



*Quality People. Building Solutions.*

Comfort Systems USA (Arkansas), Inc.

P.O. Box 16620

LittleRock, AR 72231

Phone 501-834-3320

Fax 501-834-5416

**Date:** 9/1/2025

**Return Request:** 9/15/2025

**Project:** Hot Springs National Park – Rehabilitate Bathhouses – Maurice Bathhouse

**Supplier:** Powers of Arkansas

**Manufacturer:** Quantech

**Submittal:** Air-Cooled Water Chiller (CH-1M)**Submittal Number:** 236430.001**Spec Section:** 236430

**Drawing # and Installation Location:** MP1.1

**ARCHITECT**

## Strata Architecture

1701 Oak Street, Suite 100

Kansas City, Missouri 64108

(816)474-0900

**GENERAL CONTRACTOR**

Tepa, LLC

2345 Grand Blvd, Suite 700

Kansas City, Missouri 64108

(816)708-1110

**ENGINEER**

IMEG Corp.

1600 Baltimore Street, Suite 300

Kansas City, Missouri 64108

(816)842-8437

**MECHANICAL SUBCONTRACTOR**

Comfort Systems USA (Arkansas), Inc.

9924 Landers Road

North Little Rock, Arkansas 72117

(501)834-3320

**Comments:**

**CSUSA PROJECT NO.**

**25-7065**

joe@comfortar.com

9924 Landers Road  
No. LittleRock, AR 72117

## Joseph Loomis

---

**From:** Keith Clement <keith.clement@powers-hvac.com>  
**Sent:** Thursday, May 14, 2026 9:14 AM  
**To:** Joseph Loomis  
**Cc:** Eric Blaylock  
**Subject:** RE: Maurice Chiller

**WARNING:** External Email

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Joe,

I reviewed the submitted chiller against the mechanical schedule and specs. We are not recommending any changes to the submittal at this time.

The scheduled basis-of-design unit is York, and the submitted Quantech unit is effectively the same JCI-manufactured chiller platform. Quantech is a JCI channel brand, and JCI also manufactures York products. The submitted unit meets the specified performance, configuration, and operational requirements shown in the plans and specs.

The only schedule-to-submittal differences I see are minor and tied primarily to the refrigerant transition:

1. Manufacturer / model

Schedule: York YLAA0120SE17XFBSDTX

Submitted: Quantech QTC3110TSJ17XFB

Note: Quantech is a JCI channel brand and is an equivalent JCI-manufactured chiller platform.

2. Refrigerant

Schedule: R-410A

Submitted: R-454B

Note: R-410A has been phased out for this equipment category, and R-454B is the current production refrigerant. This does not change the submitted unit's ability to meet the scheduled performance and operating requirements.

3. Capacity

Schedule: 103.3 tons

Submitted: 103.9 tons

Note: Submitted capacity slightly exceeds the scheduled requirement.

4. Efficiency

Schedule: 7.8 full-load EER, 15.97 NPLV, 17.1 IPLV

Submitted: 8.043 full-load EER, 16.00 NPLV, 17.09 IPLV

Note: Submitted performance meets or exceeds the scheduled values, with IPLV effectively matching by rounding.

5. Dimensions

Schedule maximum: 144" L x 89" W x 95" H

Submitted: 142.7" L x 88.3" W x 94.2" H

Note: Submitted unit is within the scheduled dimensional limits.

6. Electrical

Schedule: 208/3, MCA 507, MOCP 600, 65 kA SCCR, single power connection

Submitted: 208/3, MCA 507, MOCP 600, 65 kA SCCR, single power connection

Note: Matches scheduled electrical requirements.

7. Sound / accessories / configuration

The submitted unit includes the scheduled hot gas bypass, acoustic blanket, low sound fans with VFD control, 30% propylene glycol application, hermetic scroll compressors configuration.

Based on this review, no known deviations are being taken other than the refrigerant update from R-410A to R-454B due to the current refrigerant transition.

Thanks,  
Keith

**Keith Clement**

**Account Executive**

**O** | 877.274.7127

**C** | 501.472.1416

[www.powers-hvac.com](http://www.powers-hvac.com)

**From:** Keith Clement

**Sent:** Thursday, May 14, 2026 8:07 AM



## SUBMITTAL

|                       |                                                                        |
|-----------------------|------------------------------------------------------------------------|
| <b>PRODUCT</b>        | Air Cooled Chiller                                                     |
| <b>SPECIFICATION</b>  | 23 64 30 - 3                                                           |
| <b>MANUFACTURER</b>   | Quantech                                                               |
| <b>JOB NAME</b>       | Maurice Bathhouse                                                      |
| <b>LOCATION</b>       | Hot Springs, AR                                                        |
| <b>ENGINEER</b>       | IMEG                                                                   |
| <b>CONTRACTOR</b>     | Comfort Systems                                                        |
| <b>CONTRACTOR POC</b> | Joe Loomis                                                             |
| <b>DATE</b>           | August 28, 2025                                                        |
| <b>SUBMITTED BY</b>   | Contractor Sales: Eric Blaylock<br>Engineering Accounts: Keith Clement |

## EQUIPMENT SUBMITTAL FOR APPROVAL

PROJECT: Maurice Bathhouse



Air-Cooled Chiller

|           |              |
|-----------|--------------|
| EQUIPMENT | QTC3 Chiller |
| UNIT TAGS | CH-1         |
| QUANTITY  | 1            |

### SUBMITTAL NOTES:

- Unit submitted with R-454B refrigerant



**BID DATE:**  
**PROJECT:** Rehabilitate Bathhouses – Hot Springs

**LAST ADDEDNUM:** None  
**NOTE(S)**

**TO:**

## **BILL OF MATERIAL**

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| <u>ITEM</u> | <u>QTY</u> | <u>TAGS</u> | <u>DESCRIPTION</u>                           |
|-------------|------------|-------------|----------------------------------------------|
| I           | 1          | CH-1        | DIRECT EXPANSION - AIR COOLED SCROLL CHILLER |

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## **EQUIPMENT DESCRIPTIONS**

### **EQUIPMENT PROPOSAL**

#### **Items Included**

- Provide Model QTC3110TSJ17XFB Qty: 1
- Refrigerant Type: R454B
- Brine Application
- Power: 200-208/3/60 Application
- Control Transformer
- Power Connection: SP Circuit Breaker w/ Lockable Handle, 65kA SCWR
- Starter Type: Across the line starter
- TEAO Fan Motors
- Low Sound Fans with VSD
- Standard Insulation
- Aluminum MCHX Coils
- Both Chicago Code and Service Isolation Valves
- High Ambient Kit
- Louvered (Full Unit) Encl Panels (factory)
- Hot Gas Bypass required - 1 circuit
- Acoustic Blanket Required
- Compressor Parts and Labor Warranty: 66 Month (2-5 Year) from date of Shipment or from date of Start Up, whichever comes first.
- Entire Unit Parts Only Warranty: 18 Month (1 Year) (Std) (Months are from date of shipment/Years are from date of start up, whichever expires first)
- Entire Unit Labor Only Warranty: 18 Month (1 Year) (Std) (Months are from date of shipment/Years are from date of start up, whichever expires first)
- Chiller Startup
- SC-Equip Board
- Electronic Expansion Valves
- Extension Kit



# Performance Report

## Performance Specification

Project Name: **Rehabilitate Bathhouses – Hot Springs National Park**

Unit Tag: **CH-1**

Qty.: **1**

Model: **QTC3110TSJ17XF**

### Full Load - Design

#### PIN

|            |            |            |            |            |            |            |            |            |
|------------|------------|------------|------------|------------|------------|------------|------------|------------|
| QTC3110TSJ | 17XFBCTXH  | SXBLXCXX42 | BE1XXXHXXX | YAXGXXX7BX | AVGSXXXXXX |            |            |            |
| ....5...10 | ....5...20 | ....5...30 | ....5...40 | ....5...50 | ....5...60 | ....5...70 | ....5...80 | ....5...90 |



#### Unit

|                               |                   |
|-------------------------------|-------------------|
| Model No.                     | QTC3110TSJ17XFB   |
| Number of Compressors         | 4                 |
| Compressor Type               | Scroll - Hermetic |
| Number of Compressor Circuits | 2                 |
| Refrigerant                   | R454B             |

#### Performance Data

|                                |       |
|--------------------------------|-------|
| Cooling Capacity [tons.R]      | 103.9 |
| Total Power Input [kW]         | 155.0 |
| EER [Btu/W.h]                  | 8.043 |
| NPLV.IP [Btu/W.h]              | 16.00 |
| A-Weighted Sound Power [dB(A)] | 95.0  |

#### Electrical Data

|                                     |                                        |
|-------------------------------------|----------------------------------------|
| Nominal Voltage / Voltage Limits    | 200-208/3/60 / 180-220                 |
| Compressor RLA (each circuit) [A]   | 106.2 / 106.2 / - / 106.2 / 106.2 / -  |
| High LRA Current (each circuit) [A] | 652.0 / 652.0 / - / 652.0 / 652.0 / -  |
| Fan QTY (each circuit)              | 3 / 3                                  |
| Fan FLA (each circuit) [A]          | 7.6 / 7.6                              |
| Min. Circuit Ampacity [A]           | 507.0                                  |
| Recommended Fuse / CB Rating [A]    | 600.0                                  |
| Max. Inverse Time CB Rating [A]     | 600.0                                  |
| Max. Dual Element Fuse Size [A]     | 600.0                                  |
| Unit Short Circuit Withstand [kA]   | 65 kA/208                              |
| Wires Per Phase                     | 3 + 2                                  |
| Wire Range (Lug Size)               | #2/0 AWG - 400 kcmil + 250 - 500 kcmil |
| Compressor kW                       | 144.9                                  |

#### Performance Impacting Options

|                                   |                             |
|-----------------------------------|-----------------------------|
| Starter Type                      | Across the line starter     |
| Power Factor Correction Capacitor | No Power Capacitor required |
| Remote Evaporator                 | Standard Cooler required    |
| Sound Kit                         | Acoustic Blanket Required   |
| Fan                               | Low Sound Fans with VSD     |

#### Weight & Dimensional Data

|                          |       |
|--------------------------|-------|
| Shipping Weight [lbs]    | 5849  |
| Operating Weight [lbs]   | 5959  |
| Refrigerant Charge [lbs] | 91    |
| Length [in]              | 142.7 |
| Width [in]               | 88.3  |
| Height [in]              | 94.2  |

Project Name: Rehabilitate Bathhouses – Hot Springs National Park

Rating Engine Version: REV.v9\_28d.idd

Unit Name: CH-1M

Version: SN25.06b

CHL.2025-08.001



# Performance Report

## Performance Specification

Project Name: **Rehabilitate Bathhouses – Hot Springs National Park**

Unit Tag: **CH-1**

Qty.: **1**

Model: **QTC3110TSJ17XF**

### Heat Exchanger Performance

| Evaporator                                        |                         | Condenser (Air Cooled)        |                 |
|---------------------------------------------------|-------------------------|-------------------------------|-----------------|
| Heat Exchanger Type                               | Plate Heat Exchanger    | Ambient Air Temperature* [°F] | 105.0           |
| Entering Fluid Temperature* [°F]                  | 54.00                   | Altitude* [ft]                | 335             |
| Leaving Fluid Temperature* [°F]                   | 42.00                   | Condensing Temperature [°F]   | 133.33 / 133.33 |
| Flow Rate [USGPM]                                 | 215.4                   | Number of Fans                | 3 / 3           |
| Fouling Factor* [h ft <sup>2</sup> F/Btu]         | 0.000100                | Total Air Flow [cfm]          | 90000           |
| Fluid Type* / Concentration* [%]                  | Propylene Glycol / 30.0 | Total Fan Power [kW]          | 10.08           |
| Fluid Volume [USGAL]                              | 13.2                    |                               |                 |
| Evaporating Temperature [°F]                      | 38.32                   |                               |                 |
| Evaporator Pressure Drop [ft H <sub>2</sub> O]    | 6.05                    |                               |                 |
| Strainer Pressure Drop [ft H <sub>2</sub> O]      | 4.60                    |                               |                 |
| Extension Kit Pressure Drop [ft H <sub>2</sub> O] | 2.47                    |                               |                 |
| Total Pressure Drop [ft H <sub>2</sub> O]         | 13.1                    |                               |                 |
| Fluid Connection Diameter [in]                    | 3                       |                               |                 |
| Minimum Flow Rate [USGPM]                         | 150.0                   |                               |                 |
| Maximum Flow Rate [USGPM]                         | 625.0                   |                               |                 |

\* Designates user specified input

Certified in accordance with the AHRI Air-Cooled Water-Chilling Packages 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.ahridirectory.org](http://www.ahridirectory.org). Unit contains freeze protection fluids in the evaporator with a leaving chilled fluid temperature above 32 DEG F [0 DEG C] and is certified when rated per the Standard with water.



### Part Load Performance (Based on Standard AHRI Unloading)

| Percent Load | Ambient [°F] | Capacity [tons.R] | Power Input [kW] | Unit Efficiency [Btu/W.h] |
|--------------|--------------|-------------------|------------------|---------------------------|
| 100.0        | 105.0        | 103.9             | 155.0            | 8.043                     |
| 87.3         | 86.3         | 90.70             | 91.32            | 11.92                     |
| 60.5         | 86.3         | 62.81             | 55.86            | 13.49                     |
| 67.7         | 67.7         | 70.28             | 46.32            | 18.21                     |
| 32.0         | 67.7         | 33.25             | 22.28            | 17.90                     |
| 34.2         | 55.0         | 35.51             | 19.82            | 21.50                     |
| 34.2         | 55.0         | 35.51             | 19.82            | 21.50                     |

Project Name: Rehabilitate Bathhouses – Hot Springs National Park

Rating Engine Version: REV.v9\_28d.idd

Unit Name: CH-1M

Version: SN25.06b

CHL.2025-08.001



## Performance Report

### Performance Specification

Project Name: **Rehabilitate Bathhouses – Hot Springs National Park**

Unit Tag: **CH-1**

Qty.: **1**

Model: **QTC3110TSJ17XF**

#### Sound Power Levels (In Accordance with AHRI 370)

| Percent Load | Ambient [°F] | Octave Band Center Frequency [Hz] |      |      |      |      |      |      |      | LWA  |
|--------------|--------------|-----------------------------------|------|------|------|------|------|------|------|------|
|              |              | 63                                | 125  | 250  | 500  | 1000 | 2000 | 4000 | 8000 |      |
| 100.0        | 105.0        | 98.0                              | 97.0 | 93.0 | 93.0 | 89.0 | 85.0 | 82.0 | 80.0 | 95.0 |
| 87.3         | 86.3         | 96.0                              | 94.0 | 91.0 | 91.0 | 87.0 | 83.0 | 80.0 | 77.0 | 92.0 |
| 60.5         | 86.3         | 90.0                              | 89.0 | 85.0 | 86.0 | 82.0 | 78.0 | 75.0 | 73.0 | 87.0 |
| 67.7         | 67.7         | 90.0                              | 89.0 | 85.0 | 86.0 | 82.0 | 78.0 | 75.0 | 73.0 | 87.0 |
| 32.0         | 67.7         | 87.0                              | 86.0 | 82.0 | 82.0 | 79.0 | 75.0 | 72.0 | 70.0 | 84.0 |
| 34.2         | 55.0         | 87.0                              | 86.0 | 82.0 | 82.0 | 79.0 | 75.0 | 72.0 | 70.0 | 84.0 |
| 34.2         | 55.0         | 87.0                              | 86.0 | 82.0 | 82.0 | 79.0 | 75.0 | 72.0 | 70.0 | 84.0 |

Note: Unit is equipped with Acoustic Blanket Required and Low Sound Fans with VSD.

Measurement of sound pressure used to obtain the sound power data presented is based on AHRI-370.

Air-cooled chillers are rated in terms of sound power not sound pressure. Johnson Controls provides estimates of sound pressure, but this is not the rating metric.

For an air-cooled chiller, sound pressure calculated from sound power varies depending on how the chiller is assumed to behave, i.e. the radiation model. In other words, determining sound pressure from sound power requires making assumptions that result in different answers at a given distance from the chiller. The environment also influences sound pressure in the field installation. Sound pressure estimation radiation models pertaining to air-cooled chillers include the 'traditional' hemispherical model, parallelepiped model and equivalent hemispherical model.

Regarding sound power, Johnson Controls references tolerance limits based on ASHRAE guidelines. These are +/- 6dB in the 63Hz octave band, +/- 4dB in all other octave bands and +/- 3dB for the overall dBA.

Tolerance limits are based on uncertainties associated with:

1. Measurement Test Procedure
2. Repeatability
3. Production / Manufacturing Variability

Standard deviation associated with air-cooled chiller sound data is a measure of spread i.e. it indicates the range of probability of sound levels. Note that for operating conditions other than AHRI's Standard Rating Condition, higher levels of uncertainty can be expected.

Lead times for factory performance testing depend on test laboratory availability. Please confirm with Johnson Controls Customer Service.

#### Performance at AHRI Conditions

| Evaporator                               |          | Condenser                     |       |
|------------------------------------------|----------|-------------------------------|-------|
| EFT [°F]                                 | 54.00    | Ambient Temp. [°F]            | 95.0  |
| LFT [°F]                                 | 44.00    | Altitude [ft]                 | 0.00  |
| Flow Rate [USGPM]                        | 282.2    | Performance                   |       |
| Pressure Drop [ft H2O]                   | 8.24     | EER [Btu/W.h]                 | 10.01 |
| Fluid Type                               | Water    | IPLV.IP [Btu/W.h]             | 17.09 |
| Fouling Factor [h ft <sup>2</sup> F/Btu] | 0.000100 | Net Cooling Capacity [tons.R] | 118.2 |
| Fluid Volume [USGAL]                     | 13.2     |                               |       |

Note: Unit rated at design condition capacity.



# Performance Report

## Performance Specification

Project Name: **Rehabilitate Bathhouses – Hot Springs National Park**

Unit Tag: **CH-1**

Qty.: **1**

Model: **QTC3110TSJ17XF**

### Part Load Performance (Based on AHRI 550/590 - 2023 (IP))

| Percent Load | Ambient [°F] | Capacity [tons.R] | Power Input [kW] | Unit Efficiency [Btu/W.h] |
|--------------|--------------|-------------------|------------------|---------------------------|
| 100.0        | 95.0         | 118.2             | 141.7            | 10.01                     |
| 83.2         | 80.0         | 98.39             | 86.49            | 13.65                     |
| 55.4         | 80.0         | 65.55             | 52.19            | 15.07                     |
| 60.7         | 65.0         | 71.80             | 45.16            | 19.08                     |
| 28.8         | 65.0         | 34.04             | 21.73            | 18.80                     |
| 30.3         | 55.0         | 35.84             | 19.86            | 21.66                     |
| 30.3         | 55.0         | 35.84             | 19.86            | 21.66                     |

#### Notes:

Country of Origin: Mexico

Min flow rate is for chillers using water. For glycol chillers please contact the application engineering team.

This unit does not have a coil coating selected.

Compliant with ASHRAE 90.1 - 2010, 2013, 2016, 2019, 2022.

Compliant with the requirements of the LEED Energy and Atmosphere Enhanced Refrigerant Management Credit (EAc4).

The product image shown is for illustrative purposes only and is not representative of selected options.

16 15 14 13 12 11 10 9 8 7 6 5 4 3 2 1

NOTES:  
1. PLACEMENT ON A LEVEL SURFACE FREE OF OBSTRUCTIONS (INCLUDING SNOW, FOR WINTER OPERATION) OR AIR RE-CIRCULATION ENSURES RATED PERFORMANCE, RELIABLE OPERATION AND EASE OF MAINTENANCE; SITE RESTRICTIONS MAY COMPROMISE MINIMUM CLEARANCES INDICATED BELOW, RESULTING IN UNPREDICTABLE AIR FLOW PATTERNS AND POSSIBLE DIMINISHED PERFORMANCE. UNIT CONTROLS WILL OPTIMIZE OPERATION WITHOUT NUISANCE HIGH PRESSURE SAFETY CUTOFF. HOWEVER, THE SYSTEM DESIGNER MUST CONSIDER POTENTIAL PERFORMANCE DEGRADATION.

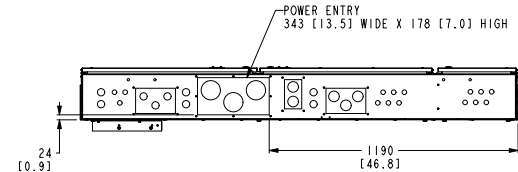
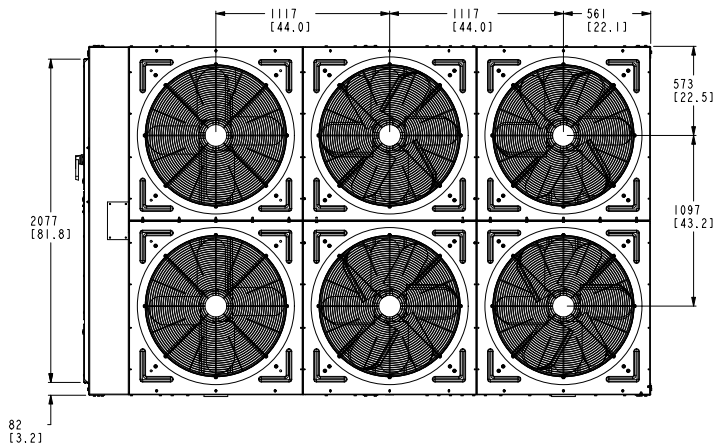
1.1. RECOMMENDED MINIMUM CLEARANCES:  
1.1.1. SIDE TO WALL - 1828.8mm[6']  
1.1.2. REAR TO WALL - 1828.8mm[6']  
1.1.3. CONTROL PANEL TO WALL - 1219.2mm[4']  
1.1.4. TOP - NO OBSTRUCTIONS ALLOWED.  
1.1.5. DISTANCE BETWEEN ADJACENT UNITS - 3048mm[10']  
1.1.6. NO MORE THAN ONE ADJACENT WALL MAY BE HIGHER THAN UNIT.

2. WEIGHT AND CENTER OF GRAVITY - REFER TO AVM REPORT.

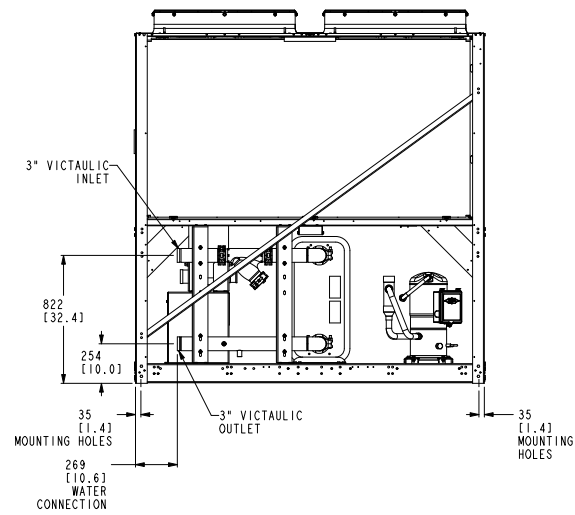
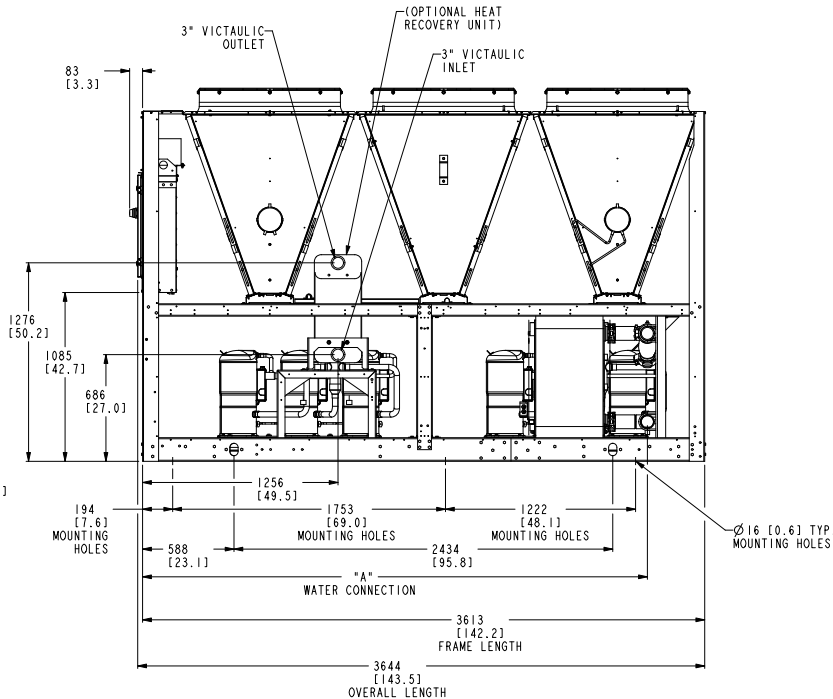
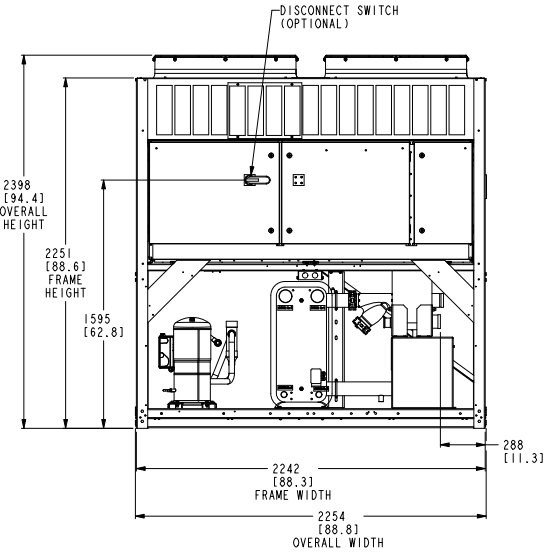
3. INSTALLING CONTRACTOR MUST INCLUDE VENT AND DRAIN ACCOMMODATIONS IN CHILLED WATER PIPING NEAR THE EVAPORATOR.

4. NUMBER OF COMPRESSORS MAY VARY FROM DRAWING.  
4.1. REFER TO PRODUCT LITERATURE.

| THIS DRAWING IS FOR THE FOLLOWING MODELS | DIMENSION "A" |
|------------------------------------------|---------------|
| QTC3090T                                 | 3244 [127.7]  |
| QTC3100T                                 | 3244 [127.7]  |
| QTC3110T                                 | 3361 [132.3]  |



CONTROL PANEL BOTTOM DETAIL



NOTE:  
PRIMARY DIMENSIONS ARE IN INCHES. DIMENSIONS ARE SHOWN IN BRACKETS.



QUANTECH

| REV. | DATE | EC. NO.    | DR. | CHK. | ENG. |
|------|------|------------|-----|------|------|
| NEW  |      | ECN19-0877 |     |      |      |

CONTINUED

\*ALL PROPRIETARY RIGHTS IN THE SUBJECT MATTER HEREOF ARE RESERVED AND NO PERMISSION IS GRANTED TO REPRODUCE THIS PART, IN WHOLE OR IN ANY PART, OR TO DISCLOSE ANY OF THE INFORMATION HEREON TO OTHERS WITHOUT WRITTEN RELEASE BY JOHNSON CONTROLS INCORPORATED\*

DO NOT SCALE  
DRAWN: D.B. NEWSWANGER 08-JAN-2020  
CHKD: X. WANG 08-JAN-2020  
ENG

|                                                        |                                               |                                 |                          |
|--------------------------------------------------------|-----------------------------------------------|---------------------------------|--------------------------|
| PRODUCT DRAWING<br>QTC3<br>WITH HEAT RECOVERY<br>6 FAN | MATERIAL<br>ENG. STD.<br>PART NO.<br>COT SIZE | DRAWING NUMBER<br>035-28261-005 | REVISION<br>VERSION<br>2 |
| SCALE: 1:000                                           | MASS (kg): 0.000                              | ORIG. NO.: 035-24059-006        | SHEET 1 OF 1             |

16 15 14 13 12 11 10 9 8 7 6 5 4 3 2 1



# QTC3 Air Cooled Scroll Chillers

## AVM Report

Project Name: **Rehabilitate Bathhouses – Hot Springs National Park**

Unit Tag: **CH-1**

Qty.: **1**

Model: **QTC3110TSJ17XF**

| PIN        |            |            |            |            |            |            |            |            |
|------------|------------|------------|------------|------------|------------|------------|------------|------------|
| QTC3110TSJ | 17XFBCTXH  | SXBLXCXX42 | BE1XXXHXXX | YAXGXXX7BX | AVGSXXXXXX |            |            |            |
| ....5...10 | ....5...20 | ....5...30 | ....5...40 | ....5...50 | ....5...60 | ....5...70 | ....5...80 | ....5...90 |

L1

L2

Ln-1

Ln



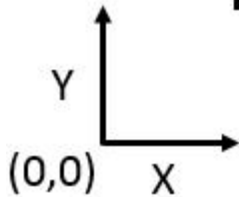
Control Panel End

R1

R2

Rn-1

Rn



| AVM Data |                 |                 |                 |            |           |                        |
|----------|-----------------|-----------------|-----------------|------------|-----------|------------------------|
| LOCATION | X Distance [in] | Y Distance [in] | JCI PART NUMBER | SAP NUMBER | COLOUR    | Operating Weights [lb] |
| R1       | 7.6             | 1.4             | 029-25336-010   | 688693     | Red/Black | 793                    |
| R2       | 76.6            | 1.4             | 029-25336-011   | 688694     | Pink      | 1045                   |
| R3       | 124.7           | 1.4             | 029-25336-009   | 688692     | Red       | 676                    |
| L1       | 7.6             | 86.9            | 029-25336-010   | 688693     | Red/Black | 990                    |
| L2       | 76.6            | 86.9            | 029-25336-012   | 688695     | Pink/Gray | 1605                   |
| L3       | 124.7           | 86.9            | 029-25336-010   | 688693     | Red/Black | 851                    |

| Weight Data            |        |                        |      |
|------------------------|--------|------------------------|------|
| Total Weight [lb]      |        | Centre of Gravity [in] |      |
| Shipping Weight [lb]   | 5848.0 | Xg [in]                | 68.3 |
| Operating Weights [lb] | 5960   | Yg [in]                | 50.8 |

# Air Cooled Scroll Liquid Chiller - Quantech QTC3 R454B 60Hz

## I. GENERAL

### a. GENERAL REQUIREMENTS

- i. 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.

### b. SCOPE

- i. 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

### c. QUALITY ASSURANCE

- i. 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
  - ii. 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.
  - iii. Chiller manufacturer shall have a factory trained and supported service organization.
  - iv. 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.
- ### d. DELIVERY AND HANDLING
- i. 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.
  - ii. Provide protective covering over vulnerable components for unit protection during shipment. Fit nozzles and open ends with plastic or fabric enclosures.
  - iii. Unit shall be stored and handled per Manufacturer's instructions.

## II. PRODUCTS

a. CHILLER MATERIALS AND COMPONENTS

- i. 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.
- ii. 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".
- iii. Operating Characteristics: Provide low and high ambient temperature control options as required to ensure unit is capable of operation from 30°F to 115°F (-1°C to 46°C) ambient temperature. [Optional: -10°F to 125°F (-23°C to 52°C) ambient.]
- iv. Service Isolation valves: Discharge (ball type) isolation valves factory installed per refrigerant circuit. Includes a system high-pressure relief valve in compliance with ASHRAE15.
- v. 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

b. COMPRESSORS

- i. 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.

c. REFRIGERANT CIRCUIT COMPONENTS

- i. Each refrigerant circuit shall include: a discharge service ball type isolation valve, 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, thermostatic expansion valves, and flexible, closed-cell foam insulated suction line and suction pressure transducer.

d. HEAT EXCHANGERS

- i. 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-Ft² - °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 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).
- ii. 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.
  4. Low Sound Fans with Variable Speed Drives. All fans shall be powered by VSDs. Fans shall provide vertical air discharge from extended orifices. Fans shall be composed of corrosion resistant aluminum hub and glass-fiber-reinforced polypropylene composite blades molded into a low-noise airfoil section. Fan impeller shall be dynamically balanced for vibration-free operation. Fan guards of heavy gauge, PVC (polyvinyl chloride) coated or galvanized steel.
- e. CONTROLS
- i. General: Automatic start, stop, operating, and protection sequences across the range of scheduled conditions and transients.
  - ii. Power/Control Enclosure: Rain and dust tight NEMA 3R powder painted steel cabinet with hinged, latched, and gasket sealed door.
  - iii. 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 -10°F to 125°F (-23°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: BACnet MS/TP, Modbus and N2 communication capabilities are standard.
- iv. 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.
- f. POWER CONNECTION AND DISTRIBUTION
  - i. 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.
  - ii. Compressor, control and fan motor power wiring shall be located in an enclosed panel or routed through liquid tight conduit.
- g. ACCESSORIES AND OPTIONS
  - i. Some accessories and options supersede standard product features. Your Quantech representative will be pleased to provide assistance.
  - ii. Microprocessor controlled, Factory installed Across-the-Line type compressor motor starters as standard.
    - 1. High Ambient Control: Permits unit operation above 115°F ambient.
  - iii. Power Supply Connections:
  - iv. 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.
  - v. Protective Chiller Panels (Factory or Field Mounted)
    - 1. Louvered Panels (full unit): Painted steel as per remainder of unit cabinet, to protect condenser coils from incidental damage, visually screen internal components, and prevent unauthorized access to internal components.
  - vi. 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.
  - vii. 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.
  - viii. Low Temperature Process Glycol: Leaving chilled liquid setpoint range 10°F to 50°F (-12°C to 10°C)
  - ix. Chicago Code Relief Valves to meet Chicago Code requirements.
  - x. Sound Reduction (Factory installed):
    - 1. Compressor Acoustic Sound Blankets
  - xi. Vibration Isolation (Field installed):
    - 1. 2" Deflection Restrained Spring Isolators: Level adjustable, restrained mounts in rugged welded steel housing with vertical and horizontal limit stops. Housings shall be designed to withstand a minimum 1.0g accelerated force in all directions to 2 inches (50.8 mm)

### III. EXECUTION

- a. INSTALLATION
  - i. General: Rig and Install in full accordance with Manufacturer's requirements, Project drawings, and Contract documents.
  - ii. Location: Locate chiller as indicated on drawings, including cleaning and service maintenance clearance per Manufacturer instructions. Adjust and level chiller on support structure.
  - iii. Components: Installing Contractor shall provide and install all auxiliary devices and accessories for fully operational chiller.

- iv. Electrical: Coordinate electrical requirements and connections for all power feeds with Electrical Contractor (Division 16).
- v. Controls: Coordinate all control requirements and connections with Controls Contractor.
- vi. Finish: Installing Contractor shall paint damaged and abraded factory finish with touch-up paint matching factory finish.