SCOPE OF WORK

Asbury Park Rooftop Unit Replacement

630 Bangs Ave.
Asbury Park, Monmouth County, NJ

Project No. A1419-00

STATE OF NEW JERSEY

Honorable Philip D. Murphy, Governor
Honorable Tahesha L. Way, Lt. Governor

DEPARTMENT OF THE TREASURY

Elizabeth Maher Muoio, Treasurer

DIVISION OF PROPERTY MANAGEMENT AND CONSTRUCTION

Christopher Chianese, Director

Date: September 3, 2024

Document Format Revision 8-1-2022

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I. OBJECTIVE

The objective of this project is to replace three rooftop HVAC units at the state office building located at 630 Bangs Ave. in Asbury Park, New Jersey. A toilet room exhaust fan will also be replaced and the control system will be upgraded. Reheat coils will be added to VAV boxes to better maintain temperature and humidity levels.

II. CONSULTANT QUALIFICATIONS

A. CONSULTANT & SUB-CONSULTANT PRE-QUALIFICATIONS

The Consultant shall be a firm pre-qualified with the Division of Property Management & Construction (DPMC) in the following discipline(s):

- **P003 HVAC Engineering**

The Consultant shall also have in-house capabilities or Sub-Consultants pre-qualified with DPMC in:

- **P001 Architecture**
- **P002 Electrical Engineering**
- **P007 Structural Engineering**
- **P025 Estimating/Cost Analysis**

As well as, **any and all** other Architectural, Engineering and Specialty Disciplines necessary to complete the project as described in this Scope of Work (SOW).

III. PROJECT BUDGET

A. CONSTRUCTION COST ESTIMATE (CCE)

The initial Construction Cost Estimate (CCE) for this project is $1,470,000.

The Consultant shall review this Scope of Work and provide a narrative evaluation and analysis of the accuracy of the proposed project CCE in its technical proposal based on its professional experience and opinion.

B. CURRENT WORKING ESTIMATE (CWE)

The Current Working Estimate (CWE) for this project is $1,898,750.

The CWE includes the construction cost estimate and all consulting, permitting and administrative fees.

The CWE is the client agency's financial budget based on this project Scope of Work and shall not be exceeded during the design and construction phases of the project unless DPMC approves the change in Scope of Work through a Contract amendment.

C. CONSULTANT'S FEES

The construction cost estimate for this project ***shall not*** be used as a basis for the Consultant's design and construction administration fees. The Consultant's fees shall be based on the information contained in this Scope of Work document and the observations made and/or the additional information received during the pre-proposal meeting.

IV. PROJECT SCHEDULE

A. SCOPE OF WORK DESIGN & CONSTRUCTION SCHEDULE

The following schedule identifies the estimated design and construction phases for this project and the estimated durations.

PROJECT PHASE	ESTIMATED DURATION (Calendar Days)
1. Site Access Approvals & Schedule Design Kick-off Meeting	**14**
2. Design Development Phase	**42**
• *Project Team & DPMC Plan/Code Unit Review & Comment*	14
3. Final Design Phase	**42**
• *Project Team & DPMC Plan/Code Unit Review & Approval*	14
4. Final Design Re-Submission to Address Comments	**7**
• *Project Team & DPMC Plan/Code Unit Review & Approval*	14
5. DCA Submission Plan Review	**30**
6. Permit Application Phase	**7**
• *Issue Plan Release*	
7. Bid Phase	**42**

8. Award Phase	**28**
9. Construction Phase	**300**
10. Project Close Out Phase	**30**

B. CONSULTANT'S PROPOSED DESIGN & CONSTRUCTION SCHEDULE

The Consultant shall submit a project design and construction schedule with its technical proposal that is similar in format and detail to the schedule depicted in **Exhibit 'A'**. The schedule developed by the Consultant shall reflect its recommended project phases, phase activities, activity durations.

A written narrative shall also be included with the technical proposal explaining the schedule submitted and the reasons why and how it can be completed in the time frame proposed by the Consultant.

This schedule and narrative will be reviewed by the Consultant Selection Committee as part of the evaluation process and will be assigned a score commensurate with clarity and comprehensiveness of the submission.

V. PROJECT SITE LOCATION & TEAM MEMBERS

A. PROJECT SITE ADDRESS

The location of the project site is:

Asbury Park State Office Building
630 Bangs Avenue
Asbury Park, NJ 07712

See **Exhibit 'B'** for the project site location map.

B. PROJECT TEAM MEMBER DIRECTORY

The following are the names, addresses, and phone numbers of the Project Team members.

1. DPMC Representative:

Name: Babatunde Ogunnubi, Design Project Manager
Address: Division Property Management & Construction
20 West State Street, 3rd Floor
Trenton, NJ 08608-1206
Phone No: (609) 633-7061
E-Mail: babatunde.ogunnubi@treas.nj.gov

2. Department of the Treasury:

Name: Mark Dae, Chief, Property Management
Address: Division Property Management & Construction
20 West State Street, 3rd Floor
Trenton, NJ 08625
Phone No: (609) 984-9711
E-Mail: Mark.Dae@treas.nj.gov

VI. PROJECT DEFINITION

A. BACKGROUND

The state office building located at 630 Bangs Avenue in Asbury Park and dedicated as the Assemblyman Thomas Smith State Office Building in 2003, is in need of replacement of three rooftop HVAC units. The building is also known as the Consolidation Building.

B. FUNCTIONAL DESCRIPTION OF THE BUILDING

A description of the building and the HVAC system can be found in a recent study performed by Schiller and Hersh Associates, Inc (S&H) shown in **Exhibit 'C'**. The state has selected Option 1 for a full HVAC system Upgrade as delineated in the study.

VII. CONSULTANT DESIGN RESPONSIBILITIES

A. DESIGN REQUIREMENTS

1. General:

The Consultant shall review the study by Schiller and Hersh Associates, Inc. shown in **Exhibit 'C'** and provide design, specifications, bid//award, permitting and construction administration services to upgrade three rooftop units (RTU's) at the Asbury Park State Office Building.

Reheat coils shall be added where needed and identified in the study.

The control system shall be upgraded.

The existing toilet room roof exhaust fan shall also be replaced.

The design documents shall provide details in the drawings and specification describing the methods and materials required by the contractors to interface the new equipment to the existing interior system components.

Provide the design for electrical supply, panels, breakers, etc. for new air handler units and ancillary equipment where required.

The specifications shall describe the preferred new equipment and shall list the names of three equal manufacturers for each.

Existing refrigerant shall be properly disposed. The Contractor shall supply the initial charge of new refrigerant.

Provide the design for all associated controls necessary for the proper operation of the new units, their related components, and the room temperature and humidity levels. All system automatic electronic controls shall have a manual override feature. Control items to address shall include, but not be limited to the following items: thermostats, wiring, smoke detectors shutdown and interface with the fire alarm panel.

2. Heating and Cooling Load Calculations:

Provide calculations of the required building air supply and exhaust quantities. Provide a ventilation schedule for all building spaces.

Provide calculations of the cooling and heating load requirements of the interior building spaces to be conditioned. Calculations shall be based on, but not be limited to items such as: conduction

and convection heat transmission, air ventilation and infiltration, internal building heat sources, solar heat gain, etc.

3. Structural Calculations:

One (1) set of signed and sealed structural calculations shall be provided to the DPMC Plan and Code Review Unit Manager indicating that the existing roof structural system is designed properly for the weight of the replacement HVAC units, curbing, supports, ductwork, etc.

The design drawings must indicate the size and dimensions of the new HVAC units and their related curbing, support fixtures, and structural components including the approved method of attachment to those components.

4. Demolition:

Special demolition and removal procedures shall be identified in the design documents for the HVAC units that are to be replaced. Special procedures and required hours for electric utility shutdown and/or switchover during the HVAC unit removal and replacement shall be described and included in the design documents.

5. New Equipment:

Delivery dates of the HVAC equipment specified must be obtainable to meet the projected completion date of the project. Documents shall include a requirement for the Contractor to minimize the HVAC system downtime.

The Consultant shall ensure that a factory representative is onsite for the start-up of the new HVAC equipment.

6. Controls:

Provide a design for a digital control system for the proper operation of the HVAC units, their related components, and building temperature levels. Control items to address shall include, but not be limited to the following: thermostats, smoke detectors, HVAC fan motor shutdown, and interface with the existing fire detection system and fire alarm panel.

All system automatic electronic controls shall have a manual override feature.

7. Testing and Balancing:

The Consultant shall, during the investigation phase of its work, use its discretion and experience to determine whether HVAC System Testing and Balancing is needed in order to properly assess the function of the existing HVAC System. Such HVAC System Testing and Balancing shall be

performed by a qualified firm. It is not required that such firm be pre-qualified with DPMC, however a NJ Business Registration Certificate will be required.

As part of the design documents, the Consultant shall ensure that, following construction, the Contractor is required to hire a qualified HVAC Testing and Balancing firm, and such firm shall perform system tests to ensure that the HVAC system as installed performs as specified and designed. The design documents shall further require that the HVAC System Testing and Balancing firm shall produce a report setting forth its findings, adjustments, recommendations, and further that it shall certify that the HVAC system meets the design intent and will perform as specified and designed and that that all equipment, i.e., fans, controls, dampers, and devices requiring adjustments or regulation are properly installed, thoroughly cleaned, adjusted, or regulated for proper operation and free from objectionable noise and vibration. It is not required that such firm be pre-qualified with DPMC, however a NJ Business Registration Certificate will be required.

As part of Consultant's Construction Site Administration services, it will oversee the Contractor's work and their hiring of a HVAC System Testing and Balancing firm. The Consultant shall further ensure that any testing and balancing is performed in accordance with the current Association Air Balancing Council Standards or other State approved associations. Any system tests shall be observed and approved by the DPMC Project Manager and Code Group and a copy of the certified report and certification referred to above is to be provided to the DPMC Project Manager. The system shall be maintained by the maintenance personnel in accordance with the report data and operating manuals provided by the Contractor.

8. Energy Rebates:

The HVAC units shall be high efficiency units with the Consultant completing application for energy rebates as described in Section IX of this Scope of Work entitled “Energy Rebate and Incentive Programs”.

B. DESIGN MEETINGS & PRESENTATIONS

1. Design Meetings:

Conduct the appropriate number of review meetings with the Project Team members during each design phase of the project so they may determine if the project meets their requirements, question any aspect of the contract deliverables, and make changes where appropriate. The Consultant shall describe the philosophy and process used in the development of the design criteria and the various alternatives considered to meet the project objectives. Selected studies, sketches, cost estimates, schedules, and other relevant information shall be presented to support the design solutions proposed. Special considerations shall also be addressed such as: Contractor site access limitations, utility shutdowns and switchover coordination, phased construction and

schedule requirements, security restrictions, available swing space, material and equipment delivery dates, etc.

It shall also be the responsibility of the Consultant to arrange and require all critical Sub-Consultants to be in attendance at the design review meetings.

Record the minutes of each design meeting and distribute within three (3) calendar days to all attendees and those persons specified to be on the distribution list by the Project Manager.

2. Design Presentations:

The minimum number of design presentations required for each phase of this project is identified below for reference:

Design Development Phase: One (1) oral presentation at phase completion.

Final Design Phase: One (1) oral presentation at phase completion.

C. EXISTING DOCUMENTATION

Copies of the following documents will be provided to each Consulting firm at the pre-proposal meeting to assist in the bidding process.

- DPMC Project A0951-00: **New Offices for Public Defender and DCA State Office Building**, As-Built 11/21/03, Ronald A. Sebring Associates, LLC.
- **New State Office Building** – Record Drawing 11/29/01, Nadaskay Kopelson Architects

Review these documents and any additional information that may be provided at a later date such as reports, studies, surveys, equipment manuals, as-built drawings, etc. The State does not attest to the accuracy of the information provided and accepts no responsibility for the consequences of errors by the use of any information and material contained in the documentation provided. It shall be the responsibility of the Consultant to verify the contents and assume full responsibility for any determination or conclusion drawn from the material used. If the information provided is insufficient, the Consultant shall take the appropriate actions necessary to obtain the additional information required.

All original documentation shall be returned to the provider at the completion of the project.

VIII. PERMITS & APPROVALS

A. NJ UNIFORM CONSTRUCTION CODE PLAN REVIEW AND PERMIT

The project construction documents must comply with the latest adopted edition of the NJ Uniform Construction Code (NJUCC).

The latest NJUCC Adopted Codes and Standards can be found at:

http://www.state.nj.us/dca/divisions/codes/codreg/

1. NJ Uniform Construction Code (NJUCC) Plan Review

Consultant shall estimate the cost of the NJUCC Plan Review by DCA and include that amount in their fee proposal line item entitled **"Plan Review and Permit Fee Allowance"**, refer to paragraph X.A.

Upon approval of the Final Design Phase Submission by DPMC, the Consultant shall submit the construction documents to the Department of Community Affairs (DCA), Bureau of Construction Project Review to secure a complete plan release.

As of July 25, 2022, the Department of Community Affairs (DCA) is only accepting digital signatures and seals issued from a third party certificate authority.

Procedures for submission to the DCA Plan Review Unit can be found at:

https://www.state.nj.us/dca/divisions/codes/forms/pdf_bcpr/pr_app_guide.pdf

Consultant shall complete the "Project Review Application" and include the following on Block 5 as the "Owner's Designated Agent Name":

Joyce Spitale, DPMC
PO Box 235
Trenton, NJ 08625-0235
Joyce.Spitale@treas.nj.gov 609-943-5193

The Consultant shall complete the NJUCC "Plan Review Fee Schedule", determine the fee due and pay the NJUCC Plan Review fees, refer to Paragraph X.A.

The NJUCC "Plan Review Fee Schedule" can be found at:

http://www.state.nj.us/dca/divisions/codes/forms/pdf_bcpr/pr_fees.pdf

2. NJ Uniform Construction Code Permit

Upon receipt of a complete plan release from the DCA Bureau of Construction Project Review, the Consultant shall complete the NJUCC permit application and all applicable technical sub-code sections. The "Agent Section" of the application and certification section of the building sub-code section shall be signed. These documents, with **six (6) sets of DCA approved, signed and sealed construction documents** shall be forwarded to the DPMC Project Manager.

The Consultant may obtain copies of all NJUCC permit applications at the following website:

https://www.nj.gov/dca/divisions/codes/resources/constructionpermitforms.html

All other required project permits shall be obtained and paid for by the Consultant in accordance with the procedures described in Paragraph VIII.B.

3. Prior Approval Certification Letters:

The issuance of a construction permit for this project may be contingent upon acquiring various "prior approvals" as defined by N.J.A.C. 5:23-1.4. It is the Consultant's responsibility to determine which prior approvals, if any, are required. The Consultant shall submit a general certification letter to the DPMC Plan & Code Review Unit Manager during the Permit Phase of this project that certifies all required prior approvals have been obtained.

In addition to the general certification letter discussed above, the following specific prior approval certification letters, where applicable, shall be submitted by the Consultant to the DPMC Plan & Code Review Unit Manager: Soil Erosion & Sediment Control, Water & Sewer Treatment Works Approval, Coastal Areas Facilities Review, Compliance of Underground Storage Tank Systems with N.J.A.C. 7:14B, Pinelands Commission, Highlands Council, Well Construction and Maintenance; Sealing of Abandoned Wells with N.J.A.C. 7:9D, Certification that all utilities have been disconnected from structures to be demolished, Board of Health Approval for Potable Water Wells, Health Department Approval for Septic Systems. It shall be noted that in accordance with N.J.A.C. 5:23-2.15(a)5, a permit cannot be issued until the letter(s) of certification is received.

4. Multi-building or Multi-site Permits:

A project that involves many buildings and/or sites requires that a separate permit shall be issued for each building or site. The Consultant must determine the construction cost estimate for *each* building and/or site location and submit that amount where indicated on the permit application.

5. Special Inspections:

In accordance with the requirements of the New Jersey Uniform Construction Code N.J.A.C. 5:23-2.20(b), Bulletin 03-5 and Chapter 17 of the International Building Code, the Consultant shall be responsible for the coordination of all special inspections during the construction phase of the project.

Bulletin 03-5 can be found at:

http://www.state.nj.us/dca/divisions/codes/publications/pdf_bulletins/b_03_5.pdf

a. Definition:

Special inspections are defined as an independent verification by a certified special inspector for **Class I buildings and smoke control systems in any class building**. The special inspector is to be independent from the Contractor and responsible to the Consultant so that there is no possible conflict of interest.

Special inspectors shall be certified in accordance with the requirements in the New Jersey Uniform Construction Code.

b. Responsibilities:

The Consultant shall submit with the permit application, a list of special inspections and the agencies or special inspectors that will be responsible to carry out the inspections required for the project. The list shall be a separate document, on letter head, signed and sealed.

B. OTHER REGULATORY AGENCY PERMITS, CERTIFICATES AND APPROVALS

The Consultant shall identify and obtain all other State Regulatory Agency permits, certificates, and approvals that will govern and affect the work described in this Scope of Work. An itemized list of these permits, certificates, and approvals shall be included with the Consultant's Technical Proposal and the total amount of the application fees should be entered in the Fee Proposal line item entitled, **"Plan Review and Permit Fee Allowance."**

The Consultant may refer to the Division of Property Management and Construction "Procedures for Architects and Engineers Manual", Paragraph "**9. REGULATORY AGENCY APPROVALS"** which presents a compendium of State permits, certificates, and approvals that may be required for this project.

The Consultant shall determine the appropriate phase of the project to submit the permit application(s) in order to meet the approved project milestone dates.

Where reference to an established industry standard is made, it shall be understood to mean the most recent edition of the standard unless otherwise noted. If an industry standard is found to be revoked, or should the standard have undergone substantial change or revision from the time that the Scope of Work was developed, the Consultant shall comply with the most recent edition of the standard.

IX. ENERGY REBATE AND INCENTIVE PROGRAMS

The Consultant shall review any and all programs on the State and Federal level to determine if any proposed upgrades to the mechanical and/or electrical equipment and systems for this project qualify for approved rebates and incentives.

The Consultant shall review the programs available on the "New Jersey's Clean Energy Program" website at: http://www.njcleanenergy.com as well as federal websites and New Jersey electric and gas utility websites to determine if and how they can be applied to this project.

The Consultant shall identify all applicable rebates and incentives in their technical proposal and throughout the design phase.

The Consultant shall be responsible to complete the appropriate registration forms and applications, provide any applicable worksheets, manufacturer's specification sheets, calculations, attend meetings, and participate in all activities with designated representatives of the programs and utility companies to obtain the entitled financial incentives and rebates for this project.

All costs associated with this work shall be estimated by the Consultant and the amount included in the base bid of its fee proposal.

X. ALLOWANCES

A. PLAN REVIEW AND PERMIT FEE ALLOWANCE

The Consultant shall obtain and pay for all of the project permits in accordance with the guidelines identified below.

1. Permits:

The Consultant shall determine the various permits, certificates, and approvals required to complete this project.

2. Permit Costs:

The Consultant shall estimate the application fee costs for all of the required project permits, certificates, and approvals (excluding the NJ Uniform Construction Code permit) and include that amount in its fee proposal line item entitled **"Plan Review and Permit Fee Allowance"**. A breakdown of each permit and application fee shall be attached to the fee proposal for reference.

NOTE: The NJ Uniform Construction Code permit is excluded since it will be paid for by the State.

3. Applications:

The Consultant shall complete and submit all permit applications to the appropriate permitting authorities and the costs shall be paid from the Consultant's permit fee allowance. A copy of the application(s) and the original permit(s) obtained by the Consultant shall be given to the DPMC Project Manager for distribution during construction.

4. Consultant Fee:

The Consultant shall determine what is required to complete and submit the permit applications, obtain supporting documentation, attend meetings, etc., and include the total cost in the base bid of its fee proposal under the "Permit Phase" column.

Any funds remaining in the permit allowance will be returned to the State at the close of the project.

XI. SOW SIGNATURE APPROVAL SHEET

This Scope of Work shall not be considered a valid document unless all signatures appear in each designated area below.

The client agency approval signature on this page indicates that they have reviewed the design criteria and construction schedule described in this project Scope of Work (including the subsequent contract deliverables and exhibits) and verifies that the work will not conflict with the existing or future construction activities of other projects at the site.

SOW APPROVED BY: James Wright 9/19/2024

JAMES WRIGHT, MANAGER DATE
DPMC PROJECT PLANNING & INITIATION

SOW APPROVED BY: Mark Dae 9/19/2024

MARK DAE, CHIEF, PROPERTY MANAGEMENT DATE
DEPARTMENT OF THE TREASURY

SOW APPROVED BY: Babatunde Ogunnubi 09/19/2024

BABATUNDE OGUNNUBI, PROJECT MANAGER DATE
DPMC PROJECT MANAGEMENT GROUP

SOW APPROVED BY: Jeanette M Barnard 12.23.24

JEANETTE BARNARD, DEPUTY DIRECTOR DATE
DW PROPERTY MGT & CONSTRUCTION

XII. CONTRACT DELIVERABLES

The following are checklists listing the Contract Deliverables that are required at the completion of each phase of this project. The Consultant shall refer to the DPMC publication entitled "Procedures for Architects and Engineers," 3.0 Edition, dated September 2022 available at https://www.nj.gov/treasury/dpmc/Assets/Files/ProceduresforArchitectsandEngineers.pdf for a detailed description of the deliverables required for each submission item listed. References to the applicable paragraphs of the "Procedures for Architects and Engineers" are provided.

Note that the Deliverables Checklist may include submission items that are "S.O.W. Specific Requirements". These requirements will be defined in the project specific scope of work and included on the deliverables checklist.

This project includes the following phases with the deliverables noted as "Required by S.O.W" on the Deliverables Checklist:

- **DESIGN DEVELOPMENT PHASE**
- **FINAL DESIGN PHASE**
- **PERMIT APPLICATION PHASE**
- **BIDDING AND CONTRACT AWARD**
- **CONSTRUCTION PHASE**
- **PROJECT CLOSE-OUT PHASE**

XIII. EXHIBITS

A. SAMPLE PROJECT SCHEDULE FORMAT
B. PROJECT SITE LOCATION MAP
C. HVAC STUDY REPORT

END OF SCOPE OF WORK

DPMC Project No.: A1419-00

Deliverables Checklist
Design Development Phase

A/E Name: _____

A/E Manual Reference	Submission Item	Required by S.O.W.		Previously Submitted		Enclosed	
		Yes	No	Yes	No	Yes	No
14.4.1.	A/E Statement of Site Visit						
14.4.2.	Narrative Description of Project						
14.4.3.	Building Code Information Questionnaire						
14.4.4.	Space Analysis						
14.4.5.	Special Features						
14.4.6.	Catalog Cuts						
14.4.7.	Site Evaluation						
14.4.8.	Subsurface Investigation						
14.4.9.	Surveys						
14.4.10.	Arts Inclusion						
14.4.11.	Design Rendering						
14.4.12.	Regulatory Approvals						
14.4.13.	Utility Availability						
14.4.14.	Drawings (6 Sets)						
14.4.15.	Specifications (6 Sets)						
14.4.16.	Current Working Estimate/Cost Analysis						
14.4.17.	Project Schedule						
14.4.18.	Formal Presentation						
14.4.19.	Plan Review/Scope of Work Compliance Statement						
14.4.20.	Design development Phase Deliverables Checklist						
S.O.W. Reference	**S.O.W. Specific Requirements**						

This checklist shall be completed by the Design Consultant and included as the cover sheet of this submission to document to the DPMC the status of all the deliverables required by the project specific Scope of Work.

_____ _____

Consultant Signature Date

DPMC Project No.: A1419-00

Deliverables Checklist
Final Design Phase

A/E Name: _____

A/E Manual Reference	Submission Item	Required by S.O.W.		Previously Submitted		Enclosed	
		Yes	No	Yes	No	Yes	No
15.4.1.	A/E Statement of Site Visit						
15.4.2.	Narrative Description of Project						
15.4.3.	Building Code Information Questionnaire						
15.4.4.	Space Analysis						
15.4.5.	Special Features						
15.4.6.	Catalog Cuts						
15.4.7.	Site Evaluation						
15.4.8.	Subsurface Investigation						
15.4.9.	Surveys						
15.4.10.	Arts Inclusion						
15.4.11.	Design Rendering						
15.4.12.	Regulatory Approvals						
15.4.13.	Utility Availability						
15.4.14.	Drawings (6 Sets)						
15.4.15.	Specifications (6 Sets)						
15.4.16.	Current Working Estimate/Cost Analysis						
15.4.17.	Project Schedule						
15.4.18.	Formal Presentation						
15.4.19.	Plan Review/Scope of Work Compliance Statement						
15.4.20.	Final Design Phase Deliverables Checklist						
S.O.W. Reference	**S.O.W. Specific Requirements**						

This checklist shall be completed by the Design Consultant and included as the cover sheet of this submission to document to the DPMC the status of all the deliverables required by the project specific Scope of Work.

_____ _____

Consultant Signature Date

DPMC Project No.: A1419-00

Deliverables Checklist
Permit Application Phase

A/E Name: _____

A/E Manual Reference	Submission Item	Required by S.O.W.		Previously Submitted		Enclosed	
		Yes	No	Yes	No	Yes	No
16.1.	N.J. UCC Permit Application						
16.4.	Drawings, Signed and Sealed (6 Sets)						
16.5.	Specifications, Signed and Sealed (6 Sets)						
16.6.	Current Working Estimate/Cost Analysis						
16.7.	Project Schedule						
16.8.	Plan Review/Scope of Work Compliance Statement						
16.9.	Permit Application Phase Deliverables Checklist						
S.O.W. Reference	**S.O.W. Specific Requirements**						

This checklist shall be completed by the Design Consultant and included as the cover sheet of this submission to document to the DPMC Project Manager the status of all the deliverables required by the project specific Scope of Work.

_____ _____

Consultant Signature Date

DPMC Project No.: A1419-00

Deliverables Checklist
Bidding and Contract Award Phase

A/E Name: _____

A/E Manual Reference	Submission Item	Required by S.O.W.		Previously Submitted		Enclosed	
		Yes	No	Yes	No	Yes	No
17.1.1.	Notice of Advertising						
17.1.2.	Bid Proposal Form						
17.1.3.	Bid Clearance Form						
17.1.4.	Drawings (6 Sets)						
17.1.5.	Specifications (6 Sets)						
17.1.6.	Construction Schedule						
17.3	Pre-Bid Conference/Mandatory Site Visit						
17.3.1.	Meeting Minutes						
17.4	Bulletins						
17.5	Post Bid Meeting						
17.6.	Contract Award "Letter of Recommendation"						
17.8.	Bid Protests - Hearings						
17.9.	Bidding and Contract Award Phase Deliverables Checklist						
S.O.W. Reference	**S.O.W. Specific Requirements**						

This checklist shall be completed by the Design Consultant and included as the cover sheet of this submission to document to the DPMC the status of all the deliverables required by the project specific Scope of Work.

_____ _____

Consultant Signature Date

DPMC Project No.: A1419-00

Deliverables Checklist
Construction Phase

A/E Name: _____

A/E Manual Reference	Submission Item	Required by S.O.W.		Previously Submitted		Enclosed	
		Yes	No	Yes	No	Yes	No
18.2.	Pre-Construction Meeting						
18.3.	Submittal Log						
18.4.	Construction Schedule						
18.5.	Project Progress Meetings						
18.7.	Contractor's Invoicing and Payment Process						
18.8.	Contractor Submittals						
18.10.	Testing						
18.11.	Shop Drawings (6 Sets)						
18.12.	As-Built & Record Set Drawings (6 Sets)						
18.13.	Change Orders						
18.14.	Construction Photographs						
18.15.	Field Observations						
18.17.	Construction Phase Deliverables Checklist						
S.O.W. Reference	**S.O.W. Specific Requirements**						

This checklist shall be completed by the Design Consultant and included as the cover sheet of this submission to document to the DPMC the status of all the deliverables required by the project specific Scope of Work.

_____ _____

Consultant Signature Date

DPMC Project No.: A1419-00

Deliverables Checklist
Project Close-Out Phase

A/E Name: _____

A/E Manual Reference	Submission Item	Required by S.O.W.		Previously Submitted		Enclosed	
		Yes	No	Yes	No	Yes	No
19.3.	Development of Punch List and Inspection Reports						
19.5.	Determination of Substantial Completion						
19.6.	Correction/Completion of Punch List						
19.7.	Submission of Close-Out Documentation						
19.7.1.	As-Built and Record Sets of Drawing (6 Sets)						
19.8.	Final Payment						
19.9.1.	Contractors Final Payment						
19.9.2.	A/E's Final Payment						
19.10.	Project Close-Out Phase Deliverables Checklist						
S.O.W. Reference	**S.O.W. Specific Requirements**						

This checklist shall be completed by the Design Consultant and included as the cover sheet of this submission to document to the DPMC the status of all the deliverables required by the project specific Scope of Work.

_____ _____

Consultant Signature Date

February 7, 1997
Rev.: January 29, 2002

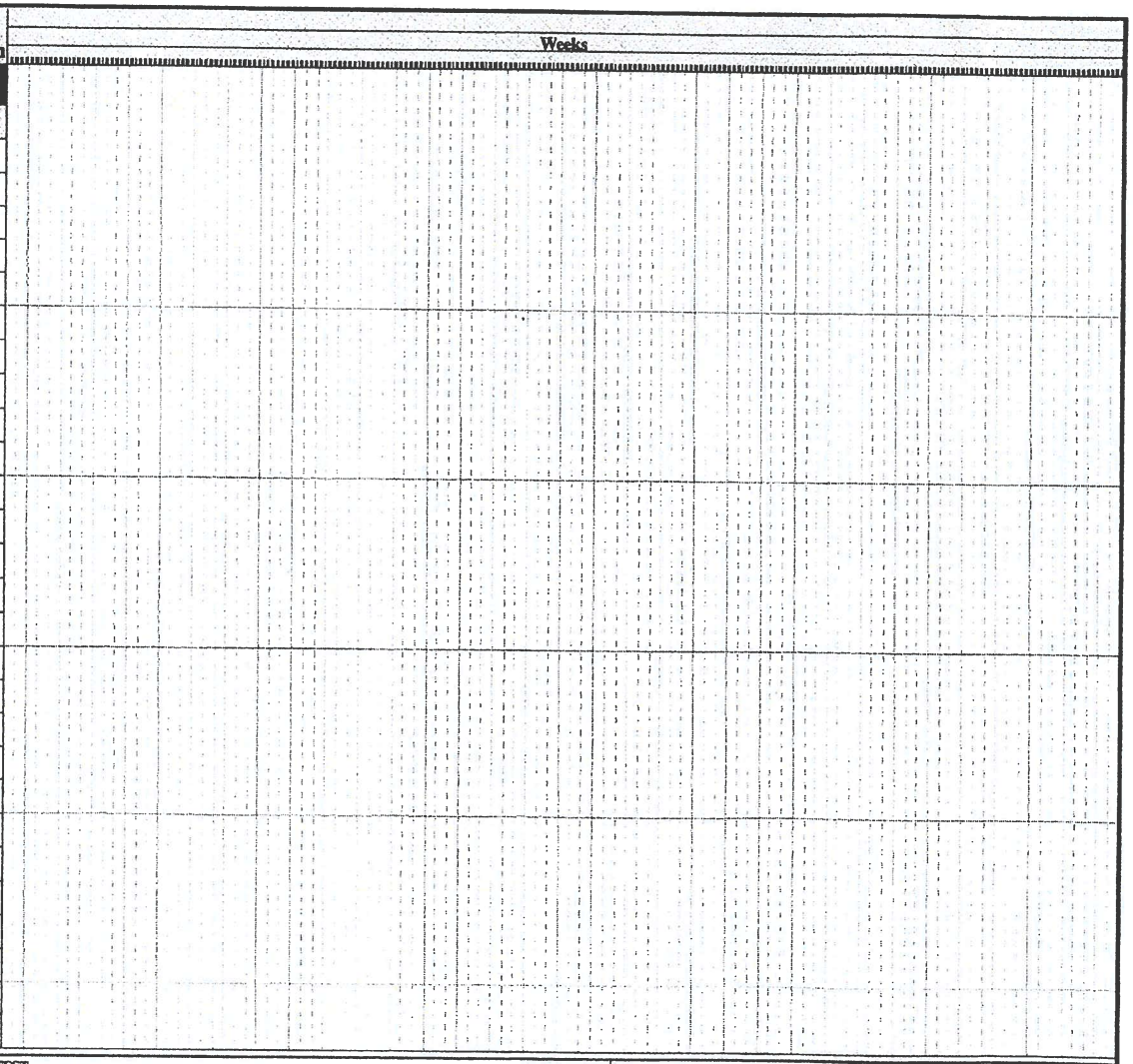
Responsible Group Code Table

The codes below are used in the schedule field "GRP" that identifies the group responsible for the activity. The table consists of groups in the Division of Property Management & Construction (DPMC), as well as groups outside of the DPMC that have responsibility for specific activities on a project that could delay the project if not completed in the time specified. For reporting purposes, the groups within the DPMC have been defined to the supervisory level of management (i.e., third level of management, the level below the Associate Director) to identify the "functional group" responsible for the activity.

CODE	DESCRIPTION	REPORTS TO ASSOCIATE DIRECTOR OF:
CM	Contract Management Group	Contract Management
CA	Client Agency	N/A
CSP	Consultant Selection and Prequalification Group	Technical Services
A/E	Architect/Engineer	N/A
PR	Plan Review Group	Technical Services
CP	Construction Procurement	Planning & Administration
CON	Construction Contractor	N/A
FM	Financial Management Group	Planning & Administration
OEU	Office of Energy and Utility Management	N/A
PD	Project Development Group	Planning & Administration

EXHIBIT 'A'

Activity ID	Description	Rspn
<PROJ>		
Design		
CV3001	Schedule/Conduct Predesign/Project Kick-Off Mtg.	CM
CV3020	Prepare Program Phase Submittal	AE
CV3021	Distribute Program Submittal for Review	CM
CV3027	Prepare & Submit Project Cost Analysis (DPMC-38)	CM
CV3022	Review & Approve Program Submittal	CA
CV3023	Review & Approve Program Submittal	PR
CV3024	Review & Approve Program Submittal	CM
CV3025	Consolidate & Return Program Submittal Comments	CM
CV3030	Prepare Schematic Phase Submittal	AE
CV3031	Distribute Schematic Submittal for Review	CM
CV3037	Prepare & Submit Project Cost Analysis (DPMC-38)	CM
CV3032	Review & Approve Schematic Submittal	CA
CV3033	Review & Approve Schematic Submittal	PR
CV3034	Review & Approve Schematic Submittal	CM
CV3035	Consolidate & Return Schematic Submittal Comment	CM
CV3040	Prepare Design Development Phase Submittal	AE
CV3041	Distribute D. D. Submittal for Review	CM
CV3047	Prepare & Submit Project Cost Analysis (DPMC-38)	CM
CV3042	Review & Approve Design Development Submittal	CA
CV3043	Review & Approve Design Development Submittal	PR
CV3044	Review & Approve Design Development Submittal	CM
CV3045	Consolidate & Return D.D. Submittal Comments	CM
CV3050	Prepare Final Design Phase Submittal	AE
CV3051	Distribute Final Design Submittal for Review	CM
CV3052	Review & Approve Final Design Submittal	CA
CV3053	Review & Approve Final Design Submittal	PR
CV3054	Review Final Design Submitl for Constructability	OCS



NOTE:
Refer to section "IV Project Schedule" of the Scope of Work for contract phase durations.

DBCA - TEST

Sheet 1 of 3

Bureau of Design & Construction Services

EXHIBIT 'A'

Activity ID	Description	Rspn	Weeks
CV3055	Review & Approve Final Design Submittal	CM	
CV3056	Consolidate & Return Final Design Comments	CM	
CV3060	Prepare & Submit Permit Application Documents	AE	
CV3068	Prepare & Submit Bidding Cost Analysis (DPMC-38)	CM	
Plan Review-Permit Acquisition			
CV4001	Review Constr. Documents & Secure UCC Permit	PR	
CV4010	Provide Funding for Construction Contracts	CA	
CV4020	Secure Bid Clearance	CM	
Advertise-Bid-Award			
CV5001	Advertise Project & Bid Construction Contracts	CP	
CV5010	Open Construction Bids	CP	
CV5011	Evaluate Bids & Prep. Recommendation for Award	CM	
CV5012	Evaluate Bids & Prep. Recommendation for Award	AE	
CV5014	Complete Recommendation for Award	CP	
CV5020	Award Construction Contracts/Issue NTP	CP	
Construction			
CV6000	Project Construction Start/Issue NTP	CM	
CV6001	Contract Start/Contract Work (25%) Complete	CON	
CV6002	Preconstruction Meeting	CM	
CV6003	Begin Preconstruction Submittals	CON	
CV6004	Longest Lead Procurement Item Ordered	CON	
CV6005	Lead Time for Longest Lead Procurement Item	CON	
CV6006	Prepare & Submit Shop Drawings	CON	
CV6007	Complete Construction Submittals	CON	
CV6011	Roughing Work Start	CON	
CV6012	Perform Roughing Work	CON	
CV6010	Contract Work (50%+) Complete	CON	
CV6013	Longest Lead Procurement Item Delivered	CON	
CV6020	Contract Work (75%) Complete	CON	

NOTE:
Refer to section "IV Project Schedule" of the Scope of Work for contract phase durations.

DBCA - TEST

Sheet 2 of 3

Bureau of Design & Construction Services

EXHIBIT 'A'

Activity ID	Description	Rspn	Weeks
CV6014	Roughing Work Complete	CON	
CV6021	Interior Finishes Start	CON	
CV6022	Install Interior Finishes	CON	
CV6030	Contract Work to Substantial Completion	CON	
CV6031	Substantial Completion Declared	CM	
CV6075	Complete Deferred Punch List/Seasonal Activities	CON	
CV6079	Project Construction Complete	CM	
CV6080	Close Out Construction Contracts	CM	
CV6089	Construction Contracts Complete	CM	
CV6090	Close Out A/E Contract	CM	
CV6092	Project Completion Declared	CM	

NOTE:
Refer to section "IV Project Schedule" of the Scope of Work for contract phase durations.

DBCA - TEST

Sheet 3 of 3

Bureau of Design & Construction Services

EXHIBIT 'A'

Project Site Location Map

Asbury Park State Office Building

EXHIBIT ‘B’

SCHILLER AND HERSH ASSOCIATES, INC.
Consulting M/E/P Engineers

636 Skippack Pike, Suite 200
Blue Bell, PA 19422

P: 215.886.8947
F: 215.886.8956
www.schillerhersh.com

NJ DPMC
Asbury Park Consolidation Building
630 Bangs Ave, Asbury Park, NJ 07712
HVAC Study Report
Date: May 17, 2024
S&H Project 2184G

Background Information:

The State of NJ DPMC retained S&H via our agency consultant contract J0393-00 Work Order #6 to perform an HVAC study for the replacement of the existing (3) RTUs serving the 3-story office building. Based on the building drawings, the building was constructed around 2000, therefore the building and equipment is approximately 24 years old.

The existing HVAC system consists of (3) McQuay RTUs that have gas-fired heat and DX cooling, which feed variable air volume (VAV) boxes serving the occupied spaces, most having hot water re-heat via a single hot water boiler. The boiler was replaced with a Lockinvar FCB2000N gas-fired unit in 2022; it was operating at 120F to serve the VAVs, at the time of our site visit.

The primary goal of the project is to replace the RTUs with a new gas-fired, DX unit, replace the toilet room exhaust fan and integrate the equipment to an upgraded Siemens HVAC control system. During the site visit, some secondary goals were noted by the building manager, namely there are building pressure issues mostly on the first floor observed by doors not being able to be closed and some select areas in the building are not correctly maintaining temperature and/or humidity.

Existing Conditions:

The existing HVAC system consists of (3) McQuay RTUs that have gas-fired heat and DX cooling. The RTUs are McQuay RPS050CLA 50 ton roof top units and date to 2000 when the building was construction, therefore they are 24 years old and well past their average service life of 15 to 20 years. Within the last 4 or 5 years, the supply and return fans had their starters replaced with new Honeywell VFDs. It was noted that the building pressure issues improved, but were not resolved on the first floor. ACU/RTU-1 feeds the first floor, ACU/RTU-2 feeds the second floor and ACU/RTU-3 feeds the third floor VAV boxes.

The RTUs are in very poor condition with significant corrosion present, as well as, the condenser coils are disintegrating. RTU-1 and 3 only have (1) compressor operational out of (2).

The majority of the VAV boxes in the building have re-heats, but some lack re-heat which appears to be causing issues with humidity. The following is a summary of the issues identified by the building manager during the site visit:

EXHIBIT 'C'

- Open Office Space 141: VAV 1-5 lacks re-heat and this area was reported to have higher humidity. Replace VAV 1-5 with a box with re-heat and extend hot water piping in order to better manage the humidity levels.

- Open Office Space 141: VAV 1-7 lacks re-heat and this area was reported to have higher humidity. Replace VAV 1-7 with a box with re-heat and extend hot water piping in order to better manage the humidity levels.

- Waiting Room 119: VAV-1-10 lacks re-heat and this area was reported to have higher humidity. Replace VAV 1-10 with a box with re-heat and extend hot water piping in order to better manage the humidity levels

- Open Office Space 222: VAV 2-6 lacks re-heat and this area was reported to have higher humidity. Replace VAV 2-7 with a box with re-heat and extend hot water piping in order to better manage the humidity levels. Also, this area was reported to be loud in terms of air noise.

- Open Office Space 222: VAV 2-6 lacks re-heat and this area was reported to have higher humidity. Replace VAV 2-7 with a box with re-heat and extend hot water piping in order to better manage the humidity levels. Also, this area was reported to be loud in terms of air noise.

- Offices 223 & 224: VAV 2-14 has low air flow or at least they cannot properly cool the spaces. Review and re-balance the supply duct and/or replace VAV setup for proper air flow based on an HVAC load calculation.

- Open Office 330: Thermostat reading seems to be inaccurate. Other thermostats on the third floor were also noted to have accuracy issues.

- Other VAVs without re-heat, but the area was not mentioned as an issue with humidity or temperature: VAV 1-11, 1-12, 1-14, 2-7, 2-8 and 2-17. It is recommended to replace these VAVs and extend re-heat piping.

The existing HVAC control system is by Siemens and requires an upgrade to the latest version, which will also require upgrades to all the VAV controllers, thermostats and wiring.

The existing toilet room 2,500 CFM exhaust fan on the roof should be replaced at the same time as the RTUs, based on the economy of scale of replacement.

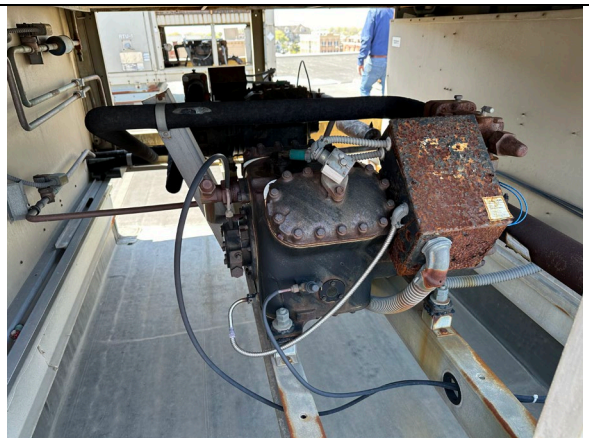
The following are a series of pictures of the existing conditions:

EXHIBIT 'C'

(3) RTUs and toilet room EF

Typical RTU

RTU nameplate

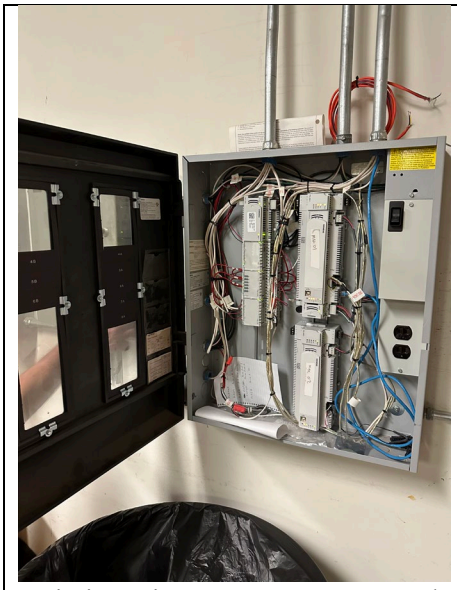


Typical compressor

Typical coil degradation

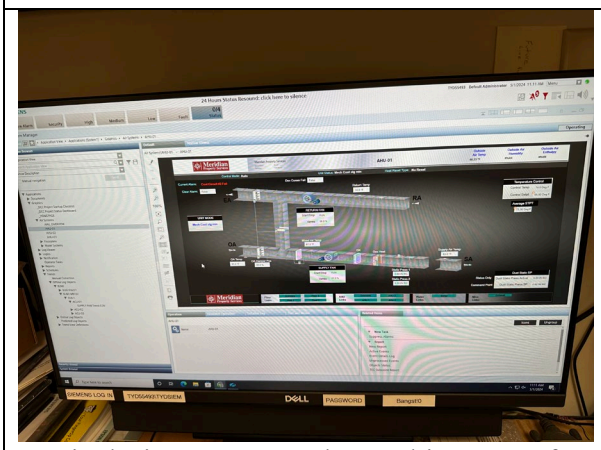
Typical coil degradation

EXHIBIT 'C'

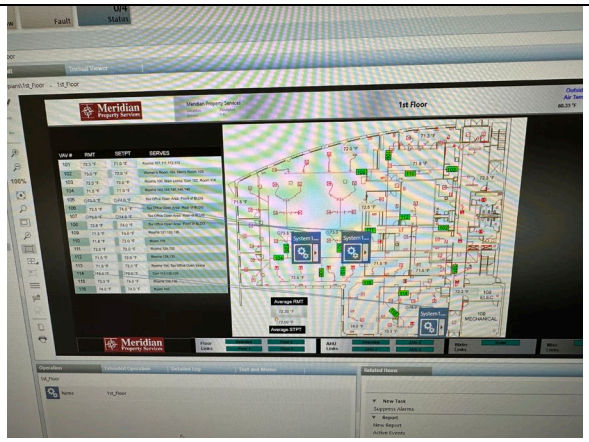


Existing Siemens HVAC control panel

Existing Lockinvar boiler and pumps



Typical Siemens controls graphic screen for RTU



Typical Siemens controls graphic screen with the floor plan and VAV status chart

EXHIBIT 'C'

Existing Notifier fire alarm control panel

Existing panel PP3 on third floor with RTU and toilet EF breakers.

Proposed HVAC Scope of Work:

Replace the existing RTUs with a new gas-fired, DX RTU with the following select features. Additional features should be provided, as required, based on the requirements of the engineering design.

- Variable speed scroll compressors.
- VFD condenser fan head pressure control.
- Modulating gas heat with stainless steel heat exchanger.
- Hot-gas re-heat for active dehumidification.
- Supply and return/exhaust fans with VFDs.
- Enthalpy-based economizer operation via fully modulating outside air damper.
- BACnet IP for Siemens controls integration.
- MERV 13 filtration.
- Given the units would ship in 2025, the new R454B refrigerant will be required, including additional internal sensors for unit shut-down due to mild flammability of the refrigerant.
- The building is located within 1 mile of the ocean, therefore provide all optional coatings for all components for a salt environment.
- Optional: UV lights for inactivating various pathogens.

Preliminary unit selections from Aaon were obtained in order to evaluate the potential size and weight of the units. Adaptor curbs will be required for each RTU in order to align the existing ductwork in the third floor with the downflow sections of the new units. See attached the preliminary selections.

EXHIBIT 'C'

The following is the detailed scope of work required for the design of the new RTUs, VAVs and exhaust fan. Additional scope may be required based on existing conditions and engineering analysis during the design phase.

- Perform an HVAC load analysis for the 3-story building to confirm the CFM, heating & cooling BTU capacities.
- Perform external static pressure calculations on the existing ductwork systems to confirm for the new RTUs.
- Structural engineer to review the capacity of the existing steel considering the weights of the new units plus the adaptor curbs.
- Provide the new RTUs with a service light and maintenance receptacle.
- Provide new exhaust fan for the toilet rooms.
- Provide a Siemens control hardware and software upgrade, as required.
- Provide new VAV controllers and thermostats for the entire building, including new hot water valve actuators.
- Provide select new VAVs with re-heat, as noted above.
- Provide new hot water piping to the new reheat VAVs. Perform pipe sizing calculations and adjust existing piping main sizes, as required.
- Paint the existing gas piping on the roof with a 3-layer application, after removing existing rust and paint.
- Provide new breaker, conduit and feeders to the new RTUs, as required. The preliminary Aaon selections match the existing breaker sizes.
- Evaluate the available short circuit current at the RTU and specify the appropriate SCCR rating.
- Provide architectural details for roof flashing of the RTU and adaptor curbs. Maintain the existing roof warranty, if applicable.
- Fire alarm duct detectors: Add new, if required. Extend and connect to the new units for shut-down.
- Add in carbon monoxide detectors on each floor near the first supply diffuser and tie detectors into the fire alarm system.
- Provide field-mounted sensors for the proper control of the system, such as return duct temperature, humidity sensors and pressure sensors for proper unit operation and discharge air temperature control. Replace common outside air temperature sensor for Siemens operation.
- Specify air and water balancing for the new systems.
- Specify days and/or times allowed for the crane operations to remove and install the new units. Coordinate with the DPMC for the allowable time for the RTU to be offline during construction. The building office spaces may be unoccupied for a period of 1 to 2 months during the entire HVAC upgrade project.
- Crane operations will require police and traffic management; costs covered by the crane company / contractor.

EXHIBIT 'C'

Construction Cost Estimate:

The following is the CCE for the project based on the preliminary analysis. The numbers below are based on second quarter 2024 costs and should be escalated at a rate of 7% per year to the mid-point of construction.

Option 1: Full HVAC system upgrade based on scope above:

Demolition:	$50,000
RTU quote/budget and installation:	$625,000
Adaptor curbs:	$30,000
Toilet room EF:	$8,000
Crane costs:	$50,000
New VAVs with reheat:	$60,000
New hot water piping & appurtenances:	$80,000
VAV control boards, sensors, valves:	$100,000
Siemens controls upgrade:	$130,000
Electrical connections:	$20,000
Interior ductwork re-connections:	$60,000
Gas piping & painting:	$10,000
Fire alarm (duct detector unit shut down):	$10,000
Fire alarm carbon monoxide detectors:	$6,000
Roof patching/flashing:	$15,000
Air and water balancing:	$25,000
Total estimated cost:	$1,279,000
Preliminary design contingency (15%):	$191,000
Total estimated construction cost:	**$1,470,000**

Exclusion: Hazardous materials investigation and remediation costs.
See attached an estimated DPMC-38 form for the Current Working Estimate for the project.

Option 2: Reduced HVAC upgrade only including the RTU and toilet EF replacements and Siemens controls upgrades (no VAV replacements; only new VAV control boards):

Demolition:	$40,000
RTU quote/budget and installation:	$625,000
Adaptor curbs:	$30,000
Toilet room EF:	$8,000
Crane costs:	$50,000
VAV control boards and sensors:	$100,000
Siemens controls upgrade:	$130,000
Electrical connections:	$20,000
Interior ductwork re-connections:	$10,000
Gas piping & painting:	$10,000
Fire alarm (duct detector unit shut down):	$10,000
Fire alarm carbon monoxide detectors:	$6,000

Roof patching/flashing:	$15,000
Air balancing:	$15,000
Total estimated cost:	$1,069,000
Preliminary design contingency (15%):	$161,000
Total estimated construction cost:	**$1,230,000**

Exclusion: Hazardous materials investigation and remediation costs.
See attached an estimated DPMC-38 form for the Current Working Estimate for the project.

Project Construction Schedule:

The RTU lead-time is estimated at 24 to 26 weeks. Allowing 30 days for preparation and review of the submittals, 60 days for installation after the RTUs are shipped and 30 days of close-out, we would recommend a total of 300 days of construction.

End of MEPFP Report.

EXHIBIT 'C'

EXHIBIT 'C'

EXHIBIT 'C'

Option 1

PROJECT COST ANALYSIS

DPMC NUMBER: N/A

Date: 5/17/2024

Project Phase: **Scope of Work**

Project Name: **RTU Replacement**

Location: **Consolidation Building, Asbury Park, NJ**

Cost Phase "C" - Construction				
1	General Construction		15,000	
2	Structural Steel			
3	Plumbing		0	
4	HVAC		1,435,000	
5	Electrical		20,000	
6	Other Trades (specify):		0	
7	**TOTAL CONSTRUCTION COST ESTIMATE (CCE) (Lines 1 thru 6)**			**1,470,000**
Cost Phase "D" - Design				
8	Consultant Design Fee		90,000	
9	Consultant Construction Administration Fee		90,000	
10	Asbestos Remediation Design Fee		0	
11	Asbestos Monitoring Fees		0	
12	Survey Services		0	
13	Testing Services		0	
14	Roofing Inspection		0	
15	Other (specify):		0	
16	**TOTAL DESIGN SERVICES (Lines 8 thru 15)**			**180,000**
Cost Phase "K" - Affirmative Action				
17	Affirmative Action	(1/2 % of Line 7)		**0**
Cost Phase "M " - Management Fees				
18	DPMC Management Fee	(8% of Line 7)		**117,600**
Cost Phase "N" - Construction Management				
19	Construction Management Services (CM/CPM)			**0**
Cost Phase "O" - Contingency				
20	Construction	(5% of Line 7)	73,500	
21	Design	(10% of Line 16)	18,000	
22	**TOTAL PROJECT CONTINGENCY (Lines 20 & 21)**			**91,500**
Cost Phase "P" - Permits				
23	U.C.C. (DCA or DPMC) Plan Review Fee		11,025	
24	U.C.C. Permit/Field Inspection/C.O. Fee		11,025	
25	Soil Conservation		0	
26	Other (specify):	DCA Review Fee	16,000	
27	**TOTAL PERMIT FEES (Lines 23 thru 26)**			**38,050**
Cost Phase "R" - Arts Inclusion				
28	Arts Inclusion Allowance			**0**
Cost Phase "B" - Other Costs				
29	Other (specify):		0	
30	Other (specify):		0	
31	**TOTAL OTHER COSTS (Lines 29 & 30)**			**0**
32	**CURRENT WORKING ESTIMATE (CWE) (Lines 7+16+17+18+19+22+27+28+31)**			**$1,897,150**

DPMC-38 Revised 9/02 (automated form)

EXHIBIT 'C'

Option 2

PROJECT COST ANALYSIS

DPMC NUMBER: N/A

Date: 5/17/2024

Project Phase: **Scope of Work**

Project Name: **RTU Replacement**

Location: **Consolidation Building, Asbury Park, NJ**

Cost Phase "C" - Construction				
1	General Construction		15,000	
2	Structural Steel			
3	Plumbing		0	
4	HVAC		1,195,000	
5	Electrical		20,000	
6	Other Trades (specify):		0	
7	**TOTAL CONSTRUCTION COST ESTIMATE (CCE) (Lines 1 thru 6)**			**1,230,000**
Cost Phase "D" - Design				
8	Consultant Design Fee		75,000	
9	Consultant Construction Administration Fee		75,000	
10	Asbestos Remediation Design Fee		0	
11	Asbestos Monitoring Fees		0	
12	Survey Services		0	
13	Testing Services		0	
14	Roofing Inspection		0	
15	Other (specify):		0	
16	**TOTAL DESIGN SERVICES (Lines 8 thru 15)**			**150,000**
Cost Phase "K" - Affirmative Action				
17	Affirmative Action	(1/2 % of Line 7)		**0**
Cost Phase "M " - Management Fees				
18	DPMC Management Fee	(8% of Line 7)		**98,400**
Cost Phase "N" - Construction Management				
19	Construction Management Services (CM/CPM)			**0**
Cost Phase "O" - Contingency				
20	Construction	(5% of Line 7)	61,500	
21	Design	(10% of Line 16)	15,000	
22	**TOTAL PROJECT CONTINGENCY (Lines 20 & 21)**			**76,500**
Cost Phase "P" - Permits				
23	U.C.C. (DCA or DPMC) Plan Review Fee		9,225	
24	U.C.C. Permit/Field Inspection/C.O. Fee		9,225	
25	Soil Conservation		0	
26	Other (specify):	DCA Review Fee	12,600	
27	**TOTAL PERMIT FEES (Lines 23 thru 26)**			**31,050**
Cost Phase "R" - Arts Inclusion				
28	Arts Inclusion Allowance			**0**
Cost Phase "B" - Other Costs				
29	Other (specify):		0	
30	Other (specify):		0	
31	**TOTAL OTHER COSTS (Lines 29 & 30)**			**0**
32	**CURRENT WORKING ESTIMATE (CWE) (Lines 7+16+17+18+19+22+27+28+31)**			**$1,585,950**

DPMC-38 Revised 9/02 (automated form)

EXHIBIT 'C'

Unit Rating

2425 South Yukon Ave • Tulsa, OK 74107 • Ph: (918) 583-2266
Ecat Version: 348.1

B3 B4 B5 1 2 3A 3B 3C 3D 3E 4A 4B 4C 5A 5B 5C 5D 5E 6A 6B 6C 6D 6E 7 8 9A 9B 9C 9D 10A

RNA-050-D-A-3-GAA0B-CB2K0:00-AAFAK-H00-ABCBL-00000-DC-CB0
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10B 11A 11B 12 13A 13B 13C 14 15 16A 16B 16C 16D 17A 17B 18A 18B 18C 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 SIZ1 SIZ2

Tag: ACU-1

Job Information

Job Name:	*S-H 3 RTU replacement*
Job Number:	*Job #57*
Site Altitude:	*0 ft*
Refrigerant:	*R-454B*

Unit Information

Approx. Op./Ship Weights:	*7155 lbs / 7155 lbs (±5%)*
Ambient Temperature (DB/WB):	*93.0 °F / 75.0 °F*
Coil Filter FV / Qty:	*333.3 fpm / 24*
Outside Air Prefilter FV / Qty:	*150.0 fpm / 6*
Supply Airflow/ESP:	*16000 SCFM / 1.80 in. w.g.*
Outside Airflow:	*2500 SCFM*
Return Temperature (DB/WB):	*75.0 °F / 62.0 °F*

Static Pressure

External:	*1.80 in. w.g.*
Cooling Coil:	*0.33 in. w.g.*
Filters Clean:	*0.40 in. w.g.*
Dirt Allowance:	*0.35 in. w.g.*
Reheat Coil:	*0.11 in. w.g.*
Economizer:	*0.18 in. w.g.*
Heating:	*0.12 in. w.g.*
Cabinet:	*0.01 in. w.g.*
Total:	*3.34 in. w.g.*

Cooling Section

	Gross	Net
Total Capacity:	*630.8 MBH*	*590.5 MBH*
Sensible Capacity:	*471.0 MBH*	*430.7 MBH*
Latent Capacity:	*159.8 MBH*	
Circuit Total Gross Capacities:	*157.4 MBH / 157.4 MBH / 158.0 MBH / 158.0 MBH*	
Mixed Air Temp (DB/WB):	*77.8 °F / 64.3 °F*	
Entering Air Temp (DB/WB):	*77.8 °F / 64.3 °F*	
Lv Air Temp (Coil) (DB/WB):	*50.4 °F / 50.2 °F*	
Lv Air Temp (Unit) (DB/WB):	*52.6 °F / 51.2 °F*	

Supply Air Fan:	*2 x 245D @ 7.26 BHP Ea.*
SA Fan RPM / Width:	*1572 RPM / 5.560 in*
SA Fan FEI:	*1.02*
Return Air Fan:	*1 x MW3505-20-RN @ 4.16 BHP Ea.*
RA Fan RPM / Pitch:	*1659 RPM / 20.0°*
RA Fan FEI:	*1.45*
Evaporator Coil:	*43.8 ft² / 4 Rows / 14 FPI*
Evaporator Face Velocity:	*365.7 fpm*

Heating Section

Preheat Type:	*Std (No Preheat)*
Auxiliary Heating Type:	*Nat. Gas Heat*
Heating Airflow:	*16000 SCFM*
Total Capacity:	*480.0 MBH*
Entering Air Temp (DB/WB):	*60.6 °F / 49.6 °F*
Leaving Air Temp (DB/WB):	*88.1 °F / 60.7 °F*
Input:	*600 MBH*
Consumption:	*600.0 MBH*
Total Turndown Ratio:	*3.0:1*

Re-heat Coil:

Capacity:	*336.2 MBH*
Leaving Air Temp (DB/WB):	*70.0 °F / 58.2 °F*
Relative Humidity:	*49.1%*

Rating Information

Listing Model	*RN-050-3-0-GAAY-V0-21-000-A*
Cooling Capacity:	*565.0 MBH*
Cooling EER:	*10.78 BTU/h·W*
Cooling IEER:	*13.23 BTU/h·W*

**Rated in accordance with AHRI Standard 340/360 (I-P)*

Application EER @ Op. Conditions: ***9.2 BTU/h·W***

Electrical Data

EXHIBIT 'C'

2425 South Yukon Ave • Tulsa, OK 74107 • Ph: (918) 583-2266
Ecat Version: 348.1

Circuit 1

Rating:	*460V/3Ø/60Hz*	*Minimum Circuit Amp:*	*140*
Unit FLA:	*135*	*Maximum Overcurrent:*	*150*
SCCR:	*10 KAIC*		

	Qty	HP	VAC	Phase	RPM	FLA	RLA
Compressor 1:	2		460	3	3500		19.9
Compressor 2:	2		460	3	3500		21.2
Condenser Fan:	6	0.75	460	3	1080	1.8	
Supply Fan:	2	10.00	460	3	1760	14.0	
Return Fan:	1	10.00	460	3	1760	14.0	
Combustion:	2	0.25	460	1	3200	0.9	

Cabinet Sound Power Levels*

Octave Bands:	63	125	250	500	1000	2000	4000	8000
Discharge LW (dB):	95	94	95	101	97	94	89	84
Return LW (dB):	93	94	86	84	87	86	83	80

*Sound power levels are given for informational purposes only. The sound levels are not guaranteed.

EXHIBIT 'C'

24.5" STAR Plenum

2425 South Yukon Ave • Tulsa, OK 74107 • Ph: (918) 583-2266
Ecat Version: 348.1

JOB INFORMATION:

Job Name:	*S-H 3 RTU replacement*
Job Tag:	*ACU-1*
Date:	*5/16/2024 12:00:00 AM*

WHEEL SPECIFICATION:

Max RPM:	*2000*
Diameter x Qty:	*24.5 in. x 2*
CFM:	*8000*
Inertia:	*10WR²*

OPERATING CONDITIONS

Air Flow:	*8000*
Fan Energy Index (FEI):	*1.02*
Static Pressure:	*3.34 in. Wg*
Relief Dampers DP:	*0 in. Wg*
TSP:	*3.34 in. Wg*
Site Altitude	*0 ft*
TSP @ Sea Level:	*3.34 in. Wg*

MOTOR SELECTION

Rated HP / Bypass:	*10 x 2 / No*
Frame Size:	*215T*
Nominal RPM:	*1760*
VAC/PH/HZ:	*460V/3Ø/60Hz*
Enclosure Type:	*ODP*
Max Inertial Load:	*0 WR²*

FAN PERFORMANCE:

RPM:	*1572*
BHP:	*7.26*
Efficiency:	*58.02%*
Max Duct SP with Blocked Airway:	*0 in. Wg @1572 RPM*

Max Duct SP with Blocked Airway:

FAN SOUND POWER (Inlet/Outlet)

Octave Band: **(Re 10^-12 watts)**

1	2	3	4	5	6	7	8
94	93	91	91	89	88	87	85
95	93	94	101	98	95	92	87

SOUND POWER A-Weighted: 87 dB

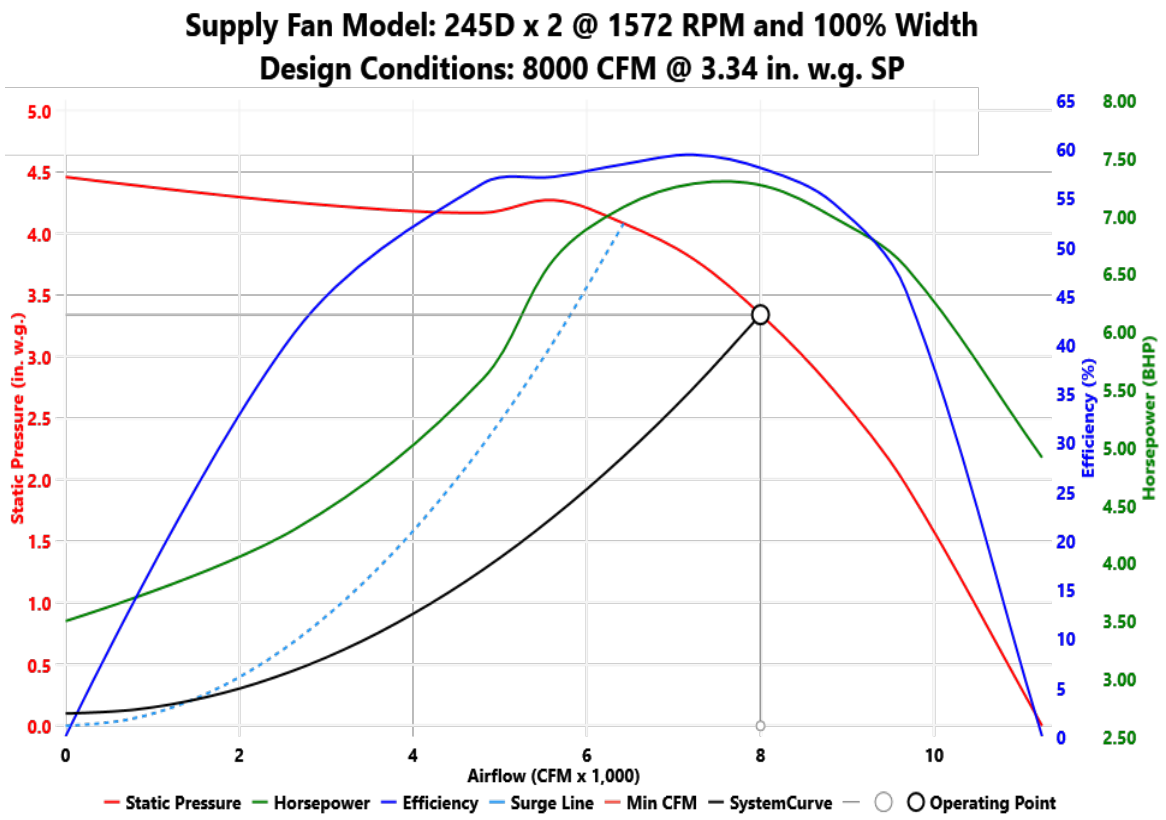


EXHIBIT 'C'

MW3505-20 Axial Fan

2425 South Yukon Ave • Tulsa, OK 74107 • Ph: (918) 583-2266
Ecat Version: 348.1

JOB INFORMATION:

Job Name:	*S-H 3 RTU replacement*
Job Tag:	*ACU-1*
Date:	*5/16/2024 12:00:00 AM*

WHEEL SPECIFICATION:

Max RPM:	*1760*
Diameter x Qty:	*35.5 in. x 1*
CFM:	*14400*
Inertia:	*9WR²*

OPERATING CONDITIONS

Air Flow:	*14400*
Fan Energy Index (FEI):	*1.45*
Static Pressure:	*1.25 in. Wg*
Relief Dampers DP:	*0 in. Wg*
TSP:	*1.25 in. Wg*
Site Altitude	*0 ft*
TSP @ Sea Level:	*1.25 in. Wg*

MOTOR SELECTION

Rated HP / Bypass:	*10 x 1 / No*
Frame Size:	*215T*
Nominal RPM:	*1760*
VAC/PH/HZ:	*460V/3Ø/60Hz*
Enclosure Type:	*ODP*
Max Inertial Load:	*0 WR²*

FAN PERFORMANCE:

RPM:	*1659*
BHP:	*4.16*
Efficiency:	*68.21%*
Max Duct SP with Blocked Airway:	*0 in. Wg @1659 RPM*

Max Duct SP with Blocked Airway:

FAN SOUND POWER (Inlet/Outlet)

Octave Band: **(Re 10^-12 watts)**

1	2	3	4	5	6	7	8
92	95	90	92	91	89	86	83
92	95	90	92	91	89	86	83

SOUND POWER A-Weighted: dB

Return Fan Model: MW3505-20 @ 1659 RPM and 100% Width
Design Conditions: 14400 CFM @ 1.25 in. w.g. SP

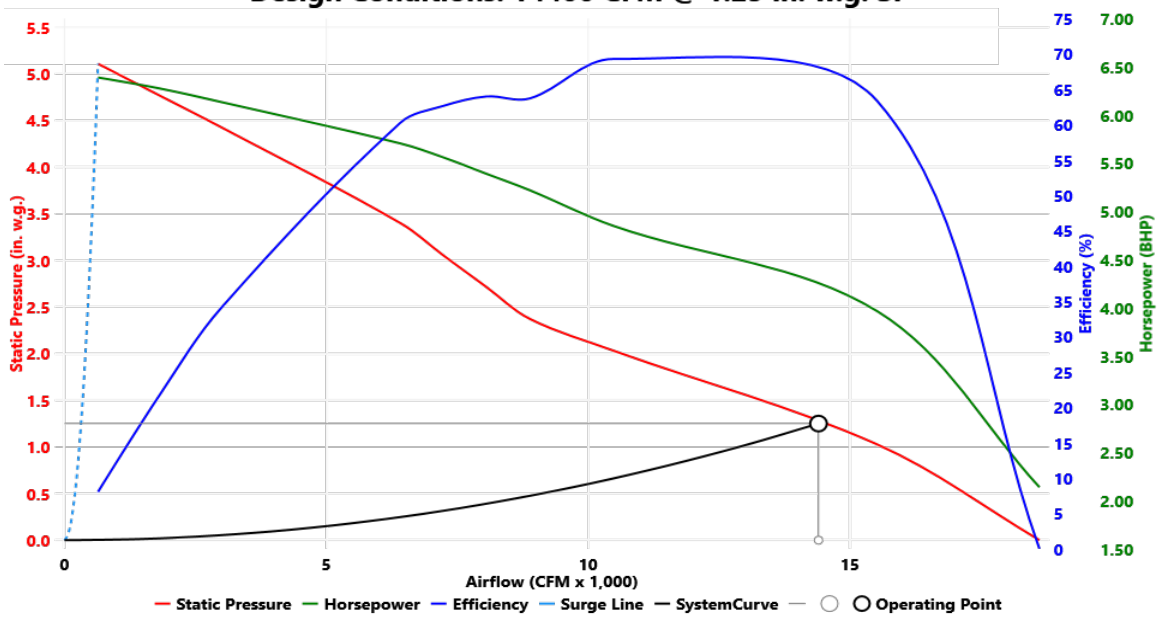


EXHIBIT 'C'

Unit Submittal

2425 South Yukon Ave • Tulsa, OK 74107 • Ph: (918) 583-2266
Ecat Version: 348.1

B3 B4 B5 1 2 3A 3B 3C 3D 3E 4A 4B 4C 5A 5B 5C 5D 5E 6A 6B 6C 6D 6E 7 8 9A 9B 9C 9D 10A

RNA-050-D-A-3-GAA0B-CB2K0:00-AAFAK-H00-ABCBL-00000-DC-CB0
A-00-F0-0-AR0-EB-DA0A-00-000-B00000-E0000B-000000B

10B 11A 11B 12 13A 13B 13C 14 15 16A 16B 16C 16D 17A 17B 18A 18B 18C 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 SIZ1 SIZ2

Tag: ACU-1

Job Name: S-H 3 RTU replacement
Job Number: Job #57
Unit Worksheet For:
Unit Worksheet Date: 5/16/2024

	Base Option	Description
RN	Generation	RN Series
A	Major Revision	Major Revision A
050	Unit Size	Fifty
D	Series	D Series
A	Minor Revision	Minor Revision A
3	Voltage	460V/3φ/60Hz
G	Compressor Style	R-454B Variable Capacity Scroll Compressor
A	Condenser Style	Microchannel Air-Cooled Condenser
A	Indoor Coil Configuration	Standard Evaporator
0	Cooling Heat Exchanger Construction	Standard
B	Cooling Staging	2 Variable Capacity Comp + 2 Two-Step Comp
C	Heat Type	Natural Gas (Vertical Unit Configuration)
B	Heat Construction	Stainless Steel Heat Exchanger, Gas Piping to the Valve
2	Heat Designation	600 MBH
K	Heat Staging	Modulating Gas Heat - Temperature Control
0	Heat Pump Auxiliary Heating	No Auxiliary Heat

	Feature Option		Decription
0	F1.	Unit Orientation	Standard Access - Hinged Access Doors with Lockable Handles
0	F2.	Supply & Return Locations	Bottom Supply+Bottom Return
A	F3A.	Supply Fan Quantity	2 Fans
A	F3B.	Supply Fan Configuration	1 Fan per VFD + Full Width Fan
F	F3C.	Supply Fan Size	24" Direct Drive Backward Curved Aluminum
A	F3D.	Supply Fan Motor Type	High Efficiency Open Motor (1,800 nominal rpm)
K	F3E.	Supply Fan Motor Size	10 hp
H	F4A.	Outside Air Section	Economizer + Power Return
0	F4B.	Energy Recovery Type	No Energy Recovery
0	F4C.	Energy Recovery Size	No Energy Recovery
A	F5A.	Return Fan Quantity	1 Fan
B	F5B.	Return Fan Configuration	1 Fan per VFD
C	F5C.	Return Fan Size	36" Axial Fan
B	F5D.	Return Fan Motor Type	High Efficiency Open Motor (1,800 nominal rpm)
L	F5E.	Return Fan Motor Size	10 hp
0	F6A.	Exhaust Fan Quantity	0 Exhaust Fans
0	F6B.	Exhaust Fan Configuration	No Exhaust Fan
0	F6C.	Exhaust Fan Size	No Exhaust Fan
0	F6D.	Exhaust Fan Motor Type	No Exhaust Fan
0	F6E.	Exhaust Fan Motor Size	No Exhaust Fan
D	F7.	Outside Air Control	Fully Modulating Actuator - Enthalpy Limit
C	F8.	Return and Exhaust Air Options	Standard Barometric Relief EA Dampers
C	F9A.	Unit Filter Type	2" Pleated MERV 8 + 4" Pleated MERV 13
B	F9B.	Unit Filter Size & Location	High Efficiency Filters in Standard Position
0	F9C.	Final Filter Type	No Final Filters
A	F9D.	Filter Options	Clogged Filter Switch - Unit Filters
0	F10A.	Refrigeration Control A	Standard - Adj Comp. Cooling Lock Out Through Unit Controls
0	F10B.	Refrigeration Control B	Standard

EXHIBIT 'C'

	Feature Option		Decription
F	F11A.	Refrigeration Options A	Modulating Hot Gas Reheat Microchannel Coil [MHGR-MC]
0	F11B.	Refrigeration Options B	Standard Packaged Unit
0	F12.	Refrigeration Accessories	None
A	F13A.	Unit Disconnect Type	Single Point Power - Non-fused Disconnect Power Switch
R	F13B.	Disconnect 1 Size	150 Amps
0	F13C.	Disconnect 2 Size	Standard - None
E	F14.	Safety Options	Remote Safety Shutdown Terminals
B	F15.	Electrical Accessories	Phase & Brown Out Protection
D	F16A.	Control Sequence	VAV Unit Controller - VAV Cool + CAV Heat
A	F16B.	Control Supplier	AAON Controls
0	F16C.	Control Supplier Options	None
A	F16D.	BMS Connection & Diagnostics	BACnet IP
0	F17A.	Preheat Configuration	Standard - None
0	F17B.	Preheat Sizing	Standard - None
0	F18A.	Option Box Location	None
0	F18B.	Option Box Size	None
0	F18C.	Option Box Accessories	None
B	F19.	Outside Air Accessories	Outside Air Hood with Metal Mesh Filters
0	F20.	Cabinet Options	Standard - None
0	F21.	Accessories	Standard
0	F22.	Maintenance Accessories	None
0	F23.	Code Options	Standard - ETL U.S.A. Listing
0	F24.	Shipping Splits	Standard
E	F25.	Air-Cooled Condenser Accessories	VFD Condenser Fan Head Pressure Control
0	F26.	Evap-Cooled Condenser Accessories	Standard
0	F27.	Water-Cooled Condenser Accessories	None
0	F28.	Energy Recovery Accessories	None
0	F29.	VFD Options	Standard
B	F30.	Miscellaneous Options	SCCR (10kA)
0	F31.	Blank	Standard
0	F32.	Blank	Standard
0	F33.	Blank	Standard
0	F34.	Blank	Standard
0	F35.	Warranty	Standard Warranty
0	F36.	Cabinet Material	Galvanized Cabinet - Double Wall + R-13 Foam Insulation
B	F37.	Specials & Paint	Premium AAON Gray Paint Exterior Paint

EXHIBIT 'C'

2425 South Yukon Ave • Tulsa, OK 74107 • Ph: (918) 583-2266

Controller Components

Ecat Version: 348.1

B3 B4 B5 1 2 3A 3B 3C 3D 3E 4A 4B 4C 5A 5B 5C 5D 5E 6A 6B 6C 6D 6E 7 8 9A 9B 9C 9D 10A

RNA-050-D-A-3-GAA0B-CB2K0:00-AAFAK-H00-ABCBL-00000-DC-CB0
A-00-F0-0-AR0-EB-DA0A-00-000-B00000-E0000B-000000B

10B 11A 11B 12 13A 13B 13C 14 15 16A 16B 16C 16D 17A 17B 18A 18B 18C 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 SIZ1 SIZ2

Tag: ACU-1

Job Name: S-H 3 RTU replacement
Job Number: Job #57

VCCX For:
VCCX Date: May 16, 2024

Part#	Included Parts	Assigned Channel	BACnet Point
ASM07503	VCCX-454 CONTROLLER		
ASM01692	OSA Temp/Hum Sensor	EBUS2 Communicating Sensor	AI:16,AI:17,AI:18,AI:19
R82890	Supply Temp Sensor - Field Installed	VCCX Control Point AI3	AI:9
ASM01820	Space Digital Temp/Hum Sensor	EBUS3 Communicating Sensor	AI:12,AI:13
R82890	Return Temp Sensor	VCCX Control Point AI4	AI:14
ASM01640	Duct Static Pressure Sensor	VCCX Control Point AI8	AI:21
	Supply Fan Control Signal 0-10VDC	VCCX Control Point AO1	AI:22
	Economizer	VCCX Control Point AO2	AI:30
R62330	Proof of Air Flow	VCCX Control Point BI1	BI:6, BI:24
G150620	Clogged Filter Switch (Standard Filters)	VCCX Control Point BI2	BI:25
	A2L Airstream Leak Detect Status	VCCX Control Point BI5	BI:9
	A2L Cabinet Leak Detect Status	VCCX Control Point BI6	BI:10
	Safety Shut Down	VCCX Control Point BI8	BI:26
	Supply Fan	Configured Relay Point	BI:0
	Morning Warm-Up	Configured Relay Point	BI:1
ASM01687	REHEAT EXPANSION MODULE		
	Reheat Enable	Reheat Expansion Module	
	Reheat HGR Valve	Reheat Expansion Module	AI:42
ASM07563	A2L MITIGATION BOARD 2		
G137750	Gas Sensor 1	A2L MB2 AI1	
G137750	Gas Sensor 2	A2L MB2 AI2	
G137750	Gas Sensor 3	A2L MB2 AI3	
	Alarm Output	A2L MB2 Fixed RO3	
ASM07563	A2L MITIGATION BOARD 1		
G137750	Gas Sensor 1	A2L MB1 AI1	
	Supply Fan Proof of Flow	A2L MB1 BI1	
	Alarm Output	A2L MB1 Fixed RO3	
ASM07716	REFRIGERATION MODULE 1		
V38391	Suction Pressure Sensor A	RM454-D 1 SP-1	AI:48
V38410	Discharge Pressure Sensor A	RM454-D 1 HP-1	AI:50
V38391	Suction Pressure Sensor C	RM454-D 1 SP-2	AI:73
V38410	Discharge Pressure Sensor C	RM454-D 1 HP-2	AI:75
	Comp Discharge Temp A	RM454-D 1 TEMP1	AI:66
	Modulated Condenser Signal A	RM454-D 1 AOUT1	AI:46
	Modulated Condenser Signal C	RM454-D 1 AOUT2	AI:47
	Comp Status Input A	RM454-D 1 BIN1	BI:77
	Comp Status Input C	RM454-D 1 BIN2	BI:78
	Emergency Shutdown	RM454-D 1 BIN4	BI:83
	Comp Enable A	RM454-D 1 RLY1	BI:84
	Comp Unload Signal A	RM454-D 1 COMP1	AI:44

EXHIBIT 'C'

	Comp Enable C	RM454-D 1 RLY2	BI:85
	Comp Load Signal C	RM454-D 1 COMP2	AI:45
	Condenser Enable A/C	RM454-D 1 RLY3	BI:86
ASM07716	REFRIGERATION MODULE 2		
V38391	Suction Pressure Sensor B	RM454-D 2 SP-1	AI:73
V38410	Discharge Pressure Sensor B	RM454-D 2 HP-1	AI:75
V38391	Suction Pressure Sensor D	RM454-D 2 SP-2	AI:73
V38410	Discharge Pressure Sensor D	RM454-D 2 HP-2	AI:75
	Comp Discharge Temp B	RM454-D 2 TEMP1	AI:91
	Modulated Condenser Signal B	RM454-D 2 AOUT1	AI:71
	Modulated Condenser Signal D	RM454-D 2 AOUT2	AI:72
	Comp Status Input B	RM454-D 2 BIN1	BI:89
	Comp Status Input D	RM454-D 2 BIN2	BI:90
	Emergency Shutdown	RM454-D 2 BIN4	BI:95
	Comp Enable B	RM454-D 2 RLY1	BI:96
	Comp Unload Signal B	RM454-D 2 COMP1	AI:69
	Comp Enable D	RM454-D 2 RLY2	BI:97
	Comp Load Signal D	RM454-D 2 COMP2	AI:70
	Condenser Enable B/D	RM454-D 2 RLY3	BI:98
ASM01670	MODULATING HOT GAS REHEAT MODULE		
	Reheat HGR Valve	MHGRV-X	AI:42
ASM01695	MODULATING GAS MODULE		
	Gas Valve Signal 1	MODGAS-XWR Gas Valve 1	
	Gas Valve Signal 2	MODGAS-XWR Gas Valve 2	
	Proof of Ignition 1	MODGAS-XWR BI3	
	Proof of Ignition 2	MODGAS-XWR BI4	
	Mod Heat Stage 1 (IGN 1)	MODGAS-XWR Heat 1 Relay	
	Mod Heat Stage 1 (IGN 2)	MODGAS-XWR Heat 2 Relay	
	Low Speed Enable	MODGAS-XWR Low Speed Relay	

EXHIBIT 'C'

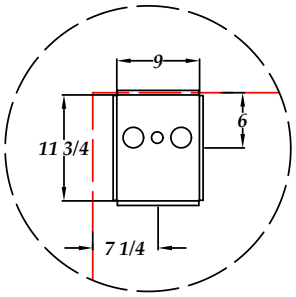
RN UNITS 50-70 TON
AIR COOLED, POWER RETURN

AAON®

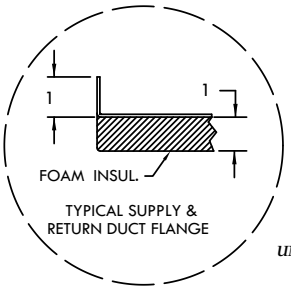
CLEARANCES

LOCATION	UNIT SIZE
	50-70 TON
OUTSIDE AIR (BACK)	48
CONTROLS SIDE (FRONT)	48
LEFT SIDE	48
RIGHT SIDE	70
TOP	UNOBSTRUCTED

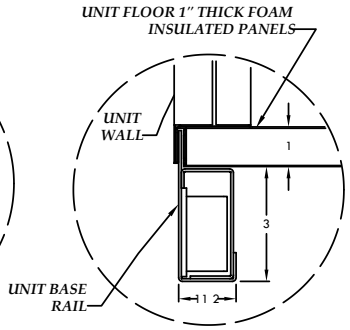
NOTE: RIGHT AND LEFT SIDE UNIT CLEARANCES ARE INTERCHANGEABLE ON UNITS THAT DO NOT HAVE THE HYDRONIC HEATING OPTION. (UNITS WITH HYDRONIC HEAT MUST HAVE 70" RIGHT SIDE ACCESS FOR SERVICE.)



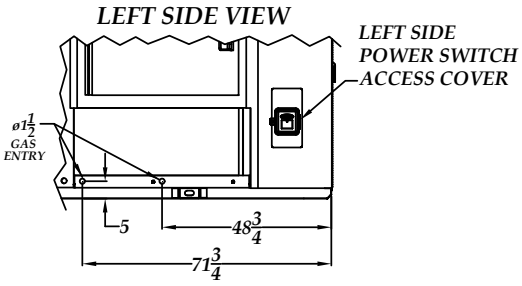
DETAIL A
UTILITY ENTRY

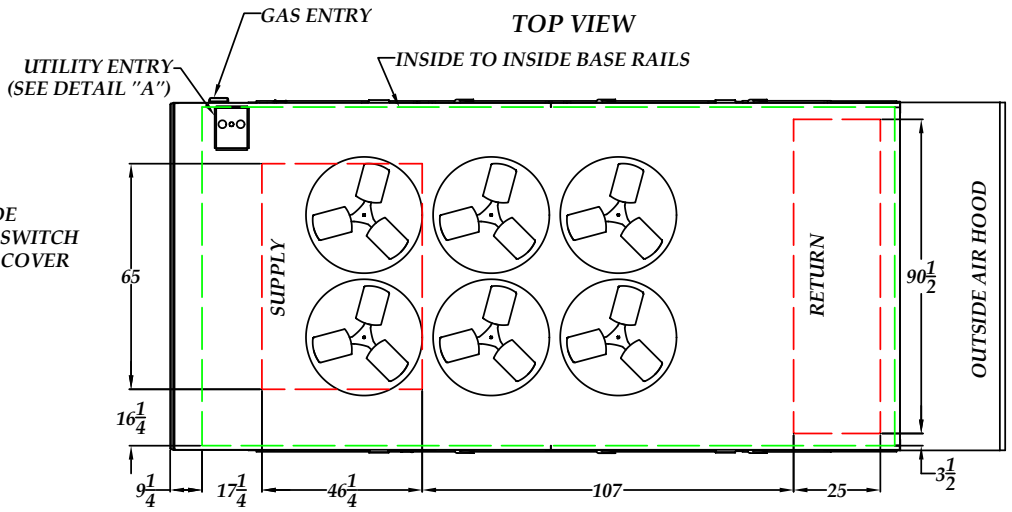


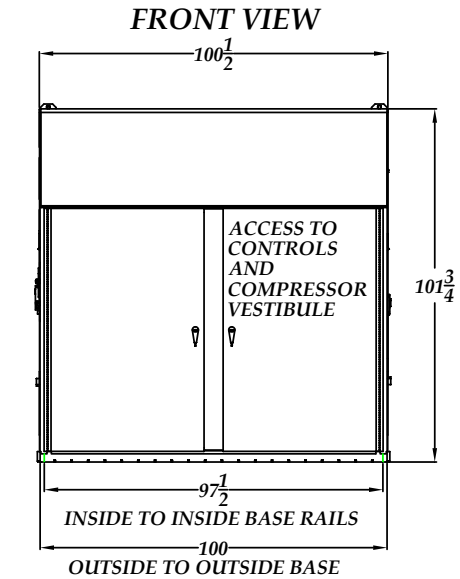
DETAIL B

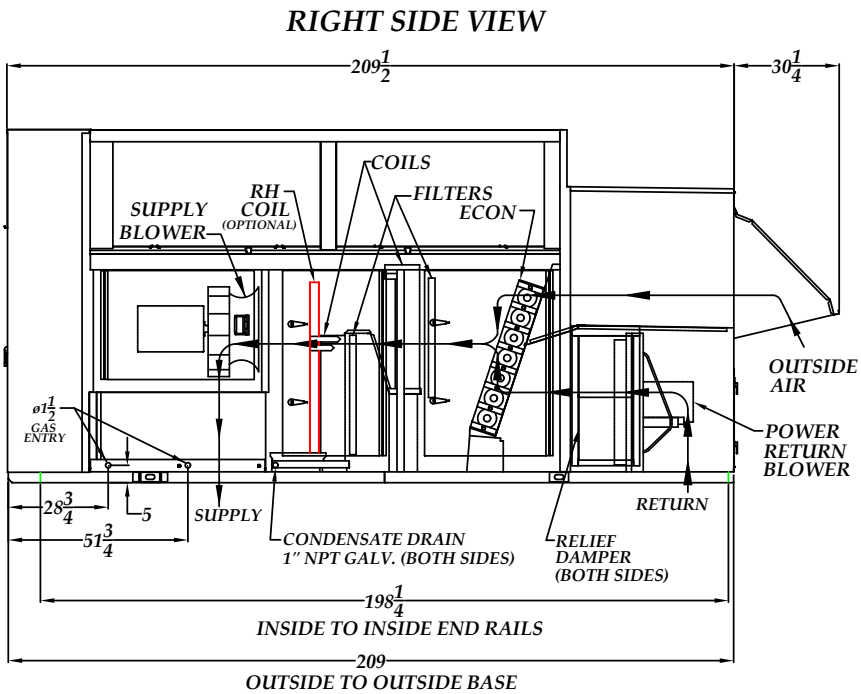


BASE RAIL CLEARANCE









CAT000307 RNA-D REV:C 01/05/23 JWC
ALL DIMENSIONS ARE IN INCHES

EXHIBIT 'C'

FIELD GAS PIPING DETAILS

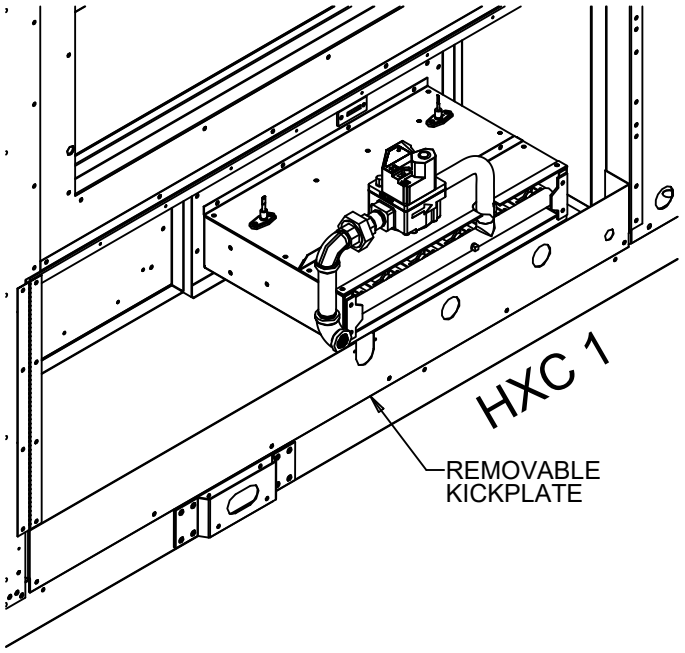
RNA SERIES D - CABINET
26-70 TON

600 MBH
2 STAGE, MODULATING

CAT000431A RNA-D REV A 04/25/23 JAS
ALL DIMENSIONS ARE IN INCHES

Field gas piping is required to the internal gas valves.
Piping should be installed adhering to building codes.
Perform leak check prior to operation.

Reference IOM for additonal information,
and details on optional gas entry through base.

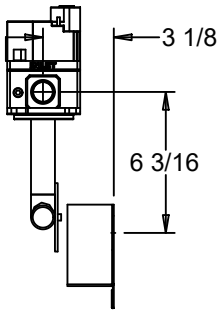


RIGHT SIDE VIEW

HEAT
EXCHANGER 1

TOP

SIDE



FRONT

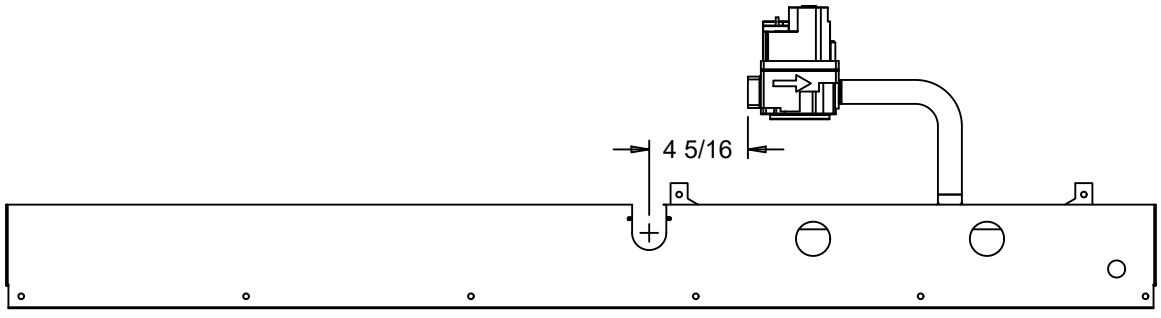


EXHIBIT 'C'

FIELD GAS PIPING DETAILS

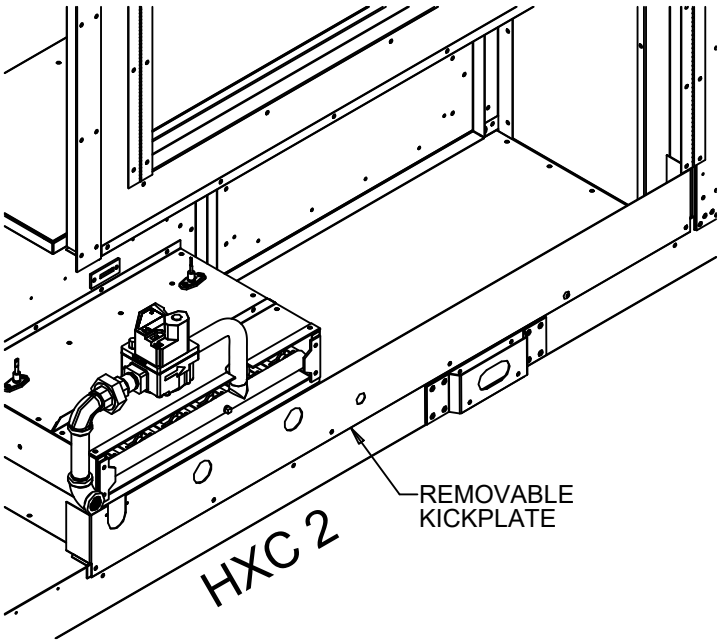
RNA SERIES D - CABINET
26-70 TON

600 MBH
2 STAGE, MODULATING

CAT000431B RNA-D REV A 04/25/23 JAS
ALL DIMENSIONS ARE IN INCHES

Field gas piping is required to the internal gas valves.
Piping should be installed adhering to building codes.
Perform leak check prior to operation.

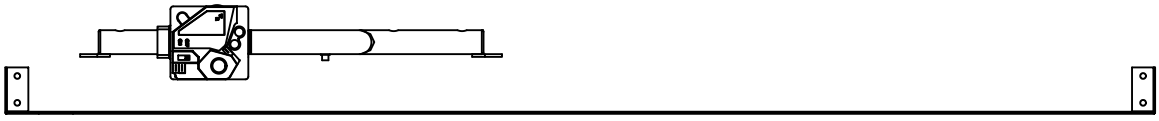
Reference IOM for additonal information,
and details on optional gas entry through base.



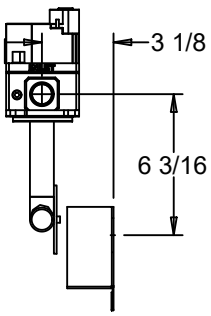
LEFT SIDE VIEW

HEAT
EXCHANGER 2

TOP



SIDE



FRONT

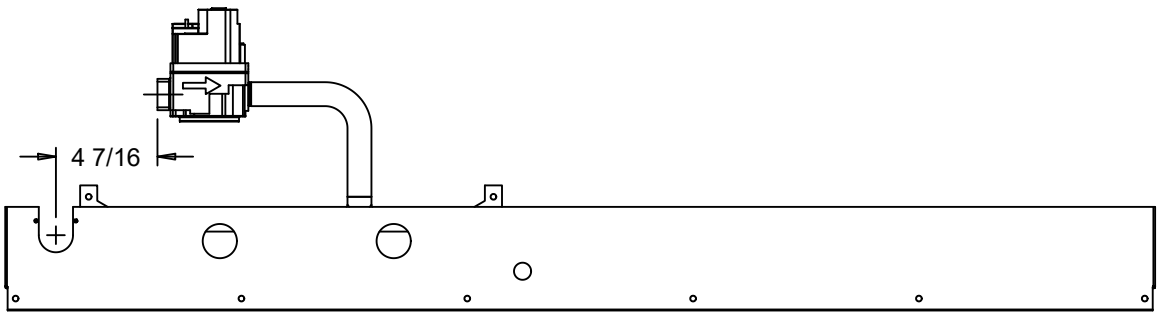


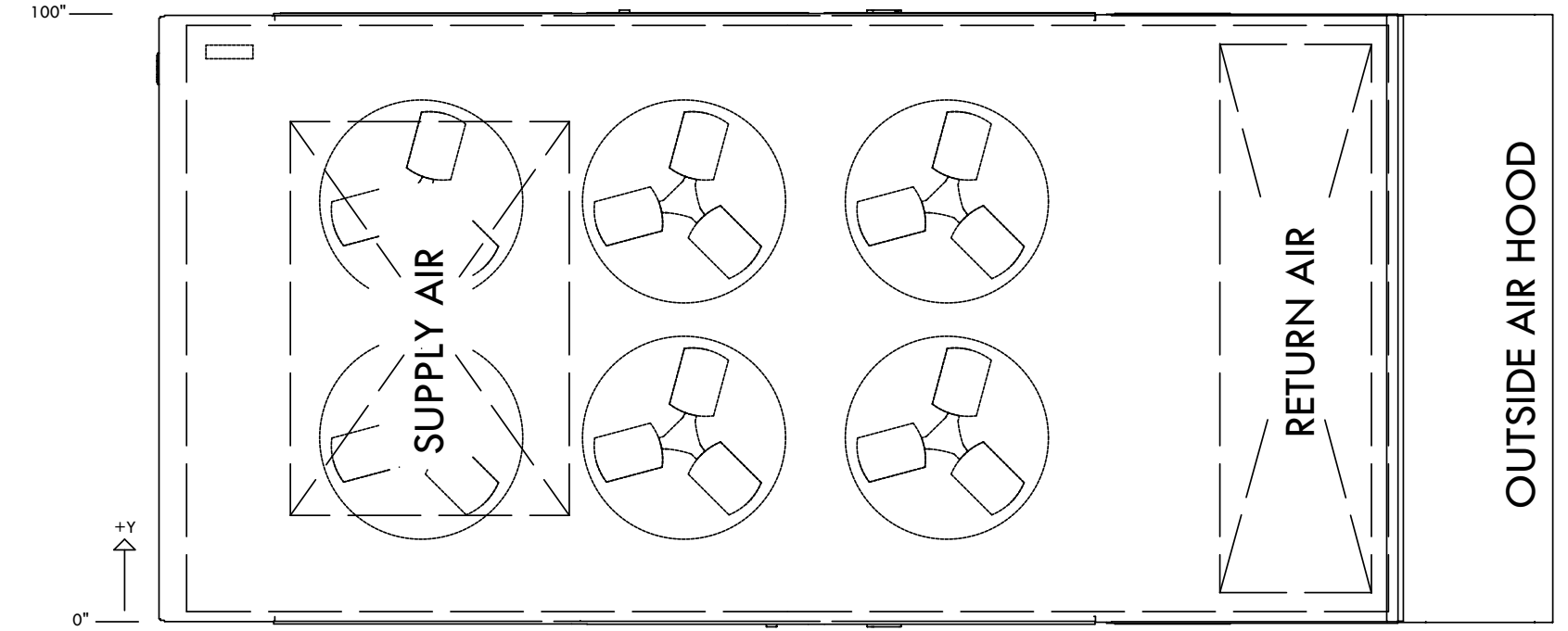
EXHIBIT 'C'

RND CABINET
AIR COOLED CONDENSING UNIT
POWER RETURN

RNA-050-D-A-3-GAA0B-CB2K0:00-AAFAK-H00-ABCBL-00000-DC-CB0A-00-F0-0-AR0-EB-DA0A-00-000-B00000-E0000B-000000B

Front Left Corner:
2023 lbs

Back Left Corner:
1455 lbs



Front Right Corner:
2139 lbs

Back Right Corner:
1538 lbs

CGx: 87.6"
CGy: 48.6"

Total Weight:
7155 lbs

Disclaimer:
This weight estimate does not account for any SPAs.

EXHIBIT 'C'

Unit Rating

2425 South Yukon Ave • Tulsa, OK 74107 • Ph: (918) 583-2266
Ecat Version: 348.1

RNA-050-D-A-3-GAA0B-CB2K0:00-AAFAK-H00-ABCBL-00000-DC-CB0
A-00-F0-0-AR0-EB-DA0A-00-000-B00000-E0000B-000000B

Tag: ACU-2

Job Information

Job Name:	*S-H 3 RTU replacement*
Job Number:	*Job #57*
Site Altitude:	*0 ft*
Refrigerant:	*R-454B*

Unit Information

Approx. Op./Ship Weights:	*7155 lbs / 7155 lbs (±5%)*
Ambient Temperature (DB/WB):	*93.0 °F / 75.0 °F*
Coil Filter FV / Qty:	*354.2 fpm / 24*
Outside Air Prefilter FV / Qty:	*150.0 fpm / 6*
Supply Airflow/ESP:	*17000 SCFM / 1.80 in. w.g.*
Outside Airflow:	*2500 SCFM*
Return Temperature (DB/WB):	*75.0 °F / 62.0 °F*

Static Pressure

External:	*1.80 in. w.g.*
Cooling Coil:	*0.36 in. w.g.*
Filters Clean:	*0.44 in. w.g.*
Dirt Allowance:	*0.35 in. w.g.*
Reheat Coil:	*0.12 in. w.g.*
Economizer:	*0.18 in. w.g.*
Heating:	*0.14 in. w.g.*
Cabinet:	*0.01 in. w.g.*
Total:	*3.46 in. w.g.*

Cooling Section

	Gross	Net
Total Capacity:	*638.3 MBH*	*593.6 MBH*
Sensible Capacity:	*486.2 MBH*	*441.5 MBH*
Latent Capacity:	*152.1 MBH*	
Circuit Total Gross Capacities:	*159.3 MBH / 159.3 MBH / 159.9 MBH / 159.9 MBH*	
Mixed Air Temp (DB/WB):	*77.8 °F / 64.3 °F*	
Entering Air Temp (DB/WB):	*77.8 °F / 64.3 °F*	
Lv Air Temp (Coil) (DB/WB):	*51.2 °F / 51.0 °F*	
Lv Air Temp (Unit) (DB/WB):	*53.5 °F / 52.0 °F*	

Supply Air Fan:	*2 x 245D @ 8.07 BHP Ea.*
SA Fan RPM / Width:	*1632 RPM / 5.560 in*
SA Fan FEI:	*1.00*
Return Air Fan:	*1 x MW3505-20-RN @ 4.63 BHP Ea.*
RA Fan RPM / Pitch:	*1731 RPM / 20.0°*
RA Fan FEI:	*1.40*
Evaporator Coil:	*43.8 ft² / 4 Rows / 14 FPI*
Evaporator Face Velocity:	*388.6 fpm*

Heating Section

Preheat Type:	*Std (No Preheat)*
Auxiliary Heating Type:	*Nat. Gas Heat*
Heating Airflow:	*17000 SCFM*
Total Capacity:	*480.0 MBH*
Entering Air Temp (DB/WB):	*60.6 °F / 49.6 °F*
Leaving Air Temp (DB/WB):	*86.5 °F / 60.1 °F*
Input:	*600 MBH*
Consumption:	*600.0 MBH*
Total Turndown Ratio:	*3.0:1*

Re-heat Coil:

Capacity:	*343.0 MBH*
Leaving Air Temp (DB/WB):	*70.0 °F / 58.6 °F*
Relative Humidity:	*50.5%*

Rating Information

Listing Model	*RN-050-3-0-GAAY-V0-21-000-A*
Cooling Capacity:	*565.0 MBH*
Cooling EER:	*10.78 BTU/h·W*
Cooling IEER:	*13.23 BTU/h·W*

**Rated in accordance with AHRI Standard 340/360 (I-P)*

Application EER @ Op. Conditions: ***9.0 BTU/h·W***

Electrical Data

EXHIBIT 'C'

2425 South Yukon Ave • Tulsa, OK 74107 • Ph: (918) 583-2266
Ecat Version: 348.1

Circuit 1

Rating:	*460V/3Ø/60Hz*	*Minimum Circuit Amp:*	*140*
Unit FLA:	*135*	*Maximum Overcurrent:*	*150*
SCCR:	*10 KAIC*		

	Qty	HP	VAC	Phase	RPM	FLA	RLA
Compressor 1:	2		460	3	3500		19.9
Compressor 2:	2		460	3	3500		21.2
Condenser Fan:	6	0.75	460	3	1080	1.8	
Supply Fan:	2	10.00	460	3	1760	14.0	
Return Fan:	1	10.00	460	3	1760	14.0	
Combustion:	2	0.25	460	1	3200	0.9	

Cabinet Sound Power Levels*

Octave Bands:	63	125	250	500	1000	2000	4000	8000
Discharge LW (dB):	96	94	95	101	98	94	90	85
Return LW (dB):	93	95	87	85	88	87	83	80

*Sound power levels are given for informational purposes only. The sound levels are not guaranteed.

EXHIBIT 'C'

24.5" STAR Plenum

2425 South Yukon Ave • Tulsa, OK 74107 • Ph: (918) 583-2266
Ecat Version: 348.1

JOB INFORMATION:

Job Name:	*S-H 3 RTU replacement*
Job Tag:	*ACU-2*
Date:	*5/16/2024 12:00:00 AM*

WHEEL SPECIFICATION:

Max RPM:	*2000*
Diameter x Qty:	*24.5 in. x 2*
CFM:	*8500*
Inertia:	*10WR²*

OPERATING CONDITIONS

Air Flow:	*8500*
Fan Energy Index (FEI):	*1.00*
Static Pressure:	*3.46 in. Wg*
Relief Dampers DP:	*0 in. Wg*
TSP:	*3.46 in. Wg*
Site Altitude	*0 ft*
TSP @ Sea Level:	*3.46 in. Wg*

MOTOR SELECTION

Rated HP / Bypass:	*10 x 2 / No*
Frame Size:	*215T*
Nominal RPM:	*1760*
VAC/PH/HZ:	*460V/3Ø/60Hz*
Enclosure Type:	*ODP*
Max Inertial Load:	*0 WR²*

FAN PERFORMANCE:

RPM:	*1632*
BHP:	*8.07*
Efficiency:	*57.45%*
Max Duct SP with Blocked Airway:	*0 in. Wg @1632 RPM*

Max Duct SP with Blocked Airway:

FAN SOUND POWER (Inlet/Outlet)

Octave Band: **(Re 10^-12 watts)**

1	2	3	4	5	6	7	8
94	93	92	91	90	89	87	85
96	93	94	101	99	96	92	87

SOUND POWER A-Weighted: 87 dB

Supply Fan Model: 245D x 2 @ 1632 RPM and 100% Width
Design Conditions: 8500 CFM @ 3.46 in. w.g. SP

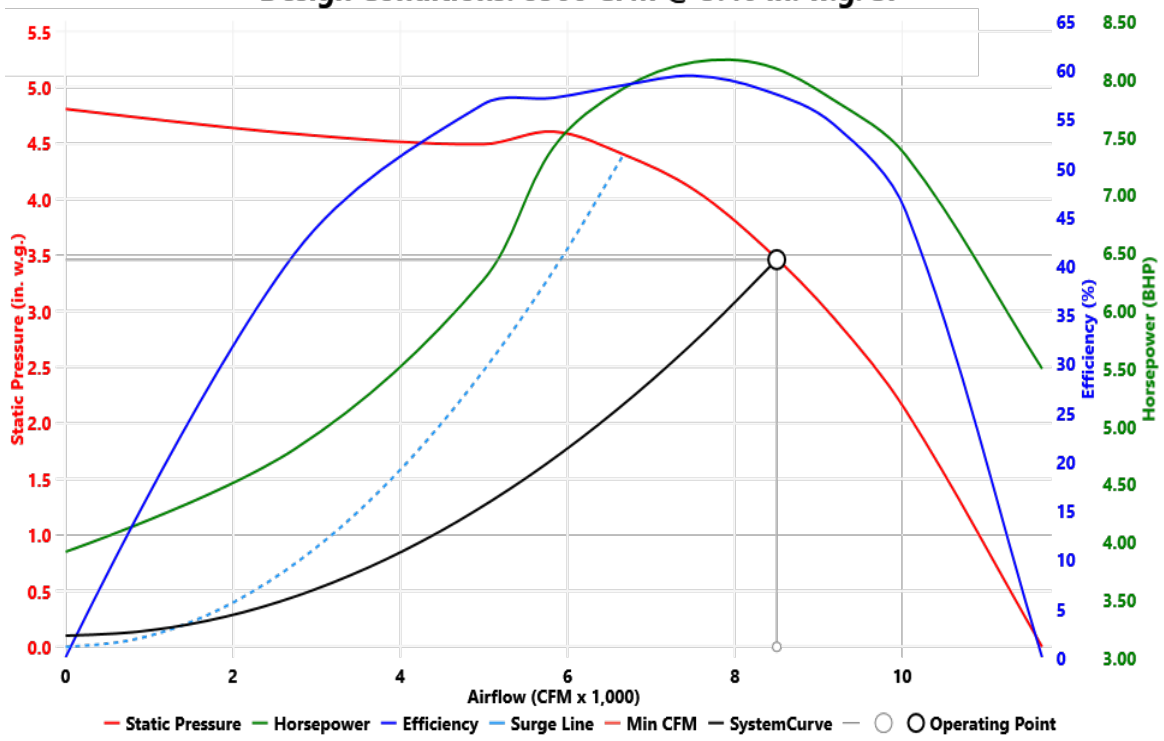


EXHIBIT 'C'

MW3505-20 Axial Fan

2425 South Yukon Ave • Tulsa, OK 74107 • Ph: (918) 583-2266
Ecat Version: 348.1

JOB INFORMATION:

Job Name:	*S-H 3 RTU replacement*
Job Tag:	*ACU-2*
Date:	*5/16/2024 12:00:00 AM*

WHEEL SPECIFICATION:

Max RPM:	*1760*
Diameter x Qty:	*35.5 in. x 1*
CFM:	*15500*
Inertia:	*9WR²*

OPERATING CONDITIONS

Air Flow:	*15500*
Fan Energy Index (FEI):	*1.40*
Static Pressure:	*1.26 in. Wg*
Relief Dampers DP:	*0 in. Wg*
TSP:	*1.26 in. Wg*
Site Altitude	*0 ft*
TSP @ Sea Level:	*1.26 in. Wg*

MOTOR SELECTION

Rated HP / Bypass:	*10 x 1 / No*
Frame Size:	*215T*
Nominal RPM:	*1760*
VAC/PH/HZ:	*460V/3Ø/60Hz*
Enclosure Type:	*ODP*
Max Inertial Load:	*0 WR²*

FAN PERFORMANCE:

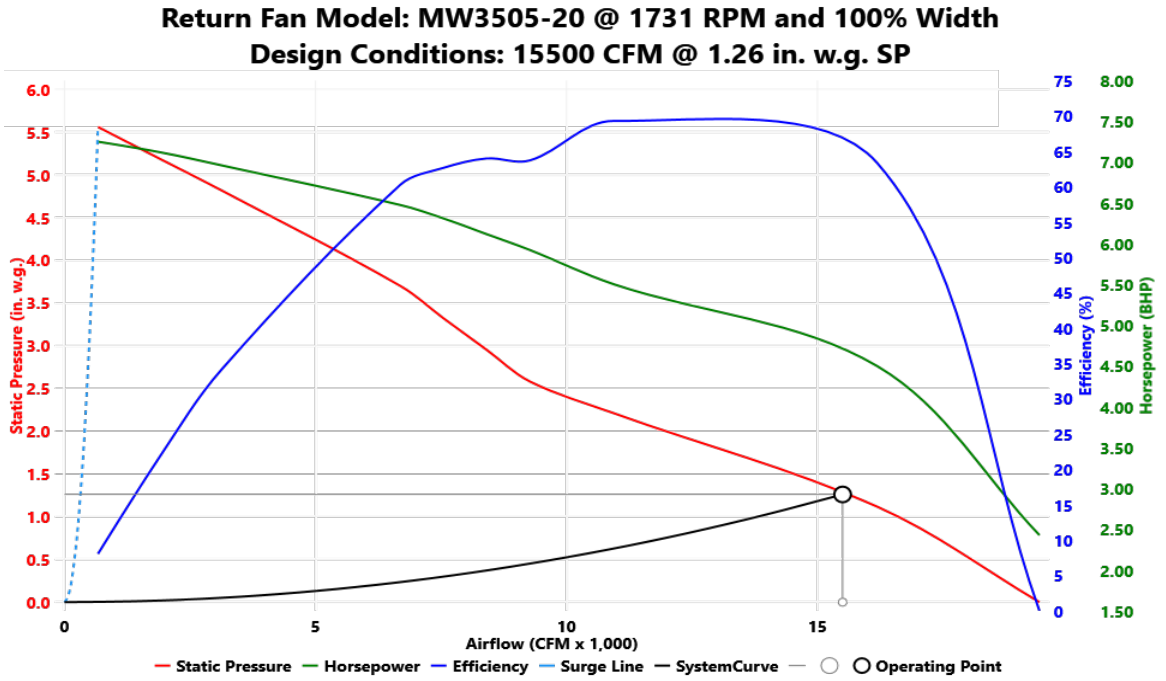
RPM:	*1731*
BHP:	*4.63*
Efficiency:	*66.50%*
Max Duct SP with Blocked Airway:	*0 in. Wg @1731 RPM*

FAN SOUND POWER (Inlet/Outlet)

Octave Band:				**(Re 10^-12 watts)**			
1	**2**	**3**	**4**	**5**	**6**	**7**	**8**
93	96	90	92	91	89	86	83
93	96	90	92	91	89	86	83

SOUND POWER A-Weighted: dB

Max Duct SP with Blocked Airway:



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Date Printed:5/16/2024 12:24:22 PM

EXHIBIT 'C'

Unit Submittal

2425 South Yukon Ave • Tulsa, OK 74107 • Ph: (918) 583-2266
Ecat Version: 348.1

B3 B4 B5 1 2 3A 3B 3C 3D 3E 4A 4B 4C 5A 5B 5C 5D 5E 6A 6B 6C 6D 6E 7 8 9A 9B 9C 9D 10A

RNA-050-D-A-3-GAA0B-CB2K0:00-AAFAK-H00-ABCBL-00000-DC-CB0
A-00-F0-0-AR0-EB-DA0A-00-000-B00000-E0000B-000000B

10B 11A 11B 12 13A 13B 13C 14 15 16A 16B 16C 16D 17A 17B 18A 18B 18C 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 SIZ1 SIZ2

Tag: ACU-2

Job Name: S-H 3 RTU replacement
Job Number: Job #57
Unit Worksheet For:
Unit Worksheet Date: 5/16/2024

	Base Option	Description
RN	Generation	RN Series
A	Major Revision	Major Revision A
050	Unit Size	Fifty
D	Series	D Series
A	Minor Revision	Minor Revision A
3	Voltage	460V/3φ/60Hz
G	Compressor Style	R-454B Variable Capacity Scroll Compressor
A	Condenser Style	Microchannel Air-Cooled Condenser
A	Indoor Coil Configuration	Standard Evaporator
0	Cooling Heat Exchanger Construction	Standard
B	Cooling Staging	2 Variable Capacity Comp + 2 Two-Step Comp
C	Heat Type	Natural Gas (Vertical Unit Configuration)
B	Heat Construction	Stainless Steel Heat Exchanger, Gas Piping to the Valve
2	Heat Designation	600 MBH
K	Heat Staging	Modulating Gas Heat - Temperature Control
0	Heat Pump Auxiliary Heating	No Auxiliary Heat

	Feature Option		Decription
0	F1.	Unit Orientation	Standard Access - Hinged Access Doors with Lockable Handles
0	F2.	Supply & Return Locations	Bottom Supply+Bottom Return
A	F3A.	Supply Fan Quantity	2 Fans
A	F3B.	Supply Fan Configuration	1 Fan per VFD + Full Width Fan
F	F3C.	Supply Fan Size	24" Direct Drive Backward Curved Aluminum
A	F3D.	Supply Fan Motor Type	High Efficiency Open Motor (1,800 nominal rpm)
K	F3E.	Supply Fan Motor Size	10 hp
H	F4A.	Outside Air Section	Economizer + Power Return
0	F4B.	Energy Recovery Type	No Energy Recovery
0	F4C.	Energy Recovery Size	No Energy Recovery
A	F5A.	Return Fan Quantity	1 Fan
B	F5B.	Return Fan Configuration	1 Fan per VFD
C	F5C.	Return Fan Size	36" Axial Fan
B	F5D.	Return Fan Motor Type	High Efficiency Open Motor (1,800 nominal rpm)
L	F5E.	Return Fan Motor Size	10 hp
0	F6A.	Exhaust Fan Quantity	0 Exhaust Fans
0	F6B.	Exhaust Fan Configuration	No Exhaust Fan
0	F6C.	Exhaust Fan Size	No Exhaust Fan
0	F6D.	Exhaust Fan Motor Type	No Exhaust Fan
0	F6E.	Exhaust Fan Motor Size	No Exhaust Fan
D	F7.	Outside Air Control	Fully Modulating Actuator - Enthalpy Limit
C	F8.	Return and Exhaust Air Options	Standard Barometric Relief EA Dampers
C	F9A.	Unit Filter Type	2" Pleated MERV 8 + 4" Pleated MERV 13
B	F9B.	Unit Filter Size & Location	High Efficiency Filters in Standard Position
0	F9C.	Final Filter Type	No Final Filters
A	F9D.	Filter Options	Clogged Filter Switch - Unit Filters
0	F10A.	Refrigeration Control A	Standard - Adj Comp. Cooling Lock Out Through Unit Controls
0	F10B.	Refrigeration Control B	Standard

EXHIBIT 'C'

	Feature Option		Decription
F	F11A.	Refrigeration Options A	Modulating Hot Gas Reheat Microchannel Coil [MHGR-MC]
0	F11B.	Refrigeration Options B	Standard Packaged Unit
0	F12.	Refrigeration Accessories	None
A	F13A.	Unit Disconnect Type	Single Point Power - Non-fused Disconnect Power Switch
R	F13B.	Disconnect 1 Size	150 Amps
0	F13C.	Disconnect 2 Size	Standard - None
E	F14.	Safety Options	Remote Safety Shutdown Terminals
B	F15.	Electrical Accessories	Phase & Brown Out Protection
D	F16A.	Control Sequence	VAV Unit Controller - VAV Cool + CAV Heat
A	F16B.	Control Supplier	AAON Controls
0	F16C.	Control Supplier Options	None
A	F16D.	BMS Connection & Diagnostics	BACnet IP
0	F17A.	Preheat Configuration	Standard - None
0	F17B.	Preheat Sizing	Standard - None
0	F18A.	Option Box Location	None
0	F18B.	Option Box Size	None
0	F18C.	Option Box Accessories	None
B	F19.	Outside Air Accessories	Outside Air Hood with Metal Mesh Filters
0	F20.	Cabinet Options	Standard - None
0	F21.	Accessories	Standard
0	F22.	Maintenance Accessories	None
0	F23.	Code Options	Standard - ETL U.S.A. Listing
0	F24.	Shipping Splits	Standard
E	F25.	Air-Cooled Condenser Accessories	VFD Condenser Fan Head Pressure Control
0	F26.	Evap-Cooled Condenser Accessories	Standard
0	F27.	Water-Cooled Condenser Accessories	None
0	F28.	Energy Recovery Accessories	None
0	F29.	VFD Options	Standard
B	F30.	Miscellaneous Options	SCCR (10kA)
0	F31.	Blank	Standard
0	F32.	Blank	Standard
0	F33.	Blank	Standard
0	F34.	Blank	Standard
0	F35.	Warranty	Standard Warranty
0	F36.	Cabinet Material	Galvanized Cabinet - Double Wall + R-13 Foam Insulation
B	F37.	Specials & Paint	Premium AAON Gray Paint Exterior Paint

EXHIBIT 'C'

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Ecat Version: 348.1

B3 B4 B5 1 2 3A 3B 3C 3D 3E 4A 4B 4C 5A 5B 5C 5D 5E 6A 6B 6C 6D 6E 7 8 9A 9B 9C 9D 10A

RNA-050-D-A-3-GAA0B-CB2K0:00-AAFAK-H00-ABCBL-00000-DC-CB0
A-00-F0-0-AR0-EB-DA0A-00-000-B00000-E0000B-000000B

10B 11A 11B 12 13A 13B 13C 14 15 16A 16B 16C 16D 17A 17B 18A 18B 18C 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 SIZ1 SIZ2

Tag: ACU-2

Job Name: S-H 3 RTU replacement
Job Number: Job #57

VCCX For:
VCCX Date: May 16, 2024

Part#	Included Parts	Assigned Channel	BACnet Point
ASM07503	VCCX-454 CONTROLLER		
ASM01692	OSA Temp/Hum Sensor	EBUS2 Communicating Sensor	AI:16,AI:17,AI:18,AI:19
R82890	Supply Temp Sensor - Field Installed	VCCX Control Point AI3	AI:9
ASM01820	Space Digital Temp/Hum Sensor	EBUS3 Communicating Sensor	AI:12,AI:13
R82890	Return Temp Sensor	VCCX Control Point AI4	AI:14
ASM01640	Duct Static Pressure Sensor	VCCX Control Point AI8	AI:21
	Supply Fan Control Signal 0-10VDC	VCCX Control Point AO1	AI:22
	Economizer	VCCX Control Point AO2	AI:30
R62330	Proof of Air Flow	VCCX Control Point BI1	BI:6, BI:24
G150620	Clogged Filter Switch (Standard Filters)	VCCX Control Point BI2	BI:25
	A2L Airstream Leak Detect Status	VCCX Control Point BI5	BI:9
	A2L Cabinet Leak Detect Status	VCCX Control Point BI6	BI:10
	Safety Shut Down	VCCX Control Point BI8	BI:26
	Supply Fan	Configured Relay Point	BI:0
	Morning Warm-Up	Configured Relay Point	BI:1
ASM01687	REHEAT EXPANSION MODULE		
	Reheat Enable	Reheat Expansion Module	
	Reheat HGR Valve	Reheat Expansion Module	AI:42
ASM07563	A2L MITIGATION BOARD 2		
G137750	Gas Sensor 1	A2L MB2 AI1	
G137750	Gas Sensor 2	A2L MB2 AI2	
G137750	Gas Sensor 3	A2L MB2 AI3	
	Alarm Output	A2L MB2 Fixed RO3	
ASM07563	A2L MITIGATION BOARD 1		
G137750	Gas Sensor 1	A2L MB1 AI1	
	Supply Fan Proof of Flow	A2L MB1 BI1	
	Alarm Output	A2L MB1 Fixed RO3	
ASM07716	REFRIGERATION MODULE 1		
V38391	Suction Pressure Sensor A	RM454-D 1 SP-1	AI:48
V38410	Discharge Pressure Sensor A	RM454-D 1 HP-1	AI:50
V38391	Suction Pressure Sensor C	RM454-D 1 SP-2	AI:73
V38410	Discharge Pressure Sensor C	RM454-D 1 HP-2	AI:75
	Comp Discharge Temp A	RM454-D 1 TEMP1	AI:66
	Modulated Condenser Signal A	RM454-D 1 AOUT1	AI:46
	Modulated Condenser Signal C	RM454-D 1 AOUT2	AI:47
	Comp Status Input A	RM454-D 1 BIN1	BI:77
	Comp Status Input C	RM454-D 1 BIN2	BI:78
	Emergency Shutdown	RM454-D 1 BIN4	BI:83
	Comp Enable A	RM454-D 1 RLY1	BI:84
	Comp Unload Signal A	RM454-D 1 COMP1	AI:44

EXHIBIT 'C'

	Comp Enable C	RM454-D 1 RLY2	BI:85
	Comp Load Signal C	RM454-D 1 COMP2	AI:45
	Condenser Enable A/C	RM454-D 1 RLY3	BI:86
ASM07716	REFRIGERATION MODULE 2		
V38391	Suction Pressure Sensor B	RM454-D 2 SP-1	AI:73
V38410	Discharge Pressure Sensor B	RM454-D 2 HP-1	AI:75
V38391	Suction Pressure Sensor D	RM454-D 2 SP-2	AI:73
V38410	Discharge Pressure Sensor D	RM454-D 2 HP-2	AI:75
	Comp Discharge Temp B	RM454-D 2 TEMP1	AI:91
	Modulated Condenser Signal B	RM454-D 2 AOUT1	AI:71
	Modulated Condenser Signal D	RM454-D 2 AOUT2	AI:72
	Comp Status Input B	RM454-D 2 BIN1	BI:89
	Comp Status Input D	RM454-D 2 BIN2	BI:90
	Emergency Shutdown	RM454-D 2 BIN4	BI:95
	Comp Enable B	RM454-D 2 RLY1	BI:96
	Comp Unload Signal B	RM454-D 2 COMP1	AI:69
	Comp Enable D	RM454-D 2 RLY2	BI:97
	Comp Load Signal D	RM454-D 2 COMP2	AI:70
	Condenser Enable B/D	RM454-D 2 RLY3	BI:98
ASM01670	MODULATING HOT GAS REHEAT MODULE		
	Reheat HGR Valve	MHGRV-X	AI:42
ASM01695	MODULATING GAS MODULE		
	Gas Valve Signal 1	MODGAS-XWR Gas Valve 1	
	Gas Valve Signal 2	MODGAS-XWR Gas Valve 2	
	Proof of Ignition 1	MODGAS-XWR BI3	
	Proof of Ignition 2	MODGAS-XWR BI4	
	Mod Heat Stage 1 (IGN 1)	MODGAS-XWR Heat 1 Relay	
	Mod Heat Stage 1 (IGN 2)	MODGAS-XWR Heat 2 Relay	
	Low Speed Enable	MODGAS-XWR Low Speed Relay	

EXHIBIT 'C'

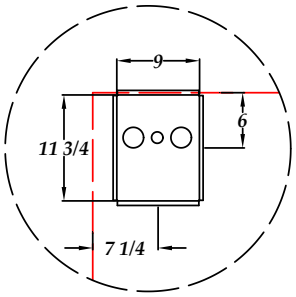
RN UNITS 50-70 TON
AIR COOLED, POWER RETURN

AAON®

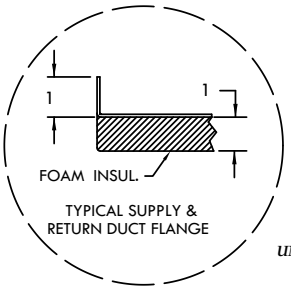
CLEARANCES

LOCATION	UNIT SIZE
	50-70 TON
OUTSIDE AIR (BACK)	48
CONTROLS SIDE (FRONT)	48
LEFT SIDE	48
RIGHT SIDE	70
TOP	UNOBSTRUCTED

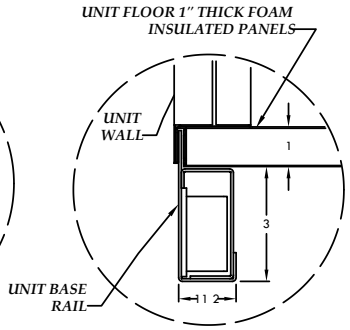
NOTE: RIGHT AND LEFT SIDE UNIT CLEARANCES ARE INTERCHANGEABLE ON UNITS THAT DO NOT HAVE THE HYDRONIC HEATING OPTION. (UNITS WITH HYDRONIC HEAT MUST HAVE 70" RIGHT SIDE ACCESS FOR SERVICE.)



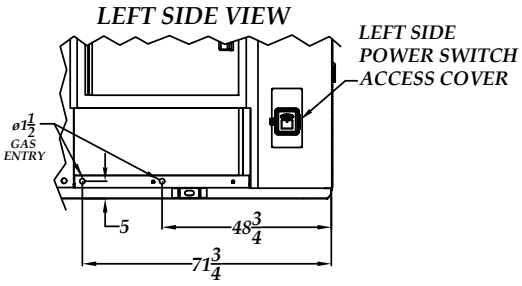
DETAIL A
UTILITY ENTRY

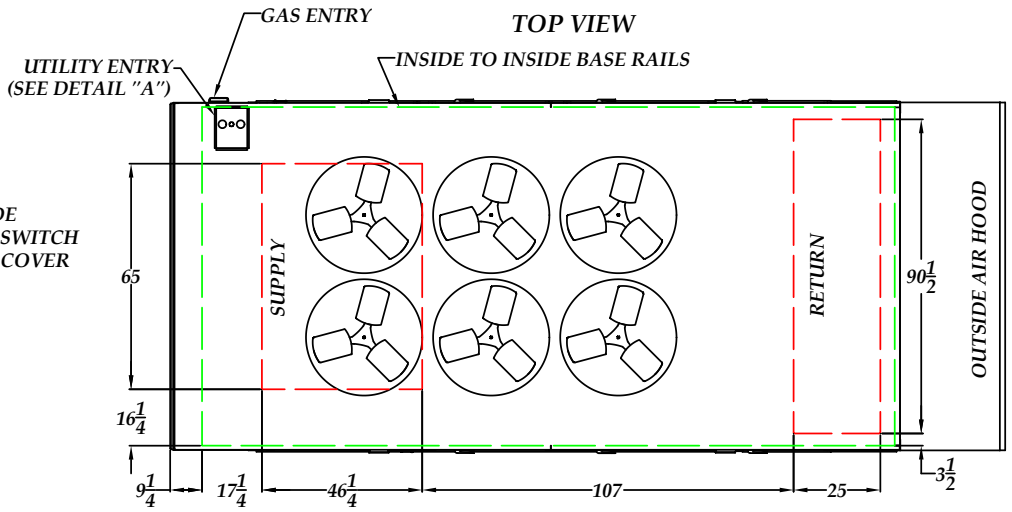


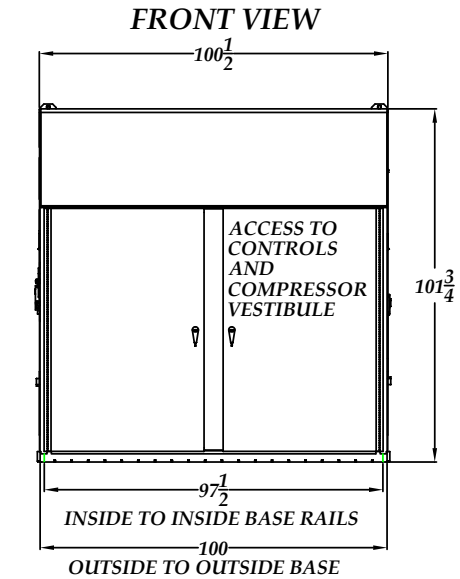
DETAIL B

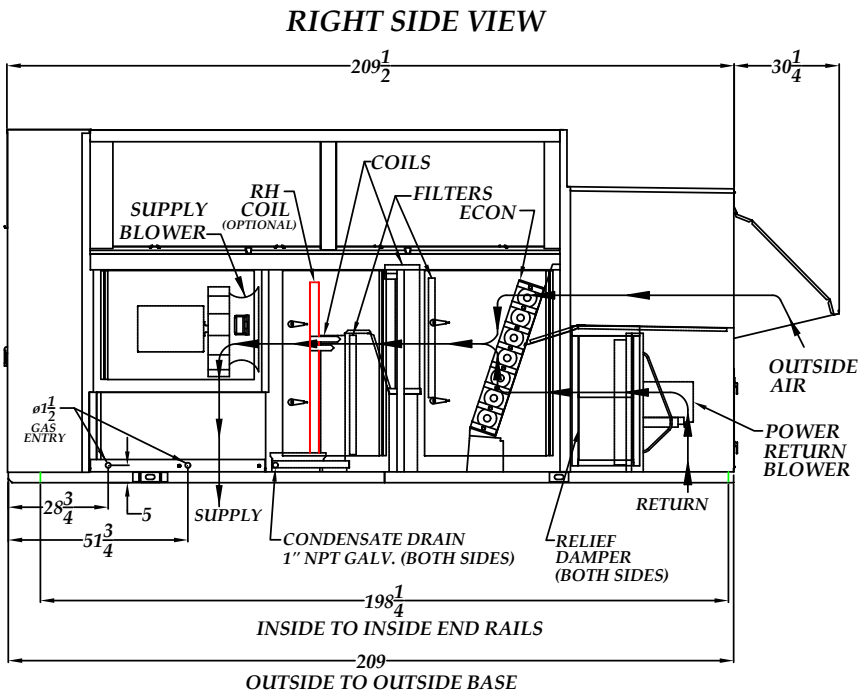


BASE RAIL CLEARANCE









CAT000307 RNA-D REV:C 01/05/23 JWC
ALL DIMENSIONS ARE IN INCHES

EXHIBIT 'C'

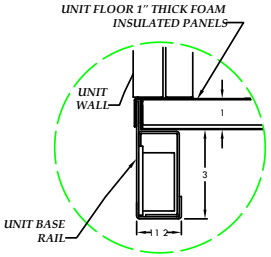
RN UNITS 50-70 TON

AIR COOLED, ELECTRIC PREHEAT, METAL MESH FILTER, RNA-D

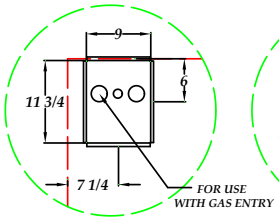
AAON®

CLEARANCES	
LOCATION	UNIT SIZE 50-70 TON
OUTSIDE AIR (BACK)	48
CONTROLS SIDE	48
LEFT SIDE	48
RIGHT SIDE	70
TOP	UNOBSTRUCTED

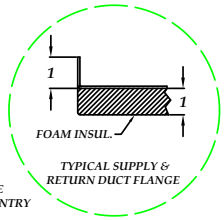
NOTE: RIGHT AND LEFT SIDE UNIT CLEARANCES ARE INTERCHANGEABLE ON UNITS THAT DO NOT HAVE THE HYDRONIC HEATING OPTION. (UNITS WITH HYDRONIC HEAT MUST HAVE 70" RIGHT SIDE ACCESS FOR SERVICE.)



BASE RAIL CLEARANCE

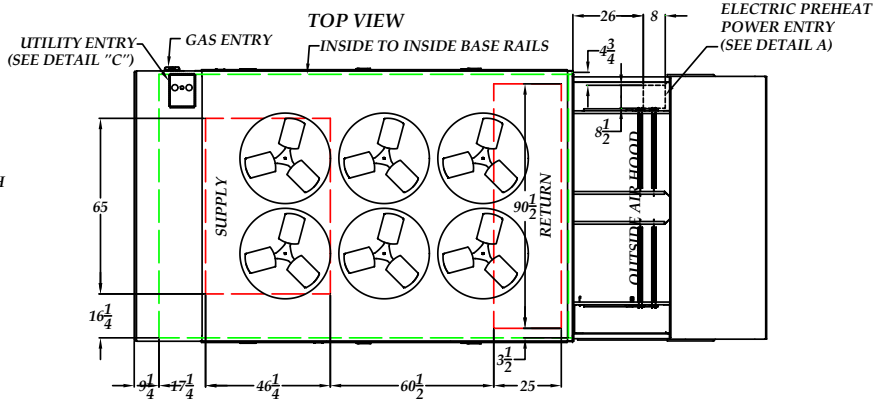


DETAIL C
UTILITY ENTRY

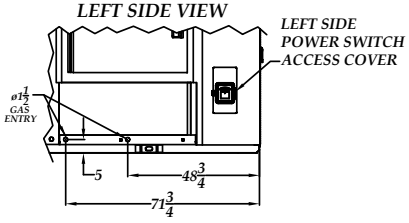


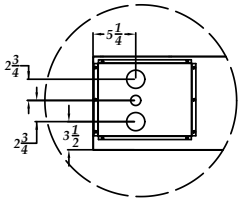
DETAIL B

TOP VIEW



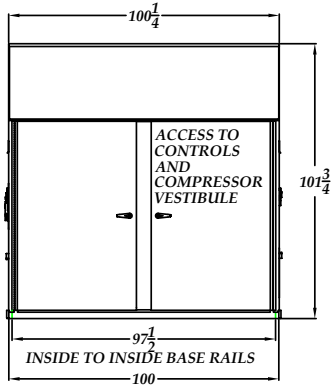
LEFT SIDE VIEW



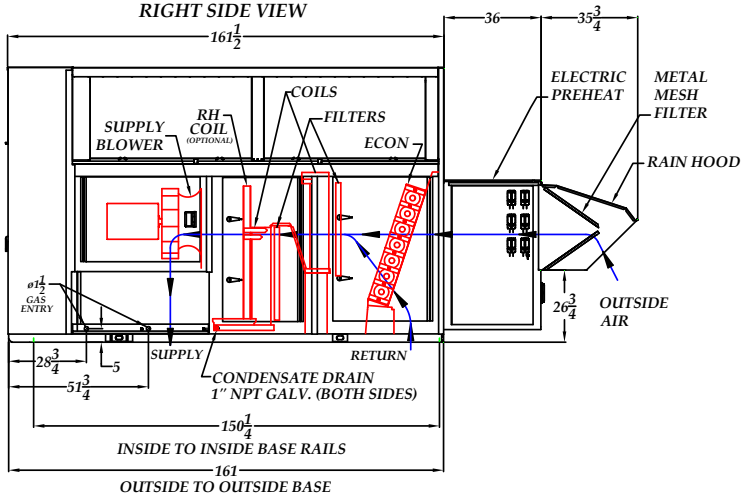


DETAIL A

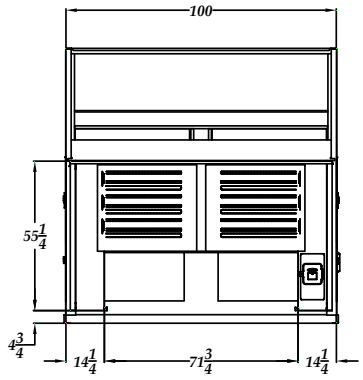
FRONT VIEW



RIGHT SIDE VIEW



BACK VIEW



CAT000344P RNA-D REV:A 10/04/23 JWC
ALL DIMENSIONS ARE IN INCHES

EXHIBIT 'C'

FIELD GAS PIPING DETAILS

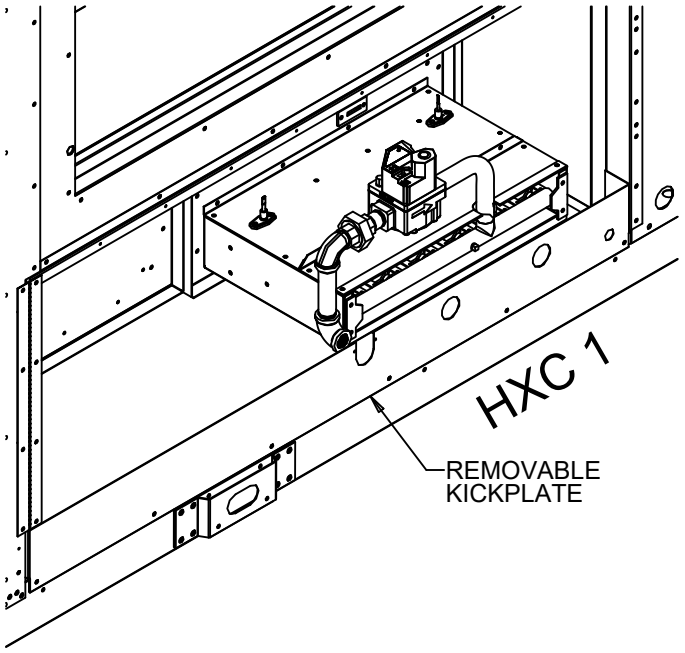
RNA SERIES D - CABINET
26-70 TON

600 MBH
2 STAGE, MODULATING

CAT000431A RNA-D REV A 04/25/23 JAS
ALL DIMENSIONS ARE IN INCHES

Field gas piping is required to the internal gas valves.
Piping should be installed adhering to building codes.
Perform leak check prior to operation.

Reference IOM for additonal information,
and details on optional gas entry through base.

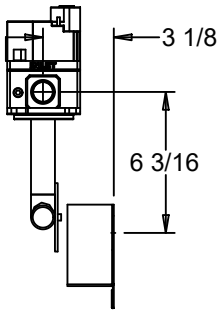


RIGHT SIDE VIEW

HEAT
EXCHANGER 1

TOP

SIDE



FRONT

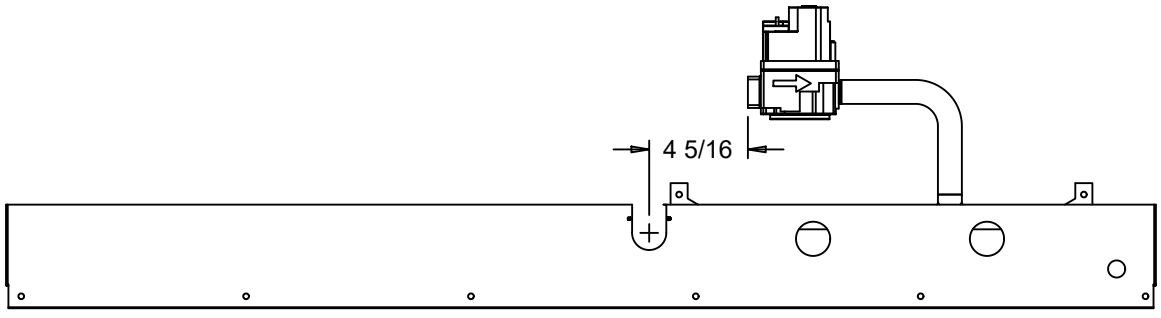


EXHIBIT 'C'

FIELD GAS PIPING DETAILS

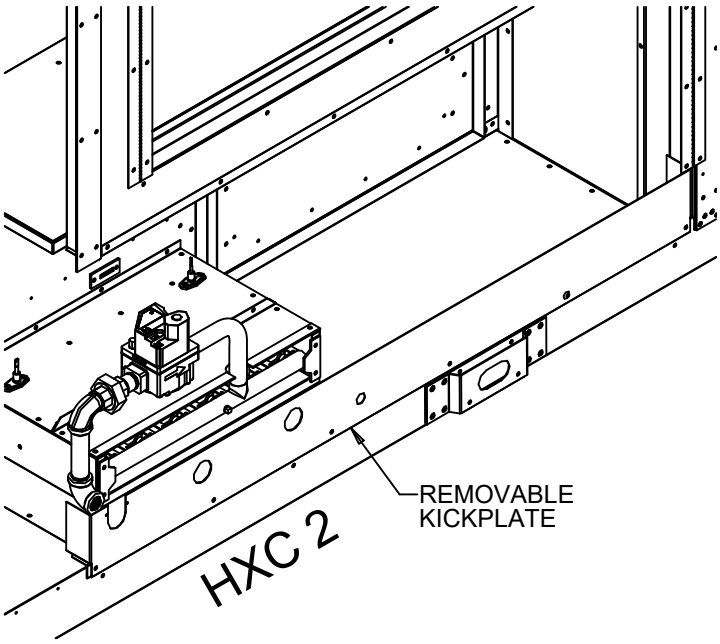
RNA SERIES D - CABINET
26-70 TON

600 MBH
2 STAGE, MODULATING

CAT000431B RNA-D REV A 04/25/23 JAS
ALL DIMENSIONS ARE IN INCHES

Field gas piping is required to the internal gas valves.
Piping should be installed adhering to building codes.
Perform leak check prior to operation.

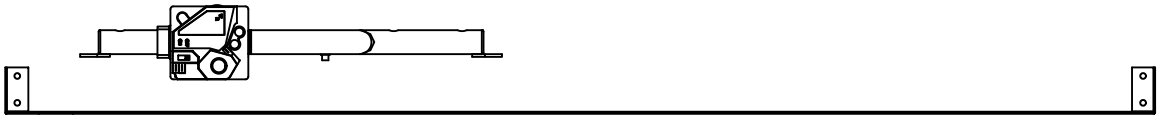
Reference IOM for additonal information,
and details on optional gas entry through base.



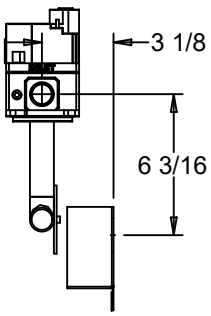
LEFT SIDE VIEW

HEAT
EXCHANGER 2

TOP



SIDE



FRONT

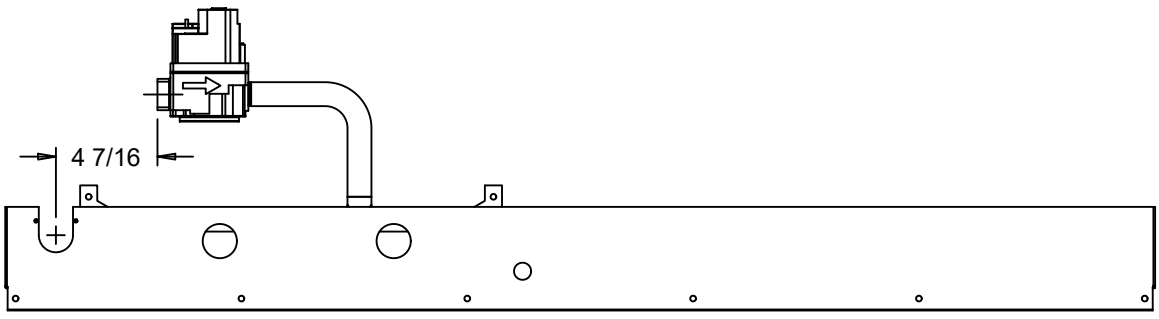


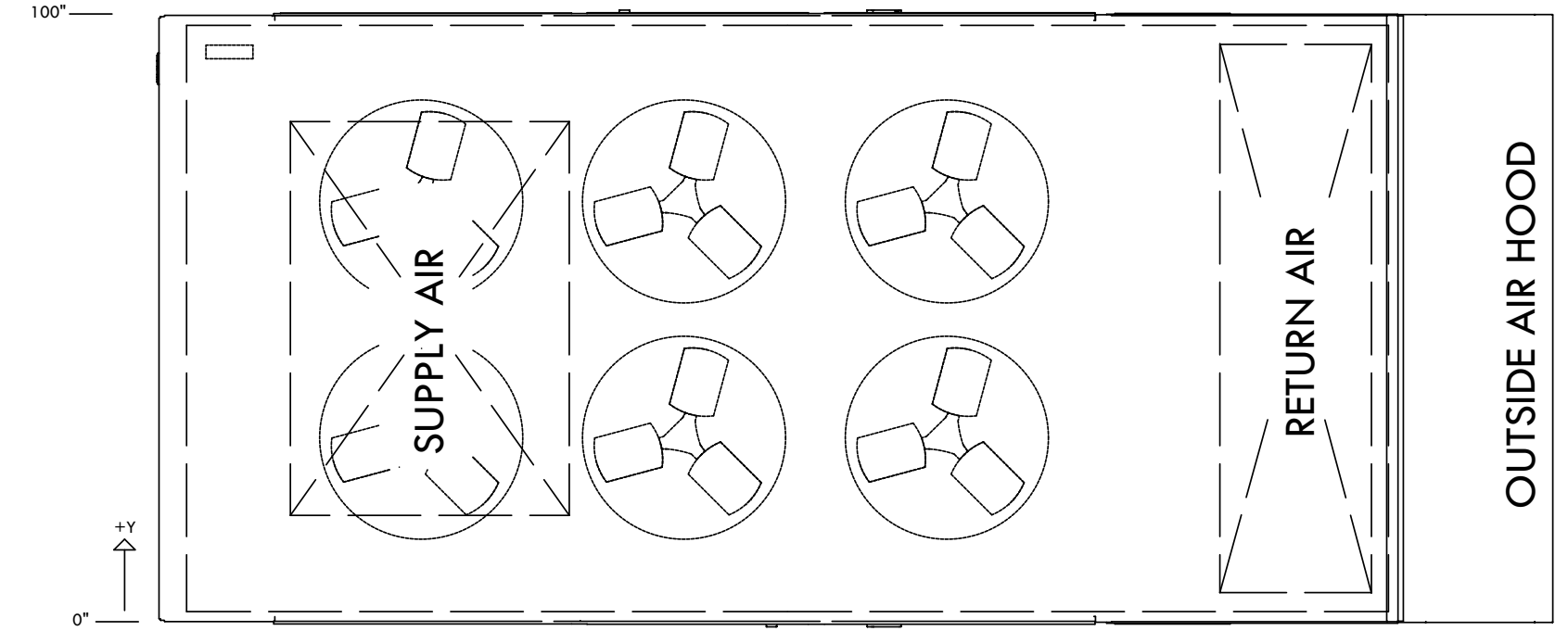
EXHIBIT 'C'

RND CABINET
AIR COOLED CONDENSING UNIT
POWER RETURN

RNA-050-D-A-3-GAA0B-CB2K0:00-AAFAK-H00-ABCBL-00000-DC-CB0A-00-F0-0-AR0-EB-DA0A-00-000-B00000-E0000B-000000B

Front Left Corner:
2023 lbs

Back Left Corner:
1455 lbs



Front Right Corner:
2139 lbs

Back Right Corner:
1538 lbs

CGx: 87.6"
CGy: 48.6"

Total Weight:
7155 lbs

Disclaimer:
This weight estimate does not account for any SPAs.

EXHIBIT 'C'

Unit Rating

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Ecat Version: 348.1

RNA-060-D-A-3-GAA0B-CB2K0:00-AAFAL-H00-ABCBL-00000-DC-CB0A-00-F0-0-AV0-EB-DA0A-00-000-B00000-E0000B-000000B

Tag: ACU-3

Job Information

Job Name:	*S-H 3 RTU replacement*
Job Number:	*Job #57*
Site Altitude:	*0 ft*
Refrigerant:	*R-454B*

Unit Information

Approx. Op./Ship Weights:	*7323 lbs / 7323 lbs (±5%)*
Ambient Temperature (DB/WB):	*93.0 °F / 75.0 °F*
Coil Filter FV / Qty:	*416.7 fpm / 24*
Outside Air Prefilter FV / Qty:	*162.0 fpm / 6*
Supply Airflow/ESP:	*20000 SCFM / 1.80 in. w.g.*
Outside Airflow:	*2700 SCFM*
Return Temperature (DB/WB):	*75.0 °F / 62.0 °F*

Static Pressure

External:	*1.80 in. w.g.*
Cooling Coil:	*0.48 in. w.g.*
Filters Clean:	*0.56 in. w.g.*
Dirt Allowance:	*0.35 in. w.g.*
Reheat Coil:	*0.15 in. w.g.*
Economizer:	*0.20 in. w.g.*
Heating:	*0.21 in. w.g.*
Cabinet:	*0.01 in. w.g.*
Total:	*3.85 in. w.g.*

Cooling Section

	Gross	Net
Total Capacity:	*718.5 MBH*	*658.7 MBH*
Sensible Capacity:	*557.4 MBH*	*497.6 MBH*
Latent Capacity:	*161.1 MBH*	
Circuit Total Gross Capacities:	*180.6 MBH / 180.6 MBH / 178.7 MBH / 178.7 MBH*	
Mixed Air Temp (DB/WB):	*77.4 °F / 64.0 °F*	
Entering Air Temp (DB/WB):	*77.4 °F / 64.0 °F*	
Lv Air Temp (Coil) (DB/WB):	*51.5 °F / 51.2 °F*	
Lv Air Temp (Unit) (DB/WB):	*54.1 °F / 52.4 °F*	

Supply Air Fan:	*2 x 245D @ 10.93 BHP Ea.*
SA Fan RPM / Width:	*1819 RPM / 5.560 in*
SA Fan FEI:	*0.95*
Return Air Fan:	*1 x MW3505-25-RN @ 6.86 BHP Ea.*
RA Fan RPM / Pitch:	*1584 RPM / 25.0°*
RA Fan FEI:	*1.10*
Evaporator Coil:	*43.8 ft² / 4 Rows / 14 FPI*
Evaporator Face Velocity:	*457.1 fpm*

Heating Section

Preheat Type:	*Std (No Preheat)*
Auxiliary Heating Type:	*Nat. Gas Heat*
Heating Airflow:	*20000 SCFM*
Total Capacity:	*480.0 MBH*
Entering Air Temp (DB/WB):	*61.9 °F / 50.4 °F*
Leaving Air Temp (DB/WB):	*83.9 °F / 59.3 °F*
Input:	*600 MBH*
Consumption:	*600.0 MBH*
Total Turndown Ratio:	*3.0:1*

Re-heat Coil:

Capacity:	*397.1 MBH*
Leaving Air Temp (DB/WB):	*70.0 °F / 58.7 °F*
Relative Humidity:	*50.9%*

Rating Information

Listing Model	*RN-060-3-0-GAAY-V0-21-000-A*
Cooling Capacity:	*610.0 MBH*
Cooling EER:	*10.19 BTU/h·W*
Cooling IEER:	*13.2 BTU/h·W*

**Rated in accordance with AHRI Standard 340/360 (I-P)*

Application EER @ Op. Conditions: ***7.9 BTU/h·W***

Electrical Data

EXHIBIT 'C'

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Ecat Version: 348.1

Circuit 1

Rating:	*460V/3Ø/60Hz*	*Minimum Circuit Amp:*	*172*
Unit FLA:	*166*	*Maximum Overcurrent:*	*175*
SCCR:	*10 KAIC*		

	Qty	HP	VAC	Phase	RPM	FLA	RLA
Compressor 1:	2		460	3	3500		25.6
Compressor 2:	2		460	3	3500		24.0
Condenser Fan:	6	0.75	460	3	1080	1.8	
Supply Fan:	2	15.00	460	3	1760	21.0	
Return Fan:	1	10.00	460	3	1760	14.0	
Combustion:	2	0.25	460	1	3200	0.9	

Cabinet Sound Power Levels*

Octave Bands:	63	125	250	500	1000	2000	4000	8000
Discharge LW (dB):	99	97	96	104	101	96	92	88
Return LW (dB):	94	95	88	86	88	86	83	80

*Sound power levels are given for informational purposes only. The sound levels are not guaranteed.

EXHIBIT 'C'

24.5" STAR Plenum

2425 South Yukon Ave • Tulsa, OK 74107 • Ph: (918) 583-2266
Ecat Version: 348.1

JOB INFORMATION:

Job Name:	*S-H 3 RTU replacement*
Job Tag:	*ACU-3*
Date:	*5/16/2024 12:00:00 AM*

WHEEL SPECIFICATION:

Max RPM:	*2000*
Diameter x Qty:	*24.5 in. x 2*
CFM:	*10000*
Inertia:	*10WR²*

OPERATING CONDITIONS

Air Flow:	*10000*
Fan Energy Index (FEI):	*0.95*
Static Pressure:	*3.85 in. Wg*
Relief Dampers DP:	*0 in. Wg*
TSP:	*3.85 in. Wg*
Site Altitude	*0 ft*
TSP @ Sea Level:	*3.85 in. Wg*

MOTOR SELECTION

Rated HP / Bypass:	*15 x 2 / No*
Frame Size:	*254T*
Nominal RPM:	*1760*
VAC/PH/HZ:	*460V/3Ø/60Hz*
Enclosure Type:	*ODP*
Max Inertial Load:	*0 WR²*

FAN PERFORMANCE:

RPM:	*1819*
BHP:	*10.93*
Efficiency:	*55.53%*
Max Duct SP with Blocked Airway:	*0 in. Wg @1819 RPM*

Max Duct SP with Blocked Airway:

FAN SOUND POWER (Inlet/Outlet)

Octave Band: **(Re 10^-12 watts)**

1	2	3	4	5	6	7	8
96	95	94	93	93	92	89	88
99	96	96	104	102	98	94	90

SOUND POWER A-Weighted: 90 dB

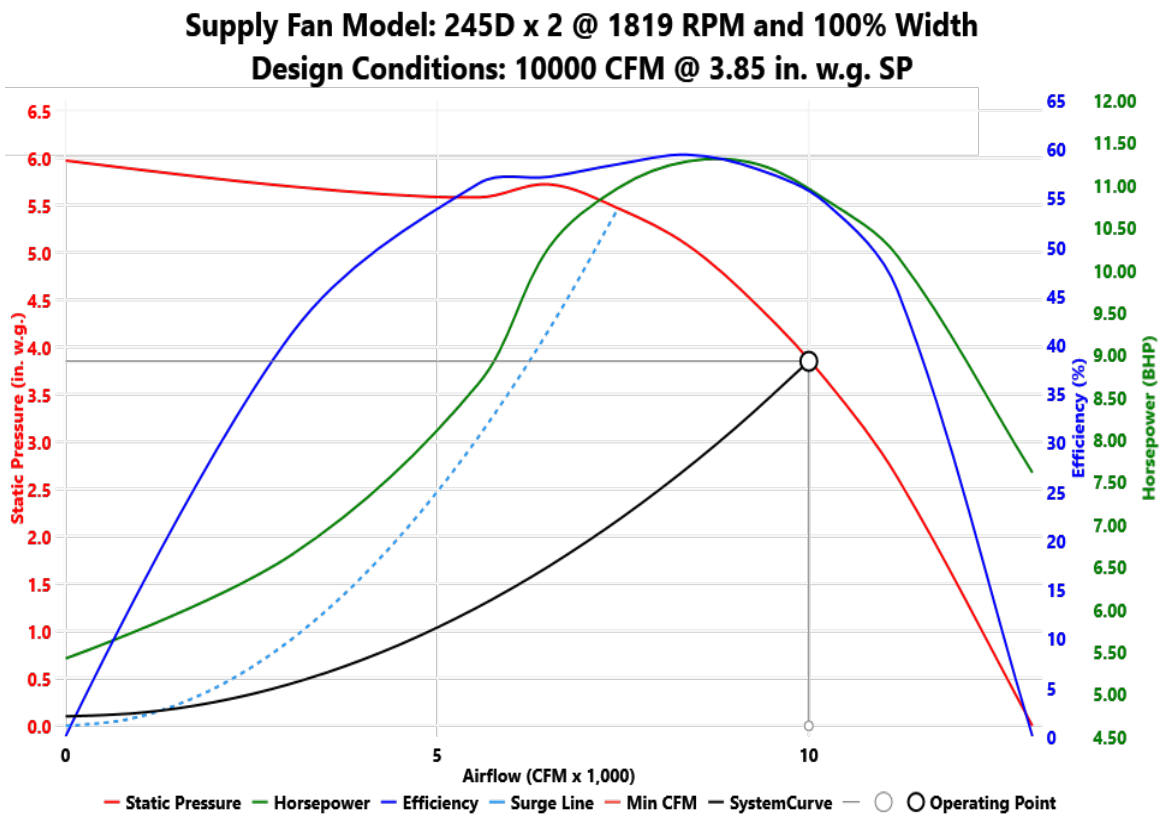


EXHIBIT 'C'

MW3505-25 Axial Fan

2425 South Yukon Ave • Tulsa, OK 74107 • Ph: (918) 583-2266
Ecat Version: 348.1

JOB INFORMATION:

Job Name:	*S-H 3 RTU replacement*
Job Tag:	*ACU-3*
Date:	*5/16/2024 12:00:00 AM*

WHEEL SPECIFICATION:

Max RPM:	*1760*
Diameter x Qty:	*35.5 in. x 1*
CFM:	*18000*
Inertia:	*9WR²*

OPERATING CONDITIONS

Air Flow:	*18000*
Fan Energy Index (FEI):	*1.10*
Static Pressure:	*1.27 in. Wg*
Relief Dampers DP:	*0 in. Wg*
TSP:	*1.27 in. Wg*
Site Altitude	*0 ft*
TSP @ Sea Level:	*1.27 in. Wg*

MOTOR SELECTION

Rated HP / Bypass:	*10 x 1 / No*
Frame Size:	*215T*
Nominal RPM:	*1760*
VAC/PH/HZ:	*460V/3Ø/60Hz*
Enclosure Type:	*ODP*
Max Inertial Load:	*0 WR²*

FAN PERFORMANCE:

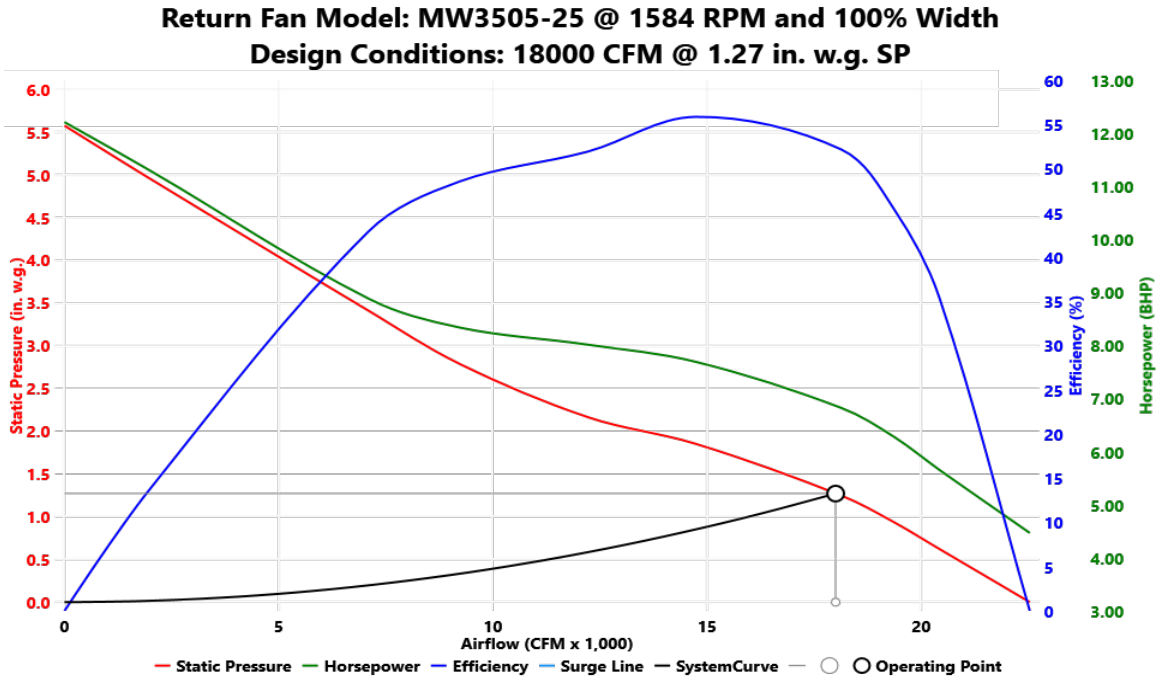
RPM:	*1584*
BHP:	*6.86*
Efficiency:	*52.53%*
Max Duct SP with Blocked Airway:	*0 in. Wg @1584 RPM*

FAN SOUND POWER (Inlet/Outlet)

Octave Band:				**(Re 10^-12 watts)**			
1	**2**	**3**	**4**	**5**	**6**	**7**	**8**
93	95	91	93	92	89	86	83
93	95	91	93	92	89	86	83

SOUND POWER A-Weighted: dB

Max Duct SP with Blocked Airway:



Date Created/Modified:5/16/2024 11:59:10 AM Using Version:348.1

Date Printed:5/16/2024 12:29:18 PM

EXHIBIT 'C'

Unit Submittal

2425 South Yukon Ave • Tulsa, OK 74107 • Ph: (918) 583-2266
Ecat Version: 348.1

B3 B4 B5 1 2 3A 3B 3C 3D 3E 4A 4B 4C 5A 5B 5C 5D 5E 6A 6B 6C 6D 6E 7 8 9A 9B 9C 9D 10A

RNA-060-D-A-3-GAA0B-CB2K0:00-AAFAL-H00-ABCBL-00000-DC-CB0
A-00-F0-0-AV0-EB-DA0A-00-000-B00000-E0000B-000000B

10B 11A 11B 12 13A 13B 13C 14 15 16A 16B 16C 16D 17A 17B 18A 18B 18C 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 SIZ1 SIZ2

Tag: ACU-3

Job Name:	S-H 3 RTU replacement	Unit Worksheet For:	
Job Number:	Job #57	Unit Worksheet Date:	5/16/2024

	Base Option	Description
RN	Generation	RN Series
A	Major Revision	Major Revision A
060	Unit Size	Sixty
D	Series	D Series
A	Minor Revision	Minor Revision A
3	Voltage	460V/3φ/60Hz
G	Compressor Style	R-454B Variable Capacity Scroll Compressor
A	Condenser Style	Microchannel Air-Cooled Condenser
A	Indoor Coil Configuration	Standard Evaporator
0	Cooling Heat Exchanger Construction	Standard
B	Cooling Staging	2 Variable Capacity Comp + 2 Two-Step Comp
C	Heat Type	Natural Gas (Vertical Unit Configuration)
B	Heat Construction	Stainless Steel Heat Exchanger, Gas Piping to the Valve
2	Heat Designation	600 MBH
K	Heat Staging	Modulating Gas Heat - Temperature Control
0	Heat Pump Auxiliary Heating	No Auxiliary Heat

	Feature Option		Decription
0	F1.	Unit Orientation	Standard Access - Hinged Access Doors with Lockable Handles
0	F2.	Supply & Return Locations	Bottom Supply+Bottom Return
A	F3A.	Supply Fan Quantity	2 Fans
A	F3B.	Supply Fan Configuration	1 Fan per VFD + Full Width Fan
F	F3C.	Supply Fan Size	24" Direct Drive Backward Curved Aluminum
A	F3D.	Supply Fan Motor Type	High Efficiency Open Motor (1,800 nominal rpm)
L	F3E.	Supply Fan Motor Size	15 hp
H	F4A.	Outside Air Section	Economizer + Power Return
0	F4B.	Energy Recovery Type	No Energy Recovery
0	F4C.	Energy Recovery Size	No Energy Recovery
A	F5A.	Return Fan Quantity	1 Fan
B	F5B.	Return Fan Configuration	1 Fan per VFD
C	F5C.	Return Fan Size	36" Axial Fan
B	F5D.	Return Fan Motor Type	High Efficiency Open Motor (1,800 nominal rpm)
L	F5E.	Return Fan Motor Size	10 hp
0	F6A.	Exhaust Fan Quantity	0 Exhaust Fans
0	F6B.	Exhaust Fan Configuration	No Exhaust Fan
0	F6C.	Exhaust Fan Size	No Exhaust Fan
0	F6D.	Exhaust Fan Motor Type	No Exhaust Fan
0	F6E.	Exhaust Fan Motor Size	No Exhaust Fan
D	F7.	Outside Air Control	Fully Modulating Actuator - Enthalpy Limit
C	F8.	Return and Exhaust Air Options	Standard Barometric Relief EA Dampers
C	F9A.	Unit Filter Type	2" Pleated MERV 8 + 4" Pleated MERV 13
B	F9B.	Unit Filter Size & Location	High Efficiency Filters in Standard Position
0	F9C.	Final Filter Type	No Final Filters
A	F9D.	Filter Options	Clogged Filter Switch - Unit Filters
0	F10A.	Refrigeration Control A	Standard - Adj Comp. Cooling Lock Out Through Unit Controls
0	F10B.	Refrigeration Control B	Standard

EXHIBIT 'C'

	Feature Option		Decription
F	F11A.	Refrigeration Options A	Modulating Hot Gas Reheat Microchannel Coil [MHGR-MC]
0	F11B.	Refrigeration Options B	Standard Packaged Unit
0	F12.	Refrigeration Accessories	None
A	F13A.	Unit Disconnect Type	Single Point Power - Non-fused Disconnect Power Switch
V	F13B.	Disconnect 1 Size	250 Amps
0	F13C.	Disconnect 2 Size	Standard - None
E	F14.	Safety Options	Remote Safety Shutdown Terminals
B	F15.	Electrical Accessories	Phase & Brown Out Protection
D	F16A.	Control Sequence	VAV Unit Controller - VAV Cool + CAV Heat
A	F16B.	Control Supplier	AAON Controls
0	F16C.	Control Supplier Options	None
A	F16D.	BMS Connection & Diagnostics	BACnet IP
0	F17A.	Preheat Configuration	Standard - None
0	F17B.	Preheat Sizing	Standard - None
0	F18A.	Option Box Location	None
0	F18B.	Option Box Size	None
0	F18C.	Option Box Accessories	None
B	F19.	Outside Air Accessories	Outside Air Hood with Metal Mesh Filters
0	F20.	Cabinet Options	Standard - None
0	F21.	Accessories	Standard
0	F22.	Maintenance Accessories	None
0	F23.	Code Options	Standard - ETL U.S.A. Listing
0	F24.	Shipping Splits	Standard
E	F25.	Air-Cooled Condenser Accessories	VFD Condenser Fan Head Pressure Control
0	F26.	Evap-Cooled Condenser Accessories	Standard
0	F27.	Water-Cooled Condenser Accessories	None
0	F28.	Energy Recovery Accessories	None
0	F29.	VFD Options	Standard
B	F30.	Miscellaneous Options	SCCR (10kA)
0	F31.	Blank	Standard
0	F32.	Blank	Standard
0	F33.	Blank	Standard
0	F34.	Blank	Standard
0	F35.	Warranty	Standard Warranty
0	F36.	Cabinet Material	Galvanized Cabinet - Double Wall + R-13 Foam Insulation
B	F37.	Specials & Paint	Premium AAON Gray Paint Exterior Paint

EXHIBIT 'C'

Controller Components

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Ecat Version: 348.1

RNA-060-D-A-3-GAA0B-CB2K0:00-AAFAL-H00-ABCBL-00000-DC-CB0
A-00-F0-0-AV0-EB-DA0A-00-000-B00000-E0000B-000000B

Tag: ACU-3

Job Name:	S-H 3 RTU replacement	VCCX For:	
Job Number:	Job #57	VCCX Date:	May 16, 2024

Part#	Included Parts	Assigned Channel	BACnet Point
ASM07503	VCCX-454 CONTROLLER		
ASM01692	OSA Temp/Hum Sensor	EBUS2 Communicating Sensor	AI:16,AI:17,AI:18,AI:19
R82890	Supply Temp Sensor - Field Installed	VCCX Control Point AI3	AI:9
ASM01820	Space Digital Temp/Hum Sensor	EBUS3 Communicating Sensor	AI:12,AI:13
R82890	Return Temp Sensor	VCCX Control Point AI4	AI:14
ASM01640	Duct Static Pressure Sensor	VCCX Control Point AI8	AI:21
	Supply Fan Control Signal 0-10VDC	VCCX Control Point AO1	AI:22
	Economizer	VCCX Control Point AO2	AI:30
R62330	Proof of Air Flow	VCCX Control Point BI1	BI:6, BI:24
G150620	Clogged Filter Switch (Standard Filters)	VCCX Control Point BI2	BI:25
	A2L Airstream Leak Detect Status	VCCX Control Point BI5	BI:9
	A2L Cabinet Leak Detect Status	VCCX Control Point BI6	BI:10
	Safety Shut Down	VCCX Control Point BI8	BI:26
	Supply Fan	Configured Relay Point	BI:0
	Morning Warm-Up	Configured Relay Point	BI:1
ASM01687	REHEAT EXPANSION MODULE		
	Reheat Enable	Reheat Expansion Module	
	Reheat HGR Valve	Reheat Expansion Module	AI:42
ASM07563	A2L MITIGATION BOARD 2		
G137750	Gas Sensor 1	A2L MB2 AI1	
G137750	Gas Sensor 2	A2L MB2 AI2	
G137750	Gas Sensor 3	A2L MB2 AI3	
	Alarm Output	A2L MB2 Fixed RO3	
ASM07563	A2L MITIGATION BOARD 1		
G137750	Gas Sensor 1	A2L MB1 AI1	
	Supply Fan Proof of Flow	A2L MB1 BI1	
	Alarm Output	A2L MB1 Fixed RO3	
ASM07716	REFRIGERATION MODULE 1		
V38391	Suction Pressure Sensor A	RM454-D 1 SP-1	AI:48
V38410	Discharge Pressure Sensor A	RM454-D 1 HP-1	AI:50
V38391	Suction Pressure Sensor C	RM454-D 1 SP-2	AI:73
V38410	Discharge Pressure Sensor C	RM454-D 1 HP-2	AI:75
	Comp Discharge Temp A	RM454-D 1 TEMP1	AI:66
	Modulated Condenser Signal A	RM454-D 1 AOUT1	AI:46
	Modulated Condenser Signal C	RM454-D 1 AOUT2	AI:47
	Comp Status Input A	RM454-D 1 BIN1	BI:77
	Comp Status Input C	RM454-D 1 BIN2	BI:78
	Emergency Shutdown	RM454-D 1 BIN4	BI:83
	Comp Enable A	RM454-D 1 RLY1	BI:84
	Comp Unload Signal A	RM454-D 1 COMP1	AI:44

EXHIBIT 'C'

	Comp Enable C	RM454-D 1 RLY2	BI:85
	Comp Load Signal C	RM454-D 1 COMP2	AI:45
	Condenser Enable A/C	RM454-D 1 RLY3	BI:86
ASM07716	REFRIGERATION MODULE 2		
V38391	Suction Pressure Sensor B	RM454-D 2 SP-1	AI:73
V38410	Discharge Pressure Sensor B	RM454-D 2 HP-1	AI:75
V38391	Suction Pressure Sensor D	RM454-D 2 SP-2	AI:73
V38410	Discharge Pressure Sensor D	RM454-D 2 HP-2	AI:75
	Comp Discharge Temp B	RM454-D 2 TEMP1	AI:91
	Modulated Condenser Signal B	RM454-D 2 AOUT1	AI:71
	Modulated Condenser Signal D	RM454-D 2 AOUT2	AI:72
	Comp Status Input B	RM454-D 2 BIN1	BI:89
	Comp Status Input D	RM454-D 2 BIN2	BI:90
	Emergency Shutdown	RM454-D 2 BIN4	BI:95
	Comp Enable B	RM454-D 2 RLY1	BI:96
	Comp Unload Signal B	RM454-D 2 COMP1	AI:69
	Comp Enable D	RM454-D 2 RLY2	BI:97
	Comp Load Signal D	RM454-D 2 COMP2	AI:70
	Condenser Enable B/D	RM454-D 2 RLY3	BI:98
ASM01670	MODULATING HOT GAS REHEAT MODULE		
	Reheat HGR Valve	MHGRV-X	AI:42
ASM01695	MODULATING GAS MODULE		
	Gas Valve Signal 1	MODGAS-XWR Gas Valve 1	
	Gas Valve Signal 2	MODGAS-XWR Gas Valve 2	
	Proof of Ignition 1	MODGAS-XWR BI3	
	Proof of Ignition 2	MODGAS-XWR BI4	
	Mod Heat Stage 1 (IGN 1)	MODGAS-XWR Heat 1 Relay	
	Mod Heat Stage 1 (IGN 2)	MODGAS-XWR Heat 2 Relay	
	Low Speed Enable	MODGAS-XWR Low Speed Relay	

EXHIBIT 'C'

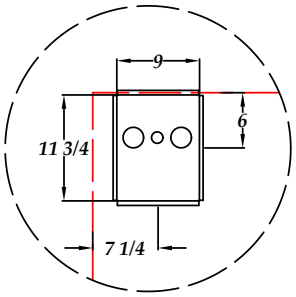
RN UNITS 50-70 TON
AIR COOLED, POWER RETURN

AAON®

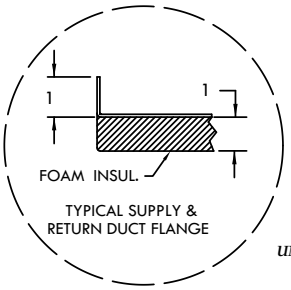
CLEARANCES

LOCATION	UNIT SIZE
	50-70 TON
OUTSIDE AIR (BACK)	48
CONTROLS SIDE (FRONT)	48
LEFT SIDE	48
RIGHT SIDE	70
TOP	UNOBSTRUCTED

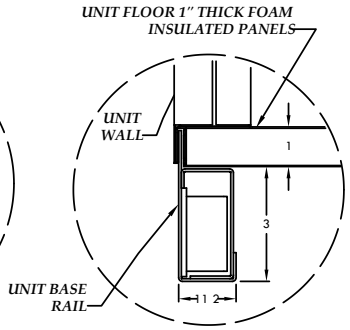
NOTE: RIGHT AND LEFT SIDE UNIT CLEARANCES ARE INTERCHANGEABLE ON UNITS THAT DO NOT HAVE THE HYDRONIC HEATING OPTION. (UNITS WITH HYDRONIC HEAT MUST HAVE 70" RIGHT SIDE ACCESS FOR SERVICE.)



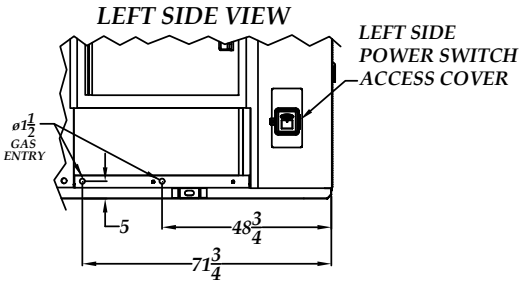
DETAIL A
UTILITY ENTRY

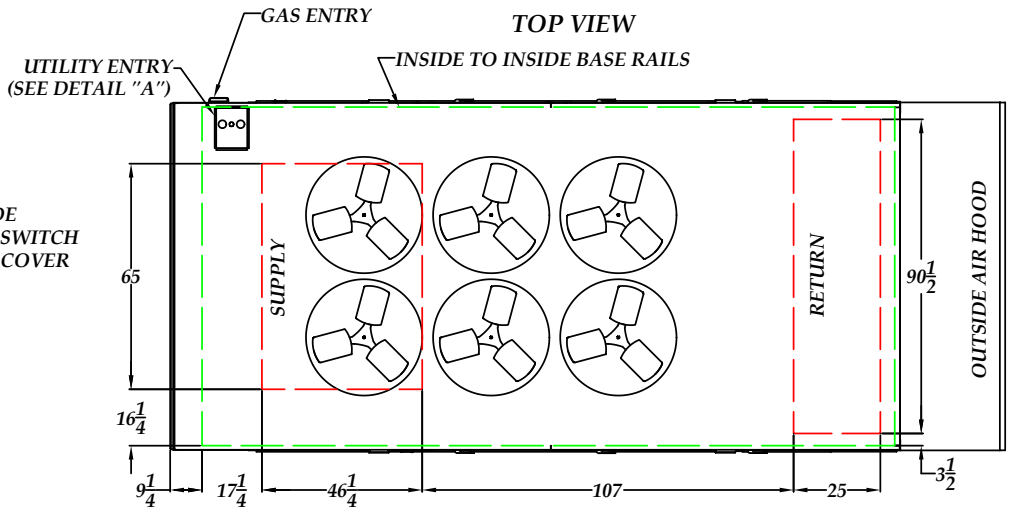


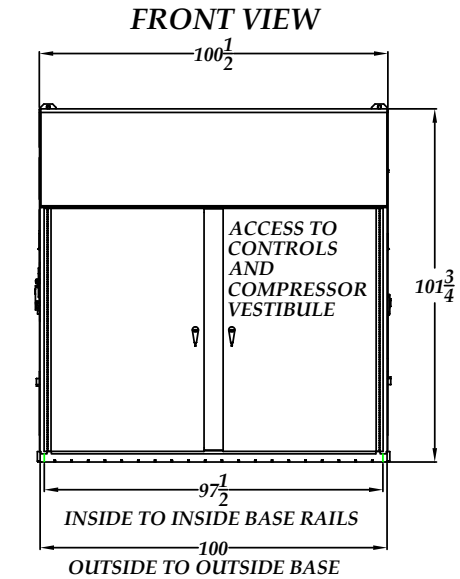
DETAIL B

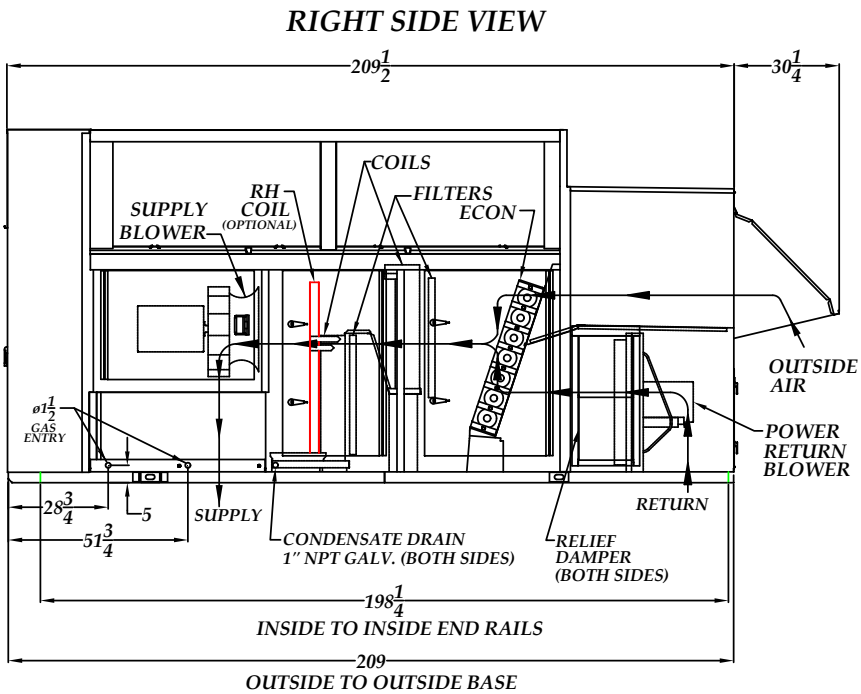


BASE RAIL CLEARANCE









CAT000307 RNA-D REV:C 01/05/23 JWC
ALL DIMENSIONS ARE IN INCHES

EXHIBIT 'C'

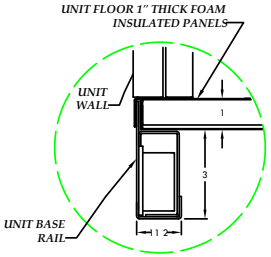
RN UNITS 50-70 TON

AIR COOLED, ELECTRIC PREHEAT, METAL MESH FILTER, RNA-D

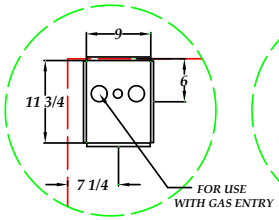
AAON®

CLEARANCES	
LOCATION	UNIT SIZE 50-70 TON
OUTSIDE AIR (BACK)	48
CONTROLS SIDE	48
LEFT SIDE	48
RIGHT SIDE	70
TOP	UNOBSTRUCTED

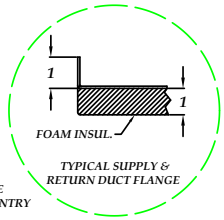
NOTE: RIGHT AND LEFT SIDE UNIT CLEARANCES ARE INTERCHANGEABLE ON UNITS THAT DO NOT HAVE THE HYDRONIC HEATING OPTION. (UNITS WITH HYDRONIC HEAT MUST HAVE 70" RIGHT SIDE ACCESS FOR SERVICE.)



BASE RAIL CLEARANCE

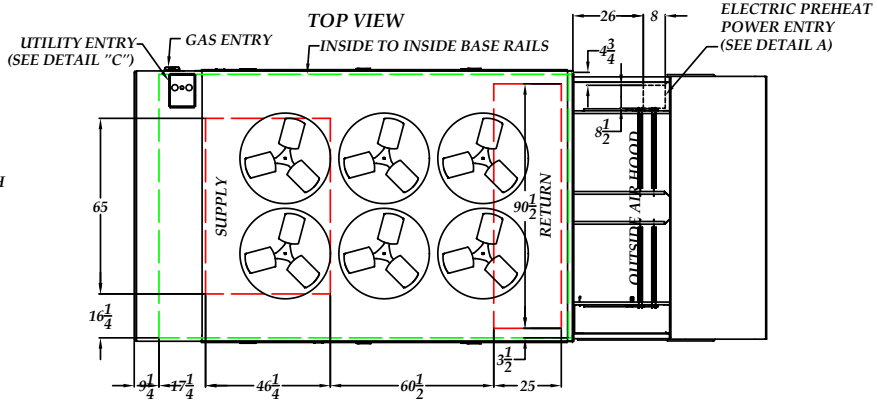


DETAIL C
UTILITY ENTRY

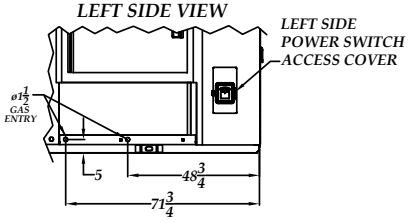


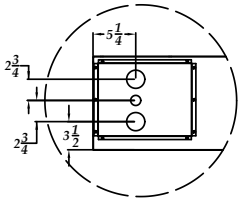
DETAIL B

TOP VIEW



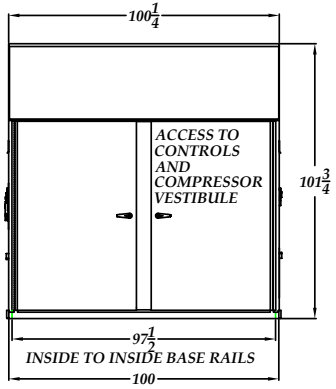
LEFT SIDE VIEW



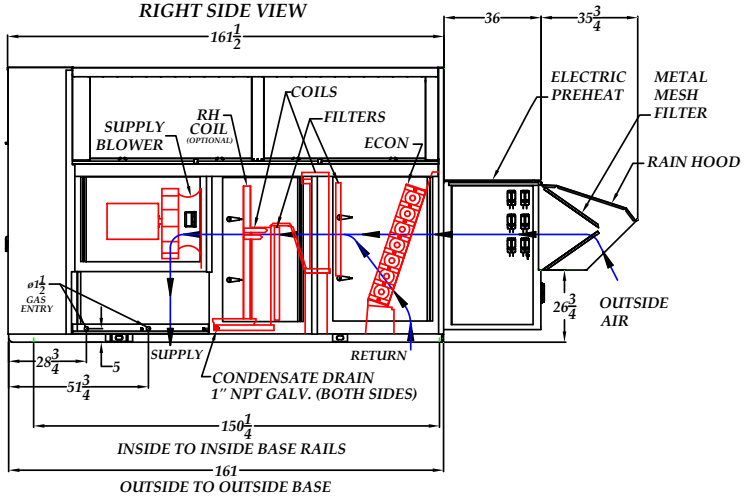


DETAIL A

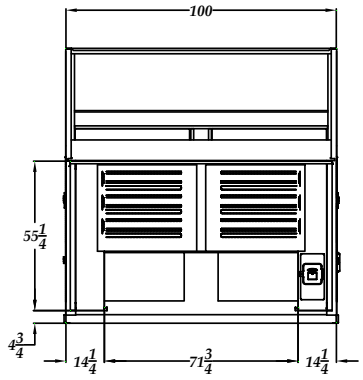
FRONT VIEW



RIGHT SIDE VIEW



BACK VIEW



CAT000344P RNA-D REV:A 10/04/23 JWC
ALL DIMENSIONS ARE IN INCHES

EXHIBIT 'C'

FIELD GAS PIPING DETAILS

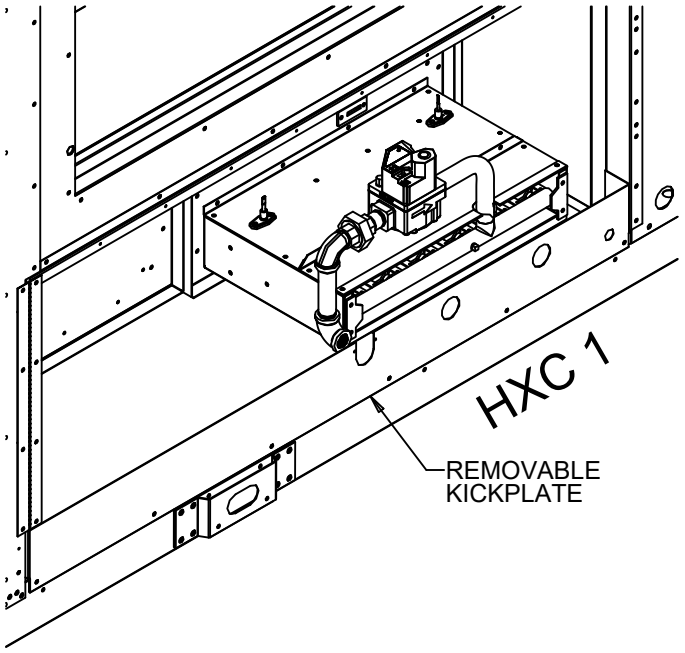
RNA SERIES D - CABINET
26-70 TON

600 MBH
2 STAGE, MODULATING

CAT000431A RNA-D REV A 04/25/23 JAS
ALL DIMENSIONS ARE IN INCHES

Field gas piping is required to the internal gas valves.
Piping should be installed adhering to building codes.
Perform leak check prior to operation.

Reference IOM for additonal information,
and details on optional gas entry through base.

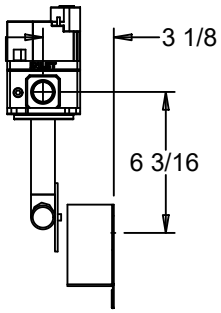


RIGHT SIDE VIEW

HEAT
EXCHANGER 1

TOP

SIDE



FRONT

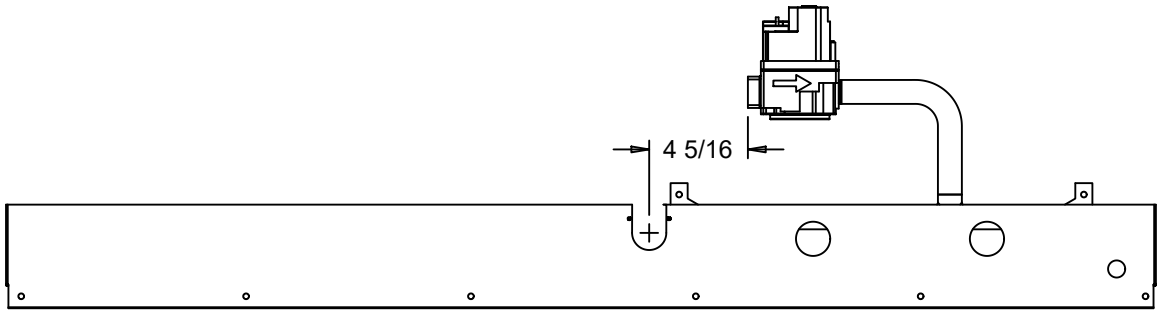


EXHIBIT 'C'

FIELD GAS PIPING DETAILS

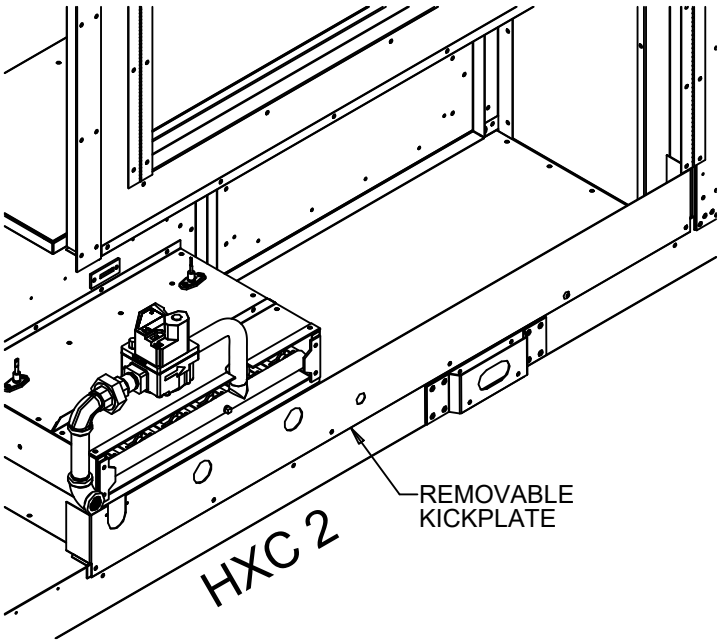
RNA SERIES D - CABINET
26-70 TON

600 MBH
2 STAGE, MODULATING

CAT000431B RNA-D REV A 04/25/23 JAS
ALL DIMENSIONS ARE IN INCHES

Field gas piping is required to the internal gas valves.
Piping should be installed adhering to building codes.
Perform leak check prior to operation.

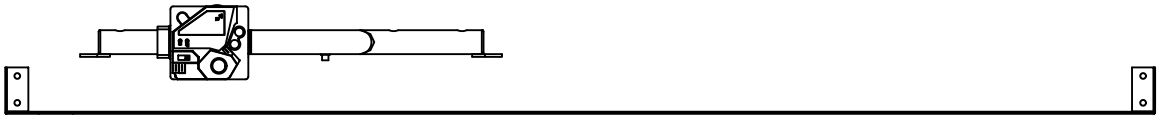
Reference IOM for additonal information,
and details on optional gas entry through base.



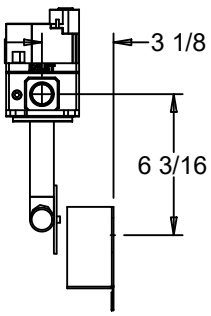
LEFT SIDE VIEW

HEAT
EXCHANGER 2

TOP



SIDE



FRONT

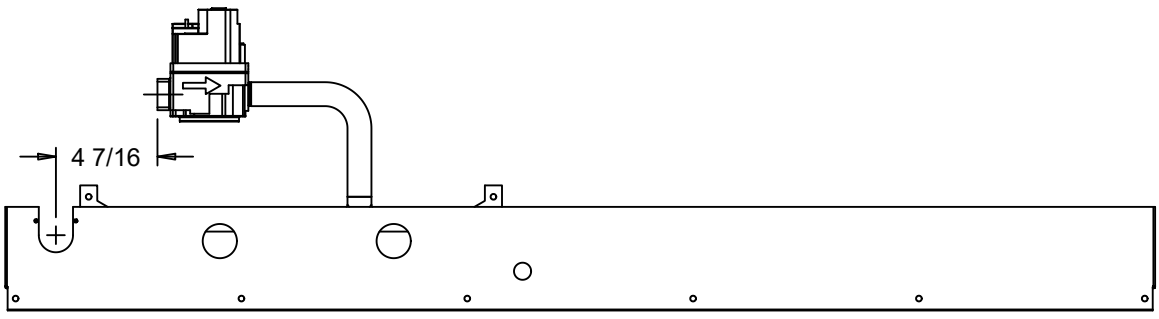
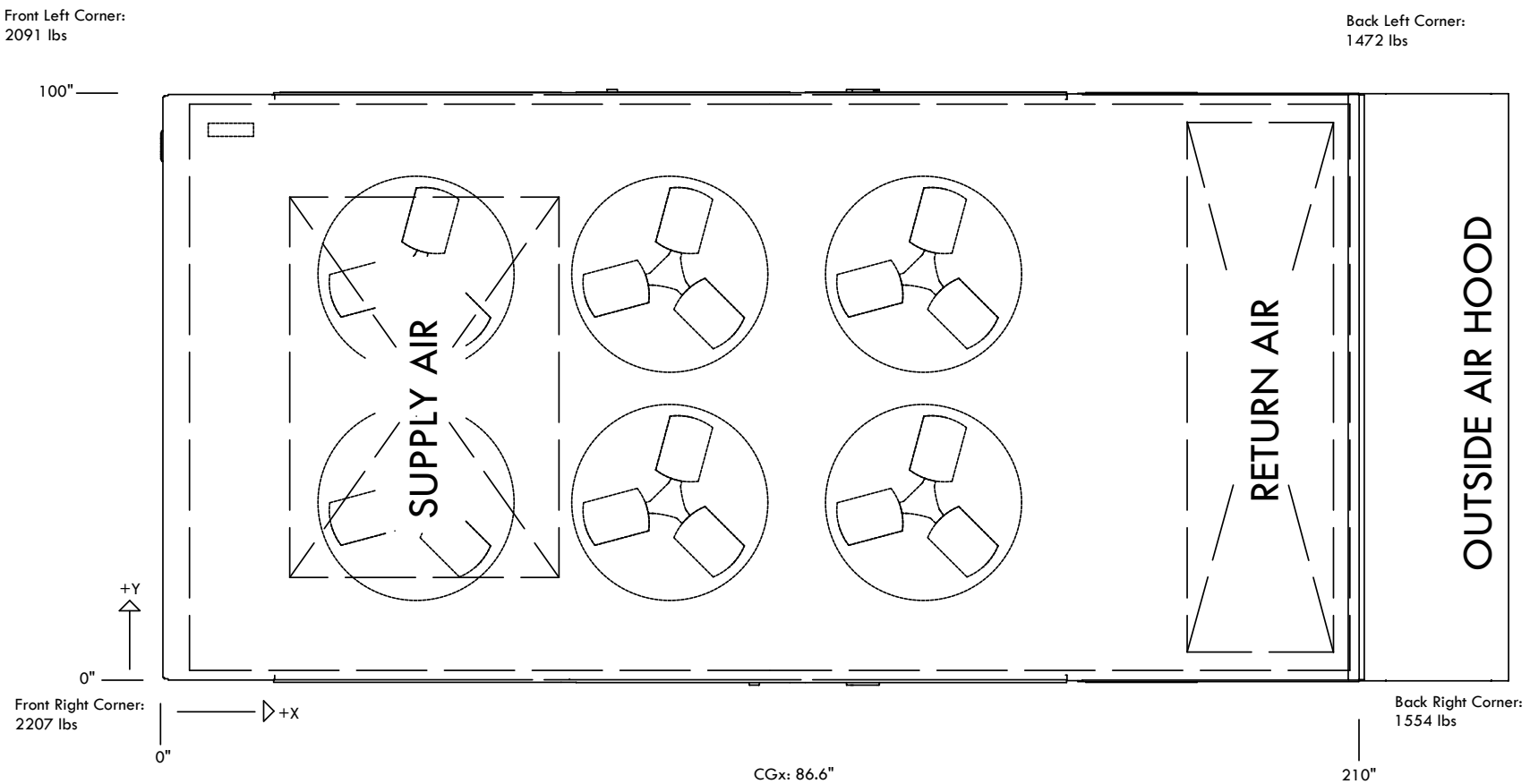


EXHIBIT 'C'

RND CABINET
AIR COOLED CONDENSING UNIT
POWER RETURN

RNA-060-D-A-3-GAA0B-CB2K0:00-AAFAL-H00-ABCBL-00000-DC-CB0A-00-F0-0-AV0-EB-DA0A-00-000-B00000-E0000B-000000B



Disclaimer:
This weight estimate does not account for any SPAs.

EXHIBIT 'C'