Dear Vendors:

Wayne State University invites you to submit your Best Educational Pricing to Pre-Purchase 4 new roof top units for the University's Facilities Planning & Management per the specifications and requirements contained in this Request for Quotation, entitled: FAB RTU Pre-Purchase 2015. Instructions to Bidders are as follows:

- Responses are to be on this request for quotation for only. Additional documents may be submitted: However, This form must be completed in full.
- Bidders that are unable to supply a specific item are encouraged to write “NO BID” on that line. Substitutions are not allowed!
- Bidders are to note expected time of delivery for each line if the order is to ship as a partial.
- All prices will be considered FOB Destination unless otherwise indicated. If prices are Shipping Point please indicate total transportation charges.
- This order will be awarded as a total package and not on a line item basis.
- Your reply must be received in the WSU Purchasing Office by e-mail no later than 4:00 PM on January 30, 2015. NO LATE BIDS WILL BE ACCEPTED

Bidding documents may be obtained by vendors from the University Purchasing Web Site at http://www.forms.purchasing.wayne.edu/Adv_bid/Adv_bid.html beginning January 22, 2015. When visiting the Web Site, click on the "MRO" link in green. If you are interested in participating in this process, you must submit your quotation to Procurement & Strategic Sourcing by e-mail no later than January 30, 2015 as follows:

E-mail: Rfp@wayne.edu and be sure your subject line reads “(company name) RFQ FAB RTU Pre-Purchase 2015 Response”

No Late Bids will be accepted
Enclosed are our requirements and bid sheet to Pre-Purchase 4 new roof top units.

You must bid using the format shown in Schedule A. Vendors Quotation should include the following:

- Price Summary, signed by authorized agent of Vendors Company/Firm – please see Schedule A
- Vendor Profile (including at least 3 references)
- Exceptions/Restrictions (if any)

The electronic submission should be limited to no more than one of each of the following file types: 1 Word Document and/or 1 Excel Workbook and/or 1 PDF document, with a total file size less than 20 megabytes.

We look forward to receiving your quotation on or before January 30, 2015. Should you have any questions or concerns about this invitation, please contact me by e-mail at Ac2843@wayne.edu (copy to Cynthia Branch, Email: Ab3577@wayne.edu). Thank you for your interest in doing business with Wayne State University.

Sincerely,

Loretta McClary
Senior Buyer
Information for Vendors

The Calendar of Events is as follows:

<table>
<thead>
<tr>
<th>Activity</th>
<th>Responsibility</th>
<th>Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>Formal Release of RFQ</td>
<td>Purchasing (PD)</td>
<td>January 22, 2015</td>
</tr>
<tr>
<td>Questions due to Procurement &amp; Strategic Sourcing</td>
<td>VENDORS</td>
<td>January 27, 2015, no later than 12:00 (noon)</td>
</tr>
<tr>
<td>Delivery of Quotations by e-mail to: <a href="mailto:Ac2843@wayne.edu">Ac2843@wayne.edu</a></td>
<td>VENDORS</td>
<td>January 30, 2015 by 4:00 p.m.</td>
</tr>
<tr>
<td>Announcement of Selected VENDOR</td>
<td>PD</td>
<td>Week of February 6, 2015</td>
</tr>
<tr>
<td>Readiness for Service/Contract Commencement</td>
<td>VENDORS</td>
<td>Week of April 10, 2015</td>
</tr>
<tr>
<td>Delivery and Acceptance</td>
<td>VENDORS/ET</td>
<td>May 1, 2015</td>
</tr>
</tbody>
</table>

The University will make every effort to adhere to the above schedule. It is subject however, to time extensions. This would be in the event that further clarification of responses or terms of contract are in the best interest of the University and in the event the University requires more time to assure that the selection of the Vendor is in accordance with its policies, rules and regulations as well as actual timing needs.

Wayne State University (hereafter referred to as UNIVERSITY) is a national research university with an urban teaching and service mission. It is a constitutionally autonomous public university with 13 schools and colleges, has an enrollment of approximately 31,000 students, and has an alumni roster of over 235,000. It is rated among the top 4 percent of all colleges and universities nationwide as classified by the Carnegie Commission.

Expenses for developing and presenting quotes shall be the entire responsibility of the Vendor and shall not be chargeable to the University. All supporting documentation and manuals submitted with this quotation will become the property of the University unless otherwise requested by the Vendor, in writing, at the time of submission, and agreed to, in writing, by the University.

Upon request, VENDOR must agree to provide a minimum of three (3) qualified references. Requests for references will come from Loretta McClary, Senior Buyer, and will be treated as confidential and not added to the publicly permanent RFP file.

References are to be from organizations that have successfully utilized the products and services. The references supplied should include the name and address of the organization, and the contact name(s), titles, e-mail, and the telephone numbers.

Failure to agree to this will result in disqualification of your bid

Vendor selected shall have an excellent track record for providing services for the size and scope of our project as outlined and shall provide WAYNE STATE UNIVERSITY with a top priority commitment. Quotations are to remain in effect a minimum of 120 days from the date of submission. A statement to this effect should be contained in the VENDOR'S cover letter.

Quotation Evaluation

1. Quotations will be evaluated and award will be based on the VENDOR'S ability to offer the best value (technical quality, past performance and price), and on anticipated quality of service for the following principal elements:
• Ability to meet all mandatory requirements and specifications of this RFP;
• Cost of Services; Compensation and Fees; (Schedule A);
• Financial Strength of the VENDOR;
• Quotation Documentation / Presentation;
• VENDOR’S Experience (Exhibit 2);
• VENDOR Profiles/References; (Exhibit 2);
• VENDOR Service Plan; (Exhibit 3);

NOTE: Evaluation Criteria are in alphabetical order and are not stated in order of preference.

VENDOR quotations will be evaluated by an evaluation team consisting of members of the UNIVERSITY’S Purchasing and the Facilities Planning & Management. A preliminary screening will be used to identify competitive VENDORS who have met the mandatory requirements. Procurement & Strategic Sourcing may subsequently request selected VENDORS to make a presentation at a set time and date, to clarify information provided in the quotations. Final consideration, evaluation, and recommendation may be made at this point. However, the UNIVERSITY reserves the right to take additional time for reference review, site visits and/or quotation negotiations.

2. To qualify for evaluation, a VENDOR’S quotation must be responsive, must have been submitted on time and must materially satisfy all mandatory requirements identified throughout the RFP. To be considered responsive, a quotation must be reasonable and substantially conform in the judgment of the UNIVERSITY to all of the specified requirements in the RFP. Any deviation from requirements indicated herein must be stated in the quotation specifically under the category "Restricted Services", and clearly identified as Exhibit 1. Otherwise it will be considered that quotations are in strict compliance with all requirements, and any successful VENDOR will be held responsible therefor.

3. If there are portions of any quotation the UNIVERSITY finds unacceptable or otherwise in need of clarification or revision, the UNIVERSITY reserves the right to negotiate with any or all VENDORS. Should the outcome of evaluations result in a recommendation, any resultant contract shall be subject to the approval of the UNIVERSITY’S General Counsel and be approved and signed by the appropriate UNIVERSITY representative.

The UNIVERSITY reserves the rights to accept, reject, modify, and/or negotiate any and all quotations received in conjunction with the Request for Quotation. It reserves the right to waive any defect or informality in the Quotations on the basis of what it considers to be in its best interests. Any quotation which the UNIVERSITY determines to be incomplete, conditional, obscure, or has irregularities of any kind, may be rejected.

This Request for Quotation (RFQ) in no manner obligates the UNIVERSITY to the eventual purchase of any products or services described, implied, or which may be proposed, until confirmed by written agreement, and may be terminated by the UNIVERSITY without penalty or obligation at any time prior to the signing of an Agreement or Purchase Order.

Vendors must refrain from giving any reference to this program, whether in the form of press releases, brochures, photographic coverage, or verbal announcements, without specific written approval from the University.

Quotations are subject to public review after the contracts have been awarded. VENDORS responding to this RFQ are cautioned not to include any proprietary information as part of their Quotation unless such proprietary information is carefully identified as such in writing, and the UNIVERSITY accepts, in writing, the information as proprietary.

You must email your responses to to Loretta McClary, at Rfp@wayne.edu and be sure your subject line reads “(company name) RFQ-FAB RTU Pre-Purchase 2015 Response”. Remember, your bids must be in the format provided and be received in the Procurement & Strategic Sourcing by January 30, 2015 by 4:00 p.m. Please submit your bids in the format provided on the quote sheet. Include any supplemental information that will illustrate the features of the vehicles proposed.
If you have any questions regarding this bid, please contact Loretta McClary by email at Ac2843 (copy to Cynthia Branch, Email: Ab3577@wayne.edu)).

Sincerely,

Loretta McClary, Senior Buyer

Attachment:

- Cost Schedule A
- Insurance Requirements Schedule B
- WSU Standard Terms & Conditions of Purchase
SCHEDULE A - PRICE SCHEDULE

Purchase of **Pre-Purchase 4 new roof top units**.

**Purchase of RTU Units:**

**Please Note Vendors must confirm the below:**
- Acceptance of WSU Standard Terms & Conditions applies to this pre-purchase and can be found on our website at [http://www.purchasing.wayne.edu/docs/po_terms.pdf](http://www.purchasing.wayne.edu/docs/po_terms.pdf)
- Vendor availability for pre qualifying meeting within 5 business days from the closing date
- Acceptance to deliver the units per the project schedule (One unit each time)
- Acceptance to work with the main contractor during start up for each unit & final start up.

<table>
<thead>
<tr>
<th>Anticipated Quantity</th>
<th>Item</th>
<th>Per Unit Price</th>
<th>Manufacturer</th>
</tr>
</thead>
<tbody>
<tr>
<td>4</td>
<td>New roof top units</td>
<td>$_____________</td>
<td></td>
</tr>
<tr>
<td>Maintenance</td>
<td>3 Years of routine service and maintenance</td>
<td>$_____________</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Payment Schedule</th>
<th>Requirements / Qualifications</th>
<th>Total Cost</th>
<th>Payment Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>75% Payment</td>
<td>Upon damage free delivery of the Chiller and all accessories, and approval of the Contractor</td>
<td>$_____________</td>
<td>$_____________</td>
</tr>
<tr>
<td>100% Payment</td>
<td>Upon proof of successful operation, check, test and start-up</td>
<td>$_____________</td>
<td>$_____________</td>
</tr>
</tbody>
</table>

Email your responses to Loretta McClary, at Rfp@wayne.edu and be sure your subject line reads “(company name) RFQ-FAB RTU Pre-Purchase 2015 Response”. Remember, your bids must be in the format provided and be received in the Procurement & Strategic Sourcing by **January 30, 2015 by 4:00 p.m.**

The Undersigned Bidder affirms that the RTU Unit is in full compliance with bid specifications of the Request for Quotation Documents and agrees to the above payment schedule.

Company Name: _________________________________________________________
Address:  _________________________________________________________

Telephone:  (________________)_______________________________________
Fax:   (________________)_______________________________________
Email address:  _________________________________________________________
Submitted by:  _________________________________________________________
Signature  _________________________________________________________
____________________________________    ___________________
(Title)                                                  (Date)
Schedule B - INSURANCE REQUIREMENTS (Rev 11-2012)

_________________________, at its sole expense, shall cause to be issued and maintained in full effect for the term of this agreement, insurance as set forth hereunder:

**General Requirements**

<table>
<thead>
<tr>
<th>Type of Insurance</th>
<th>Minimum Requirement</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Commercial General Liability (CGL)</td>
<td>$1,000,000 combined single limit</td>
</tr>
<tr>
<td>(CGL insurance should be written on ISO form CG 00 01 (or equivalent substitute)</td>
<td>$2,000,000 annual aggregate</td>
</tr>
<tr>
<td>2. Commercial Automobile Liability (including hired and non-owned vehicles)</td>
<td>$1,000,000 combined single limit per accident for bodily injury and property damage, without annual aggregate.</td>
</tr>
<tr>
<td>3. Workers' Compensation (Employers' Liability)</td>
<td>Required by the State of Michigan and Employer’s Liability in the amount of $500,000 per accident for bodily injury or disease.</td>
</tr>
</tbody>
</table>

**Maximum Acceptable Deductibles**

<table>
<thead>
<tr>
<th>Type of Insurance</th>
<th>Deductible</th>
</tr>
</thead>
<tbody>
<tr>
<td>Comprehensive General Liability</td>
<td>$5,000</td>
</tr>
<tr>
<td>Comprehensive Automobile Liability</td>
<td>0</td>
</tr>
<tr>
<td>Workers' Compensation</td>
<td>0</td>
</tr>
<tr>
<td>Property - All Risk</td>
<td>$1,000</td>
</tr>
</tbody>
</table>

**Coverage**

1. All liability policies must be written on an occurrence form of coverage.
2. Commercial General Liability (CGL) includes, but is not limited to: consumption or use of products, existence of equipment or machines on location, and contractual obligations to customers.
3. The Board of Governors of Wayne State University shall be named as an additional insured, but only with respect to accidents arising out of said contract.
4. The additional insured provision shall contain a cross liability clause as follows: “The insurance afforded applies separately to each insured against whose claim is made or suit is brought, except with respects to the limits of the company’s liability.”

**Certificates of Insurance**

1. Certificates of Insurance naming Wayne State University / Office of Risk Management as the certificate holder and stating the minimum required coverage must be forwarded to the Office of Risk Management to be verified and authenticated with the agent and/or insurance company.
2. Certificates shall contain a statement from the insurer that, for this contract, the care, custody or control exclusion is waived.
3. Certificates shall be issued on an ACORD form or one containing the equivalent wording, and require giving WSU a thirty (30) day written notice of cancellation or material change prior to the normal expiration of coverage.
4. Revised certificates must be forwarded to the Office of Risk Management thirty (30) days prior to the expiration of any insurance coverage listed on the original certificate, as follows:

   Wayne State University
   Office of Risk Management
   5700 Cass Avenue, Suite 4622 AAB
   Detroit, MI 48202

**Specific Requirements** - Individual contracts may require coverage in addition to the minimum general requirement such as, business interruption, higher limits and or blanket fidelity insurance.

**Exception to the insurance requirements** is to be approved, in writing, by the Office of Risk Management. Exceptions are determined by the type and nature of the contract and the individual contractor.
1. ACCEPTANCE: This order expressly limits acceptance to the terms and conditions stated herein. Any purported acceptance containing additional or different terms will not operate as an acceptance of this offer to purchase. Seller's shipment of goods or provision of services in response to this order shall constitute acceptance of the terms and conditions set out herein, notwithstanding any additional or different terms contained in any acknowledgement form submitted by Seller.

2. TITLE AND RISK OF LOSS: The title and risk of loss of the goods shall not pass to Buyer until Buyer receives and takes possession of the goods at the point or points of delivery.

3. PLACE OF DELIVERY: The place of delivery shall be that set forth in the block of the Purchase order entitled "Ship To". Any change thereto shall be effected by modification as provided for in Clause 5, Modification.

4. PRICE: This order shall not be filed at prices higher than specified herein Any change in price must be accepted and acknowledged, by a written Purchase Order Amendment, by Buyer.

5. MODIFICATION: Modification, rescission or amendment of this order or the contract of sale resulting from its acceptance shall be ineffective unless approved by written Purchase Order Amendment, by an authorized representative of the Wayne State University Purchasing Department.

6. CHANGES: Buyer reserves the right at any time to make changes in drawings, specifications, quantities, and delivery schedules as to any goods and/or work covered by this order. Such changes, to be binding on either Buyer or Seller, must be made by a written Purchase Order Amendment to this order. Any changes in price or time for performance resulting from such changes shall be equitably adjusted and shown on the Purchase Order Amendment.

7. ASSIGNMENT: Seller shall not, in any manner, delegate its duty of performance or assign its rights or obligations under this order without the prior written consent of the Buyer.

8. PERFORMANCE: Deliveries of goods or services ordered hereunder are to be made both in quantities and at the times specified by the Buyer. Buyer shall have the right (a) to cancel the order without liability this order if shipment is not made in accordance with such schedules for quantities or time periods; and (b) to refuse to accept delivery if shipments are made in advance of schedules herein or if quantities are in excess of this order.

9. CANCELLATION: Buyer reserves the right to cancel in whole or in part the contract resulting from the acceptance of this order if the Seller becomes insolvent; files a voluntary petition in bankruptcy, or an involuntary petition is filed to have Seller declared bankrupt and is not vacated within thirty (30) days from the date of filing; a Receiver or Trustee for Seller is appointed and such appointment is not vacated within thirty (30) days of the date thereof; Seller executes an assignment for benefit of creditors; or if Seller breaches any of the terms hereof including the warranties of Seller.

10. INSPECTION: Payment for the goods or services furnished hereunder shall not constitute acceptance thereof All goods are subject to Buyer's inspection, at the source if deemed necessary or required by government regulation. Inspection at the source may be made when deemed necessary by the Buyer. If any of the goods are found at any time to be defective in material or workmanship, or otherwise not in conformity with the requirements of this order, Buyer, in addition to any other rights which it may have under warranties or otherwise, shall have the right to reject or re-turn such goods (plus inbound transportation charges if bought F.OB. shipping point) at Seller's expense, and such goods are not to be replaced without written authorization by Buyer.

11. WARRANTIES: Seller represents and warrants that the articles supplied under this order are free from defects and conform to specifications herein and are fit for the purpose for which such goods are ordinarily employed, except if stated in a Special Condition, in which case the material must then fit that particular purpose. Seller further warrants and represents that all goods and materials delivered herein are free and clear of all liens, claims or encumbrances of any kind.

12. INFRINGEMENTS: Seller agrees to protect, hold, and save harmless Buyer against all claims for patent, trademark, copyright, or franchising infringement arising from the purchase, installation, or use of material ordered on this order, and to assume all expense and damage arising from such claims.

13. GOVERNING LAW: This order, or any agreement of sale, or service resulting from its acceptance shall be governed by and construed according to the laws of the State of Michigan.

14. NON-DISCRIMINATION: By acceptance of this order the Seller certifies that it will comply with all applicable provisions of Executive Order 11246, as amended, Section 503 of the Rehabilitation Act of 1973, as amended, and the Vietnam Era Veterans' Readjustment Assistance Act of 1974, as amended, (38 U.S.C. 4212) and Implementing regulations at 41 CFR Chapter 60, and pertinent State/Federal statutes and regulations providing for equal opportunity in employment regardless of race, sex, color, national origin, age, or physical handicap, except as to physical handicap where there exists a bona-fide occupational qualification.

15. GOVERNMENT REGULATION: In furnishing goods or services covered by this order, Seller agrees to comply with the provisions of all applicable federal, state and local laws, rules, regulations, ordinances and orders.

16. FAIR LABOR STANDARDS ACT: Seller agrees, in connection with the production of the articles specified herein to comply with all applicable requirements of Section 6, 7 and 12 of the Fair Labor Standards Act, as amended, and of regulations and orders of the United States Department of Labor issued under Section 14 thereof.

17. ADVERTISING: Seller shall not, in any manner, advertise or publish the fact that Seller has contracted to furnish Buyer the goods/services herein ordered and for failure to observe this provision, Buyer shall have the right to terminate this order without any obligations to accept deliveries after the date of termination or make further payments except for completed articles delivered prior to termination. Buyer shall have the right to return any and all goods delivered for full refund in the event the Seller violates this clause.

18. SELLER'S LIABILITY: Seller assumes the entire responsibility and liability for losses, expenses, damages, demands and claims in connection with or arising out of any personal Injury or alleged personal Injury (including death) and/or damage or destruction or alleged damage or destruction to property sustained or alleged to have been sustained in connection with or to have arisen out of the performance of the work by Seller, its agents, employees, subcontractors and consultants, save and except for liability as may result from, or in connection with or to have arisen out of the negligent performance of the work by or willful misconduct of Buyer. Seller shall indemnify and hold harmless Buyer, its officers, agents, and employees from any and all liability for such losses, expenses, damages, demands, and claims and shall defend any suit or action brought against any or all of them based on an alleged personal Injury or damage and shall pay any damages, costs and expenses including attorney fees in connection with or resulting from such suit or action.

19. Sales Tax: Wayne State University is a tax exempt Institution Tax Free Registry Number 38-6028429

20. PROHIBITION AGAINST PERSONAL INTEREST IN CONTRACTS: Seller acknowledges that no officer or employee of the Buyer may have a financial interest, direct or indirect, in any contract with the Buyer, or shall be financially interested, directly or indirectly, in the sale to the Buyer of any land, materials, supplies, or service, except on behalf of the Buyer as an officer or employee.

INSTRUCTIONS

SHIPPING AND MARKINGS: All material shall be suitably packed, marked, and shipped in accordance with the requirements of common carriers in a manner to secure lowest transportation cost and no additional charge shall be made to the Buyer therefor unless otherwise stated on the face of the Purchase Order No charge shall be made by the Seller for drayage or storage, unless otherwise stated on the face of the Purchase Order Unless otherwise specified herein, Seller shall properly mark each package with Buyer's order number, and where multiple packages comprise a single shipment, each package shall also be consecutively numbered. Purchase order number, package number and receiving location shall be shown on packing slips, bills of lading and Invoices.

PACKING SLIPS: Enclose packing slip Itemizing contents with each shipment.

INVOICES: Must show our Purchase Order number, and cash and transportation terms. Invoices Improperly rendered may be returned for correction without loss of discount Cash Discount will be computed from date of Invoice.

BILLS OF LADING: Show our Purchase Order number, and number of containers. If shipping raw materials, also show number of containers in each lot If transportation is FOB origin and transportation charges are for our account, ship at value that will produce lowest transportation cost.
Wayne State University

WSU FAB Building
Rooftop Air Conditioning Replacement
5200 Anthony Wayne Drive
Detroit, MI

WSU Project Number 130-252650

PRE-PURCHASE SPECIFICATIONS
PRE-PURCHASE SPECIFICATION

SECTION 234100 - PARTICULATE AIR FILTRATION

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary
   Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:
   1. Pleated panel filters.
   2. Self-supported pocket filters (bag filter).
   3. Front- and rear-access filter frames.
   4. Side-service housings.
   5. Filter gages – magehelic for each filter bank.

1.3 SUBMITTALS

A. Product Data: For each type of product indicated. Include dimensions; operating
   characteristics; required clearances and access; rated flow capacity, including initial and final
   pressure drop at rated airflow; efficiency and test method; fire classification; furnished
   specialties; and accessories for each model indicated.

B. Shop Drawings: For air filters. Include plans, elevations, sections, details, and attachments to
   other work.
   1. Show filter rack assembly, dimensions, materials, and methods of assembly of
      components.
   2. Include setting drawings, templates, and requirements for installing anchor bolts and
      anchorages.
   3. Wiring Diagrams: For power, signal, and control wiring.

C. Operation and Maintenance Data: For each type of filter and rack to include in emergency,
   operation, and maintenance manuals.

1.4 QUALITY ASSURANCE

A. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70,
   by a qualified testing agency, and marked for intended location and application.

B. ASHRAE Compliance:

C. Comply with NFPA 90A and NFPA 90B.
1.5 COORDINATION

1.6 EXTRA MATERIALS

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

1. Provide one complete set(s) of filters for each filter bank for both pre and final filters.

PART 2 - PRODUCTS

2.1 PLEATED PANEL FILTERS

A. Description: Factory-fabricated, self-supported, extended-surface, pleated, panel-type, disposable air filters with holding frames.

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
   a. AAF International.
   b. Airguard.
   c. Camfil Farr.
   d. Flanders-Precisionaire.

B. Filter Unit Class: UL 900, Class 2.

C. Media: Cotton and synthetic fibers coated with nonflammable adhesive.

D. Filter-Media Frame: Cardboard frame with perforated metal retainer with metal grid on outlet side and steel rod grid on inlet side, hinged, with pull and retaining handles sealed or bonded to the media.

E. Mounting Frames: Welded galvanized steel, with gaskets and fasteners; suitable for bolting together into built-up filter banks.

F. Characteristics:

1. Face Dimensions: 24 x 24 inches or 12 x 24 inches.
2. Thickness or Depth: 2 inches (50 mm).
3. Maximum or Rated Face Velocity: 500 fpm.
5. Average Arrestance, %: N/A
6. Initial Resistance: 0.30-inch wg (74 Pa) at 500 fpm (2.5 m/s).
7. Recommended Final Resistance: 1 inches wg.

2.2 SELF-SUPPORTED POCKET FILTERS

A. Description: Factory-fabricated, panel-type, disposable air filters with contoured media for extended surface.
1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
   a. Fiberbond Corp.; Multi-Wedge.

B. Filter Unit Class: UL 900, Class 1.

C. Media: Non-carcinogenic, non-shedding synthetic fiber, bonded with a flame retardant binder system.
   1. Media shall be coated with an antimicrobial agent.

D. Configuration: Multipocket.

E. Filter-Media Frame: Galvanized steel.

F. Mounting Frames: Welded galvanized steel, with gaskets and fasteners; suitable for bolting together into built-up filter banks.

G. Capacities and Characteristics:
   1. Face Dimensions: 24 x 24, 24 x 12 or 12 x 24 inches.
   2. Maximum or Rated Face Velocity: 500 fpm.
   3. Average Arrestance, %: N/A.
   4. Initial Resistance: 0.5 inches wg (Pa).
   5. Recommended Final Resistance: 1.0 inches wg (Pa).

2.3 FRONT- AND REAR-ACCESS FILTER FRAMES

A. Framing System: Galvanized-steel framing members with access for either upstream (front) or downstream (rear) filter servicing, cut to size and prepunched for assembly into modules. Vertically support filters to prevent deflection of horizontal members without interfering with either filter installation or operation.

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
   a. AAF International.
   b. Airguard.
   c. Camfil Farr.
   d. Flanders-Precisionaire.
   e. Koch Filter Corporation.

B. Prefilters: Incorporate a separate track with slide in system.

C. Sealing: Factory-installed, positive-sealing device for each row of filters, to ensure seal between gasketed filter elements and to prevent bypass of unfiltered air.

2.4 SIDE-SERVICE HOUSINGS

A. Description: Factory-assembled, side-service housings, constructed of galvanized steel with flanges to connect to duct or casing system.
1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
   a. AAF International.
   b. Airguard.
   c. Camfil Farr.
   d. Flanders-Precisionaire.
   e. Koch Filter Corporation.

B. Prefilters: Integral tracks to accommodate 2-inch- (50-mm-) deep, disposable filters.

C. Access Doors: Hinged, with continuous gaskets on perimeter and positive-locking devices, and arranged so filter cartridges can be loaded from either access door.

D. Sealing: Incorporate positive-sealing gasket material on channels to seal top and bottom of filter cartridge frames and to prevent bypass of unfiltered air.

2.5 FILTER GAGES

A. Diaphragm-type gage with dial and pointer in metal case, vent valves, black figures on white background, and front recalibration adjustment.

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
   a. Dwyer Instruments, Inc.
   b. Magnehelic.

2. Diameter: 4-1/2 inches (115 mm).

3. Scale Range for Filter Media Having a Recommended Final Resistance of 1.0- to 2.0-Inch wg (250 to 500 Pa) or Less: 0- to 2.0-inch wg (0 to 500 Pa).

B. Accessories: Static-pressure tips, tubing, gage connections, and mounting bracket.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Position each filter unit with clearance for normal service and maintenance. Anchor filter holding frames to substrate.

B. Install filters in position to prevent passage of unfiltered air.

C. Install filter gage for each filter bank. The gauge shall be mounted on the air handler, near the filter bank, in a convenient location for reading from the floor.

D. Install filter-gage, static-pressure taps upstream and downstream from filters. Install filter gages on filter banks with separate static-pressure taps upstream and downstream from filters. Mount filter gages on outside of filter housing or filter plenum in an accessible position. Adjust and level inclined gages.
E. Coordinate filter installations with duct and air-handling-unit installations.

F. Provide brass tag, mounted near filter gauge, indicating size, flow rate, initial and final pressure drops, efficiency and fire classification for each type of filter.

3.2 FIELD QUALITY CONTROL

A. Perform tests and inspections.

B. Tests and Inspections:
   1. Test for leakage of unfiltered air while system is operating.

C. Air filter will be considered defective if it does not pass tests and inspections.

D. Prepare test and inspection reports.

END OF SECTION 234100
PRE-PURCHASE SPECIFICATION

1 General

1.1 Scope

A. The requirements of the General Conditions, Supplementary Conditions, Division 1 and drawings apply to all work herein.

B. Provide microprocessor controlled, multiple-scroll compressor, air-cooled double-wall outdoor packaged rooftop air conditioning units, and components ofps

C. the scheduled capacities and performance as shown and indicated on the drawings, including but not limited to: factory-single packaged air conditioner, charge of refrigerant and oil, roof curb, field duct, power and control connections, and utility connections.

1.2 Quality Assurance

A. All units are tested, rated or certified, as applicable, in accordance with the following standards, guidelines and codes:

1. All units shall meet the latest ASHRAE 90.1 minimum energy-efficiency requirements (EER)

2. All units shall meet the latest ASHRAE 62 requirements for ventilation and indoor air quality.

3. All units shall be rated in accordance with the ARI Standard 340/360

4. Units shall be ETL and ETL Canada listed

B. Manufacturers: The design shown on the drawing is based upon products of one of the following manufacturers:

1. Carrier
2. Trane

4. Components:
   a. Structural support base.
   b. Electrical power requirements and wire/conduit and overcurrent protection sizes.
   c. All costs incurred to modify the building provisions to accept the furnished units.

C. Warranty: Manufacturer shall warrant all equipment and material of its manufacture against defects in workmanship and material for a period of twenty four (24) months from date of installation and start up of the last unit.

1. The warranty shall include parts and labor only during this period.
2. The warranty shall not include parts associated with routine maintenance, such as belts, air filters, etc.
3. Compressor warranty (Material Only) shall be 5 years (with 2 years of parts and labor noted in item C above)

1.3 Delivery and Handling

A. Unit shall be delivered to the job site fully assembled, wired, and charged with refrigerant and oil by the manufacturer.

B. Unit shall be stored and handled per Manufacturer’s instructions.

C. All handling and storage procedures shall be per manufacturer’s recommendations.

ROOF TOP AIR CONDITIONING UNITS

DSD PROJECT No. 14-4802.00

ROOF TOP AIR CONDITIONING UNITS
1.4 Submittals

A. Shop Drawings: Shop drawing submittals shall include, but not limited to, the following: drawings indicating components, dimensions, weights, required clearances, and location, type and size of field connections, and power and control wiring connections.

B. Product Data: Product data shall include dimensions, weights, capacities, ratings, fan performance, motor electrical characteristics, and gauges and finishes of materials.

C. Documentation:
   1. Fan curves with specified operating point clearly plotted shall be provided.
   2. Product data of filter media, filter performance data, filter assembly, and filter frames shall be provided.
   3. Electrical requirements for power supply wiring; including wiring diagrams for interlock and control wiring shall be supplied. Factory and field-installed wiring shall be clearly indicated.

D. Operation and Maintenance Documentation
   1. Manufacturer’s standard operating and maintenance instructions shall be supplied including but not limited to instructions for lubrication, filter replacement, compressor, motor and drive replacement, coil cleaning, filter maintenance, spare parts lists, and wiring diagrams.

2. Equipment

2.1 Product Specification

A. Summary: Completely factory assembled unitized construction single packaged air conditioning unit including a factory-mounted and wired unit controller and sensors, Single-Point Power with Non-fused Disconnect, 460V-3Ph-60Hz power supply, outdoor air handling section with return and supply openings, discharge plenum, direct-expansion refrigerant condensing section. 5kA SCCR The unit shall be provided with 5kA SCCR equipment rating as standard. The unit nameplate will reflect this rating

B. Phase Monitor: A phase monitor shall be provided on unit; designed to protect 3-phase equipment from phase loss, reversal, imbalance, and low voltage. The phase monitor fault condition is indicated at the unit control panel and the unit is placed into an emergency stop condition.

C. Factory Test: On factory assembled units, the refrigerant circuit shall be helium pressure-tested, evacuated and fully charged with refrigerant and oil. On factory assembled units, the unit controller shall be configured and run tested at the factory to minimize field setup time. If the unit is not configured and tested, then the manufacturer shall provide field start up and testing to ensure that the controller is functioning properly.

D. Unit Construction
   1. Base Rail: The unit shall include an integral design base rail with lifting points clearly marked and visible on the base rail and a 1-1/4” FPT connection for condensate drainage. The unit base shall be designed with a recessed curb mounting location. The recessed curb-mounting surface shall provide a continuous surface for field application of curb gasketing to create a weather tight seal between the curb and unit.

   2. Casing: Casing shall be complete post and panel construction with exterior skin. All panels, doors, walls, uprights, floor panels and roofing shall be one-inch thick; 1-1/2 pound density insulation. Units are specifically designed for outdoor installation.

   3. Roof: The unit roof shall be bowed with the peak in the middle of the unit and sloped to both sides of the unit for drainage. A drip lip shall run the length of the unit to prevent water drainage down the side of the unit. Roof and sidewall seams shall be continuously
caulked and covered with formed galvanized seam caps. All panel fasteners shall be secured through standing seams to prevent fastener penetrations that are exposed to the air stream.

4. Paint: Exterior painted surfaces are designed to withstand a minimum of 500 salt spray hours when tested in accordance with ASTM B-117.

5. Markings and Diagrams: All necessary tags and decals to aid in the service and/or indicating caution areas shall be provided. Electrical wiring diagrams shall be attached to the control panel access door.

6. Documentation: Installation and maintenance manuals shall be supplied with each unit.

E. Access Doors: Double wall access doors shall be provided in the fan, coil, filter and inlet sections of the unit on both sides of the unit. Doors shall be double-wall construction with a solid liner and a minimum thickness of 1-inch. Doors shall be attached to the unit with piano-type stainless steel hinges. Latches shall be single handle rotary type with 3 point contact, creating an airtight seal between the door and unit. Panels and doors shall be completely gasketed with a closed-cell, neoprene gasket. Door tiebacks shall be provided for all doors to secure doors while servicing.

F. Economizer Section.

1. Modulating Economizer: The economizer segment shall be designed to use outside air for cooling and ventilation and provide a means of exhausting air from the air-handling unit. The segment shall consist of parallel acting low-leak dampers. The return air, outside air and exhaust air dampers shall be sized for 100% of nominal unit airflow. The exhaust air damper assembly shall have a factory-assembled rain hood. The rain hood shall have a drip-lip the full width of the hood to channel moisture away from the air being drawn into the unit.

2. Power Return Fan - A SWSI plenum fan shall be provided to draw return air from the building to the single packaged unit. An access door shall be provided on at least one side of the unit for fan/motor access. The return fan shall operate to maintain a constant pressure within the return plenum. A discharge damper shall be provided to modulate building exhaust. The damper shall be controlled via building pressure. The return damper shall linked with the outside air damper to modulate volumes of return and outside airflows.

   a. Fan Motor: Fan motors shall be NEMA design ball-bearing types with electrical characteristics and horsepower as specified. Motors shall be nominal 1750 RPM, open drip-proof type. The motor shall be located within the unit on an adjustable base.

   b. Mountings: Fan and fan motor shall be internally mounted and isolated on a full width isolator support channel using 2-inch springs. The fan discharge shall be connected to the fan cabinet using a flexible connection to insure vibration-free operation.

   c. Bearings and Drives: Fan bearings shall be self-aligning, pillow block or flanged type regreaseable ball bearings and shall be designed for an average life (L50) of at least 200,000 hours. All bearings shall be factory lubricated and equipped with standard hydraulic grease fittings and lube lines extended to the motor side of the fan. Fan drives shall be selected for a 1.5 service factor and anti-static belts shall be furnished. All drives shall be fixed pitch. Fan shafts shall be selected to operate well below the first critical speed and each shaft shall be factory coated after assembly with an anti-corrosion coating.

   d. VAV Fan Control: VAV supply fan control shall be accomplished by using a variable-frequency-drive matched to the supply fan motor HP. The VFD shall include an integral DC line reactor to reduce harmonic distortion in the incoming and outgoing
power feeds. If a DC line reactor is not provided, an AC line reactor must be provided. Inlet guide vanes shall not be acceptable. VFD control keypads shall be located in the control cabinet for accessibility and servicing while the unit is operating.

Filter Section.
1. Flat Filter Rack: 85% Efficient Rigid Filters with a two-inch high-efficiency pleated pre-filters (MERV 14) shall be provided in a flat filter rack.
2. Dirty Filter Alarm: A dirty filter switch shall be provided and wired to the single packaged unit control panel. Upon closure of the switch, the controller shall display a dirty filter fault. The setting of the switch can be changed manually to close at a specified pressure drop across the filters.
3. See filter specification section.

G. Evaporator Section
1. Cooling Coil: Evaporator coils shall be direct expansion type with intertwined circuiting to assure complete coil face activity during part load operation. Coil tubes shall be 1/2" OD copper, with internally enhanced tubes. Tubes shall be enhanced mechanically expanded to bond with the aluminum fins. Coil casing shall be fabricated from heavy gauge galvanized steel. All coils shall be pressure tested at a minimum of 450 PSIG.
2. IAQ Drain Pan: The main coil drain pan shall be double-sloped Stainless Steel with a condensate connection through the base rail of the unit.
3. Intermediate Drain Pan: Coils with finned height greater than 48" shall have an intermediate drain pan extending the entire finned length of the coil. The intermediate pans shall have drop tubes to guide condensate to the main drain pan.

H. Supply Fan Section
1. Fan Motor: Fan motors shall be NEMA design ball-bearing types with electrical characteristics and horsepower as specified. Motors shall be nominal 1750 RPM, open drip-proof type ODP - Premium Efficiency. The motor shall be located within the unit on an adjustable base.
2. Fan: The fan section shall be equipped with a single double width, double inlet (DWDI) airfoil centrifugal type wheels for horizontal discharge. An access door shall be provided on both sides of the unit for fan/motor access.
3. Mountings: Fan and fan motor shall be internally mounted and isolated on a full width isolator support channel using 2-inch springs. The fan discharge shall be connected to the fan cabinet using a flexible connection to insure vibration-free operation.
4. Bearings and Drives: Fan bearings shall be self-aligning, pillow block or flanged type regreaseable ball bearings and shall be designed for an average life (L50) of at least 200,000 hours. All bearings shall be factory lubricated and equipped with standard hydraulic grease fittings and lube lines extended to the motor side of the fan. Fan drives shall be selected for a 1.5 service factor and anti-static belts shall be furnished. All drives shall be fixed pitch. Fan shafts shall be selected to operate well below the first critical speed and each shaft shall be factory coated after assembly with an anti-corrosion coating.
5. VAV Fan Control: VAV supply fan control shall be accomplished by using a variable-frequency-drive matched to the supply fan motor HP. The VFD shall include an integral DC line reactor to reduce harmonic distortion in the incoming and outgoing power feeds. If a DC line reactor is not provided, an AC line reactor must be provided. Inlet guide vanes shall not be acceptable. VFD control keypads shall be located in the control cabinet for accessibility and servicing while the unit is operating.
I. Discharge Plenum

1. Cooling Only

The discharge air temperature sensor shall be located in the discharge plenum and be located such that it accurately measures the supply air temperature.

J. Condenser Section

1. Condenser Fans: Condenser fans shall be matched up with compressors to optimize system control. Condenser fans shall be propeller type, directly driven by permanently lubricated TEAO motor.

2. Condenser Coil: Microchannel condenser coils shall be constructed of parallel flow copper tubes metallurgically brazed to enhanced aluminum alloy fins. Coils are configured in a V-bank configuration, with individual flat coils rotated from the vertical plane for protection from hail damage for each condensing circuit. Condensing coils shall have a subcooler for more efficient, stable operation.

3. Low Ambient: Compressors shall operate down to 0°F by monitoring the refrigeration system discharge pressure and adjusting condenser airflow to maintain the proper head pressure to protect compressor operation. Refrigerant pressure transducers shall be included and provide the discharge pressure on the single packaged unit control display.

4. Service Valves: Liquid, suction and discharge service valves shall be included to provide a means of isolating the refrigerant charge in the system so that the refrigeration system may be serviced without removing the charge of the unit.

5. Compressors: Units shall use industrial-duty hermetic scroll compressors, piped and charged with oil and HFC-410A refrigerant. Compressors shall have an enlarged liquid carrying capacity to withstand rugged operating conditions. Compressor frame shall be cast iron, with cast iron fixed and orbiting scrolls. Each compressor shall feature a solid state protection module, designed to protect the compressor from over-temperature and over-current conditions. Compressors shall be vibration-isolated from the unit, and installed in an easily accessible area of the unit. All compressor-to-pipe connections shall be brazed to minimize potential for leaks. Each compressor shall include a replaceable suction screen, discharge line check valve, and oil sight glass.

6. In-Line Refrigerant Driers: Refrigerant piping includes check valves, thermal expansion valves with replaceable thermostatic elements, high and low pressure switches, anti-recycling timing device to prevent compressor restart for five minutes after shutdown.

7. Freezestat: Freezestats shall be provided to prevent coil freeze up and reduce the risk of liquid flood-back to the compressor.

8. Condenser enclosure: The condenser section shall be enclosed by a wire grill condenser enclosure on the three exposed sides. Paint finish shall match the color and salt spray specifications of the unit exterior.

K. Controls

1. Enclosure: Unit shall be shipped complete with factory configured, installed, wired and tested single packaged unit controller housed in a rain and dust tight NEMA 3R/12 (IP55) powder painted steel cabinet with hinged, latched, and gasket sealed door.

2. Compressor Capacity Modulation: Unit shall include six compressors of varying size to provide 14 to 100% cooling capacity control during normal operation. The compressor sequence of operation shall reduce typical temperature change to less than 2°F at the unit discharge at full design air flow. Unit shall not require hot gas bypass and the inherent energy usage it requires to properly operate the unit. Upon entering cooling mode from other modes, the unit controller will estimate the cooling requirement and match it closely to the capacity in order to reduce the time required to satisfy the cooling...
3. Basic Controls: **BACNet compatible – see drawings.** Control shall include automatic start, stop, operating, protection sequences across the range of scheduled conditions and transients. The single packaged unit controller shall provide automatic control of compressor start/stop, energy saver delay and anti-recycle timers, condenser fans, and unit alarms. Automatic reset to normal operation after power failure. Software stored in non-volatile memory, with programmed set points retained in lithium battery backed real time clock (RTC) memory for minimum 5 years. An eighty character liquid crystal display shall be provided to show all descriptions and numeric data in English (or Metric) units. A sealed, membrane style keypad, with no less than 36 keys, shall be used to navigate the controller and enter data. Provide power voltage (bump) projection of controls and unit components.

4. Diagnostics: Upon startup of the controller, it shall run through a self-diagnostic check to verify proper operation and sequence loading. The single packaged unit controller shall continually monitor all input and output points on the controller to maintain proper operation. The unit shall continue to operate in a trouble mode or shut down as necessary to prevent an unsafe condition for the building occupants, or to prevent damage to the equipment. In the event of a unit shutdown or alarm, the operating conditions, date and time shall be stored in the shutdown history to facilitate service and troubleshooting. A minimum of ten (10) Error Histories shall be recorded.

5. BAS Communications
   a. BACnet MSTP (RS-485): The unit shall include BACnet communications directly from the unit controller. Equipment that is not native BACnet at the unit control board shall include any necessary interface or translator device factory-mounted and wired within the unit. Twisted Pair connection. A control points list, BIBBs and PICS statement shall be provided by the manufacturer to facilitate communications programming with the building automation system. Programming, establishing communications and commissioning shall be the responsibility of the installing controls contractor. Start-up Services are required for each individual unit and then as a separate additional meeting with the temperature control supplier of the Building System.
   b. Generic Hard-Wired BAS Interface: An interface shall be provided that provides an interface to any building automation system via hardwired connections. At a minimum, the interface shall provide the following inputs and outputs:
   c. Inputs: supply air reset, duct static pressure reset, smoke purge operating mode and morning warm-up
   Outputs: fault alarms for sensors

3 Execution
   3.1 Installation:
   A. General: Installing contractor shall install single packaged unit(s), (UNDER A SEPARATE CONTRACT) including components and controls required for operation, in accordance with single packaged unit manufacturer’s written instructions and recommendations. Single packaged units shall be installed as specified.
1. Unit(s) specified shall include a protective covering membrane for such equipment being shipped by truck, rail, or ship. The membrane is fully formed around the equipment exterior. The membrane covers the entire top, side and end panel surface as to protect the product effectively during shipping & storage including “Long Term Storage”. Storing on job-site shall no longer require the unit(s) to be covered with a tarp as long as the covering membrane has not been removed.

2. All size or shape equipment including electrical components, especially those not built with weatherproof enclosures, variable-frequency drives and end devices shall be effectively covered for protection against rain, snow, wind, dirt, sun fading, road salt/chemicals, rust, and corrosion during shipping cycle. Equipment shall remain clean and dry.

3. Manufacturers of units not having a protective membrane, fully formed around the equipment exterior, covering the entire top, side and end panel surface area shall be required to ship equipment covered with a tarp, in crating or in a closed truck as is necessary to ensure product protection from road salt/chemicals damage, moisture and dirt infiltration. Arrangements for long term storage at the job site shall be required.

B. Location: Locate the single packaged unit as indicated on drawings, including cleaning and service maintenance clearance per Manufacturer instructions. Adjust and level the single packaged unit on support structure.

3.2 Inspection and Start-Up Supervision: A factory-trained service representative of the manufacturer shall supervise the unit startup and application specific calibration of control components. Installation and start up services are to be provided on each unit individually due to a phased installation. During unit commissioning, by the mechanical contractor, BACNet specialist shall be present. Commissioning is expected to be 2-days per phase, 10 days total.