

# ADDENDUM NO. 1

Date: March 6, 2020

Project: IA DAS – Eldora STS Decentralization Electrical Package Re-Bid DAS RFB 898201-02 DAS Project 8982.01

### **SPECIFICATIONS ITEMS:**

### 1. 26 2923 – Variable-Frequency Motor Controllers

**a. ADD** this section in its entirety – attached.

### DRAWING ITEMS:

1. DRAWINGS

### a. SHEET - 02-M5.00 - COTTAGES 3 & 4 MECHANICAL DETAILS & CONTROLS

 REVISE - RTU INTEGRATION SCHEMATIC – delete references to VFD speed and fault on the exhaust fan. The exhaust fan is constant speed on/off. Provide status and start/stop integration only.

#### b. SHEET 02-M6.00 - COTTAGE 3 & 4 MECHANICAL SCHEDULES

- i. **REVISE** Design Basis on "AIR COOLED CONDENSING UNITS" from XC20 to XC16S and SEER to "14.5".
- **ii. REVISE** Design Basis on "FURNACE GAS SCHEDULE" from EL296UH070XV36B to EL296UH070XE36B.
- iii. ADD On "FURNACE GAS SCHEDULE" column for "MODEL" under "COOLING COIL DATA". Model on GF3-1 shall say "CX35-30/36B"

#### c. SHEET - 02-E2.01 COTTAGES 3&4 POWER GRUND FLOOR

- i. REVISE Wire and conduit for ACCU3-1 from 2#10 & 1#10GND, 1"C. to 3#10 & 1#10GND , 1"C
- ii. **REVISE –** C/B for ACCU3-1 from 30 to 25.

# d. SHEET - 02-E2.03 COTTAGES 3&4 POWER SECOND FLOOR AND ROOF

i. REVISE – BREAKER for ACCU3-1 from 30 to 25.

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#### e. SHEET - 03-M5.01 - COTTAGES 5 & RECEIVING MECHANICAL CONTROLS

i. **REVISE** RTU INTEGRATION SCHEMATIC – delete references to VFD speed and fault on the exhaust fan. The exhaust fan is constant speed on/off. Provide status and start/stop integration only.

#### f. SHEET - 03-M6.00 - COTTAGE 5 & RECEIVING MECHANICAL SCHEDULES

- i. **REVISE** Design Basis on "AIR COOLED CONDENSING UNITS" from XC20 to XC16S.
- ii. **REVISE** Design Basis for GF5-1 and GF6-1 on "FURNACE GAS SCHEDULE" from EL296UH070XV36B to EL296UH070XE36B.
- iii. **REVISE** Design Basis for GF5-2 on "FURNACE GAS SCHEDULE" from EL296UH090XV36B to EL296UH090XE36B.
- iv. **REVISE -** Cooling Coil Model for GF5-1 and GF6-1 on "FURNACE GAS SCHEDULE" from CX35-30B to CX35-36B.
- v. **REVISE -** Cooling Coil Model for GF5-2 on "FURNACE GAS SCHEDULE" from CX35-48C to CX35-49C.

#### g. SHEET – 03-E2.01 COTTAGES 5 & RECEIVING POWER GRUND FLOOR

- i. REVISE Wire and conduit for ACCU5-1 from 2#10 & 1#10GND, 1"C. to 3#10 & 1#10GND , 1"C
- ii. **REVISE –** C/B for ACCU5-2 from 25 to 30.
- iii. **REVISE –** Wire and conduit for ACCU6-1 from 2#10 & 1#10GND, 1"C. to 3#10 & 1#10GND , 1"C

#### h. SHEET - 03-E2.03 COTTAGES 5 & RECEIVING POWER SECOND FLOOR AND ROOF

i. **REVISE –** BREAKER for ACCU5-2 from 25A/3P to 30A/2P.

# i. SHEET - 04-M5.00 - COTTAGES 7 & 8 MECHANICAL DETAILS

i. **REVISE** RTU INTEGRATION SCHEMATIC – delete references to VFD speed and fault on the exhaust fan. The exhaust fan is constant speed on/off. Provide status and start/stop integration only.

# j. SHEET - 04-M6.00 - COTTAGE 7 & 8 MECHANICAL SCHEDULES

- i. **REVISE** Design Basis on "AIR COOLED CONDENSING UNITS" from XC20 to XC16S.
- ii. **REVISE** Design Basis for GF7-1 and GF8-1 on "FURNACE GAS SCHEDULE" from EL296UH070XV36B to EL296UH070XE36B.
- iii. **REVISE** Design Basis for GF7-2 on "FURNACE GAS SCHEDULE" from EL296UH090XV36B to EL296UH090XE36B.

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- iv. **REVISE Cooling Coil Model** for GF7-1 and GF8-1 on "FURNACE GAS SCHEDULE" from CX35-30B to CX35-36B.
- v. **REVISE -** Cooling Coil Model for GF7-2 on "FURNACE GAS SCHEDULE" from CX35-48C to CX35-49C.

#### k. SHEET - 04-E2.01 COTTAGES 7 & 8 POWER GRUND FLOOR

i. REVISE – C/B for ACCU7-2 from 25 to 30.

#### I. SHEET – 04-E2.03 COTTAGES 7 & 8 POWER SECOND FLOOR AND ROOF

i. REVISE - BREAKER for ACCU5-2 from 25A/3P to 30A/2P.

#### m. SHEET – 19-M6.00 VOCATIONAL MECHANICAL SCHEDULES

- i. **REVISE** Design Basis on "FURNACE GAS SCHEDULE" from EL296UH090XV48C to EL296UH090XE48C.
- ii. **REVISE** Design Basis on "AIR COOLED CONDENSING UNITS" from XC20 to XC16S and SEER to "15.5".
- iii. REVISE Cooling Coil Model to "FURNACE GAS SCHEDULE" from CX35-48C to CX35-49C.

#### n. SHEET - 019-E2.01 VOCATIONAL POWER GROUND FLOOR

i. **REVISE –** BREAKER for ACCU-1 from 25A/3P to 25A/2P.

#### 2. APPROVED SUBSTITUTIONS

SPECIFICATION SECTION	PRODUCT	APPROVED SUBSTITUTION
23 5216	Steel Water Tube Boilers	Lochinvar
23 7414	Semi-Custom Package Rooftop	LG
23 8200	Hydronic Finned Tube	Sigma
23 8200	Hvdronic Unit Heater	Sigma
23 8200	Cabinet Unit Heater	Sigma
23 8200	Electronic Baseboard	Markel
23 8300	Electronic Cabinet Heater	Markel

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### ATTACHMENTS:

- 1. Specification Section 26 2923
- 2. 01-M6.00
- 3. 02-M5.00
- 4. 02-P6.00
- 5. 02-PD.01
- 6. 03-M5.01
- 7. 04-M5.01
- 8. 08-M6.00
- 9. 11-M1.01
- 10. 11-M1.02
- 11. 11-M5.02
- 12. 11-M6.00
- 13. 19-MD.01

# END OF ADDENDUM

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### **SECTION 23 6213**

# PACKAGED AIR-COOLED REFRIGERANT COMPRESSOR AND CONDENSER UNITS

### PART 1 GENERAL

- 1.1 SECTION INCLUDES
  - A. Condensing unit package.
  - B. Charge of refrigerant and oil.
  - C. Controls and control connections.
  - D. Refrigerant piping connections.
  - E. Motor starters.
  - F. Electrical power connections.

### 1.2 RELATED REQUIREMENTS

- A. Section 23 0513 Common Motor Requirements for HVAC Equipment.
- B. Section 23 0548 Vibration and Seismic Controls for HVAC: Placement of vibration isolators.
- C. Section 23 0993 Sequence of Operations for HVAC Controls.
- D. Section 23 2300 Refrigerant Piping.
- E. Section 23 5400 Furnaces.

#### 1.3 REFERENCE STANDARDS

- A. AHRI 210/240 Standard for Performance Rating of Unitary Air-Conditioning and Air-Source Heat Pump Equipment; 2008, Including All Addenda.
- B. ASHRAE Std 15 Safety Standard for Refrigeration Systems; 2013.
- C. ASHRAE Std 23.1 Methods of Testing for Rating the Performance of Positive Displacement Refrigerant Compressors and Condensing Units that Operate at Subcritical Temperatures of the Refrigerant; 2010.
- D. ASHRAE Std 90.1 I-P Energy Standard for Buildings Except Low-Rise Residential Buildings; 2013, Including All Amendments and Errata.
- E. NEMA 250 Enclosures for Electrical Equipment (1000 Volts Maximum); 2014.
- 1.4 SUBMITTALS
  - A. See Section 01 3000 Administrative Requirements, for submittal procedures.
  - B. Product Data: Provide rated capacities, weights specialties and accessories, electrical nameplate data, and wiring diagrams. Include equipment served by condensing units in submittal, or submit at same time, to ensure capacities are complementary.
  - C. Design Data: Indicate pipe and equipment sizing.
  - D. Warranty: Submit manufacturer's warranty and ensure forms have been filled out in Owner's name and registered with manufacturer.

IA DAS - Eldora STS Decentralization Building Package Project # 417568-1 DAS Project # 8982.01

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- E. Maintenance Materials: Furnish the following for Owner's use in maintenance of project.
  - 1. See Section 01 6000 Product Requirements, for additional provisions.

#### 1.5 QUALITY ASSURANCE

- A. Products Requiring Electrical Connection: Listed and classified by Underwriters Laboratories Inc. as suitable for the purpose specified and indicated.
- 1.6 DELIVERY, STORAGE, AND HANDLING
  - A. Comply with manufacturer's installation instructions for rigging, unloading, and transporting units.

#### 1.7 WARRANTY

- A. See Section 01 7800 Closeout Submittals, for additional warranty requirements.
- B. Provide a five year warranty to include coverage for refrigerant compressors.

#### PART 2 PRODUCTS

- 2.1 MANUFACTURERS
  - A. Carrier, a part of UTC Building and Industrial Systems, a unit of United Technologies Corp: www.carrier.com/#sle.
  - B. Trane, a brand of Ingersoll Rand: www.trane.com/#sle.
  - C. York International Corporation/Johnson Controls, Inc: www.york.com/#sle.
  - D. Lennox.
  - E. Substitutions: See Section 01 6000 Product Requirements.

#### 2.2 MANUFACTURED UNITS

- A. Units: Self-contained, packaged, factory assembled and pre-wired units suitable for outdoor use consisting of cabinet, compressors, condensing coil and fans, integral sub-cooling coil, controls, liquid receiver, wind deflector, and screens.
- B. Construction and Ratings: In accordance with AHRI 210/240. Test in accordance with ASHRAE Std 23.1.
- C. Performance Ratings: Energy Efficiency Rating (EER) and Coefficient of Performance (COP) not less than prescribed by ASHRAE Std 90.1 I-P.

## 2.3 CASING

- A. House components in welded steel frame with galvanized steel panels with weather resistant, baked enamel finish.
- B. Mount starters, disconnects, and controls in weatherproof panel provided with full opening access doors. Provide mechanical interlock to disconnect power when door is opened.
- C. Provide removable access doors or panels with quick fasteners and piano hinges.

PACKAGED AIR-COOLED
REFRIGERANT COMPRESSOR
AND CONDENSER UNITS
23 6213-2

Issued for Construction Documents 01-06-2020

#### 2.4 CONDENSER COILS

- A. Coils: Aluminum fins mechanically bonded to seamless copper tubing. Provide sub-cooling circuits. Air test under water to 425 psig, and vacuum dehydrate. Seal with holding charge of nitrogen.
- B. Coil Guard: Expanded metal with lint screens.

#### 2.5 FANS AND MOTORS

- A. Vertical discharge direct driven propeller type condenser fans with fan guard on discharge.
- B. Weatherproof motors suitable for outdoor use, single phase permanent split capacitor or 3 phase, with permanent lubricated ball bearings and built in current and thermal overload protection.

### 2.6 COMPRESSORS

- A. Compressor: Hermetic scroll type.
- B. Mounting: Statically and dynamically balance rotating parts and mount on rubber-in-shear vibration isolators.
  - 1. Internally isolate hermetic units on springs.
- C. Lubrication System: Reversible, positive displacement oil pump with oil charging valve, oil level sight glass, and magnetic plug or strainer.
- D. Motor: Constant speed 1800 rpm suction gas cooled with electronic sensor and winding over temperature protection, designed for across-the-line starting. Furnish with starter.
- E. Capacity Reduction Equipment: Two-stage compressor.
- F. Sump Oil Heater: Evaporates refrigerant returning to sump during shut down. Energize heater thermostatically when compressor is not operating.

### 2.7 REFRIGERANT CIRCUIT

- A. Provide each unit with one refrigerant circuit, factory supplied and piped. Refer to Section 23 2300.
- B. For each refrigerant circuit, provide manufacturer's recommended accessories.

#### 2.8 CONTROLS

- A. On unit, mount weatherproof steel control panel, NEMA 250, containing power and control wiring, molded case disconnect switch, factory wired with single point power connection.
- B. For each compressor, provide across-the-line starter, non-recycling compressor overload, starter relay, and control power transformer or terminal for controls power. Provide manual reset current overload protection. For each condenser fan, provide across-the-line starter with starter relay.
- C. Provide safety controls arranged so any one will shut down machine:

PACKAGED AIR-COOLED REFRIGERANT COMPRESSOR AND CONDENSER UNITS 23 6213-3

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- 1. High discharge pressure switch (manual reset) for each compressor.
- 2. Low suction pressure switch (automatic reset) for each compressor.
- 3. Oil Pressure switch (manual reset).
- D. Provide the following operating controls:
  - 1. Refer to Section 23 0993 and drawings for sequence of operation.
- E. Gauges: Prepiped for suction and discharge refrigerant pressures and oil pressure for each compressor.

# PART 3 EXECUTION

- 3.1 INSTALLATION
  - A. Install in accordance with manufacturer's installation instructions.
  - B. Complete structural, mechanical, and electrical connections in accordance with manufacturer's installation instructions.
  - C. Install units on vibration isolation. Refer to Section 23 0548.
  - D. Provide connection to refrigeration piping system and evaporators. Refer to Section 23 2300. Comply with ASHRAE Std 15.
- 3.2 SYSTEM STARTUP
  - A. Supply initial charge of refrigerant and oil for each refrigeration system. Replace losses of oil or refrigerant prior to end of correction period.
  - B. Charge system with refrigerant and test entire system for leaks after completion of installation. Repair leaks, put system into operation, and test equipment performance.

# END OF SECTION

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REMARKS:       1. PERFORMANCE BASED ON 50% PROPYLENE GLYCOL ON COLD SIDE.         2. PROVIDE 135 GALLON BUFFER TANK ON THE HOT SIDE HX-2.         MARK       SYSTEM SERVED         GPM       MAX PD (PSI)         EWT (°F)       LWT (°F)         MARK       SYSTEM SERVED         GPM       MAX PD (PSI)         EWT (°F)       LWT (°F)         LWT (°F)       GPM         MARK       SYSTEM SERVED         GPM       MAX PD (PSI)         EWT (°F)       LWT (°F)         LWT (°F)       LWT (°F)         HX-1       MAREUP AIR HEATING         HX-2       DOMESTIC HOT WATER         27       6.00         108       22         4.00       40
MARK       SYSTEM SERVED       GPM       MAX PD (PSI)       EWT (°F)       GPM       MAX PD (PSI)       EWT (°F)       LWT (°F)       LWT (°F)       LWT (°F)       Design basis       REMARKS         ADD       HX-1       MAKEUP AIR HEATING       190       6.84       180       138       215       9.89       120       160       214.7       SPX APV       1
ADD       HX-1       MAKEUP AIR HEATING       190       6.84       180       215       9.89       120       160       214.7       SPX APV       1         HX-2       DOMESTIC HOT WATER       27       6.00       180       108       22       4.00       40       140       33.9       AERCO SPDW23       2         4

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LVE       DESIGN BASIS       REMARKS         12.00       B&G D-120V       EXISTING         12.00       B&G D-40V       EXISTING	VALVE FILL AT (PSI) DESIGN 12.00 B&G D 12.00 B&G D	RELIEF AT (PSI) 125.00 125.00	ACCEPTANCE CAPACITY (GAL) 34.0 11.3	R CAPACITY (GAL) 68.0 21.7 P SCHEDULE	MECHAN TYPE APHRAGM APHRAGM	A SERVED G WATER D G WATER D MECH	System Heatin Heatin
LVE       DESIGN BASIS       REMARKS         12.00       B&G D-120V       EXISTING         12.00       B&G D-40V       EXISTING	VALVE FILL AT (PSI) DESIGN 12.00 B&G D 12.00 B&G D	RELIEF AT (PSI) 125.00 125.00	ACCEPTANCE CAPACITY (GAL) 34.0 11.3	P SCHEDULE	MECHAN TA TYPE APHRAGM APHRAGM ANICAL PUM	A SERVED G WATER D G WATER D MECH TRICAL CONTRA	SYSTEM HEATIN HEATIN
AD PRESSURE.	VALVE FILL AT (PSI) DESIGN 12.00 B&G D 12.00 B&G D	RELIEF AT (PSI) 125.00 125.00	ACCEPTANCE CAPACITY (GAL) 34.0 11.3 A TOTAL OF 530 D PRESSURE 1	CAPACITY (GAL) 68.0 21.7 PSCHEDULE D-BY TO DELIVER T 62 FEET OF HEA	MECHAN TA TYPE APHRAGM	A SERVED G WATER D G WATER D MECH TRICAL CONTRA .EL AND THE TH O DELIVER A TO	SYSTEM HEATIN HEATIN ( ELEC PARALL LLEL T
LVE       DESIGN BASIS       REMARKS         12.00       B&G D-120V       EXISTING         12.00       B&G D-40V       EXISTING         12.00       B&G D-40V       EXISTING         AD PRESSURE.       DESIGN BASIS       REMARKS         RPM       DESIGN BASIS       REMARKS	VALVE FILL AT (PSI) DESIGN 12.00 B&G D 12.00 B&G D HEAD PRESSURE. RPM DESIGN	RELIEF AT (PSI) 125.00 125.00 PM AT 46 FEET OF H	ACCEPTANCE CAPACITY (GAL) 34.0 11.3 A TOTAL OF 530 D PRESSURE 1 AE MOTOR DA	P-BY TO DELIVER 10-BY TO DELI	MECHAN	A SERVED G WATER D G WATER D MECH TRICAL CONTRA .EL AND THE TH O DELIVER A TO SHUTOFF H	SYSTEM HEATIN HEATIN (ELEC PARALL LLEL T AD (FT)
ALVE FILL AT (PSI) DESIGN BASIS REMARKS 12.00 B&G D-120V EXISTING 12.00 B&G D-40V AD PRESSURE. AD PRESSURE. RPM DESIGN BASIS REMARKS 1800 B&G e1510 2BD 1,3 1800 B&G e	VALVE         DESIGN           FILL AT (PSI)         DESIGN           12.00         B&G D           12.00         B&G D           HEAD PRESSURE.         B&G D           RPM         DESIGN           1800         B&G C	RELIEF AT (PSI)         125.00         125.00         125.00         PM AT 46 FEET OF H         A         PHASE         3         3         0	ACCEPTANCE CAPACITY (GAL) 34.0 11.3 A TOTAL OF 530 D PRESSURE 1 AE MOTOR DA VOLTS 208 208	IK CAPACITY (GAL)         68.0         21.7         P SCHEDULE         D-BY TO DELIVER         10         11         12         12         12         13         14         15         15         16         17	MECHAN	A SERVED G WATER D G WATER D G WATER D MECH TRICAL CONTRA EL AND THE THO DELIVER A TO SHUTOFF H 79.4 79.4	YSTEM HEATIN HEATIN CELEC PARALL LLEL T AD (FT) 6.00 6.00
LVE       DESIGN BASIS       REMARKS         12.00       B&G D-120V       EXISTING         12.00       B&G D-40V       EXISTING         12.00       B&G E D-40V       EXISTING         AD PRESSURE.       EXISTING       EXISTING         RPM       DESIGN BASIS       REMARKS         1800       B&G e 1510 2BD       1,3         1800       B&G e 1510 2BD       1,3         1800       B&G e -90 2AAC       1,2,4         3600       B&G e-90 2AAC       1,2,4	VALVE         DESIGN           FILL AT (PSI)         DESIGN           12.00         B&G D           12.00         B&G D           12.00         B&G D           HEAD PRESSURE.         B&G E           RPM         DESIGN           1800         B&G E           1800         B&G E           3600         B&G E	RELIEF AT (PSI)         125.00         125.00         125.00         PM AT 46 FEET OF H         A         PHASE         3         3         3         3         3         3         3         3         3         3         3         3         3         3         3         3         3         3         3	ACCEPTANCE CAPACITY (GAL) 34.0 11.3 A TOTAL OF 530 D PRESSURE 1 AC MOTOR DA VOLTS 208 208 208 208 208 208	IK CAPACITY (GAL)       68.0         21.7       21.7         P SCHEDULE         D-BY TO DELIVER         T62 FEET OF HE/         HP       HP         34       7.5         34       7.5         34       7.5         34       7.5         34       7.5         34       7.5         34       7.5         34       7.5         34       7.5         34       7.5         34       7.5         34       7.5         34       7.5         34       7.5         34       7.5         34       7.5         34       7.5         34       7.5         34       7.5         35       3	MECHAN TYPE APHRAGM	A SERVED G WATER D G WATER D G WATER D MECH TRICAL CONTRA EL AND THE THO DELIVER A TO SHUTOFF H 79.4 79.4 68.7 68.7	SYSTEM HEATIN HEATIN HEATIN CELEC PARALL LLEL T AD (FT) 6.00 6.00 6.00 52.00 52.00
LVE       DESIGN BASIS       REMARKS         12.00       B&G D-120V       EXISTING         12.00       B&G D-40V       EXISTING         12.00       B&G D-40V       EXISTING         AD PRESSURE.       Image: Constraint of the second se	VALVE         DESIGN           FILL AT (PSI)         DESIGN           12.00         B&G D           12.00         B&G D           12.00         B&G D           HEAD PRESSURE.         B&G E           RPM         DESIGN           1800         B&G E           1800         B&G E           3600         B&G e-S	RELIEF AT (PSI)         125.00         125.00         125.00         PM AT 46 FEET OF H         A         PHASE         3         3         3         3         3         3         3         3         3         3         3         3	ACCEPTANCE CAPACITY (GAL) 34.0 11.3 A TOTAL OF 530 D PRESSURE 1 AC MOTOR DA VOLTS 208 208 208 208 208 208 208	IK CAPACITY (GAL)       68.0         21.7       21.7         P SCHEDULE         D-BY TO DELIVER         T62 FEET OF HE7         IP       HP         B4       7.5         34       7.5         2       3         2       3         1       ADD	MECHAN	A SERVED G WATER D G WATER D G WATER D MECH TRICAL CONTRA LEL AND THE THO O DELIVER A TO SHUTOFF H 79.4 68.7 68.7 68.7 68.7	AD (FT) 6.00 6.00 6.00 6.00 6.00 6.00 6.00 6.0
LIVE       DESIGN BASIS       REMARKS         12.00       B&G D-120V       EXISTING         12.00       B&G D-40V       EXISTING         12.00       B&G D-40V       EXISTING         AD PRESSURE.       Image: Comparison of the second s	VALVE         DESIGN           FILL AT (PSI)         DESIGN           12.00         B&G D           12.00         B&G D           HEAD PRESSURE.         B&G E1           RPM         DESIGN           1800         B&G E1           3600         B&G e-S           3600         B&G e-S	RELIEF AT (PSI)         125.00         125.00         125.00         PM AT 46 FEET OF H         A         PHASE         3         3         3         3         3         3         3         3         3         3         3         3         3         3         3         3         3         3         3	ACCEPTANCE CAPACITY (GAL) 34.0 11.3 A TOTAL OF 530 D PRESSURE 1 AC MOTOR DA VOLTS 208 208 208 208 208 208 208 208 208	IK CAPACITY (GAL)         68.0         21.7         P SCHEDULE         D-BY TO DELIVER         T62 FEET OF HE/         IP       HP         34       7.5         34       7.5         34       7.5         34       7.5         34       7.5         34       7.5         34       7.5         34       7.5         34       7.5         34       7.5         34       7.5         34       7.5         34       7.5         34       7.5         35       3         4       7.5         35       3         4       7.5         5       3         4       7.5         3       3         4       3         4       5         5       3         4       5         5       3         4       5         5       5         6       6         7       7         1       7	MECHAN	A SERVED G WATER D G WATER D G WATER D MECH TRICAL CONTRA EL AND THE THO O DELIVER A TO SHUTOFF H 79.4 79.4 68.7 6	SYSTEM HEATIN HEATIN AD (FT) HEATIN AD (FT) HEAD HEAD HEAD HEAD HEAD HEAD HEAD HEAD
LVE       DESIGN BASIS       REMARKS         12.00       B&G D-120V       EXISTING         12.00       B&G D-40V       EXISTING         12.00       B&G D-40V       EXISTING         AD PRESSURE.       Image: Comparison of the second se	VALVE         DESIGN           FILL AT (PSI)         DESIGN           12.00         B&G D           12.00         B&G D           HEAD PRESSURE.         B&G E1           RPM         DESIGN           1800         B&G e1           3600         B&G e-S           3600         B&G e-S	RELIEF AT (PSI)         125.00         125.00         125.00         PM AT 46 FEET OF H         A         PHASE         3         3         3         3         3         3         3         3         3         3         3         3         3         3         3         3         3         3	ACCEPTANCE CAPACITY (GAL) 34.0 11.3 A TOTAL OF 530 D PRESSURE) 1 AC MOTOR DA VOLTS 208 208 208 208 208 208 208 208 208	IK CAPACITY (GAL)       68.0         21.7       68.0         21.7       68.0         21.7       68.0         P SCHEDULE       62 FEET OF HE/         IP       HP         1P       HP         34       7.5         2       3         2       3         2       3         4       7.5         34       7.5         34       7.5         34       7.5         34       7.5         34       7.5         34       7.5         35       3         32       3         4       1         ADD       1	MECHAN	A SERVED G WATER D G WATER D G WATER D MECH TRICAL CONTRA .EL AND THE THO O DELIVER A TO SHUTOFF H 79.4 79.4 68.3 68.3 68.3 68.3	AD (FT) 6.00 6.00 6.00 6.00 6.00 6.00 6.00 6.0
LVE       DESIGN BASIS       REMARKS         12.00       B&G D-120V       EXISTING         12.00       B&G D-40V       EXISTING         3       B&G D-40V       EXISTING         AD PRESSURE.       Image: Comparison of the second	VALVE FILL AT (PSI) DESIGN 12.00 B&G D 12.00 B&G D HEAD PRESSURE. RPM DESIGN 1800 B&G e1 1800 B&G e1 3600 B&G e-S 3600 B&G e-S	RELIEF AT (PSI)         125.00         125.00         125.00         PM AT 46 FEET OF H         A         PHASE         3         3         3         3         3         3         3         3         3         3         3         3         3         3         3         3         3         3         3	ACCEPTANCE CAPACITY (GAL) 34.0 11.3 A TOTAL OF 530 D PRESSURE ) 1 AC MOTOR DA VOLTS 208 208 208 208 208 208 208 208 208 208	AIR TEMP	MECHAN	A SERVED G WATER D G WATER D G WATER D MECH TRICAL CONTRA LEL AND THE THO O DELIVER A TO SHUTOFF H 79.4 79.4 68.3 68.3 68.3 68.3 1NG UNIT RI	AD (FT) AD
LVE       FILL AT (PSI)       DESIGN BASIS       REMARKS         12.00       B&G D-120V       EXISTING         12.00       B&G D-40V         SAD PRESSURE.       Image: Constraint of the second s	VALVE         DESIGN           FILL AT (PSI)         DESIGN           12.00         B&G D           12.00         B&G D           12.00         B&G D           HEAD PRESSURE.            RPM         DESIGN           1800         B&G e1           1800         B&G e1           3600         B&G e-S           3600         B&G e-S           3600         B&G e-S	RELIEF AT (PSI)         125.00       125.00         125.00       125.00         PM AT 46 FEET OF H       A         A       PHASE         3       3         3       3         3       3         3       3         3       3         3       3         3       4         3       1         3       1         3       1         3       1         3       1         3       1         A       PHASE         A       1         A       1         A       1         A       1         A       1         A       1         A       1         A       1         A       1         A       1         A       1         A       1         A       1         B       1         B       1         A       1         B       1         A       1	ACCEPTANCE CAPACITY (GAL) 34.0 11.3 A TOTAL OF 530. D PRESSURE / 1 AC MOTOR DA VOLTS 208 208 208 208 208 208 208 208 208 208	IK CAPACITY (GAL)       68.0         68.0       21.7         P SCHEDULE         D-BY TO DELIVER         T62 FEET OF HEA         IP       HP         34       7.5         34       7.5         34       7.5         2       3         2       3         4       7.5         34       7.5         34       7.5         34       7.5         34       7.5         34       7.5         34       7.5         34       7.5         34       7.5         34       7.5         34       7.5         35       3         4       7.5         34       7.5         35       3         4       7.5         34       7.5         35       3         4       7.5         35       3         4       7.5         5       4         6       1         6       1         7       1         4       1	MECHAN	A SERVED G WATER D G WATER D G WATER D MECH TRICAL CONTRA .EL AND THE THO O DELIVER A TO SHUTOFF H 79.4 79.4 79.4 68.7 100 100 100 100 100 100 100 10	AD (FT) 6.00 6.00 6.00 6.00 6.00 6.00 6.00 6.0
LVE       ESIGN BASIS       REMARKS         12.00       B&G D-120V       EXISTING         12.00       B&G D-40V       EXISTING         SAD PRESSURE.       Image: Constraint of the second	VALVE         DESIGN           FILL AT (PSI)         DESIGN           12.00         B&G D           12.00         B&G D           12.00         B&G D           HEAD PRESSURE.            RPM         DESIGN           1800         B&G e1           1800         B&G e1           3600         B&G e-S	RELIEF AT (PSI)         125.00       125.00         125.00       125.00         PM AT 46 FEET OF H       A         A       PHASE         3       3         3       3         3       3         3       3         3       3         3       0.23         80       0.23	ACCEPTANCE CAPACITY (GAL) 34.0 11.3 A TOTAL OF 530 D PRESSURE) 1 AD MOTOR DA VOLTS 208 208 208 208 208 208 208 208	IK CAPACITY (GAL)       68.0         68.0       21.7         P SCHEDULE         D-BY TO DELIVER         T62 FEET OF HEA         IP       HP         HP       HP         34       7.5         34       7.5         34       7.5         34       7.5         34       7.5         34       7.5         34       7.5         34       7.5         34       7.5         34       7.5         34       7.5         34       7.5         34       7.5         1       ADD         HEATING COI         F)       EAT °F         -10       -10	MECHAN         TYPE       TA         APHRAGM       APHRAGM         APHRAGM       APHRAGM         ANICAL PUM       ANICAL PUM         ACTOR.       ANICAL PUM         RD PUMP IN STA       ANICAL OF 215 GPM         EAD (FT)       E         0       4         1       1	A SERVED G WATER D G WATER D G WATER D MECH TRICAL CONTRA .EL AND THE THO DELIVER A TO SHUTOFF H 79.4 79.4 79.4 79.4 68.7 10.74 10.74 10.74 10.74 10.74 10.74	AD (FT) 6.00 6.0
LVE         DESIGN BASIS         REMARKS           12.00         B&G D-120V         EXISTING           12.00         B&G D-40V         EXISTING           200         B&G D-40V         EXISTING           300         B&G e1510 2BD         1,3           1800         B&G e1510 2BD         1,3           1800         B&G e1510 2BD         1,3           3600         B&G e-90 2AAC         1,2,4           37         TRANE         1,2           24 X 126         TRANE         1,2           23 X 36         TRANE         1,2 <td>VALVE         FILL AT (PSI)         DESIGN           12.00         B&amp;G D           12.00         B&amp;G D           12.00         B&amp;G D           12.00         B&amp;G D           HEAD PRESSURE.         Image: Comparison of the second second</td> <td>RELIEF AT (PSI)         125.00       125.00         125.00       125.00         PM AT 46 FEET OF H       A         A       PHASE         3       3         10       0.23         80       0.23         80       0.24         60       0.24</td> <td>ACCEPTANCE CAPACITY (GAL) 34.0 11.3 A TOTAL OF 530 D PRESSURE) 1 AD MOTOR DA VOLTS 208 208 208 208 208 208 208 208</td> <td>IK CAPACITY (GAL)       68.0         68.0       21.7         P SCHEDULE         D-BY TO DELIVER         T62 FEET OF HEA         IP       HP         40       7.5         34       7.5         34       7.5         34       7.5         34       7.5         34       7.5         34       7.5         34       7.5         34       7.5         34       7.5         34       7.5         34       7.5         34       7.5         34       7.5         34       7.5         34       7.5         34       7.5         34       7.5         35       3         1       ADD         HEATING COI         -10       -10         -10       -10         -10       -10         -10       -10         -10       -10</td> <td>MECHAN           TYPE         TA           APHRAGM         APHRAGM           APHRAGM         APHRAGM           ANICAL PUM         ANICAL PUM           ACTOR.         ANICAL PUM           RD PUMP IN STA         ANICAL PUM           ACTOR.         ANICAL PUM           BAD (FT)         E           0         4           10         1           160         11</td> <td>A SERVED G WATER D G WATER D G WATER D MECH TRICAL CONTRA .EL AND THE THO DELIVER A TO SHUTOFF H 79.4 79.4 79.4 79.4 68.7 8.7 10.74 10.74 10.74 10.74 10.74 10.74 1.44 1.44</td> <td>SYSTEM HEATIN HEATIN HEATIN (ELEC PARALL LLEL T AD (FT) 6.00 6.00 6.00 6.00 6.00 6.00 6.00 6.0</td>	VALVE         FILL AT (PSI)         DESIGN           12.00         B&G D           12.00         B&G D           12.00         B&G D           12.00         B&G D           HEAD PRESSURE.         Image: Comparison of the second	RELIEF AT (PSI)         125.00       125.00         125.00       125.00         PM AT 46 FEET OF H       A         A       PHASE         3       3         10       0.23         80       0.23         80       0.24         60       0.24	ACCEPTANCE CAPACITY (GAL) 34.0 11.3 A TOTAL OF 530 D PRESSURE) 1 AD MOTOR DA VOLTS 208 208 208 208 208 208 208 208	IK CAPACITY (GAL)       68.0         68.0       21.7         P SCHEDULE         D-BY TO DELIVER         T62 FEET OF HEA         IP       HP         40       7.5         34       7.5         34       7.5         34       7.5         34       7.5         34       7.5         34       7.5         34       7.5         34       7.5         34       7.5         34       7.5         34       7.5         34       7.5         34       7.5         34       7.5         34       7.5         34       7.5         34       7.5         35       3         1       ADD         HEATING COI         -10       -10         -10       -10         -10       -10         -10       -10         -10       -10	MECHAN           TYPE         TA           APHRAGM         APHRAGM           APHRAGM         APHRAGM           ANICAL PUM         ANICAL PUM           ACTOR.         ANICAL PUM           RD PUMP IN STA         ANICAL PUM           ACTOR.         ANICAL PUM           BAD (FT)         E           0         4           10         1           160         11	A SERVED G WATER D G WATER D G WATER D MECH TRICAL CONTRA .EL AND THE THO DELIVER A TO SHUTOFF H 79.4 79.4 79.4 79.4 68.7 8.7 10.74 10.74 10.74 10.74 10.74 10.74 1.44 1.44	SYSTEM HEATIN HEATIN HEATIN (ELEC PARALL LLEL T AD (FT) 6.00 6.00 6.00 6.00 6.00 6.00 6.00 6.0
LVE         DESIGN BASIS         REMARKS           12.00         B&G D-120V         EXISTING           12.00         B&G D-40V         EXISTING           12.00         B&G D-40V         EXISTING           AD PRESSURE.         Image: Construction of the second sec	VALVE         FILL AT (PSI)         DESIGN           12.00         B&G D           12.00         B&G D           12.00         B&G D           12.00         B&G D           HEAD PRESSURE.         Image: state s	RELIEF AT (PSI)         125.00         125.00         125.00         125.00         PM AT 46 FEET OF H         A         PHASE         3         4         0         0.23         80         0.24	ACCEPTANCE CAPACITY (GAL) 34.0 11.3 A TOTAL OF 530. D PRESSURE 1 AE MOTOR DA VOLTS 208 208 208 208 208 208 208 208 208 208	IK CAPACITY (GAL)       68.0         68.0       21.7         P SCHEDULE         D-BY TO DELIVER         T62 FEET OF HEA         IP       HP         4P       HP         34       7.5         34       7.5         34       7.5         34       7.5         34       7.5         34       7.5         34       7.5         34       7.5         34       7.5         34       7.5         34       7.5         34       7.5         94       7.5         95       1         ADD       1         HEATING COI       -10         -10       -10         -10       -10         -10       -10         -10       -10	MECHAN         TYPE       TA         APHRAGM       APHRAGM         APHRAGM       APHRAGM         IANICAL PUM       ANICAL PUM         ACTOR.       APHRAGM         RD PUMP IN STA       APHRAGM         TAL OF 215 GPM       APHRAGM         EAD (FT)       E         0       4         160       11         160       13         160       13         160 <td>A SERVED G WATER D G WATER D G WATER D MECH TRICAL CONTRA .EL AND THE THO DELIVER A TO SHUTOFF H 79.4 79.4 68.3 68.3 68.3 1NG UNIT R ATA WPD (FT) 10.74 10.74 10.74 10.74 10.74 10.74 10.74 10.74 10.74 10.74 10.74 10.74 10.74 1.44 1.44</td> <td>SYSTEM HEATIN HEATIN HEATIN (ELEC PARALL LLEL T AD (FT) 600 600 600 600 600 600 600 600 600 60</td>	A SERVED G WATER D G WATER D G WATER D MECH TRICAL CONTRA .EL AND THE THO DELIVER A TO SHUTOFF H 79.4 79.4 68.3 68.3 68.3 1NG UNIT R ATA WPD (FT) 10.74 10.74 10.74 10.74 10.74 10.74 10.74 10.74 10.74 10.74 10.74 10.74 10.74 1.44 1.44	SYSTEM HEATIN HEATIN HEATIN (ELEC PARALL LLEL T AD (FT) 600 600 600 600 600 600 600 600 600 60
LIVE FILL AT (PSI)         DESIGN BASIS         REMARKS           12.00         B&G D-120V         EXISTING           12.00         B&G D-40V	VALVE       DESIGN         FILL AT (PSI)       DESIGN         12.00       B&G D         12.00       B&G D         12.00       B&G D         HEAD PRESSURE.       B&G e1         1800       B&G e1         1800       B&G e1         1800       B&G e1         3600       B&G e3         3600       B&G e4         3600       B&G e4         3600       B&G e5         3600       B&G e5         3600       B&G e5         3600       B&G e7         37       36         38       7	RELIEF AT (PSI)         125.00         125.00         125.00         125.00         PM AT 46 FEET OF H         A         PHASE         3         10         11         125.00         13         13         14         15         160         10.24	ACCEPTANCE CAPACITY (GAL) 34.0 11.3 A TOTAL OF 530 D PRESSURE) 1 AC MOTOR DA VOLTS 208 208 208 208 208 208 208 208	IK CAPACITY (GAL)       68.0         68.0       21.7         P SCHEDULE         P-BY TO DELIVER         T62 FEET OF HEA         HP       HP         34       7.5         34       7.5         34       7.5         34       7.5         34       7.5         34       7.5         34       7.5         34       7.5         34       7.5         34       7.5         34       7.5         34       7.5         34       7.5         2       3         1       ADD         HEATING COI       -10         -10       -10         -10       -10         -10       -10         -10       -10         -10       -10         -10       -10	MECHAN         TYPE       TA         APHRAGM       APHRAGM         APHRAGM       APHRAGM         APHRAGM       APHRAGM         ANICAL PUM       ANICAL PUM         ACTOR.       ANICAL PUM         RD PUMP IN STA       ANICAL OF 215 GPM         EAD (FT)       E         0       4         160       11         160       13         160       13         16	A SERVED G WATER D G WATER D G WATER D MECH TRICAL CONTRA .EL AND THE THO DELIVER A TO SHUTOFF H 79.4 79.4 79.4 79.4 79.4 68.3 68	AD (FT) AD
IVE         IVE <td>VALVE       FILL AT (PSI)       DESIGN         12.00       B&amp;G D         12.00       B&amp;G D         12.00       B&amp;G D         HEAD PRESSURE.       Image: Comparison of the second second</td> <td>RELIEF AT (PSI)         125.00         125.00         125.00         125.00         125.00         125.00         125.00         125.00         125.00         125.00         125.00         125.00         125.00         PM AT 46 FEET OF H         A         PHASE         3         3         3         3         3         3         3         3         3         3         3         3         3         3         13         3         3         3         3         3         3         3         3         0         0.23         80       0.24         60       0.24</td> <td>ACCEPTANCE CAPACITY (GAL) 34.0 11.3 A TOTAL OF 530, D PRESSURE / 1 AC MOTOR DA VOLTS 208 208 208 208 208 208 208 208 208 208</td> <td>IK CAPACITY (GAL)       68.0         68.0       21.7         P SCHEDULE         D-BY TO DELIVER         T62 FEET OF HEA         IP       HP         34       7.5         2       3         2       3         2       3         2       3         2       3         2       3         4       7.5         34       7.5         2       3         4       7.5         34       7.5         34       7.5         34       7.5         34       7.5         34       7.5         35       1         4       7.5         34       7.5         35       1         4       7.5         34       7.5         35       1         4       10         -10       -10         -10       -10         -10       -10         -10       -10         -10       -10         -10       -10          -10       -10<!--</td--><td>MECHAN         TYPE       TA         APHRAGM       APHRAGM         APHRAGM       APHRAGM         ANICAL PUM       ANICAL PUM         ACTOR.       RD PUMP IN STA         RD PUMP IN STA       FAL OF 215 GPM         EAD (FT)       E         0       4         1       1         1       1         1       1         1       1         1       1<td>A SERVED G WATER D G WATER D G WATER D MECH TRICAL CONTRA LEL AND THE THO O DELIVER A TO SHUTOFF H 79.4 79.4 79.4 79.4 68.3 68.3 1NG UNIT RI ATA WPD (FT) 10.74</td><td>SYSTEM HEATIN HEATIN HEATIN Y ELEC PARALL LLEL T AD (FT) 16.00 10 10 10 10 10 10 10 10 10 10 10 10 1</td></td></td>	VALVE       FILL AT (PSI)       DESIGN         12.00       B&G D         12.00       B&G D         12.00       B&G D         HEAD PRESSURE.       Image: Comparison of the second	RELIEF AT (PSI)         125.00         125.00         125.00         125.00         125.00         125.00         125.00         125.00         125.00         125.00         125.00         125.00         125.00         PM AT 46 FEET OF H         A         PHASE         3         3         3         3         3         3         3         3         3         3         3         3         3         3         13         3         3         3         3         3         3         3         3         0         0.23         80       0.24         60       0.24	ACCEPTANCE CAPACITY (GAL) 34.0 11.3 A TOTAL OF 530, D PRESSURE / 1 AC MOTOR DA VOLTS 208 208 208 208 208 208 208 208 208 208	IK CAPACITY (GAL)       68.0         68.0       21.7         P SCHEDULE         D-BY TO DELIVER         T62 FEET OF HEA         IP       HP         34       7.5         2       3         2       3         2       3         2       3         2       3         2       3         4       7.5         34       7.5         2       3         4       7.5         34       7.5         34       7.5         34       7.5         34       7.5         34       7.5         35       1         4       7.5         34       7.5         35       1         4       7.5         34       7.5         35       1         4       10         -10       -10         -10       -10         -10       -10         -10       -10         -10       -10         -10       -10          -10       -10 </td <td>MECHAN         TYPE       TA         APHRAGM       APHRAGM         APHRAGM       APHRAGM         ANICAL PUM       ANICAL PUM         ACTOR.       RD PUMP IN STA         RD PUMP IN STA       FAL OF 215 GPM         EAD (FT)       E         0       4         1       1         1       1         1       1         1       1         1       1<td>A SERVED G WATER D G WATER D G WATER D MECH TRICAL CONTRA LEL AND THE THO O DELIVER A TO SHUTOFF H 79.4 79.4 79.4 79.4 68.3 68.3 1NG UNIT RI ATA WPD (FT) 10.74</td><td>SYSTEM HEATIN HEATIN HEATIN Y ELEC PARALL LLEL T AD (FT) 16.00 10 10 10 10 10 10 10 10 10 10 10 10 1</td></td>	MECHAN         TYPE       TA         APHRAGM       APHRAGM         APHRAGM       APHRAGM         ANICAL PUM       ANICAL PUM         ACTOR.       RD PUMP IN STA         RD PUMP IN STA       FAL OF 215 GPM         EAD (FT)       E         0       4         1       1         1       1         1       1         1       1         1       1 <td>A SERVED G WATER D G WATER D G WATER D MECH TRICAL CONTRA LEL AND THE THO O DELIVER A TO SHUTOFF H 79.4 79.4 79.4 79.4 68.3 68.3 1NG UNIT RI ATA WPD (FT) 10.74</td> <td>SYSTEM HEATIN HEATIN HEATIN Y ELEC PARALL LLEL T AD (FT) 16.00 10 10 10 10 10 10 10 10 10 10 10 10 1</td>	A SERVED G WATER D G WATER D G WATER D MECH TRICAL CONTRA LEL AND THE THO O DELIVER A TO SHUTOFF H 79.4 79.4 79.4 79.4 68.3 68.3 1NG UNIT RI ATA WPD (FT) 10.74	SYSTEM HEATIN HEATIN HEATIN Y ELEC PARALL LLEL T AD (FT) 16.00 10 10 10 10 10 10 10 10 10 10 10 10 1
ALVE         DESIGN BASIS         REMARKS           12.00         B&G D-120V         EXISTING           12.00         B&G D-40V             EAD PRESSURE.             RPM         DESIGN BASIS         REMARKS           1800         B&G e1510 2BD         1.3           1800         B&G e-1510 2BD         1.3           1800         B&G e-90 2AAC         1.2.4             SIZE (INXIN)         DESIGN BASIS         REMARKS           24 X 126         TRANE         1.2           23 X 36         TRANE         1.2	VALVE       DESIGN         FILL AT (PSI)       DESIGN         12.00       B&G D         12.00       B&G D         12.00       B&G D         HEAD PRESSURE.       Image: Comparison of the second	RELIEF AT (PSI)         125.00       125.00         125.00       125.00         PM AT 46 FEET OF H       A         A       PHASE         3       3         3       3         3       3         3       3         3       3         3       3         3       3         3       3         3       3         3       3         3       3         3       3         3       3         3       3         3       3         3       3         4       0.23         80       0.23         80       0.24         60       0.24	ACCEPTANCE CAPACITY (GAL) 34.0 11.3 A TOTAL OF 530 D PRESSURE / 1 AC MOTOR DA VOLTS 208 208 208 208 208 208 208 208	IK CAPACITY (GAL)       68.0         68.0       21.7         P SCHEDULE         D-BY TO DELIVER         T62 FEET OF HEA         IP       HP         4       7.5         34       7.5         34       7.5         34       7.5         34       7.5         34       7.5         34       7.5         34       7.5         34       7.5         34       7.5         34       7.5         34       7.5         34       7.5         34       7.5         35       1         ADD       10         HEATING COI       -10         -10       -10         -10       -10         -10       -10         -10       -10         -10       -10         -10       -10         -10       -10         -10       -10         -10       -10         -10       -10         -10       -10         -10       -10	MECHAN         TYPE       TA         APHRAGM       APHRAGM         APHRAGM       APHRAGM         ANICAL PUM       ANICAL PUM         ACTOR.       RD PUMP IN STA         RD PUMP IN STA       FAD (FT)         EAD (FT)       E         0       4         160       11	A SERVED G WATER D G WATER D G WATER D MECH TRICAL CONTRA .EL AND THE THO O DELIVER A TO SHUTOFF H 79.4 70.74 10.74 10.74 10.74 10.74 10.74 1.44 1.44 7.45 7	SYSTEM HEATIN HEATIN HEATIN Y ELEC PARALL LLEL T AD (FT) H6.00 H6.
ALVE         DESIGN BASIS         REMARKS           12.00         B&G D-120V         EXISTING           12.00         B&G D-40V           SAD PRESSURE.         3           RPM         DESIGN BASIS         REMARKS           1800         B&G e1510 2BD         1,3           1800         B&G e1510 2BD         1,3           1800         B&G e1510 2BD         1,3           3600         B&G e1510 2BD         1,3           3600         B&G e-90 2AAC         1,2,4           SIZE (INXIN)         DESIGN BASIS         REMARKS           24 X 126         TRANE         1,2           24 X 126         TRANE         1,2           23 X 36         TRANE         1,2           23 X 36         TRANE UW         2           23 X 36         TRANE UW         2           SPX APV         TRANE W         2	VALVE       DESIGN         FILL AT (PSI)       DESIGN         12.00       B&G D         12.00       B&G D         12.00       B&G D         HEAD PRESSURE.       B&G e1         1800       B&G e1         1800       B&G e1         1800       B&G e1         3600       B&G e-S         36       TRA         23 X 36       TRAN         23 X 36       TRAN         7       DESIGN BA	RELIEF AT (PSI)         125.00       125.00         125.00       125.00         PM AT 46 FEET OF H       A         A       PHASE         3       3         3       3         3       3         3       3         3       3         3       3         3       3         3       3         3       3         3       3         3       3         3       3         3       3         3       3         3       3         4       0.23         80       0.23         80       0.24         60       0.24	ACCEPTANCE CAPACITY (GAL) 34.0 11.3 A TOTAL OF 530 D PRESSURE) 1 AC MOTOR DA VOLTS 208 208 208 208 208 208 208 208	IK CAPACITY (GAL)       68.0         21.7       68.0         21.7       68.0         21.7       68.0         21.7       68.0         21.7       68.0         21.7       68.0         21.7       68.0         21.7       68.0         21.7       68.0         21.7       68.0         0.89       7.5         21.7       7.5         21.7       7.5         34       7.5         34       7.5         34       7.5         34       7.5         34       7.5         34       7.5         34       7.5         34       7.5         34       7.5         34       7.5         34       7.5         34       7.5         34       7.5         34       7.5         34       7.5         35       1         400       10         -10       -10         -10       -10         -10       -10         -10       -10         -	MECHAN         TYPE       TA         APHRAGM       APHRAGM         APHRAM       APHRAM         APHAC       APHRAM	A SERVED G WATER D G WATER D G WATER D MECH TRICAL CONTRA EL AND THE THO O DELIVER A TO SHUTOFF H 79.4 79.4 79.4 79.4 79.4 68.3 69.4 69	SYSTEM HEATIN HEATIN HEATIN HEATIN CELEC PARALL LLEL T AD (FT) H6.00 H6.

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D     E     F       EQUIVALENT PRODUCTS BY MANUFACTURERS WHICH ARE NOT LISTED IN SC IN SPECIFICATIONS MAY BE USED WITH PRE-APPROVAL FROM ENGINEER. SE SPECIFICATIONS FOR SUBSTITUTION REQUEST INSTRUCTIONS.     INSTRUCTIONS       FAN SCHEDULE     FAN SCHEDULE       REMARKS:     1. PROVIDE NEW MOTOR. EXISTING FAN ASSEMBLY TO REMAIN.       2. COODINATE CONNECTION TO VFD AND DISCONNECT WITH ELECTRICAL OC 3. REBALANCE TO 30,000 CPM FAN AT FULL SPEED.     MOTOR DATA       MARK     HP     VOLTS     PHAGE       MARK     HP     VOLTS     PHAGE	HEDULES OR       Image: State of the state
SF-3Z5Z083TRANEAIR SEPARATOR SCHEDULEMARKSYSTEM SERVEDSIZE (IN)CAPACITY (GPM)STRAINER (Y/N)MAX PD (FT)DESIGN BASISAS-1HWS6"700Y3BELL AND GOSSETT R-6FAS-2PPG HWS4"300Y2BELL AND GOSSETT R-4F	REMARKS
GLYCOL FEED SYSTEM SCHEDULE         NOTES: 1. PROVIDE WITH PRE-MIXED 50% PROPYLENE GLYCOL SOLUTION. NO FIELD MIXING SHALL BE ALLOWED. SEE SPEC. 2. FURNSH AND INSTALL ALL PUMP CONTROLS AND WIRING.         MARK SYSTEM VOLUME APPROXIMATELY 150 GALLONS         MARK SYSTEM SERVED       TANK CAPACITY (GAL)       GUT IN RANGE (PSI)       MOTOR DATA         MARK       SYSTEM SERVED       TANK CAPACITY (GAL)       TO IN STALL ALL PUMP CONTROLS AND WIRING.         MARK       SYSTEM SERVED       TANK CAPACITY (GAL)       DESIGN BASIS       REMARKS         GFS-1       HEATING WATER       50       1.5       10.40       20-60       1/3       115       1       JL WINGERT GL50       ELECTRICAL TO PROVIDE DUPLEX F         MECHANICAL PIPING EXPANSION TANK SCHEDULE         MARK       SYSTEM SERVED       TYPE       TANK CAPACITY (GAL)       RELIEF VALVE         MARK       SYSTEM SERVED       TYPE       TANK CAPACITY (GAL)       RELIEF VALVE         MARK       SYSTEM SERVED       TYPE <td< td=""><td>ECEPTACLE REWARKS EXISTING A DEPARTMENT OF ADMINISTRATIVE SER</td></td<>	ECEPTACLE REWARKS EXISTING A DEPARTMENT OF ADMINISTRATIVE SER
MECHANICAL PUMP SCHEDULE NOTES: 1. VARIABLE FREQUENCY DRIVE AND DISCONNECT TO BE PROVIDED BY ELECTRICAL CONTRACTOR. 2. PERFORMANCE BASED ON 50% PROPYLENE GLYCOL. 3. PUMPS P-1, P-2, & P-3 SELECTED TO OPERATE WITH TWO PUMPS IN PARALLEL AND THE THIRD PUMP IN STAND-BY TO DELIVER A TOTAL OF 530 GPM AT 46 FEET OF HEAD PRESSURE. 4. PUMPS P-4 & P-5 SELECTED TO OPERATE WITH TWO PUMPS IN PARALLEL TO DELIVER A TOTAL OF 215 GPM AT 62 FEET OF HEAD PRESSURE. ADD	
MARK         SYSTEM SERVED         TYPE         GPM         HEAD (FT)         SHUTOFF HEAD (FT)         BHP         HP         VOLTS         PHASE         RPM         DESIGN BASIS           P-1         HWS         END SUCTION         265         46.00         79.40         4.84         7.5         208         3         1800         B&G e1510 2BE           P-2         HWS         END SUCTION         265         46.00         79.40         4.84         7.5         208         3         1800         B&G e1510 2BE           P-3         HWS         END SUCTION         265         46.00         79.40         4.84         7.5         208         3         1800         B&G e1510 2BE           P-3         HWS         END SUCTION         265         46.00         79.40         4.84         7.5         208         3         1800         B&G e1510 2BE           P-4         MUA HWS         INLINE         110         62.00         68.10         2.2         3         208         3         3600         B&G e-90 2AAC           P-5         MUA HWS         INLINE         110         62.00         68.10         2.2         3         208         3         3600         B&G e-90	REMARKS     NO       1,3     1,3       1,3     1,3       1,2,4     1,2,4       1,2,4     1,2,4
AIR HANDLING UNIT REPLACEMENT HEATING COIL - HOT WATER NOTES: 1 INSTALLED AS A COIL BANK IN EXISTING AHU-5 2 PERFORMANCE BASED ON 45% PROPYLENE GLYCOL HEATING COIL DATA	ADD 1 02-00
MARK         HEATING CFM         ROWS         FINS PER INCH         MBH         GPM         WPD (FT)         EWT (°F)         EAT °F         LAT °F         VELOCITY (FPM)         APD (IN)         SIZE (INXIN)         DESIGN BASIS           ADD         HC-5A         10000         4         7.33         1084         58.33         10.74         160         119         -10         90         480         0.23         24 X 126         TRANE           HC-5B         10000         4         7.33         1084         58.33         10.74         160         119         -10         90         480         0.23         24 X 126         TRANE           HC-5C         10000         4         7.33         1084         58.33         10.74         160         119         -10         90         480         0.23         24 X 126         TRANE           HC-5C         10000         4         7.33         1084         58.33         10.74         160         119         -10         90         480         0.23         24 X 126         TRANE           HC-6         2700         4         7.4         283.4         20.00         1.44         160         130         -10         90	REMARKS     1,2       1,2     1,2       1,2     1,2       2     0       2     0
HEAT EXCHANGER - PLATE AND FRAME SCHEDULE         REMARKS:         1. PERFORMANCE BASED ON 50% PROPYLENE GLYCOL ON COLD SIDE.         2. PROVIDE 135 GALLON BUFFER TANK ON THE HOT SIDE HX-2.         MARK       SYSTEM SERVED       HOT SIDE       COLD SIDE       HEATING SURFACES       DESIGN BASIS         MARK       SYSTEM SERVED       GPM       MAX PD (PSI)       EWT (*F)       CPM       MAX PD (PSI)       EWT (*F)       LWT (*F)       UST (*F)       LWT (*F)       DESIGN BASIS         HX-1       MAREUP AIR HEATING       190       6.84       180       138       215       9.89       120       160       214.7       SPX APV         HX-2       DOMESTIC HOT WATER       27       6.00       180       108       22       4.00       40       140       33.9       AERCO SPDW23	ALL DRAWN: JDB DRAWN: JDB APPROVED: TLS ISSUED FOR: CONSTF DATE: 01/06/20 PROJECT NO: #8982.01 CLIENT NO: #8982.01

				EQUIVALENT IN SPECIFICATIO SPECIFICATIO REMARKS: 1. PROVIDE 2. COODINA 3. REBALAN	PRODUCTS BY M TIONS MAY BE US DNS FOR SUBSTIT		TURERS W 1 PRE-APP 2 EQUEST IN AN ASSEME AN ASSEME AN D DISCO FULL SPEE R DATA LTS	/HICH ARE NO ROVAL FROM NSTRUCTIONS EDULE BLY TO REMAI NNECT WITH ED. PHASE	T LISTED IN SCH ENGINEER. SEE S. N. ELECTRICAL COM	HEDULES OR	1	A R C H I T E C T U R E + E N G I N E E R I N G 4125 Westown Pkwy, Suite 100   West Des Moines, IA 50266 515.223.8104   www.shive-hattery.com lowa   Illinois   Indiana
				SF-5	25	2	08	3	TRANE	1,2		Z
				AIR SEF	PARATOR SC	HEDUL	E					$\overline{\mathbf{Q}}$
	MARK AS-1 AS-2	SYSTEM SERVED HWS PPG HWS	SIZE (IN) 6" 4"	CAPACITY (GPM) 700 300	) STRAINER (Y Y Y	//N) MA	AX PD (FT) 3 2	DESIC BELL AND C BELL AND C	GN BASIS GOSSETT R-6F GOSSETT R-4F	REMARKS		LZA1
	GLYCC	DL FEED SYS	TEM SCHEI	DULE								<b>FAL</b> ERVICE
FIELD MIXING SHA	LL BE ALLOW	CUT OUT	MC HP	TOR DATA VOLTS PH,	ASE DESIG	GN BASIS			REMARKS		2	DECEN CKAGE MINISTRATIVE &
		20-00	MECHANIC			K SCHE						C PAC G PAC ENT OF AD
MARK S ET-1 ET-2	SYSTEM SER HEATING WA <sup>-</sup> HEATING WA <sup>-</sup>	VED TYP TER DIAPHR TER DIAPHR	E (( AGM ( AGM ( AGM (	CAPACITY ACC GAL) CAP 58.0 21.7	CEPTANCE ACITY (GAL) I 34.0 11.3	R RELIEF A <sup></sup> 125.0 125.0	RELIEF VAL T (PSI) F 00 00	VE FILL AT (PSI) 12.00 12.00	DESIGN BASIS B&G D-120V B&G D-40V	REMARKS EXISTING		DORA JILDIN HOOL
		MECHANI	CAL PUMP S	CHEDULE								B B B B C C B C B C B C B C B C B C B C
TO BE PROVIDED B	Y ELECTRICA	L CONTRACTOR	<u>.</u>									
TH TWO PUMPS IN VO PUMPS IN PARA	PARALLEL AN	ID THE THIRD PU IVER A TOTAL C	JMP IN STAND-I F(215 GPM AT 6	BY TO DELIVER A TO 2 FEET OF HEAD PE	TAL OF 530 GPM	AT 46 FE	ET OF HEA	AD PRESSURE	Ξ.			
GPM HE	AD (FT)	HUTOFF HEAD (	FT) BHP	HP	MOTOR DATA VOLTS	PHAS	SE SE	RPM	DESIGN BASIS	REMARKS	A 01	
265 265 265 110	46.00 46.00 46.00 62.00	79.40 79.40 79.40 68.10	4.84 4.84 4.84 2.2	7.5 7.5 7.5 3	208 208 208 208 208	3 3 3 3		1800       1800       1800       3600	B&G e1510 2BD B&G e1510 2BD B&G e1510 2BD B&G e-90 2AAC	1,3 1,3 1,3 1,2,4	ADDENDUr	
110	62.00	68.10	2.2	ADD 3	208	3		3600	B&G e-90 2AAC	1,2,4	<b>S</b> 06-2020	
	ANDLING	UNIT REPLA	CEMENT HE	ATING COIL - H	HOT WATER						1 02-0	
HEATING	COIL DATA			AIR TEMPERAT	URE						- ADE	
MBH GPN 1084 58.3	1 WPE 3 10	Q (FT) EWT ( .74 160	°F) LWT (°F) 119	EAT °F	VELOC T°F (FPM 90 480		VPD (IN) 0.23	SIZE (INXIN) 24 X 126	DESIGN BASIS TRANE	REMARKS 1,2		
1084         58.3           1084         58.3           283.4         20.0	3 10 3 10	0.74 160 0.74 160	119 119 130	-10 -10	90 480 90 480	····	0.23	24 X 126 24 X 126		1,2 1,2		
283.4         20.0           283.4         20.0	0 1.	44 160 44 160	130	-10	90 480 90 460		0.24	23 X 36 23 X 36	TRANE UW	2		50 50
HE	ΔΤ ΕΧΟΗΔ				F							DB LS ONSTF 1/06/200 175681 8982.01
.D SIDE.					_							<th< t<="" td=""></th<>
	-)   I\\/T	(°F) CP	Μ ΜΔΥ Π		) I \\/T (°E\	HEA		ACES	SIGN BASIS	REMARKS		DRAWN APPRON ISSUED DATE: PROJEC CLIENT N
84 00 180		8 21 8 22			160 140		214.7 33.9	AE	SPX APV RCO SPDW23	2		
											ן <b>4</b>	CAL

D	E	ENT PRODUCTS BY MANUFACTURERS WHICH AR	E NOT LISTED IN SCHEDULES OR	E N G I N E E R I N G Nest Des Moines, IA 50266 ttery.com
	SPECIFIC	ATIONS FOR SUBSTITUTION REQUEST INSTRUCT	TIONS.	a a a a a a a a a a a a a a a a a a a
	REMAR 1. PRO 2. COOI 2. PERA	FAN SCHEDULE (S: IDE NEW MOTOR. EXISTING FAN ASSEMBLY TO R DINATE CONNECTION TO VFD AND DISCONNECT W	EMAIN. /ITH ELECTRICAL CONTRACTOR.	5 Westown Pkwy, 6 223.8104   www.s a   Illinois   Indian
	MAI SF	MOTOR DATARKHPVOLTSPHASE-5252083	DESIGN BASIS REMARKS TRANE 1,2	
	AIR	SEPARATOR SCHEDULE		ZO
	MARKSYSTEM SERVEDSIZE (IN)CAPACITY (0AS-1HWS6"700AS-2PPG HWS4"300	GPM) STRAINER (Y/N) MAX PD (FT) D Y 3 BELL A Y 2 BELL A	DESIGN BASIS REMARKS AND GOSSETT R-6F AND GOSSETT R-4F	
	GLYCOL FEED SYSTEM SCHEDULE			ERVIC RA
PRE-MIXED 50% PROPYLENE GLYCOL SOLUTION. NO FIELD MIXING SHALL         NSTALL ALL PUMP CONTROLS AND WIRING.         ME APPROXIMATELY 150 GALLONS.         SYSTEM SERVED       TANK CAPACITY         GAL       100 PSI         CUT IN RANGE (         HEATING WATER       50	BE ALLOWED. SEE SPEC. CUT OUT MOTOR DATA PSI) RANGE(PSI) HP VOLTS 20-60 1/3 115 MECHANICAL PIPING E	PHASE       DESIGN BASIS         1       JL WINGERT GL50       ELECTRICAL TO         EXPANSION TANK SCHEDULE	REMARKS PROVIDE DUPLEX RECEPTACLE	STS DECEN G PACKAGE Int of administrative & A AVE. ELDORA, IA 50627
MARK SY ET-1 HE ET-2 HE	STEM SERVEDTYPETANK CAPACITY (GAL)ATING WATERDIAPHRAGM68.0ATING WATERDIAPHRAGM21.7	ACCEPTANCE CAPACITY (GAL)RELIEF AT (PSI)FILL AT (F 125.0034.0125.0012.0011.3125.0012.00	PSI) DESIGN BASIS REMARKS B&G D-120V EXISTING B&G D-40V	ELDORA BUILDIN SCHOOL OWA DEPARTMI 3211 EDGINGTOR
NOTES:	MECHANICAL PUMP SCHEDULE			
<ol> <li>VARIABLE FREQUENCY DRIVE AND DISCONNECT TO BE PROVIDED BY B</li> <li>PERFORMANCE BASED ON 50% PROPYLENE GLYCOL.</li> <li>PUMPS P-1, P-2, &amp; P-3 SELECTED TO OPERATE WITH TWO PUMPS IN PA</li> <li>PUMPS P-4 &amp; P-5 SELECTED TO OPERATE WITH TWO PUMPS IN PARALI</li> </ol>	ELECTRICAL CONTRACTOR. RALLEL AND THE THIRD PUMP IN STAND-BY TO DELIVER EL TO DELIVER A TOTAL OF 215 GPM AT 62 FEET OF HEA	A TOTAL OF 530 GPM AT 46 FEET OF HEAD PRESS D PRESSURE 1 ADD	SURE.	
MARKSYSTEM SERVEDTYPEGPMHEADP-1HWSEND SUCTION26546P-2HWSEND SUCTION26546P-3HWSEND SUCTION26546P-4MUA HWSINLINE11062P-5MUA HWSINLINE11062	D (FT)         SHUTOFF HEAD (FT)         BHP         HP           00         79.40         4.84         7.5           00         79.40         4.84         7.5           00         79.40         4.84         7.5           00         68.10         2.2         3           00         68.10         2.2         3           ADD         4.00         4.00	MOTOR DATA           VOLTS         PHASE         RPM           208         3         1800           208         3         1800           208         3         1800           208         3         3600           208         3         3600	DESIGN BASIS         REMARKS           B&G e1510 2BD         1,3           B&G e1510 2BD         1,3           B&G e1510 2BD         1,3           B&G e1510 2BD         1,3           B&G e-90 2AAC         1,2,4           B&G e-90 2AAC         1,2,4	3-2020 8DDENDUM 01
	NDLING UNIT REPLACEMENT HEATING CO	L - HOT WATER		1 02-00
HEATING CC	DIL DATA AIR TEMPE	RATURE		ADD ADD
MARKHEATING CFMROWSFINS PER INCHMBHGPMHC-5A1000047.33108458.33HC-5B1000047.33108458.33HC-5C1000047.33108458.33HC-6270047.4283.420.00HC-7270047.4283.420.00	WPD (FT)         EWT (°F)         LWT (°F)         EAT °F           10.74         160         119         -10           10.74         160         119         -10           10.74         160         119         -10           10.74         160         119         -10           10.74         160         119         -10           1.44         160         130         -10           1.44         160         130         -10	VELOCITY         APD (IN)         SIZE (IN)           90         480         0.23         24 X 12           90         460         0.24         23 X 3           90         460         0.24         23 X 3	KIN)DESIGN BASISREMARKS26TRANE1,226TRANE1,226TRANE1,26TRANE UW26TRANE UW2	Z0
HEA	T EXCHANGER - PLATE AND FRAME SCHEE	DULE		JDB TLS CONST 01/06/2( 417568' #8982.0
MANCE BASED ON 50% PROPYLENE GLYCOL ON COLD SIDE. E 135 GALLON BUFFER TANK ON THE HOT SIDE HX-2. SYSTEM SERVED GPM MAX PD (PSI) EWT (°F) MAKEUP AIR HEATING 190 6.84 180 DOMESTIC HOT WATER 27 6.00 180	LWT (°F)         GPM         MAX PD (PSI)         EW           138         215         9.89         1           108         22         4.00         4	HEATING SURFACES (°F) LWT (°F) (SQ. FT.) 20 160 214.7 10 140 33.9	DESIGN BASIS SPX APV AFRCO SPDW23 2	DRAWN: APPROVED: ISSUED FOR: DATE: PROJECT NO: CLIENT NO:
	4.00 4	5.00 UTI		4 CAL ES

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D	E		F	A E E R I N G Moines, IA 50266
	EQI IN S SPE	UIVALENT PRODUCTS BY MANUFACTURERS WHICH AR SPECIFICATIONS MAY BE USED WITH PRE-APPROVAL F ECIFICATIONS FOR SUBSTITUTION REQUEST INSTRUCT	E NOT LISTED IN SCHEDULES OR ROM ENGINEER. SEE TIONS.	L R E + E N G I N Suite 100   West Des shive-hattery.com
	R' 1. 2.	FAN SCHEDULE EMARKS: . PROVIDE NEW MOTOR. EXISTING FAN ASSEMBLY TO R . COODINATE CONNECTION TO VFD AND DISCONNECT V	EMAIN. /ITH ELECTRICAL CONTRACTOR.	C H I T E C T U C Westown Pkwy, 5 Westown Pkwy, 5 223.8104   www.
	3.	. REBALANCE TO 30,000 CFM FAN AT FULL SPEED. MOTOR DATA MARK HP VOLTS PHASE SF-5 25 208 3	DESIGN BASIS REMARKS TRANE 1,2	0 A R 125
		AIR SEPARATOR SCHEDULE		
	MARKSYSTEM SERVEDSIZE (IN)CAPACAS-1HWS6"AS-2PPG HWS4"	CITY (GPM)STRAINER (Y/N)MAX PD (FT)E700Y3BELL A300Y2BELL A	ESIGN BASIS REMARKS ND GOSSETT R-6F ND GOSSETT R-4F	LIZAT
	GLYCOL FEED SYSTEM SCHEDULE			<b>TRAI</b>
MARK S ET-1 ET-2	MECHANICAL PIPI YSTEM SERVED TYPE (GAL) IEATING WATER DIAPHRAGM 68.0 IEATING WATER DIAPHRAGM 21.7	NG EXPANSION TANK SCHEDULE Y ACCEPTANCE RELIEF VALVE CAPACITY (GAL) RELIEF AT (PSI) FILL AT (F 34.0 125.00 12.00 11.3 125.00 12.00	SI) DESIGN BASIS REMARKS B&G D-120V EXISTING B&G D-40V	LDORA STS UILDING PA( CHOOL MA DEPARTMENT OF AD
NOTES	MECHANICAL PUMP SCHEDL	JLE		<u>ШШѼ</u>
1. VARIABLE FREQUENCY DRIVE AND DISCONNECT TO BE PROVIDED B 2. PERFORMANCE BASED ON 50% PROPYLENE GLYCOL. 3. PUMPS P-1, P-2, & P-3 SELECTED TO OPERATE WITH TWO PUMPS IN F 4. PUMPS P-4 & P-5 SELECTED TO OPERATE WITH TWO PUMPS IN PARA	ELECTRICAL CONTRACTOR. ARALLEL AND THE THIRD PUMP IN STAND-BY TO DE LEL TO DELIVER A TOTAL OF 215 GPM AT 62 FEET C	LIVER A TOTAL OF 530 GPM AT 46 FEET OF HEAD PRESS OF HEAD PRESSURE 1 ADD	SURE.	
MARKSYSTEM SERVEDTYPEGPMHEP-1HWSEND SUCTION2654P-2HWSEND SUCTION2654P-3HWSEND SUCTION2654P-4MUA HWSINLINE1106P-5MUA HWSINLINE1106	D (FT)         SHUTOFF HEAD (FT)         BHP           6.00         79.40         4.84           6.00         79.40         4.84           6.00         79.40         4.84           2.00         68.10         2.2           2.00         68.10         2.2	MOTOR DATA           HP         VOLTS         PHASE         RPM           7.5         208         3         1800           7.5         208         3         1800           7.5         208         3         1800           7.5         208         3         1800           3         208         3         3600           3         208         3         3600	DESIGN BASIS         REMARKS           B&G e1510 2BD         1,3           B&G e1510 2BD         1,3           B&G e1510 2BD         1,3           B&G e1510 2BD         1,3           B&G e-90 2AAC         1,2,4           B&G e-90 2AAC         1,2,4	<b>3</b> 020 <b>3</b> 02
AIR H. IOTES: INSTALLED AS A COIL BANK IN EXISTING AHU-5 PERFORMANCE BASED ON 45% PROPYLENE GLYCOL	ADD ANDLING UNIT REPLACEMENT HEATING	G COIL - HOT WATER		02-06-20
				AD
MARK         HEATING CFM         ROWS         INCH         MBH         GPN           HC-5A         10000         4         7.33         1084         58.33           HC-5B         10000         4         7.33         1084         58.33           HC-5C         10000         4         7.33         1084         58.33           HC-5C         10000         4         7.33         1084         58.33           HC-6         2700         4         7.4         283.4         20.00           HC-7         2700         4         7.4         283.4         20.00	$\begin{array}{c ccccccccccccccccccccccccccccccccccc$	P         LAT F         (PPM)         APD (IN)         SIZE (IN)           0         90         480         0.23         24 X 12           0         90         460         0.24         23 X 3           0         90         460         0.24         23 X 3	KIN)DESIGN BASISREMARKS26TRANE1,226TRANE1,226TRANE1,226TRANE226TRANE UW226TRANE UW2	
HF	AT EXCHANGER - PLATE AND FRAME S(	CHEDULE		IDB LS SONSTRU 11/06/2020 175681
MANCE BASED ON 50% PROPYLENE GLYCOL ON COLD SIDE. E 135 GALLON BUFFER TANK ON THE HOT SIDE HX-2. HOT SIDE		SIDE HEATING SURFACES	DESIGN BASIS REMARKS	DRAWN: J APPROVED: T ISSUED FOR: C DATE: 0 PROJECT NO:4
STSTEW SERVEDGPMMAX PD (PSI)EWT (*FMAKEUP AIR HEATING1906.84180DOMESTIC HOT WATER276.00180	LWT(F)         GPM         MAX PD (PSI)           138         215         9.89           108         22         4.00	Lvvr (F)     Lvvr (F)     (SQ. F1.)       120     160     214.7       40     140     33.9	SPX APV 1 AERCO SPDW23 2	4
				ES

D	E E IN SF	QUIVALENT PRODUCTS BY MANUFACTURERS WHICH ARE N I SPECIFICATIONS MAY BE USED WITH PRE-APPROVAL FRO PECIFICATIONS FOR SUBSTITUTION REQUEST INSTRUCTION FAN SCHEDULE REMARKS: 1. PROVIDE NEW MOTOR. EXISTING FAN ASSEMBLY TO REM. 2. COODINATE CONNECTION TO VFD AND DISCONNECT WITH 3. REBALANCE TO 30,000 CFM FAN AT FULL SPEED. MOTOR DATA MARK HP VOLTS PHASE SF-5 25 208 3	F NOT LISTED IN SCHEDULES OR M ENGINEER. SEE NS. AIN. H ELECTRICAL CONTRACTOR. DESIGN BASIS REMARKS TRANE 1,2	A R C H I T E C T U R E + E N G I N E E R I N G 4125 Westown Pkwy, Suite 100   West Des Moines, IA 50266 515.223.8104   www.shive-hattery.com
	SYSTEM       SIZE (IN)       CAP         MARK       SERVED       SIZE (IN)       CAP         AS-1       HWS       6"       6"         AS-2       PPG HWS       4"       6"         GLYCOL EEED SYSTEM SCHEDUILE       6000000000000000000000000000000000000	AIR SEPARATOR SCHEDULE          AIR SEPARATOR SCHEDULE         ACITY (GPM)       STRAINER (Y/N)       MAX PD (FT)       DES         700       Y       3       BELL AND         300       Y       2       BELL AND	SIGN BASIS D GOSSETT R-6F D GOSSETT R-4F	RALIZATION
OTES: PROVIDE WITH PRE-MIXED 50% PROPYLENE GLYCOL SOLUTION. NO FIELD MIXING SHALL EURNISH AND INSTALL ALL PUMP CONTROLS AND WIRING. SYSTEM VOLUME APPROXIMATELY 150 GALLONS MARK SYSTEM SERVED (GAL) 100 PSI CUT IN RANGE ( GFS-1 HEATING WATER 50 1.5 10-40 MARK SY ET-1 HE ET-2 HE	GETCOLT LED STSTEIN SCHEDOLE         BE ALLOWED. SEE SPEC.         CUT OUT RANGE(PSI)       MOTOR DA HP         20-60       1/3       115         MECHANICAL PIF         STEM SERVED       TYPE         ATING WATER       DIAPHRAGM       68.0         ATING WATER       DIAPHRAGM       21.7	ATA PHASE DESIGN BASIS 1 JL WINGERT GL50 ELECTRICAL TO PR PING EXPANSION TANK SCHEDULE TY ACCEPTANCE RELIEF VALVE CAPACITY (GAL) RELIEF AT (PSI) FILL AT (PSI) 34.0 125.00 12.00	REMARKS ROVIDE DUPLEX RECEPTACLE	LDORA STS DECENT UILDING PACKAGE CHOOL VA DEPARTMENT OF ADMINISTRATIVE SE VA DEPARTMENT OF ADMINISTRATIVE SE
NOTES: 1. VARIABLE FREQUENCY DRIVE AND DISCONNECT TO BE PROVIDED BY 2. PERFORMANCE BASED ON 50% PROPYLENE GLYCOL.	MECHANICAL PUMP SCHED	DULE		ΞΞΞΥ ΞΞΞΥ
3. PUMPS P-1, P-2, & P-3 SELECTED TO OPERATE WITH TWO PUMPS IN PA 4. PUMPS P-4 & P-5 SELECTED TO OPERATE WITH TWO PUMPS IN PARALI	RALLEL AND THE THIRD PUMP IN STAND-BY TO D EL TO DELIVER A TOTAL OF 215 GPM AT 62 FEET	ELIVER A TOTAL OF 530 GPM AT 46 FEET OF HEAD PRESSUR OF HEAD PRESSURE 1 ADD MOTOR DATA	RE.	5
MARKSYSTEM SERVEDTYPEGPMHEADP-1HWSEND SUCTION26546P-2HWSEND SUCTION26546P-3HWSEND SUCTION26546P-4MUA HWSINLINE11062P-5MUA HWSINLINE11062	O(FT)         SHUTOFF HEAD (FT)         BHP           00         79.40         4.84           00         79.40         4.84           00         79.40         4.84           00         68.10         2.2           00         68.10         2.2           1         AD	HP         VOLTS         PHASE         RPM           7.5         208         3         1800           7.5         208         3         1800           7.5         208         3         1800           7.5         208         3         1800           3         208         3         3600           3         208         3         3600	DESIGN BASISREMARKSB&G e1510 2BD1,3B&G e1510 2BD1,3B&G e1510 2BD1,3B&G e-90 2AAC1,2,4B&G e-90 2AAC1,2,4	-2020 ADDENDUM C
	NDLING UNIT REPLACEMENT HEATING	G COIL - HOT WATER		02-06
ADD 2. PERFORMANCE BASED ON 45% PROPYLENE GLYCOL. HEATING CO	DIL DATA AIF			
MARK         HEATING CFM         ROWS         INCH         MBH         GPM           ADD         HC-5A         10000         4         7.33         1084         58.33           HC-5B         10000         4         7.33         1084         58.33           HC-5C         10000         4         7.33         1084         58.33           HC-5C         10000         4         7.33         1084         58.33           HC-6         2700         4         7.4         283.4         20.00           HC-7         2700         4         7.4         283.4         20.00	WPD (FT)         EWT (°F)         LWT (°F)         EA           10.74         160         119         -           10.74         160         119         -           10.74         160         119         -           10.74         160         119         -           10.74         160         130         -           1.44         160         130         -	T °FLAT °F(FPM)APD (IN)SIZE (INXIN)10904800.2324 X 12610904800.2324 X 12610904800.2324 X 12610904600.2423 X 3610904600.2423 X 3610904600.2423 X 36	DESIGN BASISREMARKSTRANE1,2TRANE1,2TRANE1,2TRANE2TRANE UW2	RUCTION DOCUMENT
HEA	T EXCHANGER - PLATE AND FRAME S	SCHEDULE		JDB : TLS 3: CONST 01/06/2( 0:417568' #8982.0
REMARKS:         1. PERFORMANCE BASED ON 50% PROPYLENE GLYCOL ON COLD SIDE.         2. PROVIDE 135 GALLON BUFFER TANK ON THE HOT SIDE HX-2.         MARK       SYSTEM SERVED       GPM       MAX PD (PSI)       EWT (°F)         ADD       HX-1       MAKEUP AIR HEATING       190       6.84       180         HX-2       DOMESTIC HOT WATER       27       6.00       180	COLD LWT (°F) GPM MAX PD (PSI) 138 215 9.89 108 22 4.00	SIDE         HEATING SURFACES           EWT (°F)         LWT (°F)         (SQ. FT.)           120         160         214.7           40         140         33.9         A	DESIGN BASIS REMARKS SPX APV 1 J.ERCO SPDW23 2	DRAMN: APPROVED: ISSUED FOF DATE: PROJECT N
				<sup>4</sup> ES ES

# **BOILER SCHEDULE - HOT WATER**

BOILER SCHEDULE - HOT WATER																
MIN GAS ELECTRICAL DATA																
OUTPUT	PRESSURE							INLET FUEL	TURNDOWN							
(MBH)	REQUIRED(IN)	EFFICIENCY	EWT (°F)	LWT (°F)	GPM	MAX PD (FT)	FUEL TYPE	PRESSURE	RATIO	VOLTS	PHASE	FLA	MCA	MOCP	DESIGN BASIS	REMARKS
2175	4	87	160	180	350	7.00	NATURAL GAS	4.00	1:15	208	3	10	13	20	AERCO BMK 2500	
2175	4	87	160	180	350	7.00	NATURAL GAS	4.00	1:15	208	3	10	13	20	AERCO BMK 2500	
2175	4	87	160	180	350	7.00	NATURAL GAS	4.00	1:15	208	3	10	13	20	AERCO BMK 2500	
2175	4	87	160	180	350	7.00	NATURAL GAS	4.00	1:15	208	3	10	13	20	AERCO BMK 2500	
(	DUTPUT (MBH) 2175 2175 2175 2175 2175	MIN GAS PRESSURE (MBH) REQUIRED(IN) 2175 4 2175 4 2175 4 2175 4 2175 4 2175 4	MIN GAS PRESSURE (MBH)EFFICIENCY2175421754217542175421754217548721754	MIN GAS PRESSURE (MBH)MIN GAS PRESSURE REQUIRED(IN)EFFICIENCYEWT (°F)21754871602175487160217548716021754871602175487160	MIN GAS PRESSURE (MBH)MIN GAS PRESSURE REQUIRED(IN)EFFICIENCYEWT (°F)LWT (°F)21754871601802175487160180217548716018021754871601802175487160180	MIN GAS PRESSURE (MBH)MIN GAS PRESSURE REQUIRED(IN)EFFICIENCYEWT (°F)LWT (°F)GPM217548716018035021754871601803502175487160180350217548716018035021754871601803502175487160180350	MIN GAS PRESSURE (MBH)         MIN GAS PRESSURE REQUIRED(IN)         EFFICIENCY         EWT (°F)         LWT (°F)         GPM         MAX PD (FT)           2175         4         87         160         180         350         7.00           2175         4         87         160         180         350         7.00           2175         4         87         160         180         350         7.00           2175         4         87         160         180         350         7.00           2175         4         87         160         180         350         7.00           2175         4         87         160         180         350         7.00	MIN GAS PRESSURE (MBH)         MIN GAS PRESSURE REQUIRED(IN)         EFFICIENCY         EWT (°F)         LWT (°F)         GPM         MAX PD (FT)         FUEL TYPE           2175         4         87         160         180         350         7.00         NATURAL GAS           2175         4         87         160         180         350         7.00         NATURAL GAS           2175         4         87         160         180         350         7.00         NATURAL GAS           2175         4         87         160         180         350         7.00         NATURAL GAS           2175         4         87         160         180         350         7.00         NATURAL GAS           2175         4         87         160         180         350         7.00         NATURAL GAS           2175         4         87         160         180         350         7.00         NATURAL GAS	MIN GAS PRESSURE (MBH)         MIN GAS PRESSURE REQUIRED(IN)         EFFICIENCY         EWT (°F)         LWT (°F)         GPM         MAX PD (FT)         FUEL TYPE         INLET FUEL PRESSURE           2175         4         87         160         180         350         7.00         NATURAL GAS         4.00           2175         4         87         160         180         350         7.00         NATURAL GAS         4.00           2175         4         87         160         180         350         7.00         NATURAL GAS         4.00           2175         4         87         160         180         350         7.00         NATURAL GAS         4.00           2175         4         87         160         180         350         7.00         NATURAL GAS         4.00           2175         4         87         160         180         350         7.00         NATURAL GAS         4.00	MIN GAS PRESSURE (MBH)         MIN GAS PRESSURE REQUIRED(IN)         EFFICIENCY         EWT (°F)         LWT (°F)         GPM         MAX PD (FT)         FUEL TYPE         INLET FUEL PRESSURE         TURNDOWN RATIO           2175         4         87         160         180         350         7.00         NATURAL GAS         4.00         1:15           2175         4         87         160         180         350         7.00         NATURAL GAS         4.00         1:15           2175         4         87         160         180         350         7.00         NATURAL GAS         4.00         1:15           2175         4         87         160         180         350         7.00         NATURAL GAS         4.00         1:15           2175         4         87         160         180         350         7.00         NATURAL GAS         4.00         1:15           2175         4         87         160         180         350         7.00         NATURAL GAS         4.00         1:15	MIN GAS PRESSURE (MBH)         MIN GAS PRESSURE REQUIRED(IN)         EFFICIENCY         EWT (°F)         LWT (°F)         GPM         MAX PD (FT)         FUEL TYPE         INLET FUEL PRESSURE         TURNDOWN RATIO         VOLTS           2175         4         87         160         180         350         7.00         NATURAL GAS         4.00         1:15         208           2175         4         87         160         180         350         7.00         NATURAL GAS         4.00         1:15         208           2175         4         87         160         180         350         7.00         NATURAL GAS         4.00         1:15         208           2175         4         87         160         180         350         7.00         NATURAL GAS         4.00         1:15         208           2175         4         87         160         180         350         7.00         NATURAL GAS         4.00         1:15         208           2175         4         87         160         180         350         7.00         NATURAL GAS         4.00         1:15         208	MIN GAS PRESSURE (MBH)         MIN GAS PRESSURE REQUIRED(IN)         EFFICIENCY         EWT (°F)         LWT (°F)         GPM         MAX PD (FT)         FUEL TYPE         INLET FUEL PRESSURE         TURNDOWN RATIO         VOLTS         PHASE           2175         4         87         160         180         350         7.00         NATURAL GAS         4.00         1:15         208         3           2175         4         87         160         180         350         7.00         NATURAL GAS         4.00         1:15         208         3           2175         4         87         160         180         350         7.00         NATURAL GAS         4.00         1:15         208         3           2175         4         87         160         180         350         7.00         NATURAL GAS         4.00         1:15         208         3           2175         4         87         160         180         350         7.00         NATURAL GAS         4.00         1:15         208         3         3           2175         4         87         160         180         350         7.00         NATURAL GAS         4.00         1:15         208	MIN GAS PRESSURE (MBH)         MIN GAS PRESSURE EFFICIENCY         EWT (°F)         LWT (°F)         GPM         MAX PD (FT)         FUEL TYPE         INLET FUEL PRESSURE         TURNDOWN RATIO         VOLTS         PHASE         FLA           2175         4         87         160         180         350         7.00         NATURAL GAS         4.00         1:15         208         3         10           2175         4         87         160         180         350         7.00         NATURAL GAS         4.00         1:15         208         3         10           2175         4         87         160         180         350         7.00         NATURAL GAS         4.00         1:15         208         3         10           2175         4         87         160         180         350         7.00         NATURAL GAS         4.00         1:15         208         3         10           2175         4         87         160         180         350         7.00         NATURAL GAS         4.00         1:15         208         3         10           2175         4         87         160         180         350         7.00         NATURAL GAS	MIN GAS PRESSURE (MBH)         MAX PD (°F)         MAX PD (FT)         FUEL TYPE         INLET FUEL PRESSURE         TURNDOWN RATIO         VOLTS         PHASE         FLA         MCA           2175         4         87         160         180         350         7.00         NATURAL GAS         4.00         1:15         208         3         10         13           2175         4         87         160         180         350         7.00         NATURAL GAS         4.00         1:15         208         3         10         13           2175         4         87         160         180         350         7.00         NATURAL GAS         4.00         1:15         208         3         10         13           2175         4         87         160         180         350         7.00         NATURAL GAS         4.00         1:15         208         3         10         13           2175         4         87         160         180         350         7.00         NATURAL GAS         4.00         1:15         208         3         10         13           2175         4         87         160         180         350         7.00 <td>MIN GAS PRESSURE (MBH)         MIN GAS PRESSURE REQUIRED(IN)         EFFICIENCY         EWT (°F)         LWT (°F)         GPM         MAX PD (FT)         FUEL TYPE         INLET FUEL PRESSURE         TURNDOWN RATIO         VOLTs         PHASE         FLA         MCA         MOCP           2175         4         87         160         180         350         7.00         NATURAL GAS         4.00         1:15         208         3         10         13         20           2175         4         87         160         180         350         7.00         NATURAL GAS         4.00         1:15         208         3         10         13         20           2175         4         87         160         180         350         7.00         NATURAL GAS         4.00         1:15         208         3         10         13         20           2175         4         87         160         180         350         7.00         NATURAL GAS         4.00         1:15         208         3         10         13         20           2175         4         87         160         180         350         7.00         NATURAL GAS         4.00         1:15         208</td> <td>MIN GAS PRESSURE (MBH)         MIN GAS PRESSURE EFFICIENCY         EWT (°F)         LWT (°F)         GPM         MAX PD (FT)         FUEL TYPE         TURNDOWN PRESSURE         TURNDOWN RATIO         VOLTS         PHASE         FLA         MCA         MOCP         DESIGN BASIS           2175         4         87         160         180         350         7.00         NATURAL GAS         4.00         1:15         208         3         10         13         20         AERCO BMK 2500           2175         4         87         160         180         350         7.00         NATURAL GAS         4.00         1:15         208         3         10         13         20         AERCO BMK 2500           2175         4         87         160         180         350         7.00         NATURAL GAS         4.00         1:15         208         3         10         13         20         AERCO BMK 2500           2175         4         87         160         180         350         7.00         NATURAL GAS         4.00         1:15         208         3         10         13         20         AERCO BMK 2500           2175         4         87         160         180</td>	MIN GAS PRESSURE (MBH)         MIN GAS PRESSURE REQUIRED(IN)         EFFICIENCY         EWT (°F)         LWT (°F)         GPM         MAX PD (FT)         FUEL TYPE         INLET FUEL PRESSURE         TURNDOWN RATIO         VOLTs         PHASE         FLA         MCA         MOCP           2175         4         87         160         180         350         7.00         NATURAL GAS         4.00         1:15         208         3         10         13         20           2175         4         87         160         180         350         7.00         NATURAL GAS         4.00         1:15         208         3         10         13         20           2175         4         87         160         180         350         7.00         NATURAL GAS         4.00         1:15         208         3         10         13         20           2175         4         87         160         180         350         7.00         NATURAL GAS         4.00         1:15         208         3         10         13         20           2175         4         87         160         180         350         7.00         NATURAL GAS         4.00         1:15         208	MIN GAS PRESSURE (MBH)         MIN GAS PRESSURE EFFICIENCY         EWT (°F)         LWT (°F)         GPM         MAX PD (FT)         FUEL TYPE         TURNDOWN PRESSURE         TURNDOWN RATIO         VOLTS         PHASE         FLA         MCA         MOCP         DESIGN BASIS           2175         4         87         160         180         350         7.00         NATURAL GAS         4.00         1:15         208         3         10         13         20         AERCO BMK 2500           2175         4         87         160         180         350         7.00         NATURAL GAS         4.00         1:15         208         3         10         13         20         AERCO BMK 2500           2175         4         87         160         180         350         7.00         NATURAL GAS         4.00         1:15         208         3         10         13         20         AERCO BMK 2500           2175         4         87         160         180         350         7.00         NATURAL GAS         4.00         1:15         208         3         10         13         20         AERCO BMK 2500           2175         4         87         160         180

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	A	В
1	AV - Exhaust Air Temp EA BV - Exhaust Fan Status BV - Exhaust Fan Status BV - Exhaust Fan Status BV - Exhaust Fan Status Starter AV - Outside Air Humidity AV - Outside Air Temp AV - Outside Air Temp	AV - Return Air Humidity AV - Return Air Temp AV - Filter Differential Pressure AV - Filter Differential Pressure RA BV - Enthalpy Wheel Status BV - Supply Fan Start/Stop AV - Supply Fan VFD Speed BV - Supply Fan VFD Speed BV - Supply Fan VFD Fault AV - Enthalpy Wheel Discharge Air Temp AV - Discharge Air Temp BV - Discharge Air Temp AV - Discharge Air Temp BV - Discharge Air Temp BV - Discharge Air Temp
2	N.C. AV - Zone Humidity AV - Zone Temp T ADD INTEGRATE AND TREND AVAILABLE PACKAGED UNIT CONTROL POINTS I MANUFACTURER. SCHEMATIC ABOVE IS THE MINIMUM INFORMATION TO DISPLAY ON THE SCHEMATIC BUT AVAILABLE FOR INTEGRATION ARE NOT REQUIRED TO THE DDC CONTROL SYSTEM SHALL SET OCCUPIED AND UNOCCUPIED S STARTUP. ERV INTEGRATION SCHEMATIC NOT TO SCALE	AV - Modulating Heat       DX         AV - Modulating Heat       AV - Digital Compressor         NTO CONTROLS GRAPHICS AS SHOWN ABOVE. AVAILABLE POINTS AND NAMES O         GRAPHIC. INTEGRATE ALL OTHER AVAILABLE POINTS FOR DIAGNOSTIC PURPOSE         BE ON A GRAPHIC AND MAY BE DISPLAYED IN A LIST.         ETPOINTS AND SCHEDULES. COORDINATE SETPOINT TEMPERATURES AND SCHE
3	Elec       Image:	Run Conditions - Continuous: The unit shall run continuously and shall maintain a heating setpoint of 7 Alarms shall be provided as follows: Low Zone Temp: If the zone temperature is less than the heating setpoint Electric Heating Stage: The controller shall measure the zone temperature and stage the heating cycling, the stage shall have a user definable (adj.) minimum runtime. The heating shall be enabled whenever: Outside air temperature is less than 65°F (adj.). AND the zone temperature is below heating setpoint. DL es: print by a user definable amount (adj.).
4	The furnace shall operate the heating or cooling using factory controls. The BAS s factory controls based on zone temperature setpont and mode. Zone Mode Adjust: The occupant shall be able to adjust the zone mode (heat or cool) at the zone sens Zone Setpoint Adjust: The occupant shall be able to adjust the zone temperature heating and cooling set Zone Optimal Start: The unit shall use an optimal start algorithm for morning start-up. This algorithm sh down period while still achieving comfort conditions by the start of scheduled occup Zone Unoccupied Override: A timed local override control shall allow an occupant to override the schedule and adjustable period of time. At the expiration of this time, control of the unit shall auto Supply Fan: The supply fan shall run continuously during occupied modes, unless shutdown on If Optimal Start Up is available, the outside air damper shall close and the return ai Minimum Outside Air Ventilation: The outside air dampers shall open during building occupied hours and be closed of minimum outside airflow with manual damper.	ystem shall send heat or cool requests to the ior. points at the zone sensor. all minimize the unoccupied warm-up or cool- place the unit into an occupied mode for an matically return to the schedule. safeties. r damper shall open. during unoccupied hours. Balancer to set EMATIC & SEQUENCE
Autoda	A A	В





	A B
	AV - Exhaust Air Temp AV - Exhaust Air Temp AV - Filter Differential Pressure H T H L RA
1	BV - Exhaust Fan Status       CI         BV - Exhaust Fan Start/Stop       Starter         BV - Exhaust Fan Start/Stop       Starter         AV - Outside Air Humidity       AV - Outside Air Temp         AV - Filter Differential Pressure       AV - Enthalpy Wheel Discharge Air Humidity
	BV - Outside Air Damper BV - Outside Air Damper BV - Outside Air Damper BV - Smoke OA N.C.
	AV - Zone Humidity AV - Zone Temp Gas AV - Digital Compressor
2	INTEGRATE AND TREND AVAILABLE PACKAGED UNIT CONTROL POINTS INTO CONTROLS GRAPHICS AS SHOWN ABOVE. AVAILABLE POINTS AND NAMES OF POINT MANUFACTURER. SCHEMATIC ABOVE IS THE MINIMUM INFORMATION TO DISPLAY ON THE GRAPHIC. INTEGRATE ALL OTHER AVAILABLE POINTS FOR DIAGNOSTIC PURPOSES. POIN SCHEMATIC BUT AVAILABLE FOR INTEGRATION ARE NOT REQUIRED TO BE ON A GRAPHIC AND MAY BE DISPLAYED IN A LIST. THE DDC CONTROL SYSTEM SHALL SET OCCUPIED AND UNOCCUPIED SETPOINTS AND SCHEDULES. COORDINATE SETPOINT TEMPERATURES AND SCHEDULES STARTUP.
	Elec       Image: Construction of the stage
3	<b>ELECTRIC UNIT HEATER CONTROL</b> NOT TO SCALE Furnaces Run Conditions - Scheduled: The unit shall run according to a user definable time schedule in the following modes: • Occupied Mode: The unit shall maintain • A 75°F (adj.) cooling setpoint. • Unoccupied Mode (night setback): The unit shall maintain • A 85°F (adj.) cooling setpoint. • A 55°F (adj.) cooling setpoint. • A 55°F (adj.) neating setpoint. • Alarms shall be provided as follows: • Wich Zone Tomport If the zone tomporture is greater than the cooling setpoint by a user definable amount (adit)
	<ul> <li>High Zone Temp: If the zone temperature is greater than the cooling setpoint by a user definable amount (adj.).</li> <li>Low Zone Temp: If the zone temperature is less than the heating setpoint by a user definable amount (adj.).</li> <li>The furnace shall operate the heating or cooling using factory controls. The BAS system shall send heat or cool requests to the factory controls based on zone temperature setpont and mode.</li> <li>Zone Mode Adjust: The occupant shall be able to adjust the zone mode (heat or cool) at the zone sensor.</li> <li>Zone Setpoint Adjust: The occupant shall be able to adjust the zone temperature heating and cooling setpoints at the zone sensor.</li> </ul>
4	Zone Optimal Start:       The unit shall use an optimal start algorithm for morning start-up. This algorithm shall minimize the unoccupied warm-up or cool-down period while still achieving comfort conditions by the start of scheduled occupied period.         Zone Unoccupied Override:       Zone Unoccupied Override control shall allow an occupant to override the schedule and place the unit into an occupied mode for an adjustable period of time. At the expiration of this time, control of the unit shall automatically return to the schedule.       BI - Zone Override         AI - Zone Temp       AI - Zone Temp
	Supply Fan: The supply fan shall run continuously during occupied modes, unless shutdown on safeties. If Optimal Start Up is available, the outside air damper shall close and the return air damper shall open. Minimum Outside Air Ventilation: The outside air dampers shall open during building occupied hours and be closed during unoccupied hours. Balancer to set minimum outside airflow with manual damper.
	A1a TYPICAL FURNACE CONTROL SCHEMATIC & SEQUENCE
Autode	A B





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Autodesk Revit 2019

Α

	A	В
1		
2		
3		
5		
4		

В

					MOTOR	OPERATED	DAMPER S
NOTES: 1. PROVIDE \ 2. CONTROL	WITH DAMPER END SWITCH S CONTRACTOR TO PROVID	. Motoriz E and ins <sup>-</sup>	ED DAMPEI TALL 120V T	R SHALL BE O 24V TRAN	INTERLOCKE ISFORMER. C	D WITH BOILER OORDINATE 120	OPERATION. BO V POWER WITH
				DIMEN	ISIONS		
						INSULATED	BLADE
MARK	EQUIPMENT SERVED	CFM	APD (IN)	H	W	BLADE	ORIENTATION
MD-1	BOILER COMBUSTION AIR	1050	0.01	48	48	YES	HORIZONTAL

MARK	CFM	
SUH-1	860	
un		

MD-1

NOTES:

 $\overline{\phantom{a}}$ 

<u>∕1</u> ADD

С

MARK

VCP-1

MARK

B-1

B-2

B-3

SYSTEM SERVED

MARK

L-1

FUEL

LAT (°F)

95

1. DISCONNECT TO BE PROVIDED AND INSTALLED BY ELECTRICAL CONTRACTOR.

EAT (°F)

-5

D

CONDENSATE RETURN

NATURAL GAS	4	14	350	280	80	
NATURAL GAS	4	14	350	280	80	
NATURAL GAS	4	14	350	280	80	
			UNIT HEA	ATER SCHED	DULE - STEA	Μ

STEAM

PRESSURE

(PSI)

15.00

# BOILER SCHEDULE - STEAM NOTES: 1. MANUFACTURER SHALL PROVIDE PRESSURE SAFETY VALVE FOR BOILER. CONTRACTOR SHALL ROUTE AND TERMINATE RELIEF PIPING PER MANUFACTURER'S REQUIREMENTS. 2. PROVIDE COMMUNICATIONS BRIDGE TO BACNET. PROVIDE DISPLAY ON DDC SYSTEM WHICH SHOWS BOILER ENABLE/DISABLE, STEAM SUPPLY PRESSURE SET POINT AND SUMMARY ALARM FOR EACH BOILER. 3. INTERLOCK BOILER OPERATION WITH MOTORIZED DAMPER AT COMBUSTION AIR INTAKE LOUVER.

GAS

MIN. (IN. WC.) MAX (IN. WC.) INPUT (MBH)

PRESSURE PRESSURE

MBH

89

HEIGHT (IN.)

48

י טנ		TANK	GPM (PER	HEAD	NUMBER OF	PUMP HP	El
	MARK	VOLUME	PUMP)	(PSI)	PUMPS	(EACH)	VOL
	FWP-1	71	3	20.00	4	1/3	20

NOTES: 1. FEEDWATER PUMP ASSEMBLY SHALL HAVE SINGLE POINT POWER CONNECTION WIT 2. JUNT SHALL BE SIZED WITH ONE STANDBY PUMP. 3. INTERLOCK PUMP OPERATION WITH BOILER LOW WATER FEED CONTROL	
1. FEEDWATER PUMP ASSEMBLY SHALL HAVE SINGLE POINT POWER CONNECTION WITH 2. WHT SHALL BE SIZED WITH ONE STANDBY PUMP. 3. INTERLOCK PUMP OPERATION WITH BOILER LOW WATER FEED CONTROL	
ADD TO MALE CONTROL ON TO ENTROL ON THE DOLLER CONTROL	
TANK GPM (PER HEAD NUMBER OF PUMP HP	ELE

7\_

TYPE

VACUUM

AIR FLOW

(CFM)

1050

GAS

RATING AT 5-1/2" HG VACUUM AT 160°F SIMULTANEOUS

GPM AIR CFM

3

DIMENSIONS

48

WIDTH (IN.) DEPTH (IN.)

4"

GROSS

OUTPUT

(MBH)

STEAM

LBS/HR

67

HEAD (FT)

46.00

HP

1

44

MOUNTING

6' - 0"

Е

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С



F

08-M6.00

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C D	E
	MECHA
EQUIVALENT PRODUCTS BY MANUFACTURERS WHICH ARE NO SCHEDULES OR IN SPECIFICATIONS MAY BE USED WITH PRE- ENGINEER. SEE SPECIFICATIONS FOR SUBSTITUTION REQUES	T LISTED IN MECTIA PPROVAL FROM T INSTRUCTIONS.
	MARK SYSTEM SERVED ET-1 HEATING WATER E
	GLYCOL FEED SYSTEM SCHEDULE
NOTES: 1. PROVIDE WITH PRE-MIXED 30% PROPYLENE GLYCOL SOLUTION. NO F	ELD MIXING SHALL BE ALLOWED. SEE SPEC.
ADD 3. SYSTEM VOLUME APPROXIMATELY 150 GALLONS.	
MARKSYSTEM SERVEDImage: Constraint of the constrai	CUT OUT         MOTOR DATA           CUT IN RANGE (PSI)         RANGE(PSI)         HP         VOLTS           10-40         20-60         1/3         120
	MECHANICAL PUMP SCHEDULE
NOTES: 1. VARIABLE FREQUENCY DRIVE AND DISCONNECT TO BE PROVIDED AND INSTALLED BY ELEC 2. PUMPS SELECTED FOR ONE PUMP TO BE LEAD AND ONE PUMP TO BE IN STAND-BY.	TRICAL CONTRACTOR.
3. PUMPS SELECTED AT 30% PROPYLENE GLYCOL.           SYSTEM         SHL	TOFF HEAD MOTOR DATA
MARKSERVEDTYPEGPMHEAD (F1)P-1HWSEND SUCTION7237.00P-2HWSEND SUCTION7237.00	(11)         BHP         HP         VOLIS           42.00         1.04         1.5         208           42.00         1.04         1.5         208
	CABINET UNIT HEATER SCHEDULE- HOT WATER
NOTES: 1. PERFORMANCE BASED ON 30% PROPYLENE GLYCOL.	
2. MANUFACTURER SHALL PROVIDE FACTORY MOUNTED DISCONNECT.	
IVIARK         AREA SERVED         CFM         EVIT("F)         LWT("F)         EAT("F)         LAT("F)           CUH-1         BAKERY         479         140         110         60         115           CUH-2         BAKERY         479         140         110         60         115	NIDE         GENI         NIAX PD (F1)         HEIGHT (F1)         ORIENTATION           29         2.00         4         0' - 0"         VERTICAL           29         2.00         4         0' - 0"         VERTICAL
CUH-3         CORRIDOR L102         256         140         107         60         109           CUH-4         DINING U103         541         140         114         60         103           CUH-5         DINING U103         541         140         114         60         103	13.5         1.00         4         0' - 0"         VERTICAL           25.5         2.25         4         0' - 0"         VERTICAL           25.5         2.25         4         0' - 0"         VERTICAL
CUH-6         DINING U103         541         140         114         60         103           CUH-6         DINING U103         541         140         114         60         103           CUH-7         VESTIBULE U102         277         140         111         60         101	25.5         2.25         4         0' - 0"         VERTICA           25.5         2.25         4         0' - 0"         VERTICA           12.4         1.00         4         0' - 0"         VERTICA
CUH-8 LOUNGE U105 479 140 110 60 115	29 2.00 4 0'-0" VERTICA
	FIN TUBE RADIATION SCHEDULE - HYDRONIC
NOTES: 1. PERFORMANCE BASED ON 30% PROPYLENE GLYCOL.	
CAPACITYEW1TUBE SIZENUMBER OFELEMENTEAMARK(BTU/FT)(°F)GPM(IN)TUBES OR ROWSLENGTH (FT)(°F)FT-19041404.01.2536' - 0"60	FIN HEIGHT (IN)     FIN WIDTH (IN)     FINS PER FOOT     LENGTH       4 1/4"     4 1/4"     50     72"
FT-2         533         140         1.0         0.75         1         1'-0"         60           FT-3         533         140         1.0         0.75         1         1'-0"         60           FT-4         566         140         4.5         0.75         1         2'-0"         60	4 1/4"         40         12"           4 1/4"         40         12"           4 1/4"         40         12"           4 1/4"         40         24"
FT-5     791     140     1.5     0.75     3     3' - 0"     6       FT-6     855     140     8.5     1     3     4' - 0"     6       FT 7     855     140     8.5     1     3     4' - 0"     6	4 1/4"         4 1/4"         32         36"           4 1/4"         4 1/4"         32         48"           4 1/4"         4 1/4"         32         48"
רו- <i>ו</i> אסט 140 א.5 1 3 4'-0" 60	4 1/4" 4 1/4" 32 48"
	UNIT HEATER SCHEDULE - HOT WATER
NOTES: 1. PERFORMANCE BASED ON 30% PROPYLENE GLYCOL. 2. MANUFACTURER SHALL PROVIDE FACTORY MOUNTED DISCONNECT	
MARK AREA SERVED CFM EWT (°F) LWT (°F)	LAT (°F) MBH GPM MAX PD (FT) HEIGHT (
HWUH-1         STORAGE BASEMENT         900         140 °F         110 °F           HWUH-2         STORAGE BASEMENT         245         140 °F         110 °F           HWUH-3         KITCHEN L 107         1800         140 °F         110 °F	112 °F         20.9         3.25         1         8' - 0"           91 °F         2.2         0.50         1         8' - 0"           103 °F         36         5 50         1         8' - 0"
Invon-s         NICHEN L107         1800         140 °F         110 °F           HWUH-4         STORAGE L109         245         140 °F         110 °F           HWUH-5         BREAKROOM G113         750         140 °F         110 °F	100 г         30         5.50         1         10' - 0"           91 °F         2.8         0.50         1         8' - 0"           111 °F         14.7         2.50         1         8' - 0"
1         HWUH-6         STORAGE G115         1800         140 °F         110 °F           ADD         HWUH-7         PREPARATION L117         750         140 °F         110 °F           HWUH-8         KITCHENUL 107         1800         140 °F         110 °F	103 °F         38         5.50         1         8' - 0"           111 °F         14.8         2.50         1         8' - 0"           103 °E         36         5 50         1         10' 0"
HWUH-9         BACK VESTIBULE L111         550         140 °F         110 °F           HWUH-10         VESTIBULE L116         500         140 °F         110 °F	103 °F         10.44         2.00         1         10° - 0"           96 °F         8         1.25         1         8' - 0"
HWUH-11         DISHWASHING ROOM U104         1100         140 °F         110 °F           HWUH-12         DRY STORAGE 107         1400         140 °F         110 °F           HWUH-13         STORAGE 109         1400         140 °F         110 °F	106 °F         22.1         5.50         1         8' - 0"           106 °F         26.2         4.50         1         8' - 0"           113 °F         33.6         5.00         1         8' - 0"
HWUH-14         STORAGE 201         750         140 °F         110 °F           HWUH-15         STORAGE 202         900         140 °F         110 °F	111 °F         13.1         2.50         1         8' - 0"           112 °F         20.8         3.25         1         8' - 0"
CHWUH-16         STORAGE 203         1800         140 °F         110 °F           HWUH-17         STORAGE 204         395         140 °F         110 °F           HWUH-18         MECH ROOM         1400         140 °F         110 °F	103 °F         36.2         5.50         1         8' - 0"           99 °F         6.3         1.00         1         8' - 0"           113 °F         32         5.00         1         8' - 0"
NOTES: 1. PERFORMANCE BASED ON OPERATING CONDITIONS.	
MARK AREA SERVED (MBH) OUTPUT MIN GAS PRESSURE EFFICIENCY (°F	T LWT MAX PD TURNDOWN (°F) GPM (FT) FUEL TYPE RATIO
B-1KITCHEN39936339111B-2KITCHEN39936339111B-3KITCHEN39936339111	140         40         6.10         NATURAL GAS         8:1           140         40         6.10         NATURAL GAS         8:1           140         40         6.10         NATURAL GAS         8:1           140         40         6.10         NATURAL GAS         8:1
D	E

						JRERS WHICH			1			MECHAN	IC
			SCHEDULES ENGINEER.	S OR IN SPE SEE SPECIF	CIFICATIONS MAY	BE USED WIT	TARE NO	PPROVAL F	FROM TIONS.	МА	RK SYSTEM	SERVED T	YF
										ET	-1 HEATING	WATER BLA	١D
		NOTES: 1. PROVI 2. FURNI 3. SYSTE	DE WITH PR SH AND INS M VOLUME	RE-MIXED 309 TALL ALL PU APPROXIMA	% PROPYLENE GL MP CONTROLS AN TELY 150 GALLON	YCOL SOLUTIC	DN. NO FI	ELD MIXING	G SHALL BE	LYCOL FEEI	D SYSTEM SCH SPEC.	IEDULE	
		MAR GFS-	K S -1 F	YSTEM SER	TANK ( VED (( TER	CAPACITY ( GAL) ·	GPM @ 100 PSI 1.5	CUT IN R	ANGE (PSI) 0-40	CUT OUT RANGE(PS 20-60	I) HP 1/3	MOTOR DATA VOLTS 120	
									MECHAN	NICAL PUMP	SCHEDULE		
NOTES: 1. VARIABLE I 2. PUMPS SEI 3. PUMPS SEI	REQUE	NCY DRIVI FOR ONE	E AND DISC PUMP TO BI	ONNECT TO E LEAD AND	BE PROVIDED AN ONE PUMP TO BE	D INSTALLED E IN STAND-BY.	BY ELECT	RICAL CON	ITRACTOR.				
	S	YSTEM					SHUT	OFF HEAD			МОТОГ	R DATA	
MARK	SI	ERVED			GPM 72	HEAD (FT)		(FT) 42.00	BHI	P I	HP VOL	TS PH	IA 3
P-2		HWS	END S	SUCTION	72	37.00		42.00	1.04	4	1.5 20 1.5 20	8	3
								CABINE	t unit he	EATER SCHE	EDULE- HOT W	ATER	
NOTES: 1. PERFORMA 2. MANUFACT	NCE BAS	SED ON 30 HALL PRO	)% PROPYL VIDE FACT(	ENE GLYCO	 ED DISCONNECT.								
MARK	AREA	SERVED	CFM	EWT (	°F) LWT (°F)	EAT (°F)	LAT (°F	) MBH	H GP	M MAX PD (	MOUNTING (FT) HEIGHT (FT)	ORIENTATION	F
CUH-1	BA	KERY	479	140	110	60	115	29	2.0	0 4	0' - 0"	VERTICAL	Ţ
CUH-2 CUH-3	CORRI		479	140	110	60 60	115	29	2.0 5 1.0	0 4 0 4	0' - 0"	VERTICAL	_
CUH-4	DININ	IG U103	541	140	114	60	103	25.5	5 1.0	5 4	0' - 0"	VERTICAL	+
CUH-5	DININ	IG U103	541	140	114	60	103	25.5	5 2.2	5 4	0' - 0"	VERTICAL	_
CUH-6			541 277	140	114	60 60	103	25.5	5 2.2 1 1 0	5 4 0 4	0' - 0"	VERTICAL	-
CUH-8	LOUN	GE U105	479	140	110	60	115	29	2.0	0 4 0 4	0' - 0"	VERTICAL	1
NOTES:								FIN TU	BE RADI	ATION SCHE	EDULE - HYDRO	DNIC	
I. PERFORMA	NCE BA	SED ON 30	0% PROPYL										
MARK (B	PACITY TU/FT)	EWI (°F)	GPM	TUBE SIZE (IN)	NUMBER OF	ELEMENI ELENGTH (F	T)   EAI	FIN HE	EIGHT (IN)	FIN WIDTH (IN)	FINS PER FOOT	LENGTH (IN)	$\top$
FT-1	904	140	4.0	1.25	3	6' - 0"	60	4	1/4"	4 1/4"	50	72"	
F1-2 FT-3	533 533	140 140	1.0	0.75	1	1' - 0"	60	4	1/4"	4 1/4"	40	12"	+
FT-4	566	140	4.5	0.75	1	2' - 0"	60	4	1/4"	4 1/4"	40	24"	$\top$
FT-5	791	140	1.5	0.75	3	3' - 0"	60	4	1/4"	4 1/4"	32	36"	
T-6 T-7	855 855	140 140	8.5 8.5	1	3	4' - 0" 4' - 0"	60 60	4	1/4" 1/4"	4 1/4" 4 1/4"	32 32	48" 48"	_
)TES: PERFORMA MANUFACT	NCE BA	SED ON 30	)% PROPYL VIDE FACTO	ENE GLYCO	 ED DISCONNECT.			UNI	T HEATE	R SCHEDUL	E - HOT WATE	R	
MARK		AREA SE		CFM	EWT (°F)	LWT (°F	) L	AT (°F)	MBH	GPM	MAX PD (FT)	MOUNTING HEIGHT (FT)	C
HWUH-1	ST	ORAGE BA		245	140 °F	110 °F		11∠ F 91 °F	<u>∠0.9</u> 2.2	0.50	1	8' - 0"	-    -
HWUH-3		KITCHEN	L107	1800	140 °F	110 °F		103 °F	36	5.50	1	10' - 0"	ŀ
	D	STORAGE	- L109 M G113	245	140 °F 140 °⊏	110 °F		91 °F 111 °⊏	2.8	0.50	1	8' - 0" 8' - 0"	
HWUH-6		STORAGE	G115	1800	140 F 140 °F	110 °F		103 °F	38	5.50	<u> </u>	8' - 0"	r F
HWUH-7	PF	REPARATI	ON L117	750	140 °F	110 °F		111 °F	14.8	2.50	1	8' - 0"	ŀ
HWUH-8				1800	140 °F	110 °F		103 °F 102 °⊑	36	5.50	1	10' - 0"	ŀ
HWUH-9	BAC	VESTIRI II	E L116	550	140 °F 140 °F	110 °F		96 °F	8	1 25	1	8' - 0"	F F
HWUH-11	DISHV	VASHING	 ROOM U104	1100	140 °F	110 °F		106 °F	22.1	5.50	1	8' - 0"	ŀ
HWUH-12	D	RY STOR	AGE 107	1400	140 °F	110 °F		106 °F	26.2	4.50	1	8' - 0"	ŀ
HWUH-13		STORAG	E 109	1400	140 °F	110 °F		113 °F	33.6	5.00	1	8' - 0"	<u>⊢</u>
		STORAG	E 201 E 202	750	140 °F 140 °⊏	110 °F		111 °F 112 °⊑	13.1 20 P	2.50	1	8' - 0" 8' - 0"	
HWUH-16		STORAG	E 203	1800	140 °F	110 °F		103 °F	36.2	5.50	1	8' - 0"	-  -
HWUH-17		STORAG	E 204	395	140 °F	110 °F		99 °F	6.3	1.00	1	8' - 0"	F
HWUH-18		MECH R	OOM	1400	140 °F	110 °F		113 °F	32	5.00	1	8' - 0"	F
- mana													

BOILER SCHEDULE - HOT WATER									२		
NOTES: 1. PERFC	RMANCE BASED C	ON OPERAT	ING CONDIT	IONS.							
		INPLIT	OUTPUT	MIN GAS PRESSURE		FWT	IWT				TURNDOWN
MARK	AREA SERVED	(MBH)	(MBH)	REQUIRED (IN)	EFFICIENCY	(°F)	(°F)	GPM	(FT)	FUEL TYPE	RATIO
B-1	KITCHEN	399	363	3	91	110	140	40	6.10	NATURAL GAS	8:1
B-2	KITCHEN	399	363	3	91	110	140	40	6.10	NATURAL GAS	8:1
B-3	KITCHEN	399	363	3	91	110	140	40	6.10	NATURAL GAS	8:1

HANICA TYPE BLADD	AL PIPING TA CAPA E ER 11	EXPANSIC NK ACC ACITY C AL) 0.0	ON TANK SC CEPTANCE APACITY (GAL) 10.0	F         HEDULE         RELIEF VALV         ELIEF AT (PSI)         FILL         125.00	E AT (PSI) DESIGN BASIS 2.00 B&G B-35LA		<b>SHAPPERATERY</b> A R C H I T E C T U R E + E N G I N E E R I N G 4125 Westown Pkwy, Suite 100   West Des Moines, IA 50266 515.223.8104   www.shive-hattery.com lowa   Illinois   Indiana
TA F PHASE 3 3	PHASE 1 J	DESIGN BAS UL WINGERT ( RPM 1800 1800	SIS GL50 ELECTRIC DESIGN B B&G E1510 1 B&G E1510 1	REMA CAL TO PROVIDE	RKS DUPLEX RECEPTACLE		CENTRALIZATION AGE STRATIVE SERVICES I A 50627
TION CAL CAL CAL CAL CAL CAL CAL CAL CAL	FAN MOT VOLTS 120 120 120 120 120 120 120 120 120	OR DATA PHASE 1 1 1 1 1 1 1 1 1 1 1 1 1	DESIGN E TRANE FF TRANE FF TRANE FF TRANE FF TRANE FF TRANE FF TRANE FF TRANE FF	BASIS BB080 BB080 BB030 BB060 BB060 BB060 BB030 BB080	REMARKS		ELDORA STS DE BUILDING PACK KITCHEN IOWA DEPARTMENT OF ADMINIS 3211 EDGINGTON AVE. ELDORA,
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