      |         |        |        |
|                       | Electric Power (Watts)         | 15034                         | 15108       | 15186       | 15764       | 15828       | 15900       | 16526       | 16600       | 16682       | 10132   | 11610  | 13816  |
|                       | Leaving Air Temp (°F db/°F wb) | 59.3 / 59.3                   | 61.7 / 61.7 | 64.0 / 64.0 | 60.2 / 59.6 | 62.0 / 61.9 | 64.4 / 64.3 | 61.0 / 59.9 | 63.2 / 62.3 | 64.6 / 64.5 | 60.9    | 74.8   | 91.3   |
| <b>240 (20 TON)</b>   |                                |                               |             |             |             |             |             |             |             |             |         |        |        |
| 2500                  | Total Capacity (Btu/h)         | 212000                        | 220000      | 226000      | 208000      | 216000      | 222000      | 206000      | 212000      | 218000      | 172000  | 194000 | 220000 |
|                       | Sensible Capacity (Btu/h)      | 110000                        | 104000      | 97000       | 122000      | 116000      | 110000      | 134000      | 128000      | 122000      |         |        |        |
|                       | Electric Power (Watts)         | 17032                         | 17094       | 17162       | 17904       | 17966       | 18034       | 18858       | 18844       | 18956       | 14536   | 17806  | 21444  |
|                       | Leaving Air Temp (°F db/°F wb) | 50.5 / 50.5                   | 52.9 / 52.9 | 55.4 / 55.4 | 51.0 / 51.0 | 53.4 / 53.4 | 55.8 / 55.8 | 51.4 / 51.4 | 54.0 / 53.9 | 56.3 / 56.3 | 83.3    | 101.6  | 120.5  |
| 3200                  | Total Capacity (Btu/h)         | 230000                        | 236000      | 244000      | 226000      | 232000      | 240000      | 222000      | 228000      | 234000      | 178000  | 202000 | 228000 |
|                       | Sensible Capacity (Btu/h)      | 123000                        | 115000      | 107000      | 140000      | 132000      | 123000      | 154000      | 146000      | 140000      |         |        |        |
|                       | Electric Power (Watts)         | 17200                         | 17274       | 17346       | 18058       | 18138       | 18218       | 18996       | 19042       | 19132       | 13450   | 15836  | 18814  |
|                       | Leaving Air Temp (°F db/°F wb) | 55.5 / 55.5                   | 57.9 / 57.9 | 60.3 / 60.3 | 55.9 / 55.9 | 58.2 / 58.2 | 60.7 / 60.7 | 56.7 / 56.1 | 59.2 / 58.6 | 61.0 / 61.0 | 71.5    | 88.1   | 105.2  |
| 4000                  | Total Capacity (Btu/h)         | 242000                        | 248000      | 256000      | 238000      | 246000      | 254000      | 234000      | 240000      | 248000      | 182000  | 206000 | 232000 |
|                       | Sensible Capacity (Btu/h)      | 136000                        | 126000      | 116000      | 154000      | 148000      | 138000      | 174000      | 162000      | 156000      |         |        |        |
|                       | Electric Power (Watts)         | 17322                         | 17404       | 17492       | 18204       | 18302       | 18390       | 19122       | 19188       | 19280       | 12510   | 14566  | 17112  |
|                       | Leaving Air Temp (°F db/°F wb) | 59.4 / 59.3                   | 61.8 / 61.7 | 64.1 / 64.1 | 60.4 / 59.6 | 61.8 / 61.8 | 64.1 / 64.1 | 60.9 / 59.8 | 63.4 / 62.3 | 65.3 / 64.5 | 62.1    | 77.5   | 93.1   |
| <b>300 (25 TON)</b>   |                                |                               |             |             |             |             |             |             |             |             |         |        |        |
| 3125                  | Total Capacity (Btu/h)         | 256000                        | 264000      | 272000      | 252000      | 260000      | 268000      | 246000      | 256000      | 264000      | 215000  | 238000 | 265000 |
|                       | Sensible Capacity (Btu/h)      | 134000                        | 126000      | 117000      | 150000      | 142000      | 132000      | 164000      | 156000      | 148000      |         |        |        |
|                       | Electric Power (Watts)         | 18642                         | 18690       | 18738       | 19578       | 19632       | 19676       | 20554       | 20614       | 20674       | 17026   | 20064  | 23894  |
|                       | Leaving Air Temp (°F db/°F wb) | 51.6 / 51.6                   | 54.1 / 54.1 | 56.6 / 56.6 | 52.1 / 52.1 | 54.5 / 54.5 | 57.1 / 57.0 | 52.7 / 52.6 | 55.0 / 55.0 | 57.4 / 57.4 | 83.4    | 100.1  | 117.7  |
| 4000                  | Total Capacity (Btu/h)         | 276000                        | 284000      | 292000      | 270000      | 282000      | 290000      | 264000      | 274000      | 284000      | 224500  | 247000 | 272000 |
|                       | Sensible Capacity (Btu/h)      | 148000                        | 138000      | 128000      | 170000      | 160000      | 150000      | 186000      | 176000      | 170000      |         |        |        |
|                       | Electric Power (Watts)         | 18754                         | 18800       | 18846       | 19708       | 19776       | 19830       | 20688       | 20748       | 20822       | 15600   | 18066  | 20738  |
|                       | Leaving Air Temp (°F db/°F wb) | 56.6 / 56.5                   | 59.0 / 58.9 | 61.4 / 61.3 | 56.8 / 56.8 | 59.0 / 59.0 | 61.4 / 61.4 | 58.2 / 57.3 | 60.4 / 59.6 | 61.8 / 61.8 | 71.7    | 86.9   | 102.3  |
| 5000                  | Total Capacity (Btu/h)         | 294000                        | 302000      | 310000      | 286000      | 296000      | 304000      | 278000      | 288000      | 298000      | 232000  | 255000 | 285000 |
|                       | Sensible Capacity (Btu/h)      | 168000                        | 156000      | 142000      | 188000      | 180000      | 168000      | 208000      | 200000      | 188000      |         |        |        |
|                       | Electric Power (Watts)         | 18866                         | 18912       | 18958       | 19812       | 19868       | 19924       | 20786       | 20862       | 20924       | 14594   | 16734  | 19388  |
|                       | Leaving Air Temp (°F db/°F wb) | 59.9 / 59.9                   | 62.3 / 62.3 | 64.6 / 64.6 | 61.1 / 60.3 | 62.6 / 62.6 | 65.0 / 64.9 | 62.4 / 60.8 | 64.1 / 62.9 | 66.2 / 65.3 | 62.8    | 76.8   | 92.2   |



TABLE 8 - JROH AIR SOURCE HEAT PUMP GENERAL PERFORMANCE (CONT'D)

| AIRFLOW<br>(CFM)    |                                   | ENTERING AIR TEMPERATURE (°F) |                |                |                |                |                |                |                |                |         |        |        |
|---------------------|-----------------------------------|-------------------------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|---------|--------|--------|
|                     |                                   | COOLING                       |                |                |                |                |                |                |                |                | HEATING |        |        |
|                     |                                   | 90                            |                |                | 95             |                |                | 100            |                |                | 20      | 30     | 40     |
| DRY BULB            | 76                                | 78                            | 80             | 76             | 78             | 80             | 76             | 78             | 80             |                |         |        |        |
| WET BULB            | 76                                | 78                            | 80             | 76             | 78             | 80             | 76             | 78             | 80             |                |         |        |        |
| <b>360 (30 TON)</b> |                                   |                               |                |                |                |                |                |                |                |                |         |        |        |
| 3450                | Total Capacity (Btu/h)            | 302000                        | 312000         | 322000         | 296000         | 306000         | 316000         | 292000         | 300000         | 310000         | 241000  | 270000 | 296000 |
|                     | Sensible Capacity (Btu/h)         | 158000                        | 148000         | 138000         | 178000         | 168000         | 158000         | 196000         | 186000         | 176000         |         |        |        |
|                     | Electric Power (Watts)            | 22770                         | 22742          | 22736          | 23924          | 23950          | 23916          | 25082          | 25198          | 25210          | 19048   | 21998  | 25896  |
|                     | Leaving Air Temp<br>(°F db/°F wb) | 52.2 /<br>52.2                | 54.6 /<br>54.6 | 57.3 /<br>57.1 | 52.6 /<br>52.6 | 55.1 /<br>55.1 | 57.5 /<br>57.5 | 53.1 /<br>53.1 | 55.5 /<br>55.5 | 57.9 /<br>57.9 | 79.3    | 96.4   | 112.4  |
| 4800                | Total Capacity (Btu/h)            | 324000                        | 334000         | 344000         | 318000         | 328000         | 338000         | 312000         | 322000         | 334000         | 252000  | 282000 | 310000 |
|                     | Sensible Capacity (Btu/h)         | 178000                        | 166000         | 152000         | 200000         | 188000         | 176000         | 222000         | 210000         | 202000         |         |        |        |
|                     | Electric Power (Watts)            | 22884                         | 22912          | 22958          | 23922          | 23994          | 24056          | 25116          | 25238          | 25296          | 17580   | 20046  | 23226  |
|                     | Leaving Air Temp<br>(°F db/°F wb) | 56.9 /<br>56.9                | 59.3 /<br>59.3 | 61.7 /<br>61.7 | 57.4 /<br>57.3 | 59.7 /<br>59.6 | 62.1 /<br>62.0 | 58.4 /<br>57.6 | 60.6 /<br>60.0 | 62.2 /<br>62.2 | 68.4    | 84     | 99.3   |
| 6000                | Total Capacity (Btu/h)            | 342000                        | 352000         | 362000         | 336000         | 348000         | 358000         | 328000         | 340000         | 350000         | 258000  | 290000 | 318000 |
|                     | Sensible Capacity (Btu/h)         | 196000                        | 182000         | 168000         | 224000         | 214000         | 200000         | 252000         | 238000         | 226000         |         |        |        |
|                     | Electric Power (Watts)            | 22918                         | 23002          | 23054          | 24076          | 24152          | 24216          | 25228          | 25280          | 25404          | 16552   | 18702  | 21466  |
|                     | Leaving Air Temp<br>(°F db/°F wb) | 60.5 /<br>60.5                | 62.8 /<br>62.8 | 65.2 /<br>65.2 | 61.4 /<br>60.7 | 62.9 /<br>62.9 | 65.3 /<br>65.3 | 62.3 /<br>61.0 | 64.3 /<br>63.3 | 66.3 /<br>65.6 | 59.7    | 74.5   | 88.7   |
| <b>420 (35 TON)</b> |                                   |                               |                |                |                |                |                |                |                |                |         |        |        |
| 4375                | Total Capacity (Btu/h)            | 364000                        | 374000         | 386000         | 356000         | 368000         | 380000         | 354000         | 362000         | 374000         | 300000  | 342000 | 382000 |
|                     | Sensible Capacity (Btu/h)         | 190000                        | 178000         | 166000         | 210000         | 200000         | 188000         | 234000         | 222000         | 210000         |         |        |        |
|                     | Electric Power (Watts)            | 30140                         | 30300          | 30468          | 31462          | 31636          | 31808          | 32954          | 33046          | 33226          | 25568   | 30104  | 35512  |
|                     | Leaving Air Temp<br>(°F db/°F wb) | 51.3 /<br>51.3                | 53.7 /<br>53.7 | 56.2 /<br>56.2 | 51.7 /<br>51.7 | 54.1 /<br>54.1 | 56.6 /<br>56.6 | 51.9 /<br>51.9 | 54.6 /<br>54.6 | 57.0 /<br>57.0 | 83.3    | 102    | 119.9  |
| 5600                | Total Capacity (Btu/h)            | 396000                        | 405000         | 420000         | 384000         | 400000         | 415000         | 380000         | 388000         | 405000         | 306000  | 350000 | 392000 |
|                     | Sensible Capacity (Btu/h)         | 214000                        | 198000         | 184000         | 240000         | 226000         | 214000         | 264000         | 248000         | 240000         |         |        |        |
|                     | Electric Power (Watts)            | 30590                         | 30784          | 30994          | 31866          | 32080          | 32304          | 33328          | 33442          | 33690          | 23574   | 27336  | 31854  |
|                     | Leaving Air Temp<br>(°F db/°F wb) | 55.9 /<br>55.9                | 58.3 /<br>58.3 | 60.7 /<br>60.7 | 56.5 /<br>56.5 | 58.7 /<br>58.6 | 61.0 /<br>61.0 | 57.5 /<br>56.7 | 60.1 /<br>59.3 | 61.5 /<br>61.4 | 70.5    | 87.5   | 104.1  |
| 7000                | Total Capacity (Btu/h)            | 415000                        | 430000         | 440000         | 410000         | 420000         | 435000         | 405000         | 410000         | 430000         | 312000  | 360000 | 405000 |
|                     | Sensible Capacity (Btu/h)         | 236000                        | 218000         | 200000         | 266000         | 256000         | 238000         | 300000         | 280000         | 268000         |         |        |        |
|                     | Electric Power (Watts)            | 30942                         | 31158          | 31386          | 32258          | 32474          | 32698          | 33710          | 33804          | 34080          | 22276   | 25488  | 29364  |
|                     | Leaving Air Temp<br>(°F db/°F wb) | 59.7 /<br>59.6                | 62.0 /<br>62.0 | 64.4 /<br>64.4 | 60.7 /<br>59.9 | 62.2 /<br>62.2 | 64.6 /<br>64.6 | 61.3 /<br>60.1 | 64.2 /<br>62.7 | 65.7 /<br>64.8 | 61.1    | 77.2   | 93.1   |
| <b>480 (40 TON)</b> |                                   |                               |                |                |                |                |                |                |                |                |         |        |        |
| 5000                | Total Capacity (Btu/h)            | 420000                        | 435000         | 450000         | 410000         | 425000         | 440000         | 405000         | 420000         | 430000         | 314000  | 354000 | 398000 |
|                     | Sensible Capacity (Btu/h)         | 218000                        | 204000         | 192000         | 242000         | 230000         | 216000         | 266000         | 254000         | 242000         |         |        |        |
|                     | Electric Power (Watts)            | 30364                         | 30592          | 30768          | 31750          | 31862          | 32108          | 32922          | 33346          | 33460          | 24300   | 28442  | 33466  |
|                     | Leaving Air Temp<br>(°F db/°F wb) | 51.0 /<br>51.0                | 53.3 /<br>53.3 | 55.9 /<br>55.8 | 51.5 /<br>51.5 | 53.8 /<br>53.8 | 56.2 /<br>56.2 | 52.1 /<br>51.9 | 54.3 /<br>54.3 | 56.7 /<br>56.7 | 77.7    | 95     | 112.9  |
| 6400                | Total Capacity (Btu/h)            | 450000                        | 465000         | 480000         | 445000         | 460000         | 475000         | 435000         | 450000         | 465000         | 322000  | 364000 | 410000 |
|                     | Sensible Capacity (Btu/h)         | 242000                        | 226000         | 210000         | 276000         | 258000         | 244000         | 308000         | 292000         | 278000         |         |        |        |
|                     | Electric Power (Watts)            | 30854                         | 31124          | 31402          | 32160          | 32358          | 32646          | 33572          | 33772          | 34078          | 22594   | 26028  | 30190  |
|                     | Leaving Air Temp<br>(°F db/°F wb) | 56.0 /<br>55.9                | 58.3 /<br>58.2 | 60.7 /<br>60.6 | 56.3 /<br>56.3 | 58.7 /<br>58.6 | 61.1 /<br>60.9 | 56.7 /<br>56.7 | 59.0 /<br>59.0 | 61.3 /<br>61.3 | 66.3    | 82.4   | 98.9   |
| 8000                | Total Capacity (Btu/h)            | 475000                        | 490000         | 510000         | 470000         | 485000         | 500000         | 455000         | 470000         | 490000         | 328000  | 372000 | 420000 |
|                     | Sensible Capacity (Btu/h)         | 270000                        | 250000         | 230000         | 312000         | 294000         | 274000         | 344000         | 326000         | 314000         |         |        |        |
|                     | Electric Power (Watts)            | 31338                         | 31628          | 31932          | 32630          | 32902          | 33202          | 33904          | 34182          | 34526          | 21480   | 24464  | 28004  |
|                     | Leaving Air Temp<br>(°F db/°F wb) | 59.7 /<br>59.6                | 62.0 /<br>61.9 | 64.3 /<br>64.2 | 59.9 /<br>59.9 | 62.2 /<br>62.2 | 64.5 /<br>64.5 | 61.2 /<br>60.3 | 63.3 /<br>62.5 | 64.8 /<br>64.8 | 57.8    | 72.7   | 88.2   |

# Performance Data (Cont'd)

TABLE 8 - JROH AIR SOURCE HEAT PUMP GENERAL PERFORMANCE (CONT'D)

| AIRFLOW<br>(CFM)    |                                | ENTERING AIR TEMPERATURE (°F) |             |             |             |             |             |             |             |             |         |        |        |
|---------------------|--------------------------------|-------------------------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|---------|--------|--------|
|                     |                                | COOLING                       |             |             |             |             |             |             |             |             | HEATING |        |        |
|                     |                                | DRY BULB                      | 90          |             |             | 95          |             |             | 100         |             |         | 20     | 30     |
|                     | WET BULB                       | 76                            | 78          | 80          | 76          | 78          | 80          | 76          | 78          | 80          |         |        |        |
| <b>540 (45 TON)</b> |                                |                               |             |             |             |             |             |             |             |             |         |        |        |
| 5625                | Total Capacity (Btu/h)         | 515000                        | 530000      | 550000      | 505000      | 520000      | 540000      | 495000      | 510000      | 530000      | 388000  | 440000 | 490000 |
|                     | Sensible Capacity (Btu/h)      | 264000                        | 250000      | 234000      | 290000      | 276000      | 262000      | 318000      | 304000      | 290000      |         |        |        |
|                     | Electric Power (Watts)         | 39510                         | 39696       | 39888       | 41542       | 41734       | 41932       | 43754       | 43944       | 44148       | 33096   | 40092  | 48528  |
|                     | Leaving Air Temp (°F db/°F wb) | 48.0 / 48.0                   | 50.4 / 50.4 | 52.8 / 52.8 | 48.5 / 48.5 | 50.9 / 50.9 | 53.3 / 53.3 | 49.1 / 49.1 | 51.5 / 51.5 | 53.8 / 53.8 | 83.7    | 102    | 119.8  |
| 7200                | Total Capacity (Btu/h)         | 560000                        | 575000      | 595000      | 550000      | 565000      | 585000      | 535000      | 555000      | 575000      | 400000  | 455000 | 515000 |
|                     | Sensible Capacity (Btu/h)      | 294000                        | 276000      | 256000      | 330000      | 312000      | 294000      | 366000      | 348000      | 330000      |         |        |        |
|                     | Electric Power (Watts)         | 40022                         | 40222       | 40412       | 42050       | 42264       | 42478       | 44264       | 44474       | 44692       | 30300   | 35454  | 42166  |
|                     | Leaving Air Temp (°F db/°F wb) | 53.3 / 53.3                   | 55.8 / 55.8 | 58.2 / 58.2 | 53.8 / 53.8 | 56.2 / 56.2 | 58.6 / 58.6 | 54.2 / 54.2 | 56.6 / 56.6 | 59.0 / 59.0 | 71.3    | 88.2   | 105.2  |
| 9000                | Total Capacity (Btu/h)         | 595000                        | 610000      | 630000      | 580000      | 600000      | 620000      | 570000      | 590000      | 605000      | 410000  | 465000 | 525000 |
|                     | Sensible Capacity (Btu/h)      | 326000                        | 302000      | 280000      | 372000      | 350000      | 328000      | 410000      | 390000      | 372000      |         |        |        |
|                     | Electric Power (Watts)         | 40440                         | 40632       | 40846       | 42466       | 42708       | 42930       | 44654       | 44920       | 45134       | 28824   | 32834  | 38228  |
|                     | Leaving Air Temp (°F db/°F wb) | 57.5 / 57.5                   | 59.9 / 59.9 | 62.3 / 62.2 | 57.9 / 57.9 | 60.2 / 60.2 | 62.5 / 62.5 | 59.1 / 58.3 | 61.1 / 60.5 | 62.9 / 62.9 | 61.9    | 77.6   | 93.4   |
| <b>600 (50 TON)</b> |                                |                               |             |             |             |             |             |             |             |             |         |        |        |
| 6250                | Total Capacity (Btu/h)         | 555000                        | 575000      | 595000      | 550000      | 565000      | 585000      | 540000      | 555000      | 575000      | 430000  | 485000 | 545000 |
|                     | Sensible Capacity (Btu/h)      | 286000                        | 270000      | 254000      | 318000      | 302000      | 286000      | 348000      | 332000      | 316000      |         |        |        |
|                     | Electric Power (Watts)         | 44098                         | 44350       | 44612       | 46300       | 46558       | 46824       | 48640       | 48898       | 49170       | 36866   | 43898  | 52694  |
|                     | Leaving Air Temp (°F db/°F wb) | 48.8 / 48.8                   | 51.2 / 51.2 | 53.7 / 53.7 | 49.3 / 49.3 | 51.7 / 51.7 | 54.2 / 54.2 | 49.8 / 49.8 | 52.3 / 52.2 | 54.7 / 54.7 | 83.6    | 101.1  | 119.7  |
| 8000                | Total Capacity (Btu/h)         | 605000                        | 625000      | 645000      | 595000      | 610000      | 630000      | 580000      | 600000      | 620000      | 446000  | 500000 | 549000 |
|                     | Sensible Capacity (Btu/h)      | 320000                        | 300000      | 278000      | 360000      | 340000      | 320000      | 400000      | 380000      | 360000      |         |        |        |
|                     | Electric Power (Watts)         | 44774                         | 45050       | 45338       | 46964       | 47248       | 47538       | 49300       | 49588       | 49868       | 33494   | 39244  | 46576  |
|                     | Leaving Air Temp (°F db/°F wb) | 54.1 / 54.1                   | 56.5 / 56.5 | 58.9 / 58.9 | 54.5 / 54.5 | 56.9 / 56.9 | 59.3 / 59.3 | 55.0 / 55.0 | 57.3 / 57.3 | 59.7 / 59.7 | 71.4    | 87.5   | 102.9  |
| 10000               | Total Capacity (Btu/h)         | 640000                        | 660000      | 680000      | 625000      | 645000      | 665000      | 615000      | 635000      | 655000      | 468000  | 525000 | 555000 |
|                     | Sensible Capacity (Btu/h)      | 354000                        | 330000      | 304000      | 405000      | 382000      | 356000      | 445000      | 425000      | 405000      |         |        |        |
|                     | Electric Power (Watts)         | 45332                         | 45624       | 45906       | 47502       | 47810       | 48124       | 49802       | 50138       | 50428       | 31072   | 35984  | 43270  |
|                     | Leaving Air Temp (°F db/°F wb) | 58.1 / 58.1                   | 60.5 / 60.5 | 62.9 / 62.9 | 58.5 / 58.5 | 60.8 / 60.8 | 63.2 / 63.2 | 59.9 / 58.9 | 61.9 / 61.2 | 63.5 / 63.5 | 63.1    | 78.2   | 90.8   |
| <b>660 (55 TON)</b> |                                |                               |             |             |             |             |             |             |             |             |         |        |        |
| 6875                | Total Capacity (Btu/h)         | 615000                        | 635000      | 655000      | 605000      | 625000      | 645000      | 595000      | 615000      | 635000      | 494000  | 560000 | 630000 |
|                     | Sensible Capacity (Btu/h)      | 316000                        | 298000      | 280000      | 350000      | 332000      | 314000      | 384000      | 366000      | 348000      |         |        |        |
|                     | Electric Power (Watts)         | 50602                         | 50952       | 51312       | 53078       | 53434       | 53798       | 55704       | 56050       | 56430       | 42186   | 50566  | 61052  |
|                     | Leaving Air Temp (°F db/°F wb) | 48.8 / 48.8                   | 51.3 / 51.3 | 53.7 / 53.7 | 49.3 / 49.3 | 51.7 / 51.7 | 54.2 / 54.2 | 49.8 / 49.8 | 52.2 / 52.2 | 54.7 / 54.7 | 86.2    | 104.6  | 123.9  |
| 8800                | Total Capacity (Btu/h)         | 665000                        | 685000      | 705000      | 650000      | 670000      | 695000      | 640000      | 660000      | 680000      | 508000  | 570000 | 645000 |
|                     | Sensible Capacity (Btu/h)      | 352000                        | 328000      | 306000      | 396000      | 374000      | 350000      | 435000      | 420000      | 396000      |         |        |        |
|                     | Electric Power (Watts)         | 51536                         | 51904       | 52296       | 53994       | 54378       | 54768       | 56612       | 56998       | 57380       | 38102   | 45104  | 53620  |
|                     | Leaving Air Temp (°F db/°F wb) | 54.1 / 54.1                   | 56.6 / 56.6 | 59.0 / 59.0 | 54.5 / 54.5 | 56.9 / 56.9 | 59.4 / 59.4 | 55.0 / 55.0 | 57.4 / 57.4 | 59.8 / 59.8 | 73.2    | 89.7   | 107.2  |
| 11000               | Total Capacity (Btu/h)         | 700000                        | 725000      | 745000      | 690000      | 710000      | 730000      | 675000      | 695000      | 715000      | 515000  | 585000 | 680000 |
|                     | Sensible Capacity (Btu/h)      | 390000                        | 362000      | 334000      | 440000      | 420000      | 392000      | 485000      | 465000      | 440000      |         |        |        |
|                     | Electric Power (Watts)         | 52284                         | 52674       | 53080       | 54720       | 55136       | 55546       | 57290       | 57742       | 58130       | 35376   | 41494  | 48668  |
|                     | Leaving Air Temp (°F db/°F wb) | 58.2 / 58.2                   | 60.6 / 60.6 | 63.0 / 63.0 | 59.2 / 58.5 | 60.9 / 60.9 | 63.2 / 63.2 | 60.1 / 58.9 | 62.1 / 61.2 | 64.3 / 63.6 | 63.2    | 78.7   | 96.6   |

TABLE 8 - JROH AIR SOURCE HEAT PUMP GENERAL PERFORMANCE (CONT'D)

| AIRFLOW<br>(CFM)    |                                | ENTERING AIR TEMPERATURE (°F) |             |             |             |             |             |             |             |             |         |        |        |
|---------------------|--------------------------------|-------------------------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|---------|--------|--------|
|                     |                                | COOLING                       |             |             |             |             |             |             |             |             | HEATING |        |        |
|                     |                                | 90                            |             |             | 95          |             |             | 100         |             |             | 20      | 30     | 40     |
| DRY BULB            | 76                             | 78                            | 80          | 76          | 78          | 80          | 76          | 78          | 80          |             |         |        |        |
| WET BULB            | 76                             | 78                            | 80          | 76          | 78          | 80          | 76          | 78          | 80          |             |         |        |        |
| <b>720 (60 TON)</b> |                                |                               |             |             |             |             |             |             |             |             |         |        |        |
| 7500                | Total Capacity (Btu/h)         | 610000                        | 630000      | 650000      | 595000      | 615000      | 635000      | 585000      | 600000      | 625000      | 465000  | 515000 | 560000 |
|                     | Sensible Capacity (Btu/h)      | 322000                        | 302000      | 284000      | 358000      | 340000      | 320000      | 396000      | 376000      | 358000      |         |        |        |
|                     | Electric Power (Watts)         | 46818                         | 47086       | 47364       | 48974       | 49242       | 49528       | 51292       | 51530       | 51830       | 34188   | 39584  | 46460  |
|                     | Leaving Air Temp (°F db/°F wb) | 51.9 / 51.9                   | 54.3 / 54.3 | 56.7 / 56.7 | 52.3 / 52.3 | 54.7 / 54.7 | 57.1 / 57.1 | 52.8 / 52.8 | 55.3 / 55.3 | 57.6 / 57.6 | 77.2    | 93.2   | 108.7  |
| 9600                | Total Capacity (Btu/h)         | 650000                        | 670000      | 695000      | 635000      | 660000      | 680000      | 620000      | 640000      | 665000      | 485000  | 530000 | 595000 |
|                     | Sensible Capacity (Btu/h)      | 360000                        | 334000      | 310000      | 410000      | 384000      | 360000      | 455000      | 430000      | 410000      |         |        |        |
|                     | Electric Power (Watts)         | 47424                         | 47678       | 47974       | 49562       | 49852       | 50150       | 51814       | 52106       | 52422       | 31720   | 36354  | 41810  |
|                     | Leaving Air Temp (°F db/°F wb) | 56.7 / 56.7                   | 59.2 / 59.2 | 61.5 / 61.5 | 57.0 / 57.0 | 59.4 / 59.4 | 61.7 / 61.7 | 57.5 / 57.5 | 59.9 / 59.9 | 62.2 / 62.2 | 66.6    | 81     | 96.8   |
| 12000               | Total Capacity (Btu/h)         | 685000                        | 705000      | 725000      | 670000      | 690000      | 710000      | 655000      | 670000      | 695000      | 490000  | 545000 | 625000 |
|                     | Sensible Capacity (Btu/h)      | 400000                        | 368000      | 338000      | 460000      | 430000      | 400000      | 525000      | 495000      | 465000      |         |        |        |
|                     | Electric Power (Watts)         | 47888                         | 48154       | 48462       | 50022       | 50286       | 50600       | 52294       | 52590       | 52900       | 30034   | 34194  | 38872  |
|                     | Leaving Air Temp (°F db/°F wb) | 60.3 / 60.3                   | 62.7 / 62.7 | 65.1 / 65.1 | 60.5 / 60.5 | 63.0 / 63.0 | 65.3 / 65.3 | 60.9 / 60.9 | 63.1 / 63.1 | 65.5 / 65.5 | 57.7    | 71.9   | 87.6   |
| <b>780 (65 TON)</b> |                                |                               |             |             |             |             |             |             |             |             |         |        |        |
| 8125                | Total Capacity (Btu/h)         | 665000                        | 685000      | 710000      | 650000      | 675000      | 695000      | 640000      | 660000      | 680000      | 510000  | 570000 | 650000 |
|                     | Sensible Capacity (Btu/h)      | 350000                        | 330000      | 308000      | 390000      | 370000      | 350000      | 430000      | 410000      | 390000      |         |        |        |
|                     | Electric Power (Watts)         | 53516                         | 53898       | 54296       | 55938       | 56310       | 56714       | 58526       | 58866       | 59302       | 38310   | 44856  | 52586  |
|                     | Leaving Air Temp (°F db/°F wb) | 51.6 / 51.6                   | 54.0 / 54.0 | 56.4 / 56.4 | 52.0 / 52.0 | 54.5 / 54.5 | 56.9 / 56.9 | 52.4 / 52.4 | 55.0 / 55.0 | 57.3 / 57.3 | 77.7    | 94.8   | 113.2  |
| 10400               | Total Capacity (Btu/h)         | 710000                        | 735000      | 755000      | 695000      | 720000      | 740000      | 680000      | 700000      | 725000      | 520000  | 590000 | 660000 |
|                     | Sensible Capacity (Btu/h)      | 392000                        | 366000      | 336000      | 445000      | 415000      | 392000      | 495000      | 470000      | 445000      |         |        |        |
|                     | Electric Power (Watts)         | 54374                         | 54782       | 55150       | 56734       | 57162       | 57608       | 59284       | 59692       | 60110       | 35268   | 41014  | 47532  |
|                     | Leaving Air Temp (°F db/°F wb) | 56.4 / 56.4                   | 58.8 / 58.8 | 61.4 / 61.4 | 56.9 / 56.9 | 59.2 / 59.2 | 61.5 / 61.5 | 57.3 / 57.3 | 59.7 / 59.7 | 62.0 / 62.0 | 66.2    | 82     | 98.1   |
| 13000               | Total Capacity (Btu/h)         | 745000                        | 770000      | 795000      | 730000      | 755000      | 775000      | 715000      | 735000      | 760000      | 530000  | 600000 | 675000 |
|                     | Sensible Capacity (Btu/h)      | 435000                        | 405000      | 370000      | 500000      | 470000      | 440000      | 570000      | 535000      | 505000      |         |        |        |
|                     | Electric Power (Watts)         | 54992                         | 55454       | 55878       | 57372       | 57834       | 58268       | 60008       | 60378       | 60816       | 33134   | 38374  | 44232  |
|                     | Leaving Air Temp (°F db/°F wb) | 60.3 / 60.3                   | 62.4 / 62.4 | 64.8 / 64.8 | 60.5 / 60.5 | 62.7 / 62.7 | 65.0 / 65.0 | 60.6 / 60.6 | 63.0 / 63.0 | 65.4 / 65.4 | 57.6    | 72.5   | 87.5   |
| <b>840 (70 TON)</b> |                                |                               |             |             |             |             |             |             |             |             |         |        |        |
| 8750                | Total Capacity (Btu/h)         | 750000                        | 775000      | 805000      | 740000      | 760000      | 790000      | 720000      | 745000      | 775000      | 570000  | 650000 | 740000 |
|                     | Sensible Capacity (Btu/h)      | 394000                        | 370000      | 348000      | 435000      | 415000      | 392000      | 480000      | 455000      | 435000      |         |        |        |
|                     | Electric Power (Watts)         | 63178                         | 63750       | 64358       | 66024       | 66588       | 67212       | 69018       | 69616       | 70270       | 46092   | 54332  | 64306  |
|                     | Leaving Air Temp (°F db/°F wb) | 50.0 / 50.0                   | 52.4 / 52.4 | 54.9 / 54.9 | 50.4 / 50.4 | 52.9 / 52.9 | 55.3 / 55.3 | 51.0 / 51.0 | 53.4 / 53.4 | 55.7 / 55.7 | 80.3    | 98.3   | 117.5  |
| 11200               | Total Capacity (Btu/h)         | 810000                        | 835000      | 860000      | 790000      | 820000      | 845000      | 775000      | 800000      | 825000      | 585000  | 675000 | 775000 |
|                     | Sensible Capacity (Btu/h)      | 435000                        | 410000      | 380000      | 495000      | 465000      | 435000      | 550000      | 520000      | 495000      |         |        |        |
|                     | Electric Power (Watts)         | 64542                         | 65188       | 65870       | 67340       | 68036       | 68688       | 70380       | 70994       | 71734       | 42510   | 49376  | 57550  |
|                     | Leaving Air Temp (°F db/°F wb) | 55.2 / 55.2                   | 57.6 / 57.6 | 59.9 / 59.9 | 55.6 / 55.6 | 57.8 / 57.8 | 60.3 / 60.3 | 55.8 / 55.8 | 58.3 / 58.3 | 60.6 / 60.6 | 68.2    | 85.6   | 103.5  |
| 14000               | Total Capacity (Btu/h)         | 850000                        | 880000      | 905000      | 830000      | 860000      | 885000      | 815000      | 840000      | 865000      | 595000  | 675000 | 800000 |
|                     | Sensible Capacity (Btu/h)      | 485000                        | 450000      | 415000      | 555000      | 520000      | 490000      | 620000      | 595000      | 560000      |         |        |        |
|                     | Electric Power (Watts)         | 65644                         | 66360       | 67046       | 68412       | 69120       | 69884       | 71414       | 72146       | 72822       | 40144   | 46428  | 53142  |
|                     | Leaving Air Temp (°F db/°F wb) | 59.1 / 59.1                   | 61.4 / 61.4 | 63.9 / 63.9 | 59.4 / 59.4 | 61.8 / 61.8 | 64.0 / 64.0 | 60.3 / 60.0 | 61.9 / 61.9 | 64.4 / 64.4 | 59.4    | 74.5   | 92.6   |

# Performance Data (Cont'd)

**TABLE 9 - JROW WATER SOURCE HEAT PUMP COOLING GENERAL PERFORMANCE**

| AIRFLOW<br>(CFM)   | EWT<br>(°F) | WATER<br>FLOW<br>(GPM)            |                                   | ENTERING AIR TEMPERATURE (°F) |                |                |                |                |                |                |                |                |    |
|--------------------|-------------|-----------------------------------|-----------------------------------|-------------------------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|----|
|                    |             |                                   |                                   | COOLING                       |                |                |                |                |                |                |                |                |    |
|                    |             |                                   |                                   | DRY BULB                      | 90             |                |                | 95             |                |                | 100            |                |    |
|                    |             |                                   |                                   | WET BULB                      | 76             | 78             | 80             | 76             | 78             | 80             | 76             | 78             | 80 |
| <b>036 (3 TON)</b> |             |                                   |                                   |                               |                |                |                |                |                |                |                |                |    |
| 375                | 50          | 9.00                              | Total Capacity (Btu/h)            | 38000                         | 39500          | 41000          | 38000          | 39500          | 41000          | 38000          | 39500          | 41000          |    |
|                    |             |                                   | Sensible Capacity (Btu/h)         | 18600                         | 17700          | 16800          | 20800          | 19900          | 18900          | 22800          | 22000          | 21000          |    |
|                    |             |                                   | Electric Power (Watts)            | 2059                          | 2060           | 2060           | 2060           | 2061           | 2062           | 2061           | 2062           | 2063           |    |
|                    |             |                                   | Leaving Air Temp<br>(°F db/°F wb) | 45.4 /<br>43.6                | 47.7 /<br>45.9 | 50.0 /<br>48.2 | 45.2 /<br>43.4 | 47.5 /<br>45.7 | 49.9 /<br>48   | 45.0 /<br>43.2 | 47.3 /<br>45.4 | 49.7 /<br>47.8 |    |
|                    | 60          | 9.00                              | Total Capacity (Btu/h)            | 37000                         | 38500          | 40000          | 37000          | 38500          | 40000          | 37000          | 38500          | 40000          |    |
|                    |             |                                   | Sensible Capacity (Btu/h)         | 18100                         | 17200          | 16200          | 20200          | 19300          | 18400          | 22400          | 21400          | 20600          |    |
|                    |             |                                   | Electric Power (Watts)            | 2239                          | 2240           | 2240           | 2240           | 2241           | 2243           | 2241           | 2242           | 2243           |    |
|                    |             |                                   | Leaving Air Temp<br>(°F db/°F wb) | 46.7 /<br>44.8                | 49.0 /<br>47.1 | 51.4 /<br>49.5 | 46.4 /<br>44.6 | 48.8 /<br>46.9 | 51.2 /<br>49.2 | 46.3 /<br>44.4 | 48.6 /<br>46.7 | 50.9 /<br>49.0 |    |
|                    | 75          | 9.00                              | Total Capacity (Btu/h)            | 35200                         | 36600          | 38000          | 35200          | 36600          | 38000          | 35400          | 36800          | 38000          |    |
|                    |             |                                   | Sensible Capacity (Btu/h)         | 17200                         | 16300          | 15400          | 19400          | 18500          | 17500          | 21400          | 20600          | 19700          |    |
|                    |             |                                   | Electric Power (Watts)            | 2573                          | 2575           | 2575           | 2574           | 2576           | 2578           | 2575           | 2577           | 2579           |    |
|                    |             |                                   | Leaving Air Temp<br>(°F db/°F wb) | 48.7 /<br>46.8                | 51.0 /<br>49.1 | 53.4 /<br>51.5 | 48.5 /<br>46.6 | 50.8 /<br>48.9 | 53.2 /<br>51.2 | 48.3 /<br>46.4 | 50.6 /<br>48.7 | 53.0 /<br>51.0 |    |
| 85                 | 9.00        | Total Capacity (Btu/h)            | 34000                             | 35200                         | 36600          | 34000          | 35400          | 36800          | 34200          | 35400          | 36800          |                |    |
|                    |             | Sensible Capacity (Btu/h)         | 16600                             | 15700                         | 14800          | 18800          | 17900          | 16900          | 20800          | 20000          | 19100          |                |    |
|                    |             | Electric Power (Watts)            | 2843                              | 2845                          | 2847           | 2845           | 2846           | 2848           | 2846           | 2847           | 2849           |                |    |
|                    |             | Leaving Air Temp<br>(°F db/°F wb) | 50.2 /<br>48.2                    | 52.5 /<br>50.5                | 54.9 /<br>52.8 | 50.0 /<br>48.0 | 52.3 /<br>50.2 | 54.7 /<br>52.6 | 49.8 /<br>47.9 | 52.1 /<br>50.1 | 54.5 /<br>52.4 |                |    |
| 480                | 50          | 9.00                              | Total Capacity (Btu/h)            | 42000                         | 44000          | 45500          | 42500          | 44000          | 45500          | 42500          | 44000          | 45500          |    |
|                    |             |                                   | Sensible Capacity (Btu/h)         | 21000                         | 19800          | 18600          | 23600          | 22600          | 21400          | 26400          | 25200          | 24000          |    |
|                    |             |                                   | Electric Power (Watts)            | 2061                          | 2062           | 2064           | 2063           | 2063           | 2065           | 2064           | 2066           | 2067           |    |
|                    |             |                                   | Leaving Air Temp<br>(°F db/°F wb) | 50.7 /<br>49.2                | 53.1 /<br>51.6 | 55.5 /<br>53.9 | 50.6 /<br>49.0 | 52.9 /<br>51.4 | 55.3 /<br>53.7 | 50.5 /<br>48.9 | 52.8 /<br>51.2 | 55.2 /<br>53.5 |    |
|                    | 60          | 9.00                              | Total Capacity (Btu/h)            | 41000                         | 42500          | 44000          | 41000          | 42500          | 44000          | 41000          | 42500          | 44500          |    |
|                    |             |                                   | Sensible Capacity (Btu/h)         | 20400                         | 19200          | 18000          | 23000          | 22000          | 20800          | 25800          | 24600          | 23400          |    |
|                    |             |                                   | Electric Power (Watts)            | 2241                          | 2243           | 2245           | 2244           | 2244           | 2246           | 2244           | 2247           | 2249           |    |
|                    |             |                                   | Leaving Air Temp<br>(°F db/°F wb) | 51.8 /<br>50.3                | 54.2 /<br>52.6 | 56.5 /<br>55.0 | 51.7 /<br>50.1 | 54 /<br>52.4   | 56.3 /<br>54.7 | 51.6 /<br>50.0 | 53.9 /<br>52.2 | 56.3 /<br>54.6 |    |
|                    | 75          | 9.00                              | Total Capacity (Btu/h)            | 39000                         | 40500          | 42000          | 39000          | 40500          | 42000          | 39000          | 40500          | 42000          |    |
|                    |             |                                   | Sensible Capacity (Btu/h)         | 19400                         | 18300          | 17100          | 22200          | 21000          | 19900          | 24800          | 23800          | 22600          |    |
|                    |             |                                   | Electric Power (Watts)            | 2578                          | 2579           | 2582           | 2579           | 2582           | 2583           | 2580           | 2583           | 2586           |    |
|                    |             |                                   | Leaving Air Temp<br>(°F db/°F wb) | 53.7 /<br>52.0                | 55.9 /<br>54.3 | 58.3 /<br>56.6 | 53.4 /<br>51.8 | 55.8 /<br>54.1 | 58.0 /<br>56.4 | 53.3 /<br>51.7 | 55.6 /<br>53.9 | 58 /<br>56.3   |    |
| 85                 | 9.00        | Total Capacity (Btu/h)            | 37400                             | 39000                         | 40000          | 37600          | 39000          | 40500          | 37600          | 39000          | 40500          |                |    |
|                    |             | Sensible Capacity (Btu/h)         | 18800                             | 17700                         | 16500          | 21600          | 20400          | 19200          | 24200          | 23000          | 21800          |                |    |
|                    |             | Electric Power (Watts)            | 2848                              | 2848                          | 2852           | 2849           | 2852           | 2854           | 2850           | 2853           | 2857           |                |    |
|                    |             | Leaving Air Temp<br>(°F db/°F wb) | 54.9 /<br>53.2                    | 57 /<br>55.5                  | 59.4 /<br>57.8 | 54.7 /<br>53.0 | 57 /<br>55.3   | 59.2 /<br>57.6 | 54.5 /<br>52.9 | 56.8 /<br>55.1 | 59.2 /<br>57.4 |                |    |

TABLE 9 - JROW WATER SOURCE HEAT PUMP COOLING GENERAL PERFORMANCE (CONT'D)

| AIRFLOW<br>(CFM)          | EWT<br>(°F) | WATER<br>FLOW<br>(GPM) |                                   | ENTERING AIR TEMPERATURE (°F) |                |                |                |                |                |                |                |                |    |
|---------------------------|-------------|------------------------|-----------------------------------|-------------------------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|----|
|                           |             |                        |                                   | COOLING                       |                |                |                |                |                |                |                |                |    |
|                           |             |                        |                                   | DRY BULB                      | 90             |                |                | 95             |                |                | 100            |                |    |
|                           |             |                        |                                   | WET BULB                      | 76             | 78             | 80             | 76             | 78             | 80             | 76             | 78             | 80 |
| <b>036 (3 TON) CONT'D</b> |             |                        |                                   |                               |                |                |                |                |                |                |                |                |    |
| 600                       | 50          | 9.00                   | Total Capacity (Btu/h)            | 45500                         | 47500          | 49000          | 46000          | 47500          | 49000          | 46000          | 47500          | 49500          |    |
|                           |             |                        | Sensible Capacity (Btu/h)         | 23400                         | 21800          | 20400          | 26600          | 25200          | 23800          | 30000          | 28600          | 27200          |    |
|                           |             |                        | Electric Power (Watts)            | 2064                          | 2066           | 2068           | 2066           | 2066           | 2069           | 2067           | 2069           | 2070           |    |
|                           |             |                        | Leaving Air Temp<br>(°F db/°F wb) | 55 /<br>53.8                  | 57.4 /<br>56.1 | 59.8 /<br>58.5 | 55.0 /<br>53.6 | 57.2 /<br>56.0 | 59.6 /<br>58.3 | 54.9 /<br>53.5 | 57.2 /<br>55.8 | 59.4 /<br>58.1 |    |
|                           | 60          | 9.00                   | Total Capacity (Btu/h)            | 44500                         | 46000          | 47500          | 44500          | 46000          | 47500          | 44500          | 46000          | 48000          |    |
|                           |             |                        | Sensible Capacity (Btu/h)         | 22800                         | 21200          | 19700          | 26000          | 24600          | 23200          | 29400          | 28000          | 26600          |    |
|                           |             |                        | Electric Power (Watts)            | 2245                          | 2248           | 2251           | 2248           | 2249           | 2252           | 2248           | 2251           | 2253           |    |
|                           |             |                        | Leaving Air Temp<br>(°F db/°F wb) | 56.0 /<br>54.7                | 58.3 /<br>57.0 | 60.7 /<br>59.3 | 55.9 /<br>54.5 | 58.1 /<br>56.9 | 60.4 /<br>59.2 | 55.8 /<br>54.4 | 58.1 /<br>56.7 | 60.3 /<br>59.0 |    |
|                           | 75          | 9.00                   | Total Capacity (Btu/h)            | 42000                         | 43500          | 45000          | 42000          | 43500          | 45000          | 42000          | 43500          | 45000          |    |
|                           |             |                        | Sensible Capacity (Btu/h)         | 21800                         | 20400          | 18800          | 25000          | 23800          | 22200          | 28400          | 27000          | 25600          |    |
|                           |             |                        | Electric Power (Watts)            | 2581                          | 2585           | 2590           | 2585           | 2586           | 2590           | 2585           | 2589           | 2592           |    |
|                           |             |                        | Leaving Air Temp<br>(°F db/°F wb) | 57.4 /<br>56.2                | 59.7 /<br>58.4 | 62.0 /<br>60.7 | 57.4 /<br>56.0 | 59.5 /<br>58.3 | 61.8 /<br>60.6 | 57.2 /<br>55.9 | 59.5 /<br>58.1 | 61.7 /<br>60.4 |    |
|                           | 85          | 9.00                   | Total Capacity (Btu/h)            | 40000                         | 41500          | 43000          | 40500          | 42000          | 43500          | 40500          | 42000          | 43500          |    |
|                           |             |                        | Sensible Capacity (Btu/h)         | 21200                         | 19700          | 18200          | 24400          | 23000          | 21400          | 27800          | 26400          | 25000          |    |
|                           |             |                        | Electric Power (Watts)            | 2851                          | 2856           | 2861           | 2855           | 2860           | 2865           | 2857           | 2860           | 2863           |    |
|                           |             |                        | Leaving Air Temp<br>(°F db/°F wb) | 58.4 /<br>57.2                | 60.7 /<br>59.4 | 63.0 /<br>61.7 | 58.4 /<br>57.0 | 60.7 /<br>59.2 | 63.0 /<br>61.5 | 58.3 /<br>56.9 | 60.5 /<br>59.1 | 62.7 /<br>61.4 |    |
| <b>048 (4 TON)</b>        |             |                        |                                   |                               |                |                |                |                |                |                |                |                |    |
| 500                       | 50          | 12.00                  | Total Capacity (Btu/h)            | 48500                         | 50500          | 52500          | 48500          | 50500          | 52500          | 48500          | 50500          | 52500          |    |
|                           |             |                        | Sensible Capacity (Btu/h)         | 23800                         | 22600          | 21200          | 26600          | 25400          | 24200          | 29400          | 28200          | 27000          |    |
|                           |             |                        | Electric Power (Watts)            | 2497                          | 2500           | 2505           | 2499           | 2503           | 2506           | 2500           | 2505           | 2510           |    |
|                           |             |                        | Leaving Air Temp<br>(°F db/°F wb) | 47.3 /<br>45.5                | 49.6 /<br>47.8 | 52.0 /<br>50.1 | 47.1 /<br>45.3 | 49.4 /<br>47.5 | 51.8 /<br>49.8 | 46.9 /<br>45.0 | 49.2 /<br>47.3 | 51.6 /<br>49.6 |    |
|                           | 60          | 12.00                  | Total Capacity (Btu/h)            | 47000                         | 49000          | 51000          | 47000          | 49000          | 51000          | 47500          | 49000          | 51000          |    |
|                           |             |                        | Sensible Capacity (Btu/h)         | 23000                         | 21800          | 20600          | 26000          | 24800          | 23600          | 28800          | 27600          | 26400          |    |
|                           |             |                        | Electric Power (Watts)            | 2746                          | 2749           | 2755           | 2748           | 2753           | 2757           | 2749           | 2754           | 2760           |    |
|                           |             |                        | Leaving Air Temp<br>(°F db/°F wb) | 48.5 /<br>46.7                | 50.8 /<br>49.0 | 53.2 /<br>51.3 | 48.3 /<br>46.5 | 50.7 /<br>48.7 | 53.0 /<br>51.1 | 48.2 /<br>46.3 | 50.5 /<br>48.5 | 52.8 /<br>50.9 |    |
|                           | 75          | 12.00                  | Total Capacity (Btu/h)            | 45000                         | 46500          | 48500          | 45000          | 46500          | 48500          | 45000          | 47000          | 48500          |    |
|                           |             |                        | Sensible Capacity (Btu/h)         | 22000                         | 20800          | 19500          | 24800          | 23600          | 22400          | 27600          | 26400          | 25200          |    |
|                           |             |                        | Electric Power (Watts)            | 3158                          | 3163           | 3167           | 3159           | 3164           | 3171           | 3160           | 3166           | 3172           |    |
|                           |             |                        | Leaving Air Temp<br>(°F db/°F wb) | 50.5 /<br>48.6                | 52.9 /<br>50.9 | 55.2 /<br>53.2 | 50.3 /<br>48.4 | 52.7 /<br>50.6 | 55.0 /<br>52.9 | 50.2 /<br>48.2 | 52.5 /<br>50.4 | 54.8 /<br>52.7 |    |
|                           | 85          | 12.00                  | Total Capacity (Btu/h)            | 43000                         | 45000          | 46500          | 43500          | 45000          | 47000          | 43500          | 45000          | 47000          |    |
|                           |             |                        | Sensible Capacity (Btu/h)         | 21200                         | 20000          | 18800          | 24000          | 22800          | 21600          | 26800          | 25800          | 24400          |    |
|                           |             |                        | Electric Power (Watts)            | 3472                          | 3477           | 3480           | 3474           | 3479           | 3484           | 3475           | 3480           | 3486           |    |
|                           |             |                        | Leaving Air Temp<br>(°F db/°F wb) | 51.9 /<br>49.9                | 54.2 /<br>52.2 | 56.5 /<br>54.4 | 51.7 /<br>49.7 | 54.0 /<br>52.0 | 56.3 /<br>54.2 | 51.5 /<br>49.5 | 53.8 /<br>51.8 | 56.1 /<br>54.0 |    |

# Performance Data (Cont'd)

**TABLE 9 - JROW WATER SOURCE HEAT PUMP COOLING GENERAL PERFORMANCE (CONT'D)**

| AIRFLOW<br>(CFM)          | EWT<br>(°F) | WATER<br>FLOW<br>(GPM) |                                   | ENTERING AIR TEMPERATURE (°F) |                |                |                |                |                |                |                |                |    |
|---------------------------|-------------|------------------------|-----------------------------------|-------------------------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|----|
|                           |             |                        |                                   | COOLING                       |                |                |                |                |                |                |                |                |    |
|                           |             |                        |                                   | DRY BULB                      | 90             |                |                | 95             |                |                | 100            |                |    |
|                           |             |                        |                                   | WET BULB                      | 76             | 78             | 80             | 76             | 78             | 80             | 76             | 78             | 80 |
| <b>048 (4 TON) CONT'D</b> |             |                        |                                   |                               |                |                |                |                |                |                |                |                |    |
| 640                       | 50          | 12.00                  | Total Capacity (Btu/h)            | 53500                         | 55500          | 57500          | 54000          | 56000          | 58000          | 54000          | 56000          | 58000          |    |
|                           |             |                        | Sensible Capacity (Btu/h)         | 26800                         | 25200          | 23600          | 30400          | 28800          | 27200          | 34000          | 32400          | 30800          |    |
|                           |             |                        | Electric Power (Watts)            | 2509                          | 2515           | 2523           | 2512           | 2517           | 2525           | 2513           | 2520           | 2526           |    |
|                           |             |                        | Leaving Air Temp<br>(°F db/°F wb) | 52.4 /<br>50.9                | 54.8 /<br>53.2 | 57.2 /<br>55.6 | 52.3 /<br>50.7 | 54.6 /<br>53.0 | 57.0 /<br>55.4 | 52.2 /<br>50.6 | 54.5 /<br>52.8 | 56.8 /<br>55.2 |    |
|                           | 60          | 12.00                  | Total Capacity (Btu/h)            | 52000                         | 54000          | 56000          | 52000          | 54000          | 56000          | 52000          | 54000          | 56000          |    |
|                           |             |                        | Sensible Capacity (Btu/h)         | 26000                         | 24400          | 22800          | 29600          | 28000          | 26400          | 33200          | 31600          | 30200          |    |
|                           |             |                        | Electric Power (Watts)            | 2759                          | 2766           | 2774           | 2762           | 2768           | 2776           | 2763           | 2771           | 2777           |    |
|                           |             |                        | Leaving Air Temp<br>(°F db/°F wb) | 53.5 /<br>52.0                | 55.8 /<br>54.2 | 58.2 /<br>56.6 | 53.4 /<br>51.8 | 55.6 /<br>54.0 | 58.0 /<br>56.4 | 53.2 /<br>51.6 | 55.5 /<br>53.9 | 57.8 /<br>56.2 |    |
|                           | 75          | 12.00                  | Total Capacity (Btu/h)            | 49000                         | 51000          | 53000          | 49500          | 51500          | 53000          | 49500          | 51500          | 53500          |    |
|                           |             |                        | Sensible Capacity (Btu/h)         | 24800                         | 23200          | 21600          | 28400          | 27000          | 25400          | 32000          | 30600          | 29000          |    |
|                           |             |                        | Electric Power (Watts)            | 3170                          | 3177           | 3186           | 3173           | 3179           | 3187           | 3175           | 3182           | 3188           |    |
|                           |             |                        | Leaving Air Temp<br>(°F db/°F wb) | 55.1 /<br>53.5                | 57.4 /<br>55.8 | 59.8 /<br>58.1 | 55.0 /<br>53.4 | 57.2 /<br>55.6 | 59.6 /<br>57.9 | 54.9 /<br>53.2 | 57.1 /<br>55.5 | 59.4 /<br>57.8 |    |
|                           | 85          | 12.00                  | Total Capacity (Btu/h)            | 47500                         | 49000          | 51000          | 47500          | 49500          | 51000          | 47500          | 49500          | 51000          |    |
|                           |             |                        | Sensible Capacity (Btu/h)         | 24000                         | 22400          | 21000          | 27600          | 26200          | 24600          | 31200          | 29800          | 28200          |    |
|                           |             |                        | Electric Power (Watts)            | 3485                          | 3489           | 3497           | 3486           | 3491           | 3499           | 3487           | 3494           | 3500           |    |
|                           |             |                        | Leaving Air Temp<br>(°F db/°F wb) | 56.3 /<br>54.6                | 58.6 /<br>56.9 | 60.9 /<br>59.2 | 56.1 /<br>54.5 | 58.3 /<br>56.7 | 60.7 /<br>59.0 | 56.0 /<br>54.3 | 58.3 /<br>56.6 | 60.4 /<br>58.8 |    |
| 800                       | 50          | 12.00                  | Total Capacity (Btu/h)            | 58000                         | 60000          | 62000          | 58000          | 60000          | 62500          | 58000          | 60000          | 62500          |    |
|                           |             |                        | Sensible Capacity (Btu/h)         | 29800                         | 27800          | 25800          | 34400          | 32400          | 30400          | 39000          | 36800          | 35000          |    |
|                           |             |                        | Electric Power (Watts)            | 2523                          | 2532           | 2541           | 2524           | 2533           | 2543           | 2527           | 2534           | 2544           |    |
|                           |             |                        | Leaving Air Temp<br>(°F db/°F wb) | 56.6 /<br>55.3                | 58.9 /<br>57.6 | 61.2 /<br>59.9 | 56.4 /<br>55.1 | 58.7 /<br>57.4 | 61.1 /<br>59.7 | 56.3 /<br>55.0 | 58.6 /<br>57.3 | 60.9 /<br>59.5 |    |
|                           | 60          | 12.00                  | Total Capacity (Btu/h)            | 56000                         | 58000          | 60000          | 56000          | 58000          | 60000          | 56000          | 58000          | 60500          |    |
|                           |             |                        | Sensible Capacity (Btu/h)         | 29000                         | 27000          | 25000          | 33600          | 31600          | 29600          | 38000          | 36000          | 34200          |    |
|                           |             |                        | Electric Power (Watts)            | 2774                          | 2783           | 2793           | 2775           | 2784           | 2794           | 2778           | 2785           | 2796           |    |
|                           |             |                        | Leaving Air Temp<br>(°F db/°F wb) | 57.4 /<br>56.1                | 59.7 /<br>58.4 | 62.1 /<br>60.7 | 57.3 /<br>56.0 | 59.6 /<br>58.2 | 61.9 /<br>60.5 | 57.2 /<br>55.9 | 59.5 /<br>58.1 | 61.7 /<br>60.4 |    |
|                           | 75          | 12.00                  | Total Capacity (Btu/h)            | 53000                         | 54500          | 56500          | 53000          | 55000          | 57000          | 53000          | 55000          | 57000          |    |
|                           |             |                        | Sensible Capacity (Btu/h)         | 27800                         | 25800          | 23800          | 32400          | 30400          | 28400          | 36800          | 34800          | 33000          |    |
|                           |             |                        | Electric Power (Watts)            | 3184                          | 3193           | 3203           | 3186           | 3195           | 3205           | 3188           | 3196           | 3207           |    |
|                           |             |                        | Leaving Air Temp<br>(°F db/°F wb) | 58.8 /<br>57.5                | 61.0 /<br>59.7 | 63.4 /<br>62.0 | 58.7 /<br>57.3 | 60.9 /<br>59.6 | 63.2 /<br>61.8 | 58.5 /<br>57.2 | 60.8 /<br>59.4 | 63.1 /<br>61.7 |    |
|                           | 85          | 12.00                  | Total Capacity (Btu/h)            | 50500                         | 52500          | 54500          | 51000          | 52500          | 54500          | 51000          | 52500          | 54500          |    |
|                           |             |                        | Sensible Capacity (Btu/h)         | 27000                         | 25000          | 23000          | 31400          | 29600          | 27600          | 35800          | 34000          | 32200          |    |
|                           |             |                        | Electric Power (Watts)            | 3495                          | 3504           | 3514           | 3497           | 3505           | 3515           | 3502           | 3507           | 3517           |    |
|                           |             |                        | Leaving Air Temp<br>(°F db/°F wb) | 59.7 /<br>58.4                | 62.0 /<br>60.6 | 64.3 /<br>62.9 | 59.6 /<br>58.3 | 61.8 /<br>60.5 | 64.1 /<br>62.7 | 59.6 /<br>58.1 | 61.7 /<br>60.4 | 64.0 /<br>62.6 |    |

TABLE 9 - JROW WATER SOURCE HEAT PUMP COOLING GENERAL PERFORMANCE (CONT'D)

| AIRFLOW<br>(CFM)   | EWT<br>(°F) | WATER<br>FLOW<br>(GPM)            |                                   | ENTERING AIR TEMPERATURE (°F) |                |                |                |                |                |                |                |                |     |    |    |
|--------------------|-------------|-----------------------------------|-----------------------------------|-------------------------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|-----|----|----|
|                    |             |                                   |                                   | COOLING                       |                |                |                |                |                |                |                |                |     |    |    |
|                    |             |                                   |                                   | DRY BULB                      |                |                | 90             |                |                | 95             |                |                | 100 |    |    |
|                    |             |                                   |                                   | WET BULB                      |                |                | 76             | 78             | 80             | 76             | 78             | 80             | 76  | 78 | 80 |
| <b>060 (5 TON)</b> |             |                                   |                                   |                               |                |                |                |                |                |                |                |                |     |    |    |
| 625                | 50          | 15.00                             | Total Capacity (Btu/h)            | 59000                         | 61500          | 63500          | 59500          | 61500          | 64000          | 59500          | 61500          | 64000          |     |    |    |
|                    |             |                                   | Sensible Capacity (Btu/h)         | 29000                         | 27400          | 25800          | 32600          | 31000          | 29400          | 36000          | 34400          | 33000          |     |    |    |
|                    |             |                                   | Electric Power (Watts)            | 2995                          | 2998           | 3004           | 2999           | 3001           | 3005           | 3001           | 3006           | 3012           |     |    |    |
|                    |             |                                   | Leaving Air Temp<br>(°F db/°F wb) | 48.4 /<br>46.5                | 50.7 /<br>48.9 | 53.2 /<br>51.3 | 48.2 /<br>46.3 | 50.5 /<br>48.6 | 52.9 /<br>51.0 | 48.0 /<br>46.1 | 50.4 /<br>48.4 | 52.8 /<br>50.8 |     |    |    |
|                    | 60          | 15.00                             | Total Capacity (Btu/h)            | 57500                         | 59500          | 61500          | 57500          | 59500          | 62000          | 57500          | 60000          | 62000          |     |    |    |
|                    |             |                                   | Sensible Capacity (Btu/h)         | 28000                         | 26600          | 25000          | 31600          | 30000          | 28600          | 35200          | 33600          | 32000          |     |    |    |
|                    |             |                                   | Electric Power (Watts)            | 3294                          | 3295           | 3302           | 3296           | 3302           | 3303           | 3298           | 3304           | 3311           |     |    |    |
|                    |             |                                   | Leaving Air Temp<br>(°F db/°F wb) | 49.6 /<br>47.7                | 52.0 /<br>50.0 | 54.4 /<br>52.4 | 49.4 /<br>47.5 | 51.8 /<br>49.8 | 54.1 /<br>52.2 | 49.3 /<br>47.3 | 51.7 /<br>49.6 | 54.0 /<br>52.0 |     |    |    |
|                    | 75          | 15.00                             | Total Capacity (Btu/h)            | 54500                         | 56500          | 58500          | 54500          | 57000          | 59000          | 55000          | 57000          | 59000          |     |    |    |
|                    |             |                                   | Sensible Capacity (Btu/h)         | 26800                         | 25200          | 23800          | 30400          | 28800          | 27200          | 33800          | 32200          | 30800          |     |    |    |
|                    |             |                                   | Electric Power (Watts)            | 3787                          | 3792           | 3792           | 3789           | 3794           | 3801           | 3790           | 3797           | 3804           |     |    |    |
|                    |             |                                   | Leaving Air Temp<br>(°F db/°F wb) | 51.6 /<br>49.5                | 53.9 /<br>51.9 | 56.2 /<br>54.2 | 51.4 /<br>49.3 | 53.7 /<br>51.6 | 56.1 /<br>54.0 | 51.2 /<br>49.2 | 53.6 /<br>51.5 | 55.9 /<br>53.7 |     |    |    |
| 85                 | 15.00       | Total Capacity (Btu/h)            | 52500                             | 54500                         | 56500          | 52500          | 54500          | 57000          | 53000          | 55000          | 57000          |                |     |    |    |
|                    |             | Sensible Capacity (Btu/h)         | 25800                             | 24200                         | 22800          | 29400          | 27800          | 26200          | 32800          | 31400          | 29800          |                |     |    |    |
|                    |             | Electric Power (Watts)            | 4165                              | 4170                          | 4166           | 4167           | 4172           | 4178           | 4169           | 4174           | 4181           |                |     |    |    |
|                    |             | Leaving Air Temp<br>(°F db/°F wb) | 52.9 /<br>50.8                    | 55.3 /<br>53.1                | 57.4 /<br>55.4 | 52.7 /<br>50.6 | 55.1 /<br>52.9 | 57.4 /<br>55.2 | 52.6 /<br>50.4 | 54.9 /<br>52.7 | 57.2 /<br>55.0 |                |     |    |    |
| 800                | 50          | 15.00                             | Total Capacity (Btu/h)            | 65000                         | 67000          | 69000          | 65000          | 67000          | 70000          | 65000          | 67000          | 70000          |     |    |    |
|                    |             |                                   | Sensible Capacity (Btu/h)         | 32400                         | 30400          | 28400          | 37000          | 35000          | 33000          | 41500          | 39500          | 37400          |     |    |    |
|                    |             |                                   | Electric Power (Watts)            | 3007                          | 3015           | 3023           | 3010           | 3016           | 3025           | 3011           | 3019           | 3028           |     |    |    |
|                    |             |                                   | Leaving Air Temp<br>(°F db/°F wb) | 53.6 /<br>52.0                | 55.9 /<br>54.3 | 58.4 /<br>56.7 | 53.4 /<br>51.8 | 55.8 /<br>54.1 | 58.2 /<br>56.5 | 53.3 /<br>51.7 | 55.6 /<br>54.0 | 58.0 /<br>56.4 |     |    |    |
|                    | 60          | 15.00                             | Total Capacity (Btu/h)            | 62500                         | 65000          | 67000          | 63000          | 65000          | 68000          | 63000          | 65000          | 68000          |     |    |    |
|                    |             |                                   | Sensible Capacity (Btu/h)         | 31600                         | 29600          | 27600          | 36000          | 34200          | 32200          | 40500          | 38500          | 36600          |     |    |    |
|                    |             |                                   | Electric Power (Watts)            | 3305                          | 3313           | 3322           | 3308           | 3314           | 3324           | 3309           | 3318           | 3327           |     |    |    |
|                    |             |                                   | Leaving Air Temp<br>(°F db/°F wb) | 54.6 /<br>53.0                | 56.9 /<br>55.3 | 59.3 /<br>57.7 | 54.4 /<br>52.8 | 56.7 /<br>55.1 | 59.1 /<br>57.5 | 54.3 /<br>52.7 | 56.6 /<br>55.0 | 59.0 /<br>57.3 |     |    |    |
|                    | 75          | 15.00                             | Total Capacity (Btu/h)            | 59500                         | 61500          | 64000          | 59500          | 62000          | 64000          | 59500          | 62000          | 64000          |     |    |    |
|                    |             |                                   | Sensible Capacity (Btu/h)         | 30200                         | 28200          | 26200          | 34800          | 32800          | 30800          | 39000          | 37200          | 35200          |     |    |    |
|                    |             |                                   | Electric Power (Watts)            | 3795                          | 3803           | 3813           | 3798           | 3804           | 3814           | 3800           | 3808           | 3818           |     |    |    |
|                    |             |                                   | Leaving Air Temp<br>(°F db/°F wb) | 56.1 /<br>54.5                | 58.4 /<br>56.8 | 60.8 /<br>59.1 | 55.9 /<br>54.3 | 58.2 /<br>56.6 | 60.6 /<br>58.9 | 55.8 /<br>54.2 | 58.2 /<br>56.5 | 60.5 /<br>58.8 |     |    |    |
| 85                 | 15.00       | Total Capacity (Btu/h)            | 57000                             | 59000                         | 61500          | 57500          | 59500          | 61500          | 57500          | 59500          | 61500          |                |     |    |    |
|                    |             | Sensible Capacity (Btu/h)         | 29000                             | 27400                         | 25400          | 33800          | 31800          | 30000          | 38500          | 36400          | 34400          |                |     |    |    |
|                    |             | Electric Power (Watts)            | 4179                              | 4176                          | 4185           | 4172           | 4181           | 4187           | 4174           | 4182           | 4191           |                |     |    |    |
|                    |             | Leaving Air Temp<br>(°F db/°F wb) | 57.4 /<br>55.6                    | 59.5 /<br>57.8                | 61.8 /<br>60.1 | 57.0 /<br>55.4 | 59.3 /<br>57.7 | 61.6 /<br>60.0 | 56.9 /<br>55.3 | 59.2 /<br>57.5 | 61.5 /<br>59.8 |                |     |    |    |

# Performance Data (Cont'd)

**TABLE 9 - JROW WATER SOURCE HEAT PUMP COOLING GENERAL PERFORMANCE (CONT'D)**

| AIRFLOW<br>(CFM)          | EWT<br>(°F) | WATER<br>FLOW<br>(GPM) |                                   | ENTERING AIR TEMPERATURE (°F) |                |                |                |                |                |                |                |                |    |
|---------------------------|-------------|------------------------|-----------------------------------|-------------------------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|----|
|                           |             |                        |                                   | COOLING                       |                |                |                |                |                |                |                |                |    |
|                           |             |                        |                                   | DRY BULB                      | 90             |                |                | 95             |                |                | 100            |                |    |
|                           |             |                        |                                   | WET BULB                      | 76             | 78             | 80             | 76             | 78             | 80             | 76             | 78             | 80 |
| <b>060 (5 TON) CONT'D</b> |             |                        |                                   |                               |                |                |                |                |                |                |                |                |    |
| 1000                      | 50          | 15.00                  | Total Capacity (Btu/h)            | 69000                         | 72000          | 74000          | 69000          | 72000          | 74000          | 69000          | 72000          | 74000          |    |
|                           |             |                        | Sensible Capacity (Btu/h)         | 36000                         | 33600          | 31000          | 41500          | 39000          | 36800          | 47000          | 44500          | 42500          |    |
|                           |             |                        | Electric Power (Watts)            | 3022                          | 3031           | 3041           | 3027           | 3032           | 3043           | 3026           | 3038           | 3043           |    |
|                           |             |                        | Leaving Air Temp<br>(°F db/°F wb) | 57.6 /<br>56.3                | 60.0 /<br>58.6 | 62.3 /<br>61.0 | 57.6 /<br>56.2 | 59.8 /<br>58.5 | 62.2 /<br>60.8 | 57.4 /<br>56.1 | 59.8 /<br>58.4 | 62.0 /<br>60.7 |    |
|                           | 60          | 15.00                  | Total Capacity (Btu/h)            | 67000                         | 69000          | 72000          | 67000          | 69000          | 72000          | 67000          | 70000          | 72000          |    |
|                           |             |                        | Sensible Capacity (Btu/h)         | 35200                         | 32600          | 30200          | 40500          | 38500          | 35800          | 46500          | 44000          | 41500          |    |
|                           |             |                        | Electric Power (Watts)            | 3320                          | 3330           | 3341           | 3323           | 3331           | 3342           | 3324           | 3334           | 3348           |    |
|                           |             |                        | Leaving Air Temp<br>(°F db/°F wb) | 58.4 /<br>57.1                | 60.8 /<br>59.4 | 63.1 /<br>61.7 | 58.3 /<br>57.0 | 60.6 /<br>59.3 | 62.9 /<br>61.6 | 58.2 /<br>56.9 | 60.5 /<br>59.2 | 62.9 /<br>61.5 |    |
|                           | 75          | 15.00                  | Total Capacity (Btu/h)            | 63500                         | 65000          | 68000          | 63500          | 66000          | 68000          | 63500          | 66000          | 68000          |    |
|                           |             |                        | Sensible Capacity (Btu/h)         | 33800                         | 31400          | 28800          | 39500          | 37000          | 34600          | 45000          | 42500          | 40000          |    |
|                           |             |                        | Electric Power (Watts)            | 3810                          | 3820           | 3831           | 3813           | 3821           | 3832           | 3814           | 3824           | 3840           |    |
|                           |             |                        | Leaving Air Temp<br>(°F db/°F wb) | 59.7 /<br>58.4                | 62.0 /<br>60.6 | 64.3 /<br>62.9 | 59.6 /<br>58.3 | 61.8 /<br>60.5 | 64.1 /<br>62.8 | 59.5 /<br>58.2 | 61.8 /<br>60.4 | 64.2 /<br>62.7 |    |
|                           | 85          | 15.00                  | Total Capacity (Btu/h)            | 60500                         | 63000          | 65000          | 61000          | 63000          | 65000          | 61000          | 63000          | 65000          |    |
|                           |             |                        | Sensible Capacity (Btu/h)         | 32800                         | 30400          | 28000          | 38500          | 35800          | 33600          | 44000          | 41500          | 39000          |    |
|                           |             |                        | Electric Power (Watts)            | 4181                          | 4191           | 4202           | 4186           | 4200           | 4203           | 4188           | 4196           | 4213           |    |
|                           |             |                        | Leaving Air Temp<br>(°F db/°F wb) | 60.5 /<br>59.2                | 62.8 /<br>61.5 | 65.1 /<br>63.8 | 60.5 /<br>59.1 | 62.9 /<br>61.4 | 64.9 /<br>63.6 | 60.4 /<br>59.0 | 62.6 /<br>61.3 | 65.1 /<br>63.5 |    |
| <b>072 (6 TON)</b>        |             |                        |                                   |                               |                |                |                |                |                |                |                |                |    |
| 750                       | 50          | 18.00                  | Total Capacity (Btu/h)            | 67000                         | 69000          | 72000          | 67000          | 70000          | 72000          | 67000          | 70000          | 72000          |    |
|                           |             |                        | Sensible Capacity (Btu/h)         | 32800                         | 31000          | 29200          | 37200          | 35400          | 33400          | 41500          | 39500          | 37800          |    |
|                           |             |                        | Electric Power (Watts)            | 3282                          | 3292           | 3304           | 3281           | 3280           | 3306           | 3282           | 3292           | 3292           |    |
|                           |             |                        | Leaving Air Temp<br>(°F db/°F wb) | 50.6 /<br>48.8                | 53.0 /<br>51.1 | 55.4 /<br>53.4 | 50.5 /<br>48.6 | 52.6 /<br>50.9 | 55.2 /<br>53.2 | 50.3 /<br>48.5 | 52.6 /<br>50.7 | 54.8 /<br>53.0 |    |
|                           | 60          | 18.00                  | Total Capacity (Btu/h)            | 65000                         | 67000          | 70000          | 65000          | 68000          | 70000          | 65000          | 68000          | 70000          |    |
|                           |             |                        | Sensible Capacity (Btu/h)         | 32000                         | 30200          | 28200          | 36200          | 34600          | 32600          | 40500          | 38500          | 37000          |    |
|                           |             |                        | Electric Power (Watts)            | 3577                          | 3599           | 3611           | 3590           | 3589           | 3602           | 3591           | 3602           | 3602           |    |
|                           |             |                        | Leaving Air Temp<br>(°F db/°F wb) | 51.6 /<br>49.8                | 54.1 /<br>52.2 | 56.5 /<br>54.5 | 51.7 /<br>49.7 | 53.7 /<br>52.0 | 56.1 /<br>54.3 | 51.5 /<br>49.5 | 53.8 /<br>51.8 | 55.9 /<br>54.1 |    |
|                           | 75          | 18.00                  | Total Capacity (Btu/h)            | 61500                         | 64000          | 66000          | 61500          | 64000          | 67000          | 62000          | 64000          | 67000          |    |
|                           |             |                        | Sensible Capacity (Btu/h)         | 30400                         | 28800          | 26800          | 34600          | 33000          | 31200          | 39000          | 37000          | 35200          |    |
|                           |             |                        | Electric Power (Watts)            | 4101                          | 4098           | 4121           | 4102           | 4099           | 4114           | 4103           | 4114           | 4128           |    |
|                           |             |                        | Leaving Air Temp<br>(°F db/°F wb) | 53.6 /<br>51.6                | 55.7 /<br>53.9 | 58.2 /<br>56.2 | 53.4 /<br>51.4 | 55.5 /<br>53.7 | 57.8 /<br>56.0 | 53.3 /<br>51.3 | 55.6 /<br>53.5 | 57.9 /<br>55.8 |    |
|                           | 85          | 18.00                  | Total Capacity (Btu/h)            | 59000                         | 61500          | 63500          | 59500          | 61500          | 64000          | 59500          | 62000          | 64000          |    |
|                           |             |                        | Sensible Capacity (Btu/h)         | 29200                         | 27800          | 25800          | 33600          | 31800          | 30200          | 37800          | 36000          | 34200          |    |
|                           |             |                        | Electric Power (Watts)            | 4494                          | 4486           | 4510           | 4495           | 4506           | 4502           | 4495           | 4506           | 4519           |    |
|                           |             |                        | Leaving Air Temp<br>(°F db/°F wb) | 54.9 /<br>52.8                | 56.9 /<br>55.1 | 59.4 /<br>57.4 | 54.7 /<br>52.6 | 57.0 /<br>54.9 | 59.1 /<br>57.2 | 54.6 /<br>52.5 | 56.8 /<br>54.7 | 59.2 /<br>57.0 |    |



**TABLE 9 - JROW WATER SOURCE HEAT PUMP COOLING GENERAL PERFORMANCE (CONT'D)**

| AIRFLOW<br>(CFM)          | EWT<br>(°F) | WATER<br>FLOW<br>(GPM)            |                                   | ENTERING AIR TEMPERATURE (°F) |                |                |                |                |                |                |                |                |     |    |    |
|---------------------------|-------------|-----------------------------------|-----------------------------------|-------------------------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|-----|----|----|
|                           |             |                                   |                                   | COOLING                       |                |                |                |                |                |                |                |                |     |    |    |
|                           |             |                                   |                                   | DRY BULB                      |                |                | 90             |                |                | 95             |                |                | 100 |    |    |
|                           |             |                                   |                                   | WET BULB                      |                |                | 76             | 78             | 80             | 76             | 78             | 80             | 76  | 78 | 80 |
| <b>072 (6 TON) CONT'D</b> |             |                                   |                                   |                               |                |                |                |                |                |                |                |                |     |    |    |
| 960                       | 50          | 18.00                             | Total Capacity (Btu/h)            | 73000                         | 76000          | 78000          | 73000          | 76000          | 79000          | 73000          | 76000          | 79000          |     |    |    |
|                           |             |                                   | Sensible Capacity (Btu/h)         | 37200                         | 34800          | 32200          | 42500          | 40500          | 38000          | 48000          | 46000          | 43000          |     |    |    |
|                           |             |                                   | Electric Power (Watts)            | 3295                          | 3308           | 3339           | 3295           | 3309           | 3325           | 3306           | 3308           | 3344           |     |    |    |
|                           |             |                                   | Leaving Air Temp<br>(°F db/°F wb) | 55.2 /<br>53.8                | 57.5 /<br>56.1 | 60.1 /<br>58.5 | 55.0 /<br>53.7 | 57.3 /<br>56.0 | 59.7 /<br>58.3 | 55.1 /<br>53.5 | 57.2 /<br>55.9 | 59.8 /<br>58.1 |     |    |    |
|                           | 60          | 18.00                             | Total Capacity (Btu/h)            | 71000                         | 73000          | 76000          | 71000          | 74000          | 76000          | 71000          | 74000          | 76000          |     |    |    |
|                           |             |                                   | Sensible Capacity (Btu/h)         | 36200                         | 33800          | 31400          | 41500          | 39500          | 37000          | 47000          | 44500          | 42000          |     |    |    |
|                           |             |                                   | Electric Power (Watts)            | 3605                          | 3620           | 3636           | 3605           | 3621           | 3637           | 3616           | 3635           | 3652           |     |    |    |
|                           |             |                                   | Leaving Air Temp<br>(°F db/°F wb) | 56.1 /<br>54.7                | 58.5 /<br>57.0 | 60.8 /<br>59.3 | 55.9 /<br>54.6 | 58.3 /<br>56.9 | 60.6 /<br>59.2 | 56.0 /<br>54.5 | 58.4 /<br>56.7 | 60.7 /<br>59.0 |     |    |    |
|                           | 75          | 18.00                             | Total Capacity (Btu/h)            | 67000                         | 69000          | 72000          | 67000          | 70000          | 72000          | 67000          | 70000          | 72000          |     |    |    |
|                           |             |                                   | Sensible Capacity (Btu/h)         | 34600                         | 32200          | 29800          | 40000          | 37800          | 35400          | 45000          | 42500          | 40500          |     |    |    |
|                           |             |                                   | Electric Power (Watts)            | 4115                          | 4130           | 4147           | 4115           | 4132           | 4149           | 4134           | 4155           | 4169           |     |    |    |
|                           |             |                                   | Leaving Air Temp<br>(°F db/°F wb) | 57.6 /<br>56.2                | 59.9 /<br>58.4 | 62.2 /<br>60.7 | 57.4 /<br>56.1 | 59.7 /<br>58.3 | 62.0 /<br>60.5 | 57.6 /<br>55.9 | 60.1 /<br>58.1 | 62.3 /<br>60.4 |     |    |    |
| 85                        | 18.00       | Total Capacity (Btu/h)            | 64000                             | 67000                         | 69000          | 64500          | 67000          | 69000          | 64500          | 67000          | 69000          |                |     |    |    |
|                           |             | Sensible Capacity (Btu/h)         | 33600                             | 31200                         | 28800          | 39000          | 36800          | 34400          | 44000          | 41500          | 39500          |                |     |    |    |
|                           |             | Electric Power (Watts)            | 4502                              | 4517                          | 4533           | 4501           | 4518           | 4535           | 4523           | 4545           | 4558           |                |     |    |    |
|                           |             | Leaving Air Temp<br>(°F db/°F wb) | 58.6 /<br>57.2                    | 60.9 /<br>59.4                | 63.2 /<br>61.7 | 58.4 /<br>57.1 | 60.7 /<br>59.3 | 63.0 /<br>61.5 | 58.7 /<br>56.9 | 61.1 /<br>59.1 | 63.4 /<br>61.4 |                |     |    |    |
| 1200                      | 50          | 18.00                             | Total Capacity (Btu/h)            | 78000                         | 81000          | 84000          | 78000          | 81000          | 84000          | 78000          | 81000          | 84000          |     |    |    |
|                           |             |                                   | Sensible Capacity (Btu/h)         | 41500                         | 38500          | 35400          | 48000          | 45000          | 42000          | 54500          | 52000          | 49000          |     |    |    |
|                           |             |                                   | Electric Power (Watts)            | 3337                          | 3353           | 3371           | 3339           | 3356           | 3375           | 3340           | 3358           | 3377           |     |    |    |
|                           |             |                                   | Leaving Air Temp<br>(°F db/°F wb) | 59.1 /<br>57.8                | 61.4 /<br>60.1 | 63.7 /<br>62.4 | 59.0 /<br>57.7 | 61.3 /<br>59.9 | 63.6 /<br>62.2 | 58.9 /<br>57.6 | 61.2 /<br>59.8 | 63.5 /<br>62.1 |     |    |    |
|                           | 60          | 18.00                             | Total Capacity (Btu/h)            | 75000                         | 78000          | 81000          | 76000          | 78000          | 81000          | 76000          | 78000          | 81000          |     |    |    |
|                           |             |                                   | Sensible Capacity (Btu/h)         | 40500                         | 37400          | 34400          | 47000          | 44000          | 41000          | 53500          | 51000          | 48000          |     |    |    |
|                           |             |                                   | Electric Power (Watts)            | 3643                          | 3660           | 3678           | 3645           | 3663           | 3682           | 3647           | 3664           | 3684           |     |    |    |
|                           |             |                                   | Leaving Air Temp<br>(°F db/°F wb) | 59.8 /<br>58.5                | 62.1 /<br>60.8 | 64.4 /<br>63.1 | 59.7 /<br>58.4 | 62.0 /<br>60.7 | 64.3 /<br>62.9 | 59.7 /<br>58.3 | 61.9 /<br>60.6 | 64.2 /<br>62.8 |     |    |    |
|                           | 75          | 18.00                             | Total Capacity (Btu/h)            | 71000                         | 74000          | 76000          | 71000          | 74000          | 76000          | 71000          | 74000          | 77000          |     |    |    |
|                           |             |                                   | Sensible Capacity (Btu/h)         | 38500                         | 35800          | 33000          | 45500          | 42500          | 39500          | 52000          | 49000          | 46500          |     |    |    |
|                           |             |                                   | Electric Power (Watts)            | 4150                          | 4167           | 4178           | 4152           | 4170           | 4189           | 4153           | 4172           | 4191           |     |    |    |
|                           |             |                                   | Leaving Air Temp<br>(°F db/°F wb) | 61.0 /<br>59.7                | 63.3 /<br>62.0 | 65.4 /<br>64.2 | 60.9 /<br>59.6 | 63.2 /<br>61.8 | 65.4 /<br>64.1 | 60.8 /<br>59.5 | 63.1 /<br>61.7 | 65.4 /<br>64.0 |     |    |    |
| 85                        | 18.00       | Total Capacity (Btu/h)            | 68000                             | 70000                         | 73000          | 68000          | 71000          | 73000          | 68000          | 71000          | 73000          |                |     |    |    |
|                           |             | Sensible Capacity (Btu/h)         | 37600                             | 34800                         | 32000          | 44500          | 41500          | 38500          | 51000          | 48000          | 45500          |                |     |    |    |
|                           |             | Electric Power (Watts)            | 4536                              | 4552                          | 4562           | 4538           | 4555           | 4574           | 4540           | 4557           | 4575           |                |     |    |    |
|                           |             | Leaving Air Temp<br>(°F db/°F wb) | 61.8 /<br>60.5                    | 64.1 /<br>62.8                | 66.2 /<br>65.0 | 61.8 /<br>60.4 | 64.0 /<br>62.7 | 66.3 /<br>64.9 | 61.7 /<br>60.3 | 63.9 /<br>62.6 | 66.2 /<br>64.8 |                |     |    |    |

# Performance Data (Cont'd)

**TABLE 9 - JROW WATER SOURCE HEAT PUMP COOLING GENERAL PERFORMANCE (CONT'D)**

| AIRFLOW<br>(CFM)   | EWT<br>(°F) | WATER<br>FLOW<br>(GPM)            |                                   | ENTERING AIR TEMPERATURE (°F) |                |                |                |                |                |                |                |                |    |
|--------------------|-------------|-----------------------------------|-----------------------------------|-------------------------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|----|
|                    |             |                                   |                                   | COOLING                       |                |                |                |                |                |                |                |                |    |
|                    |             |                                   |                                   | DRY BULB                      | 90             |                |                | 95             |                |                | 100            |                |    |
|                    |             |                                   |                                   | WET BULB                      | 76             | 78             | 80             | 76             | 78             | 80             | 76             | 78             | 80 |
| <b>084 (7 TON)</b> |             |                                   |                                   |                               |                |                |                |                |                |                |                |                |    |
| 875                | 50          | 21.00                             | Total Capacity (Btu/h)            | 81000                         | 83000          | 86000          | 81000          | 84000          | 87000          | 81000          | 84000          | 87000          |    |
|                    |             |                                   | Sensible Capacity (Btu/h)         | 39500                         | 37200          | 34800          | 44000          | 42500          | 40000          | 49000          | 47000          | 45000          |    |
|                    |             |                                   | Electric Power (Watts)            | 4685                          | 4748           | 4804           | 4717           | 4744           | 4811           | 4721           | 4775           | 4806           |    |
|                    |             |                                   | Leaving Air Temp<br>(°F db/°F wb) | 49.4 /<br>47.6                | 52.0 /<br>50.0 | 54.4 /<br>52.4 | 49.5 /<br>47.4 | 51.6 /<br>49.7 | 54.2 /<br>52.2 | 49.4 /<br>47.3 | 51.8 /<br>49.6 | 53.8 /<br>52.0 |    |
|                    | 60          | 21.00                             | Total Capacity (Btu/h)            | 78000                         | 81000          | 84000          | 78000          | 81000          | 84000          | 79000          | 81000          | 84000          |    |
|                    |             |                                   | Sensible Capacity (Btu/h)         | 38500                         | 36200          | 33800          | 43000          | 41000          | 39000          | 48000          | 46000          | 44000          |    |
|                    |             |                                   | Electric Power (Watts)            | 5017                          | 5052           | 5102           | 5022           | 5069           | 5108           | 5027           | 5074           | 5124           |    |
|                    |             |                                   | Leaving Air Temp<br>(°F db/°F wb) | 50.7 /<br>48.7                | 53.1 /<br>51.0 | 55.5 /<br>53.4 | 50.5 /<br>48.5 | 52.9 /<br>50.9 | 55.3 /<br>53.2 | 50.4 /<br>48.4 | 52.8 /<br>50.6 | 55.2 /<br>53.0 |    |
|                    | 75          | 21.00                             | Total Capacity (Btu/h)            | 75000                         | 77000          | 80000          | 75000          | 78000          | 80000          | 75000          | 78000          | 81000          |    |
|                    |             |                                   | Sensible Capacity (Btu/h)         | 36600                         | 34400          | 32200          | 41500          | 39500          | 37200          | 46500          | 44500          | 42000          |    |
|                    |             |                                   | Electric Power (Watts)            | 5606                          | 5651           | 5688           | 5611           | 5657           | 5694           | 5599           | 5663           | 5703           |    |
|                    |             |                                   | Leaving Air Temp<br>(°F db/°F wb) | 52.4 /<br>50.3                | 54.8 /<br>52.7 | 57.2 /<br>55.0 | 52.2 /<br>50.1 | 54.6 /<br>52.5 | 57.0 /<br>54.8 | 51.9 /<br>50.0 | 54.4 /<br>52.3 | 56.8 /<br>54.6 |    |
| 85                 | 21.00       | Total Capacity (Btu/h)            | 73000                             | 76000                         | 77000          | 73000          | 76000          | 78000          | 73000          | 76000          | 79000          |                |    |
|                    |             | Sensible Capacity (Btu/h)         | 36600                             | 33600                         | 32400          | 41000          | 38500          | 36000          | 46000          | 43500          | 41500          |                |    |
|                    |             | Electric Power (Watts)            | 6046                              | 6144                          | 6109           | 6110           | 6150           | 6290           | 6114           | 6154           | 6204           |                |    |
|                    |             | Leaving Air Temp<br>(°F db/°F wb) | 52.5 /<br>51.1                    | 55.5 /<br>53.4                | 56.9 /<br>56.2 | 53.0 /<br>50.9 | 55.3 /<br>53.2 | 58.2 /<br>55.7 | 52.8 /<br>50.8 | 55.2 /<br>53.0 | 57.5 /<br>55.4 |                |    |
| 1120               | 50          | 21.00                             | Total Capacity (Btu/h)            | 88000                         | 91000          | 94000          | 88000          | 91000          | 94000          | 88000          | 91000          | 94000          |    |
|                    |             |                                   | Sensible Capacity (Btu/h)         | 44000                         | 41500          | 38500          | 50500          | 48000          | 45000          | 57000          | 54000          | 50500          |    |
|                    |             |                                   | Electric Power (Watts)            | 4829                          | 4890           | 4953           | 4826           | 4882           | 4960           | 4828           | 4891           | 4994           |    |
|                    |             |                                   | Leaving Air Temp<br>(°F db/°F wb) | 54.6 /<br>53.0                | 57.0 /<br>55.4 | 59.4 /<br>57.7 | 54.4 /<br>52.8 | 56.6 /<br>55.2 | 59.3 /<br>57.6 | 54.2 /<br>52.7 | 56.6 /<br>55.1 | 59.5 /<br>57.5 |    |
|                    | 60          | 21.00                             | Total Capacity (Btu/h)            | 85000                         | 88000          | 91000          | 85000          | 88000          | 91000          | 85000          | 88000          | 92000          |    |
|                    |             |                                   | Sensible Capacity (Btu/h)         | 43000                         | 40000          | 37400          | 49000          | 46000          | 43500          | 55500          | 52500          | 51000          |    |
|                    |             |                                   | Electric Power (Watts)            | 5118                          | 5172           | 5229           | 5137           | 5205           | 5258           | 5143           | 5196           | 5206           |    |
|                    |             |                                   | Leaving Air Temp<br>(°F db/°F wb) | 55.5 /<br>53.9                | 57.9 /<br>56.2 | 60.3 /<br>58.6 | 55.5 /<br>53.7 | 58.0 /<br>56.1 | 60.4 /<br>58.4 | 55.4 /<br>53.6 | 57.7 /<br>55.9 | 59.4 /<br>58.2 |    |
|                    | 75          | 21.00                             | Total Capacity (Btu/h)            | 81000                         | 84000          | 87000          | 81000          | 84000          | 87000          | 81000          | 84000          | 87000          |    |
|                    |             |                                   | Sensible Capacity (Btu/h)         | 41500                         | 38500          | 35600          | 47500          | 44000          | 42000          | 54000          | 51000          | 47500          |    |
|                    |             |                                   | Electric Power (Watts)            | 5690                          | 5738           | 5787           | 5708           | 5797           | 5793           | 5714           | 5758           | 5852           |    |
|                    |             |                                   | Leaving Air Temp<br>(°F db/°F wb) | 56.8 /<br>55.2                | 59.2 /<br>57.5 | 61.6 /<br>59.9 | 56.8 /<br>55.1 | 59.6 /<br>57.4 | 61.4 /<br>59.7 | 56.7 /<br>55.0 | 59.0 /<br>57.3 | 61.9 /<br>59.6 |    |
| 85                 | 21.00       | Total Capacity (Btu/h)            | 78000                             | 81000                         | 83000          | 78000          | 81000          | 84000          | 78000          | 81000          | 84000          |                |    |
|                    |             | Sensible Capacity (Btu/h)         | 40000                             | 37200                         | 34600          | 46500          | 43500          | 41000          | 52500          | 50000          | 47000          |                |    |
|                    |             | Electric Power (Watts)            | 6176                              | 6219                          | 6259           | 6180           | 6219           | 6264           | 6191           | 6236           | 6284           |                |    |
|                    |             | Leaving Air Temp<br>(°F db/°F wb) | 57.9 /<br>56.2                    | 60.2 /<br>58.5                | 62.5 /<br>60.8 | 57.8 /<br>56.1 | 60.0 /<br>58.4 | 62.3 /<br>60.7 | 57.8 /<br>55.9 | 60.0 /<br>58.3 | 62.6 /<br>60.5 |                |    |

**TABLE 9 - JROW WATER SOURCE HEAT PUMP COOLING GENERAL PERFORMANCE (CONT'D)**

| AIRFLOW<br>(CFM)          | EWT<br>(°F) | WATER<br>FLOW<br>(GPM)            |                                   | ENTERING AIR TEMPERATURE (°F) |                |                |                |                |                |                |                |                |     |    |    |
|---------------------------|-------------|-----------------------------------|-----------------------------------|-------------------------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|-----|----|----|
|                           |             |                                   |                                   | COOLING                       |                |                |                |                |                |                |                |                |     |    |    |
|                           |             |                                   |                                   | DRY BULB                      |                |                | 90             |                |                | 95             |                |                | 100 |    |    |
|                           |             |                                   |                                   | WET BULB                      |                |                | 76             | 78             | 80             | 76             | 78             | 80             | 76  | 78 | 80 |
| <b>084 (7 TON) CONT'D</b> |             |                                   |                                   |                               |                |                |                |                |                |                |                |                |     |    |    |
| 1400                      | 50          | 21.00                             | Total Capacity (Btu/h)            | 93000                         | 97000          | 100000         | 94000          | 97000          | 100000         | 94000          | 97000          | 100000         |     |    |    |
|                           |             |                                   | Sensible Capacity (Btu/h)         | 48500                         | 46000          | 42000          | 58000          | 54500          | 51000          | 65000          | 60500          | 59000          |     |    |    |
|                           |             |                                   | Electric Power (Watts)            | 4969                          | 4997           | 5066           | 4905           | 4978           | 5051           | 4940           | 5050           | 5048           |     |    |    |
|                           |             |                                   | Leaving Air Temp<br>(°F db/°F wb) | 58.9 /<br>57.2                | 60.7 /<br>59.5 | 63.1 /<br>61.8 | 57.8 /<br>57.1 | 60.1 /<br>59.4 | 62.5 /<br>61.7 | 58.2 /<br>57.0 | 61.2 /<br>59.3 | 62.2 /<br>61.6 |     |    |    |
|                           | 60          | 21.00                             | Total Capacity (Btu/h)            | 91000                         | 94000          | 97000          | 91000          | 94000          | 97000          | 91000          | 94000          | 97000          |     |    |    |
|                           |             |                                   | Sensible Capacity (Btu/h)         | 48500                         | 45000          | 40500          | 56500          | 53000          | 49500          | 63500          | 59500          | 56000          |     |    |    |
|                           |             |                                   | Electric Power (Watts)            | 5185                          | 5248           | 5355           | 5182           | 5248           | 5315           | 5219           | 5315           | 5374           |     |    |    |
|                           |             |                                   | Leaving Air Temp<br>(°F db/°F wb) | 58.8 /<br>57.9                | 61.1 /<br>60.2 | 64.2 /<br>62.5 | 58.6 /<br>57.8 | 60.9 /<br>60.1 | 63.3 /<br>62.4 | 59.0 /<br>57.7 | 61.8 /<br>60.0 | 64.1 /<br>62.3 |     |    |    |
|                           | 75          | 21.00                             | Total Capacity (Btu/h)            | 86000                         | 89000          | 92000          | 86000          | 89000          | 92000          | 86000          | 89000          | 92000          |     |    |    |
|                           |             |                                   | Sensible Capacity (Btu/h)         | 45500                         | 43500          | 40000          | 55500          | 50000          | 48000          | 61500          | 58000          | 55500          |     |    |    |
|                           |             |                                   | Electric Power (Watts)            | 5825                          | 5793           | 5850           | 5716           | 5861           | 5854           | 5792           | 5842           | 5877           |     |    |    |
|                           |             |                                   | Leaving Air Temp<br>(°F db/°F wb) | 60.9 /<br>59.1                | 62.2 /<br>61.3 | 64.6 /<br>63.6 | 59.5 /<br>59.0 | 63.0 /<br>61.2 | 64.4 /<br>63.5 | 60.2 /<br>58.8 | 62.6 /<br>61.1 | 64.6 /<br>63.4 |     |    |    |
| 85                        | 21.00       | Total Capacity (Btu/h)            | 83000                             | 85000                         | 88000          | 83000          | 85000          | 89000          | 83000          | 86000          | 88000          |                |     |    |    |
|                           |             | Sensible Capacity (Btu/h)         | 44500                             | 41500                         | 38000          | 53000          | 49500          | 45500          | 60500          | 57000          | 53500          |                |     |    |    |
|                           |             | Electric Power (Watts)            | 6257                              | 6288                          | 6338           | 6248           | 6296           | 6360           | 6265           | 6309           | 6360           |                |     |    |    |
|                           |             | Leaving Air Temp<br>(°F db/°F wb) | 61.5 /<br>59.8                    | 63.4 /<br>62.1                | 65.8 /<br>64.4 | 61.0 /<br>59.7 | 63.3 /<br>62.0 | 66.1 /<br>64.2 | 61.0 /<br>59.6 | 63.4 /<br>61.9 | 65.7 /<br>64.2 |                |     |    |    |
| <b>096 (8 TON)</b>        |             |                                   |                                   |                               |                |                |                |                |                |                |                |                |     |    |    |
| 1000                      | 50          | 24.00                             | Total Capacity (Btu/h)            | 90000                         | 93000          | 97000          | 91000          | 94000          | 97000          | 91000          | 94000          | 97000          |     |    |    |
|                           |             |                                   | Sensible Capacity (Btu/h)         | 44500                         | 41500          | 39000          | 50000          | 47500          | 45000          | 55500          | 53500          | 50500          |     |    |    |
|                           |             |                                   | Electric Power (Watts)            | 5376                          | 5448           | 5510           | 5381           | 5441           | 5517           | 5384           | 5446           | 5511           |     |    |    |
|                           |             |                                   | Leaving Air Temp<br>(°F db/°F wb) | 50.1 /<br>48.3                | 52.7 /<br>50.7 | 55.1 /<br>53.1 | 49.9 /<br>48.1 | 52.3 /<br>50.5 | 55.0 /<br>52.9 | 49.8 /<br>48.0 | 52.1 /<br>50.3 | 54.6 /<br>52.7 |     |    |    |
|                           | 60          | 24.00                             | Total Capacity (Btu/h)            | 88000                         | 91000          | 94000          | 88000          | 91000          | 95000          | 88000          | 91000          | 95000          |     |    |    |
|                           |             |                                   | Sensible Capacity (Btu/h)         | 43000                         | 40500          | 38000          | 49000          | 46000          | 43500          | 54500          | 51500          | 49000          |     |    |    |
|                           |             |                                   | Electric Power (Watts)            | 5728                          | 5792           | 5849           | 5733           | 5819           | 5855           | 5735           | 5826           | 5882           |     |    |    |
|                           |             |                                   | Leaving Air Temp<br>(°F db/°F wb) | 51.2 /<br>49.3                | 53.7 /<br>51.7 | 56.1 /<br>54.0 | 51.0 /<br>49.1 | 53.7 /<br>51.5 | 56.0 /<br>53.9 | 50.8 /<br>49.0 | 53.5 /<br>51.4 | 55.9 /<br>53.7 |     |    |    |
|                           | 75          | 24.00                             | Total Capacity (Btu/h)            | 84000                         | 87000          | 90000          | 84000          | 87000          | 90000          | 84000          | 87000          | 90000          |     |    |    |
|                           |             |                                   | Sensible Capacity (Btu/h)         | 41000                         | 38500          | 36200          | 47000          | 44500          | 42000          | 52500          | 50000          | 47500          |     |    |    |
|                           |             |                                   | Electric Power (Watts)            | 6417                          | 6480           | 6512           | 6423           | 6486           | 6532           | 6426           | 6492           | 6538           |     |    |    |
|                           |             |                                   | Leaving Air Temp<br>(°F db/°F wb) | 53.0 /<br>51.0                | 55.5 /<br>53.3 | 57.8 /<br>55.7 | 52.8 /<br>50.8 | 55.3 /<br>53.1 | 57.7 /<br>55.5 | 52.7 /<br>50.6 | 55.1 /<br>53.0 | 57.5 /<br>55.3 |     |    |    |
|                           | 85          | 24.00                             | Total Capacity (Btu/h)            | 81000                         | 84000          | 87000          | 81000          | 84000          | 87000          | 81000          | 84000          | 87000          |     |    |    |
|                           |             |                                   | Sensible Capacity (Btu/h)         | 40500                         | 37400          | 34800          | 46500          | 43000          | 40500          | 52000          | 48500          | 46000          |     |    |    |
|                           |             |                                   | Electric Power (Watts)            | 6905                          | 7017           | 7063           | 6899           | 7023           | 7084           | 6900           | 7028           | 7091           |     |    |    |
|                           |             |                                   | Leaving Air Temp<br>(°F db/°F wb) | 53.5 /<br>52.1                | 56.6 /<br>54.4 | 59.0 /<br>56.8 | 53.3 /<br>51.9 | 56.4 /<br>54.2 | 58.8 /<br>56.6 | 53.2 /<br>51.8 | 56.2 /<br>54.1 | 58.7 /<br>56.4 |     |    |    |

# Performance Data (Cont'd)

**TABLE 9 - JROW WATER SOURCE HEAT PUMP COOLING GENERAL PERFORMANCE (CONT'D)**

| AIRFLOW<br>(CFM)          | EWT<br>(°F) | WATER<br>FLOW<br>(GPM)            |                                   | ENTERING AIR TEMPERATURE (°F) |                |                |                |                |                |                |                |                |    |
|---------------------------|-------------|-----------------------------------|-----------------------------------|-------------------------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|----|
|                           |             |                                   |                                   | COOLING                       |                |                |                |                |                |                |                |                |    |
|                           |             |                                   |                                   | DRY BULB                      | 90             |                |                | 95             |                |                | 100            |                |    |
|                           |             |                                   |                                   | WET BULB                      | 76             | 78             | 80             | 76             | 78             | 80             | 76             | 78             | 80 |
| <b>096 (8 TON) CONT'D</b> |             |                                   |                                   |                               |                |                |                |                |                |                |                |                |    |
| 1280                      | 50          | 24.00                             | Total Capacity (Btu/h)            | 98000                         | 102000         | 105000         | 99000          | 102000         | 106000         | 99000          | 102000         | 106000         |    |
|                           |             |                                   | Sensible Capacity (Btu/h)         | 49500                         | 46500          | 43000          | 57000          | 54000          | 50500          | 64000          | 61000          | 58500          |    |
|                           |             |                                   | Electric Power (Watts)            | 5537                          | 5602           | 5671           | 5529           | 5592           | 5664           | 5530           | 5601           | 5636           |    |
|                           |             |                                   | Leaving Air Temp<br>(°F db/°F wb) | 55.3 /<br>53.6                | 57.7 /<br>56.0 | 60.1 /<br>58.3 | 54.9 /<br>53.4 | 57.2 /<br>55.8 | 59.6 /<br>58.1 | 54.8 /<br>53.3 | 57.2 /<br>55.7 | 58.9 /<br>58.0 |    |
|                           | 60          | 24.00                             | Total Capacity (Btu/h)            | 95000                         | 99000          | 102000         | 96000          | 99000          | 102000         | 96000          | 99000          | 103000         |    |
|                           |             |                                   | Sensible Capacity (Btu/h)         | 48500                         | 45500          | 42000          | 55500          | 53000          | 50000          | 63000          | 59500          | 57500          |    |
|                           |             |                                   | Electric Power (Watts)            | 5851                          | 5915           | 5980           | 5866           | 5890           | 5959           | 5868           | 5931           | 5957           |    |
|                           |             |                                   | Leaving Air Temp<br>(°F db/°F wb) | 55.9 /<br>54.4                | 58.3 /<br>56.8 | 60.7 /<br>59.1 | 55.9 /<br>54.3 | 57.7 /<br>56.6 | 60.1 /<br>58.9 | 55.7 /<br>54.2 | 58.1 /<br>56.5 | 59.8 /<br>58.8 |    |
|                           | 75          | 24.00                             | Total Capacity (Btu/h)            | 91000                         | 94000          | 97000          | 91000          | 94000          | 97000          | 91000          | 94000          | 98000          |    |
|                           |             |                                   | Sensible Capacity (Btu/h)         | 46500                         | 43000          | 40000          | 53500          | 50500          | 46500          | 61000          | 57500          | 54500          |    |
|                           |             |                                   | Electric Power (Watts)            | 6536                          | 6577           | 6631           | 6521           | 6592           | 6700           | 6523           | 6580           | 6640           |    |
|                           |             |                                   | Leaving Air Temp<br>(°F db/°F wb) | 57.5 /<br>55.8                | 59.9 /<br>58.1 | 62.2 /<br>60.4 | 57.3 /<br>55.7 | 59.7 /<br>57.9 | 62.6 /<br>60.3 | 57.1 /<br>55.5 | 59.5 /<br>57.8 | 61.9 /<br>60.1 |    |
| 85                        | 24.00       | Total Capacity (Btu/h)            | 87000                             | 90000                         | 93000          | 87000          | 91000          | 94000          | 88000          | 91000          | 94000          |                |    |
|                           |             | Sensible Capacity (Btu/h)         | 45000                             | 41500                         | 38500          | 52500          | 49000          | 45000          | 59500          | 56500          | 53000          |                |    |
|                           |             | Electric Power (Watts)            | 7083                              | 7120                          | 7170           | 7065           | 7120           | 7242           | 7080           | 7122           | 7179           |                |    |
|                           |             | Leaving Air Temp<br>(°F db/°F wb) | 58.5 /<br>56.7                    | 60.8 /<br>59.0                | 63.2 /<br>61.3 | 58.2 /<br>56.6 | 60.6 /<br>58.9 | 63.5 /<br>61.2 | 58.2 /<br>56.5 | 60.5 /<br>58.7 | 62.8 /<br>61.0 |                |    |
| 1600                      | 50          | 24.00                             | Total Capacity (Btu/h)            | 105000                        | 108000         | 112000         | 105000         | 108000         | 112000         | 105000         | 108000         | 112000         |    |
|                           |             |                                   | Sensible Capacity (Btu/h)         | 56000                         | 51500          | 47500          | 65000          | 61500          | 57500          | 73000          | 70000          | 64000          |    |
|                           |             |                                   | Electric Power (Watts)            | 5613                          | 5714           | 5789           | 5610           | 5687           | 5767           | 5651           | 5716           | 5860           |    |
|                           |             |                                   | Leaving Air Temp<br>(°F db/°F wb) | 58.4 /<br>57.7                | 61.2 /<br>60.0 | 63.6 /<br>62.3 | 58.2 /<br>57.6 | 60.5 /<br>59.9 | 62.9 /<br>62.2 | 58.7 /<br>57.5 | 60.9 /<br>59.8 | 64.1 /<br>62.1 |    |
|                           | 60          | 24.00                             | Total Capacity (Btu/h)            | 101000                        | 105000         | 108000         | 101000         | 105000         | 108000         | 101000         | 105000         | 108000         |    |
|                           |             |                                   | Sensible Capacity (Btu/h)         | 55000                         | 51000          | 47000          | 62000          | 58000          | 56000          | 72000          | 67000          | 64500          |    |
|                           |             |                                   | Electric Power (Watts)            | 5932                          | 6002           | 6072           | 6019           | 6078           | 6074           | 5975           | 6066           | 6105           |    |
|                           |             |                                   | Leaving Air Temp<br>(°F db/°F wb) | 59.2 /<br>58.4                | 61.5 /<br>60.7 | 63.9 /<br>63.0 | 60.1 /<br>58.3 | 62.4 /<br>60.6 | 63.6 /<br>62.9 | 59.5 /<br>58.2 | 62.1 /<br>60.5 | 64.0 /<br>62.8 |    |
|                           | 75          | 24.00                             | Total Capacity (Btu/h)            | 96000                         | 99000          | 102000         | 96000          | 99000          | 103000         | 96000          | 100000         | 103000         |    |
|                           |             |                                   | Sensible Capacity (Btu/h)         | 51000                         | 49000          | 45000          | 61000          | 56000          | 52500          | 70000          | 66000          | 62500          |    |
|                           |             |                                   | Electric Power (Watts)            | 6677                          | 6625           | 6690           | 6618           | 6710           | 6763           | 6618           | 6678           | 6720           |    |
|                           |             |                                   | Leaving Air Temp<br>(°F db/°F wb) | 61.4 /<br>59.5                | 62.6 /<br>61.8 | 65.0 /<br>64.1 | 60.8 /<br>59.4 | 63.5 /<br>61.6 | 65.8 /<br>63.9 | 60.6 /<br>59.2 | 63.0 /<br>61.5 | 65.0 /<br>63.8 |    |
| 85                        | 24.00       | Total Capacity (Btu/h)            | 92000                             | 95000                         | 98000          | 92000          | 95000          | 98000          | 93000          | 96000          | 99000          |                |    |
|                           |             | Sensible Capacity (Btu/h)         | 52000                             | 45500                         | 41500          | 59500          | 54500          | 53500          | 68000          | 64000          | 60500          |                |    |
|                           |             | Electric Power (Watts)            | 7075                              | 7266                          | 7313           | 7153           | 7280           | 7182           | 7157           | 7245           | 7268           |                |    |
|                           |             | Leaving Air Temp<br>(°F db/°F wb) | 60.9 /<br>60.3                    | 64.5 /<br>62.5                | 66.8 /<br>64.8 | 61.6 /<br>60.1 | 64.5 /<br>62.4 | 65.1 /<br>64.7 | 61.4 /<br>60.0 | 64.1 /<br>62.3 | 66.1 /<br>64.6 |                |    |

**TABLE 9 - JROW WATER SOURCE HEAT PUMP COOLING GENERAL PERFORMANCE (CONT'D)**

| AIRFLOW<br>(CFM)    | EWT<br>(°F) | WATER<br>FLOW<br>(GPM)            |                                   | ENTERING AIR TEMPERATURE (°F) |                |                |                |                |                |                |                |                |     |    |    |
|---------------------|-------------|-----------------------------------|-----------------------------------|-------------------------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|-----|----|----|
|                     |             |                                   |                                   | COOLING                       |                |                |                |                |                |                |                |                |     |    |    |
|                     |             |                                   |                                   | DRY BULB                      |                |                | 90             |                |                | 95             |                |                | 100 |    |    |
|                     |             |                                   |                                   | WET BULB                      |                |                | 76             | 78             | 80             | 76             | 78             | 80             | 76  | 78 | 80 |
| <b>120 (10 TON)</b> |             |                                   |                                   |                               |                |                |                |                |                |                |                |                |     |    |    |
| 1250                | 50          | 30.00                             | Total Capacity (Btu/h)            | 122000                        | 126000         | 132000         | 122000         | 127000         | 132000         | 122000         | 127000         | 132000         |     |    |    |
|                     |             |                                   | Sensible Capacity (Btu/h)         | 59500                         | 56500          | 53500          | 67000          | 63500          | 60500          | 74000          | 71000          | 68000          |     |    |    |
|                     |             |                                   | Electric Power (Watts)            | 6004                          | 6008           | 6022           | 6008           | 6020           | 6026           | 6010           | 6022           | 6038           |     |    |    |
|                     |             |                                   | Leaving Air Temp<br>(°F db/°F wb) | 47.1 /<br>45.3                | 49.4 /<br>47.6 | 51.9 /<br>50.0 | 46.9 /<br>45.0 | 49.3 /<br>47.4 | 51.6 /<br>49.8 | 46.7 /<br>44.8 | 49.1 /<br>47.2 | 51.5 /<br>49.5 |     |    |    |
|                     | 60          | 30.00                             | Total Capacity (Btu/h)            | 118000                        | 123000         | 127000         | 118000         | 123000         | 127000         | 119000         | 123000         | 128000         |     |    |    |
|                     |             |                                   | Sensible Capacity (Btu/h)         | 58000                         | 55000          | 51500          | 65000          | 62000          | 59000          | 72000          | 69000          | 66000          |     |    |    |
|                     |             |                                   | Electric Power (Watts)            | 6598                          | 6602           | 6618           | 6602           | 6614           | 6620           | 6604           | 6618           | 6634           |     |    |    |
|                     |             |                                   | Leaving Air Temp<br>(°F db/°F wb) | 48.4 /<br>46.5                | 50.7 /<br>48.9 | 53.1 /<br>51.3 | 48.2 /<br>46.3 | 50.6 /<br>48.7 | 52.9 /<br>51.0 | 48.0 /<br>46.1 | 50.4 /<br>48.5 | 52.8 /<br>50.8 |     |    |    |
|                     | 75          | 30.00                             | Total Capacity (Btu/h)            | 112000                        | 116000         | 121000         | 113000         | 117000         | 121000         | 113000         | 117000         | 122000         |     |    |    |
|                     |             |                                   | Sensible Capacity (Btu/h)         | 55000                         | 52000          | 49000          | 62000          | 59000          | 56000          | 69000          | 66000          | 63000          |     |    |    |
|                     |             |                                   | Electric Power (Watts)            | 7580                          | 7582           | 7598           | 7584           | 7598           | 7602           | 7586           | 7600           | 7618           |     |    |    |
|                     |             |                                   | Leaving Air Temp<br>(°F db/°F wb) | 50.5 /<br>48.5                | 52.7 /<br>50.9 | 55.1 /<br>53.2 | 50.3 /<br>48.3 | 52.6 /<br>50.6 | 54.9 /<br>53.0 | 50.1 /<br>48.2 | 52.5 /<br>50.4 | 54.9 /<br>52.8 |     |    |    |
| 85                  | 30.00       | Total Capacity (Btu/h)            | 108000                            | 112000                        | 116000         | 108000         | 112000         | 117000         | 109000         | 113000         | 117000         |                |     |    |    |
|                     |             | Sensible Capacity (Btu/h)         | 53000                             | 50000                         | 47000          | 60000          | 57000          | 54000          | 67000          | 64000          | 61000          |                |     |    |    |
|                     |             | Electric Power (Watts)            | 8334                              | 8330                          | 8346           | 8338           | 8350           | 8348           | 8338           | 8352           | 8368           |                |     |    |    |
|                     |             | Leaving Air Temp<br>(°F db/°F wb) | 51.9 /<br>49.9                    | 54.1 /<br>52.2                | 56.5 /<br>54.5 | 51.7 /<br>49.7 | 54.1 /<br>52.0 | 56.2 /<br>54.3 | 51.5 /<br>49.5 | 53.9 /<br>51.8 | 56.3 /<br>54.1 |                |     |    |    |
| 1600                | 50          | 30.00                             | Total Capacity (Btu/h)            | 134000                        | 140000         | 144000         | 134000         | 140000         | 144000         | 136000         | 140000         | 146000         |     |    |    |
|                     |             |                                   | Sensible Capacity (Btu/h)         | 67000                         | 63000          | 59000          | 76000          | 72000          | 68000          | 85000          | 81000          | 77000          |     |    |    |
|                     |             |                                   | Electric Power (Watts)            | 6032                          | 6050           | 6070           | 6034           | 6054           | 6072           | 6048           | 6066           | 6086           |     |    |    |
|                     |             |                                   | Leaving Air Temp<br>(°F db/°F wb) | 52.2 /<br>50.8                | 54.7 /<br>53.1 | 57.1 /<br>55.6 | 52.0 /<br>50.6 | 54.4 /<br>53.0 | 56.8 /<br>55.4 | 52.0 /<br>50.4 | 54.4 /<br>52.8 | 56.8 /<br>55.1 |     |    |    |
|                     | 60          | 30.00                             | Total Capacity (Btu/h)            | 130000                        | 134000         | 140000         | 130000         | 136000         | 140000         | 130000         | 136000         | 140000         |     |    |    |
|                     |             |                                   | Sensible Capacity (Btu/h)         | 65000                         | 61500          | 57000          | 74000          | 70000          | 66000          | 83000          | 79000          | 76000          |     |    |    |
|                     |             |                                   | Electric Power (Watts)            | 6628                          | 6646           | 6668           | 6640           | 6660           | 6670           | 6642           | 6662           | 6674           |     |    |    |
|                     |             |                                   | Leaving Air Temp<br>(°F db/°F wb) | 53.3 /<br>51.9                | 55.7 /<br>54.2 | 58.1 /<br>56.6 | 53.3 /<br>51.7 | 55.7 /<br>54.0 | 57.9 /<br>56.4 | 53.1 /<br>51.5 | 55.5 /<br>53.8 | 57.7 /<br>56.2 |     |    |    |
|                     | 75          | 30.00                             | Total Capacity (Btu/h)            | 123000                        | 127000         | 132000         | 124000         | 128000         | 132000         | 124000         | 128000         | 134000         |     |    |    |
|                     |             |                                   | Sensible Capacity (Btu/h)         | 62500                         | 58500          | 54000          | 71000          | 67000          | 63000          | 80000          | 76000          | 72000          |     |    |    |
|                     |             |                                   | Electric Power (Watts)            | 7606                          | 7626           | 7648           | 7622           | 7642           | 7662           | 7624           | 7644           | 7668           |     |    |    |
|                     |             |                                   | Leaving Air Temp<br>(°F db/°F wb) | 55.0 /<br>53.5                | 57.4 /<br>55.9 | 59.8 /<br>58.2 | 55.0 /<br>53.3 | 57.4 /<br>55.7 | 59.8 /<br>58.0 | 54.8 /<br>53.2 | 57.2 /<br>55.5 | 59.6 /<br>57.8 |     |    |    |
| 85                  | 30.00       | Total Capacity (Btu/h)            | 118000                            | 122000                        | 127000         | 119000         | 123000         | 127000         | 119000         | 123000         | 128000         |                |     |    |    |
|                     |             | Sensible Capacity (Btu/h)         | 60500                             | 56500                         | 52500          | 69000          | 65000          | 61000          | 78000          | 74000          | 70000          |                |     |    |    |
|                     |             | Electric Power (Watts)            | 8352                              | 8370                          | 8390           | 8372           | 8388           | 8408           | 8370           | 8392           | 8414           |                |     |    |    |
|                     |             | Leaving Air Temp<br>(°F db/°F wb) | 56.1 /<br>54.7                    | 58.5 /<br>57.0                | 60.9 /<br>59.3 | 56.2 /<br>54.5 | 58.6 /<br>56.8 | 60.9 /<br>59.1 | 56.0 /<br>54.4 | 58.4 /<br>56.6 | 60.8 /<br>58.9 |                |     |    |    |

# Performance Data (Cont'd)

**TABLE 9 - JROW WATER SOURCE HEAT PUMP COOLING GENERAL PERFORMANCE (CONT'D)**

| AIRFLOW<br>(CFM)           | EWT<br>(°F) | WATER<br>FLOW<br>(GPM) |                                   | ENTERING AIR TEMPERATURE (°F) |                |                |                |                |                |                |                |                |    |
|----------------------------|-------------|------------------------|-----------------------------------|-------------------------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|----|
|                            |             |                        |                                   | COOLING                       |                |                |                |                |                |                |                |                |    |
|                            |             |                        |                                   | DRY BULB                      | 90             |                |                | 95             |                |                | 100            |                |    |
|                            |             |                        |                                   | WET BULB                      | 76             | 78             | 80             | 76             | 78             | 80             | 76             | 78             | 80 |
| <b>120 (10 TON) CONT'D</b> |             |                        |                                   |                               |                |                |                |                |                |                |                |                |    |
| 2000                       | 50          | 30.00                  | Total Capacity (Btu/h)            | 144000                        | 150000         | 154000         | 146000         | 150000         | 156000         | 146000         | 150000         | 156000         |    |
|                            |             |                        | Sensible Capacity (Btu/h)         | 75000                         | 70000          | 65000          | 86000          | 81000          | 76000          | 97000          | 92000          | 88000          |    |
|                            |             |                        | Electric Power (Watts)            | 6072                          | 6092           | 6116           | 6076           | 6098           | 6120           | 6084           | 6100           | 6126           |    |
|                            |             |                        | Leaving Air Temp<br>(°F db/°F wb) | 56.3 /<br>55.2                | 58.7 /<br>57.5 | 61.1 /<br>59.9 | 56.2 /<br>55.1 | 58.6 /<br>57.4 | 60.9 /<br>59.7 | 56.2 /<br>54.9 | 58.4 /<br>57.2 | 60.8 /<br>59.6 |    |
|                            | 60          | 30.00                  | Total Capacity (Btu/h)            | 140000                        | 144000         | 150000         | 140000         | 146000         | 150000         | 140000         | 146000         | 150000         |    |
|                            |             |                        | Sensible Capacity (Btu/h)         | 73000                         | 68000          | 63000          | 84000          | 79000          | 74000          | 95000          | 90000          | 86000          |    |
|                            |             |                        | Electric Power (Watts)            | 6668                          | 6690           | 6714           | 6672           | 6694           | 6718           | 6684           | 6698           | 6724           |    |
|                            |             |                        | Leaving Air Temp<br>(°F db/°F wb) | 57.3 /<br>56.1                | 59.6 /<br>58.4 | 61.9 /<br>60.8 | 57.1 /<br>56.0 | 59.5 /<br>58.3 | 61.8 /<br>60.6 | 57.2 /<br>55.8 | 59.3 /<br>58.1 | 61.7 /<br>60.4 |    |
|                            | 75          | 30.00                  | Total Capacity (Btu/h)            | 132000                        | 136000         | 140000         | 132000         | 136000         | 142000         | 132000         | 138000         | 142000         |    |
|                            |             |                        | Sensible Capacity (Btu/h)         | 70000                         | 65000          | 60000          | 81000          | 76000          | 71000          | 92000          | 87000          | 83000          |    |
|                            |             |                        | Electric Power (Watts)            | 7646                          | 7668           | 7692           | 7650           | 7672           | 7698           | 7662           | 7676           | 7702           |    |
|                            |             |                        | Leaving Air Temp<br>(°F db/°F wb) | 58.7 /<br>57.5                | 61.0 /<br>59.8 | 63.3 /<br>62.1 | 58.5 /<br>57.4 | 60.8 /<br>59.6 | 63.2 /<br>61.9 | 58.6 /<br>57.2 | 60.7 /<br>59.5 | 63.0 /<br>61.8 |    |
|                            | 85          | 30.00                  | Total Capacity (Btu/h)            | 126000                        | 130000         | 134000         | 127000         | 130000         | 136000         | 127000         | 132000         | 136000         |    |
|                            |             |                        | Sensible Capacity (Btu/h)         | 68000                         | 63000          | 58000          | 79000          | 74000          | 69000          | 90000          | 85000          | 80000          |    |
|                            |             |                        | Electric Power (Watts)            | 8388                          | 8408           | 8432           | 8392           | 8414           | 8438           | 8406           | 8418           | 8442           |    |
|                            |             |                        | Leaving Air Temp<br>(°F db/°F wb) | 59.6 /<br>58.5                | 61.9 /<br>60.7 | 64.2 /<br>63.0 | 59.5 /<br>58.3 | 61.8 /<br>60.6 | 64.1 /<br>62.9 | 59.6 /<br>58.2 | 61.7 /<br>60.5 | 64.0 /<br>62.7 |    |
| <b>150 (12.5 TON)</b>      |             |                        |                                   |                               |                |                |                |                |                |                |                |                |    |
| 1500                       | 50          | 36.00                  | Total Capacity (Btu/h)            | 142000                        | 148000         | 154000         | 144000         | 148000         | 154000         | 144000         | 148000         | 154000         |    |
|                            |             |                        | Sensible Capacity (Btu/h)         | 70000                         | 66000          | 62000          | 78000          | 75000          | 71000          | 87000          | 83000          | 79000          |    |
|                            |             |                        | Electric Power (Watts)            | 8046                          | 8122           | 8210           | 8054           | 8140           | 8222           | 8062           | 8150           | 8242           |    |
|                            |             |                        | Leaving Air Temp<br>(°F db/°F wb) | 48.1 /<br>46.2                | 50.5 /<br>48.6 | 53.0 /<br>51.1 | 47.9 /<br>46.0 | 50.4 /<br>48.4 | 52.7 /<br>50.8 | 47.7 /<br>45.8 | 50.2 /<br>48.2 | 52.7 /<br>50.6 |    |
|                            | 60          | 36.00                  | Total Capacity (Btu/h)            | 138000                        | 144000         | 148000         | 140000         | 144000         | 150000         | 140000         | 144000         | 150000         |    |
|                            |             |                        | Sensible Capacity (Btu/h)         | 68000                         | 64000          | 60500          | 76000          | 73000          | 69000          | 85000          | 81000          | 77000          |    |
|                            |             |                        | Electric Power (Watts)            | 8582                          | 8646           | 8726           | 8592           | 8666           | 8736           | 8598           | 8676           | 8758           |    |
|                            |             |                        | Leaving Air Temp<br>(°F db/°F wb) | 49.4 /<br>47.4                | 51.7 /<br>49.8 | 54.2 /<br>52.2 | 49.2 /<br>47.1 | 51.6 /<br>49.5 | 53.9 /<br>52.0 | 48.9 /<br>47.0 | 51.4 /<br>49.3 | 53.8 /<br>51.7 |    |
|                            | 75          | 36.00                  | Total Capacity (Btu/h)            | 132000                        | 136000         | 142000         | 132000         | 138000         | 142000         | 132000         | 138000         | 142000         |    |
|                            |             |                        | Sensible Capacity (Btu/h)         | 65000                         | 61000          | 57000          | 73000          | 69000          | 66000          | 82000          | 78000          | 74000          |    |
|                            |             |                        | Electric Power (Watts)            | 9614                          | 9664           | 9734           | 9624           | 9690           | 9744           | 9630           | 9698           | 9770           |    |
|                            |             |                        | Leaving Air Temp<br>(°F db/°F wb) | 51.2 /<br>49.2                | 53.5 /<br>51.6 | 56.0 /<br>54.0 | 51.0 /<br>49.0 | 53.5 /<br>51.4 | 55.8 /<br>53.8 | 50.8 /<br>48.8 | 53.3 /<br>51.2 | 55.8 /<br>53.5 |    |
|                            | 85          | 36.00                  | Total Capacity (Btu/h)            | 127000                        | 132000         | 136000         | 128000         | 132000         | 138000         | 128000         | 132000         | 138000         |    |
|                            |             |                        | Sensible Capacity (Btu/h)         | 62500                         | 58500          | 55000          | 71000          | 67000          | 63500          | 80000          | 76000          | 72000          |    |
|                            |             |                        | Electric Power (Watts)            | 10458                         | 10520          | 10566          | 10466          | 10530          | 10598          | 10472          | 10538          | 10608          |    |
|                            |             |                        | Leaving Air Temp<br>(°F db/°F wb) | 52.6 /<br>50.5                | 55.1 /<br>52.8 | 57.3 /<br>55.3 | 52.4 /<br>50.3 | 54.8 /<br>52.6 | 57.3 /<br>55.0 | 52.2 /<br>50.1 | 54.6 /<br>52.4 | 57.1 /<br>54.8 |    |

**TABLE 9 - JROW WATER SOURCE HEAT PUMP COOLING GENERAL PERFORMANCE (CONT'D)**

| AIRFLOW<br>(CFM)             | EWT<br>(°F) | WATER<br>FLOW<br>(GPM)            |                                   | ENTERING AIR TEMPERATURE (°F) |                |                |                |                |                |                |                |                |     |    |    |
|------------------------------|-------------|-----------------------------------|-----------------------------------|-------------------------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|-----|----|----|
|                              |             |                                   |                                   | COOLING                       |                |                |                |                |                |                |                |                |     |    |    |
|                              |             |                                   |                                   | DRY BULB                      |                |                | 90             |                |                | 95             |                |                | 100 |    |    |
|                              |             |                                   |                                   | WET BULB                      |                |                | 76             | 78             | 80             | 76             | 78             | 80             | 76  | 78 | 80 |
| <b>150 (12.5 TON) CONT'D</b> |             |                                   |                                   |                               |                |                |                |                |                |                |                |                |     |    |    |
| 1920                         | 50          | 36.00                             | Total Capacity (Btu/h)            | 156000                        | 162000         | 168000         | 158000         | 162000         | 168000         | 158000         | 164000         | 168000         |     |    |    |
|                              |             |                                   | Sensible Capacity (Btu/h)         | 79000                         | 74000          | 69000          | 89000          | 84000          | 79000          | 100000         | 95000          | 91000          |     |    |    |
|                              |             |                                   | Electric Power (Watts)            | 8274                          | 8370           | 8472           | 8294           | 8394           | 8496           | 8302           | 8402           | 8500           |     |    |    |
|                              |             |                                   | Leaving Air Temp<br>(°F db/°F wb) | 53.2 /<br>51.8                | 55.7 /<br>54.1 | 58.2 /<br>56.6 | 53.2 /<br>51.6 | 55.7 /<br>53.9 | 58.2 /<br>56.4 | 53.0 /<br>51.4 | 55.4 /<br>53.7 | 57.7 /<br>56.2 |     |    |    |
|                              | 60          | 36.00                             | Total Capacity (Btu/h)            | 152000                        | 158000         | 162000         | 152000         | 158000         | 164000         | 152000         | 158000         | 164000         |     |    |    |
|                              |             |                                   | Sensible Capacity (Btu/h)         | 76000                         | 72000          | 66000          | 87000          | 82000          | 77000          | 98000          | 93000          | 89000          |     |    |    |
|                              |             |                                   | Electric Power (Watts)            | 8776                          | 8862           | 8952           | 8798           | 8886           | 8976           | 8804           | 8894           | 8978           |     |    |    |
|                              |             |                                   | Leaving Air Temp<br>(°F db/°F wb) | 54.2 /<br>52.7                | 56.6 /<br>55.1 | 59.1 /<br>57.5 | 54.2 /<br>52.5 | 56.7 /<br>54.9 | 59.2 /<br>57.3 | 54.0 /<br>52.4 | 56.4 /<br>54.7 | 58.7 /<br>57.2 |     |    |    |
|                              | 75          | 36.00                             | Total Capacity (Btu/h)            | 144000                        | 148000         | 154000         | 144000         | 150000         | 154000         | 144000         | 150000         | 154000         |     |    |    |
|                              |             |                                   | Sensible Capacity (Btu/h)         | 73000                         | 68000          | 63500          | 84000          | 79000          | 74000          | 95000          | 90000          | 85000          |     |    |    |
|                              |             |                                   | Electric Power (Watts)            | 9786                          | 9858           | 9922           | 9796           | 9872           | 9950           | 9798           | 9878           | 9954           |     |    |    |
|                              |             |                                   | Leaving Air Temp<br>(°F db/°F wb) | 56 /<br>54.2                  | 58.4 /<br>56.6 | 60.6 /<br>59.0 | 55.8 /<br>54.0 | 58.3 /<br>56.4 | 60.7 /<br>58.8 | 55.6 /<br>53.9 | 58.0 /<br>56.3 | 60.4 /<br>58.6 |     |    |    |
| 85                           | 36.00       | Total Capacity (Btu/h)            | 138000                            | 144000                        | 148000         | 140000         | 144000         | 148000         | 140000         | 144000         | 148000         |                |     |    |    |
|                              |             | Sensible Capacity (Btu/h)         | 70000                             | 65000                         | 60500          | 81000          | 76000          | 71000          | 92000          | 87000          | 83000          |                |     |    |    |
|                              |             | Electric Power (Watts)            | 10616                             | 10684                         | 10754          | 10626          | 10698          | 10770          | 10626          | 10702          | 10772          |                |     |    |    |
|                              |             | Leaving Air Temp<br>(°F db/°F wb) | 57.1 /<br>55.3                    | 59.5 /<br>57.7                | 61.9 /<br>60.0 | 56.9 /<br>55.1 | 59.4 /<br>57.5 | 61.8 /<br>59.8 | 56.7 /<br>55.0 | 59.1 /<br>57.3 | 61.4 /<br>59.7 |                |     |    |    |
| 2400                         | 50          | 36.00                             | Total Capacity (Btu/h)            | 168000                        | 174000         | 178000         | 168000         | 174000         | 180000         | 168000         | 174000         | 180000         |     |    |    |
|                              |             |                                   | Sensible Capacity (Btu/h)         | 87000                         | 81000          | 74000          | 101000         | 94000          | 88000          | 114000         | 108000         | 102000         |     |    |    |
|                              |             |                                   | Electric Power (Watts)            | 8488                          | 8592           | 8702           | 8492           | 8610           | 8720           | 8510           | 8618           | 8736           |     |    |    |
|                              |             |                                   | Leaving Air Temp<br>(°F db/°F wb) | 57.5 /<br>56.1                | 59.9 /<br>58.4 | 62.4 /<br>60.8 | 57.2 /<br>55.9 | 59.8 /<br>58.3 | 62.2 /<br>60.7 | 57.3 /<br>55.8 | 59.7 /<br>58.1 | 62 /<br>60.5   |     |    |    |
|                              | 60          | 36.00                             | Total Capacity (Btu/h)            | 162000                        | 168000         | 172000         | 162000         | 168000         | 174000         | 164000         | 168000         | 174000         |     |    |    |
|                              |             |                                   | Sensible Capacity (Btu/h)         | 85000                         | 78000          | 72000          | 99000          | 92000          | 86000          | 112000         | 106000         | 100000         |     |    |    |
|                              |             |                                   | Electric Power (Watts)            | 8964                          | 9056           | 9154           | 8966           | 9072           | 9170           | 8982           | 9082           | 9186           |     |    |    |
|                              |             |                                   | Leaving Air Temp<br>(°F db/°F wb) | 58.4 /<br>56.9                | 60.8 /<br>59.2 | 63.2 /<br>61.6 | 58.0 /<br>56.8 | 60.6 /<br>59.1 | 63.0 /<br>61.4 | 58.1 /<br>56.6 | 60.5 /<br>58.9 | 62.9 /<br>61.3 |     |    |    |
|                              | 75          | 36.00                             | Total Capacity (Btu/h)            | 154000                        | 158000         | 164000         | 154000         | 160000         | 164000         | 154000         | 160000         | 164000         |     |    |    |
|                              |             |                                   | Sensible Capacity (Btu/h)         | 81000                         | 75000          | 69000          | 95000          | 89000          | 82000          | 106000         | 102000         | 96000          |     |    |    |
|                              |             |                                   | Electric Power (Watts)            | 9930                          | 10008          | 10092          | 9926           | 10024          | 10108          | 9946           | 10032          | 10122          |     |    |    |
|                              |             |                                   | Leaving Air Temp<br>(°F db/°F wb) | 59.7 /<br>58.2                | 62.1 /<br>60.5 | 64.4 /<br>62.8 | 59.3 /<br>58.0 | 61.9 /<br>60.3 | 64.3 /<br>62.7 | 60.0 /<br>57.9 | 61.8 /<br>60.2 | 64.1 /<br>62.5 |     |    |    |
| 85                           | 36.00       | Total Capacity (Btu/h)            | 148000                            | 152000                        | 156000         | 148000         | 152000         | 158000         | 148000         | 152000         | 158000         |                |     |    |    |
|                              |             | Sensible Capacity (Btu/h)         | 79000                             | 73000                         | 66000          | 92000          | 86000          | 80000          | 104000         | 100000         | 94000          |                |     |    |    |
|                              |             | Electric Power (Watts)            | 10746                             | 10818                         | 10896          | 10758          | 10834          | 10912          | 10760          | 10842          | 10924          |                |     |    |    |
|                              |             | Leaving Air Temp<br>(°F db/°F wb) | 60.6 /<br>59.0                    | 63.0 /<br>61.4                | 65.3 /<br>63.7 | 60.5 /<br>58.9 | 62.8 /<br>61.2 | 65.2 /<br>63.5 | 61.0 /<br>58.8 | 62.7 /<br>61.1 | 65.0 /<br>63.4 |                |     |    |    |

# Performance Data (Cont'd)

**TABLE 9 - JROW WATER SOURCE HEAT PUMP COOLING GENERAL PERFORMANCE (CONT'D)**

| AIRFLOW<br>(CFM)    | EWT<br>(°F) | WATER<br>FLOW<br>(GPM) |                                   | ENTERING AIR TEMPERATURE (°F) |                |                |                |                |                |                |                |                |     |    |    |
|---------------------|-------------|------------------------|-----------------------------------|-------------------------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|-----|----|----|
|                     |             |                        |                                   | COOLING                       |                |                |                |                |                |                |                |                |     |    |    |
|                     |             |                        |                                   | DRY BULB                      |                |                | 90             |                |                | 95             |                |                | 100 |    |    |
|                     |             |                        |                                   | WET BULB                      |                |                | 76             | 78             | 80             | 76             | 78             | 80             | 76  | 78 | 80 |
| <b>180 (15 TON)</b> |             |                        |                                   |                               |                |                |                |                |                |                |                |                |     |    |    |
| 1875                | 50          | 45.00                  | Total Capacity (Btu/h)            | 170000                        | 176000         | 182000         | 170000         | 176000         | 182000         | 170000         | 178000         | 184000         |     |    |    |
|                     |             |                        | Sensible Capacity (Btu/h)         | 84000                         | 79000          | 74000          | 94000          | 89000          | 85000          | 105000         | 100000         | 95000          |     |    |    |
|                     |             |                        | Electric Power (Watts)            | 9394                          | 9496           | 9606           | 9424           | 9526           | 9620           | 9432           | 9538           | 9648           |     |    |    |
|                     |             |                        | Leaving Air Temp<br>(°F db/°F wb) | 49.9 /<br>48.2                | 52.4 /<br>50.6 | 54.9 /<br>53.0 | 49.9 /<br>48.0 | 52.3 /<br>50.3 | 54.7 /<br>52.8 | 49.7 /<br>47.8 | 52.1 /<br>50.1 | 54.6 /<br>52.5 |     |    |    |
|                     | 60          | 45.00                  | Total Capacity (Btu/h)            | 164000                        | 170000         | 176000         | 166000         | 172000         | 178000         | 166000         | 172000         | 178000         |     |    |    |
|                     |             |                        | Sensible Capacity (Btu/h)         | 81000                         | 77000          | 72000          | 92000          | 87000          | 82000          | 102000         | 98000          | 93000          |     |    |    |
|                     |             |                        | Electric Power (Watts)            | 9974                          | 10066          | 10162          | 10014          | 10102          | 10176          | 10022          | 10112          | 10210          |     |    |    |
|                     |             |                        | Leaving Air Temp<br>(°F db/°F wb) | 51.0 /<br>49.3                | 53.5 /<br>51.7 | 56.0 /<br>54.1 | 51 /<br>49.1   | 53.4 /<br>51.4 | 55.7 /<br>53.9 | 50.8 /<br>48.9 | 53.2 /<br>51.3 | 55.7 /<br>53.6 |     |    |    |
|                     | 75          | 45.00                  | Total Capacity (Btu/h)            | 156000                        | 162000         | 168000         | 158000         | 162000         | 168000         | 158000         | 164000         | 170000         |     |    |    |
|                     |             |                        | Sensible Capacity (Btu/h)         | 77000                         | 73000          | 68000          | 88000          | 83000          | 78000          | 98000          | 94000          | 89000          |     |    |    |
|                     |             |                        | Electric Power (Watts)            | 11182                         | 11230          | 11308          | 11190          | 11264          | 11372          | 11194          | 11272          | 11352          |     |    |    |
|                     |             |                        | Leaving Air Temp<br>(°F db/°F wb) | 53.0 /<br>51.0                | 55.2 /<br>53.4 | 57.6 /<br>55.8 | 52.8 /<br>50.8 | 55.3 /<br>53.2 | 57.9 /<br>55.6 | 52.6 /<br>50.6 | 55.1 /<br>53.0 | 57.5 /<br>55.4 |     |    |    |
|                     | 85          | 45.00                  | Total Capacity (Btu/h)            | 150000                        | 156000         | 162000         | 152000         | 156000         | 162000         | 152000         | 158000         | 162000         |     |    |    |
|                     |             |                        | Sensible Capacity (Btu/h)         | 74000                         | 71000          | 66000          | 86000          | 80000          | 77000          | 97000          | 91000          | 86000          |     |    |    |
|                     |             |                        | Electric Power (Watts)            | 12292                         | 12148          | 12218          | 12082          | 12240          | 12226          | 12094          | 12246          | 12320          |     |    |    |
|                     |             |                        | Leaving Air Temp<br>(°F db/°F wb) | 54.7 /<br>52.3                | 56.2 /<br>54.6 | 58.7 /<br>57.0 | 53.7 /<br>52.1 | 56.5 /<br>54.4 | 58.4 /<br>56.8 | 53.5 /<br>51.9 | 56.3 /<br>54.2 | 58.8 /<br>56.6 |     |    |    |
| 2400                | 50          | 45.00                  | Total Capacity (Btu/h)            | 186000                        | 192000         | 198000         | 186000         | 192000         | 198000         | 186000         | 192000         | 200000         |     |    |    |
|                     |             |                        | Sensible Capacity (Btu/h)         | 94000                         | 88000          | 81000          | 107000         | 101000         | 94000          | 121000         | 115000         | 108000         |     |    |    |
|                     |             |                        | Electric Power (Watts)            | 9666                          | 9780           | 9904           | 9700           | 9816           | 9936           | 9702           | 9824           | 9956           |     |    |    |
|                     |             |                        | Leaving Air Temp<br>(°F db/°F wb) | 54.9 /<br>53.4                | 57.3 /<br>55.9 | 59.7 /<br>58.2 | 55.0 /<br>53.2 | 57.4 /<br>55.6 | 59.8 /<br>58.0 | 54.7 /<br>53.1 | 57.0 /<br>55.5 | 59.7 /<br>57.8 |     |    |    |
|                     | 60          | 45.00                  | Total Capacity (Btu/h)            | 180000                        | 186000         | 192000         | 180000         | 186000         | 192000         | 180000         | 186000         | 194000         |     |    |    |
|                     |             |                        | Sensible Capacity (Btu/h)         | 91000                         | 85000          | 79000          | 104000         | 98000          | 92000          | 118000         | 112000         | 106000         |     |    |    |
|                     |             |                        | Electric Power (Watts)            | 10232                         | 10308          | 10416          | 10248          | 10348          | 10452          | 10246          | 10354          | 10472          |     |    |    |
|                     |             |                        | Leaving Air Temp<br>(°F db/°F wb) | 56.1 /<br>54.3                | 58.2 /<br>56.8 | 60.6 /<br>59.1 | 55.9 /<br>54.1 | 58.3 /<br>56.5 | 60.8 /<br>58.9 | 55.6 /<br>54.0 | 58.0 /<br>56.4 | 60.6 /<br>58.7 |     |    |    |
|                     | 75          | 45.00                  | Total Capacity (Btu/h)            | 170000                        | 176000         | 182000         | 170000         | 176000         | 182000         | 170000         | 176000         | 182000         |     |    |    |
|                     |             |                        | Sensible Capacity (Btu/h)         | 88000                         | 82000          | 75000          | 101000         | 94000          | 88000          | 114000         | 108000         | 102000         |     |    |    |
|                     |             |                        | Electric Power (Watts)            | 11282                         | 11398          | 11490          | 11368          | 11464          | 11544          | 11372          | 11458          | 11538          |     |    |    |
|                     |             |                        | Leaving Air Temp<br>(°F db/°F wb) | 56.9 /<br>55.8                | 59.6 /<br>58.2 | 62.0 /<br>60.5 | 57.3 /<br>55.6 | 59.9 /<br>57.9 | 62.2 /<br>60.3 | 57.2 /<br>55.5 | 59.5 /<br>57.8 | 61.8 /<br>60.2 |     |    |    |
|                     | 85          | 45.00                  | Total Capacity (Btu/h)            | 162000                        | 168000         | 174000         | 164000         | 168000         | 174000         | 164000         | 170000         | 176000         |     |    |    |
|                     |             |                        | Sensible Capacity (Btu/h)         | 86000                         | 80000          | 74000          | 98000          | 93000          | 87000          | 111000         | 105000         | 99000          |     |    |    |
|                     |             |                        | Electric Power (Watts)            | 12234                         | 12306          | 12386          | 12330          | 12316          | 12396          | 12330          | 12408          | 12496          |     |    |    |
|                     |             |                        | Leaving Air Temp<br>(°F db/°F wb) | 58 /<br>56.8                  | 60.3 /<br>59.2 | 62.6 /<br>61.5 | 58.4 /<br>56.6 | 60.1 /<br>59.0 | 62.4 /<br>61.3 | 58.3 /<br>56.5 | 60.5 /<br>58.8 | 63.0 /<br>61.1 |     |    |    |



**TABLE 9 - JROW WATER SOURCE HEAT PUMP COOLING GENERAL PERFORMANCE (CONT'D)**

| AIRFLOW<br>(CFM)           | EWT<br>(°F) | WATER<br>FLOW<br>(GPM) |                                   | ENTERING AIR TEMPERATURE (°F) |                |                |                |                |                |                |                |                |     |    |    |
|----------------------------|-------------|------------------------|-----------------------------------|-------------------------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|-----|----|----|
|                            |             |                        |                                   | COOLING                       |                |                |                |                |                |                |                |                |     |    |    |
|                            |             |                        |                                   | DRY BULB                      |                |                | 90             |                |                | 95             |                |                | 100 |    |    |
|                            |             |                        |                                   | WET BULB                      |                |                | 76             | 78             | 80             | 76             | 78             | 80             | 76  | 78 | 80 |
| <b>180 (15 TON) CONT'D</b> |             |                        |                                   |                               |                |                |                |                |                |                |                |                |     |    |    |
| 3000                       | 50          | 45.00                  | Total Capacity (Btu/h)            | 198000                        | 204000         | 210000         | 198000         | 204000         | 212000         | 198000         | 206000         | 212000         |     |    |    |
|                            |             |                        | Sensible Capacity (Btu/h)         | 104000                        | 96000          | 88000          | 121000         | 113000         | 106000         | 134000         | 130000         | 123000         |     |    |    |
|                            |             |                        | Electric Power (Watts)            | 9910                          | 10032          | 10164          | 9928           | 10056          | 10188          | 9940           | 10070          | 10206          |     |    |    |
|                            |             |                        | Leaving Air Temp<br>(°F db/°F wb) | 58.9 /<br>57.5                | 61.3 /<br>59.9 | 63.7 /<br>62.2 | 58.8 /<br>57.3 | 61.2 /<br>59.7 | 63.6 /<br>62.1 | 59.4 /<br>57.2 | 61.0 /<br>59.5 | 63.4 /<br>61.9 |     |    |    |
|                            | 60          | 45.00                  | Total Capacity (Btu/h)            | 190000                        | 196000         | 204000         | 192000         | 198000         | 204000         | 192000         | 198000         | 204000         |     |    |    |
|                            |             |                        | Sensible Capacity (Btu/h)         | 101000                        | 94000          | 86000          | 118000         | 111000         | 103000         | 132000         | 125000         | 120000         |     |    |    |
|                            |             |                        | Electric Power (Watts)            | 10422                         | 10528          | 10642          | 10438          | 10548          | 10664          | 10446          | 10562          | 10682          |     |    |    |
|                            |             |                        | Leaving Air Temp<br>(°F db/°F wb) | 59.7 /<br>58.3                | 62.1 /<br>60.6 | 64.5 /<br>63.0 | 59.6 /<br>58.1 | 61.9 /<br>60.4 | 64.3 /<br>62.8 | 60.3 /<br>58.0 | 62.4 /<br>60.3 | 64.2 /<br>62.6 |     |    |    |
|                            | 75          | 45.00                  | Total Capacity (Btu/h)            | 180000                        | 186000         | 192000         | 180000         | 186000         | 192000         | 182000         | 188000         | 194000         |     |    |    |
|                            |             |                        | Sensible Capacity (Btu/h)         | 97000                         | 89000          | 82000          | 114000         | 107000         | 99000          | 128000         | 121000         | 116000         |     |    |    |
|                            |             |                        | Electric Power (Watts)            | 11508                         | 11592          | 11690          | 11520          | 11612          | 11704          | 11526          | 11622          | 11720          |     |    |    |
|                            |             |                        | Leaving Air Temp<br>(°F db/°F wb) | 61.0 /<br>59.5                | 63.3 /<br>61.8 | 65.7 /<br>64.1 | 60.8 /<br>59.3 | 63.2 /<br>61.6 | 65.5 /<br>63.9 | 61.6 /<br>59.2 | 63.7 /<br>61.5 | 65.4 /<br>63.8 |     |    |    |
|                            | 85          | 45.00                  | Total Capacity (Btu/h)            | 172000                        | 178000         | 184000         | 174000         | 178000         | 184000         | 174000         | 180000         | 186000         |     |    |    |
|                            |             |                        | Sensible Capacity (Btu/h)         | 96000                         | 87000          | 79000          | 111000         | 104000         | 96000          | 125000         | 119000         | 113000         |     |    |    |
|                            |             |                        | Electric Power (Watts)            | 12360                         | 12524          | 12614          | 12462          | 12542          | 12624          | 12458          | 12556          | 12638          |     |    |    |
|                            |             |                        | Leaving Air Temp<br>(°F db/°F wb) | 61.1 /<br>60.3                | 64.2 /<br>62.6 | 66.6 /<br>64.9 | 61.7 /<br>60.1 | 64.0 /<br>62.4 | 66.4 /<br>64.7 | 62.5 /<br>60.0 | 64.4 /<br>62.2 | 66.2 /<br>64.6 |     |    |    |
| <b>210 (17.5 TON)</b>      |             |                        |                                   |                               |                |                |                |                |                |                |                |                |     |    |    |
| 2187.5                     | 50          | 52.50                  | Total Capacity (Btu/h)            | 204000                        | 210000         | 218000         | 204000         | 212000         | 218000         | 204000         | 212000         | 220000         |     |    |    |
|                            |             |                        | Sensible Capacity (Btu/h)         | 100000                        | 94000          | 89000          | 112000         | 107000         | 101000         | 124000         | 119000         | 113000         |     |    |    |
|                            |             |                        | Electric Power (Watts)            | 11000                         | 11038          | 11092          | 11010          | 11064          | 11102          | 11018          | 11072          | 11128          |     |    |    |
|                            |             |                        | Leaving Air Temp<br>(°F db/°F wb) | 49.1 /<br>47.2                | 51.5 /<br>49.6 | 53.9 /<br>52.0 | 48.9 /<br>47.0 | 51.3 /<br>49.3 | 53.6 /<br>51.8 | 48.7 /<br>46.8 | 51.1 /<br>49.1 | 53.6 /<br>51.5 |     |    |    |
|                            | 60          | 52.50                  | Total Capacity (Btu/h)            | 198000                        | 204000         | 212000         | 198000         | 206000         | 212000         | 198000         | 206000         | 214000         |     |    |    |
|                            |             |                        | Sensible Capacity (Btu/h)         | 97000                         | 91000          | 86000          | 109000         | 104000         | 98000          | 122000         | 116000         | 110000         |     |    |    |
|                            |             |                        | Electric Power (Watts)            | 11928                         | 11960          | 12014          | 11938          | 11988          | 12022          | 11944          | 11996          | 12050          |     |    |    |
|                            |             |                        | Leaving Air Temp<br>(°F db/°F wb) | 50.3 /<br>48.4                | 52.6 /<br>50.8 | 55.1 /<br>53.1 | 50.1 /<br>48.1 | 52.5 /<br>50.5 | 54.8 /<br>52.9 | 49.9 /<br>47.9 | 52.3 /<br>50.2 | 54.8 /<br>52.7 |     |    |    |
|                            | 75          | 52.50                  | Total Capacity (Btu/h)            | 188000                        | 194000         | 202000         | 188000         | 196000         | 202000         | 188000         | 196000         | 202000         |     |    |    |
|                            |             |                        | Sensible Capacity (Btu/h)         | 92000                         | 87000          | 81000          | 105000         | 99000          | 94000          | 117000         | 112000         | 106000         |     |    |    |
|                            |             |                        | Electric Power (Watts)            | 13508                         | 13532          | 13580          | 13518          | 13564          | 13588          | 13524          | 13572          | 13622          |     |    |    |
|                            |             |                        | Leaving Air Temp<br>(°F db/°F wb) | 52.2 /<br>50.1                | 54.4 /<br>52.5 | 56.8 /<br>54.9 | 52.0 /<br>49.9 | 54.3 /<br>52.3 | 56.6 /<br>54.7 | 51.8 /<br>49.7 | 54.1 /<br>52.0 | 56.6 /<br>54.4 |     |    |    |
|                            | 85          | 52.50                  | Total Capacity (Btu/h)            | 180000                        | 188000         | 194000         | 182000         | 188000         | 194000         | 182000         | 188000         | 196000         |     |    |    |
|                            |             |                        | Sensible Capacity (Btu/h)         | 89000                         | 83000          | 78000          | 102000         | 96000          | 90000          | 114000         | 108000         | 103000         |     |    |    |
|                            |             |                        | Electric Power (Watts)            | 14726                         | 14770          | 14786          | 14734          | 14780          | 14820          | 14740          | 14786          | 14834          |     |    |    |
|                            |             |                        | Leaving Air Temp<br>(°F db/°F wb) | 53.5 /<br>51.4                | 55.9 /<br>53.7 | 58.0 /<br>56.1 | 53.2 /<br>51.2 | 55.7 /<br>53.5 | 58.0 /<br>55.9 | 53.0 /<br>51.0 | 55.4 /<br>53.3 | 57.9 /<br>55.7 |     |    |    |

# Performance Data (Cont'd)

**TABLE 9 - JROW WATER SOURCE HEAT PUMP COOLING GENERAL PERFORMANCE (CONT'D)**

| AIRFLOW<br>(CFM)             | EWT<br>(°F) | WATER<br>FLOW<br>(GPM)            |                                   | ENTERING AIR TEMPERATURE (°F) |                |                |                |                |                |                |                |                |     |    |    |
|------------------------------|-------------|-----------------------------------|-----------------------------------|-------------------------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|-----|----|----|
|                              |             |                                   |                                   | COOLING                       |                |                |                |                |                |                |                |                |     |    |    |
|                              |             |                                   |                                   | DRY BULB                      |                |                | 90             |                |                | 95             |                |                | 100 |    |    |
|                              |             |                                   |                                   | WET BULB                      |                |                | 76             | 78             | 80             | 76             | 78             | 80             | 76  | 78 | 80 |
| <b>210 (17.5 TON) CONT'D</b> |             |                                   |                                   |                               |                |                |                |                |                |                |                |                |     |    |    |
| 2800                         | 50          | 52.50                             | Total Capacity (Btu/h)            | 222000                        | 230000         | 238000         | 224000         | 232000         | 240000         | 224000         | 232000         | 240000         |     |    |    |
|                              |             |                                   | Sensible Capacity (Btu/h)         | 112000                        | 105000         | 98000          | 128000         | 121000         | 113000         | 144000         | 136000         | 129000         |     |    |    |
|                              |             |                                   | Electric Power (Watts)            | 11128                         | 11182          | 11242          | 11154          | 11208          | 11264          | 11160          | 11218          | 11278          |     |    |    |
|                              |             |                                   | Leaving Air Temp<br>(°F db/°F wb) | 54.0 /<br>52.5                | 56.4 /<br>54.9 | 58.9 /<br>57.3 | 54.0 /<br>52.3 | 56.4 /<br>54.7 | 58.8 /<br>57.1 | 53.8 /<br>52.2 | 56.2 /<br>54.5 | 58.7 /<br>56.9 |     |    |    |
|                              | 60          | 52.50                             | Total Capacity (Btu/h)            | 216000                        | 224000         | 230000         | 216000         | 224000         | 232000         | 218000         | 226000         | 232000         |     |    |    |
|                              |             |                                   | Sensible Capacity (Btu/h)         | 109000                        | 102000         | 95000          | 125000         | 118000         | 110000         | 140000         | 134000         | 126000         |     |    |    |
|                              |             |                                   | Electric Power (Watts)            | 12056                         | 12094          | 12148          | 12070          | 12122          | 12174          | 12074          | 12130          | 12188          |     |    |    |
|                              |             |                                   | Leaving Air Temp<br>(°F db/°F wb) | 55.1 /<br>53.5                | 57.4 /<br>55.9 | 59.8 /<br>58.2 | 55.0 /<br>53.3 | 57.3 /<br>55.6 | 59.8 /<br>58.0 | 54.8 /<br>53.1 | 57.2 /<br>55.5 | 59.6 /<br>57.8 |     |    |    |
|                              | 75          | 52.50                             | Total Capacity (Btu/h)            | 204000                        | 212000         | 218000         | 206000         | 212000         | 220000         | 206000         | 214000         | 220000         |     |    |    |
|                              |             |                                   | Sensible Capacity (Btu/h)         | 104000                        | 97000          | 90000          | 120000         | 113000         | 106000         | 136000         | 129000         | 122000         |     |    |    |
|                              |             |                                   | Electric Power (Watts)            | 13624                         | 13670          | 13718          | 13634          | 13684          | 13732          | 13636          | 13690          | 13732          |     |    |    |
|                              |             |                                   | Leaving Air Temp<br>(°F db/°F wb) | 56.7 /<br>55.0                | 59.1 /<br>57.3 | 61.5 /<br>59.7 | 56.5 /<br>54.8 | 58.9 /<br>57.1 | 61.3 /<br>59.5 | 56.3 /<br>54.6 | 58.7 /<br>56.9 | 61.0 /<br>59.3 |     |    |    |
| 85                           | 52.50       | Total Capacity (Btu/h)            | 196000                            | 204000                        | 210000         | 198000         | 204000         | 212000         | 198000         | 204000         | 212000         |                |     |    |    |
|                              |             | Sensible Capacity (Btu/h)         | 100000                            | 93000                         | 86000          | 116000         | 109000         | 102000         | 132000         | 125000         | 119000         |                |     |    |    |
|                              |             | Electric Power (Watts)            | 14832                             | 14874                         | 14920          | 14842          | 14890          | 14934          | 14842          | 14896          | 14930          |                |     |    |    |
|                              |             | Leaving Air Temp<br>(°F db/°F wb) | 57.8 /<br>56.0                    | 60.2 /<br>58.3                | 62.5 /<br>60.7 | 57.6 /<br>55.8 | 60.0 /<br>58.1 | 62.4 /<br>60.5 | 57.4 /<br>55.7 | 59.8 /<br>58.0 | 62.0 /<br>60.3 |                |     |    |    |
| 3500                         | 50          | 52.50                             | Total Capacity (Btu/h)            | 238000                        | 246000         | 254000         | 240000         | 248000         | 256000         | 240000         | 248000         | 256000         |     |    |    |
|                              |             |                                   | Sensible Capacity (Btu/h)         | 124000                        | 115000         | 106000         | 144000         | 136000         | 126000         | 162000         | 156000         | 146000         |     |    |    |
|                              |             |                                   | Electric Power (Watts)            | 11258                         | 11314          | 11370          | 11260          | 11328          | 11384          | 11270          | 11324          | 11394          |     |    |    |
|                              |             |                                   | Leaving Air Temp<br>(°F db/°F wb) | 58.1 /<br>56.7                | 60.5 /<br>59.0 | 62.9 /<br>61.4 | 57.8 /<br>56.5 | 60.3 /<br>58.8 | 62.7 /<br>61.2 | 58.5 /<br>56.4 | 60.0 /<br>58.7 | 62.5 /<br>61.0 |     |    |    |
|                              | 60          | 52.50                             | Total Capacity (Btu/h)            | 230000                        | 238000         | 246000         | 232000         | 240000         | 248000         | 232000         | 240000         | 248000         |     |    |    |
|                              |             |                                   | Sensible Capacity (Btu/h)         | 121000                        | 112000         | 103000         | 142000         | 132000         | 123000         | 158000         | 150000         | 144000         |     |    |    |
|                              |             |                                   | Electric Power (Watts)            | 12164                         | 12216          | 12270          | 12164          | 12228          | 12282          | 12174          | 12224          | 12294          |     |    |    |
|                              |             |                                   | Leaving Air Temp<br>(°F db/°F wb) | 58.9 /<br>57.5                | 61.3 /<br>59.8 | 63.7 /<br>62.1 | 58.6 /<br>57.3 | 61.1 /<br>59.6 | 63.5 /<br>62.0 | 59.4 /<br>57.2 | 61.4 /<br>59.5 | 63.3 /<br>61.8 |     |    |    |
|                              | 75          | 52.50                             | Total Capacity (Btu/h)            | 218000                        | 226000         | 232000         | 218000         | 226000         | 234000         | 220000         | 226000         | 234000         |     |    |    |
|                              |             |                                   | Sensible Capacity (Btu/h)         | 116000                        | 107000         | 98000          | 138000         | 127000         | 118000         | 152000         | 144000         | 138000         |     |    |    |
|                              |             |                                   | Electric Power (Watts)            | 13718                         | 13764          | 13814          | 13702          | 13776          | 13826          | 13724          | 13786          | 13838          |     |    |    |
|                              |             |                                   | Leaving Air Temp<br>(°F db/°F wb) | 60.2 /<br>58.7                | 62.6 /<br>61.0 | 64.9 /<br>63.4 | 59.8 /<br>58.6 | 62.4 /<br>60.8 | 64.8 /<br>63.2 | 60.7 /<br>58.5 | 63.0 /<br>60.7 | 64.6 /<br>63   |     |    |    |
| 85                           | 52.50       | Total Capacity (Btu/h)            | 208000                            | 216000                        | 222000         | 210000         | 216000         | 224000         | 210000         | 218000         | 224000         |                |     |    |    |
|                              |             | Sensible Capacity (Btu/h)         | 113000                            | 104000                        | 95000          | 132000         | 124000         | 115000         | 148000         | 142000         | 134000         |                |     |    |    |
|                              |             | Electric Power (Watts)            | 14902                             | 14962                         | 15008          | 14926          | 14974          | 15020          | 14924          | 14964          | 15032          |                |     |    |    |
|                              |             | Leaving Air Temp<br>(°F db/°F wb) | 60.9 /<br>59.6                    | 63.5 /<br>61.9                | 65.8 /<br>64.2 | 61.0 /<br>59.4 | 63.3 /<br>61.7 | 65.6 /<br>64.0 | 61.7 /<br>59.3 | 63.8 /<br>61.6 | 65.5 /<br>63.9 |                |     |    |    |

**TABLE 9 - JROW WATER SOURCE HEAT PUMP COOLING GENERAL PERFORMANCE (CONT'D)**

| AIRFLOW<br>(CFM)    | EWT<br>(°F) | WATER<br>FLOW<br>(GPM)            |                                   | ENTERING AIR TEMPERATURE (°F) |                |                |                |                |                |                |                |                |     |    |    |
|---------------------|-------------|-----------------------------------|-----------------------------------|-------------------------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|-----|----|----|
|                     |             |                                   |                                   | COOLING                       |                |                |                |                |                |                |                |                |     |    |    |
|                     |             |                                   |                                   | DRY BULB                      |                |                | 90             |                |                | 95             |                |                | 100 |    |    |
|                     |             |                                   |                                   | WET BULB                      |                |                | 76             | 78             | 80             | 76             | 78             | 80             | 76  | 78 | 80 |
| <b>240 (20 TON)</b> |             |                                   |                                   |                               |                |                |                |                |                |                |                |                |     |    |    |
| 2500                | 50          | 60.00                             | Total Capacity (Btu/h)            | 230000                        | 238000         | 246000         | 232000         | 240000         | 248000         | 232000         | 240000         | 248000         |     |    |    |
|                     |             |                                   | Sensible Capacity (Btu/h)         | 113000                        | 107000         | 100000         | 127000         | 121000         | 115000         | 142000         | 134000         | 129000         |     |    |    |
|                     |             |                                   | Electric Power (Watts)            | 12176                         | 12218          | 12296          | 12190          | 12260          | 12308          | 12198          | 12272          | 12352          |     |    |    |
|                     |             |                                   | Leaving Air Temp<br>(°F db/°F wb) | 49.5 /<br>47.5                | 51.8 /<br>50.0 | 54.3 /<br>52.4 | 49.2 /<br>47.3 | 51.7 /<br>49.7 | 54.0 /<br>52.2 | 49.1 /<br>47.1 | 51.5 /<br>49.5 | 53.9 /<br>51.9 |     |    |    |
|                     | 60          | 60.00                             | Total Capacity (Btu/h)            | 224000                        | 232000         | 240000         | 224000         | 232000         | 240000         | 224000         | 234000         | 242000         |     |    |    |
|                     |             |                                   | Sensible Capacity (Btu/h)         | 110000                        | 104000         | 97000          | 124000         | 117000         | 111000         | 138000         | 132000         | 125000         |     |    |    |
|                     |             |                                   | Electric Power (Watts)            | 13344                         | 13378          | 13452          | 13356          | 13424          | 13466          | 13366          | 13436          | 13512          |     |    |    |
|                     |             |                                   | Leaving Air Temp<br>(°F db/°F wb) | 50.6 /<br>48.7                | 52.9 /<br>51.1 | 55.4 /<br>53.5 | 50.4 /<br>48.5 | 52.9 /<br>50.8 | 55.1 /<br>53.3 | 50.2 /<br>48.3 | 52.7 /<br>50.6 | 55.1 /<br>53.0 |     |    |    |
|                     | 75          | 60.00                             | Total Capacity (Btu/h)            | 212000                        | 220000         | 228000         | 214000         | 220000         | 228000         | 214000         | 222000         | 230000         |     |    |    |
|                     |             |                                   | Sensible Capacity (Btu/h)         | 104000                        | 98000          | 92000          | 119000         | 112000         | 106000         | 132000         | 127000         | 120000         |     |    |    |
|                     |             |                                   | Electric Power (Watts)            | 15278                         | 15336          | 15364          | 15290          | 15350          | 15414          | 15296          | 15360          | 15430          |     |    |    |
|                     |             |                                   | Leaving Air Temp<br>(°F db/°F wb) | 52.5 /<br>50.4                | 55.0 /<br>52.8 | 57.1 /<br>55.3 | 52.3 /<br>50.2 | 54.7 /<br>52.6 | 57.2 /<br>55.0 | 52.1 /<br>50.0 | 54.5 /<br>52.4 | 56.9 /<br>54.8 |     |    |    |
| 85                  | 60.00       | Total Capacity (Btu/h)            | 204000                            | 212000                        | 218000         | 206000         | 212000         | 220000         | 206000         | 214000         | 222000         |                |     |    |    |
|                     |             | Sensible Capacity (Btu/h)         | 101000                            | 94000                         | 89000          | 115000         | 109000         | 102000         | 129000         | 123000         | 117000         |                |     |    |    |
|                     |             | Electric Power (Watts)            | 16752                             | 16804                         | 16808          | 16760          | 16816          | 16876          | 16764          | 16824          | 16886          |                |     |    |    |
|                     |             | Leaving Air Temp<br>(°F db/°F wb) | 53.8 /<br>51.7                    | 56.3 /<br>54.0                | 58.3 /<br>56.5 | 53.6 /<br>51.5 | 56.0 /<br>53.8 | 58.5 /<br>56.2 | 53.3 /<br>51.3 | 55.8 /<br>53.6 | 58.2 /<br>56.0 |                |     |    |    |
| 3200                | 50          | 60.00                             | Total Capacity (Btu/h)            | 252000                        | 260000         | 268000         | 254000         | 262000         | 270000         | 254000         | 262000         | 272000         |     |    |    |
|                     |             |                                   | Sensible Capacity (Btu/h)         | 126000                        | 118000         | 110000         | 144000         | 136000         | 128000         | 162000         | 154000         | 146000         |     |    |    |
|                     |             |                                   | Electric Power (Watts)            | 12374                         | 12458          | 12554          | 12390          | 12480          | 12574          | 12398          | 12492          | 12598          |     |    |    |
|                     |             |                                   | Leaving Air Temp<br>(°F db/°F wb) | 54.6 /<br>52.9                | 57.0 /<br>55.3 | 59.5 /<br>57.7 | 54.3 /<br>52.7 | 56.8 /<br>55.1 | 59.3 /<br>57.5 | 54.2 /<br>52.5 | 56.5 /<br>54.9 | 59.1 /<br>57.3 |     |    |    |
|                     | 60          | 60.00                             | Total Capacity (Btu/h)            | 244000                        | 252000         | 260000         | 246000         | 254000         | 262000         | 246000         | 254000         | 262000         |     |    |    |
|                     |             |                                   | Sensible Capacity (Btu/h)         | 123000                        | 114000         | 106000         | 142000         | 132000         | 125000         | 160000         | 152000         | 144000         |     |    |    |
|                     |             |                                   | Electric Power (Watts)            | 13526                         | 13606          | 13694          | 13542          | 13628          | 13714          | 13548          | 13636          | 13718          |     |    |    |
|                     |             |                                   | Leaving Air Temp<br>(°F db/°F wb) | 55.5 /<br>53.8                | 58.0 /<br>56.2 | 60.4 /<br>58.6 | 55.3 /<br>53.6 | 57.8 /<br>56.0 | 60.2 /<br>58.4 | 55.1 /<br>53.5 | 57.5 /<br>55.8 | 59.9 /<br>58.2 |     |    |    |
|                     | 75          | 60.00                             | Total Capacity (Btu/h)            | 232000                        | 238000         | 246000         | 232000         | 240000         | 248000         | 232000         | 240000         | 248000         |     |    |    |
|                     |             |                                   | Sensible Capacity (Btu/h)         | 117000                        | 109000         | 101000         | 136000         | 128000         | 119000         | 152000         | 146000         | 138000         |     |    |    |
|                     |             |                                   | Electric Power (Watts)            | 15434                         | 15504          | 15582          | 15448          | 15504          | 15604          | 15448          | 15530          | 15598          |     |    |    |
|                     |             |                                   | Leaving Air Temp<br>(°F db/°F wb) | 57.0 /<br>55.3                | 59.5 /<br>57.6 | 61.9 /<br>60.0 | 56.8 /<br>55.1 | 59.1 /<br>57.5 | 61.7 /<br>59.8 | 57.2 /<br>55.0 | 59.0 /<br>57.3 | 61.3 /<br>59.6 |     |    |    |
| 85                  | 60.00       | Total Capacity (Btu/h)            | 222000                            | 230000                        | 236000         | 224000         | 230000         | 238000         | 224000         | 232000         | 238000         |                |     |    |    |
|                     |             | Sensible Capacity (Btu/h)         | 113000                            | 105000                        | 97000          | 132000         | 125000         | 116000         | 148000         | 142000         | 134000         |                |     |    |    |
|                     |             | Electric Power (Watts)            | 16886                             | 16946                         | 17016          | 16898          | 16938          | 17012          | 16894          | 16970          | 17024          |                |     |    |    |
|                     |             | Leaving Air Temp<br>(°F db/°F wb) | 58.2 /<br>56.3                    | 60.5 /<br>58.6                | 62.9 /<br>61.0 | 57.9 /<br>56.1 | 60.1 /<br>58.5 | 62.5 /<br>60.8 | 58.4 /<br>56.0 | 60.1 /<br>58.3 | 62.3 /<br>60.6 |                |     |    |    |

# Performance Data (Cont'd)

**TABLE 9 - JROW WATER SOURCE HEAT PUMP COOLING GENERAL PERFORMANCE (CONT'D)**

| AIRFLOW<br>(CFM)           | EWT<br>(°F) | WATER<br>FLOW<br>(GPM) |                                   | ENTERING AIR TEMPERATURE (°F) |                |                |                |                |                |                |                |                |    |
|----------------------------|-------------|------------------------|-----------------------------------|-------------------------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|----|
|                            |             |                        |                                   | COOLING                       |                |                |                |                |                |                |                |                |    |
|                            |             |                        |                                   | DRY BULB                      | 90             |                |                | 95             |                |                | 100            |                |    |
|                            |             |                        |                                   | WET BULB                      | 76             | 78             | 80             | 76             | 78             | 80             | 76             | 78             | 80 |
| <b>240 (20 TON) CONT'D</b> |             |                        |                                   |                               |                |                |                |                |                |                |                |                |    |
| 4000                       | 50          | 60.00                  | Total Capacity (Btu/h)            | 270000                        | 278000         | 286000         | 270000         | 278000         | 288000         | 270000         | 280000         | 288000         |    |
|                            |             |                        | Sensible Capacity (Btu/h)         | 140000                        | 130000         | 120000         | 164000         | 154000         | 142000         | 182000         | 172000         | 166000         |    |
|                            |             |                        | Electric Power (Watts)            | 12562                         | 12660          | 12766          | 12562          | 12664          | 12786          | 12578          | 12692          | 12808          |    |
|                            |             |                        | Leaving Air Temp<br>(°F db/°F wb) | 58.5 /<br>57.0                | 60.9 /<br>59.4 | 63.3 /<br>61.7 | 58.2 /<br>56.9 | 60.5 /<br>59.2 | 63.1 /<br>61.6 | 59.0 /<br>56.7 | 61.2 /<br>59.0 | 62.9 /<br>61.4 |    |
|                            | 60          | 60.00                  | Total Capacity (Btu/h)            | 260000                        | 268000         | 276000         | 260000         | 270000         | 278000         | 262000         | 270000         | 280000         |    |
|                            |             |                        | Sensible Capacity (Btu/h)         | 138000                        | 127000         | 116000         | 160000         | 150000         | 140000         | 178000         | 168000         | 162000         |    |
|                            |             |                        | Electric Power (Watts)            | 13680                         | 13788          | 13888          | 13694          | 13808          | 13910          | 13716          | 13824          | 13932          |    |
|                            |             |                        | Leaving Air Temp<br>(°F db/°F wb) | 59.1 /<br>57.8                | 61.7 /<br>60.1 | 64.1 /<br>62.5 | 58.9 /<br>57.6 | 61.5 /<br>59.9 | 63.9 /<br>62.3 | 59.9 /<br>57.5 | 62.1 /<br>59.8 | 63.7 /<br>62.1 |    |
|                            | 75          | 60.00                  | Total Capacity (Btu/h)            | 246000                        | 254000         | 262000         | 246000         | 254000         | 262000         | 248000         | 256000         | 264000         |    |
|                            |             |                        | Sensible Capacity (Btu/h)         | 132000                        | 122000         | 111000         | 152000         | 144000         | 134000         | 172000         | 164000         | 154000         |    |
|                            |             |                        | Electric Power (Watts)            | 15558                         | 15640          | 15748          | 15586          | 15678          | 15768          | 15594          | 15674          | 15770          |    |
|                            |             |                        | Leaving Air Temp<br>(°F db/°F wb) | 60.4 /<br>59.0                | 62.7 /<br>61.4 | 65.3 /<br>63.7 | 61.0 /<br>58.8 | 62.7 /<br>61.1 | 65.1 /<br>63.5 | 61.3 /<br>58.7 | 63.3 /<br>61.0 | 65.4 /<br>63.4 |    |
|                            | 85          | 60.00                  | Total Capacity (Btu/h)            | 236000                        | 242000         | 250000         | 238000         | 244000         | 252000         | 236000         | 246000         | 252000         |    |
|                            |             |                        | Sensible Capacity (Btu/h)         | 128000                        | 118000         | 108000         | 148000         | 142000         | 132000         | 168000         | 160000         | 150000         |    |
|                            |             |                        | Electric Power (Watts)            | 16980                         | 17058          | 17138          | 17016          | 17076          | 17160          | 17018          | 17094          | 17176          |    |
|                            |             |                        | Leaving Air Temp<br>(°F db/°F wb) | 61.2 /<br>59.9                | 63.5 /<br>62.2 | 65.9 /<br>64.5 | 61.6 /<br>59.6 | 63.4 /<br>62.0 | 65.7 /<br>64.3 | 62.2 /<br>59.6 | 63.9 /<br>61.8 | 66.3 /<br>64.2 |    |
| <b>300 (25 TON)</b>        |             |                        |                                   |                               |                |                |                |                |                |                |                |                |    |
| 3125                       | 50          | 75.00                  | Total Capacity (Btu/h)            | 282000                        | 290000         | 300000         | 282000         | 292000         | 302000         | 284000         | 292000         | 304000         |    |
|                            |             |                        | Sensible Capacity (Btu/h)         | 138000                        | 130000         | 122000         | 156000         | 148000         | 140000         | 174000         | 166000         | 158000         |    |
|                            |             |                        | Electric Power (Watts)            | 14200                         | 14120          | 14078          | 14190          | 14162          | 14108          | 14194          | 14164          | 14120          |    |
|                            |             |                        | Leaving Air Temp<br>(°F db/°F wb) | 50.4 /<br>48.5                | 52.7 /<br>50.9 | 55.3 /<br>53.4 | 50.2 /<br>48.2 | 52.7 /<br>50.6 | 55.2 /<br>53.1 | 50.0 /<br>48.0 | 52.5 /<br>50.4 | 55.0 /<br>52.9 |    |
|                            | 60          | 75.00                  | Total Capacity (Btu/h)            | 272000                        | 282000         | 290000         | 274000         | 282000         | 292000         | 274000         | 284000         | 294000         |    |
|                            |             |                        | Sensible Capacity (Btu/h)         | 134000                        | 125000         | 118000         | 152000         | 144000         | 134000         | 170000         | 162000         | 152000         |    |
|                            |             |                        | Electric Power (Watts)            | 15830                         | 15808          | 15768          | 15834          | 15824          | 15802          | 15838          | 15830          | 15816          |    |
|                            |             |                        | Leaving Air Temp<br>(°F db/°F wb) | 51.7 /<br>49.6                | 54.1 /<br>52.1 | 56.4 /<br>54.5 | 51.4 /<br>49.4 | 53.9 /<br>51.8 | 56.4 /<br>54.2 | 51.2 /<br>49.2 | 53.7 /<br>51.6 | 56.2 /<br>54.0 |    |
|                            | 75          | 75.00                  | Total Capacity (Btu/h)            | 258000                        | 266000         | 276000         | 258000         | 268000         | 276000         | 260000         | 268000         | 278000         |    |
|                            |             |                        | Sensible Capacity (Btu/h)         | 127000                        | 119000         | 110000         | 144000         | 136000         | 128000         | 162000         | 154000         | 146000         |    |
|                            |             |                        | Electric Power (Watts)            | 18276                         | 18286          | 18306          | 18284          | 18306          | 18318          | 18288          | 18312          | 18334          |    |
|                            |             |                        | Leaving Air Temp<br>(°F db/°F wb) | 53.6 /<br>51.5                | 56.0 /<br>53.9 | 58.5 /<br>56.3 | 53.4 /<br>51.3 | 55.8 /<br>53.6 | 58.2 /<br>56.0 | 53.2 /<br>51.1 | 55.6 /<br>53.4 | 58.0 /<br>55.8 |    |
|                            | 85          | 75.00                  | Total Capacity (Btu/h)            | 248000                        | 256000         | 264000         | 248000         | 258000         | 266000         | 250000         | 258000         | 268000         |    |
|                            |             |                        | Sensible Capacity (Btu/h)         | 122000                        | 114000         | 106000         | 140000         | 132000         | 124000         | 158000         | 150000         | 142000         |    |
|                            |             |                        | Electric Power (Watts)            | 20010                         | 20032          | 20064          | 20018          | 20052          | 20078          | 20018          | 20056          | 20094          |    |
|                            |             |                        | Leaving Air Temp<br>(°F db/°F wb) | 54.9 /<br>52.7                | 57.3 /<br>55.1 | 59.8 /<br>57.5 | 54.7 /<br>52.5 | 57.1 /<br>54.9 | 59.6 /<br>57.2 | 54.5 /<br>52.3 | 56.9 /<br>54.6 | 59.3 /<br>57.0 |    |

**TABLE 9 - JROW WATER SOURCE HEAT PUMP COOLING GENERAL PERFORMANCE (CONT'D)**

| AIRFLOW<br>(CFM)           | EWT<br>(°F) | WATER<br>FLOW<br>(GPM)            |                                   | ENTERING AIR TEMPERATURE (°F) |                |                |                |                |                |                |                |                |     |    |    |
|----------------------------|-------------|-----------------------------------|-----------------------------------|-------------------------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|-----|----|----|
|                            |             |                                   |                                   | COOLING                       |                |                |                |                |                |                |                |                |     |    |    |
|                            |             |                                   |                                   | DRY BULB                      |                |                | 90             |                |                | 95             |                |                | 100 |    |    |
|                            |             |                                   |                                   | WET BULB                      |                |                | 76             | 78             | 80             | 76             | 78             | 80             | 76  | 78 | 80 |
| <b>300 (25 TON) CONT'D</b> |             |                                   |                                   |                               |                |                |                |                |                |                |                |                |     |    |    |
| 4000                       | 50          | 75.00                             | Total Capacity (Btu/h)            | 306000                        | 316000         | 326000         | 308000         | 318000         | 328000         | 308000         | 318000         | 330000         |     |    |    |
|                            |             |                                   | Sensible Capacity (Btu/h)         | 154000                        | 144000         | 134000         | 176000         | 166000         | 156000         | 198000         | 190000         | 180000         |     |    |    |
|                            |             |                                   | Electric Power (Watts)            | 14084                         | 14040          | 13988          | 14094          | 14040          | 13990          | 14092          | 14044          | 13970          |     |    |    |
|                            |             |                                   | Leaving Air Temp<br>(°F db/°F wb) | 55.4 /<br>53.7                | 57.9 /<br>56.1 | 60.3 /<br>58.5 | 55.2 /<br>53.5 | 57.6 /<br>55.9 | 60.1 /<br>58.3 | 55.6 /<br>53.3 | 57.4 /<br>55.7 | 59.8 /<br>58.1 |     |    |    |
|                            | 60          | 75.00                             | Total Capacity (Btu/h)            | 296000                        | 306000         | 316000         | 298000         | 306000         | 316000         | 298000         | 308000         | 318000         |     |    |    |
|                            |             |                                   | Sensible Capacity (Btu/h)         | 150000                        | 140000         | 129000         | 172000         | 162000         | 152000         | 192000         | 184000         | 176000         |     |    |    |
|                            |             |                                   | Electric Power (Watts)            | 15794                         | 15780          | 15762          | 15806          | 15786          | 15768          | 15804          | 15790          | 15750          |     |    |    |
|                            |             |                                   | Leaving Air Temp<br>(°F db/°F wb) | 56.4 /<br>54.6                | 58.9 /<br>57.1 | 61.3 /<br>59.4 | 56.2 /<br>54.4 | 58.7 /<br>56.8 | 61.1 /<br>59.2 | 56.6 /<br>54.3 | 58.4 /<br>56.6 | 60.7 /<br>59.1 |     |    |    |
|                            | 75          | 75.00                             | Total Capacity (Btu/h)            | 278000                        | 288000         | 298000         | 280000         | 290000         | 298000         | 280000         | 290000         | 300000         |     |    |    |
|                            |             |                                   | Sensible Capacity (Btu/h)         | 144000                        | 132000         | 122000         | 166000         | 156000         | 146000         | 186000         | 178000         | 168000         |     |    |    |
|                            |             |                                   | Electric Power (Watts)            | 18298                         | 18338          | 18358          | 18334          | 18324          | 18346          | 18332          | 18356          | 18368          |     |    |    |
|                            |             |                                   | Leaving Air Temp<br>(°F db/°F wb) | 57.8 /<br>56.2                | 60.4 /<br>58.5 | 62.8 /<br>60.9 | 57.7 /<br>55.9 | 60.0 /<br>58.3 | 62.4 /<br>60.7 | 58.3 /<br>55.8 | 60.0 /<br>58.1 | 62.3 /<br>60.5 |     |    |    |
| 85                         | 75.00       | Total Capacity (Btu/h)            | 268000                            | 276000                        | 284000         | 268000         | 278000         | 286000         | 270000         | 278000         | 288000         |                |     |    |    |
|                            |             | Sensible Capacity (Btu/h)         | 138000                            | 129000                        | 118000         | 160000         | 152000         | 142000         | 180000         | 174000         | 164000         |                |     |    |    |
|                            |             | Electric Power (Watts)            | 20050                             | 20086                         | 20122          | 20094          | 20092          | 20130          | 20088          | 20132          | 20160          |                |     |    |    |
|                            |             | Leaving Air Temp<br>(°F db/°F wb) | 58.8 /<br>57.2                    | 61.2 /<br>59.5                | 63.6 /<br>61.9 | 58.8 /<br>57.0 | 61.0 /<br>59.3 | 63.4 /<br>61.7 | 59.4 /<br>56.9 | 61.0 /<br>59.1 | 63.3 /<br>61.5 |                |     |    |    |
| 5000                       | 50          | 75.00                             | Total Capacity (Btu/h)            | 326000                        | 336000         | 346000         | 328000         | 338000         | 348000         | 328000         | 340000         | 350000         |     |    |    |
|                            |             |                                   | Sensible Capacity (Btu/h)         | 172000                        | 158000         | 146000         | 198000         | 188000         | 176000         | 222000         | 212000         | 204000         |     |    |    |
|                            |             |                                   | Electric Power (Watts)            | 13974                         | 13944          | 13890          | 13968          | 13918          | 13866          | 13990          | 13934          | 13876          |     |    |    |
|                            |             |                                   | Leaving Air Temp<br>(°F db/°F wb) | 59.1 /<br>57.7                | 61.6 /<br>60.1 | 64.0 /<br>62.5 | 59.5 /<br>57.6 | 61.3 /<br>59.9 | 63.7 /<br>62.3 | 59.9 /<br>57.4 | 62.1 /<br>59.7 | 63.6 /<br>62.1 |     |    |    |
|                            | 60          | 75.00                             | Total Capacity (Btu/h)            | 314000                        | 324000         | 334000         | 316000         | 326000         | 336000         | 316000         | 328000         | 338000         |     |    |    |
|                            |             |                                   | Sensible Capacity (Btu/h)         | 168000                        | 156000         | 142000         | 192000         | 184000         | 170000         | 218000         | 208000         | 196000         |     |    |    |
|                            |             |                                   | Electric Power (Watts)            | 15746                         | 15730          | 15708          | 15764          | 15728          | 15728          | 15766          | 15732          | 15712          |     |    |    |
|                            |             |                                   | Leaving Air Temp<br>(°F db/°F wb) | 59.9 /<br>58.5                | 62.2 /<br>60.9 | 64.6 /<br>63.2 | 60.5 /<br>58.3 | 62.0 /<br>60.7 | 64.6 /<br>63.0 | 60.8 /<br>58.2 | 62.6 /<br>60.4 | 64.9 /<br>62.9 |     |    |    |
|                            | 75          | 75.00                             | Total Capacity (Btu/h)            | 296000                        | 304000         | 314000         | 298000         | 308000         | 316000         | 298000         | 310000         | 320000         |     |    |    |
|                            |             |                                   | Sensible Capacity (Btu/h)         | 162000                        | 148000         | 136000         | 186000         | 178000         | 164000         | 210000         | 200000         | 188000         |     |    |    |
|                            |             |                                   | Electric Power (Watts)            | 18332                         | 18350          | 18370          | 18344          | 18352          | 18378          | 18362          | 18372          | 18408          |     |    |    |
|                            |             |                                   | Leaving Air Temp<br>(°F db/°F wb) | 61.1 /<br>59.8                | 63.4 /<br>62.1 | 65.8 /<br>64.4 | 61.5 /<br>59.5 | 63.0 /<br>61.8 | 65.6 /<br>64.2 | 62.2 /<br>59.5 | 63.9 /<br>61.6 | 66.2 /<br>63.9 |     |    |    |
| 85                         | 75.00       | Total Capacity (Btu/h)            | 284000                            | 292000                        | 300000         | 286000         | 296000         | 304000         | 284000         | 296000         | 306000         |                |     |    |    |
|                            |             | Sensible Capacity (Btu/h)         | 156000                            | 142000                        | 132000         | 182000         | 174000         | 160000         | 204000         | 196000         | 184000         |                |     |    |    |
|                            |             | Electric Power (Watts)            | 20130                             | 20162                         | 20176          | 20130          | 20166          | 20200          | 20150          | 20172          | 20210          |                |     |    |    |
|                            |             | Leaving Air Temp<br>(°F db/°F wb) | 62.1 /<br>60.6                    | 64.4 /<br>62.9                | 66.6 /<br>65.2 | 62.4 /<br>60.3 | 64.0 /<br>62.6 | 66.3 /<br>64.9 | 63.1 /<br>60.3 | 64.8 /<br>62.5 | 66.9 /<br>64.8 |                |     |    |    |

# Performance Data (Cont'd)

**TABLE 9 - JROW WATER SOURCE HEAT PUMP COOLING GENERAL PERFORMANCE (CONT'D)**

| AIRFLOW<br>(CFM)    | EWT<br>(°F) | WATER<br>FLOW<br>(GPM)            |                                   | ENTERING AIR TEMPERATURE (°F) |                |                |                |                |                |                |                |                |     |    |    |
|---------------------|-------------|-----------------------------------|-----------------------------------|-------------------------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|-----|----|----|
|                     |             |                                   |                                   | COOLING                       |                |                |                |                |                |                |                |                |     |    |    |
|                     |             |                                   |                                   | DRY BULB                      |                |                | 90             |                |                | 95             |                |                | 100 |    |    |
|                     |             |                                   |                                   | WET BULB                      |                |                | 76             | 78             | 80             | 76             | 78             | 80             | 76  | 78 | 80 |
| <b>360 (30 TON)</b> |             |                                   |                                   |                               |                |                |                |                |                |                |                |                |     |    |    |
| 3750                | 50          | 90.00                             | Total Capacity (Btu/h)            | 330000                        | 342000         | 352000         | 332000         | 342000         | 354000         | 332000         | 344000         | 356000         |     |    |    |
|                     |             |                                   | Sensible Capacity (Btu/h)         | 162000                        | 152000         | 142000         | 184000         | 174000         | 164000         | 204000         | 194000         | 186000         |     |    |    |
|                     |             |                                   | Electric Power (Watts)            | 15876                         | 15824          | 15764          | 15936          | 15818          | 15760          | 15936          | 15878          | 15814          |     |    |    |
|                     |             |                                   | Leaving Air Temp<br>(°F db/°F wb) | 51.1 /<br>49.3                | 53.5 /<br>51.7 | 56.0 /<br>54.1 | 51.0 /<br>49.0 | 53.3 /<br>51.5 | 55.8 /<br>53.9 | 50.8 /<br>48.9 | 53.3 /<br>51.2 | 55.8 /<br>53.6 |     |    |    |
|                     | 60          | 90.00                             | Total Capacity (Btu/h)            | 320000                        | 330000         | 342000         | 320000         | 332000         | 342000         | 322000         | 332000         | 344000         |     |    |    |
|                     |             |                                   | Sensible Capacity (Btu/h)         | 158000                        | 148000         | 138000         | 178000         | 170000         | 160000         | 200000         | 190000         | 180000         |     |    |    |
|                     |             |                                   | Electric Power (Watts)            | 17774                         | 17758          | 17738          | 17838          | 17756          | 17736          | 17838          | 17820          | 17796          |     |    |    |
|                     |             |                                   | Leaving Air Temp<br>(°F db/°F wb) | 52.2 /<br>50.4                | 54.7 /<br>52.8 | 57.1 /<br>55.3 | 52.2 /<br>50.2 | 54.4 /<br>52.6 | 56.9 /<br>55.0 | 52.1 /<br>50.0 | 54.5 /<br>52.4 | 57.0 /<br>54.8 |     |    |    |
|                     | 75          | 90.00                             | Total Capacity (Btu/h)            | 302000                        | 312000         | 324000         | 304000         | 314000         | 324000         | 304000         | 316000         | 326000         |     |    |    |
|                     |             |                                   | Sensible Capacity (Btu/h)         | 150000                        | 140000         | 132000         | 170000         | 160000         | 152000         | 192000         | 182000         | 172000         |     |    |    |
|                     |             |                                   | Electric Power (Watts)            | 20574                         | 20598          | 20622          | 20658          | 20676          | 20694          | 20658          | 20682          | 20708          |     |    |    |
|                     |             |                                   | Leaving Air Temp<br>(°F db/°F wb) | 54.0 /<br>52.2                | 56.4 /<br>54.5 | 58.8 /<br>57.0 | 54.1 /<br>52.0 | 56.5 /<br>54.3 | 59.0 /<br>56.7 | 53.9 /<br>51.8 | 56.3 /<br>54.1 | 58.8 /<br>56.5 |     |    |    |
| 85                  | 90.00       | Total Capacity (Btu/h)            | 290000                            | 300000                        | 310000         | 292000         | 302000         | 312000         | 292000         | 302000         | 314000         |                |     |    |    |
|                     |             | Sensible Capacity (Btu/h)         | 144000                            | 136000                        | 126000         | 166000         | 156000         | 146000         | 186000         | 178000         | 168000         |                |     |    |    |
|                     |             | Electric Power (Watts)            | 22628                             | 22564                         | 22606          | 22634          | 22672          | 22704          | 22628          | 22674          | 22714          |                |     |    |    |
|                     |             | Leaving Air Temp<br>(°F db/°F wb) | 55.6 /<br>53.4                    | 57.5 /<br>55.8                | 60.0 /<br>58.1 | 55.4 /<br>53.2 | 57.8 /<br>55.5 | 60.2 /<br>57.9 | 55.1 /<br>53.0 | 57.5 /<br>55.3 | 60.0 /<br>57.7 |                |     |    |    |
| 4800                | 50          | 90.00                             | Total Capacity (Btu/h)            | 360000                        | 370000         | 382000         | 360000         | 372000         | 384000         | 362000         | 374000         | 386000         |     |    |    |
|                     |             |                                   | Sensible Capacity (Btu/h)         | 182000                        | 168000         | 156000         | 208000         | 196000         | 184000         | 236000         | 224000         | 212000         |     |    |    |
|                     |             |                                   | Electric Power (Watts)            | 15782                         | 15720          | 15652          | 15788          | 15720          | 15652          | 15778          | 15690          | 15622          |     |    |    |
|                     |             |                                   | Leaving Air Temp<br>(°F db/°F wb) | 56.0 /<br>54.3                | 58.5 /<br>56.7 | 61.0 /<br>59.1 | 55.9 /<br>54.1 | 58.3 /<br>56.5 | 60.8 /<br>58.9 | 55.7 /<br>54.0 | 58.0 /<br>56.4 | 60.4 /<br>58.8 |     |    |    |
|                     | 60          | 90.00                             | Total Capacity (Btu/h)            | 346000                        | 358000         | 370000         | 348000         | 360000         | 372000         | 348000         | 360000         | 372000         |     |    |    |
|                     |             |                                   | Sensible Capacity (Btu/h)         | 176000                        | 164000         | 152000         | 204000         | 192000         | 178000         | 228000         | 220000         | 208000         |     |    |    |
|                     |             |                                   | Electric Power (Watts)            | 17778                         | 17752          | 17722          | 17754          | 17758          | 17726          | 17776          | 17728          | 17700          |     |    |    |
|                     |             |                                   | Leaving Air Temp<br>(°F db/°F wb) | 57.0 /<br>55.3                | 59.5 /<br>57.7 | 61.9 /<br>60.0 | 56.7 /<br>55.1 | 59.3 /<br>57.4 | 61.7 /<br>59.8 | 57.2 /<br>55.0 | 58.9 /<br>57.3 | 61.3 /<br>59.7 |     |    |    |
|                     | 75          | 90.00                             | Total Capacity (Btu/h)            | 328000                        | 338000         | 348000         | 328000         | 340000         | 350000         | 328000         | 340000         | 352000         |     |    |    |
|                     |             |                                   | Sensible Capacity (Btu/h)         | 168000                        | 156000         | 144000         | 196000         | 184000         | 170000         | 220000         | 210000         | 200000         |     |    |    |
|                     |             |                                   | Electric Power (Watts)            | 20694                         | 20708          | 20722          | 20664          | 20686          | 20736          | 20692          | 20716          | 20706          |     |    |    |
|                     |             |                                   | Leaving Air Temp<br>(°F db/°F wb) | 58.6 /<br>56.7                | 60.9 /<br>59.1 | 63.3 /<br>61.4 | 58.2 /<br>56.6 | 60.5 /<br>58.9 | 63.2 /<br>61.2 | 58.8 /<br>56.4 | 60.6 /<br>58.7 | 62.7 /<br>61.1 |     |    |    |
| 85                  | 90.00       | Total Capacity (Btu/h)            | 314000                            | 324000                        | 334000         | 314000         | 326000         | 336000         | 316000         | 326000         | 338000         |                |     |    |    |
|                     |             | Sensible Capacity (Btu/h)         | 162000                            | 150000                        | 138000         | 192000         | 180000         | 166000         | 214000         | 206000         | 194000         |                |     |    |    |
|                     |             | Electric Power (Watts)            | 22706                             | 22736                         | 22770          | 22662          | 22704          | 22746          | 22700          | 22748          | 22780          |                |     |    |    |
|                     |             | Leaving Air Temp<br>(°F db/°F wb) | 59.6 /<br>57.7                    | 62.0 /<br>60.0                | 64.3 /<br>62.4 | 59.2 /<br>57.6 | 61.5 /<br>59.9 | 63.9 /<br>62.2 | 59.8 /<br>57.4 | 61.6 /<br>59.7 | 63.9 /<br>62.0 |                |     |    |    |

**TABLE 9 - JROW WATER SOURCE HEAT PUMP COOLING GENERAL PERFORMANCE (CONT'D)**

| AIRFLOW<br>(CFM)           | EWT<br>(°F) | WATER<br>FLOW<br>(GPM)            |                                   | ENTERING AIR TEMPERATURE (°F) |                |                |                |                |                |                |                |                |     |    |    |
|----------------------------|-------------|-----------------------------------|-----------------------------------|-------------------------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|-----|----|----|
|                            |             |                                   |                                   | COOLING                       |                |                |                |                |                |                |                |                |     |    |    |
|                            |             |                                   |                                   | DRY BULB                      |                |                | 90             |                |                | 95             |                |                | 100 |    |    |
|                            |             |                                   |                                   | WET BULB                      |                |                | 76             | 78             | 80             | 76             | 78             | 80             | 76  | 78 | 80 |
| <b>360 (30 TON) CONT'D</b> |             |                                   |                                   |                               |                |                |                |                |                |                |                |                |     |    |    |
| 6000                       | 50          | 90.00                             | Total Capacity (Btu/h)            | 382000                        | 394000         | 405000         | 384000         | 396000         | 410000         | 384000         | 396000         | 410000         |     |    |    |
|                            |             |                                   | Sensible Capacity (Btu/h)         | 202000                        | 186000         | 172000         | 236000         | 222000         | 206000         | 264000         | 250000         | 240000         |     |    |    |
|                            |             |                                   | Electric Power (Watts)            | 15656                         | 15586          | 15518          | 15654          | 15582          | 15508          | 15656          | 15584          | 15506          |     |    |    |
|                            |             |                                   | Leaving Air Temp<br>(°F db/°F wb) | 59.7 /<br>58.3                | 62.1 /<br>60.6 | 64.5 /<br>63.0 | 59.6 /<br>58.1 | 61.9 /<br>60.4 | 64.3 /<br>62.8 | 60.4 /<br>58.0 | 62.6 /<br>60.3 | 64.2 /<br>62.6 |     |    |    |
|                            | 60          | 90.00                             | Total Capacity (Btu/h)            | 368000                        | 380000         | 392000         | 370000         | 382000         | 394000         | 370000         | 382000         | 394000         |     |    |    |
|                            |             |                                   | Sensible Capacity (Btu/h)         | 196000                        | 182000         | 166000         | 226000         | 216000         | 200000         | 258000         | 244000         | 234000         |     |    |    |
|                            |             |                                   | Electric Power (Watts)            | 17724                         | 17692          | 17658          | 17726          | 17694          | 17660          | 17732          | 17698          | 17662          |     |    |    |
|                            |             |                                   | Leaving Air Temp<br>(°F db/°F wb) | 60.5 /<br>59.0                | 62.9 /<br>61.4 | 65.3 /<br>63.7 | 61.0 /<br>58.9 | 62.7 /<br>61.2 | 65.1 /<br>63.5 | 61.3 /<br>58.8 | 63.4 /<br>61.1 | 65.0 /<br>63.4 |     |    |    |
|                            | 75          | 90.00                             | Total Capacity (Btu/h)            | 346000                        | 358000         | 368000         | 348000         | 360000         | 370000         | 348000         | 360000         | 372000         |     |    |    |
|                            |             |                                   | Sensible Capacity (Btu/h)         | 188000                        | 174000         | 158000         | 218000         | 208000         | 192000         | 250000         | 236000         | 224000         |     |    |    |
|                            |             |                                   | Electric Power (Watts)            | 20718                         | 20732          | 20744          | 20726          | 20742          | 20754          | 20706          | 20722          | 20736          |     |    |    |
|                            |             |                                   | Leaving Air Temp<br>(°F db/°F wb) | 61.7 /<br>60.2                | 64.1 /<br>62.5 | 66.4 /<br>64.8 | 62.3 /<br>60.1 | 63.9 /<br>62.3 | 66.3 /<br>64.7 | 62.5 /<br>60.0 | 64.6 /<br>62.3 | 66.7 /<br>64.6 |     |    |    |
| 85                         | 90.00       | Total Capacity (Btu/h)            | 332000                            | 342000                        | 352000         | 332000         | 342000         | 354000         | 334000         | 346000         | 354000         |                |     |    |    |
|                            |             | Sensible Capacity (Btu/h)         | 184000                            | 168000                        | 152000         | 212000         | 204000         | 188000         | 246000         | 232000         | 218000         |                |     |    |    |
|                            |             | Electric Power (Watts)            | 22756                             | 22790                         | 22822          | 22734          | 22772          | 22838          | 22744          | 22774          | 22816          |                |     |    |    |
|                            |             | Leaving Air Temp<br>(°F db/°F wb) | 62.6 /<br>61.0                    | 64.9 /<br>63.3                | 67.3 /<br>65.6 | 63.1 /<br>60.9 | 64.6 /<br>63.2 | 67.1 /<br>65.5 | 63.1 /<br>60.7 | 65.2 /<br>63.0 | 67.5 /<br>65.4 |                |     |    |    |
| <b>420 (35 TON)</b>        |             |                                   |                                   |                               |                |                |                |                |                |                |                |                |     |    |    |
| 4375                       | 50          | 105.00                            | Total Capacity (Btu/h)            | 396000                        | 410000         | 425000         | 398000         | 410000         | 425000         | 398000         | 415000         | 425000         |     |    |    |
|                            |             |                                   | Sensible Capacity (Btu/h)         | 194000                        | 182000         | 170000         | 220000         | 208000         | 196000         | 244000         | 232000         | 222000         |     |    |    |
|                            |             |                                   | Electric Power (Watts)            | 24308                         | 24510          | 24728          | 24338          | 24546          | 24772          | 24362          | 24576          | 24804          |     |    |    |
|                            |             |                                   | Leaving Air Temp<br>(°F db/°F wb) | 50.2 /<br>48.3                | 52.7 /<br>50.7 | 55.3 /<br>53.1 | 49.9 /<br>48.0 | 52.4 /<br>50.4 | 55.0 /<br>52.9 | 49.7 /<br>47.8 | 52.2 /<br>50.2 | 54.7 /<br>52.6 |     |    |    |
|                            | 60          | 105.00                            | Total Capacity (Btu/h)            | 384000                        | 396000         | 410000         | 386000         | 398000         | 410000         | 386000         | 400000         | 415000         |     |    |    |
|                            |             |                                   | Sensible Capacity (Btu/h)         | 188000                        | 176000         | 164000         | 214000         | 202000         | 190000         | 238000         | 228000         | 216000         |     |    |    |
|                            |             |                                   | Electric Power (Watts)            | 25732                         | 25920          | 26122          | 25760          | 25956          | 26164          | 25782          | 25984          | 26198          |     |    |    |
|                            |             |                                   | Leaving Air Temp<br>(°F db/°F wb) | 51.3 /<br>49.4                | 53.9 /<br>51.8 | 56.4 /<br>54.2 | 51.1 /<br>49.1 | 53.6 /<br>51.5 | 56.1 /<br>53.9 | 50.9 /<br>48.9 | 53.3 /<br>51.3 | 55.8 /<br>53.7 |     |    |    |
|                            | 75          | 105.00                            | Total Capacity (Btu/h)            | 364000                        | 376000         | 390000         | 366000         | 378000         | 392000         | 368000         | 380000         | 394000         |     |    |    |
|                            |             |                                   | Sensible Capacity (Btu/h)         | 180000                        | 168000         | 156000         | 204000         | 194000         | 182000         | 230000         | 218000         | 206000         |     |    |    |
|                            |             |                                   | Electric Power (Watts)            | 28358                         | 28526          | 28706          | 28382          | 28562          | 28750          | 28400          | 28584          | 28780          |     |    |    |
|                            |             |                                   | Leaving Air Temp<br>(°F db/°F wb) | 53.2 /<br>51.1                | 55.7 /<br>53.5 | 58.2 /<br>56.0 | 53 /<br>50.9   | 55.4 /<br>53.2 | 57.9 /<br>55.7 | 52.7 /<br>50.7 | 55.2 /<br>53.0 | 57.6 /<br>55.5 |     |    |    |
| 85                         | 105.00      | Total Capacity (Btu/h)            | 350000                            | 362000                        | 374000         | 352000         | 364000         | 376000         | 354000         | 366000         | 378000         |                |     |    |    |
|                            |             | Sensible Capacity (Btu/h)         | 172000                            | 162000                        | 150000         | 198000         | 186000         | 176000         | 224000         | 212000         | 200000         |                |     |    |    |
|                            |             | Electric Power (Watts)            | 30490                             | 30646                         | 30812          | 30514          | 30680          | 30854          | 30522          | 30700          | 30886          |                |     |    |    |
|                            |             | Leaving Air Temp<br>(°F db/°F wb) | 54.5 /<br>52.4                    | 57.0 /<br>54.7                | 59.5 /<br>57.1 | 54.2 /<br>52.1 | 56.7 /<br>54.5 | 59.2 /<br>56.9 | 54.0 /<br>51.9 | 56.4 /<br>54.2 | 58.9 /<br>56.6 |                |     |    |    |

# Performance Data (Cont'd)

TABLE 9 - JROW WATER SOURCE HEAT PUMP COOLING GENERAL PERFORMANCE (CONT'D)

| AIRFLOW<br>(CFM)           | EWT<br>(°F) | WATER<br>FLOW<br>(GPM)            |                                   | ENTERING AIR TEMPERATURE (°F) |                |                |                |                |                |                |                |                |     |    |    |
|----------------------------|-------------|-----------------------------------|-----------------------------------|-------------------------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|-----|----|----|
|                            |             |                                   |                                   | COOLING                       |                |                |                |                |                |                |                |                |     |    |    |
|                            |             |                                   |                                   | DRY BULB                      |                |                | 90             |                |                | 95             |                |                | 100 |    |    |
|                            |             |                                   |                                   | WET BULB                      |                |                | 76             | 78             | 80             | 76             | 78             | 80             | 76  | 78 | 80 |
| <b>420 (35 TON) CONT'D</b> |             |                                   |                                   |                               |                |                |                |                |                |                |                |                |     |    |    |
| 5600                       | 50          | 105.00                            | Total Capacity (Btu/h)            | 430000                        | 445000         | 460000         | 435000         | 450000         | 460000         | 435000         | 450000         | 465000         |     |    |    |
|                            |             |                                   | Sensible Capacity (Btu/h)         | 218000                        | 202000         | 188000         | 250000         | 236000         | 220000         | 278000         | 268000         | 252000         |     |    |    |
|                            |             |                                   | Electric Power (Watts)            | 24852                         | 25108          | 25360          | 24908          | 25130          | 25382          | 24926          | 25182          | 25428          |     |    |    |
|                            |             |                                   | Leaving Air Temp<br>(°F db/°F wb) | 55.1 /<br>53.5                | 57.7 /<br>55.9 | 60.2 /<br>58.3 | 54.9 /<br>53.3 | 57.3 /<br>55.7 | 59.8 /<br>58.1 | 55.3 /<br>53.1 | 57.1 /<br>55.5 | 59.5 /<br>57.9 |     |    |    |
|                            | 60          | 105.00                            | Total Capacity (Btu/h)            | 415000                        | 430000         | 445000         | 420000         | 435000         | 445000         | 420000         | 435000         | 450000         |     |    |    |
|                            |             |                                   | Sensible Capacity (Btu/h)         | 212000                        | 198000         | 182000         | 244000         | 230000         | 216000         | 272000         | 260000         | 246000         |     |    |    |
|                            |             |                                   | Electric Power (Watts)            | 26218                         | 26436          | 26674          | 26278          | 26478          | 26716          | 26290          | 26534          | 26780          |     |    |    |
|                            |             |                                   | Leaving Air Temp<br>(°F db/°F wb) | 56.0 /<br>54.4                | 58.5 /<br>56.8 | 60.9 /<br>59.2 | 55.9 /<br>54.2 | 58.2 /<br>56.6 | 60.7 /<br>59.0 | 56.3 /<br>54.0 | 58.1 /<br>56.4 | 60.6 /<br>58.8 |     |    |    |
|                            | 75          | 105.00                            | Total Capacity (Btu/h)            | 394000                        | 405000         | 420000         | 398000         | 410000         | 425000         | 398000         | 410000         | 430000         |     |    |    |
|                            |             |                                   | Sensible Capacity (Btu/h)         | 202000                        | 188000         | 174000         | 234000         | 220000         | 206000         | 262000         | 252000         | 240000         |     |    |    |
|                            |             |                                   | Electric Power (Watts)            | 28756                         | 28954          | 29166          | 28832          | 29022          | 29208          | 28836          | 29062          | 29318          |     |    |    |
|                            |             |                                   | Leaving Air Temp<br>(°F db/°F wb) | 57.5 /<br>55.9                | 59.9 /<br>58.3 | 62.3 /<br>60.6 | 57.4 /<br>55.7 | 59.8 /<br>58.0 | 62.1 /<br>60.4 | 58.0 /<br>55.5 | 59.6 /<br>57.8 | 61.7 /<br>60.0 |     |    |    |
| 85                         | 105.00      | Total Capacity (Btu/h)            | 378000                            | 390000                        | 405000         | 380000         | 394000         | 405000         | 382000         | 396000         | 410000         |                |     |    |    |
|                            |             | Sensible Capacity (Btu/h)         | 196000                            | 182000                        | 168000         | 228000         | 214000         | 198000         | 254000         | 242000         | 234000         |                |     |    |    |
|                            |             | Electric Power (Watts)            | 30824                             | 31008                         | 31206          | 30866          | 31084          | 31282          | 30910          | 31130          | 31362          |                |     |    |    |
|                            |             | Leaving Air Temp<br>(°F db/°F wb) | 58.5 /<br>56.9                    | 60.9 /<br>59.3                | 63.3 /<br>61.6 | 58.3 /<br>56.7 | 60.8 /<br>59.0 | 63.2 /<br>61.4 | 59.1 /<br>56.5 | 61.3 /<br>58.8 | 62.7 /<br>61.0 |                |     |    |    |
| 7000                       | 50          | 105.00                            | Total Capacity (Btu/h)            | 460000                        | 475000         | 490000         | 460000         | 475000         | 490000         | 465000         | 480000         | 495000         |     |    |    |
|                            |             |                                   | Sensible Capacity (Btu/h)         | 242000                        | 224000         | 206000         | 278000         | 264000         | 246000         | 312000         | 298000         | 282000         |     |    |    |
|                            |             |                                   | Electric Power (Watts)            | 25362                         | 25618          | 25866          | 25386          | 25652          | 25932          | 25430          | 25692          | 25982          |     |    |    |
|                            |             |                                   | Leaving Air Temp<br>(°F db/°F wb) | 59.0 /<br>57.5                | 61.4 /<br>59.9 | 63.7 /<br>62.3 | 59.3 /<br>57.4 | 61.1 /<br>59.7 | 63.5 /<br>62.1 | 59.8 /<br>57.2 | 61.8 /<br>59.6 | 64.0 /<br>61.9 |     |    |    |
|                            | 60          | 105.00                            | Total Capacity (Btu/h)            | 445000                        | 460000         | 470000         | 450000         | 460000         | 475000         | 450000         | 465000         | 480000         |     |    |    |
|                            |             |                                   | Sensible Capacity (Btu/h)         | 236000                        | 218000         | 200000         | 272000         | 258000         | 240000         | 306000         | 294000         | 280000         |     |    |    |
|                            |             |                                   | Electric Power (Watts)            | 26658                         | 26900          | 27154          | 26784          | 26956          | 27220          | 26750          | 27052          | 27358          |     |    |    |
|                            |             |                                   | Leaving Air Temp<br>(°F db/°F wb) | 59.6 /<br>58.3                | 62.0 /<br>60.7 | 64.4 /<br>63.1 | 60.0 /<br>58.0 | 61.9 /<br>60.5 | 64.2 /<br>62.9 | 60.6 /<br>58.0 | 62.4 /<br>60.2 | 64.1 /<br>62.5 |     |    |    |
|                            | 75          | 105.00                            | Total Capacity (Btu/h)            | 420000                        | 430000         | 445000         | 425000         | 440000         | 450000         | 420000         | 440000         | 455000         |     |    |    |
|                            |             |                                   | Sensible Capacity (Btu/h)         | 226000                        | 208000         | 190000         | 262000         | 250000         | 234000         | 296000         | 284000         | 268000         |     |    |    |
|                            |             |                                   | Electric Power (Watts)            | 29162                         | 29380          | 29608          | 29236          | 29496          | 29716          | 29216          | 29500          | 29758          |     |    |    |
|                            |             |                                   | Leaving Air Temp<br>(°F db/°F wb) | 61.0 /<br>59.5                | 63.4 /<br>61.8 | 65.7 /<br>64.2 | 61.2 /<br>59.2 | 63.0 /<br>61.5 | 65.2 /<br>63.9 | 61.9 /<br>59.2 | 63.6 /<br>61.4 | 65.7 /<br>63.7 |     |    |    |
| 85                         | 105.00      | Total Capacity (Btu/h)            | 405000                            | 415000                        | 430000         | 405000         | 420000         | 430000         | 405000         | 420000         | 435000         |                |     |    |    |
|                            |             | Sensible Capacity (Btu/h)         | 222000                            | 204000                        | 186000         | 256000         | 244000         | 226000         | 288000         | 274000         | 260000         |                |     |    |    |
|                            |             | Electric Power (Watts)            | 31234                             | 31444                         | 31674          | 31264          | 31488          | 31722          | 31264          | 31546          | 31754          |                |     |    |    |
|                            |             | Leaving Air Temp<br>(°F db/°F wb) | 61.5 /<br>60.2                    | 63.8 /<br>62.5                | 66.2 /<br>64.8 | 62.1 /<br>60.0 | 63.7 /<br>62.3 | 66.1 /<br>64.6 | 62.9 /<br>60.0 | 64.7 /<br>62.2 | 66.6 /<br>64.5 |                |     |    |    |



**TABLE 9 - JROW WATER SOURCE HEAT PUMP COOLING GENERAL PERFORMANCE (CONT'D)**

| AIRFLOW<br>(CFM)    | EWT<br>(°F) | WATER<br>FLOW<br>(GPM)            |                                   | ENTERING AIR TEMPERATURE (°F) |                |                |                |                |                |                |                |                |     |    |    |
|---------------------|-------------|-----------------------------------|-----------------------------------|-------------------------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|-----|----|----|
|                     |             |                                   |                                   | COOLING                       |                |                |                |                |                |                |                |                |     |    |    |
|                     |             |                                   |                                   | DRY BULB                      |                |                | 90             |                |                | 95             |                |                | 100 |    |    |
|                     |             |                                   |                                   | WET BULB                      |                |                | 76             | 78             | 80             | 76             | 78             | 80             | 76  | 78 | 80 |
| <b>480 (40 TON)</b> |             |                                   |                                   |                               |                |                |                |                |                |                |                |                |     |    |    |
| 5000                | 50          | 120.00                            | Total Capacity (Btu/h)            | 445000                        | 465000         | 480000         | 450000         | 465000         | 480000         | 450000         | 465000         | 485000         |     |    |    |
|                     |             |                                   | Sensible Capacity (Btu/h)         | 220000                        | 208000         | 194000         | 248000         | 236000         | 224000         | 276000         | 264000         | 252000         |     |    |    |
|                     |             |                                   | Electric Power (Watts)            | 25644                         | 25884          | 26170          | 25672          | 25940          | 26204          | 25694          | 25968          | 26234          |     |    |    |
|                     |             |                                   | Leaving Air Temp<br>(°F db/°F wb) | 50.6 /<br>48.7                | 52.9 /<br>51.0 | 55.4 /<br>53.4 | 50.4 /<br>48.5 | 52.8 /<br>50.8 | 55.1 /<br>53.2 | 50.2 /<br>48.3 | 52.6 /<br>50.6 | 54.9 /<br>53.0 |     |    |    |
|                     | 60          | 120.00                            | Total Capacity (Btu/h)            | 435000                        | 450000         | 465000         | 435000         | 450000         | 465000         | 435000         | 450000         | 470000         |     |    |    |
|                     |             |                                   | Sensible Capacity (Btu/h)         | 212000                        | 202000         | 188000         | 242000         | 228000         | 216000         | 270000         | 258000         | 244000         |     |    |    |
|                     |             |                                   | Electric Power (Watts)            | 27026                         | 27246          | 27514          | 27054          | 27304          | 27546          | 27074          | 27332          | 27608          |     |    |    |
|                     |             |                                   | Leaving Air Temp<br>(°F db/°F wb) | 51.8 /<br>49.7                | 54.0 /<br>52.1 | 56.4 /<br>54.5 | 51.6 /<br>49.5 | 53.9 /<br>51.9 | 56.2 /<br>54.3 | 51.4 /<br>49.4 | 53.7 /<br>51.7 | 56.2 /<br>54.1 |     |    |    |
|                     | 75          | 120.00                            | Total Capacity (Btu/h)            | 410000                        | 425000         | 440000         | 415000         | 430000         | 445000         | 415000         | 430000         | 445000         |     |    |    |
|                     |             |                                   | Sensible Capacity (Btu/h)         | 204000                        | 192000         | 178000         | 232000         | 220000         | 208000         | 260000         | 248000         | 234000         |     |    |    |
|                     |             |                                   | Electric Power (Watts)            | 29592                         | 29774          | 30020          | 29618          | 29846          | 30052          | 29634          | 29870          | 30122          |     |    |    |
|                     |             |                                   | Leaving Air Temp<br>(°F db/°F wb) | 53.5 /<br>51.5                | 55.7 /<br>53.8 | 58.2 /<br>56.2 | 53.3 /<br>51.3 | 55.7 /<br>53.6 | 57.9 /<br>56.0 | 53.1 /<br>51.1 | 55.5 /<br>53.4 | 57.9 /<br>55.8 |     |    |    |
| 85                  | 120.00      | Total Capacity (Btu/h)            | 396000                            | 410000                        | 425000         | 398000         | 415000         | 425000         | 398000         | 415000         | 430000         |                |     |    |    |
|                     |             | Sensible Capacity (Btu/h)         | 196000                            | 186000                        | 172000         | 224000         | 212000         | 200000         | 252000         | 240000         | 228000         |                |     |    |    |
|                     |             | Electric Power (Watts)            | 31686                             | 31836                         | 32068          | 31710          | 31924          | 32098          | 31720          | 31944          | 32182          |                |     |    |    |
|                     |             | Leaving Air Temp<br>(°F db/°F wb) | 54.8 /<br>52.6                    | 56.9 /<br>55.0                | 59.3 /<br>57.3 | 54.6 /<br>52.5 | 56.9 /<br>54.7 | 59.1 /<br>57.1 | 54.4 /<br>52.3 | 56.7 /<br>54.6 | 59.1 /<br>56.9 |                |     |    |    |
| 6400                | 50          | 120.00                            | Total Capacity (Btu/h)            | 490000                        | 505000         | 520000         | 490000         | 505000         | 525000         | 490000         | 510000         | 525000         |     |    |    |
|                     |             |                                   | Sensible Capacity (Btu/h)         | 248000                        | 232000         | 214000         | 282000         | 268000         | 252000         | 318000         | 302000         | 288000         |     |    |    |
|                     |             |                                   | Electric Power (Watts)            | 26324                         | 26634          | 26968          | 26384          | 26668          | 27006          | 26404          | 26734          | 27048          |     |    |    |
|                     |             |                                   | Leaving Air Temp<br>(°F db/°F wb) | 55.3 /<br>53.8                | 57.7 /<br>56.1 | 60.1 /<br>58.5 | 55.3 /<br>53.6 | 57.5 /<br>56.0 | 59.9 /<br>58.3 | 55.1 /<br>53.4 | 57.5 /<br>55.8 | 59.7 /<br>58.2 |     |    |    |
|                     | 60          | 120.00                            | Total Capacity (Btu/h)            | 475000                        | 490000         | 505000         | 475000         | 490000         | 505000         | 475000         | 490000         | 510000         |     |    |    |
|                     |             |                                   | Sensible Capacity (Btu/h)         | 242000                        | 224000         | 208000         | 276000         | 262000         | 246000         | 312000         | 296000         | 280000         |     |    |    |
|                     |             |                                   | Electric Power (Watts)            | 27638                         | 27930          | 28246          | 27702          | 27962          | 28282          | 27716          | 28022          | 28356          |     |    |    |
|                     |             |                                   | Leaving Air Temp<br>(°F db/°F wb) | 56.2 /<br>54.7                | 58.6 /<br>57.0 | 61 /<br>59.4   | 56.2 /<br>54.5 | 58.4 /<br>56.9 | 60.8 /<br>59.2 | 56.0 /<br>54.4 | 58.4 /<br>56.7 | 60.8 /<br>59.0 |     |    |    |
|                     | 75          | 120.00                            | Total Capacity (Btu/h)            | 445000                        | 465000         | 480000         | 450000         | 465000         | 480000         | 450000         | 465000         | 480000         |     |    |    |
|                     |             |                                   | Sensible Capacity (Btu/h)         | 230000                        | 214000         | 198000         | 266000         | 250000         | 236000         | 302000         | 286000         | 270000         |     |    |    |
|                     |             |                                   | Electric Power (Watts)            | 30102                         | 30374          | 30660          | 30174          | 30448          | 30696          | 30190          | 30466          | 30780          |     |    |    |
|                     |             |                                   | Leaving Air Temp<br>(°F db/°F wb) | 57.6 /<br>56.1                | 60.0 /<br>58.4 | 62.3 /<br>60.7 | 57.6 /<br>55.9 | 60.0 /<br>58.2 | 62.1 /<br>60.6 | 57.5 /<br>55.8 | 59.8 /<br>58.1 | 62.3 /<br>60.4 |     |    |    |
| 85                  | 120.00      | Total Capacity (Btu/h)            | 430000                            | 445000                        | 460000         | 430000         | 445000         | 460000         | 430000         | 445000         | 465000         |                |     |    |    |
|                     |             | Sensible Capacity (Btu/h)         | 224000                            | 208000                        | 192000         | 258000         | 242000         | 226000         | 294000         | 280000         | 262000         |                |     |    |    |
|                     |             | Electric Power (Watts)            | 32124                             | 32380                         | 32648          | 32210          | 32468          | 32734          | 32222          | 32480          | 32782          |                |     |    |    |
|                     |             | Leaving Air Temp<br>(°F db/°F wb) | 58.6 /<br>57.1                    | 60.9 /<br>59.4                | 63.3 /<br>61.7 | 58.7 /<br>56.9 | 61.0 /<br>59.2 | 63.4 /<br>61.5 | 58.5 /<br>56.8 | 60.8 /<br>59.1 | 63.3 /<br>61.3 |                |     |    |    |

# Performance Data (Cont'd)

**TABLE 9 - JROW WATER SOURCE HEAT PUMP COOLING GENERAL PERFORMANCE (CONT'D)**

| AIRFLOW<br>(CFM)           | EWT<br>(°F) | WATER<br>FLOW<br>(GPM) |                                   | ENTERING AIR TEMPERATURE (°F) |                |                |                |                |                |                |                |                |    |
|----------------------------|-------------|------------------------|-----------------------------------|-------------------------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|----|
|                            |             |                        |                                   | COOLING                       |                |                |                |                |                |                |                |                |    |
|                            |             |                        |                                   | DRY BULB                      | 90             |                |                | 95             |                |                | 100            |                |    |
|                            |             |                        |                                   | WET BULB                      | 76             | 78             | 80             | 76             | 78             | 80             | 76             | 78             | 80 |
| <b>480 (40 TON) CONT'D</b> |             |                        |                                   |                               |                |                |                |                |                |                |                |                |    |
| 8000                       | 50          | 120.00                 | Total Capacity (Btu/h)            | 520000                        | 540000         | 555000         | 520000         | 540000         | 555000         | 525000         | 540000         | 560000         |    |
|                            |             |                        | Sensible Capacity (Btu/h)         | 276000                        | 256000         | 236000         | 322000         | 302000         | 282000         | 360000         | 346000         | 326000         |    |
|                            |             |                        | Electric Power (Watts)            | 26946                         | 27290          | 27658          | 26978          | 27332          | 27706          | 26998          | 27358          | 27748          |    |
|                            |             |                        | Leaving Air Temp<br>(°F db/°F wb) | 59.0 /<br>57.8                | 61.3 /<br>60.1 | 63.7 /<br>62.4 | 58.9 /<br>57.6 | 61.2 /<br>59.9 | 63.5 /<br>62.3 | 59.4 /<br>57.5 | 61.1 /<br>59.8 | 63.5 /<br>62.1 |    |
|                            | 60          | 120.00                 | Total Capacity (Btu/h)            | 505000                        | 520000         | 535000         | 505000         | 520000         | 540000         | 505000         | 520000         | 540000         |    |
|                            |             |                        | Sensible Capacity (Btu/h)         | 270000                        | 250000         | 230000         | 314000         | 294000         | 276000         | 352000         | 340000         | 320000         |    |
|                            |             |                        | Electric Power (Watts)            | 28206                         | 28530          | 28878          | 28236          | 28572          | 28926          | 28290          | 28596          | 28960          |    |
|                            |             |                        | Leaving Air Temp<br>(°F db/°F wb) | 59.7 /<br>58.5                | 62.0 /<br>60.8 | 64.4 /<br>63.2 | 59.6 /<br>58.4 | 61.9 /<br>60.7 | 64.3 /<br>63.0 | 60.4 /<br>58.3 | 61.8 /<br>60.6 | 64.2 /<br>62.9 |    |
|                            | 75          | 120.00                 | Total Capacity (Btu/h)            | 475000                        | 490000         | 505000         | 475000         | 490000         | 510000         | 475000         | 495000         | 510000         |    |
|                            |             |                        | Sensible Capacity (Btu/h)         | 260000                        | 240000         | 220000         | 304000         | 284000         | 264000         | 340000         | 330000         | 310000         |    |
|                            |             |                        | Electric Power (Watts)            | 30596                         | 30892          | 31208          | 30624          | 30932          | 31258          | 30688          | 30954          | 31288          |    |
|                            |             |                        | Leaving Air Temp<br>(°F db/°F wb) | 60.9 /<br>59.7                | 63.2 /<br>62.0 | 65.5 /<br>64.3 | 60.8 /<br>59.6 | 63.1 /<br>61.8 | 65.4 /<br>64.1 | 61.7 /<br>59.4 | 63.0 /<br>61.7 | 65.3 /<br>64.0 |    |
|                            | 85          | 120.00                 | Total Capacity (Btu/h)            | 455000                        | 470000         | 485000         | 455000         | 470000         | 485000         | 460000         | 470000         | 490000         |    |
|                            |             |                        | Sensible Capacity (Btu/h)         | 252000                        | 232000         | 212000         | 296000         | 278000         | 258000         | 332000         | 316000         | 302000         |    |
|                            |             |                        | Electric Power (Watts)            | 32574                         | 32852          | 33148          | 32602          | 32888          | 33194          | 32672          | 32912          | 33226          |    |
|                            |             |                        | Leaving Air Temp<br>(°F db/°F wb) | 61.7 /<br>60.5                | 64.0 /<br>62.8 | 66.3 /<br>65.1 | 61.6 /<br>60.4 | 63.9 /<br>62.6 | 66.2 /<br>64.9 | 62.6 /<br>60.2 | 64.5 /<br>62.5 | 66.1 /<br>64.8 |    |
| <b>540 (45 TON)</b>        |             |                        |                                   |                               |                |                |                |                |                |                |                |                |    |
| 5625                       | 50          | 135.00                 | Total Capacity (Btu/h)            | 550000                        | 570000         | 590000         | 550000         | 570000         | 590000         | 555000         | 575000         | 595000         |    |
|                            |             |                        | Sensible Capacity (Btu/h)         | 270000                        | 256000         | 240000         | 302000         | 288000         | 272000         | 334000         | 320000         | 304000         |    |
|                            |             |                        | Electric Power (Watts)            | 31570                         | 31690          | 31784          | 31586          | 31706          | 31822          | 31596          | 31718          | 31836          |    |
|                            |             |                        | Leaving Air Temp<br>(°F db/°F wb) | 46.9 /<br>45.1                | 49.4 /<br>47.5 | 51.8 /<br>50.0 | 46.7 /<br>44.9 | 49.2 /<br>47.3 | 51.7 /<br>49.8 | 46.5 /<br>44.7 | 49.0 /<br>47.1 | 51.5 /<br>49.5 |    |
|                            | 60          | 135.00                 | Total Capacity (Btu/h)            | 535000                        | 555000         | 570000         | 535000         | 555000         | 575000         | 535000         | 555000         | 575000         |    |
|                            |             |                        | Sensible Capacity (Btu/h)         | 262000                        | 248000         | 234000         | 294000         | 280000         | 264000         | 326000         | 312000         | 296000         |    |
|                            |             |                        | Electric Power (Watts)            | 32880                         | 33020          | 33126          | 32900          | 33040          | 33180          | 32914          | 33058          | 33198          |    |
|                            |             |                        | Leaving Air Temp<br>(°F db/°F wb) | 48.2 /<br>46.4                | 50.7 /<br>48.8 | 53.0 /<br>51.3 | 48.0 /<br>46.2 | 50.5 /<br>48.6 | 53.0 /<br>51.0 | 47.8 /<br>46.0 | 50.3 /<br>48.4 | 52.7 /<br>50.8 |    |
|                            | 75          | 135.00                 | Total Capacity (Btu/h)            | 505000                        | 525000         | 545000         | 510000         | 525000         | 545000         | 510000         | 530000         | 550000         |    |
|                            |             |                        | Sensible Capacity (Btu/h)         | 248000                        | 234000         | 220000         | 280000         | 266000         | 252000         | 312000         | 298000         | 284000         |    |
|                            |             |                        | Electric Power (Watts)            | 36142                         | 36292          | 36398          | 36164          | 36318          | 36476          | 36180          | 36340          | 36500          |    |
|                            |             |                        | Leaving Air Temp<br>(°F db/°F wb) | 50.3 /<br>48.4                | 52.8 /<br>50.8 | 55.0 /<br>53.1 | 50.1 /<br>48.2 | 52.5 /<br>50.5 | 55.0 /<br>52.9 | 49.9 /<br>48.0 | 52.3 /<br>50.3 | 54.8 /<br>52.7 |    |
|                            | 85          | 135.00                 | Total Capacity (Btu/h)            | 490000                        | 505000         | 525000         | 490000         | 510000         | 525000         | 490000         | 510000         | 530000         |    |
|                            |             |                        | Sensible Capacity (Btu/h)         | 240000                        | 226000         | 210000         | 272000         | 258000         | 244000         | 304000         | 290000         | 276000         |    |
|                            |             |                        | Electric Power (Watts)            | 39214                         | 39360          | 39516          | 39236          | 39388          | 39546          | 39252          | 39410          | 39570          |    |
|                            |             |                        | Leaving Air Temp<br>(°F db/°F wb) | 51.8 /<br>49.7                | 54.2 /<br>52.1 | 56.6 /<br>54.5 | 51.6 /<br>49.5 | 53.9 /<br>51.9 | 56.4 /<br>54.2 | 51.3 /<br>49.4 | 53.7 /<br>51.7 | 56.2 /<br>54.0 |    |

**TABLE 9 - JROW WATER SOURCE HEAT PUMP COOLING GENERAL PERFORMANCE (CONT'D)**

| AIRFLOW<br>(CFM)           | EWT<br>(°F) | WATER<br>FLOW<br>(GPM)            |                                   | ENTERING AIR TEMPERATURE (°F) |                |                |                |                |                |                |                |                |    |
|----------------------------|-------------|-----------------------------------|-----------------------------------|-------------------------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|----|
|                            |             |                                   |                                   | COOLING                       |                |                |                |                |                |                |                |                |    |
|                            |             |                                   |                                   | DRY BULB                      | 90             |                |                | 95             |                |                | 100            |                |    |
|                            |             |                                   |                                   | WET BULB                      | 76             | 78             | 80             | 76             | 78             | 80             | 76             | 78             | 80 |
| <b>540 (45 TON) CONT'D</b> |             |                                   |                                   |                               |                |                |                |                |                |                |                |                |    |
| 7200                       | 50          | 135.00                            | Total Capacity (Btu/h)            | 605000                        | 625000         | 645000         | 605000         | 625000         | 650000         | 610000         | 630000         | 650000         |    |
|                            |             |                                   | Sensible Capacity (Btu/h)         | 302000                        | 284000         | 266000         | 342000         | 326000         | 306000         | 384000         | 364000         | 346000         |    |
|                            |             |                                   | Electric Power (Watts)            | 31866                         | 31972          | 32074          | 31904          | 31982          | 32084          | 31914          | 32022          | 32124          |    |
|                            |             |                                   | Leaving Air Temp<br>(°F db/°F wb) | 52.2 /<br>50.9                | 54.7 /<br>53.3 | 57.2 /<br>55.7 | 52.2 /<br>50.6 | 54.5 /<br>53.1 | 56.9 /<br>55.5 | 52.0 /<br>50.5 | 54.5 /<br>52.9 | 56.9 /<br>55.3 |    |
|                            | 60          | 135.00                            | Total Capacity (Btu/h)            | 585000                        | 605000         | 625000         | 590000         | 610000         | 630000         | 590000         | 610000         | 630000         |    |
|                            |             |                                   | Sensible Capacity (Btu/h)         | 294000                        | 276000         | 256000         | 334000         | 318000         | 298000         | 374000         | 356000         | 338000         |    |
|                            |             |                                   | Electric Power (Watts)            | 33218                         | 33352          | 33488          | 33272          | 33370          | 33502          | 33282          | 33422          | 33558          |    |
|                            |             |                                   | Leaving Air Temp<br>(°F db/°F wb) | 53.3 /<br>51.9                | 55.7 /<br>54.3 | 58.2 /<br>56.7 | 53.3 /<br>51.7 | 55.5 /<br>54.1 | 58.0 /<br>56.5 | 53.1 /<br>51.5 | 55.5 /<br>53.9 | 58.0 /<br>56.3 |    |
|                            | 75          | 135.00                            | Total Capacity (Btu/h)            | 555000                        | 575000         | 595000         | 555000         | 575000         | 595000         | 560000         | 580000         | 600000         |    |
|                            |             |                                   | Sensible Capacity (Btu/h)         | 282000                        | 262000         | 244000         | 320000         | 302000         | 286000         | 360000         | 344000         | 324000         |    |
|                            |             |                                   | Electric Power (Watts)            | 36484                         | 36644          | 36812          | 36562          | 36726          | 36830          | 36570          | 36740          | 36910          |    |
|                            |             |                                   | Leaving Air Temp<br>(°F db/°F wb) | 54.9 /<br>53.5                | 57.4 /<br>55.9 | 59.8 /<br>58.2 | 55.0 /<br>53.3 | 57.4 /<br>55.7 | 59.6 /<br>58.1 | 54.8 /<br>53.2 | 57.2 /<br>55.5 | 59.6 /<br>57.8 |    |
| 85                         | 135.00      | Total Capacity (Btu/h)            | 535000                            | 550000                        | 570000         | 535000         | 555000         | 570000         | 535000         | 555000         | 575000         |                |    |
|                            |             | Sensible Capacity (Btu/h)         | 270000                            | 254000                        | 236000         | 310000         | 292000         | 278000         | 352000         | 334000         | 316000         |                |    |
|                            |             | Electric Power (Watts)            | 39598                             | 39684                         | 39862          | 39620          | 39788          | 39884          | 39622          | 39802          | 39982          |                |    |
|                            |             | Leaving Air Temp<br>(°F db/°F wb) | 56.3 /<br>54.6                    | 58.5 /<br>57.0                | 60.8 /<br>59.3 | 56.1 /<br>54.4 | 58.5 /<br>56.8 | 60.6 /<br>59.1 | 55.9 /<br>54.3 | 58.3 /<br>56.6 | 60.7 /<br>58.9 |                |    |
| 9000                       | 50          | 135.00                            | Total Capacity (Btu/h)            | 650000                        | 670000         | 690000         | 650000         | 670000         | 695000         | 650000         | 675000         | 695000         |    |
|                            |             |                                   | Sensible Capacity (Btu/h)         | 334000                        | 312000         | 290000         | 386000         | 362000         | 338000         | 430000         | 415000         | 390000         |    |
|                            |             |                                   | Electric Power (Watts)            | 32116                         | 32174          | 32264          | 32132          | 32226          | 32314          | 32120          | 32220          | 32328          |    |
|                            |             |                                   | Leaving Air Temp<br>(°F db/°F wb) | 56.7 /<br>55.3                | 58.9 /<br>57.7 | 61.3 /<br>60.1 | 56.5 /<br>55.2 | 58.9 /<br>57.5 | 61.4 /<br>59.9 | 56.9 /<br>55.1 | 58.7 /<br>57.4 | 61.2 /<br>59.8 |    |
|                            | 60          | 135.00                            | Total Capacity (Btu/h)            | 630000                        | 645000         | 670000         | 630000         | 650000         | 670000         | 630000         | 650000         | 675000         |    |
|                            |             |                                   | Sensible Capacity (Btu/h)         | 324000                        | 304000         | 282000         | 376000         | 354000         | 330000         | 420000         | 405000         | 382000         |    |
|                            |             |                                   | Electric Power (Watts)            | 33540                         | 33618          | 33746          | 33554          | 33684          | 33808          | 33564          | 33682          | 33830          |    |
|                            |             |                                   | Leaving Air Temp<br>(°F db/°F wb) | 57.6 /<br>56.2                | 59.7 /<br>58.6 | 62.1 /<br>60.9 | 57.4 /<br>56.0 | 59.8 /<br>58.4 | 62.2 /<br>60.7 | 57.9 /<br>55.9 | 59.6 /<br>58.2 | 62.1 /<br>60.6 |    |
|                            | 75          | 135.00                            | Total Capacity (Btu/h)            | 595000                        | 610000         | 630000         | 595000         | 615000         | 635000         | 595000         | 615000         | 635000         |    |
|                            |             |                                   | Sensible Capacity (Btu/h)         | 312000                        | 288000         | 266000         | 364000         | 340000         | 318000         | 405000         | 392000         | 368000         |    |
|                            |             |                                   | Electric Power (Watts)            | 36862                         | 37018          | 37182          | 36858          | 37056          | 37210          | 36892          | 37050          | 37240          |    |
|                            |             |                                   | Leaving Air Temp<br>(°F db/°F wb) | 58.9 /<br>57.5                | 61.3 /<br>59.8 | 63.7 /<br>62.2 | 58.7 /<br>57.4 | 61.2 /<br>59.7 | 63.5 /<br>62.0 | 59.3 /<br>57.2 | 60.9 /<br>59.5 | 63.4 /<br>61.9 |    |
| 85                         | 135.00      | Total Capacity (Btu/h)            | 570000                            | 585000                        | 605000         | 570000         | 590000         | 610000         | 570000         | 590000         | 610000         |                |    |
|                            |             | Sensible Capacity (Btu/h)         | 302000                            | 280000                        | 256000         | 354000         | 330000         | 308000         | 396000         | 382000         | 358000         |                |    |
|                            |             | Electric Power (Watts)            | 39916                             | 40082                         | 40258          | 39904          | 40126          | 40300          | 39944          | 40124          | 40324          |                |    |
|                            |             | Leaving Air Temp<br>(°F db/°F wb) | 59.9 /<br>58.4                    | 62.2 /<br>60.7                | 64.6 /<br>63.0 | 59.6 /<br>58.3 | 62.1 /<br>60.5 | 64.4 /<br>62.9 | 60.3 /<br>58.2 | 61.9 /<br>60.4 | 64.3 /<br>62.7 |                |    |

# Performance Data (Cont'd)

**TABLE 9 - JROW WATER SOURCE HEAT PUMP COOLING GENERAL PERFORMANCE (CONT'D)**

| AIRFLOW<br>(CFM)    | EWT<br>(°F) | WATER<br>FLOW<br>(GPM) |                                   | ENTERING AIR TEMPERATURE (°F) |                |                |                |                |                |                |                |                |     |    |    |
|---------------------|-------------|------------------------|-----------------------------------|-------------------------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|-----|----|----|
|                     |             |                        |                                   | COOLING                       |                |                |                |                |                |                |                |                |     |    |    |
|                     |             |                        |                                   | DRY BULB                      |                |                | 90             |                |                | 95             |                |                | 100 |    |    |
|                     |             |                        |                                   | WET BULB                      |                |                | 76             | 78             | 80             | 76             | 78             | 80             | 76  | 78 | 80 |
| <b>600 (50 TON)</b> |             |                        |                                   |                               |                |                |                |                |                |                |                |                |     |    |    |
| 6250                | 50          | 150.00                 | Total Capacity (Btu/h)            | 600000                        | 620000         | 645000         | 600000         | 625000         | 645000         | 605000         | 625000         | 645000         |     |    |    |
|                     |             |                        | Sensible Capacity (Btu/h)         | 294000                        | 280000         | 262000         | 330000         | 314000         | 298000         | 366000         | 350000         | 334000         |     |    |    |
|                     |             |                        | Electric Power (Watts)            | 32648                         | 32812          | 33062          | 32676          | 32912          | 33092          | 32700          | 32940          | 33190          |     |    |    |
|                     |             |                        | Leaving Air Temp<br>(°F db/°F wb) | 47.7 /<br>45.9                | 50.0 /<br>48.4 | 52.5 /<br>50.8 | 47.5 /<br>45.7 | 49.9 /<br>48.1 | 52.3 /<br>50.5 | 47.3 /<br>45.5 | 49.7 /<br>47.9 | 52.2 /<br>50.3 |     |    |    |
|                     | 60          | 150.00                 | Total Capacity (Btu/h)            | 580000                        | 605000         | 625000         | 585000         | 605000         | 625000         | 585000         | 605000         | 630000         |     |    |    |
|                     |             |                        | Sensible Capacity (Btu/h)         | 286000                        | 270000         | 254000         | 322000         | 306000         | 290000         | 356000         | 342000         | 326000         |     |    |    |
|                     |             |                        | Electric Power (Watts)            | 35128                         | 35348          | 35514          | 35156          | 35382          | 35618          | 35178          | 35408          | 35650          |     |    |    |
|                     |             |                        | Leaving Air Temp<br>(°F db/°F wb) | 49.0 /<br>47.1                | 51.4 /<br>49.5 | 53.7 /<br>51.9 | 48.8 /<br>46.9 | 51.2 /<br>49.3 | 53.6 /<br>51.7 | 48.5 /<br>46.7 | 51.0 /<br>49.1 | 53.4 /<br>51.5 |     |    |    |
|                     | 75          | 150.00                 | Total Capacity (Btu/h)            | 555000                        | 575000         | 595000         | 555000         | 575000         | 595000         | 555000         | 580000         | 600000         |     |    |    |
|                     |             |                        | Sensible Capacity (Btu/h)         | 272000                        | 256000         | 242000         | 308000         | 292000         | 276000         | 344000         | 328000         | 312000         |     |    |    |
|                     |             |                        | Electric Power (Watts)            | 39568                         | 39770          | 39878          | 39594          | 39804          | 40024          | 39606          | 39826          | 40054          |     |    |    |
|                     |             |                        | Leaving Air Temp<br>(°F db/°F wb) | 50.9 /<br>49.0                | 53.3 /<br>51.4 | 55.5 /<br>53.7 | 50.7 /<br>48.8 | 53.1 /<br>51.1 | 55.6 /<br>53.5 | 50.5 /<br>48.6 | 52.9 /<br>50.9 | 55.3 /<br>53.3 |     |    |    |
|                     | 85          | 150.00                 | Total Capacity (Btu/h)            | 535000                        | 555000         | 575000         | 535000         | 555000         | 575000         | 535000         | 555000         | 580000         |     |    |    |
|                     |             |                        | Sensible Capacity (Btu/h)         | 262000                        | 246000         | 230000         | 298000         | 282000         | 266000         | 334000         | 318000         | 302000         |     |    |    |
|                     |             |                        | Electric Power (Watts)            | 43100                         | 43290          | 43492          | 43124          | 43322          | 43530          | 43106          | 43342          | 43556          |     |    |    |
|                     |             |                        | Leaving Air Temp<br>(°F db/°F wb) | 52.3 /<br>50.3                | 54.7 /<br>52.6 | 57.1 /<br>55.0 | 52.0 /<br>50.1 | 54.5 /<br>52.4 | 56.9 /<br>54.7 | 51.8 /<br>49.9 | 54.2 /<br>52.2 | 56.7 /<br>54.5 |     |    |    |
| 8000                | 50          | 150.00                 | Total Capacity (Btu/h)            | 660000                        | 680000         | 705000         | 660000         | 685000         | 705000         | 660000         | 685000         | 710000         |     |    |    |
|                     |             |                        | Sensible Capacity (Btu/h)         | 332000                        | 310000         | 290000         | 376000         | 356000         | 336000         | 420000         | 400000         | 380000         |     |    |    |
|                     |             |                        | Electric Power (Watts)            | 33236                         | 33500          | 33776          | 33334          | 33526          | 33808          | 33348          | 33620          | 33898          |     |    |    |
|                     |             |                        | Leaving Air Temp<br>(°F db/°F wb) | 52.8 /<br>51.5                | 55.3 /<br>53.9 | 57.7 /<br>56.3 | 52.8 /<br>51.3 | 55.0 /<br>53.7 | 57.5 /<br>56.1 | 52.6 /<br>51.2 | 55.1 /<br>53.5 | 57.5 /<br>55.9 |     |    |    |
|                     | 60          | 150.00                 | Total Capacity (Btu/h)            | 640000                        | 660000         | 680000         | 640000         | 660000         | 685000         | 640000         | 665000         | 685000         |     |    |    |
|                     |             |                        | Sensible Capacity (Btu/h)         | 322000                        | 302000         | 280000         | 366000         | 348000         | 326000         | 410000         | 392000         | 370000         |     |    |    |
|                     |             |                        | Electric Power (Watts)            | 35666                         | 35924          | 36192          | 35774          | 35952          | 36228          | 35784          | 36054          | 36324          |     |    |    |
|                     |             |                        | Leaving Air Temp<br>(°F db/°F wb) | 53.8 /<br>52.5                | 56.2 /<br>54.9 | 58.7 /<br>57.3 | 53.9 /<br>52.3 | 56.0 /<br>54.6 | 58.5 /<br>57.1 | 53.7 /<br>52.1 | 56.1 /<br>54.4 | 58.5 /<br>56.9 |     |    |    |
|                     | 75          | 150.00                 | Total Capacity (Btu/h)            | 605000                        | 625000         | 645000         | 610000         | 630000         | 650000         | 610000         | 630000         | 655000         |     |    |    |
|                     |             |                        | Sensible Capacity (Btu/h)         | 306000                        | 288000         | 268000         | 352000         | 332000         | 314000         | 396000         | 376000         | 356000         |     |    |    |
|                     |             |                        | Electric Power (Watts)            | 40112                         | 40242          | 40500          | 40140          | 40378          | 40534          | 40142          | 40398          | 40656          |     |    |    |
|                     |             |                        | Leaving Air Temp<br>(°F db/°F wb) | 55.7 /<br>54                  | 57.8 /<br>56.4 | 60.2 /<br>58.7 | 55.5 /<br>53.8 | 57.9 /<br>56.2 | 60.0 /<br>58.5 | 55.3 /<br>53.7 | 57.7 /<br>56.0 | 60.1 /<br>58.3 |     |    |    |
|                     | 85          | 150.00                 | Total Capacity (Btu/h)            | 580000                        | 600000         | 620000         | 585000         | 605000         | 625000         | 585000         | 605000         | 630000         |     |    |    |
|                     |             |                        | Sensible Capacity (Btu/h)         | 296000                        | 278000         | 258000         | 342000         | 322000         | 304000         | 388000         | 368000         | 346000         |     |    |    |
|                     |             |                        | Electric Power (Watts)            | 43594                         | 43658          | 43910          | 43614          | 43842          | 43944          | 43610          | 43854          | 44104          |     |    |    |
|                     |             |                        | Leaving Air Temp<br>(°F db/°F wb) | 56.8 /<br>55.1                | 58.8 /<br>57.4 | 61.2 /<br>59.8 | 56.5 /<br>54.9 | 59.0 /<br>57.2 | 61.0 /<br>59.6 | 56.4 /<br>54.8 | 58.8 /<br>57.1 | 61.2 /<br>59.4 |     |    |    |

**TABLE 9 - JROW WATER SOURCE HEAT PUMP COOLING GENERAL PERFORMANCE (CONT'D)**

| AIRFLOW<br>(CFM)           | EWT<br>(°F) | WATER<br>FLOW<br>(GPM) |                                   | ENTERING AIR TEMPERATURE (°F) |                |                |                |                |                |                |                |                |     |    |    |
|----------------------------|-------------|------------------------|-----------------------------------|-------------------------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|-----|----|----|
|                            |             |                        |                                   | COOLING                       |                |                |                |                |                |                |                |                |     |    |    |
|                            |             |                        |                                   | DRY BULB                      |                |                | 90             |                |                | 95             |                |                | 100 |    |    |
|                            |             |                        |                                   | WET BULB                      |                |                | 76             | 78             | 80             | 76             | 78             | 80             | 76  | 78 | 80 |
| <b>600 (50 TON) CONT'D</b> |             |                        |                                   |                               |                |                |                |                |                |                |                |                |     |    |    |
| 10000                      | 50          | 150.00                 | Total Capacity (Btu/h)            | 705000                        | 730000         | 750000         | 710000         | 730000         | 755000         | 710000         | 735000         | 760000         |     |    |    |
|                            |             |                        | Sensible Capacity (Btu/h)         | 368000                        | 342000         | 318000         | 420000         | 394000         | 376000         | 470000         | 455000         | 425000         |     |    |    |
|                            |             |                        | Electric Power (Watts)            | 33788                         | 34068          | 34364          | 34000          | 34276          | 34394          | 33882          | 34178          | 34616          |     |    |    |
|                            |             |                        | Leaving Air Temp<br>(°F db/°F wb) | 56.9 /<br>55.9                | 59.3 /<br>58.2 | 61.7 /<br>60.6 | 57.2 /<br>55.7 | 59.6 /<br>58.1 | 61.5 /<br>60.5 | 57.5 /<br>55.6 | 59.2 /<br>57.9 | 61.9 /<br>60.3 |     |    |    |
|                            | 60          | 150.00                 | Total Capacity (Btu/h)            | 685000                        | 705000         | 730000         | 685000         | 710000         | 730000         | 685000         | 710000         | 735000         |     |    |    |
|                            |             |                        | Sensible Capacity (Btu/h)         | 360000                        | 334000         | 308000         | 410000         | 386000         | 360000         | 460000         | 445000         | 420000         |     |    |    |
|                            |             |                        | Electric Power (Watts)            | 36188                         | 36460          | 36750          | 36374          | 36636          | 36912          | 36288          | 36582          | 36896          |     |    |    |
|                            |             |                        | Leaving Air Temp<br>(°F db/°F wb) | 57.8 /<br>56.7                | 60.1 /<br>59.0 | 62.5 /<br>61.4 | 58.0 /<br>56.5 | 60.4 /<br>58.8 | 62.7 /<br>61.2 | 58.4 /<br>56.4 | 60.0 /<br>58.7 | 62.4 /<br>61   |     |    |    |
|                            | 75          | 150.00                 | Total Capacity (Btu/h)            | 645000                        | 665000         | 690000         | 650000         | 670000         | 690000         | 650000         | 670000         | 695000         |     |    |    |
|                            |             |                        | Sensible Capacity (Btu/h)         | 340000                        | 320000         | 294000         | 400000         | 372000         | 348000         | 445000         | 425000         | 405000         |     |    |    |
|                            |             |                        | Electric Power (Watts)            | 40614                         | 40730          | 41006          | 40578          | 40910          | 41164          | 40652          | 40872          | 41142          |     |    |    |
|                            |             |                        | Leaving Air Temp<br>(°F db/°F wb) | 59.4 /<br>57.9                | 61.4 /<br>60.3 | 63.7 /<br>62.6 | 59.1 /<br>57.8 | 61.6 /<br>60.1 | 64.0 /<br>62.4 | 59.9 /<br>57.7 | 62.0 /<br>60.0 | 63.6 /<br>62.3 |     |    |    |
|                            | 85          | 150.00                 | Total Capacity (Btu/h)            | 620000                        | 640000         | 660000         | 620000         | 645000         | 665000         | 625000         | 645000         | 665000         |     |    |    |
|                            |             |                        | Sensible Capacity (Btu/h)         | 330000                        | 310000         | 286000         | 388000         | 362000         | 338000         | 435000         | 415000         | 396000         |     |    |    |
|                            |             |                        | Electric Power (Watts)            | 44064                         | 44120          | 44382          | 44034          | 44338          | 44570          | 44078          | 44288          | 44526          |     |    |    |
|                            |             |                        | Leaving Air Temp<br>(°F db/°F wb) | 60.4 /<br>58.8                | 62.2 /<br>61.1 | 64.6 /<br>63.4 | 60.1 /<br>58.7 | 62.5 /<br>60.9 | 64.9 /<br>63.3 | 60.9 /<br>58.5 | 62.9 /<br>60.8 | 64.5 /<br>63.1 |     |    |    |
| <b>660 (55 TON)</b>        |             |                        |                                   |                               |                |                |                |                |                |                |                |                |     |    |    |
| 6875                       | 50          | 165.00                 | Total Capacity (Btu/h)            | 655000                        | 675000         | 700000         | 655000         | 680000         | 705000         | 655000         | 680000         | 705000         |     |    |    |
|                            |             |                        | Sensible Capacity (Btu/h)         | 320000                        | 302000         | 286000         | 360000         | 342000         | 324000         | 398000         | 382000         | 364000         |     |    |    |
|                            |             |                        | Electric Power (Watts)            | 37578                         | 37910          | 38190          | 37620          | 37962          | 38322          | 37648          | 38000          | 38368          |     |    |    |
|                            |             |                        | Leaving Air Temp<br>(°F db/°F wb) | 48.2 /<br>46.3                | 50.6 /<br>48.7 | 52.9 /<br>51.1 | 48.0 /<br>46.1 | 50.4 /<br>48.5 | 52.8 /<br>50.9 | 47.8 /<br>45.9 | 50.2 /<br>48.3 | 52.6 /<br>50.6 |     |    |    |
|                            | 60          | 165.00                 | Total Capacity (Btu/h)            | 635000                        | 660000         | 680000         | 640000         | 660000         | 685000         | 640000         | 665000         | 685000         |     |    |    |
|                            |             |                        | Sensible Capacity (Btu/h)         | 312000                        | 294000         | 278000         | 350000         | 334000         | 316000         | 390000         | 372000         | 356000         |     |    |    |
|                            |             |                        | Electric Power (Watts)            | 40462                         | 40772          | 41006          | 40502          | 40816          | 41150          | 40534          | 40854          | 41192          |     |    |    |
|                            |             |                        | Leaving Air Temp<br>(°F db/°F wb) | 49.3 /<br>47.4                | 51.8 /<br>49.8 | 54.0 /<br>52.2 | 49.1 /<br>47.2 | 51.5 /<br>49.5 | 54.0 /<br>51.9 | 48.9 /<br>47.0 | 51.3 /<br>49.3 | 53.7 /<br>51.7 |     |    |    |
|                            | 75          | 165.00                 | Total Capacity (Btu/h)            | 605000                        | 630000         | 650000         | 610000         | 630000         | 655000         | 610000         | 635000         | 655000         |     |    |    |
|                            |             |                        | Sensible Capacity (Btu/h)         | 298000                        | 280000         | 262000         | 336000         | 320000         | 302000         | 376000         | 358000         | 342000         |     |    |    |
|                            |             |                        | Electric Power (Watts)            | 45500                         | 45772          | 46094          | 45536          | 45816          | 46108          | 45530          | 45848          | 46150          |     |    |    |
|                            |             |                        | Leaving Air Temp<br>(°F db/°F wb) | 51.1 /<br>49.1                | 53.6 /<br>51.5 | 56.0 /<br>53.9 | 50.9 /<br>48.9 | 53.3 /<br>51.3 | 55.8 /<br>53.6 | 50.7 /<br>48.7 | 53.1 /<br>51.0 | 55.6 /<br>53.4 |     |    |    |
|                            | 85          | 165.00                 | Total Capacity (Btu/h)            | 585000                        | 605000         | 630000         | 590000         | 610000         | 630000         | 590000         | 610000         | 635000         |     |    |    |
|                            |             |                        | Sensible Capacity (Btu/h)         | 288000                        | 270000         | 252000         | 326000         | 310000         | 292000         | 366000         | 350000         | 332000         |     |    |    |
|                            |             |                        | Electric Power (Watts)            | 49434                         | 49690          | 49958          | 49552          | 49732          | 50002          | 49580          | 49754          | 50044          |     |    |    |
|                            |             |                        | Leaving Air Temp<br>(°F db/°F wb) | 52.4 /<br>50.3                | 54.8 /<br>52.7 | 57.3 /<br>55.1 | 52.2 /<br>50.1 | 54.6 /<br>52.5 | 57.0 /<br>54.8 | 52.1 /<br>50.0 | 54.3 /<br>52.3 | 56.8 /<br>54.6 |     |    |    |

# Performance Data (Cont'd)

**TABLE 9 - JROW WATER SOURCE HEAT PUMP COOLING GENERAL PERFORMANCE (CONT'D)**

| AIRFLOW<br>(CFM)           | EWT<br>(°F) | WATER<br>FLOW<br>(GPM)            |                                   | ENTERING AIR TEMPERATURE (°F) |                |                |                |                |                |                |                |                |    |
|----------------------------|-------------|-----------------------------------|-----------------------------------|-------------------------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|----|
|                            |             |                                   |                                   | COOLING                       |                |                |                |                |                |                |                |                |    |
|                            |             |                                   |                                   | DRY BULB                      | 90             |                |                | 95             |                |                | 100            |                |    |
|                            |             |                                   |                                   | WET BULB                      | 76             | 78             | 80             | 76             | 78             | 80             | 76             | 78             | 80 |
| <b>660 (55 TON) CONT'D</b> |             |                                   |                                   |                               |                |                |                |                |                |                |                |                |    |
| 8800                       | 50          | 165.00                            | Total Capacity (Btu/h)            | 720000                        | 745000         | 770000         | 720000         | 745000         | 770000         | 725000         | 750000         | 775000         |    |
|                            |             |                                   | Sensible Capacity (Btu/h)         | 362000                        | 340000         | 316000         | 410000         | 390000         | 368000         | 460000         | 435000         | 415000         |    |
|                            |             |                                   | Electric Power (Watts)            | 38440                         | 38832          | 39248          | 38580          | 38870          | 39292          | 38602          | 39006          | 39416          |    |
|                            |             |                                   | Leaving Air Temp<br>(°F db/°F wb) | 53.1 /<br>51.8                | 55.5 /<br>54.1 | 58.0 /<br>56.5 | 53.1 /<br>51.6 | 55.3 /<br>53.9 | 57.7 /<br>56.4 | 53.0 /<br>51.4 | 55.3 /<br>53.7 | 57.8 /<br>56.1 |    |
|                            | 60          | 165.00                            | Total Capacity (Btu/h)            | 700000                        | 720000         | 745000         | 700000         | 725000         | 750000         | 700000         | 725000         | 750000         |    |
|                            |             |                                   | Sensible Capacity (Btu/h)         | 350000                        | 330000         | 306000         | 400000         | 378000         | 358000         | 450000         | 430000         | 405000         |    |
|                            |             |                                   | Electric Power (Watts)            | 41320                         | 41578          | 41964          | 41364          | 41722          | 42006          | 41380          | 41760          | 42142          |    |
|                            |             |                                   | Leaving Air Temp<br>(°F db/°F wb) | 54.4 /<br>52.7                | 56.4 /<br>55.1 | 58.9 /<br>57.4 | 54.1 /<br>52.5 | 56.5 /<br>54.8 | 58.6 /<br>57.2 | 54.0 /<br>52.3 | 56.3 /<br>54.6 | 58.8 /<br>57.0 |    |
|                            | 75          | 165.00                            | Total Capacity (Btu/h)            | 665000                        | 685000         | 710000         | 665000         | 690000         | 710000         | 670000         | 690000         | 715000         |    |
|                            |             |                                   | Sensible Capacity (Btu/h)         | 334000                        | 316000         | 292000         | 384000         | 362000         | 344000         | 435000         | 415000         | 390000         |    |
|                            |             |                                   | Electric Power (Watts)            | 46224                         | 46392          | 46746          | 46264          | 46580          | 46784          | 46272          | 46612          | 46956          |    |
|                            |             |                                   | Leaving Air Temp<br>(°F db/°F wb) | 55.9 /<br>54.1                | 57.9 /<br>56.5 | 60.3 /<br>58.8 | 55.6 /<br>53.9 | 58.1 /<br>56.3 | 60.1 /<br>58.6 | 55.4 /<br>53.8 | 57.8 /<br>56.1 | 60.3 /<br>58.4 |    |
| 85                         | 165.00      | Total Capacity (Btu/h)            | 640000                            | 660000                        | 685000         | 640000         | 665000         | 685000         | 645000         | 665000         | 690000         |                |    |
|                            |             | Sensible Capacity (Btu/h)         | 324000                            | 300000                        | 284000         | 374000         | 352000         | 334000         | 425000         | 400000         | 380000         |                |    |
|                            |             | Electric Power (Watts)            | 50088                             | 50572                         | 50500          | 50122          | 50418          | 50536          | 50116          | 50440          | 50764          |                |    |
|                            |             | Leaving Air Temp<br>(°F db/°F wb) | 56.9 /<br>55.1                    | 59.5 /<br>57.5                | 61.2 /<br>59.8 | 56.7 /<br>55.0 | 59.1 /<br>57.3 | 61.0 /<br>59.6 | 56.5 /<br>54.8 | 58.9 /<br>57.1 | 61.3 /<br>59.4 |                |    |
| 11000                      | 50          | 165.00                            | Total Capacity (Btu/h)            | 770000                        | 795000         | 820000         | 775000         | 800000         | 825000         | 775000         | 800000         | 830000         |    |
|                            |             |                                   | Sensible Capacity (Btu/h)         | 405000                        | 376000         | 348000         | 460000         | 430000         | 410000         | 515000         | 495000         | 465000         |    |
|                            |             |                                   | Electric Power (Watts)            | 39256                         | 39678          | 40124          | 39384          | 39982          | 40170          | 39394          | 39834          | 40494          |    |
|                            |             |                                   | Leaving Air Temp<br>(°F db/°F wb) | 57.1 /<br>56.1                | 59.5 /<br>58.4 | 61.9 /<br>60.8 | 57.2 /<br>55.9 | 59.8 /<br>58.2 | 61.6 /<br>60.6 | 57.8 /<br>55.8 | 59.4 /<br>58.1 | 62.1 /<br>60.4 |    |
|                            | 60          | 165.00                            | Total Capacity (Btu/h)            | 745000                        | 770000         | 795000         | 750000         | 775000         | 800000         | 750000         | 775000         | 800000         |    |
|                            |             |                                   | Sensible Capacity (Btu/h)         | 388000                        | 366000         | 338000         | 450000         | 425000         | 394000         | 505000         | 480000         | 460000         |    |
|                            |             |                                   | Electric Power (Watts)            | 42148                         | 42340          | 42752          | 42090          | 42592          | 42986          | 42098          | 42508          | 42954          |    |
|                            |             |                                   | Leaving Air Temp<br>(°F db/°F wb) | 58.3 /<br>56.8                | 60.3 /<br>59.2 | 62.6 /<br>61.5 | 58.1 /<br>56.6 | 60.5 /<br>59.0 | 62.9 /<br>61.3 | 58.7 /<br>56.5 | 60.8 /<br>58.8 | 62.5 /<br>61.2 |    |
|                            | 75          | 165.00                            | Total Capacity (Btu/h)            | 710000                        | 730000         | 755000         | 710000         | 735000         | 760000         | 710000         | 735000         | 760000         |    |
|                            |             |                                   | Sensible Capacity (Btu/h)         | 372000                        | 346000         | 324000         | 435000         | 410000         | 380000         | 490000         | 465000         | 445000         |    |
|                            |             |                                   | Electric Power (Watts)            | 46914                         | 47228          | 47422          | 46876          | 47302          | 47646          | 46874          | 47246          | 47606          |    |
|                            |             |                                   | Leaving Air Temp<br>(°F db/°F wb) | 59.6 /<br>58.0                | 61.9 /<br>60.3 | 63.8 /<br>62.7 | 59.3 /<br>57.8 | 61.8 /<br>60.1 | 64.1 /<br>62.5 | 60.0 /<br>57.7 | 62.2 /<br>60.0 | 63.7 /<br>62.3 |    |
| 85                         | 165.00      | Total Capacity (Btu/h)            | 680000                            | 705000                        | 725000         | 685000         | 705000         | 730000         | 685000         | 710000         | 730000         |                |    |
|                            |             | Sensible Capacity (Btu/h)         | 362000                            | 334000                        | 306000         | 425000         | 400000         | 370000         | 475000         | 450000         | 435000         |                |    |
|                            |             | Electric Power (Watts)            | 50734                             | 51006                         | 51312          | 50668          | 50934          | 51384          | 50652          | 51006          | 51308          |                |    |
|                            |             | Leaving Air Temp<br>(°F db/°F wb) | 60.5 /<br>58.8                    | 62.8 /<br>61.2                | 65.1 /<br>63.5 | 60.2 /<br>58.7 | 62.3 /<br>61.0 | 65.0 /<br>63.3 | 61.0 /<br>58.6 | 63.1 /<br>60.9 | 64.5 /<br>63.2 |                |    |

**TABLE 9 - JROW WATER SOURCE HEAT PUMP COOLING GENERAL PERFORMANCE (CONT'D)**

| AIRFLOW<br>(CFM)    | EWT<br>(°F) | WATER<br>FLOW<br>(GPM)            |                                   | ENTERING AIR TEMPERATURE (°F) |                |                |                |                |                |                |                |                |     |    |    |
|---------------------|-------------|-----------------------------------|-----------------------------------|-------------------------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|-----|----|----|
|                     |             |                                   |                                   | COOLING                       |                |                |                |                |                |                |                |                |     |    |    |
|                     |             |                                   |                                   | DRY BULB                      |                |                | 90             |                |                | 95             |                |                | 100 |    |    |
|                     |             |                                   |                                   | WET BULB                      |                |                | 76             | 78             | 80             | 76             | 78             | 80             | 76  | 78 | 80 |
| <b>720 (60 TON)</b> |             |                                   |                                   |                               |                |                |                |                |                |                |                |                |     |    |    |
| 7500                | 50          | 180.00                            | Total Capacity (Btu/h)            | 725000                        | 755000         | 780000         | 725000         | 755000         | 780000         | 725000         | 755000         | 785000         |     |    |    |
|                     |             |                                   | Sensible Capacity (Btu/h)         | 358000                        | 340000         | 312000         | 398000         | 382000         | 364000         | 440000         | 420000         | 405000         |     |    |    |
|                     |             |                                   | Electric Power (Watts)            | 38494                         | 38900          | 39720          | 38638          | 38920          | 39356          | 38660          | 39066          | 39370          |     |    |    |
|                     |             |                                   | Leaving Air Temp<br>(°F db/°F wb) | 47.1 /<br>45.6                | 49.5 /<br>47.9 | 52.8 /<br>50.3 | 47.3 /<br>45.5 | 49.3 /<br>47.8 | 51.7 /<br>50.1 | 47.1 /<br>45.3 | 49.5 /<br>47.6 | 51.5 /<br>49.9 |     |    |    |
|                     | 60          | 180.00                            | Total Capacity (Btu/h)            | 705000                        | 730000         | 760000         | 705000         | 730000         | 760000         | 705000         | 735000         | 760000         |     |    |    |
|                     |             |                                   | Sensible Capacity (Btu/h)         | 348000                        | 330000         | 310000         | 388000         | 372000         | 354000         | 430000         | 410000         | 392000         |     |    |    |
|                     |             |                                   | Electric Power (Watts)            | 41296                         | 41668          | 42062          | 41460          | 41688          | 42090          | 41482          | 41852          | 42244          |     |    |    |
|                     |             |                                   | Leaving Air Temp<br>(°F db/°F wb) | 48.4 /<br>46.8                | 50.7 /<br>49.1 | 53.0 /<br>51.5 | 48.5 /<br>46.6 | 50.5 /<br>48.9 | 52.8 /<br>51.3 | 48.4 /<br>46.5 | 50.7 /<br>48.8 | 53.1 /<br>51.1 |     |    |    |
|                     | 75          | 180.00                            | Total Capacity (Btu/h)            | 670000                        | 695000         | 720000         | 670000         | 700000         | 725000         | 675000         | 700000         | 725000         |     |    |    |
|                     |             |                                   | Sensible Capacity (Btu/h)         | 328000                        | 314000         | 296000         | 372000         | 352000         | 338000         | 415000         | 394000         | 376000         |     |    |    |
|                     |             |                                   | Electric Power (Watts)            | 46400                         | 46532          | 46884          | 46430          | 46744          | 46908          | 46446          | 46768          | 47110          |     |    |    |
|                     |             |                                   | Leaving Air Temp<br>(°F db/°F wb) | 50.6 /<br>48.7                | 52.5 /<br>51.0 | 54.9 /<br>53.3 | 50.5 /<br>48.5 | 52.8 /<br>50.8 | 54.7 /<br>53.1 | 50.3 /<br>48.4 | 52.7 /<br>50.6 | 55.1 /<br>52.9 |     |    |    |
| 85                  | 180.00      | Total Capacity (Btu/h)            | 645000                            | 670000                        | 695000         | 645000         | 670000         | 695000         | 650000         | 670000         | 700000         |                |     |    |    |
|                     |             | Sensible Capacity (Btu/h)         | 318000                            | 300000                        | 280000         | 360000         | 342000         | 322000         | 400000         | 388000         | 364000         |                |     |    |    |
|                     |             | Electric Power (Watts)            | 50322                             | 50580                         | 50880          | 50350          | 50634          | 51048          | 50336          | 50504          | 50968          |                |     |    |    |
|                     |             | Leaving Air Temp<br>(°F db/°F wb) | 52.0 /<br>50.0                    | 54.3 /<br>52.3                | 56.7 /<br>54.6 | 51.9 /<br>49.8 | 54.2 /<br>52.1 | 56.7 /<br>54.4 | 51.7 /<br>49.7 | 53.6 /<br>52.0 | 56.4 /<br>54.3 |                |     |    |    |
| 9600                | 50          | 180.00                            | Total Capacity (Btu/h)            | 800000                        | 830000         | 860000         | 805000         | 830000         | 860000         | 805000         | 835000         | 865000         |     |    |    |
|                     |             |                                   | Sensible Capacity (Btu/h)         | 405000                        | 380000         | 356000         | 455000         | 435000         | 410000         | 510000         | 480000         | 460000         |     |    |    |
|                     |             |                                   | Electric Power (Watts)            | 39626                         | 40096          | 40588          | 39872          | 40110          | 40614          | 39784          | 40388          | 40890          |     |    |    |
|                     |             |                                   | Leaving Air Temp<br>(°F db/°F wb) | 52.2 /<br>51.1                | 54.5 /<br>53.4 | 56.9 /<br>55.7 | 52.6 /<br>50.9 | 54.3 /<br>53.2 | 56.7 /<br>55.6 | 52.3 /<br>50.8 | 54.9 /<br>53.1 | 57.2 /<br>55.4 |     |    |    |
|                     | 60          | 180.00                            | Total Capacity (Btu/h)            | 775000                        | 805000         | 835000         | 780000         | 805000         | 835000         | 780000         | 805000         | 835000         |     |    |    |
|                     |             |                                   | Sensible Capacity (Btu/h)         | 394000                        | 370000         | 346000         | 440000         | 420000         | 394000         | 500000         | 475000         | 450000         |     |    |    |
|                     |             |                                   | Electric Power (Watts)            | 42302                         | 42738          | 43190          | 42536          | 42958          | 43410          | 42504          | 42882          | 43352          |     |    |    |
|                     |             |                                   | Leaving Air Temp<br>(°F db/°F wb) | 53.2 /<br>52.1                | 55.5 /<br>54.4 | 57.9 /<br>56.7 | 53.6 /<br>51.9 | 55.9 /<br>54.2 | 58.3 /<br>56.5 | 53.2 /<br>51.8 | 55.5 /<br>54.1 | 57.9 /<br>56.4 |     |    |    |
|                     | 75          | 180.00                            | Total Capacity (Btu/h)            | 735000                        | 765000         | 790000         | 735000         | 765000         | 795000         | 740000         | 765000         | 795000         |     |    |    |
|                     |             |                                   | Sensible Capacity (Btu/h)         | 370000                        | 352000         | 328000         | 430000         | 400000         | 376000         | 480000         | 460000         | 435000         |     |    |    |
|                     |             |                                   | Electric Power (Watts)            | 47270                         | 47440          | 47844          | 47184          | 47682          | 48068          | 47254          | 47578          | 47998          |     |    |    |
|                     |             |                                   | Leaving Air Temp<br>(°F db/°F wb) | 55.3 /<br>53.6                | 57.1 /<br>56.0 | 59.5 /<br>58.3 | 54.9 /<br>53.5 | 57.6 /<br>55.8 | 59.9 /<br>58.1 | 55.0 /<br>53.4 | 57.1 /<br>55.7 | 59.5 /<br>58.0 |     |    |    |
| 85                  | 180.00      | Total Capacity (Btu/h)            | 705000                            | 735000                        | 760000         | 710000         | 735000         | 760000         | 710000         | 735000         | 760000         |                |     |    |    |
|                     |             | Sensible Capacity (Btu/h)         | 358000                            | 334000                        | 318000         | 415000         | 392000         | 364000         | 465000         | 445000         | 425000         |                |     |    |    |
|                     |             | Electric Power (Watts)            | 51094                             | 51408                         | 51542          | 51070          | 51314          | 51810          | 51052          | 51438          | 51704          |                |     |    |    |
|                     |             | Leaving Air Temp<br>(°F db/°F wb) | 56.5 /<br>54.7                    | 58.9 /<br>57.1                | 60.5 /<br>59.4 | 56.3 /<br>54.6 | 58.4 /<br>56.9 | 61.1 /<br>59.2 | 56.1 /<br>54.5 | 58.5 /<br>56.8 | 60.5 /<br>59.1 |                |     |    |    |

# Performance Data (Cont'd)

**TABLE 9 - JROW WATER SOURCE HEAT PUMP COOLING GENERAL PERFORMANCE (CONT'D)**

| AIRFLOW<br>(CFM)           | EWT<br>(°F) | WATER<br>FLOW<br>(GPM) |                                   | ENTERING AIR TEMPERATURE (°F) |                |                |                |                |                |                |                |                |    |
|----------------------------|-------------|------------------------|-----------------------------------|-------------------------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|----|
|                            |             |                        |                                   | COOLING                       |                |                |                |                |                |                |                |                |    |
|                            |             |                        |                                   | DRY BULB                      | 90             |                |                | 95             |                |                | 100            |                |    |
|                            |             |                        |                                   | WET BULB                      | 76             | 78             | 80             | 76             | 78             | 80             | 76             | 78             | 80 |
| <b>720 (60 TON) CONT'D</b> |             |                        |                                   |                               |                |                |                |                |                |                |                |                |    |
| 12000                      | 50          | 180.00                 | Total Capacity (Btu/h)            | 865000                        | 895000         | 925000         | 865000         | 895000         | 925000         | 865000         | 895000         | 930000         |    |
|                            |             |                        | Sensible Capacity (Btu/h)         | 445000                        | 415000         | 394000         | 515000         | 485000         | 450000         | 580000         | 550000         | 520000         |    |
|                            |             |                        | Electric Power (Watts)            | 40832                         | 41338          | 41632          | 40726          | 41254          | 41944          | 40780          | 41376          | 41922          |    |
|                            |             |                        | Leaving Air Temp<br>(°F db/°F wb) | 56.9 /<br>55.4                | 59.2 /<br>57.7 | 60.7 /<br>60.0 | 56.4 /<br>55.3 | 58.7 /<br>57.6 | 61.5 /<br>59.9 | 56.3 /<br>55.2 | 58.9 /<br>57.4 | 61.2 /<br>59.8 |    |
|                            | 60          | 180.00                 | Total Capacity (Btu/h)            | 835000                        | 865000         | 895000         | 835000         | 865000         | 895000         | 835000         | 865000         | 895000         |    |
|                            |             |                        | Sensible Capacity (Btu/h)         | 430000                        | 400000         | 372000         | 500000         | 475000         | 445000         | 570000         | 540000         | 510000         |    |
|                            |             |                        | Electric Power (Watts)            | 43380                         | 43844          | 44330          | 43368          | 43770          | 44276          | 43332          | 43822          | 44336          |    |
|                            |             |                        | Leaving Air Temp<br>(°F db/°F wb) | 57.7 /<br>56.2                | 60.1 /<br>58.5 | 62.4 /<br>60.8 | 57.5 /<br>56.1 | 59.5 /<br>58.4 | 61.9 /<br>60.7 | 57.2 /<br>56.1 | 59.5 /<br>58.3 | 61.9 /<br>60.6 |    |
|                            | 75          | 180.00                 | Total Capacity (Btu/h)            | 785000                        | 815000         | 845000         | 790000         | 815000         | 845000         | 790000         | 815000         | 845000         |    |
|                            |             |                        | Sensible Capacity (Btu/h)         | 420000                        | 388000         | 354000         | 485000         | 455000         | 425000         | 550000         | 525000         | 495000         |    |
|                            |             |                        | Electric Power (Watts)            | 47888                         | 48306          | 48818          | 47934          | 48352          | 48794          | 48008          | 48376          | 48822          |    |
|                            |             |                        | Leaving Air Temp<br>(°F db/°F wb) | 58.8 /<br>57.6                | 61.1 /<br>59.9 | 63.8 /<br>62.1 | 58.7 /<br>57.5 | 61.0 /<br>59.7 | 63.3 /<br>62.0 | 58.8 /<br>57.4 | 60.9 /<br>59.6 | 63.2 /<br>61.9 |    |
|                            | 85          | 180.00                 | Total Capacity (Btu/h)            | 755000                        | 780000         | 805000         | 755000         | 780000         | 810000         | 755000         | 785000         | 810000         |    |
|                            |             |                        | Sensible Capacity (Btu/h)         | 405000                        | 376000         | 346000         | 470000         | 445000         | 415000         | 540000         | 505000         | 480000         |    |
|                            |             |                        | Electric Power (Watts)            | 51578                         | 51960          | 52358          | 51626          | 52008          | 52412          | 51646          | 52088          | 52438          |    |
|                            |             |                        | Leaving Air Temp<br>(°F db/°F wb) | 59.7 /<br>58.5                | 62.0 /<br>60.8 | 64.3 /<br>63.1 | 59.6 /<br>58.4 | 61.9 /<br>60.7 | 64.2 /<br>63.0 | 59.5 /<br>58.3 | 62.0 /<br>60.6 | 64.1 /<br>62.9 |    |
| <b>780 (65 TON)</b>        |             |                        |                                   |                               |                |                |                |                |                |                |                |                |    |
| 8125                       | 50          | 195.00                 | Total Capacity (Btu/h)            | 770000                        | 795000         | 825000         | 770000         | 800000         | 830000         | 770000         | 800000         | 830000         |    |
|                            |             |                        | Sensible Capacity (Btu/h)         | 390000                        | 370000         | 338000         | 430000         | 415000         | 396000         | 475000         | 460000         | 440000         |    |
|                            |             |                        | Electric Power (Watts)            | 33976                         | 34400          | 35322          | 34130          | 34412          | 34868          | 34140          | 34598          | 34872          |    |
|                            |             |                        | Leaving Air Temp<br>(°F db/°F wb) | 47.0 /<br>46.5                | 49.3 /<br>48.9 | 52.8 /<br>51.3 | 47.2 /<br>46.4 | 49.1 /<br>48.7 | 51.5 /<br>51.1 | 47.0 /<br>46.2 | 49.3 /<br>48.6 | 51.2 /<br>51.0 |    |
|                            | 60          | 195.00                 | Total Capacity (Btu/h)            | 745000                        | 775000         | 800000         | 750000         | 775000         | 805000         | 750000         | 775000         | 805000         |    |
|                            |             |                        | Sensible Capacity (Btu/h)         | 380000                        | 360000         | 338000         | 420000         | 405000         | 386000         | 465000         | 445000         | 430000         |    |
|                            |             |                        | Electric Power (Watts)            | 36734                         | 37124          | 37536          | 36920          | 37132          | 37554          | 36928          | 37312          | 37554          |    |
|                            |             |                        | Leaving Air Temp<br>(°F db/°F wb) | 48.1 /<br>47.7                | 50.4 /<br>50.0 | 52.8 /<br>52.4 | 48.3 /<br>47.5 | 50.2 /<br>49.8 | 52.6 /<br>52.2 | 48.2 /<br>47.3 | 50.5 /<br>49.7 | 52.4 /<br>52.1 |    |
|                            | 75          | 195.00                 | Total Capacity (Btu/h)            | 710000                        | 730000         | 765000         | 710000         | 735000         | 765000         | 710000         | 740000         | 765000         |    |
|                            |             |                        | Sensible Capacity (Btu/h)         | 358000                        | 328000         | 322000         | 405000         | 382000         | 364000         | 455000         | 430000         | 420000         |    |
|                            |             |                        | Electric Power (Watts)            | 41832                         | 43126          | 42294          | 41854          | 42368          | 42528          | 41784          | 42186          | 42144          |    |
|                            |             |                        | Leaving Air Temp<br>(°F db/°F wb) | 50.3 /<br>49.5                | 53.9 /<br>52.0 | 54.5 /<br>54.2 | 50.2 /<br>49.3 | 52.8 /<br>51.7 | 54.9 /<br>54.0 | 49.8 /<br>49.2 | 52.4 /<br>51.5 | 53.9 /<br>53.9 |    |
|                            | 85          | 195.00                 | Total Capacity (Btu/h)            | 685000                        | 710000         | 735000         | 685000         | 710000         | 735000         | 685000         | 710000         | 735000         |    |
|                            |             |                        | Sensible Capacity (Btu/h)         | 354000                        | 324000         | 306000         | 392000         | 380000         | 350000         | 440000         | 420000         | 405000         |    |
|                            |             |                        | Electric Power (Watts)            | 45354                         | 46212          | 46330          | 45760          | 45648          | 46548          | 45666          | 45944          | 45966          |    |
|                            |             |                        | Leaving Air Temp<br>(°F db/°F wb) | 50.9 /<br>50.8                | 54.2 /<br>53.2 | 56.4 /<br>55.5 | 51.5 /<br>50.6 | 53.0 /<br>53.0 | 56.5 /<br>55.3 | 51.1 /<br>50.5 | 53.3 /<br>52.8 | 55.2 /<br>55.2 |    |



**TABLE 9 - JROW WATER SOURCE HEAT PUMP COOLING GENERAL PERFORMANCE (CONT'D)**

| AIRFLOW<br>(CFM)           | EWT<br>(°F) | WATER<br>FLOW<br>(GPM)            |                                   | ENTERING AIR TEMPERATURE (°F) |                |                |                |                |                |                |                |                |     |    |    |
|----------------------------|-------------|-----------------------------------|-----------------------------------|-------------------------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|-----|----|----|
|                            |             |                                   |                                   | COOLING                       |                |                |                |                |                |                |                |                |     |    |    |
|                            |             |                                   |                                   | DRY BULB                      |                |                | 90             |                |                | 95             |                |                | 100 |    |    |
|                            |             |                                   |                                   | WET BULB                      |                |                | 76             | 78             | 80             | 76             | 78             | 80             | 76  | 78 | 80 |
| <b>780 (65 TON) CONT'D</b> |             |                                   |                                   |                               |                |                |                |                |                |                |                |                |     |    |    |
| 10400                      | 50          | 195.00                            | Total Capacity (Btu/h)            | 840000                        | 870000         | 905000         | 845000         | 875000         | 905000         | 845000         | 875000         | 905000         |     |    |    |
|                            |             |                                   | Sensible Capacity (Btu/h)         | 440000                        | 410000         | 386000         | 490000         | 465000         | 445000         | 550000         | 525000         | 500000         |     |    |    |
|                            |             |                                   | Electric Power (Watts)            | 35088                         | 35574          | 36080          | 35388          | 35868          | 36096          | 35236          | 35728          | 36252          |     |    |    |
|                            |             |                                   | Leaving Air Temp<br>(°F db/°F wb) | 52.2 /<br>52.0                | 54.5 /<br>54.3 | 56.9 /<br>56.7 | 52.7 /<br>51.9 | 55.1 /<br>54.2 | 56.6 /<br>56.6 | 52.3 /<br>51.8 | 54.5 /<br>54.1 | 56.9 /<br>56.4 |     |    |    |
|                            | 60          | 195.00                            | Total Capacity (Btu/h)            | 815000                        | 845000         | 875000         | 815000         | 845000         | 875000         | 820000         | 845000         | 880000         |     |    |    |
|                            |             |                                   | Sensible Capacity (Btu/h)         | 425000                        | 400000         | 376000         | 480000         | 450000         | 425000         | 540000         | 515000         | 490000         |     |    |    |
|                            |             |                                   | Electric Power (Watts)            | 37724                         | 38170          | 38636          | 37860          | 38448          | 38908          | 37990          | 38312          | 38796          |     |    |    |
|                            |             |                                   | Leaving Air Temp<br>(°F db/°F wb) | 53.1 /<br>53.0                | 55.5 /<br>55.3 | 57.8 /<br>57.7 | 53.3 /<br>52.8 | 56.0 /<br>55.2 | 58.4 /<br>57.5 | 53.4 /<br>52.7 | 55.5 /<br>55.1 | 57.9 /<br>57.4 |     |    |    |
|                            | 75          | 195.00                            | Total Capacity (Btu/h)            | 775000                        | 800000         | 830000         | 775000         | 800000         | 830000         | 775000         | 805000         | 830000         |     |    |    |
|                            |             |                                   | Sensible Capacity (Btu/h)         | 400000                        | 384000         | 358000         | 465000         | 440000         | 410000         | 520000         | 495000         | 470000         |     |    |    |
|                            |             |                                   | Electric Power (Watts)            | 42726                         | 42812          | 43232          | 42556          | 42962          | 43520          | 42624          | 43090          | 43488          |     |    |    |
|                            |             |                                   | Leaving Air Temp<br>(°F db/°F wb) | 55.3 /<br>54.5                | 56.9 /<br>56.8 | 59.3 /<br>59.2 | 54.8 /<br>54.4 | 57.2 /<br>56.7 | 59.9 /<br>59.0 | 54.9 /<br>54.2 | 57.3 /<br>56.5 | 59.6 /<br>58.9 |     |    |    |
| 85                         | 195.00      | Total Capacity (Btu/h)            | 740000                            | 770000                        | 795000         | 745000         | 770000         | 795000         | 745000         | 770000         | 800000         |                |     |    |    |
|                            |             | Sensible Capacity (Btu/h)         | 398000                            | 372000                        | 346000         | 450000         | 430000         | 400000         | 510000         | 485000         | 455000         |                |     |    |    |
|                            |             | Electric Power (Watts)            | 46026                             | 46372                         | 46896          | 46468          | 46358          | 47062          | 46410          | 46742          | 47208          |                |     |    |    |
|                            |             | Leaving Air Temp<br>(°F db/°F wb) | 55.6 /<br>55.6                    | 57.9 /<br>57.9                | 60.3 /<br>60.2 | 56.3 /<br>55.5 | 57.8 /<br>57.8 | 60.5 /<br>60.1 | 56.0 /<br>55.4 | 58.2 /<br>57.6 | 60.8 /<br>59.9 |                |     |    |    |
| 13000                      | 50          | 195.00                            | Total Capacity (Btu/h)            | 900000                        | 930000         | 965000         | 905000         | 935000         | 965000         | 905000         | 935000         | 965000         |     |    |    |
|                            |             |                                   | Sensible Capacity (Btu/h)         | 475000                        | 445000         | 410000         | 550000         | 525000         | 490000         | 625000         | 595000         | 565000         |     |    |    |
|                            |             |                                   | Electric Power (Watts)            | 36322                         | 36840          | 37382          | 36284          | 36694          | 37254          | 36282          | 36748          | 37338          |     |    |    |
|                            |             |                                   | Leaving Air Temp<br>(°F db/°F wb) | 57.1 /<br>56.3                | 59.5 /<br>58.6 | 61.8 /<br>61.0 | 56.8 /<br>56.2 | 58.8 /<br>58.5 | 61.1 /<br>60.8 | 56.7 /<br>56.1 | 58.8 /<br>58.4 | 61.2 /<br>60.7 |     |    |    |
|                            | 60          | 195.00                            | Total Capacity (Btu/h)            | 870000                        | 900000         | 930000         | 870000         | 900000         | 935000         | 875000         | 905000         | 935000         |     |    |    |
|                            |             |                                   | Sensible Capacity (Btu/h)         | 470000                        | 440000         | 400000         | 540000         | 510000         | 480000         | 615000         | 585000         | 550000         |     |    |    |
|                            |             |                                   | Electric Power (Watts)            | 38682                         | 39166          | 39790          | 38738          | 39224          | 39734          | 38798          | 39238          | 39756          |     |    |    |
|                            |             |                                   | Leaving Air Temp<br>(°F db/°F wb) | 57.5 /<br>57.1                | 59.8 /<br>59.4 | 62.6 /<br>61.7 | 57.5 /<br>57.0 | 59.8 /<br>59.3 | 62.1 /<br>61.6 | 57.5 /<br>56.9 | 59.6 /<br>59.2 | 62.0 /<br>61.5 |     |    |    |
|                            | 75          | 195.00                            | Total Capacity (Btu/h)            | 820000                        | 850000         | 880000         | 825000         | 850000         | 880000         | 825000         | 855000         | 880000         |     |    |    |
|                            |             |                                   | Sensible Capacity (Btu/h)         | 450000                        | 415000         | 388000         | 525000         | 495000         | 460000         | 595000         | 565000         | 535000         |     |    |    |
|                            |             |                                   | Electric Power (Watts)            | 43284                         | 43750          | 44116          | 43298          | 43722          | 44168          | 43314          | 43786          | 44184          |     |    |    |
|                            |             |                                   | Leaving Air Temp<br>(°F db/°F wb) | 58.8 /<br>58.4                | 61.4 /<br>60.7 | 63.4 /<br>63.0 | 58.7 /<br>58.3 | 61.0 /<br>60.6 | 63.3 /<br>62.9 | 58.6 /<br>58.2 | 61.1 /<br>60.4 | 63.2 /<br>62.8 |     |    |    |
| 85                         | 195.00      | Total Capacity (Btu/h)            | 785000                            | 815000                        | 840000         | 790000         | 815000         | 840000         | 790000         | 815000         | 845000         |                |     |    |    |
|                            |             | Sensible Capacity (Btu/h)         | 440000                            | 400000                        | 370000         | 510000         | 480000         | 450000         | 585000         | 550000         | 520000         |                |     |    |    |
|                            |             | Electric Power (Watts)            | 46958                             | 47408                         | 47796          | 46970          | 47354          | 47762          | 46988          | 47438          | 47842          |                |     |    |    |
|                            |             | Leaving Air Temp<br>(°F db/°F wb) | 59.7 /<br>59.3                    | 62.3 /<br>61.5                | 64.6 /<br>63.9 | 59.6 /<br>59.2 | 61.9 /<br>61.5 | 64.2 /<br>63.8 | 59.5 /<br>59.1 | 62.0 /<br>61.3 | 64.3 /<br>63.6 |                |     |    |    |

# Performance Data (Cont'd)

**TABLE 9 - JROW WATER SOURCE HEAT PUMP COOLING GENERAL PERFORMANCE (CONT'D)**

| AIRFLOW (CFM)       | EWT (°F) | WATER FLOW (GPM)               |                                | ENTERING AIR TEMPERATURE (°F) |             |             |             |             |             |             |             |             |     |    |    |
|---------------------|----------|--------------------------------|--------------------------------|-------------------------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-----|----|----|
|                     |          |                                |                                | COOLING                       |             |             |             |             |             |             |             |             |     |    |    |
|                     |          |                                |                                | DRY BULB                      |             |             | 90          |             |             | 95          |             |             | 100 |    |    |
|                     |          |                                |                                | WET BULB                      |             |             | 76          | 78          | 80          | 76          | 78          | 80          | 76  | 78 | 80 |
| <b>840 (70 TON)</b> |          |                                |                                |                               |             |             |             |             |             |             |             |             |     |    |    |
| 8750                | 50       | 210.00                         | Total Capacity (Btu/h)         | 855000                        | 885000      | 920000      | 855000      | 890000      | 920000      | 860000      | 890000      | 920000      |     |    |    |
|                     |          |                                | Sensible Capacity (Btu/h)      | 435000                        | 415000      | 390000      | 480000      | 460000      | 440000      | 530000      | 505000      | 485000      |     |    |    |
|                     |          |                                | Electric Power (Watts)         | 41440                         | 42014       | 42632       | 41698       | 42290       | 42658       | 41720       | 42320       | 42962       |     |    |    |
|                     |          |                                | Leaving Air Temp (°F db/°F wb) | 45.4 / 45.1                   | 47.8 / 47.5 | 50.2 / 49.9 | 45.7 / 45.0 | 48.1 / 47.3 | 50.0 / 49.7 | 45.5 / 44.8 | 47.9 / 47.2 | 50.4 / 49.6 |     |    |    |
|                     | 60       | 210.00                         | Total Capacity (Btu/h)         | 830000                        | 860000      | 895000      | 835000      | 865000      | 895000      | 835000      | 865000      | 895000      |     |    |    |
|                     |          |                                | Sensible Capacity (Btu/h)      | 420000                        | 400000      | 378000      | 470000      | 445000      | 430000      | 515000      | 495000      | 475000      |     |    |    |
|                     |          |                                | Electric Power (Watts)         | 44482                         | 44816       | 45406       | 44510       | 45060       | 45432       | 44530       | 45090       | 45692       |     |    |    |
|                     |          |                                | Leaving Air Temp (°F db/°F wb) | 47.0 / 46.3                   | 49.0 / 48.7 | 51.4 / 51.1 | 46.9 / 46.2 | 49.3 / 48.5 | 51.2 / 50.9 | 46.7 / 46.0 | 49.1 / 48.4 | 51.5 / 50.8 |     |    |    |
|                     | 75       | 210.00                         | Total Capacity (Btu/h)         | 790000                        | 820000      | 850000      | 795000      | 825000      | 855000      | 795000      | 825000      | 855000      |     |    |    |
|                     |          |                                | Sensible Capacity (Btu/h)      | 400000                        | 382000      | 360000      | 450000      | 430000      | 410000      | 500000      | 480000      | 455000      |     |    |    |
|                     |          |                                | Electric Power (Watts)         | 49742                         | 50014       | 50572       | 49770       | 50264       | 50590       | 49794       | 50294       | 50838       |     |    |    |
|                     |          |                                | Leaving Air Temp (°F db/°F wb) | 48.9 / 48.2                   | 50.8 / 50.5 | 53.3 / 52.9 | 48.7 / 48.1 | 51.1 / 50.4 | 53.1 / 52.8 | 48.6 / 47.9 | 50.9 / 50.2 | 53.3 / 52.6 |     |    |    |
| 85                  | 210.00   | Total Capacity (Btu/h)         | 765000                         | 790000                        | 820000      | 765000      | 795000      | 820000      | 765000      | 795000      | 825000      |             |     |    |    |
|                     |          | Sensible Capacity (Btu/h)      | 388000                         | 362000                        | 342000      | 435000      | 415000      | 390000      | 485000      | 465000      | 445000      |             |     |    |    |
|                     |          | Electric Power (Watts)         | 54046                          | 54792                         | 55054       | 54074       | 54532       | 55322       | 54134       | 54562       | 55072       |             |     |    |    |
|                     |          | Leaving Air Temp (°F db/°F wb) | 50.2 / 49.5                    | 53.0 / 51.9                   | 55.1 / 54.2 | 50.1 / 49.4 | 52.4 / 51.7 | 55.2 / 54.1 | 50.1 / 49.2 | 52.3 / 51.6 | 54.6 / 53.9 |             |     |    |    |
| 11200               | 50       | 210.00                         | Total Capacity (Btu/h)         | 940000                        | 975000      | 1005000     | 940000      | 975000      | 1010000     | 945000      | 975000      | 1010000     |     |    |    |
|                     |          |                                | Sensible Capacity (Btu/h)      | 485000                        | 460000      | 430000      | 540000      | 510000      | 495000      | 605000      | 580000      | 555000      |     |    |    |
|                     |          |                                | Electric Power (Watts)         | 43034                         | 43720       | 44452       | 43472       | 44164       | 44474       | 43404       | 43944       | 44704       |     |    |    |
|                     |          |                                | Leaving Air Temp (°F db/°F wb) | 50.9 / 50.9                   | 53.3 / 53.2 | 55.7 / 55.7 | 51.6 / 50.7 | 54.0 / 53.1 | 55.5 / 55.5 | 51.3 / 50.6 | 53.4 / 53.0 | 55.8 / 55.4 |     |    |    |
|                     | 60       | 210.00                         | Total Capacity (Btu/h)         | 910000                        | 945000      | 975000      | 915000      | 945000      | 980000      | 915000      | 945000      | 980000      |     |    |    |
|                     |          |                                | Sensible Capacity (Btu/h)      | 465000                        | 445000      | 420000      | 535000      | 500000      | 470000      | 595000      | 570000      | 540000      |     |    |    |
|                     |          |                                | Electric Power (Watts)         | 46082                         | 46406       | 47112       | 45932       | 46790       | 47484       | 45944       | 46608       | 47334       |     |    |    |
|                     |          |                                | Leaving Air Temp (°F db/°F wb) | 52.7 / 51.8                   | 54.3 / 54.2 | 56.7 / 56.6 | 52.2 / 51.7 | 54.9 / 54.0 | 57.4 / 56.4 | 52.2 / 51.6 | 54.3 / 53.9 | 56.8 / 56.3 |     |    |    |
|                     | 75       | 210.00                         | Total Capacity (Btu/h)         | 865000                        | 895000      | 925000      | 865000      | 900000      | 930000      | 870000      | 900000      | 930000      |     |    |    |
|                     |          |                                | Sensible Capacity (Btu/h)      | 445000                        | 420000      | 390000      | 515000      | 485000      | 460000      | 575000      | 545000      | 520000      |     |    |    |
|                     |          |                                | Electric Power (Watts)         | 51166                         | 51734       | 52354       | 50992       | 51614       | 52274       | 51178       | 51712       | 52402       |     |    |    |
|                     |          |                                | Leaving Air Temp (°F db/°F wb) | 54.3 / 53.4                   | 56.6 / 55.8 | 59.0 / 58.1 | 53.7 / 53.3 | 56.1 / 55.6 | 58.5 / 58.0 | 53.8 / 53.2 | 56.1 / 55.5 | 58.6 / 57.8 |     |    |    |
| 85                  | 210.00   | Total Capacity (Btu/h)         | 835000                         | 860000                        | 890000      | 835000      | 865000      | 895000      | 835000      | 865000      | 895000      |             |     |    |    |
|                     |          | Sensible Capacity (Btu/h)      | 430000                         | 405000                        | 376000      | 500000      | 475000      | 445000      | 560000      | 535000      | 505000      |             |     |    |    |
|                     |          | Electric Power (Watts)         | 55406                          | 55920                         | 56486       | 55238       | 55736       | 56362       | 55328       | 55838       | 56526       |             |     |    |    |
|                     |          | Leaving Air Temp (°F db/°F wb) | 55.4 / 54.5                    | 57.8 / 56.8                   | 60.1 / 59.2 | 54.9 / 54.4 | 57.1 / 56.7 | 59.5 / 59.0 | 54.9 / 54.3 | 57.2 / 56.6 | 59.7 / 58.9 |             |     |    |    |

TABLE 9 - JROW WATER SOURCE HEAT PUMP COOLING GENERAL PERFORMANCE (CONT'D)

| AIRFLOW<br>(CFM)           | EWT<br>(°F) | WATER<br>FLOW<br>(GPM) |                                   | ENTERING AIR TEMPERATURE (°F) |                |                |                |                |                |                |                |                |     |    |    |
|----------------------------|-------------|------------------------|-----------------------------------|-------------------------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|-----|----|----|
|                            |             |                        |                                   | COOLING                       |                |                |                |                |                |                |                |                |     |    |    |
|                            |             |                        |                                   | DRY BULB                      |                |                | 90             |                |                | 95             |                |                | 100 |    |    |
|                            |             |                        |                                   | WET BULB                      |                |                | 76             | 78             | 80             | 76             | 78             | 80             | 76  | 78 | 80 |
| <b>840 (70 TON) CONT'D</b> |             |                        |                                   |                               |                |                |                |                |                |                |                |                |     |    |    |
| 14000                      | 50          | 210.00                 | Total Capacity (Btu/h)            | 1005000                       | 1040000        | 1075000        | 1010000        | 1045000        | 1075000        | 1010000        | 1045000        | 1080000        |     |    |    |
|                            |             |                        | Sensible Capacity (Btu/h)         | 535000                        | 490000         | 455000         | 610000         | 575000         | 545000         | 685000         | 655000         | 620000         |     |    |    |
|                            |             |                        | Electric Power (Watts)            | 44628                         | 45658          | 46472          | 44832          | 45608          | 46258          | 44824          | 45504          | 46400          |     |    |    |
|                            |             |                        | Leaving Air Temp<br>(°F db/°F wb) | 55.7 /<br>55.4                | 58.7 /<br>57.7 | 61.1 /<br>60.1 | 55.9 /<br>55.3 | 58.3 /<br>57.6 | 60.2 /<br>60.0 | 55.7 /<br>55.1 | 57.9 /<br>57.5 | 60.3 /<br>59.9 |     |    |    |
|                            | 60          | 210.00                 | Total Capacity (Btu/h)            | 975000                        | 1005000        | 1040000        | 975000         | 1010000        | 1045000        | 975000         | 1010000        | 1045000        |     |    |    |
|                            |             |                        | Sensible Capacity (Btu/h)         | 520000                        | 485000         | 450000         | 600000         | 565000         | 525000         | 675000         | 645000         | 610000         |     |    |    |
|                            |             |                        | Electric Power (Watts)            | 47220                         | 47956          | 48736          | 47290          | 48048          | 48896          | 47316          | 48072          | 48872          |     |    |    |
|                            |             |                        | Leaving Air Temp<br>(°F db/°F wb) | 56.5 /<br>56.2                | 58.9 /<br>58.5 | 61.3 /<br>60.9 | 56.5 /<br>56.1 | 58.9 /<br>58.4 | 61.4 /<br>60.7 | 56.4 /<br>56.0 | 58.7 /<br>58.3 | 61.1 /<br>60.7 |     |    |    |
|                            | 75          | 210.00                 | Total Capacity (Btu/h)            | 925000                        | 955000         | 985000         | 925000         | 955000         | 985000         | 925000         | 955000         | 990000         |     |    |    |
|                            |             |                        | Sensible Capacity (Btu/h)         | 495000                        | 465000         | 430000         | 580000         | 545000         | 510000         | 655000         | 620000         | 585000         |     |    |    |
|                            |             |                        | Electric Power (Watts)            | 52224                         | 52794          | 53506          | 52184          | 52862          | 53592          | 52270          | 52954          | 53686          |     |    |    |
|                            |             |                        | Leaving Air Temp<br>(°F db/°F wb) | 58.1 /<br>57.5                | 60.2 /<br>59.8 | 62.5 /<br>62.1 | 57.8 /<br>57.4 | 60.1 /<br>59.7 | 62.4 /<br>62.0 | 57.9 /<br>57.3 | 60.2 /<br>59.6 | 62.5 /<br>61.9 |     |    |    |
|                            | 85          | 210.00                 | Total Capacity (Btu/h)            | 885000                        | 915000         | 945000         | 890000         | 915000         | 945000         | 890000         | 920000         | 950000         |     |    |    |
|                            |             |                        | Sensible Capacity (Btu/h)         | 485000                        | 455000         | 420000         | 560000         | 530000         | 495000         | 640000         | 605000         | 570000         |     |    |    |
|                            |             |                        | Electric Power (Watts)            | 56310                         | 56806          | 57480          | 56324          | 56950          | 57560          | 56364          | 56994          | 57680          |     |    |    |
|                            |             |                        | Leaving Air Temp<br>(°F db/°F wb) | 59.0 /<br>58.4                | 61.0 /<br>60.7 | 63.4 /<br>63.0 | 58.9 /<br>58.3 | 61.2 /<br>60.6 | 63.3 /<br>62.9 | 58.8 /<br>58.2 | 61.1 /<br>60.4 | 63.4 /<br>62.7 |     |    |    |

## Performance Data (Cont'd)

**TABLE 10 - JROW WATER SOURCE HEAT PUMP HEATING GENERAL PERFORMANCE**

| AIRFLOW<br>(CFM)   | EWT<br>(°F) | WATER<br>FLOW<br>(GPM) |                                | ENTERING AIR TEMPERATURE (°F) |       |       |
|--------------------|-------------|------------------------|--------------------------------|-------------------------------|-------|-------|
|                    |             |                        |                                | HEATING                       |       |       |
|                    |             |                        |                                | DRY BULB                      | 20    | 30    |
| <b>036 (3 TON)</b> |             |                        |                                |                               |       |       |
| 375                | 40          | 9.00                   | Total Capacity (Btu/h)         | 34000                         | 33400 | 33000 |
|                    |             |                        | Electric Power (Watts)         | 2756                          | 2987  | 3223  |
|                    |             |                        | Leaving Air Temp (°F db/°F wb) | 103.6                         | 112.4 | 121.3 |
|                    | 50          | 9.00                   | Total Capacity (Btu/h)         | 38000                         | 37400 | 37000 |
|                    |             |                        | Electric Power (Watts)         | 3004                          | 3223  | 3468  |
|                    |             |                        | Leaving Air Temp (°F db/°F wb) | 113.5                         | 122.1 | 131.2 |
|                    | 60          | 9.00                   | Total Capacity (Btu/h)         | 42500                         | 41500 | 41500 |
|                    |             |                        | Electric Power (Watts)         | 3237                          | 3480  | 3707  |
|                    |             |                        | Leaving Air Temp (°F db/°F wb) | 124.0                         | 132.7 | 141.6 |
|                    | 70          | 9.00                   | Total Capacity (Btu/h)         | 47000                         | 46500 | 46000 |
|                    |             |                        | Electric Power (Watts)         | 3514                          | 3715  | 4002  |
|                    |             |                        | Leaving Air Temp (°F db/°F wb) | 135.1                         | 143.9 | 153.6 |
| 480                | 40          | 9.00                   | Total Capacity (Btu/h)         | 34400                         | 34000 | 33600 |
|                    |             |                        | Electric Power (Watts)         | 2443                          | 2660  | 2900  |
|                    |             |                        | Leaving Air Temp (°F db/°F wb) | 86.3                          | 95.5  | 104.6 |
|                    | 50          | 9.00                   | Total Capacity (Btu/h)         | 39000                         | 38000 | 37800 |
|                    |             |                        | Electric Power (Watts)         | 2648                          | 2880  | 3121  |
|                    |             |                        | Leaving Air Temp (°F db/°F wb) | 94.8                          | 103.4 | 112.5 |
|                    | 60          | 9.00                   | Total Capacity (Btu/h)         | 43500                         | 42500 | 42000 |
|                    |             |                        | Electric Power (Watts)         | 2842                          | 3073  | 3320  |
|                    |             |                        | Leaving Air Temp (°F db/°F wb) | 103.5                         | 112.2 | 121.1 |
|                    | 70          | 9.00                   | Total Capacity (Btu/h)         | 48000                         | 47500 | 47000 |
|                    |             |                        | Electric Power (Watts)         | 3052                          | 3294  | 3547  |
|                    |             |                        | Leaving Air Temp (°F db/°F wb) | 112.7                         | 121.3 | 129.9 |
| 600                | 40          | 9.00                   | Total Capacity (Btu/h)         | 35200                         | 34600 | 34000 |
|                    |             |                        | Electric Power (Watts)         | 2251                          | 2449  | 2673  |
|                    |             |                        | Leaving Air Temp (°F db/°F wb) | 74.3                          | 83.3  | 92.4  |
|                    | 50          | 9.00                   | Total Capacity (Btu/h)         | 39500                         | 39000 | 38500 |
|                    |             |                        | Electric Power (Watts)         | 2408                          | 2622  | 2859  |
|                    |             |                        | Leaving Air Temp (°F db/°F wb) | 81                            | 90    | 98.9  |
|                    | 60          | 9.00                   | Total Capacity (Btu/h)         | 44500                         | 43500 | 43000 |
|                    |             |                        | Electric Power (Watts)         | 2580                          | 2796  | 3025  |
|                    |             |                        | Leaving Air Temp (°F db/°F wb) | 88.2                          | 97.3  | 106   |
|                    | 70          | 9.00                   | Total Capacity (Btu/h)         | 49500                         | 49000 | 48000 |
|                    |             |                        | Electric Power (Watts)         | 2733                          | 2969  | 3202  |
|                    |             |                        | Leaving Air Temp (°F db/°F wb) | 96.1                          | 105.3 | 113.5 |

TABLE 10 - JROW WATER SOURCE HEAT PUMP HEATING GENERAL PERFORMANCE (CONT'D)

| AIRFLOW<br>(CFM)   | EWT<br>(°F) | WATER<br>FLOW<br>(GPM) |                                | ENTERING AIR TEMPERATURE (°F) |       |       |
|--------------------|-------------|------------------------|--------------------------------|-------------------------------|-------|-------|
|                    |             |                        |                                | HEATING                       |       |       |
|                    |             |                        |                                | DRY BULB                      | 20    | 30    |
| <b>048 (4 TON)</b> |             |                        |                                |                               |       |       |
| 500                | 40          | 12.00                  | Total Capacity (Btu/h)         | 43000                         | 42500 | 42000 |
|                    |             |                        | Electric Power (Watts)         | 3373                          | 3633  | 3901  |
|                    |             |                        | Leaving Air Temp (°F db/°F wb) | 99.1                          | 108.4 | 117.2 |
|                    | 50          | 12.00                  | Total Capacity (Btu/h)         | 48500                         | 47500 | 47000 |
|                    |             |                        | Electric Power (Watts)         | 3618                          | 3895  | 4173  |
|                    |             |                        | Leaving Air Temp (°F db/°F wb) | 109.3                         | 118.0 | 126.6 |
|                    | 60          | 12.00                  | Total Capacity (Btu/h)         | 54000                         | 53000 | 52500 |
|                    |             |                        | Electric Power (Watts)         | 3897                          | 4184  | 4481  |
|                    |             |                        | Leaving Air Temp (°F db/°F wb) | 119.4                         | 127.9 | 136.6 |
|                    | 70          | 12.00                  | Total Capacity (Btu/h)         | 59500                         | 59000 | 58000 |
|                    |             |                        | Electric Power (Watts)         | 4226                          | 4527  | 4789  |
|                    |             |                        | Leaving Air Temp (°F db/°F wb) | 130.1                         | 138.6 | 147.1 |
| 640                | 40          | 12.00                  | Total Capacity (Btu/h)         | 44000                         | 43000 | 42500 |
|                    |             |                        | Electric Power (Watts)         | 3045                          | 3304  | 3559  |
|                    |             |                        | Leaving Air Temp (°F db/°F wb) | 83.4                          | 92.2  | 101.0 |
|                    | 50          | 12.00                  | Total Capacity (Btu/h)         | 49500                         | 48500 | 48000 |
|                    |             |                        | Electric Power (Watts)         | 3251                          | 3499  | 3774  |
|                    |             |                        | Leaving Air Temp (°F db/°F wb) | 91.3                          | 100.0 | 108.9 |
|                    | 60          | 12.00                  | Total Capacity (Btu/h)         | 55500                         | 54500 | 53500 |
|                    |             |                        | Electric Power (Watts)         | 3467                          | 3733  | 4019  |
|                    |             |                        | Leaving Air Temp (°F db/°F wb) | 99.9                          | 108.5 | 117.3 |
|                    | 70          | 12.00                  | Total Capacity (Btu/h)         | 61500                         | 60500 | 59500 |
|                    |             |                        | Electric Power (Watts)         | 3720                          | 3996  | 4291  |
|                    |             |                        | Leaving Air Temp (°F db/°F wb) | 108.8                         | 117.3 | 125.8 |
| 800                | 40          | 12.00                  | Total Capacity (Btu/h)         | 44500                         | 44000 | 43000 |
|                    |             |                        | Electric Power (Watts)         | 2815                          | 3061  | 3324  |
|                    |             |                        | Leaving Air Temp (°F db/°F wb) | 71.6                          | 80.6  | 89.6  |
|                    | 50          | 12.00                  | Total Capacity (Btu/h)         | 50500                         | 49500 | 48500 |
|                    |             |                        | Electric Power (Watts)         | 3013                          | 3248  | 3504  |
|                    |             |                        | Leaving Air Temp (°F db/°F wb) | 78.0                          | 87.0  | 96.1  |
|                    | 60          | 12.00                  | Total Capacity (Btu/h)         | 56500                         | 56000 | 54500 |
|                    |             |                        | Electric Power (Watts)         | 3186                          | 3429  | 3694  |
|                    |             |                        | Leaving Air Temp (°F db/°F wb) | 85.3                          | 94.4  | 103.0 |
|                    | 70          | 12.00                  | Total Capacity (Btu/h)         | 63500                         | 62500 | 61000 |
|                    |             |                        | Electric Power (Watts)         | 3378                          | 3647  | 3910  |
|                    |             |                        | Leaving Air Temp (°F db/°F wb) | 93.0                          | 102.1 | 110.3 |

## Performance Data (Cont'd)

**TABLE 10 - JROW WATER SOURCE HEAT PUMP HEATING GENERAL PERFORMANCE (CONT'D)**

| AIRFLOW<br>(CFM)   | EWT<br>(°F) | WATER<br>FLOW<br>(GPM) |                                | ENTERING AIR TEMPERATURE (°F) |       |       |
|--------------------|-------------|------------------------|--------------------------------|-------------------------------|-------|-------|
|                    |             |                        |                                | HEATING                       |       |       |
|                    |             |                        |                                | DRY BULB                      | 20    | 30    |
| <b>060 (5 TON)</b> |             |                        |                                |                               |       |       |
| 625                | 40          | 15.00                  | Total Capacity (Btu/h)         | 53000                         | 52000 | 51500 |
|                    |             |                        | Electric Power (Watts)         | 4166                          | 4492  | 4845  |
|                    |             |                        | Leaving Air Temp (°F db/°F wb) | 98.2                          | 107.2 | 116.3 |
|                    | 50          | 15.00                  | Total Capacity (Btu/h)         | 60000                         | 59000 | 58500 |
|                    |             |                        | Electric Power (Watts)         | 4494                          | 4838  | 5205  |
|                    |             |                        | Leaving Air Temp (°F db/°F wb) | 108.4                         | 117.0 | 126.1 |
|                    | 60          | 15.00                  | Total Capacity (Btu/h)         | 67000                         | 66000 | 65000 |
|                    |             |                        | Electric Power (Watts)         | 4883                          | 5227  | 5539  |
|                    |             |                        | Leaving Air Temp (°F db/°F wb) | 118.8                         | 127.3 | 136.5 |
|                    | 70          | 15.00                  | Total Capacity (Btu/h)         | 74000                         | 73000 | 73000 |
|                    |             |                        | Electric Power (Watts)         | 5290                          | 5624  | 6154  |
|                    |             |                        | Leaving Air Temp (°F db/°F wb) | 129.3                         | 137.9 | 147.3 |
| 800                | 40          | 15.00                  | Total Capacity (Btu/h)         | 54000                         | 53000 | 52500 |
|                    |             |                        | Electric Power (Watts)         | 3809                          | 4107  | 4438  |
|                    |             |                        | Leaving Air Temp (°F db/°F wb) | 82.2                          | 91.3  | 100.3 |
|                    | 50          | 15.00                  | Total Capacity (Btu/h)         | 61500                         | 60000 | 59500 |
|                    |             |                        | Electric Power (Watts)         | 4061                          | 4368  | 4717  |
|                    |             |                        | Leaving Air Temp (°F db/°F wb) | 90.8                          | 99.4  | 108.5 |
|                    | 60          | 15.00                  | Total Capacity (Btu/h)         | 68000                         | 67000 | 67000 |
|                    |             |                        | Electric Power (Watts)         | 4323                          | 4662  | 5031  |
|                    |             |                        | Leaving Air Temp (°F db/°F wb) | 99.0                          | 107.7 | 116.8 |
|                    | 70          | 15.00                  | Total Capacity (Btu/h)         | 77000                         | 75000 | 74000 |
|                    |             |                        | Electric Power (Watts)         | 4651                          | 4998  | 5363  |
|                    |             |                        | Leaving Air Temp (°F db/°F wb) | 108.3                         | 116.5 | 125.2 |
| 1000               | 40          | 15.00                  | Total Capacity (Btu/h)         | 54500                         | 54000 | 53000 |
|                    |             |                        | Electric Power (Watts)         | 3571                          | 3852  | 4166  |
|                    |             |                        | Leaving Air Temp (°F db/°F wb) | 70.5                          | 79.7  | 89.1  |
|                    | 50          | 15.00                  | Total Capacity (Btu/h)         | 62000                         | 61000 | 60500 |
|                    |             |                        | Electric Power (Watts)         | 3752                          | 4049  | 4374  |
|                    |             |                        | Leaving Air Temp (°F db/°F wb) | 77.3                          | 86.5  | 95.6  |
|                    | 60          | 15.00                  | Total Capacity (Btu/h)         | 70000                         | 69000 | 68000 |
|                    |             |                        | Electric Power (Watts)         | 3967                          | 4277  | 4617  |
|                    |             |                        | Leaving Air Temp (°F db/°F wb) | 84.9                          | 93.6  | 102.6 |
|                    | 70          | 15.00                  | Total Capacity (Btu/h)         | 78000                         | 77000 | 76000 |
|                    |             |                        | Electric Power (Watts)         | 4212                          | 4539  | 4892  |
|                    |             |                        | Leaving Air Temp (°F db/°F wb) | 92.1                          | 100.8 | 109.8 |

TABLE 10 - JROW WATER SOURCE HEAT PUMP HEATING GENERAL PERFORMANCE (CONT'D)

| AIRFLOW<br>(CFM)   | EWT<br>(°F) | WATER<br>FLOW<br>(GPM) |                                | ENTERING AIR TEMPERATURE (°F) |       |       |
|--------------------|-------------|------------------------|--------------------------------|-------------------------------|-------|-------|
|                    |             |                        |                                | HEATING                       |       |       |
|                    |             |                        |                                | DRY BULB                      | 20    | 30    |
| <b>072 (6 TON)</b> |             |                        |                                |                               |       |       |
| 750                | 40          | 18.00                  | Total Capacity (Btu/h)         | 56500                         | 55500 | 54500 |
|                    |             |                        | Electric Power (Watts)         | 3957                          | 4276  | 4628  |
|                    |             |                        | Leaving Air Temp (°F db/°F wb) | 89.5                          | 98.2  | 107.1 |
|                    | 50          | 18.00                  | Total Capacity (Btu/h)         | 63500                         | 62500 | 61500 |
|                    |             |                        | Electric Power (Watts)         | 4287                          | 4636  | 4999  |
|                    |             |                        | Leaving Air Temp (°F db/°F wb) | 98.2                          | 107.0 | 115.9 |
|                    | 60          | 18.00                  | Total Capacity (Btu/h)         | 71000                         | 70000 | 69000 |
|                    |             |                        | Electric Power (Watts)         | 4629                          | 4986  | 5368  |
|                    |             |                        | Leaving Air Temp (°F db/°F wb) | 107.5                         | 116.3 | 125.0 |
|                    | 70          | 18.00                  | Total Capacity (Btu/h)         | 79000                         | 78000 | 77000 |
|                    |             |                        | Electric Power (Watts)         | 5020                          | 5375  | 5761  |
|                    |             |                        | Leaving Air Temp (°F db/°F wb) | 117.8                         | 125.6 | 134.2 |
| 960                | 40          | 18.00                  | Total Capacity (Btu/h)         | 58000                         | 56500 | 55500 |
|                    |             |                        | Electric Power (Watts)         | 3629                          | 3916  | 4239  |
|                    |             |                        | Leaving Air Temp (°F db/°F wb) | 75.7                          | 84.5  | 93.5  |
|                    | 50          | 18.00                  | Total Capacity (Btu/h)         | 65000                         | 64000 | 63000 |
|                    |             |                        | Electric Power (Watts)         | 3871                          | 4188  | 4535  |
|                    |             |                        | Leaving Air Temp (°F db/°F wb) | 82.7                          | 91.5  | 100.4 |
|                    | 60          | 18.00                  | Total Capacity (Btu/h)         | 73000                         | 72000 | 71000 |
|                    |             |                        | Electric Power (Watts)         | 4160                          | 4480  | 4827  |
|                    |             |                        | Leaving Air Temp (°F db/°F wb) | 90.4                          | 99.2  | 108.0 |
|                    | 70          | 18.00                  | Total Capacity (Btu/h)         | 82000                         | 80000 | 79000 |
|                    |             |                        | Electric Power (Watts)         | 4444                          | 4780  | 5143  |
|                    |             |                        | Leaving Air Temp (°F db/°F wb) | 98.7                          | 107.2 | 115.8 |
| 1200               | 40          | 18.00                  | Total Capacity (Btu/h)         | 59000                         | 57500 | 56500 |
|                    |             |                        | Electric Power (Watts)         | 3381                          | 3667  | 3976  |
|                    |             |                        | Leaving Air Temp (°F db/°F wb) | 65.2                          | 74.3  | 83.5  |
|                    | 50          | 18.00                  | Total Capacity (Btu/h)         | 67000                         | 65000 | 64000 |
|                    |             |                        | Electric Power (Watts)         | 3586                          | 3887  | 4215  |
|                    |             |                        | Leaving Air Temp (°F db/°F wb) | 71.2                          | 80.1  | 89.2  |
|                    | 60          | 18.00                  | Total Capacity (Btu/h)         | 75000                         | 73000 | 72000 |
|                    |             |                        | Electric Power (Watts)         | 3834                          | 4148  | 4466  |
|                    |             |                        | Leaving Air Temp (°F db/°F wb) | 77.8                          | 86.3  | 95.2  |
|                    | 70          | 18.00                  | Total Capacity (Btu/h)         | 84000                         | 82000 | 81000 |
|                    |             |                        | Electric Power (Watts)         | 4070                          | 4381  | 4715  |
|                    |             |                        | Leaving Air Temp (°F db/°F wb) | 84.5                          | 93.1  | 102.1 |

## Performance Data (Cont'd)

**TABLE 10 - JROW WATER SOURCE HEAT PUMP HEATING GENERAL PERFORMANCE (CONT'D)**

| AIRFLOW<br>(CFM)   | EWT<br>(°F) | WATER<br>FLOW<br>(GPM) | DRY BULB                       | ENTERING AIR TEMPERATURE (°F) |        |        |
|--------------------|-------------|------------------------|--------------------------------|-------------------------------|--------|--------|
|                    |             |                        |                                | HEATING                       |        |        |
|                    |             |                        |                                | 20                            | 30     | 40     |
| <b>084 (7 TON)</b> |             |                        |                                |                               |        |        |
| 875                | 40          | 21.00                  | Total Capacity (Btu/h)         | 71000                         | 70000  | 69000  |
|                    |             |                        | Electric Power (Watts)         | 5548                          | 5925   | 6317   |
|                    |             |                        | Leaving Air Temp (°F db/°F wb) | 95.1                          | 103.8  | 112.9  |
|                    | 50          | 21.00                  | Total Capacity (Btu/h)         | 80000                         | 79000  | 78000  |
|                    |             |                        | Electric Power (Watts)         | 6055                          | 6449   | 6872   |
|                    |             |                        | Leaving Air Temp (°F db/°F wb) | 104.3                         | 113.3  | 121.9  |
|                    | 60          | 21.00                  | Total Capacity (Btu/h)         | 89000                         | 88000  | 87000  |
|                    |             |                        | Electric Power (Watts)         | 6626                          | 7046   | 7490   |
|                    |             |                        | Leaving Air Temp (°F db/°F wb) | 114.1                         | 122.9  | 131.6  |
|                    | 70          | 21.00                  | Total Capacity (Btu/h)         | 99000                         | 97000  | 96000  |
|                    |             |                        | Electric Power (Watts)         | 7257                          | 7707   | 8147   |
|                    |             |                        | Leaving Air Temp (°F db/°F wb) | 124.4                         | 132.8  | 141.3  |
| 1120               | 40          | 21.00                  | Total Capacity (Btu/h)         | 73000                         | 72000  | 70000  |
|                    |             |                        | Electric Power (Watts)         | 5076                          | 5455   | 5855   |
|                    |             |                        | Leaving Air Temp (°F db/°F wb) | 79.9                          | 89.0   | 97.9   |
|                    | 50          | 21.00                  | Total Capacity (Btu/h)         | 82000                         | 80000  | 79000  |
|                    |             |                        | Electric Power (Watts)         | 5518                          | 5889   | 6295   |
|                    |             |                        | Leaving Air Temp (°F db/°F wb) | 87.5                          | 96.3   | 105.3  |
|                    | 60          | 21.00                  | Total Capacity (Btu/h)         | 92000                         | 90000  | 89000  |
|                    |             |                        | Electric Power (Watts)         | 5968                          | 6370   | 6803   |
|                    |             |                        | Leaving Air Temp (°F db/°F wb) | 95.7                          | 104.4  | 113.2  |
|                    | 70          | 21.00                  | Total Capacity (Btu/h)         | 102000                        | 100000 | 99000  |
|                    |             |                        | Electric Power (Watts)         | 6481                          | 6906   | 7360   |
|                    |             |                        | Leaving Air Temp (°F db/°F wb) | 104.2                         | 112.7  | 121.2  |
| 1400               | 40          | 21.00                  | Total Capacity (Btu/h)         | 74000                         | 72000  | 72000  |
|                    |             |                        | Electric Power (Watts)         | 4760                          | 5110   | 5505   |
|                    |             |                        | Leaving Air Temp (°F db/°F wb) | 68.6                          | 77.8   | 87.2   |
|                    | 50          | 21.00                  | Total Capacity (Btu/h)         | 83000                         | 82000  | 80000  |
|                    |             |                        | Electric Power (Watts)         | 5165                          | 5515   | 5895   |
|                    |             |                        | Leaving Air Temp (°F db/°F wb) | 75.0                          | 84.0   | 93.1   |
|                    | 60          | 21.00                  | Total Capacity (Btu/h)         | 94000                         | 92000  | 91000  |
|                    |             |                        | Electric Power (Watts)         | 5538                          | 5905   | 6311   |
|                    |             |                        | Leaving Air Temp (°F db/°F wb) | 81.9                          | 90.8   | 99.7   |
|                    | 70          | 21.00                  | Total Capacity (Btu/h)         | 105000                        | 103000 | 101000 |
|                    |             |                        | Electric Power (Watts)         | 5961                          | 6349   | 6774   |
|                    |             |                        | Leaving Air Temp (°F db/°F wb) | 89.3                          | 97.8   | 106.6  |



TABLE 10 - JROW WATER SOURCE HEAT PUMP HEATING GENERAL PERFORMANCE (CONT'D)

| AIRFLOW<br>(CFM)   | EWT<br>(°F) | WATER<br>FLOW<br>(GPM) |                                | ENTERING AIR TEMPERATURE (°F) |        |        |
|--------------------|-------------|------------------------|--------------------------------|-------------------------------|--------|--------|
|                    |             |                        |                                | HEATING                       |        |        |
|                    |             |                        |                                | DRY BULB                      | 20     | 30     |
| <b>096 (8 TON)</b> |             |                        |                                |                               |        |        |
| 1000               | 40          | 24.00                  | Total Capacity (Btu/h)         | 80000                         | 79000  | 78000  |
|                    |             |                        | Electric Power (Watts)         | 6393                          | 6819   | 7261   |
|                    |             |                        | Leaving Air Temp (°F db/°F wb) | 93.8                          | 102.7  | 111.9  |
|                    | 50          | 24.00                  | Total Capacity (Btu/h)         | 90000                         | 89000  | 88000  |
|                    |             |                        | Electric Power (Watts)         | 6977                          | 7424   | 7902   |
|                    |             |                        | Leaving Air Temp (°F db/°F wb) | 103.1                         | 112.2  | 121.2  |
|                    | 60          | 24.00                  | Total Capacity (Btu/h)         | 101000                        | 100000 | 98000  |
|                    |             |                        | Electric Power (Watts)         | 7618                          | 8116   | 8615   |
|                    |             |                        | Leaving Air Temp (°F db/°F wb) | 113.1                         | 121.9  | 130.4  |
|                    | 70          | 24.00                  | Total Capacity (Btu/h)         | 112000                        | 110000 | 109000 |
|                    |             |                        | Electric Power (Watts)         | 8371                          | 8882   | 9330   |
|                    |             |                        | Leaving Air Temp (°F db/°F wb) | 123.4                         | 132.0  | 140.8  |
| 1280               | 40          | 24.00                  | Total Capacity (Btu/h)         | 81000                         | 80000  | 79000  |
|                    |             |                        | Electric Power (Watts)         | 5902                          | 6321   | 6751   |
|                    |             |                        | Leaving Air Temp (°F db/°F wb) | 78.6                          | 87.9   | 97.2   |
|                    | 50          | 24.00                  | Total Capacity (Btu/h)         | 92000                         | 91000  | 90000  |
|                    |             |                        | Electric Power (Watts)         | 6375                          | 6809   | 7261   |
|                    |             |                        | Leaving Air Temp (°F db/°F wb) | 86.4                          | 95.4   | 104.6  |
|                    | 60          | 24.00                  | Total Capacity (Btu/h)         | 103000                        | 102000 | 100000 |
|                    |             |                        | Electric Power (Watts)         | 6894                          | 7358   | 7854   |
|                    |             |                        | Leaving Air Temp (°F db/°F wb) | 94.6                          | 103.4  | 112.3  |
|                    | 70          | 24.00                  | Total Capacity (Btu/h)         | 115000                        | 113000 | 112000 |
|                    |             |                        | Electric Power (Watts)         | 7488                          | 7981   | 8504   |
|                    |             |                        | Leaving Air Temp (°F db/°F wb) | 103.2                         | 111.8  | 120.4  |
| 1600               | 40          | 24.00                  | Total Capacity (Btu/h)         | 82000                         | 81000  | 80000  |
|                    |             |                        | Electric Power (Watts)         | 5542                          | 5951   | 6396   |
|                    |             |                        | Leaving Air Temp (°F db/°F wb) | 67.5                          | 76.9   | 86.3   |
|                    | 50          | 24.00                  | Total Capacity (Btu/h)         | 94000                         | 92000  | 91000  |
|                    |             |                        | Electric Power (Watts)         | 5976                          | 6381   | 6814   |
|                    |             |                        | Leaving Air Temp (°F db/°F wb) | 74.0                          | 83.1   | 92.4   |
|                    | 60          | 24.00                  | Total Capacity (Btu/h)         | 106000                        | 104000 | 102000 |
|                    |             |                        | Electric Power (Watts)         | 6404                          | 6832   | 7301   |
|                    |             |                        | Leaving Air Temp (°F db/°F wb) | 80.9                          | 89.9   | 98.9   |
|                    | 70          | 24.00                  | Total Capacity (Btu/h)         | 118000                        | 116000 | 114000 |
|                    |             |                        | Electric Power (Watts)         | 6895                          | 7345   | 7839   |
|                    |             |                        | Leaving Air Temp (°F db/°F wb) | 88.2                          | 97.0   | 105.8  |

## Performance Data (Cont'd)

**TABLE 10 - JROW WATER SOURCE HEAT PUMP HEATING GENERAL PERFORMANCE (CONT'D)**

| AIRFLOW<br>(CFM)    | EWT<br>(°F) | WATER<br>FLOW<br>(GPM) |                                | ENTERING AIR TEMPERATURE (°F) |        |        |
|---------------------|-------------|------------------------|--------------------------------|-------------------------------|--------|--------|
|                     |             |                        |                                | HEATING                       |        |        |
|                     |             |                        |                                | DRY BULB                      | 20     | 30     |
| <b>120 (10 TON)</b> |             |                        |                                |                               |        |        |
| 1250                | 40          | 30.00                  | Total Capacity (Btu/h)         | 107000                        | 105000 | 103000 |
|                     |             |                        | Electric Power (Watts)         | 7522                          | 8094   | 8736   |
|                     |             |                        | Leaving Air Temp (°F db/°F wb) | 98.9                          | 107.3  | 116.1  |
|                     | 50          | 30.00                  | Total Capacity (Btu/h)         | 120000                        | 118000 | 116000 |
|                     |             |                        | Electric Power (Watts)         | 8178                          | 8780   | 9482   |
|                     |             |                        | Leaving Air Temp (°F db/°F wb) | 108.4                         | 116.8  | 125.5  |
|                     | 60          | 30.00                  | Total Capacity (Btu/h)         | 134000                        | 132000 | 129000 |
|                     |             |                        | Electric Power (Watts)         | 8894                          | 9592   | 10310  |
|                     |             |                        | Leaving Air Temp (°F db/°F wb) | 118.3                         | 126.9  | 135.4  |
|                     | 70          | 30.00                  | Total Capacity (Btu/h)         | 148000                        | 146000 | 142000 |
|                     |             |                        | Electric Power (Watts)         | 9752                          | 10476  | 11216  |
|                     |             |                        | Leaving Air Temp (°F db/°F wb) | 128.9                         | 137.1  | 145.5  |
| 1600                | 40          | 30.00                  | Total Capacity (Btu/h)         | 110000                        | 107000 | 105000 |
|                     |             |                        | Electric Power (Watts)         | 6770                          | 7302   | 7892   |
|                     |             |                        | Leaving Air Temp (°F db/°F wb) | 83.2                          | 91.8   | 100.8  |
|                     | 50          | 30.00                  | Total Capacity (Btu/h)         | 123000                        | 121000 | 119000 |
|                     |             |                        | Electric Power (Watts)         | 7248                          | 7814   | 8446   |
|                     |             |                        | Leaving Air Temp (°F db/°F wb) | 91.2                          | 99.7   | 108.5  |
|                     | 60          | 30.00                  | Total Capacity (Btu/h)         | 138000                        | 136000 | 132000 |
|                     |             |                        | Electric Power (Watts)         | 7794                          | 8422   | 9078   |
|                     |             |                        | Leaving Air Temp (°F db/°F wb) | 99.7                          | 108.3  | 116.6  |
|                     | 70          | 30.00                  | Total Capacity (Btu/h)         | 154000                        | 150000 | 148000 |
|                     |             |                        | Electric Power (Watts)         | 8432                          | 9082   | 9818   |
|                     |             |                        | Leaving Air Temp (°F db/°F wb) | 108.3                         | 116.6  | 125.1  |
| 2000                | 40          | 30.00                  | Total Capacity (Btu/h)         | 112000                        | 109000 | 107000 |
|                     |             |                        | Electric Power (Watts)         | 6256                          | 6764   | 7320   |
|                     |             |                        | Leaving Air Temp (°F db/°F wb) | 71.6                          | 80.4   | 89.5   |
|                     | 50          | 30.00                  | Total Capacity (Btu/h)         | 126000                        | 124000 | 121000 |
|                     |             |                        | Electric Power (Watts)         | 6620                          | 7160   | 7746   |
|                     |             |                        | Leaving Air Temp (°F db/°F wb) | 78.1                          | 87.0   | 95.9   |
|                     | 60          | 30.00                  | Total Capacity (Btu/h)         | 142000                        | 140000 | 136000 |
|                     |             |                        | Electric Power (Watts)         | 7066                          | 7630   | 8238   |
|                     |             |                        | Leaving Air Temp (°F db/°F wb) | 85.4                          | 94.3   | 102.8  |
|                     | 70          | 30.00                  | Total Capacity (Btu/h)         | 158000                        | 154000 | 152000 |
|                     |             |                        | Electric Power (Watts)         | 7562                          | 8150   | 8802   |
|                     |             |                        | Leaving Air Temp (°F db/°F wb) | 93.1                          | 101.4  | 109.8  |

TABLE 10 - JROW WATER SOURCE HEAT PUMP HEATING GENERAL PERFORMANCE (CONT'D)

| AIRFLOW<br>(CFM)      | EWT<br>(°F) | WATER<br>FLOW<br>(GPM) |                                | ENTERING AIR TEMPERATURE (°F) |        |        |
|-----------------------|-------------|------------------------|--------------------------------|-------------------------------|--------|--------|
|                       |             |                        |                                | HEATING                       |        |        |
|                       |             |                        |                                | DRY BULB                      | 20     | 30     |
| <b>150 (12.5 TON)</b> |             |                        |                                |                               |        |        |
| 1500                  | 40          | 36.00                  | Total Capacity (Btu/h)         | 128000                        | 127000 | 125000 |
|                       |             |                        | Electric Power (Watts)         | 9306                          | 9972   | 10666  |
|                       |             |                        | Leaving Air Temp (°F db/°F wb) | 99.0                          | 108.0  | 117.1  |
|                       | 50          | 36.00                  | Total Capacity (Btu/h)         | 144000                        | 142000 | 140000 |
|                       |             |                        | Electric Power (Watts)         | 10216                         | 10938  | 11686  |
|                       |             |                        | Leaving Air Temp (°F db/°F wb) | 108.6                         | 117.3  | 126.3  |
|                       | 60          | 36.00                  | Total Capacity (Btu/h)         | 160000                        | 158000 | 156000 |
|                       |             |                        | Electric Power (Watts)         | 11260                         | 12024  | 12812  |
|                       |             |                        | Leaving Air Temp (°F db/°F wb) | 118.7                         | 127.2  | 135.9  |
|                       | 70          | 36.00                  | Total Capacity (Btu/h)         | 178000                        | 174000 | 172000 |
|                       |             |                        | Electric Power (Watts)         | 12452                         | 13218  | 13924  |
|                       |             |                        | Leaving Air Temp (°F db/°F wb) | 129.1                         | 137.4  | 146.3  |
| 1920                  | 40          | 36.00                  | Total Capacity (Btu/h)         | 132000                        | 129000 | 127000 |
|                       |             |                        | Electric Power (Watts)         | 8464                          | 9078   | 9738   |
|                       |             |                        | Leaving Air Temp (°F db/°F wb) | 83.1                          | 92.1   | 101.3  |
|                       | 50          | 36.00                  | Total Capacity (Btu/h)         | 148000                        | 146000 | 144000 |
|                       |             |                        | Electric Power (Watts)         | 9172                          | 9828   | 10552  |
|                       |             |                        | Leaving Air Temp (°F db/°F wb) | 91.3                          | 99.9   | 108.9  |
|                       | 60          | 36.00                  | Total Capacity (Btu/h)         | 166000                        | 162000 | 160000 |
|                       |             |                        | Electric Power (Watts)         | 9990                          | 10698  | 11468  |
|                       |             |                        | Leaving Air Temp (°F db/°F wb) | 99.4                          | 108.1  | 116.9  |
|                       | 70          | 36.00                  | Total Capacity (Btu/h)         | 184000                        | 180000 | 178000 |
|                       |             |                        | Electric Power (Watts)         | 10924                         | 11676  | 12494  |
|                       |             |                        | Leaving Air Temp (°F db/°F wb) | 108.3                         | 116.6  | 125.2  |
| 2400                  | 40          | 36.00                  | Total Capacity (Btu/h)         | 134000                        | 132000 | 129000 |
|                       |             |                        | Electric Power (Watts)         | 7906                          | 8470   | 9096   |
|                       |             |                        | Leaving Air Temp (°F db/°F wb) | 71.5                          | 80.5   | 89.8   |
|                       | 50          | 36.00                  | Total Capacity (Btu/h)         | 152000                        | 148000 | 146000 |
|                       |             |                        | Electric Power (Watts)         | 8490                          | 9082   | 9752   |
|                       |             |                        | Leaving Air Temp (°F db/°F wb) | 78.2                          | 87.1   | 96.1   |
|                       | 60          | 36.00                  | Total Capacity (Btu/h)         | 170000                        | 166000 | 164000 |
|                       |             |                        | Electric Power (Watts)         | 9162                          | 9794   | 10496  |
|                       |             |                        | Leaving Air Temp (°F db/°F wb) | 85.1                          | 93.9   | 102.8  |
|                       | 70          | 36.00                  | Total Capacity (Btu/h)         | 188000                        | 184000 | 182000 |
|                       |             |                        | Electric Power (Watts)         | 9926                          | 10594  | 11344  |
|                       |             |                        | Leaving Air Temp (°F db/°F wb) | 92.6                          | 101.1  | 109.8  |

## Performance Data (Cont'd)

**TABLE 10 - JROW WATER SOURCE HEAT PUMP HEATING GENERAL PERFORMANCE (CONT'D)**

| AIRFLOW<br>(CFM)    | EWT<br>(°F) | WATER<br>FLOW<br>(GPM) |                                | ENTERING AIR TEMPERATURE (°F) |        |        |
|---------------------|-------------|------------------------|--------------------------------|-------------------------------|--------|--------|
|                     |             |                        |                                | HEATING                       |        |        |
|                     |             |                        |                                | DRY BULB                      | 20     | 30     |
| <b>180 (15 TON)</b> |             |                        |                                |                               |        |        |
| 1875                | 40          | 45.00                  | Total Capacity (Btu/h)         | 154000                        | 150000 | 148000 |
|                     |             |                        | Electric Power (Watts)         | 10996                         | 11752  | 12570  |
|                     |             |                        | Leaving Air Temp (°F db/°F wb) | 95.6                          | 104.2  | 113.2  |
|                     | 50          | 45.00                  | Total Capacity (Btu/h)         | 172000                        | 170000 | 166000 |
|                     |             |                        | Electric Power (Watts)         | 12040                         | 12876  | 13760  |
|                     |             |                        | Leaving Air Temp (°F db/°F wb) | 104.6                         | 113.3  | 122.2  |
|                     | 60          | 45.00                  | Total Capacity (Btu/h)         | 192000                        | 188000 | 186000 |
|                     |             |                        | Electric Power (Watts)         | 13260                         | 14152  | 15078  |
|                     |             |                        | Leaving Air Temp (°F db/°F wb) | 114.3                         | 122.8  | 131.4  |
|                     | 70          | 45.00                  | Total Capacity (Btu/h)         | 212000                        | 208000 | 206000 |
|                     |             |                        | Electric Power (Watts)         | 14648                         | 15554  | 16398  |
|                     |             |                        | Leaving Air Temp (°F db/°F wb) | 124.7                         | 132.6  | 141.2  |
| 2400                | 40          | 45.00                  | Total Capacity (Btu/h)         | 158000                        | 154000 | 152000 |
|                     |             |                        | Electric Power (Watts)         | 10048                         | 10750  | 11528  |
|                     |             |                        | Leaving Air Temp (°F db/°F wb) | 80.4                          | 89.2   | 98.3   |
|                     | 50          | 45.00                  | Total Capacity (Btu/h)         | 176000                        | 174000 | 170000 |
|                     |             |                        | Electric Power (Watts)         | 10876                         | 11640  | 12476  |
|                     |             |                        | Leaving Air Temp (°F db/°F wb) | 87.9                          | 96.7   | 105.7  |
|                     | 60          | 45.00                  | Total Capacity (Btu/h)         | 198000                        | 194000 | 190000 |
|                     |             |                        | Electric Power (Watts)         | 11846                         | 12660  | 13552  |
|                     |             |                        | Leaving Air Temp (°F db/°F wb) | 96.0                          | 104.7  | 113.4  |
|                     | 70          | 45.00                  | Total Capacity (Btu/h)         | 220000                        | 216000 | 212000 |
|                     |             |                        | Electric Power (Watts)         | 12956                         | 13814  | 14752  |
|                     |             |                        | Leaving Air Temp (°F db/°F wb) | 104.7                         | 112.8  | 121.4  |
| 3000                | 40          | 45.00                  | Total Capacity (Btu/h)         | 160000                        | 156000 | 154000 |
|                     |             |                        | Electric Power (Watts)         | 9416                          | 10070  | 10802  |
|                     |             |                        | Leaving Air Temp (°F db/°F wb) | 69.1                          | 78.1   | 87.3   |
|                     | 50          | 45.00                  | Total Capacity (Btu/h)         | 180000                        | 176000 | 174000 |
|                     |             |                        | Electric Power (Watts)         | 10118                         | 10806  | 11582  |
|                     |             |                        | Leaving Air Temp (°F db/°F wb) | 75.4                          | 84.4   | 93.5   |
|                     | 60          | 45.00                  | Total Capacity (Btu/h)         | 202000                        | 198000 | 196000 |
|                     |             |                        | Electric Power (Watts)         | 10928                         | 11652  | 12472  |
|                     |             |                        | Leaving Air Temp (°F db/°F wb) | 82.4                          | 91.1   | 100.0  |
|                     | 70          | 45.00                  | Total Capacity (Btu/h)         | 226000                        | 222000 | 218000 |
|                     |             |                        | Electric Power (Watts)         | 11848                         | 12610  | 13472  |
|                     |             |                        | Leaving Air Temp (°F db/°F wb) | 89.8                          | 98.1   | 106.8  |

TABLE 10 - JROW WATER SOURCE HEAT PUMP HEATING GENERAL PERFORMANCE (CONT'D)

| AIRFLOW<br>(CFM)      | EWT<br>(°F) | WATER<br>FLOW<br>(GPM) |                                | ENTERING AIR TEMPERATURE (°F) |        |        |
|-----------------------|-------------|------------------------|--------------------------------|-------------------------------|--------|--------|
|                       |             |                        |                                | HEATING                       |        |        |
|                       |             |                        |                                | DRY BULB                      | 20     | 30     |
| <b>210 (17.5 TON)</b> |             |                        |                                |                               |        |        |
| 2187.5                | 40          | 52.50                  | Total Capacity (Btu/h)         | 188000                        | 186000 | 184000 |
|                       |             |                        | Electric Power (Watts)         | 13470                         | 14446  | 15538  |
|                       |             |                        | Leaving Air Temp (°F db/°F wb) | 99.7                          | 108.4  | 117.4  |
|                       | 50          | 52.50                  | Total Capacity (Btu/h)         | 212000                        | 208000 | 206000 |
|                       |             |                        | Electric Power (Watts)         | 14714                         | 15804  | 16956  |
|                       |             |                        | Leaving Air Temp (°F db/°F wb) | 109.3                         | 118.1  | 127.0  |
|                       | 60          | 52.50                  | Total Capacity (Btu/h)         | 236000                        | 232000 | 230000 |
|                       |             |                        | Electric Power (Watts)         | 16138                         | 17284  | 18412  |
|                       |             |                        | Leaving Air Temp (°F db/°F wb) | 119.6                         | 127.9  | 136.7  |
|                       | 70          | 52.50                  | Total Capacity (Btu/h)         | 260000                        | 256000 | 252000 |
|                       |             |                        | Electric Power (Watts)         | 17688                         | 18758  | 19812  |
|                       |             |                        | Leaving Air Temp (°F db/°F wb) | 129.9                         | 138.0  | 146.6  |
| 2800                  | 40          | 52.50                  | Total Capacity (Btu/h)         | 194000                        | 190000 | 188000 |
|                       |             |                        | Electric Power (Watts)         | 12250                         | 13118  | 14112  |
|                       |             |                        | Leaving Air Temp (°F db/°F wb) | 83.9                          | 92.7   | 101.8  |
|                       | 50          | 52.50                  | Total Capacity (Btu/h)         | 218000                        | 214000 | 210000 |
|                       |             |                        | Electric Power (Watts)         | 13212                         | 14158  | 15194  |
|                       |             |                        | Leaving Air Temp (°F db/°F wb) | 91.7                          | 100.4  | 109.4  |
|                       | 60          | 52.50                  | Total Capacity (Btu/h)         | 242000                        | 238000 | 236000 |
|                       |             |                        | Electric Power (Watts)         | 14274                         | 15318  | 16438  |
|                       |             |                        | Leaving Air Temp (°F db/°F wb) | 100.0                         | 108.6  | 117.6  |
|                       | 70          | 52.50                  | Total Capacity (Btu/h)         | 270000                        | 264000 | 260000 |
|                       |             |                        | Electric Power (Watts)         | 15486                         | 16570  | 17738  |
|                       |             |                        | Leaving Air Temp (°F db/°F wb) | 108.9                         | 117.1  | 125.8  |
| 3500                  | 40          | 52.50                  | Total Capacity (Btu/h)         | 198000                        | 194000 | 190000 |
|                       |             |                        | Electric Power (Watts)         | 11378                         | 12206  | 13130  |
|                       |             |                        | Leaving Air Temp (°F db/°F wb) | 72.2                          | 81.1   | 90.2   |
|                       | 50          | 52.50                  | Total Capacity (Btu/h)         | 222000                        | 218000 | 214000 |
|                       |             |                        | Electric Power (Watts)         | 12144                         | 13038  | 14014  |
|                       |             |                        | Leaving Air Temp (°F db/°F wb) | 78.5                          | 87.5   | 96.5   |
|                       | 60          | 52.50                  | Total Capacity (Btu/h)         | 248000                        | 244000 | 240000 |
|                       |             |                        | Electric Power (Watts)         | 13030                         | 13966  | 15002  |
|                       |             |                        | Leaving Air Temp (°F db/°F wb) | 85.6                          | 94.4   | 103.3  |
|                       | 70          | 52.50                  | Total Capacity (Btu/h)         | 278000                        | 272000 | 266000 |
|                       |             |                        | Electric Power (Watts)         | 14008                         | 14978  | 16054  |
|                       |             |                        | Leaving Air Temp (°F db/°F wb) | 93.2                          | 101.6  | 110.2  |

## Performance Data (Cont'd)

**TABLE 10 - JROW WATER SOURCE HEAT PUMP HEATING GENERAL PERFORMANCE (CONT'D)**

| AIRFLOW<br>(CFM)    | EWT<br>(°F) | WATER<br>FLOW<br>(GPM) |                                | ENTERING AIR TEMPERATURE (°F) |        |        |
|---------------------|-------------|------------------------|--------------------------------|-------------------------------|--------|--------|
|                     |             |                        |                                | HEATING                       |        |        |
|                     |             |                        |                                | DRY BULB                      | 20     | 30     |
| <b>240 (20 TON)</b> |             |                        |                                |                               |        |        |
| 2500                | 40          | 60.00                  | Total Capacity (Btu/h)         | 214000                        | 210000 | 208000 |
|                     |             |                        | Electric Power (Watts)         | 15596                         | 16844  | 18204  |
|                     |             |                        | Leaving Air Temp (°F db/°F wb) | 98.8                          | 107.7  | 116.7  |
|                     | 50          | 60.00                  | Total Capacity (Btu/h)         | 240000                        | 236000 | 234000 |
|                     |             |                        | Electric Power (Watts)         | 17082                         | 18426  | 19892  |
|                     |             |                        | Leaving Air Temp (°F db/°F wb) | 108.5                         | 117.1  | 126.4  |
|                     | 60          | 60.00                  | Total Capacity (Btu/h)         | 266000                        | 264000 | 260000 |
|                     |             |                        | Electric Power (Watts)         | 18762                         | 20156  | 21584  |
|                     |             |                        | Leaving Air Temp (°F db/°F wb) | 118.5                         | 127.2  | 136.0  |
|                     | 70          | 60.00                  | Total Capacity (Btu/h)         | 296000                        | 290000 | 290000 |
|                     |             |                        | Electric Power (Watts)         | 20686                         | 21968  | 23070  |
|                     |             |                        | Leaving Air Temp (°F db/°F wb) | 129.0                         | 137.3  | 146.9  |
| 3200                | 40          | 60.00                  | Total Capacity (Btu/h)         | 220000                        | 214000 | 212000 |
|                     |             |                        | Electric Power (Watts)         | 14064                         | 15164  | 16404  |
|                     |             |                        | Leaving Air Temp (°F db/°F wb) | 83.3                          | 92.0   | 101.0  |
|                     | 50          | 60.00                  | Total Capacity (Btu/h)         | 246000                        | 242000 | 238000 |
|                     |             |                        | Electric Power (Watts)         | 15212                         | 16380  | 17678  |
|                     |             |                        | Leaving Air Temp (°F db/°F wb) | 91.0                          | 99.7   | 108.8  |
|                     | 60          | 60.00                  | Total Capacity (Btu/h)         | 276000                        | 270000 | 266000 |
|                     |             |                        | Electric Power (Watts)         | 16510                         | 17768  | 19148  |
|                     |             |                        | Leaving Air Temp (°F db/°F wb) | 99.5                          | 107.9  | 116.9  |
|                     | 70          | 60.00                  | Total Capacity (Btu/h)         | 306000                        | 300000 | 294000 |
|                     |             |                        | Electric Power (Watts)         | 18010                         | 19316  | 20738  |
|                     |             |                        | Leaving Air Temp (°F db/°F wb) | 108.1                         | 116.3  | 124.9  |
| 4000                | 40          | 60.00                  | Total Capacity (Btu/h)         | 222000                        | 218000 | 216000 |
|                     |             |                        | Electric Power (Watts)         | 12944                         | 14016  | 15178  |
|                     |             |                        | Leaving Air Temp (°F db/°F wb) | 71.2                          | 80.5   | 89.6   |
|                     | 50          | 60.00                  | Total Capacity (Btu/h)         | 250000                        | 246000 | 242000 |
|                     |             |                        | Electric Power (Watts)         | 13886                         | 15000  | 16212  |
|                     |             |                        | Leaving Air Temp (°F db/°F wb) | 77.9                          | 86.9   | 96.0   |
|                     | 60          | 60.00                  | Total Capacity (Btu/h)         | 282000                        | 276000 | 272000 |
|                     |             |                        | Electric Power (Watts)         | 14990                         | 16144  | 17408  |
|                     |             |                        | Leaving Air Temp (°F db/°F wb) | 85.1                          | 93.8   | 102.7  |
|                     | 70          | 60.00                  | Total Capacity (Btu/h)         | 314000                        | 308000 | 302000 |
|                     |             |                        | Electric Power (Watts)         | 16242                         | 17432  | 18736  |
|                     |             |                        | Leaving Air Temp (°F db/°F wb) | 92.5                          | 100.9  | 109.6  |

TABLE 10 - JROW WATER SOURCE HEAT PUMP HEATING GENERAL PERFORMANCE (CONT'D)

| AIRFLOW<br>(CFM)    | EWT<br>(°F) | WATER<br>FLOW<br>(GPM) |                                | ENTERING AIR TEMPERATURE (°F) |        |        |
|---------------------|-------------|------------------------|--------------------------------|-------------------------------|--------|--------|
|                     |             |                        |                                | HEATING                       |        |        |
|                     |             |                        |                                | DRY BULB                      | 20     | 30     |
| <b>300 (25 TON)</b> |             |                        |                                |                               |        |        |
| 3125                | 40          | 75.00                  | Total Capacity (Btu/h)         | 214000                        | 258000 | 254000 |
|                     |             |                        | Electric Power (Watts)         | 18756                         | 20004  | 21444  |
|                     |             |                        | Leaving Air Temp (°F db/°F wb) | 98.5                          | 106.5  | 115.3  |
|                     | 50          | 75.00                  | Total Capacity (Btu/h)         | 296000                        | 290000 | 286000 |
|                     |             |                        | Electric Power (Watts)         | 20286                         | 21762  | 23352  |
|                     |             |                        | Leaving Air Temp (°F db/°F wb) | 107.2                         | 115.8  | 124.6  |
|                     | 60          | 75.00                  | Total Capacity (Btu/h)         | 328000                        | 322000 | 318000 |
|                     |             |                        | Electric Power (Watts)         | 22180                         | 23712  | 25282  |
|                     |             |                        | Leaving Air Temp (°F db/°F wb) | 116.8                         | 125.2  | 134.0  |
|                     | 70          | 75.00                  | Total Capacity (Btu/h)         | 362000                        | 356000 | 352000 |
|                     |             |                        | Electric Power (Watts)         | 24144                         | 25704  | 27184  |
|                     |             |                        | Leaving Air Temp (°F db/°F wb) | 126.7                         | 135.0  | 143.7  |
| 4000                | 40          | 75.00                  | Total Capacity (Btu/h)         | 274000                        | 266000 | 262000 |
|                     |             |                        | Electric Power (Watts)         | 16998                         | 18202  | 19540  |
|                     |             |                        | Leaving Air Temp (°F db/°F wb) | 83.0                          | 91.4   | 100.4  |
|                     | 50          | 75.00                  | Total Capacity (Btu/h)         | 304000                        | 298000 | 294000 |
|                     |             |                        | Electric Power (Watts)         | 18190                         | 19496  | 20938  |
|                     |             |                        | Leaving Air Temp (°F db/°F wb) | 90.3                          | 98.7   | 107.7  |
|                     | 60          | 75.00                  | Total Capacity (Btu/h)         | 340000                        | 332000 | 326000 |
|                     |             |                        | Electric Power (Watts)         | 19600                         | 21028  | 22530  |
|                     |             |                        | Leaving Air Temp (°F db/°F wb) | 98.3                          | 106.7  | 115.5  |
|                     | 70          | 75.00                  | Total Capacity (Btu/h)         | 376000                        | 368000 | 362000 |
|                     |             |                        | Electric Power (Watts)         | 21178                         | 22688  | 24256  |
|                     |             |                        | Leaving Air Temp (°F db/°F wb) | 106.6                         | 114.8  | 123.4  |
| 5000                | 40          | 75.00                  | Total Capacity (Btu/h)         | 278000                        | 272000 | 266000 |
|                     |             |                        | Electric Power (Watts)         | 15700                         | 16942  | 18204  |
|                     |             |                        | Leaving Air Temp (°F db/°F wb) | 71.4                          | 80.4   | 89.2   |
|                     | 50          | 75.00                  | Total Capacity (Btu/h)         | 312000                        | 306000 | 300000 |
|                     |             |                        | Electric Power (Watts)         | 16642                         | 17958  | 19326  |
|                     |             |                        | Leaving Air Temp (°F db/°F wb) | 77.5                          | 86.4   | 95.3   |
|                     | 60          | 75.00                  | Total Capacity (Btu/h)         | 348000                        | 340000 | 334000 |
|                     |             |                        | Electric Power (Watts)         | 17762                         | 19134  | 20594  |
|                     |             |                        | Leaving Air Temp (°F db/°F wb) | 84.2                          | 92.8   | 101.8  |
|                     | 70          | 75.00                  | Total Capacity (Btu/h)         | 386000                        | 378000 | 370000 |
|                     |             |                        | Electric Power (Watts)         | 19006                         | 20456  | 21980  |
|                     |             |                        | Leaving Air Temp (°F db/°F wb) | 91.2                          | 99.6   | 108.2  |

## Performance Data (Cont'd)

**TABLE 10 - JROW WATER SOURCE HEAT PUMP HEATING GENERAL PERFORMANCE (CONT'D)**

| AIRFLOW<br>(CFM)    | EWT<br>(°F) | WATER<br>FLOW<br>(GPM) |                                | ENTERING AIR TEMPERATURE (°F) |        |        |
|---------------------|-------------|------------------------|--------------------------------|-------------------------------|--------|--------|
|                     |             |                        |                                | HEATING                       |        |        |
|                     |             |                        |                                | DRY BULB                      | 20     | 30     |
| <b>360 (30 TON)</b> |             |                        |                                |                               |        |        |
| 3750                | 40          | 90.00                  | Total Capacity (Btu/h)         | 214000                        | 294000 | 288000 |
|                     |             |                        | Electric Power (Watts)         | 20512                         | 21962  | 23546  |
|                     |             |                        | Leaving Air Temp (°F db/°F wb) | 93.7                          | 102.3  | 110.8  |
|                     | 50          | 90.00                  | Total Capacity (Btu/h)         | 334000                        | 328000 | 324000 |
|                     |             |                        | Electric Power (Watts)         | 22178                         | 23760  | 25496  |
|                     |             |                        | Leaving Air Temp (°F db/°F wb) | 102.4                         | 110.8  | 119.8  |
|                     | 60          | 90.00                  | Total Capacity (Btu/h)         | 372000                        | 366000 | 360000 |
|                     |             |                        | Electric Power (Watts)         | 24076                         | 25788  | 27632  |
|                     |             |                        | Leaving Air Temp (°F db/°F wb) | 111.6                         | 120.0  | 128.8  |
|                     | 70          | 90.00                  | Total Capacity (Btu/h)         | 410000                        | 405000 | 398000 |
|                     |             |                        | Electric Power (Watts)         | 26190                         | 27958  | 29746  |
|                     |             |                        | Leaving Air Temp (°F db/°F wb) | 121.0                         | 129.3  | 137.8  |
| 4800                | 40          | 90.00                  | Total Capacity (Btu/h)         | 308000                        | 302000 | 296000 |
|                     |             |                        | Electric Power (Watts)         | 18674                         | 20068  | 21528  |
|                     |             |                        | Leaving Air Temp (°F db/°F wb) | 79.3                          | 88.0   | 96.9   |
|                     | 50          | 90.00                  | Total Capacity (Btu/h)         | 346000                        | 338000 | 332000 |
|                     |             |                        | Electric Power (Watts)         | 19938                         | 21406  | 22982  |
|                     |             |                        | Leaving Air Temp (°F db/°F wb) | 86.5                          | 95.0   | 103.9  |
|                     | 60          | 90.00                  | Total Capacity (Btu/h)         | 386000                        | 376000 | 372000 |
|                     |             |                        | Electric Power (Watts)         | 21382                         | 22966  | 24652  |
|                     |             |                        | Leaving Air Temp (°F db/°F wb) | 94.1                          | 102.5  | 111.4  |
|                     | 70          | 90.00                  | Total Capacity (Btu/h)         | 425000                        | 415000 | 410000 |
|                     |             |                        | Electric Power (Watts)         | 23010                         | 24686  | 26462  |
|                     |             |                        | Leaving Air Temp (°F db/°F wb) | 102.0                         | 110.2  | 119.0  |
| 6000                | 40          | 90.00                  | Total Capacity (Btu/h)         | 314000                        | 308000 | 302000 |
|                     |             |                        | Electric Power (Watts)         | 17330                         | 18722  | 20148  |
|                     |             |                        | Leaving Air Temp (°F db/°F wb) | 68.4                          | 77.4   | 86.4   |
|                     | 50          | 90.00                  | Total Capacity (Btu/h)         | 352000                        | 346000 | 338000 |
|                     |             |                        | Electric Power (Watts)         | 18280                         | 19770  | 21296  |
|                     |             |                        | Leaving Air Temp (°F db/°F wb) | 74.2                          | 83.2   | 92.1   |
|                     | 60          | 90.00                  | Total Capacity (Btu/h)         | 396000                        | 386000 | 380000 |
|                     |             |                        | Electric Power (Watts)         | 19406                         | 20974  | 22596  |
|                     |             |                        | Leaving Air Temp (°F db/°F wb) | 80.8                          | 89.4   | 98.3   |
|                     | 70          | 90.00                  | Total Capacity (Btu/h)         | 440000                        | 430000 | 420000 |
|                     |             |                        | Electric Power (Watts)         | 20674                         | 22320  | 24020  |
|                     |             |                        | Leaving Air Temp (°F db/°F wb) | 87.4                          | 96.0   | 104.7  |



TABLE 10 - JROW WATER SOURCE HEAT PUMP HEATING GENERAL PERFORMANCE (CONT'D)

| AIRFLOW<br>(CFM)    | EWT<br>(°F) | WATER<br>FLOW<br>(GPM) |                                | ENTERING AIR TEMPERATURE (°F) |        |        |
|---------------------|-------------|------------------------|--------------------------------|-------------------------------|--------|--------|
|                     |             |                        |                                | HEATING                       |        |        |
|                     |             |                        |                                | DRY BULB                      | 20     | 30     |
| <b>420 (35 TON)</b> |             |                        |                                |                               |        |        |
| 4375                | 40          | 105.00                 | Total Capacity (Btu/h)         | 214000                        | 366000 | 362000 |
|                     |             |                        | Electric Power (Watts)         | 28298                         | 30106  | 32088  |
|                     |             |                        | Leaving Air Temp (°F db/°F wb) | 98.3                          | 107.2  | 116.2  |
|                     | 50          | 105.00                 | Total Capacity (Btu/h)         | 415000                        | 410000 | 405000 |
|                     |             |                        | Electric Power (Watts)         | 30746                         | 32674  | 34768  |
|                     |             |                        | Leaving Air Temp (°F db/°F wb) | 107.8                         | 116.4  | 125.2  |
|                     | 60          | 105.00                 | Total Capacity (Btu/h)         | 460000                        | 455000 | 450000 |
|                     |             |                        | Electric Power (Watts)         | 33556                         | 35602  | 37712  |
|                     |             |                        | Leaving Air Temp (°F db/°F wb) | 117.6                         | 126.1  | 134.7  |
|                     | 70          | 105.00                 | Total Capacity (Btu/h)         | 510000                        | 505000 | 511000 |
|                     |             |                        | Electric Power (Watts)         | 36878                         | 38800  | 40312  |
|                     |             |                        | Leaving Air Temp (°F db/°F wb) | 128.0                         | 136.1  | 147.8  |
| 5600                | 40          | 105.00                 | Total Capacity (Btu/h)         | 380000                        | 374000 | 368000 |
|                     |             |                        | Electric Power (Watts)         | 26038                         | 27646  | 29438  |
|                     |             |                        | Leaving Air Temp (°F db/°F wb) | 82.6                          | 91.6   | 100.7  |
|                     | 50          | 105.00                 | Total Capacity (Btu/h)         | 430000                        | 420000 | 415000 |
|                     |             |                        | Electric Power (Watts)         | 27988                         | 29688  | 31590  |
|                     |             |                        | Leaving Air Temp (°F db/°F wb) | 90.5                          | 99.2   | 108.1  |
|                     | 60          | 105.00                 | Total Capacity (Btu/h)         | 480000                        | 470000 | 460000 |
|                     |             |                        | Electric Power (Watts)         | 30246                         | 32052  | 34056  |
|                     |             |                        | Leaving Air Temp (°F db/°F wb) | 98.7                          | 107.3  | 116.0  |
|                     | 70          | 105.00                 | Total Capacity (Btu/h)         | 530000                        | 520000 | 510000 |
|                     |             |                        | Electric Power (Watts)         | 32888                         | 34784  | 36874  |
|                     |             |                        | Leaving Air Temp (°F db/°F wb) | 107.5                         | 115.6  | 124.2  |
| 7000                | 40          | 105.00                 | Total Capacity (Btu/h)         | 388000                        | 380000 | 374000 |
|                     |             |                        | Electric Power (Watts)         | 24568                         | 26022  | 27676  |
|                     |             |                        | Leaving Air Temp (°F db/°F wb) | 71.1                          | 80.1   | 89.4   |
|                     | 50          | 105.00                 | Total Capacity (Btu/h)         | 440000                        | 430000 | 420000 |
|                     |             |                        | Electric Power (Watts)         | 26188                         | 27716  | 29438  |
|                     |             |                        | Leaving Air Temp (°F db/°F wb) | 77.8                          | 86.7   | 95.6   |
|                     | 60          | 105.00                 | Total Capacity (Btu/h)         | 490000                        | 480000 | 470000 |
|                     |             |                        | Electric Power (Watts)         | 28100                         | 29712  | 31510  |
|                     |             |                        | Leaving Air Temp (°F db/°F wb) | 84.8                          | 93.4   | 102.2  |
|                     | 70          | 105.00                 | Total Capacity (Btu/h)         | 545000                        | 535000 | 525000 |
|                     |             |                        | Electric Power (Watts)         | 30318                         | 32018  | 33900  |
|                     |             |                        | Leaving Air Temp (°F db/°F wb) | 92.1                          | 100.5  | 109.1  |

## Performance Data (Cont'd)

**TABLE 10 - JROW WATER SOURCE HEAT PUMP HEATING GENERAL PERFORMANCE (CONT'D)**

| AIRFLOW<br>(CFM)    | EWT<br>(°F) | WATER<br>FLOW<br>(GPM) |                                | ENTERING AIR TEMPERATURE (°F) |        |        |
|---------------------|-------------|------------------------|--------------------------------|-------------------------------|--------|--------|
|                     |             |                        |                                | HEATING                       |        |        |
|                     |             |                        |                                | DRY BULB                      | 20     | 30     |
| <b>480 (40 TON)</b> |             |                        |                                |                               |        |        |
| 5000                | 40          | 120.00                 | Total Capacity (Btu/h)         | 214000                        | 386000 | 382000 |
|                     |             |                        | Electric Power (Watts)         | 27740                         | 29528  | 31478  |
|                     |             |                        | Leaving Air Temp (°F db/°F wb) | 92.8                          | 101.4  | 110.4  |
|                     | 50          | 120.00                 | Total Capacity (Btu/h)         | 440000                        | 435000 | 430000 |
|                     |             |                        | Electric Power (Watts)         | 29906                         | 31762  | 33802  |
|                     |             |                        | Leaving Air Temp (°F db/°F wb) | 101.7                         | 110.4  | 118.9  |
|                     | 60          | 120.00                 | Total Capacity (Btu/h)         | 495000                        | 485000 | 475000 |
|                     |             |                        | Electric Power (Watts)         | 32430                         | 34382  | 36484  |
|                     |             |                        | Leaving Air Temp (°F db/°F wb) | 111.0                         | 119.3  | 127.9  |
|                     | 70          | 120.00                 | Total Capacity (Btu/h)         | 545000                        | 535000 | 525000 |
|                     |             |                        | Electric Power (Watts)         | 35364                         | 37380  | 39508  |
|                     |             |                        | Leaving Air Temp (°F db/°F wb) | 120.6                         | 128.8  | 137.1  |
| 6400                | 40          | 120.00                 | Total Capacity (Btu/h)         | 405000                        | 396000 | 390000 |
|                     |             |                        | Electric Power (Watts)         | 25764                         | 27288  | 29056  |
|                     |             |                        | Leaving Air Temp (°F db/°F wb) | 78.3                          | 87.2   | 96.2   |
|                     | 50          | 120.00                 | Total Capacity (Btu/h)         | 455000                        | 445000 | 440000 |
|                     |             |                        | Electric Power (Watts)         | 27574                         | 29116  | 30886  |
|                     |             |                        | Leaving Air Temp (°F db/°F wb) | 86.0                          | 94.4   | 103.3  |
|                     | 60          | 120.00                 | Total Capacity (Btu/h)         | 510000                        | 500000 | 490000 |
|                     |             |                        | Electric Power (Watts)         | 29616                         | 31230  | 33074  |
|                     |             |                        | Leaving Air Temp (°F db/°F wb) | 93.8                          | 102.0  | 110.5  |
|                     | 70          | 120.00                 | Total Capacity (Btu/h)         | 565000                        | 555000 | 540000 |
|                     |             |                        | Electric Power (Watts)         | 31972                         | 33716  | 35650  |
|                     |             |                        | Leaving Air Temp (°F db/°F wb) | 101.6                         | 109.9  | 118.2  |
| 8000                | 40          | 120.00                 | Total Capacity (Btu/h)         | 415000                        | 405000 | 396000 |
|                     |             |                        | Electric Power (Watts)         | 24426                         | 25846  | 27434  |
|                     |             |                        | Leaving Air Temp (°F db/°F wb) | 67.6                          | 76.6   | 85.7   |
|                     | 50          | 120.00                 | Total Capacity (Btu/h)         | 465000                        | 455000 | 445000 |
|                     |             |                        | Electric Power (Watts)         | 26022                         | 27428  | 29030  |
|                     |             |                        | Leaving Air Temp (°F db/°F wb) | 73.7                          | 82.6   | 91.6   |
|                     | 60          | 120.00                 | Total Capacity (Btu/h)         | 525000                        | 510000 | 500000 |
|                     |             |                        | Electric Power (Watts)         | 27792                         | 29228  | 30894  |
|                     |             |                        | Leaving Air Temp (°F db/°F wb) | 80.6                          | 89.1   | 97.9   |
|                     | 70          | 120.00                 | Total Capacity (Btu/h)         | 585000                        | 570000 | 555000 |
|                     |             |                        | Electric Power (Watts)         | 29850                         | 31342  | 33066  |
|                     |             |                        | Leaving Air Temp (°F db/°F wb) | 87.5                          | 95.8   | 104.3  |

TABLE 10 - JROW WATER SOURCE HEAT PUMP HEATING GENERAL PERFORMANCE (CONT'D)

| AIRFLOW<br>(CFM)    | EWT<br>(°F) | WATER<br>FLOW<br>(GPM) |                                | ENTERING AIR TEMPERATURE (°F) |        |        |
|---------------------|-------------|------------------------|--------------------------------|-------------------------------|--------|--------|
|                     |             |                        |                                | HEATING                       |        |        |
|                     |             |                        |                                | DRY BULB                      | 20     | 30     |
| <b>540 (45 TON)</b> |             |                        |                                |                               |        |        |
| 5625                | 40          | 135.00                 | Total Capacity (Btu/h)         | 214000                        | 475000 | 470000 |
|                     |             |                        | Electric Power (Watts)         | 36558                         | 39324  | 42636  |
|                     |             |                        | Leaving Air Temp (°F db/°F wb) | 99.0                          | 107.8  | 116.9  |
|                     | 50          | 135.00                 | Total Capacity (Btu/h)         | 540000                        | 530000 | 525000 |
|                     |             |                        | Electric Power (Watts)         | 40046                         | 43116  | 46538  |
|                     |             |                        | Leaving Air Temp (°F db/°F wb) | 108.7                         | 117.4  | 126.3  |
|                     | 60          | 135.00                 | Total Capacity (Btu/h)         | 605000                        | 595000 | 585000 |
|                     |             |                        | Electric Power (Watts)         | 44186                         | 47450  | 50892  |
|                     |             |                        | Leaving Air Temp (°F db/°F wb) | 119.1                         | 127.4  | 136.3  |
|                     | 70          | 135.00                 | Total Capacity (Btu/h)         | 670000                        | 660000 | 655000 |
|                     |             |                        | Electric Power (Watts)         | 48970                         | 52120  | 55818  |
|                     |             |                        | Leaving Air Temp (°F db/°F wb) | 129.7                         | 138.0  | 147.4  |
| 7200                | 40          | 135.00                 | Total Capacity (Btu/h)         | 495000                        | 485000 | 475000 |
|                     |             |                        | Electric Power (Watts)         | 33390                         | 35534  | 38190  |
|                     |             |                        | Leaving Air Temp (°F db/°F wb) | 83.6                          | 92.2   | 101.2  |
|                     | 50          | 135.00                 | Total Capacity (Btu/h)         | 555000                        | 545000 | 540000 |
|                     |             |                        | Electric Power (Watts)         | 35834                         | 38310  | 41244  |
|                     |             |                        | Leaving Air Temp (°F db/°F wb) | 91.4                          | 100.1  | 108.9  |
|                     | 60          | 135.00                 | Total Capacity (Btu/h)         | 620000                        | 610000 | 600000 |
|                     |             |                        | Electric Power (Watts)         | 38708                         | 41518  | 44730  |
|                     |             |                        | Leaving Air Temp (°F db/°F wb) | 99.7                          | 108.3  | 117.1  |
|                     | 70          | 135.00                 | Total Capacity (Btu/h)         | 695000                        | 680000 | 670000 |
|                     |             |                        | Electric Power (Watts)         | 42136                         | 45230  | 48694  |
|                     |             |                        | Leaving Air Temp (°F db/°F wb) | 108.9                         | 117.0  | 125.7  |
| 9000                | 40          | 135.00                 | Total Capacity (Btu/h)         | 510000                        | 495000 | 485000 |
|                     |             |                        | Electric Power (Watts)         | 31696                         | 33324  | 35526  |
|                     |             |                        | Leaving Air Temp (°F db/°F wb) | 72.1                          | 80.8   | 89.9   |
|                     | 50          | 135.00                 | Total Capacity (Btu/h)         | 575000                        | 560000 | 550000 |
|                     |             |                        | Electric Power (Watts)         | 33472                         | 35404  | 37862  |
|                     |             |                        | Leaving Air Temp (°F db/°F wb) | 78.8                          | 87.5   | 96.4   |
|                     | 60          | 135.00                 | Total Capacity (Btu/h)         | 640000                        | 625000 | 615000 |
|                     |             |                        | Electric Power (Watts)         | 35542                         | 37814  | 40562  |
|                     |             |                        | Leaving Air Temp (°F db/°F wb) | 85.8                          | 94.3   | 103.1  |
|                     | 70          | 135.00                 | Total Capacity (Btu/h)         | 710000                        | 695000 | 685000 |
|                     |             |                        | Electric Power (Watts)         | 37954                         | 40588  | 43636  |
|                     |             |                        | Leaving Air Temp (°F db/°F wb) | 92.9                          | 101.5  | 110.2  |

## Performance Data (Cont'd)

**TABLE 10 - JROW WATER SOURCE HEAT PUMP HEATING GENERAL PERFORMANCE (CONT'D)**

| AIRFLOW<br>(CFM)    | EWT<br>(°F) | WATER<br>FLOW<br>(GPM) |                                | ENTERING AIR TEMPERATURE (°F) |        |        |
|---------------------|-------------|------------------------|--------------------------------|-------------------------------|--------|--------|
|                     |             |                        |                                | HEATING                       |        |        |
|                     |             |                        |                                | DRY BULB                      | 20     | 30     |
| <b>600 (50 TON)</b> |             |                        |                                |                               |        |        |
| 6250                | 40          | 150.00                 | Total Capacity (Btu/h)         | 214000                        | 520000 | 515000 |
|                     |             |                        | Electric Power (Watts)         | 40746                         | 43778  | 47066  |
|                     |             |                        | Leaving Air Temp (°F db/°F wb) | 98.0                          | 107.0  | 116.0  |
|                     | 50          | 150.00                 | Total Capacity (Btu/h)         | 595000                        | 585000 | 575000 |
|                     |             |                        | Electric Power (Watts)         | 44650                         | 47894  | 51328  |
|                     |             |                        | Leaving Air Temp (°F db/°F wb) | 107.5                         | 116.2  | 125.3  |
|                     | 60          | 150.00                 | Total Capacity (Btu/h)         | 665000                        | 650000 | 640000 |
|                     |             |                        | Electric Power (Watts)         | 49058                         | 52370  | 55952  |
|                     |             |                        | Leaving Air Temp (°F db/°F wb) | 117.9                         | 125.8  | 134.6  |
|                     | 70          | 150.00                 | Total Capacity (Btu/h)         | 730000                        | 720000 | 710000 |
|                     |             |                        | Electric Power (Watts)         | 54028                         | 57290  | 60836  |
|                     |             |                        | Leaving Air Temp (°F db/°F wb) | 128.2                         | 136.1  | 145.0  |
| 8000                | 40          | 150.00                 | Total Capacity (Btu/h)         | 540000                        | 535000 | 525000 |
|                     |             |                        | Electric Power (Watts)         | 36920                         | 39666  | 42668  |
|                     |             |                        | Leaving Air Temp (°F db/°F wb) | 82.5                          | 91.5   | 100.5  |
|                     | 50          | 150.00                 | Total Capacity (Btu/h)         | 610000                        | 600000 | 590000 |
|                     |             |                        | Electric Power (Watts)         | 39914                         | 42806  | 45992  |
|                     |             |                        | Leaving Air Temp (°F db/°F wb) | 90.4                          | 99.2   | 108.0  |
|                     | 60          | 150.00                 | Total Capacity (Btu/h)         | 680000                        | 670000 | 660000 |
|                     |             |                        | Electric Power (Watts)         | 43324                         | 46404  | 49768  |
|                     |             |                        | Leaving Air Temp (°F db/°F wb) | 98.7                          | 107.4  | 1160   |
|                     | 70          | 150.00                 | Total Capacity (Btu/h)         | 755000                        | 745000 | 730000 |
|                     |             |                        | Electric Power (Watts)         | 47186                         | 50444  | 53942  |
|                     |             |                        | Leaving Air Temp (°F db/°F wb) | 107.4                         | 115.8  | 124.4  |
| 10000               | 40          | 150.00                 | Total Capacity (Btu/h)         | 555000                        | 545000 | 535000 |
|                     |             |                        | Electric Power (Watts)         | 34400                         | 36908  | 39680  |
|                     |             |                        | Leaving Air Temp (°F db/°F wb) | 71.0                          | 80.2   | 89.3   |
|                     | 50          | 150.00                 | Total Capacity (Btu/h)         | 625000                        | 615000 | 600000 |
|                     |             |                        | Electric Power (Watts)         | 36824                         | 39448  | 42368  |
|                     |             |                        | Leaving Air Temp (°F db/°F wb) | 77.7                          | 86.6   | 95.6   |
|                     | 60          | 150.00                 | Total Capacity (Btu/h)         | 700000                        | 685000 | 675000 |
|                     |             |                        | Electric Power (Watts)         | 39584                         | 42358  | 45432  |
|                     |             |                        | Leaving Air Temp (°F db/°F wb) | 84.7                          | 93.5   | 102.3  |
|                     | 70          | 150.00                 | Total Capacity (Btu/h)         | 780000                        | 765000 | 750000 |
|                     |             |                        | Electric Power (Watts)         | 42714                         | 45646  | 48850  |
|                     |             |                        | Leaving Air Temp (°F db/°F wb) | 92.1                          | 100.7  | 109.4  |

TABLE 10 - JROW WATER SOURCE HEAT PUMP HEATING GENERAL PERFORMANCE (CONT'D)

| AIRFLOW<br>(CFM)    | EWT<br>(°F) | WATER<br>FLOW<br>(GPM) |                                | ENTERING AIR TEMPERATURE (°F) |        |        |
|---------------------|-------------|------------------------|--------------------------------|-------------------------------|--------|--------|
|                     |             |                        |                                | HEATING                       |        |        |
|                     |             |                        |                                | DRY BULB                      | 20     | 30     |
| <b>660 (55 TON)</b> |             |                        |                                |                               |        |        |
| 6875                | 40          | 165.00                 | Total Capacity (Btu/h)         | 214000                        | 580000 | 575000 |
|                     |             |                        | Electric Power (Watts)         | 46880                         | 50120  | 53674  |
|                     |             |                        | Leaving Air Temp (°F db/°F wb) | 98.7                          | 107.9  | 117.0  |
|                     | 50          | 165.00                 | Total Capacity (Btu/h)         | 660000                        | 650000 | 640000 |
|                     |             |                        | Electric Power (Watts)         | 51386                         | 54828  | 58578  |
|                     |             |                        | Leaving Air Temp (°F db/°F wb) | 108.3                         | 117.3  | 126.2  |
|                     | 60          | 165.00                 | Total Capacity (Btu/h)         | 730000                        | 725000 | 715000 |
|                     |             |                        | Electric Power (Watts)         | 56462                         | 60062  | 63870  |
|                     |             |                        | Leaving Air Temp (°F db/°F wb) | 118.3                         | 127.0  | 135.7  |
|                     | 70          | 165.00                 | Total Capacity (Btu/h)         | 810000                        | 795000 | 785000 |
|                     |             |                        | Electric Power (Watts)         | 61904                         | 65502  | 68410  |
|                     |             |                        | Leaving Air Temp (°F db/°F wb) | 128.6                         | 136.4  | 145.3  |
| 8800                | 40          | 165.00                 | Total Capacity (Btu/h)         | 600000                        | 590000 | 585000 |
|                     |             |                        | Electric Power (Watts)         | 42492                         | 45544  | 48780  |
|                     |             |                        | Leaving Air Temp (°F db/°F wb) | 82.9                          | 92.0   | 101.3  |
|                     | 50          | 165.00                 | Total Capacity (Btu/h)         | 675000                        | 665000 | 655000 |
|                     |             |                        | Electric Power (Watts)         | 46084                         | 49288  | 52692  |
|                     |             |                        | Leaving Air Temp (°F db/°F wb) | 90.9                          | 99.8   | 108.9  |
|                     | 60          | 165.00                 | Total Capacity (Btu/h)         | 755000                        | 745000 | 730000 |
|                     |             |                        | Electric Power (Watts)         | 50144                         | 53504  | 57140  |
|                     |             |                        | Leaving Air Temp (°F db/°F wb) | 99.3                          | 108.0  | 116.7  |
|                     | 70          | 165.00                 | Total Capacity (Btu/h)         | 840000                        | 825000 | 810000 |
|                     |             |                        | Electric Power (Watts)         | 54656                         | 58156  | 61890  |
|                     |             |                        | Leaving Air Temp (°F db/°F wb) | 108.0                         | 116.4  | 124.9  |
| 11000               | 40          | 165.00                 | Total Capacity (Btu/h)         | 610000                        | 600000 | 590000 |
|                     |             |                        | Electric Power (Watts)         | 39548                         | 42408  | 45516  |
|                     |             |                        | Leaving Air Temp (°F db/°F wb) | 71.3                          | 80.4   | 89.7   |
|                     | 50          | 165.00                 | Total Capacity (Btu/h)         | 690000                        | 680000 | 670000 |
|                     |             |                        | Electric Power (Watts)         | 42572                         | 45526  | 48758  |
|                     |             |                        | Leaving Air Temp (°F db/°F wb) | 78.0                          | 87.0   | 96.0   |
|                     | 60          | 165.00                 | Total Capacity (Btu/h)         | 775000                        | 760000 | 750000 |
|                     |             |                        | Electric Power (Watts)         | 45978                         | 49040  | 52368  |
|                     |             |                        | Leaving Air Temp (°F db/°F wb) | 85.1                          | 93.9   | 102.9  |
|                     | 70          | 165.00                 | Total Capacity (Btu/h)         | 865000                        | 850000 | 830000 |
|                     |             |                        | Electric Power (Watts)         | 49770                         | 52942  | 56390  |
|                     |             |                        | Leaving Air Temp (°F db/°F wb) | 92.6                          | 101.2  | 109.9  |

## Performance Data (Cont'd)

**TABLE 10 - JROW WATER SOURCE HEAT PUMP HEATING GENERAL PERFORMANCE (CONT'D)**

| AIRFLOW<br>(CFM)    | EWT<br>(°F) | WATER<br>FLOW<br>(GPM) |                                | ENTERING AIR TEMPERATURE (°F) |        |        |
|---------------------|-------------|------------------------|--------------------------------|-------------------------------|--------|--------|
|                     |             |                        |                                | HEATING                       |        |        |
|                     |             |                        |                                | DRY BULB                      | 20     | 30     |
| <b>720 (60 TON)</b> |             |                        |                                |                               |        |        |
| 7500                | 40          | 180.00                 | Total Capacity (Btu/h)         | 214000                        | 530000 | 520000 |
|                     |             |                        | Electric Power (Watts)         | 32284                         | 34880  | 37792  |
|                     |             |                        | Leaving Air Temp (°F db/°F wb) | 87.0                          | 95.4   | 103.9  |
|                     | 50          | 180.00                 | Total Capacity (Btu/h)         | 610000                        | 600000 | 585000 |
|                     |             |                        | Electric Power (Watts)         | 35270                         | 38132  | 41230  |
|                     |             |                        | Leaving Air Temp (°F db/°F wb) | 95.2                          | 103.7  | 112.1  |
|                     | 60          | 180.00                 | Total Capacity (Btu/h)         | 680000                        | 665000 | 655000 |
|                     |             |                        | Electric Power (Watts)         | 38814                         | 41738  | 45090  |
|                     |             |                        | Leaving Air Temp (°F db/°F wb) | 104.0                         | 112.1  | 120.5  |
|                     | 70          | 180.00                 | Total Capacity (Btu/h)         | 755000                        | 740000 | 725000 |
|                     |             |                        | Electric Power (Watts)         | 42846                         | 45906  | 49310  |
|                     |             |                        | Leaving Air Temp (°F db/°F wb) | 113.2                         | 121.2  | 129.1  |
| 9600                | 40          | 180.00                 | Total Capacity (Btu/h)         | 565000                        | 550000 | 540000 |
|                     |             |                        | Electric Power (Watts)         | 29136                         | 31504  | 34142  |
|                     |             |                        | Leaving Air Temp (°F db/°F wb) | 74.3                          | 83.0   | 91.7   |
|                     | 50          | 180.00                 | Total Capacity (Btu/h)         | 640000                        | 625000 | 610000 |
|                     |             |                        | Electric Power (Watts)         | 31544                         | 34034  | 36782  |
|                     |             |                        | Leaving Air Temp (°F db/°F wb) | 81.4                          | 90.0   | 98.5   |
|                     | 60          | 180.00                 | Total Capacity (Btu/h)         | 715000                        | 700000 | 685000 |
|                     |             |                        | Electric Power (Watts)         | 34290                         | 36896  | 39772  |
|                     |             |                        | Leaving Air Temp (°F db/°F wb) | 88.9                          | 97.4   | 105.8  |
|                     | 70          | 180.00                 | Total Capacity (Btu/h)         | 800000                        | 780000 | 760000 |
|                     |             |                        | Electric Power (Watts)         | 37390                         | 40112  | 43162  |
|                     |             |                        | Leaving Air Temp (°F db/°F wb) | 96.8                          | 104.8  | 113.1  |
| 12000               | 40          | 180.00                 | Total Capacity (Btu/h)         | 580000                        | 565000 | 555000 |
|                     |             |                        | Electric Power (Watts)         | 27054                         | 29252  | 31722  |
|                     |             |                        | Leaving Air Temp (°F db/°F wb) | 64.7                          | 73.6   | 82.6   |
|                     | 50          | 180.00                 | Total Capacity (Btu/h)         | 660000                        | 640000 | 630000 |
|                     |             |                        | Electric Power (Watts)         | 29126                         | 31404  | 33920  |
|                     |             |                        | Leaving Air Temp (°F db/°F wb) | 70.7                          | 79.4   | 88.3   |
|                     | 60          | 180.00                 | Total Capacity (Btu/h)         | 745000                        | 725000 | 705000 |
|                     |             |                        | Electric Power (Watts)         | 31396                         | 33732  | 36340  |
|                     |             |                        | Leaving Air Temp (°F db/°F wb) | 77.1                          | 85.7   | 94.4   |
|                     | 70          | 180.00                 | Total Capacity (Btu/h)         | 830000                        | 810000 | 790000 |
|                     |             |                        | Electric Power (Watts)         | 33914                         | 36352  | 39078  |
|                     |             |                        | Leaving Air Temp (°F db/°F wb) | 83.9                          | 92.4   | 100.8  |

TABLE 10 - JROW WATER SOURCE HEAT PUMP HEATING GENERAL PERFORMANCE (CONT'D)

| AIRFLOW<br>(CFM)    | EWT<br>(°F) | WATER<br>FLOW<br>(GPM) |                                | ENTERING AIR TEMPERATURE (°F) |        |        |
|---------------------|-------------|------------------------|--------------------------------|-------------------------------|--------|--------|
|                     |             |                        |                                | HEATING                       |        |        |
|                     |             |                        |                                | DRY BULB                      | 20     | 30     |
| <b>780 (65 TON)</b> |             |                        |                                |                               |        |        |
| 8125                | 40          | 195.00                 | Total Capacity (Btu/h)         | 214000                        | 585000 | 575000 |
|                     |             |                        | Electric Power (Watts)         | 37140                         | 40228  | 43520  |
|                     |             |                        | Leaving Air Temp (°F db/°F wb) | 87.7                          | 96.5   | 105.3  |
|                     | 50          | 195.00                 | Total Capacity (Btu/h)         | 675000                        | 660000 | 650000 |
|                     |             |                        | Electric Power (Watts)         | 40960                         | 44048  | 47586  |
|                     |             |                        | Leaving Air Temp (°F db/°F wb) | 96.6                          | 105.2  | 113.7  |
|                     | 60          | 195.00                 | Total Capacity (Btu/h)         | 755000                        | 740000 | 725000 |
|                     |             |                        | Electric Power (Watts)         | 45294                         | 48642  | 52260  |
|                     |             |                        | Leaving Air Temp (°F db/°F wb) | 105.8                         | 114.0  | 122.2  |
|                     | 70          | 195.00                 | Total Capacity (Btu/h)         | 835000                        | 820000 | 800000 |
|                     |             |                        | Electric Power (Watts)         | 50120                         | 53624  | 57286  |
|                     |             |                        | Leaving Air Temp (°F db/°F wb) | 115.1                         | 123.0  | 131.0  |
| 10400               | 40          | 195.00                 | Total Capacity (Btu/h)         | 615000                        | 605000 | 590000 |
|                     |             |                        | Electric Power (Watts)         | 33386                         | 36222  | 39308  |
|                     |             |                        | Leaving Air Temp (°F db/°F wb) | 74.6                          | 83.6   | 92.5   |
|                     | 50          | 195.00                 | Total Capacity (Btu/h)         | 700000                        | 685000 | 670000 |
|                     |             |                        | Electric Power (Watts)         | 36538                         | 39400  | 42526  |
|                     |             |                        | Leaving Air Temp (°F db/°F wb) | 82.0                          | 90.8   | 99.6   |
|                     | 60          | 195.00                 | Total Capacity (Btu/h)         | 790000                        | 770000 | 755000 |
|                     |             |                        | Electric Power (Watts)         | 40034                         | 42986  | 46242  |
|                     |             |                        | Leaving Air Temp (°F db/°F wb) | 90.0                          | 98.4   | 107.0  |
|                     | 70          | 195.00                 | Total Capacity (Btu/h)         | 880000                        | 860000 | 840000 |
|                     |             |                        | Electric Power (Watts)         | 43936                         | 46992  | 50384  |
|                     |             |                        | Leaving Air Temp (°F db/°F wb) | 98.2                          | 106.4  | 114.6  |
| 13000               | 40          | 195.00                 | Total Capacity (Btu/h)         | 630000                        | 620000 | 605000 |
|                     |             |                        | Electric Power (Watts)         | 30826                         | 33552  | 36510  |
|                     |             |                        | Leaving Air Temp (°F db/°F wb) | 64.7                          | 74.0   | 83.0   |
|                     | 50          | 195.00                 | Total Capacity (Btu/h)         | 720000                        | 705000 | 690000 |
|                     |             |                        | Electric Power (Watts)         | 33682                         | 36338  | 39228  |
|                     |             |                        | Leaving Air Temp (°F db/°F wb) | 71.1                          | 80.0   | 88.8   |
|                     | 60          | 195.00                 | Total Capacity (Btu/h)         | 815000                        | 795000 | 780000 |
|                     |             |                        | Electric Power (Watts)         | 36674                         | 39344  | 42310  |
|                     |             |                        | Leaving Air Temp (°F db/°F wb) | 77.8                          | 86.5   | 95.2   |
|                     | 70          | 195.00                 | Total Capacity (Btu/h)         | 915000                        | 895000 | 870000 |
|                     |             |                        | Electric Power (Watts)         | 40012                         | 42730  | 45760  |
|                     |             |                        | Leaving Air Temp (°F db/°F wb) | 84.9                          | 93.4   | 101.9  |

## Performance Data (Cont'd)

**TABLE 10 - JROW WATER SOURCE HEAT PUMP HEATING GENERAL PERFORMANCE (CONT'D)**

| AIRFLOW<br>(CFM)    | EWT<br>(°F) | WATER<br>FLOW<br>(GPM) |                                | ENTERING AIR TEMPERATURE (°F) |         |        |
|---------------------|-------------|------------------------|--------------------------------|-------------------------------|---------|--------|
|                     |             |                        |                                | HEATING                       |         |        |
|                     |             |                        |                                | DRY BULB                      | 20      | 30     |
| <b>840 (70 TON)</b> |             |                        |                                |                               |         |        |
| 8750                | 40          | 210.00                 | Total Capacity (Btu/h)         | 214000                        | 670000  | 660000 |
|                     |             |                        | Electric Power (Watts)         | 45482                         | 48972   | 52774  |
|                     |             |                        | Leaving Air Temp (°F db/°F wb) | 92.3                          | 100.9   | 109.6  |
|                     | 50          | 210.00                 | Total Capacity (Btu/h)         | 770000                        | 755000  | 740000 |
|                     |             |                        | Electric Power (Watts)         | 50094                         | 53744   | 57838  |
|                     |             |                        | Leaving Air Temp (°F db/°F wb) | 101.4                         | 109.7   | 118.2  |
|                     | 60          | 210.00                 | Total Capacity (Btu/h)         | 860000                        | 845000  | 825000 |
|                     |             |                        | Electric Power (Watts)         | 55334                         | 59328   | 63658  |
|                     |             |                        | Leaving Air Temp (°F db/°F wb) | 110.8                         | 119.2   | 127.2  |
|                     | 70          | 210.00                 | Total Capacity (Btu/h)         | 950000                        | 935000  | 910000 |
|                     |             |                        | Electric Power (Watts)         | 61730                         | 65844   | 70228  |
|                     |             |                        | Leaving Air Temp (°F db/°F wb) | 120.4                         | 128.4   | 136.0  |
| 11200               | 40          | 210.00                 | Total Capacity (Btu/h)         | 710000                        | 695000  | 680000 |
|                     |             |                        | Electric Power (Watts)         | 41228                         | 44176   | 47618  |
|                     |             |                        | Leaving Air Temp (°F db/°F wb) | 78.5                          | 87.3    | 96.2   |
|                     | 50          | 210.00                 | Total Capacity (Btu/h)         | 800000                        | 785000  | 770000 |
|                     |             |                        | Electric Power (Watts)         | 44796                         | 47956   | 51518  |
|                     |             |                        | Leaving Air Temp (°F db/°F wb) | 86.1                          | 94.7    | 103.4  |
|                     | 60          | 210.00                 | Total Capacity (Btu/h)         | 900000                        | 885000  | 865000 |
|                     |             |                        | Electric Power (Watts)         | 49058                         | 52410   | 56144  |
|                     |             |                        | Leaving Air Temp (°F db/°F wb) | 94.3                          | 102.8   | 111.2  |
|                     | 70          | 210.00                 | Total Capacity (Btu/h)         | 1005000                       | 980000  | 960000 |
|                     |             |                        | Electric Power (Watts)         | 54056                         | 57586   | 61522  |
|                     |             |                        | Leaving Air Temp (°F db/°F wb) | 102.8                         | 110.9   | 119.2  |
| 14000               | 40          | 210.00                 | Total Capacity (Btu/h)         | 725000                        | 710000  | 695000 |
|                     |             |                        | Electric Power (Watts)         | 38338                         | 41118   | 44184  |
|                     |             |                        | Leaving Air Temp (°F db/°F wb) | 67.9                          | 76.9    | 85.9   |
|                     | 50          | 210.00                 | Total Capacity (Btu/h)         | 825000                        | 810000  | 790000 |
|                     |             |                        | Electric Power (Watts)         | 41524                         | 44316   | 47500  |
|                     |             |                        | Leaving Air Temp (°F db/°F wb) | 74.5                          | 83.3    | 92.1   |
|                     | 60          | 210.00                 | Total Capacity (Btu/h)         | 930000                        | 910000  | 890000 |
|                     |             |                        | Electric Power (Watts)         | 45118                         | 48018   | 51320  |
|                     |             |                        | Leaving Air Temp (°F db/°F wb) | 81.5                          | 90.1    | 98.8   |
|                     | 70          | 210.00                 | Total Capacity (Btu/h)         | 1045000                       | 1020000 | 995000 |
|                     |             |                        | Electric Power (Watts)         | 49350                         | 52378   | 55820  |
|                     |             |                        | Leaving Air Temp (°F db/°F wb) | 88.8                          | 97.2    | 105.7  |



# Heating

**TABLE 11 - GAS FURNACE OPTIONS**

| FURNACE MBH INPUT | FURNACE MBH OUTPUT | HEATERS | STAGES | MODULATION |
|-------------------|--------------------|---------|--------|------------|
| 75                | 60                 | (1) 75  | 2      | 5:1        |
| 100               | 80                 | (1)100  | 2      | 5:1,10:1   |
| 150               | 120                | (1)150  | 2      | 5:1,10:1   |
| 200               | 160                | (1)200  | 2      | 5:1,10:1   |
| 250               | 200                | (1)250  | 2      | 5:1,10:1   |
| 300               | 240                | (1)300  | 2      | 5:1,10:1   |
| 350               | 280                | (1)350  | 2      | 5:1,10:1   |
| 400               | 320                | (1)400  | 2      | 5:1,10:1   |
| 500               | 400                | (1)500  | 2      | 5:1,10:1   |
| 600               | 480                | (1)600  | 2      | 5:1,10:1   |
| 200               | 160                | (2)100  | 4      | 10:1       |
| 300               | 240                | (2)150  | 4      | 10:1       |
| 400               | 320                | (2)200  | 4      | 10:1       |
| 500               | 400                | (2)250  | 4      | 10:1       |
| 600               | 480                | (2)300  | 4      | 10:1       |
| 700               | 560                | (2)350  | 4      | 10:1       |
| 800               | 640                | (2)400  | 4      | 10:1       |
| 1000              | 800                | (2)500  | 4      | 10:1       |
| 1200              | 960                | (2)600  | 4      | 10:1       |
| 800               | 640                | (4)200  | 8      | 20:1       |
| 1000              | 800                | (4)250  | 8      | 20:1       |
| 1200              | 960                | (4)300  | 8      | 20:1       |
| 1400              | 1120               | (4)350  | 8      | 20:1       |
| 1600              | 1280               | (4)400  | 8      | 20:1       |

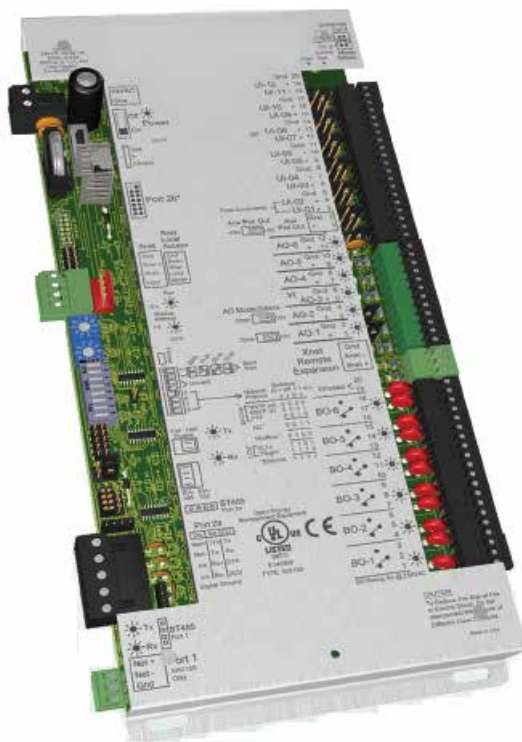
**TABLE 12 - ELECTRIC HEAT OPTIONS**

| 208 V CAPACITY kW | 280/480 V CAPACITY kW | HEATER CONTROL STAGES |
|-------------------|-----------------------|-----------------------|
| 3.65              | 5                     | 1, SCR                |
| 7.50              | 10                    | 2, SCR                |
| 11.25             | 15                    | 2, SCR                |
| 15.00             | 20                    | 2, 4, SCR             |
| 18.75             | 25                    | 2, 4, SCR             |
| 22.50             | 30                    | 2, 4, SCR             |
| 26.25             | 35                    | 2, 4, SCR             |
| 30.00             | 40                    | 2, 4, SCR             |
| 37.50             | 50                    | 4, SCR                |
| 45.00             | 60                    | 4, SCR                |
| 52.50             | 70                    | 4, SCR                |
| 60.00             | 80                    | 4, SCR                |
| 75.00             | 100                   | 4, SCR                |
| 81.40             | 110                   | 4, SCR                |
| 90.00             | 120                   | 4, SCR                |
| 97.50             | 130                   | 4, SCR                |
| 105.00            | 140                   | 4, SCR                |
| 112.50            | 150                   | 4, SCR                |

# Controls

## STANDALONE CONTROLLER

The unit controller is a general use controller that can be easily customized to meet various sequence of operation needs. Capable of operating in a 100% standalone control mode, the unit controller can connect to a Building Automation System (BAS) using the four leading protocols. The point mapping to these protocols can be preset so that the protocol and baud rates desired can be easily field-selected without the need for additional downloads or technician assistance. The unit controller provides ample input/output capacity on the base controller plus support for an expander board if additional input/output capacity is needed.



### Design Features

- Up to 24 input/output points
- Built in protocol support for BACnet, Modbus, N2 and LonWorks (**Note:** LonWorks does require an additional plug in PC board)
- Remote access support over the Internet/Intranet or modem
- Powerful, high-speed 16-bit microprocessor
- The unit controller on a 100% outside air unit utilizes an outdoor temperature sensor and a leaving air (duct) temperature sensor

## Specifications

### 1. Power

24 VAC  $\pm$  15%, 50–60 Hz, 20 VA power consumption (single Class 2 source only, 100 VA or less)

### 2. Physical

Rugged aluminum housing, removable screw terminals with custom silk-screening available

### 3. Environmental Operating Range

-40 °F to 150 °F (-40 °C to 65.5 °C); 10–95% relative humidity, non-condensing

### 4. Digital Outputs

Six digital outputs, relay contacts rated at 5 A resistive @ 250 VAC; configured as dry contact, normally open or normally closed

### 5. Universal Inputs

Twelve inputs, configurable for 0–10 V, RTD Therm Dry, or 0–20 mA Inputs 1 and 2 may be used for pulse counting

### 6. Analog Outputs

Six analog outputs: analog outputs 1 and 2 are configurable for 0–10 V or 0–20 mA, while analog outputs 3 through 6 are 0–10 V only

### 7. Standard Communication Ports

**Port 1:** Connect to an ARCNET only

**Port 2a:** Configurable for EIA-232 or EIA-485 (2-wire or 4-wire)

**Rnet port:** Interface with handheld keypad

**Xnet Remote Expansion port:** Connect to a board expander

### 8. Optional Plug-ins

Ethernet - for local or Internet access to controller

### 9. Status Indication

Visual (LED) status of power, running, and errors; LED indicators transmit/receive for Port 1, Port 2a, and for each of the 12 outputs

### 10. Battery

Provides a minimum of 10,000 hours of data retention during power outages

### 11. Protection

Surge and transient protection circuitry for power and communications

### 12. Listed By

FCC Part 15 - Subpart B - Class A; Pending listings at the time of publishing this document: UL 916 (PAZX), cUL C22.2 No. 205-M1983 (PAZX7), CE (1997)

### 13. Weight

1 lb, 3 oz (.5 kg)

# Controls (Cont'd)

## 14. Overall Dimensions

| WIDTH                            | HEIGHT | DEPTH |
|----------------------------------|--------|-------|
| <b>DIMENSIONS IN INCHES</b>      |        |       |
| 5                                | 11-3/4 | 2*    |
| <b>DIMENSIONS IN MILLIMETERS</b> |        |       |
| 127                              | 299    | 51*   |

\*Recommended depth

## 15. Mounting Hole Dimensions

| WIDTH                            | HEIGHT |
|----------------------------------|--------|
| <b>DIMENSIONS IN INCHES</b>      |        |
| 4                                | 11-3/8 |
| <b>DIMENSIONS IN MILLIMETERS</b> |        |
| 102                              | 289    |

## EQUIPMENT TOUCH INTERFACE

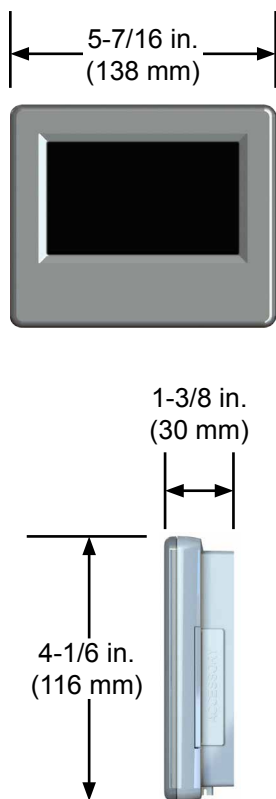
The Equipment Touch (E-Touch) display is designed altogether as an equipment interface, a temperature sensor, and a diagnostic tool. With programmed screens, the E-Touch interface has a color LCD touchscreen able to provide a custom graphic interface to control the DOAS equipment.



**Features and Benefits**

- 4.3-inch color touchscreen
- Onboard temperature and humidity sensor
- Access to nearly any data point in the controller
- BACnet explorer shows network visible BACnet objects
- Schedule interface allows for BACnet schedule view and edit functionality
- Alarm view displays the controller's alarm history buffer
- Supports 13 languages
- Trending
- Multi-level password protection limits access based on credentials
- Screens offer a library of interactive controls

**Specifications**



|                           |   |
|---------------------------|---|
| <b>POWER</b>              | 24 VAC (±15%), 5 VA, 50–60 Hz, Class 2  |
| <b>BACKLIT COLOR LCD</b>  | 4.3-inch resistive touchscreen color LCD with backlighting<br>WQVGA 480 x 272 pixels  |
| <b>OPERATING RANGE</b>    | -4.0–140.0 °F (-20.0–60.0 °C), 10%–90% RH non-condensing  |
| <b>COMMUNICATION</b>      | Rnet: 2-wire EIA-485 (115 kbps)   |
| <b>MEMORY</b>             | <ul style="list-style-type: none"> <li>• 16 MB flash memory to store screen file</li> <li>• 1.5 MB RAM to store variable data and LCD data</li> <li>• 4 KB serial EEPROM to store nonvolatile configuration data</li> </ul> |
| <b>TEMPERATURE SENSOR</b> | Range: -4.0–140.0 °F (-20.0–60.0 °C)<br>Accuracy from 30.0–100.0 °F: ±1.0 °F (±0.55 °C)<br>Accuracy over full range: ±2.0 °F (±1.1 °C)<br>Resolution: 0.2 °F (0.1 °C)   |
| <b>HUMIDITY SENSOR</b>    | Range: 0–100% RH<br>Accuracy from 20–80% RH:: ±3% RH<br>Accuracy over full range: ±5% RH<br>Resolution: 0.05% RH  |
| <b>LISTED BY</b>          | UL-916 (PAZX), CE, FCC Part 15-Subpart B-Class A  |


## Zone Sensor Data

The communicating zone sensors allow for the flexibility to easily manage the conditions to ensure the comfort and productivity of the zone occupants. The ZS sensors are available in a variety of zone sensing combinations to address your application needs. These combinations include temperature, relative humidity, and indoor air quality.





### ZS Standard Sensor

- Temperature, CO<sub>2</sub>, and Humidity
- Addressable/supports daisy chaining
- Local communication point
- Mounts on a standard 2" x 4" electrical box

### ZS Plus Sensor

- Slide potentiometer to make the zone warmer or cooler
-  button to override the schedule and put the zone in an occupied state or force the zone to an unoccupied state
- Green LED to indicate occupied state
- Temperature, CO<sub>2</sub>, and Humidity
- Addressable/supports daisy chaining
- Local communication point
- Mounts on a standard 2" x 4" electrical box

### ZS Pros Sensor

- LCD display
-  button to override the schedule and put the zone in an occupied state or force the zone to an unoccupied state
-  and  buttons to change any editable property, such as the setpoint temperature
-  button to cycle through information defined in the control program
- Green LED to indicate occupied state
- Temperature, CO<sub>2</sub>, and Humidity
- Addressable/supports daisy chaining
- Local communication point
- Mounts on a standard 2" x 4" electrical box
- Setpoint adjust
- Alarm indicator



ZS Standard Sensor



ZS Plus Sensor



ZS Pro Sensor

Consult the *ZS Sensor Application Guide* to configure the control program for the desired user interaction with the sensor, as well as the *ZS Sensor User Guide* for basic user instructions.

TABLE 13 - SENSOR SPECIFICATIONS

|                                       |   |   |            |
|---------------------------------------|---|---|------------|
| Sensing Element Range and Accuracy    | <b>TEMPERATURE ONLY</b>   |   |            |
|                                       | Range   | 32.0 °F–122.0 °F (0.0 °C–50.0 °C)                                   |            |
|                                       | Accuracy  | ± 0.35 °F (0.2 °C)  |            |
|                                       | <b>TEMPERATURE IF HUMIDITY IS INCLUDED</b>  |   |            |
|                                       | Range   | 50.0 °F–104.0 °F (10.0 °C–40.0 °C)                                  |            |
|                                       | Accuracy  | ± 0.5 °F (0.3 °C)   |            |
|                                       | OPTIONS   | <b>HUMIDITY</b>   |            |
|                                       |   | Range   | 10–90%     |
|                                       |   | Accuracy  | 2% typical |
|                                       |   | <b>CO<sub>2</sub></b>   |            |
| Range                                 |   | 0–2,000 PPM   |            |
| Accuracy                              |   | ± 75 PPM typical  |            |
| <b>VOC</b>                            |   |   |            |
| Range                                 |   | 0–2,000 PPM   |            |
| Accuracy                              | 1 PPM typical   |   |            |
| Power Requirements                    | <b>TEMPERATURE ONLY</b>   |   |            |
|                                       | ZS Standard or ZS Plus  | 12 Vdc @ 6 mA   |            |
|                                       | ZS Pro  | 12 Vdc @ 7 mA   |            |
|                                       | <b>TEMPERATURE WITH HUMIDITY</b>  |   |            |
|                                       | ZS Standard or ZS Plus  | 12 Vdc @ 7 mA   |            |
|                                       | ZS Pro  | 12 Vdc @ 8 mA   |            |
|                                       | <b>TEMPERATURE WITH HUMIDITY AND VOC</b>  |   |            |
|                                       | All Models  | 12 Vdc @ 60 mA  |            |
|                                       | <b>TEMPERATURE WITH HUMIDITY AND CO<sub>2</sub></b>   |   |            |
|                                       | All Models  | 12 Vdc @ 15 mA (idle) to 190 mA (CO <sub>2</sub> measurement cycle) |            |
| <b>TEMPERATURE AND CO<sub>2</sub></b> |   |   |            |
| All Models                            | 12 Vdc @ 14 mA (idle) to 189 mA (CO <sub>2</sub> measurement cycle)   |   |            |
| Power Supply                          | The four-conductor Rnet cable from a controller supplies +12 Vdc @ 210 mA. For additional power, use an external power supply. Use the above power requirements to calculate the size of the external power supply. |   |            |
| Communication                         | 115 kbps  |   |            |
| Local Access Port                     | For local access to start up and troubleshoot the system  |   |            |
| Environmental Operating Range         | -4.0 °F–122.0 °F (-20.0 °C–50.0 °C), 10–90% relative humidity, non-condensing   |   |            |
| Mounting                              | Standard 4x2-inch electrical box using the 6-32 x 1/2" mounting screws  |   |            |
| Overall Dimensions                    | <b>TEMPERATURE SENSOR OF TEMPERATURE WITH HUMIDITY SENSOR</b>   |   |            |
|                                       | Width   | 3 inch (7.62 cm)  |            |
|                                       | Height  | 4-13/16 inch (12.22 cm)   |            |
|                                       | Depth   | 13/16 inch (2.01 cm)  |            |
|                                       | <b>SENSOR WITH CO<sub>2</sub> OR VOC</b>  |   |            |
|                                       | Width   | 2-7/8 inch (7.3 cm)   |            |
|                                       | Height  | 4-13/16 inch (12.22 cm)   |            |
|                                       | Depth   | 1-1/4 inch (3.18 cm)  |            |

# Sequence of Operation

## Air Source Cooling 100% Outside Air

The unit controller is turned on by a switch located on its front upper left corner. Several Occupancy Control options are available for starting the unit. These can be selected from the BACview display pad on the Controls screen (requires user password). The Resident Program has an adjustable scheduler that uses the internal time clock to allow for separate Sequences for Occupied and Unoccupied periods. This can be accessed from the BACview display pad on the Schedules screen (requires user password).

**NOTE:** All temperature-related events have an additional 10 second (fixed) “delay on make” to allow temperatures to settle.

### OCCUPIED MODE

When the BACview Schedule calls for the start of the Occupied Mode and the unit controller has verified that there are no fault or shutdown conditions, after a 30 second (fixed) delay the unit goes into Occupied Mode.

#### 1. Outdoor Air Damper (OD)

- After the unit goes into Occupied Mode, the Outdoor Air (OA) damper will open. As the OA damper opens, the Outdoor Air Damper Actuator (OADA) auxiliary switches close.
- The OA damper stays open until the system reaches the end of the Occupied Mode period. It will remain open until the supply fan turns off. After the supply fan turns off, the OA damper will close.

#### 2. Supply Fan (SF)

- As the OA damper opens, the OADA auxiliary switch will close and the SF will turn on.
- The SF will run for 60 seconds (fixed) before cooling, dehumidification, or heating will be enabled.
  - The SF shall operate continuously while the unit is in the Occupied Mode. When the system reaches the end of the Occupied Mode period, the SF will continue to run for an additional 2 minutes before turning off.
  - SF-VSC: Supply Fan with Variable Speed Control.
  - The SF-VSC will modulate its speed based upon the SF Differential Pressure Transmitter (SF-DPT) signal and the supply duct static pressure setpoint.
  - **Optional:** For constant air volume (CAV), select “Manual Override” in the BACview keypad and input the required speed (%) as determined in the field by Test and Balancing.



### 3. Exhaust Fan (EF)

- At the same time the SF turns on, the EF will be enabled to run.
- The EF shall be enabled to run while the unit is in the Occupied Mode. When the system reaches the end of the Occupied Mode period, the EF will be enabled to run for an additional 2 minutes before turning off.
- EF-VSC: Exhaust Fan with Variable Speed Control.
  - If the Zone Differential Pressure Transmitter (ZN-DPT) signal is above the building static pressure setpoint, the EF-VSC will modulate its speed based upon the ZN-DPT and the setpoint. If the ZN-DPT signal is below the building static pressure setpoint, the EF will modulate down to 0% (adjustable) speed.
  - **Optional:** For constant air volume (CAV), select “Manual Override” in the BACview keypad and input the required speed (%) as determined in the field by Test and Balancing.

### 4. Cooling Mode

- Cooling Mode is available when the Outdoor Air Temperature (OAT) is 1 °F (fixed) above the OAT cooling lower limit (55 °F, adjustable) and there is a demand for cooling.
- When the Outdoor Air Temperature (OAT) is 1 °F (adjustable) or more above the OAT cooling setpoint 70 °F, adjustable), compressor #1 turns on.
- When the SAT is 2 °F (adjustable) or more above the SAT cooling setpoint (70 °F, adjustable), compressor #2 turns on -- not less than 30 minutes (adjustable) after compressor #1 turned on.
- When the SAT is 2 °F (adjustable) or more below the SAT cooling setpoint (70 °F, adjustable), compressor #2 turns off.
- When the OAT is 1 °F (adjustable) or more below the OAT cooling setpoint (70 °F, adjustable), compressor #1 turns off.
- Minimum SF-VSC modulation shall be 50% (adjustable; 50% min.).
- **Optional:** When enabled, if there is a call for 1st stage cooling, 2nd stage cooling will be enabled after a 10-minute (adjustable) delay. Both compressors modulate based upon the cooling setpoint. Default is “OFF.”
- Compressor enabling logic includes a 5-minute (fixed) minimum run-time and a 5-minute (fixed) minimum time-off delay to prevent compressor short cycling.
- Digital Compressors:
  - The unit controller controls the capacity of the digital compressor by rapidly loading and unloading the compressor in 15 second intervals.
  - The digital compressor will modulate based upon the SAT sensor and setpoint (70 °F, adjustable).
  - If the DX LAT drops to 38 °F or less for 3 minutes, the unit controller will issue an alarm and the compressor stops. When the DX LAT warms back up to 55 °F or more, the compressor turns back on.

## **Sequence of Operation**

### **Air Source Cooling 100% Outside Air (Cont'd)**

- If there is a current call for 1st stage cooling and compressor #1 is shut down due to an alarm (HPS1, LPS1, or DX LAT1), compressor #2 will be turned on to take its place until it returns.
- Hot Gas Reheat (HGRH) – On/Off:
  - When the SAT is 1 °F (adjustable) or more below the SAT cooling setpoint (70 °F, adjustable), HGRH turns on and cycles based upon the SAT cooling setpoint.
  - When SAT is 2 °F (adjustable) or more above the SAT cooling setpoint, HGRH turns off.

#### **5. Dehumidification Mode**

- Dehumidification Mode is available if the OAT is 1 °F (fixed) above the dehumidification lower limit of 60 °F (adjustable) and there is no call for heating.
- When the Outdoor Air Dew Point (OADP) is 1 °F (adjustable) or more above the Supply Air Dew Point (SADP) setpoint (53 °F, adjustable), Dehumidification Mode is enabled. After the minimum time-off delay, compressor #1 turns on.
- When the SADP is 2 °F (adjustable) or more above the SADP setpoint (53 °F, adjustable) and after minimum time-off delay, compressor #2 turns on, not less than 30 minutes (adjustable) after compressor #1 turned on. Both compressors respond in sequence and run at full cooling.
- HGRH is enabled to operate as necessary based upon the SAT dehumidification setpoint (70 °F, adjustable).
- When SADP is 1 °F (adjustable) or more below SADP setpoint (53 °F, adjustable), compressor #2 turns off.
- When the OADP is 2 °F (adjustable) or more below the SADP setpoint (53 °F, adjustable), compressor #1 turns off and Dehumidification Mode is disabled.
- Digital Compressors:
  - The unit controller controls the capacity of the digital compressor by rapidly loading and unloading the compressor in 15 second intervals.
  - The digital compressor will modulate based upon the SADP sensor and SADP setpoint (53 °F, adjustable).
- Hot Gas Reheat (HGRH) – On/Off:
  - When the SAT is 1 °F (adjustable) or more below the SAT dehumidification setpoint, HGRH turns on and cycles based upon the SAT dehumidification setpoint .
  - When the SAT is 2 °F (adjustable) or more above the SAT dehumidification setpoint, HGRH turns off.

## 6. Heating Mode

- Heating Mode is available when the OAT is 1 °F (fixed) below the OAT heating upper limit (60 °F, adjustable) and there is a demand for heating.
- When the OAT is 1 °F (adjustable) or more below the OAT heating setpoint (55 °F, adjustable), heating is enabled and operates based upon SAT heating setpoint (70 °F, adjustable).
- When OAT is 1 °F (adjustable) or more above the OAT heating setpoint (55 °F, adjustable), heating is disabled.

## UNOCCUPIED MODE

When the Occupancy Control indicates the end of the Occupied Mode, the compressor(s) and outdoor fan(s) will turn off (subject to minimum run-time) or the heating system will turn off. The SF and EF will continue to run for 2 minutes before turning off. After this, the OA damper will close. The unit is now off.

## Safety Switches

- **High Pressure Switch (HPS1):** If HPS1 is open, compressor #1 will turn off and the unit controller will issue an alarm. After manually resetting HPS1, the HPS1 alarm will reset. Following a minimum time off delay, compressor #1 will turn on. If the unit controller records 3 high pressure start/restart failure incidents within 1 hour, compressor #1 is locked out and the unit controller will issue an alarm. The compressor lockout can be reset in the BACview display pad or by cycling the power of the unit controller.
- This sequence is the same for compressor #2, Y2, and HPS2.
- **Low Pressure Switch (LPS1):** If LPS1 is open after the LPS1 by-pass time, the unit controller will issue an alarm and compressor #1 turns off. After 30 seconds (fixed), the LPS1 alarm will reset. Following a minimum time off delay, compressor #1 will turn on. If the unit controller records three low pressure start/restart failure incidents within 1 hour, compressor #1 is locked out and the unit controller will issue an alarm. The compressor lock-out can be reset in the BACview display pad or by cycling the power of the unit controller.
- This sequence is the same for compressor #2, Y2, and LPS2.

## Safety Shutdown

- If a compressor fails to start three times in an hour due to high pressure switch lockout.
- If a compressor fails to start three times in an hour due to low pressure switch lockout.
- If a compressor fails to start three times in an hour due to DX leaving air temperature lockout.
- If the unit controller detects an SAT sensor failure.

# Sequence of Operation

## Air Source Cooling 100% Outside Air (Cont'd)

### Standard Alarms

(Alarms require reset in the BACview or cycling the power of the unit controller unless noted)

1. **OADA Alarm:** When the OADA fails to open or closes due to OADA-A (adj.) being open, following 2 minute (adjustable) delay. Unit will automatically shut down.
2. **OADA Hand:** When the OADA is commanded closed but the OADA-A (adj.) still indicates to the unit controller it is open, following 2 minute (adjustable) delay.
3. **Supply Fan Alarm:** When the SF fails to start and the SF-APS does not confirm air flow to the unit controller, following 1 minute (adjustable) delay. Unit will automatically shut down.
4. **Supply Fan Hand:** When the SF is commanded off and the SF-APS still indicates air flow to unit controller, following 1 minute (adjustable) delay. OA Damper (if existing) will be commanded to remain open.
5. **Supply Fan Run Time:** When the SF run time has exceeded the maximum run time allotted (adjustable).
6. **Exhaust Fan Alarm:** When the EF fails to start and the EF-APS does not confirm air flow to unit controller, following 1 minute (adjustable) delay.
7. **Exhaust Fan Hand:** When the EF is commanded off and the EF-APS still indicates air flow to unit controller, following 1 minute (adjustable) delay.
8. **Exhaust Fan Run Time:** When the EF run time has exceeded the maximum run time allotted (adjustable).
9. **Compressor #1 Alarm:** Compressor stops due to CC1-CS open, following 60 second (fixed) delay. Compressor lockout occurs if alarm happens 3 times in 1 hour (Compressor #1 STOP).
10. **Compressor #1 Hand:** Compressor is commanded off but the CC1-CS still indicates to the unit controller it is on, following 60 second (fixed) delay.
11. **Compressor #1 Run Time:** When the C1 run time has exceeded the maximum run time allotted (adjustable).
12. **High Pressure Switch #1 Alarm:** Compressor stops due to HPS1 open, following 30 second (fixed) delay. Requires HPS1 manual reset. Compressor lockout occurs if alarm happens 3 times in 1 hour (High Pressure Switch #1 STOP).
13. **Low Pressure Switch #1 Alarm:** Compressor stops due to LPS1 open; following 90 second (fixed) delay. Compressor lockout occurs if alarm happens 3 times in 1 hour (Low Pressure Switch #1 STOP).
14. **Freeze Protection #1 Alarm:** Compressor stops due to DX LAT1 freeze condition, following 3 minute (adjustable) delay. Compressor lockout occurs if alarm happens 3 times in 1 hour (FP #1 STOP).
15. **Compressor #2 Alarm:** Compressor stops due to CC2-CS open; following 60 second (fixed) delay. Compressor lockout occurs if alarm happens 3 times in 1 hour (Compressor #2 STOP).
16. **Compressor #2 Hand:** Compressor is commanded off but the CC2-CS still indicates to the unit controller it is on, following 60 second (fixed) delay.

17. **Compressor #2 Run Time:** When the C2 run time has exceeded the maximum run time allotted (adjustable).
18. **High Pressure Switch #2 Alarm:** Compressor stops due to HPS2 open, following 30 second (fixed) delay. Requires HPS2 manual reset. Compressor lockout occurs if alarm happens 3 times in 1 hour (High Pressure Switch #2 STOP).
19. **Low Pressure Switch #2 Alarm:** Compressor stops due to LPS2 open, following 90 second (fixed) delay. Compressor lockout occurs if alarm happens 3 times in 1 hour (Low Pressure Switch #2 STOP).
20. **Freeze Protection #2 Alarm:** Compressor stops due to DX LAT2 freeze condition, following 3 minute (adjustable) delay. Compressor lockout occurs if alarm happens 3 times in 1 hour (FP #2 STOP).
21. **Sensor Failure:** Readings exceed sensor limits, following 2 minute (fixed) delay. Alarms reset automatically.
22. **SAT Sensor Failure:** Open: -60.2 °F, Short: 296 °F. Unit will automatically shut down.
23. **High SAT Alarm:** SAT high limit, 130 °F (adjustable) with Gas Furnace Heat. Alarm resets automatically.
24. **Low SAT Alarm:** SAT low limit, 40 °F (adjustable), following 10 minute (adjustable) delay. Unit will automatically shut down.
25. **Heat Failure:** In heating mode and the SAT falls below 50 °F (adjustable), following 10 minute (adjustable) delay. Alarm resets automatically.

# Sequence of Operation

## Air Source Heat Pump 100% Outside Air

The unit controller is turned on by a switch located on its front upper left corner. Several Occupancy Control options are available for starting the unit. These can be selected from the BACview display pad on the Controls screen (requires user password). The Resident Program has an adjustable scheduler that uses the internal time clock to allow for separate Sequences for Occupied and Unoccupied periods. This can be accessed from the BACview display pad on the Schedules screen (requires user password).

**NOTE:** All temperature-related events have an additional 10 second (fixed) “delay on make” to allow temperatures to settle.

### OCCUPIED MODE

When the BACview Schedule calls for the start of the Occupied Mode and the unit controller has verified that there are no fault or shutdown conditions, after a 30 second (fixed) delay the unit goes into Occupied Mode.

#### 1. Outdoor Air Damper (OD)

- After the unit goes into Occupied Mode, the Outdoor Air (OA) damper will open. As the OA damper opens, the Outdoor Air Damper Actuator (OADA) auxiliary switches close.
- The OA damper stays open until the system reaches the end of the Occupied Mode period. It will remain open until the supply fan turns off. After the supply fan turns off, the OA damper will close.

#### 2. Supply Fan (SF)

- As the OA damper opens, the OADA auxiliary switch will close and the SF will turn on.
- The SF will run for 60 seconds (fixed) before cooling, dehumidification, or heating will be enabled.
  - The SF shall operate continuously while the unit is in the Occupied Mode. When the system reaches the end of the Occupied Mode period, the SF will continue to run for an additional 2 minutes before turning off.
  - The Supply Fan with Variable Speed Control (SF-VSC) will modulate its speed based upon the SF Differential Pressure Transmitter (SF-DPT) signal and the supply duct static pressure setpoint.
  - **Optional:** For constant air volume (CAV), select “Manual Override” in the BACview keypad and input the required speed (%) as determined in the field by Test and Balancing.

#### 3. Exhaust Fan (EF)

- At the same time the SF turns on, the EF will be enabled to run.
- The EF shall be enabled to run while the unit is in the Occupied Mode. When the system reaches the end of the Occupied Mode period, the EF will be enabled to run for an additional 2 minutes before turning off.

- EF-VSC: Exhaust Fan with Variable Speed Control.
  - If the Zone Differential Pressure Transmitter (ZN-DPT) signal is above the building static pressure setpoint, the EF-VSC will modulate its speed based upon the ZN-DPT and the setpoint.
  - If the ZN-DPT signal is below the building static pressure setpoint, the EF will modulate down to 0% (adjustable) speed.
  - **Optional:** For constant air volume (CAV), select “Manual Override” in the BACview keypad and input the required speed (%) as determined in the field by Test and Balancing.

#### 4. Cooling Mode

- Reversing Valve is “OFF” in Cooling Mode.
- Cooling Mode is available when the Outdoor Air Temperature (OAT) is 1 °F (fixed) above the OAT cooling lower limit (55 °F, adjustable) and there is a demand for cooling.
- When the Outdoor Air Temperature (OAT) is 1 °F (adjustable) or more above the OAT cooling setpoint (70 °F, adjustable), compressor #1 turns on.
- When the SAT is 2 °F (adjustable) or more above the SAT cooling setpoint (70 °F, adjustable), compressor #2 turns on, not less than 30 minutes (adjustable) after compressor #1 turned on.
- When the SAT is 2°F (adjustable) or more below the SAT cooling setpoint (70 °F, adjustable), compressor #2 turns off.
- When the OAT is 1°F (adjustable) or more below the OAT cooling setpoint (70 °F, adjustable), compressor #1 turns off.
- Minimum SF-VSC modulation shall be 50% (adjustable; 50% min.).
- **Optional:** When enabled, if there is a call for 1st stage cooling, 2nd stage cooling will be enabled after a 10-minute (adjustable) delay. Both compressors modulate based upon the cooling setpoint. Default is “OFF.”
- Compressor enabling logic includes a 5-minute (fixed) minimum run-time and a 5-minute (fixed) minimum time-off delay to prevent compressor short cycling.
- Digital Compressors:
  - The unit controller controls the capacity of the digital compressor by rapidly loading and unloading the compressor in 15 second intervals.
  - The digital compressor will modulate based upon the SAT sensor and setpoint (70 °F, adjustable).
  - If the DX LAT drops to 38 °F or less for 3 minutes, the unit controller will issue an alarm and the compressor stops. When the DX LAT warms back up to 55 °F or more, the compressor turns back on.
- If there is a current call for 1st stage cooling and compressor #1 is shut down due to an alarm (HPS1, LPS1, or DX LAT1), compressor #2 will be turned on to take its place until it returns.

## **Sequence of Operation**

### **Air Source Heat Pump 100% Outside Air (Cont'd)**

- Hot Gas Reheat (HGRH) – On/Off:
  - When the SAT is 1.0 °F (adjustable) or more below the SAT cooling setpoint (70.0 °F, adjustable), HGRH turns on and cycles based upon the SAT cooling setpoint.
  - When SAT is 2.0 °F (adjustable) or more above the SAT cooling setpoint, HGRH turns off.

#### **5. Dehumidification Mode**

- Reversing Valve is “OFF” in Dehumidification Mode.
- Dehumidification Mode is available if the OAT is 1.0 °F (fixed) above the dehumidification lower limit of 60 °F (adjustable) and there is no call for heating.
- When the Outdoor Air Dew Point (OADP) is 1.0 °F (adjustable) or more above the Supply Air Dew Point (SADP) setpoint (53.0 °F, adjustable), Dehumidification Mode is enabled. After the minimum time-off delay, compressor #1 turns on.
- When the SADP is 2 °F (adjustable) or more above the SADP setpoint (53.0 °F, adjustable), and after minimum time-off delay, compressor #2 turns on, not less than 30 minutes (adjustable) after compressor #1 turned on. Both compressors respond in sequence and run at full cooling.
- HGRH is enabled to operate as necessary based upon the SAT dehumidification setpoint (70.0 °F, adjustable).
- When SADP is 1.0 °F (adjustable) or more below SADP setpoint (53.0 °F, adjustable), compressor #2 turns off.
- When the OADP is 2.0 °F (adjustable) or more below the SADP setpoint (53.0 °F, adjustable), compressor #1 turns off and Dehumidification Mode is disabled.
- Digital Compressors:
  - The unit controller controls the capacity of the digital compressor by rapidly loading and unloading the compressor in 15 second intervals.
  - The digital compressor will modulate based upon the SADP sensor and SADP setpoint (53.0 °F, adjustable).
- Hot Gas Reheat (HGRH) – On/Off:
  - When the SAT is 1.0 °F (adjustable) or more below the SAT dehumidification setpoint, HGRH turns on and cycles based upon the SAT dehumidification setpoint .
  - When the SAT is 2.0 °F (adjustable) or more above the SAT dehumidification setpoint, HGRH turns off.

#### **6. Heating Mode**

- Heating Mode is available when the OAT is 1.0 °F (fixed) below the OAT heating upper limit (60.0 °F, adjustable) and there is a demand for heating.
- Reversing Valve is “ON” in Heating Mode.



- When the OAT is 1.0 °F (adjustable) or more below the OAT heating setpoint (55.0 °F, adjustable), compressor #1 turns on.
- When the SAT is 2.0 °F (adjustable) or more below the SAT heating setpoint (70.0 °F, adjustable), compressor #2 turns on, not less than 10 minutes (adjustable) after compressor #1 turned on.
- When the SAT is 2.0 °F (adjustable) or more above the SAT heating setpoint (70.0 °F, adjustable), compressor #2 turns off.
- When the OAT is 2.0 °F (adjustable) or more above the OAT heating setpoint (55.0 °F, adjustable), compressor #1 turns off.
- Heat pump operation shall be disabled if the SF-VSC modulation drops below 85% (adjustable).
- **Optional:** When enabled, if there is a call for 1st stage heating, 2nd stage heating will be enabled after a 10-minute (adjustable) delay. Both compressors modulate based upon the heating setpoint. Default is "OFF."
- Compressor enabling logic includes a 5-minute (fixed) minimum run-time as well as the 5-minute (fixed) minimum time-off delay to prevent compressor short cycling.
- Digital Compressor:
  - The unit controller controls the capacity of the digital compressor by rapidly loading and unloading the compressor in 15 second intervals.
  - The digital compressor will modulate based on the SAT sensor and SAT heating setpoint (70.0 °F, adjustable).
  - If there is a current call for 1st stage heating and compressor #1 is shut down due to an alarm (HPS1, LPS1, or DX LAT1), compressor #2 will be turned on to take its place until it returns.
- Defrost Mode: On defrost mode, the reversing valve will switch to cooling to defrost the built-up ice on the condenser coil.
  - The unit is equipped with a Defrost Timer. The defrost timer provides a selectable time interval between defrost cycles. It will allow a 10 minute defrost every 30/60/90 minutes as long as the defrost thermostat is closed. The timer is factory set at 60 minutes. The time interval may be changed to 30 or 90 minutes if desired (disconnect power to the unit before moving the jumper). The hold input on the defrost timer allows the timer to accumulate time while the compressor is running in heating mode. A warm outdoor coil causes the defrost thermostat to open which will prevent time accumulation or end the Defrost period. The defrost timer allows up to a 10 minutes defrost cycle if the defrost thermostat is closed. When the defrost period ends, either by opening of the defrost thermostat or after the 10 minutes defrost period has elapsed, the timer is reset. By shorting the two test terminals together on the defrost timer, a 60 minute delay is reduced to 14 seconds and a 10 minute delay is reduced to 2.3 seconds for testing purposes.
  - During defrost cycle, the auxiliary heat will energize based upon the SAT setpoint.

## Sequence of Operation

### Air Source Heat Pump 100% Outside Air (Cont'd)

- Supplemental Heat:
  - After either heat pump has been enabled, when the SAT is 2.0 °F (adjustable) or more below the SAT heating setpoint (70.0 °F, adjustable), and after a 10-minute (adjustable) delay period, supplemental heating will be enabled. When the SAT is equal to the SAT heating setpoint (70.0 °F, adjustable), supplemental heating will be disabled.
- Modulated Supplemental Heat:
  - Modulating Gas Furnace: On demand for supplemental heating, the unit controller modulates the gas furnace controller to control the gas flow based upon the SAT heating setpoint (70.0 °F, adjustable).

#### 7. Auxiliary (Emergency) Heating Mode

- Compressors are “OFF” in Auxiliary (Emergency) Heating Mode.
- Auxiliary (Emergency) Heating mode is selectable using the BACview display pad or BAS (default is “OFF”). Auxiliary (Emergency) Heating mode will automatically be turned on if both heat pump compressors fail or are disabled due to either the OAT going below the Compressor Disable setpoint of 26.0 °F (adjustable) or the SF-VSC modulating below 85% (adjustable).
- Auxiliary (Emergency) Heating Mode is available when the OAT is below the OAT heating upper limit (60.0 °F, adjustable) and there is a demand for heating.
- Modulated Auxiliary (Emergency) Heat:
  - Modulating Gas Furnace: On demand for auxiliary (emergency) heating, the unit controller modulates the gas furnace controller to control the gas flow based upon the SAT heating setpoint (70.0 °F, adjustable).

#### UNOCCUPIED MODE

When the Occupancy Control indicates the end of the Occupied Mode, the compressor(s) and outdoor fan(s) will turn off (subject to minimum run-time). The SF and EF will continue to run for 2 minutes before turning off. After this, the OA damper will close. The unit is now off.

#### Safety Switches

- **High Pressure Switch (HPS1):** If HPS1 is open, compressor #1 will turn off and the unit controller will issue an alarm. After manually resetting HPS1, the HPS1 alarm will reset. Following a minimum time off delay, compressor #1 will turn on. If the unit controller records three high pressure start/restart failure incidents within 1 hour, compressor #1 is locked out and the unit controller will issue an alarm. The compressor lockout can be reset in the BACview display pad or by cycling the power of the unit controller.
- This sequence is the same for compressor #2, Y2, and HPS2.
- **Low Pressure Switch (LPS1):** If LPS1 is open after the LPS1 by-pass time, the unit controller will issue an alarm and compressor #1 turns off. After 30 seconds (fixed), the LPS1 alarm will reset. Following a minimum time off delay, compressor #1 will turn on. If the unit controller records three low pressure start/restart failure incidents within 1 hour, compressor #1 is locked out and the unit controller will issue an alarm. The compressor lockout can be reset in the BACview display pad or by cycling the power of the unit controller.
- This sequence is the same for compressor #2, Y2, and LPS2.

### Safety Shutdown

- If a compressor fails to start three times in an hour due to high pressure switch lockout.
- If a compressor fails to start three times in an hour due to low pressure switch lockout.
- If a compressor fails to start three times in an hour due to DX leaving air temperature lockout.
- If the unit controller detects an SAT sensor failure.

### Standard Alarms

(alarms require reset in the BACview or cycling the power of the unit controller unless noted)

1. **OADA Alarm:** When the OADA fails to open or closes due to OADA-A (adjustable) being open, following 2 minute (adjustable) delay. Unit will automatically shut down.
2. **OADA Hand:** When the OADA is commanded closed but the OADA-A (adjustable.) still indicates to the unit controller it is open, following 2 minute (adjustable) delay.
3. **Supply Fan Alarm:** When the SF fails to start and the SF-APS does not confirm air flow to unit controller, following 1 minute (adjustable) delay. Unit will automatically shut down.
4. **Supply Fan Hand:** When the SF is commanded off and the SF-APS still indicates air flow to the unit controller, following 1 minute (adjustable) delay. OA Damper (if existing) will be commanded to remain open.
5. **Supply Fan Run Time:** When the SF run time has exceeded the maximum run time allotted (adjustable).
6. **Exhaust Fan Alarm:** When the EF fails to start and the EF-APS does not confirm air flow to the unit controller, following 1 minute (adjustable) delay.
7. **Exhaust Fan Hand:** When the EF is commanded off and the EF-APS still indicates air flow to the unit controller, following 1 minute (adjustable) delay.
8. **Exhaust Fan Run Time:** When the EF run time has exceeded the maximum run time allotted (adjustable).
9. **Compressor #1 Alarm:** Compressor stops due to CC1-CS open, following 60 second (fixed) delay. Compressor lock out occurs if alarm happens 3 times in 1 hour (Compressor #1 STOP).
10. **Compressor #1 Hand:** Compressor is commanded off but the CC1-CS still indicates to the unit controller it is on, following 60 second (fixed) delay.
11. **Compressor #1 Run Time:** When the C1 run time has exceeded the maximum run time allotted (adjustable).
12. **High Pressure Switch #1 Alarm:** Compressor stops due to HPS1 open, following 30 second (fixed) delay. Requires HPS1 manual reset. Compressor lock out occurs if alarm happens 3 times in 1 hour (High Pressure Switch #1 STOP).
13. **Low Pressure Switch #1 Alarm:** Compressor stops due to LPS1 open, following 90 second (fixed) delay. Compressor lock out occurs if alarm happens 3 times in 1 hour (Low Pressure Switch #1 STOP).

## ***Sequence of Operation***

### ***Air Source Heat Pump 100% Outside Air (Cont'd)***

14. **Freeze Protection #1 Alarm:** Compressor stops due to DX LAT1 freeze condition, following 3 minute (adjustable) delay. Compressor lock out occurs if alarm happens 3 times in 1 hour (FP #1 STOP).
15. **Compressor #2 Alarm:** Compressor stops due to CC2-CS open, following 60 second (fixed) delay. Compressor lock out occurs if alarm happens 3 times in 1 hour (Compressor #2 STOP).
16. **Compressor #2 Hand:** Compressor is commanded off but the CC2-CS still indicates to the unit controller it is on, following 60 second (fixed) delay.
17. **Compressor #2 Run Time:** When the C2 run time has exceeded the maximum run time allotted (adjustable).
18. **High Pressure Switch #2 Alarm:** Compressor stops due to HPS2 open, following 30 second (fixed) delay. Requires HPS2 manual reset. Compressor lock out occurs if alarm happens 3 times in 1 hour (High Pressure Switch #2 STOP).
19. **Low Pressure Switch #2 Alarm:** Compressor stops due to LPS2 open, following 90 second (fixed) delay. Compressor lock out occurs if alarm happens 3 times in 1 hour (Low Pressure Switch #2 STOP).
20. **Freeze Protection #2 Alarm:** Compressor stops due to DX LAT2 freeze condition, following 3 minute (adjustable) delay. Compressor lock out occurs if alarm happens 3 times in 1 hour (FP #2 STOP).
21. **Sensor Failure:** Readings exceed sensor limits, following 2 minute (fixed) delay. Alarms reset automatically.
22. **SAT Sensor Failure:** Open: -60.2 °F, Short: 296 °F. Unit will automatically shut down.
23. **High SAT Alarm:** SAT high limit, 130 °F (adjustable) with Gas Furnace Heat. Alarm resets automatically.
24. **Low SAT Alarm:** SAT low limit, 40 °F (adjustable), following 10 minute (adjustable) delay. Unit will automatically shut down.
25. **Heat Failure:** In heating mode and the SAT falls below 50 °F (adjustable), following 10 minute (adjustable) delay. Alarm resets automatically.

# Sequence of Operation

## Water Source Heat Pump 100% Outside Air

The unit controller is turned on by a switch located on its front upper left corner. Several Occupancy Control options are available for starting the unit. These can be selected from the BACview display pad on the Controls screen (requires user password). The Resident Program has an adjustable scheduler that uses the internal time clock to allow for separate Sequences for Occupied and Unoccupied periods. This can be accessed from the BACview display pad on the Schedules screen (requires user password).

**NOTE:** All temperature-related events have an additional 10 second (fixed) “delay on make” to allow temperatures to settle.

### OCCUPIED MODE

When the BACview Schedule calls for the start of the Occupied Mode, and the unit controller has verified that there are no fault or shutdown conditions, after a 30 second (fixed) delay the unit goes into Occupied Mode.

#### 1. Outdoor Air Damper (OD)

- After the unit goes into Occupied Mode, the Outdoor Air (OA) damper will open. As the OA damper opens, the Outdoor Air Damper Actuator (OADA) auxiliary switches close.
- The OA damper stays open until the system reaches the end of the Occupied Mode period. It will remain open until the supply fan turns off. After the supply fan turns off, the OA damper will close.

#### 2. Supply Fan (SF)

- As the OA damper opens, the OADA auxiliary switch will close and the SF will turn on.
- The SF will run for 60 seconds (fixed) before cooling, dehumidification, or heating will be enabled.
  - The SF shall operate continuously while the unit is in the Occupied Mode. When the system reaches the end of the Occupied Mode period, the SF will continue to run for an additional 2 minutes before turning off.
  - The Supply Fan with Variable Speed Control (SF-VSC) will modulate its speed based upon the SF Differential Pressure Transmitter (SF-DPT) signal and the supply duct static pressure setpoint.
  - **Optional:** For constant air volume (CAV), select “Manual Override” in the BACview keypad and input the required speed (%) as determined in the field by Test and Balancing.

#### 3. Exhaust Fan (EF)

- At the same time the SF turns on, the EF will be enabled to run.
- The EF shall be enabled to run while the unit is in the Occupied Mode. When the system reaches the end of the Occupied Mode period, the EF will be enabled to run for an additional 2 minutes before turning off.

## Sequence of Operation

### Water Source Heat Pump 100% Outside Air (Cont'd)

- EF-VSC: Exhaust Fan with Variable Speed Control.
  - If the Zone Differential Pressure Transmitter (ZN-DPT) signal is above the building static pressure setpoint, the EF-VSC will modulate its speed based upon the ZN-DPT and the setpoint. If the ZN-DPT signal is below the building static pressure setpoint, the EF will modulate down to 0% (adjustable) speed.
  - **Optional:** For constant air volume (CAV), select “Manual Override” in the BACview keypad and input the required speed (%) as determined in the field by Test and Balancing.

#### 4. Cooling Mode

- Reversing Valve is “ON” in Cooling Mode.
- Cooling Mode is available when the Outdoor Air Temperature (OAT) is 1 °F (fixed) above the OAT cooling lower limit (55 °F, adjustable) and there is a demand for cooling.
- When the Outdoor Air Temperature (OAT) is 1.0 °F (adjustable) or more above the OAT cooling setpoint (70.0 °F, adjustable), compressor #1 turns on.
- When the SAT is 2.0 °F (adjustable) or more above the SAT cooling setpoint (70.0 °F, adjustable), compressor #2 turns on, not less than 30 minutes (adjustable) after compressor #1 turned on.
- When the SAT is 2.0 °F (adjustable) or more below the SAT cooling setpoint (70.0 °F, adjustable), compressor #2 turns off.
- When the OAT is 1 °F (adjustable) or more below the OAT cooling setpoint (70.0 °F, adjustable), compressor #1 turns off.
- Minimum SF-VSC modulation shall be 50% (adjustable; 50% min.).
- **Optional:** When enabled, if there is a call for 1st stage cooling, 2nd stage cooling will be enabled after a 10-minute (adjustable) delay. Both compressors modulate based upon the cooling setpoint. Default is “OFF.”
- Compressor enabling logic includes a 5-minute (fixed) minimum run-time and a 5-minute (fixed) minimum timeoff delay to prevent compressor short cycling.
- Digital Compressors:
  - The unit controller controls the capacity of the digital compressor by rapidly loading and unloading the compressor in 15 second intervals.
  - The digital compressor will modulate based upon the SAT sensor and setpoint (70.0 °F, adjustable).
  - If the DX LAT drops to 38.0 °F or less for 3 minutes, the unit controller will issue an alarm and the compressor stops. When the DX LAT warms back up to 55.0 °F or more, the compressor turns back on.
- If there is a current call for 1st stage cooling and compressor #1 is shut down due to an alarm (HPS1, LPS1, or DX LAT1), compressor #2 will be turned on to take its place until it returns.

- Hot Gas Reheat (HGRH) – On/Off:
  - When the SAT is 1.0 °F (adjustable) or more below the SAT cooling setpoint (70.0 °F, adjustable), HGRH turns on and cycles based upon the SAT cooling setpoint.
  - When SAT is 2.0 °F (adjustable) or more above the SAT cooling setpoint, HGRH turns off.

## 5. Dehumidification Mode

- Reversing Valve is “ON” in Dehumidification Mode.
- Dehumidification Mode is available if the OAT is 1.0 °F (fixed) above the dehumidification lower limit of 60.0 °F (adjustable) and there is no call for heating.
- When the Outdoor Air Dew Point (OADP) is 1.0 °F (adjustable) or more above the Supply Air Dew Point (SADP) setpoint (53.0 °F, adjustable), Dehumidification Mode is enabled. After the minimum time-off delay, compressor #1 turns on.
- When the SADP is 2.0 °F (adjustable) or more above the SADP setpoint (53.0 °F, adjustable), and after minimum time-off delay, compressor #2 turns on, not less than 30 minutes (adjustable) after compressor #1 turned on. Both compressors respond in sequence and run at full cooling.
- HGRH is enabled to operate as necessary based upon the SAT dehumidification setpoint (70.0 °F, adjustable).
- When SADP is 1.0 °F (adjustable) or more below SADP setpoint (53.0 °F, adjustable), compressor #2 turns off.
- When the OADP is 2.0 °F (adjustable) or more below the SADP setpoint (53.0 °F, adjustable), compressor #1 turns off and Dehumidification Mode is disabled.
- Digital Compressors:
  - The unit controller controls the capacity of the digital compressor by rapidly loading and unloading the compressor in 15 second intervals.
  - The digital compressor will modulate based upon the SADP sensor and SADP setpoint (53.0 °F, adjustable).
- Hot Gas Reheat (HGRH) – On/Off:
  - When the SAT is 1.0 °F (adjustable) or more below the SAT dehumidification setpoint, HGRH turns on and cycles based upon the SAT dehumidification setpoint .
  - When the SAT is 2.0 °F (adjustable) or more above the SAT dehumidification setpoint, HGRH turns off.

## 6. Heating Mode

- Heating Mode is available when the OAT is 1.0 °F (fixed) below the OAT heating upper limit (60.0 °F, adjustable) and there is a demand for heating.
- Reversing Valve is “OFF” in Heating Mode.
- When the OAT is 1.0 °F (adjustable) or more below the OAT heating setpoint (55 °F, adjustable), compressor #1 turns on.

## Sequence of Operation

### Water Source Heat Pump 100% Outside Air (Cont'd)

- When the SAT is 2.0 °F (adjustable) or more below the SAT heating setpoint (70 °F, adjustable), compressor #2 turns on, not less than 10 minutes (adjustable) after compressor #1 turned on.
- When the SAT is 2.0 °F (adjustable) or more above the SAT heating setpoint (70 °F, adjustable), compressor #2 turns off.
- When the OAT is 2.0 °F (adjustable) or more above the OAT heating setpoint (55 °F, adjustable), compressor #1 turns off.
- Heat pump operation shall be disabled if the SF-VSC modulation drops below 85% (adjustable).
- **Optional:** When enabled, if there is a call for 1st stage heating, 2nd stage heating will be enabled after a 10-minute (adjustable) delay. Both compressors modulate based upon the heating setpoint. Default is "OFF."
- Compressor enabling logic includes a 5-minute (fixed) minimum run-time as well as the 5-minute (fixed) minimum time-off delay to prevent compressor short cycling.
- Digital Compressor:
  - The unit controller controls the capacity of the digital compressor by rapidly loading and unloading the compressor in 15 second intervals.
  - The digital compressor will modulate based on the SAT sensor and SAT heating setpoint (70.0 °F, adjustable).
  - If there is a current call for 1st stage heating and compressor #1 is shut down due to an alarm (HPS1, LPS1, or DX LAT1), compressor #2 will be turned on to take its place until it returns.
- Auxiliary Heat:
  - After either heat pump has been enabled, when the SAT is 2.0 °F (adjustable) or more below the SAT heating setpoint (70.0 °F, adjustable), and after a 10-minute (adjustable) delay period, auxiliary heating will be enabled. When the SAT is equal to the SAT heating setpoint (70.0 °F, adjustable), auxiliary heating will be disabled.
- Modulated Auxiliary Heat:
  - Modulating Gas Furnace: On demand for auxiliary heating, the unit controller modulates the gas furnace controller to control the gas flow based upon the SAT heating setpoint (70.0 °F, adjustable).

#### 7. Emergency Heating Mode

- Compressors are "OFF" in Emergency Heating Mode.
- Emergency Heating mode is selectable using the BACview display pad or BAS (default is "OFF"). Emergency Heating mode will automatically be turned on if both heat pump compressors fail or are disabled due to either the OAT going below the Compressor Disable setpoint of 26.0 °F (adjustable) or the SF-VSC modulating below 85% (adjustable).



- Modulated Emergency Heat:
  - Modulating Gas Furnace: On demand for emergency heating, the unit controller modulates the gas furnace controller to control the gas flow based upon the SAT heating setpoint (70.0 °F, adjustable).

## UNOCCUPIED MODE

When the Occupancy Control indicates the end of the Occupied Mode, the compressor(s) and outdoor fan(s) will turn off (subject to minimum run-time). The SF and EF will continue to run for 2 minutes before turning off. After this, the OA damper will close. The unit is now off.

## Safety Switches

- **High Pressure Switch (HPS1):** If HPS1 is open, compressor #1 will turn off and the unit controller will issue an alarm. After manually resetting HPS1, the HPS1 alarm will reset. Following a minimum time off delay, compressor #1 will turn on. If the unit controller records three high pressure start/restart failure incidents within an hour, compressor #1 is locked out and the unit controller will issue an alarm. The compressor lockout can be reset in the BACview display pad or by cycling the power of the unit controller.
- This sequence is the same for compressor #2, Y2, and HPS2.
- **Low Pressure Switch (LPS1):** If LPS1 is open after the LPS1 by-pass time, the unit controller will issue an alarm and compressor #1 turns off. After 30 seconds (fixed), the LPS1 alarm will reset. Following a minimum time off delay, compressor #1 will turn on. If the unit controller records three low pressure start/restart failure incidents within an hour, compressor #1 is locked out and the unit controller will issue an alarm. The compressor lockout can be reset in the BACview display pad or by cycling the power of the unit controller.
- This sequence is the same for compressor #2, Y2, and LPS2.

## Safety Shutdown

- If a compressor fails to start three times in an hour due to high pressure switch lockout.
- If a compressor fails to start three times in an hour due to low pressure switch lockout.
- If a compressor fails to start three times in an hour due to DX leaving air temperature lockout.
- If the unit controller detects an SAT sensor failure.

## Standard Alarms

(alarms require reset in the BACview or cycling the power of the unit controller unless noted)

1. **OADA Alarm:** When the OADA fails to open or closes due to OADA-A (adjustable) being open, following 2 minute (adjustable) delay. Unit will automatically shut down.
2. **OADA Hand:** When the OADA is commanded closed but the OADA-A (adjustable) still indicates to the unit controller it is open, following 2 minute (adjustable) delay.
3. **Supply Fan Alarm:** When the SF fails to start and the SF-APS does not confirm air flow to the unit controller, following 1 minute (adjustable) delay. Unit will automatically shut down.

## ***Sequence of Operation***

### ***Water Source Heat Pump 100% Outside Air (Cont'd)***

4. **Supply Fan Hand:** When the SF is commanded off and the SF-APS still indicates air flow to the unit controller, following 1 minute (adjustable) delay. OA Damper (if existing) will be commanded to remain open.
5. **Supply Fan Run Time:** When the SF run time has exceeded the maximum run time allotted (adjustable).
6. **Exhaust Fan Alarm:** When the EF fails to start and the EF-APS does not confirm air flow to the unit controller, following 1 minute (adjustable) delay.
7. **Exhaust Fan Hand:** When the EF is commanded off and the EF-APS still indicates air flow to the unit controller, following 1 minute (adjustable) delay.
8. **Exhaust Fan Run Time:** When the EF run time has exceeded the maximum run time allotted (adjustable).
9. **Compressor #1 Alarm:** Compressor stops due to CC1-CS open, following 60 second (fixed) delay. Compressor lock out occurs if alarm happens 3 times in 1 hour (Compressor #1 STOP).
10. **Compressor #1 Hand:** Compressor is commanded off but the CC1-CS still indicates to the unit controller it is on, following 60 second (fixed) delay.
11. **Compressor #1 Run Time:** When the C1 run time has exceeded the maximum run time allotted (adjustable).
12. **High Pressure Switch #1 Alarm:** Compressor stops due to HPS1 open, following 30 second (fixed) delay. Requires HPS1 manual reset. Compressor lockout occurs if alarm happens 3 times in 1 hour (High Pressure Switch #1 STOP).
13. **Low Pressure Switch #1 Alarm:** Compressor stops due to LPS1 open, following 90 second (fixed) delay. Compressor lock out occurs if alarm happens 3 times in 1 hour (Low Pressure Switch #1 STOP).
14. **Freeze Protection #1 Alarm:** Compressor stops due to DX LAT1 freeze condition, following 3 minute (adjustable) delay. Compressor lock out occurs if alarm happens 3 times in 1 hour (FP #1 STOP).
15. **Compressor #2 Alarm:** Compressor stops due to CC2-CS open, following 60 second (fixed) delay. Compressor lock out occurs if alarm happens 3 times in 1 hour (Compressor #2 STOP).
16. **Compressor #2 Hand:** Compressor is commanded off but the CC2-CS still indicates to the unit controller it is on, following 60 second (fixed) delay.
17. **Compressor #2 Run Time:** When the C2 run time has exceeded the maximum run time allotted (adjustable).
18. **High Pressure Switch #2 Alarm:** Compressor stops due to HPS2 open, following 30 second (fixed) delay. Requires HPS2 manual reset. Compressor lock out occurs if alarm happens 3 times in 1 hour (High Pressure Switch #2 STOP).
19. **Low Pressure Switch #2 Alarm:** Compressor stops due to LPS2 open, following 90 second (fixed) delay. Compressor lock out occurs if alarm happens 3 times in 1 hour (Low Pressure Switch #2 STOP).

20. **Freeze Protection #2 Alarm:** Compressor stops due to DX LAT2 freeze condition, following 3 minute (adjustable) delay. Compressor lock out occurs if alarm happens 3 times in 1 hour (FP #2 STOP).
21. **Sensor Failure:** Readings exceed sensor limits, following 2 minute (fixed) delay. Alarms reset automatically.
22. **SAT Sensor Failure:** Open: -60.2 °F, Short: 296.0 °F. Unit will automatically shut down.
23. **High SAT Alarm:** SAT high limit, 130.0 °F (adjustable) with Gas Furnace Heat. Alarm resets automatically.
24. **Low SAT Alarm:** SAT low limit, 40.0 °F (adjustable), following 10 minute (adjustable) delay. Unit will automatically shut down.
25. **Heat Failure:** In heating mode and the SAT falls below 50.0 °F (adjustable), following 10 minute (adjustable) delay. Alarm resets automatically.
26. **Freeze Stat Alarm:** If Freeze Stat (FZT) relay opens indicating a water line freeze condition. Both compressors will automatically shut down. Alarm resets automatically when FZT relay closes.
27. **Water Flow Alarm:** If Water Flow Switch (WFS) relay opens indicating a no flow or low flow in water line. Both compressors will automatically shut down. Alarm resets automatically when WFS relay closes.

