



**TETRA TECH**

240 Continental Drive, Suite 200  
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## **Addendum**

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Sussex Correctional Institution Programs Building HVAC & Electrical Upgrades  
OMB/DFM/DOC Contract No: MC380400068

Tt Project No. 200-26912-14006

Addendum No. 2  
to  
Drawings and Project Manual

May 4, 2015

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To: ALL BIDDERS

This ADDENDUM forms a part of the BIDDING AND CONTRACT DOCUMENTS and modifies the following documents:

Original DRAWINGS dated April 14, 2015,  
PROJECT MANUAL dated March 27, 2015, and  
Addendum No. 01 dated April 20, 2015.

Acknowledge receipt of the ADDENDUM in the space provided on the FORM OF PROPOSAL

This ADDENDUM consists of one (1) pages and the following:

### **CHANGES TO PROJECT MANUAL**

- 2.1 Spec Section 00 41 13; Bid Form; Page 4: Subcontractors List; **ADD** Duct Cleaners to the Subcontractor List.
  - A. **DELETE** "Original Page 4: Subcontractor List" and **REPLACE** with "Revised Page 4: Subcontractor List" as attached to this addendum.
- 2.2 Spec Section 23 31 13; Metal Ducts; Article 3.6; Duct Cleaning
  - A. Paragraph A: **ADD** the following Subparagraphs
    - 1. All Duct Cleaning and sanitizing shall be in accordance with the current NADCA Standards.
    - 2. Provide NADCA Certifications for the Duct Cleaner and Superintendent with the Bid Form.

### **CHANGES TO DRAWINGS**

- 2.3 Sheet M-102:
  - A. Attic Plan-Mechanical-New Work-Sheetmetal
    - 1. **PROVIDE** galvanized steel metal drain pans under the three (3) new Air Handling Units. Provide PVC drain with cap and Water Sensor in each drain pan. Water Sensor to alert DDC/ATC Central Front End of a condensate leak situation.

2. Ignore the Piping Leaders that are not attached to anything. It is just a layering issue from Sheet M-103.
3. AHU-3's; **REVERSE** the direction of the 20x6 45° take-off just above the Air Handling Unit. Refer to the corresponding removal work on Sheet MD-102 and MD-401 provided by this addendum.
4. Duct between AHU-3 and ERU-1; **REVERSE** the direction on the 10x10 Exhaust Duct to the New Exhaust Main to ERU-1. Refer to the corresponding removal work on Sheet MD-102 and MD-401 provided by this addendum.
5. New Exhaust Main to ERU-1 shall be 26x22.
6. Branch Exhaust Main heading up the drawing shall be 20x20.
7. Ignore the outline form existing AHU-3 below the new ERU. The CADD layer should have been turned off.
8. Add Roof Curb, Penetration and Flashing Details Sketches attached to this Addendum to this sheet.

B. Elevation View of Energy Recovery Unit

1. Exhaust Main into ERU shall be 22x26.
2. Supply Air from ERU shall be 18x30.
3. Outside Air to ERU shall be 18x30.
4. Exhaust Air from ERU shall be 18x30.
5. Provide Balancing Dampers on the four (4) ducts to and from the ERU.
6. Provide a Backdraft Damper in the existing 52x30 Outside Air Duct between the Outside Air Louver and supply connection from the ERU.
7. **ADD** the following note: "For Roof Curb, Penetration, Flashing and Curb Details, refer to the Sketches attached to this addendum."

2.4 Sheet MD-102

A. Attic Plan-Mechanical Removal Work- Sheet Metal & Piping:

1. Exhaust duct near AHU-3; **REMOVE** the 45° take-off from the 20x6 Exhaust duct that connects the 20x10 Exhaust Branch Main in order to reverse the flow. **ADD** a Removal Work Note No. 8 Symbol to that area. Refer to the corresponding New Work on Sheet M-102 added by this Addendum.
2. Exhaust duct near AHU-3; **REMOVE** the 45° take-off from the 8x8 Exhaust Duct that connects to the 20x10 Exhaust Branch Main in order to reverse the flow. **ADD** a Removal Work Note No. 8 Symbol to that area. Refer to the corresponding New Work on Sheet MD-102 added by this Addendum.

2.5 Sheet MD-401

A. Partial Attic Plan-Mechanical Removal Work:

1. Exhaust duct near AHU-3; **REMOVE** the 45° take off from the 8x8 Exhaust Duct that connects to the 20x6 Exhaust duct that connects the 20x10 Exhaust Main in order to reverse the flow. **ADD** a Removal Note No. 8 Symbol to that area. Refer to the corresponding New Work on Sheet M-102 added by this Addendum.

2. Exhaust duct near AHU-3; **REMOVE** the 45° take off from the 8x8 Exhaust Duct that connects to the 20x40 Exhaust Branch Main in order to reverse the flow. **ADD** a Removal Note No. 8 Symbol to that area. Refer to the corresponding New Work on Sheet MD-102 added by this Addendum.

2.6 Sheet M-103

A. Attic Plan- Mechanical New Work-Piping:

1. AHU-2; **ADD** 1-1/4" Condensate Line with trap and connect to a Little Giant Condensate Pump CP-2. Run 1-1/4" Condensate Discharge up to approximately 12 feet AFE Run 1 1/4" Condensate approximately 20 feet East and connect to the new 1 1/2" Condensate Header. Refer to this Addendum for Electrical and Pump Requirements.
2. AHU-3; **ADD** 1-1/4" Condensate Line with trap and connect to a Little Giant Condensate Pump CP-3. Run 1-1/4" Condensate Discharge up to approximately 12 feet AFF Run 1-1/4" Condensate approximately 30 feet North and connect to the new 1-1/2" Condensate Header. Refer to this Addendum for Electrical and Pump Requirements.
3. AHU-1; **ADD** 1-1/4" Condensate Line with trap and connect to a Little Giant Condensate Pump CP-1. Run 1-1/4" Condensate Discharge up to approximately 12 feet AFF Run 1-1/4" Condensate approximately 5 feet North and connect to the new 1-1/2" Condensate Header. Refer to this Addendum for Electrical and Pump Requirements.
4. Provide a New 1-1/2" Condensate Header approximately 12 feet AFF starting at AHU-1 and running approximately 50 feet North, penetration the North Wall of the Attic and connecting to an existing Rainwater Downspout. Sleeve and seal wall penetration in accordance with the Specifications.
5. **ADD** the following Schedule to the Sheet:

**Condensate Pump Schedule**

**MFR: Little Giant Pump, Co.**

Unit		Systems		TDH	Motor	
Ref. No.	Model No.	Served	GPM	(ft of Hd)	HP	Electrical
CP-1	VCL-14 ULS	AHU-1	1.0	13.0	1/50	115-1-60
CP-2	VCM-20-ULST	AHU-2	0.5	13.0	1/30	115-1-60
CP-3	VCM-20-ULST	AHU-3	0.5	13.0	1/30	115-1-60

**Remarks:** Provide automatic condensate pump with automatic start-stop and safety switch.

2.7 Sheet M-501: Schedule of Details

A. Pump Schedule

1. HWP-1
  - a. **ADD** 105.0 GPM to the GPM Column
  - b. **ADD** the following phrase to the remarks column:  
"Provide Inverter Duty Motor: VFD's to be furnished by the BAS Contractor to the Electrician for Installation".
2. HWP-2
  - a. **ADD** 105.0 GPM to the GPM column
  - b. **ADD** the following phrases to the remarks column.
    1. "To be balanced to New Flows indicated."
    2. "Provide Inverter Duty Motor."
    3. "VFD to be furnished by the BAS Contractor to the Electrician for installation."

3. CHWP-1

- a. **ADD** the following phrase to the remarks column: "... to the Electrician for installation."

4. CHWP-2

- a. **ADD** the following phrase to the remarks column: "... to the Electrician for installation."

2.8 Sheet E-401:

A. Attic Plan- New Work

1. AHU's-1, 2 and 3

- a. **CHANGE** the symbol from a New Combination Starter Disconnect (Dark) to a VFD being furnished by the BAS Contractor to the Electrician for installation (light).
2. AHU-1: **REPLACE** specified 60A, 3P-240V CB (circuit breaker) with matching new 40A, 3P, 240V CB in circuit #EP1-2-4-6. **REVISE** branch circuit to (3) #8 & (1) #10G, 1"C via, Local 60a, 3p, 240v non-fused disconnect switch. Refer to drawing #E-602.
3. **PROVIDE** a branch circuit from spare circuit #30 of panel "EP1" with (3) #12 & (1) #12G, 3/4"C to lighting and receptacle load for all the three (3) Air Handling Units (AHU1, AHU2 & AHU3). Refer to drawings #E-402 & E-602.
4. AHU-2: **REPLACE** specified 25A, 3P-240V CB (circuit breaker) with matching new 30A, 3P, 240V CB in circuit # EP 1-1-3-5. **REVISE** branch circuit to (3) #10 & (1) #10G, 3/4"C via, Local 30a, 3p, 240v non-fused disconnect switch. Refer to drawing #E-602.
5. AHU-2: See item 3 above.
6. AHU-3: **REPLACE** specified 25A, 3P CB, 240V CB (circuit breaker) with matching new 30A, 3P, 240V CB in circuit # EP 1-8-10-12. **REVISE** branch circuit to (3) #10, & (1) #10G, 3/4"C via, Local 30A, 3P, 240V non-fused disconnect switch. Refer to contract drawing #E-602.
7. AHU-3: See item 3 above.
8. ERU-1: **REPLACE** Branch Circuit Breaker 35A, 240V, 3P with 40A, 240V, 3P to Circuit 8-10-12 of Panel "EP2" (located in 2<sup>nd</sup> floor Mechanical Room). **REVISE** branch Circuit to (3) #8, & (1) #10g, 1"C. **PROVIDE** 60A, 240V, 3P Non-Fused Disconnect Switch to be mounted on wall in a suitable place near Power Conduit Entry Point. Provide Control wiring as required.
9. New condensate pumps CP-1, CP-2 & CP-3 for AHU-1, AHU-2 & AHU-3 respectively:

**PROVIDE** a branch circuit from spare circuit#32 of panel "EP1" with (3) #12, & (1) #12G, 3/4"C to three (3) 20A, 125V, 2P, ground receptacle outlets for condensate pumps. CP-1, CP-2 & CP-3 (for AHU-1, AHU-2 & AHU-3 respectively). Receptacle outlets shall be mounted on unistrut supports as required and to be located near the respective condensate pump. Update panelboard schedule of "EP1" shown on drawing #E-602. Reference drawing #E-401 & E-602.

B. 1<sup>st</sup> Floor Plan- New Work

1. **ADD** the following note:

"For the distance between the Chiller and the Electrical Room, refer to either the Site Plan, SP-101, the Site Plan SP-401 or the Mechanical 1<sup>st</sup> Floor Plan on Sheet M-101."

- 2.9 Sheet E-402:  
A. Partial Site Plan- New Work

1. **ADD** the following note:

“For the distance between the Chiller and the Electrical Room, refer to either the Site Plan SP-101, the Site Plan SP-401 or the Mechanical 1<sup>st</sup> Floor Plan on Sheet M-101.”

**CLARIFICATIONS FROM THURSDAY, APRIL 30, 2015 WALK THRU AND SITE VISIT.**

- 2.10 Questions regarding digging and boring around and under the fence line.  
A. 1 inch thick Steel plates may be used in lieu of backfilling the excavations on both sides of the fence for the installation of underground piping and conduit. Steel plate must overlap the undisturbed earth by 4 feet on three (3) sides assuming the fourth side is against the fence itself, otherwise it must overlap on all four (4) sides.
- 2.11 Lifting of items over the fence line is still prohibited (not allowed).
- 2.12 Electrical Power from the Chiller to the Electrical Room can be ran in the ground outside the building. Contractor shall be responsible to hire a 3<sup>rd</sup> Party Site Utility Locator and be responsible to repair any damages. Under this approach Work has to be directionally bored.
- 2.13 Swing space will be available during construction. Work will be performed in one (1) dormitory at a time. Occupants will not be returning to their beds after each work day.

**CLARIFICATIONS/REQUESTS FOR INFORMATION**

- 2.14 Schlosser & Associates, Inc. e-mail dated 4/29/15  
A. Drawing M-001, New Work Note # 7, states to clean and sanitize all remaining existing duct.  
1. There is no specification section for duct cleaning to outline the extent of or standards to be followed for this process.  
**Response:** Duct Cleaning Specifications are already are noted in Spec Section 23 31 13; Metal Ducts, Article 3.6; Duct Cleaning.  
2. Are there any (duct cleaning) certifications required of the provider of this service? (NADCA, etc.)  
**Response:** Yes, Duct Cleaning must follow NADCA Standards. Duct Cleaners and Superintendents must be NADCA certified. Provide Certifications with the Bid Form.  
3. What exactly are the standards of sanitation you are looking for, and/or what procedures are to be followed for the duct cleaning?  
**Response:** NADCA Standards are to be followed. As of now there is no 3<sup>rd</sup> Party Certification or testing.  
4. Can we add “Duct Cleaning” to the Subcontractor Listing to ensure that the above standards/procedures are followed, and that the vender qualifications for this work are met?  
**Response:** Yes, Refer to corresponding items identified in this addendum.
- B. Drawing E-401, notes that combination motor starters are required to be provided by the E.C. for AHU-1, 2, 3, and ERV-1. On Drwg. M-501, schedules show that VFD’s are to be provided by the ATC contractor for this same (above) equipment.

1. If VFD's are to be provided by the ATC contractor, then would the combo motor starters still be required?

**Response:** VFD's for the three (3) new Air Handling Units and four (4) Circulating Pumps shall be furnished by the BAS Contractor to the Electrician for installation. Refer to further revisions or updates and/or clarifications under this addendum.

**END OF ADDENDUM 02**

Attachments:

Bid Form Page 4  
Sketch C-M-SK-1  
Sketch C-M-SK-2  
Johnson Controls Pre-Purchase Equipment Proposal dated April 17, 2015  
Shop Drawing 23 64 23 Air-Cooled Scroll Chiller  
Shop Drawing 23 72 00 Energy Recovery Units  
Shop Drawing 23 73 13 Air Handling Units

SUSSEX CORRECTIONAL INSTITUTION  
BOOT CAMP TO PROGRAMS BUILDING CONVERSION

26912-14006  
MC3804000068

BOOT CAMP TO PROGRAMS BUILDING CONVERSION  
SUSSEX CORRECTIONAL INSTITUTION  
DELAWARE DEPARTMENT OF CORRECTION  
GEORGETOWN, DELAWARE  
OMB/DEM/DOC Contract No.: MC3804000068

**BID FORM**

**SUBCONTRACTOR LIST**

In accordance with Title 29, Chapter 6962 (d)(10)b Delaware Code, the following sub-contractor listing must accompany the bid submittal. The name and address of the sub-contractor **must be listed for each category** where the bidder intends to use a sub-contractor to perform that category of work. In order to provide full disclosure and acceptance of the bid by the *Owner*, it is **required** that bidders list themselves as being the sub-contractor for all categories where he/she is qualified and intends to perform such work.

<u>Subcontractor Category</u>	<u>Subcontractor</u>	<u>Address (City &amp; State)</u>	<u>Subcontractors tax payer ID # or Delaware Business license #</u>
1. HVAC/Mechanical	_____	_____	_____
2. Electric	_____	_____	_____
3. Insulation	_____	_____	_____
4. Testing, Balancing & Adjusting	_____	_____	_____
5. DDC/ATC Controls	_____	_____	_____
6. Duct Cleaning	_____	_____	_____

**DRAWINGS REDACTED**





Date: April 17, 2015  
To: Tetra Tech  
Attention: Scott Parlow  
Subject: Sussex Correctional Institution  
Boot Camp Programs Building Conversion  
Addendum: 1

We offer to furnish the following equipment and services at prices stated and according to the equipment manufacturer's standard terms and conditions. All warranties are provided by the equipment manufacturer unless otherwise noted. All warranties are parts only for a period of 12 months unless otherwise noted.

#### SCOPE SUMMARY

Item	Qty	Tag	Manufacturer	Description
A	1	CH-1	JOHNSON CONTROLS	Air Cooled Scroll Chiller
B	3	AHU-1, 2, 3	JOHNSON CONTROLS	Air Handling Units
C	1	ERU-1	JOHNSON CONTROLS	Energy Recovery Unit

BASE BID \$82,000.00  
BASE RAILS \$ 1,510.00  

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Accepted Bid \$83,510.00

Project: Sussex Correctional Institution Boot Camp Programs Building Conversion  
Date: 04/17/15

c/o Building Systems & Services  
1504 Kirkwood Highway – Wilmington, DE 19805  
Telephone: 302-996-0900 Fax: 302-996-0999  
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## **SCOPE DETAIL**

### **Item A**

**Furnish one (1) JOHNSON CONTROLS Air Cooled Scroll Chiller**

**Tag: CH-1**

**Options/Accessories:**

- Single point power connection with:
  - 208/3/60
  - Non-fused disconnect switch
  - Non-powered GFI service outlet
- Microprocessor control panel with keypad and display
- Control transformer
- BACnet interface to building automation system
- 95% power factor capacitors
- R-410A refrigerant
- Brazed stainless steel plate and frame evaporator heat exchanger
- 3/4" closed cell foam evaporator insulation
- Scroll compressors
- Compressor isolation valves
- Two independent refrigerant circuits
- 6 staged capacity control
- Hot gas bypass
- Air cooled condenser with:
  - "Micro-channel" coil
  - Corrosion protection coating
  - Hail guards
  - Direct drive condenser fans/motors
  - 0°F low ambient control
- Sound attenuation package with:
  - Ultra-quiet condenser fans
  - Compressor sound blanket
- Wire compressor enclosure and louvered condenser enclosure
- Chilled water flow switch

**Project: Sussex Correctional Institution Boot Camp Programs Building Conversion**

**Date: 04/17/15**

c/o Building Systems & Services  
1504 Kirkwood Highway – Wilmington, DE 19805  
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- External 1" housed spring vibration isolation mounts
- Manufacturer's five (5) year compressor parts warranty
- Manufacturer's first year full unit parts and labor warranty
- Startup service

Items not included:

- Any ATC other than items specifically listed above
- Any external vibration isolation other than items specifically listed above

#### **Item B**

**Furnish three (3) JOHNSON CONTROLS Air Handling Units**

**Tag: AHU-1, 2, 3**

Options/Accessories:

- Max 1% air leakage at +/- 8" total static pressure
- Max L/240 panel deflection at +/- 8" total static pressure
- Double wall construction with:
  - G90 galvanized steel exterior and interior
- 2" foam panel, R-13 insulation
- Hinged, double wall access doors
- Fan section service lighting with:
  - Single on/off switch
  - Vapor proof fixtures
  - Incandescent lights
- Single point power connection with:
  - 208/3/60
  - Non-fused disconnect switch
- Combination mixing box and filter section with:
  - Outside/Return air dampers
  - MERV 8 filters
  - Magnehelic filter gauge
  - Side loaded
  - Hinged access door(s)
- Coil section with:
  - IAQ stainless steel drain pan with mastic coating

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- Preheat hot water coil
- Coil spacer
- Chilled water coil
- Hinged access door(s)
- Supply fan section with:
  - DWDI centrifugal fan
  - 2" deflection internal spring vibration isolation
  - Adjustable belt drive (AHU-2, 3)
  - Fixed belt drive (AHU-1)
  - Extended lube lines
  - Premium efficiency TEFC motor
  - Inverter duty rated motor
  - Hinged access door(s)
- Factory packaged controls including:
  - Outside/return air damper actuator
- Unit shipped in sections for field assembly by mechanical contractor
- Manufacturer's first year full unit parts and labor warranty
- Startup service

Items not included:

- Any ATC other than items specifically listed above
- Any external vibration isolation other than items specifically listed above

**Item C**

**Furnish one (1) JOHNSON CONTROLS Energy Recovery Unit**

**Tag: ERU-1**

Options/Accessories:

- Indoor application
- Single point power connection with:
  - 208/3/60
- 24V control transformer
- Galvanized steel casing with manufacturer's standard finish
- Access doors
- Total enthalpy energy recovery wheel

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- Manufacturer's standard start-stop-jog control for defrost and economizer sequence of operation
- MERV 5 air filters
- DWDI centrifugal supply fan
  - Adjustable belt drive
  - Premium efficiency motor
- DWDI centrifugal exhaust fan
  - Adjustable belt drive
  - Premium efficiency motor
- Unit ships in one piece (60.00" L x 52.69" W x 57.37" H) to fit through double doors or outside air louver
  - Unit capacity slightly less than specified to use this cabinet size option
- Manufacturer's five (5) year wheel parts warranty
- Manufacturer's first year full unit parts warranty

Items not included:

- Any ATC other than items specifically listed above
- Any external vibration isolation other than items specifically listed above
- Disconnect switch
- Startup service
- Labor warranty

Project: Sussex Correctional Institution Boot Camp Programs Building Conversion  
Date: 04/17/15

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## SPECIFICATION COMPLIANCE STATEMENTS

### Specification Section 236423 Scroll Air Cooled Water Chillers

#### JOHNSON CONTROLS Clarifications and Exceptions

Spec Section	Spec language	Clarification or Exception
2.1/K/11/b	Powered GFI Duplex Receptacle	Non-powered GFI duplex receptacle provided.
2.1/H/5/b	Capacity Control	6 staged capacity control exceeds specified 4 staged capacity control. Optional deduct for hot gas bypass provided.
1.4/A	Warranty	Manufacturer's first year full unit parts and labor warranty provided in addition to specified five (5) year compressor parts warranty.

### Specification Section 237313 Modular Indoor Central Station Air Handling Units

#### JOHNSON CONTROLS Clarifications and Exceptions

Spec Section	Spec language	Clarification or Exception
2.2/A/5	Factory Finish	Manufacturer's standard galvanized steel finish provided.
2.2/C/3/c	Access Door Width	Minimum access door width is 18".
2.2/D/3	Drain Pan Construction	IAQ stainless steel drain pan with mastic coating provided.
2.5/A/2 2.5/B/4	Filtration Requirements	2" pleated, MERV 8 filters provided.
	Warranty	Manufacturer's first year full unit parts and labor warranty provided.

Project: Sussex Correctional Institution Boot Camp Programs Building Conversion

Date: 04/17/15

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**Specification Section 237200 Air-to-Air Energy Recovery Equipment  
JOHNSON CONTROLS Clarifications and Exceptions**

<b>Spec Section</b>	<b>Spec language</b>	<b>Clarification or Exception</b>
1.4/A	Warranty	Manufacturer's five (5) year wheel parts warranty provided.
2.1/F	Variable Frequency Controller	Manufacturer's standard start-stop-jog control for defrost and economizer sequence of operation provided.
	Shipping Splits (Addendum 1)	Unit ships in one piece to fit through double doors or existing outside air louver. Unit capacity slightly less than specified to use this cabinet size option.

**Specification Section 237200 Air-to-Air Energy Recovery Equipment  
(Optional) GREENHECK Clarifications and Exceptions**

<b>Spec Section</b>	<b>Spec language</b>	<b>Clarification or Exception</b>
1.4/A	Warranty	Manufacturer's five (5) year wheel parts warranty provided.
	Shipping Splits (Addendum 1)	Unit shipped in sections for field assembly by mechanical contractor.

**WARRANTY**

**Air Cooled Scroll Chiller (CH-1)**

- Manufacturer's five (5) year compressor parts warranty
- Manufacturer's first year full unit parts and labor warranty

**Air Handling Units (AHU-1, 2, 3)**

- Manufacturer's first year full unit parts and labor warranty

**Energy Recovery Unit (ERU-1)**

- Manufacturer's five (5) year wheel parts warranty
- Manufacturer's first year full unit parts warranty

Project: Sussex Correctional Institution Boot Camp Programs Building Conversion  
Date: 04/17/15

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### **LEAD TIME**

Lead time for approval shop drawings is 1 day after notification of award of order.

Air Cooled Scroll Chiller (CH-1)

- Unit will ship from the factory in 6 weeks after date of release for fabrication.

Air Handling Units (AHU-1, 2, 3)

- Units will ship from the factory in 6 weeks after date of release for fabrication.

Energy Recovery Unit (ERU-1)

- Unit will ship from the factory in 7 weeks after date of release for fabrication.

### **PRICE**

The total price for the above equipment and services is **\$ 82,000** net 30 days, FOB factory, freight prepaid and allowed, less any applicable taxes.

Optional Price Add for GREENHECK in lieu of JOHNSON CONTROLS Energy Recovery Unit (Tag: ERU-1) is **\$ 15,000**.

Optional Price Deduct for Chiller Power Factor Capacitors is **\$ 2,900**.

Optional Price Deduct for Chiller Hot Gas Bypass is **\$ 400**.

### **SUMMARY**

Thank you for this opportunity to offer the above equipment and services. Please call me if there are any questions with this proposal.

Sincerely,

Courtney H. Bauer  
Sale Engineer

Project: Sussex Correctional Institution Boot Camp Programs Building Conversion  
Date: 04/17/15

c/o Building Systems & Services  
1504 Kirkwood Highway – Wilmington, DE 19805  
Telephone: 302-996-0900 Fax: 302-996-0999  
Page 8 of 8



CONTRACTOR: Building Systems & Services

SUBMITTAL DATE 04 / 29 / 15

1504 Kirkwood Highway, Wilmington, DE 19805

Check following as applicable:

- ☐ First Submission  
☐ Re-submission

ARCHITECT: Tetra Tech Architects & Engineers

**PROJECT IDENTIFICATION**

Architect's  
Project No.: 200-26912-14006

Proj. Name: Programs Bldg Conversion

Location: Sussex Correctional Institution

**PRODUCT IDENTIFICATION**

Specification Section No. 23 64 23

A/E Submittal No. \_\_\_\_\_

Name of Product: Air-Cooled Scroll Chiller

Name of Manufacturer: Johnson Controls - York

**SUBCONTRACTOR**

**SUPPLIER**

**RELATIONSHIP TO STRUCTURE**

Building  
Name \_\_\_\_\_

(Room #)

(Room Name)

Contract Drawing No.: \_\_\_\_\_

RESERVED FOR USE BY TETRA TECH

**ACTION SUBMITTAL:**

- ☐ Approved
- ☒ Approved As Noted **Provide Additional Requested Information**
- ☐ Approved, Revise and Return Corrected Copies
- ☐ Rejected
- ☐ Incomplete, Submit Additional Information

**INFORMATIONAL SUBMITTAL:**

- ☐ No Action Taken
- ☐ Returned for Resubmittal

Reviewed By: Scott D. Parlow, PE

Date: April; 29, 2015

Reviewed only for the limited purpose of checking for conformance with information given and the design concept expressed in the Contract Documents. Review not conducted for the purpose of determining the accuracy and completeness of other details such as dimensions and quantities, or for substantiating instructions for installation or performance of equipment or systems, all of which remain the responsibility of the Contractor as required by the Contract Documents. Review shall not constitute approval of safety precautions or of any construction means, methods, techniques, sequences or procedures.

**DEVIATION FROM CONTRACT DOCUMENTS:** \_\_\_\_\_

**CONTRACTOR COMMENTS:** \_\_\_\_\_

**Engineer's**

**ARCHITECT'S COMMENTS:**

1. Provide BACnet Open Protocol BAS Communication Capability.
2. Provide BACnet Points List of available readable & writeable points.
3. Provide Fan Guards, Steel Safety guards with Corrosion Resistant Coating.
4. Provide 2nd Year Parts & Labor Warranty Quote to all the Bidding Contractors per State of Delaware requirements.

**CONTRACTOR'S STAMP**

**CONTRACTOR'S CERTIFICATION**

I CERTIFY THAT THIS SUBMITTAL HAS BEEN REVIEWED AND APPROVED BY THE CONTRACTOR IN ACCORDANCE WITH THE GENERAL CONDITIONS.

BY \_\_\_\_\_



## **TRANSMITTAL LETTER**

DATE: April 24, 2015

TO: Tetra Tech Inc.

ATTENTION: Scott Parlow

SUBJECT: Sussex Correctional Institution  
HVAC & Electrical Systems Upgrades  
Boot Camp to Programs Building Conversion

**WE ARE SENDING YOU HERewith ONE (1) ELECTRONIC SET OF SHOP DRAWINGS FOR:**

- \* Approval.
- \* Return 1 approved copy as requested.
- \* Fabrication held up until approval received.

### **DESCRIPTION**

**One (1) JOHNSON CONTROLS Air Cooled Scroll Chiller**  
**Tag: CH-1**

### **BUILDING SYSTEMS & SERVICES**

BY: \_\_\_\_\_

Courtney H. Bauer

c/o Building Systems & Services  
1504 Kirkwood Highway – Wilmington, DE 19805  
Telephone: 302-996-0900 Fax: 302-996-0999



ORIGINAL DATE: April 24, 2015

## **PROJECT**

Sussex Correctional Institution  
Boot Camp to Programs Building Conversion  
Georgetown, DE

## **ENGINEER**

Tetra Tech Inc.  
Newark, DE

## **SUBMITTAL**

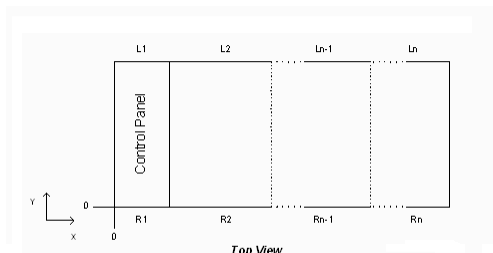
**One (1) JOHNSON CONTROLS Air Cooled Scroll Chiller**  
**Tag: CH-1**

**NOTE: This equipment operates with refrigerant/oil which during normal operation/service can do damage to an unprotected rubber roof, if applicable. Responsibility for any rubber roof protection is by others.**

c/o Building Systems & Services  
1504 Kirkwood Highway – Wilmington, DE 19805  
Telephone: 302-996-0900 Fax: 302-996-0999

**DRAWING REDACTED**

Project Name	Unit Tag	Date	Chiller Type
SCI Boot Camp	CH-1	2015-02-16	Air Cooled Scroll Chillers
PIN			Version
YLAA0080SE17XFBSDTCAXXBLXCXX45SX1XXXHXXXYAXXPXX3BXXLX1JXXXXX			E.15.0.1-D.28.0120



LOCATION	X Distance (in)	Y Distance (in)	JCI PART NUMBER	SAP NUMBER	COLOUR	Operating Weights (lb)
R1	19.5	1.4	029-25334-004	433670	CP-1D-1200	931
R2	96.1	1.4	029-25334-004	433670	CP-1D-1200	861
L1	19.5	86.9	029-25334-006	433872	CP-1D-1785N	1400
L2	96.1	86.9	029-25334-006	433872	CP-1D-1785N	1294

Total Weight (lb)		Centre of Gravity (in)	
Operating	4486	Xg	56.3
Shipping	4393	Yg	52.7

All values are de-rated by 15% apart from those which have part number. (029-25334-013 and 029-25336-014: 0% de-rated), (029-25335-004: 10% de-rated), (029-25335-001 and 029-25335-003: 25% de-rated)



## Design Conditions Datasheet

Unit Tag	Qty	Model No	Net Cooling Capacity (TR)	Nominal Voltage	Refrigerant Type
CH-1	1	YLAA0080SE17XFBSBTC	79	208-3-60	R410A

PIN:								
YLAA0080SE	17XFBSBTC	XXBLXCCX45	SX1XXHXHXX	YAXXPX3BX	XLX1JXXXXX			
....5...10	....5...20	....5...30	....5...40	....5...50	....5...60	....5...70	....5...80	....5...90

Evaporator Data			Evaporator Data (Cont.)		Performance Data	
EWT (°F)	55.3		Fluid Volume (USGAL)	6.7	EER (EER)	10.2
LWT (°F)	45		Min. Flow Rate (USGPM)	100	NPLV (EER)	15.8
Design Flow Rate (USGPM)	183		Max. Flow Rate (USGPM)	355		
Evap. Press. Drop (ft H <sub>2</sub> O)	8.9				Physical Data	
Strainer Press. Drop (ft H <sub>2</sub> O)	0		Condenser Data		Rigging Wt. (lb)	4393
Ext. Kit Press. Drop (ft H <sub>2</sub> O)	0		Ambient Temp. Design (°F)	95	Operating Wt. (lb)	4486
Total Press. Drop (ft H <sub>2</sub> O)	8.9		Altitude (ft)	0	Refrigerant Charge (lb)	106
Fluid	Water		User Min. Operating Air Temp. (°F)	0		
Fouling Factor (h.ft <sup>2</sup> .F/Btu)	0.0001		User Max. Operating Air Temp. (°F)	125		

Electrical Data				
Circuit	1	2	3	4
Compressor RLA	58 / 58 / 58	48 / 48 / 48		
Fan QTY/FLA (each)	2 / 7.6	2 / 7.6		
High LRA Current	284 / 284 / 284	249 / 249 / 249		

Single Point				
Min. Circuit Ampacity	373			
Recommended Fuse/CB Rating	400			
Max. Inverse Time CB Rating	400			
Max. Dual Element Fuse Size (A)	400			
Unit Short Circuit Withstand (STD)	5 [kA]			
Wire Lugs Per Phase	3 + 2		Operating Condition Electrical Data	
Wire Range (Lug Size)	#2/0 AWG - 400 kcmil + 250 - 500 kcmil		Compressor kW	86.7
Starter Type	Across The Line		Total Fan kW	3
			Total kW	93.4

### Notes:

Certified in accordance with the AHRI Air-Cooled Water Chilling Packages Using Vapor Compression Cycle Certification Program, which is based on AHRI Standard 550/590 (I-P) and AHRI Standard 551/591 (SI). Certified units may be found in the AHRI Directory at [www.ahrirectory.org](http://www.ahrirectory.org) Auxiliary components included in total kW - Oil heaters, Chiller controls. Auxiliary power is already included in the compressor and fan power



Part Load Rating Data				
Stage	Ambient (°F)	Capacity (TR)	Total kW	Unit Efficiency
1	95	79	93.4	10.2
2	88.6	70.6	75.2	11.3
3	80.7	60.1	53.2	13.6
4	71.5	48	37.5	15.4
5	59.7	32.5	21.4	18.3
6	55	17.3	10.8	19.1

Sound Power Levels (In Accordance with AHRI 370) measured at 3.3ft										
Stage	Ambient (°F)	63	125	250	500	1K	2K	4K	8K	LWA
1	95	92	91	87	87	83	79	76	73	89
2	88.6	92	91	87	87	83	79	76	73	89
3	80.7	92	91	87	87	83	79	76	73	89
4	71.5	91	90	86	86	82	78	75	72	87
5	59.7	89	88	84	84	80	76	73	70	86
6	55	86	85	81	81	77	73	70	67	83

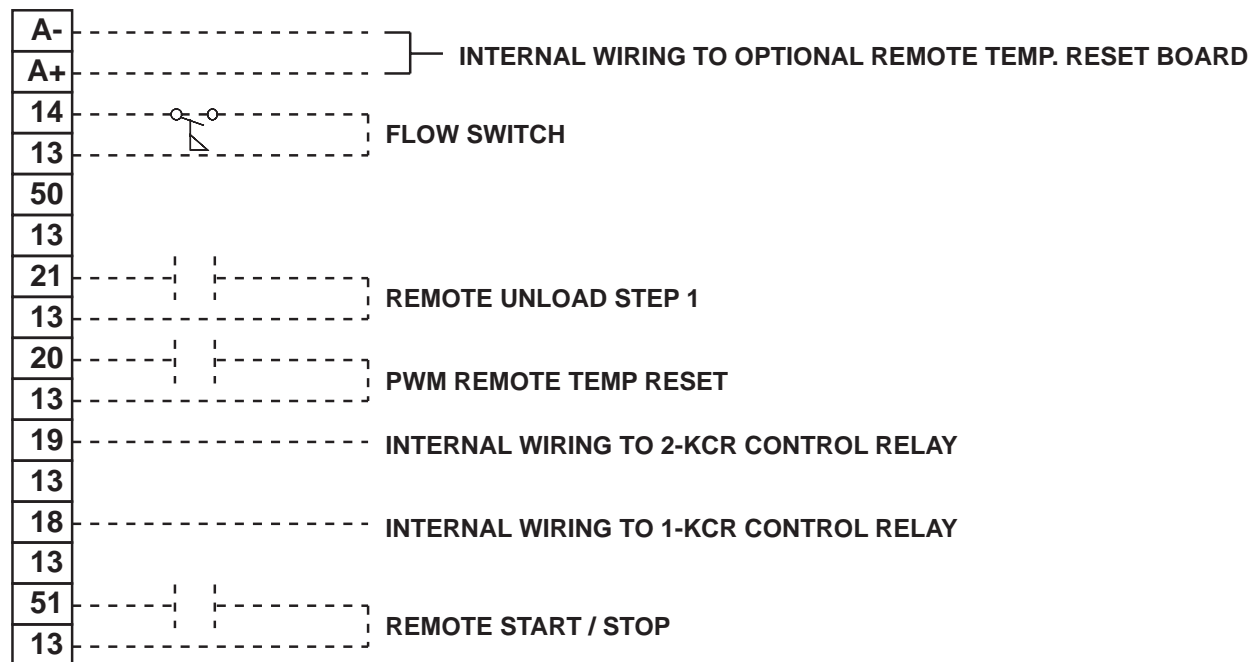
Note: Unit is equipped with Acoustic Sound Blanket and Ultra Quiet Fans.

**DRAWINGS REDACTED**



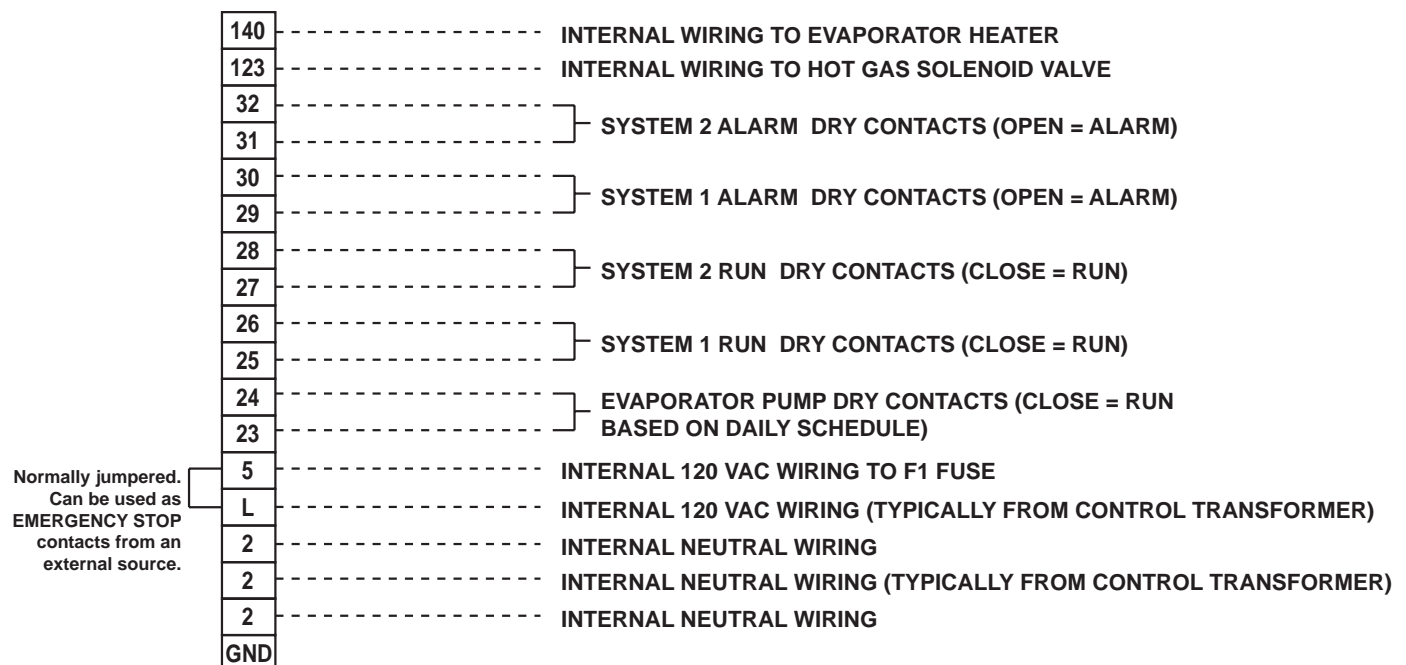
# User Control Wiring

## USER CONTROL WIRING INPUTS



XTBC1

## USER CONTROL WIRING OUTPUTS



XTBC2

# Notes

Designation	DESCRIPTION
ACC	ACCESSORY
- ADIS	DISPLAY BOARD
- AMB	MICRO BOARD

- BAMB	AMBIENT
- BDP	DISCHARGE PRESSURE
- BECT	ENTERING CHILLED TEMPERATURE
- BLCT	LEAVING CHILLED TEMPERATURE
	NOT FITTED ON REMOTE EVAP UNITS

- BMP	MOTOR PROTECTOR COMPRESSOR
- BSP	SUCTION PRESSURE

- CPF	CAPACITOR POWER FACTOR
-------	------------------------

- ECH	CRANKCASE HEATER
- EEH	EVAPORATOR HEATER
- EPH	PUMP HEATER
- EXT	EXTERNAL TO CONTROL PANEL

- F	FUSE
- FHP	HIGH PRESSURE CUTOUT
- FSI	FAN SPEED INHIBIT TWO SPEED FAN OPTION ONLY

GND	GROUND
G/Y	GREEN / YELLOW

J	PLUG BOARD CONNECTOR
---	----------------------

- K	CIRCUIT BOARD RELAY
- KF	FAN CONTACTOR LINE
- KFH	FAN CONTACTOR HIGH SPEED (INCLUDING COIL SUPPRESSOR)
- KFL	FAN CONTACTOR LOW SPEED (INCLUDING COIL SUPPRESSOR)
- KFOL	FAN OVERLOAD
- KFS	RELAY FAN SPEED
- KM	COMPRESSOR CONTACTOR (INCLUDING COIL SUPPRESSOR)
- KCR	CONTROL RELAY
- KP	PUMP CONTACTOR PART (INCLUDING COIL SUPPRESSOR)

- M	COMPRESSOR MOTOR
- MF	MOTOR FAN
- MP	MOTOR PUMP

NU	NOT USED
----	----------

PE	PROTECTIVE EARTH
PWM	PULSE WIDTH MODULATION TEMP RESET or REMOTE UNLOAD 2nd STEP

Designation	DESCRIPTION
- QCB	CIRCUIT BREAKER
- QMMSC	MANUAL MOTOR STARTER COMPRESSOR
- QMMSP	MANUAL MOTOR STARTER PUMP
- QSD	SWITCH DISCONNECT

R	RESISTOR
RED	RED
RP	RUN PERMISSIVE
RU	REMOTE UNLOAD 1st STEP

SCR	SCREEN
- SF	FLOW SWITCH
- SKP	KEYPAD
- SOA	SWITCH OFF AUTO

- T	TRANSFORMER
- TC	TRANSFORMER CURRENT

- UBR	BRIDGE RECTIFIER
-------	------------------

WHT	WHITE
-----	-------

- XTBC	TERMINAL BLOCK CUSTOMER
- XTBF	TERMINAL BLOCK FACTORY


- YHGSV	HOT GAS SOLENOID VALVE (INCLUDING COIL SUPPRESSOR)
- YLLSV	LIQUID LINE SOLENOID VALVE (INCLUDING COIL SUPPRESSOR)
	FIELD MOUNTED AND WIRED ON REMOTE EVAP UNITS

- ZCPR	COMPRESSOR
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	NOTE WELL {SEE NOTE}
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	WIRING AND ITEMS SHOWN THUS ARE STANDARD YORK ACCESSORIES
---	--

	WIRING AND ITEMS SHOWN THUS ARE NOT SUPPLIED BY YORK
---	---

	ITEMS THUS ENCLOSED FORM A COMPONENTS OR SETS OF COMPONENTS
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## Notes (Cont'd)

- A. This drawing is based on IEC symbols.
  - B. Field wiring to be in accordance with the relevant electrical code as well as all other applicable codes and specifications
  - C. All sources of supply shown on this diagram to be taken from one main isolator, not shown or supplied by the chiller manufacturer .
  - D. Green and yellow wire is used for earth, multi-coloured cable used for low voltage. Red wire used for AC control, blue wire for neutral, black wire for AC and DC power. Orange wire should be used for interlock control wiring supplied by external source.
  - E. Legend designation depicts component abbreviations. Number prefix located, if applicable, on schematic circuit, refers to system thereon, e.g.= 1-FHP2 refers to high pressure cutout no 2 on system no 1.
  - F. All wiring to control section voltage free contacts requires a supply provided by the customer maximum voltage 240 volts. The customer must take particular care when deriving the supplies for the voltage free terminals with regard to a common point of isolation. Thus, these circuits when used must be fed via the common point of isolation the voltage to these circuits is removed when the common point of isolation to the unit is opened. This common point of isolation is not supplied. The voltage free contacts are rated at 100VA. All inductive devices {relays} switch by the voltage free contacts must have their coil suppressed using standard r/c suppressors.
  - G. Customer voltage free contacts connected to terminal 13 must be rated at 30v 5ma
  - H. No controls {relays etc.} Should be mounted in any section of the control panel. Additionally, control wiring not connected to the control panel should not be run through the panel. If these precautions are not followed, electrical noise could cause malfunctions or damage to the unit and its controls.
- 
1. Refer to installation commissioning operation and maintenance manual for customer connections and customer connection notes, non compliance to these instructions will invalidate unit warranty.
  2. Wiring and components for compressor 3 only fitted when unit has 3 compressors on the system. 1-BMP3 is replaced by a link across terminals 134 & 135. 2-BMP3 is replaced by a link across terminals 234 & 235.
  3. FHP2 is only fitted on 0089 and above. When not fitted 1-FHP2 is replaced by a link across terminals 132 & 139. 2-FHP2 is replaced by a link across terminals 232 & 239
  4. Fitted on units with hot gas bypass option.
  5. EMS option is wired as shown
  6. This wiring must be used for old display 031-0110-000
  7. Network connection point
  8. Printer port
  9. Remote emergency stop can be wired between terminal 1 and 5 after removing link
  10. Power factor correction accessory. Power factor correction fitted to each compressor contactor
  11. Not fitted on compressors with internal motor protection. For system 1 terminals 132 & 133, 133 & 134 And 134 & 135 are linked. For system 2 terminals 232 & 233, 233 & 234 and 234 & 235 are linked.
  12. Only fitted on systems with 3 or 4 fans
  13. Only fitted on systems with 4 fans
  14. Only fitted on systems with 5 fans
  15. Only fitted on systems with 6 fans
  16. Input switch disconnect or circuit breaker option replaces input terminal block
  17. Input switch disconnect & system circuit breaker option replaces input terminal block
  18. 115V control circuit requires a 115V supply unless control circuit transformer-T2 & -F3 are fitted
  19. For optional hydro kit. Heater -EPH is fitted and wired as shown. On single pump -KP1, -QMMSP1 and -MP1 are fitted & wired as shown. On two pump hydro kits -KP2, -QMMSP2 & -MP2 are also fitted and wired as shown.
  20. Current measurement option wired as shown
  21. Only fitted on systems with single speed fans
  22. Only fitted on systems with two speed fans
  23. Optional compressor manual motors starters.
  24. See sheet 3 of connection diagram for power input options



Air Cooled Scroll Liquid Chiller -YORK YLAA R410A 50Hz & 60Hz

## **1. GENERAL**

### **1.01. GENERAL REQUIREMENTS**

The requirements of this Section shall conform to the general provisions of the Contract, including General and Supplementary Conditions, Conditions of the Contract, and Contract Drawings.

### **1.02. SCOPE**

Provide Microprocessor controlled, multiple scroll compressor, air-cooled, liquid chillers of the scheduled capacities as shown and indicated on the Drawings, including but not limited to:

1. Chiller package
2. Charge of refrigerant and oil
3. Electrical power and control connections
4. Chilled liquid connections
5. Manufacturer start-up

### **1.03. QUALITY ASSURANCE**

A. Products shall be Designed, Tested, Rated and Certified in accordance with, and Installed in compliance with applicable sections of the following Standards and Codes:

1. AHRI 550/590 – Water Chilling Packages Using the Vapor Compression Cycle
2. AHRI 370 – Sound Rating of Large Outdoor Refrigerating and Air-Conditioning Equipment
3. ANSI/ASHRAE 15 – Safety Code for Mechanical Refrigeration
4. ANSI/ASHRAE 34 – Number Designation and Safety Classification of Refrigerants
5. ASHRAE 90.1 – Energy Standard for Buildings Except Low-Rise Residential Buildings
6. ANSI/NFPA 70 – National Electrical Code (N.E.C.)
7. ASME Boiler and Pressure Vessel Code, Section VIII, Division 1
8. OSHA – Occupational Safety and Health Act
9. Manufactured in facility registered to ISO 9001
10. Conform to Intertek Testing Services for construction of chillers and provide ETL/cETL Listed Mark

B. Factory Run Test: Chiller shall be pressure-tested, evacuated and fully charged with refrigerant and oil, and shall be factory operational run tested with water flowing through the vessel.

C. Chiller manufacturer shall have a factory trained and supported service organization.

D. Warranty: Manufacturer shall Warrant all equipment and material of its manufacture against defects in workmanship and material for a period of eighteen (18) months from date of shipment or twelve (12) months from date of start-up, whichever occurs first.

### **1.04. DELIVERY AND HANDLING**



- A. Unit shall be delivered to job site fully assembled with all interconnecting refrigerant piping and internal wiring ready for field installation and charged with refrigerant and oil by the Manufacturer.
- B. Provide protective covering over vulnerable components for unit protection during shipment. Fit nozzles and open ends with plastic enclosures.
- C. Unit shall be stored and handled per Manufacturer's instructions.

## 2. PRODUCTS

### 2.01. CHILLER MATERIALS AND COMPONENTS

- A. General: Install and commission, as shown on the schedules and plans, factory assembled, charged, and tested air cooled scroll compressor chiller(s) as specified herein. Chiller shall be designed, selected, and constructed using a refrigerant with Flammability rating of "1", as defined by ANSI/ASHRAE STANDARD 34 Number Designation and Safety Classification of Refrigerants. Chiller shall include not less than two refrigerant circuits above 50 tons (200kW), scroll compressors, direct-expansion type evaporator, air-cooled condenser, refrigerant, lubrication system, interconnecting wiring, safety and operating controls including capacity controller, control center, motor starting components and special features as specified herein or required for safe, automatic operation.
- B. Cabinet: External structural members shall be constructed of heavy gauge, galvanized steel coated with baked on powder paint which, when subject to ASTM B117, 1000 hour, 5% salt spray test, yields minimum ASTM 1654 rating of "6".
- C. Operating Characteristics: Provide low and high ambient temperature control options as required to ensure unit is capable of operation from 0°F to 125°F (-18°C to 52°C) ambient.
- D. Service Isolation valves: Suction and discharge (ball type) isolation valves factory installed per refrigerant circuit. Includes a system high-pressure relief valve in compliance with ASHRAE15.
- E. Pressure Transducers and Readout Capability
  - 1. Discharge Pressure Transducers: Permits unit to sense and display discharge pressure.
  - 2. Suction Pressure Transducers: Permits unit to sense and display suction pressure.
  - 3. High Ambient Control: Allows units to operate when the ambient temperature is above 115°F (46°C). Includes discharge pressure transducers

### 2.02. COMPRESSORS

- A. Compressors: Shall be hermetic, scroll-type, including:
  - 1. Compliant design for axial and radial sealing.
  - 2. Refrigerant flow through the compressor with 100% suction cooled motor.
  - 3. Large suction side free volume and oil sump to provide liquid handling capability.
  - 4. Compressor crankcase heaters to provide extra liquid migration protection.
  - 5. Annular discharge check valve and reverse vent assembly to provide low-pressure drop, silent shutdown and reverse rotation protection.
  - 6. Initial oil charge.
  - 7. Oil level sight glass.
  - 8. Vibration isolator mounts for compressors.



9. Brazed-type connections for fully hermetic refrigerant circuits.
10. Compressor Motor overloads capable of monitoring compressor motor current. Provides extra protection against compressor reverse rotation, phase-loss and phase-imbalance.

## 2.03. REFRIGERANT CIRCUIT COMPONENTS

Each refrigerant circuit shall include: suction and discharge service ball type isolation valves, high side pressure relief, liquid line shutoff valve with charging port, low side pressure relief device, filter-drier, solenoid valve, sight glass with moisture indicator, thermal expansion valves, and flexible, closed-cell foam insulated suction line and suction pressure transducer.

## 2.04. HEAT EXCHANGERS

### A. Evaporator:

1. Evaporator shall be brazed-plate stainless steel construction capable of refrigerant working pressure of 650 psig (3103 kPa) and liquid side pressure of 150 psig (1034 kPa) [Option for 300 psig (2068 kPa) available].
2. Brazed plate heat exchangers shall be UL listed.
3. Exterior surfaces shall be covered with 3.4" (19mm), flexible, closed cell insulation, thermal conductivity of 0.26k ([BTU/HR-Ft<sup>2</sup> - °F]/in.) maximum.
4. Water nozzles shall be provided with grooves for field provided ANSI/AWWA C-606 mechanical couplings.
5. Evaporator shall include vent and drain fittings and thermostatically controlled heaters to protect to -20°F (-29°C) ambient in off-cycle.
6. A 20-mesh, serviceable wye-strainer and mechanical couplings shall be provided for field installation on evaporator inlet prior to startup.
7. Evaporator shall be provided with piping extension kit and mechanical couplings to extend liquid connection from evaporator to edge of unit. Thermal dispersion type flow switch shall be factory installed in the evaporator outlet pipe extension and wired to the unit control panel. Insulation and heat trace on piping shall be responsibility of installing contractor. Extension kit nozzle connections shall be ANSI/AWWA C-606 (grooved).

### B. Air-cooled Condenser:

1. Coils: Condenser coils shall be constructed of a single material to avoid galvanic corrosion due to dissimilar metals. Coils and headers are brazed as one piece. Integral sub cooling is included. Coils shall be designed for a design working pressure of 650 PSIG (45 bar). Condenser coil shall be washable with potable water under 100 psi (7 bar) pressure.
2. Low Sound Fans: Shall be dynamically and statically balanced, direct drive, corrosion resistant glass fiber reinforced composite blades molded into a low noise, full-airfoil cross section, providing vertical air discharge and low sound. Each fan shall be provided in an individual compartment to prevent crossflow during fan cycling. Guards of heavy gauge, PVC (poly- vinylchloride) coated or galvanized steel shall be factory installed.
3. Fan Motors: High efficiency, direct drive, 6 pole, 3 phase, insulation class "F", current protected, Totally Enclosed Air-Over (TEAO) , rigid mounted, with double sealed, permanently lubricated, ball bearings.

## 2.05. CONTROLS

- ### A. General:
- Automatic start, stop, operating, and protection sequences across the range of scheduled conditions and transients.



B. Power/Control Enclosure: Rain and dust tight NEMA 3R powder painted steel cabinet with hinged, latched, and gasket sealed door.

C. Microprocessor Control Center:

1. Automatic control of compressor start/stop, anti-coincidence and anti-recycle timers, automatic pumpdown at system shutdown, condenser fans, evaporator pump, evaporator heater, unit alarm contacts, and chiller operation from 0°F to 125°F (-18°C to 52°C) ambient. Automatic reset to normal chiller operation after power failure.
2. Software stored in non-volatile memory, with programmed setpoints retained in lithium battery backed real-time-clock (RTC) memory for minimum 5 years.
3. Forty character liquid crystal display, descriptions in English (or Spanish, French, Italian, or German), numeric data in English (or Metric) units. Sealed keypad with sections for Setpoints, Display/Print, Entry, Unit Options & clock, and On/Off Switch.
4. Programmable Setpoints (within Manufacturer limits): display language; chilled liquid temperature setpoint and range, remote reset temperature range, daily schedule/holiday for start/stop, manual override for servicing, low and high ambient cutouts, low liquid temperature cutout, low suction pressure cutout, high discharge pressure cutout, anti-recycle timer (compressor start cycle time), and anti-coincident timer (delay compressor starts).
5. Display Data: Return and leaving liquid temperatures, low leaving liquid temperature cutout setting, low ambient temperature cutout setting, outdoor air temperature, English or metric data, suction pressure cutout setting, each system suction pressure, liquid temperature reset via a 4-20milliamp or 0-10 VDC input, anti-recycle timer status for each compressor, anti-coincident system start timer condition, compressor run status, no cooling load condition, day, date and time, daily start/stop times, holiday status, automatic or manual system lead/lag control, lead system definition, compressor starts/operating hours (each), status of hot gas valves, evaporator heater and fan operation, run permissive status, number of compressors running, liquid solenoid valve status, load & unload timer status, water pump status.
6. System Safeties: Shall cause individual compressor systems to perform auto shut down; manual reset required after the third trip in 90 minutes. System Safeties include: high discharge pressure, low suction pressure, high pressure switch, and motor protector. Compressor motor protector shall protect against damage due to high input current or thermal overload of windings.
7. Unit Safeties: Shall be automatic reset and cause compressors to shut down if low ambient, low leaving chilled liquid temperature, under voltage, and flow switch operation.
8. Alarm Contacts: Low ambient, low leaving chilled liquid temperature, low voltage, low battery, and (per compressor circuit): high discharge pressure, and low suction pressure.
9. BAS Communications: YORKTalk 2, BACnet MS/TP, Modbus and N2 communication capabilities are standard.

D. Manufacturer shall provide any controls not listed above, necessary for automatic chiller operation. Mechanical Contractor shall provide field control wiring necessary to interface sensors to the chiller control system.

## 2.06. POWER CONNECTION AND DISTRIBUTION

A. Power Panels:

1. NEMA 3R/12 rain/dust tight, powder painted steel cabinets with hinged, latched, and gasket sealed outer doors. Provide main power connection(s), control power connections, compressor and fan motor start contactors, current overloads, and factory wiring.





2. Power supply shall enter unit at a single location, be 3 phase of scheduled voltage, and connect to individual terminal blocks per compressor. Separate disconnecting means and/or external branch circuit protection (by Contractor) required per applicable local or national codes.

B. Compressor, control and fan motor power wiring shall be located in an enclosed panel or routed through liquid tight conduit.

## 2.07. ACCESSORIES AND OPTIONS

Some accessories and options supersede standard product features. Your Johnson Controls representative will be pleased to provide assistance.

A. Microprocessor controlled, Factory installed Across-the-Line type compressor motor starters as standard.

B. Outdoor Ambient Temperature Control

1. Low Ambient Control: Permits unit operation to 0°F ambient. Standard unit controls to 30°F ambient.

2. High Ambient Control: Permits unit operation above 115°F ambient.

C. Power Supply Connections:

1. Single Point or Multiple Point Disconnect: Single or Dual point Non-Fused Disconnect(s) and lockable external handle (in compliance with Article 440-14 of N.E.C.) can be supplied to isolate the unit power voltage for servicing. Separate external fusing must be supplied, by others, in the incoming power wiring, which must comply with the National Electric Code and/or local codes.

D. Control Power Transformer: Converts unit power voltage to 120-1-60 (500 VA capacity). Factory-mounting includes primary and secondary wiring between the transformer and the control panel.

E. Condenser Coil Environmental Protection:

1. Post-Coated Dipped: Dipped-cured coating on condenser coils for seashore and other corrosive applications (with the exception of strong alkalis, oxidizers, and wet bromine, chlorine and fluorine in concentrations greater than 100 ppm).

F. Protective Chiller Panels (Factory or Field Mounted)

1. Louvered/Wire Panels: Louvered steel panels on external condenser coils painted as per remainder of unit cabinet. Heavy gauge, welded wire-mesh, coated to resist corrosion, around base of machine to restrict unauthorized access.

G. Thermal Dispersion Flow Switch (Factory installed and wired in piping extension kit): Normally open, 30bar pressure rating, stainless steel 316L construction, IP67, -4°F to 158°F ambient rating.

H. Hot Gas By-Pass: Permits continuous, stable operation at capacities below the minimum step of unloading to as low as 5% capacity (depending on both the unit & operating conditions) by introducing an artificial load on the evaporator. Hot gas by-pass is installed on only one refrigerant circuit.

I. Sound Reduction (Factory installed):

1. Ultra Quiet - Low speed, reduced noise fans

2. Compressor Acoustic Sound Blankets

J. Vibration Isolation (Field installed):

1. 1" Deflection Spring Isolators: Level adjustable, spring and cage type isolators for mounting under the unit base rails.

K. Non-powered GFI duplex receptacle.






### **3. EXECUTION**

#### **3.01. INSTALLATION**

- A. General: Rig and Install in full accordance with Manufacturer's requirements, Project drawings, and Contract documents.
- B. Location: Locate chiller as indicated on drawings, including cleaning and service maintenance clearance per Manufacturer instructions. Adjust and level chiller on support structure.
- C. Components: Installing Contractor shall provide and install all auxiliary devices and accessories for fully operational chiller.
- D. Electrical: Coordinate electrical requirements and connections for all power feeds with Electrical Contractor (Division 16).
- E. Controls: Coordinate all control requirements and connections with Controls Contractor.
- F. Finish: Installing Contractor shall paint damaged and abraded factory finish with touch-up paint matching factory finish.

	<b>LIMITED WARRANTY ENGINEERED SYSTEMS EQUIPMENT</b>	
<b>SERVICE POLICY</b>	Supersedes: 50.05-NM2 (1008)	Form 50.05-NM2 (309)

## POLICY STATEMENT

Johnson Controls, Inc. (JCI) warrants all new Engineered Systems Equipment and materials, or installation or start-up services performed by JCI in connection therewith, against defects in workmanship and material for a period of eighteen (18) months from date of shipment or twelve (12) months from date of start-up, whichever occurs first. This warranty does not extend to products used for rental chiller duty. Subject to the exclusions listed below, JCI, at its option, will repair or replace, FOB point of shipment, such JCI products or components as it finds defective.

Except for reciprocating replacement compressors, which JCI warrants for a period of twelve (12) months from date of shipment, JCI reconditioned or replacement materials, or installation or start-up services performed by JCI in connection therewith, warrants against defects in workmanship and material for a period of ninety (90) days from date of shipment. Subject to the exclusions listed below, JCI, at its option, will repair or replace, FOB point of shipment, such JCI products or components as it finds defective.

### Exclusions:

Unless specifically agreed to in the contract documents, this warranty does not include the following costs and expenses:

1. Labor to remove or reinstall any equipment, materials, or components.
2. Shipping, handling, or transportation charges.
3. Cost of refrigerant.
4. Cost of rental chillers or other temporary cooling equipment.

No warranty repairs or replacements will be made until payment for all equipment, materials, or components has been received by JCI.

### ALL WARRANTIES ARE VOID IF:

1. Equipment is used with refrigerants, oil, or antifreeze agents other than those authorized by JCI.

2. Equipment is used with any material or any equipment such as evaporators, tubing, other low side equipment, or refrigerant controls not approved by JCI.
3. Equipment has been damaged by freezing because it is not properly protected during cold weather, or damaged by fire or any other conditions not ordinarily encountered.
4. Equipment is not installed, operated, maintained and serviced in accordance with instructions issued by JCI.
5. Equipment is damaged due to dirt, air, moisture, or other foreign matter entering the refrigerant system.
6. Equipment is not properly stored, protected, or inspected by the customer during the period from date of shipment to date of initial start-up.
7. Equipment is damaged due to acts of god, abuse, neglect, sabotage, or acts of terrorists.

THIS WARRANTY IS IN LIEU OF ALL OTHER WARRANTIES AND LIABILITIES, EXPRESS OR IMPLIED IN LAW OR IN FACT, INCLUDING THE WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE. THE WARRANTIES CONTAINED HEREIN SET FORTH BUYER'S SOLE AND EXCLUSIVE REMEDY IN THE EVENT OF A DEFECT IN WORKMANSHIP OR MATERIALS. IN NO EVENT SHALL JCI'S LIABILITY FOR DIRECT OR COMPENSATORY DAMAGES EXCEED THE PAYMENTS RECEIVED BY JCI FROM BUYER FOR THE MATERIALS OR EQUIPMENT INVOLVED. NOR SHALL JCI BE LIABLE FOR ANY SPECIAL, INCIDENTAL, OR CONSEQUENTIAL DAMAGES. THESE LIMITATIONS ON LIABILITY AND DAMAGES SHALL APPLY UNDER ALL THEORIES OF LIABILITY OR CAUSES OF ACTION, INCLUDING, BUT NOT LIMITED TO, CONTRACT, WARRANTY, TORT (INCLUDING NEGLIGENCE) OR STRICT LIABILITY. THE ABOVE LIMITATIONS SHALL INURE TO THE BENEFIT OF JCI'S SUPPLIERS AND SUBCONTRACTORS.



PRODUCT TYPE:	AIR COOLED SCROLL CHILLERS	COMPRESSOR SERIAL NUMBER(S):
YORK CONTRACT NO.:		
UNIT MODEL NUMBER:	YLAA0080SE	
UNIT SERIAL NUMBER:		
UNIT TAG ID:	CH-1	
UNIT LOCATION:		

Shipping Date

**18 months (1 Year) Labor Only Warranty  
FOR THE ENTIRE UNIT  
YORK INTERNATIONAL CORPORATION  
ENGINEERED SYSTEMS**

PRODUCT TYPE:	Air Cooled Scroll Chillers	COMPRESSOR SERIAL NUMBER(S):
YORK CONTRACT NO.:		
UNIT MODEL NUMBER:	YLAA0080SE	
UNIT SERIAL NUMBER:		
UNIT TAG ID:	CH-1	
UNIT LOCATION:		

PROJECT NAME:    SCI Boot Camp  
Installation  
Address:

\_\_\_\_\_  
Shipping Date

The term of this agreement is 18 months (1 Year), commencing \_\_\_\_\_ and expires \_\_\_\_\_.

**LIMITED WARRANTY**

WHEN PROPERLY ENDORSED, THIS PROTECTION PLAN BETWEEN YORK INTERNATIONAL CORPORATION (YORK) AND CUSTOMER, WARRANTS, TO THE CUSTOMER NAMED HEREIN, \*\*\* UNASSIGNED \*\*\* FOR THE . IT DOES NOT COVER REFRIGERANT COST, FREIGHT CHARGES, OR ANY OTHER COSTS.

THIS WARRANTY EXCLUDES IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE, AND WE DO NOT ASSUME, OR AUTHORIZE ANY OTHER PERSON TO ASSUME OTHER WARRANTIES FOR US. THIS WARRANTY IS OFFERED AS AN EXTENSION TO THE STANDARD LIMITED WARRANTY (FORM 50.05-NM2) AND IS SUBJECT TO THE SAME LIMITATIONS AND EXCLUSIONS, EXCEPT WHERE NOTED.

THIS PROTECTION PLAN DOES NOT COVER FAILURE OR DAMAGE RESULTING FROM FIRE, FLOOD, ABUSE, OR ACT OF GOD. ALSO EXCLUDED ARE DAMAGES OR FAILURES CAUSED BY INSTALLATION, OPERATION, OR MAINTENANCE CONTRARY TO YORK RECOMMENDATIONS, OR THOSE OF THE MANUFACTURER IF OTHER THAN YORK. IN NO EVENT SHALL YORK BE LIABLE FOR CONSEQUENTIAL, INCIDENTAL, OR INDIRECT DAMAGE, LOSS, OR INJURY. WARRANTY FOR EXCHANGE OR PARTS PROCUREMENT SERVICE SHALL BE AVAILABLE THROUGH THE SERVICER LISTED HEREIN DURING NORMAL WORKING HOURS.

DISTRICT SERVICE OFFICE: \_\_\_\_\_

OFFERED BY:

\_\_\_\_\_  
York Selling Representative Print/Sign

\_\_\_\_\_  
Date

APPROVED BY:

\_\_\_\_\_  
York Area Service Manager Print/Sign

\_\_\_\_\_  
Date

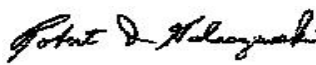
ACCEPTED BY:

\_\_\_\_\_  
Customer Signature

\_\_\_\_\_  
Date

(Manufacturer's Use Only)

AUTHORIZED  
BY:



\_\_\_\_\_  
Manager, Warranty Administration

2015-02-16

\_\_\_\_\_  
Date

CONTRACTOR: Building Systems & Services

SUBMITTAL DATE 04 / 29 / 15

1504 Kirkwood Highway, Wilmington, DE 19805

Check following as applicable:

- ☐ First Submission  
☐ Re-submission

ARCHITECT: Tetra Tech Architects & Engineers

**PROJECT IDENTIFICATION**

Architect's  
Project No.: 200-26912-14006

Proj. Name: Programs Bldg Conversion

Location: Sussex Correctional Institution

**PRODUCT IDENTIFICATION**

Specification Section No. 23 72 00

A/E Submittal No. \_\_\_\_\_

Name of Product: Energy Recovery Unit

Name of Manufacturer: \_\_\_\_\_

**SUBCONTRACTOR**

**SUPPLIER**

**RELATIONSHIP TO STRUCTURE**

Building  
Name \_\_\_\_\_

(Room #)

(Room Name)

Contract Drawing No.: \_\_\_\_\_

RESERVED FOR USE BY TETRA TECH

**ACTION SUBMITTAL:**

- ☐ Approved  
☒ Approved As Noted  
☐ Approved, Revise and Return  
Corrected Copies  
☐ Rejected  
☐ Incomplete, Submit Additional Information

**INFORMATIONAL SUBMITTAL:**

- ☐ No Action Taken  
☐ Returned for Resubmittal

Reviewed By: Scott D. Parlow,

Date: May 1, 2015

Reviewed only for the limited purpose of checking for conformance with information given and the design concept expressed in the Contract Documents. Review not conducted for the purpose of determining the accuracy and completeness of other details such as dimensions and quantities, or for substantiating instructions for installation or performance of equipment or systems, all of which remain the responsibility of the Contractor as required by the Contract Documents. Review shall not constitute approval of safety precautions or of any construction means, methods, techniques, sequences or procedures.

**DEVIATION FROM CONTRACT DOCUMENTS:** \_\_\_\_\_

**CONTRACTOR COMMENTS:** \_\_\_\_\_

**ARCHITECT'S COMMENTS:** 1. Provide quote for 2nd Year Parts & Labor Warranty to all Bidding Contractors per State of Delaware requirements.

**CONTRACTOR'S STAMP**

**CONTRACTOR'S CERTIFICATION**

I CERTIFY THAT THIS SUBMITTAL HAS BEEN REVIEWED AND APPROVED BY THE CONTRACTOR IN ACCORDANCE WITH THE GENERAL CONDITIONS.

BY \_\_\_\_\_



## **TRANSMITTAL LETTER**

DATE: April 24, 2015

TO: Tetra Tech Inc.

ATTENTION: Scott Parlow

SUBJECT: Sussex Correctional Institution  
HVAC & Electrical Systems Upgrades  
Boot Camp to Programs Building Conversion

**WE ARE SENDING YOU HEREWITH ONE (1) ELECTRONIC SET OF SHOP DRAWINGS FOR:**

- \* Approval.
- \* Return 1 approved copy as requested.
- \* Fabrication held up until approval received.

### **DESCRIPTION**

**One (1) JOHNSON CONTROLS Energy Recovery Unit**  
**Tag: ERU-1**

### **BUILDING SYSTEMS & SERVICES**

BY: \_\_\_\_\_

Courtney H. Bauer

c/o Building Systems & Services  
1504 Kirkwood Highway – Wilmington, DE 19805  
Telephone: 302-996-0900 Fax: 302-996-0999



ORIGINAL DATE: April 24, 2015

**PROJECT**

Sussex Correctional Institution  
Boot Camp to Programs Building Conversion  
Georgetown, DE

**ENGINEER**

Tetra Tech Inc.  
Newark, DE

**SUBMITTAL**

**One (1) JOHNSON CONTROLS Energy Recovery Unit  
Tag: ERU-1**

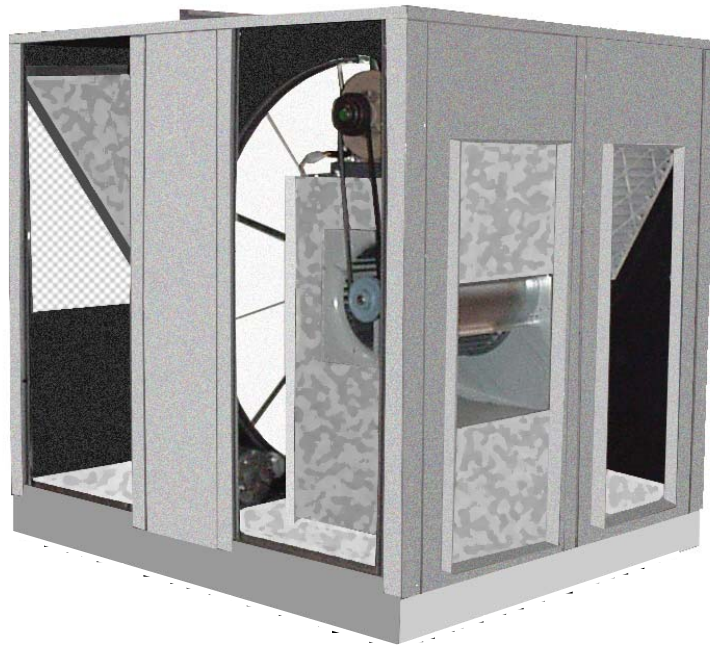
c/o Building Systems & Services  
1504 Kirkwood Highway – Wilmington, DE 19805  
Telephone: 302-996-0900 Fax: 302-996-0999

# JOHNSON CONTROLS

## Side by Side Discharge Indoor Units

### Energy Recovery Ventilators

---



"S" Series  
Indoor Units

---



**Date**

04/16/2015

**Project Name**

SCI Boot Camp

**Project Number****Client / Purchaser**

## Submittal Summary Page

Qty	Tag #	Model #	Description
1		VS046N00H2AL52	Energy Recovery Ventilator, Stand Alone, Side By Side Wheel, 3400 - 4600 CFM, High Speed Blower, 208/230-3-60 <ul style="list-style-type: none"><li>• Stand-Alone ERV</li><li>• Low Ambient Kit</li><li>• Stop-Start-Jog</li></ul>

Equipment start-up and commissioning by a factory trained technician is recommended.  
Contact your supplying distributor or sales representative for additional information & guidance.

Project Name: **SCI Boot Camp**

Unit Model #: **VS046N00H2AL52**

Quantity: **1**

System: **VS046N00H2AL52**

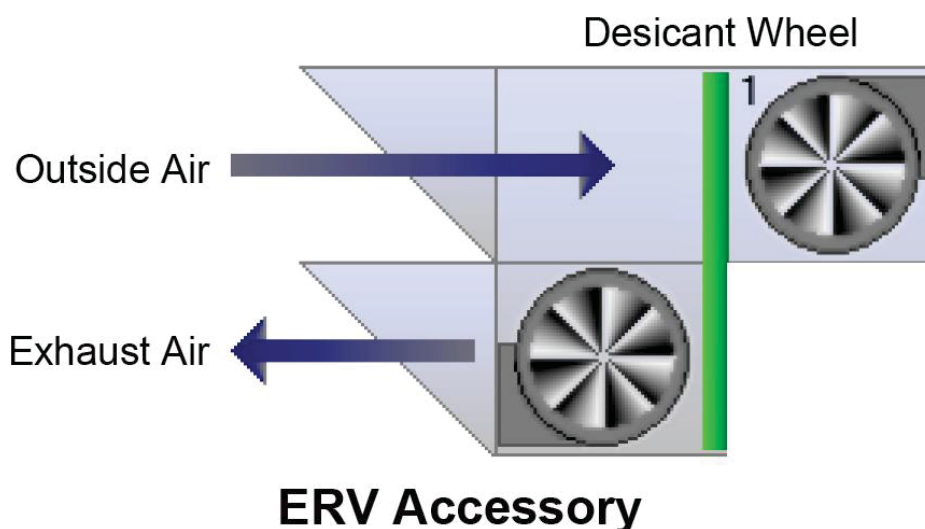
### Net Outside Air

CFM 4550  
Cooling DB (°F) 95.00  
Cooling Wetbulb (°F) 75.00  
Heating Drybulb (°F) .00

Altitude (ft) 0  
Net Exhaust Air (CFM) 4550

### 1. Outside Air + Exhaust Air Transfer

CFM 4838  
Cooling DB (°F) 81.67  
Cooling Wetbulb (°F) 66.41  
Heating Drybulb (°F) 44.94



### Load Reduction

Summer (Tons) 11.83  
Winter (MBH) 280.71

### Return Air

CFM 3800  
Cooling Drybulb (°F) 75.00  
Cooling Wetbulb (°F) 60.00  
Heating Drybulb (°F) 70.00

### Electrical Data

Voltage 208-3-60  
Max. Fuse or Breaker Size (Amps) 40  
Ampacity (Amps) 34.50

**Distributor/Contractor responsible for providing any necessary balancing dampers and/or transitions if connecting ERV to a building or unitized equipment.**

Project Name: **SCI Boot Camp**

Unit Model #: **VS046N00H2AL52**

Quantity: **1**

System: **VS046N00H2AL52**

### Factory Installed Options

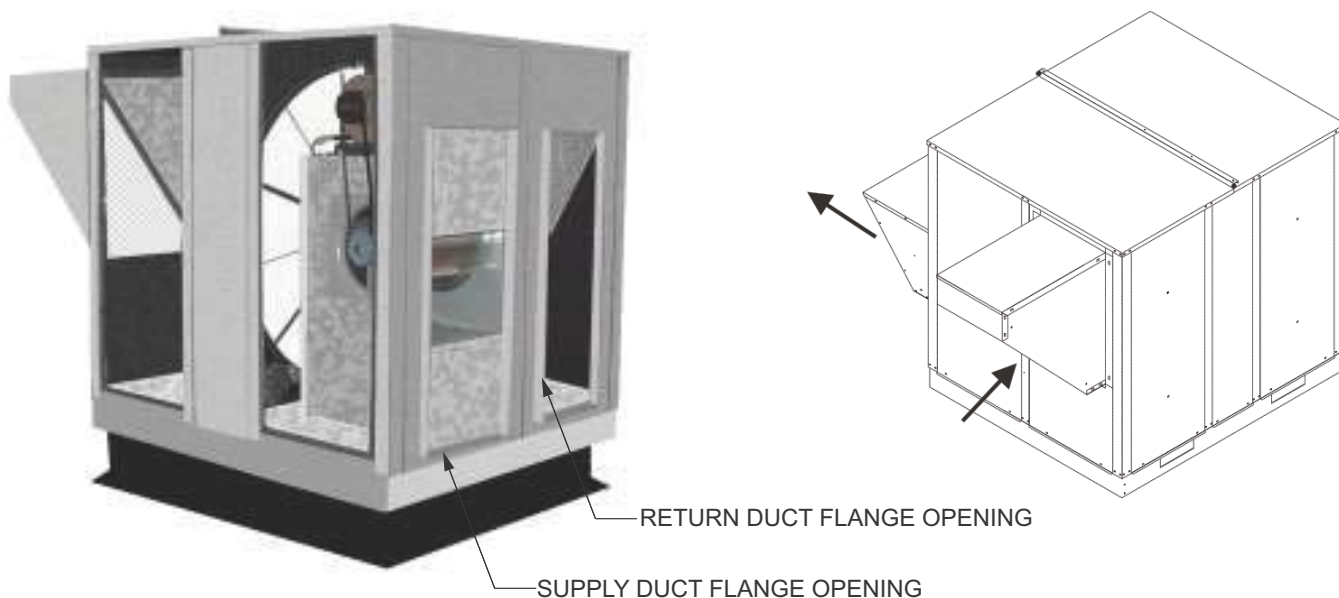
#### VS046N00H2AL52

Product Category:	<b>V</b>	Energy Recovery Ventilator
Wheel Type:	<b>S</b>	Stand Alone, Side By Side Wheel
CFM:	<b>046</b>	3400 - 4600 CFM
Cabinet:	<b>N00</b>	Stand-Alone ERV
Blower Speed:	<b>H</b>	High Speed Blower
Voltage:	<b>2</b>	208/230-3-60
Duct Type:	<b>A</b>	
Additional Options:	<b>L5</b>	Low Ambient Kit Stop-Start-Jog
Product Generation:	<b>2</b>	

### Field Installed Accessories

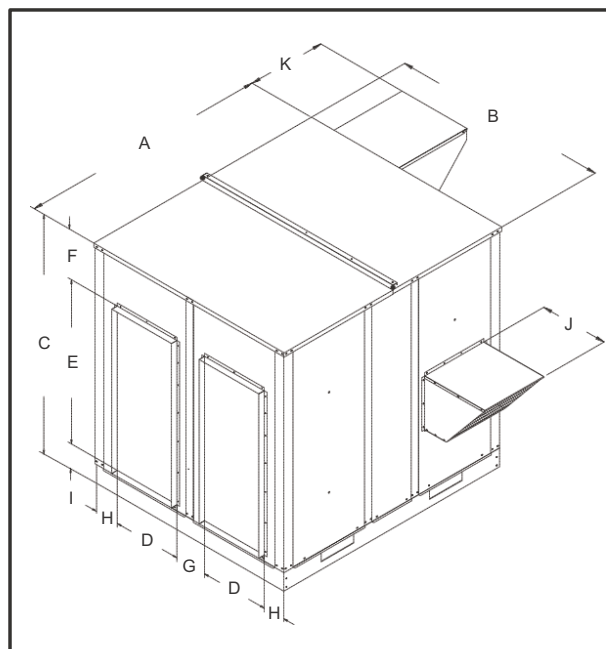
Outdoor unit with curb shown below.  
Indoor unit provided. Duct flanges  
provided in lieu of weather hoods.

## S SERIES STAND ALONE ERV'S FOR SIDE BY SIDE DUCT ARRANGEMENTS



### FEATURES AND NOTES

1. Stand alone design allows higher levels of outdoor air to be introduced into the conditioned space.
2. Static test ports provided to verify intake and exhaust CFM.
3. Balancing damper(s) is field provided when connected to ductwork. System may not operate properly without balancing damper.
4. Roof curbs are available for the ERV's.
5. See blower performance charts for airflow at various E.S.P.
6. Filter rack with 2" pleated filters included. Found in return air section.



ERV Roof Curbs	
Series	Model No
S011	01-2D1-2514
S020	01-2D1-3014
S028	01-2D1-3614
S036	01-2D1-4114
S046	01-2D1-4614
S062	01-2D1-5214

ERV Data				Dimensional Data								
ERV Series	CFM Range	A	B	C	D	E	F	G	H	I	J	K
S011	300-1100	44.75	32.13	33.50	11.00	27.00	4.00	4.25	2.88	2.50	20.75	14.38
S020	1200-2000	54.38	37.25	37.50	12.00	30.00	5.87	5.13	4.06	1.63	20.75	17.50
S028	1200-2800	52.25	42.63	43.56	14.00	32.00	8.69	5.25	4.25	2.88	20.75	25.50
S036	2000-3600	60.00	46.60	57.37	16.50	30.50	12.00	6.50	4.05	5.88	20.75	25.50
S046	3000-4600	60.00	52.69	57.37	16.50	39.50	12.00	8.69	5.50	5.88	20.75	28.06

Unit dimensions: 60.00" L x 52.69" W x 57.37" H  
Unit will fit through double doors or outside air  
louver. Shipping splits not required.

**DRAWINGS REDACTED**

## Specifications and Electrical Data - 3000 through 4600 CFM ERV's

Model Numbers		O46-02 - Stand Alone O/U N46-02 - O/U Indoor			D46-02 - Down Discharge			S46-02 - Stand Alone S/S Indoor		
Line Voltage - 60hz		208/230v 3ph	460v 3ph	575v 3ph	208/230v 3ph	460v 3ph	575v 3ph	208/ 230v 3ph	<del>460v 3ph</del>	<del>575v 3ph</del>
Fresh Air Blower	Motor - hp / type	5 / Belt			5 / Belt			5 / Belt		
	Wheel Size (dia x width) -in	12 x 12			12 x 12			12 x 12		
	Motor Speed -rpm	1725			1725			1725		
	Motor Speed(s)	Adjustable Sheave			Adjustable Sheave			Adjustable Sheave		
	Bearing Type	Ball			Ball			Ball		
	Full Load Amps	14.8	7.0	5.1	14.8	7.0	5.1	14.8	<del>7.0</del>	<del>5.1</del>
	Service Factor	1.15			1.15			1.15		
Exhaust Air Blower	Motor - hp Stationary	5 / Belt			5 / Belt			5 / Belt		
	Wheel Size (dia x width) -in	12 x 12			12 x 12			12 x 12		
	Motor Speed -rpm	1725			1725			1725		
	Motor Speed(s)	Adjustable Sheave			Adjustable Sheave			Adjustable Sheave		
	Bearing Type	Ball			Ball			Ball		
	Full Load Amps-Stationary	14.8	7.0	5.1	14.8	7.0	5.1	14.8	<del>7.0</del>	<del>5.1</del>
	Service Factor	1.15			1.15			1.15		
Enthalpy Wheel Electrical Data	Motor - hp (1 phase)	0.17			0.17			0.17		
	Potential Volts	200 / 208 - 230			200 / 208 - 230			200 / 208 - 230		
	Motor Speed -rpm	1075			1075			1075		
	Full Load Amps	1.2			1.2			1.2		
Total Electrical	MCA - Stationary	34.5	17.0	12.7	34.5	17.0	12.7	34.5	<del>17.0</del>	<del>12.7</del>
	OCPD - Stationary	40	25	15	40	25	15	40	<del>25</del>	<del>15</del>
Wheel Data	Wheel Depth x Diameter - in	3 x 46.776			3 x 46.776			3 x 46.776		
	Construction / Media Type	Segmented Pies/Polymeric			Segmented Pies/Polymeric			Segmented Pies/Polymeric		
Curb	Curb Height - in	14			14			14		
Weights	Shipping Weight - lbs. (kg)	1228			1228			1228		
	Net Weight - lbs. (kg)	1113			1113			1113		

## AHRI Certified Ratings

Thermal Ratings @ 0" Pressure Diff.				
Total Effectiveness	100% Airflow Heating	68%	60%	65%
	75% Airflow Heating	73%	67%	71%
	100% Airflow Cooling	68%	60%	63%
	75% Airflow Cooling	73%	67%	70%
Net Effectiveness	100% Airflow Heating	68%	60%	65%
	75% Airflow Heating	73%	67%	71%
	100% Airflow Cooling	68%	60%	63%
	75% Airflow Cooling	73%	67%	70%
Enthalpy Wheel AHRI Rating Data				
Nominal Airflow CFM		3900 @ .95Δ		
EATR - -1.00 HO		4.40%		
EATR - 0.00 HO		1.10%		
EATR - +1.00 HO		0.20%		
OACF - -1.00 HO		0.99		
OACF - 0.00 HO		1.06		
OACF - +1.00 HO		1.11		

## Blower RPM for S46

### SUPPLY

Mist Eliminator Filter in Intake Hood (5HP)								
		External Static Pressure (in water)						
		0	0.25	0.5	0.75	1	1.25	1.5
CFM	3000	965	1085	1150	1230	1295	1345	1420
	3400	1035	1145	1250	1290	1335	1415	1475
	3800	1120	1245	1285	1315	1440	1470	1535
	4200	1215	1305	1355	1430	1465	1530	1595
	4600	1300	1375	1450	1460	1540	1590	1650

### EXHAUST

Barometric Hood, 2" Pleated Filters (5HP)								
		External Static Pressure (in water)						
		0	0.25	0.5	0.75	1	1.25	1.5
CFM	3000	1010	1105	1195	1255	1300	1375	1415
	3400	1100	1190	1250	1320	1370	1410	1480
	3800	1185	1245	1360	1410	1440	1475	1540
	4200	1240	1355	1425	1465	1530	1590	1630
	4600	1345	1410	1485	1520	1585	1650	1700

#### Notes:

1. Drive losses included in the above tables.
2. Performance can vary depending on ambient conditions
3. Blower RPMs are for reference only

RPM Range		
Low	780-1020	Standard Unit
Medium	1000-1315	Optional Kit
High	1315-1700	Optional Kit

**DRAWINGS REDACTED**



## ERV Standard Features

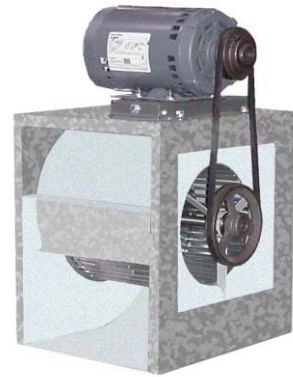
**Energy Recovery Ventilators are supplied with filters before the Energy Recovery Wheel.** The type(s) of filters are determined by the style of the ERV.

**"S" series** have 2" pleated filters for both the exhaust air and the intake air.



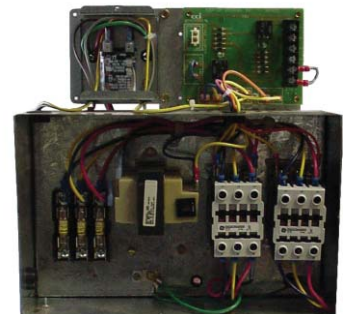
***Energy Recovery Ventilators are supplied with fully tested blower assemblies.*** Some of the features are as follows:

1. The blowers are housed within a sheet metal frame to insure reliable performance.
2. The blower motor is mounted on an adjustable motor mount that provides an easy method of adjusting the belts.
3. All blowers are equipped with adjustable sheave pulleys.
4. The blower pulley and the motor pulley are aligned by a state of the art "laser" alignment system.



**Energy Recovery Ventilators are supplied with fully tested control systems.** Some of the features are as follows:

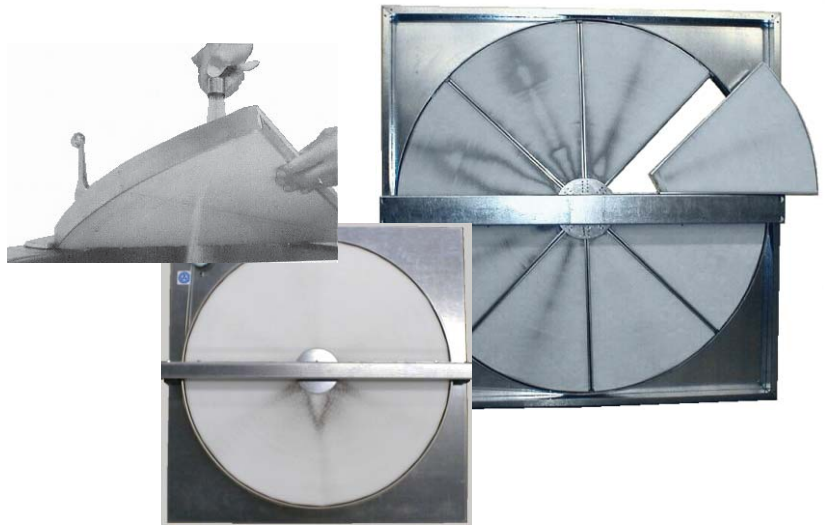
1. Electronic control board.
2. Fully wired.
3. Independently fused.
4. Color coded wires.
5. Provides own 24 volt circuit.
6. All options are "plug-in" modules.



## Enthalpy Wheels and Maintenance

### Energy Recovery Wheel

The heart of the Energy Recovery Ventilator is the Energy Recovery Wheel (defined by AHRI as a rotary heat exchanger). The wheel has a patented design of parallel layers of wrapped polymeric material that is impregnated with a silica gel (desiccant). This unique design makes it the only truly cleanable wheel on the market today. The small wheels (19 inch diameter) are slide out cassettes, and the larger wheels have pie segments that are removable for cleaning.

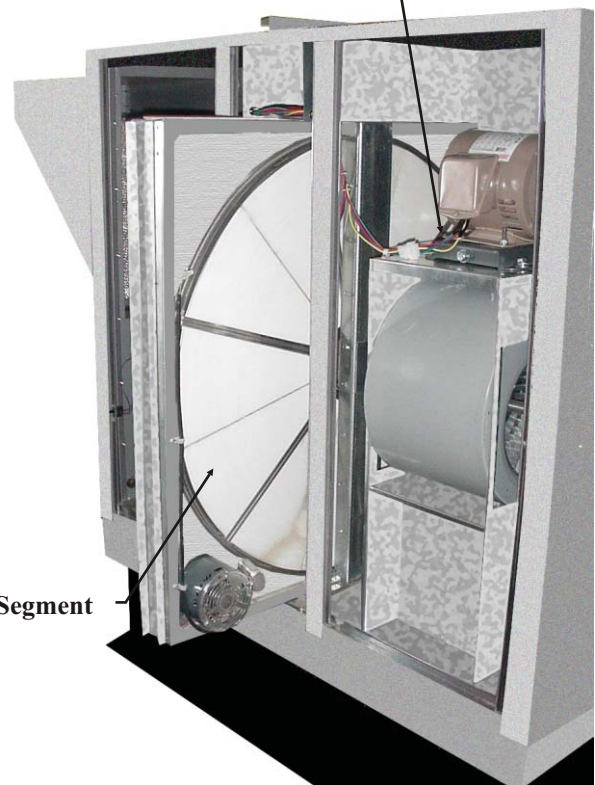


Energy Recovery Ventilators are designed for ease of maintenance.

- ❖ All of the enthalpy wheels are designed to "slide" in and out of the ERV. This allows easy access to all parts of the wheel.
- ❖ Wheel "Pie" segments can be removed for easy cleaning.
- ❖ All wiring is color coded to match the wiring diagram.
- ❖ Control boxes provided with internal fuses.
- ❖ Blower motors are mounted on "adjustable" bases that allow easy tensioning of the belts.
- ❖ All filters are standard sizes.
- ❖ All options are easily installed by simply plugging them into the appropriate plug.
- ❖ Roof curbs have duct supports.

Adjustable Motor Mount

Wheel Pie Segment



## Guide Specifications

Prepared for the guidance of architects, consulting engineers, and mechanical contractors.

**General** – Furnish and install \_\_\_\_\_ mechanical cooling system, complete with a Stand Alone Energy Recovery Ventilator (ERV).

**Approvals** – The Stand Alone Energy Recovery Ventilator will contain an energy recovery component rated in accordance with AHRI Standard 1030-2000 with ratings certified by AHRI.

**Cabinet** – ERV shall be designed to attach directly to the air conditioning (rooftop, upflow, horizontal) unit. It shall be galvanized material with a powdered enamel paint finish electrostatically bonded to the metal. Cabinet panels where conditioned air is handled shall be fully insulated to prevent sweating and minimize sound. Openings shall be provided for power connections. Lifting devices will be provided for rigging. Test ports shall be provided so airflow can be measured across the energy recovery wheel.

**Intake Air Blower (belt drive)** – ERV shall contain a centrifugal blower. It shall have ball bearings and adjustable belt drive. Motor mount base shall permit ease of motor changeover and belt tension adjustment.

**Exhaust Air Blower (belt drive)** – ERV shall contain a centrifugal blower. It shall have ball bearings and adjustable belt drive. Motor mount base shall permit ease of motor changeover and belt tension adjustment.

**Energy Recovery Wheel** – The energy recovery device shall be a rotary heat exchanger per AHRI Standard 1060 description. The device will be an enthalpy wheel coated with a silica gel desiccant by a patented process without the use of binders or adhesives which may plug the desiccant aperture. The substrate shall be a lightweight polymer. Desiccant shall not dissolve or deliquesce in the presence of water or high humidity. The wheel shall be easily cleanable with standard coil cleaning solution. On ERV's the wheel will be provided with removable segments for cleaning and maintenance. All diameter and perimeter seals shall be provided. The energy recovery cassette shall be Underwriters Laboratories Recognized Component for electrical and fire safety. **The enthalpy wheel has a five year manufacturer's parts warranty.**

~~**Balancing Dampers** – These dampers will be mounted inside the rooftop air conditioning unit to adjust for the amount of exhaust air on packaged units (ordered separately) and field provide and installed in duct work for units that stand alone.~~

~~**Barometric Relief Dampers** – Barometric relief dampers will be provided in the outdoor units within exhaust air hood to prevent air infiltration when the ERV is de-energized.~~

~~**ERV Support** – All outdoor ERV's will be provided with support legs attached to the cabinet to support for the intake and exhaust end of the rooftop unit. Horizontal ERV's will be provided with support brackets for hanging.~~

~~**Filters** – All outdoor ERV's shall be provided with mist eliminator type filters in the intake air hood.~~

**Power Connection** – The ERV shall be provided with a single point power connection for high voltage.

### ~~Options:~~

~~**Optional ERV Equipment Support** – Furnish and install the optional equipment support for the intake and exhaust end of the outdoor unit.~~

~~**Optional Roof Mounting Frame** – Furnish and install the optional roof mounting frame to maintain proper height above the roof.~~

~~**Optional Low Ambient Kit** – Furnish and install the optional low ambient kit to prevent frost formation on the energy recovery wheel.~~

~~**Optional Motorized Intake Air Damper** – Furnish and install the optional motorized intake air damper.~~

~~**Optional Stop-Start-Jog** – On units wanting economizer type control, it is recommended to install the optional stop-start-jog controls.~~

CONTRACTOR: Building Systems & Services

SUBMITTAL DATE 04 / 29 / 15

1504 Kirkwood Highway, Wilmington, DE 19805

Check following as applicable:

- ☐ First Submission  
☐ Re-submission

ARCHITECT: Tetra Tech Architects & Engineers

**PROJECT IDENTIFICATION**

Architect's  
Project No.: 200-26912-14006

Proj. Name: Programs Bldg Conversion

Location: Sussex Correctional Institution

**PRODUCT IDENTIFICATION**

Specification Section No. 23 73 13

A/E Submittal No. \_\_\_\_\_

Name of Product: Air Handling Units

Name of Manufacturer: \_\_\_\_\_

**SUBCONTRACTOR**

**SUPPLIER**

**RELATIONSHIP TO STRUCTURE**

Building  
Name \_\_\_\_\_

(Room #)

(Room Name)

Contract Drawing No.: \_\_\_\_\_

RESERVED FOR USE BY TETRA TECH

**ACTION SUBMITTAL:**

- ☐ Approved
- ☒ Approved As Noted **Provide Additional Requested Information**
- ☐ Approved, Revise and Return Corrected Copies
- ☐ Rejected
- ☐ Incomplete, Submit Additional Information

**INFORMATIONAL SUBMITTAL:**

- ☐ No Action Taken
- ☐ Returned for Resubmittal

Reviewed By: Scott D. Parlow, PE

Date: April 29, 2015

Reviewed only for the limited purpose of checking for conformance with information given and the design concept expressed in the Contract Documents. Review not conducted for the purpose of determining the accuracy and completeness of other details such as dimensions and quantities, or for substantiating instructions for installation or performance of equipment or systems, all of which remain the responsibility of the Contractor as required by the Contract Documents. Review shall not constitute approval of safety precautions or of any construction means, methods, techniques, sequences or procedures.

**DEVIATION FROM CONTRACT DOCUMENTS:** \_\_\_\_\_

**CONTRACTOR COMMENTS:**

**Notes to Contractors:** 1. A 6 inch Base Rail is being provided with all Air Handling Units.  
2. Air Handling Units are being shipped in sections.  
3. Contractors are responsible to pick-up the costs for the 2nd year warranty. from the Equipment Vendor.

**Engineer's**

**ARCHITECT'S COMMENTS:**

**Notes to Equipment Vendor:** 1. Change AHU-3 Motor to 3.0 hp.  
2. Outlet Velocity for AHU-2 appears to be too high,  
3. Provide top inverted discharge blow on all AHU's.  
4. Provide quote to all Biding Contractors for 2nd Year Parts & Labor Warranty per State of Delaware requirements.  
5. Refer to miscellaneous commetns insdie submittal.

**CONTRACTOR'S STAMP**

**CONTRACTOR'S CERTIFICATION**

I CERTIFY THAT THIS SUBMITTAL HAS BEEN REVIEWED AND APPROVED BY THE CONTRACTOR IN ACCORDANCE WITH THE GENERAL CONDITIONS.

BY \_\_\_\_\_



## **TRANSMITTAL LETTER**

DATE: April 24, 2015

TO: Tetra Tech Inc.

ATTENTION: Scott Parlow

SUBJECT: Sussex Correctional Institution  
HVAC & Electrical Systems Upgrades  
Boot Camp to Programs Building Conversion

**WE ARE SENDING YOU HEREWITH ONE (1) ELECTRONIC SET OF SHOP DRAWINGS FOR:**

- \* Approval.
- \* Return 1 approved copy as requested.
- \* Fabrication held up until approval received.

### **DESCRIPTION**

**Three (3) JOHNSON CONTROLS Solution Air Handling Units**  
**Tag: AHU-1, 2, 3**

### **BUILDING SYSTEMS & SERVICES**

BY: \_\_\_\_\_

Courtney H. Bauer

c/o Building Systems & Services  
1504 Kirkwood Highway – Wilmington, DE 19805  
Telephone: 302-996-0900 Fax: 302-996-0999



ORIGINAL DATE: April 24, 2015

**PROJECT**

Sussex Correctional Institution  
Boot Camp to Programs Building Conversion  
Georgetown, DE

**ENGINEER**

Tetra Tech Inc.  
Newark, DE

**SUBMITTAL**

**Three (3) JOHNSON CONTROLS Solution Air Handling Units**  
**Tag: AHU-1, 2, 3**

**DRAWINGS REDACTED**



## SOLUTION XT AIR HANDLING UNIT PERFORMANCE SPECIFICATION

Unit Tag	Qty	Model	Air Flow (CFM)
AHU-1	1	Indoor Air Handler 54 x 78	9700

### Unit Sequence

Tier 1

FS <<< CC <<< FM

### Basic Unit Options

Insulation Type: (Refer to Each Segment)  
Base Rail Height: 6"  
Performance: Commercial Performance

### Statement of compliance of standard units.

Solution XT AHU's meet IBC seismic requirements for non-critical equipment ( $I_p = 1.0$ ) for locations with design spectral response  $S_{ds} \leq 0.43$ . Units must be rigid mounted.

The anchorage of the unit to the ground or building structure needs to be evaluated by and is the responsibility of the engineer of record.

Specification of seismic requirements is the responsibility of the project design engineer. If formal certification is required, please contact your sales representative and/or application engineer for review. Certain application and site requirements may require additional cost and/or lead time.

### Unit Special Quotes

None

**\*Note:** Component locations are listed as Segment Hand (Unit Hand) : ex. Left (Right)  
See Submittal Drawing for additional details





## SOLUTION XT AIR HANDLING UNIT PERFORMANCE SPECIFICATION

Unit Tag	Qty	Model	Air Flow (CFM)
AHU-1	1	Indoor Air Handler 54 x 78	9700

<b>Segments Listed Starting At Air Inlet</b>
--



## SOLUTION XT AIR HANDLING UNIT PERFORMANCE SPECIFICATION

Unit Tag	Qty	Model	Air Flow (CFM)
AHU-1	1	Indoor Air Handler 54 x 78	9700

### FM – Filter/Mixing Box Segment

#### Segment Detail

Segment Air Pressure Drop (in. w.g.): 0.36

	Outside Air (OA)	Return/Mixed Air (RA/MA)
AirFlow (CFM)	9700	9700
Opening (QTY) Size	21.00Hx60.00W	21.00Hx60.00W
Area per Opening (ft <sup>2</sup> )	8.75	8.75
Location	Top	Front-High(Front)
Damper (QTY) Size	(1)21.00x60	(1)21.00x60
Damper Type	Control	Control
Configuration	100%	100%
Damper Model	CD60	CD60
Damper Material	Galvanized	Galvanized
Blade Orientation	Parallel	Parallel
Min. Allowed CFM	N/A	N/A
Damper Linkage	Linked	Linked

#### Filter Media Detail

Filter Type	2"Pleated 30% (MERV 8)
Filter Area (ft <sup>2</sup> )	35.56
Filter QTY/Size	(8)24x20; (4)16x20
Load Option	Side
Filter APD (in. w.g.)	0.12
Dirty Filter Allowance	0.00
Spare Filter Type	None
Spare Filter QTY	0

#### Filter/Mixing Box Segment Options

Interior Galvanized Liner  
Foam Insulation Panels: R-13  
Galvanized Floor Liner STD Gauge  
Exterior Galvanized Liner  
Access Door on Right Side(Right) 48H x 33W  
Standard Door Latch, No Lock, Outward  
Opening  
Filter Gauge (Magnehelic) (0 - 1 in. w. c.)  
Factory mounted 24 V, modulating, 0-10 VDC actuator with spring return



## SOLUTION XT AIR HANDLING UNIT PERFORMANCE SPECIFICATION

Unit Tag	Qty	Model	Air Flow (CFM)
AHU-1	1	Indoor Air Handler 54 x 78	9700

### CC – Cooling Coil Segment

#### Coil Segment Details

Coil Space: 23"

#### Coil Segment Options

Interior Galvanized Liner  
Foam Insulation Panels: R-13  
Galvanized Floor Liner STD Gauge  
Exterior Galvanized Liner  
33" IAQ Coil Drain Pan Right (Right)  
Stainless Steel  
Mastic Coating  
Access Door on Right Side(Right) 48H x 18W  
Standard Door Latch, No Lock, Outward Opening  
Bulkhead Material Galvanized  
Coil Supports Galvanized

### UV Surface Decontamination Detail

None



# SOLUTION XT AIR HANDLING UNIT PERFORMANCE SPECIFICATION

Unit Tag	Qty	Model	Air Flow (CFM)
AHU-1	1	Indoor Air Handler 54 x 78	9700

## FS - Supply Fan Segment

### Segment Details

Segment Air Pressure Drop (in. w.g.):	0.00
Air Flow (CFM):	9700
Altitude (ft.):	0
TSP/ESP (in. w.g.):	2.64/ 1.50
Air Inlet:	Front(Front)
Fan Discharge:	Rear(Rear)

### Fan Segment Options

2" Spring Isolator
Interior Galvanized Liner
Foam Insulation Panels: R-13
Galvanized Floor Liner STD Gauge
Exterior Galvanized Liner
Incandescent Light
External Light Switch
Inverter Drive Balancing
Access Door on Right Side(Right) 48H x 18W
Standard Door Latch, No Lock, Outward Opening

### Fan Detail

Type:	FC
Size:	18-18
Construction:	S
Bearing Options:	Permanent Seal
Fan RPM:	933
BHP:	7.10
Fan BHP w/ Belt Loss:	7.49
Outlet Velocity (ft/min):	3080

### Motor Detail (per motor)

Motor Type:	TECO TEFC Premium Efficiency
HP	7.5
Voltage/Phase/Frequency:	208/3/60 Hz
Insulation Class:	F
Motor RPM:	1800
Frame Size:	213
Location:	Right(Right)

Drive Type:	Belt Drive
Belt Drive Type:	<del>Fixed</del> Provide Adjustable Drive
Full Load Amps (FLA):	19.50
Efficiency:	91.7%



# SOLUTION XT AIR HANDLING UNIT PERFORMANCE SPECIFICATION

Unit Tag	Qty	Model	Air Flow (CFM)
AHU-1	1	Indoor Air Handler 54 x 78	9700

## Wired Disconnect –Supply Fan

### Wired Disconnect Details

Disconnect Type: Non Fused  
Motor Horsepower: 7.5

### Wired Disconnect Electrical Details

Full Load Amps (FLA): 19.5

### Wired Disconnect Options

Enclosure Type: NEMA 1

**Copper Conductors Only**

## Coils & Spacers Listed Starting In Direction Of Air Flow

### CC Coil – 01

#### Coil General/Physical Details

Location: 0 Rows: 1  
Tag: AirCoil Fins Per Inch: 8  
Application: Heating Tubes Per Circuit: 4  
Coil Type: Water Finned Height (in.): 45.00  
Face Type: Full Finned Length (in.): 66  
Tube Diameter: 1/2" BDW Coil Face Area (ft²): 20.6  
Tube Material: Copper Coil Conn. Loc.: Right(Rig  
ht)  
Tube Wall Thickness: .016" Supp Conn Size: 1-1/2"  
Fouling Factor (hft²°F/btu): 0.00000 Rtn Conn Size: 1-1/2"  
Fin Type: Corrugated # of Supply Conn. 1  
Fin Thickness: .006" (per coil):  
Fin Material: Aluminum  
Casing Material: Galvanized  
Connection Material: Steel\*  
Connection Type: MPT  
Coating: None

#### Air Side Performance

Air Flow (scfm): 9700  
Altitude (ft.): 0  
EAT-DB (°F): 47.0  
LAT-DB (°F): 74.2  
FV (ft/min): 471  
TMBH: 286.0  
APD (in. w.g.): 0.04

#### Fluid Side Performance

EWT (°F): 180.0  
LWT (°F): 149.1  
GPM: 19.0  
WPD (ft): 4.7  
FPS: 3.6  
Fluid Type: Water  
Fluid Weight(lb): 23.0  
Fluid Volume(ft³): 0.4

\*Johnson Controls suggests using red brass or copper connectors when the coil is to be attached to a copper or brass piping system.

Ratings are for coils manufactured by Johnson Controls, Inc., 507 E. Michigan St., Milwaukee WI 53202.

BDW Tube Spacing: 1.25" x 1.08"

#### AHRI Messages:

This coil is certified in accordance with the AHRI Forced-Circulation Air-Cooling and Air-Heating Coils Certification Program which is based on AHRI Standard 410 within the range of Standard rating conditions listed in Table 1 of the Standard. Certified units may be found in the AHRI Directory at [www.ahridirectory.org](http://www.ahridirectory.org).

Coil Dll Version: 7.2a



# SOLUTION XT AIR HANDLING UNIT PERFORMANCE SPECIFICATION

Unit Tag	Qty	Model	Air Flow (CFM)
AHU-1	1	Indoor Air Handler 54 x 78	9700

## CC Spacer - 02

### Segment Details

Location:	1
Spacer Length:	6"
Spacer Material:	Galvanized

## CC Coil - 03

### Coil General/Physical Details

### Air Side Performance

### Fluid Side Performance

Location:	2	Rows:	5	Air Flow (scfm):	9700	EWT (°F):	45.0
Tag:	AirCoil	Fins Per Inch:	13	Altitude (ft.):	0	LWT (°F):	56.0
Application:	Cooling	Tubes Per Circuit:	6	EAT-DB (°F):	82.2	GPM:	80.0
Coil Type:	Water	Finned Height (in.):	45.00	EAT-WB (°F):	68.4	WPD (ft):	11.2
Face Type:	Full	Finned Length (in.):	66	LAT-DB (°F):	55.0	FPS:	4.6
Tube Diameter:	1/2" BDW	Coil Face Area (ft²):	20.6	LAT-WB (°F):	53.9	Fluid Type:	Water
Tube Material:	Copper	Coil Conn. Loc.:	Right(Rig ht)	FV (ft/min):	471	Fluid Weight(lb):	110.0
Tube Wall Thickness:	.016"	Supp Conn Size:	3"	SMBH:	293.8	Fluid Volume(ft³):	1.8
Fouling Factor (hft²°F/btu):	0.00000	Rtn Conn Size:	3"	TMBH:	440.6		
Fin Type:	Corrugated	# of Supply Conn. (per coil):	1	APD (in. w.g.):	0.74		
Fin Thickness:	.006"						
Fin Material:	Aluminum						
Casing Material:	Galvanized						
Connection Material:	Steel*						
Connection Type:	MPT						
Coating:	None						

\*Johnson Controls suggests using red brass or copper connectors when the coil is to be attached to a copper or brass piping system.

Ratings are for coils manufactured by Johnson Controls, Inc., 507 E. Michigan St., Milwaukee WI 53202.

BDW Tube Spacing: 1.25" x 1.08"

### AHRI Messages:

This coil is certified in accordance with the AHRI Forced-Circulation Air-Cooling and Air-Heating Coils Certification Program which is based on AHRI Standard 410 within the range of Standard rating conditions listed in Table 1 of the Standard. Certified units may be found in the AHRI Directory at [www.ahridirectory.org](http://www.ahridirectory.org).

Coil DII Version: 7.2a



# SOLUTION XT AIR HANDLING UNIT PERFORMANCE SPECIFICATION

Unit Tag	Qty	Model	Air Flow (CFM)
AHU-1	1	Indoor Air Handler 54 x 78	9700

## Electrical Circuit Summary

### Short-Circuit Summary

50 kA rms Symmetrical 220 V Maximum

### Circuit 1

Supply Fan Motor Control

### Circuit 1 Electrical Details

Full Load Amps (FLA): 19.5  
Minimum Circuit Ampacity (MCA): 24.4  
Maximum Overcurrent Protection: 40.00

### Circuit 2

Lights and Outlets

### Circuit 2 Electrical Details

Maximum Overcurrent Protection: 15.00

## Static Pressure Summary

Segment	Component	Supply (in. w.g.)	Return Fan (in. w.g.)
FM Filter / Mixing Box	Opening Pressure Drop	0.21	
	Control Galvanized (CD60)	0.03	
	2" Pleated 30% (MERV 8)	0.12	
CC Variable Length Cooling Coil	Heating 1 rows 8 fins	0.04	
	Cooling 5 rows 13 fins	0.74	
FS-DWDI Supply Fan	External Static Pressure - User Entered Pressure Drop	1.50	
<b>Total</b>		<b>2.64</b>	<b>0.00</b>
Air handling unit parameters vary depending on conditions. Parameters such as airflows, air pressure drops, and coil capacities are shown for design conditions.			



# SOLUTION XT AIR HANDLING UNIT PERFORMANCE SPECIFICATION

Unit Tag	Qty	Model	Air Flow (CFM)
AHU-1	1	Indoor Air Handler 54 x 78	9700

## Dimension & Weights Summary

Section	Length* (in.)	Width** (in.)	Height (in.)	Weight (lbs.)
FM Filter / Mixing Box Segment	39	78	54	554
CC Variable Length Cooling Coil Segment	49	78	54	1368
FS-DWDI Supply Fan Segment	41	78	54	1002
<b>Overall:</b>	<b>129</b>	<b>78</b>	<b>54</b>	<b>2924</b>
*The length includes bottom tier segments only. **The width does not include coil connection extensions or door latches that extent beyond the unit casing. The width does not include the depth of any pipe chases.				

## Shipping Skid Summary

Shipping Skid	Length* (in.)	Width** (in.)	Height*** (in.)	Weight (lbs.)
(FS-DWDI)	43	85	64	1002
(CC)	49	85	64	1368
(FM)	39	83	64	554
<b>Ship Loose:</b> None				
*The length includes any mounted rain-hoods, discharge flanges, tie-down brackets, shipping wood-blocks, front dampers, split connectors, electrical/control components, outriggering extensions, isolation dampers, inlet baskets **The width includes any door handles, coil connections, drain connections, lifting lugs, mounted pipe-chases, electrical/control components, tie-down brackets, side dampers ***The height includes any base-rails, shipping wood-blocks, roof peak, discharge flanges, mounted gas-furnace flue pipes				
<b>Shipping Skid Sequence</b>  <b>Tier</b> (FS) < (CC) < (FM)				





## SOLUTION XT AIR HANDLING UNIT PERFORMANCE SPECIFICATION

Unit Tag	Qty	Model	Air Flow (CFM)
AHU-1	1	Indoor Air Handler 54 x 78	9700

### Sound Summary

	Octave Band Sound Power Levels (dB Re. 1 picowatt)								dBA
	63	125	250	500	1000	2000	4000	8000	
Ducted Discharge Rear-1, FS	93	90	88	88	88	84	80	75	
Return Air Front-1, FM	84	79	75	77	79	76	70	65	
Outside Air Top-1, FM	78	73	69	73	74	71	65	60	78

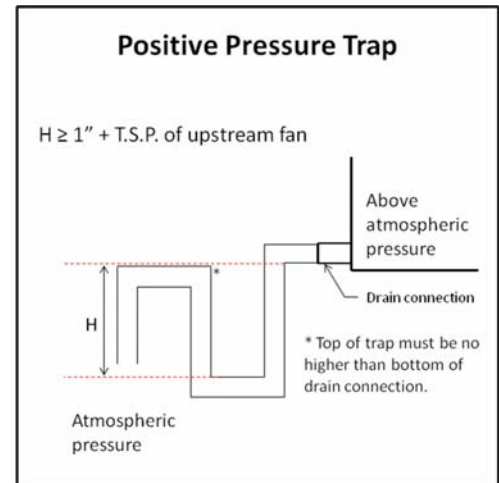
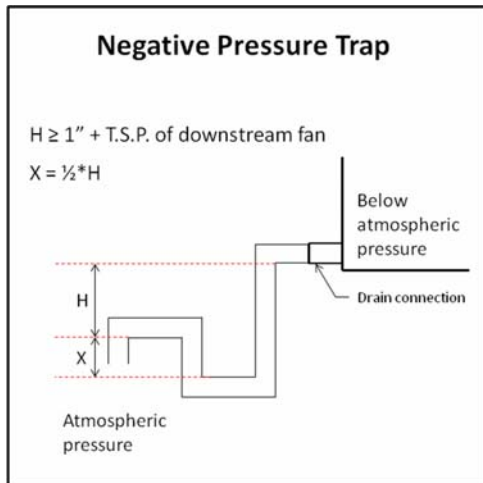
***Sound data tested in accordance with AHRI-260 (2001), Standard for Sound Rating of Ducted Air Moving and Conditioning Equipment.***

#### Notes:

1. The overall A-weighted sound power level is only applicable to sound radiation outdoors and casing radiated sound. This metric does not apply to ducted components
2. Return air sound powers are estimated using 85% of unit flow. Outside air sound powers are estimated using 15% of unit flow.

Unit Tag	Qty	Model	Air Flow (CFM)
AHU-1	1	Indoor Air Handler 54 x 78	9700

## Recommended Trap Height Summary



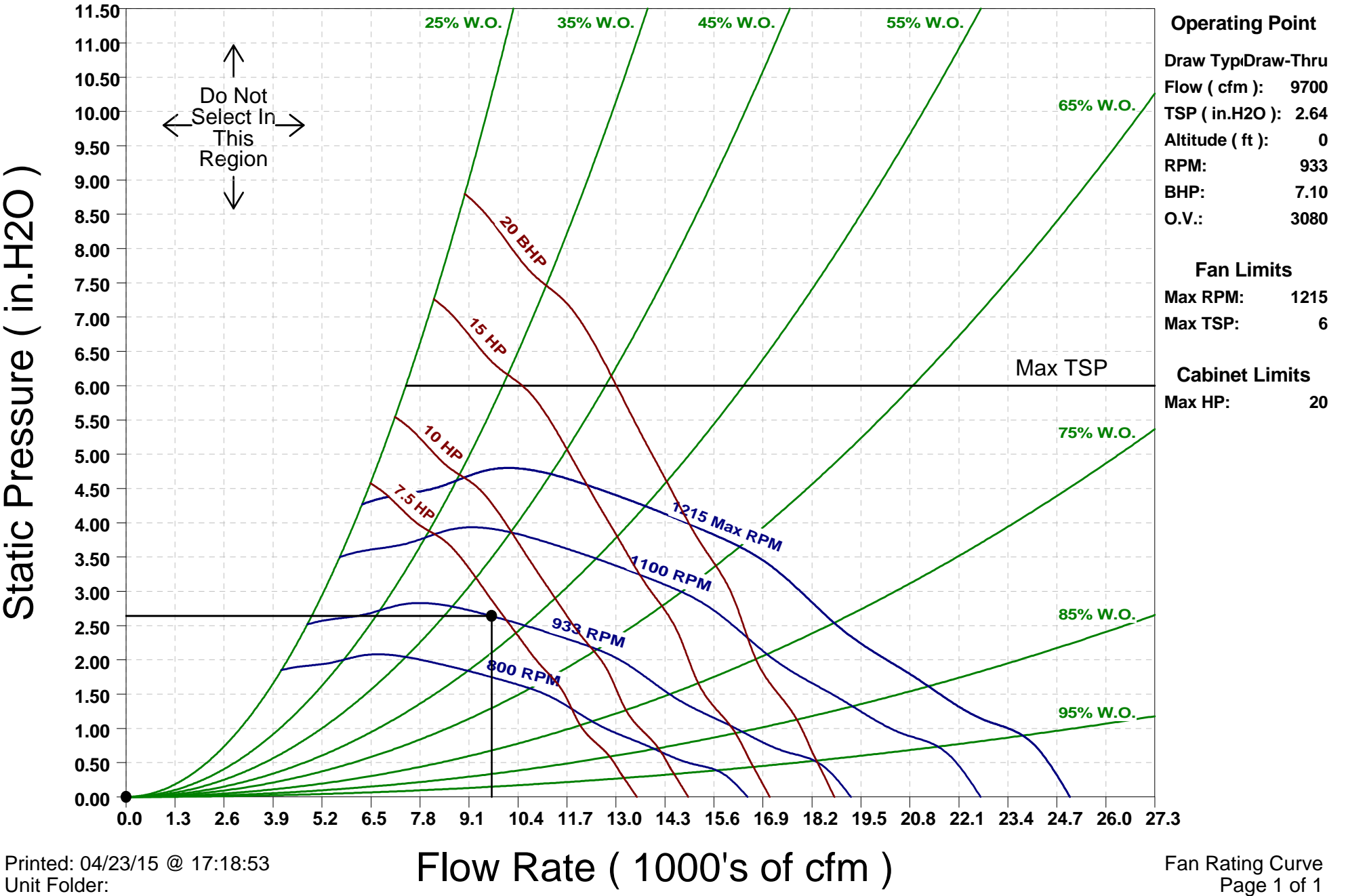
Segment	Applicable Fan	Fan TSP [in H <sub>2</sub> O]	Positive or Negative	Calculated Dimensions			Recommended		Base Rail Height
				H	X	H + X	H	H + X	
CC	Supply Fan	2.64"	Negative	3.64"	1.82"	5.46"	3.75"	5.75"	6"

### Notes:

Formulas and calculations are recommendations only. Contractor shall determine actual dimensions required for each trap based on jobsite conditions, and application requirements.

Refer to section 2 (Installation) of the IOM for more information.

Project Name	Unit Tag	Qty	Model	Seg	Fan Type	Class	Size
SCI Boot Camp	AHU-1	1	XTI-54x78	FS	FC	S	18-18



**DRAWINGS REDACTED**



## SOLUTION XT AIR HANDLING UNIT PERFORMANCE SPECIFICATION

Unit Tag	Qty	Model	Air Flow (CFM)
AHU-2	1	Indoor Air Handler 36 x 60	4475

### Unit Sequence

Tier 1

FS <<< CC <<< FM

### Basic Unit Options

Insulation Type: (Refer to Each Segment)  
Base Rail Height: 6"  
Performance: Commercial Performance

### Statement of compliance of standard units.

Solution XT AHU's meet IBC seismic requirements for non-critical equipment ( $I_p = 1.0$ ) for locations with design spectral response  $S_{ds} \leq 0.43$ . Units must be rigid mounted.

The anchorage of the unit to the ground or building structure needs to be evaluated by and is the responsibility of the engineer of record.

Specification of seismic requirements is the responsibility of the project design engineer. If formal certification is required, please contact your sales representative and/or application engineer for review. Certain application and site requirements may require additional cost and/or lead time.

### Unit Special Quotes

None

**\*Note:** Component locations are listed as Segment Hand (Unit Hand) : ex. Left (Right)  
See Submittal Drawing for additional details



## SOLUTION XT AIR HANDLING UNIT PERFORMANCE SPECIFICATION

Unit Tag	Qty	Model	Air Flow (CFM)
AHU-2	1	Indoor Air Handler 36 x 60	4475

<b>Segments Listed Starting At Air Inlet</b>
--



## SOLUTION XT AIR HANDLING UNIT PERFORMANCE SPECIFICATION

Unit Tag	Qty	Model	Air Flow (CFM)
AHU-2	1	Indoor Air Handler 36 x 60	4475

### FM – Filter/Mixing Box Segment

#### Segment Detail

Segment Air Pressure Drop (in. w.g.): 0.29

	Outside Air (OA)	Return/Mixed Air (RA/MA)
AirFlow (CFM)	4475	4475
Opening (QTY) Size	15.25Hx46.00W	15.25Hx46.00W
Area per Opening (ft²)	4.87	4.87
Location	Top	Front-Low(Front)
Damper (QTY) Size	(1)15.25x46	(1)15.25x46
Damper Type	Control	Control
Configuration	100%	100%
Damper Model	CD60	CD60
Damper Material	Galvanized	Galvanized
Blade Orientation	Parallel	Parallel
Min. Allowed CFM	N/A	N/A
Damper Linkage	Unlinked	Unlinked

#### Filter Media Detail

Filter Type	2"Pleated 30% (MERV 8)
Filter Area (ft²)	16.00
Filter QTY/Size	(8)24x12
Load Option	Side
Filter APD (in. w.g.)	0.12
Dirty Filter Allowance	0.00
Spare Filter Type	None
Spare Filter QTY	0

#### Filter/Mixing Box Segment Options

Interior Galvanized Liner  
Foam Insulation Panels: R-13  
Galvanized Floor Liner STD Gauge  
Exterior Galvanized Liner  
Access Door on Left Side(Left) 30H x 28W  
Standard Door Latch, No Lock, Outward  
Opening  
Filter Gauge (Magnehelic) (0 - 1 in. w. c.)  
Factory mounted 24 V, modulating, 0-10 VDC actuator with spring return



## SOLUTION XT AIR HANDLING UNIT PERFORMANCE SPECIFICATION

Unit Tag	Qty	Model	Air Flow (CFM)
AHU-2	1	Indoor Air Handler 36 x 60	4475

### CC – Cooling Coil Segment

#### Coil Segment Details

Coil Space: 23"

#### Coil Segment Options

Interior Galvanized Liner  
Foam Insulation Panels: R-13  
Galvanized Floor Liner STD Gauge  
Exterior Galvanized Liner  
33" IAQ Coil Drain Pan Left (Left)  
Stainless Steel  
Mastic Coating  
Access Door on Left Side(Left) 30H x 18W  
Standard Door Latch, No Lock, Outward Opening  
Bulkhead Material Galvanized  
Coil Supports Galvanized

### UV Surface Decontamination Detail

None





## SOLUTION XT AIR HANDLING UNIT PERFORMANCE SPECIFICATION

Unit Tag	Qty	Model	Air Flow (CFM)
AHU-2	1	Indoor Air Handler 36 x 60	4475

### FS - Supply Fan Segment

#### Segment Details

Segment Air Pressure Drop (in. w.g.):	0.00
Air Flow (CFM):	4475
Altitude (ft.):	0
TSP/ESP (in. w.g.):	2.86/ 1.65
Air Inlet:	Front(Front)
Fan Discharge:	Rear(Rear)

#### Fan Segment Options

2" Spring Isolator
Interior Galvanized Liner
Foam Insulation Panels: R-13
Galvanized Floor Liner STD Gauge
Exterior Galvanized Liner
Incandescent Light
External Light Switch
Inverter Drive Balancing
Access Door on Left Side(Left) 30H x 18W
Standard Door Latch, No Lock, Outward Opening

#### Fan Detail

Type:	FC
Size:	12-9
Construction:	S
Bearing Options:	Permanent Seal
Fan RPM:	1395
BHP:	3.94
Fan BHP w/ Belt Loss:	4.22
Outlet Velocity (ft/min):	3386

**Seems High. Specified at 2198 fpm. Check Fan Size  
Options in order to reduce Outlet Velocity**

#### Motor Detail (per motor)

Motor Type:	Baldor TEFC Premium Efficiency
HP	5.0
Voltage/Phase/Frequency:	208/3/60 Hz
Insulation Class:	F
Motor RPM:	1800
Frame Size:	184
Location:	Left(Left)
Drive Type:	Belt Drive
Belt Drive Type:	Adjustable
Full Load Amps (FLA):	13.90
Efficiency:	89.5%



# SOLUTION XT AIR HANDLING UNIT PERFORMANCE SPECIFICATION

Unit Tag	Qty	Model	Air Flow (CFM)
AHU-2	1	Indoor Air Handler 36 x 60	4475

## Wired Disconnect –Supply Fan

### Wired Disconnect Details

Disconnect Type: Non Fused  
Motor Horsepower: 5.0

### Wired Disconnect Electrical Details

Full Load Amps (FLA): 13.9

### Wired Disconnect Options

Enclosure Type: NEMA 1

**Copper Conductors Only**

## Coils & Spacers Listed Starting In Direction Of Air Flow

### CC Coil – 01

#### Coil General/Physical Details

Location: 0 Rows: 1  
Tag: AirCoil Fins Per Inch: 9  
Application: Heating Tubes Per Circuit: 4  
Coil Type: Water Finned Height (in.): 27.50  
Face Type: Full Finned Length (in.): 48  
Tube Diameter: 1/2" BDW Coil Face Area (ft²): 9.2  
Tube Material: Copper Coil Conn. Loc.: Left(Left)  
Tube Wall Thickness: .016" Supp Conn Size: 1-1/2"  
Fouling Factor (hft²°F/btu): 0.00000 Rtn Conn Size: 1-1/2"  
Fin Type: Corrugated # of Supply Conn. 1  
Fin Thickness: .006" (per coil):  
Fin Material: Aluminum  
Casing Material: Galvanized  
Connection Material: Steel\*  
Connection Type: MPT  
Coating: None

#### Air Side Performance

Air Flow (scfm): 4475  
Altitude (ft.): 0  
EAT-DB (°F): 34.5  
LAT-DB (°F): 65.2  
FV (ft/min): 486  
TMBH: 148.7  
APD (in. w.g.): 0.04

#### Fluid Side Performance

EWT (°F): 180.0  
LWT (°F): 154.6  
GPM: 12.0  
WPD (ft): 4.1  
FPS: 4.1  
Fluid Type: Water  
Fluid Weight(lb): 11.0  
Fluid Volume(ft³): 0.2

\*Johnson Controls suggests using red brass or copper connectors when the coil is to be attached to a copper or brass piping system.

Ratings are for coils manufactured by Johnson Controls, Inc., 507 E. Michigan St., Milwaukee WI 53202.

BDW Tube Spacing: 1.25" x 1.08"

#### AHRI Messages:

This coil is certified in accordance with the AHRI Forced-Circulation Air-Cooling and Air-Heating Coils Certification Program which is based on AHRI Standard 410 within the range of Standard rating conditions listed in Table 1 of the Standard. Certified units may be found in the AHRI Directory at [www.ahridirectory.org](http://www.ahridirectory.org).

Coil Dll Version: 7.2a



# SOLUTION XT AIR HANDLING UNIT PERFORMANCE SPECIFICATION

Unit Tag	Qty	Model	Air Flow (CFM)
AHU-2	1	Indoor Air Handler 36 x 60	4475

## CC Spacer - 02

### Segment Details

Location:	1
Spacer Length:	6"
Spacer Material:	Galvanized

## CC Coil - 03

### Coil General/Physical Details

### Air Side Performance

### Fluid Side Performance

Location:	2	Rows:	5	Air Flow (scfm):	4475	EWT (°F):	45.0
Tag:	AirCoil	Fins Per Inch:	13	Altitude (ft.):	0	LWT (°F):	55.7
Application:	Cooling	Tubes Per Circuit:	6	EAT-DB (°F):	83.3	GPM:	43.0
Coil Type:	Water	Finned Height (in.):	27.50	EAT-WB (°F):	70.3	WPD (ft):	7.0
Face Type:	Full	Finned Length (in.):	48	LAT-DB (°F):	55.3	FPS:	4.1
Tube Diameter:	1/2" BDW	Finned Area (ft²):	9.2	LAT-WB (°F):	54.3	Fluid Type:	Water
Tube Material:	Copper	Coil Conn. Loc.:	Left(Left)	FV (ft/min):	486	Fluid Weight(lb):	49.0
Tube Wall Thickness:	.016"	Supp Conn Size:	2-1/2"	SMBH:	139.9	Fluid Volume(ft³):	0.8
Fouling Factor (hft²°F/btu):	0.00000	Rtn Conn Size:	2-1/2"	TMBH:	230.2		
Fin Type:	Corrugated	# of Supply Conn. (per coil):	1	APD (in. w.g.):	0.88		
Fin Thickness:	.008"						
Fin Material:	Aluminum						
Casing Material:	Galvanized						
Connection Material:	Steel*						
Connection Type:	MPT						
Coating:	None						

\*Johnson Controls suggests using red brass or copper connectors when the coil is to be attached to a copper or brass piping system.

Ratings are for coils manufactured by Johnson Controls, Inc., 507 E. Michigan St., Milwaukee WI 53202.

BDW Tube Spacing: 1.25" x 1.08"

### AHRI Messages:

This coil is certified in accordance with the AHRI Forced-Circulation Air-Cooling and Air-Heating Coils Certification Program which is based on AHRI Standard 410 within the range of Standard rating conditions listed in Table 1 of the Standard. Certified units may be found in the AHRI Directory at [www.ahridirectory.org](http://www.ahridirectory.org).

Coil Dll Version: 7.2a



# SOLUTION XT AIR HANDLING UNIT PERFORMANCE SPECIFICATION

Unit Tag	Qty	Model	Air Flow (CFM)
AHU-2	1	Indoor Air Handler 36 x 60	4475

## Electrical Circuit Summary

### Short-Circuit Summary

50 kA rms Symmetrical 220 V Maximum

### Circuit 1

Supply Fan Motor Control

### Circuit 1 Electrical Details

Full Load Amps (FLA): 13.9  
Minimum Circuit Ampacity (MCA): 17.4  
Maximum Overcurrent Protection: 30.00

### Circuit 2

Lights and Outlets

### Circuit 2 Electrical Details

Maximum Overcurrent Protection: 15.00

## Static Pressure Summary

Segment	Component	Supply (in. w.g.)	Return Fan (in. w.g.)
FM Filter / Mixing Box	Opening Pressure Drop	0.14	
	Control Galvanized (CD60)	0.03	
	2" Pleated 30% (MERV 8)	0.12	
CC Variable Length Cooling Coil	Heating 1 rows 9 fins	0.04	
	Cooling 5 rows 13 fins	0.88	
FS-DWDI Supply Fan	External Static Pressure - User Entered Pressure Drop	1.65	
<b>Total</b>		<b>2.86</b>	<b>0.00</b>
Air handling unit parameters vary depending on conditions. Parameters such as airflows, air pressure drops, and coil capacities are shown for design conditions.			



# SOLUTION XT AIR HANDLING UNIT PERFORMANCE SPECIFICATION

Unit Tag	Qty	Model	Air Flow (CFM)
AHU-2	1	Indoor Air Handler 36 x 60	4475

## Dimension & Weights Summary

Section	Length* (in.)	Width** (in.)	Height (in.)	Weight (lbs.)
FM Filter / Mixing Box Segment	34	60	36	353
CC Variable Length Cooling Coil Segment	49	60	36	962
FS-DWDI Supply Fan Segment	37	60	36	654
<b>Overall:</b>	<b>120</b>	<b>60</b>	<b>36</b>	<b>1969</b>
*The length includes bottom tier segments only. **The width does not include coil connection extensions or door latches that extent beyond the unit casing. The width does not include the depth of any pipe chases.				

## Shipping Skid Summary

Shipping Skid	Length* (in.)	Width** (in.)	Height*** (in.)	Weight (lbs.)
(FS-DWDI)	39	67	46	654
(CC)	49	67	46	962
(FM)	34	65	46	353
<b>Ship Loose:</b> None				
*The length includes any mounted rain-hoods, discharge flanges, tie-down brackets, shipping wood-blocks, front dampers, split connectors, electrical/control components, outriggering extensions, isolation dampers, inlet baskets **The width includes any door handles, coil connections, drain connections, lifting lugs, mounted pipe-chases, electrical/control components, tie-down brackets, side dampers ***The height includes any base-rails, shipping wood-blocks, roof peak, discharge flanges, mounted gas-furnace flue pipes				
<b>Shipping Skid Sequence</b>				
<b>Tier</b> <div>(FS) &lt; (CC) &lt; (FM)</div>				



## SOLUTION XT AIR HANDLING UNIT PERFORMANCE SPECIFICATION

Unit Tag	Qty	Model	Air Flow (CFM)
AHU-2	1	Indoor Air Handler 36 x 60	4475

### Sound Summary

	Octave Band Sound Power Levels (dB Re. 1 picowatt)								dBA
	63	125	250	500	1000	2000	4000	8000	
Ducted Discharge Rear-1, FS	90	88	89	92	92	90	84	78	
Return Air Front-1, FM	80	85	79	76	79	80	74	66	
Outside Air Top-1, FM	73	78	72	71	74	75	69	61	80

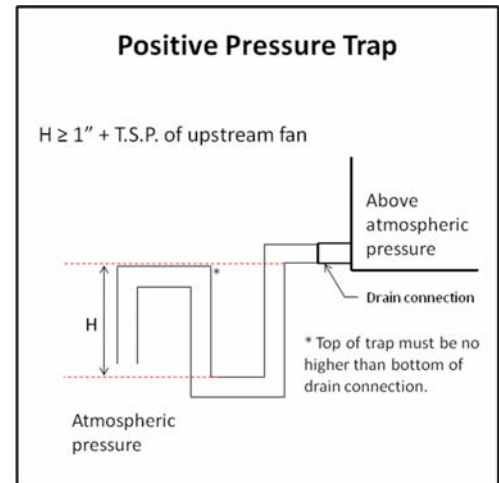
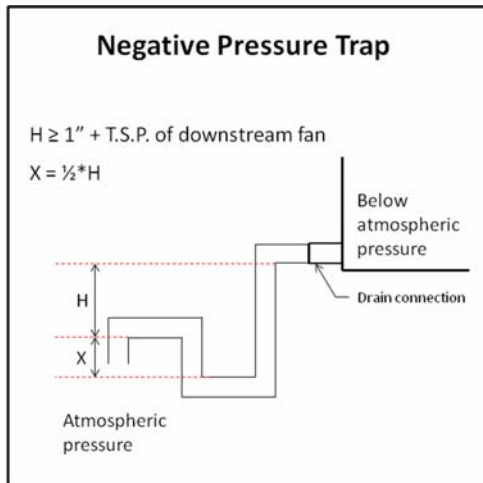
***Sound data tested in accordance with AHRI-260 (2001), Standard for Sound Rating of Ducted Air Moving and Conditioning Equipment.***

#### Notes:

1. The overall A-weighted sound power level is only applicable to sound radiation outdoors and casing radiated sound. This metric does not apply to ducted components
2. Return air sound powers are estimated using 85% of unit flow. Outside air sound powers are estimated using 15% of unit flow.

Unit Tag	Qty	Model	Air Flow (CFM)
AHU-2	1	Indoor Air Handler 36 x 60	4475

## Recommended Trap Height Summary



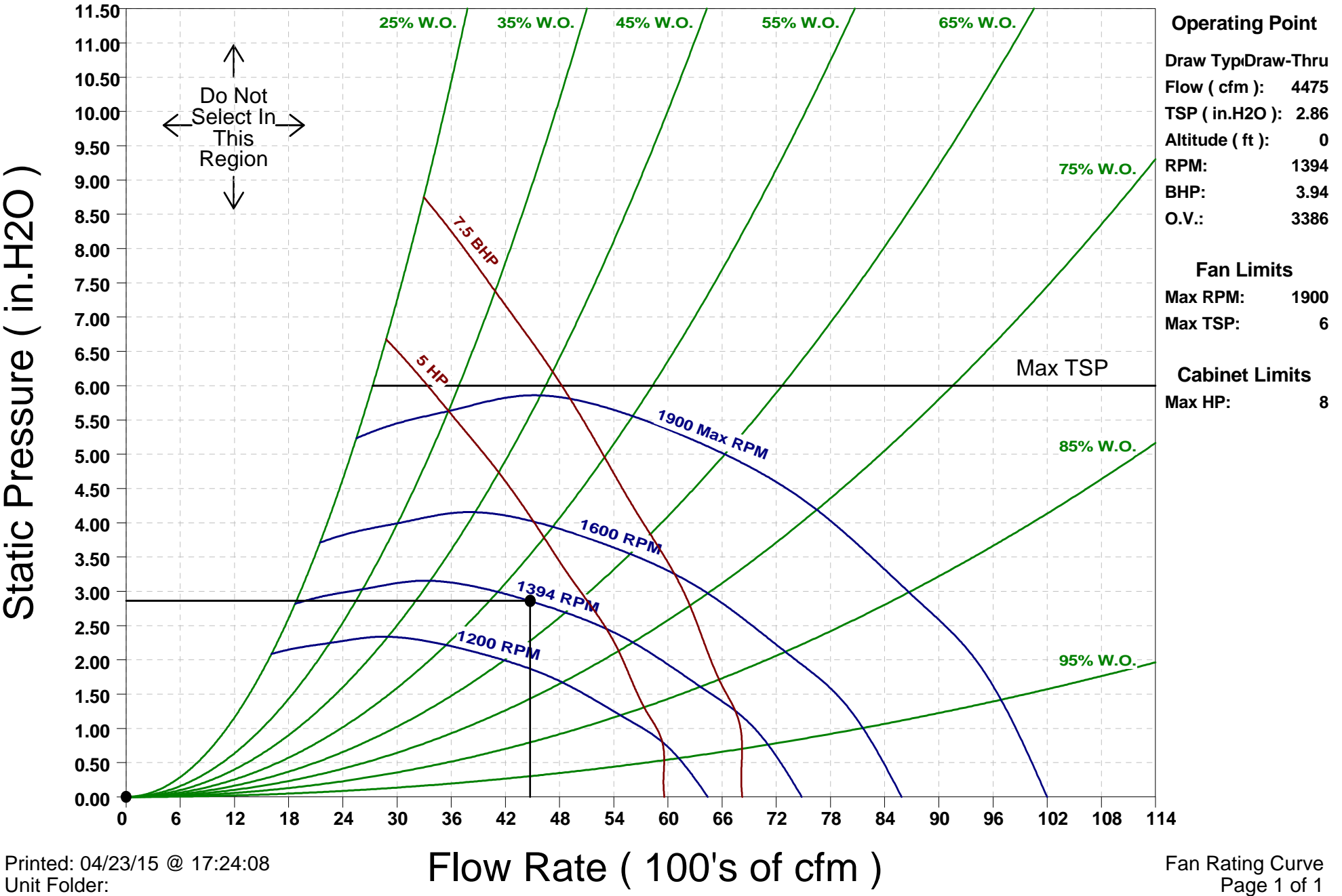
Segment	Applicable Fan	Fan TSP [in H <sub>2</sub> O]	Positive or Negative	Calculated Dimensions			Recommended		Base Rail Height
				H	X	H + X	H	H + X	
CC	Supply Fan	2.86"	Negative	3.86"	1.93"	5.79"	4.00"	6.00"	6"

### Notes:

Formulas and calculations are recommendations only. Contractor shall determine actual dimensions required for each trap based on jobsite conditions, and application requirements.

Refer to section 2 (Installation) of the IOM for more information.

Project Name	Unit Tag	Qty	Model	Seg	Fan Type	Class	Size
SCI Boot Camp	AHU-2	1	XTI-36x60	FS	FC	S	12-9





**DRAWINGS REDACTED**



## SOLUTION XT AIR HANDLING UNIT PERFORMANCE SPECIFICATION

Unit Tag	Qty	Model	Air Flow (CFM)
AHU-3	1	Indoor Air Handler 36 x 48	3375

### Unit Sequence

Tier 1

FS <<< CC <<< FM

### Basic Unit Options

Insulation Type: (Refer to Each Segment)  
Base Rail Height: 6"  
Performance: Commercial Performance

### Statement of compliance of standard units.

Solution XT AHU's meet IBC seismic requirements for non-critical equipment ( $I_p = 1.0$ ) for locations with design spectral response  $S_{ds} \leq 0.43$ . Units must be rigid mounted.

The anchorage of the unit to the ground or building structure needs to be evaluated by and is the responsibility of the engineer of record.

Specification of seismic requirements is the responsibility of the project design engineer. If formal certification is required, please contact your sales representative and/or application engineer for review. Certain application and site requirements may require additional cost and/or lead time.

### Unit Special Quotes

None

**\*Note:** Component locations are listed as Segment Hand (Unit Hand) : ex. Left (Right)  
See Submittal Drawing for additional details



## SOLUTION XT AIR HANDLING UNIT PERFORMANCE SPECIFICATION

Unit Tag	Qty	Model	Air Flow (CFM)
AHU-3	1	Indoor Air Handler 36 x 48	3375

<b>Segments Listed Starting At Air Inlet</b>
--



## SOLUTION XT AIR HANDLING UNIT PERFORMANCE SPECIFICATION

Unit Tag	Qty	Model	Air Flow (CFM)
AHU-3	1	Indoor Air Handler 36 x 48	3375

### FM – Filter/Mixing Box Segment

#### Segment Detail

Segment Air Pressure Drop (in. w.g.): 0.31

	Outside Air (OA)	Return/Mixed Air (RA/MA)
AirFlow (CFM)	3375	3375
Opening (QTY) Size	15.25Hx34.00W	15.25Hx34.00W
Area per Opening (ft²)	3.60	3.60
Location	Top	Front-Low(Front)
Damper (QTY) Size	(1)15.25x34	(1)15.25x34
Damper Type	Control	Control
Configuration	100%	100%
Damper Model	CD60	CD60
Damper Material	Galvanized	Galvanized
Blade Orientation	Parallel	Parallel
Min. Allowed CFM	N/A	N/A
Damper Linkage	Linked	Linked

#### Filter Media Detail

Filter Type	2"Pleated 30% (MERV 8)
Filter Area (ft²)	11.11
Filter QTY/Size	(2)24x20; (2)16x20
Load Option	Side
Filter APD (in. w.g.)	0.13
Dirty Filter Allowance	0.00
Spare Filter Type	None
Spare Filter QTY	0

#### Filter/Mixing Box Segment Options

Interior Galvanized Liner  
Foam Insulation Panels: R-13  
Galvanized Floor Liner STD Gauge  
Exterior Galvanized Liner  
Access Door on Right Side(Right) 30H x 32W  
Standard Door Latch, No Lock, Outward  
Opening  
Filter Gauge (Magnehelic) (0 - 1 in. w. c.)  
Factory mounted 24 V, modulating, 0-10 VDC actuator with spring return



## SOLUTION XT AIR HANDLING UNIT PERFORMANCE SPECIFICATION

Unit Tag	Qty	Model	Air Flow (CFM)
AHU-3	1	Indoor Air Handler 36 x 48	3375

### CC – Cooling Coil Segment

#### Coil Segment Details

Coil Space: 23"

#### Coil Segment Options

Interior Galvanized Liner  
Foam Insulation Panels: R-13  
Galvanized Floor Liner STD Gauge  
Exterior Galvanized Liner  
33" IAQ Coil Drain Pan Right (Right)  
Stainless Steel  
Mastic Coating  
Access Door on Right Side(Right) 30H x 18W  
Standard Door Latch, No Lock, Outward Opening  
Bulkhead Material Galvanized  
Coil Supports Galvanized

### UV Surface Decontamination Detail

None



## SOLUTION XT AIR HANDLING UNIT PERFORMANCE SPECIFICATION

Unit Tag	Qty	Model	Air Flow (CFM)
AHU-3	1	Indoor Air Handler 36 x 48	3375

### FS - Supply Fan Segment

#### Segment Details

Segment Air Pressure Drop (in. w.g.):	0.00
Air Flow (CFM):	3375
Altitude (ft.):	0
TSP/ESP (in. w.g.):	2.74/ 1.50
Air Inlet:	Front(Front)
Fan Discharge:	Rear(Rear)

#### Fan Segment Options

2" Spring Isolator
Interior Galvanized Liner
Foam Insulation Panels: R-13
Galvanized Floor Liner STD Gauge
Exterior Galvanized Liner
Incandescent Light
External Light Switch
Inverter Drive Balancing
Access Door on Right Side(Right) 30H x 18W
Standard Door Latch, No Lock, Outward Opening

#### Fan Detail

Type:	FC
Size:	10-10
Construction:	S
Bearing Options:	Permanent Seal
Fan RPM:	1545
BHP:	2.64
Fan BHP w/ Belt Loss:	2.82
Outlet Velocity (ft/min):	2803

**Change to a 3.0 hp Motor**

#### Motor Detail (per motor)

Motor Type:	Baldor TEFC Premium Efficiency
HP	5.0
Voltage/Phase/Frequency:	208/3/60 Hz
Insulation Class:	F
Motor RPM:	1800
Frame Size:	184
Location:	Right(Right)
Drive Type:	Belt Drive
Belt Drive Type:	Adjustable
Full Load Amps (FLA):	13.90
Efficiency:	89.5%

**Change to a 3.0 hp Motor**



# SOLUTION XT AIR HANDLING UNIT PERFORMANCE SPECIFICATION

Unit Tag	Qty	Model	Air Flow (CFM)
AHU-3	1	Indoor Air Handler 36 x 48	3375

## Wired Disconnect –Supply Fan

### Wired Disconnect Details

Disconnect Type: Non Fused  
Motor Horsepower: 5.0

### Wired Disconnect Electrical Details

Full Load Amps (FLA): 13.9

### Wired Disconnect Options

Enclosure Type: NEMA 1

**Copper Conductors Only**

## Coils & Spacers Listed Starting In Direction Of Air Flow

### CC Coil – 01

#### Coil General/Physical Details

Location: 0 Rows: 1  
Tag: AirCoil Fins Per Inch: 8  
Application: Heating Tubes Per Circuit: 4  
Coil Type: Water Finned Height (in.): 27.50  
Face Type: Full Finned Length (in.): 36  
Tube Diameter: 1/2" BDW Coil Face Area (ft²): 6.9  
Tube Material: Copper Coil Conn. Loc.: Right(Rig  
ht)  
Tube Wall Thickness: .016" Supp Conn Size: 1-1/2"  
Fouling Factor (hft²°F/btu): 0.00000 Rtn Conn Size: 1-1/2"  
Fin Type: Corrugated # of Supply Conn. 1  
Fin Thickness: .006" (per coil):  
Fin Material: Aluminum  
Casing Material: Galvanized  
Connection Material: Steel\*  
Connection Type: MPT  
Coating: None

#### Air Side Performance

Air Flow (scfm): 3375 EWT (°F): 180.0  
Altitude (ft.): 0 LWT (°F): 144.3  
EAT-DB (°F): 50.5 GPM: 4.5  
LAT-DB (°F): 71.9 WPD (ft): 0.5  
FV (ft/min): 489 FPS: 1.6  
TMBH: 78.3 Fluid Type: Water  
APD (in. w.g.): 0.04 Fluid Weight(lb): 10.0  
Fluid Volume(ft³): 0.2

\*Johnson Controls suggests using red brass or copper connectors when the coil is to be attached to a copper or brass piping system.

Ratings are for coils manufactured by Johnson Controls, Inc., 507 E. Michigan St., Milwaukee WI 53202.

BDW Tube Spacing: 1.25" x 1.08"

#### AHRI Messages:

This coil is certified in accordance with the AHRI Forced-Circulation Air-Cooling and Air-Heating Coils Certification Program which is based on AHRI Standard 410 within the range of Standard rating conditions listed in Table 1 of the Standard. Certified units may be found in the AHRI Directory at [www.ahridirectory.org](http://www.ahridirectory.org).

Coil Dll Version: 7.2a



## SOLUTION XT AIR HANDLING UNIT PERFORMANCE SPECIFICATION

Unit Tag	Qty	Model	Air Flow (CFM)
AHU-3	1	Indoor Air Handler 36 x 48	3375

### CC Spacer - 02

#### Segment Details

Location:	1
Spacer Length:	6"
Spacer Material:	Galvanized

### CC Coil - 03

#### Coil General/Physical Details

#### Air Side Performance

#### Fluid Side Performance

Location:	2	Rows:	5	Air Flow (scfm):	3375	EWT (°F):	45.0
Tag:	AirCoil	Fins Per Inch:	13	Altitude (ft.):	0	LWT (°F):	51.0
Application:	Cooling	Tubes Per Circuit:	4	EAT-DB (°F):	83.0	GPM:	60.0
Coil Type:	Water	Finned Height (in.):	27.50	EAT-WB (°F):	70.0	WPD (ft):	4.3
Face Type:	Full	Finned Length (in.):	36	LAT-DB (°F):	54.0	FPS:	3.8
Tube Diameter:	1/2" BDW	Coil Face Area (ft²):	6.9	LAT-WB (°F):	53.0	Fluid Type:	Water
Tube Material:	Copper	Coil Conn. Loc.:	Right(Rig ht)	FV (ft/min):	489	Fluid Weight(lb):	41.0
Tube Wall Thickness:	.016"	Supp Conn Size:	2-1/2"	SMBH:	109.3	Fluid Volume(ft³):	0.7
Fouling Factor (hft²°F/btu):	0.00000	Rtn Conn Size:	2-1/2"	TMBH:	181.4		
Fin Type:	Corrugated	# of Supply Conn. (per coil):	1	APD (in. w.g.):	0.89		
Fin Thickness:	.008"						
Fin Material:	Aluminum						
Casing Material:	Galvanized						
Connection Material:	Steel*						
Connection Type:	MPT						
Coating:	None						

\*Johnson Controls suggests using red brass or copper connectors when the coil is to be attached to a copper or brass piping system.

Ratings are for coils manufactured by Johnson Controls, Inc., 507 E. Michigan St., Milwaukee WI 53202.

BDW Tube Spacing: 1.25" x 1.08"

#### AHRI Messages:

This coil is certified in accordance with the AHRI Forced-Circulation Air-Cooling and Air-Heating Coils Certification Program which is based on AHRI Standard 410 within the range of Standard rating conditions listed in Table 1 of the Standard. Certified units may be found in the AHRI Directory at [www.ahridirectory.org](http://www.ahridirectory.org).

Coil DII Version: 7.2a





# SOLUTION XT AIR HANDLING UNIT PERFORMANCE SPECIFICATION

Unit Tag	Qty	Model	Air Flow (CFM)
AHU-3	1	Indoor Air Handler 36 x 48	3375

## Electrical Circuit Summary

### Short-Circuit Summary

50 kA rms Symmetrical 220 V Maximum

### Circuit 1

Supply Fan Motor Control

### Circuit 1 Electrical Details

Full Load Amps (FLA): 13.9  
Minimum Circuit Ampacity (MCA): 17.4  
Maximum Overcurrent Protection: 30.00

### Circuit 2

Lights and Outlets

### Circuit 2 Electrical Details

Maximum Overcurrent Protection: 15.00

## Static Pressure Summary

Segment	Component	Supply (in. w.g.)	Return Fan (in. w.g.)
FM Filter / Mixing Box	Opening Pressure Drop	0.15	
	Control Galvanized (CD60)	0.03	
	2" Pleated 30% (MERV 8)	0.13	
CC Variable Length Cooling Coil	Heating 1 rows 8 fins	0.04	
	Cooling 5 rows 13 fins	0.89	
FS-DWDI Supply Fan	External Static Pressure - User Entered Pressure Drop	1.50	
<b>Total</b>		<b>2.74</b>	<b>0.00</b>
Air handling unit parameters vary depending on conditions. Parameters such as airflows, air pressure drops, and coil capacities are shown for design conditions.			



# SOLUTION XT AIR HANDLING UNIT PERFORMANCE SPECIFICATION

Unit Tag	Qty	Model	Air Flow (CFM)
AHU-3	1	Indoor Air Handler 36 x 48	3375

## Dimension & Weights Summary

Section	Length* (in.)	Width** (in.)	Height (in.)	Weight (lbs.)
FM Filter / Mixing Box Segment	38	48	36	335
CC Variable Length Cooling Coil Segment	49	48	36	864
FS-DWDI Supply Fan Segment	36	48	36	572
<b>Overall:</b>	<b>123</b>	<b>48</b>	<b>36</b>	<b>1771</b>
*The length includes bottom tier segments only. **The width does not include coil connection extensions or door latches that extent beyond the unit casing. The width does not include the depth of any pipe chases.				

## Shipping Skid Summary

Shipping Skid	Length* (in.)	Width** (in.)	Height*** (in.)	Weight (lbs.)
(FS-DWDI)	38	55	46	572
(CC)	49	55	46	864
(FM)	38	53	46	335
<b>Ship Loose:</b> None				
*The length includes any mounted rain-hoods, discharge flanges, tie-down brackets, shipping wood-blocks, front dampers, split connectors, electrical/control components, outriggering extensions, isolation dampers, inlet baskets **The width includes any door handles, coil connections, drain connections, lifting lugs, mounted pipe-chases, electrical/control components, tie-down brackets, side dampers ***The height includes any base-rails, shipping wood-blocks, roof peak, discharge flanges, mounted gas-furnace flue pipes				
<b>Shipping Skid Sequence</b>  <b>Tier</b> (FS) < (CC) < (FM)				



# SOLUTION XT AIR HANDLING UNIT PERFORMANCE SPECIFICATION

Unit Tag	Qty	Model	Air Flow (CFM)
AHU-3	1	Indoor Air Handler 36 x 48	3375

## Sound Summary

	Octave Band Sound Power Levels (dB Re. 1 picowatt)								dBA
	63	125	250	500	1000	2000	4000	8000	
Ducted Discharge Rear-1, FS	87	86	88	90	90	88	82	77	
Return Air Front-1, FM	78	82	76	73	78	77	71	62	
Outside Air Top-1, FM	71	75	69	68	73	72	66	58	77

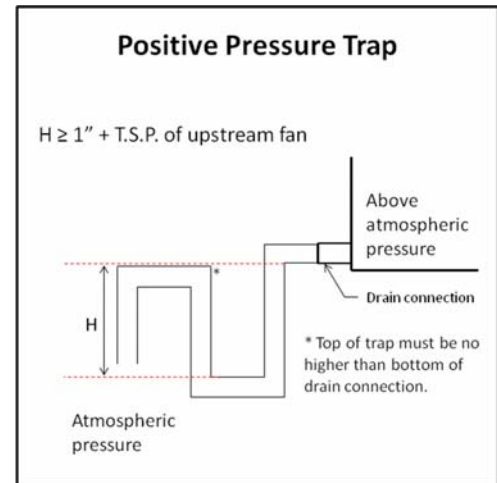
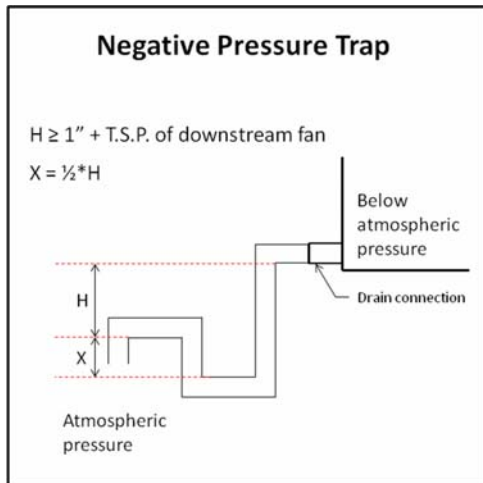
***Sound data tested in accordance with AHRI-260 (2001), Standard for Sound Rating of Ducted Air Moving and Conditioning Equipment.***

### Notes:

1. The overall A-weighted sound power level is only applicable to sound radiation outdoors and casing radiated sound. This metric does not apply to ducted components
2. Return air sound powers are estimated using 85% of unit flow. Outside air sound powers are estimated using 15% of unit flow.

Unit Tag	Qty	Model	Air Flow (CFM)
AHU-3	1	Indoor Air Handler 36 x 48	3375

## Recommended Trap Height Summary



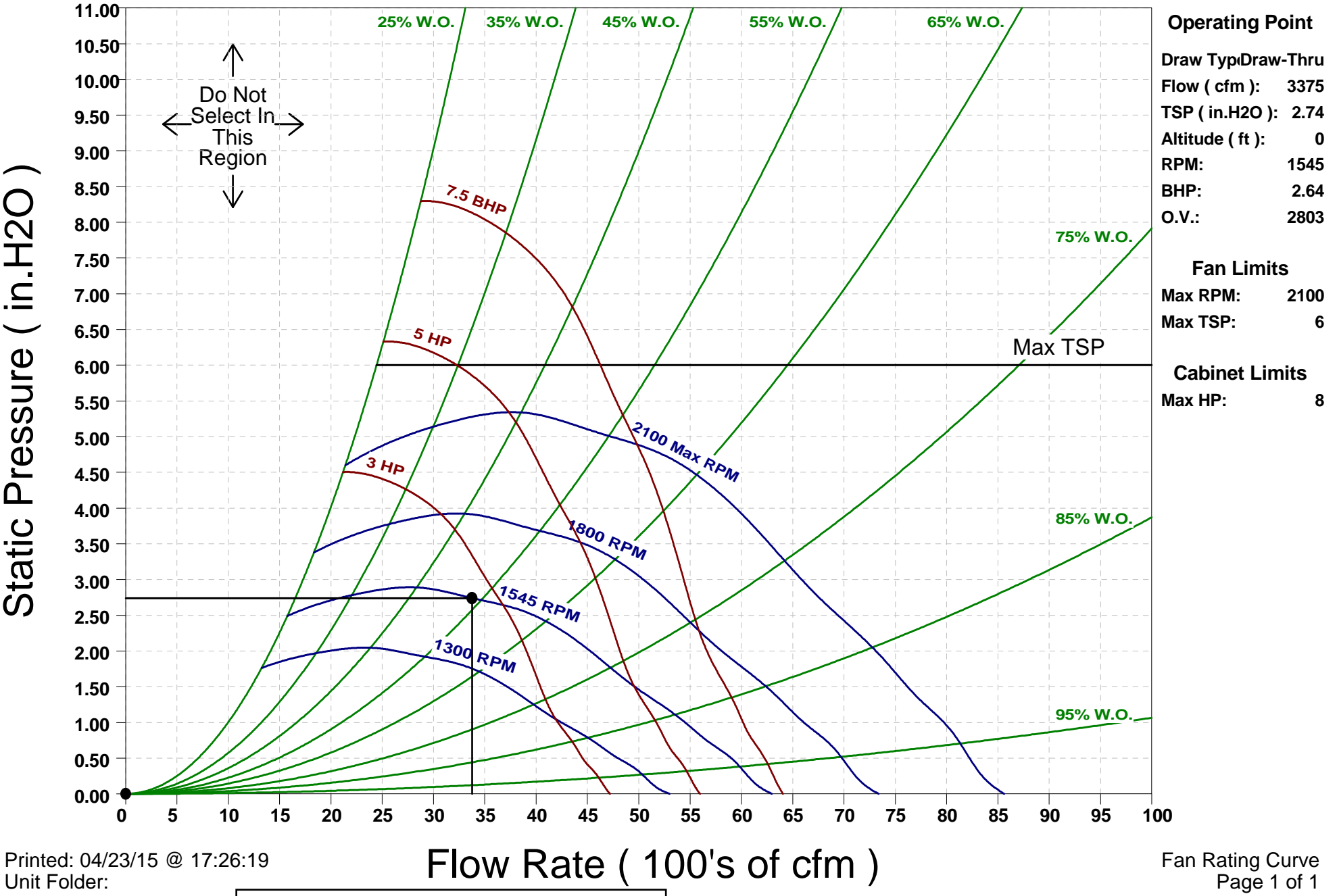
Segment	Applicable Fan	Fan TSP [in H <sub>2</sub> O]	Positive or Negative	Calculated Dimensions			Recommended		Base Rail Height
				H	X	H + X	H	H + X	
CC	Supply Fan	2.74"	Negative	3.74"	1.87"	5.61"	3.75"	5.75"	6"

### Notes:

Formulas and calculations are recommendations only. Contractor shall determine actual dimensions required for each trap based on jobsite conditions, and application requirements.

Refer to section 2 (Installation) of the IOM for more information.

Project Name	Unit Tag	Qty	Model	Seg	Fan Type	Class	Size
SCI Boot Camp	AHU-3	1	XTI-36x48	FS	FC	S	10-10



**DRAWINGS REDACTED**

**STANDARD PARTS & LABOR LIMITED WARRANTY**  
**YORK® SOLUTION™ XTO/XTI**  
**JOHNSON CONTROLS**

PRODUCT TYPE: YORK® SOLUTION™ XTO/XTI  
YORK CONTRACT NO.:  
UNIT MODEL NUMBER:  
UNIT SERIAL NUMBER:  
UNIT TAG ID:  
UNIT LOCATION:

STARTUP DATE:  
SHIPPING DATE:

PROJECT NAME:  
INSTALLATION  
ADDRESS:

**LIMITED WARRANTY**

Subject to the terms, conditions, exclusions, and other limitations set forth in the Standard Limited Warranty for Engineered Systems Equipment (50.05-NM2), when properly endorsed, this protection plan between Johnson Controls, Inc. ("Seller") and the undersigned Customer ("Buyer") warrants that that each new Engineered Systems Equipment manufactured by Seller and materials, or installation or start-up services performed by Johnson Controls in connection therewith, are free from defects in material and workmanship for eighteen (18) months from the date of shipment from Seller's facility or twelve (12) months from startup, whichever occurs first. When properly endorsed, this protection plan between the Seller and Buyer, warrants, to the customer named herein, labor for the entire air handling unit. Labor repairs must be performed in accordance with instructions issued by Johnson Controls.

THIS WARRANTY IS EXCLUSIVE AND IN LIEU OF ALL OTHER WARRANTIES AND LIABILITIES, EXPRESS OR IMPLIED IN LAW OR IN FACT, INCLUDING, WITHOUT LIMITATION, THE WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE. THE WARRANTIES CONTAINED HEREIN SET FORTH BUYER'S SOLE AND EXCLUSIVE REMEDY IN THE EVENT OF A DEFECT IN WORKMANSHIP OR MATERIALS. IN NO EVENT SHALL JOHNSON CONTROLS' LIABILITY FOR DIRECT OR COMPENSATORY DAMAGES EXCEED THE PAYMENTS RECEIVED BY JOHNSON CONTROLS FROM BUYER FOR THE MATERIALS OR EQUIPMENT INVOLVED. NOR SHALL JOHNSON CONTROLS BE LIABLE FOR ANY SPECIAL, INCIDENTAL, OR CONSEQUENTIAL DAMAGES. THESE LIMITATIONS ON LIABILITY AND DAMAGES SHALL APPLY UNDER ALL THEORIES OF LIABILITY OR CAUSES OF ACTION, INCLUDING, BUT NOT LIMITED TO, CONTRACT, WARRANTY, TORT (INCLUDING NEGLIGENCE) OR STRICT LIABILITY. THE ABOVE LIMITATIONS SHALL INURE TO THE BENEFIT OF JOHNSON CONTROLS' SUPPLIERS AND SUBCONTRACTORS.

Notification of defect and any warranty claim must be made in writing, postage paid, with a brief written description of the problem to Buyer's local Johnson Controls' sales/service office. Nothing herein is intended to provide warranty coverage to lessees or anyone other than Buyer and no third-parties are intended to be beneficiaries of this warranty.

BRANCH SERVICE OFFICE:

OFFERED BY:

\_\_\_\_\_  
Johnson Controls Selling Representative Print/Sign

\_\_\_\_\_  
Date

APPROVED BY:

\_\_\_\_\_  
Johnson Controls Branch Manager or other authorized individual Print/Sign

\_\_\_\_\_  
Date

ACCEPTED BY:

\_\_\_\_\_  
Customer Signature

\_\_\_\_\_  
Date