# UNIVERSITY OF KENTUCKY

## Purchasing Division

Request for Proposal
UK-2274-23
Proposal Due Date – 08/10/2022

Custom Air Handling Unit

# UNIVERSITY OF KENTUCKY
# Purchasing Division

# REQUEST FOR PROPOSAL (RFP)

**ATTENTION: This is not an order. Read all instructions, terms and conditions carefully.**

| | | |
|---|---|---|
| **PROPOSAL NO.:** | **UK-2274-23** | **RETURN ORIGINAL COPY OF PROPOSAL TO:** |
| **Issue Date:** | **07/13/2022** | **UNIVERSITY OF KENTUCKY** |
| **Title:** | **Custom Air Handling unit** | **PURCHASING DIVISION** |
| **Purchasing Officer:** | **Ken Scott** | **411 S LIMESTONE** |
| | | **ROOM 322 PETERSON SERVICE BLDG.** |
| **Phone:** | **859-257-9102** | **LEXINGTON, KY 40506-0005** |

**IMPORTANT: PROPOSALS MUST BE RECEIVED BY: 08/10/2022 by 3 P.M. LEXINGTON, KY TIME.**

NOTICE OF REQUIREMENTS

1. The University's General Terms and Conditions and Instructions to Bidders, viewable at www.uky.edu/Purchasing/terms.htm, apply to this RFP. When the RFP includes construction services, the University's General Conditions for Construction and Instructions to Bidders, viewable at www.uky.edu/Purchasing/ccphome.htm, apply to the RFP.
2. Contracts resulting from this RFP must be governed by and in accordance with the laws of the Commonwealth of Kentucky.
3. Any agreement or collusion among offerors or prospective offerors, which restrains, tends to restrain, or is reasonably calculated to restrain competition by agreement to bid at a fixed price or to refrain from offering, or otherwise, is prohibited.
4. Any person who violates any provisions of KRS 45A.325 shall be guilty of a felony and shall be punished by a fine of not less than five thousand dollars nor more than ten thousand dollars, or be imprisoned not less than one year nor more than five years, or both such fine and imprisonment. Any firm, corporation, or association who violates any of the provisions of KRS 45A.325 shall, upon conviction, be fined not less than ten thousand dollars or more than twenty thousand dollars.

AUTHENTICATION OF BID AND STATEMENT OF NON-COLLUSION AND NON-CONFLICT OF INTEREST

I hereby swear (or affirm) under the penalty for false swearing as provided by KRS 523.040:

1. That I am the offeror (if the offeror is an individual), a partner, (if the offeror is a partnership), or an officer or employee of the bidding corporation having authority to sign on its behalf (if the offeror is a corporation);
2. That the attached proposal has been arrived at by the offeror independently and has been submitted without collusion with, and without any agreement, understanding or planned common course of action with, any other Contractor of materials, supplies, equipment or services described in the RFP, designed to limit independent bidding or competition;
3. That the contents of the proposal have not been communicated by the offeror or its employees or agents to any person not an employee or agent of the offeror or its surety on any bond furnished with the proposal and will not be communicated to any such person prior to the official closing of the RFP:
4. That the offeror is legally entitled to enter into contracts with the University of Kentucky and is not in violation of any prohibited conflict of interest, including, but not limited to, those prohibited by the provisions of KRS 45A.330 to .340, and164.390;
5. That the offeror, and its affiliates, are duly registered with the Kentucky Department of Revenue to collect and remit the sale and use tax imposed by Chapter 139 to the extent required by Kentucky law and will remain registered for the duration of any contract award;
6. That I have fully informed myself regarding the accuracy of the statement made above.

SWORN STATEMENT OF COMPLIANCE WITH CAMPAIGN FINANCE LAWS

In accordance with KRS45A.110 (2), the undersigned hereby swears under penalty of perjury that he/she has not knowingly violated any provision of the campaign finance laws of the Commonwealth of Kentucky and that the award of a contract to a bidder will not violate any provision of the campaign finance laws of the Commonwealth of Kentucky.

CONTRACTOR REPORT OF PRIOR VIOLATIONS OF KRS CHAPTERS 136, 139, 141, 337, 338, 341 & 342

The contractor by signing and submitting a proposal agrees as required by 45A.485 to submit final determinations of any violations of the provisions of KRS Chapters 136, 139, 141, 337, 338, 341 and 342 that have occurred in the previous five (5) years prior to the award of a contract and agrees to remain in continuous compliance with the provisions of the statutes during the duration of any contract that may be established. Final determinations of violations of these statutes must be provided to the University by the successful contractor prior to the award of a contract.

CERTIFICATION OF NON-SEGREGATED FACILITIES

The contractor, by submitting a proposal, certifies that he/she is in compliance with the Code of Federal Regulations, No. 41 CFR 60-1.8(b) that prohibits the maintaining of segregated facilities.

**SIGNATURE REQUIRED:** This proposal cannot be considered valid unless signed and dated by an authorized agent of the offeror. Type or print the signatory's name, title, address, phone number and fax number in the spaces provided. Offers signed by an agent are to be accompanied by evidence of his/her authority unless such evidence has been previously furnished to the issuing office.

| | | |
|---|---|---|
| **DELIVERY TIME:** | **NAME OF COMPANY:** | **DUNS #** |
| **PROPOSAL FIRM THROUGH:** | **ADDRESS:** | **Phone/Fax:** |
| **PAYMENT TERMS:** | **CITY, STATE & ZIP CODE:** | **E-MAIL:** |
| **SHIPPING TERMS: F. O. B. DESTINATION PREPAID AND ALLOWED** | **TYPED OR PRINTED NAME:** | **WEB ADDRESS:** |
| **FEDERAL EMPLOYER ID NO.:** | **SIGNATURE:** | **DATE:** |

# Table of Contents

Attachments:

Attachment A Specifications
Attachment B Drawings

## 1.0 DEFINITIONS

The term "addenda" means written or graphic instructions issued by the University of Kentucky prior to the receipt of proposals that modify or interpret the RFP documents by additions, deletions, clarifications and/or corrections.

The term "competitive negotiations" means the method authorized in the Kentucky Revised Statutes, Chapter 45A.085.

The terms "offer" or “proposal” mean the offeror’s/offerors’ response to this RFP.

The term "offeror" means the entity or contractor group submitting the proposal.

The term "contractor" means the entity receiving a contract award.

The term "purchasing agency" means the University of Kentucky, Purchasing Division, Room 322 Peterson Service Building, Lexington, KY 40506-0005.

The term "purchasing official" means the University of Kentucky’s appointed contracting representative.

The term "responsible offeror" means a person, company or corporation that has the capability in all respects to perform fully the contract requirements and the integrity and reliability that will assure good faith performance. In determining whether an offeror is responsible, the University may evaluate various factors including (but not limited to): financial resources; experience; organization; technical qualifications; available resources; record of performance; integrity; judgment; ability to perform successfully under the terms and conditions of the contract; adversarial relationship between the offeror and the University that is so serious and compelling that it may negatively impact the work performed under this RFP; or any other cause determined to be so serious and compelling as to affect the responsibility of the offeror.

The term "solicitation" means RFP.

The term "University" means University of Kentucky.

## 2.0 GENERAL OVERVIEW

### 2.1 Intent and Scope

This Request for Proposal (RFP) is issued to solicit proposals from qualified, experienced, financially sound, and responsible firms to provide a custom air handler for the UK BSL-3 project.

The Scope of Services includes the work outlined in Section 7.0, Scope of Services. Potential Suppliers are responsible for delivering the air handler to the site. The project contractor will unload and lift to the roof. Provide in your proposal the number of lifts and weights.

It is the intent of the University to award a contract to the qualified Offeror who's Offer, conforming to the conditions and requirements of the RFP, is determined to be the most advantageous to the University, cost and other factors considered.

The firm whose systems is selected would provide all design and installation assistance services necessary to construct the facilities in accordance with the guidelines, standards and limitations contained in the Request for Proposal and in the Offerors Proposal.

In addition, please refer to the attached drawings.

### 2.2 Background Information

The existing BSL-3 lab is fed from the central air handler. We will be installing a new air handler to serve only this lab. This air handler will be installed on the roof above. This contact is for the air handler, humidifier, VFDs and roof curb as specified and shown on the drawings.

### 2.3 University Information

Since his arrival, President Eli Capilouto has set forth an ambitious agenda to extend and enhance our role as Kentucky's land-grant and flagship research university. By focusing on infrastructure growth and improvement; creating opportunities for innovative teaching, learning, and academic excellence; fostering a robust research and creative scholarship enterprise; providing life-saving subspecialty care; empowering communities through service and outreach; and encouraging a transparent and shared dialogue about institutional priorities; the University of Kentucky will ensure a new century of promise for the people we impact.

Founded in 1865 as a land-grant institution adjacent to downtown Lexington, UK is nestled in the scenic heart of the beautiful Bluegrass Region of Kentucky. From its early beginnings, with only 190 students and 10 professors, UK's campus now covers more than 918 acres and is home to more than 30,000 students and approximately 14,500 employees, including more than 2,300 full-time faculty. UK is one of a small number of universities in the United States that has programs in agriculture, engineering, a full complement of health colleges including medicine and pharmacy, law and fine arts on a single campus, leading to groundbreaking discoveries and unique interdisciplinary collaboration. The state's flagship university consists of 17 academic and professional colleges where students can choose from more than 200 majors and degree programs at the undergraduate and graduate levels.

The colleges are Agriculture, Food and Environment; Arts and Sciences; Business and Economics; Communication and Information; Dentistry; Design; Education; Engineering; Fine Arts; Graduate School; Health Sciences; Law; Medicine; Nursing; Pharmacy; Public Health; and Social Work. These colleges are supported by a modern research library system.

Research at the University of Kentucky is a dynamic enterprise encompassing both traditional scholarship and emerging technologies, and UK's research faculty, staff and students are establishing UK as one of the nation's most prolific public research universities. UK's research enterprise attracted $285 million in research grants and contracts from out-of-state sources, which generated a $580 million impact on the Kentucky economy. Included in this portfolio is $153 million in federal awards from the National Institutes of Health, non-NIH grants from the Department Health and Human Services, the National Science Foundation, Department of Energy, Department of Agriculture and NASA, among others. The National Science Foundation ranks UK's research enterprise 44th among public institutions.

With more than 50 research centers and institutes, UK researchers are discovering new knowledge, providing a rich training ground for current students and the next generation of researchers, and advancing the economic growth of the Commonwealth of Kentucky. Several centers excel in the services offered to the public. The Gluck Equine Research Center is one of only three facilities of its kind in the world, conducting research in equine diseases.

The Center for Applied Energy Research is pursuing groundbreaking discovery across the energy disciplines. CAER staff are pioneering new ways to sustainably utilize Kentucky natural resources through carbon-capture algae technology, biomass/coal to liquid products and the opening of UK's first LEED-certified research lab to support the development of Kentucky's growing alternative energy industry. Among the brightest examples of UK's investment in transformative research is the Markey Cancer Center. As a center of excellence and distinction at UK, Markey's robust research and clinical enterprise is the cornerstone of our commitment to Kentucky – fundamental to our success in uplifting lives through our endeavors and improving the general health and welfare of our state – burdened by the nation's highest rate of cancer deaths per 100,000 people. In 2013, Markey earned the prestigious National Cancer Institute-designation (NCI) – one of 68 nationally and the only one in Kentucky.

The University of Kentucky was awarded a $20 million Clinical Translational Sciences Award (CTSA) from the National Institutes of Health (NIH). As one of only 60 institutions with this research distinction, UK was awarded the CTSA for its potential in moving research and discovery in the lab into practical field and community applications. The CTSA and NCI are part of a trifecta of federal research grants that includes an Alzheimer's Disease Center. UK is one of only 22 universities in the country to hold all three premier grants from NIH.

Established in 1957, the medical center at UK is one of the nation's finest academic medical centers and includes the University's clinical enterprise, UK HealthCare. The 569-bed UK Albert B. Chandler Hospital and Kentucky Children's Hospital, along with 256 beds at UK Good Samaritan Hospital, are supported by a growing faculty and staff providing the most advanced subspecialty care for the most critically injured and ill patients throughout the Commonwealth and beyond. Over the last several years, the number of patients served by the medical enterprise has increased from roughly 19,000 discharges to more than 36,000 discharges in 2014.

UK Chandler Hospital includes the only Level 1 Trauma Center for both adult and pediatric patients in Central and Eastern Kentucky. In addition, UK HealthCare recently opened one of the country's largest robotic hybrid operating rooms and the first of its kind in the region. While our new patient care pavilion is the leading healthcare facility for advanced medical procedures in the region, our talented physicians consult with and travel to our network of affiliate hospitals so Kentucky citizens can receive the best health care available close to their home and never need to leave the Bluegrass for complex subspecialty care.

UK's agenda remains committed to accelerating the University's movement toward academic excellence in all areas and gain worldwide recognition for its outstanding academic programs, its commitment to students, its investment in pioneering research and discovery, its success in building a diverse community and its engagement with the larger society. It is all part of the University's fulfillment of our promise to Kentucky to position our state as a leader in American prosperity.

**SUSTAINABILITY**
Sustainability is an institution-wide priority for the University of Kentucky. We strive to ensure that all activities are ecologically sound, socially just, and economically viable, and that they will continue to be so for future generations. This commitment also prioritizes the integration of these principles in curricula, research, athletics, health care, creative works, and outreach. This principled approach to operational practices and intellectual pursuits is intended to prepare students and empower the campus community to support sustainable development in the Commonwealth and beyond. The UK Sustainability Strategic Plan guides these efforts (https://www.uky.edu/sustainability/sustainability-strategic-plan).

## 2.4 Supplier Diversity and Procurement

The University of Kentucky is committed to serve as an advocate for diverse businesses in their efforts to conduct business. Diverse Business Enterprises (DBE) consist of minority, women, disabled, veteran and disabled veteran owned business firms that are at least fifty-one percent owned and operated by an individual(s) of the aforementioned categories. Also included in this category are disabled business enterprises and non-profit work centers for the blind and severely disabled.

The University is committed to increasing the amount of goods and services acquired from businesses owned and controlled by diverse persons to 10% of all procurement expenditures. The University expects its suppliers to support and assist in this effort.

Among the University's goals for DBE participation in procurement are:

- To ensure the absence of barriers that reduce the participation of diverse suppliers
- Educate vendors on "how to" do business with the University
- Support diverse vendors seeking to do business with the University in the areas of goods, services, construction, and other areas of procurement
- Encourage participation of qualified diverse vendors by directing them to agencies that can benefit from their product or service
- Provide resources for diverse vendors
- Sponsor events to assist diverse vendors in becoming active, responsible, and responsive participants in the University's purchasing opportunities

For additional information regarding how diverse suppliers may participate in this Request for Proposal, submit any questions to the Purchasing Officer as indicated in Section 3.2 by the Deadline for Written Questions date.

## 3.0 PROPOSAL REQUIREMENTS

### 3.1 Key Event Dates

| | |
|---|---|
| Release of RFP | 07/13/2022 |
| Deadline for Written Questions | 3 p.m. Lexington, KY Time on 07/26/2022 |
| RFP Proposals Due | 3 p.m. Lexington, KY Time on 08/10/2022 |

### 3.2 Offeror Communication

To ensure that RFP documentation and subsequent information (modifications, clarifications, addenda, Written Questions and Answers, etc.) are directed to the appropriate persons within the offeror's firm, each offeror who intends to participate in this RFP is to provide the following information to the purchasing officer. Prompt, thorough compliance is in the best interest of the offeror. Failure to comply may result in incomplete or delayed communication of addenda or other vital information. Contact information is the responsibility of the offeror. Without the prompt information, any communication shortfall shall reside with the offeror.

- Name of primary contact
- Mailing address of primary contact
- Telephone number of primary contact
- Fax number of primary contact
- E-mail address of primary contact
- Additional contact persons with same information provided as primary contact

This information shall be transmitted via fax or e-mail to:

Ken Scott
Purchasing Division
University of Kentucky
322 Peterson Service Building
Lexington, KY 40506-0005
Phone: (859) 257-9102
Fax: (859) 257-1951
E-mail: kenneth.scott.uky.edu

All communication with the University regarding this RFP shall only be directed to the purchasing officer listed above.

## 3.3 Pre-Proposal Conference

A pre-proposal conference will not be held for this Request for Proposals.

## 3.4 Offeror Presentations

All offerors whose proposals are judged acceptable for award may be required to make a presentation to the evaluation committee.

## 3.5 Preparation of Offers

The offeror is expected to follow all specifications, terms, conditions and instructions in this RFP.

The offeror will furnish all information required by this solicitation.

Proposals should be prepared simply and economically, providing a description of the offeror's capabilities to satisfy the requirements of the solicitation. Emphasis should be on completeness and clarity of content. All documentation submitted with the proposal should be bound in the single volume except as otherwise specified.

An electronic version of the RFP, in .PDF format only, is available through the University of Kentucky Purchasing Division website at: https://purchasing.uky.edu/bid-and-proposal-opportunities.

## 3.6 Proposed Deviations from the RFP

The stated requirements appearing elsewhere in this RFP shall become a part of the terms and conditions of any resulting contract. Any deviations therefrom must be specifically defined in accordance with the transmittal letter, Section 4.3 (d). If accepted by the University, the deviations shall become part of the contract, but such deviations must not be in conflict with the basic nature of this RFP.

Note: Offerors shall not submit their standard terms and conditions as exceptions to the University's General Terms and Conditions. Each exception to the University's General Terms and Conditions shall be individually addressed.

## 3.7 Proposal Submission and Deadline

Offeror must provide the following materials prior to 3 p.m. (Lexington, KY time) on the date specified in Section 3.1 and addressed to the purchasing officer listed in Section 3.2:

- **Technical Proposal:** One (1) copy on an electronic storage device (USB) (1 copy per storage device) each clearly marked with the proposal number and name, firm name and what is included (Technical Proposal) and two (2) printed copies in a single package, separate from the Financial Proposal.

- **Financial Proposal:** One (1) copy on an electronic storage device (USB) (1 copy per storage device) each clearly marked with the proposal number and name, firm name and what is included (Financial Proposal) and two (2) printed copies in a single package, separate from the Technical Proposal.

**Note: Proposals received after the closing date and time will not be considered. In addition, proposals received via fax or e-mail are not acceptable.**

**The University of Kentucky accepts deliveries of RFPs Monday through Friday from 8 a.m. to 5 p.m. Lexington, KY time. However, RFPs must be received by 3 p.m. Lexington, KY time on the date specified on the RFP in order to be considered.**

Proposals shall be enclosed in sealed envelopes to the above referenced address and shall show on the face of the envelope: the closing time and date specified, the solicitation number and the name and address of the offeror. The technical proposal shall be submitted in a sealed envelope and the financial proposal shall be submitted in a sealed envelope under separate cover. Both sealed envelopes shall have identical information on the cover, with the addition that one will state “Technical Information,” and the other, “Financial Proposal.”

Note: In accordance with the Kentucky Revised Statute 45A.085, there will be no public opening.

## 3.8 Modification or Withdrawal of Offer

An offer and/or modification of offer received at the office designated in the solicitation after the exact hour and date specified for receipt will not be considered.

An offer may be modified or withdrawn by written notice before the exact hour and date specified for receipt of offers. An offer also may be withdrawn in person by an offeror or an authorized representative, provided the identity of the person is made known and the person signs a receipt for the offer, but only if the withdrawal is made prior to the exact hour and date set for receipt of offers.

## 3.9 Acceptance or Rejection and Award of Proposal

The University reserves the right to accept or reject any or all proposals (or parts of proposals), to waive any informalities or technicalities, to clarify any ambiguities in proposals and (unless otherwise specified) to accept any item in the proposal. In case of error in extension or prices or other errors in calculation, the unit price shall govern. Further, the University reserves the right to make a single award, split awards, multiple awards or no award, whichever is in the best interest of the University.

## 3.10 Rejection

Grounds for the rejection of proposals include (but shall not be limited to):

- Failure of a proposal to conform to the essential requirements of the RFP.
- Imposition of conditions that would significantly modify the terms and conditions of the solicitation or limit the offeror's liability to the University on the contract awarded on the basis of such solicitation.
- Failure of the offeror to sign the University RFP. This includes the Authentication of Proposal and Statement of Non-Collusion and Non-Conflict of Interest statements.
- Receipt of proposal after the closing date and time specified in the RFP.

## 3.11 Addenda

Any addenda or instructions issued by the purchasing agency prior to the time for receiving proposals shall become a part of this RFP. Such addenda shall be acknowledged in the proposal. No instructions or changes shall be binding unless documented by a proper and duly issued addendum.

## 3.12 Disclosure of Offeror's Response

The RFP specifies the format, required information and general content of proposals submitted in response to this RFP. The purchasing agency will not disclose any portions of the proposals prior to contract award to anyone outside the Purchasing Division, the University's administrative staff, representatives of the state or federal government (if required) and the members of the committee evaluating the proposals. After a contract is awarded in whole or in part, the University shall have the right to duplicate, use or disclose all proposal data submitted by offerors in response to this RFP as a matter of public record.

Any submitted proposal shall remain valid six (6) months after the proposal due date.

The University shall have the right to use all system ideas, or adaptations of those ideas, contained in any proposal received in response to this RFP. Selection or rejection of the proposal will not affect this right.

### 3.13 Restrictions on Communications with University Staff

From the issue date of this RFP until a contractor is selected and a contract award is made, offerors are not allowed to communicate about the subject of the RFP with any University administrator, faculty, staff or members of the board of trustees except: the purchasing office representative, any University purchasing official representing the University administration, others authorized in writing by the purchasing office and University representatives during offeror presentations. If violation of this provision occurs, the University reserves the right to reject the offeror's proposal.

### 3.14 Cost of Preparing Proposal

Costs for developing the proposals and any subsequent activities prior to contract award are solely the responsibility of the offerors. The University will provide no reimbursement for such costs.

### 3.15 Disposition of Proposals

All proposals become the property of the University. The successful proposal will be incorporated into the resulting contract by reference.

### 3.16 Alternate Proposals

Offerors may submit alternate proposals. If more than one proposal is submitted, all must be complete (separate) and comply with the instructions set forth within this document. Each proposal will be evaluated on its own merits.

### 3.17 Questions

All questions should be submitted by either fax or e-mail to the purchasing officer listed in Section 3.2 no later than the date listed in Section 3.1.

### 3.18 Section Titles in the RFP

Section titles used herein are for the purpose of facilitating ease of reference only and shall not be construed to infer the construction of contractual language.

### 3.19 No Contingent Fees

No person or selling agency shall be employed or retained or given anything of monetary value to solicit or secure this contract, except bona fide employees of the offeror or bona fide established commercial or selling agencies maintained by the offeror for the purpose of securing business. For breach or violation of this provision, the University shall have the right to reject the proposal, annul the contract without liability, or, at its discretion, deduct from the contract price or otherwise recover the full amount of such commission, percentage, brokerage or contingent fee or other benefit.

## 3.20 Proposal Addenda and Rules for Withdrawal

Prior to the date specified for receipt of offers, a submitted proposal may be withdrawn by submitting a written request for its withdrawal to the University purchasing office, signed by the offeror. Unless requested by the University, the University will not accept revisions or alterations to proposals after the proposal due date.

## 3.21 Requirement To Perform Vendor Onboarding and Registration

As a condition of award, and for any renewals performed during the life of the contract, successful Contractor agrees to register their company with PaymentWorks, Inc., the University's vendor onboarding application. Registration information will be provided by the Purchasing Division as part of the award process. During the vendor registration process, successful Contractor agrees to provide any applicable information pertaining to diversity demographics for their company. Further, should any company or diversity information change during the life of the contract, successful Contractor agrees to update this information in PaymentWorks as applicable.

# 4.0 PROPOSAL FORMAT AND CONTENT

## 4.1 Proposal Information and Criteria

The following list specifies the items to be addressed in the proposal. Offerors should read it carefully and address it completely and in the order listed to facilitate the University's review of the proposal.

Proposals shall be organized into the sections identified below. The content of each section is detailed in the following pages. It is strongly suggested that offerors use the same numbers for the following content that are used in the RFP.

- Signed Authentication of Proposal and Statement of Non-Collusion and Non-Conflict of Interest Form
- Transmittal Letter
- Executive Summary and Proposal Overview
- Criteria 1 - Offeror Qualifications
- Criteria 2 - Services Defined
- Criteria 3 - Financial Proposal
- Criteria 4 - Evidence of Successful Performance and Implementation Schedule
- Criteria 5 - Other Additional Information

## 4.2 Signed Authentication of Proposal and Statements of Non-Collusion and Non-Conflict of Interest Form

The Offeror will sign and return the proposal cover sheet and print or type their name, firm, address, telephone number and date. The person signing the offer must initial erasures or other changes. An offer signed by an agent is to be accompanied by evidence of their authority unless such evidence has been previously furnished to the purchasing agency. The signer shall further certify that the proposal is made without collusion with any other person, persons, company or parties submitting a proposal; that it is in all respects fair and in good faith without collusion or fraud; and that the signer is authorized to bind the principal offeror.

## 4.3 Transmittal Letter

The Transmittal Letter accompanying the RFP shall be in the form of a standard business letter and shall be signed by an individual authorized to legally bind the offeror. It shall include:

- A statement referencing all addenda and written questions, the answers and any clarifications to this RFP issued by the University and received by the offeror (If no addenda have been received, a statement to that effect should be included.).
- A statement that the offeror's proposal shall remain valid for six (6) months after the closing date of the receipt of the proposals.
- A statement that the offeror will accept financial responsibility for all travel expenses incurred for oral presentations (if required) and candidate interviews.
- A statement that summarizes any deviations or exceptions to the RFP requirements and includes a detailed justification for the deviation or exception.
- A statement that identifies the confidential information as described in Section 6.23.

## 4.4 Executive Summary and Proposal Overview

The Executive Summary and Proposal Overview shall condense and highlight the contents of the technical proposal in such a way as to provide the evaluation committee with a broad understanding of the entire proposal.

As part of the Executive Summary and Proposal Overview, Offeror shall submit with their response a summarized profile describing the demographic nature of their company or organization:

1. When was your organization established and/or incorporated?
2. Indicate whether your organization is classified as local, regional, national, or international.
3. Describe the size of your company in terms of number of employees, gross sales, etc.

4. Is your company certified as small business, minority-owned, women-owned, veteran-owned, disabled-owned, or similar classification?

5. Include other demographic information that you feel may be applicable to the Request for Proposal submission.

6. Offeror shall describe in detail their company's commitment to diversity, equity, and inclusion. Information shall be provided as to the number of diverse individuals that the vendor employees as well as a description of vendors efforts to do business with Diverse Business Enterprises as they conduct their own business. In additional, please indicate the diversity nature of your company as well as ownership race/ethnicity.

| Check One Only | Diverse Business Description (If Diverse Business, determine the classification that is the best description) | Internal Code |
|---|---|---|
| | Minority Owned (only) | 10 |
| | Veteran Owned and Small Business | 100 |
| | Minority and Woman and Small Business | 110 |
| | Minority and Woman and Veteran-Owned Business | 120 |
| | Minority and Veteran and Small Business | 130 |
| | Woman and Veteran and Small Business | 140 |
| | Minority and Woman and Veteran-Owned Small Business | 150 |
| | Woman Owned (only) | 20 |
| | Small Business (only) | 30 |
| | Veteran Owned (only) | 40 |
| | Minority and Woman Owned | 50 |
| | Minority and Small Business | 60 |
| | Minority and Veteran-Owned | 70 |
| | Woman Owned and Small Business | 80 |
| | Woman and Veteran-Owned | 90 |
| | Diversity not indicated | 999 |

| Race/Ethnicity | Check One |
|---|---|
| Asian | |
| Black/African American | |
| Hispanic or Latino | |
| Native American | |
| Native Hawaiian/Pacific Islander | |
| White | |
| Other | |

## 4.5 Criteria 1 - Offeror Qualifications

The purpose of the Offeror Qualifications section is to determine the ability of the offeror to respond to this RFP. Offerors must describe and offer evidence of their ability to meet each of the qualifications listed below.

Our supply chains and business partnerships are an important aspect of this work. In your proposal, please (A) provide your company's mission and vision relative to sustainability, and (B) how your company, through services, products, and partnerships, will help the University of Kentucky advance specific elements of the Sustainability Strategic Plan.

a) Please provide the contact information and a brief narrative describing the history of your company. Identify the ownership of your company, the primary contact person for the University account, and provide a statement to indicate if your company has ever filed for bankruptcy, been in default on a loan, or if there are pending liens, claims, or lawsuits against the company. If so, please provide a complete description of the circumstances and status.

b) Please provide the Offerors qualifications for performing the work described in this RFP.

c) Do you have the manufacturing personnel to support the work required for the services described in this RFP?

d) Provide information on how your air handler is assembled and details on the components that will be used to manufacture this air handler.

## 4.6 Criteria 2 – Performance

Provide cut sheets (Specifications) for all the coils, fans and equipment and show the performance and the design conditions.

## 4.7 Criteria 3 – Financial Proposal

The Financial Summary Form shall contain the complete financial offer made to the University using the format contained in Section 8.0. All financial information must be submitted in a sealed envelope under separate cover.

## 4.8 Criteria 4 – Evidence of Successful Performance and Implementation Schedule

List two (2) similar projects that were completed successfully and on time.

## 4.9 Criteria 5 – Other Additional Information

Provide a schedule production and delivery detailing when the air handler should be available for delivery to the University.

The offeror may present any creative approaches that might be appropriate. The offeror may also provide supporting documentation that would be pertinent to this RFP.

Offeror shall describe in detail their company's commitment to diversity, equity and inclusion. Information shall be provided as to the number of diverse individuals that the vendor employees as well as a description of vendors efforts to do business with Diverse Business Enterprises as they conduct their own business.

## 5.0 EVALUATION CRITERIA PROCESS

A committee of University officials appointed by the Chief Procurement Officer will evaluate proposals and make a recommendation to the Chief Procurement Officer. The evaluation will be based upon the information provided in the proposal, additional information requested by the University for clarification, information obtained from references and independent sources and oral presentations (if requested).

The evaluation of responsive proposals shall then be completed by an evaluation team, which will determine the ranking of proposals. Proposals will be evaluated strictly in accordance with the requirements set forth in this solicitation, including any addenda that are issued. The University will award the contract to the responsible offeror whose proposal is determined to be the most advantageous to the University, taking into consideration the evaluation factors set forth in this RFP.

The evaluation of proposals will include consideration of responses to the list of criteria in Section 4.0. Offerors must specifically address all criteria in their response. Any deviations or exceptions to the specifications or requirements must be described and justified in a transmittal letter. Failure to list such exceptions or deviations in the transmittal letter may be considered sufficient reason to reject the proposal.

The relative importance of the criteria is defined below:

**Primary Criteria**

- Offeror Qualifications
- Services Defined
- Financial Proposal
- Evidence of Successful Performance and Implementation

**Secondary Criteria**

- Other Additional Services

The University will evaluate proposals as submitted and may not notify offerors of deficiencies in their responses.

Proposals must contain responses to each of the criteria, listed in Section 4 even if the offeror's response cannot satisfy those criteria. A proposal may be rejected if it is conditional or incomplete in the judgment of the University.

## 6.0 SPECIAL CONDITIONS

### 6.1 Scope

This Request for Proposals is to establish a Purchase Order for custom Air Handling Equipment that will serve new construction/renovations at the University.

### 6.2 Effective Date

The effective date of the contract shall be the date upon which the parties execute it and all appropriate approvals, including that of the Commonwealth of Kentucky Government Contracts Review Committee, have been received.

### 6.3 Competitive Negotiation

It is the intent of the RFP to enter into competitive negotiation as authorized by KRS 45A.085.

The University will review all proposals properly submitted. However, the University reserves the right to request necessary modifications, reject all proposals, reject any proposal that does not meet mandatory requirement(s) or cancel this RFP, according to the best interests of the University.

Offeror(s) selected to participate in negotiations may be given an opportunity to submit a Best and Final Offer to the purchasing agency. All information-received prior to the cut-off time will be considered part of the offeror's Best and Final Offer.

The University also reserves the right to waive minor technicalities or irregularities in proposals providing such action is in the best interest of the University. Such waiver shall in no way modify the RFP requirements or excuse the offeror from full compliance with the RFP specifications and other contract requirements if the offeror is awarded the contract.

### 6.4 Appearance Before Committee

Any, all or no offerors may be requested to appear before the evaluation committee to explain their proposal and/or to respond to questions from the committee concerning the proposal. Offerors are prohibited from electronically recording these meetings. The committee reserves the right to request additional information.

## 6.5 Additions, Deletions or Contract Changes

The University reserves the right to add, delete, or change related items or services to the contract established from this RFP. No modification or change of any provision in the resulting contract shall be made unless such modification is mutually agreed to in writing by the contractor and the Chief Procurement Officer and incorporated as a written modification to the contract. Memoranda of understanding and correspondence shall not be interpreted as a modification to the contract.

## 6.6 Contractor Cooperation in Related Efforts

The University reserves the right to undertake or award other contracts for additional or related work to other entities. The contractor shall fully cooperate with such other contractors and University employees and carefully fit its work to such additional work. The contractor shall not commit or permit any act which will interfere with the performance of work by any other contractor or by University employees. This clause shall be included in the contracts of all contractors with whom this contractor will be required to cooperate. The University shall equitably enforce this clause to all contractors to prevent the imposition of unreasonable burdens on any contractor.

## 6.7 Entire Agreement

The RFP shall be incorporated into a purchase order. The RFP and those portions of the offeror's response accepted by the University, shall be the entire agreement between the parties.

## 6.8 Governing Law

The contractor shall conform to and observe all laws, ordinances, rules and regulations of the United States of America, Commonwealth of Kentucky and all other local governments, public authorities, boards or offices relating to the property or the improvements upon same (or the use thereof) and will not permit the same to be used for any illegal or immoral purposes, business or occupation. The resulting contract shall be governed by Kentucky law and any claim relating to this contract shall only be brought in the Franklin Circuit Court in accordance with KRS 45A.245.

## 6.9 Kentucky's Personal Information Security and Breach Investigation Procedures and Practices Act

To the extent Company receives Personal Information as defined by and in accordance with Kentucky's Personal Information Security and Breach Investigation Procedures and Practices Act, KRS 61.931, 61.932 and 61.933 (the "Act"), Company shall secure and protect the Personal Information by, without limitation: (i) complying with all requirements applicable to non-affiliated third parties set forth in the Act; (ii) utilizing security and breach investigation procedures that are appropriate to the nature of the Personal Information disclosed, at least as stringent as University's and reasonably designed to protect the Personal Information from unauthorized access, use, modification, disclosure, manipulation, or destruction; (iii) notifying University of a security breach relating to Personal Information in the possession of Company or its agents or subcontractors within seventy-two (72) hours of discovery of an actual or suspected breach unless the exception set forth in KRS 61.932(2)(b)2 applies and Company abides by the requirements set forth in that exception; (iv) cooperating with University in complying with the response, mitigation, correction, investigation, and notification requirements of the Act , (v) paying all costs of notification, investigation and mitigation in the event of a security breach of Personal Information suffered by Company; and (vi) at University's discretion and direction, handling all administrative functions associated with notification, investigation and mitigation.

## 6.10 Termination for Convenience

The University of Kentucky, Purchasing Division, reserves the right to terminate the resulting contract without cause with a thirty (30) day written notice. Upon receipt by the contractor of a "notice of termination," the contractor shall discontinue all services with respect to the applicable contract. The cost of any agreed upon services provided by the contractor will be calculated at the agreed upon rate prior to a "notice of termination" and a fixed fee contract will be pro-rated (as appropriate).

## 6.11 Termination for Non-Performance

Default

The University may terminate the resulting contract for non-performance, as determined by the University, for such causes as:

- Failing to provide satisfactory quality of service, including, failure to maintain adequate personnel, whether arising from labor disputes, or otherwise any substantial change in ownership or proprietorship of the Contractor, which in the opinion of the University is not in its best interest, or failure to comply with the terms of this contract;

- Failing to keep or perform, within the time period set forth herein, or violation of, any of the covenants, conditions, provisions or agreements herein contained;

- Adjudicating as a voluntarily bankrupt, making a transfer in fraud of its creditors, filing a petition under any section from time to time, or under any similar law or statute of the United States or any state thereof, or if an order for relief shall be entered against the Contractor in any proceeding filed by or against contractor thereunder. In the event of any such involuntary bankruptcy proceeding being instituted against the Contractor, the fact of such an involuntary petition being filed shall not be considered an event of default until sixty (60) days after filing of said petition in order that Contractor might during that sixty (60) day period have the opportunity to seek dismissal of the involuntary petition or otherwise cure said potential default; or

- Making a general assignment for the benefit of its creditors, or taking the benefit of any insolvency act, or if a permanent receiver or trustee in bankruptcy shall be appointed for the Contractor.

Demand for Assurances

In the event the University has reason to believe Contractor will be unable to perform under the Contract, it may make a demand for reasonable assurances that Contractor will be able to timely perform all obligations under the Contract. If Contractor is unable to provide such adequate assurances, then such failure shall be an event of default and grounds for termination of the Contract.

Notification

The University will provide ten (10) calendar days written notice of default. Unless arrangements are made to correct the non-performance issues to the University's satisfaction within ten (10) calendar days, the University may terminate the contract by giving forty-five (45) days notice, by registered or certified mail, of its intent to cancel this contract.

## 6.12 Funding Out

The University may terminate this contract if funds are not appropriated or are not otherwise available for the purpose of making payments without incurring any obligation for payment after the date of termination, regardless of the terms of the contract. The University shall provide the contractor thirty (30) calendar days' written notice of termination under this provision.

## 6.13 Prime Contractor Responsibility

Any contracts that may result from the RFP shall specify that the contractor(s) is/are solely responsible for fulfillment of the contract with the University.

## 6.14 Assignment and Subcontracting

The Contractor(s) may not assign or delegate its rights and obligations under any contract in whole or in part without the prior written consent of the University. Any attempted assignment or subcontracting shall be void.

## 6.15 Permits, Licenses, Taxes

The contractor shall procure all necessary permits and licenses and abide by all applicable laws, regulations and ordinances of all federal, state and local governments in which work under this contract is performed.

The contractor must furnish certification of authority to conduct business in the Commonwealth of Kentucky as a condition of contract award. Such registration is obtained from the Secretary of State, who will also provide the certification thereof. However, the contractor need not be registered as a prerequisite for responding to the RFP.

The contractor shall pay any sales, use, personal property and other tax arising out of this contract and the transaction contemplated hereby. Any other taxes levied upon this contract, the transaction or the equipment or services delivered pursuant hereto shall be the responsibility of the contractor.

The contractor will be required to accept liability for payment of all payroll taxes or deductions required by local and federal law including (but not limited to) old age pension, social security or annuities.

## 6.16 Attorneys' Fees

In the event that either party deems it necessary to take legal action to enforce any provision of the contract and in the event that the University prevails, the contractor agrees to pay all expenses of such action including attorneys' fees and costs at all stages of litigation.

## 6.17 Royalties, Patents, Copyrights and Trademarks

The Contractor shall pay all applicable royalties and license fees. If a particular process, products or device is specified in the contract documents and it is known to be subject to patent rights or copyrights, the existence of such rights shall be disclosed in the contract documents and the Contractor is responsible for payment of all associated royalties. To the fullest extent permitted by law the Contractor shall indemnify, hold the University harmless, and defend all suits, claims, losses, damages or liability resulting from any infringement of patent, copyright, and trademark rights resulting from the incorporation in the Work or device specified in the Contract Documents.

Unless provided otherwise in the contract, the Contractor shall not use the University's name nor any of its trademarks or copyrights, although it may state that it has a Contract with the University.

## 6.18 Indemnification

The contractor shall indemnify, hold and save harmless the University, its affiliates and subsidiaries and their officers, agents and employees from losses, claims, suits, actions, expenses, damages, costs (including court costs and attorneys' fees of the University's attorneys), all liability of any nature or kind arising out of or relating to the Contractor's response to this RFP or its performance or failure to perform under the contract awarded from this RFP. This clause shall survive termination for as long as necessary to protect the University.

## 6.19 Method of Award

It is the intent of the University to award a contract to the qualified offeror whose offer, conforming to the conditions and requirements of the RFP, is determined to be the most advantageous to the University, cost and other factors considered.

Notwithstanding the above, this RFP does not commit the University to award a contract from this solicitation. The University reserves the right to reject any or all offers and to waive formalities and minor irregularities in the proposal received.

## 6.20 Reciprocal Preference

In accordance with KRS 45A.494, a resident offeror of the Commonwealth of Kentucky shall be given a preference against a nonresident offeror. In evaluating proposals, the University will apply a reciprocal preference against an offeror submitting a proposal from a state that grants residency preference equal to the preference given by the state of the nonresident offeror. Residency and non-residency shall be defined in accordance with KRS 45A.494(2) and 45A.494(3), respectively. Any offeror claiming Kentucky residency status shall submit with its proposal a notarized affidavit affirming that it meets the criteria as set forth in the above reference statute.

## 6.21 Confidentiality

The University recognizes an offeror's possible interest in preserving selected information and data included in the proposal; however, the University must treat such information and data as required by the Kentucky Open Records Act, KRS 61.870, et seq.

Information areas which normally might be considered proprietary, and therefore confidential, shall be limited to individual personnel data, customer references, formulae and company financial audits which, if disclosed, would permit an unfair advantage to competitors. If a proposal contains information in these areas and the offeror declares them to be proprietary in nature and not available for public disclosure, the offeror shall declare in the Transmittal Letter the inclusion of proprietary information and shall noticeably label as confidential or proprietary each sheet containing such information. Proposals containing information declared by the offeror to be proprietary or confidential, either wholly or in part, outside the areas listed above may be deemed non-responsive and may be rejected.

The University's General Counsel shall review each offeror's information claimed to be confidential and, in consultation with the offeror (if needed), make a final determination as to whether or not the confidential or proprietary nature of the information or data complies with the Kentucky Open Records Act.

## 6.22 Conflict of Interest

This Request for Proposal and resulting Contract are subject to provisions of the Kentucky Revised Statutes regarding conflict of interest and the University of Kentucky's Ethical Principles and Code of Conduct (www.uky.edu/Legal/ethicscode.htm). When submitting and signing a proposal, an offeror is certifying that no actual, apparent or potential conflict of interest exists between the interests of the University and the interests of the offeror. A conflict of interest (whether contractual, financial, organizational or otherwise) exists when any individual, contractor or subcontractor has a direct or indirect interest because of a financial or pecuniary interest, gift or other activities or relationships with other persons (including business, familial or household relationships) and is thus unable to render or is impeded from rendering impartial assistance or advice, has impaired objectivity in performing the proposed work or has an unfair competitive advantage.

Questions concerning this section or interpretation of this section should be directed to the University purchasing officer identified in this RFP.

## 6.23 Personal Service Contract Policies

Pursuant to the Kentucky Model Procurement Code (Code), the Government Contract Review Committee (GCRC) of the Kentucky General Assembly may establish policies that govern personal service contracts. Under the Code, a personal service contract is an agreement whereby an individual, firm, partnership or corporation is to perform certain services requiring professional skill or professional judgment for a specified period of time at an agreed upon price.

### A. Professional Service Rate Schedules:

The GCRC has established rate schedules for certain professional services and may impact any contract established under the Code. These rate schedules are located on the GCRC website at the following link: https://apps.legislature.ky.gov/moreinfo/contracts/homepage.html. Access/click the dropdown menu within the web page for the rates information.

### B. Invoicing of Personal Service Contracts:

The Kentucky Model Procurement Code was recently amended to establish conditions for invoicing for fees for personal service contracts. It states, "No payment shall be made on any personal service contract unless the individual, firm, partnership, or corporation awarded the personal service contract submits its invoice on a form established by the committee." The Government Contract Review Committee has adopted a personal service contract invoice form that must be submitted as a condition of payment. A copy of the form is located on the GCRC website at: https://apps.legislature.ky.gov/moreinfo/contracts/PSC%20INVOICE%20FORM.pdf.

## 6.24 Copyright Ownership and Title to Designs and Copy

The contractor and University intend this RFP to result in a contract for services, and both consider the products and results of the services to be rendered by the contractor hereunder to be a work made for hire. The contractor acknowledges and agrees that the work and all rights therein, including (without limitation) copyright, belongs to and shall be the sole and exclusive property of the University. For any work that is not considered a work made for hire under applicable law, title and copyright ownership shall be assigned to the University.

Title to all dies, type, cuts, artwork, negatives, positives, color separations, progressive proofs, plates, copy and any other requirement not stated herein required for completion of the finished product for use in connection with any University job shall be the property of and owned by the University. Such items shall be returned to the appropriate department upon completion and/or delivery of work unless otherwise authorized by the University. In the event that time of return is not specified, the contractor shall return all such items to the appropriate University department within one week of delivery.

## 6.25 University Brand Standards

The contractor must adhere to all University of Kentucky Brand Standards. University Brand Standards are maintained by the University Public Relations Office (UKPR) and can be viewed at http://www.uky.edu/prmarketing/brand-standards. Non-adherence to the standards can have a penalty up to and including contract cancellation. Only the UKPR Director or designee can approve exceptions to the University standards.

Graphics standards for the UK HealthCare areas are governed by UK HealthCare Clinical Enterprise Graphic Standards, found at: https://ukhealthcare.uky.edu/staff/brand-strategy.

Contractor warrants that its products or services provided hereunder will be in compliance with all applicable Federal disabilities laws and regulations, including without limitation the accessibility requirements of Section 255 of the Federal Telecommunications Act of 1996 (47 U.S.C. § 255) and Section 508 of the Rehabilitation Act of 1973, as amended (29 U.S.C. 794d), and its implementing regulations set forth at Title 36, Code of Federal Regulations, Part 1194. For purposes of clarity, updated regulations under Section 508 standards now incorporate WCAG 2.0, and for purposes of this agreement WCAG 2.0 Level AA compliance is expressly included. Contractor agrees to promptly respond to, resolve and remediate any complaint regarding accessibility of products or services in a timely manner and provide an updated version to University at no cost. If deficiencies are identified, University reserves the right to request from Contractor, a timeline by which accessibility standards will be incorporated into the products or services provided by Contractor and shall provide such a timeline within a commercially reasonable duration of time. Failure to comply with these requirements shall constitute a material breach of this Agreement and shall be grounds for termination of this Agreement.

Where any customized web services are provided, Contractor represents that it has reviewed the University's Web Policy and all products or services will comply with its published standards.

Contractor will provide University with a current Voluntary Product Accessibility Template (VPAT) for any deliverable(s). If none is available, Vendor will provide sufficient information to reasonably assure the University that the products or services are fully compliant with current requirements.

## 6.26 Printing Statutes

The purchase of printing services for all state agencies is governed by Chapter 57 of the Kentucky Revised Statutes. Specifically, all printing must be awarded to the lowest responsive bidder and approved by the Governor of Kentucky. In compliance with these statutes, all printing must be provided by a contract established by the Purchasing Division.

## 6.27 Payment Terms

The University adheres to a strategic approach regarding payables management based on risk minimization, processing costs, and industry best practices. As such, suppliers and individuals doing business with the University will be paid based on the following protocol:

1. The University utilizes Payment Plus (e-payables) as its primary default form of payment. By enrolling in Payment Plus, suppliers can receive payments immediately (all invoices will be paid immediately upon confirmation of goods receipt and invoice). The process is electronic and the supplier receives real-time payment notices. Additional information regarding Payment Plus (and enrollment form) can be found at: https://www.uky.edu/ufs/payment-plus-supplier-enrollment-form.

2. Payments by check. Payment terms for check payments are Net-30.

3. Individuals receiving payments from the University that require ACH direct payments will only be processed under special circumstances as approved by the Controller's office. Payment terms for ACH are Net-40.

# 7.0 SCOPE OF SERVICES

## 7.1 Detailed Services Defined

Please refer to the drawings and specifications for the features and details of the air handler to be provided.

*When a conflict arises between scoped and specifications is identified, the more restrictive shall apply.

Air Handling Unit must be delivered to the University of Kentucky no later than May 1, 2023. Are you able to meet that deadline?

Yes / No Estimated Delivery Date: _____

If "No", what date can the University expect delivery? _____

## 8.0 FINANCIAL OFFER SUMMARY

Offerors are to provide a fixed price for the services offered.

### 8.1 Mandatory Services (Section 7.1)

Please complete and attach Section 7.1 to provide support for your firm fixed price bid.

Price will include: All materials, labor, manufacturing, design and shipping to perform the work described above.

### 8.2 Optional Services (Section 7.2)

None

### 8.3 Alternate Pricing

In addition to the above financial offer, the offeror may submit alternative financial proposals, however the information requested above must be supplied and will be used for proposal evaluation purposes.

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# SECTION 23 7323 - CUSTOM AIR-HANDLING SYSTEMS

## PART 1 - GENERAL

### 1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

### 1.2 SUMMARY

A. This Section includes custom roof mounted air-handling system with coils, fans, dampers, humidifiers and air filters.

### 1.3 REFERENCES

A. AFBMA 9 – Load Ratings and Fatigue Life for Ball Bearings
B. AMCA Publication 99 – Standards Handbook
C. AMCA Standard 203 – Field Performance Measurement of Fan Systems
D. AMCA Standard 210 – Laboratory Methods of Testing Fans for Performance Rating
E. AMCA Standard 300 – Reverberant Room Method for Sound Testing of Fans
F. AMCA Standard 500 – Laboratory Methods for Testing of Dampers and Louvers
G. ARI Standard 410 – Forced Circulation Air-Cooling and Air-Heating Coils
H. ANSI/ASHRAE Standard 111 – Practices for Measurement, Testing, Adjusting and Balancing of Building HVAC Systems
I. ASHRAE Standard 52.1 – Dust-Spot Procedures for Testing Air-Cleaning Devices
J. ANSI/ASHRAE Standard 52.2 – Method of Testing Air-Cleaning Devices for Removal Efficiency by Particle Size
K. ANSI/ASHRAE 15 – Safety Standard for Refrigeration Systems
L. ANSI/ASHRAE 62.1 – Ventilation for Acceptable Indoor Air Quality
M. ANSI/ASHRAE 90.1 – Energy Standard for Buildings Except Low-Rise Residential
N. ASTM A-653 – Specification for General Requirements for Steel Sheet, Zinc-Coated (Galvanized) by the Hot-Dipped Process
O. ASTM B117 – Standard Practice for Operating Salt Spray Apparatus
P. NEMA MG1 – Motors and Generators
Q. NFPA 70 – National Electric Code
R. NFPA 90A – Standard for the Installation of Air Conditioning and Ventilating Systems
S. UL 900 – Test Performance of Air Filters
T. UL 1995 – Standard for Heating and Cooling Equipment

### 1.4 SCOPE

A. Work includes, but not limited to the following:
   1. One 100% outside air supply air system comprising of dampers, coils, humidifier, fans and filters.
   2. A 4’-0” service vestibule is to be included on one side of the unit.

1.5 SUBMITTALS

A. General: Submit each item in this Article according to the Conditions of the Contract and Division 1 Specification Sections.

B. Product Data for the custom air-handling unit specified, which includes the following:

1. Brief description of each unit section layout including type of floor, walls, insulation, base frame, access doors, windows in access door, door latches, lights, electrical devices, pressure gauges, thermometers and drain pans.
2. For all fans:

    a. Fan manufacturer, arrangement, rotation, class and optional accessories (inlet screen, protection cages and etc.)
    b. Certified fan-performance curves with system operating conditions indicated.
    c. Certified fan-sound power ratings.

3. Certified Humidifier Dispersion Panel-performance
4. Certified Sound Trap insertion loss and static pressure drop data. Include the manufacturer's sound trap specification sheet with the type of construction and listing of material used.
5. Sound absorption criteria and sound transmission loss data for Octave Bands 1 through 7 for wall and roof panels with perforated interior skins.
6. Electrical wiring schematics – both circuits, lighting and electrical receptacles.
7. Lights/GFI/Switches with construction and electrical characteristics.
8. Certified coil-performance ratings with system operating conditions indicated.
9. Moisture Eliminators with construction, performance and method of attachment to coil.
10. Motor ratings and electrical characteristics plus motor and fan accessories.
11. Material gages and finishes for walls, floors, ceiling and etc.
12. Filter Frame construction including size and shape of holding clips or clamps.
13. Dampers, including housings, linkages. Indicate on the shop
14. drawings the future location of the actuators (actuators are to be provided by others.)
15. Access Doors to be used
16. Flexible Connections for the fans: type and manufacturer's specification sheet
17. Vibration isolators and Inertia base: construction, load
18. ranges, layout with dimensions.
19. Magnehelic Gages: Type and manufacturer specification sheet
20. Thermometers: Type and manufacturer's specification sheet
21. Floor Drains: construction details (integration into the unit enclosure). type, and accessories

C. Shop Drawings from manufacturer detailing equipment assemblies and indicating dimensions, weights, loadings, required clearances, method of field assembly, components, and location and size of each field connection. The shop drawings shall clearly show the location of each wall face and type of face, being perforated or solid. If the unit can not be shipped in a single package, indicate on a drawing how the unit will be broken down for shipping and how the unit will be reassembled on the jobsite. Show the location of each floor drain and routing of the drain piping.

D. ALL UNIT SHOP DRAWINGS ARE TO BE DRAWN TO A MINIMUM SCALE OF 1/8" = 1'-0".

E. Shop drawing details: Include in the submittal, the following details:

1. Wall construction, both perforated and solid wall faces.
2. Floor and roof construction
3. Piping arrangement for each component
4. Trolley beam and coil pull ring assemblies

5. For each fan type - fan, inertia base, and support structure for each coil type – coil support assembly, method of attachment of the moisture eliminator to the coil, drain pan (indicating direction of slope), size of condensate drainage piping
6. Shipping split assembly

F. Wiring diagrams detailing wiring for power and control systems and differentiating between manufacturer-installed and field-installed wiring.

G. Welding Certificates: Provide certification of individuals who will be welding the piping in accordance to ASME Code, Section IX as required by the Commonwealth of Kentucky, Department of Housing, Building and Construction, Office of State Fire marshal Boiler Inspection Section (Boiler and Pressure Vessel and Pressure Piping Law).

H. Include an operation and maintenance manual including all of the operation/maintenance manuals of the individual components.

## 1.6 QUALITY ASSURANCE

A. NFPA Compliance: Custom air-handling unit and components shall be designed, fabricated, and installed in compliance with NFPA 90A, “Installation of Air Conditioning and Ventilating Systems.”

B. Comply with current issue of the Kentucky Building Code.

C. Comply with the latest version of OSHA regulations (29 CFR, www.osha.gov)

D. All materials and devices used in the construction and operation of the custom air handling unit shall not exceed a flame spread index of 25 and a smoke developed index of 50.

E. Listing and Labeling: Provide electrically operated components specified in this Section that are listed and labeled.

F. The Terms “Listed” and “Labeled”: As defined in the National Electrical Code, Article 100.

G. UL and NEMA Compliance: Provide motors required as part of air-handling unit that are listed and labeled by UL and comply with applicable NEMA standards.

H. Compliance with Kentucky Boiler and Pressure Vessel and Pressure Piping Law: All welds on the hot water and steam systems are to be done by a certified welder fulfilling the requirement of ASME Code, Section IX (KY Boiler Code: New Installations – 815 KAR 15:025, Section 1. Minimum Standards) and is to be inspected by the Commonwealth of Kentucky Department of Housing, Buildings and Construction for compliance.

I. Listing and Labeling Agency Qualifications:

1. A “Nationally Recognized Testing Laboratory” (NRTL) as defined in OSHA. Regulation 1910.7.

J. Warranty

1. The air handling unit manufacturer shall provide the parts warranty for equipment manufactured by him and all vendor supplied components. Said warranty shall cover replacement of all defective parts for a 12-month period after the engineer issues a substantial completion declaration of the portion of the project the air handling unit serves. Provide a separate price for a 24-month warranty period in lieu of a 12-month period.

2. Prior to the warranty period, the manufacturer's representative is to be responsible for monthly inspection and maintenance while the unit is in this transition time period. The monthly inspection is to include but not limited to the following

    a. Check to ensure protective coil connection caps are in place,
    b. Verify the unit is stored in a manner that is acceptable to the custom air handling unit manufacturer,
    c. Perform a long-term fan storage procedure as recommended by the fan manufacturer (similar to Twin City Engineering Supplement ES-201). Some of the procedures include but not limited to - rotation of the fan wheel and the greasing of the bearings with the fan impeller being left at approximately 180 degrees from that of the previous month to prevent the shaft and impeller from taking a set in one position.
    d. Verify unit is clean. Cleaning is the responsible of the construction manager.

3. Provide written monthly reports to the owner (or parties representing the owner) reflecting what maintenance was done and any unsatisfactory conditions observed in the storage of the unit that may limit the future warranty.

## 1.7 DELIVERY, STORAGE, AND HANDLING

A. Prior to shipment, all coils shall be degreased to remove oil and all coil fins shall be combed straight. Connections to coils shall have threaded protectors (caps or plugs) furnished on the coil connections. All items shipped loose such as filters, steam humidifier assemblies, caulking, etc. shall be itemized on the shipping ticket and be suitably secured in the unit or on a separate pallet. All duct connections shall be covered with plywood or sheet metal caps. All equipment shall be delivered to the job site or the successful installing Contractor's receiving site, suitably packaged and protected for overland trucking and for storing the equipment outside exposed to the weather.

B. If multiple units are required, work out a schedule of priority with the Contractor, which shall determine the manufacturing and delivery sequence.

C. Building constraints, unit size and trucking limitations will require that units be shipped in more than one piece. Limit the maximum weight of any piece to 20,000# unless directed otherwise by the Contractor. Coordinate maximum size restraints with the Contractor. Indicate all split points on the shop drawings.

D. All vibration isolated components shall be suitably restrained before shipment.

E. The manufacturer is responsible for providing lift and support points on each units for rigging and positioning of the unit to its final destination. Clearly indicate the maximum load that can be imposed on any lift or support point.

F. Lift and support units with manufacturer's designated lifting or supporting points.

## 1.8 SEQUENCING AND SCHEDULING

A. Coordinate size and location of unit with installed structural-steel support members.

## 1.9 EXTRA MATERIALS

A. Furnish extra materials described below that match products installed. These extra materials are to be packaged with protective covering for storage and are identified with labels describing contents.

1. Two maintenance fan blank-off panels.

## PART 2 - PRODUCTS

### 2.1 MANUFACTURERS

A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

B. Manufacturers: Subject to compliance with requirements, provide units from one of the following:

1. Air Enterprises
2. Governaire
3. Haakon
4. Climate Craft
5. Webco, Inc.
6. TMI

### 2.2 GENERAL

A. Units shall be completely factory assembled and tested with the exception of unit splits as required for shipping or installation requirements as indicated on the schedule and drawings. The equipment's cooling, heating, humidifying, capacity and performance shall meet or exceed that shown on the schedule. Tags and decals to aid in service or to indicate caution areas shall be provided. Electrical wiring diagrams shall be attached to the control panel access doors. Operation and Maintenance manuals shall be furnished with each unit.

### 2.3 CABINET CONSTRUCTION

A. Cabinets shall be constructed in a watertight and airtight manner. The manufacturer's cabinet construction shall result in an ASHRAE/ANSI Standard 111 Leakage Class 5 rating, or better, as measured in accordance with AMCA Standard 210. A leakage rate as a percent of airflow shall only be submitted following calculation at specific project conditions. Maximum casing leakage (cfm/100 ft2 of casing surface area) = CL X P0.65. Published leakage rates at generic conditions shall not be submitted.

B. Casing deflection shall not exceed L/200 (.0005” per inch) at 1.5 times the casing internal operating pressure at design airflow conditions, not to exceed 12” w. g., whichever is less. L is defined as the panel span taken at the panel seam joint.

C. The unit shall be constructed on an 8” welded structural tubular steel base. Base tubing shall be cold-formed carbon steel, electric resistance welded. Equipment using a die-formed sheet metal base is not acceptable. Formed intermediate cross members shall be constructed of hot rolled 12-gauge galvanized steel. After fabrication, the base frame shall be thoroughly cleaned and coated with high solids, polyamide epoxy paint system for superior corrosion resistance.

D. Units shipped in multiple sections shall be engineered for ease of field assembly. Gasket supplied with the unit shall be a high-quality weather resistant closed-cell EPDM sponge rubber. Each section shall include a permanent label to aid in proper field assembly. All gasket and necessary assembly hardware shall ship loose with unit. Floors shall be designed to deflect no more than 1/200 of span under operating conditions.

E. Floors (Vestibule)

1. Shall be fabricated of 3/16″ aluminum tread plate. All floor sheets seams shall be continuously welded and welded to the unit base structure with a 2” turned up lip at the perimeter.
2. Floor seams at shipping splits shall be welded in the field by the installing contractor. The manufacture shall provide 3/16” aluminum tread plate strips to cover the floor seams. The strip shall be continuously welded on both sides.
3. All accessible sections without a drain pan shall have a 1.25” diameter floor drain piped through the unit base for drainage.
4. Floors shall be insulated with a two-part polyurethane water impervious foam insulation. A 20-gauge G90 galvanized steel under liner shall be provided.

F. Floors (Air Tunnel)
1. The floors shall be aluminum tread plate. The thickness is 3/16" OD over treads and 1/8" at the base. All floor sheets seams shall be continuously welded and welded to the unit base structure. All floor sheets shall be isolated from the base assembly with a thermal break gasket.
2. Shall consist of a 2” recessed floor capable of retaining approximately 2-inches of water with fully welded seams. Screw or bolt penetrations through the recessed floor/base shall not exist.
3. All accessible sections without a drain pan shall have a 1.25” diameter floor drain piped through the unit base for drainage.
4. All internal equipment shall be provided with a minimum 2-inch base to elevate components off the floor for housekeeping.
5. All aluminum floor sheet seams shall be gasketed to provide a thermal break.
6. All aluminum floor sheet seams shall be welded to provide a waterproof barrier.
7. Floors shall be insulated with a two-part polyurethane water impervious foam insulation. A 20-gauge G90 galvanized steel under liner shall be provided.

G. Wall and roof panels
1. Panels shall be 3” thick double wall construction. Panel joints shall be sealed with an industrial EPDM gasket to form a water and airtight seal.
2. Panels shall be individually removable for service without removing the roof or compromising the integrity of the cabinet wall. Panels shall be joined with 5/16” bolts that can be removed and refastened. Panel attachment with screws is not acceptable. All panels shall utilize thermal break construction between the exterior panel and the interior liner and between the panels and the base and roof frames.
3. For long term durability, exterior panels shall be powder coated, minimum 16-gauge G90 galvanized steel that passes a 1,000-hour ASTM B-117 salt spray resistance test and 3000-hour ASTM G-23 accelerated weathering test. The power coat paint color shall be selected by the engineer and architect from the manufacturer's RAL color chart. The exterior panels shall be powder coated. Spray painted exterior finishes are not acceptable.
4. Interior liners shall be a minimum 20-gauge 304 stainless steel. Panel liners shall be of a single piece construction and attached to the exterior panels with a full thermal break. To allow for cleaning, no fasteners shall be used on the exposed liner surface. Single wall units are not acceptable.

H. Insulation
1. All wall and roof panels shall be insulated with an injected foam insulation with an R value of 6.6/inch. Panels shall be designed to deflect no more than 1/200 of span under operating design conditions when measured at the panel seam. Insulation shall fill the panel without voids. Panels shall have a minimum 20-gauge 304 stainless steel solid interior liner. The composite R-value of the 3” unit casing shall be no less than R-19.8.

I. Access doors shall be provided into all sections of the air-handling unit as indicated in the plan documents. Doors shall be sized as shown on plan drawings, shall be a minimum 3” thick with R19.8 polyurethane foam insulation and shall be double wall construction using the same material type as the corresponding section. Doors shall comply with the requirements of UL 1995 and NFPA 90. The door frame shall be 0.125” extruded 6063-T5 aluminum. Each door shall be mounted with adjustable die cast aluminum hinges. All doors and mounting frames shall incorporate a thermal break design and the doors shall seal to

a replaceable extruded EPDM sponge rubber gasket. Doors shall open against static pressure or shall include a pressure relief feature on the door latch.

1. The door latch assembly shall consist of a roller cam compression arm with a chrome plated steel inner handle and glass fiber/nylon composite outer handle. One tool operated lock shall be provided on each fan section access door. All doors shall have a minimum of two latches.
2. A 10”x12” thermal pane viewing window with one wire mesh safety glass pane and one clear pane shall be provided. The frame shall have a no-through-metal thermal break design. Viewing windows shall be on all doors serving a lighted section.

J. The entire unit, including walls, roof, doors, joints, and seams shall include thermal break construction. This construction shall be supported by tested performance producing no condensation on the exterior surface when the air tunnel temperature is 50°F DB under the following exterior conditions:

1. $(Th - 50) / (Th - Tdp) < 3.4$
   a. Th = Ambient dry bulb temperature (°F) external to housing
   b. Tdp = Ambient dew point temperature (°F) external to housing

## 2.4 FAN ASSEMBLIES – General

A. The fan shall be of the size and type specified in the unit schedule. To assure maximum performance, fans shall be supplied by a manufacturer specializing in fan design and production.

All fan assemblies shall be designed for heavy-duty industrial applications. Fan framing assemblies shall be fabricated from structural steel electrically welded to form a rigid, integral base. Individual fan assemblies shall be independently isolated.

All motors shall be NEMA design B with Class F insulation. Electrical characteristics and horsepower shall be as specified on the project schedule. All motors shall have a minimum service factor of 1.15. Motors shall have ball bearings. Motors shall be premium efficiency ODP type and shall be factory wired to a fan array motor overload panel. The motor shall be located within the unit and mounted on an adjustable heavy steel base. The motor base shall be fastened securely to the structural steel framing of the fan assembly.

All fans shall meet the minimum efficiency and maximum brake horsepower values as scheduled. All fans shall be selected to operate at a point no higher than 90% of the peak static pressure rating as defined by the fan performance curve at the selected operating speed. Manufacturer must ensure maximum fan RPM is below the first critical speed.

B. Each fan shall be provided with a factory installed airflow measuring device. Airflow device to be mounted out of the direct air stream so as not to affect system static pressure or sound performance. Sensor accuracy shall be +/- 3%. Factory installed assembly shall include flow sensors for field connection to a transducer provided by others.

## 2.5 FAN ASSEMBLIES – DIRECT DRIVE FAN ARRAY

A. Approved manufacturers: ClimateCraft, Greenheck, and Twin City Fan & Blower

1. Fan Arrays shall be direct-drive, non-overloading SWSI plenum fans designed for industrial duty and suitable for continuous operation.
   a. Fans shall be arranged in an array using one or more welded structural steel assemblies and shall be of the size and quantity specified in the unit schedule. Screwed or riveted frames are unacceptable. Fan assemblies shall be attached directly to base structural members.
   b. Fan wheels shall be constructed of aluminum to reduce rotational weight and vibration. Fan blades shall be extruded aluminum for uniformity and improved vibration characteristics.

c. Each fan and motor assembly shall be independently isolated within the structural assembly using 1-inch deflection spring isolators. Isolators shall be mounted in a three-point arrangement that provides both vertical and horizontal (thrust) isolation and shall not require field adjustment. If hard mounted or rubber in shear is used in place of internal spring isolations, external isolation of the entire air handling unit is required, no exceptions. Isolation system shall be seismic rated to withstand seismic forces in excess of 4G horizontally and vertically to satisfy specified IBC seismic requirements.

d. A fan inertia base shall be provided or the fan structure shall exceed an equivalence of 2x mass of the total rotating parts of the fan array. Fan and motor assemblies shall be designed such that no natural frequencies exist within the operating RPM range of the fan, eliminating the need for "lockout" frequency settings in the variable speed drive. The purchasing contractor will be responsible for all costs associated with externally isolating any unit that does not include individual fan isolation.

e. All fan arrays shall meet the minimum motor efficiency, maximum brake horsepower and total motor horsepower values scheduled. All fans shall be selected to operate at a point no higher than 90% of the peak static pressure rating as defined by the fan performance curve at the selected operating speed. Manufacturer must ensure maximum fan RPM is below the first critical speed. Fans shall be Class 2 construction.

f. All fan and motor assemblies shall be dynamically balanced by the manufacturer to a maximum allowable vibration of 0.040 inches per second at design RPM and a maximum 0.080 inches per second overall vibration limit to bring the fan balance in conformance to a BV-5 Grade G1 per ANSI/AMCA 204. In addition, the manufacturer shall insure that no critical frequencies exist in the fan operating range by varying motor speed in 1Hz increments from design RPM to 50% of design RPM.

2. Unloading
   a. Fan curves shall be submitted with the system curve indicating the minimum system operating static pressure and the point of fan surge.

3. Motors
   a. Electrical characteristics and horsepower shall be as specified on the project schedule.
   b. Motors shall be Premium Efficiency per NEMA MG1 Table 12-12 type, shall have NEMA Class F insulation, shall meet NEMA Standard MD-1 Inverter Duty rating and shall be designed to withstand 1600V peak voltage spikes and rise times ≥0.1 microseconds.
   c. Motors shall have grease lubricated ball bearings designed to deliver a minimum L10 life of 250,000 hours at full load and the maximum operating RPM of the associated fan. Grease zerks and spring-loaded grease relief valves shall be provided in each motor to allow easy bearing lubrication without damaging the seals due to over lubrication. Permanently lubricated bearings are allowed if a spare motor per fan array is provided.
   d. For efficient operation in a direct drive application, motors shall be capable of operating greater than 60HZ to at least the design operating speed of the fan.
   e. Each motor shall be provided with a shaft grounding device to harmlessly bleed potential induced shaft voltages to ground.

4. Warranty
   a. All rotating parts shall be warranted by the unit manufacturer for a full five (5) years from date of unit start-up. Parts warranties provided by third parties are not acceptable.

5. Options
   a. Provide an overhead motor removal system to facilitate motor replacement.
      1) The assembly shall include a pivoting manually operated winch, capable of being easily moved to any motor location.
      2) Structural steel I beams for mounting a trolley to assist in fan motor removal. The beams shall be mounted overhead of the fan and motor and in the service vestibule.
   b. Ruskin BD6 aluminum gravity backdraft dampers shall be provided on the inlet of each fan to prevent recirculation of air in the event of motor failure.

6. Fan Array Controls
   a. Fan arrays shall be controlled using a common control signal, such as the duct static control signal, to modulate the fan speed.
   b. Each fan motor shall be factory wired to its own dedicated variable frequency drive. The fan array is selected for N+1 operation, requiring a separate VFD for each individual fan. Three (3) of the four (4) fans shall operate at all times and be controlled in unison, maintaining a consistent and uniform airflow pattern over coils, filters and other devices. The BAS/controls contractor shall rotate the "off" fan in the N+1 arrangement weekly for equal wear.

## 2.6 UNIT SOUND POWER

A. Fan sound power levels (dB) for the unit shall not exceed values as specified on the equipment schedule.

B. Unit manufacturer shall provide certified inlet, supply and casing radiated, sound power levels based on the final unit configuration.

## 2.7 COILS

A. Provide complete coil section(s) with service access door(s) as shown on the plan drawings. Coil connections shall extend through the section casing for ease of installation. Coil connections must be sealed from both the inside and exterior surfaces of the panel with the sleeve of the inner seal covering the pipe within the depth of the panel, all to minimize leakage and condensation. An integral double wall stainless steel air seal which completely seals around the cooling coil casing and extends to the unit pressure bearing surface shall be provided. Air seals/safing materials that are mechanically fastened to the inner liner of the cabinet only shall be constructed of 16-gauge materials to match the material type in the appropriate section and shall be gasketed and have fasteners every 3 inches.

B. Multiple, "stacked" coil arrangements must be constructed so as to allow independent removal of any coil without the removal of another within the coil bank.

C. All coils shall meet or exceed the capacities specified on the mechanical schedule and all water coil performances shall be certified in accordance with the AHRI Forced Circulation Air Heating and Air Cooling Coil certification program which is based on AHRI Standard 410. Face velocities shall not exceed those specified on the mechanical schedule.

D. All blow-through cooling coils shall have removable stainless-steel mist eliminators as manufactured by Mistop regardless of coil face velocity, no exception.

E. All cooling coil and heating coil sections shall include a double sloped drain pan constructed from 304L stainless steel. All corners shall be welded watertight. Coils shall rest on stainless steel supports. The pan shall have a minimum pitch of 2" from high point to the bottom of the drain outlet connection, providing at least a 1/8" per foot slope. The drain pan shall be insulated with a 2-part sprayed on polyurethane, water impervious foam. Insulation shall be applied to the entire under side of the drain pan and coil section base assembly. If multiple stacked coils are used, intermediate drain pans are required. Intermediate pans shall be insulated and drained with 3/4" copper down-comers to the main pan. All drain pan openings shall be covered with walk-on aluminum grating for safety. Open drain pan openings are not acceptable.

F. Water coils shall be of a staggered tube design with high efficiency die formed corrugated plate-type fins for maximum performance. All coils shall be tested with 400 psig compressed air under clear water. Coils shall be designed to operate at 300 psig internal pressure and up to 250ºF. Tubes shall be 5/8" diameter, seamless 0.035" wall copper, mechanically expanded into full drawn fin collars for a continuous compression bond over the full finned length for high efficiency performance. Cooling coil and heating

casings shall be a minimum 16-gauge stainless steel. Coil casing reinforcements shall be required for fin lengths over 42". Coil fins shall be 0.0095" thick aluminum as a minimum. Coils shall be serviceable using 0.25" M.P.T. drain and vent taps on the supply and return headers. Threaded seamless red brass coil connections shall be brazed to copper supply and return headers.

G. Provide coil removal rails inside the air tunnel and in the vestibule to assist with coil removal.

H. Coils are designed for N+1 capacity.

## 2.8 NEEDLEPOINT BIPOLAR IONIZATION

A. Provide needlepoint bipolar ionization upstream of the cooling coils. The unit shall be similar to the GPS-iMOD. Provide one unit per coil section. Unit shall be the entire length of the coil.

## 2.9 SOUND ATTENUATOR

A. The factory mounted sound attenuator shall be equal to Commercial Acoustics Model HP-LF constructed of galvanized steel.

## 2.10 FILTERS

A. Provide complete filter section(s) with filter racks and service access door(s) as shown on the plan drawings. Holding frames provided for medium efficiency applications will be accessible. Holding frames provided for high efficiency applications will be upstream accessible. Holding frames shall be constructed from heavy gauge stainless steel and shall be equipped with polyurethane foam gaskets. Frames shall be installed with vertical stiffeners and appropriate frame-to-frame sealant to provide a rigid leak tight assembly. An integral air seal which completely seals around the filter frame assembly and extends to the unit pressure bearing surface shall be provided. Air seals/safing materials that are mechanically fastened to the inner liner of the cabinet only shall be constructed of 16 gage materials to match the material type in the appropriate section and shall be gasketed and have fasteners every 3 inches

B. Filter fasteners shall be capable of being installed without the requirement of tools, nuts or bolts. The holding frame shall be designed to accommodate standard size filters with the application of the appropriate type fastener. The filter rack shall be designed to use standard 24"x24" and 12"x24" filters only. Odd sized filters are not allowed. Holding frame assemblies shall be sized to meet or exceed the face area specified by the mechanical schedule.

C. Gauges
1. A Magnehelic differential pressure gauge shall be provided factory installed for measuring the pressure drop across each filter type. The gauge shall be a diaphragm-actuated dial type, 4¾" O.D., with white dial, black figures and graduations and pointer zero adjustment.

D. Medium efficiency pleated filters shall be 2" thick MERV 8 as rated by ASHRAE Standard 52.1 test methods. Filter media shall be of the non-woven cotton fabric type. Filters shall be UL900 Class 2 listed. 100% outside air units shall have 4" thick MERV 8 filters.

E. High efficiency rigid filters shall be 12" deep, high capacity, pleated, totally rigid disposable type. Filters shall consist of micro-fine synthetic media laminated to a non-woven backing, media support grid, contour stabilizers and enclosing frame. The filter media shall have an average efficiency of MERV 13 as rated by ASHRAE 52.1 test methods as shown on the equipment schedule. The enclosing frame shall be constructed of galvanized steel. It shall be constructed and assembled in such a manner that a rigid and durable enclosure for the filter pack is affected. The enclosing frame shall be equipped with protective diagonal

support members on both the entering air and air leaving sides of the filters. The filters shall be UL900 Class 2 listed.

1. Filter clips shall be Camfil C78 series clips or approved equal (equivalencies need to be approved during the submittal process and should not be installed until approved.) is required. This clip comes in various lengths and the installed clip must be sized to match the filter being held by the clip.

2. Filters shall be Cam-Farr 30/30 or equal by American Air Filter, Eco-Air or Airguard.

## 2.11 OUTDOOR AIR INTAKE CONTROL DAMPER, RAIN LOUVER, AND RAIN HOOD

A. Outside air openings shall have factory mounted aluminum airfoil low-leak dampers. Damper shall be parallel blade type. Damper frame shall be 0.125” thick aluminum hat channel. Damper shall meet the leakage requirements of ASHRAE Std. 90.1 and of the International Energy Conservation Code by leaking less than 3 CFM/sq. ft. at 1” of static pressure, and shall be tested in accordance with AMCA Standard 500-D.

B. The damper shall be equal to Ruskin CD50.

C. The outside air intake rain louver shall be Ruskin EME3625 high velocity vertical blade type, no equals.

D. The outside air intake hood shall be constricted of G90 galvanized steel and powder coated to match the exterior panels per the casing powder coat paint specification.

## 2.12 ROOF CURB

A. Provide a roof curb to support the air handling unit.

B. The curb will set on the concrete roof deck. Coordinate installation, flashing and counter flashing with roofing manufacturer.

C. Curb shall be minimum of 12” above the roof insulation. For bidding assume 4” of insulation.

## 2.13 SERVICE VESTIBULE UNIT HEATER

A. Provide a unit heater in the service vestibule. This will be field installed with a DDC thermostat that communicates with Delta Center. Heater shall be 1.5 KW, 115 volt.

## 2.14 ELECTRICAL POWER AND CONTROLS

A. Unit operating voltage shall be 460V, 3-phase, 60Hz. All wiring and electrical equipment supplied by the manufacturer shall conform to and be installed in accordance with the requirements of UL1995.

B. Each section provided with a service access door, or as indicated on the plan drawings, shall be equipped with a vapor proof LED service light. All lights shall be completely installed and wired to a single 60-minute timer switch. All switch boxes shall include a GFCI convenience receptacle. Lights and GFCI outlets shall be wired to a separate 115VAC power connection.

C. Provide copper wires, bus bars, and fittings throughout, except internal wire of the control transformer may be aluminum if copper termination is provided. Identify power supply terminals with permanent markers.

The maximum temperature of terminals shall not exceed 167°F (75°C) when the equipment is tested in accordance with its rating.

D. All wiring, 460VAC and 115VAC, shall be run in plated EMT and Liquid Tight conduit.

E. Mount a permanent nameplate on the unit to display the manufacturer, serial number and model number, date of manufacture, horsepower, current rating and voltage.

2.15 UNIT TESTING AND QUALITY CONTROL

A. The fans shall be factory run tested to ensure design integrity and proper RPM. All electrical circuits shall be tested to ensure correct operation before shipment of unit. Units shall pass all quality control checks and be thoroughly cleaned prior to shipment.

B. The unit cabinet shall be factory tested to verify its cabinet leakage rating at design both positive and negative operating static pressure(s). Cabinet leakage shall not exceed a Leakage Class rating of 5 as defined by ANSI/ASHRAE Standard 111. Leak testing shall be performed by measuring the airflow pumped into and out of the air-handling unit at the cabinet design operating static pressure. All unit openings shall be sealed. The air shall then be pumped into and out of the unit until the appropriate operating pressures are achieved. Airflow measurements shall be performed in compliance with AMCA Standard 210. The testing shall be performed at the factory. A detailed report, including all data and test methods, shall be presented to the owner or his representative prior to equipment shipment.

2.16 HUMIDIFIERS — STEAM INJECTION TYPE PANELS: (Factory of field installed)

A. Humidifiers shall be as scheduled on the Drawings.

B. Provide steam control valve, furnished and sized by the humidifier manufacturer, for each humidifier panel.

C. Each packaged steam injection type humidifier panel shall consist of a steam supply header/separator, a condensate collection header and a bank of closely spaced steam dispersion tubes spanning the distance between the two headers.

D. Each packaged humidifier panel assembly of tubes and headers shall be contained within a galvanized metal casing to allow convenient duct mounting or to facilitate the stacking of and/or the end-to-end mounting of multiple packaged steam injection type humidifier panels in air handler casings.

E. Tubes and headers shall be of 304 stainless steel and joints shall be heli-arc welded. Tubes shall be joined to headers with slip fit couplers. Provide insulated tubes; insulation is to meet flame spread of 10 and smoke developed of 50.

F. Each tube shall be fitted with two rows of steam discharge tubelets inserted into the tube wall centered on the diametric line and spaced 1-1/2 inches apart. The tubelets shall be made of a non-metallic material designed for steam temperatures. The two rows shall discharge steam in diametrically opposite directions. Each tubelet shall contain a steam orifice sized for its required steam capacity.

G. The humidifier shall provide absorption characteristics that preclude water accumulation on any in-duct surfaces within 24” downstream of the humidifier tube panel while maintaining conditions of 90% (maximum) relative humidity at minimum temperature of $51^0$F in the duct air stream.

H. Air pressure loss across the humidifier panel shall not exceed 0.08” W.C. at a duct velocity of 750 FPM.

I. Subject to compliance with requirements, manufacturers offering steam humidifiers which may be incorporated in the work include, but are not limited to, the following:

1. Armstrong International, Inc.
2. Dri-Steem Humidifier Company
3. Pure Humidifier Company

J. Install steam injection type humidifier panels in accordance with manufacturer's installation instructions.
1. Provide with insulated panel and dispersion tubes.

K. Fasten steam humidifier panels to air handling unit sections all around perimeter of humidifier panels and air handling unit sections. Seal off airtight so that all air passes through the humidifier panels.

L. Install the bottom of the humidifier panel at 2'-6" minimum above unit floor.

M. Provide manifold extensions to make multiple steam hose connections to manifolds.

N. Connect to the condensate header, a check valve, strainer, float and thermostatic-trap, ball type shutoff valve and a steam condensate return line. Terminate the condensate return line 1" outside of the unit with a threaded (for sizes 2" and smaller) or flanged (for sizes larger than 2") connection. The steam condensate line shall slope down towards the exterior of the unit at a minimum slope of 1/8" change in elevation to 10'-0" length of pipe. The size of the trap shall be in accordance with the manufacturer's recommendation.

O. Provide unions (for pipe sizes less than or equal to 2") or flanges (for pipe sizes 2-1/2" or larger) at the discharge side of the trap on the condensate return line.

P. Extend steam supply line from steam injector type humidifier panel, through the exterior wall of air handler and 3" beyond for field connection. Pitch steam supply line down to the humidifier panel at a slope of 1/8" per foot.

## PART 3 - EXECUTION

### 3.1 EXAMINATION

A. Examine areas to receive units for compliance with requirements for installation tolerances and other conditions affecting unit performance. Examine proposed route of moving units into place and verify that it is free of interferences. Verify piping rough-in locations. Verify branch circuit wiring suitability. Do not proceed with installation until unsatisfactory conditions have been corrected.

B. Final locations of the units on the Drawings are approximate, unless dimensioned. Determine exact locations before roughing-in piping and electrical work.

C. Upon delivery, inspect unit for damage that may have occur before final delivery. Contractor will be responsible for damages after delivery is made. Contact owner's representative immediately after inspection if damage is noted.

### 3.2 COORDINATION

A. Coordinate the following tasks with custom air handling unit manufacturer
1. Review with manufacturer all instruction instructions and procedures; understand all of the requirements before installation is to be begin.

2. Coordinate delivery of unit with project schedule and stage the unit at a designated off- site location if the unit is delivery before site is prepared for installation.
3. Review the final installation of unit with manufacturer and demand manufacturer to provide a written letter that unit is installed per the manufacturer's installation instructions.

## 3.3 INSTALLATION

A. Install in strict accordance with manufacturer's requirements, shop drawings, and Contract Documents.

B. Equipment rigging and assembly to be supervised by the manufacturer's representative. Provide for as long a period of time as is necessary to ensure proper assembly or onsite training but no less than 2 full days.

C. Adjust in alignment on concrete foundations, sole plates or other supporting structure. Level, grout, and bolt in place.

D. Coordinate electrical installation with electrical contractor.

E. Coordinate controls with control contractor.

F. Provide all appurtenances required ensuring a fully operational and functional system.

## 3.4 INSTALLATION, GENERAL

A. General: Provide the labor, materials and equipment necessary to lift custom air handling units and set them in place, and assemble the unit sections in the locations shown on the drawings.

B. Anchor units to roof curb/structural steel in accordance to the manufacturer's recommendations.

C. Units will be delivered to the project site in several sections. Coordinate the maximum weight of each section with the crane lifting capacity being used by the installing party. Assemble unit sections in the locations shown on the drawings. Make any required connections between sections such as, fastening sections together, connecting piping and wiring, etc.

D. Install custom air-handling units level and plumb, according to manufacturer's written instructions.
1. The units are to be leveled with metal shims and the base rail is to be grouted over the entire perimeter of the unit.

E. Arrange installation of units to provide access space around air-handling units for service and maintenance.

## 3.5 CONNECTIONS

A. The Drawings indicate the general arrangement of piping, fittings, and specialties. The following are specific connection requirements:
1. Arrange piping installations to allow unit servicing and maintenance.
2. Connect condensate drain pans using Type M copper tubing. Provide piping full size of unit drain outlets. Extend to nearest equipment or floor drain. Construct deep trap at connection to drain pan or as otherwise noted, and install cleanouts at changes in direction.
3. Chilled Water and Energy Recovery Water Piping: Conform to applicable requirements of Section "Hydronic Piping." Connect to supply and return coil tappings as indicated.
4. Steam and Condensate Return Piping: Conform to applicable requirements of Section "Steam and Condensate Piping." Connect to supply and return coil tappings as indicated. Field piping will be required inside the custom units for condensate return piping.

B. The Drawings indicate the general arrangement of ducts and duct accessories. Make final duct connections as indicated.

C. Electrical: Conform to applicable requirements of Division 26 Sections.

D. Connect fan motors to wiring systems and to ground. Tighten electrical connectors and terminals according to manufacturer's published torque-tightening values. Where manufacturer's torque values are not indicated, use those specified in UL 486A and UL 486B.

## 3.6 ADJUSTING

A. Adjust water coil flow, with control valves to full coil flow, to indicated gpm.

B. Adjust damper linkages for proper damper operation.

## 3.7 CLEANING

A. After completing installation, inspect exposed finish. Remove burrs, dirt, and construction debris, and repair damaged finishes including chips, scratches, and abrasions.

B. Clean fan interiors to remove foreign material and construction dirt and dust. Vacuum clean fan wheels, cabinets, and coils entering air face.

## 3.8 STARTUP

A. Equipment start-up is to be supervised by the unit manufacturer’s representative service organization. Physical connections and start-up are provided by the installing contractor. The start-up engineer shall conduct such operating tests as required to ensure that the unit is operating in accordance with design. Complete testing of all safety and emergency control devices shall be made. The start-up engineer shall submit a written report to the owner and manufacturer containing all test data recorded as required above and a letter certifying that the unit is operating properly.

B. Inspect field assembly of components and installation of central-station air-handling units including piping, ductwork, and electrical connections.

C. Provide complete Operation & Maintenance Manuals with descriptive literature, model, and serial number of all equipment, performance data, manufacturer’s instructions for operating and maintenance, lubrication recommendation and schedule, and winter shutdown procedure.

D. Prepare a written report on findings and recommended corrective actions.

E. Final Checks before Startup: Perform the following before startup:
1. Verify that shipping, blocking, and bracing are removed.
2. Verify that unit is secure on mountings and supporting devices and that connections for piping, ductwork, and electrical are complete. Verify that proper thermal overload protection is installed in motors, starters, and disconnects.
3. Perform cleaning and adjusting specified in this Section.
4. Verify proper motor rotation direction, and verify free fan wheel rotation and smooth bearings operations.
5. Lubricate bearings and other moving parts with factory-recommended lubricants.
6. Comb coil fins for parallel orientation.

7. Verify that manual and automatic volume control, and smoke dampers in connected ductwork systems are in fully open position.

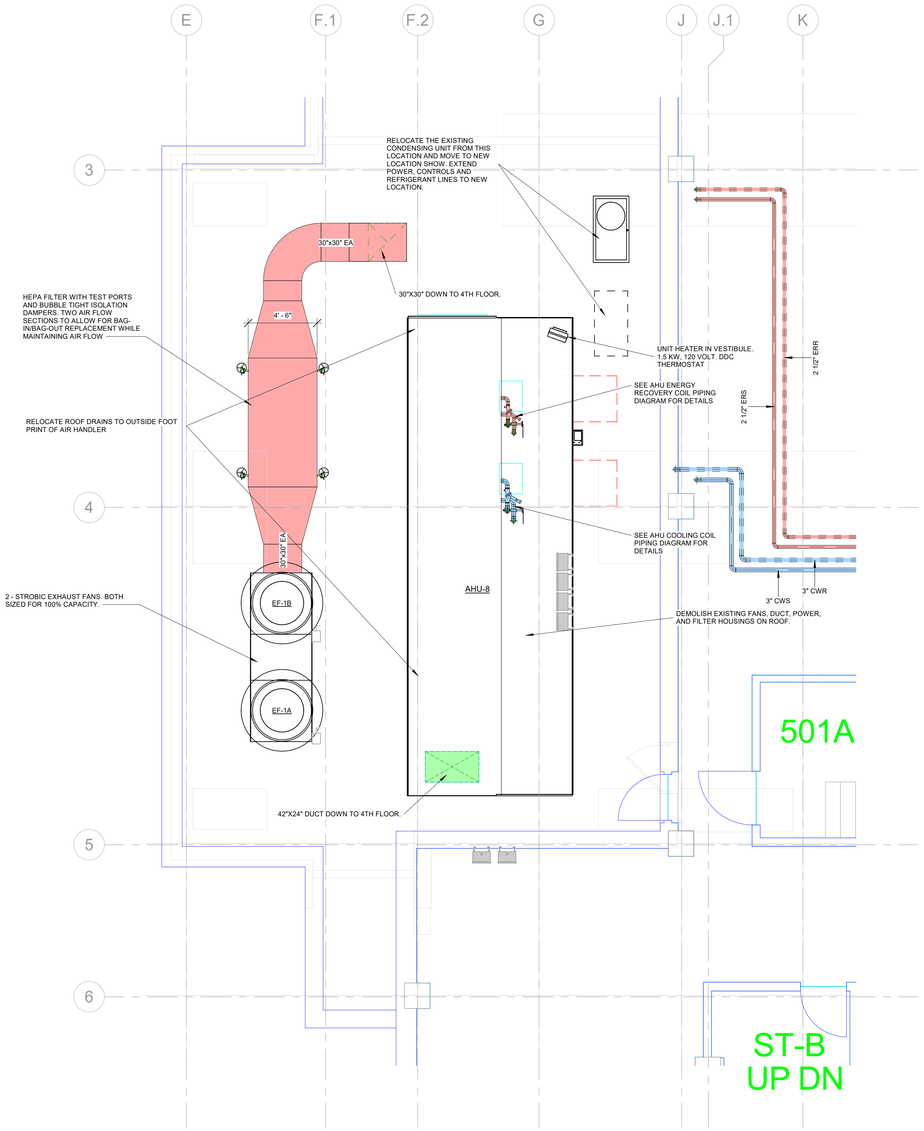
F. Starting procedures for custom air-handling units include the following:
1. Energize motor; verify proper operation of motor, drive system, and fan wheel.
2. Measure and record motor electrical values for voltage and amperage.

## 3.9 DEMONSTRATION

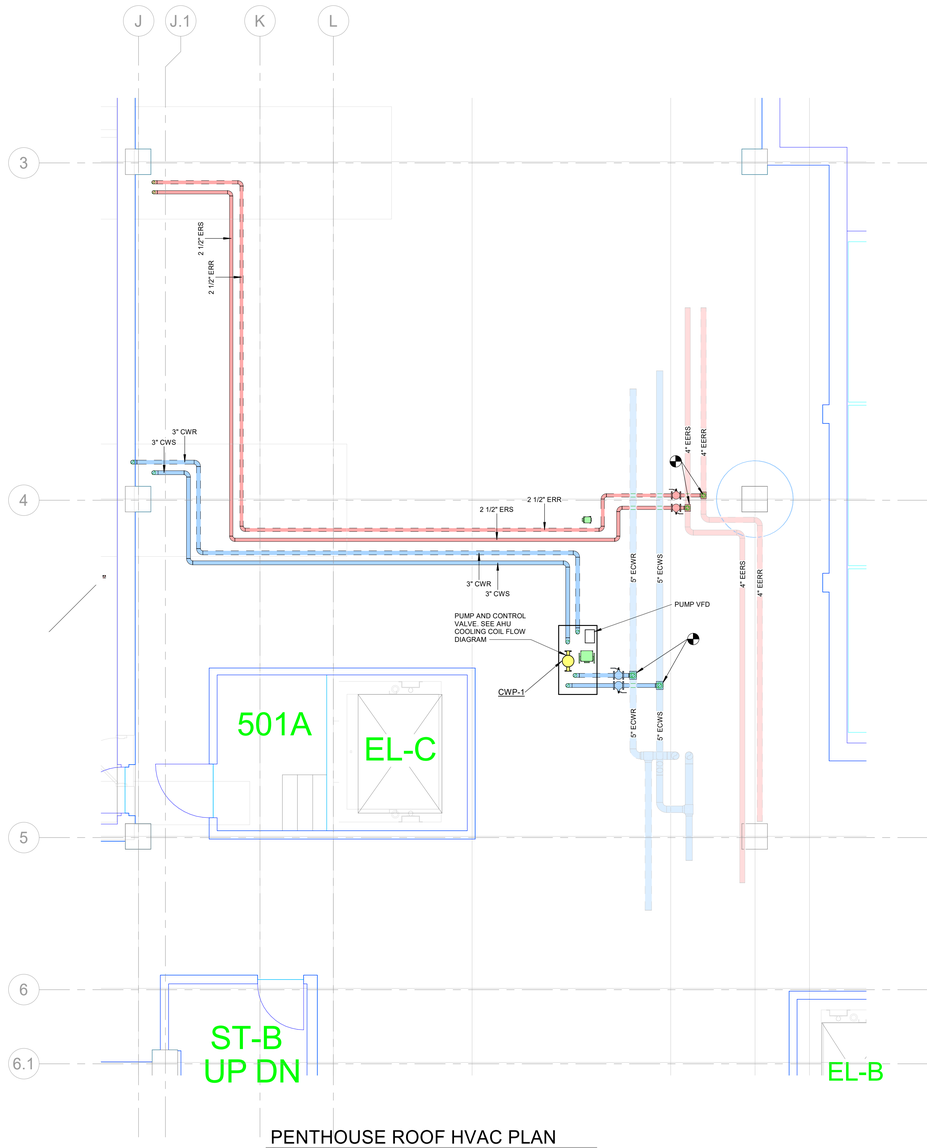
A. Demonstration Services: Arrange and pay for a factory-authorized service representative to train Owner's maintenance personnel on the following:
1. Procedures and schedules related to start-up and shut down, troubleshooting, servicing, preventative maintenance, and how to obtain replacement parts.
2. Review operating and maintenance data contained in the Operating and Maintenance Manuals.

B. Schedule training with at least 7 days' advance notice.

END OF SECTION 23 7323




PENTHOUSE ROOF HVAC PLAN
SCALE: 1/4" = 1'-0"




PENTHOUSE ROOF HVAC PLAN
SCALE: 1/4" = 1'-0"

PRINT DATE: 7/13/2022 11:49:47 AM

NOTE:

IT IS NOT INTENDED THAT THE PLANS SHOW ALL OFFSETS IN PIPES, CONDUITS, AND DUCTS REQUIRED FOR INSTALLATION OF THE WORK. DETAILS AND SECTIONS ARE INCLUDED FOR SOME AREAS TO SHOW INTENDED RELATIONSHIP OF THE WORK OF VARIOUS TRADES. IT SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR AND SUB-CONTRACTORS TO COORDINATE INSTALLATION OF THE WORK AND TO PROVIDE THE NECESSARY OFFSETS, TRANSFORMATIONS, AND FITTINGS REQUIRED. NO ADDITIONAL COMPENSATION WILL BE ALLOWED FOR CORRECTION CONFLICTS BETWEEN THE WORK OF VARIOUS TRADES. DETAILS AND SECTIONS ARE SHOWN FOR THE CONTRACTORS CONVENIENCEAND SHALL NOT BE CONSIDERED COMPLETE IN EVERY DETAIL.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LEXINGTON, KY
UNIVERSITY OF KENTUCKY
HSRB - BSL 3 RENOVATION
50% CD SUBMITTAL



| | |
|---|---|
| UK PROJECT NUMBER | 2573 |
| OMNI PROJECT NUMBER | 2137 |
| DATE | 06/10/2022 |
| | PHASE 1&2 |
| REVISIONS | |

HVAC PENTHOUSE PLANS

H-1.2

## GRILLES, REGISTERS AND DIFFUSERS

| SYMBOL | MANUFACTURER | MODEL | PANEL SIZE | DIFFUSER SIZE | DIFFUSER INLET | DESIGN CFM | P.D. (IN. W.G.) | THROW (FT) | DIRECTION OF THROW | NC | MOUNTING | REMARKS |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| S-1 | PRICE | ASPD | 24"x24" | 12"x12" | 5" RD | 100 | 0.108 | 3-5-8 | 4-WAY | 17 | SEE PLANS | *1 |
| S-2 | PRICE | ASPD | 24"x24" | 24"x24" | 6" RD | 200 | 0.07 | 3-4-7 | 4-WAY | 23 | SEE PLANS | *1 |
| S-3 | PRICE | ASPD | 24"x24" | 24"x24" | 8" RD | 300 | 0.07 | 4-6-9 | 4-WAY | 22 | SEE PLANS | *1 |
| S-4 | PRICE | ASPD | 24"x24" | 24"x24" | 10" RD | 400 | 0.1 | 5-7-10 | 4-WAY | 20 | SEE PLANS | *1 |
| S-5 | PRICE | ASPD | 24"x24" | 24"x24" | 12" RD | 500 | 0.11 | 5-8-12 | 4-WAY | 17 | SEE PLANS | *1 |
| S-6 | PRICE | LFD | 24"x48 | 22"x46" | 12" RD | 480 | 0.12 | | 1-WAY | 25 | SEE PLANS | *3 |
| | | | | | | | | | | | | |
| E-1 | PRICE | 630 | 18"x18" | 16"x16" | 16"x16" | 640 | 0.05" | --- | --- | 20 | SEE PLANS | *2 |
| E-2 | PRICE | 630 | --- | 5"x6" | 5"x6" | 35 | 0.025 | --- | --- | <19 | SIDEWALL | *2 |

1. SQUARE PLAQUE DIFFUESER, FINISH OFF-WHITE, ALUMINUM CONSTRUCTION.
2. ALUMINUM LOUVERED GRILL WITH 45 DEG DEFLECTION. FINISH OFF-WHITE.
3. LAMINAR FLOW DIFFUSER WITH UNIDIRECTIONAL LOW VELOCITY AIR PATTERN. PROVIDE WITH EQUALIZATION BAFFLE. FINSIH OFF-WHITE.

## AIR HANDLER UNITS

| SYMBOL | MANUFACTURER | MODEL | A.C.C. | MAX CFM | MIN. O.A. | EXT. STATIC PRESSURE | BHP | FAN RPM | FAN MOTOR RPM | FAN MOTOR HP | FAN MOTOR PH | FAN MOTOR VOLTS | COOLING COIL NO. | HEATING COIL NO. | FILTER | REMARKS |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| AHU-8 | CLIMATECRAFT | CUSTOM | *1 | 6,000 | 6,000 | *2 | 3.06, *3 | 3,550 | 4,357 | 5 | 3 | 480 | CC-8 | ERC-8 | *4 | *5 |

1. NEEDLEPOINT BIPOLAR IONIZATION, LED LIGHTS, HUMIDIFIER, SERVICE CORRIDOR, SOUND TRAPS, PRE AND FINAL FILTERS, CUSTOM COLOR, CUSTOM BUILT CURB.
2. EXTERNAL STATIC 3". DESIGN FOR N+1 ON THE COOLING AND HEATING COILS (INCLUDED PRESSURES WITH 1 COIL BLOCKED OFF ON EACH FOR HEATING AND COOLING), 0.4" EXTRA FOR PRE FILTER LOADING, 0.4" EXTRA FOR FINAL FILTER LOADING.
3. FANS TO BE PROVIDED WITH BACKDRAFT DAMPERS AND SIZED FOR N+1. CURRENT DESIGN HAS 4 FANS (SIZED FOR 3 OPERATING). PROVIDE WITH GREASE ZERKS ON THE MOTORS, PIEZOMETRIC FLOW TAPS ON ALL FANS, AND MOTOR SHAFT GROUNDING RINGS. FANS ARE TO BE PROVIDED WITH VFDS.
4. PREFILTER RACK 6 - 24X24, FINAL FILTER RACK 6 - 24X24.
5. SOUND OUTLET OPWER LEVELS: 63HZ/81, 125HZ/72, 250HZ/61, 500HZ/66, 1000HZ/62, 2000HZ/70, 4000HZ/61, 8000HZ/64.

## CONTROL VALVES

| SYMBOL | MANUFACTURER | TYPE | SERVICE | GPM - LBS/HR | STEAM INLET PRESS (PSI) | DESIGN P.D. (PSI) | DESIGN P.D. (FT) | DESIGN Cv | SIZE | % OPEN AT DESIGN FLOW | RANGEABILITY | MIN. CLOSE OFF PRESS. (PSI) | RECOMM. OPER. P.D. (PSI) | RATED PRESSURE (PSI) | REMARKS |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| CV-1 | NELES | 3-WAY | CHILLED WATER | 66 | --- | 4.3 | 10 | 31.7 | 3" | <85 | 75 | 100 | 100 | 250 | *1 |
| CV-2 | BELIMO | 3-WAY | ENERGY RECOVERY | 37 | --- | 4.3 | 10 | 17.7 | 2" | <85 | 75 | 50 | 50 | 175 | *2 |

1. SIMILAR TO A NELES SERIES GW 3-WAY MIXING VALVE WITH ELECTRIC OPERATOR.
2. PROVIDE WITH ELECTRIC OPERATOR.

## COOLING COIL

| SYMBOL | MANUFACTURER | MODEL | ROWS | F.P.I. | MAX CFM | VEL. FPM | A.P.D.IN W.G. | E.D.B. | E.W.B. | L.D.B. | L.W.B. | GPM | E.W.T./L.W.T. | P.D. IN FT. | DIMEN. HxW | REMARKS |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| CC-8 | CLIMATECRAFT | 58WC36050-08-10AW | 8 | 10 | 6000 | 480/240 | 0.95/0.34 | 95 | 77 | 55.4/51.7 | 55.3/51/3 | 66/75 | 46/60 | 17/6.2 | 36X50 EA | *1/*2 |

1. PERFORMANCE WITH ONE COIL BLANKED OFF.
2. PERFORMANCE WITH NO COILS BLANKED OFF.

## PREHEAT COIL

| SYMBOL | MANUFACTURER | MODEL | ROWS | F.P.I. | MAX CFM | VEL. FPM | A.P.D.IN W.G. | E.D.B. | L.D.B. | GPM | E.W.T. | P.D. IN FT. | DIMEN. HxW | REMARKS |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ERC-8 | CLIMATECRAFT | 58WC36050-08-10AW | 8 | 10 | 6000 | 480/240 | 0.61/0.20 | -10 | 50.1/55.8 | 37/30 | 65 | 10.5/8.5 | 36X50 EA | *1/*2, *3 |

1. PERFORMANCE WITH ONE COIL BLANKED OFF.
2. PERFORMANCE WITH NO COILS BLANKED OFF.
3. PERFORMANCE WITH 30% PROPYLENE GLYCOL.

## PUMP SCHEDULE

| SYMBOL | MANUFACTURER | MODEL | SIZE | GPM | HEAD FT. | BHP | HP | MOTOR RPM | MOTOR PH | MOTOR VOLTS | SHUT OFF HEAD FT. | END OF CURVE FLOW-GPM | TYPE | REMARKS |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| CWP-1 | B&G | E-80 | 1.5X1.5X7C | 66 | 35 | 0.922 | 1.5 | 1542 | 3 | 480 | 45 | 85 | IN-LINE | *1 |

1. PUMP SHALL ALSO BE ABLE TO OPERATE AT 75 GPM @25' OF HEAD. PUMP SHALL BE RATED FOR 250 PSIG STATIC PRESSURE. PROVIDE WITH VFD.

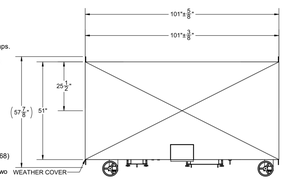
## FANS

| SYMBOL | MANUFACTURER | MODEL | TYPE | SONES | CFM | E.S.P. IN. W.G. | FAN RPM | BHP | MOTOR HP | MOTOR RPM | MOTOR PH | MOTOR VOLTS | TOTAL DISCHARGE CFM | EFF. STACK @ 15 MPH WIND | REMARKS |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| EF-1A | STROBIC | M33C20N200I4 | TRI-STACK | *1 | 6,000 | 7.2 | 1800 | 18.64 | 20 | 1800 | 3 | 480 | 9,325 | 29 FT | *2 |
| EF-1B | STROBIC | M33C20N200I4 | TRI-STACK | *1 | 6,000 | 7.2 | 1800 | 18.64 | 20 | 1800 | 3 | 480 | 9,325 | 29 FT | *2 |

1. PROVIDE WITH SOUND CONE. dBA AT 10FT 63HZ/47, 125HZ/61, 250HZ/73, 500HZ/80, 1000HZ/83, 2000HZ/82, 4000HZ/79, 8000HZ/73.
2. FANS ARE TO BE SIZED FOR N+1. THE BYPASS DAMPER SHALL BE SIZED TO ALLOW BOTH FANS TO RUN AT 75% WITH NO AIR FLOW IN THE EXHAUST DUCT AND MAINTAIN STATIC SETPOINT. BYPASS AND MONTOR ISOLATION DAMPERS ARE TO BE MOTOR OPERATED STYLE. COORDINATE ELECTRIC ACTUATOR SIGNAL WITH CONTROL CONTRACTOR. PROVIDE WITH NEMA 4 ELECTRICAL DISCONNECT FOR EACH FAN.

HEPA FILTER: Camfil or equal with the following features.

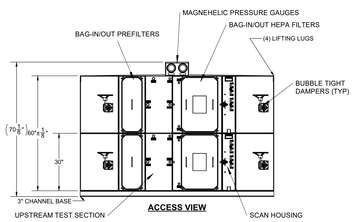
1. Housing shall be a minimum of 304 welded stainless steel.
2. 4 - Upstream Damper - CF-BTD-1X1-M-SS 1X1 Square bubble tight damper w/ manual actuator.
3. 4 - CF-1X1-20D-1PB-SS Prefilter Housing with Static Taps.
4. 4 - CF-1X1-TSU-14-SS Test Housing.
5. 4 - CF-1X1-012P-1GB-SS HEPA Housing with Test Ports and Static Taps.
6. 4 - CF-1X1-SAFESCAN-M-SS Test Housing.
7. 4 - Downstream Damper - CF-BTD-1X1-M-SS 1X1 Square bubble tight damper w/ manual actuator.
8. Magnehelic Gages with Copper tubing.
9. (2) Magnehelic/605/Indicating Transmitter Gage - Range: 0-1.
10. (2) Magnehelic/605/Indicating Transmitter Gage - Range: 0-3.
11. 3" High Channel Base. Mount on 12" curb.
12. Housing Weather Cover Welded on.
13. Lifting Lugs.
14. View Ports on Doors.
15. Fixed Door Latches.
16. Removable Locking Trays.
17. Brass Plugs.
18. 8 - 12XH-24Z24Z12-CD-3-C-A-00-0/00 99.99% HEPA Filter (855210568) (Initial & spare set).
19. 12 - 30/30 DUAL 9 24X24X2 MERV 9 Prefilter (406331005) (Initial & two spare sets).
20. 4 - BAG 80CX96-3G W/16" CLEAR (M61000022) (Initial & spare set).
21. 4 - STRAP, SECURITY 100" (M34002685) (Initial & spare set).
22. 6 - BAG 64CX72-3G W/16" CLEAR (M61000018) (Initial & two spare sets).
23. 6 - STRAP, SECURITY 80" (M34002684) (Initial & two spare sets).




PLAN VIEW

CAMFIL BAG-IN/BAG-OUT HOUSING OR EQUAL

| QTY | SYSTEM CONFIGURATION | |
|---|---|---|
| 1 | DAMPER | |
| - | MODEL NO. | CF-BTD-2X2-M-SS |
| 1 | PREFILTER HOUSING | |
| - | MODEL NO. | CF-2X2-20D-1PB-SS |
| - | PREFILTER SIZE | 24"X24"X2" (NOM.) |
| - | BAG SIZE | 64CX72-3G |
| - | STRAP | 80" |
| 2 | UPSTREAM TEST SECTION | |
| - | MODEL NO. | CF-2X2-TSU-14-SS |
| 3 | HEPA HOUSING | |
| - | MODEL NO. | CF-BAG-012P-1GB-SS |
| - | HEPA FILTER SIZE | 24"X24"X12" (NOM.) |
| - | BAG SIZE | 80CX96/3G |
| - | STRAP | 100" |
| - | SST LOCKING TRAY | NOT REQUIRED |
| 4 | SCAN HOUSING | |
| - | MODEL NO. | CF-2X2-SAFESCAN-M-SS |
| | GAGE INFORMATION | |
| - | MANUFACTURER | DWYER MAGNEHELIC |
| - | PREFILTER | 605-1 |
| - | HEPA | 605-3 |
| - | TUBING | COPPER |
| - | FITTINGS | BRASS |
| - | APPLICATION | OUTDOOR |
| | DECON INFORMATION | |
| - | UPSTREAM DECON | NONE |
| - | DOWNSTREAM DECON | NONE |
| | PROJECT INFORMATION | |
| - | PROJECT | NOT SPECIFIED |
| - | ENGINEER | NOT SPECIFIED |
| - | TAGS | |




ACCESS VIEW

## HEPA FILTER DETAIL
SCALE: 3/8" = 1'-0"

## REHEAT COILS

| SYMBOL | MANUFACTURER | MODEL | ROWS | F.P.I. | MAX CFM | VEL. FPM | A.P.D. | GPM | W.P.D. IN FT. | WATER VEL. | SF E.A.T. | SF E.W.T. | SF CAP. | SF L.A.T. | SF DIM. WxH | SF REMARKS |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| RH-4 | DAIKIN | 5BS0902B | 2 | 9 | 700 | 560 | 0.20 | 2.0 | 2.01 | 2.18 | 55.0 | 135 | 35.1 | 101.3 | 15"x12" | FHS-8 *1 |
| RH-6 | DAIKIN | 5BS1002B | 2 | 10 | 1100 | 502 | 0.18 | 2.0 | 2.90 | 2.18 | 55.0 | 135 | 55.4 | 101.4 | 21"x15" | FHS-10 *1 |
| RH-8 | DAIKIN | 5BD1002B | 2 | 10 | 1600 | 568 | 0.22 | 3.0 | 1.04 | 1.63 | 55.0 | 135 | 75.9 | 98.8 | 27"x15" | FHS-12 *1 |

*1. 0.0095" ALUMINUM FINS AND 0.035" COPPER TUBES. PROVIDE GASKETED ACCESS DOOR UPSTEAM AND DOWNSTREAM FOR CLEANING.

## TERMINAL UNITS

| SYMBOL | MANUFACTURER | MODEL | DUCT SIZE CFM MIN | DUCT SIZE CFM MAX | DUCT SIZE INLET | DUCT SIZE OUTLET | STATIC DP IN W.G. | ASSOCIATED REHEAT COIL | ASSOCIATED SOUND TRAP NO. | REMARKS |
|---|---|---|---|---|---|---|---|---|---|---|
| FHECC-8 | PHOENIX | MEV | 0 | 600 | 6 | 8 | 0.6" - 3" | --- | --- | *1, *3 |
| FHEV-8 | PHOENIX | MEV | 0 | 600 | 8 | 8 | 0.6" - 3" | --- | ST-2 or ST-5 | *1, *2 |
| FHEV-10 | PHOENIX | MEV | 0 | 850 | 10 | 10 | 0.6" - 3" | --- | ST-3 | *1, *2 |
| FHSV-8 | PHOENIX | MSV | 0 | 600 | 8 | 8 | 0.6" - 3" | HC-4 | ST-2 | *1, *2 |
| FHSV-10 | PHOENIX | MSV | 0 | 850 | 10 | 10 | 0.6" - 3" | HC-6 | ST-3 | *1, *2 |
| FHSV-12 | PHOENIX | MSV | 0 | 1300 | 12 | 12 | 0.6" - 3" | HC-8 | ST-4 | *1, *2 |

*1 PROVIDE WITH NEAR BUBBLE TIGHT CLOSE OFF, 1 SECOND SPEED OF RESPONSE AND BACNET INTEGRATION.

*2 MODULATING CELERIS CONTROL.

*3 3 POSITION CONTROL.

## SOUND TRAPS

| SYMBOL | MANUFACTURER | MODEL | DIMEN. WxHxL | MAX CFM | FACE VEL. FPM | P.D. IN. W.G. | INSERTION LOSS dB 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | SELF GEN. NOISE dB 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | REMARKS |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ST-1 | IAC | HS | 12x12x36 | 400 | 400 | 0.03 | 7 | 9 | 14 | 19 | 20 | 28 | 30 | 13 | 36 | 29 | 35 | 30 | 31 | 35 | 22 | 20 | *1 |
| ST-2 | IAC | HS | 15x12x36 | 700 | 560 | 0.06 | 7 | 9 | 14 | 19 | 20 | 28 | 30 | 13 | 47 | 41 | 42 | 40 | 40 | 43 | 33 | 22 | *1 |
| ST-3 | IAC | HS | 21x15x36 | 1100 | 502 | 0.05 | 6 | 10 | 12 | 15 | 19 | 26 | 32 | 13 | 66 | 61 | 53 | 57 | 55 | 57 | 53 | 46 | *1 |
| ST-4 | IAC | HS | 27x15x36 | 1600 | 569 | 0.06 | 6 | 10 | 12 | 15 | 19 | 26 | 32 | 13 | 66 | 61 | 53 | 57 | 55 | 57 | 53 | 46 | *1 |
| ST-5 | IAC | TXL | 8"x21x21x36 | 700 | 2000 | 0.07 | 12 | 15 | 25 | 15 | 8 | 7 | 6 | 4 | 20 | 35 | 42 | 41 | 35 | 29 | 20 | 20 | USE WITH BSC, *2 |

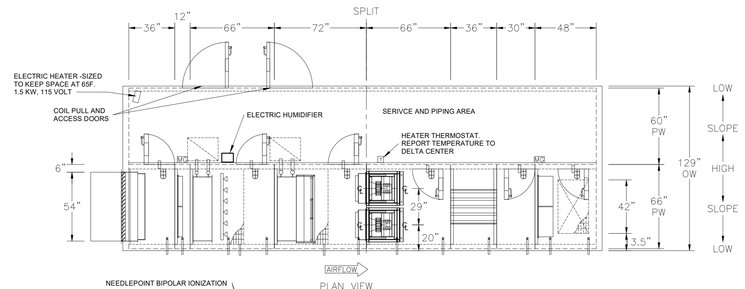
*1 FILL SHALL BE TOTALLY ENCAPSULATED AND SEALED WITH POLYMER FILM. STANDARD GALVANIZED STEEL, POLYMER SHEETING, ACOUSTIC INFILL.

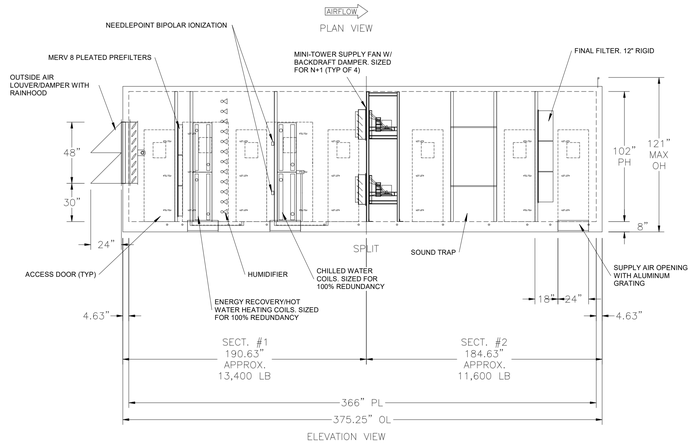
*2 PACKLESS SILENCERS WITH NO FILL. GALVANIZED STEEL CONSTRUCTION.

## HUMIDIFIERS

| SYMBOL | MANUFACTURER | MODEL | CFM | CONTROL VALVE # PER. HR. | ELECTRICAL VOLTAGE/PHASE | ELECTRICAL KW | ELECTRICAL MCA | ELECTRICAL MOCP | DIST. MANIFOLD SIZE | DIST. MANIFOLD ABSORPTION | REMARKS |
|---|---|---|---|---|---|---|---|---|---|---|---|
| <varies> | <varies> | <varies> | <varies> | <varies> | <varies> | <varies> | <varies> | <varies> | <varies> | <varies> | <varies> |

*1 0.01" PRESSURE DROP, 3" CENTERS, BACNET INTERGRATION,0.9 GPM WATER FILL RATE, 2.3 GPM DRAIN RATE.




## AHU-1 DETAIL
SCALE: 1/4" = 1'-0"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LEXINGTON, KY

# UNIVERSITY OF KENTUCKY HSRB - BSL 3 RENOVATION

## 50% CD SUBMITTAL



UK PROJECT NUMBER 2573
OMNI PROJECT NUMBER 2137

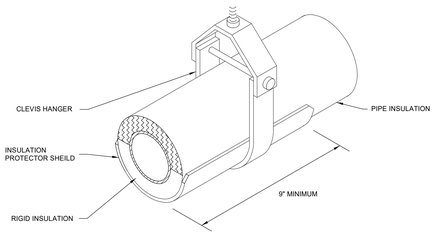
DATE 06/10/2022
PHASE 1&2

REVISIONS

HVAC SCHEDULES

H-2.1

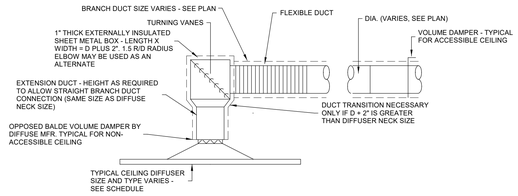
PRINT DATE: 7/13/2022 11:49:55 AM




PROVIDE SECTION OF RIGID INSULATION BETWEEN PROTECTOR SHEILD AND PIPE TO PREVENT CRUSHING OF INSULATION. SECTION OF RIGID INSULATION SHALL BE FULL SIZE (MINIMUM) OF BEARING SURFACE OF SHEILD. CONTRACTOR'S OPTION – USE SECTION OF RIGID INSULATION WITH FULL CIRCUMFERENCE OF OIPE AT EACH PROTECTOR SHEILD.

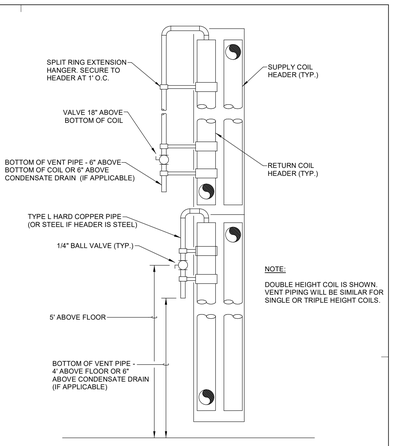
## TYPICAL PIPE SUPPORT DETAIL WITH SHIELD

SCALE: NONE



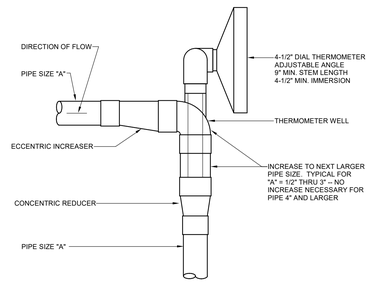

## CONNECTOIN TO S.A. CEILING DIFFUSER

SCALE: NONE



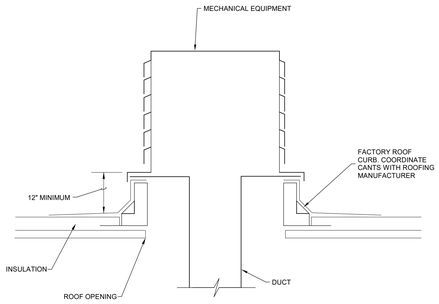

## COIL VENT PIPING DETAIL

SCALE: NONE



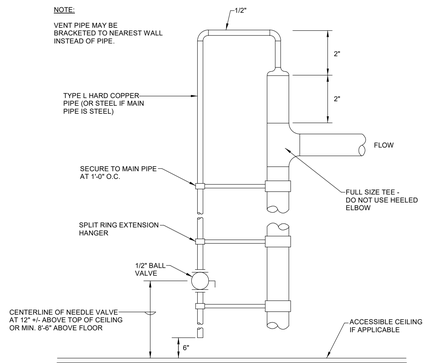

## PIPE THERMOMETER INSTALLATION DETAIL

SCALE: NONE



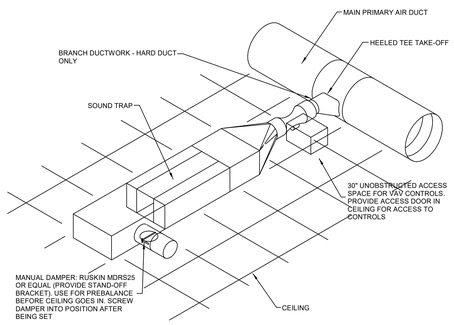

## MECHANICAL CURB INSTALLATION DETAIL

SCALE: NONE



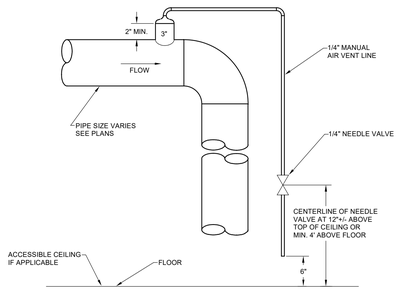

## MANUAL AIR VENT DETAIL - PIPES 3" AND SMALLER

SCALE: NONE



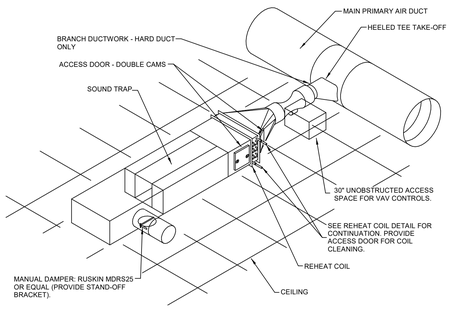

## TYPIAL DUCTWORK DETAIL FOR A PHOENIX EXHAUST UNIT

SCALE: NONE



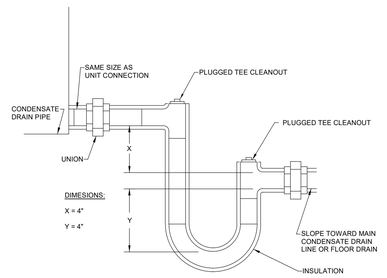

## MANUAL AIR VENT DETAIL - PIPES 4" AND LARGER

SCALE: NONE



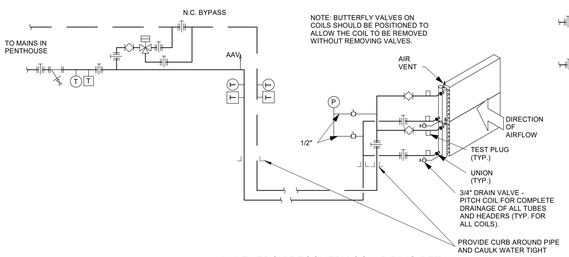

## TYPICAL DUCTWORK DETAIL FOR A PHOENIX SUPPLY UNIT

SCALE: NONE



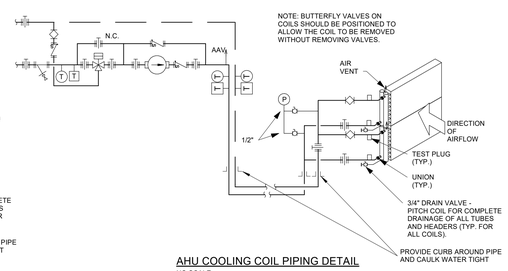

## DRAW THROUGH TRAP DETAIL

SCALE: NONE



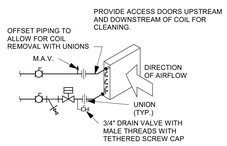

## AHU ENERGY RECOVERY COIL PIPING DETAIL

NO SCALE




## AHU COOLING COIL PIPING DETAIL

NO SCALE




## REHEAT COIL PIPING DETAIL

NO SCALE

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LEXINGTON, KY

# UNIVERSITY OF KENTUCKY HSRB - BSL 3 RENOVATION

## 50% CD SUBMITTAL

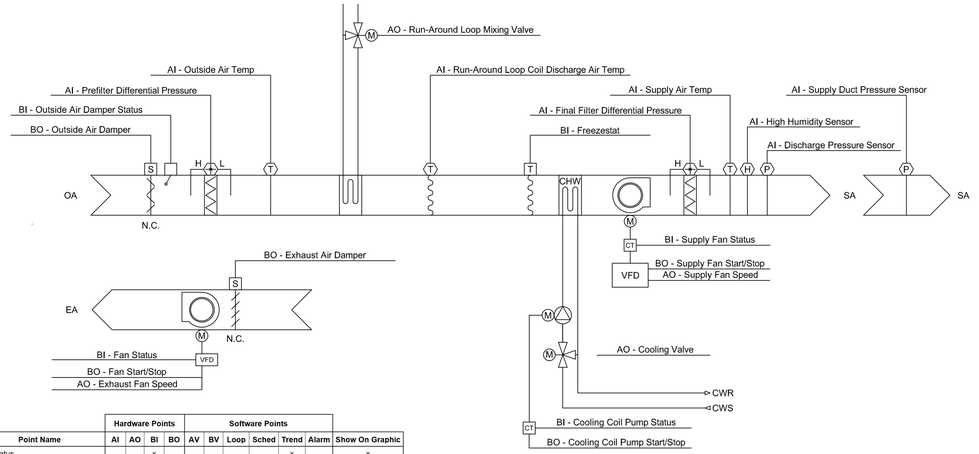


| | |
|---|---|
| UK PROJECT NUMBER | 2573 |
| OMNI PROJECT NUMBER | 2137 |
| DATE | 06/10/2022 |
| | PHASE 1&2 |
| REVISIONS | |

HVAC DETAILS

H-3.1

PRINT DATE: 7/13/2022 11:50:01 AM




| | Hardware Points | | | | Software Points | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Point Name | AI | AO | BI | BO | AV | BV | Loop | Sched | Trend | Alarm | Show On Graphic |
| Fan Status | | | x | | | | | | x | | x |
| Fan VFD Speed Control | | x | | | | | | | | | |
| Exhaust Air Damper | | | | x | | | | | x | | x |
| Fan Start/Stop | | | | x | | | | | x | | x |
| Fan Failure | | | | | | | | | | x | |
| Fan in Hand | | | | | | | | | | x | |
| Fan Runtime Exceeded | | | | | | | | | | x | |
| Bypass Damper position | x | | | | | | | | x | | x |
| Exhaust Static Pressure | x | | | | | | | | x | | x |
| Exhaust Static Pressure Setpoint | | x | | | | | | | x | | x |
| HEPA Filter Pressure Drop | | x | | | | | | | x | | x |

**Exhaust Fan - On/Off (typical of 2)**

Run Conditions - Interlocked:
The fan(s) EF1A & 1B shall be interlocked to run whenever Air Handling Unit AHU-8 runs. If the supply trips on safeties, the exhaust fans should be controlled to a lower static setpoint (0.25" adj.). The exhaust fans shall be the first on and last off. Coordinate ramp speed of VFDs on air handler and EFs so that the rooms maintain pressure relationships on statup. On startup both exhaust fans should start and run at 75%, modulating the bypass damper to maintian the duct static pressure.

Fan:
Track runtime for maintenance. If one fan fails close its associtated damper and alarm the DDC.

Exhaust Air Damper:
The exhaust air damper shall open anytime the unit runs and shall close anytime the unit stops. The exhaust air damper shall start closing as soon as the fan stops or fails.

Alarms shall be provided as follows:
- Damper Failure: Commanded open, but the status is closed.
- Damper in Hand: Commanded closed, but the status is open.

Fan Status:
The controller shall monitor the fan status.

Alarms shall be provided as follows:
- Fan Failure: Commanded on, but the status is off.
- Fan in Hand: Commanded off, but the status is on.
- Fan Runtime Exceeded: Fan status runtime exceeds a user definable limit (adj.).

Duct Pressure Sensor:
Provide a pressure sensor in the exhaust duct system to measure duct static pressure (1.5" adj. coordinate with Balancing contractor). Locate 3/4 down duct. If static is high, modulate the fans down to 75% speed (adj) and then modulate the fan plenum damper from closed to open to maintain static pressure. Reverse operation on low static.

**100% Outside Air Unit (AHU-8) - Supply Air Temp (typical of 1)**

Run Conditions - Interlocked:
The unit AHU-8 shall be interlocked to run whenever EF-1A &/or 1B runs.

Freeze Protection:
The unit shall shut down and generate an alarm upon receiving a freezestat status. The energcy recovery coil valve shall modulate to maintain 52°F (adj.) plenum temperature downstream of the coil whenever the freezestat is on.

Outside Air Damper:
The outside air damper shall open anytime the unit runs and shall close anytime the unit stops. The supply fan shall start only after the damper status has proven the damper is open. The outside air damper shall close 4sec (adj.) after the supply fan stops.

Alarms shall be provided as follows:
- Outside Air Damper Failure: Commanded open, but the status is closed.
- Outside Air Damper in Hand: Commanded closed, but the status is open.

Energy Recovery - Run-Around Loop Coils:
There is an existing heat recovery pump and piping that should run under its own control. Modulate the run-around loop mixing valve for energy recovery as follows.

Cooling Recovery Mode:
The controller shall measure the discharge air temperature and modulate the run-around loop mixing valve to maintain the unit supply air temperature setpoint. The run-around loop shall run for cool recovery whenever:
- Exhaust air temperature is 5°F (adj.) or more below the outside air temperature.
- AND the unit is in a cooling mode.
- AND the supply fan is on.

Energy Recovery Mode:
The controller shall measure the discharge air temperature and modulate the run-around loop mixing valve to maintain the unit supply air temperature setpoint. The run-around loop shall run for energy recovery whenever:
- Exhausst air temperature is 5°F (adj.) or more above the outside air temperature.
- AND the unit is in a heating mode.
- AND the supply fan is on.

Frost Protection:
The run-around loop mixing valve shall close to 0% (adj.) in order to circulate water through the exhaust air coil whenever:
- Run-around loop temperature drops below 33°F (adj.)
- OR the exhaust air temperature drops below 30°F (adj.).

Supply Fan:
The supply fan shall run anytime the unit is commanded to run. Provide a static pressure sensor 2/3 downstream. The variable frequency drive shall modulate to maintain a constant pressure at the pressure sensor. Show the sensor location on the controls as-builts.

Alarms shall be provided as follows:
- Supply Fan Failure: Commanded on, but the status is off.
- Supply Fan in Hand: Commanded off, but the status is on.
- High static pressure.
- Low static pressure.

Supply Air Temperature Setpoint - Fixed:
The controller shall monitor the supply air temperature and shall maintain a fixed supply air temperature setpoint of 55°F (adj.).

Cooling Coil Valve:
The controller shall measure the supply air temperature and modulate the cooling coil valve to maintain its cooling setpoint.

The cooling shall be enabled whenever:
- Outside air temperature is greater than 50°F (adj.).
- AND the fan status is on.

Cooling Coil Pump:
The recirculation pump shall run whenever:
- The cooling coil valve is enabled.
- OR the freezestat (if present) is on.

Alarms shall be provided as follows:
- Cooling Coil Pump Failure: Commanded on, but the status is off.
- Cooling Coil Pump in Hand: Commanded off, but the status is on.
- Cooling Coil Pump Runtime Exceeded: Status runtime exceeds a user definable limit.

Humidification:
Provide a humidistat in the Lab and Animal rooms. Control the humidifier to maintain a setpoint of 30% (adj.). Trend the humidity. Provide a high limit humidistat in the supply plenum to limit the humidity in the supply air to 95% (adj.).

Alarms shall be provided as follows:
- Low Room Humidity (adj.).
- High Room Humidity (adj.).
- Humidifier Run Alarm.
- High duct Humidity (adj.).

Prefilter Differential Pressure Monitor:
The controller shall monitor the differential pressure across the prefilter.

Alarms shall be provided as follows:
- Prefilter Change Required: Prefilter differential pressure exceeds a user definable limit (adj.).

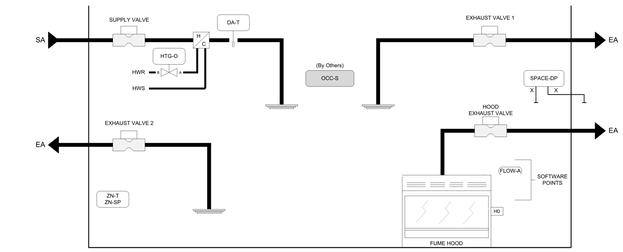
Final Filter Differential Pressure Monitor:
The controller shall monitor the differential pressure across the final filter.

Alarms shall be provided as follows:
- Final Filter Change Required: Final filter differential pressure exceeds a user definable limit (adj.).

Supply Air Temperature:
The controller shall monitor the supply air temperature.

Alarms shall be provided as follows:
- High Supply Air Temp: If the supply air temperature is greater than 60°F (adj.).
- Low Supply Air Temp: If the supply air temperature is less than 45°F (adj.).

| | Hardware Points | | | | Software Points | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Point Name | AI | AO | BI | BO | AV | BV | Loop | Sched | Trend | Alarm | Show On Graphic |
| Duct Supply Pressure | x | | | | | | | | x | | x |
| Duct Discharge Pressure | x | | | | | | | | x | | x |
| Final Filter Differential Pressure | x | | | | | | | | x | | x |
| Outside Air Temp | x | | | | | | | | x | | x |
| Prefilter Differential Pressure | x | | | | | | | | x | | x |
| Run-Around Loop Coil Discharge Air Temp | x | | | | | | | | x | | x |
| Run-Around Loop Temp | x | | | | | | | | | x | x |
| Supply Air Temp | x | | | | | | | | x | | x |
| Cooling Valve | | x | | | | | | | x | | x |
| Run-Around Loop Mixing Valve | | x | | | | | | | x | | x |
| Cooling Coil Pump Status | | | x | | | | | | x | | x |
| Freezestat | | | x | | | | | | x | x | x |
| Outside Air Damper Status | | | x | | | | | | x | | x |
| Run-Around Loop Pump Status | | | x | | | | | | x | | x |
| Supply Fan Status | | | x | | | | | | x | | x |
| Supply Fan VFD Speed | | x | | | | | | | | | x |
| Cooling Coil Pump Start/Stop | | | | x | | | | | x | | x |
| Outside Air Damper | | | | x | | | | | x | | x |
| Run-Around Loop Pump Start/Stop | | | | x | | | | | x | | x |
| Supply Fan Start/Stop | | | | x | | | | | x | | x |
| Supply Air Temp Setpoint | | | | | x | | | | x | | x |
| Cooling Coil Pump Failure | | | x | | | | | | | x | x |
| Cooling Coil Pump in Hand | | | x | | | | | | | x | x |
| Cooling Coil Pump Runtime Exceeded | | | | | | | | | | x | x |
| Final Filter Change Required | | | | | | | | | | x | x |
| High Supply Air Temp | | | | | | | | | | x | x |
| Low Supply Air Temp | | | | | | | | | | x | x |
| Outside Air Damper Failure | | | x | | | | | | | x | x |
| Outside Air Damper in Hand | | | x | | | | | | | x | x |
| Prefilter Change Required | | | | | | | | | | x | x |
| Supply Fan Failure | | | x | | | | | | | x | x |
| Supply Fan in Hand | | | x | | | | | | | x | x |
| Supply Fan Runtime Exceeded | | | | | | | | | | x | x |




***BIOSAFETY CABINET: (NIC)***
The fume hood monitor will generate an exhaust airflow control signal for the appropriate airflow control device in order to provide a constant CFM for the Biosafety Cabinet. Separate audible and visual alarms will be provided for flow alarm and emergency exhaust conditions. The fume hood monitor will sound an audible and visual alarm when the face velocity drops below the face velocity set point to indicate an unsafe airflow condition.

***VOLUMETRIC OFFSET CONTROL***
Volumetric Offset Control (VOC) will be used to control room air pressure isolation, through a CFM Offset Set Point between the incoming air (Supply) and the outgoing air (Exhaust, Safety Cabinets etc) in the space or zone. The typical "VOC" control method involves the use of the supply air to modulate for temperature control and indoor air quality (air change control) in the space, while the exhaust is tracking the supply and maintaining the CFM offset to maintain offset isolation. Reheat coils are provided to reheat the supply air as need to maintain space temperature.

Pressure monitors will be installed as stand-alone devices that display the pressure of the critical rooms relative to the reference spaces. Provide a display in the corridor that show the room pressures in red (not safe), yellow (marginal) or green (safe).

***ROOM TEMPERATURE CONTROL***
If the room is cold, modulate the fume hood controls to minimum CFM, then modulate the reheat valve open as required to maintain room temperature. If room is hot, modulate the reheat valve closed and then modulate the CFM from minimum up to maximum. Report the discharge air temperature downstream of the reheat coil.

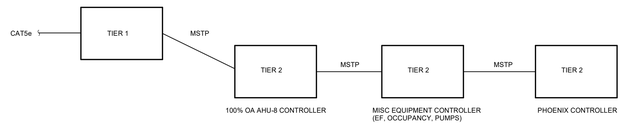
If two boxes are controlled by one thermostate in a single room, the master box shall control as stated above. The slave box should track the same CFM as the master box and the reheat coil should be controlled to maintain the same discharge air temperature as the master box.

***DECONTAMINATION***
Decontamination mode shall be started key swith located in the hall way (labeled "Enable Decontamination Mode"). Each valve shall be provided with an "ultra low" leakage damper. When rooms are needing to decontaminate the controls shall fully close the supply first and then the exhaust (always keeping the rooms 464D and 464C under negative pressure or neutral pressure when fully closed). These valve shall remain closed through the duration of the decontamination period. Once complete, the exhaust valve should open and then the supply and the room should "purge" for a minimum time period before anyone is allow back inside the room.

***SHUTDOWN and STARTUP***
During a shutdown, or startup (scheduled or due to power outage). The valves shall be modulated to maintain pressurization of the rooms. Rooms in order of pressure relation priority: 464D, 464C, 464B, 464E, and 464.

Interface to Delta Center via Jace Panel and BACnet IP.

| | Hardware Points | | | | Software Points | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Point Name | AI | AO | BI | BO | AV | BV | Loop | Sched | Trend | Alarm | Show On Graphic |
| Room Setpoint | x | | | | | | | | x | | x |
| Room Setpoint Override | | x | | | | | | | x | | x |
| Room Temperature | x | | | | | | | | x | | x |
| Minimum Supply CFM Setpoint | | x | | | | | | | x | | x |
| Maximum Supply CFM Setpoint | | x | | | | | | | x | | x |
| Supply CFM | x | | | | | | | | x | | x |
| Minimum Exh. CFM Setpoint | | x | | | | | | | x | | x |
| Maximum Exh. CFM Setpoint | | x | | | | | | | x | | x |
| Exh. CFM | x | | | | | | | | x | | x |
| Room Pressure | x | | | | | | | | x | | x |
| Room Pressure alarm | x | | | | | | | | x | | x |
| Reheat Valve position | x | | | | | | | | x | | x |
| Reheat Valve signal | | x | | | | | | | x | | x |
| Discharge air temperature | x | | | | | | | | x | | x |
| Air Valve position | x | | | | | | | | x | | x |
| | | | | | | | | | | | |




NETWORK FLOW LAYOUT

| CONTROL SYSTEM MATRIX | ELECTRICAL CONTRACTOR | FUME HOOD CONTRACTOR | MECHANICAL CONTRACTOR | CONTROLS CONTRACTOR | UK FM CONTROLS | AIR HANDLER MANUFACTURER |
|---|---|---|---|---|---|---|
| COORD. ETHERNET CABLE WITH UK IT | | | | X | | |
| FUME HOOD CONTROLS INSTALL | | X | | | | |
| FUME HOOD CONTROLS PROGRAMMING | | X | | | | |
| REHEAT CONTROL VALVES INSTALL | | | X | | | |
| REHEAT CONTROL VALVES CONTROL | | X | | | | |
| DISCHARGE AIR THERMOSTATS INSTALL AND READ | | X | | | | |
| GRAPHICS | | | | | X | |
| SET AIR HANDLER | | | X | | | |
| CONTROLS FOR AIR HANDLER | | | | X | | |
| INSTALL COIL CONTROL VALVES AND PUMPS | | | X | | | |
| CONTROL PUMPS AND CONTROL VALVES | | | | X | | |
| MOUNT VFDs | | | | | | X |
| WIRE VFDs AND PUMPS | X | | | | | |
| SET EXHAUST FANS | | X | | | | |
| SET VFDs FOR EXHAUST FANS | | X | | | | |
| POWER TO EXH. FANS VFDs AND FROM VFDs TO FAN DISCONNECTS | X | | | | | |
| CONTROLS FOR EXHAUST FANS | | | | X | | |
| SUPPLY HIGH PRESSURE DUCT SENSOR INSTALL AND CONTROL | | | | X | | |
| HIGH LIMIT HUMIDISTAT | | | | X | | |
| ROOM HUMIDISTAT INSTALL AND READ | | X | | | | |

MISC POINTS:

EMERGENCY SHOWER: MONITOR FLOW ALARM PROVIDED ON THE EMERGENCY SHOWER AND REPORT STATUS.

**NOTE:**

IT IS NOT INTENDED THAT THE PLANS SHOW ALL OFFSETS IN PIPES, CONDUITS, AND DUCTS REQUIRED FOR INSTALLATION OF THE WORK. DETAILS AND SECTIONS ARE INCLUDED FOR SOME AREAS TO SHOW INTENDED RELATIONSHIP OF THE WORK OF VARIOUS TRADES. IT SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR AND SUB-CONTRACTORS TO COORDINATE INSTALLATION OF THE WORK AND TO PROVIDE THE NECESSARY OFFSETS, TRANSFORMATIONS, AND FITTINGS REQUIRED. NO ADDITIONAL COMPENSATION WILL BE ALLOWED FOR CORRECTION CONFLICTS BETWEEN THE WORK OF VARIOUS TRADES. DETAILS AND SECTIONS ARE SHOWN FOR THE CONTRACTOR'S CONVENIENCEAND SHALL NOT BE CONSIDERED COMPLETE IN EVERY DETAIL.

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REVISIONS

INSTURMENTATION AND CONTROLS

IC-4.1